# University of Kent

# Canterbury Local Plan Call-for-Sites Submission

June 2020

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**For and on behalf of Avison Young (UK) Limited**

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# 1. Introduction

1.1 The purpose of this statement is to present a series of sites in/around the University of Kent's campus in Canterbury for consideration in Canterbury City Council's (CCC's) Local Plan Call-for-Sites exercise. It has been prepared by Avison Young on behalf of the University of Kent.

1.2 The sites are uniquely suitable for development in that they offer the opportunity to satisfy very significant economic and social needs that otherwise would not be capable of being met. They are also available and achievable and therefore comprise deliverable sustainable development opportunities.

**Structure of Statement**

1.3 This statement is structured as follows:

- **Section 2** describes the sites and the proposed development;
- **Section 3** sets out the unique economic and social need to allocate the sites for development in the new local plan;
- **Sections 4 to 8** appraises the suitability of the sites;
- **Section 9** provides details of availability;
- **Section 10** considers achievability; and
- **Section 11** concludes the document.

# 2. The Sites and the Proposed Development

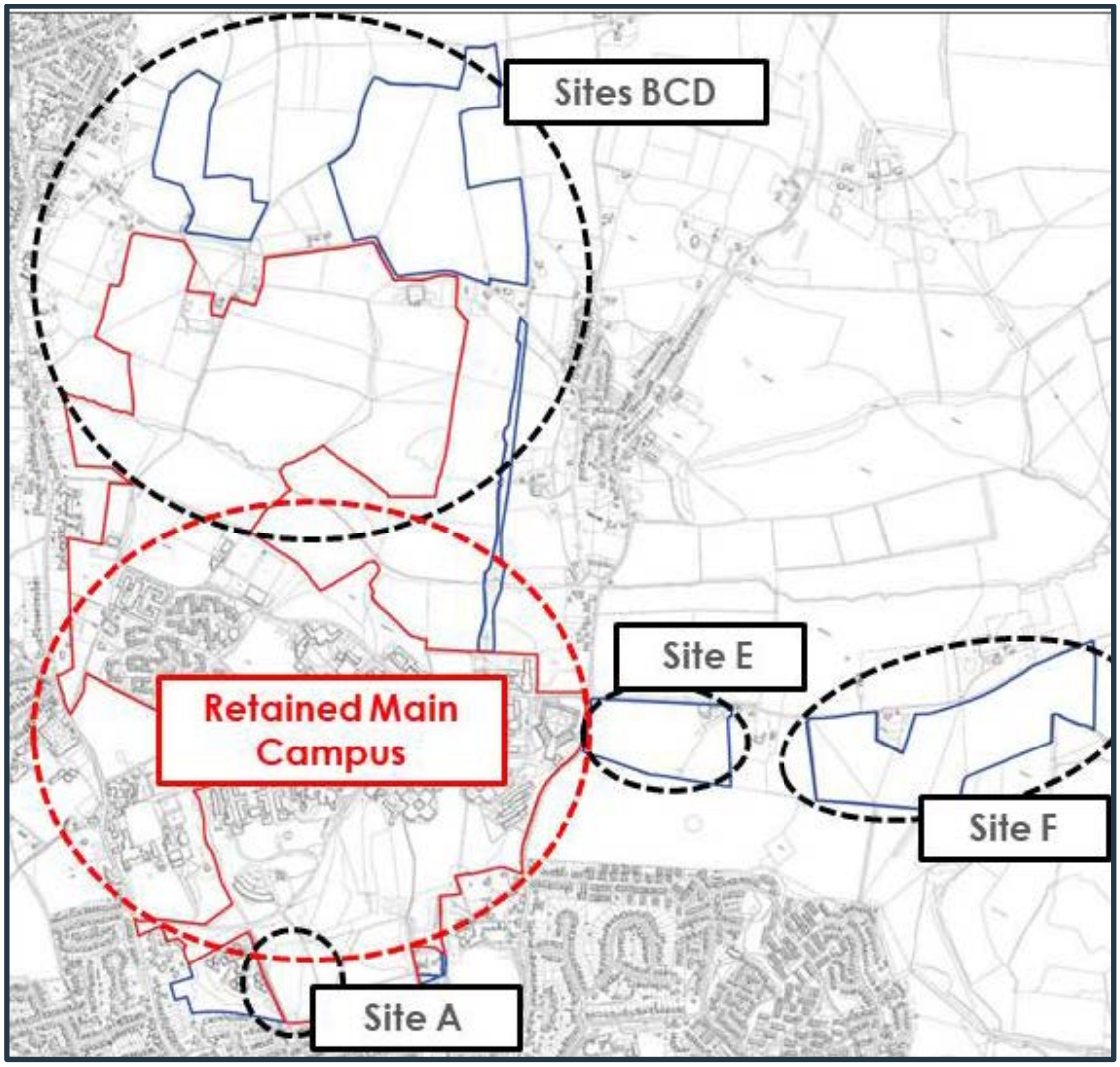
### The Sites

2.1 The University's landholdings extend to approximately 230ha of land at and around its campus in Canterbury (refer to Site Location Plan at Appendix A). Approximately 125ha of this land is to be sold for the purposes of non-university development (referred to collectively as the 'Disposal Sites'). The remaining 105ha is to be retained and will continue as the University's main campus and used for Higher Education purposes (teaching, research, student housing, and associated functions).

2.2 The Disposal Sites comprise 6 separate land parcels (Sites A-F) which are adjacent to the retained 'Main Campus', as illustrated in Figure 2.1, below. Red-line plans and aerial photographs of each site are enclosed at Appendix A.

2.3 We note that the Main Campus site area includes a small area of land on Giles Lane that falls outside of the University's land ownership but is being promoted for development within this submission jointly by the University and the 3rd party landowner (Giles Lane Investments). Refer to Appendix B for further details.

*Figure 2.1 Overview Site Plan*



## Proposed Development

2.4 The emerging development proposals are as follows:

Retained Campus:

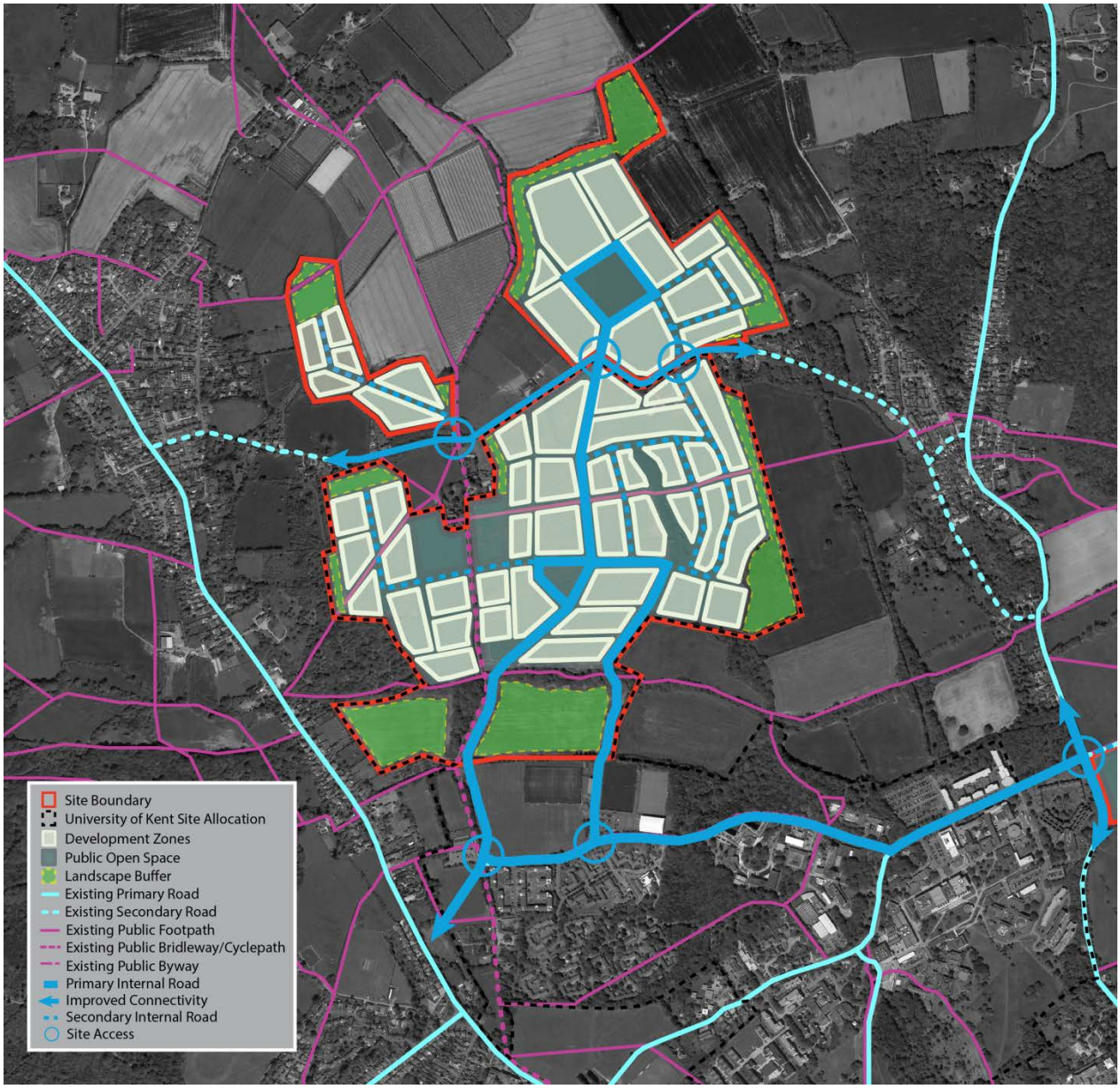
- Site area: 105ha.
- Proposed development: Higher Education and associated uses, to include student housing, commercial employment uses ('knowledge community') and a hotel/conference facility. This is broadly as per the development supported by current Local Plan Policy EMP7 and as anticipated in the current University Masterplan (enclosed at Appendix E). This includes the 3rd party adjacent land on Giles Lane referred to above for which plans are being prepared for a purpose built student accommodation scheme.

*Figure 2.2 Extract from Current University Masterplan*

Sites B, C and D (combined):

- Site area: 93ha
- Proposed development: New residential-led community comprising c.2,500 homes and associated uses.

*Figure 2.3 Illustrative Spatial Diagram (Sites BCD)*



Site A:

- Site area: 5.6ha
- Proposed development: Higher Education and/or associated uses including student housing, commercial employment uses ('knowledge community') and/or a hotel/conference facility.

*Figure 2.4 Illustrative Spatial Diagram (Site A)*

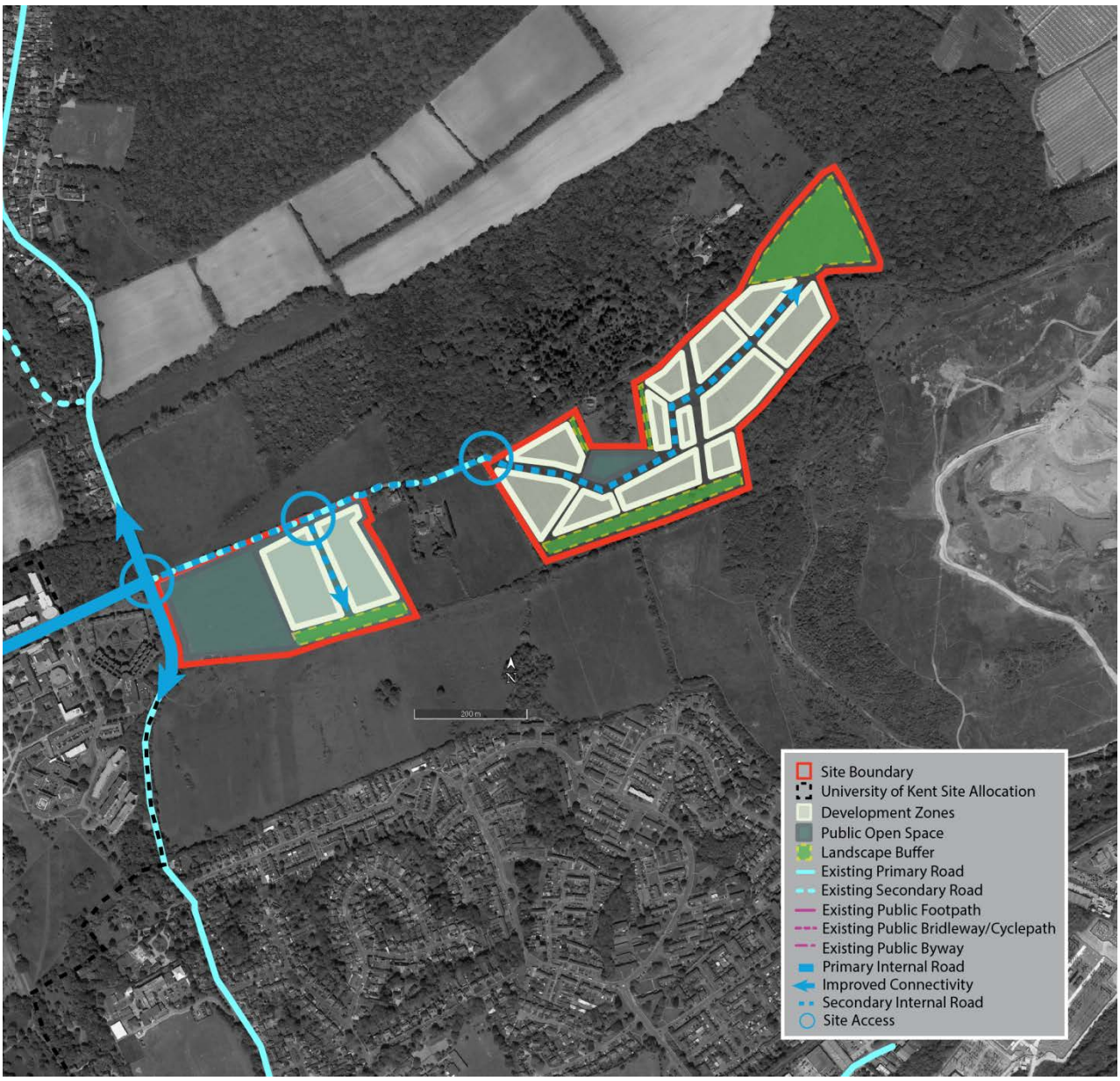
Site E:

- Site area: 8.1ha
- Proposed development: Housing, Higher Education, and/or associated uses including student housing, commercial employment uses ('knowledge community') and/or a hotel/conference facility.

Site F:

- Site area: 18.4ha
- Proposed development: Housing, Higher Education and/or associated uses, to include student housing, commercial employment uses ('knowledge community') and a hotel/conference facility.

*Figure 2.5 Illustrative Spatial Diagram (Sites E and F)*

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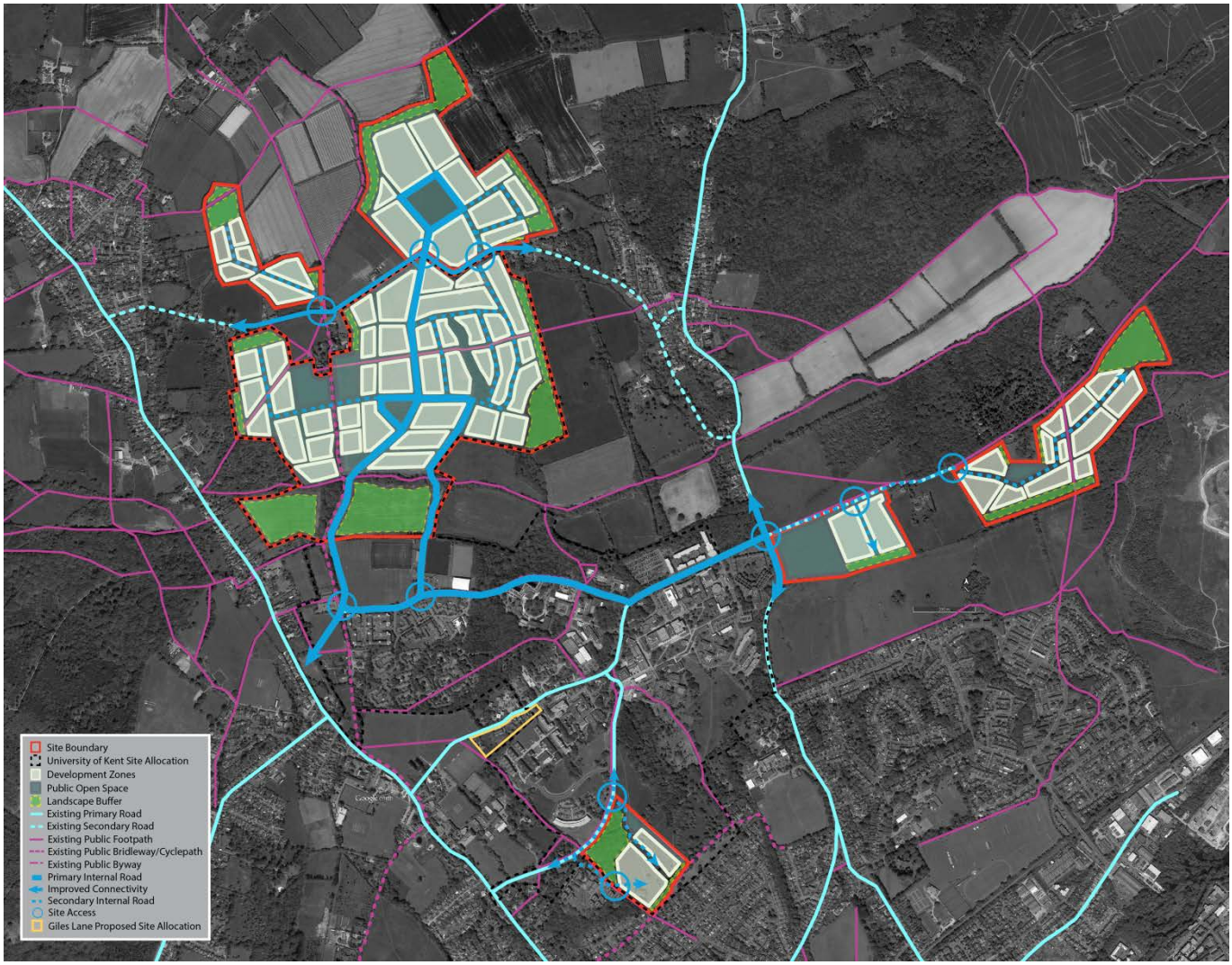
2.5 The Spatial Strategy diagram below illustrates the emerging development concept for the landholdings as a whole.

*Figure 2.6 Illustrative Spatial Diagram (All Sites)*




2.6 The proceeding sections of this submission consider the suitability, availability and achievability of the sites for the emerging development proposals as set out above.

# 3. Unique Suitability (Need)

3.1 NPPF para.67 sets the national planning policy basis for the call-for-sites exercise, by requiring planning authorities to prepare a strategic housing land availability assessment in order to gain a clear understanding of the land available in their area for development. The Government's Planning Practice Guidance (PPG) clarifies that this assessment may include land for economic development as well as housing in order that sites may be identified for the use that is most appropriate.

3.2 In considering the suitability of sites, the PPG requires plan-makers to take into account the range of needs for housing, economic and other uses. The starting point for assessing need for the purposes of local plan preparation will be a district-wide assessment of requirements for housing, employment and other needs following established methodologies which will establish 'top-down' requirements for each use. In order for the future plan to be properly justified (and therefore sound) it should also have regard to site-specific ('bottom-up') social, economic, and environmental needs where these exist.

3.3 This site-specific need is a fundamental material consideration in determining the suitability of the sites presented in this submission. For reasons that are explained below, there is an economic and social need for these specific sites to be brought forward for development – a need that cannot be satisfied if the sites are not developed. We consider this to be a significant material consideration in assessing the suitability of the sites.

**The UK Higher Education Sector and its Role in UK Economic Success**

The Economic Benefits of Higher Education

3.4 The contribution of higher education to the UK's economic success has become the focus of greater attention over recent years.

3.5 Universities employ thousands of staff throughout the country and through their direct activities they generate and deliver taxes to the Exchequer ('direct impacts'). In addition they also have a vital role in supporting a wide range of industries, with far reaching supply chains stretching through the wider UK economy ('indirect impacts'). In the wider consumer economy, the presence of universities is also significant, with Universities' own staff, employees, students and visitors all spending money on retail, accommodation, leisure and transport ('induced' impact). Each of these channels, in turn, generates more GDP, jobs and tax receipts.

3.6 The latest Oxford Economics study of the economic impact of Universities was published in October 2017[1] and identified that the higher education sector:

- Makes a substantial contribution to UK GDP, equal to £52.9 billion gross value added (GVA) – equivalent to 2.9% of UK GDP or £1 in every £34;
- Supports almost 944,000 jobs of all skill levels in the UK economy – approximately three times as many jobs than in the city of Sheffield; and

[1] The Economic Impact of Universities in 2014–15 – Oxford Economics (October 2017)

- Generates £14.1 billion worth of tax receipts for the government that can be reinvested into public services, which is equivalent to 2.7% of all tax receipts received by Her Majesty's Revenue and Customs (HMRC).

3.7 Crucially for long term sustainable economic growth, higher education creates a skilled workforce, with graduates forming the foundation of the UK's economic competitiveness. As well as helping to fill skills shortages and sustain existing companies, graduates themselves often go on to create their own companies, leading to a significant employment diversification. According to the HESA (2016), more than 11 new graduate start-ups are launched every day, creating more than 21,000 jobs every year.

3.8 At a local level, universities and colleges act as anchor organisations in their local economies, often having deep historic links with the places in which they are located, whereas other resources for economic growth – such as residents, workers, firms and investors – are more mobile. Because of this rootedness, the scale of their operations, and related impacts on local economies, universities are often termed 'anchor institutions'. Highly unlikely to relocate, they play a distinct role in creating the long-term conditions needed for economic growth. Often as the largest employers in their area, universities boost local consumer spending through student numbers, supporting local business, housing and tourism.

## The Role of Higher Education in Meeting Economic Growth Objectives

3.9 The role of higher education institutions in supporting economic growth and development has taken centre stage over recent years as governments around the world have pushed for private-sector led, innovation driven economic recoveries from the Global Financial Crisis.

3.10 In May 2010 David Cameron stated the Coalition government's commitment to moving away from 'a narrow foundation for growth' of 'just a few industries', to supporting growing industries such as aerospace, pharmaceuticals, high-value manufacturing, hi-tech engineering and low carbon technology.

3.11 Central to the growth strategy was a drive to rebalance the economy and place it on a more sustainable footing by moving away from a reliance on government and consumer spending towards net trade and investment (HM Treasury 2011). For this rebalancing to succeed however growth sectors require a number of external factors, including the conditions for innovation and skilled workers. Higher education is central to these, creating the conditions for innovation by attracting inward investment, developing research infrastructure and supporting the commercialisation of research, and providing the skilled workforce necessary to stimulate private-sector growth.

3.12 We provide below a summary of Government legislative and policy based initiatives, since 2010, that have sought to place education, and in particular higher education, as central to the UK's economic strategy.

## HM Treasury: Plan for Growth (March 2011)

3.13 In the Government's Plan for Growth, education is described as 'the foundation of economic success'. The Government further stated that "*our economy needs to become much more dynamic ... and retooled for a high-tech future, if we are going to create the jobs and prosperity we need for the next generation*". This aspiration to use science to underpin economic growth has been met with a growing focus on the importance of universities in research and innovation, nurturing entrepreneurship through spin-off firms, and

supporting the development of a knowledge base in Science, Technology, Engineering and Mathematics (STEM) subjects.

Department for Business Innovation & Skills Higher Education White Paper (June 2011)

3.14 In the UK Government's Higher Education White Paper 'Students at the Heart of the System' (June 2011), it is recognised that universities have 'a much wider role' in developing *"a research infrastructure, and a culture of excellence, that has made the UK a place where many of the most talented researchers in the world want to work"*. Universities typically now provide functions beyond education, expanding into research and development, which is of critical importance to innovation.

3.15 Universities are also commonly playing an important role in bridging the gap between higher education and enterprise, with the commercialisation of research through spin-off businesses and licensing, and by establishing and supporting the development of incubator businesses. The Government recognised the importance of this function for regional economic development where universities have the potential to anchor regional industrial clusters by attracting and retaining academic, graduate and business talent, developing networks and nurturing entrepreneurship through spin-off firms.

3.16 Universities also have a vital role in developing STEM capabilities that are essential to the UK economic growth strategy. A report to the Select Committee on Science and Technology (2012/2013) highlighted that '*the workforce of the future will increasingly require higher-level skills as structural adjustments in the economy force businesses to move up the value chain. These jobs of the future will increasingly require people with the capabilities that a STEM qualification provides'*.

3.17 However it is reported that there is currently a deficit in the number of STEM graduates and postgraduates required to fulfil this increasing demand and realise the Government's economic ambitions. The Confederation of British Industry (CBI) reported that 'STEM skills shortages are widespread' with over 40% of employers currently experiencing difficulty recruiting staff with STEM qualifications. Supporting universities to fill the vacancies with high quality STEM graduates and postgraduates is therefore critical to economic growth.

The Witty Report (October 2013)

3.18 The Witty Report (Encouraging a British Invention Revolution: Sir Andrew Witty's Review of Universities and Growth) stressed that UK universities have an 'enhanced 3rd mission' of promoting regional economic growth. Noting that universities already contribute an estimated £69 billion to the UK economy through employment, provision of skills, creation and transfer of knowledge, inward investment and by working with private sector companies, the report charged them with facilitating economic growth as a core strategic goal by acting as local anchor institutions.

The City Growth Commission (October 2014)

3.19 The RSA City Growth Commission was a 12 month inquiry into how best to enable the UK's major cities to drive growth and respond to the fiscal and economic changes. The Final Recommendations 'Unleashing Metro Growth' Report of October 2014 identifies the importance of universities, specifically with a focus on science and innovation. The report identifies university education and research amongst the UK's largest and fastest growing export industries, and notes that world-class universities are well distributed, across the

country. Universities have played a key role in transitioning the UK to a knowledge economy through training graduates in advanced skills, and through research that leads to industrial innovation. In leading the UK economy to succeed in global competition for knowledge intensive industries, universities are a vital competitive advantage for metropolitan economies.

3.20 The RSA 'UniverCities' Report of October 2014 outlines policy recommendations for universities to enhance their economic impact on the UK's metropolitan areas. It identifies that Universities are key economic assets in every major UK city, with university education a substantial economic activity employing 320,000 staff directly, nationwide. University education and research have been among the UK's largest and fastest growing industries in recent decades. The higher education sector generated an estimated £10.7bn of export earnings for the UK in 2011-12 and attracts 100,000 new overseas students annually to study in the UK.

3.21 Despite the world-class performance of UK universities, the report identified barriers to their continued contribution to UK businesses, including: low levels of investment in research and development (R&D) across much of the UK economy; poor access to (long-term) finance; and below-average management skills in UK businesses. While globally competitive, the UK university system has unique characteristics, which mean that universities need to be understood as institutions with unique attributes.

### Fixing the Foundations, Creating a More Prosperous Nation (July 2015)

3.22 Fixing the Foundations, Creating a More Prosperous Nation (July 2015) set out the Government's strategy for fixing the UK's 'productivity problem'. A key plank of this strategy is to expand the higher education sector, via the removal of the cap on student numbers. The intention is that expanding participation in higher education will translate to a more highly skilled population which will give the UK competitive economic advantage.

### 2016 White Paper

3.23 The 2016 Government White Paper (Higher Education: Success as a Knowledge Economy) explains that the UK's universities rank among the country's most valuable economic assets, underpinning both a strong economy and a flourishing society. It makes clear the Universities have a fundamental role in ensuring that the UK is successful as a knowledge economy.

3.24 This builds upon numerous Ministerial Statements from the Minister of State for Universities and Science that stress the importance of universities to the UK economy, including the stated aim (2015) of boosting higher education exports to £30 billion per annum by 2030 (up from £18 billion in 2012).

### Industrial Strategy White Paper 2017

3.25 In the Industrial Strategy White Paper, the Government set out five foundations of productivity: ideas, people, infrastructure, business environment and places. We will make a significant contribution to each of these foundations through policies, funding schemes and advocacy and champion the value of ideas.

3.26 The Government has set an ambition for the UK to become the most innovative country in the world. To achieve this, the White Paper notes the UK needs a generational increase in public and private R&D investment. As such the Government has committed to reach 2.4 per cent of GDP investment in R&D by 2027 and to reach 3 per cent of GDP in the longer term, placing the UK in the top quartile of OECD countries.

If met it is estimated this could increase public and private R&D investment by as much as £80bn over the next 10 years, with much wider benefits across the UK economy. This will raise the standard of living and establish UK leadership in global markets.

3.27 A key facet of the White Paper is the need to improve the quality and reputation of the UK's technical education and in particular shortages of STEM skills (40 per cent of employers reported a shortage of STEM graduates as being a key barrier in recruiting appropriate staff. Jobs in science, research, engineering and technology are expected to rise at double the rate of other occupations between now and 2023.

Research England & the Office for Students

3.28 The Higher Education Funding Council for England (HEFCE) ceased to exist as of 1 April 2018, when its duties were divided between the newly created Office for Students and Research England (operating within United Kingdom Research and Innovation).

3.29 The vision for Research England is for English Higher Education Providers to play a central role in the economy and society delivering world-class research with transformational real-world application, developing the skilled and talented workforce that modern research and development (R&D) intensive economy needs, and operating as major international players to enhance the UK's global reach and influence. Research England oversees the sustainability of the Higher Education research base in England; managing the £900 million UK Research Partnership Investment Fund; and administering the Higher Education Innovation Fund (HEIF).

3.30 In September 2019 it was announced that Higher Education Innovation Funding would rise to £250m from 2020, further emphasising the growing importance the Government is placing on achieving its Industrial Strategy.

Conservative Party Manifesto (2019)

3.31 Following the 12 December 2019 general election, the Government has begun work to implement the 2019 Conservative Party Manifesto. Whilst much of this remains to be translated into future policy legislation and policy, it provides an up to date indication of the Government's priorities to 'levelling up Britain's skills'.

3.32 In particular, the Manifesto states that:

*"the UK is home to leading universities, which attract students from all over the world, conduct vital research, and generate enormous benefits for our economy and our society. They also do an excellent job of generating many of the skills that our economy needs, producing globally renowned scientists, entrepreneurs and creators, and enabling millions of people to fulfil their potential. In the next Parliament we will work to maintain and strengthen our global position in higher education…We will strengthen universities and colleges' civic role."*

**The UK Higher Education Sector and its Role in Social Mobility**

3.33 Universities in the broadest sense exist to provide education and learning opportunities for its students, but there is also a broader social role that Universities contribute toward at the societal level. Social mobility, and

improving it (or reducing barriers), is about ensuring every person, regardless of background, economic or social class has equal opportunity to the same opportunities as others.

3.34 A Government report issued in 2012[2] highlighted that increased access to higher education leads to higher skills, increased productivity, and higher pay. This is particularly true in respect of an ever increasing globally focused knowledge based service economies where people with lower skills have experienced reduced demand for the their labour and subsequently reduced average income levels.

3.35 A 2012 (Wilson)[3] study into the economic and social mobility impacts that higher education generated for individuals found that graduates are more likely to be employed, enjoy higher wages and better job satisfaction, and more likely to find it easier to move from one job to the next. Higher education enables individuals from low-income backgrounds to enter higher status jobs and increase their earnings. Graduates also enjoy substantial health benefits – a reduced likelihood of smoking, and lower incidence of obesity and depression. They are less likely to be involved in crime, more likely to be engaged with their children's education and more likely to be active in their communities. In short, graduates are wealthier, healthier and happier.

**The University of Kent**

Current Economic and Social Value

3.36 The University of Kent is an "anchor institution" within the social and economic 'ecosystem' of Canterbury. It is delivering on the needs of the regional economy and for local people, at the same time as providing world leading research, delivering innovative and meaningful business collaborations with multi-nationals and local small and medium sized enterprises alike, and providing focussed employability experience to its students.

*Economic Impact*

3.37 Key facts about the University of Kent:

- It was established in 1965. It has been subject to significant growth over this period and now has approximately 19,860 students studying at its various campuses of which Canterbury is its main campus (with 16,500 students);
- It offers an extensive range of undergraduate and postgraduate subjects;
- It is a research intensive institution. It is ranked 17th in the UK for research intensity with 97% of its research being of international quality (Research Excellence Framework, 2014);
- The University has invested £191m in facilities and resources over the last five years;
- The University has a further £175m planned investments in facilities and resources over the next five years to 2022-23;
- 31% of students are international (The Times Higher Education rankings, 2020);
- It is ranked 54th out of 131 UK universities (The Times and Sunday Times Good University Guide, 2020); and
- It is ranked 351-400 out of 1,397 world universities (The Times Higher Education rankings, 2020).

3.38 Further details can be found here: https://www.kent.ac.uk/about/keyfacts2020.html

[2] HM Government. *University Challenge: How Higher Education Can Advance Social Mobility*, 2012.
[3] Wilson, T. *A Review of Business – University Collaboration*, 2012.

3.39 The University commissioned Viewforth Consulting to assess its economic impact in 2018 (report enclosed at Appendix C). A summary of its findings are set out in Table 3.1, below:

*Table 3.1 Summary of Economic Impacts (University of Kent)*

| | Canterbury | Kent | South East Region | UK |
|---|---|---|---|---|
| **Output** | £342.9m (directly or through secondary effects)<br>Additional £142.9m generated by student expenditure<br><br>**Total: £485.7m** | £423.1 (directly or through secondary effects)<br>Additional £211.4 generated by student expenditure<br><br>**Total: £634.5m** | £549.7 (directly or through secondary effects)<br>Additional £357.9m generated by student expenditure<br><br>**Total: £907.6m** | £594.3m (directly or through secondary effects)<br>Additional £371.8m generated by student expenditure<br><br>**Total: £966.1m** |
| **Employment** | 2,969 FTE (direct) jobs<br>1,166 FTE (indirect) jobs<br>1,242 FTE generated by student expenditure<br><br>**Total: 5,377 FTE jobs** in Canterbury are dependent on the University (10% of Canterbury employment) | 4,988 FTE (direct & indirect) jobs<br>1,837 FTE generated by student expenditure<br><br>**Total: 6,825 FTE jobs** in Kent are dependent on the University (1.4% of Kent employment) | 6,338 FTE (direct & indirect) jobs<br>3,110 FTE generated by student expenditure<br><br>**Total: 9,448 FTE jobs** in the South East Region are dependent on the University (0.19% of South East employment) | 6,706 FTE (direct & indirect) jobs<br>3,206 FTE generated by student expenditure<br><br>**Total: 9,912 FTE jobs** in the UK are dependent on the University |
| **GVA** | £208.5m (directly or through knock-on effects)<br>£67.3m generated by student expenditure<br><br>**Total: £275.8m** (9% of Canterbury's GVA) | £254.5 (directly or through knock-on effects)<br>£99.5 generated by student expenditure<br><br>**Total: £354m** (9% of Kent's GVA) | £320.6m (directly or through knock-on effects)<br>£168.5m generated by student expenditure<br><br>**Total: £489.1m** (0.2% of South East GVA) | £342.1m (directly or through knock-on effects)<br>£174.2m generated by student expenditure<br><br>**Total: £516.4m** |
| **Export Earnings (2015/16)** | Non EU students: paid £36.4m in fees<br>EU students: paid £13.4m in fees.<br>Research related: The University earned £14.5m for research and other services paid from international sources.<br>International student spending: estimated at £77.4m of off-campus personal spending<br>**Total: £141.7m in export earnings**. | | | |

3.40 The direct and indirect economic impacts set out above are generated alongside more qualitative imapcts, including the Canterbury Innovation Centre, which provides 3,600sqm of business space dedicated to supporting start-ups and providing support to students, staff and graduates wishing to start a business; the University's Conference Centre which assists in generating in excess of 200,000 bed nights throughout the year; and charitable fundraising initiatives such as the 'Raise and Give' scheme which raised £238,732.80 during the academic year spanning 2018-19.

3.41 Clearly, the University is a significant asset for the Canterbury economy.

*Social Impact*

3.42 The contribution of higher education towards achieving advancements in social mobility for its graduates has become the focus of greater attention over recent years.

3.43 The University has been awarded a gold rating, the highest, in the UK Government's Teaching Excellence Framework (TEF). Based on the evidence available, the TEF Panel judged that the UoK delivers consistently outstanding teaching, learning and outcomes for its students. It is of the highest quality found in the UK.

3.44 The TEF Panel also reported that UoK 'students from all backgrounds achieve consistently outstanding outcomes. Very high proportions of students from all backgrounds continue with their studies and then progress to employment, notably exceeding the provider benchmarks. This is particularly beneficial for student outcomes in Kent, as the UoK had forecasted for the 2019-20 academic year that it will have 14,273 home students from within Kent.

3.45 The UoK is dedicated to improving social outcomes for its students and has committed to a large increase in funding for the development and piloting of targeted student success measures. This is provided through an ongoing financial commitment to outreach of disadvantaged groups at £2m per annum. The UoK will also continue to provide funding for hardship in order to meet financial shortfalls not met by the student opportunity fund. For 2019-20 the UoK is forecasting to spend a total of £10m on access, student success and progression, and financial support measures.

3.46 In order to understand the social impact the UoK generates locally, the University uses household income to assess the extent to which it is widening participation from groups with less economic capital and secondary school performance data to provide context about educational capital. Trends reveal that the UoK is recruiting a much more ethnically diverse population of students where numbers of entrants from all BME groups has risen year on year since 2008.

3.47 The UoK assists in helping achieve social mobility gains through financial support for disadvantaged students, which through its own monitoring programmes has demonstrated that students at a higher risk of withdrawing (students from low household income/and or mature students) who are in receipt of a bursary have higher completion rates, i.e. are more likely to stay on and achieve their degree than their peers who do not receive a bursary.

3.48 The University anticipates that it will provide bursary support to a minimum of 700 students in 2019-20. Awards of £4,500 will be allocated to eligible students across 3 years of study comprising £1,500 per year of study. Students that study a year abroad, year in industry or a 4 year undergraduate degree programme will receive an additional award of £1,500 (a maximum award of £6,000). This support will be targeted at students with a household income below £42,875 who also meet other widening participation criteria. In addition, the University will also grow its Partner School and College Stipend Scheme to include more bursaries and we will introduce competitive work-linked financial programmes of support in partnership with these institutions too.

3.49 Eligibility for the financial support packages will be determined by a number of indicators; in order to qualify, students under 21 whose household incomes fall within these bands will be required to meet low participation criteria (the student's household is located in an area that traditionally has had low levels of participation in higher education (quintiles 1 and 2) as defined by the Higher Education Funding Council for England (HEFCE) or is classified as social housing).

3.50 Students who are 21 or over (at the 30th September on their year of entry) will be eligible for the Kent Mature Student Bursary if they meet the household income thresholds as outlined above. Equally, all eligible

candidates will have attended state funded education (including state funded secondary or Further Education aged 16 onwards). Students with disabilities in receipt of DSA9 with an income up to £42,875 are also eligible.

3.51 In addition to the bursary support described above the University is also in the process of modelling for the introduction of a new type of financial support, based upon a range of indicators and allocated to targeted students in combination with a range of academic support. The UoK will make available support to students who are at risk of underperforming in terms of retention and success. For example, evidence suggests that students who enter from low house-hold income backgrounds (less than £25,000) are more likely to commute and to work, with a reduction in engagement seen for this group. Furthermore, students who enter with specific entry qualifications are also at risk of under-performance. Elements of the support package, both financial and student success, may not necessarily be allocated on entry but at important transition points. This new approach is currently being piloted and the UoK will continue to measure impact alongside other initiatives. The pilot will also enable the UoK to refine eligibility criteria and support levels, for targeted groups, which is likely to include entry level and other disadvantage measures.

3.52 Other key social impact facts about the University of Kent include:

- In December 2018 there were 19,860 students enrolled at UoK, and there are currently 5,831 members of staff (salaried, timesheet, full-time and part-time staff) of which 1,175 are academic staff;
- Of the 19,860 students enrolled in December 2018, 5,380 were new undergraduates and 2,375 new postgraduates;
- The UoK has registered students from 159 different countries that attend UoK, comprising 76% from the UK, 9% from Europe and a further 15% overseas;
- For the 2019-20 academic year, the UoK forecasts that it will have 14,273 home students from within Kent, which represents approximately 70% of the total student population;
- 11% of University of Kent graduates remain in Kent after graduation (i.e. approximately 2,200 of the current student base will remain in Kent);
- In 2017-18 the University provided bursaries, scholarships, grants and awards of £7.3m for undergraduates and £12.2m for postgraduates;
- Kent students delivered a total of 77,000 volunteering hours with an estimated economic value of approximately £540,000, benefitting more than 130 local organisations; and
- The University has a Student Employment Rate of six months after graduation in 2017, more than 95% of Kent undergraduates and 97% of postgraduates who responded to a national survey had found a job, or were going on to further studies.

3.53 The UoK has also established a number of initiatives to encourage and develop students' employability skills, including the nationally recognised Employability Points Scheme together with a dedicated incubator, Hub for Innovation and Enterprise (Hub), responding to internal demand from student and staff entrepreneurs.

3.54 The Hub is located in the Canterbury Innovation Centre and is the University's delivery vehicle for student entrepreneurship, start-up support and start-up space, which has contributed to the local business community in the following ways:

- 186 companies have been created and developed at the University of Kent's incubator space since 2010. As a result, 254 jobs have been created in the local community;

- Student Enterprise has run 849 business advice sessions since 2013; and
- 63 companies were established over the last two years.

3.55 The University and its students and staff also helpfully contribute elsewhere in the community, such as:

- The UoK offers workshops and activities with regional schools and colleges and a Student Ambassador Scheme which has operated for more than 10 years;
- Kent Law Clinic received 1,430 enquiries during the year; legal advice was provided in 360 of these matters and 178 other clients were formally represented during the year;
- The Gulbenkian Arts Centre welcomes over 10,000 young people a year to participate in engagement programmes helping develop creative and cultural arts in the region;
- The newly established Kent and Medway Medical School will take a leading role in the education of a new generation of medical professionals and the development of medical research in the region and retention of future medical professionals to serve the community; and
- Students volunteered over 90,000 hours both on campus and in the local community helping more than 130 local organisations.

3.56 Clearly, the University delivers significant social value to Canterbury and Kent.

## Economic Threats to the University and its Response

3.57 The university is currently operating at an unsustainable financial position. It requires an injection of funds to address its debt liabilities and a reduction in operating costs (and/or increase in income) to repair its balance sheet on an ongoing basis. This situation has been made significantly worse in the short term by Covid-19.

3.58 The University operates on narrow margins. Its income is principally based on funding from the UK Government for domestic students (which is loss-making) combined with fees from international students, research income, income from student housing, and spin-off commercial activities. Government funding is becoming increasingly insecure; domestic tuition fees are capped (and have only been subject to one inflationary increase since 2012); limits on international students are being imposed; there is increasing national and international competition for students; and the competition for research funding is significant. These threats to income are compounded by the need to continually invest in teaching/research quality and facilities in order to compete effectively for students and research funding.

3.59 These threats are affecting the UK Higher Education sector as whole, however the effects on the University of Kent have been particularly severe and, as noted above, it is now operating at an unsustainable financial position. It has put in place a strategy to respond to this which comprises the following components:

- Operational restructuring;
- Academic portfolio review (reduction in range and number of courses);
- Optimising new sources of academic income (online, apprenticeships, etc);
- Increased income from commercial services; and
- Land sales/property rationalisation (capital receipts for repayment of loans and expenditure into academic activity).

3.60 The potential to generate value from its estate is the most significant of the above components in terms of the scale of ‘bullet’ funds that can be generated and the overall impact on the University’s operating

position. The University is obliged to achieve 'best value' for the sale of any land and all receipts will be 'ring-fenced' to be reinvested back into the University to resolve its debt position and help fund its further expansion, helping to improve its student offer, position in the market and ultimately ensuring a long term sustainable future for the University.

### National Planning Policy Context

3.61 As is clear from the above contextual information, the Higher Education sector is an extremely important part of the UK economy and there is a need for it to grow in order support the delivery of economic and social government policy objectives. Furthermore, that the University is a successful higher education/economic asset that is particularly well aligned with government policy (in terms of its subject and research focus) and therefore well placed to deliver the growth necessary to satisfy our economic and social needs.

3.62 The purpose of the planning system is to achieve sustainable development – responding to needs by helping to deliver positive growth having regard to economic, social and environmental considerations. It follows that national planning policies support the principle of sustaining and growing the HE sector.

3.63 The National Planning Policy Framework (NPPF) confirms a general presumption in favour of sustainable development at paragraph 11 and goes onto establish clear in-principle support for proactively driving and supporting sustainable economic development, and therefore the principle of supporting the Higher Education sector. This is a core land use planning principle which should underpin both plan-making and decision taking, as per paragraph 80:

*"Planning policies and decisions should help create the conditions in which businesses can invest, expand and adapt. Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development. The approach taken should allow each area to build on its strengths, counter any weaknesses and address the challenges of the future. This is particularly important where Britain can be a global leader in driving innovation…"*

3.64 Accordingly, as a starting point the new Local Plan should do everything it can to support the University.

## Summary

3.65 The Higher Education sector delivers significant economic and social value to the UK. Sustaining and growing the sector is a key component of cross-departmental UK Government policy and is accounted for in national planning policy which requires Local Plans to give significant weight to the need to support the sector.

3.66 Locally, the University of Kent delivers significant economic and social value to Canterbury and Kent. Significant weight should be placed on the need to sustain and grow the University in the preparation of the new Local Plan.

3.67 The University is under economic threat due to shortcomings in the way in which the UK HE sector is funded, which has been significantly compounded by the financial shock of Covid-19. The success of the University's financial recovery plan is dependent on generating value from its estate via the disposal of surplus land for development. This is dependent on support from the planning system.

3.68 Accordingly, there is a need for the new Local Plan to allocate surplus land at the University for value-generating development in order to deliver social and economic planning policy objectives.

3.69 The sites presented in this submission are therefore uniquely suitable for development. There is no other suitable, available, or achievable land that in the district that is capable of satisfying this need. This is a unique need and a unique solution, and a significant material consideration in assessing the suitability of the sites in our view.

# 4. Suitability – Main Campus

4.1 The purpose of this section is to consider the suitability of the Main Campus for development of Higher Education and associated uses, to include student housing, commercial employment uses ('knowledge community') and a hotel/conference facility.

4.2 The PPG advises that sites allocated in existing development plans can generally be considered suitable for development, however notes that it may be necessary to assess whether circumstances have changed which would alter their suitability.

4.3 Significant work has been undertaken since the current local plan was adopted in the preparation of the University Masterplan, which was published in 2019 (enclosed at Appendix E). This sets out a 'blueprint' for the evolution of the Main Campus, including a series of supporting strategies covering place-making; planning and environment; biodiversity and landscape; and movement and transport (enclosed at Appendices F to I).

4.4 The masterplan and strategies are underpinned by an evidence base including the following (enclosed at Appendix I to N):

- Baseline Mapping;
- Building analysis (including historical evolution) and university campus benchmarking study
- Landscape Setting and Views Appraisal;
- Preliminary Ecology Appraisal; and
- Traffic surveys.

4.5 It was also informed by public/stakeholder consultation.

4.6 The updated development proposals for the Main Campus are aligned with the Masterplan which remains up to date, and demonstrates the suitability of the site for the proposed development.

# 5. Suitability – Sites B, C, and D (Combined)

5.1 The matrix below provides a high level appraisal of the suitability of Sites B, C and D (combined) for development of a new residential-led community comprising c.2,500 homes and associated uses.

5.2 The appraisal draws upon a review of local plan policy designations and existing evidence, and identifies where further survey and assessment work will be undertaken in due course. Existing evidence is enclosed at Appendices A to O and signposted in the matrix below.

5.3 The appraisal provides a 'RAG Rating' against each criteria on the following basis: Green (suitable for development); Green/Amber hatched (suitable for development but with known constraints/policy issues that can be satisfied); Amber (likely to be suitable for development – further work required to confirm); Red (unlikely to be suitable for development).

*Table 5.1 Suitability Appraisal (Sites BCD)*

| Criteria | Appraisal | Rating |
|---|---|---|
| Previously developed land | • Sites B, C, and D are wholly greenfield land.<br>• National planning policy supports the development of greenfield land where there is no alternative suitable, available and achievable previously developed land. The evidence on land supply prepared to inform the current Local Plan confirms that there is a very limited supply of suitable available achievable previously developed land in the district. While this evidence base is being updated, we do not consider the position to have changed significantly.<br>• **In the absence of an alternative supply of suitable available achievable previously developed land, greenfield land should be treated as suitable for development in principle (by necessity).** | |
| Agricultural land designation | • Agricultural Land Classification is graded 1 (best) to 5 (worst), with grades 1, 2 and 3a considered the Best and Most Versatile (BMV) agricultural land in planning terms.<br>• Site B is classified as Grade 3 (Good to Moderate).<br>• Site C and D are classified as Grade 2 (Very Good)<br>• NPPF paragraph 171 (with reference to footnote 53) requires that where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of higher quality. While preferred, policy does not preclude the development of better quality land where this is justified by economic and other benefits.<br>• This matter was tested as part of the current Local Plan, where several of the Strategic Site Allocations comprise BMV agricultural land. The Inspector accepted that allocating such land was justified by housing need and broader sustainability considerations.<br>• An updated Agricultural Land Survey and Assessment of the land will be undertaken to support the next round of local plan representations, however at this stage it is assumed that the classification will remain unchanged.<br>• **The loss of BMV agricultural land will be an adverse impact associated with the redevelopment of the site. Nonetheless this should be weighed in the planning balance (having regard to the availability of alternative suitable achievable land and the benefits of developing this land). The site is considered suitable on this basis.** | |
| Flood risk | • Sites B, C and D are located within Flood Zone 1 (low risk of flooding) and are therefore not at risk of flooding (as per the Environment Agency's on-line flood maps).<br>• The Sarre Penn watercourse flows east to west through Site B, which includes adjacent land that forms part of its natural flood plain. In principle this land is not suitable for development.<br>• The development of the site would be expected to accord with sustainable surface water drainage national planning policy requirements (i.e. maintaining the existing greenfield run-off rates taking into account climate change) to | |

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| | ensure that development does not pose an increased risk of flooding elsewhere.<br>• A Flood Risk Assessment and Surface Water Drainage Strategy will be prepared at the planning application stage.<br>• **The site is suitable for development in flood risk terms.** | |
| Transport | Highways<br>• Traffic Surveys of both the University campus and surrounding major road network were undertaken in 2018 for both term and vacation periods. This has informed the preparation of a transport strategy for the main University campus. This is to be updated to account for the proposals for the promoted sites. Existing information is enclosed at Appendix I.<br>• Vehicular access to the Sites BCD can be provided via the University's main campus to the south – Giles Lane and University Road which connect into Whitstable Road and St Stephen's Hill. Assessment work is to be undertaken to inform the next round of local plan representations, to include identifying the scope of likely capacity upgrade works.<br>• Feasibility testing for new access points from the main campus onto Whitstable Road near Rough Common Road and at Blean Primary School have been undertaken and demonstrated to be achievable. Refer to Transport Strategy at Appendix I. Opportunities for further or alternative access improvements onto Whitstable Road are to be undertaken to inform the next round of local plan representations.<br>• Sites B, C and D all have direct access to the primary road network via Tyler Hill Road. This is a narrow rural road with no pedestrian footpaths or street lighting for the majority of its length. A feasibility exercise is to be undertaken to determine the potential to widen/improve this road.<br>Bus<br>• The University's main campus is served by 3 bus lines which provide frequent services to/from Canterbury City Centre. There is opportunity to extend these routes into Sites BCD, which we note may improve public transport accessibility for Blean and Tyler Hill. Consultation with bus operators is to be undertaken to confirm his.<br>Cyclists/Pedestrians<br>• Sites BCD are criss-crossed by existing Public Right of Ways, including public footpaths, cycle paths and a public byway (along the southeastern edge of Site C and western edge of Site D) which provide good pedestrian/cycle accessibility across the sites. Development of the land offers the opportunity to improve these connections further.<br>• **The sites benefit from existing vehicular, pedestrian and cycle access, and there is clear opportunity to improve these to support the development of this land. Further transport feasibility work is to be undertaken ahead of the next round of local plan public consultation to determine the quantum of development that can be supported in transport terms (and the strategy for doing so), and will inform the update to the existing masterplan. In principle, the sites are considered suitable in transport terms.** | |
| Heritage | • Designated Heritage assets affect parts of Sites BCD.<br>• There is a Scheduled Ancient Monument (SAM) in the northern part of Site B (Dispersed medieval settlement remains and a Roman building immediately SW of St. Cosmus and St. Damian's Church'). There are 2 identified 'Prehistoric Sites' located in close proximity to the SAM.<br>• Adjacent to the SAM, but outside of the site boundary, lies the Grade II* listed 'Church Of St Cosmus And St Damian' and the Grade II listed 'Church Cottage'. Sites BCD are likely to form part of the setting of these buildings.<br>• Part of the western part of Site B is located within the Blean Conservation Area, whereas Site C is located directly adjacent to the Blean Conservation Area and both Site C and D adjoin the Amery Court Conservation Area. Site D abuts the Canterbury and Whitstable Railway (Hackington & Blean) Conservation Area along its eastern boundary.<br>• A heritage appraisal to assess the significance of these assets is to be undertaken to inform the preparation of the updated masterplan for Sites BCD. This will be included in representations to the next round of local plan public consultation.<br>• **It is anticipated that Sites BCD can be developed without harming the significance of these heritage assets through careful design informed by heritage advice therefore the sites are considered suitable for development in heritage terms.** | |
| Landscape | • Sites BCD (and the area to the north) comprise the only significant area of land adjacent to the built-up part of Canterbury that is not designated as an Area of | |

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| | High Landscape Value. The sites are also not subject to any other landscape based policy designations in the current Local Plan.<br>• A Landscape Setting and Views Appraisal was undertaken to inform the current University masterplan. This is enclosed at Appendix L.<br>• The land is also considered more broadly in the Canterbury Landscape Character and Biodiversity Appraisal (which we understand is being updated by the Council). It forms part of Landscape Character Area 36 (Blean Parklands)<br>• This evidence confirms the following for Sites BCD:<br>- The sites are visually contained by virtue of the complex of woodland to the north, west, and east plus the topography of the site (which dips down to the north of the University's main campus. Development on the site should not be visible from Canterbury City Centre (World Heritage Site, Conservation Area, Listed Buildings), and longer distant views to the north/east/west will be blocked by woodland.<br>- Short distant views to/from Blean, Tyler Hill, and public roads/rights of way will be affected by development. This can be accounted for as part of masterplanning to minimise adverse impacts.<br>- The landscape quality of the sites themselves is not of significant value.<br>• The updated masterplan will be informed by further landscape/visual impact assessment work which will form part of representations to the next round of local plan consultation.<br>• **The sites are considered suitable for development in landscape terms.** | |
| Minerals | • The southern part of Site B and the entirety of Sites CD are designated as Minerals Safeguarding Areas (as defined on the current Local Plan Policies Map). This could constrain the development potential of parts of the site, having regard to NPPF para 206. Any loss of minerals potential should be balanced with the social and economic benefits of allowing development.<br>• A Minerals Assessment is to be undertaken and submitted as part of representations to the next round of local plan consultation to provide more detailed evidence on the extent of this constraint.<br>• **A large proportion of the site is suitable for development in principle, in minerals policy terms. The remainder of the site could be suitable (subject to the findings of further evidence being prepared and having regard to balanced planning considerations)** | |
| Ecology/Biodiversity | • A Preliminary Ecological Appraisal (Phase 1Habitat Survey) has been undertaken (enclosed at Appendix M). The intention is to update this to inform local plan representations, nonetheless baseline conditions are not expected to have materially changed therefore its findings are considered to remain relevant.<br>• The appraisal concludes that Sites BCD are of limited botanical interest (as the majority comprises species poor improved grassland - arable agricultural use) although they may have some value for fauna. While improved grassland is the principal habitat, the site does accommodate localised areas of habitats that have potential to support protected species, including ancient woodland, hedgerows, ponds, and the Sarre Penn river channel. As these potentially valuable habitats comprise a small proportion of the site only, it is anticipated that they can be retained (or satisfactorily re-provided) as part of redevelopment. This should not significantly constrain development potential.<br>• Species specific surveys will be required at the planning application stage and appropriate mitigation strategies identified and secured. Surveys likely to be required include:<br>- Bats<br>- Dormice<br>- Badgers<br>- Great Crested Newts<br>- Reptiles<br>- Breeding birds<br>- Fish<br>- Invertebrates<br>• The site is located in close proximity to the Blean Woodland complex which is designated as a Special Area for Conservation (SCA). It is also located within the Zone of Influence of the Thanet Coast and Sandwich Bay Special Protection Area (SPA) and Thames Medway and Swale Estuary SPA. Habitats Regulation requirements in terms of Screening and potential Appropriate Assessment will need to be satisfied at the planning application stage. Mitigation measures to manage access/e recreation pressure on these designated sites are to be identified and worked into the masterplan as part of an Environmental Strategy.<br>• Further investigation will be required regarding the interrelationship between potential air quality impacts associated with development (notably vehicle | |

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| | traffic) and the Blean Woodland SPA to determine if this could constrain development potential and/or whether any site specific mitigation measures are necessary. A district-wide strategy may be the most appropriate solution.<br>• A number of small areas of land adjacent to the site boundary are designated as Local Wildlife Sites and Local Nature Reserves. Site B and D are within a 'SSSI Impact Risk Zone' requiring consultation with Natural England. Site B and D are both partially located within a National Habitat Network 'Network Enhancement Zone 1'. Sites B, C and D are all wholly located within 'The Blean' Biodiversity Opportunity Area. Consideration will need to be given to any potential impact that development might have on these designated areas and necessary mitigation measures identified,.<br>• **The site itself has limited ecological value. At this stage it is anticipated that existing valuable habitats can either be retained or re-provided on-site and that there is an opportunity for bio-diversity net gain as part of redevelopment.**<br>• **A strategy will be required to inform the preparation of development proposals and to manage future development to ensure that the potential for adverse impacts on off-site ecological assets is managed and mitigated where appropriate. A preliminary strategy will be prepared to inform masterplanning work and will be submitted as part of representations to the next round of local plan consultation. The site is suitable for development in ecological terms.** | |
| Noise | • There are no known noise sensitive receptors or significant sources of noise in the local area that would make the site unsuitable for development.<br>• A Noise Impact Assessment would be undertaken at the planning stage.<br>• **The site is suitable for development in noise terms.** | |
| Air quality | • The sites are not located within an Air Quality Management Area with the closest being located 2.15km to the south near the junction of A229 Whitstable Road and Forty Acres Road near the centre of Canterbury.<br>• There are no known existing air quality issues that would make the sites unsuitable for residential development.<br>• In the short-medium term the development of the site will likely have an adverse impact on air quality through construction stage dust and vehicle based emissions once operational (this will likely fall away in the medium-long term due to the shift to electric vehicles). As noted above, there are a number of sensitive sites in the local area that could be adversely impacted by this.<br>• A strategy is to be prepared to inform the preparation of development proposals and to manage future development to ensure that the potential for adverse impacts on off-site ecological assets is managed and mitigated where appropriate.<br>• An Air Quality Impact Assessment would also be undertaken at the planning application stage.<br>• **The site is suitable for development in air quality terms. There may be some constraints to development and/or a requirement for mitigation measures.** | |
| Ground conditions | • The site's historic uses indicate that it is not likely to be subject to contamination.<br>• The majority of the Site B is within an 'unproductive' groundwater vulnerability area, with sections towards the centre of the site having a 'low' and 'medium – low' value.<br>• Site B has a designated 'Minor Aquifer Intermediate' Ground Water Vulnerability as per Environment Agency Mapping.<br>• Site C and D are classified as having an 'unproductive' groundwater vulnerability area.<br>• Site B, C and D soilscape comprises a combination of partly 'Freely Draining Slightly Acid Loamy Soils', partly 'Slowly Permeably Seasonally Wet Acid Loamy and Clayey Soils', and partly 'Loamy Soils with Naturally High Groundwater'.<br>• Site B comprises primarily London Clay, Head Gravel, and Brickearth geological conditions. Site C and D comprise predominantly 4th Terrace and small sections of London Clay along their southern boundaries.<br>• **There are no known Ground Condition constraints that have been identified – The site is suitable for development.** | |
| Utilities | • Both Site B (northwestern corner) and Site D (through the middle of site) have an underground gas line running north-south through the sites.<br>• The existing university campus is served by all utilities and at this stage it is anticipated that these can be extended into the site (alongside appropriate capacity upgrades)<br>• **The site is suitable for development in utilities terms.** | |

5.4 As noted above, for the purposes of this submission Sites BCD include a small area of land on Giles Lane owned by a 3rd party who the University is working with to bring forward development (on that land). Refer to Appendix B for further details.

5.5 Figures 5.1 to 5.3, below, illustrate suitability considerations:

*Figure 5.1 Transport Key Considerations (Sites BCD)*

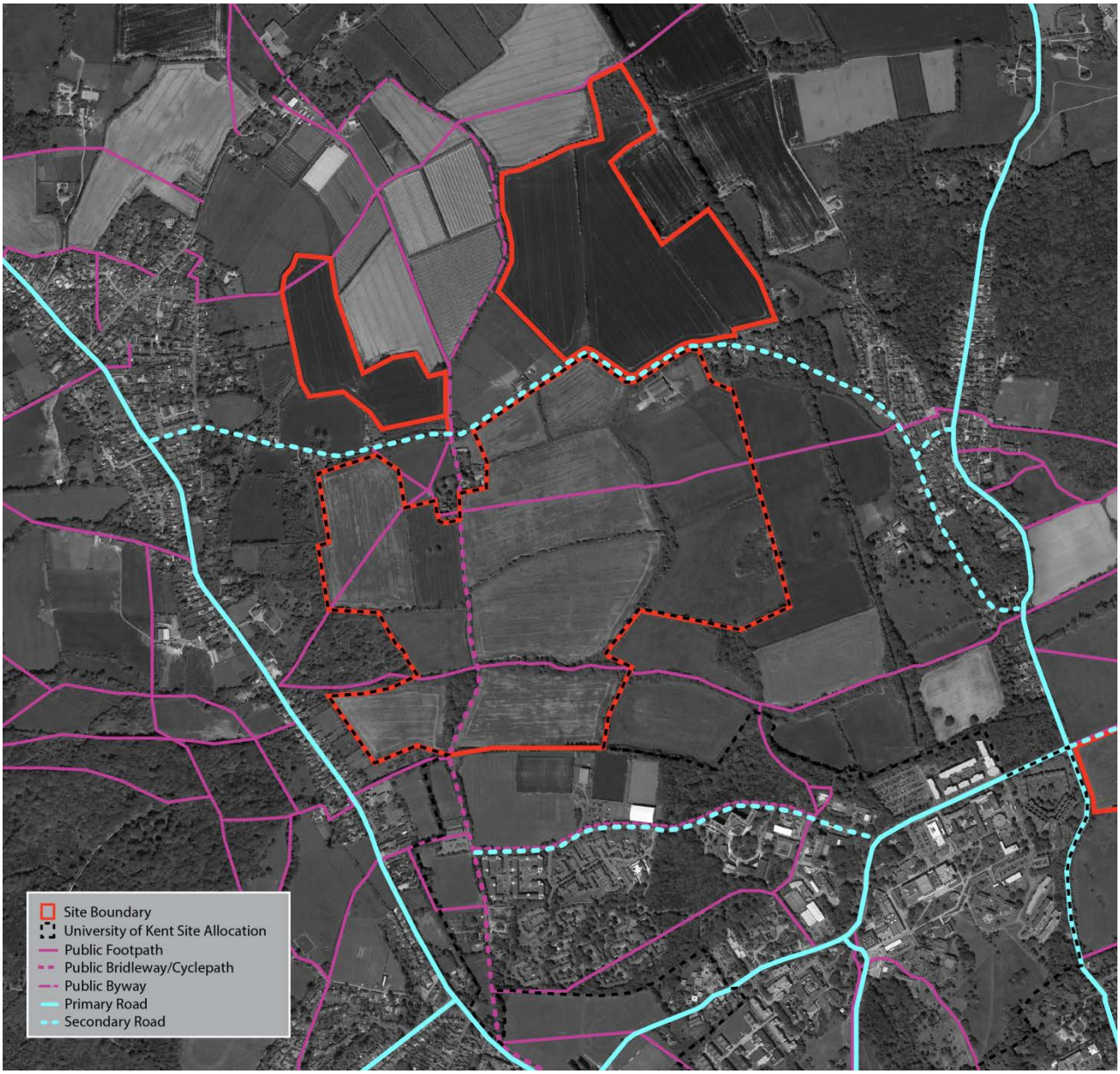


*Figure 5.2 Environment Key Considerations (Sites BCD)*

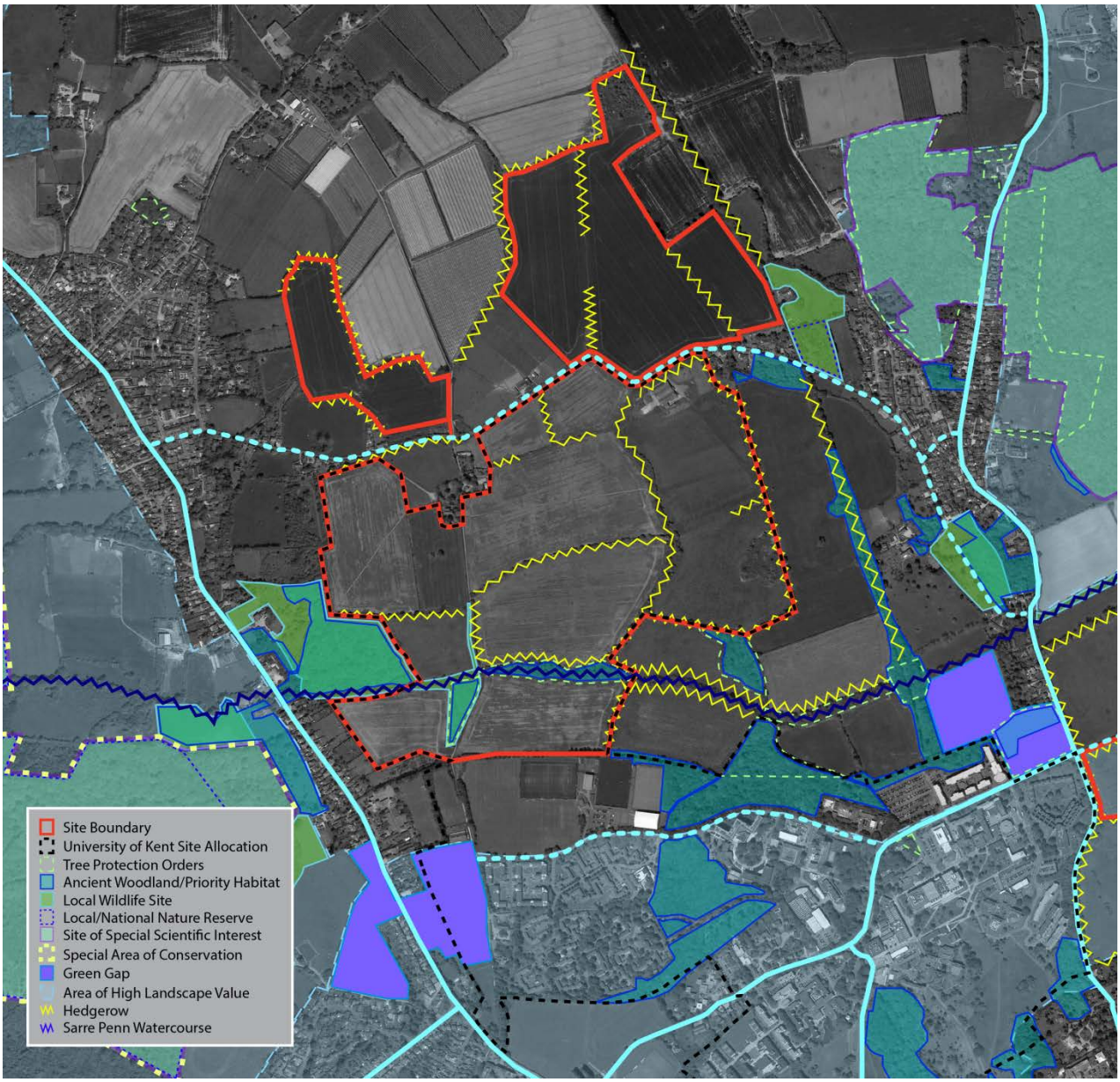
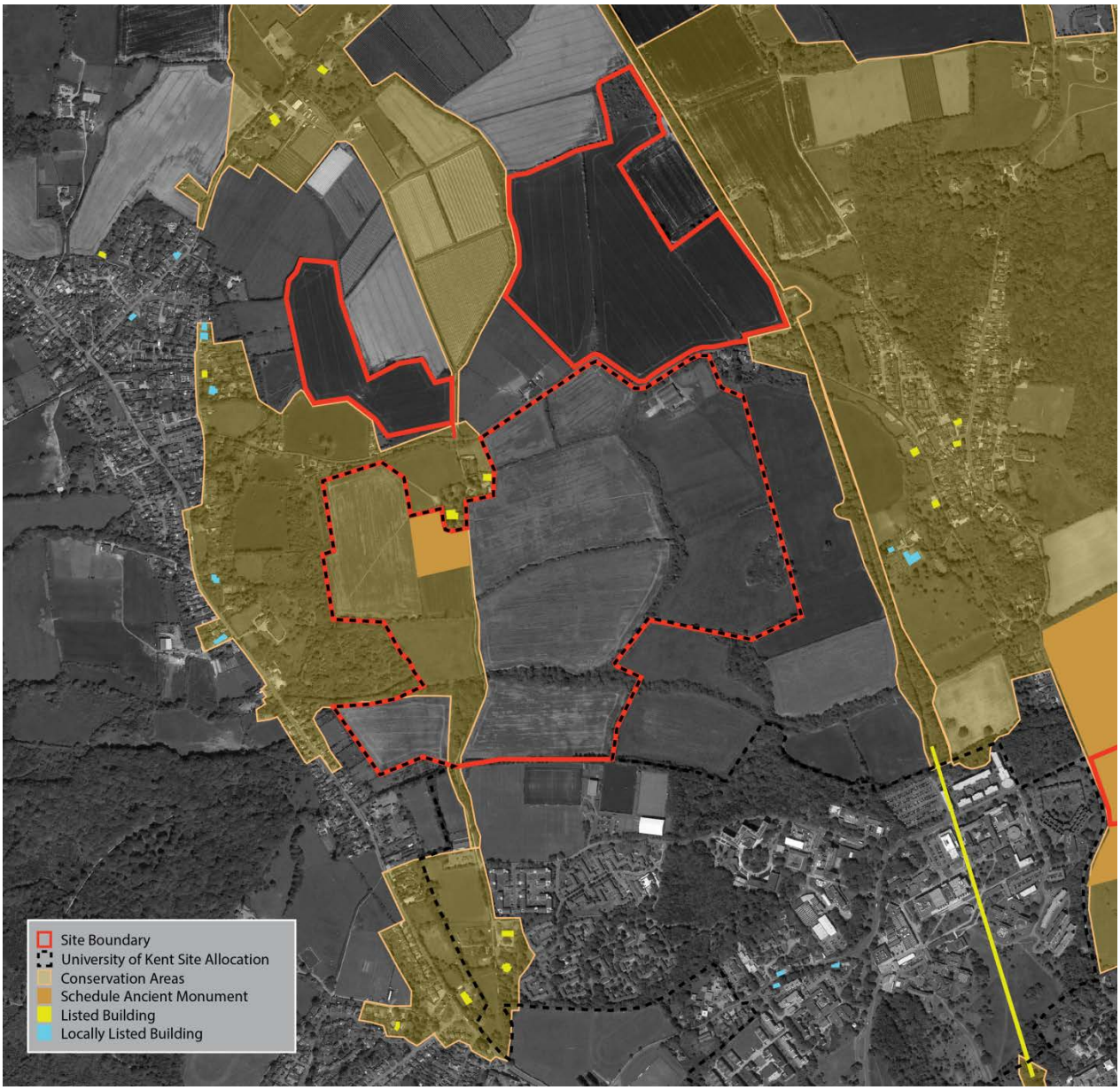


*Figure 5.3 Heritage Key Considerations (Sites BCD)*



# 6. Suitability – Site A

6.1 The matrix below provides a high level appraisal of the suitability of Site A for development of Higher Education and associated uses, to include student housing, commercial employment uses ('knowledge community') and a hotel/conference facility.

6.2 As per the previous section, the appraisal draws upon a review of local plan policy designations and existing evidence, and identifies where further survey and assessment work will be undertaken in due course. Existing evidence is enclosed at Appendices A to O and signposted in the matrix below.

6.3 The appraisal provides a 'RAG Rating' against each criteria on the following basis: Green (suitable for development); Green/Amber hatched (suitable for development but with known constraints/policy issues that can be satisfied); Amber (likely to be suitable for development – further work required to confirm); Red (unlikely to be suitable for development).

*Table 6.1 Suitability Appraisal (Site A)*

| Criteria | Appraisal | Rating |
|---|---|---|
| Previously developed land | • The Site is wholly greenfield land.<br>• National planning policy supports the development of greenfield land where there is no alternative suitable, available and achievable previously developed land. The evidence on land supply prepared to inform the current Local Plan confirms that there is a very limited supply of suitable available achievable previously developed land in the district. While this evidence base is being updated, we do not consider the position to have changed significantly.<br>• **In the absence of an alternative supply of suitable available achievable previously developed land, greenfield land should be treated as suitable for development in principle (by necessity).** | |
| Agricultural land designation | • **Site A is classified as 'non-agricultural land' and therefore is suitable for development.** | |
| Flood risk | • Site A is located within Flood Zone 1 (low risk of flooding) and is therefore not at risk of flooding (as per the Environment Agency's on-line flood maps).<br>• The development of the site would be expected to accord with sustainable surface water drainage national planning policy requirements (i.e. maintaining the existing greenfield run-off rates taking into account climate change) to ensure that development does not pose an increased risk of flooding elsewhere.<br>• A Flood Risk Assessment and Surface Water Drainage Strategy will be prepared at the planning application stage.<br>• **The site is suitable for development in flood risk terms.** | |
| Transport | <u>Highways</u><br>• Traffic Surveys of both the University campus and surrounding major road network were undertaken in 2018 for both term and vacation periods. This has informed the preparation of a transport strategy for the main University campus. This is to be updated to account for the proposals for the promoted sites. Existing information is enclosed at Appendix I.<br>• Vehicular access to the Site A can be provided via the University's main campus via University Road which connect into Whitstable Road and St Stephen's Hill. Assessment work is to be undertaken to inform the next round of local plan representations, to include identifying the scope of likely capacity upgrade works.<br><u>Bus</u><br>• The University's main campus is served by 3 bus lines which provide frequent services to/from Canterbury City Centre. The 'Innovation Centre' bus stop is located adjacent to the site along University Road and is served by the 'Triangle' bus service.<br><u>Cyclists/Pedestrians</u> | |

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| | • Site A has a number of footpaths cutting through it leading to/from the UoK campus towards Canterbury centre. There is also a PROW bridleway that runs E-W along the southern boundary of the site.<br>• **The site benefits from existing vehicular, pedestrian and cycle access, and is well served by public transport.** | |
| Heritage | • There are no designated statutory or locally listed assets on-site.<br>• The Grade II listed 'Beverly Farmhouse' is located in approximately 200m north of the developable area of the site on the opposite side of University Road.<br>• Site A is approximately 275m east of the Canterbury (Whitstable Road) Conservation Area and approximately 250m west of the Canterbury and Whitstable Railway (St. Stephen's) Conservation Area.<br>• A heritage appraisal to assess the significance of this asset is to be undertaken to inform the preparation of the updated masterplan for Site A. This will be included in representations to the next round of local plan public consultation.<br>• **It is anticipated that Site A can be developed without substantially harming the significance of the nearby listed heritage asset therefore the Site is suitable for development in heritage terms.** | |
| Landscape | • Site is located within an area designated as an Area of High Landscape Value where development proposals should have particular regard to the historic setting of Canterbury and the World Heritage Site.<br>• It is also considered more broadly in the Canterbury Landscape Character and Biodiversity Appraisal (which we understand is being updated). It forms part of Landscape Character Area 28 (Stour Valley Slopes).<br>• A Landscape Setting and Views Appraisal was undertaken to inform the current University masterplan. This is enclosed at Appendix L.<br>• This evidence indicates that the site is sensitive in landscape terms particularly in terms of the setting of the WHS and views to/from the city centre. This will constrain the development potential of the site but should not preclude it with high standards of design.<br>• The University intends to update the existing masterplan for this site, which will be informed by further landscape/visual impact assessment work which will form part of representations to the next round of local plan consultation.<br>• **The site could be suitable for development in landscape terms.** | |
| Minerals | • The majority of Site A is located within the 'River Terrace Deposits' and a small portion of the southern part of the site is located in the 'Brickearth' Mineral Safeguarding Areas (as defined on the current Local Plan Policies Map). This could constrain the development potential of parts of the site, having regard to NPPF para 206. Any loss of minerals potential should be balanced with the social and economic benefits of allowing development.<br>• A Minerals Assessment is to be undertaken and submitted as part of representations to the next round of local plan consultation to provide more detailed evidence on the extent of this constraint.<br>• **The site could be suitable (subject to the findings of further evidence being prepared and having regard to balanced planning considerations)** | |
| Ecology/biodiversity | • A Preliminary Ecological Appraisal (Phase 1Habitat Survey) has been undertaken (enclosed at Appendix M). The intention is to update this to inform future local plan representations, nonetheless baseline conditions are not expected to have materially changed therefore its findings are considered to remain relevant.<br>• The north western corner of Site A has existing woodland which is designated as 'Deciduous Woodland Priority Habitat' which has biodiversity value. It is anticipated that this would be retained as part of future development.<br>• The remainder of the site comprises 'poor semi-improved meadows' dominated by relatively coarse neutral grassland with a low proportion of wildflowers. This has limited biodiversity value.<br>• Species specific surveys will be required at the planning application stage and appropriate mitigation strategies identified and secured. Surveys likely to be required include:<br>- Bats<br>- Dormice<br>- Badgers<br>- Breeding birds<br>- Invertebrates<br>• **The site is subject to identified ecological constraints; however the majority of the southern part of the site is of limited ecological value. Constraints can be** | |

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| | **effectively managed via a sound ecological strategy which is to be prepared to inform masterplanning work and will be submitted as part of representations to the next round of local plan consultation. The site is suitable for development in ecological terms.** | |
| Noise | • There are no known noise sensitive receptors or significant sources of noise in the local area that would make the site unsuitable for development.<br>• A Noise Impact Assessment would be undertaken at the planning stage.<br>• **The site is suitable for development in noise terms.** | |
| Air quality | • The site is not located within an Air Quality Management Area with the closest being located 600m to the south near the junction of A229 Whitstable Road and Forty Acres Road near the centre of Canterbury.<br>• There are no known existing air quality issues that would make the site unsuitable for the development proposed.<br>• The construction and operational stage of development may have an adverse impact on air quality through construction dust and an increase in vehicle based emissions (this will likely fall away in the medium-long term due to the shift to electric vehicles). There are a number of sensitive sites in the local area that could be affected by this. Nonetheless the scale of development (and therefore potential impact) proposed for this site is likely to be limited.<br>• A strategy is to be prepared to inform the preparation of development proposals and to manage future development to ensure that the potential for adverse impacts on off-site ecological assets is managed and mitigated where appropriate.<br>• An Air Quality Impact Assessment would also be undertaken at the planning application stage.<br>• **The site is suitable for development in air quality terms.** | |
| Ground conditions | • The site's historic uses indicate that it is not likely to be subject to contamination.<br>• The site is wholly designated as having a 'Minor Aquifer High' Ground Water Vulnerability as per Environment Agency Mapping. It comprises 'Freely Draining Slightly Acid Loamy Soils'.<br>• **There are no known Ground Condition constraints that have been identified – The site is suitable for development in ground condition terms.** | |
| Utilities | • It is expected that there are existing Utility services located in close proximity to the site which future development could connect to.<br>• **A site specific Utilities Assessment will be undertaken and submitted as part of representations to the next round of local plan consultation.** | |

6.4 Figures 6.1 to 6.3, below, illustrate suitability considerations:

*Figure 6.1 Transport Key Considerations (Site A)*

*Figure 6.2 Environmental Key Considerations (Site A)*

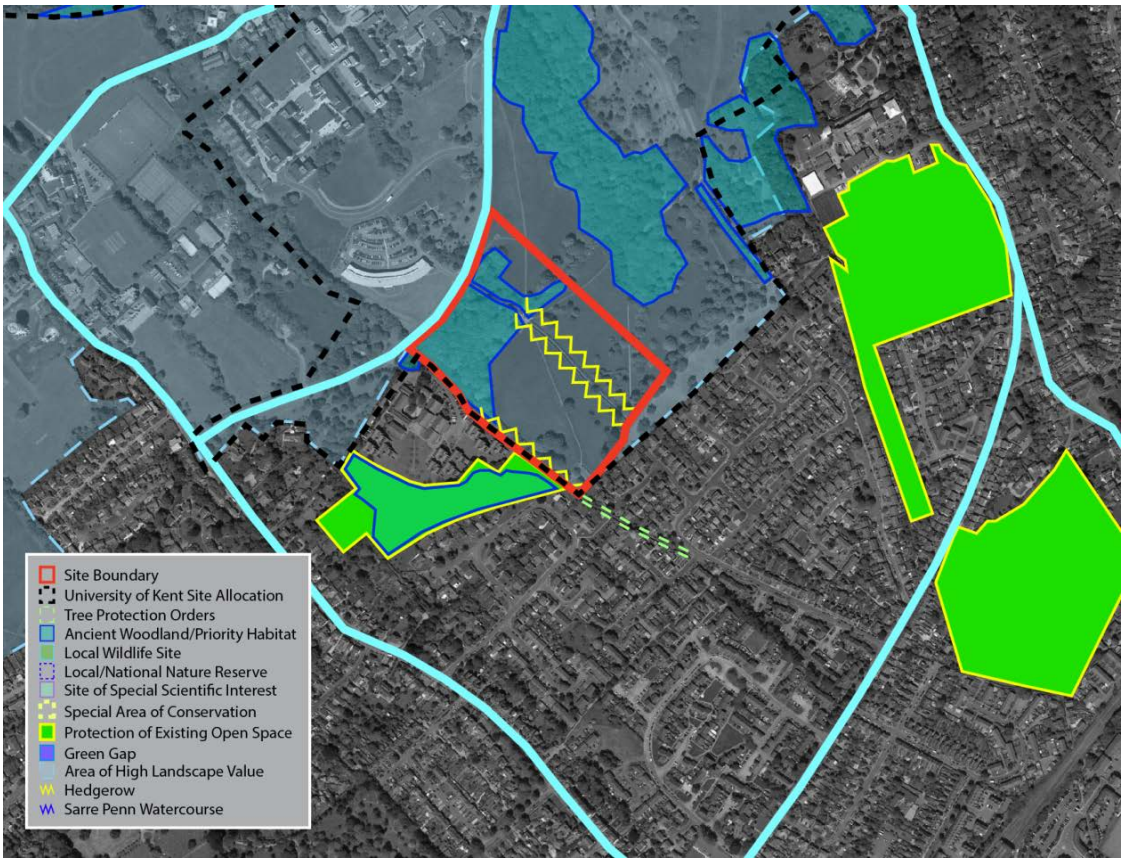

*Figure 6.3 Heritage Key Considerations (Site A)*

# 7. Suitability – Site E

7.1 The matrix below provides a high level appraisal of the suitability of Site E for development of housing or Higher Education and associated uses, to include student housing, commercial employment uses ('knowledge community') and a hotel/conference facility.

7.2 We note that there may be potential for adjacent land to the east (Site F) and 3rd party land to the south to also come forward for development.

7.3 As per the previous section, the appraisal draws upon a review of local plan policy designations and existing evidence, and identifies where further survey and assessment work will be undertaken in due course. Existing evidence is enclosed at Appendices A to O and signposted in the matrix below.

7.4 The appraisal provides a 'RAG Rating' against each criteria on the following basis: Green (suitable for development); Green/Amber hatched (suitable for development but with known constraints/policy issues that can be satisfied); Amber (likely to be suitable for development – further work required to confirm); Red (unlikely to be suitable for development).

*Table 7.1 Suitability Appraisal (Site E)*

| Criteria | Appraisal | Rating |
|---|---|---|
| Previously developed land | • The Site is wholly greenfield land.<br>• National planning policy supports the development of greenfield land where there is no alternative suitable, available and achievable previously developed land. The evidence on land supply prepared to inform the current Local Plan confirms that there is a very limited supply of suitable available achievable previously developed land in the district. While this evidence base is being updated, we do not consider the position to have changed significantly.<br>• **In the absence of an alternative supply of suitable available achievable previously developed land, greenfield land should be treated as suitable for development in principle (by necessity).** | |
| Agricultural land designation | • Agricultural Land Classification is graded 1 (best) to 5 (worst), with grades 1, 2 and 3a considered the Best and Most Versatile (BMV) agricultural land in planning terms.<br>• Site E is classified as Grade 3 (Good to Moderate).<br>• NPPF paragraph 171 (with reference to footnote 53) requires that where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of higher quality. While preferred, policy does not preclude the development of better quality land where this is justified by economic and other benefits.<br>• This matter was tested as part of the current Local Plan, where several of the Strategic Site Allocations comprise BMV agricultural land. The Inspector accepted that allocating such land was justified by housing need and broader sustainability considerations.<br>• An updated Agricultural Land Survey and Assessment of the land will be undertaken to support the next round of local plan representations, however at this stage it is assumed that the classification will remain unchanged.<br>• **The loss of BMV agricultural land will be an adverse impact associated with the redevelopment of the site. Nonetheless this should be weighed in the planning balance (having regard to the availability of alternative suitable achievable land and the benefits of developing this land). The site is considered suitable on this basis.** | |
| Flood risk | • Site E is located within Flood Zone 1 (low risk of flooding) and are therefore not at risk of flooding (as per the Environment Agency's on-line flood maps).<br>• The development of the site would be expected to accord with sustainable surface water drainage national planning policy requirements (i.e. maintaining | |

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| | the existing greenfield run-off rates taking into account climate change) to ensure that development does not pose an increased risk of flooding elsewhere.<br>• A Flood Risk Assessment and Surface Water Drainage Strategy will be prepared at the planning application stage.<br>• **The site is suitable for development in flood risk terms.** | |
| Transport | Highways<br>• Traffic Surveys of both the University campus and surrounding major road network were undertaken in 2018 for both term and vacation periods. This has informed the preparation of a transport strategy for the main University campus. This is to be updated to account for the proposals for the promoted sites. Existing information is enclosed at Appendix I.<br>• Site E has direct access to the primary road network via St Stephens Hill (a 2-lane single carriageway) at its junction with Giles Lane along the eastern boundary of the University. Assessment work is to be undertaken to inform the next round of local plan representations, to include identifying the scope of likely capacity upgrade works if needed.<br>Bus<br>• The University's main campus is served by 3 bus lines which provide frequent services to/from Canterbury City Centre. An existing bus stop is located on St Stephen's Hill (adjacent to Site E's western boundary) which is served by the Stagecoach No. 5 bus service<br>Cyclists/Pedestrians<br>• There is a Public Right of Way footpath that runs along the northern boundary of the site from the St Stephens Hill/Giles Lane junction along a private road which connects to further footpaths east of the site. Development of the land offers the opportunity to improve these connections further.<br>• **The site benefits from existing vehicular, pedestrian and cycle access, and is well served by public transport.** | |
| Heritage | • There are no statutory or locally listed buildings on-site.<br>• There is a listed Scheduled Ancient Monument (SAM) along the western part of Site E ('Tyler Hill medieval pottery'). There are numerous 'Medieval Kilns' and 'Probable Medieval Kiln Sites' within the SAM and in close proximity to its boundaries. Site E is entirely located within the Tyler Hill Conservation Area. These heritage assets will constrain but nor preclude the development of the site.<br>• A heritage appraisal to assess the significance of these assets is to be undertaken to inform the preparation of the updated masterplan for Site E. This will be included in representations to the next round of local plan public consultation.<br>• **It is anticipated that the eastern part of Site E as a minimum is suitable for development in heritage terms.** | |
| Landscape | • Site E is located within an area designated as an Area of High Landscape Value where development proposals should have particular regard to the historic setting of Canterbury and the World Heritage Site.<br>• It is also considered more broadly in the Canterbury Landscape Character and Biodiversity Appraisal (which we understand is being updated). It forms part of Landscape Character Area 28 (Stour Valley Slopes).<br>• Site E was not included in the University's Landscape Setting and Views Appraisal and therefore the capacity of the site to accommodate development in landscape terms has not yet been assessed in detail.<br>• The University's Masterplan is to be updated to include this site which will be informed by further landscape/visual impact assessment work which will form part of representations to the next round of local plan consultation.<br>• **It is anticipated that Site E will have some capacity to accommodate development without adverse landscape impacts, however this will be confirmed through further evidence work.** | |
| Minerals | • Site E is not located within a mineral safeguarding area.<br>• **The Site is suitable in mineral safeguarding terms.** | |
| Ecology/biodiversity | • A Preliminary Ecological Appraisal (Phase 1Habitat Survey) which was undertaken to inform the University Framework Masterplan did not include any detailed assessments of Site E, but the intention is to update the PEA to include Site E to inform local plan representations.<br>• Online Magic Mapping of the site suggests the site is comprised of improved grassland and is bounded by a series of hedgerows. These features may comprise suitable habitat for protected species which will require species specific surveys at the planning application stage and appropriate mitigation | |

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| | strategies identified and secured. Surveys likely to be required include:<br>- Bats<br>- Dormice<br>- Badgers<br>- Great Crested Newts<br>- Reptiles<br>- Breeding birds<br>- Invertebrates<br>• Located opposite the north eastern corner of the site is an area of Ancient Woodland which is designated as 'Deciduous Woodland Priority Habitat', the majority of which is located within locally designated Little Hall and Kemberland Woods and Pasture Local Wildlife Site.<br>• The north eastern corner of the site is also within a 'SSSI Impact Risk Zone' requiring consultation with Natural England.<br>• The site is also within the Zone of Influence of the Thanet Coast and Sandwich Bay Special Protection Area (SPA). Habitats Regulation requirements in terms of Screening and potential Appropriate Assessment will need to be satisfied at the planning application stage. Mitigation measures to manage access/recreation pressure on these designated sites are to be identified and worked into the masterplan as part of an Environmental Strategy<br>• Site E is wholly located within 'The Blean' Biodiversity Opportunity Area<br>• Site E is partially located within a National Habitat Network 'Network Enhancement Zone 2'.<br>• **The site is likely subject to ecological constraints either within the site or due to adjacent habitat features. Further survey work will be required in order to determine suitability, alongside a sound ecological strategy. This is to be prepared to inform masterplanning work and will be submitted as part of representations to the next round of local plan consultation.** | |
| Noise | • There are no known noise sensitive receptors or significant sources of noise in the local area that would make the site unsuitable for development.<br>• A Noise Impact Assessment would be undertaken at the planning stage.<br>• **The site is suitable for development in noise terms.** | |
| Air quality | • The site is not located within an Air Quality Management Area with the closest being located 1.5km to the south along Broad Oak Drive.<br>• There are no known air quality impacts that would make the sites unsuitable for development.<br>• The construction and operational stage of development may have an adverse impact on air quality through construction dust and an increase in vehicle based emissions (this will likely fall away in the medium-long term due to the shift to electric vehicles). There are a number of sensitive sites in the local area that could be affected by this. Nonetheless the scale of development (and therefore potential impact) proposed for this site is likely to be limited.<br>• A strategy is to be prepared to inform the preparation of development proposals and to manage future development to ensure that the potential for adverse impacts on off-site ecological assets is managed and mitigated where appropriate.<br>• An Air Quality Impact Assessment would also be undertaken at the planning application stage.<br>• **The site is suitable for development in air quality terms.** | |
| Ground conditions | • The majority of the site is within an 'unproductive' groundwater vulnerability area, with a small section having a 'low' value.<br>• Site E comprises 'Slowly Permeable Seasonally Wet Slightly Acid but Base-Rich Loamy and Clayey Soils'.<br>• The geology of the site is predominantly London Clay, with a small section of Head gravel near the eastern boundary of the site.<br>• **There are no known Ground Condition constraints that have been identified – The site is suitable for development.** | |
| Utilities | • Site E includes an underground gas line (the same gas line that runs through Sites B and D) which follows a northwest-southeast route through the centre of the site.<br>• The existing university campus is served by all utilities and at this stage it is anticipated that these can be extended into the site (alongside appropriate capacity upgrades)<br>• **The site is suitable for development in utilities terms.** | |

7.5 Figures 7.1 to 7.3, below, illustrate suitability considerations:

*Figure 7.1 Transport Key Considerations (Sites E and F)*

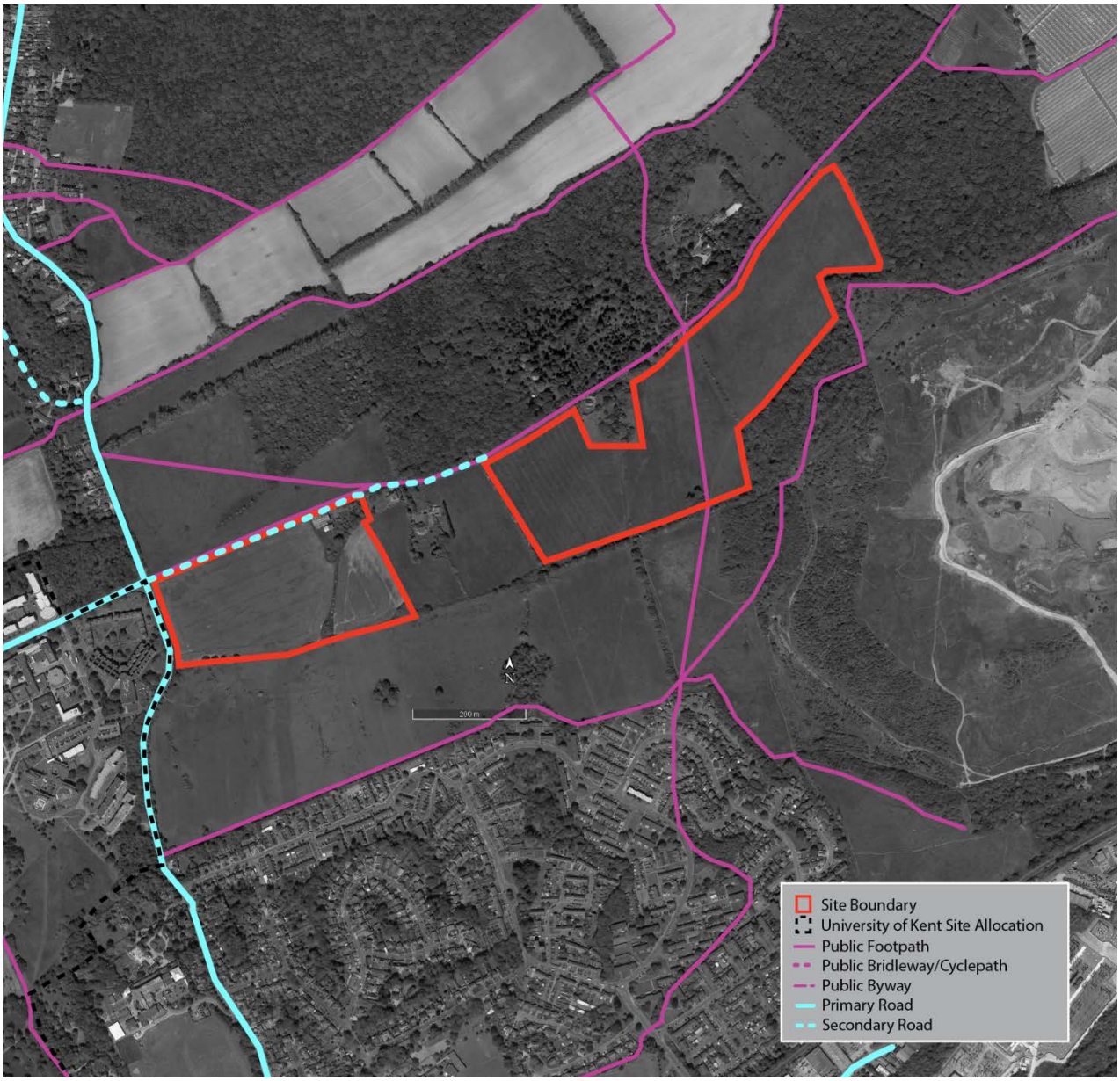


*Figure 7.2 Environmental Key Considerations (Sites E and F)*

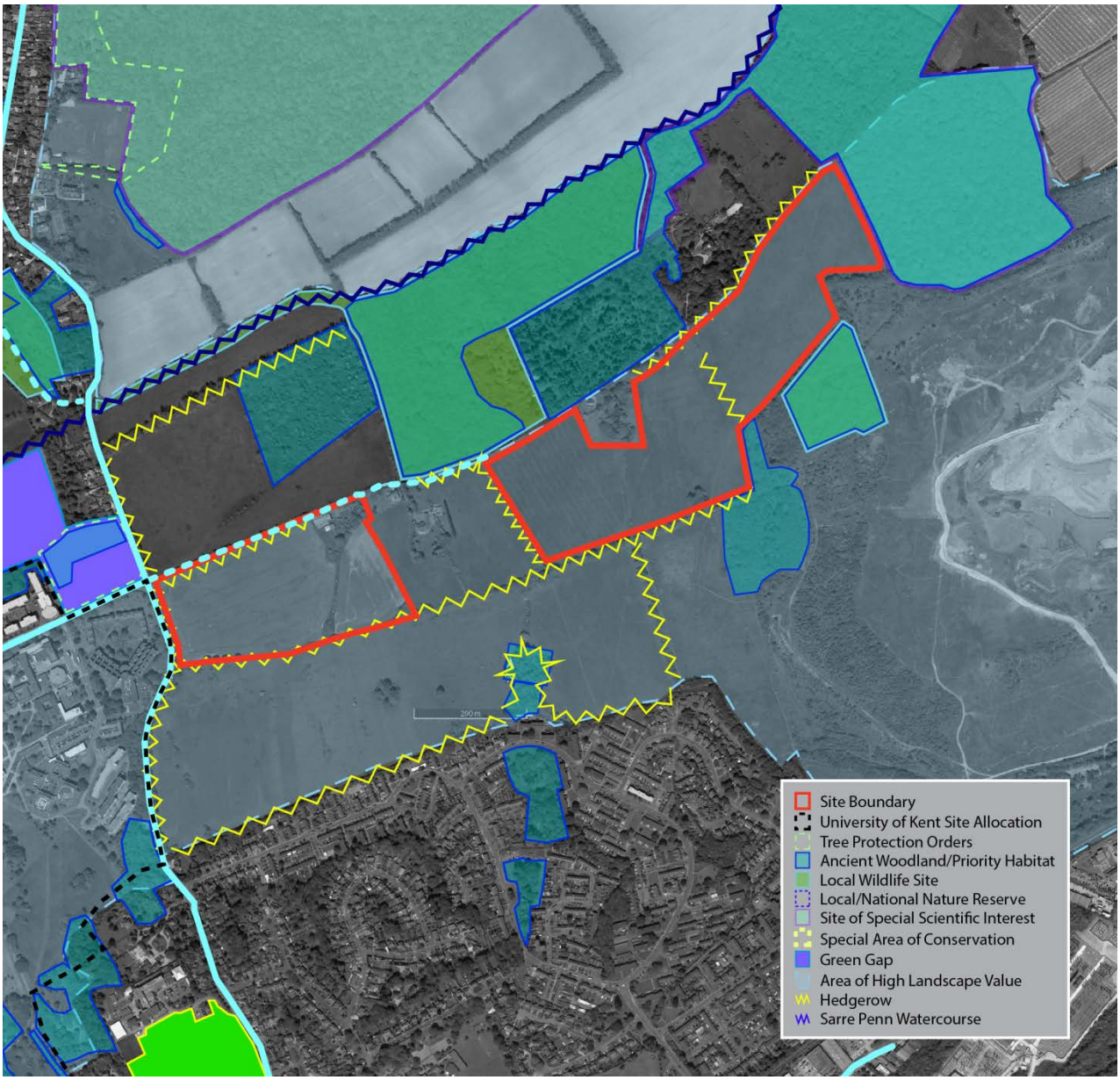
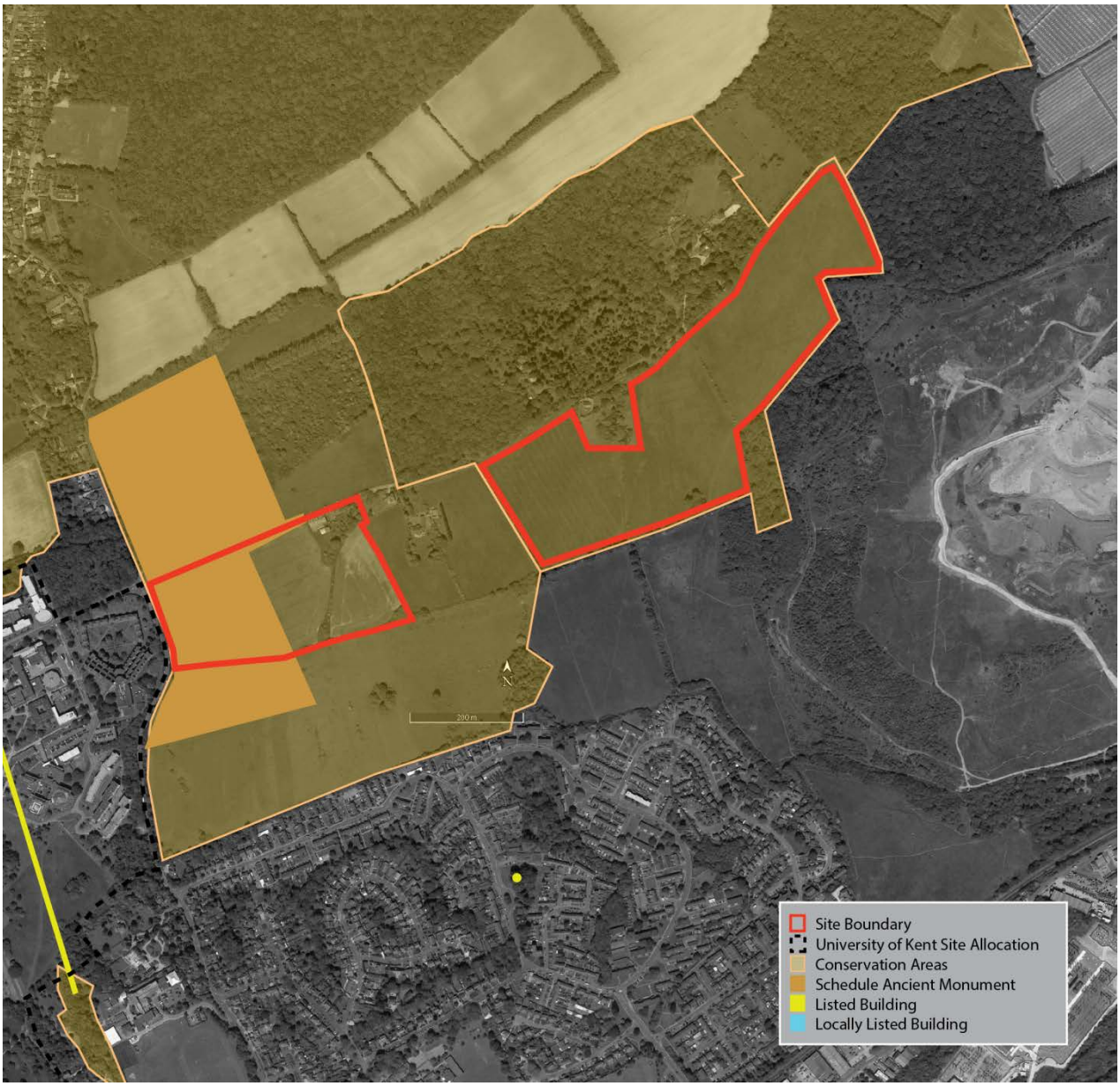


*Figure 7.3 Heritage Key Considerations (Sites E and F)*



# 8. Suitability – Site F

8.1 The matrix below provides a high level appraisal of the suitability of Site F for development for housing or Higher Education and associated uses, to include student housing, commercial employment uses ('knowledge community') and a hotel/conference facility. We note that there may be potential for adjacent land to the west (Site E) to also come forward for development.

8.2 As per the previous section, the appraisal draws upon a review of local plan policy designations and existing evidence, and identifies where further survey and assessment work will be undertaken in due course. Existing evidence is enclosed at Appendices A to O and signposted in the matrix below. The appraisal provides a 'RAG Rating' against each criteria on the following basis: Green (suitable for development); Green/Amber hatched (suitable for development but with known constraints/policy issues that can be satisfied); Amber (likely to be suitable for development – further work required to confirm); Red (unlikely to be suitable for development).

*Table 8.1 Suitability Appraisal (Site F)*

| Criteria | Appraisal | Rating |
|---|---|---|
| Previously developed land | • The Site is wholly greenfield land.<br>• National planning policy supports the development of greenfield land where there is no alternative suitable, available and achievable previously developed land. The evidence on land supply prepared to inform the current Local Plan confirms that there is a very limited supply of suitable available achievable previously developed land in the district. While this evidence base is being updated, we do not consider the position to have changed significantly.<br>• **In the absence of an alternative supply of suitable available achievable previously developed land, greenfield land should be treated as suitable for development in principle (by necessity).** | |
| Agricultural land designation | • Agricultural Land Classification is graded 1 (best) to 5 (worst), with grades 1, 2 and 3a considered the Best and Most Versatile (BMV) agricultural land in planning terms.<br>• Site F is classified as 'Grade 3 – Good to Moderate' agricultural land, with Grade 3a/3b along the northern edges of the site and the remainder southern parts of the site being classified as Grade 3b agricultural land.<br>• NPPF paragraph 171 (with reference to footnote 53) requires that where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of higher quality. While preferred, policy does not preclude the development of better quality land where this is justified by economic and other benefits.<br>• This matter was tested as part of the current Local Plan, where several of the Strategic Site Allocations comprise BMV agricultural land. The Inspector accepted that allocating such land was justified by housing need and broader sustainability considerations.<br>• An updated Agricultural Land Survey and Assessment of the land will be undertaken to support the next round of local plan representations, however at this stage it is assumed that the classification will remain unchanged.<br>• **The loss of BMV agricultural land will be an adverse impact associated with the redevelopment of the site. Nonetheless this should be weighed in the planning balance (having regard to the availability of alternative suitable achievable land and the benefits of developing this land). The site is considered suitable on this basis.** | |
| Flood risk | • Site F is located within Flood Zone 1 (low risk of flooding) and are therefore not at risk of flooding (as per the Environment Agency's on-line flood maps).<br>• The development of the site would be expected to accord with sustainable surface water drainage national planning policy requirements (i.e. maintaining the existing greenfield run-off rates taking into account climate change) to ensure that development does not pose an increased risk of flooding elsewhere. | |

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| | • A Flood Risk Assessment and Surface Water Drainage Strategy will be prepared at the planning application stage.<br>• **The site is suitable for development in flood risk terms.** | |
| Transport | Highways<br>• Access to the site is provided via a private road along the site's northern boundary. The private road connects with the St Stephens Hill/Giles Lane junction adjacent to Site E. Assessment work is to be undertaken to inform the next round of local plan representations, to include identifying the scope of likely capacity upgrade work if needed as well as potential to widen the private access road as needed.<br>• Opportunities to improve existing highway connectivity in conjunction with the development of Site E and/or the development of land to the east (which could potentially connect into the Land at Sturry Road/Broad Oak Strategic Site Allocation and future plans for the landfill site).<br>Bus<br>• The University's main campus is served by 3 bus lines which provide frequent services to/from Canterbury City Centre. An existing bus stop is located on St Stephen's Hill (adjacent to Site E's western boundary) which is served by the Stagecoach No. 5 bus service. This bus stop is approximately 500m west of the site. Opportunities to extend bus services into the site are likely to be challenging.<br>Cyclists/Pedestrians<br>• There is a paved Public Right of Way footpath that runs along the northern boundary of the site (along the private access road) which originates from the St Stephens Hill/Giles Lane junction west of the site and provides direct connection between the University campus and Broad Oak and Sturry to the east.<br>• There is also a footpath running N-S through the site which provides connections towards Canterbury and agricultural and woodland areas north of the site.<br>• **The site is isolated and poorly connected in transport terms. It is unlikely to be possible to satisfactorily address this if the site is brought forward for development in isolation. However, there is potential to address this matter if surrounding land is also brought forward for development (to the east, west and south).** | |
| Heritage | • There are no statutory or locally listed buildings on-site.<br>• The site is wholly located within the Allcroft Grange Conservation Area.<br>• The 'Tyler Hill medieval pottery' Scheduled Ancient Monument (within Site E) lies approximately 500m to the west.<br>• A heritage appraisal to assess the significance of the conservation area is to be undertaken to inform the preparation of the updated masterplan for Sites F. This will be included in representations to the next round of local plan public consultation.<br>• **It is anticipated that the site can be developed without substantially harming the significance of these heritage assets.** | |
| Landscape | • Site F is located within an area designated as an Area of High Landscape Value where development proposals should have particular regard to the historic setting of Canterbury and the World Heritage Site.<br>• The area is also considered more broadly in the Canterbury Landscape Character and Biodiversity Appraisal (which we understand is being updated). It forms part of Landscape Character Area 28 (Stour Valley Slopes).<br>• Site F was not included in the University's Landscape Setting and Views Appraisal and therefore the capacity of the site to accommodate development in landscape terms has not yet been assessed in detail.<br>• The University's Masterplan is to be updated to include this site which will be informed by further landscape/visual impact assessment work which will form part of representations to the next round of local plan consultation.<br>• **It is anticipated that Site E will have some capacity to accommodate development without adverse landscape impacts, however this will be confirmed through further evidence work.** | |
| Minerals | • **Site F is not located within a mineral safeguarding area and therefore is suitable for development in mineral policy terms.** | |
| Ecology/biodiversity | • A Preliminary Ecological Appraisal (Phase 1Habitat Survey) was undertaken to inform the University Framework Masterplan but did not specifically include any detailed assessments of Site F, but the intention is to update the PEA to include Site F to inform local plan representations.<br>• Online Magic Mapping of the site suggests the site is comprised of improved grassland and is bounded by a series of hedgerows. These features may | |

| | | |
|---|---|---|
| | comprise suitable habitat for protected species which will require species specific surveys at the planning application stage and appropriate mitigation strategies identified and secured. Surveys likely to be required include:<br>- Bats<br>- Dormice<br>- Badgers<br>- Great Crested Newts<br>- Reptiles<br>- Breeding birds<br>- Invertebrates<br>• Site F is bounded along its eastern boundary by the 'West Blean and Thornden Woods Site of Specific Scientific Interest (SSSI)'. The site is also within a 'SSSI Impact Risk Zone' requiring consultation with Natural England.<br>• Site F is bounded by the 'Little Hall and Kemberland Woods and Pasture' along its northern boundary and southeast corner. Both woodlands are designated as 'Deciduous Woodland Priority Habitat' and are partially comprised of designated Ancient Woodland.<br>• The site is also within the Zone of Influence of the Thanet Coast and Sandwich Bay Special Protection Area (SPA). Habitats Regulation requirements in terms of Screening and potential Appropriate Assessment will need to be satisfied at the planning application stage. Mitigation measures to manage access/e recreation pressure on these designated sites are to be identified and worked into the masterplan as part of an Environmental Strategy<br>• Site F is wholly located within 'The Blean' Biodiversity Opportunity Area<br>• SiteF is partially located within a National Habitat Network 'Network Enhancement Zone 2'.<br>• **The site is likely subject to ecological constraints either within the site or due to adjacent habitat features. Further survey work will be required in order to determine suitability, alongside a sound ecological strategy. This is to be prepared to inform masterplanning work and will be submitted as part of representations to the next round of local plan consultation.** | |
| Noise | • There are no known noise sensitive receptors or significant sources of noise in the local area that would make the site unsuitable for development.<br>• A Noise Impact Assessment would be undertaken at the planning stage.<br>• **The site is suitable for development in noise terms.** | |
| Air quality | • The site is not located within an Air Quality Management Area with the closest being located 1.5km to the south along Broad Oak Drive.<br>• There are no known air quality issues that would make the site unsuitable for development, nonetheless this should be confirmed by survey work (including in respect to the waste site to the south east).<br>• The construction and operational stage of development may have an adverse impact on air quality through construction dust and an increase in vehicle based emissions (this will likely fall away in the medium-long term due to the shift to electric vehicles). There are a number of sensitive sites in the local area that could be affected by this.<br>• A strategy is to be prepared to inform the preparation of development proposals and to manage future development to ensure that the potential for adverse impacts on off-site ecological assets is managed and mitigated where appropriate.<br>• An Air Quality Impact Assessment would also be undertaken at the planning application stage.<br>• **The site is suitable for development in air quality terms.** | |
| Ground conditions | • The majority of the site is within a 'unproductive' groundwater vulnerability area, with a small section having a 'low' value.<br>• Site F comprises 'Slowly Permeable Seasonally Wet Slightly Acid but Base-Rich Loamy and Clayey Soils'.<br>• **There are no known Ground Condition constraints that have been identified – The site is suitable for development.** | |
| Utilities | • The existing university campus is served by all utilities and at this stage it is anticipated that these could be extended into the site (alongside appropriate capacity upgrades) in conjunction with Site E<br>• **The site could be made suitable for development in utilities terms.** | |

8.3 Figures 7.1 to 7.3, in the previous section, illustrate suitability considerations.

# 9. Availability

9.1 The University of Kent holds the freehold title to all land promoted in this submission with the exception of a small area of land adjacent to the Main Campus on Giles Lane (which forms part of the Main Campus site). Title plans and reports for the University's land is enclosed at Appendix O.

9.2 The Giles Lane land is in full control of Giles Lane Investments who, alongside the University and St Edmunds School, own the land and are working together to bring the site forward for redevelopment.

9.3 There are no restrictive covenants (or similar constraints) on the land that prevents it being brought forward for development.

9.4 The University (and the 3rd party) confirm that the land is available for development now.

# 10. Achievability

### Main Campus

10.1 The University Masterplan includes an implementation strategy that sets out its intended approach to delivering the proposed development on the Main Campus. As described in the Masterplan, this comprise a combination of 'asset management' type works required to sustain the University alongside development necessary to expand and broaden the offer of the University (to include introducing complementary commercial uses associated with its aim of being a 'knowledge community', including the hotel/conferencing facility.

10.2 The achievability of this is dependent on generating value from the sale of the Disposal Sites. We note that future land receipts will be fully reinvested into the University.

10.3 As noted in the previous section, Giles Lane Investments are working with the University and St Edmunds School to bring forward the Giles Lane site for development for student housing.

### Disposal Sites (Sites BCD, A, E and F)

10.4 The University has appointed Land Agents (Avison Young) to provide market/development advice on the development potential of the disposal sites.

Market Appraisal

10.5 An appraisal of market conditions for the proposed (non-Higher Education related) uses is enclosed at Appendix D. This concludes the following:

- **Housing** – The market fundamentals are strong in this location. There would be good market demand for new housing in this location (Sites A, BCD, E);
- **Offices** – The market will support small scale office development as part of a wider residential-led mixed use scheme or one that complements (slots into) the existing University campus on Sites A, E and B;
- **Industrial** – There would be limited demand for industrial development in this location; and
- **Hotel** – Sites A, B and E offer potential to support a hotel/conferencing facility.

Delivery

*Site BCD*

10.6 The University does not intend to act as developer for Site BCD. Its intention is to sell the site onto a developer who will take it forward. There are a wide range of potential routes available to the University, ranging from a simple disposal to a 3rd party to different partnership options. The options each have advantages and disadvantages in terms of financial return; risk; control; resource requirements; and procurement complications. Avison Young currently advising the University on the most appropriate approach, which is expected to be agreed by end 2020.

10.7 Notwithstanding which delivery option the University chooses, site BCD would be an attractive proposition for strategic land/master developers as well as some of the larger plc housebuilders. We would expect both to

partner with a Registered Provider (for the purposes of delivering the affordable housing component) and would likely to deliver a range of product (in terms of style, unit size, and unit type) likely with 3-4 outlets running in parallel. We would anticipate a completion rate of around 50 units per year per outlet (200 per year in total), with a total delivery period of 10-15 years when accounting for market fluctuations.

10.8 Avison Young intend to undertake soft market testing with housebuilders/developers over the course of 2020 to inform the update to the University masterplan, and to help ensure the deliverability of the disposal site proposals. The results of this will form part of future representations to the local plan.

*Sites A, E and F*

10.9 Again, the University does not intend to act as the Developer for Sites A, E and F. There are a range of options open to the University from straightforward disposals of the individual sites to more complex partnering arrangements which will likely be part of a wider delivery strategy including sites A,B,C,D,E and F.

10.10 It is possible for the sites to be sold individually to hotel/conference centre or office developers and this potential will be explored through some informal soft market testing during 2020. Alternatively the sites could form part of the wider opportunity, offering a complimentary mix of uses to be delivered by a master developer either as a straightforward disposal or a through a more complex partnering agreement with the University.

Viability

10.11 On the basis of the market appraisal, it is anticipated that the proposed development for the Disposal Sites will be viable. The update to the University's Masterplan (to incorporate the updated proposals for the Disposal Sites) will be informed by viability testing to refine the proposals. Viability appraisal evidence will be submitted to the Council as part of future representations.

# 11. Conclusion

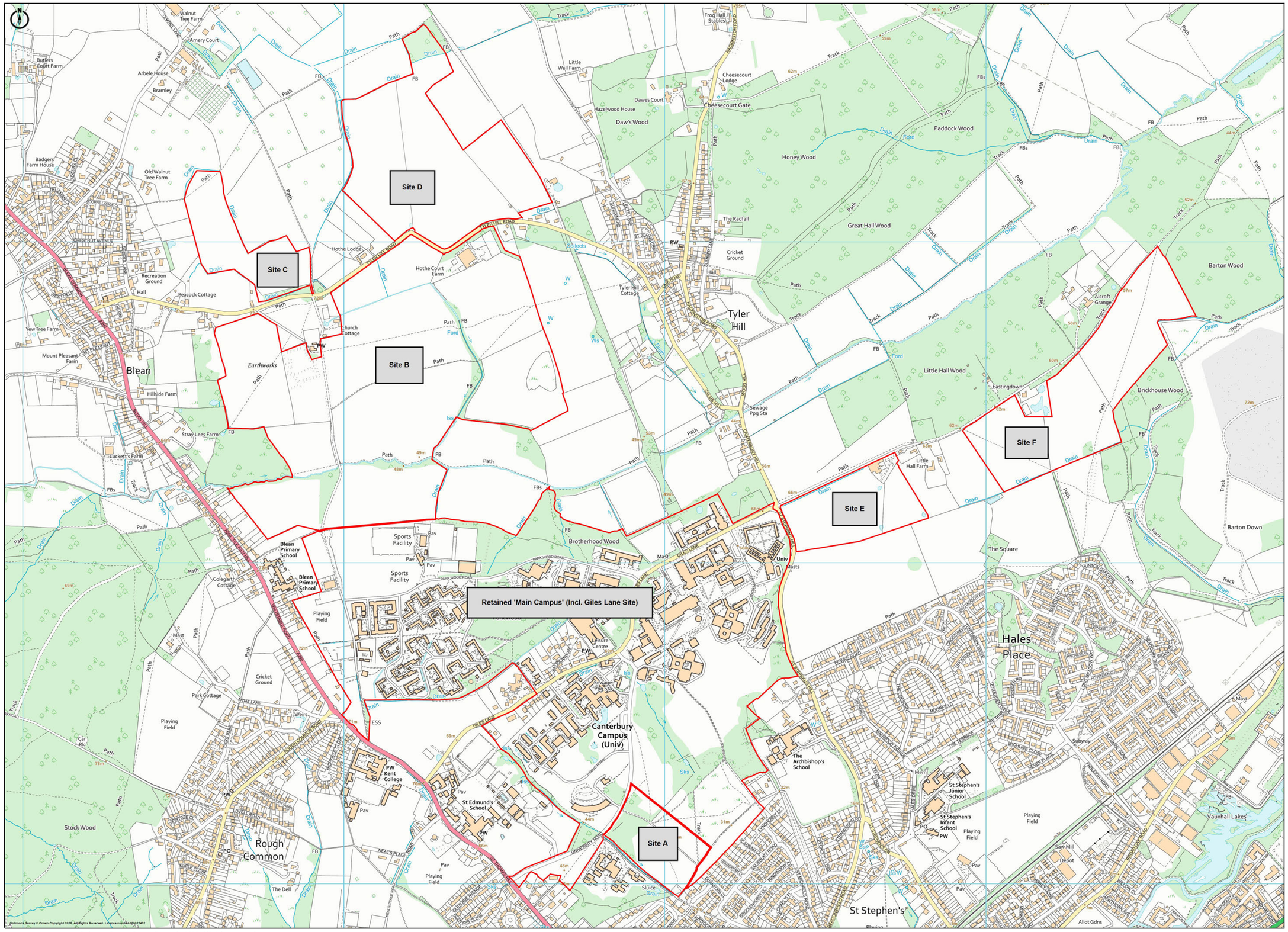
11.1 The sites presented in this document are uniquely suitable for development in that they offer the opportunity to satisfy very significant economic and social needs that otherwise would not be capable of being met. They are also available and achievable and therefore comprise deliverable sustainable development opportunities.

11.2 As noted throughout this submission, the University is in the process of preparing further evidence to demonstrate suitability and achievability matters which it aims to complete by end 2020 and submit to the Council as part of future representations to the emerging Local Plan. It intends to seek to discuss and agree the scope of this evidence with the Council, however it is anticipated that this will comprise the following:

- Agricultural Land Survey and Assessment;
- Updated Transport and Access Strategy;
- Updated Historic Asset Appraisal;
- Updated Landscape and Visual Impact appraisal;
- Minerals Assessment;
- Updated Preliminary Ecological Appraisal;
- Environmental Strategy (to include air quality and ecology considerations);
- An update to the University Masterplan to include addendum documents to cover the disposal sites;
- Delivery strategy (including viability and soft market testing).

# Appendix A
# Site Location Plan, Site Plans, Aerial Photograph

# University of Kent - Call for Sites - Site Location Plan




Promap V2 LANDMARK INFORMATION

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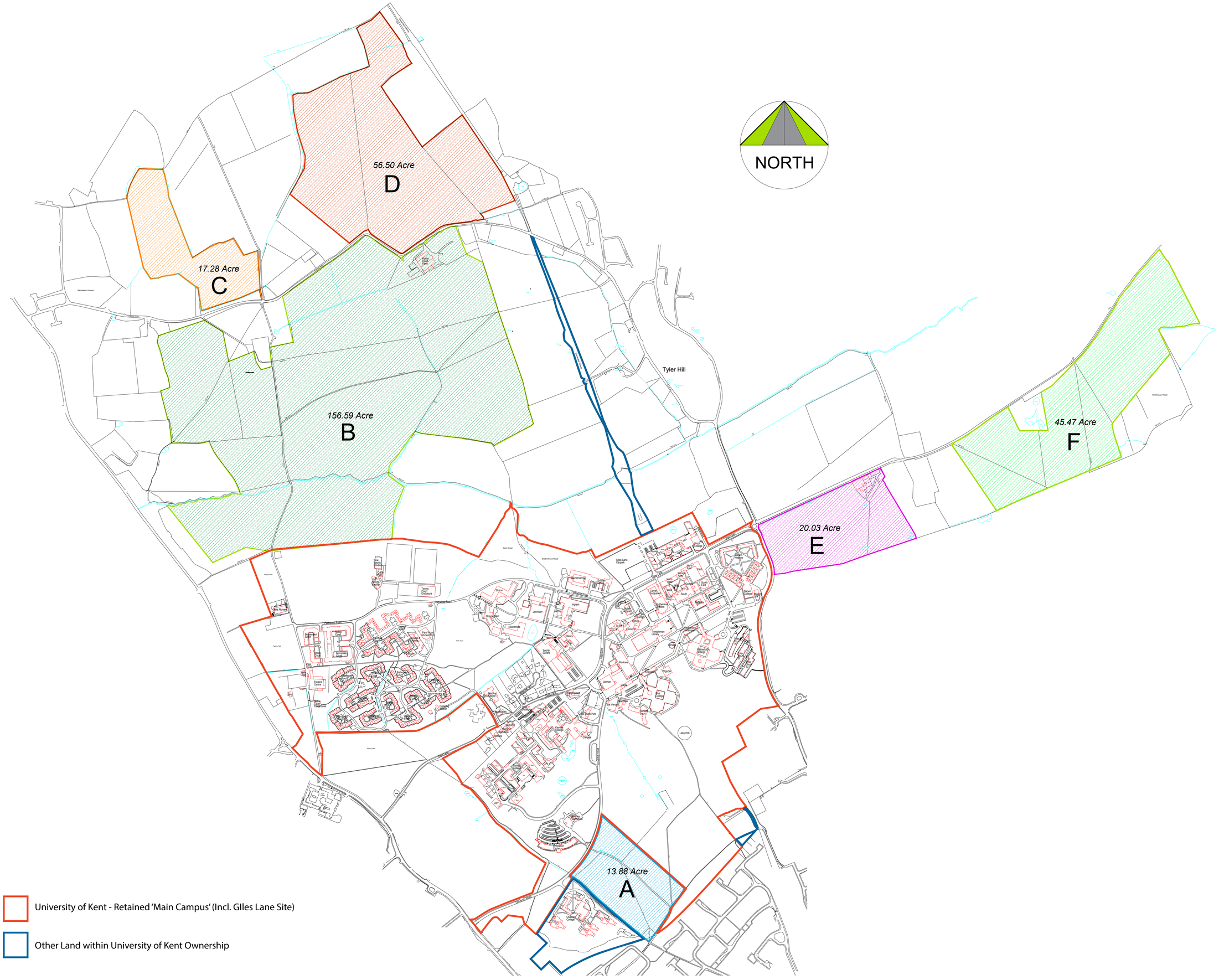
Licence number 100022432.
Plotted Scale - 1:8000. Paper Size - A2

AVISON YOUNG




University of Kent - Retained 'Main Campus' (Incl. Glles Lane Site)

Other Land within University of Kent Ownership

University of Kent

**Drawing Title**

Site Location Plan - Call for Sites

**Project Title**

Estates Department
University of Kent
Canterbury
Kent. CT2 7NZ

**Scale** –
1:5000 @ (A1) *unless otherwise stated*

| DRAWING NO | U5-5-16-003 |
|---|---|

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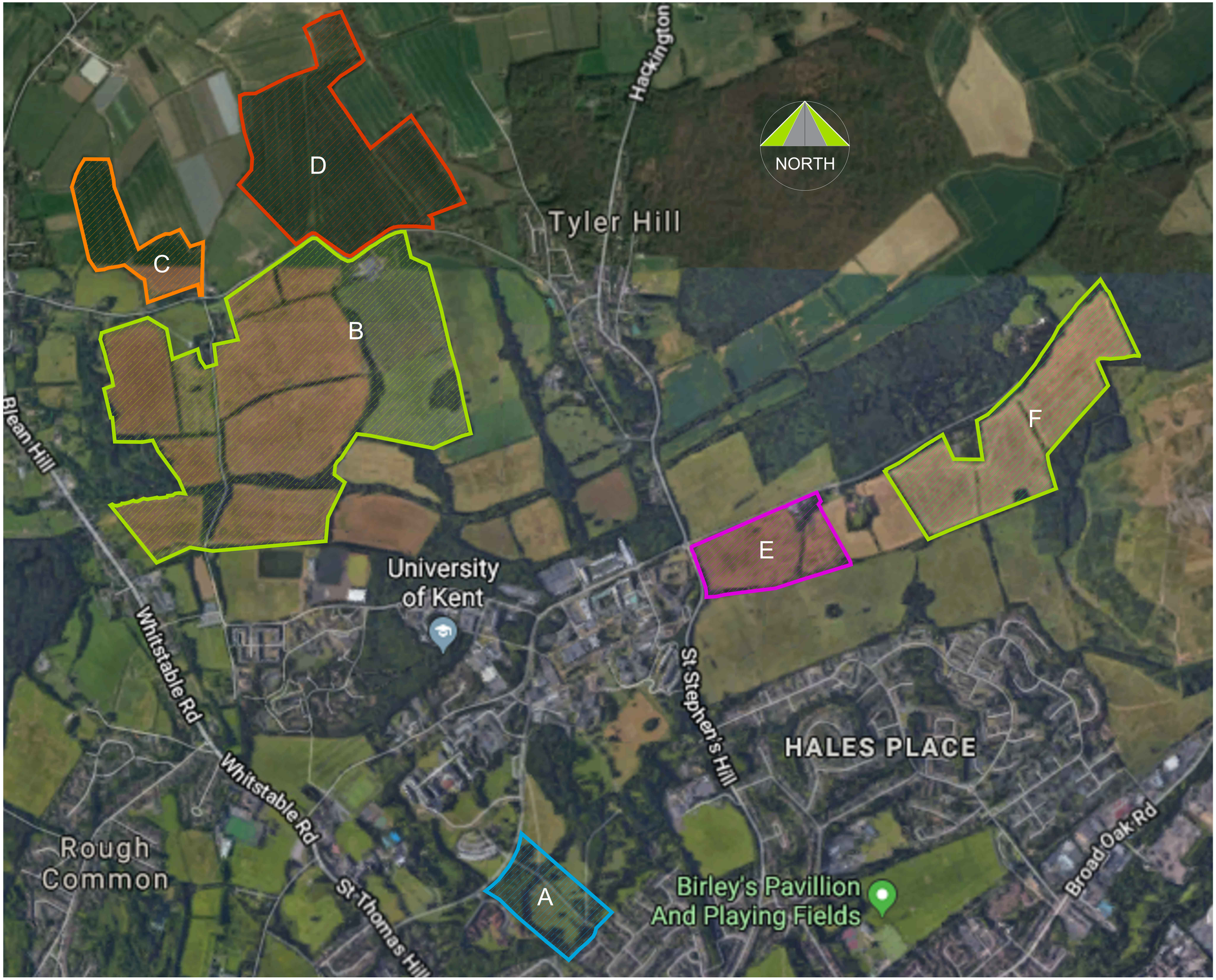
**Estates Department**
**Canterbury ,Kent, CT2 7NN.UK**




| DRAWING NO | U5-5-17-001 |
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| Revision No. | Date | Description |
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| Rev 001 | 16.05.19 | Boundary update against GoogleMaps |
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University of Kent

**Drawing Title**

Land Development
Acreage Plan

Background - GoogleMaps

**Project Title**

Estates Department
University of Kent
Canterbury
Kent. CT2 7NZ

| Scale– 1:5000 @ (A1) approximate scale | Date– 16.05.19 |
|---|---|
| | Drawn– Neil Hornsey |
| DRAWING NO | U5-5-17-001 |

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# Appendix B
# Giles Lane Site Details

# Giles Lane - Site Location Plan

Promap V2
LANDMARK INFORMATION

**Ordnance Survey** © Crown Copyright 2020. All Rights Reserved.
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Plotted Scale - **1:1250**. Paper Size - **A4**

AVISON YOUNG

# Appendix C
# The Economic Impact of the University of Kent

# THE ECONOMIC IMPACT OF THE UNIVERSITY OF KENT

Viewforth Consulting Ltd, April 2018

Viewforth Consulting Ltd
www.viewforthconsulting.co.uk

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# Executive Summary

This study was commissioned by the University of Kent. It was undertaken in early 2018 and is a 'snapshot' of the economic impact generated by the University in the academic and financial year 2015/16 (the latest year for which data were available.)

The study undertook modelled analysis of the expenditure of the University of Kent as well as the personal (non-fee) expenditure of University of Kent Students.

The University has campuses in Canterbury and Chatham as well as a study centre in Tonbridge, Kent. The study included detailed modelled analysis of the distribution of university impact flowing out from the two campuses at Canterbury and Chatham (Medway), across Kent and the rest of the South East as well as the impact on the UK as a whole.

**Key Results for impact on the local and regional economy**

**Impact on Canterbury**

**Output**

- The University of Kent generated £342.9m (directly and through secondary or 'knock-on' effects) in Canterbury itself, with an additional £142.9m of output generated by the personal expenditure of students, making a total of £485.7m of output in Canterbury.

**Employment**

- The University directly provided 2969 full-time equivalent (FTE) jobs in Canterbury and generated a further 1166 FTE jobs in the city. Added to this are the 1242 FTE jobs in the City created by the personal expenditure of students to make a total of 5377 FTE jobs in Canterbury dependent on the University's activities. This is equivalent to 10% of Canterbury 2015 employment.

**GVA**

- The University generated £208.5m of GVA (directly and through secondary or 'knock-on' effects) in Canterbury itself, with an additional £67.3m of GVA generated in Canterbury businesses by the personal expenditure of students, making a total of £275.8m of GVA in Canterbury. This was equivalent to 9% of Canterbury GVA.

**Impact on Medway Towns**

**Output**

- The University of Kent generated £38.1m (directly and through secondary or 'knock-on' effects) across Medway area with an additional £19.5m of output generated by the personal expenditure of students, making a total of £57.6m of output in the Medway Towns.

**Employment**

- The University generated 404 full-time equivalent (FTE) jobs across the Medway Towns. Together with 169 FTE jobs in Medway created by the personal expenditure of students this made a total of 573 FTE jobs in Medway dependent on the University's activities. This was equivalent to 0.8% of Medway 2015 employment.

**GVA**

- The University generated £24.1m of GVA ( directly and through secondary or 'knock-on' effects) in Medway Towns, with an additional £9.2m of GVA generated in Medway businesses by the personal expenditure of students, making £33.3m of GVA in the Medway Towns. This was equivalent to 0.7% of Medway GVA.

**Impact on Kent as a whole (including Canterbury and Medway Towns)**

**Output**

- The University of Kent generated £423.1m (directly and through secondary or 'knock-on' effects) across Kent (including Canterbury and Medway Towns), with an additional £211.4m of output generated by the personal expenditure of students, making a total of £634.5m of output in Kent.

**Employment**

- The University generated 4988 full-time equivalent (FTE) jobs across Kent (including in Canterbury and Medway Towns). Together with 1837 FTE jobs in the county created by the personal expenditure of students this made a total of 6825 FTE jobs in Kent dependent on the University's activities. This was equivalent to 1.4% of Kent 2015 employment.

**GVA**

- The University generated £254.5m of GVA (directly and through secondary or 'knock-on' effects) in Kent, with an additional £99.5m of GVA generated in Kent businesses by the personal expenditure of students, making £354m of GVA in Kent. This was equivalent to nearly 0.9% of Kent GVA.

**Total Impact on the South East Region of England**

**Output**

- The University of Kent generated £549.7m (directly and through secondary or 'knock-on' effects) across the South East Region with an additional £357.9m of output generated by the personal expenditure of students, making a total of £907.6m of output in the South East.

**Employment**

- The University generated 6338 full-time equivalent (FTE) jobs across the South East. Together with 3110 FTE jobs in the South East created by the personal expenditure of students this made a total of 9448 FTE jobs in the South East dependent on the University's activities. This was equivalent to just over 0.19% of South East 2016 workforce jobs.

**GVA**

- The University generated £320.6m of GVA ( directly and through secondary or 'knock-on' effects) in the South East, with an additional £168.5m of GVA generated in South East businesses by the personal expenditure of students, making £489.1m of GVA in the South East. This was equivalent to 0.2 % of South East GVA.

**Total Impact on the UK[1]**

**Output**

- The University of Kent generated £594.3m (directly and through secondary or 'knock-on' effects) across the UK with an additional £371.8m of output generated by the personal

[1] To take account of displacement issues, the impact of UK domestic students on the rest of the UK outside the South East is disregarded.

expenditure of students and their visiting family and friends, making a total of £966.1m of output in the UK.

**Employment**

- The University generated 6706 full-time equivalent (FTE) jobs across the UK. Together with 3206 FTE jobs in the UK created by the personal expenditure of this made a total of 9912 FTE jobs in the UK dependent on the University's activities.

**GVA**

- The University generated £342.1m of GVA (**directly** and through secondary or 'knock-on' effects) in the UK, with an additional £174.2m of GVA generated in UK businesses by the personal expenditure of students, making a total contribution to UK GDP of £516.4m.

**Export Earnings**

- The University was a significant export earner for the UK in 2015/2016. Non EU students paid £36.4m in fees and fees paid by students from the rest of the EU was estimated to be £13.4m. The University earned a further £14.5m for research and other services paid from international sources. Added to this was the estimated £77.4m of off-campus personal spending of international students, making a total of £141.7m in export earnings.

# Background to the Study

This study was commissioned by the University of Kent. It was undertaken in early 2018 and is a 'snapshot' of the economic impact generated by the University in the academic and financial year 2015/16 (the latest year for which data were available.)

The study undertook modelled analysis of the expenditure of the University of Kent as well as the personal (non-fee) expenditure of University of Kent Students.

The University has campuses in Canterbury and Medway as well as a study centre in Tonbridge, Kent. The study included modelled analysis of the distribution of university impact flowing out from the two campuses at Canterbury and Medway across Kent and the rest of the South East as well as its impact on the UK as a whole.

## Data Sources and Methodology

Data used included information relating to the University's income and expenditure, staff and student numbers from Higher Education Statistics Agency ( HESA) data for 2015/16, supplemented by more detailed information on finance , staffing and student numbers by domicile of origin provided by the University of Kent itself. Other data sources included the Office of National Statistics labour market and economic data (including NOMIS[2] and other official data and a number of University of Kent's own published documents such as the Annual Report and Financial Statements.

Impact on the UK and South East Region was modelled using an input output model of the UK with a regional extension (using location quotients) for the South East. This model was purpose built for modelling higher education impact and has been used for many other university impact studies

[2] See: https://www.nomisweb.co.uk/

across the UK including those undertaken for major HE agencies and government departments as well as individual universities.[3] The model includes analysis of direct and secondary effects.[4]

The distribution of regional impact from Canterbury and Medway Towns across Kent and the rest of the South East was then analysed through the construction of a University of Kent-specific 'Gravity Modelling System.' This purpose-built Gravity Modelling System combined a range of mass and distance variables[5] to model flow of impact out from 2 key points of initial impact in the South East (Canterbury and Chatham) to reflect the 2 main centres of university campus activity. The distribution of impact from each initial point was modelled and the results were then combined to be able to present the overall flow of University of Kent impact across the South East.

Impact results are presented in terms of impact on output, FTE employment and GVA. Outcome multipliers were calculated for the University (i.e., for example, how many jobs are generated outside the University for every job inside the University) and these are included in Appendix Two. It is important to note that this study involved detailed and bespoke analysis of the University of Kent and its impact. It did not use or 'borrow' multipliers from any other study or modelling system – the outcome multipliers presented are University of Kent-specific and are derived from the modelled results. This is only possible in studies which comprise original and bespoke modelling.

# About the University of Kent

The University of Kent has its main campus base in Canterbury on the South East Coast of England. It has an additional campus in Medway, as part of the Universities at Medway collaboration on the historic dockyard site at Chatham. It also has a study centre in Tonbridge, Kent as well as postgraduate centres in Brussels, Paris, Athens and Rome. The University was granted its Royal Charter as a University in 1965. It has a strong international outlook with an emphasis on building international links and partnerships across Europe and beyond. It has a wide academic portfolio including Humanities, Science, Social Science and Business.

# Finance, Students and Staffing

## Finance

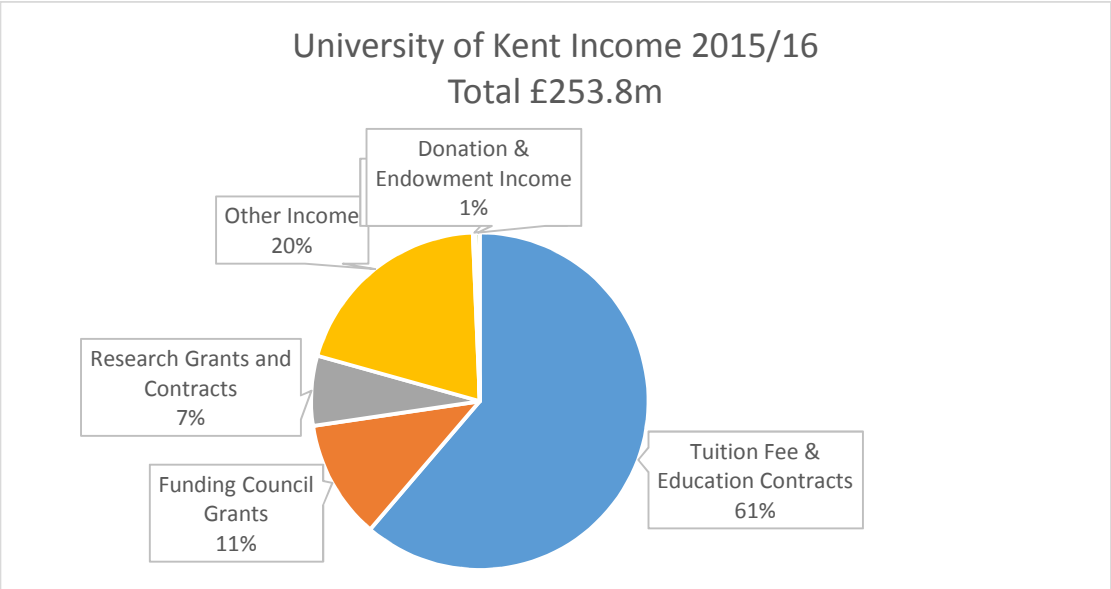
In 2015/16 the University reported a total income of £253.8 million with expenditure in the same year of £247.7m. The majority of university income came from tuition fees (61%). Higher Education Funding Council grants accounted for a further 12% and research contract funding made up 7%. The University also earned 20% of its income from other sources including for residence and catering, consultancy and other services, with donations and endowments making up 1% of its overall income (Figure 1.)

[3] This model was originally constructed as part of work for Universities UK in modelling UK higher education impact. The full mathematical specification of the model can be found in annexe B of the 2014 Universities Uk report *The impact of universities on the UK economy* http://www.universitiesuk.ac.uk/policy-and-analysis/reports/Pages/impact-higher-education-institutions-uk-economy.aspx

[4] Secondary effects incorporate **both** indirect and induced effects.

[5] ( Labour Market data from *Nomis* https://www.nomisweb.co.uk/ combined with travel time by road )

*Figure 1: Income of the University of Kent 2015/16*

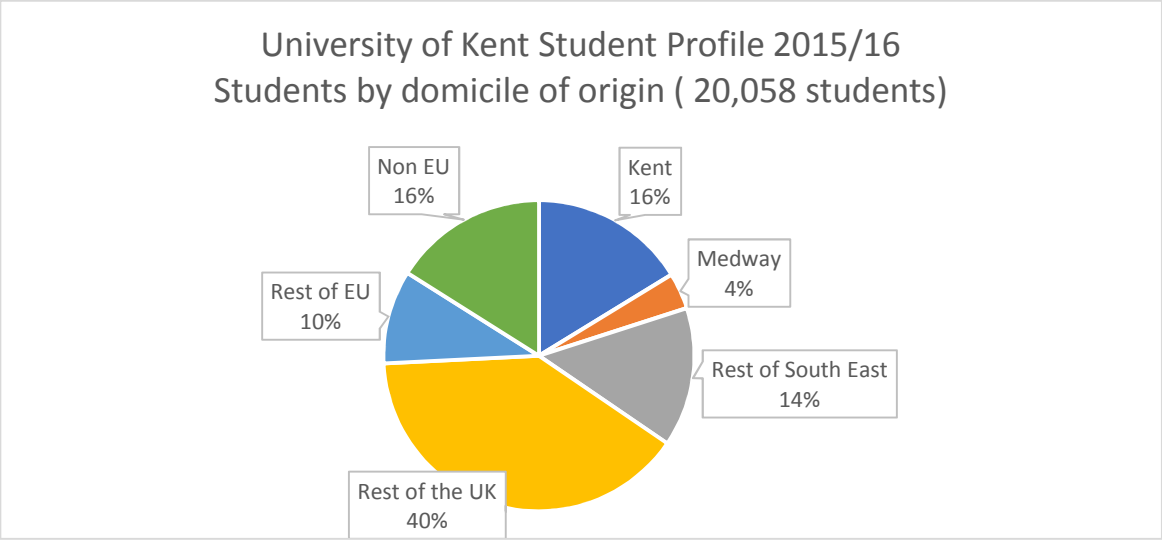



Source: *HESA Finances 2015/16*

## Students

With over 21,600 students, the University provides opportunities for local students as well as acting as a magnet to attract highly qualified applicants from the rest of the UK and further afield. Figure 2 shows where students come from. In 2015/16, 16% of students came from Kent, 4% from Medway and 14% from other parts of the South East. 40% of students came from other parts of the UK and 26% of the overall student population were international students (with 16% from non-EU countries and 10% from EU countries.)

*Figure 2: University of Kent Student Profile 2015/16*



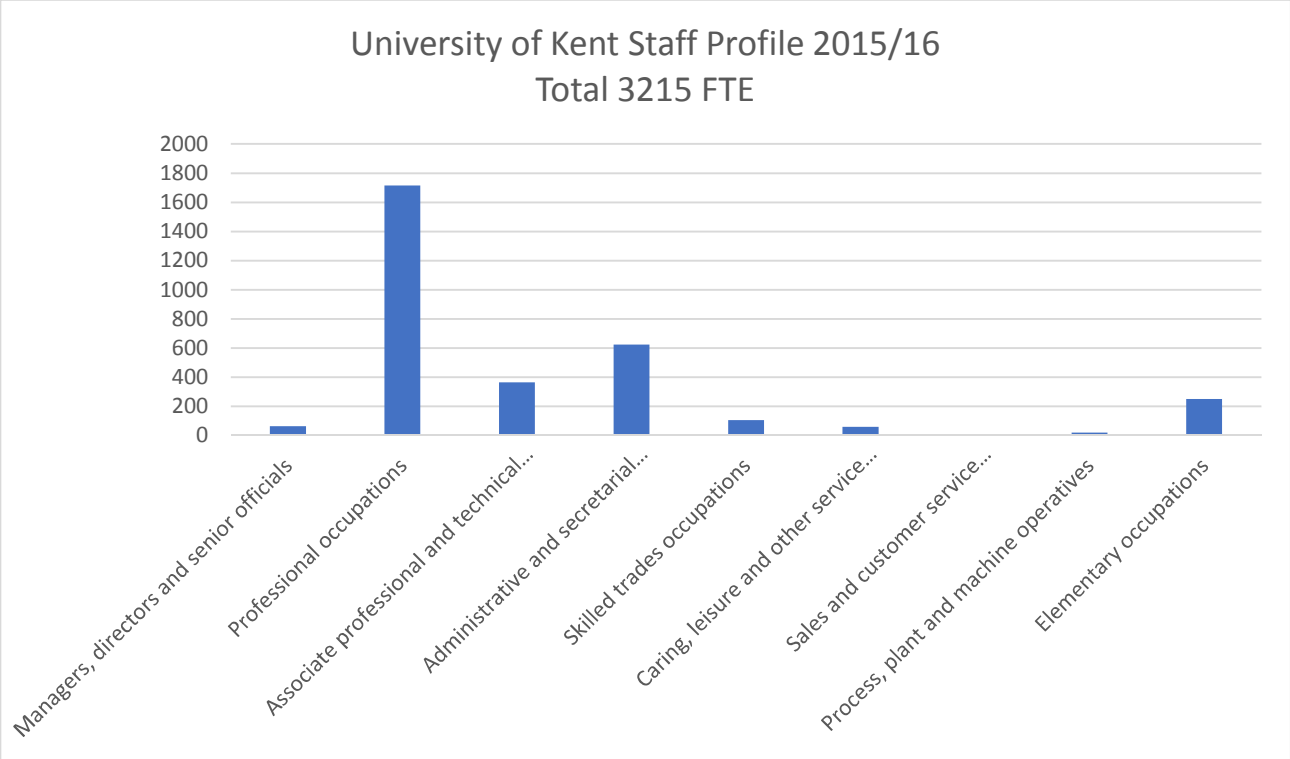

*Source: Student data provided by the University of Kent*

## Staff

The University directly employed over 3,900 staff which translated into 3215 FTE. Figure 3 shows the overall profile of staff occupations. There are staff in nearly every occupational category but with a clear specialism in 'white collar' particularly professional positions. All academic staff are included in SOC 2

Professional occupations as are a number of support staff such as Librarians. The apparently small number of Managerial staff is reflects the university structure where a number of senior management positions will be held by people who are also classified as academic staff.

*Figure 3: University of Kent Staff Profile 2015/16*




*Source: HESA Staff in Higher Education 2015/16*

## Export Earnings

The University was a significant export earner for the UK in 2015/2016. Non EU students paid £36.4m in fees and fees paid by students from the rest of the EU was estimated to be £13.4m. The University earned a further £14.5m for research and other services paid from international sources. Added to this was the estimated £77.4m of off-campus personal spending of international students, making a total of £141.7m in export earnings.

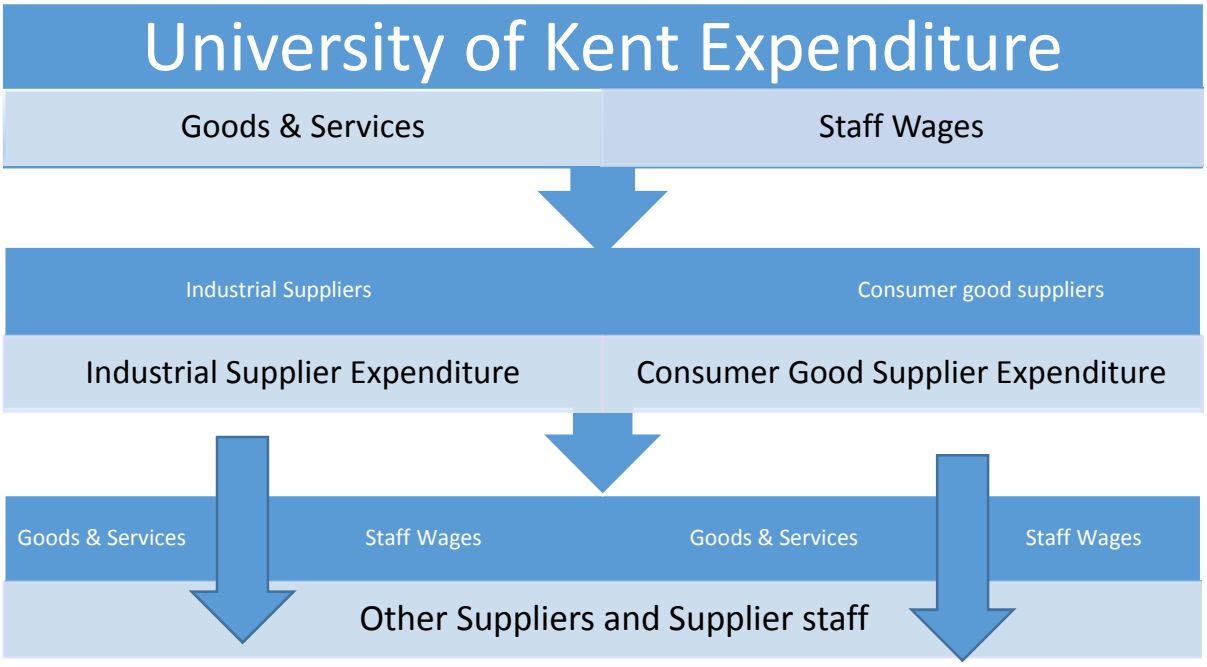
# Modelling economic impact

## University of Kent Impact on the UK

The University of Kent spent nearly £248 million in 2015/16. Through this expenditure (including staff costs as well as general operating expenditure) the University generated employment and output throughout the economy as well as contributing to GDP. Figure 4 illustrates the process through which this is achieved.

In order to fulfil University of Kent orders, University of Kent suppliers spend money with their own suppliers, who in turn hire staff and buy in supplies from others, who in turn would spend money with their suppliers and so on, with impact rippling through the economy. University staff expenditure in shops and on consumer goods creates income and generates demand for other consumer goods and service, and so on.

*Figure 4: University of Kent Expenditure generating economic activity*

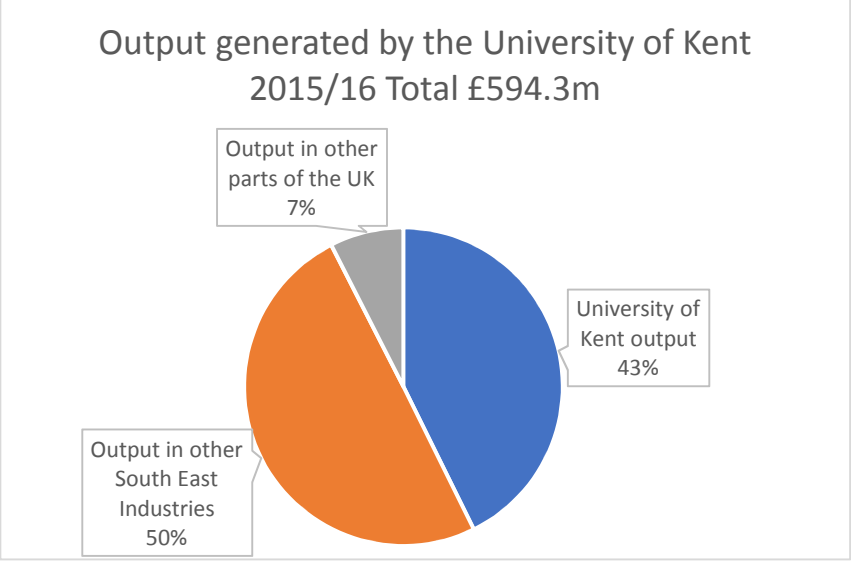



## Impact on UK Output

The direct output of the University of Kent came to £253.8m.[6] It generated additional output of £340.5m in other industries through its expenditure. Overall the University of Kent generated total output in the UK of £594.3m. This is shown in Figure 5.

The majority of the impact (93%, including the University's own output) was in the South East region with 7% flowing to other parts of the UK.

*Figure 5: Total Output Impact on the UK and South East of England*



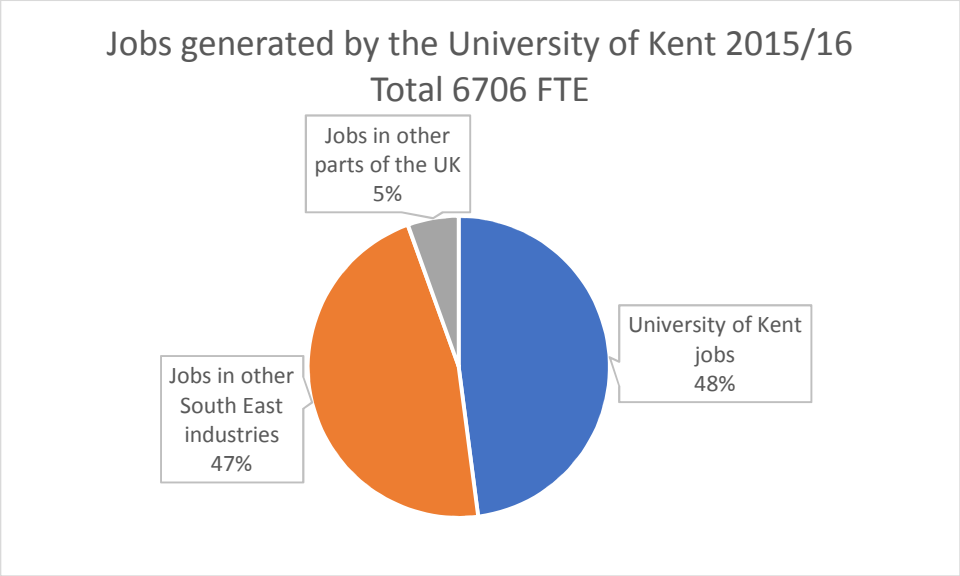

*Source: Viewforth Modelled Analysis 2017*

[6] The income or 'turnover' of the University is equivalent to its direct output.

## Impact on UK employment

Total employment generated by the University came to 6706 full-time-equivalent jobs in the UK. 3215 of these were jobs in the University itself, with a further 3123 created outside the University in other parts of the South East and additional 368 FTE jobs in the rest of the UK. This is shown in Figure 6.

*Figure 6: Total UK Employment generated by the University of Kent 2015/16*

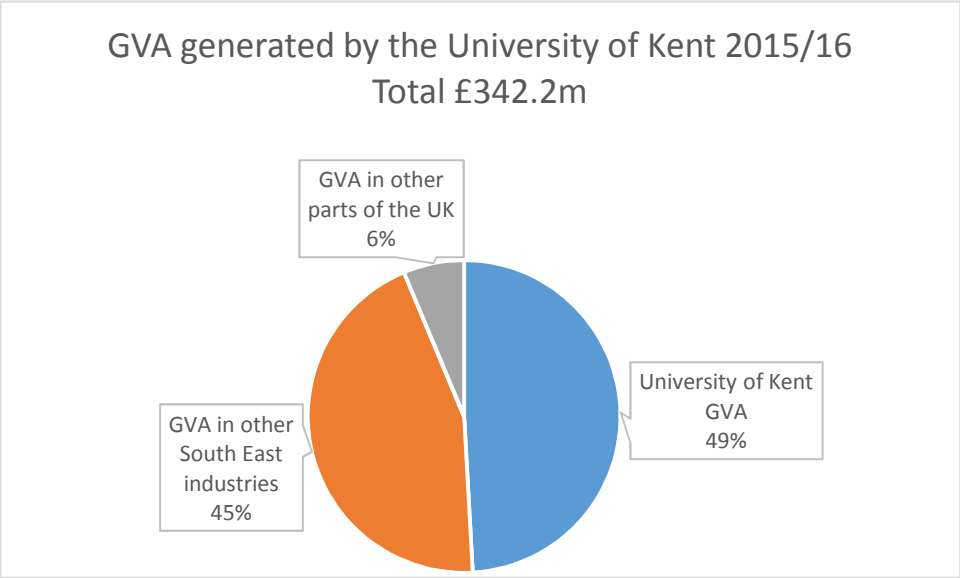



*Source: Viewforth Modelled Analysis 2017*

## Impact on GDP

The total impact on UK GDP[7] of the University of Kent amounted to £342.1m. This includes the University of Kent's direct GVA[8] of £168.3m (49% of the total) and a further £152.3m in other South East industries and £21.6m in the rest of the UK. This is shown in Figure 7.

*Figure 7: GVA generated by the University of Kent*




*Source: Viewforth Modelled Analysis 2017*

[7] Gross Domestic Product
[8] Gross Value Added - the industry and firm level measure of contribution to GDP

### Additional impact on the UK of international student personal spending.

Results for the impact of all student personal expenditure on the economy is presented as part of the impact on the regional and local economies. However when considering total UK impact only expenditure of international students would normally be considered as only international student personal expenditure is 'additional' to the UK economy. The personal spending of the 5174 International students attracted by the University of Kent (students from both non EU and EU countries) was estimated to be £77.4m. This expenditure generated £106.2m of output, 898 FTE jobs in the UK and contributed £49.2m to UK GDP.

## Regional and local impact

### Modelling distribution of impact across the South East

Modelling the local and regional dimension of the University of Kent impact was of particular interest for this study. As well as the importance of the University in supporting regional innovation and growth through its research and teaching, as a large enterprise in itself the University has a de facto important influence on the local economy. With campuses in Canterbury and in Medway the distribution of impact will also be more diffuse than if there was a single campus in Canterbury alone.

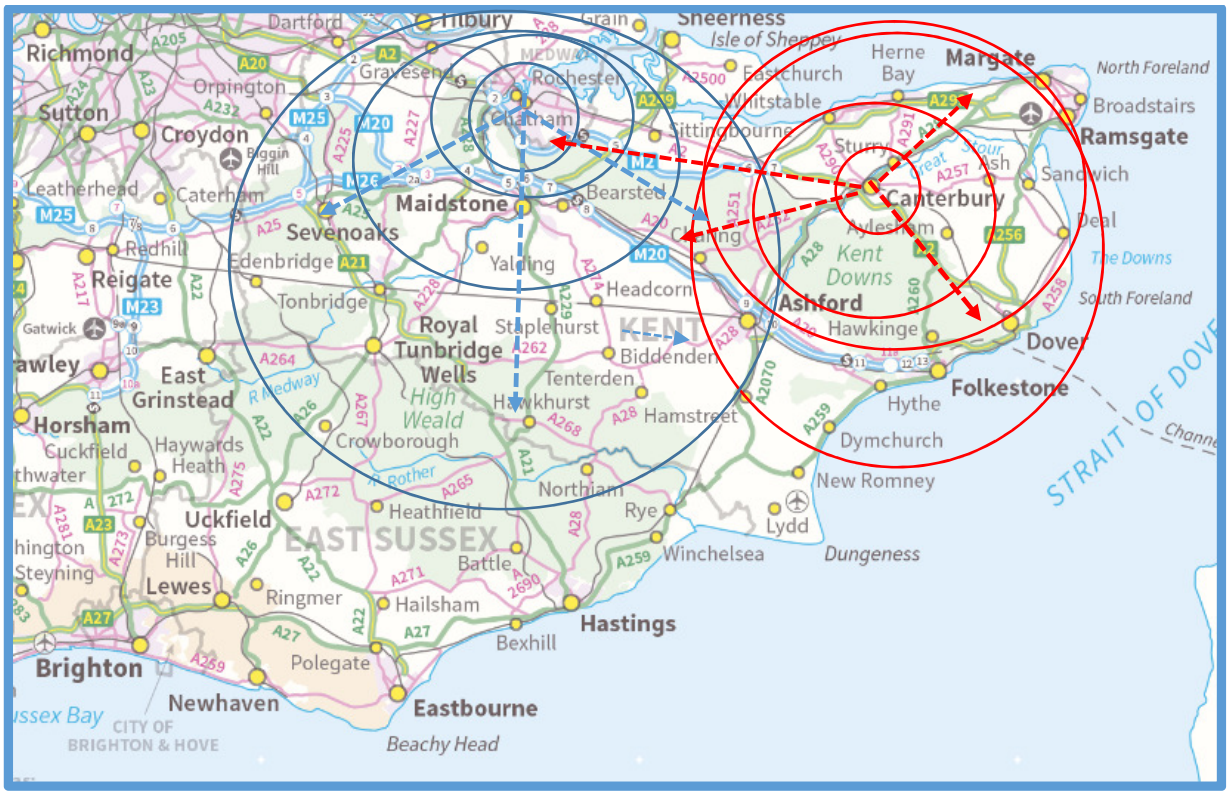
In order to analyse the more local impact, we constructed a University of Kent specific gravity modelling system. A gravity model takes an intuitive approach to modelling impact distribution. It combines indicators of economic 'mass' (in this case concentrations of employment) together with measures of distance (in this case travel time by road) from the source of the impact. It enables a better representation of where impact generated by the University eventually flows.

A large part is likely to be concentrated in the host town but not all the Institution's requirements (nor those of its staff) will be met by suppliers in the immediate locality, and not all the needs of *their* suppliers will be met in the local area. Hence impact flows further afield to where those requirements are most likely to be met – concentrations of economic activity moderated by distance. The further away from the original source of impact, the weaker the flow.

With the University of Kent, while the majority of expenditure originated in Canterbury, there was also another initial point of impact in Chatham. The gravity modelling system incorporated both points of impact and modelled flow from those points separately. This was then combined to present the overall picture.

There are overlapping flows of impact from each point so that, for example, expenditure in Chatham will still have an impact on the Canterbury area as the impact flows out from Chatham across the South East. Conversely expenditure in Canterbury will also have an impact on Chatham as it flows out across the South East area. The concept is illustrated in Figure 8.

*Figure 8: Modelling distribution of impact flow*




## Institutional impact on local and regional output

Looking initially at the impact from flow from the University alone (i.e. not including student expenditure), the majority of University impact (which includes direct and secondary impact) can be seen to be in Kent, with most of that concentrated in Canterbury. Table 1 shows the distribution of the overall impact of the University (£594.3m) and Figure 9 focusses on the distribution within the South East (£549.7m.)

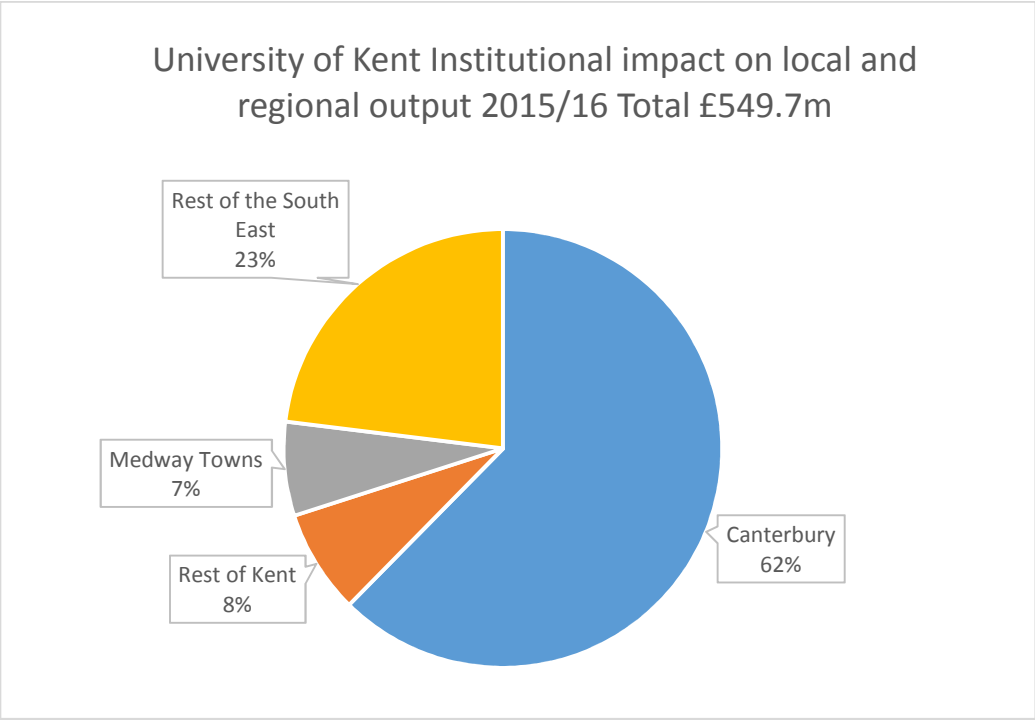
Table 1: University of Kent institutional impact on all UK output

| Table 1 | | | |
|---|---|---|---|
| Output | Direct £m | Secondary £m | Total Impact £m |
| Canterbury | 229.3 | 113.6 | 342.9 |
| Medway Towns | 24.5 | 13.6 | 38.1 |
| Rest of Kent | 0.0 | 42.1 | 42.1 |
| ***ALL Kent incl. Medway Towns*** | ***253.8*** | ***169.3*** | ***423.1*** |
| Rest of South East | 0.0 | 126.6 | 126.6 |
| ***ALL South East*** | ***253.8*** | ***295.9*** | ***549.7*** |
| Rest of UK | 0.0 | 44.6 | 44.6 |
| ***Total UK*** | ***253.8*** | ***340.5*** | ***594.3*** |

*Source: Viewforth Modelled Analysis 2018* Totals may not sum due to rounding

Figure 9 shows that 77% of impact was felt in the Kent area (62% in Canterbury, with 7% in Medway Towns and 8% in the rest of Kent), with 23% flowing to the rest of the South East.

*Figure 9: University of Kent institutional impact on local and regional output*




*Source: Viewforth Modelled Analysis 2018*

## Institutional impact on local and regional employment

The picture is similar for employment generated (Table 2 and Figure 10), with the majority of employment generated ( 4988 FTE jobs) being in Kent ( including Canterbury and Medway Towns.)

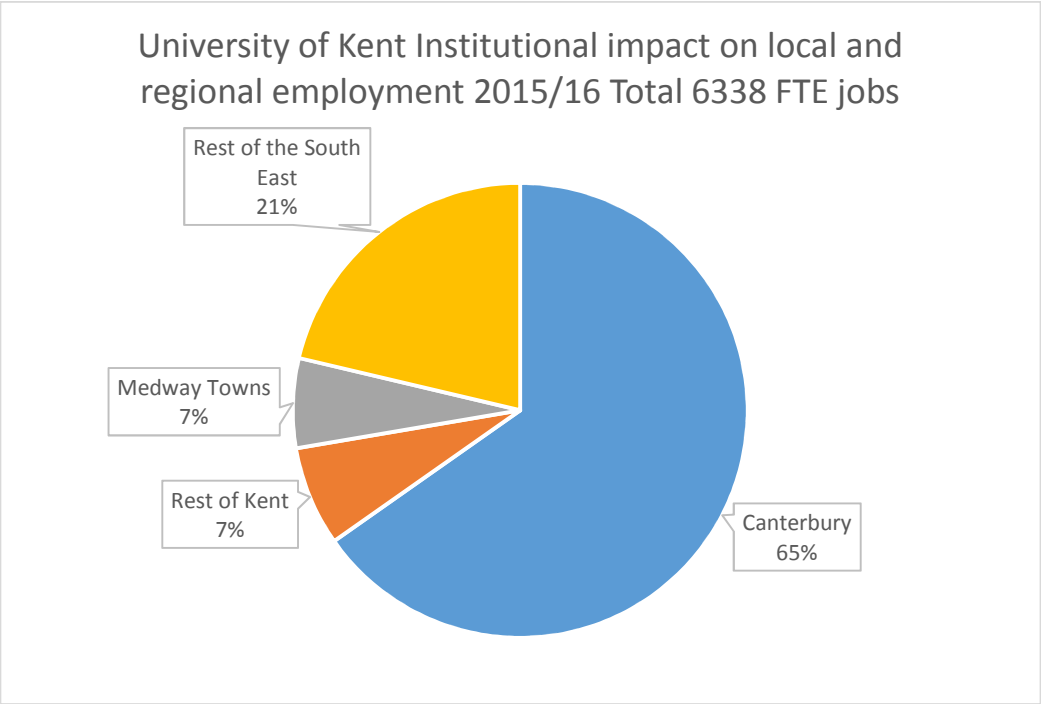
Table 2: University of Kent institutional impact on all UK employment

| Table 2 | | | |
|---|---|---|---|
| FTE Jobs | Direct FTE | Secondary FTE | Total FTE |
| Canterbury | 2969 | 1166 | 4135 |
| Medway Towns | 246 | 158 | 404 |
| Rest of Kent | 0 | 449 | 449 |
| ***ALL Kent incl Medway Towns*** | ***3215*** | ***1773*** | ***4988*** |
| Rest of South East | 0 | 1350 | 1350 |
| ***ALL South East*** | ***3215*** | ***3123*** | ***6338*** |
| Rest of UK | 0 | 368 | 368 |
| ***Total UK*** | ***3215*** | ***3491*** | ***6706*** |

*Source: Viewforth Modelled Analysis 2018* Totals may not sum due to rounding

Figure 10 shows the proportional regional distribution of employment, with 79% of all South East employment generated being in Kent (65% in Canterbury and 7% in Medway Towns with 7% in the rest of Kent) and the remaining 21% elsewhere in the South East.

*Figure 10: University of Kent institutional impact on local and regional employment*




*Source: Viewforth Modelled Analysis 2018*

## Institutional impact on local and regional GVA

Table 3 and Figure 11 shows the distribution of GVA, again showing the majority of GVA generated (which includes the University's own direct GVA) to be in Kent (including Medway).

Table 3: All UK GVA impact of the University of Kent

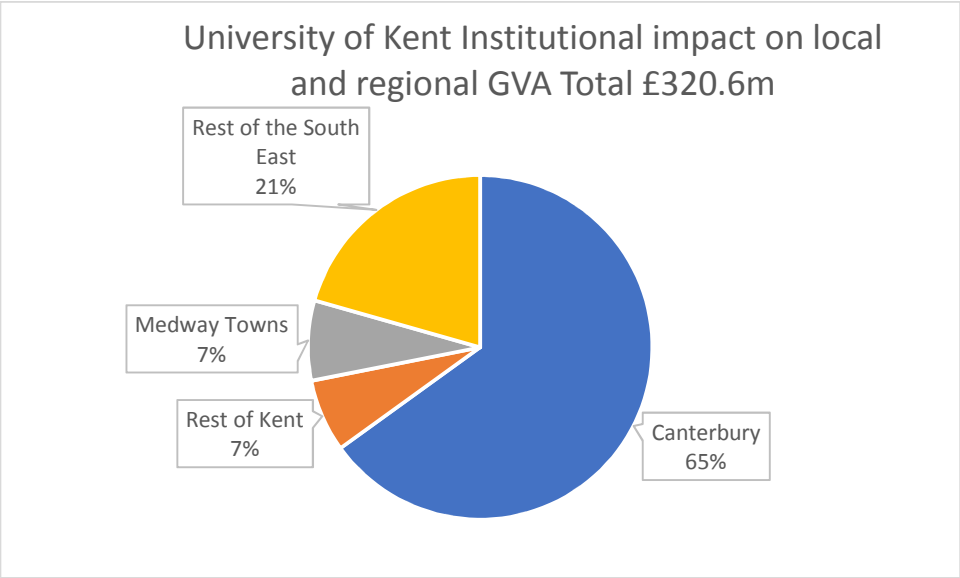
| Table 3 | | | |
|---|---|---|---|
| **GVA** | **Direct £m** | **Secondary £m** | **Total Impact £m** |
| Canterbury | 152.2 | 56.3 | 208.5 |
| Medway Towns | 16.1 | 8.0 | 24.1 |
| Rest of Kent | 0.0 | 21.9 | 21.9 |
| ***ALL Kent incl Medway Towns*** | ***168.3*** | ***86.2*** | ***254.5*** |
| Rest of South East | 0.0 | 66.0 | 66.0 |
| ***ALL South East*** | ***168.3*** | ***152.3*** | ***320.6*** |
| Rest of UK | 0.0 | 21.6 | 21.6 |
| ***Total UK*** | ***168.3*** | ***173.8*** | ***342.1*** |

*Source: Viewforth Modelled Analysis 2018* Totals may not sum due to rounding

In Figure 11 the regional proportions are shown. The relatively larger share of GVA than output accruing to Canterbury (65% compared to 62% output )is because most of the University's direct GVA is attributed to its main base in Canterbury where the majority of staff are employed . As a particularly high skill organisation the University will tend to have a higher GVA relative to most of its suppliers . [9]

[9] Organisations that are both labour intensive and highly skilled tend to have a higher GVA to output ratio than those which are more capital intensive or which need to buy in a significant proportion of materials to produce their outputs.

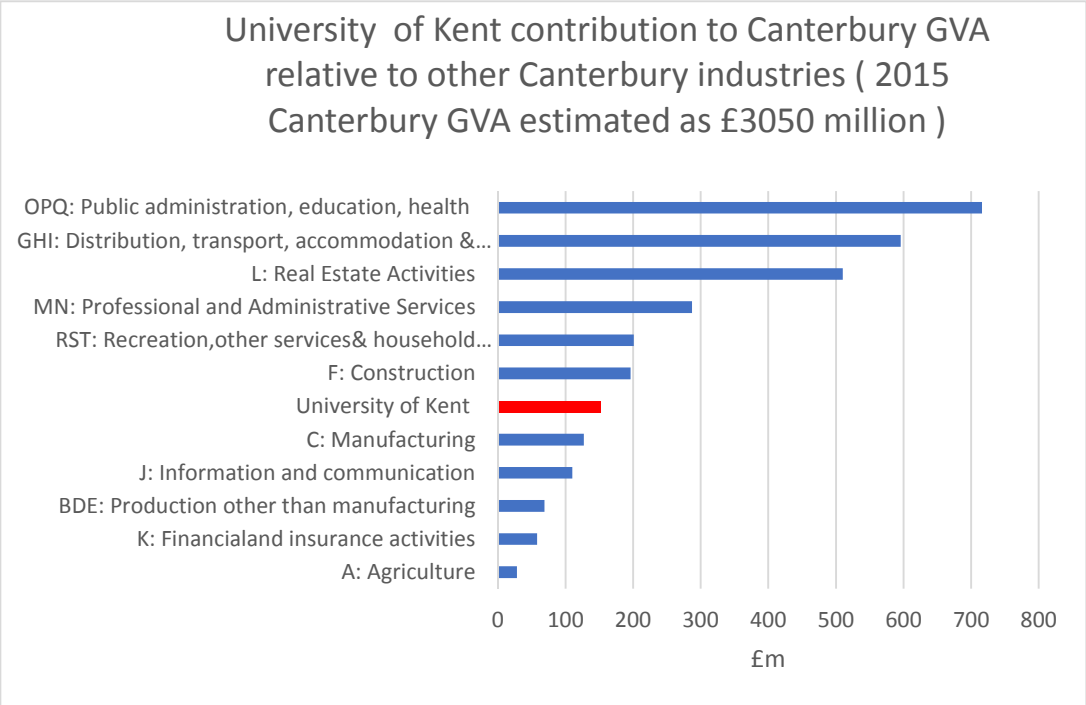
*Figure 11: University of Kent Institutional impact on local and regional GVA*




*Source: Viewforth Modelled Analysis 2018*

To illustrate the comparatively high contribution to Canterbury GVA compared to other Canterbury industries, the GVA of the University in Canterbury was compared to that of other industries. This is shown in Figure 12 below. It can be seen that the University – as a single organisation – contributes more to Canterbury GVA than a number of entire industries based in Canterbury. [10]

*Figure 12 University of Kent contribution to Canterbury GVA*




*Source : University of Kent financial accounts and ONS estimates of Canterbury GVA by industry 2015.*

[10] As the University's £152m GVA would be included in the overall Canterbury GVA ( as part of Public administration, education and health, the total GVA contribution of the Public Administration, education and health sector was reduced by £152mso that the University can be compared in the same chart.

## Additional impact of student personal expenditure

The fees that students pay to the University form part of the University income and expenditure flows and hence the impact of student fees paid is captured within the institutional impact that has already been presented. However the personal (non-fee) expenditure of students is substantial and is of significant importance at a local level, with many local businesses dependent on the student trade. In total the personal (non-fee) expenditure of students amounted to an estimated £300m, with £240m of this being money brought *into* Kent and Medway Towns by students from outside these areas – from the rest of the South East, from the rest of the UK and from other countries (the remaining £60m being local Kent and Medway Towns student expenditure.)

Students spend money on food, accommodation, clothing, travel, and entertainment generating business for local landlords, shops, bars and restaurants. Some spending will not be entirely local (for instance where online purchases are concerned.) However much personal consumer expenditure by its nature has to be local (e.g. spending in bars, restaurants, coffee shops, etc. as well as on personal services such as hairdressing.) The thriving environment of the campus and environs will be very dependent on the student pound.

The detailed results for student impact, disaggregated by different groups of students (Students from Kent, Medway Towns students, Students from the rest of the South East, Students from the rest of the UK, rest of EU and Non-EU students ) is presented in in Appendix One. While at a UK level only international student expenditure is usually regarded as relevant (as only international student expenditure is additional to the UK as a whole), the impact of all student expenditure is of interest at regional and local level. In this study we assume that the impact of all student expenditure is important, on the basis that the money is either being attracted into the local economy from elsewhere (80% of the 2015/16 expenditure was estimated as coming *into* Kent and Medway or being *retained* in the Kent and Medway economies ( 20% of the total expenditure was retained) as students stay in their local area rather than go elsewhere. The detailed disaggregation of the impact each group of students' expenditure is provided in Appendix One for information and also for use where needed in different policy fora.

Overall, student personal expenditure generated £357.9 of output, £168.5m of GVA and 3110 FTE jobs in the South East region. Around 59 % of South East impact was in the Kent area (40% in Canterbury and 5 % in the Medway Towns area) and the remaining 41% elsewhere in the South East. The distribution of employment impact is shown in Table 4 and Figure 13.

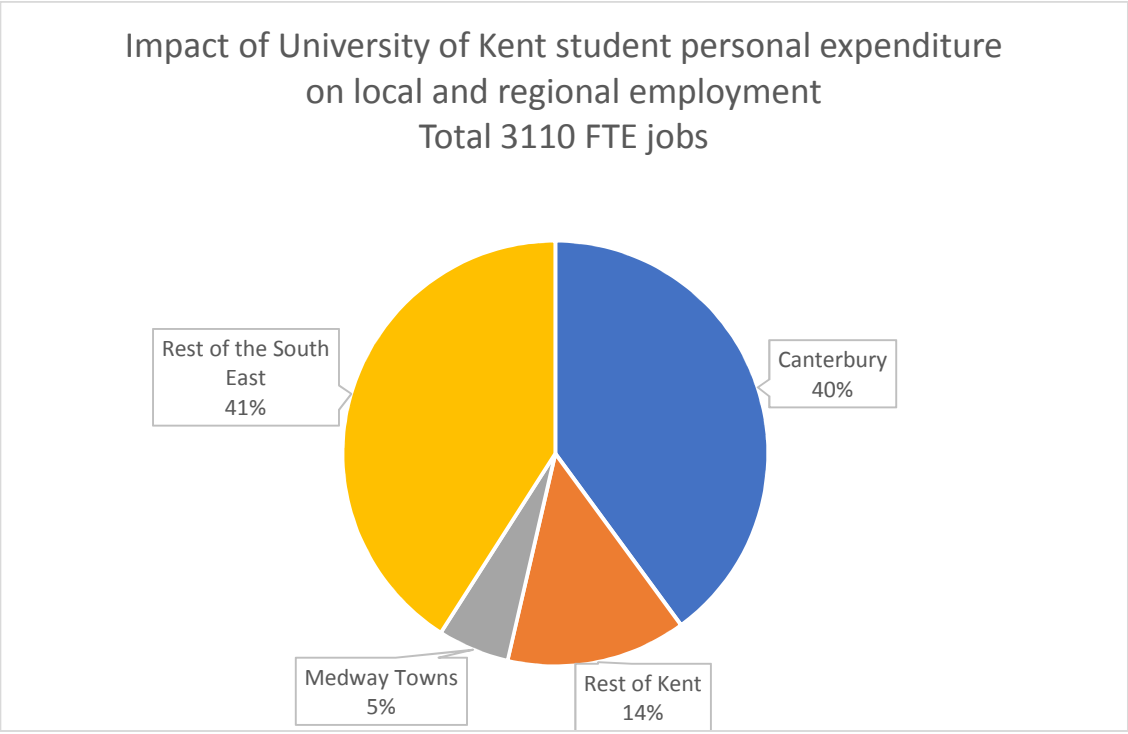
Table 4. Impact of University of Kent Student Personal Expenditure on local and regional employment

| | |
|---|---|
| Canterbury | 1242 |
| Medway Towns | 169 |
| Rest of Kent | 425 |
| All Kent ( including Canterbury & Medway Towns) | 1837 |
| Rest of South East | 1273 |
| ALL South East | 3110 |
| Rest of UK | 96 |
| Total UK | 3206 |

*Source: Viewforth Modelled Analysis 2018*

The distribution of employment impact from student expenditure is more dispersed across the South East than that of the University mainly because the University's impact includes its own employees.

*Figure 13: Impact of University of Kent Student personal expenditure on local and regional employment*




*Source: Viewforth Modelled Analysis 2018*

## Local and Regional impact of the University of Kent and its students

This section presents the local and regional impact of the University of Kent together with the impact of student personal expenditure. This gives the most comprehensive picture of the importance of the University of Kent to the South East economy.

Figures 14, 15 and 16 present the overall impact on the South East Region ( Direct and Secondary)[11] in terms of output, employment and GVA with the proportions of impact accruing to Canterbury, the Medway Towns, the rest of Kent, and the rest of the South East.

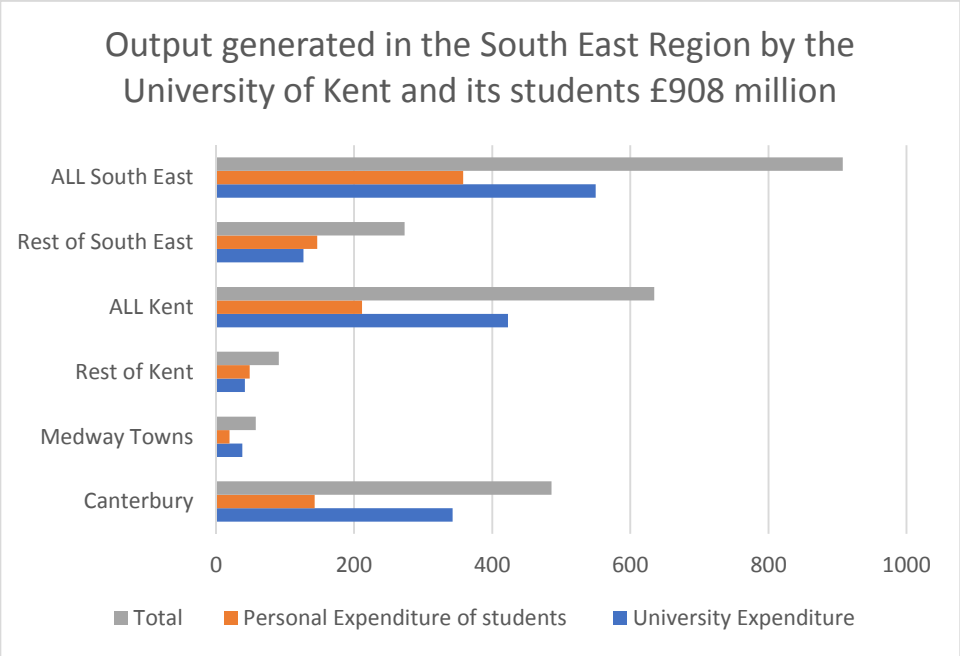
It can be seen that, across every measure, the majority of impact is in Kent –( including Canterbury and Medway Towns) between 70% - 72%, and just over one quarter ( c. 28-30%) being in the rest of the South East. **Full disaggregated detail is included in Appendix One**.

This section illustrates some of the results and puts these into context.

[11] 'Direct' output, employment and GVA is that of the University itself. Secondary output, employment and GVA is that generated in other businesses outside the university by the expenditure of the university and its staff.

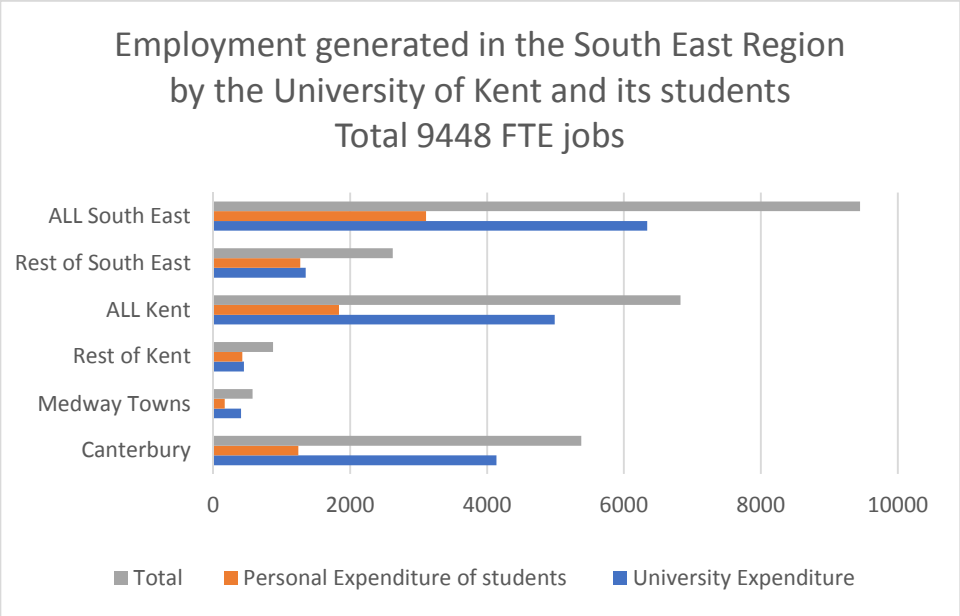
## Impact on the South East Region

*Figure 14: Output generated in the South East Region by the University of Kent and its students*




*Source: Viewforth Modelled Analysis 2018*

*Figure 15: Jobs generated in the South East Region by the University of Kent and its students*




*Source: Viewforth Modelled Analysis 2018*

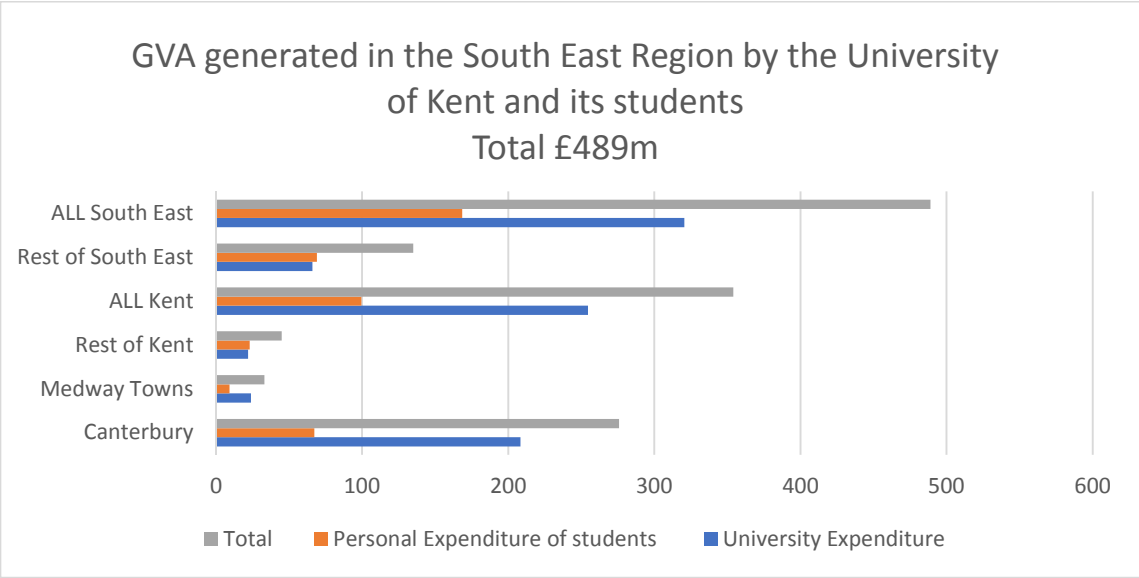
In total, 9448 FTE jobs were generated across the South East. 5377 of these were in Canterbury 574 in Medway Towns, a further 874 in the rest of Kent and 2623 in the rest of the South East. The 9448 FTE

jobs generated represent 0.19% of all South East Region employment, which is significant for a single organisation in such a large region.[12]

At a more local level the significance is even more striking.

- The 5377 FTE jobs in Canterbury were equivalent to over 10 % of all Canterbury employee jobs.[13]
- Total Kent employment (6825, including Canterbury and Medway Towns) was equivalent to 1.4% of all Kent employee jobs.[14]
- The share of Medway employee jobs came to just over 0.8%.[15]

*Figure 16: GVA generated in the South East Region by the University of Kent and its students*




*Source: Viewforth Modelled Analysis 2018*

For comparison, the total regional GVA generated of £489m as equivalent to nearly 0.2% of 2015 South East Regional GVA.[16] Total GVA generated in Canterbury (£275.8m) was equivalent to just over 9% of Canterbury GVA.[17] The £33.3m of GVA generated in Medway made up nearly 0.7% of all Medway 2015 GVA.[18] The £354m of GVA in Kent as a whole was equivalent to 0.9% of all Kent GVA.[19]

[12] All South East employment in 2016 came to 4.9 million (ONS 2016)
[13] Nomis (2017). There were 64000 Canterbury employee jobs in 2016.( The definition of employee jobs excludes self-employed, government-supported trainees, HM Forces and all farm-based agriculture. However it is also a headcount figure whereas the impact jobs are FTEs so in practice this may understate University's impact may be understated as a share of all employment. By translating the part-time jobs into Fulltime on the basis of 2 x Part time jobs = 1 Fulltime job,the numbers are more compatible – making 51,000 full time employee jobs in Canterbury. We have used this full time approximation throughout for comparisons.
[14] Nomis (2016) Total employee jobs headcount 605,000, FT translation 506,500) )
[15] Nomis (2016) There were 86,000 (headcount) employee jobs in Medway in 2015, FT translation 72,500.
[16] ONS (2016) South East GVA came to £249,174 million
[17] ONS (2017) Canterbury 2015 GVA was estimated as £3050m.
[18] ONS (2017) 2015 Medway GVA was £4794m.
[19] ONS (2017) 2015 Kent GVA was £37,783m.

# Conclusions

This study analysed the economic impact of the University of Kent in the academic and financial year 2015/16. Results are presented for the impact of the University in terms of impact on output, employment and GVA at local, regional and UK level. Additional analysis was undertaken of the impact of student personal (non-fee) expenditure, with a particular emphasis on the importance of student expenditure at the local level.

This study shows that the University of Kent is of major importance to both the local and the wider regional economy. The University is clearly making an important contribution across the South East but is of particular importance to Canterbury, Medway Towns and Kent , with the jobs generated in Canterbury being equivalent to 10% of Canterbury employment, jobs generated in Medway being equivalent to 0.8% of Medway jobs and those in Kent overall being 1.4% of Kent jobs.

Appendix One: Disaggregated results for impact of the University of Kent and Kent Students 2015/16.

**1: OUTPUT**

| Output | Direct £m | University Secondary Impact £m | Total University Impact | Non EU Students | Rest of EU Students | Rest of UK Students | Rest of South East Studnets SE | Kent Students | Medway Students | Total Impact of Student Personal Expenditure £m | Total Impact £m |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Canterbury** | **229.3** | **113.6** | **342.9** | **25.3** | **15.4** | **53.7** | **21.2** | **23.4** | **3.9** | **142.9** | **485.7** |
| **Medway Towns** | **24.5** | **13.6** | **38.1** | **2.2** | **1.3** | **9.0** | **2.6** | **3.1** | **1.4** | **19.5** | **57.6** |
| **Rest of Kent** | **0.0** | **42.1** | **42.1** | **7.6** | **4.6** | **19.9** | **7.0** | **7.9** | **2.1** | **49.0** | **91.1** |
| ***ALL Kent incl. Medway Towns*** | ***253.8*** | ***169.3*** | ***423.1*** | ***35.0*** | ***21.3*** | ***82.5*** | ***30.8*** | ***34.5*** | ***7.3*** | ***211.4*** | ***634.5*** |
| **Rest of South East** | **0.0** | **126.6** | **126.6** | **22.5** | **13.6** | **59.5** | **21.0** | **23.7** | **6.2** | **146.5** | **273.1** |
| ***ALL South East*** | ***253.8*** | ***295.9*** | ***549.7*** | ***57.5*** | ***34.9*** | ***142.0*** | ***51.8*** | ***58.2*** | ***13.5*** | ***357.9*** | ***907.6*** |
| **Rest of UK** | **0.0** | **44.6** | **44.6** | **8.6** | **5.2** | **0.0** | **0.0** | **0.0** | **0.0** | **13.9** | **58.5** |
| ***Total UK*** | ***253.8*** | ***340.5*** | ***594.3*** | ***66.1*** | ***40.1*** | ***142.0*** | ***51.8*** | ***58.2*** | ***13.5*** | ***371.8*** | ***966.1*** |

*Source: Viewforth Analysis 2018* (*Totals may not sum due to rounding)*

**2. Employment**

| Jobs | Direct FTE | University Secondary Impact FTE | Total University Impact | Non EU Students | Rest of EU Students | Rest of UK Students | Rest of South East Studnets SE | Kent Students | Medway Students | Total Impact of Student Personal Expenditure FTE | Total Impact FTE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Canterbury** | **2969** | **1166** | **4135** | **220** | **134** | **466** | **184** | **204** | **34** | **1242** | **5377** |
| **Medway Towns** | **246** | **158** | **404** | **19** | **11** | **78** | **23** | **27** | **12** | **169** | **573** |
| **Rest of Kent** | **0** | **449** | **449** | **66** | **40** | **172** | **61** | **69** | **18** | **425** | **874** |
| ***ALL Kent incl Medway Towns*** | ***3215*** | ***1773*** | ***4988*** | ***304*** | ***185*** | ***717*** | ***268*** | ***299*** | ***63*** | ***1837*** | ***6825*** |
| **Rest of South East** | **0** | **1350** | **1350** | **195** | **118** | **517** | **182** | **206** | **54** | **1273** | **2623** |
| ***ALL South East*** | ***3215*** | ***3123*** | ***6338*** | ***499*** | ***303*** | ***1234*** | ***450*** | ***506*** | ***117*** | ***3110*** | ***9448*** |
| **Rest of UK** | **0** | **368** | **368** | **60** | **36** | **0** | **0** | **0** | **0** | **96** | **464** |
| ***Total UK*** | ***3215*** | ***3491*** | ***6706*** | ***559*** | ***339*** | ***1234*** | ***450*** | ***506*** | ***117*** | ***3206*** | ***9911*** |

*Source: Viewforth Analysis 2018* (*Totals may not sum due to rounding)*

**3. GVA**

| GVA | Direct £m | University Secondary Impact £m | Total University Impact | Non EU Students | Rest of EU Students | Rest of UK Students | Rest of South East Studnets SE | Kent Students | Medway Students | Total Impact of Student Personal Expenditure £m | Total Impact £m |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Canterbury** | **152.2** | **56.3** | **208.5** | **11.9** | **7.3** | **25.3** | **10.0** | **11.0** | **1.8** | **67.3** | **275.8** |
| **Medway Towns** | **16.1** | **8.0** | **24.1** | **1.0** | **0.6** | **4.2** | **1.2** | **1.5** | **0.6** | **9.2** | **33.3** |
| **Rest of Kent** | **0.0** | **21.9** | **21.9** | **3.6** | **2.2** | **9.3** | **3.3** | **3.7** | **1.0** | **23.0** | **45.0** |
| ***ALL Kent incl Medway Towns*** | ***168.3*** | ***86.2*** | ***254.5*** | ***16.5*** | ***10.0*** | ***38.8*** | ***14.5*** | ***16.2*** | ***3.4*** | ***99.5*** | ***354.0*** |
| **Rest of South East** | **0.0** | **66.0** | **66.0** | **10.6** | **6.4** | **28.0** | **9.9** | **11.2** | **2.9** | **69.0** | **135.0** |
| ***ALL South East*** | ***168.3*** | ***152.3*** | ***320.6*** | ***27.1*** | ***16.4*** | ***66.9*** | ***24.4*** | ***27.4*** | ***6.4*** | ***168.5*** | ***489.1*** |
| **Rest of UK** | **0.0** | **21.6** | **21.6** | **3.6** | **2.2** | **0.0** | **0.0** | **0.0** | **0.0** | **5.7** | **27.3** |
| ***Total UK*** | ***168.3*** | ***173.8*** | ***342.1*** | ***30.6*** | ***18.6*** | ***66.9*** | ***24.4*** | ***27.4*** | ***6.4*** | ***174.2*** | ***516.4*** |

*Source: Viewforth Analysis 2018* (*Totals may not sum due to rounding)*

## Appendix Two: University of Kent Multipliers

The Modelling system used for this analysis enables multipliers to be derived for the University of Kent (institutional impact only). These multipliers are derived from the tailored analysis. They are *outcomes* from the analysis.

**Output Multipliers**

UK: 2.34

Regional (South East): 2.17

All Kent (incl. Medway Towns & Canterbury) 1.67

Canterbury: 1.45

Medway: 1.05

In other words, every £1m of the University's own output generates an additional £1.34m in the UK:

£ 0.45m in Canterbury

£0.05m in Medway

£0.16m in the rest of Kent

*( £0.66m in all of Kent, including Canterbury and Medway Towns)*

£0.51m in the rest of the South East

£0.17m in the rest of the UK

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**Employment Multipliers**

UK: 2.09

Regional (South East): 1.97

All Kent (incl. Medway Towns & Canterbury) 1.55

Canterbury: 1.36

Medway: 1.05

In other words, for every 100 FTE jobs inside the University as a whole, the University generates an additional 109 FTE jobs in the UK:

36 FTE in Canterbury

5 FTE in Medway

14 FTE in the rest of Kent

*(55 FTE across all of Kent, including Canterbury and Medway Towns)*

42 FTE in the rest of the South East

12 FTE in the rest of the UK

---

**GVA**

UK: 2.03

Regional (South East): 1.90

All Kent (incl. Medway Towns & Canterbury) 1.51

Canterbury: 1.33

Medway: 1.05

In other words, every £1m of the University's own GVA generates an additional £1.03m of GVA in the UK:

£0.33m in Canterbury

£0.05m in Medway

£0.13m in the rest of Kent

*(£0.51m across all of Kent, including Canterbury and Medway Towns)*

£0.39m in the rest of the South East

£0.13m in the rest of the UK

**FTE jobs per £1m of University output**

Every £1m of University of Kent Output generates 26.4 FTE jobs:

12.6 in the University

4.6 elsewhere in Canterbury

0.6 in Medway

1.8 in the rest of Kent

5.3 in the rest of the South East

1.5 in the rest of the UK

*( All UK: 26.4, ALL South East 25.0, All Kent ( including Canterbury and Medway Towns 19.7)*

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## Appendix Three: References & Bibliography


HESA Staff in Higher Education 2015/16 ( HESA 2017)

HESA Finances in Higher Education 2015/16 ( HESA 2017)

HESA Students in Higher Education 2015/16 ( HESA 2017)

NomisWeb https://www.nomisweb.co.uk/

Office for National Statistics (ONS): *Gross Value Added (GVA) for Local Enterprise Partnerships (LEPs)*

Office for National Statistics (ONS): *Regional Gross Value Added (Income Approach) by Local Authority in the UK*

University of Kent: Annual Review and Financial Statements 2016

# Appendix D
# Property Market Appraisal

AVISON YOUNG

# University of Kent

## Property Market Appraisal

## 1. Introduction

1.1 This section provides a high level commercial market review for each potential use identified for Sites A-F at the University of Kent (excluding Higher Education related uses).

## 2. National Market Commentary

**Economic Trends**

2.1 The impact of Covid-19 will be the main driver of economic performance in the near term and we expect dramatic decline GDP in Q2. Despite the monetary and fiscal measures being enacted to combat the economic fallout of the virus, it is strongly anticipated that the UK will enter a recession in 2020 which could exceed that observed in 2008-09. There is however hope that recovery will be quicker due to the cause being a market shock rather than a structural issue.

2.2 Longer term, the UK has now entered the next phase of Brexit negotiations, following the official departure from the European Union on January 31st 2020. Whilst uncertainty around the timing of Brexit has lifted, there remains a high level of uncertainty surrounding UK's future relationship with EU, particularly in terms of trading.

2.3 UK GDP growth flatlined in Q4 2019, albeit preliminary figures indicate annual GDP growth for 2019 was 1.4%. GDP growth for the three months to January 2020 was also flat, suggesting that the potential post-election 'Boris-bounce' did not materialise. The spread of the Covid-19 disease will continue to cause huge disruption to business activity and have a dramatic impact on the economy in at least the short-term. Significant repercussions are already visible across liquid asset classes.

2.4 Beyond Covid-19, the March 2020 budget made commitments to spending increases over the next five years that should boost economic growth and provide defence against the economic uncertainties from Brexit, particularly around trading relationships. The extra public investment takes government spending to 3% of GDP, a level not seen on a sustained basis for decades.

2.5 The Markit / CIPS Purchasing Managers Indices for services declined at the fastest rate since the measure was introduced in early 2020, falling to 34.7 from 53.2 in March from February. Construction PMI scores fell considerably, down to 39.3 for March from 52.6 in February due to site closures and near-absent new starts. The manufacturing PMI was also down in March, decreasing to 47.8 from 51.7 in February. These falls come off the back of positive growth earlier in the year.

2.6 The labour market remained buoyant for much of last year with the employment rate reaching a record high of 76.5% at the end of 2019. Real earnings increased by 1.8% (excluding bonuses) for the third consecutive month. However, forward looking indicators suggest the job market is cooling. Covid-19 is expected to push unemployment up to 6% from 3.9% as businesses struggle to meet staff requirements with significantly curtailed incomes. In the two weeks from 16 March, 950,000 successful universal credit applications were made. A usual figure for this period would be around 100,000 applications. In the four weeks to 13 April, universal credit applications increased by 1.4 million.

2.7 Inflation fell slightly to 1.7% in February, down from 1.8% in January. Inflation is likely to remain below the Bank of England's 2% target in 2020. The Bank of England (BoE) cut interest rates to 0.1%, following earlier cuts as exceptional measures in, to combat the negative impact of Covid-19.

2.8 Outlook – Covid-19 escalation will significantly hit economic growth, with a deep but potentially short-lived recession forecasted. However, fiscal stimulus from the Budget and the emergency interest rate cut are likely to go some way to mitigating impact. Capital Economics most recently forecasted GDP growth at -12% for 2020, considerably down on their original 1% forecast at the beginning of the year.

2.9 In terms of Brexit, businesses now appear to be more confident, albeit they remain wary of the potential headwinds facing the UK. Recent comments from Boris Johnson suggest the UK's strategy is to aim for a Canada style agreement, rather than a closer Norway style relationship with the EU.

**Occupier**

2.10 Central London office take-up totalled 12.3 million sq ft in 2019, following a strong performance in Q4. This is one of the strongest years on record and only just surpassed by 2018's 12.5 million sq ft. The limited supply and high demand has placed considerable pressure on rental levels throughout Central London. Rents for the most sought after spaces in the City continue to surpass previous benchmarks and in some instances achieve levels comparable to the West End.

2.11 Total take-up across the Big Nine office markets in the U.K amounted to 8.8 million sq ft in 2019, 3% above the ten year average albeit below the 10 million sq ft achieved in the previous two years. The heightened uncertainty surrounding Brexit and false deadlines resulted in the total being down on the previous two years but comparable to 2016.

2.12 Covid-19 will exacerbate the structural challenges faced by the retail market, despite the exceptional measures to mitigate impact. The Centre for Retail Research estimated over 143,000 jobs losses in 2019 as a result of more than 16,000 stores closing. Unfortunately 2020 is unlikely to be any better for the retail market as the CRR suggests that over 20,000 stores may not reopen when government restrictions have been lifted. Reflecting the difficult conditions, average retail rental values fell by -4.7% in 2019, down from -2.6% in 2018 (MSCI Monthly Index).

2.13 Demand for industrial property continued to rise, albeit at a slower pace last year. Recently, supermarkets and discounters have set significant requirements for logistical facilities across the UK to cope with the additional demand from Covid-19. However, looking forward, supply chain disruptions from Covid-19 will impact the industrial and warehouse sectors.

2.14 Longer term, the sector continues to be underpinned by the growth in e-commerce which could be further accelerated by trends adopted during the lockdown. However, the slowdown in the global economy and Brexit uncertainty have weighed on the sector to some extent. Average rental growth increased by 3.1% in the 12 months to December (MSCI Monthly Index). This is robust but it's a slowdown from the circa 4% pa growth seen in the previous three years.

2.15 Outlook – Longer term, the changes that businesses, government and individuals will implement during the Covid-19 crisis will accelerate some trends already evident in the market, including deglobalisation of supply chains, a shift towards online retail and flexible working practices in the service sector.

**Investment Market**

2.16 Investment activity in the UK commercial market totalled £13.4 billion in Q1 2020 (Property Data). Although down on the 5 year quarterly average, this figure was marginally up on the same period in 2019. Overseas investors accounted for 71% of the quarter's investment activity as UK institutions recorded their lowest quarterly investment volume since 2009.

2.17 While some deals which were already in their late stages have completed, it is unlikely that investors will have new interests until the economic outlook is clearer, adopting a wait and see attitude. Financers are also unlikely to offer funds in the absence of accurate valuations due to the exceptional circumstances. Hence lockdown restrictions are likely to have notable impacts on Q2 investment at least.

2.18 All-property equivalent yields have edged up to 6% amid weak economic outlook and stress in the retail property sector. Consequently, all-property average capital value growth fell further negative to -3.0% in the year to December (MSCI Monthly Index), down from 2.1% a year earlier.

2.19 Outlook – Investment activity suffered as a result of Brexit uncertainty. The increased clarity in recent months is a positive for investors although concerns remain over the nature of our future relationship with the EU. Covid-19 will have a short term impact on activity – particularly through the lack of valuation capacity as site visits are suspended, comparable evidence is limited and market uncertainty reigns – but long-run demand will remain. There is significant appetite in the market and considerable amounts of capital to invest, primarily in the industrial and office sectors, hence investments are likely to be postponed rather than pulled entirely. Challenges in the retail sector are likely to remain in the year ahead and we expect capital values to deteriorate further.

# 3. Local Market Commentary

**Office Market Commentary**

3.1 Vacancies in the Kent office market are currently low. Several years of constant occupier demand and limited new supply have meant that vacancies fell to a cyclical low last year. While now decompressing, levels remain low, with the main upward pressure a swathe of new speculative inventory finally coming to market.

3.2 While the impact of the coronavirus is still largely unclear, a likely outcome in the near future will be a slowdown in leasing activity in the market. This could see vacancies start to creep out, though the eventual outcome rests on how businesses weather the storm and how government policy responds to the outbreak.

3.3 Prior to the outbreak, solid market conditions allowed landlords to push rents in the market, while nationally, rental values were in decline. This helped rents increase to new highs in 2019, and while growth has now begun to moderate as availability from supply comes on line, this slowdown has been relatively gentle. This said, the market's 4 & 5 Star rent growth has eased more quickly, with expansion halting in early 2020.

3.4 Investment activity has seemingly reflected these occupier conditions, with investment almost doubling year-on-year in 2019. Almost £100 million traded in the year, with foreign investors particularly active. Domestic investors were also active, though, with Kent County Council among the most notable of late. Heading into mid-2020, activity will likely slow in the short term as restrictions on travel, social distancing and economic uncertainty dampen investment volumes.

3.5 Limited supply and consistent demand has seen rents expand by around 30% over the past five years in Kent's office inventory. The market did experience a slowdown in line with the rest of the UK following the Brexit vote in 2016, low vacancy and continued net absorption saw rents rally into last year. But renewed Brexit and political headwinds, combined with a wave of new supply on the horizon, saw landlords moderate expectations. The added layer of coronavirus-related uncertainty now in the mix is likely to have pulled this slowdown forward.

Kent Office Rents

3.6 Rents in the market currently stand around £17.50 per Square Foot (SF). At this level, the market is among the most affordable in the South East, renting at a premium to only the neighbouring Sussex East and South Coast markets. Recent growth has propelled the market ahead of the nearby Essex Market to the north, but rents vary widely by submarket.

3.7 Sevenoaks submarket rents are at around £22/SF, while the most affordable rents are typically found in the Thanet Submarket at around £13.50/SF (currently the second lowest of all mainland submarkets in the South East, ahead of only Hastings in Sussex East). Top-end rents are typically found in the western submarkets, with London Road in Sevenoaks particularly successful. The road has seen a number of notable lettings over the past year or so, with rents pushing towards £30/SF at Parkfield House.

3.8 While rental growth is slowing across the market, healthy gains were still being made before the outbreak. Rents in Dover are typically among the most affordable in the region; however, the recent political headwinds facing the UK have placed the submarket (as well as the market) in a unique position to capitalise on increased demand for both office and industrial stock near key international shipping ports.

Kent Office Sales

3.9 Over the past decade, the pool of buyers in Kent has diversified, with private equity and local authorities expanding their share of ownership, while institutional and private investors have been less active in recent years. The market's discount to the capital and other regional office markets in the South East has also made it an attractive option for value-add plays as well as for foreign investors just looking for value.

3.10 Kent's improving occupier market conditions had translated into an attractive destination for investors earlier this cycle. But the effects of Brexit and wider political uncertainty saw investment stutter in the years after the vote, as investors pivoted to more core markets and held fire in preparation for UK's departure from the European Union. While the December election result did unlock some office deals in the last few weeks of 2019 and opening quarter of 2020, heading into mid-2020, subdued sales activity will likely continue as the coronavirus outbreak continues to hamper business.

3.11 Prior to the outbreak, domestic investors had been active buyers in the market over the past three years. This continued last year, with the most significant transaction Yachtfast Properties' acquisition of 22 Mount Ephraim in Tunbridge Wells in early 2019. The London-based firm purchased the property from Berkley Group for £14.5 million, reflecting a net initial yield of 5.4%. The property, built in late 2016, is fully let to law firm Cripps Pemberton Greenish.

3.12 Foreign capital was also particularly active last year, with overseas investors purchasing the most in four years, though they were still net sellers overall. Among the most notable was the sale of Kent Science Park as part of the national Knowledge Factory portfolio in December. JV partners Chicago-based Harrison Street Real Estate and London-based Trinity Investment Management acquired the portfolio from Angelo, Gordon & Co for £185 million, with the Kent properties estimated to contribute around £42 million to the total sale price. It is understood the motivation behind the purchase is the UK's emerging life sciences sector, with Rob Sadler, head of life sciences at Savills, noting that the sector in the UK is currently around 10-15 years behind the U.S., and that the sector's growth potential, government support and the relative weakness of sterling (against the dollar).

3.13 The emergence of local authorities leveraging their ability to borrow cheaply from the Public Works Loan Board (PWLB) has also started to pick up in market. Among the most notable of these deals was Kent County Council's acquisition of 1 and 42 Kings Hill Avenue for £23 million, reflecting a net initial yield of 7%, in January 2020 from Liberty Property Trust. The motivation behind the purchase is understood to be the excellent quality of the space while to also “reaffirm its long-standing commitment to Kings Hill Avenue and present a strong investment opportunity for the council.” The council has been a development partner of Liberty at Kings Hill for over 30 years.

3.14 Average office yields have remained relatively flat over the past two years, trending near cyclical lows. Around half of trades are at yields between 7% and 8%, with around 40% at yields of 8%+. Higher-quality 4 & 5 Star inventory tends to trade between 6% and 7% most frequently. There has been evidence of softer pricing on some smaller deals, though, with Whatman House trading for £6 million in November last year, down from the asking price of £6.3 million. The forecast suggests that yields may start to decompress in the near term, but much will depend on the level of impact and disruption caused in the investment market and wider economy by the spread of the coronavirus.

Office Use Achievability

3.15 From a commercial and market perspective, any office redevelopment would likely have to be small scale and form part of a wider residential/mixed use scheme, or one that supports the existing University Campus, most likely at Sites A, B and E.

**Industrial Market Commentary**

3.16 Totalling around 7 million SF of industrial inventory in the north east of Kent, Dover, Thanet and Canterbury form the Kent East cluster. The submarkets' industrial offerings are generally geared toward smaller scale industrial activities suited to smaller local business, though they do host a number of larger national and international occupiers, as well. Among the larger occupiers are John Parker & Sons, Hornby Hobbies and Wahl.

3.17 While the area is more suited to smaller business and multi-let trade counter type parks, landlords have been enjoying among the most favourable market conditions in the past couple of decades. The surge for industrial space this cycle has seen fundamentals in the submarkets improve markedly, and with the huge increase in demand, allowed landlords to aggressively expand rental values, though this is starting to slow in 2020. Such dynamics encouraged development to increase quickly across the submarkets, with Thanet particularly active, with hundreds of new units at the Manston Business Park over the past few years.

3.18 Investment activity in the submarkets is historically quite low, with deals often at the smaller end of the market, rarely surpassing £1 million. That said, there have been a number of stand out deals over the past five years, as demand for industrial stock has grown. Last year saw volumes hit a new cyclical high.

Canterbury / East Kent Industrial Rents

3.19 The east Kent occupier market, dynamics have made it easy for landlords here to push rental expansion aggressively this cycle. Strong demand for space has enabled continued growth in the submarket, even while the sector across many other areas in the south east has started to slow. Indeed, as of 2020 Q1, overall year on-year growth was greater than 8%, only slightly off the peak above 9% in early 2018.

3.20 With such strong growth, there has been a wave of new supply coming on line in the submarkets over the past five years or so, much of which was developed on a speculative basis. Even so, occupier demand has generally met this supply well, limiting vacancy rises and allowing landlords to continue capitalising on the supply deficit.

3.21 The well documented surge in demand for industrial space in the latter half of this cycle has had similar impact here as with the rest of the Kent Market. Located between key shipping ports of Dover and Medway, the logistics subsector has been the fastest growing. The increased onus placed on quicker delivery times to customers has been a major driver for this. While still growing rapidly, the subsector has decelerated from the double-digit growth seen last year, with an uptick in availability.

3.22 The specialised industrial subsector had been keeping pace with the logistics subsector for much of this cycle, until mid-2018, when it eased rapidly into 2019 to around 5%, a five-year low. It has since started to pick up once again, though, and is now back in line with the average. The light industrial subsector has seen more subdued growth for much of the cycle, actually dropping briefly negative in 2016. In the years since, growth has trended strongly upward to levels in line with the average as of 2020 Q1.

3.23 Growth has been fastest in Thanet over the past 12 months, with gains of more than 8%. Canterbury and Dover have also seen rapid growth, though they lagged slightly below 8%. All remain fairly similar in terms of average rent, ranging from £7/SF-£8/SF. Canterbury has the highest average rents, with recent lettings also supporting this trend. The Wincheap Trading estate secured two 5,000-plus-SF lettings in 2019, with the first

recording an asking rent at £8.70/SF and the second recording an effective rent of £10.30/SF in August and July, respectively.

Canterbury / East Kent Industrial Sales

3.24 Vendors in the Kent East Cluster will be pleased with the continued performance of the occupier market. Tight vacancies and rapidly rising rents despite swathes of new space coming on line in recent years will be an encouraging sign of strength for the area. Indeed, investment volumes of £61 million from 2015-19 have almost tripled those recorded in the previous five year period. The average volume per annum has also grown rapidly, to more than £12 million—almost 60% higher than long term average for the cluster.

3.25 Strong investment continued in 2019 with around £17 million trading, a new cyclical high. A number of deals drove volumes, with trades coming in all of the submarkets, though Thanet and Canterbury saw the highest volumes.

3.26 The most notable trade of the year was the sale of the former Manston Airport. RiverOak Strategic Partners (RSP) acquired the site for £16.5 million from Stone Hill Park in July 2019. Following the sale, RSP has stated the plans to return the airport to operation following new investment and development, providing "a world-class air cargo operation that delivers much-needed runway capacity, jobs for local people and businesses."

3.27 In Canterbury, the former Stagecoach Bus Depot on Herne Bay High Street was also sold. The 56,700-SF property was acquired by Guildmore Developments from Coastal Developments also in July 2019 for £3.2 million. The site is now undergoing conversion into a private residential scheme. Canterbury Business Park on Coldharbour Lane was among the only other multi million pound sales. The 5,000-SF property was acquired by Quercus 7 from Invicta Properties for £2.2 million in June 2019.

3.28 Heading into mid-2020, there are a flurry of smaller units transacting. These include a number of units on Herne Bay's West Industrial Park currently under offer as well as units in Whitstable, Lakesview International Business Park and a number of exchanged units in the Manston Park in Thanet.

Industrial Use Conclusion

3.29 It is apparent that the Industrial Market, prior to the Covid-19 outbreak has been performing well in the east Kent region, with notable deals in Canterbury specifically. Despite a reasonably strong industrial market we consider that on an overall basis, similarly to office uses, the future demand for significant industrial use will be limited in this location.

3.30 From a commercial perspective, Site B perhaps holds the highest level of development potential due to the scale of the site however access and the site's location will limit demand.

3.31 There are also significant commercial challenges that would need to be addressed. Sites C, D and F currently do not benefit from significant access to the local highways network which would be essential for logistics and distribution operators looking to transport goods in and out of the area.

**Hotel Market Commentary**

3.32 The economic consequences from COVID-19 will be significant and hotels are likely to be disproportionately impacted. With the ongoing enforced lock down, the current focus is cash conservation. The range of fiscal

measures put in place by the UK government, in particular the business rates 12-month holiday for the hospitality sector, together with the ability to furlough staff for an initial period of up to 3-months, have substantially reduced the holding costs to hoteliers of a closed hotel operation.

3.33 Prior to the outbreak of COVID-19, the global economic crisis in 2008 was the last occasion when the UK witnessed a decline in inbound visitor arrivals. Looking at the period post SARS in 2003, of particular interest is the difference in recovery between London and regional UK. Despite the outbreak of SARS predominantly being confined to China and South East Asia, long-haul travel to the UK was affected.

3.34 The severity of the economic downturn will likely have a more lasting impact on the performance of the regional UK hotel market. Corporate budgets are likely to be squeezed, whilst the level of unemployment will dictate the disposable income available and therefore the propensity to spend on leisure-based experiences.

3.35 We have held discussions with local agents who operate within Kent and the Canterbury hotel market. We understand that the number of travellers and visitors looking to stay in Kent appears to be strong with demand being focussed in key points of interests and destinations such as coastal regions, national parks and city centres. Despite good levels of demand we understand there to be a distinct lack of supply in key areas as companies such as AirBnB look to expand further.

3.36 In terms of performance in specific areas of Kent and Medway, the 2017 Cambridge Model Economic Impact Study - the industry standard measurement used to calculate the economic impact on an area from tourism - identifies Canterbury district as the lead destination for business bed nights per year (485,000) followed by Maidstone (301,000) and Thanet (236,000). Canterbury also leads for holiday bed nights with over 1.4m stays per year followed by Folkestone and Hythe district (909,000) and Dover district (875,000).

Hotel Conclusion

3.37 It is clear that within Kent, the city of Canterbury is one of the top performing districts for hotel operators and we therefore consider from a commercial perspective that there could be potential for the provision of Hotel/Conference centre facilities. However, the demand from hotel operators will depend not only on location but also the size and specification, careful consideration would have to be made to ensure that occupier demand is maximised.

3.38 Sites A, B and E are likely to offer greatest potential bearing in mind their adjacency to the main university campus and proximity (and ease of access) to the city centre.

## Residential Market Commentary

3.39 The table below indicates that average property prices within CT2 are lower compared to national values. It is worth noting that the average property value in CT2 is circa £335,487 for all properties in the area (Source: Zoopla: May 2020).

| Property Type | CT2 | CT (Canterbury) | National |
|---|---|---|---|
| 1 Bedroom | £213,200 | £160,800 | £213,600 |
| 2 Bedroom | £273,300 | £240,500 | £231,800 |
| 3 Bedroom | £332,900 | £300,000 | £267,600 |
| 4 Bedroom | £431,900 | £439,400 | £449,100 |
| 5 Bedroom | £513,900 | £542,100 | £727,600 |

*(Source: Mouseprice May 2020)*

3.40 The table below details the variety of stock that currently exists in CT2, Canterbury and Nationally. The table demonstrates a similarity with CT2, the Canterbury postcode and the national trends The majority of the houses within the immediate area comprise semi-detached houses which is representative of the demographic of the area, small to large families.

| Property Type | CT2 | CT (Canterbury) | National |
|---|---|---|---|
| Detached | 20.15% | 23.14% | 23.52% |
| Semi-Detached | 35.59% | 27.67% | 27.96% |
| Terrace | 27.84% | 30.38% | 30.48% |
| Flat | 16.41% | 18.81% | 18.04% |

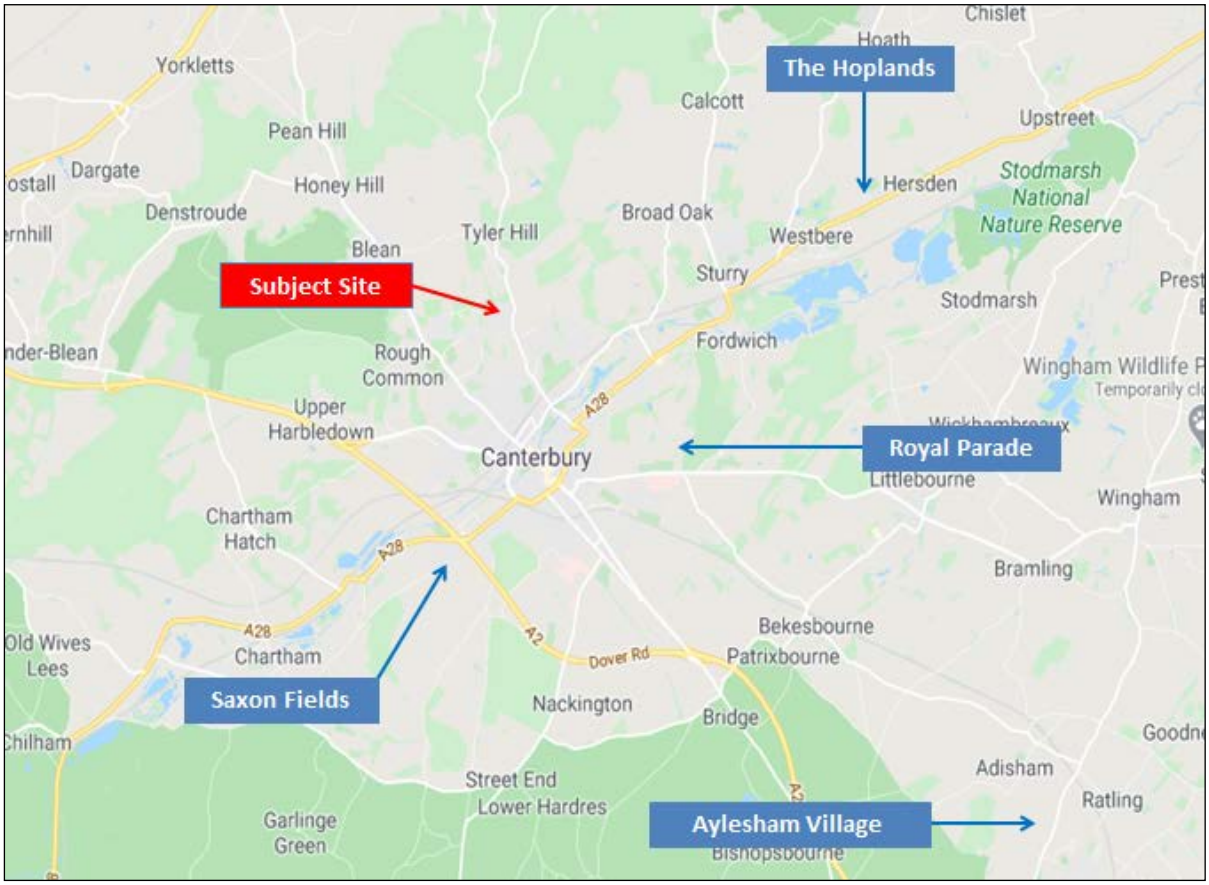
*(Source: Mouseprice May 2020)*

3.41 The table below demonstrates the level of ownership within CT2 and Canterbury compared to national trends. The area attracts small families and first time buyers due to its good transport connections into London and rural setting. A high proportion of property in this area is owner occupied, social rented ownership broadly correlates with the local and the national average.

| Property Type | CT2 | CT | National |
|---|---|---|---|
| Owner Occupied | 58.94% | 53.28% | 63.57% |
| Social Rented | 15.28% | 10.58% | 17.63% |

*(Source: Mouseprice May 2020)*

3.42 We note that there is limited amount of new build development immediately around the site. Consequently, we have considered schemes in the surrounding area, which we have identified on the map below:




3.43 **Saxon Fields, CT1 3UA-** This Pentland Homes development is located 2.8 miles to the south of the subject site. Saxon Fields is a distinctive collection of Art Deco inspired 2, 3 and 4 bedroom homes. The development will include a wide range of on-site facilities including shops, office accommodation, a new school, wildlife corridors and a cricket pitch. We have obtained an asking price list which is displayed below:

| Unit Name | Bed | Type | Sq Ft | Most Recent Price | £PSF |
|---|---|---|---|---|---|
| The Bruton | 2 | Terraced House | 936 | £347,000 | £371 |
| The Harrogate | 2 | Semi-detached House | 970 | £360,000 | £371 |
| The Tonbridge | 3 | Semi-detached House | 1,117 | £425,000 | £361 |
| The Charterhouse | 3 | Detached House | 1,423 | £535,000 | £376 |
| The Winchester | 3 | Semi-detached House | 1,434 | £540,000 | £377 |
| The Harrow | 3 | Semi-detached House | 1,522 | £570,000 | £375 |

3.44 The above information has been summarised in the following table:

| | Max | Avg | Min |
|---|---|---|---|
| Price: | £570,000 | £462,833 | £347,000 |
| £psf | £377 | £372 | £361 |
| Sq. ft | 1,522 | 1,244 | 936 |

3.45 We note that each of these houses comes with at least one ensuite bathroom, a rear garden, a garage or two car parking spaces. This development is subject to the help to buy scheme.

**3.46** **Royal Parade, CT1 1TJ -** This Taylor Wimpey development lies approximately 3.5 miles east of the subject site. Set just outside Canterbury on the former Howe Barracks site, Royal Parade has a selection of 2 bedroom apartments and 2, 3 and 4 bedroom houses. Royal Parade features a 14 acre legacy park with paths and trails, natural play space, ponds and woodland glades for residents. The development is also just a short distance from a host of transport links, including Canterbury West Railway Station. We have obtained an asking price list, which is displayed below:

| Unit Name | Bed | Type | Sq Ft | Most Recent Price | £PSF |
|---|---|---|---|---|---|
| The Byford | 3 | Detached House | 958 | £339,975 | £356 |
| The Colton | 3 | Detached House | 1,134 | £339,975 | £300 |
| The Aubury | 3 or 4 | Detached House | 1,208 | £337,000 | £279 |
| The Birchford | 3 | Semi-detached House | 958 | £323,995 | £338 |
| The Beauford | 2 | Mid Terraced House | 856 | £272,000 | £317 |
| Coach House | 2 | Mid Terraced House | 762 | £233,500 | £306 |

3.47 The above information has been summarised in the following table:

| | Max | Avg | Min |
|---|---|---|---|
| Price: | £339,995 | £307,744 | £233,500 |
| £psf | £356 | £314 | £279 |
| Sq. ft | 1,134 | 979 | 762 |

3.48 We note that each of these houses comes with at least one ensuite bathroom, a rear garden, a garage or two car parking spaces. This development is subject to the help to buy scheme.

3.49 **Oakdene at The Hoplands, Hersden, CT3 4GD -** This Redrow development lies approximately 4.7 miles to the north east of the subject site. Located 5 miles north east of Canterbury, surrounded by countryside and 6 miles south of Herne Bay. The development comprises a number of 3, 4 and 5 bedroom houses set within areas of public open space. The development also includes an area allocated open play space. We have obtained a recent asking price list, which is displayed below:

| Unit Name | Bed | Type | Sq Ft | Most Recent Price | £PSF |
|---|---|---|---|---|---|
| The Ludlow | 3 | Semi - detached House | - | £319,995 | - |
| The Warwick | 3 | Detached House | - | £359,995 | - |
| The Amberley | 4 | Detached House | - | £384,995 | - |

3.50 The above information has been summarised in the following table:

| | Max | Avg | Min |
|---|---|---|---|
| Price: | £384,995 | £354,995 | £319,995 |

3.51 We note that each of these houses comes with at least one ensuite bathroom, a rear garden, a garage or two car parking spaces.

**3.52** **Aylesham Village, CT3 3BW** -This Persimmon Homes development lies approximately 9 miles south east of the subject site. The development comprises a collection of two, three and four bedroom homes aimed at first time buyers and growing families looking to live within rural Kent. We have obtained an asking price list for Phase 2a, which is displayed below:

| Unit Name | Bed | Type | Sq Ft | Most Recent Price | £PSF |
|---|---|---|---|---|---|
| The Alnwick | 2 | End terraced House | - | £225,950 | - |
| Clayton Corner | 3 | Detached House | - | £289,950 | - |
| The Hatfield | 3 | Detached House | - | £275,950 | - |
| The Roseberry | 4 | Detached House | - | £306,950 | - |

3.53 The above information has been summarised in the following table:

| | Max | Avg | Min |
|---|---|---|---|
| **Price:** | **£306,950** | **£274,700** | **££22,950** |

3.54 We note that all units come with driveway parking or a Garage. The subject phase does not seem to benefit from the same levels of green space and play areas as the above comparables.

3.55 We have also analysed units that are currently for sale in close proximity to the University Campus:

| Address | Type | Beds | Price (£) | Area (Sq Ft) | £PSF | Comments |
|---|---|---|---|---|---|---|
| Rough Common, Canterbury, CT2 | Detached | 4 | £500,000 | 1,300 | £385 | Good specification with off street car parking and a rear garden |
| Whitstabe Road, Canterbury, CT2 | Mid Terraced | 5 | £500,000 | 1,909 | £262 | High Specification with small rear garden and on-street parking. |
| Cherry Garden Road, Canterbury, CT2 | Detached | 3 | £475,000 | 1,435 | £331 | Garage and off road parking with a large rear garden. Average specification. |
| Hillside Avenue, Canterbury CT2 | Semi-detached | 3 | £425,000 | 1,269 | £335 | Average specification with rear garden, garage and off street parking |
| Stablegate Mews, St Stephens Road, Canterbury CT2 | Terraced | 2 | £279,995 | 538 | £520 | Small recently renovated terraced mews house with on street car parking, no rear garden. |
| Dexter Close, Canterbury, CT2 | Apartment | 2 | £199,000 | 673 | £296 | Average specification with en-suite bathroom and on-street parking |
| Walden Court, Canterbury, CT2 | Apartment | 2 | £210,000 | 680 | £309 | Average specification ground floor flat with allocated parking |
| Shaftsbury Road, Canterbury, CT2 | Apartment | 3 | £215,000 | 632 | £340 | Poor specification with on street car parking. Advertised as ideal property for student let. |

3.56 The subject sites benefit from a desirable rural location with good transport links into central Canterbury, surrounding villages as well as the A2 and M2 motorway network to the west.

3.57 We would highlight that new build surrounding schemes achieved transaction values of £270 - £370 per sq ft for 2, 3 and 4 bedroom houses. It is important to note that schemes quoting at the higher end of this range benefit from superior locations and specifications. Also all schemes quoted above have either car parking spaces, a garage and a front or rear garden.

3.58 The Saxon Fields and Royal Parade schemes provide the most useful comparable evidence for the subject sites due to their proximity to Canterbury City Centre. We would expect a new build development to achieve broadly similar values depending on size and specification.

3.59 As part of our research we have also considered the local re-sale market and note that these units were broadly achieving values of circa £260 - £360 per sq ft. We would expect a new build development to command a premium over and above this.

Residential Conclusion

3.60 From a commercial perspective, we consider that there would be good demand within this location for residential development subject to the various technical and environmental constraints associated with the sites.

3.61 Sites ABC, D and E provide the best opportunity for future residential development at scale, which is an important consideration to ensure the delivery of the appropriate infrastructure to serve a new housing development in this location.

3.62 The access constraints associated with site F will present challenges to any future demand for residential development

**Avison Young**
**June 2020.**

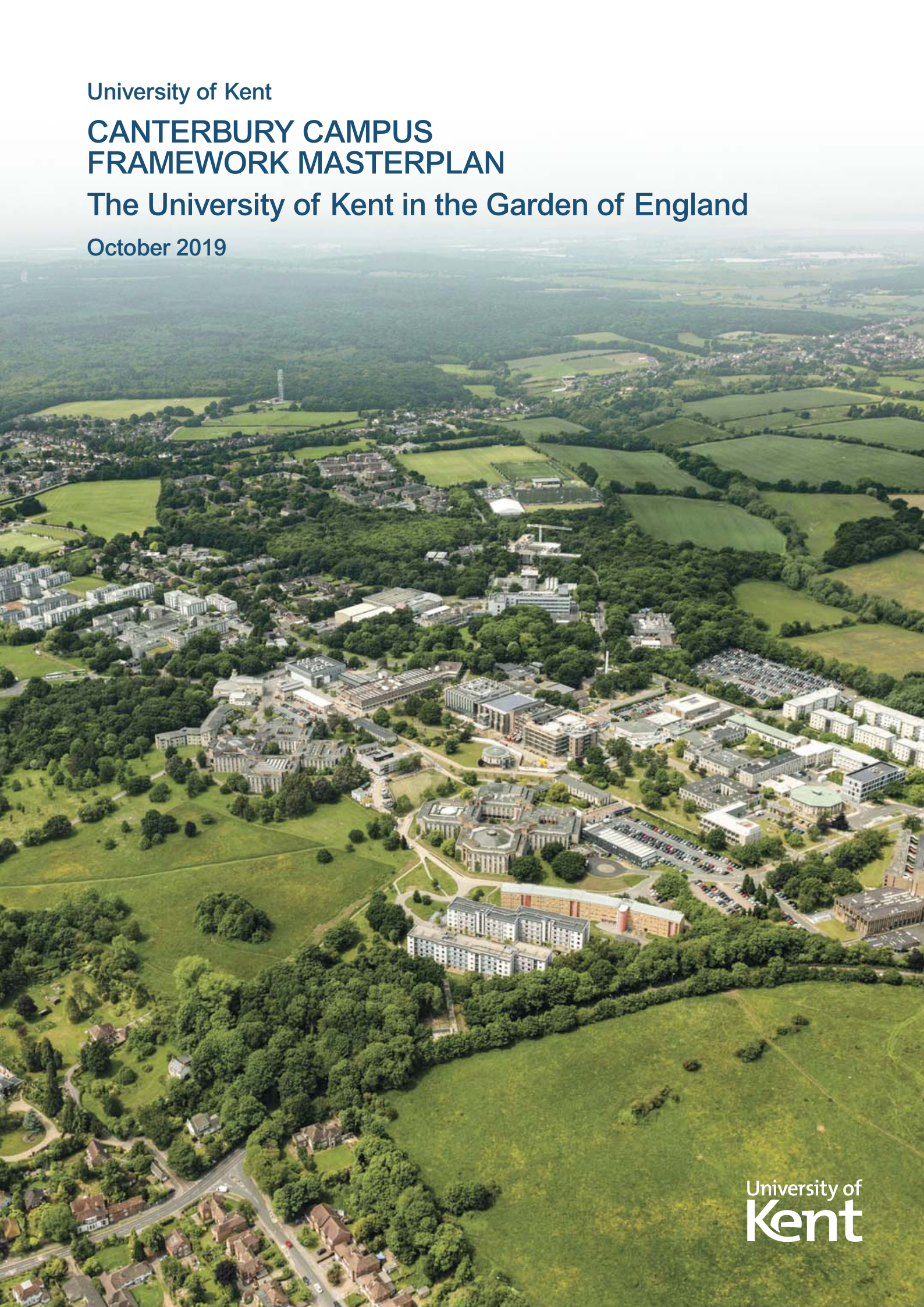
# Appendix E
# University of Kent Masterplan

University of Kent

# CANTERBURY CAMPUS FRAMEWORK MASTERPLAN

## The University of Kent in the Garden of England

October 2019



University of Kent

Concept Sketch

This masterplan is dedicated to the memory of Ben Hamilton-Baillie (4 July 1955 – 3 March 2019). Ben was a highly creative architect, transport thinker and street designer and an enthusiastic member of the masterplan team. Ben's work for the University spanned much of the last decade and was always thought-provoking and highly-valued. More than anything Ben was just great fun to work with. Much of what the Masterplan proposes in re-prioritising vehicle movement throughout the campus was inspired by him. I hope we are able to celebrate his life by implementing his ideas for the University.

Obituary by John Letherland, on behalf of the whole masterplan team

*"Ben was the UK's most influential and innovative voice promoting the idea of 'shared space' – that is, equal priority for all road users."*

Quote from Laura Laker, (The Guardian, 18 March 2019)

University of Kent

# CANTERBURY CAMPUS FRAMEWORK MASTERPLAN

## The University of Kent in the Garden of England

October 2019

# Foreword

We are rightly proud of our home at the heart of Kent. For more than fifty years, our original and largest campus has been a fundamental part of the historic City of Canterbury, bringing energy, investment and expertise to the area. Since our foundation and the original Holford Masterplan, the University has evolved into a modern, high achieving institution where academic excellence and sociability combine. As the UK's European university, we now have nearly 20,000 students at our centres in Canterbury, Medway, Athens, Brussels, Paris, Rome and Tonbridge.

The job of a university, however, is not to stand still but to look to the future. With the sector more competitive than ever, we know we must continuously adapt to meet the needs of future students and the city. We also know that the environment we work in is critical to this – from how our campus looks and feels to its impact on our neighbours around us. It is this sense of purpose that led us to produce a Framework Masterplan.

The Masterplan is not a strictly binding blueprint for future campus development but is rather a framework to guide long-term change. At its heart are a series of principles that allow us to evolve responsibly. Any future development is focussed in the existing core of the campus, while the University's unique setting overlooking Canterbury is celebrated and preserved. The natural environment is also cherished, connecting us with Kent's deserved status as 'the Garden of England'. Above all, we are determined that our Canterbury campus is a place where academic excellence is celebrated, while also making a positive contribution to the lives of our neighbours and the city we inhabit.

This has been an extensive and, crucially, collaborative process. Led by the foresight of independent masterplanner and urbanist John Letherland, we have consulted widely and taken expert advice from key bodies including Kent County Council (KCC), Canterbury City Council (CCC) and Highways England, plus the University's own staff and students. We have also worked closely with local stakeholders throughout as plans have taken shape, seeking advice from residents' associations, community groups, businesses and the wider public. Thank you to
all of those who fed in through the extensive consultation process, and to John and the Masterplan project team for steering its delivery.

The end result is a truly inspiring document, helping us to think deeply about the future role and presence of the University. Our aim for the years ahead is to be delivering one of the best education and student experiences, within an open environment at the heart of its community. The framework set out in this document will play a vital part in making this a reality. I hope you will join me in celebrating this pioneering work as we look ahead to the university of the future.

**Professor Karen Cox**
Vice-Chancellor and President

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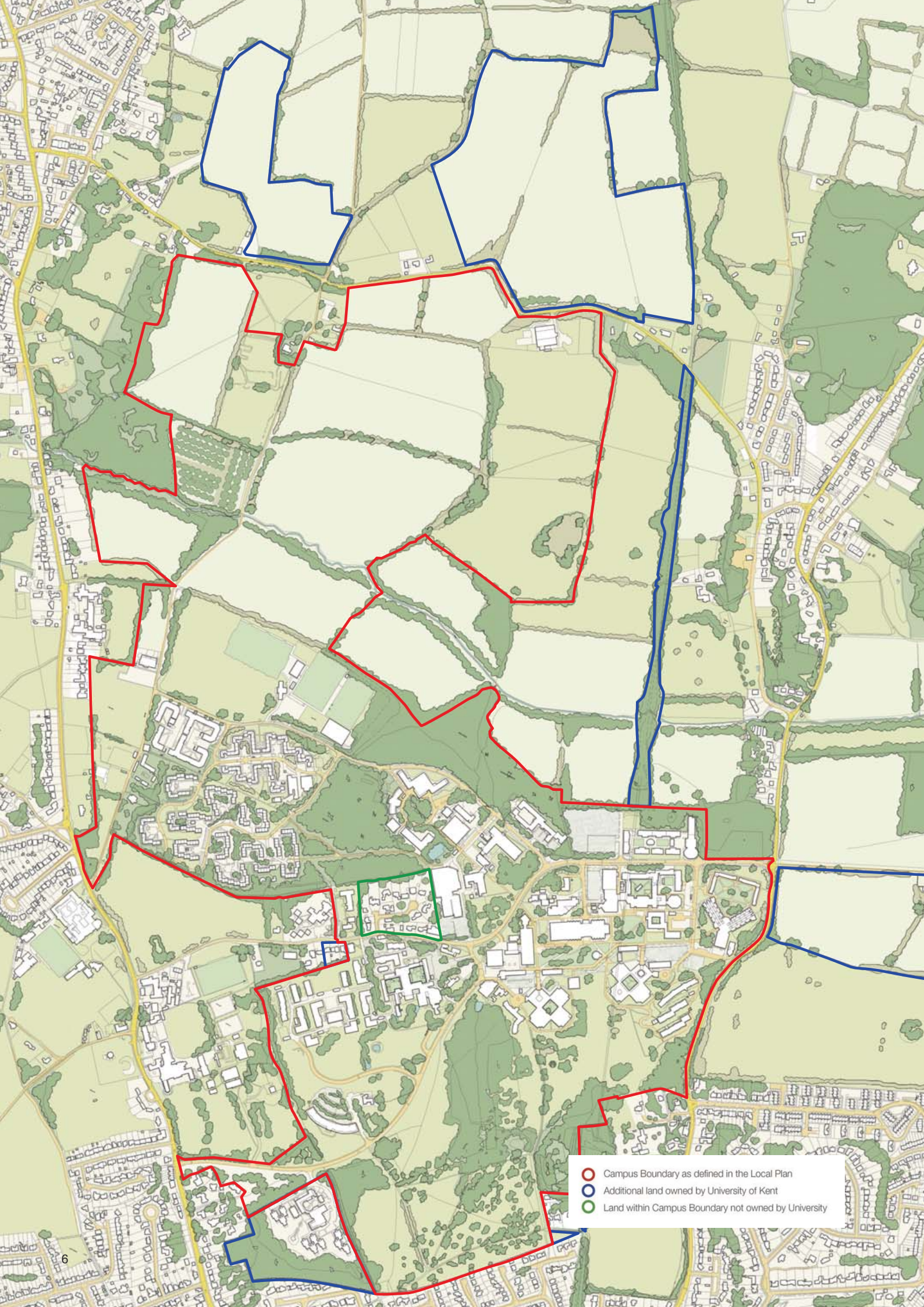

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent
Land within Campus Boundary not owned by University

# Background to the Masterplan

This Framework Masterplan has been prepared in support of the *'University of Kent Plan 2015-2020'* and *'Kent 2025: Refreshing the University Strategy'*. Its purpose is to provide a spatial framework to guide the future development of the University Campus over the next fifty years. The plan sets out principles to guide where new buildings might be located and landscapes conserved. It is, however, a flexible plan able to accommodate many forms of new development when the particular future building needs of the University become known. The plan should not therefore be read as a strictly binding blue-print for the future campus development, but rather as an overarching structure or framework to guide long-term change.

The plan draws heavily upon the inspirations that guided the Holford Plan prepared for the founding of the University of Kent in 1965. Holford's central idea was that of a university in a landscape. This theme ensured that the selection of building locations and architectural forms was determined in response to views through landscape, the topography of the land and to pre-existing landscape features.

The success of Canterbury and the region are inexorably linked to the success of its Higher Education institutions; in the half-century since its foundation, the University of Kent has enjoyed remarkable success and the campus has grown very considerably in consequence. The next half-century is likely to see significant further change in response to the urgent societal demand for the ideas, learning and research discoveries of academic staff and alumni. The Framework Masterplan provides a structure to accommodate this change, whilst at the same time delivering a sustainable framework for future changes in the learning community.

Future speculation is an endeavour fraught with a very high risk of error and, with an organisation as complex as a university, the problem of future planning is complex indeed. One method that perhaps gives some leverage on this complex issue is to think of the organisation as being composed of many interrelated systems, each of which evolves and changes at different rates. In this model, the time horizon from future planning is particular to each issue at hand; for example, day-to-day planning for immediate needs, yearly planning for the academic year, five-year plans to set strategic goals and objectives etc. The campus has evolved gradually and relatively slowly, so to the casual observer it may appear permanent and un-changing. As such, it requires a long planning horizon as landscapes, buildings, shared spaces and economics evolve and change over long periods.

The Masterplan describes a spatial framework for the future of the University of Kent in the Garden of England. The title reflects the desire to renew a commitment to the founding landscape-led planning principles. It also expresses the University's commitment to conservation and environmental sustainability, and to create a campus that is open and welcoming to neighbouring communities, the City of Canterbury and to the people of Kent who are all actively invited to use the campus and its facilities.

The Framework Masterplan was commissioned by the University of Kent as part of a big-picture review of the future of the institution, and as such it will remain a university document. It has been prepared in line with Policy EMP7 of the Local District Plan and in collaboration with Canterbury City Council and other stakeholders, and was consulted on widely in the surrounding communities. It is intended to establish an appropriate balance between providing certainty while still allowing necessary flexibility. Although it will remain a University document, the City Council has confirmed that this Masterplan fulfils the local plan requirement for a masterplan to be prepared, and it is intended that it will provide a bridge between Policy EMP7 and planning applications, and provide a framework for Canterbury City Council when determining development proposals.

**Peter Czarnomski**
Director of Estates

# Preface

In April 2005 at the invitation of the Vice-Chancellor of the University of Kent, I founded Kent School of Architecture. From humble beginnings, the school has grown to become Kent School of Architecture and Planning (KSAP) with over 500 students, three research centres, and a range of postgraduate programmes running alongside the professionally validated architecture programmes. We have PhD students from all over the world involved in all aspects of architectural research. I am passionate about the role of architecture and planning in the University and remain an advocate for the growth of a learning environment which encompasses a high quality landscape and built environment, designed to promote delight and happiness among those who inhabit it.

In 2014 I supported the need for a masterplan review, ambitious for the University to continue to grow its profile and esteem in an increasingly competitive education market. The need to plan and improve the physical working environment as a place to attract the best students, staff and researchers was obvious to me – high quality places which nourish mind and body are not a luxury, they are essential to wellbeing, creativity and quality of life.

For these reasons, I recommended Sir Terry Farrell to undertake the role of developing a masterplan for the University. I was fortunate to know Terry as the country's leading architect/planner, recognising his international work in placemaking, his authority as an architectural practitioner, his knowledge of, and commitment to Kent (he has a substantial Lutyens house there) and his ability to understand fundamental issues when rethinking the built environment.

I was delighted to support the study produced by Sir Terry and his team in 2015, and his vision for how the University could evolve over the next 50 years as a garden campus to distinguish it from other Universities in the sector.

The Farrell vision was much more than a development plan. What Sir Terry and his team proposed was an audacious reshaping of the whole campus environment that would help reposition the University as a centre for learning at the heart of the Garden of England, while laying the foundations for an academic environment appropriate for 21st century learning.

We should not forget that the University is the steward of an estate which is itself a present and future resource, and that it has a responsibility to manage and curate the landscape and buildings thoughtfully and with care. This approach has created one of the country's most successful universities, but that is no reason for complacency. The University has a responsibility to continuously innovate and regenerate its greatest resource. Holford had a potent and original vision for the University and his legacy is to be respected and celebrated, but it is also necessary to constantly review and refresh to provide an environment which will allow students and staff to thrive.

I have watched the Masterplan mature and evolve under the guidance of John Letherland, who spent most of his career working alongside and collaborating with Terry Farrell. I have witnessed John's commitment to the benevolent influence of landscape on the built environment from his teaching at KSAP, where his experience has been much sought-after by students.

I am delighted that the clear principles that Terry Farrell established have been retained, strengthened and developed under John's stewardship. For that reason, I have been a consistent and supportive advocate for the Masterplan. As an architect and educator with 50 years of experience in the field, I understand the importance of the underlying philosophy applied to good placemaking and the emphasis placed on rebalancing the built environment within a dynamic landscape.

The University of Kent in Canterbury has the ability to become a truly remarkable environment, unique among university campuses in the UK and, if the Masterplan guidance is followed, truly memorable placemaking will emerge.

I leave the University of Kent this year, proud that Kent School of Architecture and Planning is recognised as one of the leading schools of architecture and planning in the country. I have been a persistent and vocal advocate of the University and the school of architecture for nearly 15 years as head of that school, and I urge the Vice-Chancellor to embrace and realise this vision for the UK's first truly evolutionary garden campus.

**Professor Don Gray**
April 2019

# Executive Summary

Following my contribution to the Concept Masterplan produced by Sir Terry Farrell in 2015, I was honoured to be appointed to undertake the preparation of a Framework Masterplan on behalf of the University of Kent in Canterbury to guide the future development of its main campus at Canterbury. The University Campus today is very different from that which opened in 1965, and a masterplan review was long overdue.

Today the campus is at a tipping-point between fulfilling the imperative for built space, balanced against the resulting loss of its green landscape setting, requiring a new and long-term vision to be determined for the future campus development. The Vice-Chancellor and Executive Group recognise that, by taking a big-picture overview, the Framework Masterplan is a once-in-a-generation opportunity to create a campus environment of enduring and unique quality, and one which has a positive impact upon Canterbury and the region.

Since the inception of the Holford Masterplan in 1965, the University has experienced great success and has grown significantly as a result. During this period of growth and evolution, the planning of the campus has largely followed a pragmatic project-based approach to development, utilising available sites within the wider campus outside the confines of the original Holford Masterplan to deliver the quantum of space required. The demand for space has resulted in the gradual expansion of the built environment over time and the consequent erosion of the surrounding open landscape, without an overall guiding plan. As a result, there has been a loss of coherence – or 'sense of place' – and a subsequent loss of the identity offered by the original Masterplan.. It is my belief that continuing to follow this approach will result in a gradual decline in the quality of campus facilities and experience.

The Masterplan described in this document advocates a more strategic plan-based approach to the gradual evolution of the Canterbury campus, in order to ensure that all future capital and management investment results in cumulative improvement to the campus environment as a whole.

The Framework Masterplan illustrated overleaf has built on the findings of the Concept Masterplan study completed in 2015, and follows a complementary strategy by establishing a simple set of urban design principles to guide the gradual implementation of a campus. This approach has respected the built and landscape heritage, is environmentally sustainable and is capable of growth over time.

## 10 Urban Design Principles for the Canterbury Campus

1 Respect the Landscape Character

The campus must be interwoven with the varied landscape character and the underlying natural geology and topography that defines the local landscape characteristics. It must also respect and nurture the existing flora and fauna whilst creating new habitats to add to the biodiversity. The Masterplan should be capable of merging the Campus into the natural landscapes, as well as with those manufactured by human influence over time. This might involve bringing more of the natural landscape into the heart of the Campus, extending historic hedgerows and integrating the existing network of ponds, wetlands and water courses into the plan to diversify habitats and harness methods of sustainable drainage.

2 Link the Past, Present and the Future

The Masterplan must respond to and integrate with the history of the area, the architectural heritage, the archaeology, the conservation areas, the scheduled ancient monuments, the social history and the Canterbury Cathedral World Heritage Site, in order to reveal the historic narrative of the campus, linking together its past, present and future. New pedestrian and cycle routes through the landscape should help to reveal this inherent landscape heritage.

3 Consolidate Development and the Built Form

We need to make more effective and intensive use of the heart of the campus and to focus development there, in order to safeguard and conserve the surrounding open landscapes from development sprawl. The middle of the University would also benefit from an increase in the variety of uses, roles and functions (including commercial, cultural and student residential accommodation) to make it more vibrant and sustainable. Alongside this, more distant parts of the campus such as Park Wood, Hothe Court and the Sarre Penn Valley would benefit from being better connected with the Campus Heart.

4 Variety in the Public Realm

A more varied public realm needs to be developed across the campus, influenced and informed by the natural characteristics of the location and a landscape that encourages walking and cycling, sport and play. More ‘places’ of quality and variety need to be created in the spaces between buildings to establish a network of spaces throughout the landscape to promote opportunities for formal and incidental meeting, learning and culture. In addition, the health and wellbeing of students, staff and visitors would be improved by establishing walking, jogging and cycling routes around the campus.

5 A Better Sense of Arrival and Connectivity

The campus needs more well-defined ‘front doors’ to improve legibility generally as well as to enhance the experience of arrival for students, staff and visitors. These could include public spaces and more arrival and departure points to the north, south, east and west of the campus. Stronger, more legible and safer pedestrian and cycle routes would improve day-to-day travel (as well as the visitor experience) between the Campus Heart, the City and Canterbury West station. The University and the neighbourhoods of north Canterbury would also benefit from a new northern entrance to the rail station, and the masterplan should anticipate this happening in the future.

6 Create a Clear and Legible Mental Map

A clear and more legible network of routes needs to be created generally, to establish a safer environment that benefits from passive surveillance and that is easy to find your way around. A clear network of streets, spaces and places should be defined that will connect public facilities within the campus. New buildings should create and frame new views of historic Canterbury in order to help with orientation around the campus.

7 A Clear Pattern of Movement

As with all successful places, a clear hierarchy of movement is needed across the campus with main streets, secondary streets and side streets, as well as back streets for servicing. An east-west promenade along the Giles Lane ridgeline would start to form a ‘high street’ and conform to existing patterns of movement in the surrounding landscape, perhaps reviving the former alignment of Giles Lane. A north-south, cross-campus connection, perhaps following the former 'Crab and Winkle' rail line, would also help to establish a framework of principal streets. In this way, a walkable and more cyclable campus would help to encourage safe, healthy connections to all facilities.

# Executive Summary

8 Good Neighbourliness

The Masterplan should reinforce the relationship between the University and city or 'Town and Gown' and help to strengthen connections between the University and the surrounding context. Proposals should benefit, enhance and complement surrounding local communities wherever possible. Examples of 'good neighbourliness' should include safeguarding existing views to and from historic Canterbury.

9 Re-prioritise Transport

The Masterplan should give precedence to the needs of pedestrians and cyclists throughout the public realm. Traffic should be tamed to limit its impact on a predominantly pedestrian environment.

The use of public transport should be promoted to reinforce the accessibility and sustainability of the University. In parallel, car parking should be rationalised and consolidated so that it does not have a negative impact on the campus environment. New parking areas should be located at arrival/departure locations to minimise vehicular movement within the campus and landscape and topography used sensitively to screen its visual impact.

10 A Deliverable Plan

The Masterplan must respect the existing fabric of the campus and be deliverable in stages, to enable gradual growth and change over time as funds become available.

The concept drawing opposite (figure 1) shows how these principles have been applied to the existing campus in composing the Framework Masterplan. This simplified 'mental map' illustrates a network of places of different character, yet one that is coherent and interconnected, set within a varied green landscape and with a clear pattern of movement, with priority for pedestrians and cyclists.

In attempting to bring together a multitude of varying (and often conflicting) factors, I hope this summary will enable everyone to better understand the Framework Masterplan and that you will appreciate and enjoy the analysis and explanation provided in the following pages.

**John Letherland**
Masterplanner & Urbanist
August 2019

Figure 1: Concept sketch: The Masterplan incorporates a new and more legible 'mental map' of the campus

Figure 2: Proposed Framework Masterplan August 2019

6
7
8
9
10
3
11
2
1 University Gate
2 Beverley Court
3 University Square
4 Park Wood Circle
5 Hothe Court Community Garden
6 Brotherhood Square
7 Giles Circus
8 St. Stephens Square
9 Darwin Gardens
10 Registry Court
11 Templeman Square
12 Sports Hub

# 1 Introduction

# 1 Introduction

Figure 3: Aerial view of the Campus Heart from the north with Canterbury and the North Downs beyond

## 1.1 The University's Place in Canterbury

The University of Kent is a major influence on the social, economic, cultural, intellectual and public life of Canterbury; it is a leading contributor to the success of this historic city through its role in education, research and the talents of its staff and students. In short, the University of Kent changes people's lives.

The Canterbury campus contributes more than £485m to the economy in Canterbury, through direct expenditure on goods and services and spending by its students (Source: *The Economic Impact of the University of Kent*, bu Viewforth Consulting Ltd, April 2018). It is the largest employer in the city and one in ten jobs here is dependent on its activities. The University's research directly impacts its communities and it aims to grow its research and innovation activities for the benefit of the region. University academics work with local individuals, local groups and other organisations to increase its research impact and identify new ways in which its activities can benefit the region.

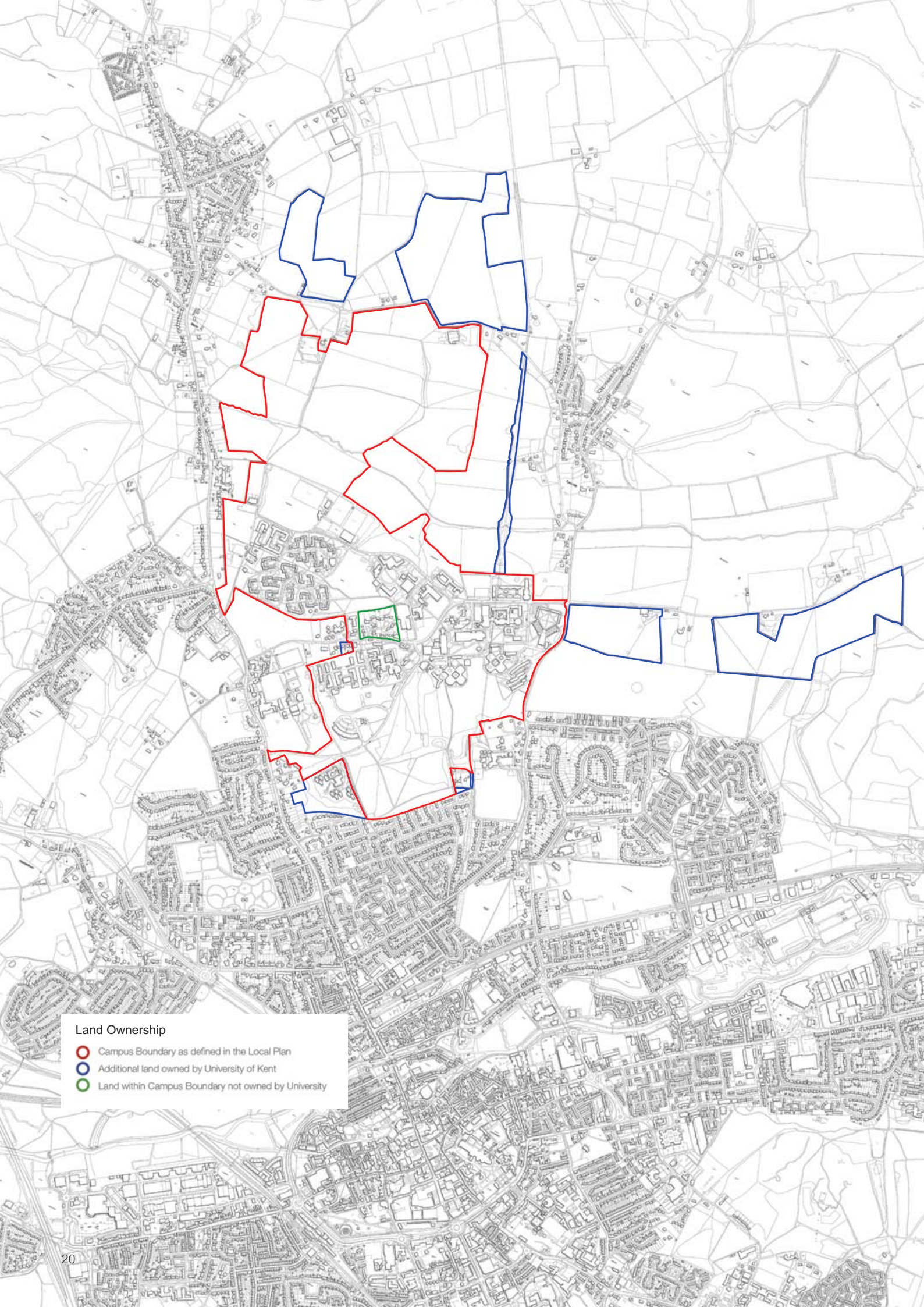
It is committed to leading initiatives that ensure it delivers benefits to the region as a whole. It is working with local health authorities and Canterbury Christ Church University to deliver significant health, wellbeing and social care benefits to the community through the creation of Kent and Medway Medical School. It partners with regional economic and development organisations to support economic growth and it will continue to engage with them to ensure its activities best meet the needs of employers and the local economy. The University's contribution to Canterbury's cultural and artistic life is extensive and it continues to engage local young people with a range of creative activities.

The University is seeking new ways to open up its campus as a resource for local communities, to encourage more use of the Gulbenkian Arts Centre, conference and library services and its growing sports facilities.

The University of Kent has prepared this Framework Masterplan to guide the future development of its main campus in Canterbury. The Framework Masterplan is intended as a document to guide the development of the physical estate in support of the documents *'University of Kent Plan 2015-2020'* and *'Kent 2025: Refreshing the University Strategy'* and their core strategic objectives of research development, educational development and engagement with staff, students and the wider community.

The Framework Masterplan outlines a vision for the evolution of the Canterbury campus that aims to bring benefits to the University, the City of Canterbury, and to the wider region. Among the benefits that the University hopes to realise are:

- Supporting the green economy strands of the Canterbury District Local Plan through the natural conservation of the campus, along with a commitment to high environmental and sustainability standards for new buildings
- Preservation and enhancement of heritage assets within the campus and its wider setting
- Supporting economic growth with a focus on knowledge-based services, through the creation of new business space and support services on campus
- Expanding Canterbury's experience economy by providing additional leisure facilities focused on culture, sport and learning, and offering new community amenities
- Helping to grow Canterbury's visitor economy by offering 20% more capacity for overnight stays with a new hotel and conference centre
- Relieving pressure on the city's transport system by promoting green travel options, improving pedestrian and cycle access to the campus and proposing new public transport links
- Providing more purpose-built student accommodation on or adjacent to the campus to help relieve pressure on the local housing market
- Along with Canterbury Christ Church University, providing a home for the new Kent and Medway Medical School, which will attract aspiring doctors from within the local community and beyond, offering training and development opportunities that will help to keep that talent in Kent and Medway


Land Ownership
Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent
Land within Campus Boundary not owned by University

## 1.2 Why prepare a Framework Masterplan?

The University identified the need for a masterplan in 2014 to help shape the future of its Canterbury campus and ensure it realises mutual benefits for the University and the community. The Framework Masterplan builds on the principles established in the University's original development plan, created by Sir William Holford (later Lord William Holford) in 1965.

The University of Kent is a leading UK university with proven excellence in research, teaching and the student experience. The Framework Masterplan will help the University to flourish and to develop its facilities as it continues to invest to create the best possible environment for its students, staff and the whole University community. It underpins the University's commitment to secure its position as a top 20 UK University and to be a globally recognised research institution. It will reflect its reputation for excellent teaching and as a highly ambitious centre for knowledge-exchange.

The need for a Framework Masterplan is manifest: there has not been a masterplan since 1965, and, during this time, Higher Education has evolved while the University and Canterbury Campus has grown significantly in size. Development of the campus in recent times has tended to be pragmatic rather than strategic and has not had placemaking at its heart. Good placemaking is therefore more important than ever and a masterplan is needed to help deliver this. The need for a masterplan is also identified in Policy EMP 7 of the Canterbury District Local Plan.

In July 2015, the University published a study by Sir Terry Farrell as a first step in this process and to help engage with stakeholders and local people over the future of the campus. This was the subject of an extensive consultation programme between April and September 2016; the results of which are set out in full in the Concept Masterplan Consultation Statement (April 2017). Since then, the University has tested and developed the principles set out in the Farrell Study in the process of preparing this more detailed Framework Masterplan, which fulfils the requirements of Policy EMP7.

## 1.3 The Scope of the Framework Masterplan

The Framework Masterplan is intended to guide the future development of the campus in Canterbury. The resultant document sets out a flexible *'spatial framework'* for the Canterbury campus, rather than a precise *'blue-print'* for development. As such, it provides a strategic direction for the development of the campus that places an equal focus on the provision of excellent buildings and high-quality spaces that strengthen its character and respect for the rich landscape and ecology of the surrounding environment.

The key purposes of the Masterplan are to:

1. Harness the role of the University as an economic driver for the city and region and maximise its potential to nurture business and innovation
2. Establish a stronger spatial relationship with Canterbury District and also with the University's Medway campus
3. Provide a once in a generation opportunity to set out a planning and decision-making tool for the University by giving spatial expression to its Estate Strategy in the short-term; a strategy up to the end of the Canterbury District Local Plan period (2031) in the medium-term; and a long-term vision for the campus
4. Provide Canterbury City Council, as Local Planning Authority, with a framework for determining planning applications
5. Enable a broad mix of uses and their disposition within the heart of the campus and throughout the campus area to make the most of land and ensure that the campus is active all year
6. Maintain and strengthen the campus character of the University by establishing a clear placemaking strategy – including layout, scale and massing
7. Ensure that future development respects, preserves and where possible enhances, the setting of the site in the wider countryside, Canterbury's World Heritage Site, the Scheduled Ancient Monuments, Conservation Areas, Listed and Locally-Listed buildings and the University's other heritage assets

Figure 4: The University of Kent Estate in Context

8 Establish a Landscape and Biodiversity Strategy that ensures that the landscape character and nature conservation interests of the whole site, including Ancient Woodland, trees covered by Tree Preservation Orders and important hedgerows, and the Blean Complex are safeguarded and wherever possible enhanced
9 Establish an effective Movement and Transport Strategy that enables updates to the University Travel Plan and sets the context for detailed Transport Impact Assessment as and when planning applications are made
10 Encourage healthy lifestyles and nurture wellbeing for staff and students
11 Set out the University's approach and commitment to environmental sustainability in the widest sense
12 Provide a bridge between Policy EMP7 (see Section 4 below) and planning applications, establishing an appropriate balance between providing certainty and still allowing necessary flexibility

The Framework Masterplan establishes a series of principles that will guide the future development of the campus to preserve and enhance its setting within the wider countryside and heritage area, integrate effectively with the local transport system, align with Canterbury City Council and Kent County Council's transport strategy and ensure that the University offers a more welcoming environment for visitors. It will also build upon several allied strategies for the management of specific aspects of the proposed campus developments. These include a Landscape and Biodiversity Strategy, a Movement and Transport Strategy, a Planning and Environment Strategy, and a Placemaking Strategy.

The masterplan proposals themselves are generally limited to the 'campus' as defined in the Canterbury District Local Plan (the red boundary in the accompanying illustration), excluding the privately-owned houses along Giles Lane and Woodland Way. However, the Canterbury District Local Plan anticipates proposals beyond the campus boundary, stating that these could be dealt with through the planning process and that the boundary may also be reconsidered when the Local Plan is reviewed.

Given this, and in the interests of good planning, the Framework Masterplan offers ideas which stray beyond the strict campus boundary, including a new access route between the campus and Whitstable Road, an option for re-providing/redeveloping Blean Primary School and greater connectivity and links with Canterbury West Station and the surrounding area. The Campus boundary itself is addressed later in this document, and the University will fully engage with all relevant stakeholders, including Canterbury City Council and the local communities, over any proposals it brings forward for nearby land that it owns.

## 1.4 The Masterplan and Sustainability

The Framework Masterplan is an ambitious document setting out a vision for the future evolution of the Canterbury campus. During its development, we have worked with a large number of professional bodies, expert advisors, stakeholders and local community groups and carried out extensive public consultation. We have learned a great deal from those who have helped and contributed and are delighted that, overall, they are supportive of the plan.

Unsurprisingly, given the scale of the ecological crisis that our world is currently facing, a recurring concern in the feedback we have received relates to the University's commitment to sustainability and carbon management, as well as the University's ambition to address the problem of climate change. Fully aware of these issues, the Masterplan has deliberately set out to address the broader issues of environmental sustainability as a component part of its proposals, and a common-sense approach to sustainability in the wider sense is embedded in the masterplan thinking.

Inevitably, the University campus must adapt and evolve in order to satisfy a range of contemporary expectations that have developed since the time of the 1965 Holford Masterplan: the imperative for a more sustainable attitude toward our planet, greater competition between universities and therefore greater demand for 'placemaking' in university environments, and the academic and business worlds moving towards sharing flexible, inclusive and inspiring working environments.

Entrance

Unibus

# 1 Introduction

The Masterplan sets out the consolidation of the Campus Heart and its environs as a fundamental issue. This will not only make best use of already-developed brownfield land, it will have additional benefit in safeguarding the surrounding landscape context.

To respect the environment and create a better sense of health and wellbeing among its students, staff and visitors, the University has made a commitment to adhere to the following principles:

- Co-location of buildings to aid energy efficiency and limit heat waste
- A higher-density campus to provide improved conditions for cogeneration of power
- Carefully considered spaces between buildings to take advantage of natural light, shading, natural ventilation and shelter in the design of the buildings and landscape
- The creation of a very walkable and cyclable campus to encourage healthier lifestyles and increased well-being amongst students and staff
- Safeguarding natural habitats and nurturing biodiversity to increase the inherent value of the campus as a 'place' and enrich the surrounding area
- Taming traffic to limit the impact on a predominantly pedestrian environment and rationalising car parking to make it more efficient, less reliant on fossil-fuels and reduce impacts on air quality and noise
- Use of Passive Design principles to take account of landform, layout, building orientation, massing and landscaping during detailed design to minimise energy consumption and overheating and to combat climate change
- Flexibility and resilience built into the Masterplan to increase adaptability to respond to climate change and other challenges
- During detailed design, attention should be given to providing natural ventilation and a comfortable indoor temperature to ensure wellbeing
- Good air quality to be prioritised in line with CCC's draft Air Quality Action Plan (April 2018) to ensure that there are no significant adverse impacts on air quality from future development. This includes promoting walking and cycling, and managing car parking provision. The impact of future development proposals on air quality will be dealt with at planning application stage, through air quality assessments (AQA)
- Holistic development principles to be applied across the campus to promote healthy and sustainable lifestyles, including incorporating facilities into the landscape that encourage walking and cycling, sport and play. Buildings should encourage the use of stairs rather than lifts for those that can use them
- The District Heating Network to be expanded to serve new buildings within the Campus Heart where practicable
- Photovoltaics will be incorporated into buildings to generate low carbon electricity for the campus
- Appropriate renewable energy technologies will be incorporated within specific developments where feasible and viable
- Sustainable Urban Drainage Systems (SuDS) to be incorporated to help manage run-off rates and reduce the risk of pollution reaching sensitive controlled waters on campus. Future development proposals will be covered by detailed planning applications that will be accompanied by a detailed SuDS strategy (NB: KCC offers a pre-app service for major developments – further details of which can be found at: www.kent.gov.uk/)
- The University's Carbon Management Plan to be implemented to set new targets for the future including, in line with CDLP Policy DBE1, requiring new buildings to meet BREEAM 'Very Good' as a minimum

In addition, the University will invest in (and commit to) its own Travel Plan in response to a growing reliance upon public transport by environmentally conscious and financially sensitive students and staff. The targets to increase the use of public transport by staff, students and visitors goes way beyond mere best practice in this field. The creation of a very walkable and cyclable campus will encourage healthier lifestyles and increased wellbeing among students and staff. Taming traffic to limit the impact on a predominantly pedestrian environment and rationalising car parking will make the campus safer and more transport-efficient, much less reliant on fossil-fuels and reduce impacts on air quality and noise.

The Framework Masterplan makes reference to the University's work in the area of sustainability and carbon management. More detail can be found on the Environmental Management System on the University of Kent website:
www.kent.ac.uk/estates/sustainability/ems/index.html

The Environmental Management System includes the University's Carbon Management Strategy and Plan, which has targets that have been successfully reached. For example, during the period from 2010/11 to 2016/17 the target was to reduce carbon emissions to 14,998 tCO2 per annum. The actual emission level at 31 July 2017 was 14,657 tCO2 per annum.

The University is currently preparing the next phase of its Carbon Management Plan, to cover 2021-2030 and to set new targets that reflect those included in the Paris Agreement on Climate Change (see weblinks below):
www.kent.ac.uk/estates/sustainability/ems/index.html
www.kent.ac.uk/estates/sustainability/index.html
www.kent.ac.uk/estates/files/sustainability/EMS%20Documents/Strategies/Carbon_Strategy_2018-21.pdf

## 1.5 Preparing the Framework Masterplan: The Consultation Process

The *'University of Kent Plan 2015-2020'* includes a strategic objective to increase engagement between the University, the community and wider society. The Framework Masterplan defines a clear direction for the future development of the campus over the long term. In order for the Masterplan to be successful and enduring, its endorsement by the immediate local community as well as by Canterbury City Council has been a major priority.

Taking account of CCC's Statement of Community Involvement (SCI) (2007), the University has adopted the following consultation principles during the development of this Masterplan:

- Be clear and transparent about the process and programme
- Seek to engage a wide range of groups and individuals, including those that have relevant Local Plan Policies
- Employ a wide variety of methods to engage all concerned
- Make greater efforts to engage with key relevant 'hard to reach' groups
- Acknowledge receipt of comments and feedback, and
- Prepare a Consultation Statement at each stage to record comments and feedback received and explain how they have influenced the masterplan proposals

The University of Kent has worked collaboratively with CCC and its consultants, Kent County Council (KCC) and a wide range of other stakeholders to ensure that a high-quality Framework Masterplan is fully informed by a wide range of knowledge, expertise and opinion (including from local residents, businesses and organisations). The Masterplan has been prepared in three steps:

1 Step 1: Strategic Vision

A Strategic Spatial Vision Discussion Document was created to enable a range of stakeholders to discuss and shape an overall spatial vision and the strategies for delivering it. This drew on a number of 'building blocks', including consultation feedback on the Concept Masterplan (as set out in the Concept Masterplan Consultation Statement). The Discussion Document was widely consulted on, including at a Strategic Spatial Vision Workshop held at the Canterbury Campus in July 2017. A Workshop Report providing a short factual summary and account of the discussions that took place at the event was published on the University's website in August 2017. This was followed by publication of a record of a Staff Focus Group in September 2017 and then a Consultation Statement in November 2017, which set out details of all discussion and comments received, along with the University's responses to them.

2 Step 2: Framework Masterplan Proposals

This step involved preparing proposals for specific areas of the campus. The proposals drew on the strategic vision and strategies, which were amended to take account of feedback received during Step 1 (as set out in the November 2017 Consultation Statement) and discussions with CCC, KCC and other technical stakeholders. The Framework Masterplan consultation material set out proposals for movement and transport and short and medium-term developments within four character areas: University Rise, Whitstable Road, Campus Heart and the Sarre Penn Valley. Consultation on the Masterplan Proposals took place in September to November 2018. In February 2019, the University published a Consultation Statement that sets out comments received and its response to them.

3 Step 3: Framework Masterplan Document

The third step involved reviewing feedback, revising the proposals to take account of the comments received and the results of on-going studies, and publishing a full draft Framework Masterplan document for comment for a six-week period.

The Framework Masterplan was published online at www.kent.ac.uk/masterplan with a limited number of hard copies in the Templeman Library, The Beaney, Blean Village Hall, The Tyler's Kiln and the City Council offices in Military Road. A Consultation Statement will be prepared showing how the final Framework Masterplan Document takes account of comments made.

The Framework Masterplan was widely consulted on within the University Community. Consultation has taken various forms, including presentations to the Vice-Chancellor and the Executive Group, Deans, Heads of Schools, members of staff and representatives of the student body. Presentations and workshops have also been undertaken with staff representatives, stakeholders and members of the wider community to help to determine the brief and direction of the Masterplan. The result was the Strategic Spatial Vision set out later in this document.

## 1.6 The Structure and Status of the Framework Masterplan Document

The document explains the principles behind the Masterplan and has been structured to take the reader through the influences upon it, the processes completed and the conclusions that have been reached.

The document contains the following sequence of chapters:

1 Introduction:

An explanation of the University's importance to Canterbury and the region, the background and purpose to the Masterplan, the broad aspirations for the Masterplan and the status of the document

2 The University of Kent in the Garden of England:

A brief description of the University and its campus from its beginnings in 1965, followed by a description of the development sequence that followed and a diagnosis of the campus today

3 The Imperative for Change:

An explanation of the need for this Framework Masterplan, Terry Farrell's 2015 vision and the requirement for a new approach in the context of the future of Higher Education

4 Strategic Spatial Vision, Objective and Principles:

The brief from the University and the foundations on which the Masterplan is built, a reference to the planning context and the strategic approach to placemaking

5 The Masterplan Narrative and Continuity with the Past:

An explanation of the landscape context (including the historic, regional and local) which has determined the approach to the Masterplan

6 Landscape Character Area Descriptions:

A detailed description of each of the landscape character areas, including the landscape, heritage and built environments

7 Landscape Character Area Proposals:

A synopsis of the design proposals included in each of the landscape character areas, which contribute to the overall masterplan proposals, including outline design guidelines

8 The Framework Masterplan:

A summary of the overall proposals, including the campus-wide components of the Masterplan

9 Consultation:

A brief summary of the public and internal consultation process

10 The Way Forward, Potential Consolidation and Growth:

A brief description of the University's aspirations for development in the short, medium and long-term

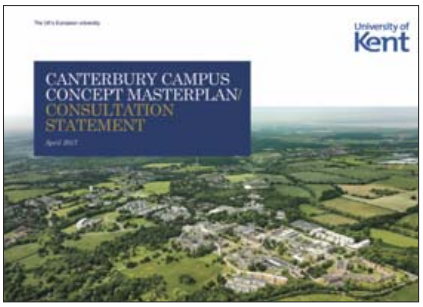
11 Making It Happen, Implementation, Monitoring and Review:

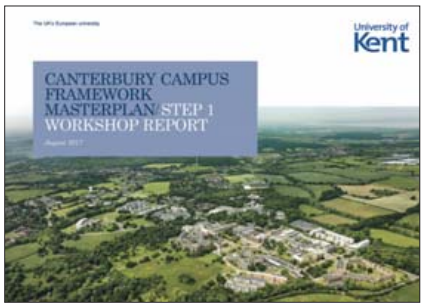
How the Masterplan will be implemented and possible future initiatives to update, monitor and review it

12 Appendices

The Framework Masterplan is intended to be a material consideration in planning matters. It is hoped that Canterbury City Council will endorse it as planning guidance for implementing CDLP Policy EMP7 and give it significant weight when determining planning applications. The University is keen to continue to engage in pre-application discussions with the local planning authority in all future planning applications.

# 1 Introduction



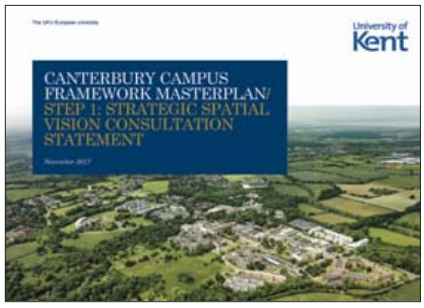




Figure 5: Consultation event in the Sibson Building and the covers of the published Consultation Reports

# 2 The University of Kent in the Garden of England

Figure 6: William Holford's plan for the University, June 1964

## 2.1 Introduction

The University of Kent was granted its Royal Charter in January 1965 and received its first cohort of 500 students later that year. It is easy to assume that this new University campus emerged into the landscape fully-formed without respect for, or connection with, the past. This is very far from the truth, as the Canterbury campus emerged from the remnants of several large estates that pre-existed the University.

The University is one of a number of 'plate-glass' universities established in the post-war era of new technology, optimism and increasing participation in Higher Education. After consideration of many alternative options, a large site was assembled for the Canterbury campus on a ridgeline overlooking the historic city on open farmland along Giles Lane, a rural road connecting Whitstable Road with St Stephen's Hill. After an extended selection process, the architect Holford was appointed in 1962 to masterplan the campus, and he immediately got to work on the urgent task of transforming the spectacular open site into a working university.

## 2.2 The 1965 Holford Masterplan

William Holford, RIBA gold medallist, RIBA president and a life peer, was appointed to plan the University of Kent campus in Canterbury and presented his first outline plan in 1963. Probably due to the extraordinary pace at which the proposals were developed and delivered, no masterplan report seems ever to have been published. From the outset, Holford's plan was heavily criticised for its fortress nature; to the critics it seemed there was never a proper plan and to this day the Canterbury campus is considered by many to be the least successful in terms of its architecture. However, further analysis suggests that an interesting and thoughtful concept was at the heart of this university campus.

The original expression of Holford's founding university campus plan was one of widely-spaced buildings set in expansive landscapes overlooking the Cathedral in the historic city below (Figure 6). This approach was an innovation compared with more ancient universities embedded within their parent cities and towns. For pragmatic reasons of cost, land availability and deliverability, the 1960's universities were all to be 'of the town but not in it'.

The University of Kent is unique among its contemporaries in being located on working agricultural land rather than being the development of a former great estate.

Holford's Masterplan for the Canterbury campus was both a product of his response to the University brief and also his response to the remarkable landscape setting. It was underpinned by two key ideas:

- First and foremost, the University plan was to be based upon a collegiate organisational model following the long-established tradition of much older institutions. The idea was to create compact, cross-disciplinary learning communities, in which students would live, work, eat and enjoy their social activities. The hope was to promote sociability and interdisciplinary exchange. Each college was designed as a self-contained building expressed through a rigorous geometrical plan of interlocking squares and spaces
- The second idea was for the heart of the campus to be placed on the 'plateau' along the Giles Lane ridgeline within an open parkland landscape. The college buildings were to be distributed strategically around the campus heart to emphasise their importance, and to frame significant views and vistas – most notably towards the ancient Cathedral in the valley below.

The original campus designed by Holford set out a clear vision. The Templeman Library was placed deliberately on the centre line of the ridge, with the college buildings distributed strategically around it to define the edge of the original campus and to emphasise their importance (Figures 7 & 8). Common academic facilities were to be housed in buildings located centrally around the library to be shared between all colleges. The working 'heart' of the campus core was to be surrounded by a collection of independent college buildings, arranged around the perimeter of the core in such a way that the core could be 'contained' (and therefore defined) by the most important college buildings.

Figure 7: Watercolour of the campus proposals from the south by Holford's office, June 1964

There were to be three areas or 'zones' within the campus – central academic buildings, science buildings and colleges. There were to be at least eight contemporary colleges distributed around the campus heart on the hill-top ridge and down University Road, where they were most visible. Large landscape spaces in between were a response to the parkland setting. The science area was to be developed along the ridge to the west behind the campus and hidden within a belt of trees. The original widely dispersed campus layout no doubt came from a formula tried out in some North American campuses and left plenty of room between buildings to accommodate future intensification over time.

Holford anticipated expansion of a 'science area' to the north-west of the campus heart, and a gap was created in the otherwise regular disposition of college buildings around the perimeter of the core (between Woolf College and Keynes College) to allow for the campus to extend into Park Wood and Brotherhood Wood. Although this concept was followed through at first with the Electronics (now Jennison), Chemical (now Ingram) and Biological (now Stacey) Laboratories, the idea was seemingly abandoned in the 1980s when the area to the north-west was developed instead for low-density student housing. Consequently, a good deal more of the original ancient woodland of Park Wood and Brotherhood Wood survives to this day.

Holford and his team delivered the first phase of the University, which was very architectural in nature (indeed Holford never engaged a landscape architect as part of his team). The layout was composed of a central campus core of academic buildings, arranged around a largely orthogonal grid of streets and spaces that ran at right angles to St Stephens Hill and parallel to (the newly aligned) Giles Lane.

Figure 8: View of the University established on the ridgeline from Canterbury city centre

At the centre of the core sits the Templeman Library, clearly expressed on the ridgeline as the backbone to the campus heart. Ironically, given the green landscape setting, the first phase of the campus conformed to a rather formal layout; Templeman Library, the Marlowe building and Eliot and Rutherford Colleges were arranged deliberately to define and enclose a large green space, no doubt intended to establish an impressive setting for the new library from the outset and to create a great ceremonial University space. In Holford's vision, this space was to have been further distinguished by the Senate Building designed as a campanile located in front of the library and no doubt intended to grace the skyline along the ridge. Lack of funds was to blame for it never having been realised and, rather than a clock tower, the library remains the centre-piece of the campus heart.

This initial grouping enabled Holford to create a clearly defined hierarchy in which the library and the college buildings were expressed as the most important buildings. The college buildings are slightly taller than the library but set slightly apart and downhill, such that their height does not dominate. They are connected to the core but at the same time independent from it, located as they are at the threshold between the campus core and the surrounding green landscape.

Holford translated his campus idea into architecture and each building was designed in strict adherence to a geometric order. Like many of the 1960s UK universities, the architectural legacy of the early phases of the University of Kent in Canterbury is predominantly expressed by Brutalist and Modernist buildings, some of which were designed by Lord Holford's own office. The founding buildings were built to Holford's design and

included Eliot & Rutherford Colleges, the Marlowe Building and the Templeman Library. The first Kent college buildings of Eliot and Rutherford draw strongly in their concept and form from the Bryn Mawr College buildings by Louis Khan, under whom Anthony Wade (Holford's deputy) had studied at the University of Philadelphia.

Their expression is dominated by the panelisation and prefabrication that enabled them to be designed and constructed at great speed to meet the tight programme. These buildings were deliberately located and orientated to frame significant views and vistas most notably towards the ancient Cathedral in the valley below. Whereas the core is 'urban' in nature, the colleges were intentionally located as 'objects' in space; it is an architectural language of contrast between geometric order within a free-flowing picturesque landscape.

Holford anticipated expansion of a 'science area' to the north-west of the campus heart, and a gap was created in the otherwise regular disposition of college buildings around the perimeter of the core (between Woolf College and Keynes College) to allow for the campus to extend into Park Wood and Brotherhood Wood.

Holford resigned from the project in late 1965 and did not guide the development of the Masterplan beyond the first phase. Although his influence on the architectural expression of the college buildings waned, the Masterplan proved flexible enough to allow each college to develop its own architectural personality and expression over time. Holford's Masterplan anticipated a relatively modest first phase, followed by gradual growth over time as demands and budgets allowed. This approach enabled the University to grow incrementally over time as funding became available. The relationship he established in the first phase between geometric forms within the campus heart and an informal campus edge to the parkland, set the pattern for subsequent phases and remains evident in the composition of the campus today.

New colleges were developed gradually, and the widely dispersed campus layout gradually intensified over time. Further colleges were developed around the campus heart according to the masterplan pattern, but interestingly (apart from the satellite Chaucer College) not down University Road as Holford had planned. Keynes and Turing Colleges to the east and Woolf College to the north were anticipated by Holford, and largely follow his space-positive template of overlapping squares forming courtyards and circulation routes, around which the functional spaces were arranged. However, not all subsequent college buildings adopted Holford's suggested expression. Darwin College at the eastern edge of the campus heart breaks all Holford's spatial guidance with its objective-positive expression, complex levels, zonal planning and deliberate divergence from the orthogonal grid of streets. However, as with all general rules there needs to be an exception and perhaps variety in the campus is strengthened for all that.

The original campus designed by Holford was of its time, and a thoughtful and dramatic response to post-war needs; it could even be described in some senses as adventurous and innovative, exploring as it did new ideas and new models emanating from the urban and architectural theories of that era.

However, based as it was on symmetry of arrangement and grand axes centred on the Cathedral, the plan was not universally liked; its detractors criticised the bleakness of the setting and the

*"…curiously old-fashioned attempted grandeur and formality…".*

Critics were also disparaging of the low-density nature of the campus in which the buildings were widely dispersed, leaving students large distances to negotiate whilst exposed to the weather:

*"…students trudge down endless unprotected paths from one monumental building to another…. There is none of the interplay of buildings and the spaces between them that should make a university site an exhilarating place in which to move about."*

There were other perceived shortfalls in the plan by Holford. Despite the significance of the landscape in the setting of the Canterbury campus, the landscape architect was a late appointment and therefore the design of the landscape was not developed until late in the masterplan

process. As such, it was a rather open and raw landscape into which the first buildings were placed. In addition, the buildings are set as objects in this landscape and seen in the round – they therefore lack any hidden back yard space to deal with the pragmatics of servicing; as such these normally discrete essential activities are on full view to all.

Despite the criticism, the Holford Plan delivered a working University at Canterbury in a remarkably short planning period, and it laid the building foundations around which the University of Kent has grown and prospered over its first half century.

## 2.3 Architecture and Built Form

The University of Kent in Canterbury is well known as a very verdant campus with an abundance of open space, located as it is at the threshold between the city and open countryside. Indeed, the landscape patterns established well before the founding of the University are still vividly present in the form and functioning of the campus today despite the complete transformation of so many other aspects of the University and its organisation. The landscape was, for many centuries, a place for cultivation and growth of the sustaining necessities of life, and the past continues to shape the arrangement of the University today; the names of Brotherhood Farm, Beverley Farm, Hothe Court Farm, Park Wood, Brotherhood Wood and Hospital Wood suggest the very rural character of the area prior to the arrival of the University campus (Figure 10).

Furthermore, despite the outwardly modernist face of the 1965 University campus, there is no doubt that heritage influenced the layout and forms of the Holford Masterplan. He worked with the topography, the alignment of historic routes and the former agricultural features of the site to create a dramatic new university campus in a unique and ancient working landscape.

**University Architecture and Built Form:** The 1960s, described by some as a 'golden age' of university building, is currently undergoing a reappraisal in architectural criticism. A more sympathetic view of this period is now emerging recognising the radically new approach taken to town planning, the striking new architecture it generated, and the innovative use of modern building materials and new industrialised methods used in the construction. The writer and film-maker Jonathan Meades has described the Brutalist period as important because:

*"…it was one of those rare periods when British architecture abandoned its habitual stance of offensively inoffensive "good manners", of strenuous politeness."*

Many buildings from this period are rightly considered to be unique and the finest of their type. Certainly, Holford's concept for Eliot College (and later reprised for its near-identical 'twin' Rutherford College) is a fascinating exploration of a flexible, mixed-use building typology that simply would not have been created in the private sector or outside of a university campus.

Today's campus has emerged from a (more or less) continuous process of design and construction, and yet the architectural character has remained relatively consistent in its height, scale and choice of materials. Although many of the buildings can be described as 'iconic' through their uniqueness, overall the architectural composition of the campus is delightfully modest and does not rely upon showy, over-scaled or extrovert architecture. This is a place where academic endeavour takes place in thoughtfully designed buildings within a predominantly green landscape setting.

The Canterbury campus has evolved as a somewhat diverse collection of buildings since the University was founded in the mid-1960s, and this trend continues to this day. The development of the University can be divided into several quite discreet eras. In addition to remaining architectural fragments from the pre-university use of the land, each group covers a period of approximately one decade.

**The 1960s, and the Founding of the University (Figure 11):** Holford's central idea for the University was of a campus set in a landscape, yet interestingly the Masterplan can be described as very 'architectural' in nature. It was composed of a central campus core of academic buildings, arranged around a largely orthogonal grid of streets and spaces that ran at right angles to St Stephens Hill and parallel to Giles Lane. At the core sits

Figure 9: The first phase of the University opened in 1965 and some of the first 500 students

the Templeman Library, clearly expressed on the ridgeline as the backbone to the campus heart (Figure 9).

The working 'heart' of the campus core was to be surrounded in plan by a collection of eight independent college buildings, arranged around the perimeter of the core in such a way that the core could be 'contained' – and therefore defined by – the most important college buildings.

This approach to the Masterplan enabled Holford to create a clearly defined architectural hierarchy in which the library and the college buildings were expressed as the most important buildings. They are connected to the core but at the same time independent from it, located as they are at the threshold between the campus core and the surrounding green landscape.

Whereas the core is 'urban' in nature, the colleges are intentionally located as 'objects' in space. It is the landscape setting that dominates the final result, with the buildings carefully located to avoid breaking the ridgeline or dominating the natural setting. The relationship of geometric forms in landscape, together with the planned layout for Darwin and future colleges to the west and north, created an informal campus edge to the parkland to the south with views to Canterbury and beyond.

As with all general rules, there is of course an exception; Holford anticipated expansion of the Masterplan to the north-west of the campus heart, so a gap was created in the otherwise regular disposition of college buildings around the perimeter of the core (now manifest between Woolf College and Keynes College) to allow for the campus to expand into Park Wood.

Holford translated his campus idea into architecture and each building was designed in strict adherence to a geometric order. The founding buildings were built to Holford's design and included Eliot & Rutherford Colleges, the Marlowe Building and the Templeman Library. The planning of the colleges in particular was based on overlapping squares forming courtyards and circulation routes, around which the functional spaces were arranged.

The Masterplan anticipated a relatively modest first phase followed by gradual growth. This approach anticipated the colleges to be developed gradually over time, and for the campus heart to be consolidated incrementally with additional buildings as funding became available. The Holford Masterplan layout suggested that subsequent college buildings should also adopt the same overlapping courtyard expression.

It is instructive to note that patterns set out in the Holford masterplan at the foundation of the University, fifty years ago, are still evident in the form and functioning of the campus today despite the complete transformation of so many other aspects of the University and its organisation. Indeed, the landscape patterns from the period before the founding of the university are still legible and profoundly influence the arrangement of the University today.

The selection of materials in these early buildings, together with architectural modelling and detail, helped to embed them into their context. Windows in the Eliot and Rutherford College buildings were grouped in vertical bands and recessed behind the sculpted concrete wall panels to reduce their impact on distant views. Earthy brick colours at the upper levels and chamfered corners softened the building outline against the landscape skyline and wooded backdrop. The Physics Laboratory, now the Marlowe Building made use of similar architectural techniques and façade modelling, with recessed narrow windows set within an earthy brick and an over-sailing horizontal upper storey supported on a cantilevered structure.

This collection of buildings began to create a garden setting on the plateau overlooking Canterbury, formed on its western edge by the Marlowe Building and loosely defined on its southern edge by Eliot & Rutherford Colleges, framing views back to the historic city. The definition of this space was completed by the Templeman Library on its northern edge, which echoed the forms of the neighbouring colleges but created a more formal, civic expression with heavily buttressed brick piers and intermittent vertical bands of glazing.

During the late 1960s, the campus was further enlarged with the addition of the Chemical Laboratory (now adapted as Ingram), the Electronics Laboratory (Jennison) and the Sports Hall to the north-west of Giles Lane, Cornwallis (a complex of buildings) and Gulbenkian Theatre in the central campus and Keynes College to the west of the junction of Giles Lane with University Road. The Cornwallis and Jennison buildings are both two storey horizontally expressed buildings, formed of textured concrete panels set parallel with (and at right angles to) the facades to provide solar shading. Keynes College is formed of twin courtyards and expressed stair towers reminiscent of more traditional university architecture. Fenestration patterns and building materials follow the precedent set by Holford's founding Eliot College and Rutherford College buildings.

All these buildings, whilst different in form, use, construction and appearance, share a family resemblance and sit comfortably as a coherent collection of buildings in the landscape, as Holford had envisaged.

**1970s Campus Expansion:** During the 1970s the University campus was enlarged eastwards up to St Stephen's Hill and exhibited the first departures from the founding masterplan principles. Darwin College, The Registry, The Senate and Rutherford Extension were added to the Campus Heart and the Stacey Building was developed to the north-west.

The Registry, designed in the architectural language of the earlier Cornwallis building, together with the Templeman Library and Gulbenkian Theatre, frame an open landscaped courtyard, connected diagonally with the original central campus garden to the south-west. The Senate, with its geometric octagonal form in concrete and brick, sits as a pavilion comfortably alongside this family of buildings.

The experimental 'Y-plan' used at Darwin College breaks with the courtyard form used elsewhere on the campus. The use of brickwork, with rectangular windows vertically aligned, is also a departure from the modular panelised architecture used elsewhere. The modelling on the facades is created by a regular rhythm of set-back segments of the brick wall, to express a crenelated series of masonry blocks. Perhaps deliberately, Darwin College bears little relationship with the site or neighbouring buildings. The design ignores the symbiotic relationship of architecture and landscape that the Holford Masterplan and early buildings had established.

**1980s New Departures:** The 1980s saw a great increase in student residential accommodation on campus with the development of the Darwin Houses, and also with Park Wood as a satellite community away from the campus heart (effectively stretching the campus). The Darwin Houses form a continuous terrace that is set well back from Giles Lane, resulting in an awkwardly wide margin of 'estate space' along its northern face. The terrace does at least return on its west and east edges to enclose (with Darwin College) an expansive courtyard garden on the south side. By contrast, the Park Wood housing, planned as a series of suburban-style clusters arranged around car parking courts and cul-de-sacs within a woodland setting, is a complete departure from the collegiate forms of the earlier buildings. In addition to student housing, general academic and college extensions were developed in the campus heart at Cornwallis (Octagon), the School of European Culture and Language (Cornwallis North West), Grimond and Eliot Extension.

The idea of a unified campus architecture as envisaged by Holford was decisively abandoned during this period. Buildings were designed using an eclectic mix of different architectural languages constructed from a diverse range of materials. The resulting architecture is of varying quality.

**1990s: Further Expansion:** This period saw the continued expansion of student housing on campus with the development of Becket Court adjacent to Eliot College, and Tyler Court (phase one) to the east of Rutherford College. Becket Court is a cranked 'L-form' block, with folded roofs and expressed in a 'modern vernacular' style. Tyler Court is a long slab/finger block cut into the hill, and its siting significantly obstructs views out of the eastern end of the campus. The large-scale building massing, small windows, brick colour and texture create the appearance of an urban scale apartment block, alien to the landscape setting. Park Wood (phase two) extended the phase one layout. The Sports Pavilion was also built at this time to the north side of Park Wood Road.

Figure 10: The landscape prior to the construction of the University

Figure 11: Holford's Masterplan superimposed upon the landscape

Figure 12: The University today superimposed upon the landscape

Also, during the 1980s, additional academic buildings were developed in the campus heart in Cornwallis, together with the Templeman Library (phase two), in an architectural language that refers to the earlier neighbouring buildings. North-west of the campus core, the Canterbury (Kent) Business School (now Chipperfield Building) was the first building to be developed around a 'garden circus', in a woodland clearing within Brotherhood Wood at the termination of a diagonal footpath linked to the central campus garden.

**2000s: Further Expansion:** Following the millennium, the process of adding new campus buildings established in the previous decades continued, and each building was designed independently without an apparent unifying architectural language. Additions included the Keynes College Extension lecture theatres, Cornwallis North East the extension of the Sports Centre and the extension to the Gulbenkian Theatre.

During this period, large student housing projects were also completed, including Tyler Court B. This development comprised two stepped, long finger blocks cut into the landscape and set parallel to the first phase. The blocks step down the hillside creating unsatisfactory ambiguous landscaped spaces between them.

Woolf College, constructed in 2008, was the first new college building to be completed since Darwin College in the 1970s. The design of the new college revived the courtyard form of Holford's original college buildings, although the layout is at a much larger scale than the original buildings. This, together with the flat and somewhat featureless architecture, creates the impression of a modern urban mansion block rather than the intimacy of a collegiate courtyard.

The Canterbury Innovation Centre (2009) (not a University building) sits upon the contoured hillside of University Rise commanding views south towards Chaucer College and Canterbury beyond. The building is distinctive, crescent in form and somewhat of an anomaly in relation to the more orthogonal buildings that inhabit the rest of the Campus. The low profile of the building, predominantly two-storeys in height, minimises its presence in relation to the Grade II listed Beverley Farmhouse. Its modular elevation, comprising panelised glazing set within large projecting bays that express the individual units, is capped by an expansive oversailing mono-pitch roof. The elevation south towards University Road is animated by a 'brise soliel' of metal louvres which run the length of the elevation either side of a white rendered portal, creating a framed centre-piece. The car parking is concealed behind within segmented bays subdivided by landscaped bunds.

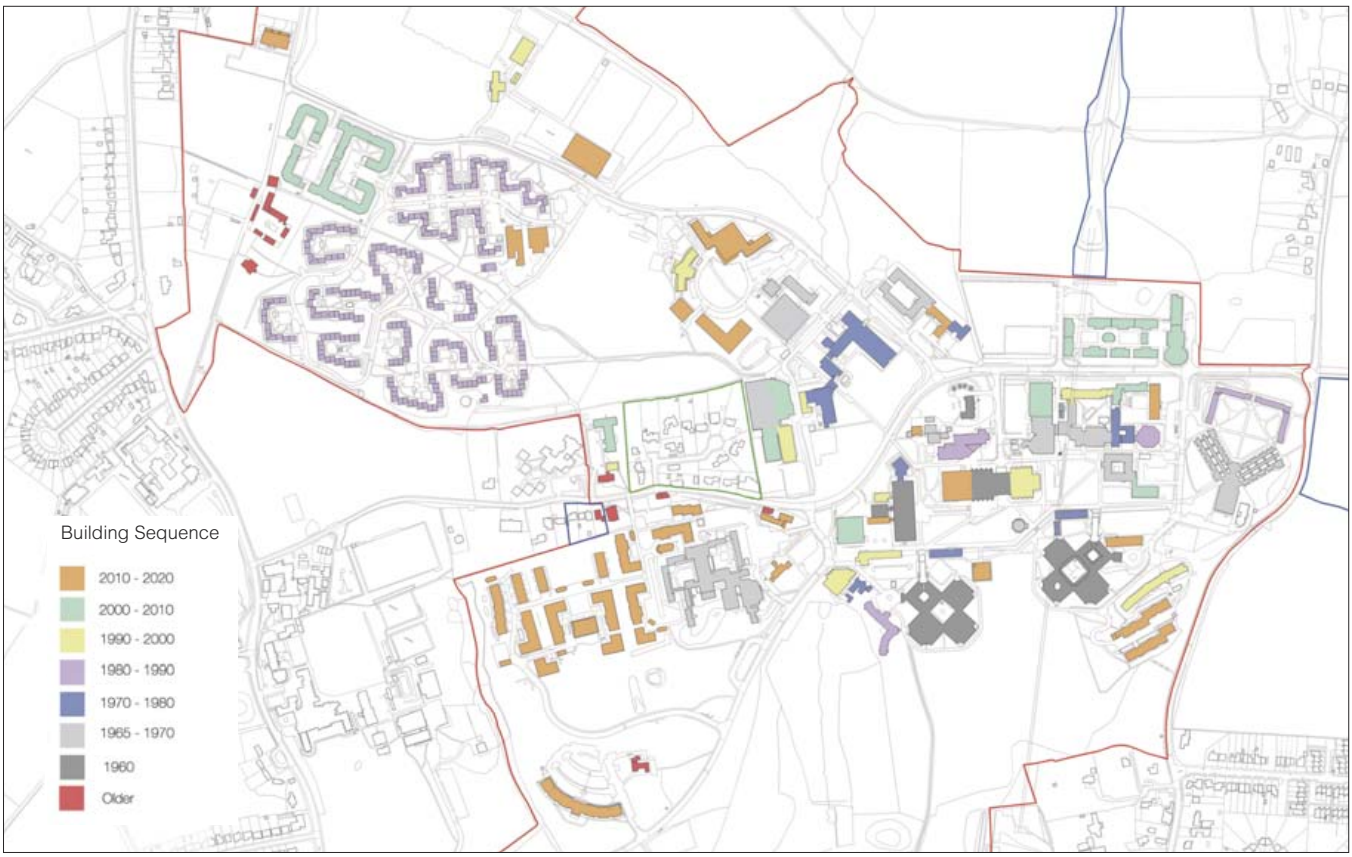
The Jarman Building (2009) is a large, square composition that dominates the western arrival space to the campus at the summit of University Road. Despite this gateway location, the facades lack animation and the building misses the opportunity to animate the spaces that surround it. Also, the unique design, using contemporary materials and detailing, makes little reference to other campus buildings.

**2010 to the Present Day (Figure 12):** During the last decade, the process of campus growth has continued with the addition of a number of notable buildings.

The Colyer-Fergusson (Music) building (2012) respects the form and scale of its neighbours, particularly the strong horizontal layering of the Marlowe Building. The building is finished in exposed washed aggregate concrete blocks similar to those used at Keynes College.

Turing College is the latest college to be completed (2015), and further extends the campus along the ridgeline to the west. It comprises a series of parallel finger and 'C-shaped' blocks spaced apart to allow the garden spaces to pass between them. At the centre is a square, which contains communal and social facilities. The use of gabion walls, wood and dark cladding help to soften the impact of the buildings into the landscape, however the predominant use of lighter render and cladding does make the buildings a prominent feature on the skyline.

The Wigoder Building (2016), a small white frame clad block, is located next to Eliot College. Although modest in size, this building has a significant and negative impact on the architectural dialogue between Eliot & Rutherford Colleges and interrupts the landscape connection between the Parklands and the campus heart. Views to the historic city are also partially blocked by the building (Figure 15).



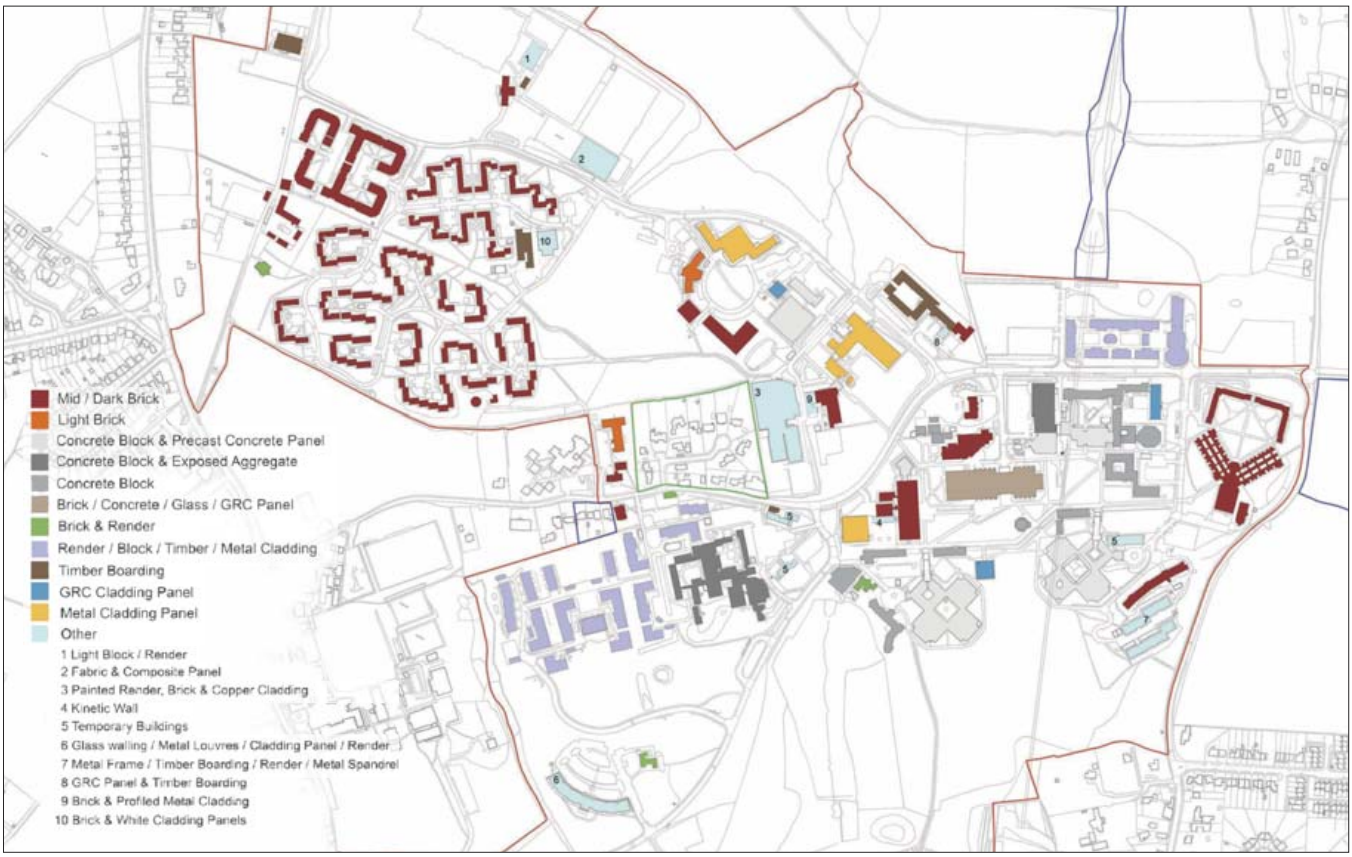




Figure 13: University building sequence (top) and predominant materials (bottom)

The Sibson Building (2017) fronts onto the circus garden at the end of the north-west link to the campus core and represents another one-off architectural innovation within the campus. The architectural language in this case is created from organic curvilinear forms, an irregular pattern of vertical fin louvres and rich mixture of coloured zinc cladding to reflect the natural woodland colours.

As a place of innovation, it is entirely appropriate that the University of Kent should continue to push architectural boundaries and support innovation in architecture, alongside an appreciation of the relevant issues of memory and continuity with the past in this particular location. These issues will continue to be explored as part of the Framework Masterplan process and flexible guidance provided on future development, layout, scale and massing of buildings that will distinguish, and reinforce the differences between, one character area from another. (N.B. A list of the architectural awards already bestowed upon the University is included in Appendix 5 to this report).

## 2.4 The University Today: Growth and Success

Today the University of Kent is among the most highly regarded and successful UK universities (Figure 16). While the Canterbury campus is where the University started remains by far its largest base, it has another major campus in Medway, a centre for part-time study in Tonbridge, and postgraduate centres in Athens, Brussels, Paris and Rome.

Over the years, the University has also acquired land to the north and south of Tyler Hill Road and to the east of St Stephens Hill. Consequently, the Canterbury District Local Plan (July 2017) increased the size of the designated campus to take in University-owned land to the north, up to Tyler Hill Road, at the request of the University. The designated campus (outlined in red) and other nearby University-owned land (outlined in blue) is outlined in the accompanying illustration (Figure 4).

The designated campus encompasses almost approximately 450 acres (about 180 hectares) of land, buildings, roads, parkland, woodland and farmland. It is interesting to note that the walled Roman City of Canterbury is 130 acres, which is approximately the same size as the campus heart. For comparison, the Olympic Park in Stratford, London is 560 acres and nearby Sissinghurst Park is 460 acres.

The designated campus extends northwards to Tyler Hill Road, a narrow, minor road which connects the villages of Blean and Tyler Hill with inadequate provision for pedestrians and cyclists. Blean is well-connected to the campus and accessible for pedestrians and cyclists by the Old Salt Road (Sustrans Route 1). The Church of St Cosmus and St Damian on Tyler Hill, just outside the campus, is a listed parish church and graveyard. The north eastern boundary of the campus is formed by working farms and woodland between it and Tyler Hill, which are bisected by the University-owned former Crab and Winkle railway line. The village of Tyler Hill, although close to the campus to the north-east, is less well-connected and a lack of significant footpaths and cycle routes mean that it is dependent upon busy minor roads to connect to Blean and to Canterbury.

To the west, the campus extends to Hackington Road and St Stephen's Hill, with Giles Lane forming the only vehicular access point from the east. The University owns land to the east of St Stephen's Hill (accessed from a private road known as Little Hall Farm Lane), which was formally important for the tile industry but is now farmed. To the south, grazing land falls down quite steeply to the Hales Place neighbourhood. A significant number of students that live off-campus choose to live in this area.

The southern boundary of the campus is formed by the residential streets of Harkness Drive, Cadham Place and Damerham Close, with The Archbishop's School to the south-east and Chaucer College to the south-west. Canterbury West station sites to the south-west of the campus. Given the current lack of a northern entrance to the station, pedestrians and cyclists visiting the campus must take a rather convoluted route from the station via Station Road West, Hackington Place and a series of paths/streets. This route is hard to find for the occasional visitor and relies upon a narrow, low-headroom tunnel which is intimidating to use after dark. The Station is served in its east and west approaches by level crossings; therefore, the road approaches to the University (ie:

Whitstable Road and St Stephen's Hill) close when trains are entering or leaving the station, impeding the progress of buses and taxis along these routes.

The western boundary of the campus is formed by St Thomas Hill and Whitstable Road; schools, housing and fields border these roads. University Road joins St Thomas Hill in the south-western corner of the campus and sweeps up to meet Giles Lane at its heart. St Edmund's School and its playing fields extend either side of Giles Lane, a public highway that forms the key east-west vehicular route across the Ccampus. The Old Salt Road public bridleway (and Sustrans Route 1) peels off from Whitstable Road and heads off north across the campus up to Tyler Hill and beyond. A roundabout is just to the north, with the village of Rough Common to the west and the listed Blean House to the east. The rest of the western boundary is characterised by mainly two-storey housing and fields fronting Whitstable Road, with Blean Primary School fronting the brow of the hill before the road dips first down and then back up to Blean.

In overall terms, the elevated position of the campus along the ridgeline provides a backdrop to the World Heritage Site and other heritage assets in the centre of the City. The Framework Masterplan has been shaped such that it will protect the special natural and semi-natural environment of the campus to ensure that:

- Any future proposals do not significantly change the skyline and protect/enhance the visual amenity of people at important viewpoints
- Any development of the visually sensitive ridgeline does not introduce dominant features by way of careful siting, scale and massing, choice of external materials and colour and landscaping
- The Masterplan seeks to conserve the scenic quality of important views from the surrounding area and the visual setting of the City, Blean, Tyler Hill and Rough Common
- Any external lighting introduced to create a safe environment or to floodlight sports pitches etc, will be designed to minimise glare and avoid a negative impact on the visually sensitive ridgeline.

In addition, the Campus sits in a strategically important location from a landscape and biodiversity perspective, being encompassed by extensive areas of Ancient Woodland to the east, west and north. In combination, these woods form the Blean Woodland Complex, which is one of the largest areas of contiguous/semi-contiguous Ancient Woodland in England. There are also areas of Ancient Woodland within the campus itself, together with a range of rich wildlife habitats.

The existing movement network across the campus and in the surrounding area is summarised in the accompanying illustration.

## 2.5 The Campus in Numbers

The campus provides about 49,000sqm of academic space for three faculties (Humanities, Sciences and Social Sciences) as well as professional services space, including retail and hospitality (34,500sqm), indoor (approx. 7,600sqm) and outdoor sports facilities and about 5,400 student bed-spaces. It is also home to the Gulbenkian Arts Centre (300-seat theatre and 340-seat cinema), the Colyer-Fergusson (Music) Building (400 seats), the Canterbury Innovation Centre (approx. 3,600sqm), the Oak's Children's Nursery and the University Medical Centre.

The campus and many of its facilities are open for public use, providing accessible grounds and open spaces, a large number of Public Rights of Way and footpaths, together with a Community Garden. There are currently 2,165 university-related car parking spaces spread across 62 separate parking areas, with additional spaces being provided for commercial uses.

The campus is in use all year round. Clearly it is busiest during academic term-time (and particularly at the beginning and end of terms), but the University hosts conferences and events throughout the year and provides important tourist accommodation outside of term-time. The cultural, business and recreational facilities referred to above are also open throughout the year.

Figure 14: Photographs of the Canterbury campus 2019

Figure 15: The Wigoder Building, opened in 2016

## 2.6 Relationship with the District and Wider Region

The University of Kent provides significant positive impacts for Canterbury District and the wider region which can be summarised as follows:

- The University directly or indirectly supports more than 8,300 jobs in the region
- It provides almost 3,210 'full-time equivalent' jobs and provides employment opportunities for more than 5,000 of its students annually
- The University hosts the Canterbury Innovation Centre, which provides 3,600sqm of business space and the University's Hub for Innovation and Enterprise, offering dedicated support for start-up businesses
- Nearly 4,000 alumni have remained in the county of Kent
- The University offers workshops and activities with regional schools and colleges and a Student Ambassador Scheme has operated for more than 10 years
- Kent Law Clinic received 1,430 enquiries during the year; legal advice was provided in 360 of these matters and 178 other clients were formally represented during the year
- Students volunteered more than 77,000 hours both on campus and in the local community during the 2015/16 academic year
- The Gulbenkian was awarded National Portfolio Organisation status with the Arts Council of England for three years from April 2015

- From June to September 2016, the University's Conference Office staged more than 4,350 events and booked more than 145,000 overnight stays over a 13-week period, raising revenue of more than £4m and providing a vital addition to the 219,000 bed nights provided elsewhere in the city throughout the year
- Kent Union's 'Raise and Give' scheme raised £170,046.052 in the 2015/16 academic year.

The University participated fully in the Council's review of the impact that the Canterbury-based Higher and Further Education institutions have on the Canterbury District. The Higher and Further Education Impact Review Report (January 2017) identifies a number of negative impacts associated with student rich parts of the District, as well as many of the positive impacts identified above. These include impacts on community living, such as distortions of the local housing market, unkempt gardens and over-flowing bins, letting boards, additional on street car parking, noise and anti-social behaviour. The Report makes 32 recommendations for action to reduce negative impacts and increase positive impacts. The University is working collaboratively with all relevant partners to do this and a number of the recommendations are referred to in subsequent sections of this Framework Masterplan.

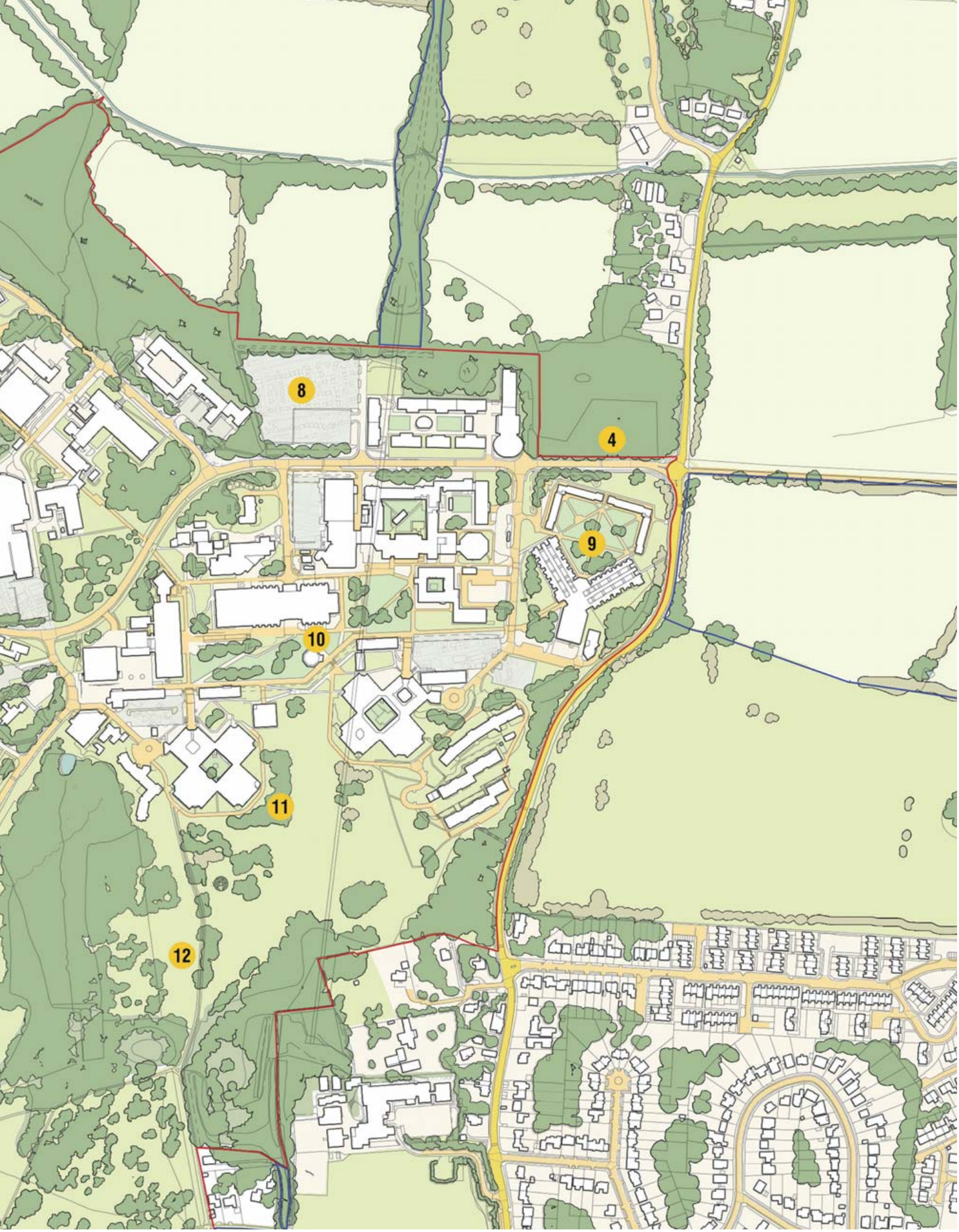
The Impact Review goes on to note that the University of Kent and Canterbury Christ Church University make a significant economic contribution to the district, with up to 28% of all economic output in the district generated by the universities and four out of the top ten largest employers in the district are related to the Higher Education sector. It also acknowledges that during the recent recession, the district's Higher Education sector helped to insulate Canterbury's economy by providing a relatively stable and resilient supply of high value jobs locally.

It is worth noting that the city of Canterbury is currently experiencing its own transformation. It has evolved in recent years physically, socio-economically and demographically. Future planned change at Mountfield Park will see an area south of Canterbury transformed into a mixed-use site with 4,000 homes, 70,000sqm of employment floorspace, two primary schools, woodland, open space, local shops and community facilities. The project includes options to improve sustainable travel with an enlarged park and ride, fast bus travel to the city centre and pedestrian and cycle connections.

A number of projects are promoted under the 'Canterbury Knowledge City' banner. These aim to improve the supply of high quality business space and facilities in order to promote business development, high-level skills and support productivity. These include:

- Kent Medical School and Research Complex – medical complex to deliver clinical capacity, training and research to support medical services across the county;
- Canterbury Innovation Centre Phase II – which replicates the successful formula of the existing facility, providing more serviced offices/workshops for innovative firms; and
- Makers Space and Hot House – specialist facilities and equipment for new makers, creatives, programmers, scientists and engineers.

Figure 16: Plan of the central part of the campus today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# 3 The Imperative for Change

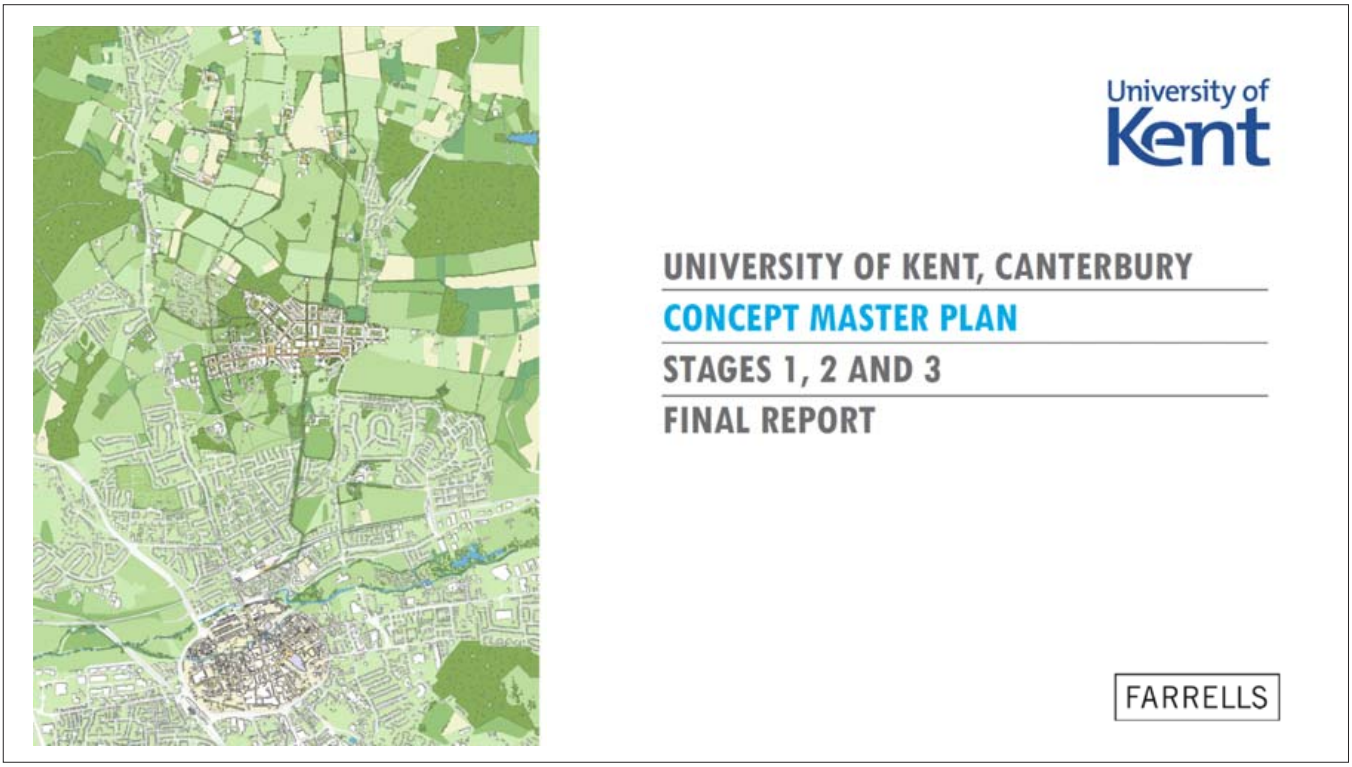


Figure 17: Images reproduced from the Farrells Study, 2015

## 3.1 A Masterplan Vision for the Campus

The University of Kent is an extremely successful organisation which, in the context of significant changes to the funding and direction of Higher Education in the UK, is now dealing with a great deal of uncertainty. In that context, the Masterplan for the Canterbury campus is intended to provide a framework for development that will enable the University of Kent to cope with change and to continue to be a success. The Masterplan is concerned with shaping and guiding the spatial organisation of the future campus, including the form and location of buildings, their landscape setting, the shared spaces they define and the whole environment that is created as a consequence. It is an issue which is perhaps the most protracted of all the many issues that the University's Vice-Chancellor and the Executive Group is charged with managing for the future.

The 50th anniversary of the founding of the University of Kent provided an occasion to both reflect on the astonishing success of the University during its first half century and to speculate on its evolution over the next fifty years. It was at this important milestone in the evolution of the campus and the University of Kent commissioned Sir Terry Farrell to provide a high-level blue-print for its future development and to articulate a vision for the next 50 years, recognising the critical relationship with Canterbury and the wider district.

## 3.2 The Farrells Study

The 2015 Farrells Study was significant in being perhaps the first overview taken of the campus since the first masterplan created by Holford in 1965. While it had, of necessity, focussed upon building functions and disposition, Sir Terry Farrell took the opportunity to review how the campus had evolved as a *'place'* (Figure 17).

The recommendations made in Farrell's vision are wide-reaching in their scope and aspirations and, although they draw attention to a number of shortcomings in the way in which the campus has developed and sprawled in recent years, the study overall is optimistic in its appraisal of what the campus is capable of becoming (Figure 18).

It is interesting to note that Farrell emphasised the importance of landscape in the University estate, set as it is in Kent with its reputation as the 'Garden of England'. There is no doubt that the green landscape setting is one of the most important and unique features of the Canterbury campus; indeed, it is significant to note that Farrell goes even further in his manifesto in advocating that the landscape is the University's USP and suggests that the campus could perhaps become *'…The Best Garden Campus in the UK…'* (Figure 22).

It was Sir Terry Farrell's vision which provided the foundation for a more detailed Framework Masterplan described in this report.

In building upon the 2015 Farrells Study, the development of this Framework Masterplan has placed particular emphasis upon analysing and understanding the nature of the University's unique landscape setting. The approach has been to create a masterplan informed by (and which respects) the shapes and patterns in the landscape, the character and history of the campus, the landscape setting, the social history, and so on. The intention behind the Framework Masterplan has been to reinforce, and in some cases rediscover, the deep connection between the University of Kent and its landscape setting. Seeing the landscape in this way perhaps stands as a powerful metaphor for the cultivation of new knowledge and the growth of individuals through research and teaching that is the central mission of the University of Kent.

## 3.3 The Wider University Estate Today: Overall Challenges and Opportunities

The Canterbury campus is one of a number of new suburban satellites that developed around the perimeter of the historic city in the post-war era, as Canterbury continued to grow well beyond the original city walls. Not only is the University of Kent considered to be the UK's European university, it is also now within the 'magic hour' from London by train. While it is physically independent from Canterbury, it is only a mile away from the city centre. As a result, it is free from the hustle and bustle of the city, while being only a 25-minute walk away from the 'cultural capital' of Kent.

**1.**
A **plan** for future
**growth and development**

**2.**
Improved **potential & value** of the **University Land Holdings**

**3.**
Make
**place-making**
a **top priority**

**4.**
**Flexibility**
to accommodate
an evolving **mixed-use, knowledge-based economy**

**5.**
Reinforcement of the University's **reputation for excellence** in all aspects of
**sustainability**

**6.**
A coherent and unique
**brand** for the University,
recognising its **reputation** as
the **UK's European University**

**7.**
An environment for
**social interaction**

**8.**
A **stimulating, safe and supportive** environment -
home to a **vibrant academic community**

**9.**
Strengthen the
**symbiotic**
**relationship with the city**

**10.**
Create a **remarkable**
**public realm**

Figure 18: Urban Design Principles reproduced from the Farrells Study, 2015

The University is well-known as a very verdant campus with plenty of open space, located within a semi-rural landscape setting, and the names of Brotherhood Farm, Beverley Farm, Hothe Court Farm Park Wood, Brotherhood Wood and Hospital Wood suggest the very rural character of the area prior to the arrival of the University campus.

However, a review of the campus today reveals a number of short-comings both in the environmentand in its relationship with the wider context, and the current University estate faces several issues that need to be addressed:

- The campus lacks coherence and a strong *'mental map'*; the buildings are arranged as 'objects' in the landscape rather than being arranged to define and enclose the 'spaces' between them. Consequently, it is a very difficult place for visitors to navigate
- Motor vehicles tend to dominate the environment and car parks infiltrate into the very heart of the campus. The campus roads are not particularly urban, but are often busy and intimidating. The design of the roads does nothing to discourage high speeds
- Giles Lane is a public highway, and both this and University Road are used by motorists to avoid the city centre, thereby adding to non-university vehicle traffic in the centre of the campus
- The design of the landscape was not sufficiently well addressed in Holford's day. While blessed with an abundance of green spaces, the campus today still lacks a sense of coherence and an organised public realm. Furthermore, the green spaces within the campus are rather homogenous and repetitious, and this lack of variety means that the University under-achieves in terms of landscape character and personality
- The hill-top location dictates that, for much of the academic year, the campus is very exposed to the weather. It is only in the Summer Term that students benefit from the green open spaces. The public realm would benefit from a more sheltered network of outdoor spaces
- The low-density and dispersed campus environment means that paths that connect the core with the outer campus are long, and lack animation or passive surveillance.
- Emerging tensions between the University and its neighbours where development pressure, traffic and other perceived nuisances provide the focus for potential dispute.

These criticisms should be set against the many delights of the current campus, which include a generous green landscape setting, the quality of many of the facilities and buildings and the spectacular views of Canterbury.

Through the Framework Masterplan process, the University has taken stock of the future potential of the University estate, not only to deliver future growth but also to evolve as a more inclusive and vital place. It is a time of great uncertainty, when growth has levelled out and universities are competing for more limited student numbers, so flexibility and adaptability are key.

With the benefit of fifty years of experience, based on the campus development to date, we may confidently predict that much of the campus of fifty years hence is already constructed and that the future campus plan will be in the form of an evolved version of the current spatial arrangements. While the Framework Masterplan proposals themselves are strictly focussed upon the defined 'campus' as designated in the Canterbury District Local Plan, the Masterplan document also takes the opportunity to identify additional proposals for adjoining areas outside of the campus boundary; however, these are limited to infrastructure, transport and movement and not to development at this stage. By taking a big-picture and long-term overview of Canterbury and district, the Masterplan has looked for ideas and opportunities to realise wider benefits on land beyond the designated campus boundary.

## 3.4 The University of Kent in Canterbury: Campus at a 'Tipping Point'

The Holford plan set out a clear vision for the campus as a collection of discrete colleges in a parkland landscape, with common facilities shared centrally between them. Half a century since the inception of the campus, the extent of tree cover has increased very significantly and is now a dominant feature, replacing the openness of the campus experienced on the opening day. Perhaps in this regard the setting is now closer to what Holford had

imagined in the early 1960s. Future growth, in so far as it was known or anticipated, was to be accommodated by the addition of more college buildings distributed along the hill top ridge and down University Road, with large landscape spaces in-between creating the college settings.

However, the campus has evolved in quite different ways from that which Holford intended for several important reasons:

- The University of Kent has experienced a thirty-fold increase in academic areas and student numbers since its inception in 1965
- The original collegiate system has been replaced by a more subject-based School system, along with a wide range of alternative ways to accommodate residential students, including shared apartments, town houses and many students living off campus in Canterbury
- Season-by-season the landscape has matured and developed, such that large areas of planting and maturing woodland now distinguish the formerly bleak and exposed ridgeline
- Finally, and perhaps most importantly, the approach to providing accommodation has been much more pragmatic and tactical than envisaged by Holford. Buildings have been added within the confines of the original Holford campus heart, as well as on available sites within the wider campus as the estate has grown in size. Some original structures have been extensively modified or replaced, and many of the buildings that have been realised are good works of architecture. At the same time, the focus has been on developing good buildings perhaps at the expense of developing spaces of equal quality between them, and the ever-pressing demand for car parking has seen large surface parking areas retained and expanded. The main point here is that growth and the dramatic other changes have been delivered without strict adherence to an overall guiding plan.

Since the inception of the Holford Masterplan in 1965, the University has experienced great success and the campus has grown significantly as a result. The process of land acquisition has continued over the decades since the University first opened, and this has led to a substantial growth in the estate; for example, the University estate now includes significantly more land to the north of the campus heart up to and beyond Tyler Hill Road and a large area of land to the east of St Stephen's Hill, as well as the corridor of land once occupied by the former Crab and Winkle rail line (between the campus heart and Tyler Hill Road). Conversely, the area of land to the south of the campus heart (designated on Holford's plan as playing fields) was never acquired.

During this period of growth and evolution, the planning of the campus has largely followed a pragmatic project-based approach to development, utilising available sites within the wider campus outside the confines of the original Holford Masterplan to deliver the quantum of space required. This raises an interesting question: if such a tactical approach has served the University well to date why should it change to a masterplan guided approach to accommodate future change?

The answer to that key question is that the campus has arrived at a 'tipping-point' in its evolution; the investment in new buildings, spaces and facilities is eroding functionality and legibility of the campus as a whole. This in turn is beginning to erode the functionality and quality of the student experience of learning and living at the University of Kent. This approach has followed a much more tactical development of the campus than envisaged by Holford; the demand for space has resulted in the gradual expansion of the built environment and the consequent erosion of the open parkland setting, without an overall guiding plan. As a result, there has been a loss of coherence – or 'sense of place' – and a subsequent loss of identity offered by the original masterplan; continuing to follow this approach will result in a gradual decline in the quality of campus facilities and experience (Figure 19).

In this time of greater uncertainty in Further Education, when growth has levelled out and universities are competing for more limited student numbers, the University has taken the brave but important decision to take a big-picture overview of the Canterbury campus, including projections for future growth, appropriate use of the larger land ownership, and the quality of the campus as a place. Through this Framework Masterplan, the University is taking stock of the potential of the campus,

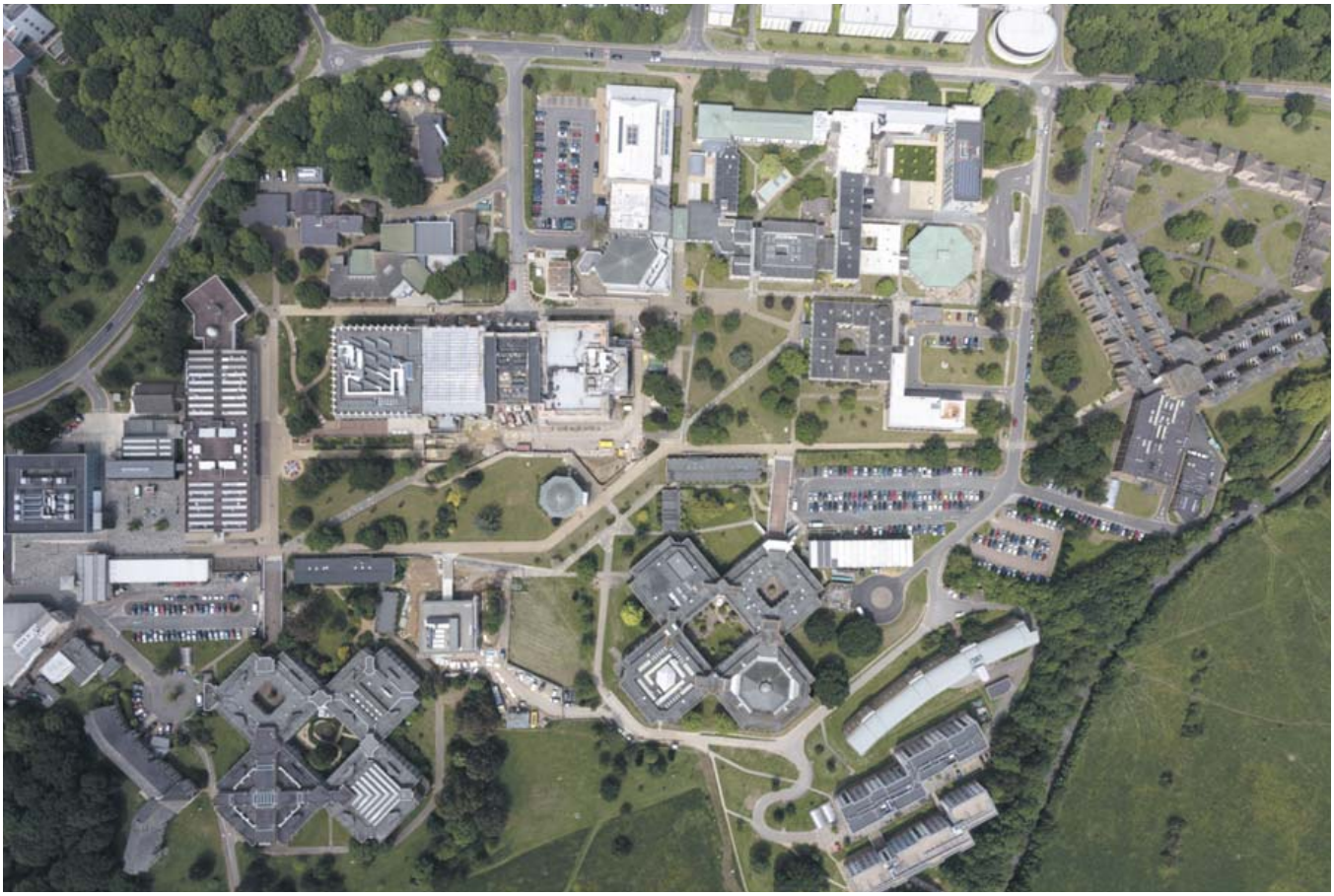


Figure 19: Aerial view of the Campus Heart

not only to deliver future growth but also to evolve as a more inclusive and vital place.

Urban theorists worldwide now recognise the positive and measurable impacts of good placemaking, including its relevance to productivity, economy, health, wellbeing and the desirability of a location. Future emphasis on campus planning must therefore be focussed on growth, balanced with flexibility and good placemaking.

*"Place is actually more important to the world's economy than ever before"*

Professor Richard Florida,
Urban Studies Theorist, University of Toronto

The Canterbury Campus Framework Masterplan is therefore focussed upon arresting and reversing the erosion of campus quality, in order to ensure that future capital and estate management investment is channeled towards delivering cumulative improvement to the campus environment for the benefit of the whole University and the wider community.

## 3.5 The Aspirations and Drivers behind the Framework Masterplan Study

This Framework Masterplan document is intended to guide the development of the physical estate in support of the *'University of Kent Plan 2015-2020'* and *'Kent 2025:*

Figure 20: Aerial view of the Designated Campus

Figure 21: Plan of the Designated Campus (the red line denotes the campus boundary)

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent
Land within Campus Boundary not owned by University

# 3 The Imperative for Change

*Refreshing the University Strategy'*, key documents which set out the future direction of the University and which include the core strategic objectives of research development, educational development and engagement with staff, students and the wider community.

In planning the strategic direction of the University of Kent over an extended planning horizon of the next few decades, there are three categories of future change that the Framework Masterplan has addressed:

1 The Knowledge Economy:

Development of a knowledge-based economy in Canterbury, with the University of Kent playing a central role in partnership with the Canterbury City Council, along with other regional, national and international agencies. The economy of the UK is increasingly based upon knowledge, information and creativity, and Canterbury plays a key role as a 'City of Learning' in that marketplace. Formulation of campus development plans that will enable the University to successfully address and fulfil the economic imperatives of the Knowledge Economy, will require ever closer collaboration between the University and the City, to develop a shared economic vision that will benefit both organisations and make them stronger.

2 Strategic Planning:

The long-term strategic planning of the campus over an extended planning horizon has inevitably needed to address a variety of complex issues beyond the campus boundary. Canterbury City Council has identified Movement and Transport, Education and Air-Quality as some of the most significant issues to resolve in preparing a Framework Masterplan for the Canterbury campus. Other issues are likely to include strategic land acquisition, infrastructure development (both within and beyond campus), defining and influencing patterns of growth beyond the designated campus boundary, long-term policy strategies on sustainability, the environment, heritage, health and wellbeing. Taking a 360° overview across Canterbury and the District has therefore been essential in developing long-term partnerships of trust with local communities, businesses and the City of Canterbury.

3 Adaptability and Flexibility:

The Framework Masterplan also needs to deal with the unforeseen, and to respond to urgent or unexpected contingencies that might arise, such as:

- Developing facilities for research into new areas of knowledge or technology that require innovative specialist facilities
- Responding to unexpected peaks and troughs in the demand for space
- Diversifying and broadening the University's economic base
- Responding to opportunities to form partnerships with commercial businesses
- Accommodating new facilities supported by grants and endowments

These issues, and those related to them, have been carefully considered as part of assembling the Framework Masterplan, and this report describes the form that an evolved campus masterplan should take. It sets out a framework in which the University can flexibly plan for the future, whilst acknowledging a lack of detailed knowledge about what quantum and type will be needed in the years to come. The Masterplan has been based upon sound 'placemaking' principles, in order to achieve a successful and enduring environment that will enrich the experience of working, studying and visiting the campus, and that will allow for the future accommodation needs of the University to be met.

Figure 22: View of Canterbury and the Cathedral from the Campus Heart

# 4 Strategic Spatial Vision, Objectives and Principles

# 4 Strategic Spatial Vision, Objectives and Principles

## 4.1 The Strategic Spatial Vision

In the preparation of this Framework Masterplan for the Canterbury campus in line with Policy EMP7 of the Local District Plan, the University and its masterplan team worked collaboratively with Canterbury City Council, Kent County Council and a wide range of other local stakeholders.

The Strategic Spatial Vision for the campus draws on a number of building blocks that have helped frame it. The key building blocks are identified in the accompanying illustration (Figure 23).

In order to set the strategic direction for the Framework Masterplan, the University of Kent developed a narrative concept for its Canterbury campus during the consultation process with neighbouring local communities and the resultant 'Strategic Spatial Vision' can be expressed as follows:

*The Canterbury campus will be defined by a strong high-quality landscape that helps to create an outstanding place to teach, learn, work, undertake research, live and enjoy. It will form an integral part of Canterbury District by providing educational, cultural, recreational, sporting and employment opportunities for people in the District and the wider Kent region and will use the University's national reputation to help improve economic prosperity.*

*Roads on the campus will be transformed into attractive streets that prioritise walking and cycling and buses and public paths and bridleways will be enhanced to provide a welcoming and legible network of routes.*

*The campus and nearby University-owned land will be developed in ways that support its special natural and semi-natural environment, the setting of Canterbury's World Heritage Site and local heritage assets.*

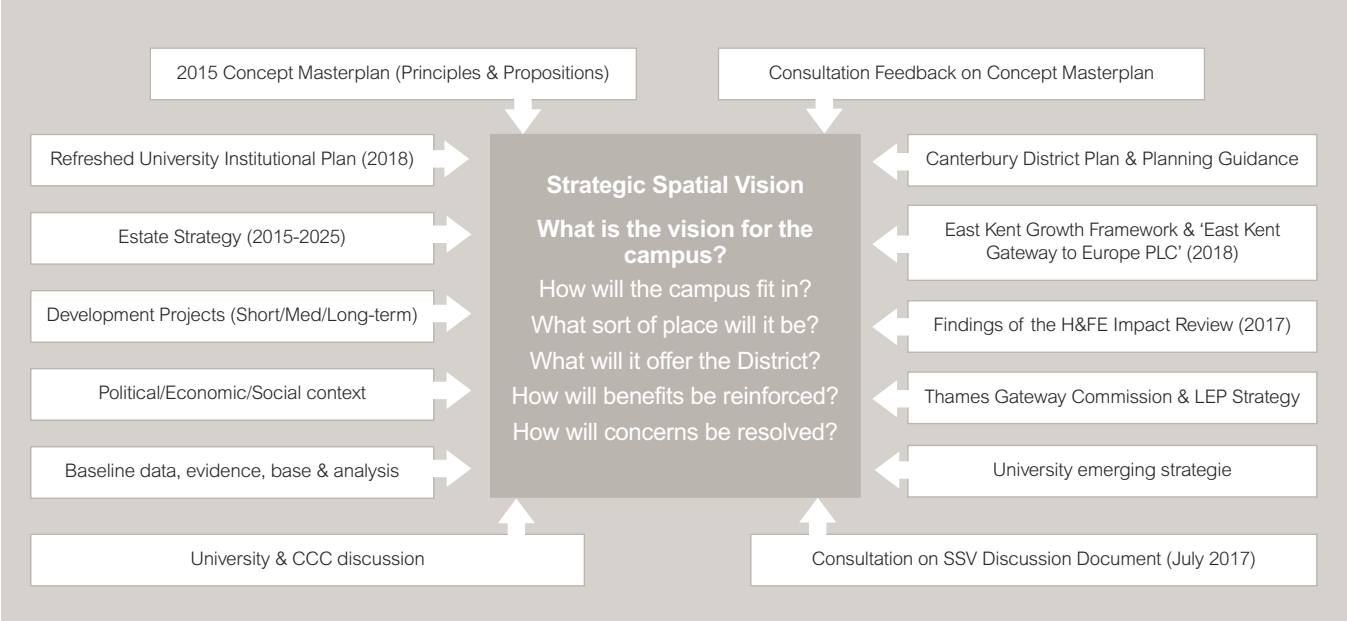



Figure 23: The key building blocks of the Strategic Spatial Vision for the Campus

*Future development will respect the quality of life and day-to-day activities of people living and working in the surrounding villages and residential neighbourhoods and seek to mitigate any change to the wider surrounding area in terms of traffic, car parking, air quality or demand for recreation. The campus and development on nearby University-owned land will be outward facing and seek to improve the lives of local people as well as being an exemplar for environmental sustainability by reducing energy use and carbon emissions, adopting high standards for water usage and waste and recycling and creating an environment that promotes healthy living and physical and mental wellbeing.*

*The University's ownership will enable the long-term stewardship of the campus and ensure that it is managed and maintained in ways that sustain the outstanding place that is created.*

## 4.2 Strategic Objectives

A number of key Strategic Objectives were identified by the University to guide the development of the campus and to help deliver the Strategic Spatial Vision. These objectives take account of the findings of a series of studies and strategies developed by the University and regional partners, as well as the feedback provided during consultation on the Farrells Study and at Step One of the Framework Masterplan process:

1 A Plan for Future Evolution:

A flexible plan to accommodate growth of the Canterbury campus, taking account of future plans for the Medway campus, including:

- academic and research facilities
- student housing
- much-needed new shared amenities
- facilities that encourage year-round use and contribution to local economy (including, cultural and sports uses, visitor accommodation, a hotel/conference facility)
- infrastructure

2 Enhance the Potential and Quality of the University Estate:

Make best use of the existing built resources in order to:

- deliver future growth balanced with flexibility and good placemaking
- evolve as a more inclusive and vital place
- locate new facilities to enhance the Estate as a whole
- deliver the positive and measurable impacts of good placemaking
- improve the quality of spaces between buildings to enhance productivity, economy, health and wellbeing and encourage healthy lifestyles
- develop the campus to enhance the interface with neighbours and improve linkages with local communities as well as Canterbury

3 Make 'Placemaking' a Top Priority:

The Masterplan should:

- nurture and enhance the renown and appeal of the University and its campus as a 'place'
- strengthen the University's reputation as a great place to be, through the quality and diversity of its overall environment
- inspire a greater celebration of arrival at the campus from all directions

4 Ensure Flexibility to accommodate an Evolving, Mixed-use, Knowledge-based Economy:

The campus Framework Masterplan must be sufficiently flexible to:

- allow the campus to accommodate a wide range and mix of uses
- create partner space for companies in the knowledge-based and commercial research economy

5 Establish the University's Reputation for excellence in all aspects of sustainability:

Facilities should be consolidated to:
- promote energy efficiency and limit heat waste
- provide conditions for cogeneration of power
- take advantage of natural light, shading and shelter in the design of the buildings and landscape
- promote the creation of a walkable campus to encourage safe, healthy connections to all facilities
- nurture the biodiversity value of the campus and surrounding area
- tame traffic to limit the impact on a predominantly pedestrian environment and rationalise car parking to make it more efficient/reduce impacts on air quality

6 Strengthen the University's Unique Attributes to Distinguish it from its Competitors:

Recognising its reputation as the UK's European university, the Masterplan should:
- Evolve the campus as a more inclusive and vital place
- Strengthen academic and physical links with the University's satellite campuses
- Reinforce the campus as a varied and verdant green landscape in the 'Garden of England'
- Develop the University as a place of innovation, continue to push architectural boundaries and support originality

7 Develop an Environment for Social Interaction:

The Masterplan must help deliver an environment that will enable and encourage:
- spaces and facilities that support student societies, group-working, activities and volunteering
- the character of Kent students as socially aware members of the community to prepare them for post-university careers

8 Create a Remarkable Public Realm:

The Framework Masterplan should enable the development of a safe and sustainable public realm that:
- encourages social interaction and leisure activities
- supports university events and commercial activities
- can be used for formal and informal teaching and learning activities

9 Strengthen Connections with the Surrounding Context:

The preparation of a masterplan provides the opportunity for:
- a holistic and considered approach towards the campus as a whole
- integration with the Canterbury District Local Plan, influencing its review and refinement to guide future development needs
- maintaining the campus character while respecting the setting of the wider countryside
- establishing key facilities within the campus that will serve the needs of the wider city

10 Create a Home for a Vibrant Academic Community:

The campus should:
- foster intellectual exchange
- allow its students and staff to develop their careers and academic pursuits within a stimulating, safe and supportive environment

11 Create a Compact & Consolidated Campus Heart:

The Campus Heart should be the first choice for:
- locating new academic and other uses
- creating space and places of quality in the public realm

12 Safeguard the potential of adjoining land:

The Masterplan must ensure that:
- proposals for the campus enhance and complement adjoining land
- proposals benefit surrounding local communities wherever possible
- proposals do not prejudice access to adjoining land and facilitate future access wherever possible

## 4.3 Policy Context and Evidence Base

**Policy Context:** The Framework Masterplan incorporates the spatial expression of the *'University of Kent Plan 2015-2020'* and '*Kent 2025: Refreshing the University Strategy'* and the Estates Strategy (2015-2025) that supports them. It is also influenced by the Institutional Plan:

- Local Plans: The Canterbury District Local Plan (CDLP) was adopted by CCC in July 2017 and is supported by a number of relevant planning guidance documents. Kent County Council adopted the Kent Mineral and Waste Local Plan (KMWLP) in July 2016 and this is supported by the KMWLP Safeguarding Supplementary Planning Document, adopted in April 2017
- Policy EMP7 (University of Kent): This provides in-principle support for development within the defined campus of educational buildings for teaching and office space; student accommodation; business accommodation (compatible with the University's role in research and development and business innovation); sports facilities and other facilities directly related to the University's core business. The Proposals Map defines the campus boundary, as identified in Figure 21 above, and designates the land for the above purposes. The full text of this policy and other key local plan designations and guidance is set out in Appendix 3.3.1
- Economic Strategies: The importance of Higher Education to economic growth and prosperity made clear in the Government's Industrial Strategy White Paper (November 2017). At a regional level, the Thames Estuary Growth Commission is investigating opportunities for growth based upon creating internationally-competitive centres of excellence, connectivity and communities and the South East Local Enterprise Partnership is reviewing its Strategic Economic Plan and is encouraging closer links to be forged between business and the Higher and Further Education sectors.

At a sub-regional level, Kent County Council and the five East Kent districts of Ashford, Canterbury, Dover, Shepway and Thanet have developed the East Kent Growth Framework which sets out an overarching strategic approach for identifying investment priorities to achieve long-term economic growth across East Kent between 2017 and 2027. The Framework (December 2017) identifies Higher Education, tourism, creative, healthcare and professional services as the main growth sectors for Canterbury. It also identifies four key objectives as the 'building blocks' for driving continued and sustained growth and focusing future investment across East Kent:

1 Unlocking growth through infrastructure
2 Delivery of business space
3 Supporting productivity within business, and
4 Placemaking and shaping.

The document goes on to identify 70 projects or interventions across East Kent, including:

- Road infrastructure projects (Milton Manor roundabout, A2 slip at Bridge, A2 off slip and park and ride relocation and the Wincheap Traffic Management Scheme) and more strategic new roads (Sturry Link Road and a longer-term Canterbury Eastern by-pass – which would link the A28 near the Sturry Road Park and Ride with the A2 at a new interchange near Bridge)
- A number of projects are promoted under the 'Canterbury Knowledge City' banner aimed at improving the supply of high-quality business space and facilities in order to promote business development, high-level skills and support productivity. These include the Kent and Medway Medical School (KMMS), the Canterbury Innovation Centre Phase II and Makers Space and Hot House (specialist facilities and equipment for new makers, creatives, programmers, scientists and engineers)

Figure 24: Image from the Movement & Transport Strategy by Hamilton-Baillie Associates, March 2018

**Canterbury transport infrastructure priorities**

- National Cycle Network Route 1
- New road schemes
- Bus improvements
- Major road routes

Drawing on the Growth Framework, in January 2018 the East Kent authorities published 'East Kent – The Gateway to UK plc' which highlights the national importance of East Kent to the UK economy and the opportunities for growth.

### Canterbury District Transport Strategy (2014-2031)

The headline aim of the strategy is *"…to improve access to services, goods and opportunities and tackle the negative impacts of traffic by promoting sustainable modes of transport, achieving reliable vehicle journey times and supporting sustainable development."*

Figure 25: Public transport connects the University with Canterbury and the surrounding local communities

Traffic modelling undertaken as part of the evidence base for the strategy forecasts that, based on known development proposals and in a *'Do Minimum'* scenario, travel demand (person trips) would increase by up to 17% and traffic growth (vehicle trips) would increase by 18%. The strategy contains four key strands to reduce these increases, improve journey time reliability and meet the target that traffic levels in the centre of Canterbury do not increase by 2031. These are (1) encouraging sustainable travel by encouraging the use of alternatives to the private car; (2) managing the availability of car parking to balance the impact of car use with the need to provide access to services and opportunities; (3) managing the (road) network to achieve reliable journey times across the network; and (4) reducing the demand to travel by reducing the overall number of journeys undertaken.

Drawing on the Strategy, the transport infrastructure priorities for Canterbury identified in the CDLP (paragraph 5.17) that supports Policy T1 (Transport Strategy) are as follows:

- Sturry Link Road
- Herne Relief Road
- Wincheap: A2 off-slip, relief road and new traffic management scheme

- South Canterbury: fast bus link and improved walking and cycling links
- New A2 interchange at Bridge
- A28 Sturry Road bus link completion, and integrated transport package
- Vauxhall Road / Broad Oak Road junction capacity improvements
- Expansion of park-and-ride sites
- Extension to the Crab and Winkle Way in Whitstable
- Tourtel Road roundabout improvements
- Canterbury West Station: improved access
- Expansion of the Urban Traffic Control system
- Herne Bay to Canterbury Cycle Route (part of National Cycle Network Route 1)
- Whitstable traffic management improvements

In addition to the above, in April 2018, CCC and KCC announced that it also wanted a new A28 bypass linking Sturry Road (near the Sturry Road Park and Ride) to the A2 at a new interchange near Bridge to take through traffic away from the ring road to help tackle poor air quality and support economic growth.

Several of these priority measures are directly relevant to the Framework Masterplan, especially, the extension to the Crab and Winkle Way (part of National Cycle Network Route 1) and the access improvements to Canterbury West Station. The key relevant priorities are identified in the accompanying illustration (Figure 24).

**Evidence Base:** The Framework Masterplan has been informed and supported by an appropriate and proportionate evidence base, including the following studies and strategies:

- Preliminary Ecology Appraisal and Guidance (February 2018) (reporting on a habitat survey carried out in August 2017)
- University of Kent's Travel Plan and Parking Management Strategy, which are updated regularly and informed by campus surveys
- Technical note on existing traffic flows in and around the campus (February 2018), drawing on traffic counts carried out in May 2017 and January 2018
- Building Analysis Schedule (January 2018): an assessment of all campus buildings and their contribution to architectural character and public realm
- Benchmarking Study: University and Campus Landscapes (February 2018)
- Historical Evolution (November 2017): mapping out how the campus has evolved over time
- Baseline Mapping (November 2017): including all relevant planning and environmental designations
- Landscape Setting and Views Appraisal by LUC, dated December 2018
- Stand-alone spatial strategies, including Placemaking, Planning and Environment, Landscape and Biodiversity and Movement and Transport.

This Framework Masterplan also draws on the findings of a number of studies undertaken to support planning applications for individual buildings (including archaeology, ecology and transport). Going forward, subsequent planning applications will be supported by more detailed studies, strategies and assessments in accordance with CCC's reasonable requirements and will be the subject of Environmental Impact Assessment, where necessary.

## 4.4 Landscape Setting and Views Appraisal

In 1988, Canterbury Cathedral, St Augustine's Abbey and St Martin's Church were inscribed as a Cultural Site on the World Heritage List. Local Plan Policy HE2 (World Heritage Site and Buffer Zone) states that Canterbury City Council will protect and enhance the Universal Value of the inscribed Canterbury World Heritage Site (WHS). Policy HE3 (Significant Views of the City and WHS) also makes clear that Canterbury City Council will seek to protect views, including from the Canterbury Areas of High Landscape Value. Both are supported by the World Heritage Site Management Plan (2002).

Amongst other things, Policy HE3 (Significant views of the city and World Heritage Site) makes clear that ...

*"Through the careful siting and design of buildings and appropriate landscaping, developers should demonstrate how their proposals will respect or enhance the landscape and topographical features which contribute to the Outstanding Universal Value of World Heritage Site."*

Justifying text 9.24 goes on to state that:

*"Canterbury's valley location results in a large number of viewpoints that allow broad vistas across the City's roofscape and some of the most important viewpoints are described in the Canterbury Conservation Area Appraisal."*

The primary aim of the Management Plan is the sustainable protection, conservation and presentation of the Site; the Plan sets out objectives and a programme of actions to protect and maintain the Site's overall significance. Paras 2.2.15 to 2.2.17 of the Plan outline the approach taken to establishing a 'buffer zone' to highlight the importance of, and help protect, the WHS' setting. This notes that at Canterbury, statutory protection is afforded by the current designations and local plan policies, but that the Management Plan is useful to draw attention to the significance of the historic and visual links and the areas which form the immediate setting of the World Heritage Site.

The World Heritage Site is located to the south-east of the campus. The nearest part of the campus is some way from the 'Buffer Zone'. The Plan makes clear that the 'Buffer Zone' does not have statutory status, nor does it bring with it any additional controls or restrictions. However, it highlights the need to take into account the impact on the WHS of any proposals or developments in this area.

A number of other Local Plan Policies (but not limited to those listed below) also place a high priority on the protection of the landscape character and setting:

1 Policy LB2 (Areas of High Landscape Value)

This designates most of the Campus Heart and University Rise as part of an Area of High Landscape Value (AHLV). Policy LB2 and its sister Policy LB4 (Landscape Character Areas) both set out criteria for considering development proposals in relation to landscape and biodiversity and the justifying text for both refer to the intended role of the Canterbury District Landscape and Biodiversity Appraisal in determining planning applications.

2 Policy LB4 (Landscape Character Areas)

Proposals for development, and associated land use change or land management, must demonstrate that they are informed by, and sympathetic to, the landscape character of the locality. In considering development proposals, the Council will take every opportunity to reinforce, restore, conserve or improve, as appropriate, the landscape character of the area in which development is proposed.

3 Policy LB5 (Sites of International Conservation Importance) (Blean Complex Special Area of Conservation (SAC), Thames, Medway and Swale Estuary two Special Policy Area (SPA) and the Thanet Coast and Sandwich Bay SPA)

Sites of international nature conservation importance receive the highest levels of protection. No development will be permitted which may have an adverse impact on the integrity of a Special Area of Conservation. For example, suitable planting is encouraged around visually prominent farm buildings (particularly large, modern sheds) to soften the visual impact.

4 Policy LB8 (Landscape Scale Biodiversity Networks) (Areas of Ancient Woodland)

States that new development will need to (amongst other things):

- avoid the fragmentation of existing habitats and support the creation of coherent ecological networks through both urban and rural areas, and
- retain, protect and enhance notable ecological features of conservation value such as ancient woodland, neutral grassland, hedgerows, trees, wetlands, river corridors and other water bodies, and habitats that offer breeding or feeding sites of local importance to populations of protected or targeted species.

5 Policy LB11 (The Blean Complex)

The Council will support projects that restore, enhance and connect the valued woodland habitat complex of Blean. The Council will give particular support to projects that benefit the landscape through sensitive and traditional woodland practices and which support the timber market and wider local economy. The City Council will refuse proposals for development that would result in the loss, deterioration or damage to the character or integrity of The Blean Complex. Development should provide opportunities for biodiversity improvement within the identified Biodiversity Improvement Areas.

The Framework Masterplan therefore has a responsibility to protect the local landscape character and setting, demonstrate the impact on the local townscape character and the skyline and ensure that the backdrop of the World Heritage Site is protected. Furthermore, it must demonstrate that any development proposals (and any associated land use or land management change) are informed by, and sympathetic to, the World Heritage Site.

Long distance view locations have been identified for their accessibility from a public space and their advantage of providing the best views to illustrate the historic significance of the city and the World Heritage Site. The locations are described and depicted in detail in the Canterbury Conservation Area Appraisal, but include the view from specified locations at Tonford Meadows, Harbledown, St. Thomas Hill, St. Martin's Hill, St. George's Field, New House Lane, Neal's Place, the University Road/University Slopes and Beaconsfield Road/St. Stephen's playing fields.

Consequently, as a component part of preparing the Framework Masterplan, Land Use Consultants (LUC) were appointed to undertake an initial Landscape Setting and Views Appraisal to assess the impact of the Masterplan proposals upon the long distance views identified above to ensure that there is no detrimental impact upon landscape interests, protected species, sites or features of nature conservation interest or sites of archaeological or historical importance. The results of this study are published in full in an accompanying appendix to this report.

In order to facilitate this study, building plots were identified from the masterplan proposals and projected into three-dimensions to create a rudimentary model of the development proposals. Assumptions were made about the likely use and height of each of the identified building plots. These assumptions are identified on the accompanying illustrations.

In overall terms, this study demonstrates that new development in the Masterplan is situated within the wooded university slopes and does not form a prominent feature on the wooded skyline. The proposed buildings do not impose on the backdrop to views of the Cathedral or compete for prominence with the Bell Harry Tower. The proposed locations of buildings do not compete with the Cathedral for prominence, and woodland retained as part of the Framework Masterplan will continue to contribute to the wooded backdrop. Where filtered views are achieved through hedgerows in the winter, proposed buildings would be seen set within the wooded skyline and would not form prominent features on the skyline.

As noted above, the Framework Masterplan sets out a flexible spatial framework for the Canterbury campus and not a precise blue-print for development. Any new development brought forward in the future will conform to the principles of the Masterplan and will be submitted as planning applications; they will therefore be subject to more detailed Landscape and Visual Impact Assessment testing as part of the usual planning process.

In principle, all new development will correspond to the heights of the existing adjacent University buildings and will therefore not break the ridgeline. The exceptions to this rule on height are the replacement student housing in Park Wood and at Darwin College, where the proposal for increased height and density would include additional height to the buildings. Further tree planting will be considered as a mitigation measure. If it is considered desirable that a small number of new buildings break this rule (for example, to emphasise an important feature of the Masterplan and/or the architecture), justification will form part of the detailed planning consent.

Detailed studies of all new developments will be undertaken at planning stage to understand and minimise the visual impacts of any new construction proposals.

## 4.5 A Place to Live, Work and Play

Good placemaking is becoming more relevant to the global economy and to our individual lives than ever before, so it has been an overarching aspiration throughout the Framework Masterplan process.

The choice of where to live, work and play is arguably the most important decision we make and exerts a powerful influence over the jobs we have access to, the people we meet, and our ability to lead happy and fulfilled lives. It is also recognised as a key driver for the desirability or 'liveability' of an area. Consequently, the campus must be the most powerful expression of the academic, cultural and civic life of the University, an enduring expression of its aspirations and achievements.

While new university buildings will provide an environment for enhanced learning and academic excellence, the masterplan concept advocates a wider diversity of landscaped spaces to broaden the opportunity for the interaction of the university community. The places and spaces between the buildings will be the public 'living rooms' where all members of the university community can gather to exchange ideas, where formal events take place and informal encounters are made possible. Where possible, related academic disciplines will be co-located to encourage the sharing of spaces to foster inter-school communication and collaboration. The campus will be approached as a 'living lab' to allow opportunities for students to engage with spaces as part of their taught curriculum – for example, using appropriate parts of the campus for archaeological studies, such as University Rise, the Sarre Penn Valley and St Stephens Hill.

To avoid undue pressure on the local housing market, net increases in academic or administrative floorspace that result in increased student numbers may, where appropriate, be matched by a corresponding increase in purpose-built student accommodation on the campus to be focussed within the Campus Heart and Whitstable Road Character Areas. Also existing agricultural land in the Sarre Penn Valley and other parts of the University Estate will be kept in productive use until such times as it is needed for development.

The University will continue to provide sports, community and cultural facilities that are open to local people and look for opportunities to increase such provision by improving and expanding existing campus facilities. It will also investigate other opportunities to work in partnership with the City Council to improve the city's cultural, leisure and tourism offer.

The University will facilitate full commercial use of the campus throughout the year, including residential conferences and tourist-related accommodation outside of term times by managing and promoting accommodation for these uses, particularly over the 13-week summer period. In parallel, it will continue to promote business and research opportunities across the campus to foster the knowledge-based economy, including safeguarding and promoting the existing Canterbury Innovation Centre and the University's existing Hub for Innovation and Enterprise.

The Masterplan for this part of the campus also includes an option for a new conferencing hotel on the land currently allocated for the extension of the Canterbury Innovation Centre (currently safeguarded for B1 Use Class under Policy EMP 1 of the Local Plan). Should the University develop a conferencing hotel in this location, any planning application will need to consider the relevant planning designations pursuant to the site at that time. The Masterplan therefore includes the option to develop the designated Business Innovation Park land for either business (B1) or a conferencing hotel.

Overall, the University Estate must adapt and evolve in order to satisfy a range of contemporary expectations that have developed since the time of the Holford Masterplan: a growing re-emphasis upon public transport, the academic and business worlds moving towards shared flexible, inclusive and inspiring working environments, and the evolution of retail and other commercial activities leading to a growing interest to co-locate with the University.

Figure 26: Walking and cycling is popular within the pedestrianised parts of the existing campus

Cornwallis
Octagon
IT Training
University of
Kent

Blean Common
Blean Church
Rough Common
St. Stephens
Kingsford Mill
St. Dunstans
Harbledown
Whitehall
Turnford
Winecheap Street
Thannington

# 5 The Masterplan Narrative: Continuity with the Past

Figure 27: Aerial view of the Campus Heart from the south-east with Blean Village and Blean Forest beyond

# 5 The Masterplan Narrative: Continuity with the Past

## 5.1 Introduction

This chapter describes the background context of the University of Kent campus in Canterbury, and the approach taken in the preparation of the Framework Masterplan for the future evolution of the campus.

The University of Kent Strategic Plan 2015-2020 opens with a re-statement of the commitments made in the University's Charter: *'The objectives of the University are to advance education and disseminate knowledge by teaching, scholarship and research for the public benefit.'* The plan goes on to restate the University's core values that enshrine academic freedom, integrity and accountability, sustainability, critical thinking and intellectual creativity.

If the Framework Masterplan is to be successful therefore, the campus must evolve to become the expression of these commitments and values, ensuring that the entire university community, as well as those who visit the campus, are inspired by the high ideals and values of the University of Kent. It is the campus on which the University's Strategic objectives of delivering excellence in research, education and engagement with society can be made operational and visible. The University of Kent Canterbury campus must therefore be considered as more than merely the sum of the buildings and the spaces between them.

This chapter explains the concept and design principles behind the Masterplan and has been structured to take the reader through the influences that have been taken into account, the processes that have been undertaken and the conclusions that have been reached in its formation. This process has been extensive and thorough in its execution, involving all parties.

## 5.2 Continuity with the Past

The future is never a direct extrapolation from the past, and new circumstances demand new approaches, or at least adjustment, to 'best-laid' plans. However, an understanding of history is an important part of placemaking in respecting continuity with the past and in preserving memory. There are lessons we can learn from the past that will enrich the Framework Masterplan, and the pre-university era, as well as the thinking behind the original masterplan for the campus, needs to be factored into our thinking.

In preparing a Masterplan for the future campus development, it has been necessary to address many pressing practical issues including:

- The shapes and patterns ingrained in the existing landscape and the origins of the settlement pattern
- The original intent of the 1965 Holford Masterplan
- The campus today and what it is capable of becoming
- The future provision of sufficient space of the appropriate type
- The design of open spaces
- The protection and enhancement of the landscape
- The conservation of the natural environment and scope for greater biodiversity
- Access and traffic arrangements
- Compliance with local community, statutory and town planning policies, and so on
- The conservation of heritage areas

It is also essential that the campus as a whole, during every phase of its development, becomes a coherent expression of the University's objectives and values.

The land on which the campus has been developed over the last half century includes three former farms: Brotherhood, Beverley and Hothe Court. The names of these farms and some of the former farmhouses and other agricultural buildings remain embedded in the University Estate as a palimpsest of past use. In addition, former field lines, tracks and paths, woodlands and evidence of agricultural workings can be seen in the open spaces of the campus. Beneath these layers of historic land use, the underlying topographical features of landform and watercourses shaped both the former agricultural use and campus plan. The villages of Blean and Tyler Hill, once housing the working communities of the area, are the immediate close neighbours of the University.

## 5.3 The Regional Context: Geology, Topography and Patterns in the Landscape

The development of successful human habitat – wherever in the world that may be – has invariably been influenced by the natural landscape in which it is located; landscape is the primary infrastructure of our lives and culture. The natural landscape is indelibly ingrained in the urban landscapes we create. Everything is there for a reason; the shapes and patterns of human settlement anr embedded in (and derived from) the landscape and if we are to design successful communities for the future, it is important that we understand the ways in which landscape and urbanity relate and fit together.

The origins of the University of Kent estate are rooted in the geology, geography, topography and history of the landscape that it inhabits. An understanding of the distinctive geology of Kent, and the way it has influenced the topography of this region is very revealing.

Few places are defined so markedly by their geology as Kent, where dramatic landscape is an expression of one of the most famous rock formations in the world (Figure 28). A large Cretaceous era chalk 'dome' once existed across this part of the UK and connected it to mainland Europe via a land-bridge. The White Cliffs of Dover and the Alabaster Coast of Normandy are both part of the same geological system. Only 10,000 years ago, at the

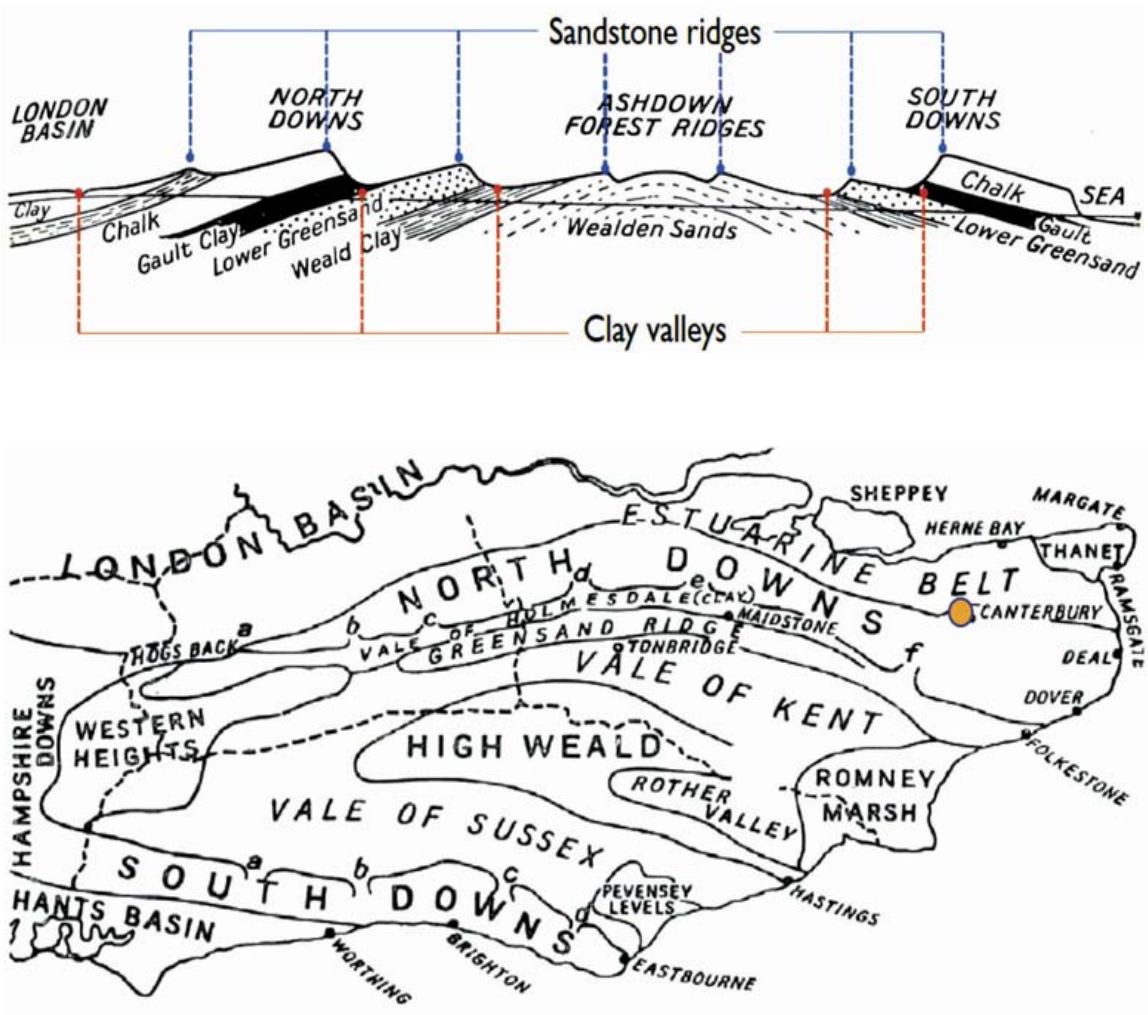



Figure 28: The Relationship between the Geology and the Topography of the Kent Peninsula

end of the last major ice age, rising sea levels in the North Sea cut a path through the land bridge and disconnected this western peninsula from the rest of mainland Europe.

Over time, the cretaceous dome was eroded to reveal the sands and clay of The Weald, an extremely fertile and productive landscape from which Kent gained its reputation as the 'Garden of England'. The geological formation that results gives rise to Kent's distinctive 'saw-tooth' topography of ridges and valleys, which represents a cross section through a time period of some 70 million years.

The environmental assessment prepared at the time of the Turing College development describes the geology of the area as characterised by marked discontinuity, composed of various tertiary bedrock outcrops of a variety of sands, silt and clay, including London Clay Formation capped within the estate by superficial deposits of Head Brickearth. This geological formation largely follows an east-west orientation between the Thames Basin in the north and the south coast of England. This pattern is very evident in the landscape around Canterbury, which sits on the threshold of the Thames Estuarine Belt to the north and the North Downs to the south; the Great Stour river flows eastward along this geological junction (Figure 30).

Between the valley of the Great Stour and the North Kent Coast, the landscape is expressed as a series of parallel wooded ridges and valleys. Traditional rural settlements in this area (such as Blean Common, Rough Common and Tyler Hill) took root along these east-west ridges, where the high-ground was well-drained and flooding-free, where long-distance routes could be established for year-round use, and with the added benefit of long-distance views of approaching invaders (Figure 29). The forests would have provided food from hunting and foraging, as well as building materials and level building land in woodland clearings. By contrast, the valleys between these ridges are largely settlement-free; the valley sides provided difficult building land but, cleared of trees, the south facing slopes were more valuable for fruit and hop-growing. In contrast, the valley floors were occupied by watercourses, wetlands, streams and ponds and were liable to flooding.

Until the medieval period, the landscape of east Kent was characterised by the presence of the Wantsum Channel, which separated the Isle of Thanet from the mainland and into which the streams running through university land ran, rather than into the River Stour. The resultant hydrology of today's campus is highly localised, with some springs and dug pools, underground water courses and overland streams running roughly west to east in relation to ridges of the same orientation that rise and fall between Canterbury and Whitstable. Some local springs and wells are very old – even on campus – with the possibility that they were venerated at some stage in history. A perched water table across the university land preserves organic remains, which indicates the potential for early human occupation of the current campus (on post glacial deposits buried below the current land surface) but does not relate strongly to any current landscape features.

## 5.4 The Landscape History of the University of Kent Campus, Canterbury

Our knowledge of landscape history has traditionally been accumulated by piecing together what is learnt from the jig-saw of archaeological excavations and by understanding the nature of the better preserved landscapes in the surrounding context (Figure 31). The development of new technologies, such as LIDAR laser scanning, is enabling the landscape to reveal its secrets more coherently and in more depth, which is gradually providing a better understanding of the broader landscape context of the land which the University inhabits.

Early Prehistory (prior to 2,350 BC): Evidence of settlements prior to the Bronze Age are scarce in the region, although the archaeological remains of human settlement within early pre-history has been found within the campus. Random scatters of some very early finds include a Palaeolithic hand axe (found at St. Stephen's Road in 1946), flint implements (found in 1925 north of Forty Acres Road), and a Neolithic Polished flint axe (found in 1952 in a garden to the east of St. Edmund's School).

Bronze Age (BC 2,350 to BC 700): Although there is a paucity of substantial landscape or settlement remains from the Bronze Age period on campus, burial mounds found in the vicinity confirm that human occupation of the

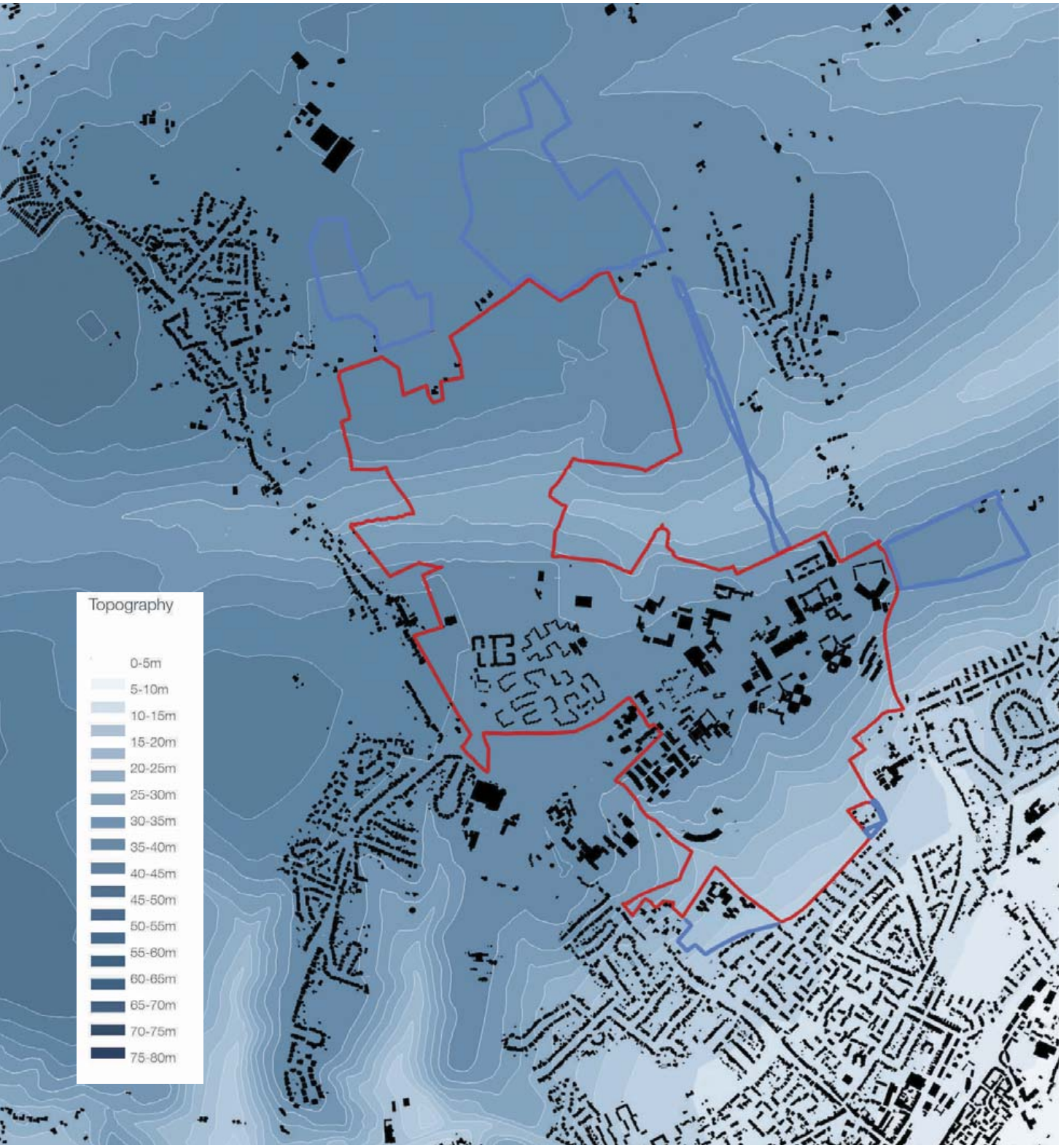
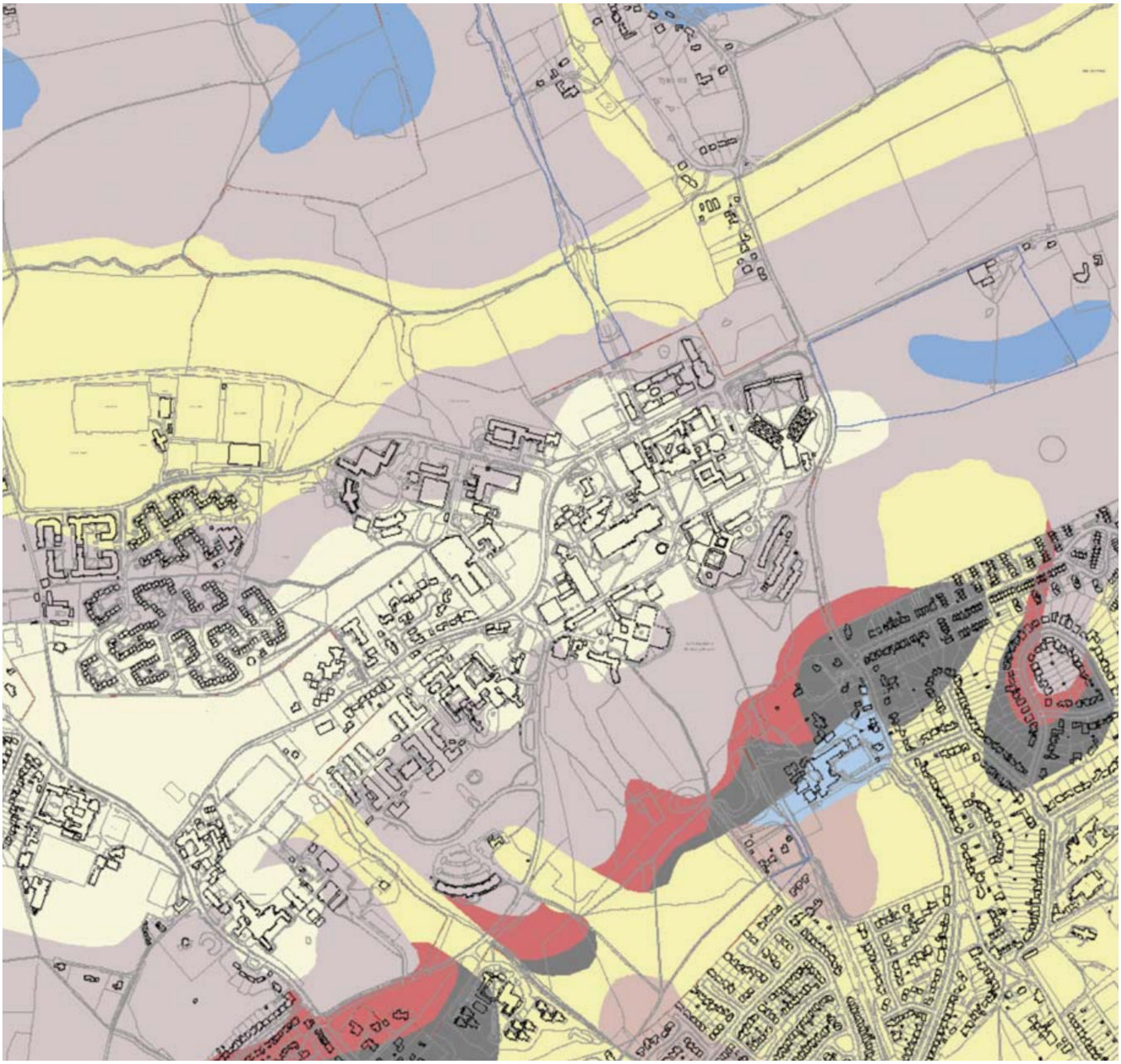



Figure 29: Figure ground drawing of the University campus superimposed over a contour map. The Campus buildings are clearly arranged along the ridgeline along with the settlement of Rough Common to the west. The villages of Blean and Tyler Hill both sit on the ridgeline to the north



Geology

4th Terrace
Brickearth
Head Gravel
2nd River Gravels
London Clay
Oldhaven Beds
Woolwich Beds
Thanet Beds
Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent

Figure 30: The layers of geological strata beneath the Campus gives rise to the undulating topography in the area

landscape is likely to have been intense and total. Massive numbers of these are found within the Island of Thanet, on the Sutton Wedge and at Thanet Earth, based on ring-ditch cropmark identification and excavation. Some features of settlement archaeology from the Later Bronze Age have been recorded recently at Lees Court, with rubbish pits, hoards and some traces of buildings being recovered, and Bronze Age material also coming from the slopes of Bigbury Hill in recent years. Some late Bronze Age pottery and fire cracked flints and a cremation burial were found during the construction of Turing College in 1998, suggesting that industrial activity and settlement took place here.

Iron Age Landscape (BC 700 to AD 43): In this period we can envisage a fully exploited open landscape of lightly-defended agricultural settlements formed of ovoid-shaped enclosures with rectangular field boundaries and lanes, a picture that is supported by finds revealed in a recent geophysical survey near Blean Church. Much of today's landscape seems to have been derived from this period, although there were changes in alignments dating from the late iron age. In 2012, a farm settlement from this period was discovered at St Edmunds School to the west of the campus, revealing ditches, lanes and a circular settlement enclosure with pits and traces of wooden buildings. This settlement most likely extended into the area now occupied by Turing College, where a massive oval enclosure with loom weights and spindle whorls indicates that textile production took place.

A large nucleated hillfort at Bigbury Hill in the late Iron Age (approx BC 300) has recently been revealed in woodland to the west of the campus. Also, an extensive system of large-scale linear double-ditch earthwork defences and landscape boundaries have been found, which mark a major change in the landscape and doubtless constrained access to land now owned by the University. These earthworks suggest that a centralised political authority was exercising total control over the landscape in property terms, although perhaps not in terms of defence. The hillfort at Bigbury seems to have been abandoned around the time of Julius Caesar's visit to Britain. Whether it was the site of Caesar's first major battle with the Britons in BC 54 is not certain, although fortifications identified east of Bigbury may yet turn out to relate to this encounter as recorded in Gallic Wars 5:

"*We marched by night for about 12 miles before coming in sight of the enemy forces. They had moved with their cavalry and chariots down from the higher ground to a river and were trying … to engage us in battle. When our cavalry drove them back, they hid in the wood where they enjoyed a position with extremely good man-made defences … because many trees had been cut down and used to block entrances to it [the fort]. The Britons came out of the woods in small groups to fight …. But the men of the Seventh Legion holding up their shields to form a protective shell, piled up earth against the fortifications and captured the place.*"

What is certain is that Caesar's early incursion into Britain coincides with the onset of major socio-political change, of which the foundation of Canterbury is the most obvious landscape intervention.

The development of the settlement at Canterbury comes after Bigbury was abandoned around BC 50; the southern slopes of the university campus are likely to have been strongly affected by the emergence of the large urban settlement developing at its foot and the radial pattern of roads that emanated from it. A defensive enclosure has been identified from this period before the Roman conquest of AD 43, with metalled roads in some areas, craft production, sanctuary sites developing, and surrounding burial grounds; the Dane John mound is the most obvious survivor of a high-status burial in a tumulus.

The Roman Occupation (AD 43-410): The Roman occupation from AD 43 sees the continued development of the Iron Age landscape, including the fort at Canterbury, military roads that began to connect East Kent and the development of a civitas capital with new streets and public buildings. Cemeteries were developed outside the city on the north side of Canterbury and along the roads leading to London and Reculver, which pass close to the campus. Roman building materials and building types made an appearance within landscape and large well-to-do farms or villas became common across this part of Kent, including the Roman villa identified south of Blean Church. A range of agricultural and industrial activities were carried out around Canterbury during the Roman period and archaeological finds suggest that these were spread across campus, where land use would have been strongly influenced by proximity to the city.

The Late Roman period (AD 250-410) saw the end of the open Roman city of Canterbury, with the construction of a city wall in AD 260; local militarisation of the region began and forts built at Reculver and Richborough to defend against incursions by the Gauls. The silting of Dover harbour led to the port traffic moving to Richborough, which may have resulted in significant trade coming through Canterbury via river craft, at least as far as Fordwich. Some new villas were built in east Kent during this period and others destroyed. Certainly this was now a more militarised and less civilian landscape than some other parts of lowland Britain, but it was still strongly connected in landscape character to that of the first three centuries AD.

The Arrival of the Anglo-Saxons (AD 410-1066): The sharp deterioration of Canterbury as an urban centre in the years around AD 400 undoubtedly changed the landscape greatly. The city remained something of a centre of political continuity if not population; its theatre was reused by the Anglo-Saxon kings of Kent, while a royal centre was established and ecclesiastical communities developed beyond its walls. The surrounding landscape is likely to have been less intensively used in this period, giving rise to the re-forestation of Blean Woods in AD 500 to 600, which covers over some Iron Age and Roman settlement sites. However, some areas of settlement continued outside Canterbury, and Blean Church may date from the early Anglo-Saxon period as does St Stephens, Hackington.

Figure 31: Excavation on the Turing College site

Figure 32: Canterbury OS Sheet 179: 1816-19

Figure 33: Aerial photograph: Canterbury to Coast
By comparing these two images it is possible to determine the east-west grain of the landscape emphasised by the Great Stour and the north coast. The close relationship between the topography, the settlement patterns and land-use is also evident.

The Medieval Period: Medieval settlements found in and around the campus reflect a mixture of types, including dispersed farms such as Beverley Farm (a 15th century Wealden Hall with 16th and 17th century additions), the potential medieval manor house at Blean (an isolated compound of large buildings adjacent to Blean Church), as well as nucleated villages such as Harbledown, mentioned in Chaucer's Canterbury Tales. The existing networks of lanes, hedgerows, field and terrace systems date from this period. The presence of medieval industrial activity is most obvious in the tile kiln sites excavated at Tyler Hill, Darwin College and elsewhere within the University Estate, where copious tile debris has been recovered. There are likely other (yet unknown) craft activities or medieval farms within and around the campus, as revealed in the excavation at Turing College and also in finds of medieval pots from under the campus library.

The post-Medieval Period: The post-medieval era was a period of relative contraction for Canterbury, losing its major pilgrimage focus, with the removal of religious orders from the area. The development of the seats of wealthy families characterise this era, such as Beverley Farm (a well-to-do 16th century hall-house), Hothe Court, a timber-framed house and Manor Court dating from the 16th century, while Hales Place to the east of the campus was a major aristocratic residence. The present pattern of flora and fauna may strongly relate to land use in this period, as hedgerow plants can survive up to 400 years or more. Organised management of the surrounding woodlands continues up to the present-day.

The Industrial Era: With industrialisation came the railways, and in 1830 the Canterbury and Whitstable Railway line was opened. This was extremely early in the history of railways; it is thought to be the first ever railway in the south of England and possibly the first railway in the world to convey both passengers and goods traffic regularly by mechanical power. Nicknamed the 'Crab and Winkle Line', it was built primarily to carry fish and seafood to market in Canterbury. Earlier industrial uses have been identified and are significant in the evolution of this landscape – for example, the geological formation provided a useful resource and gave rise to the extensive production of pottery and tiles in the Roman and Medieval periods.

The Modern Era: Since 1945, the land that now comprises the University Estate has been either intensively farmed or developed for building; both can be described as industrial processes which have had a massive impact upon the development of the landscape, and which has involved some disturbance or removal of ancient land surfaces. This has led to a number of archaeological discoveries which have contributed to our understanding of the evolving picture of the history of this landscape. The construction of the University itself involved the removal of trees, hedgerows and other field enclosures, as well as the large-scale levelling and making-up of ground, profoundly modifying the landscape to create the idealised modernist landscape of the early university. Subsequent planting and growth of trees and the gradual maturing of the landscape has had the effect of softening and masking the starkly modernist environment, contributing to the continuing evolution of the landscape, and once again re-inventing the landscape as a local place with a story to which people might become more connected.

## 5.5 The District Context: Routes through the Landscape

Historically, Canterbury was developed to defend an important bridging point of the Great Stour, once a navigable river, at an important intersection of trade routes across the county; its subsequent role as a major market town and religious centre grew from there. Traditionally, this river (which flows to Pegwell Bay on the east coast of Kent) was Canterbury's principal line of communication and supply for goods. Land routes leading in and out of Canterbury emerged in a strongly radial pattern following the lines of least resistance through the landscape; along the valley floor (now the A28), Watling Street (now the A2) and the ridgeline route of the North Downs Way (Figures 32 & 33).

To the north of Canterbury, the east-west ridgelines (high ground that was free from flooding year-round) provided a convenient network of movement to early settlers. Subsequently ridgeline routes became farm tracks, which in-turn evolved into roads (such as Giles Lane and Tyler Hill Road) that connect between the radial routes emanating out of Canterbury. Interestingly, two very historic routes also cut their way north-south across the open landscape of ridges and valleys:

1 The Old Salt Road: An ancient route between Canterbury and Whitstable used to transport the valuable commodity of salt from the village of Seasalter on the north coast. Seasalter did not impress Edward Hasted, who in his 1799 History of Kent described it as: "*in an obscure out of the way situation, bounded by the sea northward, but the large tract of marshes which adjoin it westward, as well as the badness of the water, make it very unhealthy*".

2 The Canterbury to Whitstable Rail Line: The six-mile-long, single-track railway followed a straight line between Canterbury and Whitstable and ingenious engineering techniques were employed to climb the hills and to tunnel under the Giles Lane ridgeline. It was closed to all traffic in 1952 and parts of the line were then sold off (the University owns the tunnel and former track bed north of the Tyler Hill tunnel entrance). The railway and tunnel were largely forgotten until 1974, when the University's Cornwallis Building experienced a partial collapse of the tunnel, after which all but a short length at the south end of the tunnel was filled in.

The Crab and Winkle Line and the Old Salt Road became publicly prominent again in 1997-99, when The Crab & Winkle Line Trust was founded and a seven-mile footpath and cycleway (now called 'The Crab & Winkle Way') was opened. This now forms part of National Cycle Route (NCR1). In spite of its name, the popular route uses only a short length of the abandoned track bed through Clowes Wood and combines that with parts of the Old Salt Road.

Significantly for the Framework Masterplan, two important radial routes also emerge north from Canterbury: Whitstable Road to the west (the A290) and St Stephen's Hill to the east. These routes sit to the east and west of the two historic routes described above and define a segment of the north part of the city in which the University Estate figures most prominently, and on which the Framework Masterplan is focussed.

It was into the distinctive and unique landscape pattern described above that the University of Kent arrived in 1965. Unsurprisingly, after consideration of many alternative options, the new university found a suitable home on the relatively flat, well-drained land along the ridgeline overlooking the historic city of Canterbury.

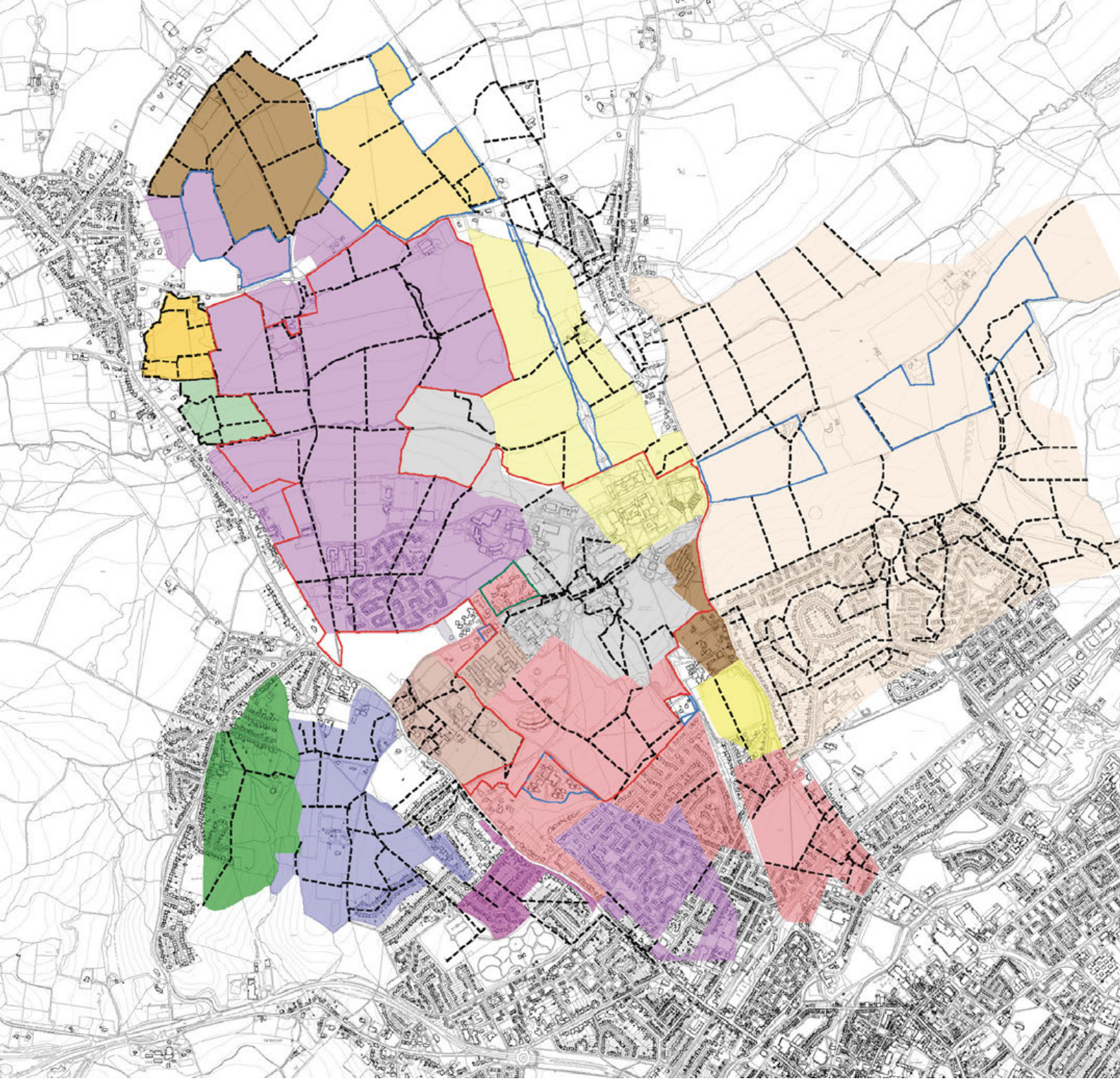
## 5.6 The Local Context: Land Ownership, Field Patterns and Land Use

Comparisons between today's maps and those of the 19th century are very interesting indeed and they confirm that, in large part, the historic pattern of rural field boundaries survive, both within and outside of the University Estate. They also confirm a strong relationship between historic and present-day field boundaries and land ownership boundaries, and that little has changed in that respect over a long period of time. They indicate that a very limited number of landowners existed historically and show clearly that the University ownership is based largely upon land once owned by the Brothers of St John's Hospital and Mary Ann Baker (Figures 34 & 35).

A substantial part of the University Estate was pieced together over time from the three existing farms (Brotherhood Farm, Beverley Farm and Hothe Court Farm) that survived from the pre-Conquest era, as well as three existing woodlands (known as Brotherhood Wood, Park Wood and Bluebell Wood/Hospital Wood). Not an historic estate in itself by any means, but certainly the productive land of earlier estates that existed to the north of Canterbury.

Certainly, there would have been a strong and symbiotic relationship between the city, the church and these productive estates, and it is interesting to note that the tradition of productivity carries on today – putting the land to the productive growth of knowledge. There remains a strong link therefore between the existing University Estate – and continuity with – the estates that preceded it.

Perhaps not surprisingly, the use of the land became more intense with closer proximity to Canterbury, with market gardens, orchards and hop fields occupying south-facing slopes and helping to feed the growing city. Conversely, this land-use pattern reverses with greater distance from the city, where enclosed fields, pasture and woodlands predominate, and where one of the largest areas of Ancient Woodlands has survived in Blean Woods.



## Estates and Farms from the 1800s

- John Godfrey
- Eastbridge Hospital
- Thomas White
- Thomas Anderson
- Exors of Thomas Fleet
- Hales Place Estate
- Brothers of Saint John's Hospital
- Mary Anne Baker
- Rev James Hamilton
- Thomas Hyde
- Mary Twyman
- Frances Dorvers
- William Newport
- Field Lines
- Campus Boundary as defined in the Local Plan
- Additional land owned by University of Kent

Figure 34: Tithe map with layers combined and superimposed over the current OS map

Figure 35: Tithe maps showing field patterns, agricultural land use, parish boundaries and historic land ownerships in the context of the contemporary University Estate

Figure 36: Top left: Farmer George Keir's 1963 monument to leaving Brotherhood Farm Top right: Beverley Farm
Bottom left: Farmer Ella Kier at Brotherhood Farm c. 1960 Bottom right: Hothe Court 1969

Figure 37: Historic views of pre-university Canterbury

## 5.7 The Historical Context: Estates, Place Names and Land Use

Looking at the campus today, it is easy to imagine that one day in 1965 the University appeared fully formed. However, we know from our research that this is far from the truth and that the process of selecting the host city, followed by choosing a suitable site for the University and building it out, was a long and carefully considered process. During the 50 years since its emergence, the University has grown considerably; today the University is the custodian of an estate that continues to grow, partly to provide future building or amenity land and partly to protect and control the estate as an asset.

As highlighted earlier in this document, many (possibly most) of the universities that emerged in the 1960s were located in the former grounds of grand houses, often gifted to the host cities by estate owners who lacked the funds to maintain them. This was not the case at Canterbury, where the land chosen for the campus was farmland and woodland, deliberately chosen for their proximity to its host city, on land considered to be of low-grade agricultural quality (Figure 36 & 37).

The Saxon (or even earlier) roots of many of the places and geographical features are revealed in the etymology of the names we find today. For example, the Sarre Penn, the stream that flows along the valley between the Giles Lane and Tyler Hill ridgelines, means the 'head or top' of the River Wantsum (into which it flows); Tyler Hill is named for the former tile-making industry in this location; Blean in early English meant 'rough ground'; Beverley Farm is thought to refer to a field or a patch of cleared land (rather than a naturally open meadow); Hothe (from Hothe Court) meant wood or 'heath'. The parish of Hothe was described by Edward Hasted in his 1799 History of Kent as: *"situated in a lonely unfrequented country, both unwholesome and unpleasant, the soil being for the most part a deep stiff clay".*

Blean is mentioned in the Canterbury Tales, when the pilgrims were overtaken by a canon and his yeoman in "Boughton under Blee" (now Boughton under Blean).

The names Brotherhood Farm, Brotherhood Wood and Hospital Wood refer to the religious order that once owned them and who founded places of healing and asylums in the area in the 1080s. Hale's Place Estate (to the east of the University) was purchased by the Hale family in 1675, and a Carmelite convent, a church and farm offices were established (designed by Pugin) in 1863. It was sold to the Jesuits in 1880 (as 'St Mary's College'), but the buildings were demolished in the late 1920s. The property was subsequently developed with houses, but a memory of the estate is preserved in the formal layout of some of the streets.

## 5.8 The Landscape Components of the University Estate

In summary, it is clear that there is a rich and complex relationship between the shapes and patterns in the landscape, and the pattern of human intervention and settlement through time in this segment of north Canterbury.

From the analysis above, the following list is a summary of the components that make this landscape distinctive and unique, and which have become the main 'ingredients' of the landscape and biodiversity thinking within the evolving Framework Masterplan:

- The forests and woodlands
- The soil types and orientation to the sun
- The settlement of the ridgelines and open landscape in the valleys
- The network of tracks, footpaths on year-round flood-free routes
- The valley-bottom watercourses, wetlands, streams and ponds
- The field patterns and land use
- Fruit and hop-growing on south-facing slopes
- New cycleways on historic routes and the disused rail line
- The public realm, open space, squares, gardens and allotments
- The buildings and structures
- The network of roads
- The network of services and utilities

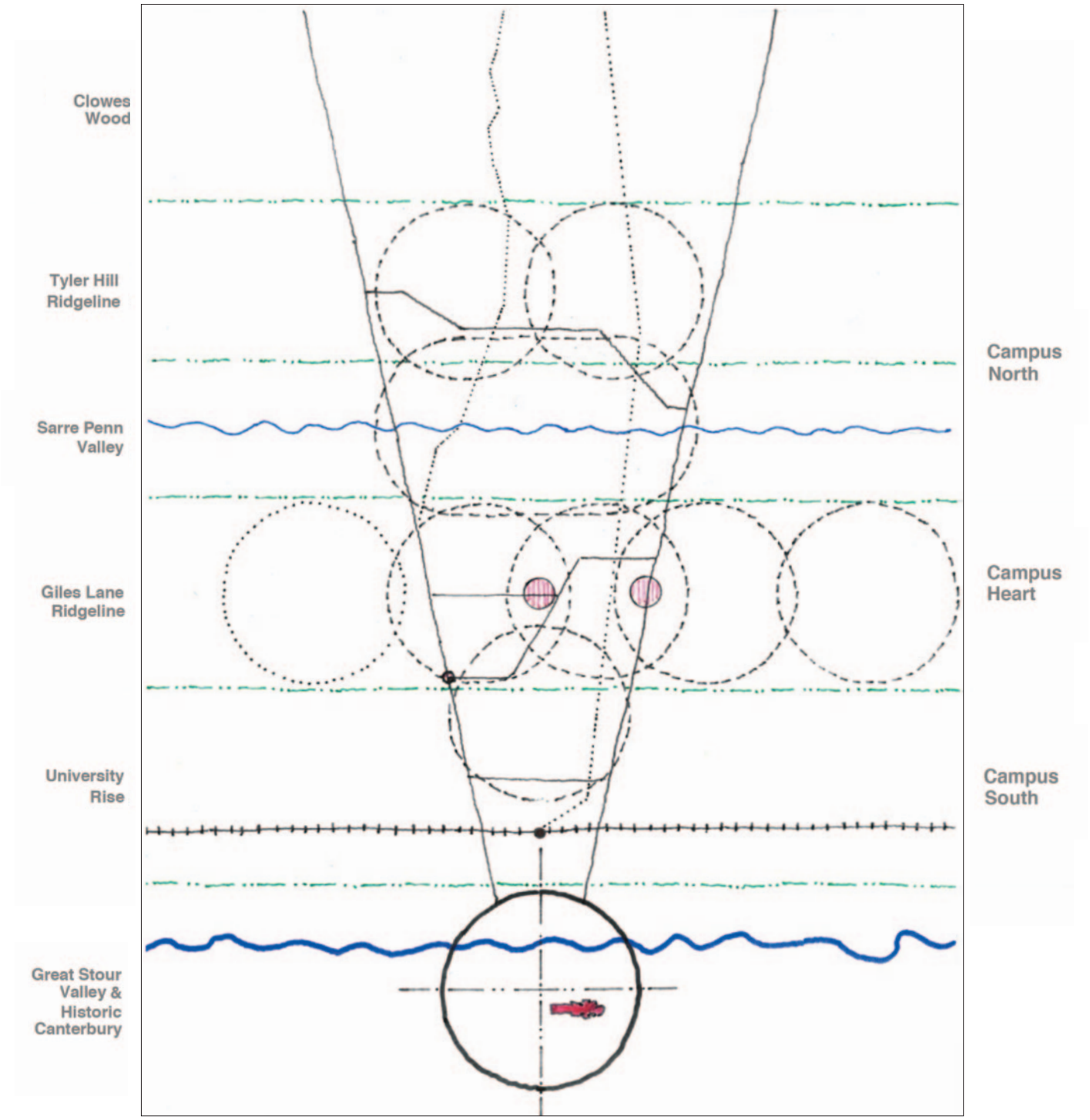



Figure 38: Concept drawings defining the various landscape character areas that characterise the Canterbury Campus

# 5 The Masterplan Narrative: Continuity with the Past

If the university community is to be truly sustainable, we must understand and apply the landscape character that shaped it in the first place and apply that knowledge in guiding and shaping its evolution. Understanding and balancing the relationship between the built environment and the landscape in which it makes its home will be the key to a successful University Estate of the future.

The settlement of the ridgelines was shaped directly from the landscape character of this particular area, and this pattern remains very strong and clear in the area north of Canterbury. The pattern of settlement remained intact throughout the medieval period and changed little between the 19th century and the development of the University in the 1960s. Even today these hill-top settlements remain largely separated by swathes of open landscape and the rural nature of the area north of Canterbury holds to the original pattern.

This analysis of the relationship between the landscape and the communities that came to inhabit it provides us with a direction for the future. It represents the genius loci of this landscape, and there is a compelling argument for following this pattern of sensitive, incremental development along the ridgelines north of Canterbury in the future evolution of the University Estate (Figure 38).

## 5.9 Summary: The Emerging Landscape Character Zones

The built environment of the Canterbury campus today is set within a variety of distinct but connected landscape characters (Figure 39) described below:

- The '*Heart*' of the university campus sits astride Giles Lane, an historic ridgeline road that once ran through open farmland overlooking Canterbury and the Great Stour Valley. Giles Lane connects two of the radial routes which emanate from Canterbury – Whitstable Road and St Stephen's Hill – and which are described in the section titled 'Routes through the Landscape' above. In choosing to consolidate future University development along the ridgeline, the campus heart will continue to take advantage of exceptional views both to the historic city to the south and the Kent Downs beyond, as well as the views north over open countryside towards Whitstable and the coast. Distant views of the campus on the ridgeline are moderated by its setting among, or adjacent to, mature (and in some cases historic) woodlands. The location of new building footprints in the Masterplan have been carefully considered to avoid breaking the landscape silhouette along the ridgeline and to avoid dominating the natural setting
- To the west, development such as the Park Wood student housing, the Sibson Building, the Chipperfield Building (previously Kent Business School) and so on are set predominantly within long-established ancient woodland
- Parkland and open grasslands embellish the campus to the south and offer attractive and extensive views over historic Canterbury. The landscape reaches down to meet the residential suburbs of north Canterbury
- Enclosed and active agricultural land to the north and east of the campus heart provides yet another landscape character within the extensive Canterbury campus

The landscape setting dominates the University Estate, and our understanding of landscape character offers a clear direction to the Framework Masterplan proposals. The following Landscape Character Zones have therefore been identified and form the framework around which the evolution of the masterplan thinking has been based: The Tyler Hill Ridgeline, the Sarre Penn Valley, The Giles Lane Ridgeline and University Rise.

Within each of those character zones, smaller areas of landscape character have been identified within the Framework Masterplan and more detailed masterplan proposals have been developed. The next stage of the masterplan thinking has been focused upon ideas which develop (and differentiate between) these character areas, and these are described in the following chapter.

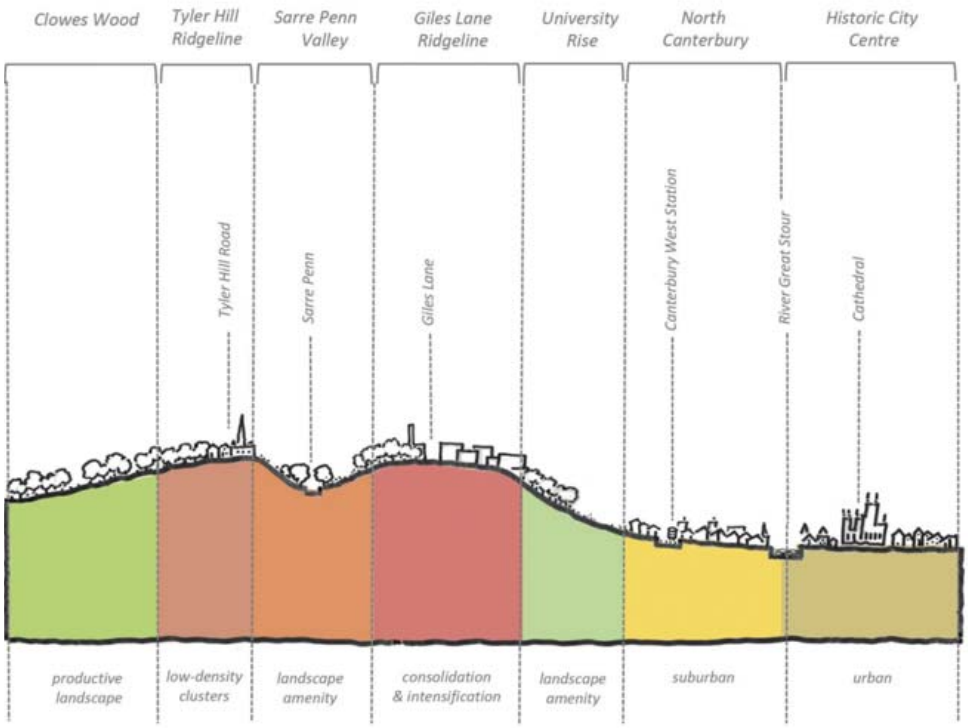



Figure 39: Landscape character areas defined in plan (top) and section (bottom)

# 6 Landscape Character Areas: Description

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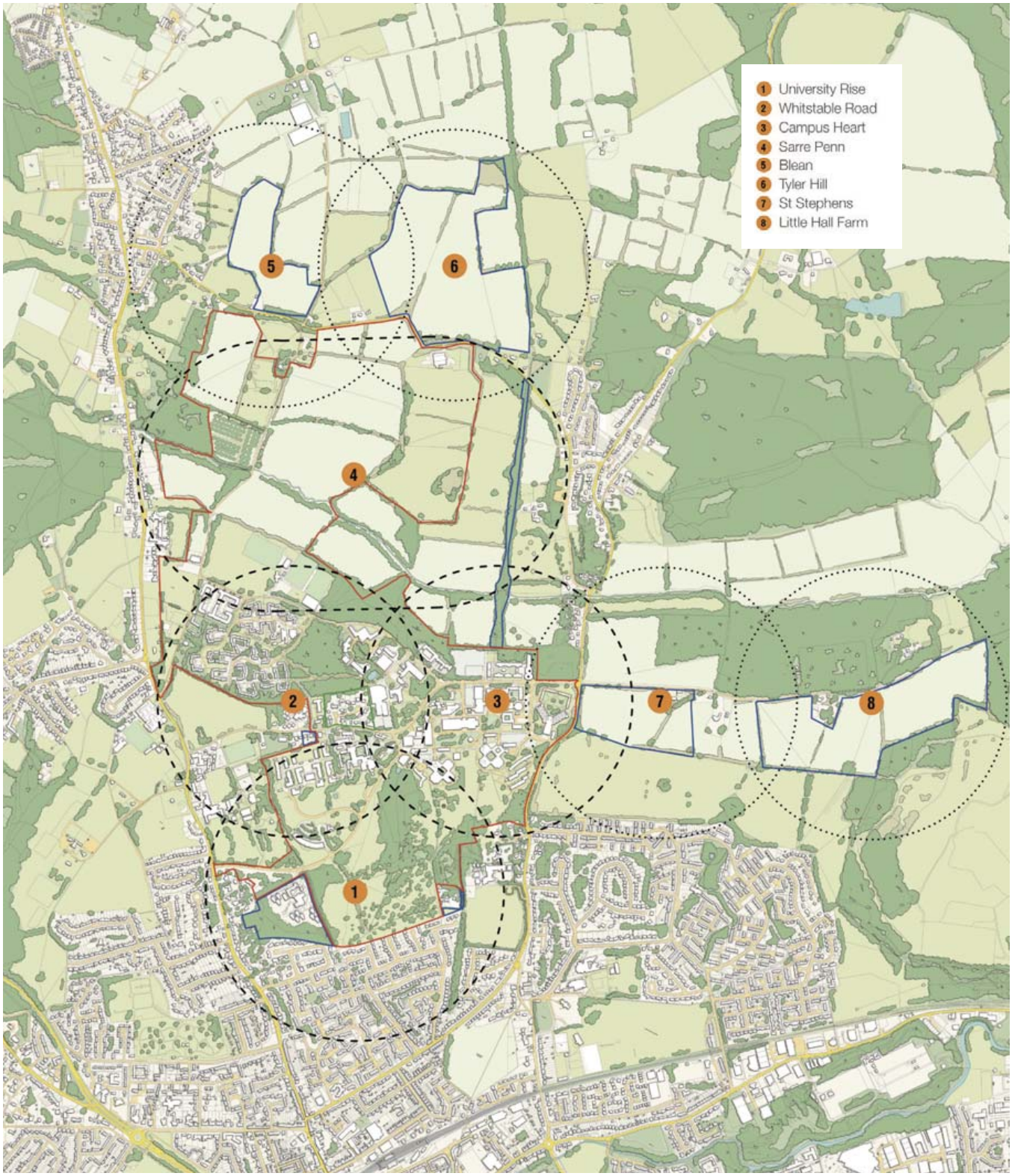



Figure 40: Plan of the Canterbury campus and the wider University Estate showing the landscape character areas denoted by circles

## 6.1 Introduction and Context

A *Landscape Character Area* is identified as a portion of the campus which has a specific identity and attributes which distinguish it from other parts of the campus. Every element of the landscape and the built environment contributes to the distinct identity and personality of the place.

Each Landscape Character Area has been analysed and described in order to allow the evolving design and development of these areas to be informed by the existing context and its function, and the inherent landscape qualities of each (Figure 40).

The overall University Estate has been broken down and categorised into eight individual Character Areas:

- University Rise
- Whitstable Road
- Campus Heart
- St Stephens Hill
- Little Hall Farm
- Sarre Penn Valley
- Blean
- Tyler Hill

The four character areas that form the core of the University campus are the subject of the current masterplan study. These form the campus boundary as defined by the CCC Local Plan. They are University Rise, Whitstable Road, The Campus Heart and the Sarre Penn Valley. The following chapter provides an illustrated description of each of these four character areas and their inherent landscape qualities, plus an assessment of the opportunities to enrich the character areas through the gradual evolution and implementation of the Masterplan.

## 6.2 Landscape Character Area 1 Description: University Rise

**Character Description:** University Rise is located to the south of the ridgeline along which Giles Lane travels. This predominantly parkland landscape is characterised by areas of open grassland and punctuated by belts of woodland. It overlooks the Great Stour Valley, occupying the slope below Keynes and Turing Colleges and reaching down to meet the residential suburbs of north Canterbury (Figure 41).

The open landscape of the University Rise Character Area provides a green setting for the University as well as a landscape demarcation from the city, which is part of the University's attractiveness to students, academic staff and visitors. University Rise provides an impression to visitors of a verdant campus and offers views across the historic city of Canterbury. Similarly, University Rise provides a backdrop to Canterbury in views from the south in a reciprocal and complimentary way. Bluebell Wood and remnant hedgerows and orchard contribute to the diversity of the parkland that forms the setting for this part of the campus.

From an ecological perspective, this character area contains a range of habitat types and is home to populations of the protected *Great Crested Newt*. Aside from the obvious advantages of a biodiverse ecological landscape, this area provides a number of additional ecosystem services. For example, green space is freely accessible to the university community and visitors alike. The network of footpaths extending across this character area mean that staff, students and the local community enjoy amenity value from the grasslands, woodlands and parklands. Remnant hedgerows provide a glimpse into the area's past, and fruit-bearing species remain from larger orchards that once provided food for the people of Canterbury. University Rise also notably contains the 'South Portal' to the historic Crab and Winkle railway tunnel, although this is not located within the University Estate.

University Rise is characterised by sloping ground overlooking the Great Stour Valley and the historic city of Canterbury. Existing fragments of the former agrarian use of the land remain, including Beverley Farm; although the farm itself was closed, the historic building was retained and the farmland was absorbed into the campus.

Holford's vision of the University extending down University Avenue as a series of satellite colleges was never realised, and neither was the plan to locate the sports facilities at the foot of University Rise. The land that was formerly orchards and greenhouses was given over to

# 6 Landscape Character Areas: Description

Figure 41: Landscape Character Area: University Rise existing layout

housing as Canterbury expanded northwards in the mid-1960s. Instead, the campus expanded predominantly along the ridgeline with the introduction of Keynes College (late 1960's) and Turing College (2012). Residential buildings set out as terraces of finger and L-shaped blocks extended the development of the ridgeline through to the University's western boundary. The exception to this rule was Chaucer College which was developed privately within a belt of mature trees to the south of University Avenue. Also at this time, the Canterbury Innovation Centre was developed privately, on the slope just north of University Avenue adjacent to the Grade II listed Beverley Farmhouse.

**Existing Habitat Types:** There are five broad types of habitat present within this Landscape Character Area:

1 Grasslands

The grasslands which make up much of this character area, while not botanically rich, are especially important to the setting of the University and its context in the wider landscape and provide some ecological interest as a large continuous feature.

The majority of the grassland in University Rise is species-poor semi-improved meadow. *Yorkshire Fog* and *False-Oat Grass* are generally dominant, while *Meadow Barley*, *Red Fescue*, *Cock's Foot*, *Sweet Vernal Grass* and *Common Bent* are all frequent. Recently-sown wildflower meadows have been created to the south of Turing College and the Innovation Centre. The former has established less well, however, more weed species characteristic of disturbed ground. The most flower-rich area is located towards the top of University Rise to the west of Bluebell Wood.

The ecological value of these meadows is enhanced by the fact they form one component of a wider habitat mosaic including woodlands and scattered trees. Free-standing trees can be found across these meadows and provide substantial local cooling around buildings towards the north of this character area.

Meadow habitat in University Rise also contributes to attenuating rainwater run-off from the campus. In addition, some Sustainable Drainage System (SuDS) features to the north of the site around Turing College (including swales, French drains and permeable green paving to the Innovation Centre car park) are all important for managing and controlling rainwater run-off from this highly sloping site. These meadows are mown annually for hay by the University Estate maintenance team.

2 Woodlands

Bluebell Wood: A 4ha hillside woodland (known historically as Hospital Wood) reaching from the edge of the Campus Heart at the north, to the boundary of the campus to the south. Large *Oak* trees are present along with frequent *Hornbeam* and the occasional *Sweet Chestnut. Silver Birch* appears to be the dominant canopy species, allowing higher light levels to penetrate to the ground flora. Towards the bottom of the slope, pollarded *Hornbeam* and *Norway Maple* dominate, casting more shade and inhibiting the development of shrub layer and varied ground flora. As the name suggests, much of the woodland's ground flora is dominated by *Bluebells* with occasional *Wood Anemone*. Remnant hedgerow, ditch and bank features are also present within this woodland and further ecological interest is provided by the ponds at both the top and base of the hill and from seasonal wet ditches and gulleys.

Chaucer College Woodland: A 1ha *Norway-Maple*-dominated woodland south of University Road and the Innovation Centre. Dense shade cast has inhibited development of a shrub understorey, while ground flora species are also limited.

Other Woodlands: A number of smaller woodlands within this character area add to the ecological diversity and provide easy access to woodland habitats. To the south of University Rise, an area of secondary woodland abuts the lower section of the Eliot Path, where *Sycamore* dominates the canopy while *Oak*, *Norway Maple*, *Ash*, *Wild Cherry*, *Hornbeam*, *Field Maple* and *Grey Willow* are all frequent to occasional. Although some patches of *Bluebells* are present, *Ivy* and *Nettle* dominate much of the ground flora. A large steep-sided hollow (historically a clay pit) is present in the southern extremity.

These areas of woodland play an important role in sequestering carbon from the atmosphere.

3 Hedgerows

A number of historic hedgerows remain from the estate's agricultural past; a recent campus hedgerow survey identified several hedgerows which are designated 'important' as set out in the Hedgerow Regulations 1997:

Chaucer Fields: A double hedge enclosing a track extends through Chaucer Fields. The track is a historic landscape route between Canterbury and Blean. A variety of woody species are present including *Privet*, *Field Maple*, *Elm*, *Ash* and *Rose*. Standard trees also occur including *Oak*, *Ash*, *Sycamore* and *Yew*. Ground flora is present along the hedge bottom including a range of species such as *Plantains*, *Bedstraws*, *Ivy* and a variety of grasses.

Chaucer College: This unmanaged tree line on the edge of a woodland just north of Chaucer College is bordered on either side by a double chain-link fence at the western end. The canopy is approximately 8m with mature trees at approximately 12m high. Woody species include *Field Maple*, *Sycamore*, *Hawthorn*, *Oak*, *Rose*, *Hornbeam* and *Lime.* Ground flora is present along the length of the tree line. There are no gaps, but the vegetation is thin is places where trees are tall.

Innovation Centre: This hedgerow forms a boundary to a triangular area of amenity grassland to the north of University Road and the hedgerow widens to become a shelterbelt in places. The main height is 8-10m with tall canopy trees of up to 18-20m. There is a ditch along the north-eastern section and one gap of 4m. The dominant woody species include *Sycamore*, *Field Maple*, *Ash*, *Alder*, *Dogwood*, *Hazel*, *Elder*, *Yew*, *Holly* and *Hawthorn*. There is one mature coppice of *Hazel* and a very mature *Oak* with potential as a veteran tree. The ground flora is dominated by *Nettle* and *Bramble* with a few herbaceous species.

South-Western: This hedgerow in the far south-western edge of the site forms a boundary around a square area of semi-improved grassland. The hedgerow is approximately 2m high, trimmed to shape. There is one 2m gap.

Turing College: This is a line of trees and shrubs located north of Turing College. Trees reach a height of approximately 10-12m. At the eastern end the hedgerow becomes shrubby and is clipped to a height of 2m. Woody species include *Crack Willow*, *Oak*, *Rose*, *Hawthorn*, *Field Maple*, *Holly*, *Hazel*, *Ash*, *Sycamore*, *Gorse* and *Goat Willow.* Varied herbaceous vegetation is also present; a section of approximately 30m of *Cotoneaster* is present. One mature *Sycamore* is located at the eastern end. There are two gaps of several metres along its length.

In addition, an unmanaged tree line south of Keynes College and north of University Road represents the boundary of a small field adjacent to Beverley Farm. Only the north and west sides of the field are represented by the existing trees and nothing of the hedgerow itself.

4 Watercourses

University Rise contains four of the University's ponds and the two ponds located within Bluebell Wood are known to support populations of *Great Crested Newts* (as well as various other amphibian species) and are arguably the most important for biodiversity on campus. Unfortunately, all of the ponds are in a neglected state, being silted and overgrown by trees and shrubs, which inhibit their ecological and amenity potential. The ponds include:

Lower Eliot Pond (Bluebell Wood): This is an attractive circular shaded pond approximately 10m in diameter and 30cm deep. Historically some areas have been cut back. Aquatic/riparian vegetation includes *Yellow Iris*, *Water Lily*, *Water Starwort* and *Soft Rush*. This pond is known to be the main breeding pond for the *Great Crested Newt* on campus, with a medium population identified from the last survey (2014).

Upper Eliot Pond (Bluebell Wood): Similar in size and shape to Lower Eliot Pond, this pond is attractive from an amenity perspective, being located adjacent to Beckett Court halls of residence. Aquatic/riparian vegetation includes abundant *Yellow Iris*, plus occasional *Gypsywort* and *Soft Rush*. Some *Giant Hogweed* can also be found in one area of the pond bank. This pond is also known to support the *Great Crested Newt.*

Figure 42: Originating from the 15th century, Beverley Farmhouse is a Grade II listed building

Beverly Farm Pond: A rectangular (10m × 5m), shallow, shaded pond at the southern end of the copse at the south of Turing College. This pond was recently dredged and cleared resulting in a lack of aquatic/riparian vegetation.

Keynes Pond: Located on the southern edge of Keynes College, Keynes Pond provides a well-used social space and forms an important natural landmark in this area, being in close proximity to the café within Keynes College. The pond is not well maintained however, and the overgrown vegetation reduces the opportunity to take advantage of the views across Canterbury. Whereas the other ponds above are considered to be 'natural', Keynes Pond was constructed as a large, deep S-shape of approximately 25m × 8m. The southern edge consists of trees and bramble including *Grey Willow*, *Crack Willow* and *Sycamore*. The pond supports a large population of ducks.

## 5 Built Environment

Context: As noted in the summary above, University Rise is characterised by sloping ground overlooking the Great Stour Valley and the historic city of Canterbury. Existing fragments of the former agrarian use of the land remain, including Beverley Farm.

The land that was formerly orchards and greenhouses was given over to housing as Canterbury expanded northwards in the mid-1960s. Instead, the campus expanded predominantly along the ridgeline. Residential buildings set out as terraces of finger and L-shaped blocks extended the development of the ridgeline through to the University's western boundary. The exception to this rule was Chaucer College which was developed privately within a belt of mature trees to the south of University

Avenue. Also at this time, the Canterbury Innovation Centre was developed on the slope just north of University Avenue adjacent to the Garde II listed Beverley Farmhouse.

Heritage: Beverley Farmhouse is a designated Grade II listed building located on the south-facing slopes of University Rise (Figure 42). The origins of this two-storey timber-framed building are 15th century, with adaptations surviving from the 16th and 17th centuries. The old part of the house is L-shaped on plan, but a further wing of three storeys was added to the west in the 19th century. Although the setting today is open grassland close to the University approach road from Canterbury, the building reminds us of the agricultural past of this part of the campus.

Beverley Farmhouse is well-maintained and in beneficial use as overnight accommodation for visitors to the University and to Canterbury, and within 15 minutes walking distance of the city centre. The building enjoys views overlooking the World Heritage Site of historic Canterbury located some way to the south east of the campus.

Architectural Character: The predominant architectural character of the contemporary University buildings is of prefabricated modular construction using repetitive material components. In Keynes College, this economy of construction was achieved using robust concrete-based materials, whereas the later Turing College buildings use a mixture of lighter weight cladding; render, block, timber & metal panels.

Overall the built sections of University Rise do not respond sympathetically to the agrarian or cultural patterns in the landscape. While the design of Keynes College responded strongly to Holford's lead in building height and choice of materials, the light colours of the cladding of Turing College sit rather uncomfortably in the landscape and are visible from long distances. Some older sections of hedgerows and native trees remain around the buildings, but the more recent introduction of swales etc in the landscape design for Turing College will have made drainage more sustainable and improved ecology.

Within the built environment of University Rise the landscape is predominantly ornamental planting, with the exception of the SuDS planting between building blocks, where the species have mostly been selected to survive in wet winters as well as dry summers and provide good ground coverage year-round. Most notable of the 'vegetated architecture' is the sedum roofs covering the Turing College Restaurant and Turing College Store, which provide good habitats for insects and support smaller species of wildlife.

## 6.3 Landscape Character Area 2 Description: Whitstable Road

Character Description: The character area of Whitstable Road is located to the north of University Rise and sits squarely along the Giles Lane ridgeline to the west of the main Campus Heart. This landscape character area is mainly comprised of the historic woodlands of Park Wood and Brotherhood Wood, plus the remnants of Hothe Court Farm; consequently, it is the woodland environment which dominates and distinguishes this part of the campus from the remainder of the University (Figure 43).

From an ecological perspective, this character area is incredibly important as it contains a large area (approximately 4 hectares) of protected Ancient Woodland, so there is a particularly strong natural dimension to this part of the campus. Originally one large contiguous woodland, Park Wood and Brotherhood Wood have been somewhat fragmented as a result of the development of the university buildings and activities. Overall, the dominance of the woodland has not been completely sacrificed to development.

In terms of present-day university functions, Park Wood contains low-density student housing in the western-most part of the campus. Given its adjacency to (and good connectivity with) the Campus Heart, science-based academic buildings predominate in Brotherhood Wood along with other functions such as the Sports Centre, the Business School and the recently completed Sibson Building.

1 Giles Lane
2 Hothe Court
3 Hothe Court Community Garden
4 Hothe Court Barn
5 Old Salt Road
6 Western Sports Pitch
7 Oaks Nursery
8 Sports Pavilions
9 Park Wood
10 Woody's Culvert
11 Jennison Pond, University Pond
12 Brotherhood Wood

Figure 43: Landscape Character Area: Whitstable Road existing layout

# 6 Landscape Character Areas: Description

The built environment in this part of the campus shows variety of character as development has taken shape incrementally over a long period. Notably this area comprises strong evidence of the former agrarian use of the land within Hothe Court Farm, Brotherhood Wood and Park Wood. The landscape character of woodland, farm fields and rural lanes (Giles Lane and the Old Salt Road), together with historic and enduring places and place names, all form part of the personality of this part of the campus.

Hothe Court Farmhouse is a 15/16th century building, extended and refaced in the 18th century on the site of an earlier Manor House and is Grade II listed. It was purchased by the University in 1969 together with 66 acres of farmland, as well as the farmyard and associated buildings. Subsequently, the farmhouse was adapted for residential use while the surviving farmyard buildings were used for estates maintenance activities. Due to its location on flat (formerly agricultural) land along the ridgeline, the farmland to the north has provided the open space necessary for the Sports Fields, Sports Pavilions and the Oaks Nursery. More recently, the Hothe Court kitchen garden has provided the space for the recently-opened Community Garden.

The Whitstable Road Character Area also notably contains the historic Salt Road which links Canterbury with Whitstable and Seasalter. Today this route is a public bridleway and forms part of National Cycle Route 1, which links Dover with the Shetland Isles (nick-named the 'Crab and Winkle Way').

**Existing Habitat Types:** There are five broad types of habitat present within this Landscape Character Area, and no ecologically significant grassland habitats:

1 Woodlands

Park Wood: This 5.2ha ancient woodland is located on the western edge of the main campus and contains a low-density development of student housing, integrated into the most western part of this wood. Shrub layers such as *Hazel* and *Holly* are prevalent, while *Bluebells* are also frequent and locally dominant. Coppicing management has recently begun in this woodland, starting at the southern edge. In the west, a number of individual and groups of trees around Hothe Court Farm are subject to tree protection orders (TPOs). The southern section of the wood has been bisected in recent years by a cycle/footpath which has created a woodland ride that may indeed be to the benefit of certain woodland edge species.

Brotherhood Wood: This shaded 5.0ha area of ancient woodland abuts the western side of the Campus Heart and, although more heavily developed by academic buildings and structures, it is similar in size and landscape composition to Park Wood. The upper canopy is dominated by *Oak* standards, while overgrown *Hornbeam* and *Sweet Chestnut* coppice is also present. *Bluebells* and *Wood Anemone* are present as ground flora, with *Common Cow-Wheat* (the larval food plant of the rare *Heath Fritillary Butterfly*) present along the northern boundary. Coppice management began in this woodland recently, starting at the eastern-most edge. Two small ancient woodland copses also extend down to Giles Lane between the Sports Centre and the Ingram Building. Once clearly part of Brotherhood Wood, these copses have become somewhat detached by expansion of the University over the years. This part of Brotherhood Wood contains a number of *Oak* standards and *Bluebells* are dominant in the ground flora; *Bramble* is also present and becoming more dominant through lack of management.

Summary: Not surprisingly, the woodlands are the dominant feature in this landscape character area. Their role, and particularly that of Brotherhood Wood, is invaluable in attenuating and improving the water quality of run-off entering the important Sarre Penn stream, and ultimately the Great Stour. In addition to sequestering carbon from the atmosphere, woodland and free-standing trees also provide substantial local cooling. This has been harnessed to good effect in the new Sibson Building development, as well as in the student housing within Park Wood.

## 2 Hedgerows

A number of hedgerows are present within the Whitstable Road Character Area. A recent campus hedgerow survey identified a number of hedgerows of significance, including several important, historic hedgerows that act as important wildlife corridors along the western boundary of the campus; these are designated 'important' as set out under the Hedgerow Regulations of 1997.

Community Oasis Garden: The north boundary of the Community Oasis Garden is marked by a shrubby *Hawthorn* hedgerow with two mature trees along the western boundary of the University Estate, which is mostly complete (there is one gap of approximately 2m.) The height of the hedge is approximately 1-1.5m high and 0.5-1m wide. The northern section is dominated by *Blackthorn*, *Field Maple* and *Goat Willow* with a short section of 5m high *Cypresses*, *Rosa sp.*, *Laurel* and *Birch* trees. The main woody species are *Hawthorn*, *Blackthorn*, *Elder*, *Field Maple* and *Goat Willow*. Mature trees include *Sycamore* and *Horse Chestnut.* The ground flora includes *Ivy*, *Bramble*, *Hogweed*, *Cleavers* and *Deadly Nightshade*. The main hedgerow is trimmed and forms a boundary around the sports field and along the internal road.

Western Sports Pitch: This is a shrubby hedge with mature trees. There is one gap of 2m. The height of the hedge is approximately 15m with a width of 5m. The woody species are mixed, including *Ash*, *Oak*, *Sycamore*, *Hazel*, *Field Maple*, *Holly*, *Privet*, *Elder* and *Blackthorn*. The hedgerow is not trimmed but creates a wooded boundary on the western side of an area of amenity grassland.

## 3 Watercourses

The Whitstable Road Character Area contains two of the University's ponds located near to the Jennison and Woody's buildings. Unfortunately, these ponds are both in a neglected state and under-utilised for both biodiversity and amenity. Neither pond is currently considered ecologically important due to the presence of non-native species of flora and fauna.

Jennison Pond: Originally constructed as a reflecting pool for telescopes mounted on the roof of the Jennison Building, this pond is now no longer in use and somewhat neglected. Rectangular in shape and measuring approximately 30m × 15m with a depth of 50cm. The pond is currently overgrown, although recent construction of the new Economics Building to the north includes a footpath to ease access to this pond. There is a large population of non-native *Goldfish*, a legacy of unwanted student pets. *Alpine Newts* and *New Zealand Pygmy weed* have also been recorded, previously further reducing the ecological value of this pond.

Woody's Culvert: Located in the north-western corner of Park Wood, this rectangular 20m × 5m pond is heavily shaded and relatively inaccessible. It has been largely ignored by the estate management regime, due to a recorded presence of the *Chytrid Fungus* which is extremely infectious in UK amphibians and a major factor in their recent decline in numbers.

GCN Experimental Ponds: This area under the control of Durell Institute of Conservation and Ecology (DICE) contains eight lined ponds, each 1m × 2m in size. Although the site is not managed by the University Estates Department, the *Great Crested Newt* population may restrict activities in areas adjacent to the site at certain times of year.

## 4 Hothe Court Community Garden

Current conservation policies form part of a comprehensive strategy to retain and protect the remaining important features of the farmhouse and its setting.

The development of the former Kitchen Garden to the west of Hothe Court Farm into a lively community garden space has significant potential to contribute to improved health and wellbeing, as well as opening up that area of the campus for socialising, creating a sense of place and identity. Remnants of the former glasshouse structures that belonged to the house and the University Observatory are also located adjacent to the recently established Kent Community Oasis Garden (KentCOG).

Figure 44: Grade II listed Hothe Court which originated in the 15th or 16th century

This area also contains the Old Salt Road, the bridleway that forms part of NCN Route 1, which is well used by pedestrians and cyclists.

5 Built Environment

Context: The built environment in this part of the campus shows variety of character as development has taken shape incrementally over a long period. Notably this area comprises strong evidence of the former agrarian use of the land within Hothe Court Farm, Brotherhood Wood and Park Wood. The landscape character of woodland, farm fields and rural lanes (Giles Lane & the Old Salt Road), together with historic and enduring places and place names, all form part of the personality of this part of the campus.

Park Wood: The 1980s saw the development of Park Wood as a satellite community of student residential accommodation set some distance away from the Campus Heart. Holford's original masterplan concept for this as the Science Area was decisively abandoned with the development of the Park Wood housing, which follows a traditional Radburn layout of suburban-style, homogenous clusters around courts and cul-de-sacs. Car parking dominates the spaces between buildings. In developing this student housing at a deliberately domestic scale, the University may have been acting expediently to give themselves the flexibility to dispose of the buildings as private housing if not required as student accommodation. The second phase of Park Wood housing in the 1990s extended the phase one layout with a more orthogonal arrangement of buildings and courts. The Sports Pavilion also built at this time extended the campus development to the north side of Park Wood Road. Further south, the woodland character is stronger with mature trees and some remnant hedges.

Brotherhood Wood: Closer to the campus core the size and scale of development increases. Brotherhood Wood was developed more in line with Holford's concept for science-based academic buildings and structures. From the late 1960s onwards, the campus was enlarged with the addition of the Chemical Laboratory (now adapted as Ingram), the Electronics Laboratory (Jennison), Sports Hall and Department of Biosciences (Stacey) to the north west of Giles Lane. These buildings were largely formed

of prefabricated modular components, using materials such as brick, block and textured concrete panels to enable economic and speedy construction. Their construction and fenestration patterns follow the precedent set by Holford's founding Eliot College and Rutherford College buildings. More recently Ingram and the Sports Hall have been extended and over-clad with different materials including powder-coated aluminium cladding panels. The Kent Business School, now Chipperfield Building, was the first of a number of buildings to be developed around a 'Garden Circus' formed in a clearing in Brotherhood Wood. An axial footpath links this circus directly to the Campus Heart. The more recent Sibson Building similarly fronts onto this circus, although this building strays significantly from the traditional University palette of materials, and like Darwin and Woolf Colleges it represents another tradition of one-off architectural expression within the campus. The architectural language in this case is created from organic curvilinear forms, and rich mixture of coloured zinc cladding to reflect the natural woodland colours.

Heritage: A number of designated and undesignated heritage assets are located in close proximity in this character area, all owned by the University. The Grade II Hothe Court Farmhouse is the centre of a group of buildings, with a Grade II listed barn to the north and associated minor farmyard buildings, including the East and West Oast Houses that survived demolition in the 1970s (a coach house and stable did not).

Hothe Court: Characterised by the Kentish vernacular farmhouse, oast houses, cottages and barns, this area in the far west of the campus includes Hothe Court Farmhouse. It is a 15th or 16th century building, extended and refaced in the 18th century on the site of an earlier Manor House (Figure 44). It was purchased by the University in 1969 together with 66 acres of farmland, as well as the farmyard and associated buildings. Since that time, the farmhouse has served a variety of uses, including residential, while the surviving farmyard buildings are used for estates maintenance activities. The farmhouse was taken out of use in 2010 due to some structural instability. Structural repairs are imminent and the building exterior continues to be maintained and protected. The surrounding farmland was redeveloped as sports fields.

Current conservation policies form part of a comprehensive strategy to retain and protect the remaining important features of the farmhouse and its setting. However, the development and expansion of the University since the 1970s has affected the coherence of the immediate landscape and has effectively isolated the farmhouse and associated buildings from the farmland. The setting of the farmhouse as a farm, and as a manorial site, has therefore been all but lost.

Giles Lane: Characterised by the Kentish vernacular cottages along Giles Lane and the southern fringes of Park Wood, University buildings include Woodlands, Rothford, Olive and Tanglewood Cottages, numbers one and two Olive Cottages, Tanglewood and Giles Cottage (formerly Conway) are locally listed. The built environment along Giles Lane sits within the remnants of the original woodland, although few mature trees remain.

## 6.4 Landscape Character Area 3 Description: Campus Heart

Character Description: The heart of the University is located to the west of Whitstable Road Character Area, along the ridgeline over-looking the Great Stour Valley. In the main, it sits to the south of Giles Lane as it was realigned by Lord Holford as part of his original 1965 masterplan. This character area takes advantage of exceptional views to both historic Canterbury to the south and the Kent Downs beyond, as well as the views north across open countryside towards Whitstable and the coast (Figure 45).

Excluding the woodland section, the Campus Heartis rather weak in representing the original natural landscape. While some mature trees remain, overall the landscape today is managed for amenity. Hedgerows are predominantly species-poor with high proportions of non-native species and, aside from the meadow grasslands to the south of Eliot and Rutherford Colleges, there are no ecologically significant grassland habitats. The majority of grassland in the Campus Heart is intensively managed as amenity grassland.

Holford's vision saw the Campus Heart sitting along the prominent ridgeline overlooking Canterbury, set within an open parkland landscape, with the college buildings

# 6 Landscape Character Areas: Description

1 Rutherford College
2 Eliot College
3 Bluebell Wood
4 Giles Lane
5 Brotherhood Wood
6 Crab & Winkle Old Railway Line
7 Woolf College Wood & Pond
8 Darwin College
9 Tyler Hill Medieval Pottery & Tile Industry - Scheduled Monument
10 St Stephens Hill Woodland
11 Father Courage Sculpture
12 Templeman Library

Figure 45: Landscape Character Area: Campus Heart existing layout

distributed strategically around it to emphasise their importance. The site chosen for the Campus Heart had formerly been open farmland overlooking the Stour Valley. In order to achieve this vision, Brotherhood Farm was closed and demolished and the farmland used to form the core of the campus.

The southern part of the character area is criss-crossed with formal and informal footpaths following desire lines which connect the north of Canterbury to the Campus Heart. A set of steps below Tyler Court forms an eastern entrance from St Stephen's Hill for pedestrians.

To the north of the Campus Heart, one of the most significant historic components is the 'North Portal' entrance to the Crab and Winkle railway line. Running north from the edge of Giles Lane car park, this pathway follows the line of the old railway; more details are provided within the Sarre Penn Valley Character Area.

**Existing Habitat Types:** There are six broad types of habitat present within this Landscape Character Area:

1 Amenity Grassland

The landscape of the Campus Heart is predominantly tightly-mown amenity grassland, with a reasonable area of ornamental planting. Amenity grassland predominates between the Campus Heart's buildings, car parks and roads. This is mostly species-poor and regularly tightly-mown. While species have mostly been selected to provide good ground coverage and year-round colour, some non-native species are favoured by pollinating insects. Such species include *Lavender*, *Verbena Bonariensis* and *Elephant Ears Bergenia Cordifolia*.

The Campus Heart also includes many free-standing tree species. Many of these have been relatively recently planted although there are a good number of mature *Oaks* which may be remnants of the former more widespread ancient woodland that was present prior to the University's development and expansion.

The Campus Heart also includes a few species-rich lawn areas; these are found mostly on roadside embankments where thinner, poorer soils have enabled a greater diversity of herbs to establish including *Bird's-Foot Trefoil*, *Daisy*, *Creeping Buttercup*, *Field Bindweed*, *Creeping Cinquefoil*, *Black Medick*, *Hawkweed*, *Crane's-Bill*, *Selfheal* and *White Clover*.

Examples of green roofs and green façades are also in evidence in a few locations within the Campus Heart. Most notable of the more recent 'vegetated architecture' is the living wall to the Grimond Building and Clematis Vines on the Cornwallis storage building and the stairs to the Jarman Building. Arguably the most impressive examples of green façades are the Ivy-clad walls of Rutherford College, covering a pre-cast concrete façade.

2 Parkland Grasslands

Although not botanically rich, as a single continuous feature the grasslands in this character area provide some ecological interest. They also have considerable landscape interest, being important both to the setting of the University and to the context of the University in its surrounding landscape.

The majority of the parklands grassland in the southern part of the Campus Heart Character Area is species-poor, semi-improved meadow. *Yorkshire Fog* and *False-Oat Grass* are generally dominant, while *Meadow Barley*, *Red Fescue*, *Cock's Foot*, *Sweet Vernal Grass* and *Common Bent* are all frequent. Recently-sown wildflower meadows have been created to the south of Eliot and Turing Colleges.

The most flower-rich area is located towards the top of the southern slopes between Eliot path and Bluebell Wood. The ecological value of these meadows is enhanced by the fact they form one component of a wider habitat mosaic including woodlands and scattered trees.

Free standing trees can be found across these meadows and the north-eastern component of this area is described as the University's Arboretum. These meadows are mown annually for hay.

# 6 Landscape Character Areas: Description

## 3 Woodlands

To the north of the Campus Heart, Brotherhood Wood and Foxborough Wood extend around and behind the University buildings as far as the eastern boundary of the campus. Further south are smaller patches of this woodland which have been fragmented over the years by the development of the campus. A small copse of trees around the boiler house is protected by historic tree protection orders.

Woolf College Wood: Along the northern side of Woolf College, a small (0.6 hectare) woodland links the former Crab and Winkle Rail Line woodland shaw to the west with a block of ancient woodland to the east which sits outside the University's boundary. There are *Oak* standards, and *Bluebells* are frequent in the ground flora. Woolf College pond also sits in the centre of this woodland parcel. Although not classified as ancient woodland, this area is subject to a planning condition from the development of Woolf College that prohibits the removal of any significant trees without planning permission.

St Stephen's Hill Woodland: Adjoining the far eastern boundary of the University Estate, an area of secondary woodland extends between the eastern side of Woolf College and St Stephen's Hill Road. *Ash*, *Sycamore* and *Silver Birch* are most frequent in the upper canopy although there are some *Oak* standards present, particularly along the western margins. Ivy and Common Nettle dominate much of the ground flora.

Tree Protection Orders: Two areas of woodland are subject to tree protection orders (TPOs) or other restrictions. These include the trees surrounding the boiler house, which are subject to a tree protection order listing specific trees, and the woodland north of Woolf College, which is protected subject to planning.

## 4 Hedgerows

A number of hedgerows are present within the Campus Heart Character Area, although these are generally species-poor and include many non-native species such as *Leyland Cyrus.* A recent campus hedgerow survey identified only one hedgerow designated as 'important' as set out in the Hedgerow Regulations 1997

Giles Lane: This is a section of shrubby hedgerow with trees that extends from the rear of the Marlowe Building to the south to the Boiler House area to the north, where it widens to become a small copse. These trees are of significant height at approximately 15m, and they form a tall, green corridor along Giles Lane. The hedgerow is dominated by *Hornbeam* with further woody species within copse of *Rowan*, *Oak*, *Holly*, *Sweet Chestnut*, *Hawthorn*, *Roses* and *Field Maple*. The hedgerow is trimmed back on the road side.

## 5 Watercourses

Woolf Pond: Located in the woodland behind Woolf College, this pond is circular in shape with a diameter of c.15m. It is heavily shaded with a large amount of leaf litter and no aquatic or riparian vegetation.

## 6 Built Environment

As described earlier in this document, in his 1965 Masterplan Holford conceived a vision for the University Campus Heart sitting along the prominent ridgeline overlooking Canterbury, set within an open parkland landscape, with the college buildings distributed strategically around it to emphasise their importance. The site chosen for the Campus Heart had formerly been open farmland overlooking the Stour Valley.

The founding buildings included the Templeman Library, Eliot and Rutherford Colleges and the Physics Laboratory, now Marlowe Building. The Templeman Library was positioned on the ridgeline as the main, central focal point to the campus, a symbol of the cultural and civic purpose to the University from the outset. This group of founding buildings were strategically conceived in a formal arrangement to define and enclose a green space into which the Senate Building was later added. The Marlowe Building was also located on the ridgeline but was restricted to two-storeys in height to ensure the library was given due prominence. The taller Eliot and Rutherford Colleges were positioned slightly down the southern slope to avoid their silhouettes rising above the ridgeline to further accentuate the prominence of the library.

Figure 46: Views of the Campus Heart today, including the Grade II listed 'Father Courage' sculpture by FE McWilliam

The planning layout was based on overlapping squares forming courtyards and circulation routes, around which the functional spaces were arranged. It is an architectural language of contrast between geometric order with a free flowing picturesque landscape. The relationship of geometric forms in landscape, together with Holford's planned layout for Darwin and future colleges to the west and north, created a formal layout of buildings and squares within the central campus with an informal edge to the parkland to the south and views to Canterbury and beyond.

The selection of materials in these early buildings, together with architectural modelling and detail, derived from the political and economic circumstances of the time. The necessity to deliver the buildings within demanding time and budget constraints to meet the Government's education programme led to prefabrication and modular construction. This is manifest in the geometric building plans, modular repetition and appearance with windows grouped in vertical bands and recessed behind sculpted concrete wall panels. Earthy brick colours at the upper levels and chamfered corners soften the building outlines and help embed them against the landscape skyline and wooded backdrop.

Since the University was first opened in 1965 the central campus has expanded, generally following this early pattern of development but without a clear hierarchy or order to the public realm or architecture. This has resulted in permeable but poorly-defined areas of public space with a lack of overall legibility for pedestrian movement and a lack of clear definition of public space. With the exception of the original set-piece of Templeman Library, Eliot and Rutherford Colleges and the Marlowe Building noted above, which do provide some sense of Holford's original plan for the Campus Heart, the layout of buildings in the landscape and lack of character in the spaces between buildings mean that this character area has a moderately weak cultural dimension with little relationship with its historical past. Notwithstanding this, the over-riding character is a Campus Heart that enjoys a dramatic garden setting on the ridgeline overlooking Canterbury, framing the views back to the historic city.

Heritage: The Campus Heart contains a designated heritage asset located close to the centre of this character area; this is the Grade II listed 'Father Courage' Sculpture. FE McWilliam's totemic sculpture symbolises the political and social change of the post-war era (Figure 46). It refers to the play 'Mother Courage' by Berthold Brecht, which denounced the horrors of war and as such it embodies themes explored by several sculptors in this period.

To the east of the Campus Heart is the site of the Tyler Hill Medieval Pottery and Tile Industry, which has recently been designated as a Scheduled Monument. The Tyler Hill ceramic industry was based on the local availability of raw materials including London Clay and timber from the surrounding woods. It is possible that the first kilns were located here in about 1150. An extensive fire in Canterbury in 1174, which destroyed many timber houses and badly damaged Christ Church Priory, had proved an impetus to tile production at Tyler Hill, because as a result it was determined that future roofs in Canterbury should be tiled. The Tyler Hill industry dominated Kent, especially east Kent, producing everyday house tiles as well as decorated floor tiles and pottery. In the summer of 2000, Channel 4's Time Team excavated one of the kilns which proved to be one of the best-preserved medieval tile kilns ever found in England.

Built evidence of the former agrarian use of the Campus Heart also still exists and contributes greatly to the quality of place that the Campus has become. The built heritage includes the houses and cottages along Giles Lane – Rothford, Olive Cottages and Tanglewood: the latter two being locally listed.

In addition, underneath the Campus Heart runs the disused Crab and Winkle tunnel, which opened in 1830 as the first steam-powered railway in southern England, and the first in the world to operate a steam-hauled passenger service.

## 6.5 Landscape Character Area 4 Description: Sarre Penn Valley

Character Description: The Sarre Penn Valley is located between the ridgelines of Giles Lane and Tyler Hill Road in the northernmost part of the University Campus. In broad terms, the southern boundary of the Sarre Penn Valley is Park Wood Road and the northern boundary is Tyler Hill Road. This area is characterised by areas of enclosed fields and punctuated by small belts of woodland (Figure 47).

Dominated by the Sarre Penn stream (a tributary of the Great Stour River), this character area occupies the small valley north of the Campus Heart/Whitstable Road Character Areas and consists predominantly of enclosed and active agricultural land, with remnant original hedgerow features. The River Wantsum is also a tributary of the River Stour; combined they formed the Wantsum Channel that once separated the Isle of Thanet from mainland UK. The Saxon name 'Sarre Penn' translates as the 'head or top of the River Wantsum' (into which it flows). Sarre is also a place-name of a village located on what was once the mainland (west) coast line of the Wantsum Channel.

The valley slopes are an agrarian landscape and there are few built elements to this character area. They include the historic (12tth century) Church of St Cosmus & St Damian in the north-west, the Sports Pavilion buildings in the south, the Oaks Nursery in the south-west, the historic Crab and Winkle rail line in the east and the working Hothe Court Farm buildings in the north.

The landscape and built environment in this part of the University campus is little touched by recent development and is used by the University as a research facility for archaeological exploration, surveying and building conservation.

**Existing Habitat Types:** There are five broad types of habitat present within this Landscape Character Area:

### 1 Arable Fields

Despite its rural agricultural feel, the overall natural dimension of the character area is weak, although the habitat complexity is enhanced considerably by the Sarre Penn stream. While the stream provides a vegetated watercourse with some important hedgerow corridors, the hedgerows have many gaps and the lack of connectivity between the numerous small woodland areas reduces the ecological value of the landscape. Remnant hedgerows provide a glimpse into the area's past, and fruit-bearing species remain from larger orchards that once provided food for the people of Canterbury. This area also notably contains the northern entrance, the 'North Portal' to the Crab and Winkle railway tunnel, which also forms part of the University Estate.

### 2 Woodlands

The woodlands and surrounding vegetation are extremely important in attenuating and improving the water quality of run-off entering the important Sarre Penn stream and ultimately therefore the River Stour:

West Triangle Wood: Located on the western edge of the landholding, this 0.5ha woodland is dominated by *Oaks* with *Hazel* coppice forming the shrub layer. *Bluebells* and *Wood Anemone* dominate the ground flora. Further ecological complexity is provided by the Sarre Penn stream which bounds the woodland's northern edge.

Sarre Penn Shaw: An east-west aligned woodland shaw extending along the Sarre Penn stream between West Triangle Wood in the west and the former Crab and Winkle rail line in the east. This shaw is noteworthy for providing connectivity between Brotherhood Wood, West Triangle Wood, Foxborough Wood and the woodland of Blean Pastures Local Wildlife Site. The canopy is dominated by *Oaks* and *Ash*, while *Hazel*, *Hawthorn*, *Blackthorn*, *Dogwood*, *Field Maple* and *Grey Willow* are all frequent in the understorey. *Bluebells* and *Wood Anemone* dominate the ground flora in Foxborough Wood.

# 6 Landscape Character Areas: Description

1 Brotherhood Wood
2 Sports Pavilion
3 Blean Primary School
4 West Triangle Wood
5 Sarre Penn Stream
6 Roman Villa Remains
7 St. Cosmus & St. Damian Church
8 Old Salt Road
9 Hothe Court Farm
10 Crab & Winkle Old Railway
11 Foxborough Wood
12 Sarre Penn Shaw

Figure 47: Landscape Character Area: Sarre Penn Valley existing layout

Foxborough Shaw: A north-south aligned c.0.5ha and 10-35m wide woodland shaw extending between Hothe Court Farm in the north and the Sarre Penn stream and Foxborough Wood in the south. *Oak* dominates the canopy whilst *Hawthorn*, *Blackthorn* and *Elder* frequent the understorey. A narrow stream or ditch (dry in summer) extends the length of the woodland feeding into the Sarre Penn at the valley bottom.

Tree protection Orders: A section of Brotherhood Wood that forms the southern edge of this character area is subject to a tree protection order (TPO).

3 Hedgerows

A large number of hedgerows are present within the Sarre Penn Valley Character Area as a legacy of the agricultural land use. A recent campus hedgerow survey identified six hedgerows designated as 'important' under the terms of the Hedgerow Regulations 1997.

North West Arable: This hedgerow borders an arable field. The eastern section is a shrubby hedgerow of approximately 2.5m in height dominated by woody species of *Hawthorn* but also includes *Oak*, *Goat Willow* and *Rose*. Along the northern boundary by Tyler Hill Road, *Blackthorn* is dominant and interspersed with *Holly*, *Hazel*, *Elm*, *Field Maple*, *Birch*, *Poplar* and *Ash*. The eastern section is trimmed low in contrast to the northern section, which is untrimmed with mature trees over 12m. The western section is approximately 6-7m high with several individual mature trees. Woody species include *Goat Willow*, *Pear*, *Rose*, *Elder* and *Plum*. The herbaceous layer includes *Yarrow*, *Dock*, *Scentless Mayweed*, *Fleabane*, *Hairy Willowherb*, *Rosehip*, *Hogweed* and *Nettle*. The southern end of the western section becomes a shelterbelt with a wide belt of mature trees. An area of rough grassland and trees is located west of the western section.

Western Footpath: This is a section of trimmed hedgerow along the western side of the Crab and Winkle Way bridleway. It is approximately 2.5m high and stock-proof, bordering a grassland field to the west. The dominant woody species is *Hawthorn* with *Holly*, *Rose*, *Field Maple*, *Elder*, *Oak*, *Ash* and *Willow*. The northern section is dominated by *Ash*. Herbaceous species of *Nettle*, *Fleabane*, *Thistle* and grasses can be found, along with *Gatekeeper Butterflies.*

Farmlands: This hedgerow separates two fields; to the north is an arable field and to the south is a grassland field. There are two gaps along its length. The average height is 3-4m and the hedgerow is open at the base and not stock-proof. The dominant woody species is *Hawthorn* with *Elder*, *Blackthorn*, a mixture of small and large *Oak* trees, *Goat Willow*, *Rose and Holly*. The herbaceous layer is dominated by *Thistle*, *Hogweed*, *Dock*, *Nettle*, *Scentless Mayweed*, *Poppy*, *Bramble* and grasses.

Farmhouse: This hedgerow borders Tyler Hill Road and arable fields. It is trimmed and approximately 2m high. The dominant woody species are *Field Maple* and *Dogwood*, with *Rose*, *Blackthorn*, *Hawthorn*, *Elm*, *Holly* and *Hazel*. The western end is dominated by *Blackthorn*. There are two gaps along its length and several animal runs through it. It is trimmed and dense at the base. The herbaceous layer is narrow along the arable field and includes *Ivy*, *White Briony*, *Bracken*, *Mugwort*, *Hogweed*, *Bramble* and grasses.

New Woodland: This is a section of 4-5m high hedgerow to the east of the newly planted woodland. It forms a section of the eastern boundary of the bridleway/cycle path near the bottom of the hill where the path crosses the stream. Woody species include mature and young trees of *Goat Willow*, *Oak*, *Rose*, *Hawthorn*, *Field Maple*, *Blackthorn*, *Crack Willow* and *Mature Ash*. The field layer is dominated by *Bramble*, *White Briony*, *Hairy Willow Herb* and *Nettle*. The hedgerow is likely to be trimmed back occasionally away from the cycle path.

Oaks Nursery: This hedgerow is dominated by tall, mature trees and is at times wider than 5m. It creates a boundary around a rough grassland field north of Oaks children's nursery. Trees vary in height from 5-6m up to 10-12m. The western boundary widens to 10m at the northern end where it becomes woodland. The main woody species are *Hornbeam*, *Hawthorn*, *Sycamore*, *Field Maple*, *Dogwood*, *Hazel*, *Tree of Heaven*, *Cherry*, *Oak*, *Blackthorn* and *Rose*. The ground flora includes *Cow Parsley*, *Hedge Bindweed*, *Hogweed*, *Nettle*, *Ivy*, *Red Campion*, *Mallow*, *Spear*

Figure 48: Views of the Sarre Penn Valley today; above: St Cosmus & St Damian Church, Blean, right: the Old Salt Road (NCR 1) crossing the Sarre Penn Stream

*Thistle*, *Creeping Thistle*, *Cleavers*, *Rye Grass* and *Meadow Foxtail*. This hedgerow/shelterbelt is not trimmed but creates a dense wooded boundary around the field. Eleven woody species were identified and, although it is in places wide enough to be woodland, it has the characteristics of a hedgerow, which was present over 30 years ago.

In addition to those identified above, a further hedgerow exists in this character area:

Sports Fields South: This is a shrubby hedgerow with occasional adjacent trees forming the southern boundary of the main sports field. It is approximately 1m in height and 1m in width. Two gaps of approximately 5m occur along its length. The main woody species are *Hawthorn* with *Elder* and *Ash*. Occasional *Cherry*, *Holly*, *Elm* and *Rose* also occur. The hedgerow is trimmed and dense to the base.

### 4 Watercourses

The Sarre Penn Stream, a section of which flows through the University's landholdings, is a 13km tributary of the River Stour. Flowing west to east across the centre of the character area, the Sarre Penn has formed a shallow sided V-shaped valley. For virtually its entire journey across the University's landholding, the Sarre Penn is densely shaded by mature trees and shrubs and thus there is little in the way of riparian herbaceous vegetation. Woody debris is a key feature within the channel, generating organic matter that contributes to the overall

productivity of the river system. This debris, along with overhanging canopies and submerged roots and limbs, provides refuges for fish and invertebrates and diversifies flow and the range of species that can inhabit the varied current velocities. Tree roots also stabilise the banks that may otherwise be vulnerable to collapse. For this reason, South East Water generally recommends retention and restoration of the stream's wooded character, although advises against fully enclosing vegetation.

The western-most section of the stream forms part of the Blean Pastures Local Wildlife site. The stream and adjoining habitat are therefore likely to function as important corridors for wildlife moving between these important habitats and the campus.

### 5 Built Environment

The valley slopes are an agrarian landscape and there are few built elements to this character area. University-owned buildings include the Sports Pavilion buildings in the south of this character area, plus the Oaks Nursery and the Hothe Court Farm buildings in the south-west. Two historic routes cross this landscape from north to south: The former trackbed of the Crab and Winkle rail line in the east and the Old Salt Road in the west, which was an ancient route carrying sea salt from the north coast of Kent to Canterbury.

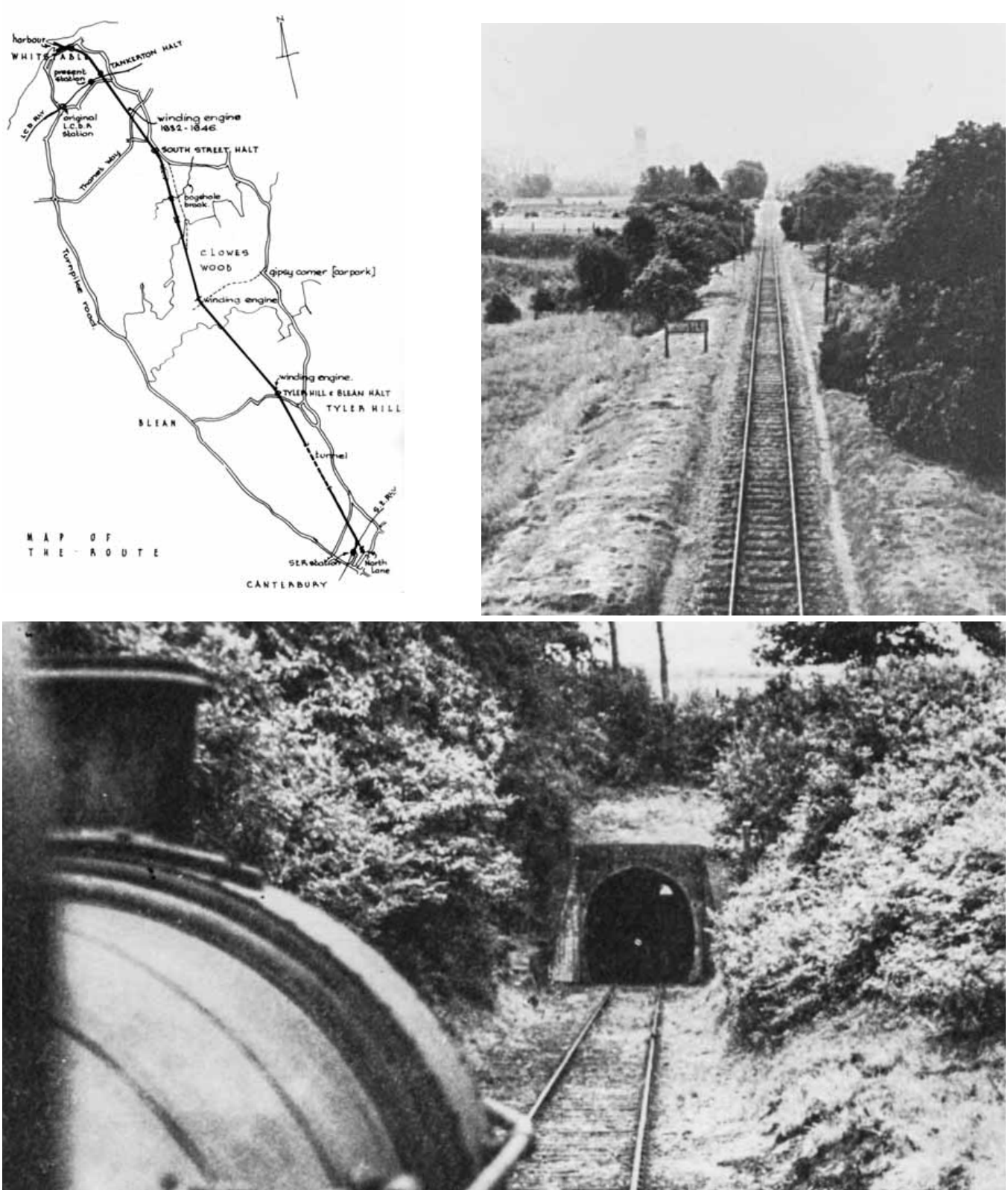



Figure 49: Views of the former Crab and Winkle railway and the North Portal of the Tyler Hill Tunnel

The landscape and built environment in this part of the University campus is little touched by recent development and is used primarily by the University as a research facility for archaeological exploration, surveying and building conservation.

Heritage: A number of designated and undesignated heritage assets are located in this character area, including a designated Scheduled Monument within the campus immediately to the south and west of St Cosmus and St Damian's Church. This monument includes the remains of a dispersed medieval settlement and an earlier Roman building situated on the southern slope of the valley. The Roman remains are represented by below-ground archaeology and have been identified as a villa. Analysis of associated pottery fragments indicates that the building was in use during the first to third centuries AD. The dispersed medieval settlement survives in the form of earthworks and associated buried remains, and part of a roughly north-south aligned track runs along the eastern side of the monument. Documentary evidence, including an entry in the Domesday Book, suggests that the settlement was in existence by the 11th century. Analysis of pottery fragments found within the settlement suggests that it had fallen into disuse by the early 15th century.

Immediately beyond the monument to the north and east, on land adjacent to the campus but not owned by the University, is the associated parish church of St Cosmus and St Damian. The church is Listed Grade II* and the standing fabric dates mainly to the 13th century (Figure 48). The Grade II listed Church Cottage sits close by, also on Tyler Hill Road. The church and its churchyard, both of which remain in use, are not included in the scheduling noted above.

In addition, the following designated heritage assets are located within this character area in the west of the Campus on land owned by the University:

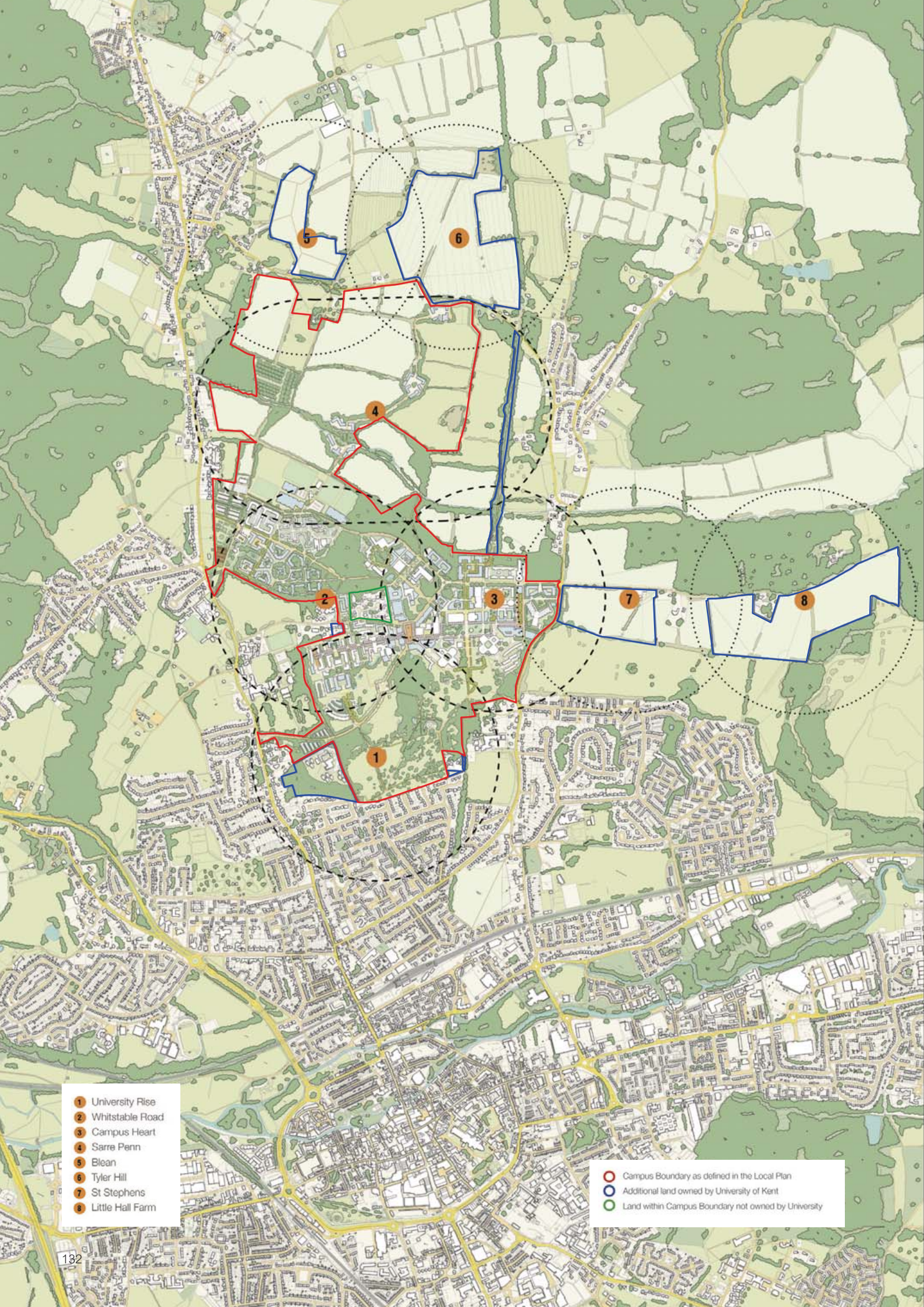
- Former Canterbury and Whitstable Railway Trackbed north of campus (unlisted)
- Tyler Hill Tunnel including the North Portal (former Canterbury and Whitstable Railway), Grade II* (Figure 49)

All of these historic structures are considered to be of great importance in defining the agrarian character of this area.

Figure 50: Contemporary photos showing the green and biodiverse landscape setting of the campus

REGISTRY

# 7 Landscape Character Areas: Proposals


1 University Rise
2 Whitstable Road
3 Campus Heart
4 Sarre Penn
5 Blean
6 Tyler Hill
7 St Stephens
8 Little Hall Farm
Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent
Land within Campus Boundary not owned by University

## 7.1 Introduction: An Holistic and Integrated Approach to the Masterplan Thinking

Since its inception, the University of Kent in Canterbury has evolved and grown as land has been purchased in order to accommodate expansion of the facilities. As noted earlier in this document, the designated campus today encompasses almost 450 acres (about 180 hectares) of land, and is composed of a complex collage of land parcels. Consequently, the University Estate is not one environment, but several, and the previous chapter has provided a very comprehensive and detailed analysis of that, and of the four Landscape Character Areas that form the core of the existing campus.

The University Estate today is well known as a very verdant campus with plenty of open space, located within a semi-rural landscape setting. The names of Brotherhood Farm, Beverley Farm, Hothe Court Farm Park Wood, Brotherhood Wood and Hospital Wood are a palimpsest of the very rural character that characterised the area prior to the arrival of the University. The masterplan process has explored ways in which to express and reinforce these different character areas, working with their variety and distinctiveness and exploring what each area is capable of becoming.

Whils this focus on developing ideas for the component parts of the estate has been a necessary part of the masterplanning process, following this approach alone has its limitations; in order to create an integrated and holistic masterplan, it is necessary always to look beyond the particular and be mindful of the bigger picture. In parallel with this 'bottom-up' approach therefore, the masterplan design process has also maintained a 'top-down' overview of the campus, to understand how the component parts might be integrated with each other whilst maintaining their distinctive and individual characters.

The accompanying concept drawing (figure 52) shows how these principles have been applied to the existing campus in composing the Framework Masterplan. This simplified 'mental map' illustrates how the Masterplan is composed of a network of places of different character, yet one that is coherent and interconnected, set within a varied green landscape and with a clear pattern of movement. This concept drawing not only sets the template for the future masterplan, it provides a brief for each of the individual character areas and the role they must play in delivering the overall masterplan composition:

1 University Rise

- Entrance square at the junction of Whitstable Road and University Avenue
- Re-landscaping of University Road to become University Avenue
- University car park north of Chaucer College to free up the Campus Heart
- New conferencing hotel in Turing South and a new arrival square on University Avenue
- Improved pedestrian and cycle routes to city and rail station
- Restoration of historic hedgerows, streams and ponds
- Open-air theatre in Chaucer Fields

2 Whitstable Road

- Holford Walk east-west pedestrian and cycle route created
- New connection between Whitstable Road and Park Wood Road
- Enhancements to the heritage setting of Hothe Court
- New 'Centre of Excellence' adjacent to Hothe Court historic buildings
- Park Wood housing earlier phases redeveloped and the density of student housing and height increased
- University car park north of Hothe Court to free-up the Campus Heart

3 The Campus Heart

- Holford Walk east-west pedestrian and cycle route created
- New entrance square at junction of University Avenue and Giles Lane
- New entrance square on St Stephen's Hill
- Tyler Hill Ancient Monument made accessible along with pedestrian/cycle links to east

Figure 51: Proposed Framework Masterplan for the Canterbury Campus showing the landscape context and the character areas denoted by circles

Figure 52: Concept sketch: The Masterplan incorporates a new and more legible 'mental map' of the Campus

New pedestrian/cycle route adjacent to Tyler Hill Road
Improved connection to Tyler Hill village
New cycle & pedestrian route along Crab & Winkle line
New Sarre Penn valley cycle route
Darwin College housing replaced
Ancient Monument:
Tyler Hill Tyler Hill medieval pottery and tile industry
Holford Walk east-west pedestrian and cycle route
New axial approach through Eliot Fields
New open air theatre in Chaucer Fields
New pedestrian and cycle route to city and rail station
Beverley Meadows

- Darwin College housing replaced and the density of student housing and height increased
- Development of Estates Department and Giles Lane car park, with parking replaced in podium
- Enhanced approach to the Campus Heart through Eliot Fields
- Improved pedestrian and cycle routes to city and rail station
- North-side station entrance to Canterbury West station

4 Sarre Penn Valley

- National cycle route (NCN1) retained along Old Salt Road
- New cycle and pedestrian along the former 'Crab and Winkle' rail line
- Restoration of historic hedgerows, streams and ponds
- Footpath along Sarre Penn Valley upgraded to cycle route
- Improved connections to Tyler Hill village
- Safer pedestrian/cycle route adjacent to Tyler Hill Road
- Ancient Monument and Blean village made more accessible
- Small, discreet building clusters introduced to better integrate this area with the rest of the campus

In this way, by working at the big-picture and at the particular at the same time, the masterplan team has been able to compose an overall masterplan that integrates the detailed mini-masterplans for each individual character area. Each one of these mini-masterplans articulates how the landscape, the built environment and the biodiversity would work harmoniously together in each individual character area. The mini-masterplans for the individual character areas are described in detail below:

## 7.2 Landscape Character Area Proposals: University Rise

The Framework Masterplan, while acknowledging that the University Rise character area must continue to play a role in providing a green setting to the south of the campus as well as a landscape demarcation from the city, also recognises that there is still significant potential to improve both the natural, built and cultural dimensions of this character area (Figures 53 & 54).

The Masterplan respects the open 'parklands' character of this part of the campus and acknowledges the opportunities for landscape and biodiversity enhancements and more clearly-defined and legible routes. Significantly, this includes creating a new promenade connecting with the Campus Heart through Turing and Keynes College courtyards, as part of a wider initiative to create a unified, connected campus along the ridgeline.

Furthermore, new built development is limited to the area to the south of the Turing College student hub building, modest infill development along Giles Lane and some larger new buildings framing the south and west side of a new, central *'University Square'*. The Masterplan also identifies a location for a new hotel with conference facilities, thus taking the opportunity to diversify uses and to broaden commercial activity within the campus.

1 Landscape Enhancements

Overall, the open nature of University Rise is maintained in the Masterplan, in order to provide a green setting to the University as well as a landscape demarcation from the city. More variety could be achieved in the homogenous grassland areas through the planting of wildflower meadows, orchards and reinstatement of hedgerows. In particular, several important hedgerows exist in Chaucer Fields, and the Masterplan proposes to re-establish the ones that have been removed to acknowledge the former agricultural use and the importance of this land in helping to provision the growing population of Canterbury.

The Masterplan proposes to connect different areas of grassland by footpaths and tracks to help with wayfinding for pedestrians and cyclists, and reinstated hedgerows will provide a new network of 'eco-highways' for native animals and wildlife.

It proposes to extend the network of woodland paths through Bluebell Wood. The existing paths are well used by students, staff and visitors all year-round, but are especially popular in the spring months due to the impressive display provided by the woodland's Bluebells. The efficient and well-established woodland maintenance regime that cares for Bluebell Wood should be extended into the smaller woodlands and shaws, in order to protect this leisure and biodiversity amenity in this part of the campus.

The network of ponds and watercourses has been extended in the Masterplan through the creation of a third pond west of Lower Eliot pond, in order to provide greater ecological and amenity interest in this section of grassland and also to provide an important alternative breeding area for the *Great Crested Newt*. A large, biodiverse and ecologically designed wetland feature such as this, created in a prime location, would become a focal landscape attraction and showcase the University's greater aspirations for biodiversity. Access to the water and its wildlife could be maximised through multiple seating areas and boardwalks winding around the margins and even across the wetland.

Keynes Pond could also be transformed into a more attractive duck pond by cleaning and filtering the water that feeds it and by cutting back vegetation to enable long views across Canterbury. Enhancements can also be made to the dry ponds south of Turing and north of Beverley Farm. SuDS features should be used as both an attenuation and amenity feature in all future developments, and the existing complex extended and planted to enhance the landscape.

## 2 Public Realm and Network of Movement

Connections form the foundation of a successful University. The expansion of knowledge and skills depends upon the ability of individuals and organisations to connect and interact with one another and to engage with an ever-expanding body of knowledge. The links that provide such connections, both physical and virtual, provide the University with the essential structure for its activities of learning and knowledge distribution.

In terms of movement, the University Rise character area is bisected by University Road, which provides the main road entrance to the University. It is likely that University Road will remain the principle approach for traffic approaching the University from the city centre to the south but its form and character change to become more of a formal avenue reinforced by linear tree planting.

Holford intended the experience of arrival along University Avenue to be a spectacular entry point to the campus and very much in the English picturesque tradition. However, the entrance to the campus from Whitstable Road is poorly defined and the road itself is a rather utilitarian length of highway. The existing unremarkable junction between Whitstable Road and University Road provides an opportunity to create a notable, generous entry space and gateway between public highway and University Estate. Such a transition space could create a landmark on Whitstable Road, highlighting the transition into the city. A new gatehouse building, or sculpture, will also help to establish the 'front door' characteristics of this space, combing surface treatments, lighting and other framing techniques (such as an actual gate) will clearly signpost entry into a distinct environment and combine to establish a highly recognisable landmark place, without needing to interfere with the flow of slow-speed traffic.

From this new entry square, the road climbs gradually up the hill and the landscape has been conceived to use the change in the level to gradually reveal glimpses of the University buildings beyond through the trees. The Framework Masterplan takes the opportunity to restore Holford's vision, emphasising the beauty of this route to impress visitors with the beautiful green landscape setting of the University.

# 7 Landscape Character Areas: Proposals

Figure 53: Landscape Character Area: University Rise existing layout

1 University Gate
2 University Avenue
3 Beverly Farm
4 Turing College
5 Turing Walk
6 Keynes College
7 University Square
8 Crab & Winkle Foot/ Cycle Path
9 Labyrinth
10 Open Air Theatre
11 Hospital Wood
12 Beverley Court

Figure 54: Landscape Character Area: University Rise proposed masterplan layout

University Road itself will transform from a standard estate road to respond more sympathetically to the parkland character of University Rise in its approach to the Campus Heart along the renamed 'University Avenue'. A sequence of distinct spaces will punctuate the route, aligned to interrupt the linear continuity. Road markings and conventional highway signs will be minimised, and the apparent width of the carriageway kept to a minimum. The approach from Whitstable Road will be a rich experience, as the road emerges from dense woodland at the bottom of the hill into open parkland enhanced by the backdrop of Bluebell Wood. A sense of arrival to the University as a whole will be greatly enhanced by a new public square at the heart of the University Campus and described in the Campus Heart Character Area. There will be a close connection between people and the landscape surroundings as views of historic Canterbury emerge across the parklands to the south, as visitors pass through a variety of green landscape environments, curving up through the parklands along a spectacular, tree-fringed avenue as the setting for one of England's greenest Universities (Figures 55 & 56).

One of the founding principles of the Movement and Transport Strategy is to reduce reliance upon the motor vehicle, particularly for short journeys that could quite easily be undertaken by other means (eg: public transport, walking and cycling). The University benefits from close proximity to Canterbury city centre and to Canterbury West rail station, and a number of walking and cycling links to the city already exist, as do frequent bus services. The Masterplan includes proposals to upgrade and extend the existing network of walking and cycling links with the city to make this journey even more available by sustainable means.

The mMasterplan encourages opportunities for walking and cycling by the use of landscaping and planting to emphasise clearly defined and legible routes and proposes a significant growth in the role and status of two established footpath routes converging to the south of the University towards Canterbury West Station. The western arm links to Salisbury Road, running close to Chaucer College; this route is likely to retain the character of an upgraded footpath, with surfacing and discrete lighting to promote direct connection to the Station. By comparison, the existing easterly route is likely to be busier and a major opportunity exists to enhance the use and status of this through improvements in the alignment of this route (see the Campus Heart Character Area). This route will transform into the principal traffic-free approach to the University (a key section of Route 1 of the National Cycle Network) by improved signing, lighting and paving that will be highly distinctive and visible from the station exit into the centre of the University. This route anticipates the opening of a northern entrance into Canterbury West Station from Roper Road at some point in the future, as well as the regeneration and re-use of disused sections of the Crab and Winkle Line trackbed (south section) as a sustainable transport route. To achieve these goals, both initiatives will require productive partnership working with Network Rail, the new Train Operating Company, CCC, KCC and relevant land owners.

Easy movement within the campus around a well-defined and legible network of paths and cycleways is also a founding principle of the Framework Masterplan. In order to fulfil this ambition, the masterplan proposals in University Rise include a major new promenade connecting east-west along the ridgeline to create a more unified and connected campus. New buildings will be located specifically to delineate and activate new legible routes such as this. This new pedestrian and cycle route will lead directly from the newly-created central square at

Figure 55: University Rise concept sketch

Figure 56: University Rise concept sketch

the top of University Avenue (see above) and connect directly through the heart of Keynes College through to the western edge of the campus within Turing College. It will also form a component part of a much longer pedestrian/cycle route through the Campus Heart between Turing and Darwin Colleges, that will provide a key axis and a backbone to a much clearer and legible network of movement around the campus.

### 3 Built Environment

In the Framework Masterplan, the setting of Beverley Farmhouse will remain largely unchanged to the south in its parkland setting, although the following proposals will have some positive impacts:

- The Masterplan proposes that the pedestrian and vehicle approach to Beverley Farmhouse will be made more prominent in order to emphasise the ease of access to this direct footpath between the campus and Canterbury to encourage walking and to discourage the use of the car. There is therefore likely to be more footfall on this route
- A new conferencing/hotel will be located up the hill to the north in Turing South. The Masterplan assumes that this new intervention will have a positive effect upon Beverley Farmhouse in creating a visitor focus in this part of the campus. It is also hoped that this will provide an opportunity for a symbiotic relationship between the two buildings to emerge. For example, Beverley

Farmhouse might provide some related, luxury overnight accommodation which is complimentary to the hotel, with additional meeting space and/or a restaurant that brings more life and visitors to this historic building

New buildings on the University Rise ridgeline might be highly visible from Canterbury and the hills to the south, which in turn may impact upon the setting of the Canterbury World Heritage Site. Any new development within University Rise will therefore need to be sensitively integrated to achieve a careful balance between additional built space and enriching and extending the public realm. Rather than integrating buildings widely throughout this area, new development within the Framework Masterplan has been strategically focussed on fitting in with the landscape and creating a more consolidated and coherent campus in the area of the ridgeline to maintain the significant areas of open space to the south.

New buildings are arranged to more clearly define useable spaces between the buildings that will be able to support a variety of activities and create a sense of place. While the university buildings provide an environment for learning and academic excellence, the places and spaces between the buildings will become the public 'living rooms' where all members of the university community can gather, exchange ideas, and where the sense of community is supported through formal events and informal encounters. A wider diversity of spaces will broaden the opportunity for interaction within the university community.

At the same time, the Masterplan encourages the introduction of a wider variety of uses and commercial opportunities within University Rise. Several new buildings are proposed within Turing College to reinforce the campus location along the ridgeline (or on flat land within the ridgeline 'plateau') in gap sites where development will provide more enclosure or help define the new central square and the east-west promenade. In harmony with Keynes and Turing Colleges, the new buildings proposed in Turing South are envisaged as a courtyard development, with new buildings enclosing garden spaces or courtyards.

The Masterplan for this part of the campus also includes an option for a new conferencing hotel, introduced immediately to the south of Turing College and north of the existing Canterbury Innovation Centre. The siting and location of this facility has been carefully considered by the University and its advisors and the preferred location at Turing South is explained and justified as follows:

- A conference centre would need to be seen as part of the University but also have its own separate identity; Turing South is an ideal location from this point of view, physically part of the University but visibly separate from the heart of the campus
- Turing South is well-located in terms of access, being within easy walking and cycling distance of Canterbury and Canterbury West station, close to bus stops with regular services to the city and near to the southernmost vehicular entrance to the campus from Whitstable Road for those arriving by car or taxi
- The location near the campus entrance would ensure it is easy to find and would mean that vehicles using the conference centre don't add to vehicular movements and congestion within the Campus Heart or Giles Lane
- The location would be large enough to accommodate both the conference centre and co-located hotel accommodation, as well as dedicated parking for both
- It would offer excellent views over Canterbury and the Cathedral while the building itself could nestle into the slopes to minimise its visual impact on the city itself
- The setting and surroundings would present a 'soft' and green environment for the buildings, one of the unique features of the campus
- Apart from the term-time hustle and bustle of the student residential cluster, the Masterplan envisages that a conferencing hotel development here would take advantage of the close proximity to Turing College, where unused student bedrooms in the summer would provide additional overspill accommodation
- It would also be close to the Canterbury Innovation Centre, which may encourage further inward investment as part of a package of campus "attractors"

- A hotel development in this location would also provide an opportunity to introduce hotel-related uses into the nearby historic Beverley Farmhouse, such as a fine-dining restaurant, additional seminar space and bedroom suites on the first floor

A new two-level car park is also proposed to the west of the hotel to provide car parking for hotel guests. A car park in this location would take advantage of the sloping ground to nestle into the landscape. Separate entry points for cars at both levels would avoid the need for internal ramps and so keep the building footprint as small as possible.

It is envisaged that the introduction of a conferencing hotel in this location would help make full commercial use of the campus throughout the year, including residential conferences and tourist-related accommodation outside of term times, particularly over the 13-week summer period.

The University recognises that this land is currently allocated for the extension of the Canterbury Innovation Centre and is safeguarded for B1 Use Class under Policy EMP 1 of the Local Plan. Should a hotel/conference centre be brought forward in this location, it would need to be considered in the context of the relevant planning policy at the time of submitting an application. Furthermore, the planning application would need to be submitted as a departure to the Local Plan, and be accompanied by clear supporting evidence to justify the loss of potential B1 space and the need for a conferencing hotel on this particular site.

To the south of University Rise, an open-air theatre is proposed in a former clay-pit at the bottom of Bluebell Wood. As the character area is fairly exposed, this woodland edge location will provide shelter for this new cultural component, that might be curated by the existing Gulbenkian Theatre. A facility such as this might also be considered for use as meeting/teaching space to extend the use of the outdoor environment for social occasions outside the summer months, further increasing its amenity value.

Finally, new University-related parking space is provided in the masterplan proposals in two parcels of land screened within dense pockets of trees and tall screening hedges on either side of the University Avenue north of Chaucer College. These areas of parking are intended to replace the multitude of small car parks currently occupying valuable space in the Campus Heart. Their strategic location will ensure that car users in future will leave their cars close to the perimeter of the campus; the short journey into the Campus Heart can quite easily be undertaken by public transport, walking or cycling.

4 Design Guidelines

The Framework Masterplan proposes the following principles and improvements:

1 Public Realm:

- University Square, a new arrival square at the junction between University Avenue and Giles Lane
- University Road replanted to create avenue with lofty tree canopies that maintain Cathedral views from road and southern slopes
- A new arrival forecourt ('Beverley Court') created as a punctuation point along University Avenue to symbolise visitor arrival at the new conferencing hotel. This court will give access to the new hotel as well as a new viewing platform created to provide a view of Canterbury and the Cathedral
- An east/west promenade ('Turing Walk') between the western boundary of Turing College and University Square, through Keynes College
- Upgrade and extend the existing network of walking and cycling links between the campus and the city to make this journey even more easily available by sustainable means
- A north/south route from Bluebell Wood and University Avenue to the new Hotel Garden Court, Turing College student hub and Turing College 'central square'
- A new, improved setting for Tanglewood Cottage within its own small garden square, at the junction of the route between Keynes College and Park Wood
- There is significant opportunity for the landscape in this character area to be used more widely for education purposes

- Sheltered outdoor learning spaces would allow the ponds, woodland and parkland areas to be used as outdoor classrooms, not only for students in subject-relevant areas such as wildlife conservation but across all areas of study
- All new development proposals should include an ecological survey if appropriate to conserve and enhance biodiversity, and to encourage opportunities to incorporate biodiversity in and around developments
- Future development proposals to incorporate a Sustainable Urban Drainage Systems (SuDS) strategy to help manage run-off rates and reduce the risk of pollution reaching sensitive controlled waters on campus

2 Architecture:

- New buildings to reinforce the established architectural character and share a family resemblance
- The predominant architectural character of the buildings could continue the pattern of prefabricated modular construction using repetitive material components to respond to context (NB: this approach should be considered but may not always be appropriate or essential)
- Front doors must address the main public spaces, pedestrian and cycle routes
- Light service deliveries and recycling collections should be made from shared surfaces into main entrance; heavier goods via service areas accessed from University Avenue, Giles Lane or Turing Road
- A Heritage Assessment, along with desk-based archaeological assessments, should be undertaken if required at a detailed level to inform the architectural design process and to help determine any appropriate measures of mitigation

3 Building Uses:

- Building uses should vary and enrich the existing pattern of uses
- Appropriate uses include hotel/conferencing facilities, commercial workspace, academic uses, student support and student housing
- More public uses and places of entertainment (such as a Student Union building) would ideally be located adjacent to the new Central Square
- There is an opportunity to create an open-air theatre in the clay pit to the south of Bluebell Wood
- Car parking screened within dense pockets of trees and tall screening hedges on either side of the University Avenue north of Chaucer College

4 Building Height:

- Building heights will match the height of the existing university buildings and should not break the ridgeline silhouette
- If it is considered appropriate that a small number of new buildings break this rule (for example, to emphasise an important feature of the Masterplan and/or the architecture), justification of this point will form part of the detailed planning consent
- Building heights should vary between two-to-four-storeys and should sit comfortably within their neighbouring context
- Buildings should sit within the existing treeline/skyline when viewed from middle and long distances

5 Building Form:

- In principle, all new development will be developed along the ridgeline, or on flat land within the ridgeline 'plateau'
- Where filtered views are achieved through trees or hedgerows in the winter, proposed buildings will be seen set within the wooded skyline and in principle will not form prominent features on the skyline. Further tree planting will be considered as an additional mitigation measure
- Buildings should be particularly responsive to the parklands setting and the historic landscape context of this character area, and sit comfortably as a coherent collection of buildings in the landscape

- Buildings should be arranged in clusters or as courtyard developments to enclose and define a coordinated and coherent public realm of streets, squares, courtyards and gardens
- Detailed studies of any new developments will be undertaken at planning stage to understand the visual impacts of any new construction proposals

6 Building Materials:
- Building materials to be responsive to the parkland setting in texture, colour and hue and should be predominantly 'natural' in appearance, including brick/masonry/timber/natural metal finishes
- In highly visible locations, new buildings should be finished in muted colours and avoid the use of reflective materials and large expanses of glazing to lessen any impact on distant views of the campus
- Recessing of windows, louvres and brise soleil should be considered to mitigate reflectivity in areas of glazing integrated into new building facades
- The light colouring of the existing Turing College buildings should be mitigated by the introduction of Gabion walls on the most exposed surfaces, which would help to soften the impact of the buildings into the landscape
- Roofs should be flat or pitched and incorporate (wherever possible) green and/or blue roofs, roof gardens, photovoltaic/solar/thermal collectors for sustainable energy provision
- The design of the hotel roof should be carefully considered as a medium-to-large building, and its design should acknowledge its presence as foreground to the western campus ridgeline development; a stepped/garden/landscaped roof could help sit and integrate the building within the landscape

7 Internal and External Lighting:
- Detailed studies should be carried out at planning stage to understand the impact of internal and external illumination of buildings, pathways and carparks in order to mitigate against the harmful or negative effects of internal and external lighting proposals on the local ecology and biodiversity, and to protect the backdrop of the city, the World Heritage Site and distant views of the campus

8 Potential Early Wins:
- The east/west promenade ('Turing Walk')
- The new hotel arrival forecourt ('Beverley Court')
- Landscape and biodiversity improvements to SuDS and ponds

## 7.3 Landscape Character Area Proposals: Whitstable Road

The Framework Masterplan acknowledges the unique woodlands character of this part of the campus, along with the fragments of the former agrarian use of the land including Hothe Court. It also recognises the opportunities for landscape and biodiversity enhancements and more clearly defined and legible routes. Significantly, public realm proposals provide the key to a wider initiative to create a unified, connected campus along the ridgeline:
- a more prominent diagonal promenade connecting Brotherhood Wood with the Campus Heart
- a more significant and actively-used pedestrian and cycle route between Giles Lane and the Old Salt Road
- a new 'Centre of Excellence' based around the historic Hothe Court buildings which respects their setting and significance

While it is vital that the remaining Ancient Woodland is protected from major development, there is still significant potential to improve both the natural and cultural dimensions of this character area (Figures 57 & 58).

1 Landscape Enhancements

The predominant woodlands character of the Whitstable Road Character Area is maintained and reinforced in the Masterplan. It aims to ensure that this valuable woodland is not further harmed and to amplify the sylvan setting enjoyed by the student housing of Park Wood and the academic buildings in Brotherhood Wood.

# 7 Landscape Character Areas: Proposals

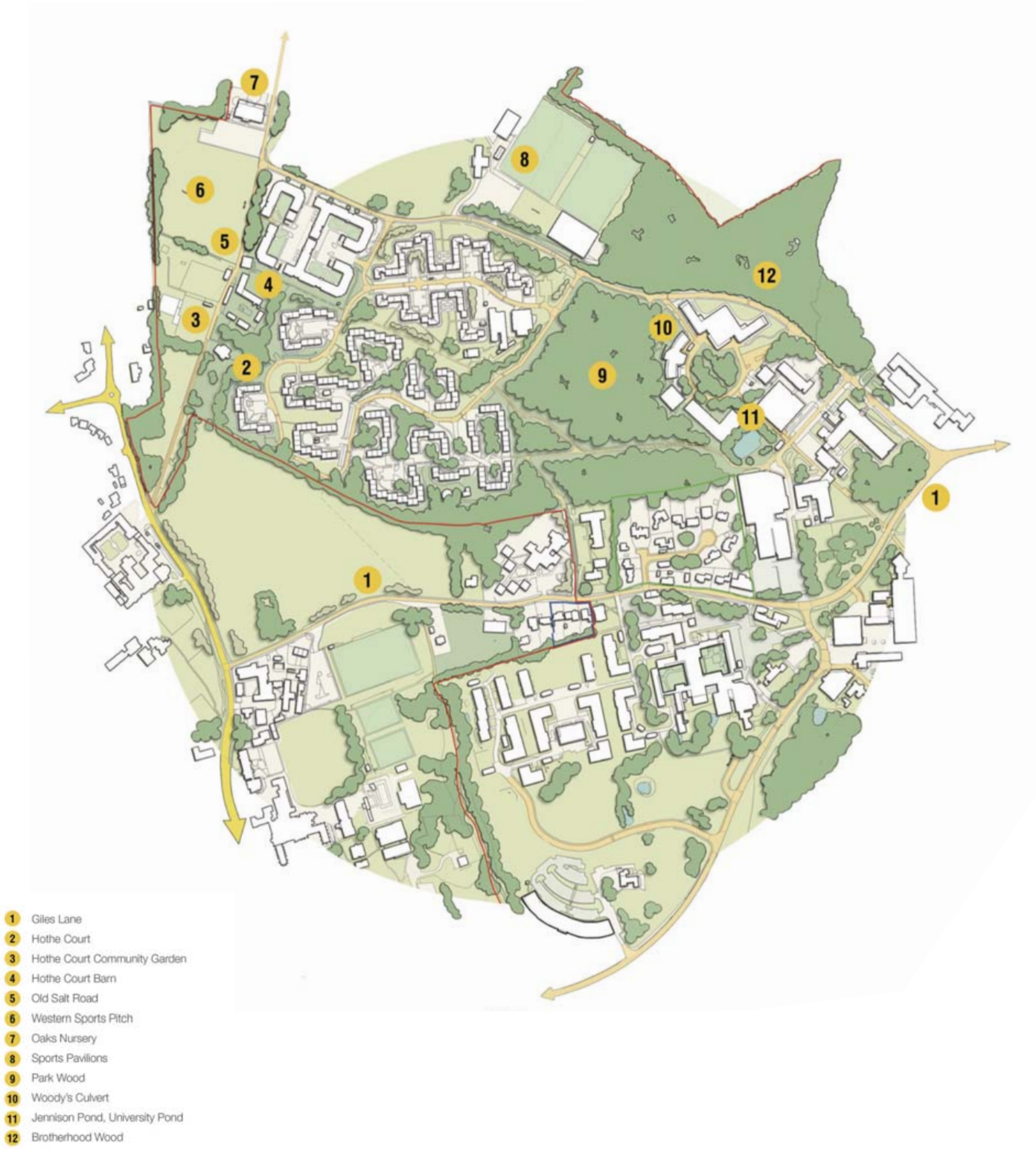



Figure 57: Landscape Character Area: Whitstable Road existing layout

Figure 58: Landscape Character Area: Whitstable Road proposed masterplan layout

# 7 Landscape Character Areas: Proposals

This character area is situated in a strategically important location with respect to the Blean Living Landscape initiative and the campus woodlands and other semi-natural habitats are viewed as integral elements of the wider Blean Woodland Complex – one of the largest areas of remaining Ancient Woodlands in the UK. The Masterplan proposes to emphasise the original footprint of the pre-university woodland and the gradual intensification of trees throughout Park Wood and Brotherhood Wood. In this context, there is great opportunity to work with the Blean Initiative to create new woodland, meadow and wetland habitats within the campus to help strengthen connectivity between fragmented components of this internationally valuable landscape and ecosystem.

In addition to creating new habitats, traditional coppice management of the woodlands is already beginning to be practiced, benefitting a wide range of woodland species. These existing woodlands have the potential to attract iconic species such as the *Nightjar*, the *Nightingale* and the *Heath Fritillary Butterfly*, and the Masterplan recognises that effective woodland maintenance regimes need to be established throughout the woodland areas. Recently coppiced areas are vital to encourage the growth of *Cow-wheat*, the *Heath Fritillary butterfly's* primary larval food (NB: the butterfly was locally known as *'Woodman's Follower'* as it followed the traditional coppice cycle). Wider coppice management would also benefit other woodland ground flora including *Bluebells* and *Wood Anemones*, and coppicing will generally attract a greater diversity of woodland fauna including *Dormice* and a variety of shrub-nesting birds.

Figure 59: Whitstable Road concept sketch

This landscape character area provides an abundance of woodland which can be extremely beneficial to good health and wellbeing and the footpath/cycle way bisecting Park Wood enables good public access to the Ancient Woodlands and links to more informal woodland footpaths that follow desire lines to other parts of the campus.

Hothe Court, at the high-point of the Giles Lane ridgeline, is of particular historic significance. The historic house, the farmyard and the remnants of its kitchen garden still remain to this day, but the buildings would once have benefitted from a more open landscape setting, and would have overlooked farmland to the north, south and west. However, this setting has gradually been eroded by the growth and development of the University and the colonisation of the area by new trees.

In the illustrative masterplan proposals, the former garden surrounding the existing house (including the approach drive) is restored to something close to that indicated on the OS Map of 1870 with clearly defined tree planting and hedging, lawns and approach driveway. The Masterplan also attempts to re-establish something of the former agricultural and heritage context once enjoyed by Hothe Court, by linking it visually with the open field to the south as far as possible without the loss of existing trees. The former kitchen garden is also returned to beneficial use in the Masterplan as the Kent Community Oasis Garden (KentCOG), managed as a community-focussed education facility by a group of enthusiastic and environmentally-conscious members of the local community, university staff and students. With support from the University, the garden will in due course expand into the small field to the south and attract a greater number of participants. The University could even develop targets to produce an increasing proportion of its own food from these garden areas and from the nearby farmland; perhaps one day the University could begin selling its own honey and other produce.

The network of ponds, swales and watercourses that intersect this character area are retained and enhanced in the masterplan proposals to provide natural/sustainable

Figure 60: Whitstable Road concept sketch

drainage integrated with buildings and landscape. This will extend the masterplan principle of sustainable drainage and provide greater ecological and amenity interest in this character area. The focus on water and wetlands will be further extended through the creation of Hothe Court Pond, which will provide an important alternative breeding area for the *Great Crested Newt*. This proposed biodiverse and ecologically-designed wetland feature will provide a new focal landscape attraction in this rather forgotten and neglected part of the campus and will showcase the University's commitment to enhanced biodiversity. Access to the water and its wildlife will be maximised through multiple seating areas and boardwalks winding around the margins and even across the wetland.

### 2 Public Realm and Network of Movement

Due in large part to the dramatic change in landscape character in this area and the circuitous nature of Park Wood Road skirting the northern edge of the Ancient Woodlands, Whitstable Road Character Area is considered psychologically to be somewhat remote from the Campus Heart. Although this does reinforce a separate identity and personality for the area as a result, there is also a tendency among the university community to use motor vehicles to access this part of the campus, which adds to the traffic passing through the Campus Heart.

The Masterplan proposes measures to deter people from driving short-distance journeys such as these and to

encourage them to use healthier and more sustainable forms of movement such as walking, cycling or public transport. For example, the Masterplan proposes to create a new controlled vehicular entrance to the campus within the Whitstable Road Character Area at the junction of the Old Salt Road and Park Wood Road. A new car park is located adjacent to the Oaks Nursery and close to the new western campus entrance. This car park will accommodate vehicles entering the campus via this route and a university-control gate will prevent them from penetrating further into the campus. The journey into the campus will then continue on foot or by bicycle through Park Wood itself, or along Park Wood Road by shuttle bus or by public transport (Figure 60).

The proposals described above will include the introduction of vehicular traffic (including buses) to a short section of the Old Salt Road adjacent to Hothe Court (between Whitstable Road and Park Wood Road). The Masterplan recognises that this section of the Old Salt Road is currently part of the national cycle network (NCN1). In implementing this proposal, the existing rural character of the Old Salt Road should be preserved as much as possible and the introduction of traffic here should not be at the expense of the cycle route.

The Old Salt Road is an ancient route through the University Estate and not a publicly adopted highway, as such it will remain an integral part of the university network and all traffic would be limited and controlled. Some changes to the surface treatment will be necessary, including shared surfaces, sensitive traffic-calming measures, passing places and carriageway widths that ensure that traffic does not move fast whilst the safe movement of pedestrians and cyclists is preserved. All changes of this nature will be subject to detailed discussions and agreement with the planning authority during the gradual development of the Masterplan.

The Masterplan further proposes to encourage more use of the existing traffic-free woodland paths and cycle routes through positioning of interpretation/wayfinding boards to create a safer pattern of movement. The existing east-west footpath/cycleway linking Jennison Pond and Hothe Court through Park Wood is a great asset and maximising safe 24-hour access through the woodlands in this way is a priority for the Masterplan. For example, this

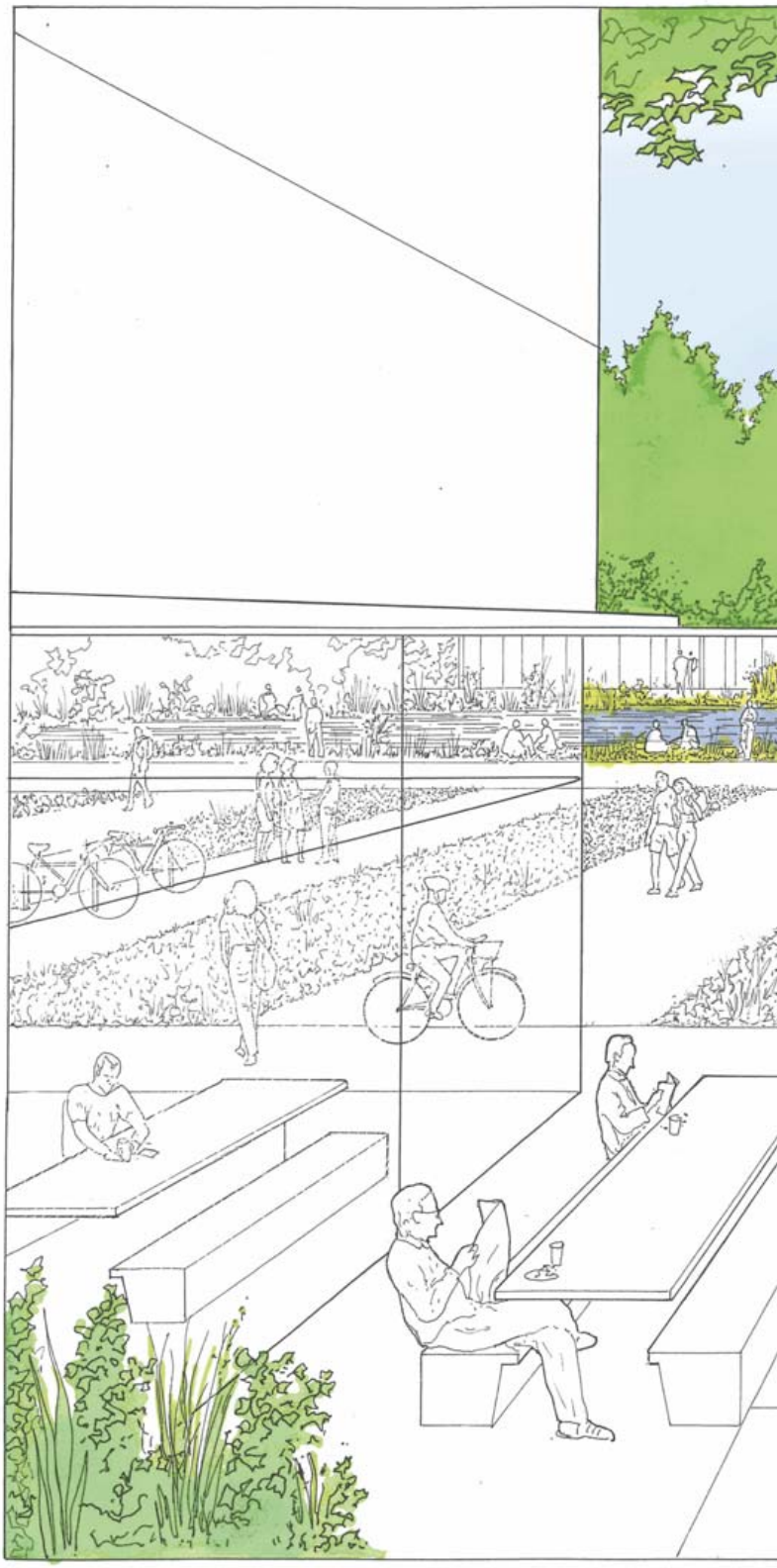
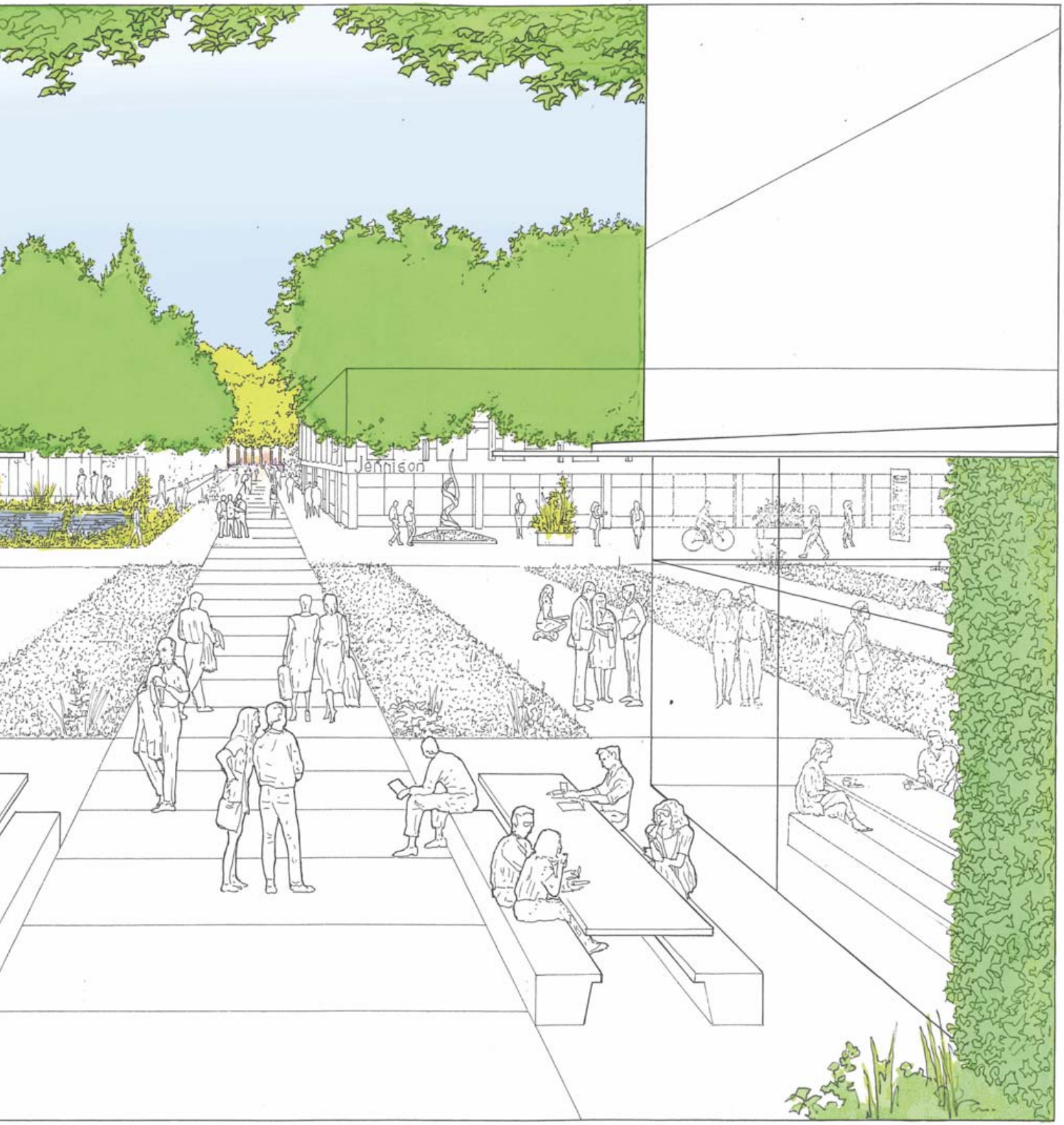


Figure 61: Sketch view of Jennison Square and Jennison Pond, and route north to Brotherhood Square


Jennison

route will become even more prominent by becoming new route for NCN1.

At present, part of NCN1 shares Park Wood Road with fast-moving vehicles. In the Masterplan, it is proposed to divert this important cycle route away from the road and along the existing cycle route through Park Wood itself to encourage more people to cycle. It also proposes a new 'Centre of Excellence' based around Hothe Court, which (along with the new car park at the Oaks Nursery) will help to activate the east-west spine route.

Within Park Wood, the Masterplan proposes greater legibility by the creation of 'Park Wood Circus' as a focal hub for the redevelopment of Park Wood student housing. This will vary the uses in Park Wood by providing a mix of new facilities such as a shop, a café/bar, wi-fi hub, meeting space as well as event and activity spaces, providing a new heart around which student housing can grow. In addition, an entrance forecourt for the new sports facilities new sports facilities along Park Wood Road and a pedestrian/cycle connection to the student residential community in Park Wood and Hothe Court to the south is created. To the south of this area, the University Medical Centre has been reconfigured in the Masterplan to provide a new courtyard space for visitors to this facility, and to create a more attractive and legible route to link the Whitstable Road and University Rise character areas. These proposed routes and spaces will be well-lit to ensure 24-hour safety for the university community as well as visitors.

Similarly, in Brotherhood Wood the Masterplan proposes to reinforce the strong, diagonal pedestrian/cycle route between Giles Lane crossing and the Sibson/Business School precinct. New building footprints and new front doors are arranged to reinforce this route. The conclusion of this diagonal route will be an enhanced definition of the woodland clearing – 'Brotherhood Circus' – that will form a shared forecourt to the Sibson Building, the Business School and the School of Economics. This is intended as a sheltered and well-used public space onto which the building entrances face, with a shared surface to slow traffic and accommodate drop-off and pick-up. Further south, the Masterplan promotes a new rectilinear square – Jennison Square – to be created between the Jennison and Ingram buildings, between Park Wood Road and the Jennison Pond transport (Figure 61). A new landscaped space created around Jennison Pond will be developed as green space within a woodland clearing at the threshold between Park Wood and Brotherhood Wood.

### 3 Built Environment

The Framework Masterplan seeks to enhance the setting of the built heritage in this part of the campus, and to breathe new life into the historic structures.

At Hothe Court, the development and gradual expansion of the University since the 1970s has downgraded the coherence of the original cluster of historic buildings and their immediate landscape context. This has effectively isolated the farmhouse and associated buildings from the farmland that once provided its historic context. The sense of Hothe Court as a farm, and as a manorial site, has therefore been all but lost and the original setting altered out of all recognition.

In order to create a new sense of place and purpose to this part of the campus, the Masterplan therefore illustrates the possible development of a new 'Centre of Excellence' at Hothe Court. The new built form for this 'Centre for Excellence' is articulated in the Masterplan as a series of courtyard developments that would reflect the form and nature of the original farmyard. This proposal also includes the restoration of the original farmyard to the north of the original Hothe Court Farmhouse. A sensitively-designed development such as this would provide the opportunity for more academic, teaching and research space, and a new intervention in the west of the campus at the high-point of the ridgeline. It would also add a diversity of new uses to (the otherwise mono-cultural) Park Wood as part of the placemaking agenda and help Hothe Court to play a more important role in the overall campus. An architectural character derived from contemporary agricultural buildings could provide an appropriate and effective response in this area.

The Masterplan proposes the integration and re-use of the existing listed and historic buildings for the new 'Centre of Excellence', including the farmyard, the barn and the oast houses, such that the historic Hothe Court once again plays an important role in the University Estate. A new use will be found for the historic farmhouse, possibly as a residential dwelling to respect its original purpose, and/or

as an integral part of the new 'Centre of Excellence'. The original setting of the house itself will be restored as closely as possible to that indicated on the OS Map of 1870, by the restoration of the original garden to the south of the house, with its elliptical carriage drive leading off from the Old Salt Road, and by careful thinning out of the undergrowth, to provide an enhanced outlook over the fields to the south. To the east, a tree-lined green space will be created as a green landscaped link to Park Wood that incorporates a pond with wetlands as an enhancement to biodiversity. This concept for the regeneration of Hothe Court will sit comfortably alongside the restoration of the former kitchen garden and orchard to the west, currently undergoing a transformation as part of the development of the Kent Community Oasis Garden.

New buildings in the Whitstable Road Character Area must respond to the historic woodland character and enhance the characteristics and qualities that make it a special place.

In Park Wood for example, the Masterplan proposes the incremental replacement of the older stock of Park Wood student housing with a more structured layout of buildings and spaces, introducing a wider variety and mix of uses. Higher density student housing in this area would achieve a more efficient use of space by creating more housing within the same area. The more structured and formal layout proposed has been conceived to work within the existing layout of trees to preserve the woodland environment.

In Brotherhood Wood, the existing pattern of development of academic buildings within clearings in the woodland is continued in the Masterplan. It sets out to ensure that this part of the campus becomes more coherent and valued and is identified more strongly as an individual 'place'. The name 'Brotherhood Wood' is adopted in the Masterplan to respect the historic woodland with its roots in the origin of the place. As noted above, 'Brotherhood Circus' will be created as a shared forecourt around which existing and new buildings are located. Similarly, immediately to the south 'Jennison Square', another redefined woodland space, will give identity to several new buildings including the new Kent and Medway Medical School.

Design Guidelines

The Framework Masterplan recognises there are a variety of sub-areas within the overall Whitstable Road Character Area, so the design guidelines are structured accordingly:

Brotherhood Wood

1 Public Realm:

- Diagonal route from Campus Heart to Brotherhood Circus established as a direct pedestrian/cycle route
- Jennison Square created between Jennison and Ingram, with adjoining green space around Jennison Pond
- Jennison Pond to become an attractive amenity hub at the entrance to the Park Wood east-west route
- Square and green space to become key connection node between the Campus Heart, Park Wood and Brotherhood Circus
- New courtyard development proposed to replace the temporary Estates Management structures with car parking below taking advantage of sloping site gradient
- All new development proposals should include an ecological survey if appropriate to conserve and enhance biodiversity, and to encourage opportunities to incorporate biodiversity in and around developments
- Future development proposals to incorporate a Sustainable Urban Drainage Systems (SuDS) strategy to help manage run-off rates and reduce the risk of pollution reaching sensitive controlled waters on campus

2 Architecture:

- Buildings, while different in form, use, construction and appearance, to share a family resemblance and sit comfortably as a coherent collection of buildings in the landscape, as Holford had envisaged
- Front doors to address main public spaces, pedestrian and cycle routes
- Servicing by light deliveries etc from shared surfaces to main entrance; heavier goods via service area and road connection to Park Wood Road

- A Heritage Assessment, along with desk-based archaeological assessments, should be undertaken if required at a detailed level to inform the architectural design process and to help determine any appropriate measures of mitigation

3 Building Height:
- Building height three-to-four-storeys to match the height of the existing University buildings
- New buildings should not break the ridgeline silhouette. If it is considered appropriate that a small number of new buildings break this rule (for example, to emphasise an important feature of the Masterplan and/or the architecture), justification of this point will form part of the detailed planning consent
- Heights conceived to sit comfortably with neighbouring context and treeline/skyline when viewed from middle and long distances

4 Building Form:
- Continue existing pattern of development of academic buildings within clearings in the woodland
- Buildings arranged to enclose landscaped courtyards and a defined public realm
- Detailed studies of any new developments will be undertaken at planning stage to understand the visual impacts of any new construction proposals

5 Building Materials:
- Building materials to be responsive to the woodland character setting in texture and colour/hue
- Predominantly natural materials; brick/masonry/timber/natural metal finish
- In highly visible locations, new buildings should be finished in muted colours and avoid the use of reflective materials and large expanses of glazing to lessen any impact on distant views of the campus
- Recessing of windows, louvres and brise soleil should be considered to mitigate reflectivity in areas of glazing integrated into new building facades
- Roofs should be flat or pitched and incorporate (wherever possible) green and/or blue roofs, roof gardens, photovoltaic/solar/thermal collectors for sustainable energy provision

6 Internal and External Lighting:
- Detailed studies should be carried out at planning stage to understand the impact of internal and external illumination of buildings, pathways and car parks in order to mitigate against the harmful or negative effects of internal and external lighting proposals on the local ecology and biodiversity, and to protect the backdrop of the city, the World Heritage Site and distant views of the campus

7 Potential Early Wins:
- Clear out and clean up Jennison Pond
- Fit filters to surface water drainage system to improve water quality to enable biodiversity
- Prune trees and bushes to open up space around the pond
- Create a new green landscaped space all around Jennison Pond with tables, seating and grassed areas under existing trees for meeting, picnicking, etc

Park Wood

1 Public Realm:
- East-west route through Park Wood to Hothe Court strengthened as a direct and very active, safe pedestrian/cycle route
- New circus to create a ‘heart’ to Park Wood student housing
- All new development proposals should include an ecological survey if appropriate to conserve and enhance biodiversity, and to encourage opportunities to incorporate biodiversity in and around developments
- Future development proposals to incorporate a Sustainable Urban Drainage Systems (SuDS) strategy to help manage run-off rates and reduce the risk of pollution reaching sensitive controlled waters on campus

2 Architecture:
- Buildings, while different in form, use, construction and appearance, to share a family resemblance and sit comfortably as a coherent collection of buildings in the landscape
- The Masterplan facilitates an increase in density for student accommodation upon the previously developed plots to create an enhanced and more efficient use of space, increasing legibility while maintaining the woodland
- Front doors to address main public spaces, pedestrian and cycle routes
- Servicing by light deliveries etc from shared surfaces to main entrance; heavier goods via service area and road connection to Park Wood Road
- The sports facilities are enlarged and expanded with a larger Tennis Centre, a replacement leisure/sports hall and a new swimming pool complex
- A Heritage Assessment, along with desk-based archaeological assessments, should be undertaken if required at a detailed level to inform the architectural design process and to help determine any appropriate measures of mitigation
- Incorporate Sustainable Urban Drainage Systems (SuDS) to help manage run-off rates and reduce the risk of pollution reaching sensitive controlled waters on campus. Future development proposals to be covered by detailed planning applications that will be accompanied by a detailed SuDS strategy

3 Building Uses:
- Student residential, sports and leisure
- Park Wood housing to contain a mix of new facilities such as a shop, cafe and wi-fi hub, bar, meeting space, etc

4 Building Height:
- Park Wood student housing: four-storeys
- Sports Halls: single 13m storey
- Heights conceived to sit comfortably with neighbouring context and treeline/skyline when viewed from middle and long distances

5 Building Form:
- Incremental replacement of the earlier phase and older stock of Park Wood housing with a more structured layout of buildings framing routes and enclosing courtyard gardens
- Buildings arranged to enclose landscaped courtyards and a defined public realm

6 Building Materials:
- Building materials to be responsive to the woodland character setting in texture and colour/hue
- Student Housing: Building materials to be responsive to woodland character. Predominantly brick/masonry and timber. Alternative materials may be considered if sympathetic with context (EG: the colour and hues of the anodised aluminium cladding to Sibson)
- Greater use of timber in buildings within Park Wood, and less timber outside Park Wood
- Roofs should be flat or pitched and incorporate (wherever possible) green and/or blue roofs, roof gardens, photovoltaic/solar/thermal collectors for sustainable energy provision

7 Internal & External Lighting:
- Detailed studies should be carried out at planning stage to understand the impact of internal and external illumination of buildings, pathways and car parks in order to mitigate against the harmful or negative effects of internal and external lighting proposals on the local ecology and biodiversity, and to protect the backdrop of the City, the World Heritage Site and distant views of the campus

8 Potential Early Wins:
- East-west route through Park Wood to Hothe Court route to become even more prominent by becoming new route for NCN1

Hothe Court

1 Public Realm:
- East-west route through Park Wood to Hothe Court strengthened as a direct and very active, safe pedestrian/cycle route

- Part of the Old Salt Road opened to controlled university traffic and buses to improve connectivity and footfall. The existing character of the Old Salt Road should be preserved as far as possible. All changes to this route, including shared surfaces, sensitive traffic-calming measures, passing places and carriageway width will be subject to detailed discussions and agreement with the planning authority during the gradual development of the Masterplan
- Courtyards created within new development to provide external teaching areas and university community interaction spaces
- Swales retained, enhanced and rerouted to provide natural/sustainable drainage, integrated with buildings and landscape
- Use planting to enhance the existing SuDS feature; use SuDS as both an attenuation and amenity feature in any future developments
- Garden to Hothe Court farmhouse linked to fields to south to restore heritage setting
- Car parking area created in field south of Oaks Nursery within dense green landscape setting, with access from Salt Road/Whitstable Road and Park Wood Road
- Visitor parking area to be created in field adjacent to Whitstable Road junction within dense green landscape setting, with access from Salt Road/Whitstable Road
- All new development proposals should include an ecological survey if appropriate to conserve and enhance biodiversity, and to encourage opportunities to incorporate biodiversity in and around developments
- Future development proposals to incorporate a Sustainable Urban Drainage Systems (SuDS) strategy to help manage run-off rates and reduce the risk of pollution reaching sensitive controlled waters on campus

2 Spaces & Places for Education:

- Community Garden to be expanded and opened as visitor centre/produce market, with controlled access from Salt Road/Whitstable Road

3 Architecture:

- Characterised by the Kentish vernacular farmhouse, oast houses, cottages and barns
- This area includes the Grade II listed house and garden on the site of the former 16th century farmhouse and the Grade II listed barn to the north of the farmhouse
- Buildings, while different in form, use, construction and appearance, to share a family resemblance and sit comfortably as a coherent collection of buildings in the landscape
- Buildings should be particularly responsive to setting and historic context and arranged to restore agrarian setting of Hothe Court
- The Masterplan builds on the historic character of the area to reinforce the prominence of this historic site and creating an appropriate setting for the listed buildings. A Heritage Assessment, along with desk-based archaeological assessments, should be undertaken if required at a detailed level to inform the architectural design process and to help determine any appropriate measures of mitigation
- The Masterplan creates a new 'Centre of Excellence' established at Hothe Court such that it plays an important role in the University Estate and a destination in the west of the campus at the high-point of the ridgeline
- Front doors to address main public spaces, courtyards, pedestrian and cycle routes
- Servicing by light deliveries etc from shared surfaces to main entrance; heavier goods via service area and road connection to Park Wood Road

4 Building Uses:

- A variety of sympathetic uses integrated into existing buildings
- New buildings to be academic and/or research-based

5 Building Height:

- Building height of one-to-two-storeys, including 8.5m single-storey workshop spaces including single 8.5m storey workshop spaces
- Heights conceived to sit comfortably with neighbouring context and treeline/skyline when viewed from middle and long distances

6 Building Form:
- Buildings arranged to enclose landscaped courtyards and a defined public realm
- New building layout arranged around courtyard spaces with former farmyard as a rural reference for scale of original farm development
- Detailed studies of any new developments will be undertaken at planning stage to understand the visual impacts of any new construction proposals

7 Building Materials:
- Building materials to be responsive to the agrarian character of the neighbouring woodland setting in texture and colour/hue
- Predominantly natural materials; brick/masonry/timber/natural metal finish
- In highly visible locations, new buildings should be finished in muted colours and avoid the use of reflective materials and large expanses of glazing to lessen any impact on distant views of the campus
- Recessing of windows, louvres and brise soleil should be considered to mitigate reflectivity in areas of glazing integrated into new building facades
- Roofs should be flat or pitched and incorporate (wherever possible) green and/or blue roofs, roof gardens, photovoltaic/solar/thermal collectors for sustainable energy provision

8 Internal and External Lighting:
- Detailed studies should be carried out at planning stage to understand the impact of internal and external illumination of buildings, pathways and car parks in order to mitigate against the harmful or negative effects of internal and external lighting proposals on the local ecology and biodiversity, and to protect the backdrop of the city, the World Heritage Site and distant views of the campus

9 Potential Early Wins:
- Hothe Court Pond and Wetlands

Giles Lane (North)

1 Public Realm:
- A new courtyard square created around and maintaining the mature existing tree line is proposed between the Sports Hall site and Stacey as a linking space between University Square and Jennison Square
- An existing footpath to the west of the sports centre site creates an additional north south link from the newly formed public realm around Tanglewood Cottage to Park Wood
- A new courtyard on route of public footpath is created at the University Medical Centre to create a more legible route between Turing College and Park Wood
- All new development proposals should include an ecological survey if appropriate to conserve and enhance biodiversity, and to encourage opportunities to incorporate biodiversity in and around developments
- Future development proposals to incorporate a Sustainable Urban Drainage Systems (SuDS) strategy to help manage run-off rates and reduce the risk of pollution reaching sensitive controlled waters on campus

2 Architecture:
- Characterised by the Kentish vernacular cottages along Giles Lane, Woodlands, Rothford, Olive Cottages and Tanglewood and the southern fringes of Park Wood
- Buildings, while different in form, use, construction and appearance, to share a family resemblance and sit comfortably as a coherent collection of buildings in the landscape
- Building should be particularly responsive to setting and historic context
- Front doors to address main public spaces, courtyards, pedestrian and cycle routes
- Servicing by light deliveries etc from shared surfaces to main entrance; heavier goods via service area and road connection to Giles Lane
- A Heritage Assessment, along with desk-based archaeological assessments, should be undertaken if required at a detailed level to inform the architectural design process and to help determine any appropriate measures of mitigation

3 Building Uses:
- New buildings to be academic and/or support buildings

4 Building Height:
- Building height three-storeys
- Heights conceived to sit comfortably with neighbouring context and treeline/skyline when viewed from middle and long distances

5 Building Form:
- Buildings arranged to enclose landscaped courtyards and a defined public realm

6 Building Materials:
- Building materials to be responsive to the agrarian character of the neighbouring woodland setting in texture and colour/hue
- Predominantly natural materials; brick/masonry/timber/natural metal finish
- In highly-visible locations, new buildings should be finished in muted colours and avoid the use of reflective materials and large expanses of glazing to lessen any impact on distant views of the campus
- Recessing of windows, louvres and brise soleil should be considered to mitigate reflectivity in areas of glazing integrated into new building facades
- Roofs should be flat or pitched and incorporate (wherever possible) green and/or blue roofs, roof gardens, photovoltaic/solar/thermal collectors for sustainable energy provision

7 Internal and External Lighting:
- Detailed studies should be carried out at planning stage to understand the impact of internal and external illumination of buildings, pathways and carparks in order to mitigate against the harmful or negative effects of internal and external lighting proposals on the local ecology and biodiversity, and to protect the backdrop of the City, the World Heritage Site and distant views of the campus

8 Potential Early Wins:
- Improved setting of Tanglewood Cottage

## 7.4 Landscape Character Area Proposals: Campus Heart

To fully describe the masterplan proposals for the Campus Heart, it is necessary to diagnose the thinking behind the original campus from its founding in 1965 and to understand what the original masterplan was seeking to achieve.

The heart of the campus originated on the open farmland on the ridgeline overlooking the Stour Valley and the historic city of Canterbury. The founding buildings – the Templeman Library, Eliot College, Rutherford College and the Physics Laboratory, now the Marlowe Building – were strategically arranged in a semi-formal grouping to enclose a large green space. The Templeman Library was located on the ridgeline at the academic heart of the campus and as an important civic component in the first phase of buildings. With the library in a central position, the various college buildings were arranged around the outer edge of the Campus Heart, slightly downhill from the ridge; in this way, they appear to be subservient buildings and give the library even more prominence. The very distinct geometry of the Eliot and Rutherford College buildings were deliberately oriented to capture views to historic Canterbury and beyond and formed an informal edge to the parkland to the south. Holford originally intended to complete this composition with a tall tower on the skyline (the original design for the Senate Building), sitting within the central green space.

Since this structure was established in the original masterplan, the Campus Heart has grown somewhat incrementally over the past fifty years, as the demand for space and size of budgets have allowed. Over time, subsidiary academic buildings have been arranged less formally within the Campus Heart, but without a clear hierarchy or order to the public realm or architecture. Furthermore, numerous car parks occupy space between the buildings, allowing vehicle users easy access at the expense of pedestrians and cyclists and adding little to the quality of the public realm. This ad-hoc policy has resulted in some fine buildings set in poorly defined and windswept areas of public space, with a lack of overall coherence, legibility and shelter.

Although Holford's influence on the architectural expression of the college buildings waned, the Masterplan proved flexible enough to allow each college to develop its own architectural personality and expression over time and the overriding character is a university with a very green garden setting on the ridgeline overlooking Canterbury, framing the views back to the historic city. It is instructive to note that patterns set out in the Holford Masterplan at the foundation of the University, fifty years ago, are still vividly present in the form and functioning of the Campus Heart today, despite the complete transformation of so many other aspects of the University and its organisation. Indeed, the landscape patterns from the period before the founding of the University are still legible and profoundly influence the arrangement of the Campus Heart today. Taking all this into account, the Masterplan has returned to Holford's 1965 vision for inspiration but tries to resolve the shortcomings that have emerged over time (Figures 62 & 63).

1 Landscape Enhancements:

The University is well known as a very verdant campus with plenty of open space, with great views of historic Canterbury and located within a semi-rural landscape setting. The Framework Masterplan provides an opportunity to reconsider the relationship between the University and its landscape in order to create the reputation of Kent as the 'greenest' campus of all those in the UK.

The Campus Heart is already blessed with an abundance of green spaces, but these are rather homogenous and repetitious; many of the existing areas of green landscape are ill-defined, under-used and lacking variety and it is difficult to navigate around without undue reliance on signage. Furthermore, the hill-top location dictates that, for much of the academic year, the Campus Heart is very exposed to the weather. It is only in the Spring and short Summer Terms that students benefit from the green open spaces. For these unfortunate reasons, the Campus Heart rather under-achieves in terms of its landscape character and personality. The Masterplan therefore proposes that an increase in built development is carefully balanced by the development of a well-defined public realm and a network of outdoor spaces within the heart of the campus.

The masterplan proposals for the Campus Heart will create spaces between buildings which are more coherently defined, and which will further reinforce the overall landscape qualities of the University. The Campus Heart will benefit from a new linked network of civic spaces and high-quality squares, gardens, courts and quads with a greater degree of shelter provided by carefully located surrounding buildings. New green and hard-landscaped areas are formed to bring a greater variety of user-experience to the Campus Heart. The reconfigured public realm will include formal gathering spaces, informal spaces, recreational spaces, performance spaces, as well as quiet spaces, avenues of trees and fruit blossom, along with more open wildflower meadows and so on. The landscapes will change character with passing seasons. As part of this more 'space positive' approach, a clear and legible 'mental map' is created for the Campus Heart through the delivery of a coherent pattern of streets and streets, landmark features and distinctive and varied spaces. This approach will help to diversify the use and personality of new external spaces across the campus (Figures 64 & 65).

This Character Area has the opportunity to develop a more 'urban' ecosystem, being a fairly homogenous built-up area. Green spaces within the Campus Heart are not reaching their full potential in terms of biodiversity and associated landscape and recreational value, so the Masterplan proposes more trees in the Campus Heart to provide protection from wind and heat gain in direct sun. As well as sequestering carbon from the atmosphere, woodland and free-standing trees also provide substantial local cooling. There are still a number of mature trees surrounding buildings which provide substantial local cooling, and these are retained in the masterplan proposals.

A tiered and more formal landscape is introduced to the sloping land between Eliot College and Rutherford College to create a transitional space between the more formal garden layout of the Campus Heart and the parklands to the south. The new tiered garden gives improved connections between the Campus Heart, the new entrance square and Tyler Court student residences.

# 7 Landscape Character Areas: Proposals

Figure 62: Landscape Character Area: Campus Heart existing layout

1 Wade Court
2 Turing Walk
3 University Square
4 The Wetlands
5 Brotherhood Square
6 Giles Circus
7 Woolf West
8 St. Stephens Square
9 Darwin Gardens
10 Registry Court
11 Holford Walk
12 Templeman Square

Figure 63: Landscape Character Area: Campus Heart proposed Masterplan layout

Figure 64: Campus Heart concept sketches

The open spaces to the south of the Campus Heart are retained in the Masterplan to provide a green setting to the University as well as a landscape demarcation from the city. Greater variety in flora and habitats is proposed in some of the more homogenous grassland areas through the creation of zones of meadows and by planting orchards; low-mown amenity grassland. New wildflower areas and natural wooded zones will also reduce the management impact on this landscape. Like the University Rise Character Area, connectivity between grassland zones would assist and encourage the movement of fauna. These zones could help create a pattern of eco-highways and connectivity between landscape zones and act as natural wayfinding guidance for pedestrians and cyclists.

It is vital that the remaining pockets of woodland to the north of the Campus Heart are protected from major development and woodland maintenance regimes should be established in the smaller areas of woodland.

### 2 Public Realm and Network of Movement

While the university buildings provide an environment for learning and academic excellence, the places and spaces between the buildings should be the public 'living rooms' which broaden the opportunity for interaction. They should be areas where all members of the university community and where all members of the University community can gather, exchange ideas, and where the sense of community is supported through formal events and informal encounters.

The Masterplan concept for the Campus Heart starts by establishing a simple grid of streets, spaces and places based around a main east-west route along the ridge-line, which will connect Turing College and St Stephen's Hill. In addition, a main north-south route will be established through this character area by closely following the former Crab and Winkle railway line, to connect the Campus Heart with the city centre. Within this overall organisational structure, the heart of the campus is composed around a simple grid of streets, spaces and places, out of which are identified a pattern of building plots, which in turn are arranged around a new layout of squares, gardens and other public spaces which will form the new public realm.

These new routes in the Masterplan will align and link with a network of new spaces to ease connectivity through the Campus Heart and support journeys to and from its surroundings. A first step in this more 'space positive' approach will be the development of two new 'Gateway Squares' along the primary east-west route to define clear entrance points to the Campus Heart, to ensure a sense of arrival to the heart of the campus and to provide a more welcoming approach for visitors.

The first new square – 'University Square' – will be established at the western edge of the Campus Heart at the junction of University Road and Giles Lane (Figure 87). University Square will be a lively and predominantly hard-landscaped space that will provide space for markets and become a gathering place for pop-up shops and cafes. This would be the place where festivals are celebrated, so we would imagine this as the place for the annual Christmas Tree and carol singers, Autumn Harvest festivals, wine and beer festivals etc. This space will be surrounded (and defined) by new and existing buildings, with shops and cafes on their ground floor facing the square. Cultural and leisure buildings, student services and a variety of other buildings will all provide similarly active frontages.

The second new square will be located on the Giles Lane ridgeline at the east of the Campus Heart, to form a new eastern pedestrian entrance to the campus. St Stephens Square would sit astride St Stephen's Hill at the northern edge of Darwin College and slightly to the south of the mini-roundabout at Giles Lane, where the land is flat and the carriageway runs straight. The creation of St Stephen's Square would include widening of the verges on each side of the carriageway to accommodate bus stops on each side of the road, with shared surfaces to create a safer environment for pedestrians and cyclists. Widening of the verges and pushing back the hedgerows to create this space would provide much-improved visibility for drivers, pedestrians and cyclists, and thereby provide a safer place for pedestrians and cyclists to cross St Stephen's Hill.

It should be pointed out that St Stephen's Hill is a publicly adopted highway and likely to remain an integral part of the surrounding public highway network and accessible

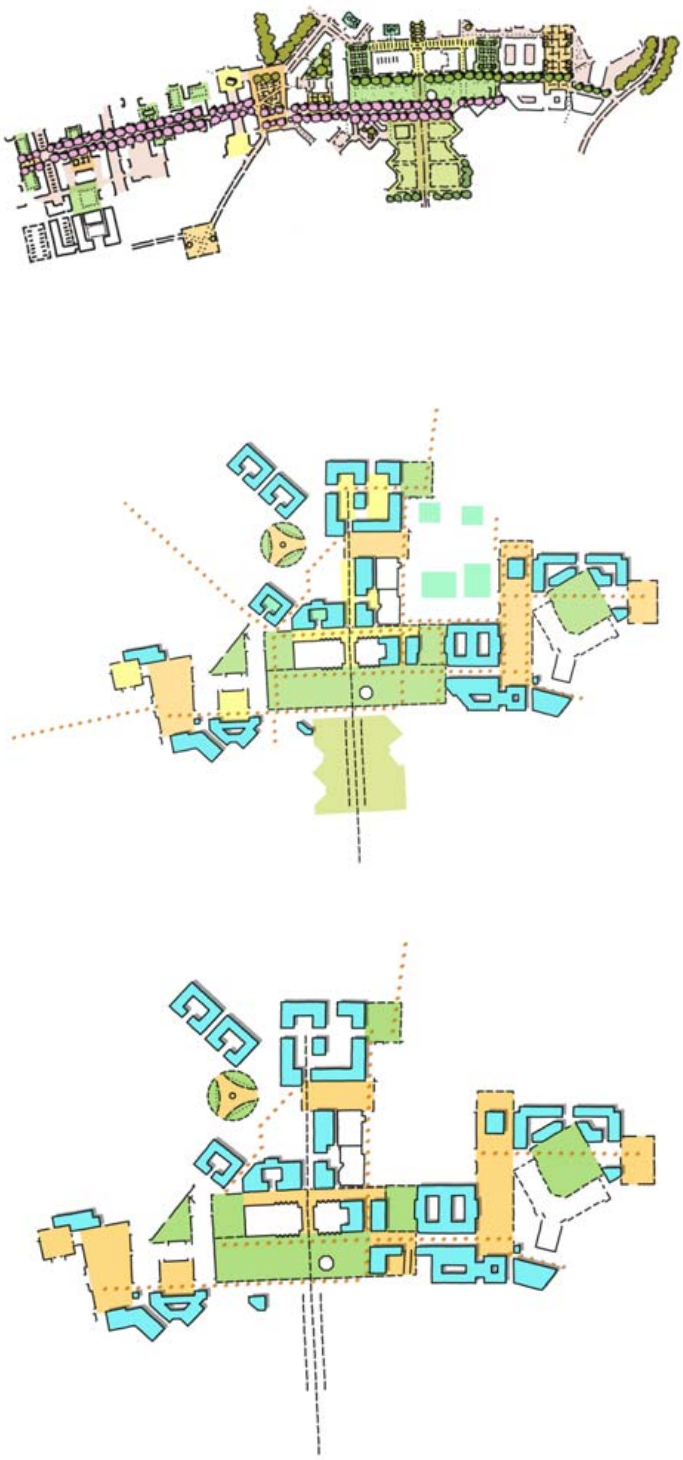


Figure 65: Campus Heart concept sketches

for all travel modes. The Masterplan does not propose to change the character of St Stephen's Hill as a road open to general traffic, simply to make it safer to cross for bus passengers, pedestrians and cyclists. Some changes to the surface treatment are suggested on the masterplan drawing, including shared surfaces and traffic-calming tables to provide safe pedestrian and cycle access to connect between the existing network of footpaths to the east and west of St Stephen's Hill. However, any changes of this nature will be subject to detailed discussion, and agreement with, the Highways Authority during the gradual development of the Masterplan.

This new linear space would not only provide a new 'front door' to the University, it would also provide a new entry point into the newly-designated Scheduled Ancient Monument on University-owned land to the east of St Stephen's Hill. In addition, from discussions held with officers from Kent County Council and Canterbury City Council highways, it is clear that both authorities are keen to encourage new and improved pedestrian/cycle routes between St Stephen's Hill and Mayton Lane to the east. Although not within the scope of this masterplan, the University would be keen to play its part in enabling these connections as part of future discussions regarding the development of university-owned land in this area.

These two important new squares will serve as new landmark spaces to organise and orientate within the campus and provide a location for new landmark buildings at the 'gateway' to the heart of the campus. Both of these new squares will be composed of a traffic-calmed table to provide space for taxi drop-off and pick-up, bus stops and bus turning and cycle parking.

Holford Walk will serve as the main pedestrian way through the core, linking secondary spaces (such as Marlowe Square and Templeman Gardens) along its route (Figures 66, 67 & 86). In this way, a clear, coherent and hierarchical network of routes is created within the Campus Heart that will link with the rest of the University Estate and establishing a greater priority to walking and cycling routes.

A secondary network of east-west and north-south tertiary links will complete a grid supporting a very legible and pedestrian-dominant public realm throughout the campus.

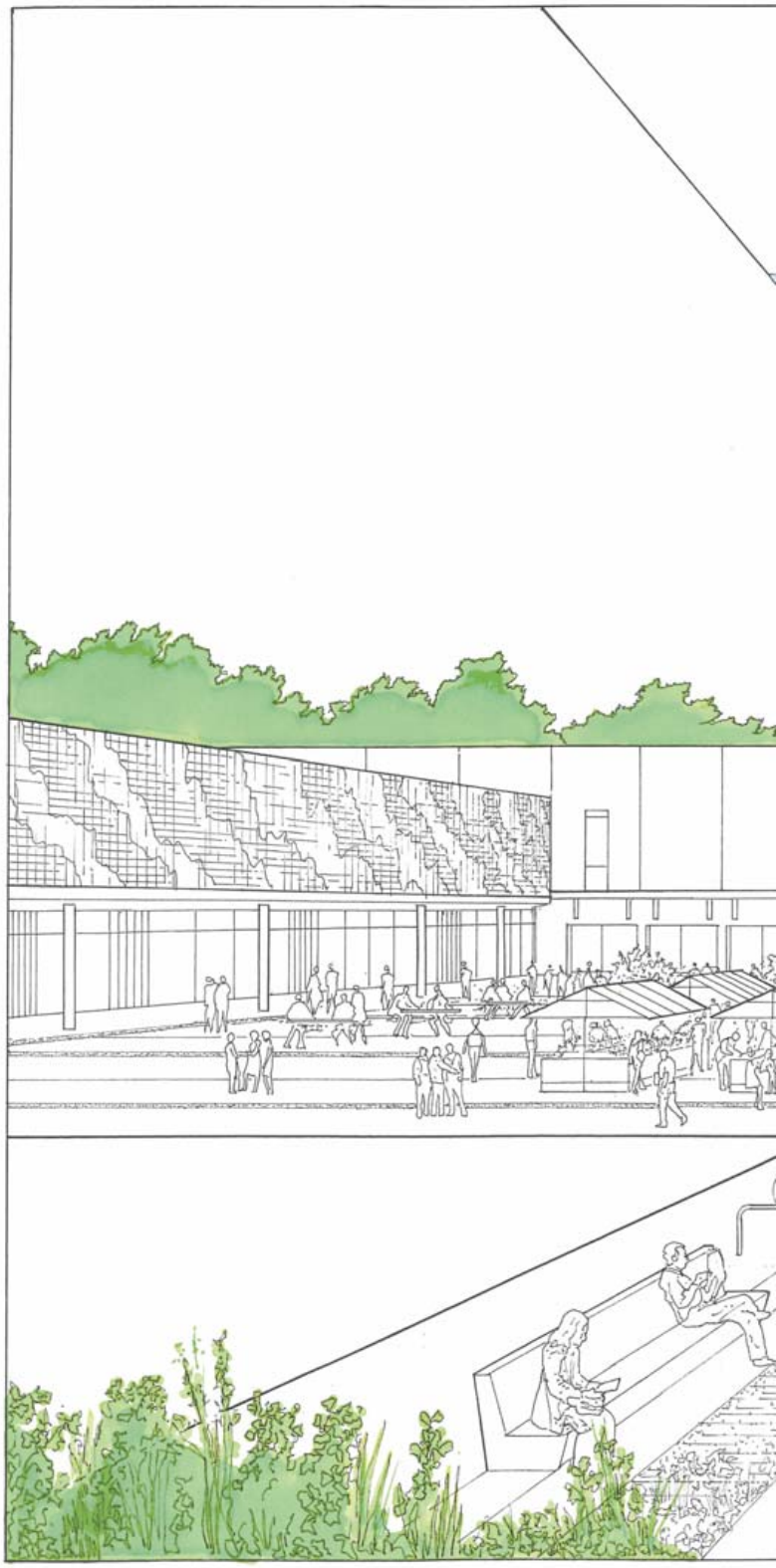


Figure 66: Sketch view showing Marlowe Square, and route east along Holford Walk toward Rutherford College

Figure 67: Concept drawing of the proposed Holford Walk, a pedestrian promenade connecting the Campus east to west along the ridgeline

In order to facilitate this transformation, the numerous existing car parks will be relocated to the perimeter of the Campus Heart. Greater coherence in the layout of the campus will enable ease of movement through streets and spaces and between university buildings, reduce the reliance on signage and facilitate a more efficient servicing and management of the campus. This clear network of routes will include primary streets, secondary streets and back streets to help the functioning and servicing of the campus by defining different uses. Different paving types will define clear pedestrian routes from vehicular routes, provide appropriate locations for front doors as well as servicing routes, clarify the appropriate location for utilities and other infrastructure and improve maintenance cost efficiency.

The Campus Heart will be linked directly with the existing parklands to the south, and to the other character areas to the north and west, through a clear and coherent arrangement of new pedestrian and cycleways that emanate from the Templeman Library. Existing walking routes between Canterbury and the campus, although plentiful, are not well-defined or easy to find, especially for the occasional visitor. This is not helped by the fact that the entrance to Canterbury West train station is on the south side of the rail lines, facing away from the University. These circumstances legislate towards greater unnecessary use of motor vehicles to undertake the journey between Canterbury and the campus.

Figure 68: Campus Heart concept sketch

The Masterplan encourages opportunities for walking and cycling by the use of landscaping and planting to emphasise and realign the established footpath and cycleway that runs south from the Campus Heart to Canterbury West Station. This existing route will form the principal traffic-free approach to the University (a key section of Route 1 of the National Cycle Network) by improved signing, lighting and paving. The route will be highly distinctive and visible from the station exit right into the heart of the University campus. As noted in the University Rise proposals above, this route anticipates the opening of a northern entrance into Canterbury West Station from Roper Road at some point in the future, as well as the regeneration and re-use of disused sections of the Crab and Winkle Line trackbed (south section) as a sustainable transport route. This latter initiative will require a detailed design study to confirm its viability; at present the southern section of the Crab and Winkle Line trackbed is discontinuous and includes stepped changes of level. To achieve these goals, both initiatives will require productive partnership working with Network Rail, the new Train Operating Company, CCC, KCC and relevant land owners.

Underneath the Campus Heart runs the disused Crab and Winkle tunnel, which local walking and cycling groups are keen to see re-opened as a pedestrian and cycle route. This initiative has not been included within the scope of the current proposals and emphasis has been placed on keeping pedestrian and cycle routes on the ground

surface. The viability, cost and engineering of a project such as this has not been explored within the scope of this masterplan study and the initiative will depend upon longer-term changes to the campus. However, the Framework Masterplan does nothing to prevent it happening in the future and we are happy to explore the views of the local community to assess whether this is something we should consider in the future.

To reinforce this masterplan concept (Figure 68), other major spaces are created. For example, the open space to the south of the University library – Templeman Gardens – will become a space where public events and gatherings can take place in Spring, and where students and staff can continue to take advantage of the incredible views over historic Canterbury. In addition, in the east of the Campus Heart a new square oriented north-south – Registry Court – will create a clearly articulated space to connect Woolf College, Darwin College and Tyler Court. This space will also make an important link to Darwin Gardens and St Stephens Square beyond, which will create a new entrance sequence to the University for arrival from the east. Both Darwin Gardens and Registry Court are defined by new infill development and new buildings to the north and south. Holford Walk continues east until it meets St Stephens Hill on the original (pre-1965) alignment of Giles Lane.

### 3 Built Environment

It is instructive to note that the shapes and patterns set out in the Holford Masterplan are still vividly present in the form and functioning of the campus today, despite the complete transformation of so many other aspects of the University and its organisation. The initial grouping of buildings that Holford created in the first phase still form the centre of the Campus Heart and the most important buildings still dominate and define the Campus layout today. The formal set-piece of Templeman Library, the Marlowe building and Eliot and Rutherford Colleges, arranged as they were as the 'working heart' of the University, established an impressive setting for the new library from the outset; the resultant large green space that these buildings enclose remains the great ceremonial space of the University which is retained and celebrated in today's masterplan.

The later college buildings anticipated by Holford were also developed over time – including Darwin, Woolf and Keynes – and these are distributed strategically around the original campus 'core' to define the edge of the Campus Heart and contain the 'core' as the original masterplan envisaged. Common academic and administrative buildings were subsequently developed around this original core, to be shared between all colleges. FE McWilliam's totemic 'Father Courage' sculpture sits at the heart of this set- piece. The Framework Masterplan recognises the significance of this original grouping of buildings, sculpture and spaces and the heritage value that it brings and retains it at the heart of the evolving Campus.

In overall terms and in support of the landscape and public realm improvements, the Masterplan proposes that future growth is consolidated within the Campus Heart rather than continuing to allow development to spread across the land-holdings, in order to protect and preserve the existing open space and to create an accessible, inclusive and more coherent campus.

The masterplan recognises that proposals for new development need to achieve a careful balance between built space to provide additional capacity and open space to enrich the campus. As part of the masterplan policy of consolidation therefore, the Masterplan adopts a 'space positive' approach to the planning of the Campus Heart. Creating positive spatial relationships between the buildings is intended to enable a variety of characterful places, spaces and high-quality external environments at the same time as defining the opportunities for new buildings to gradually increase the capacity of the University. New buildings should be located to create clearly defined and activate the new legible routes described above.

This rethink of the masterplan strategy has created the chance to exploit a significant amount of under-utilised space within the area between the Jarman Building and Darwin College. The current 'loose-fit', low density character of the campus offers an opportunity to unlock significant development capacity at its heart and to allow sympathetic growth through its consolidation and reorganisation. Several of the existing buildings

were only ever anticipated to provide temporary accommodation, and others are reaching the end of their useful life. This offers an opportunity for beneficial change. The Masterplan identifies the potential to redevelop several existing buildings in the Campus Heart into higher-density up-to-date facilities. Consolidation offers a number of benefits, including significant savings in energy, maintenance and management costs, while unlocking capacity in an environment mostly free of outside constraints.

Within the proposed building plots, the Masterplan only proposes a very broad definition of future uses, but the aspiration is that an extensive mix of uses will be incorporated to include not only academic facilities, student housing and other related amenities, but also meeting spaces, leisure uses, shops, cafes and so on. The Holford Walk, for example, will be lined with shops, cafes, cultural and leisure buildings and a variety of other active frontages to support its role as a lively and active thoroughfare. In a complementary way, Holford Walk should also be considered as a priority location for new University 'Centres of Excellence' which will reinforce and support the Campus Heart as a centre of learning and privileged place for social interactions. A mix of uses in the Campus Heart will be of great benefit in creating activity and vibrancy throughout the public realm across a broad spectrum of the day/night and annual academic cycle.

Each plot should have a purpose that takes into consideration its location in the overall campus and its relationship to nearby spaces and amenities. To illustrate this point, our concept anticipates that new academic and student residential buildings will predominate in the heart of the campus, whereas we suggest a location for hotel and conferencing facilities outside the heart, to take advantage of an association with the University while maintaining a degree of independence.

4 Design Guidelines

The Framework Masterplan proposes the following principles and improvements:

1 Public Realm:

- Establish an east-west promenade route – Holford Walk – connecting University Square with Registry Court, including replacement of the Locke shopping parade and Rutherford Annexe
- Establish a north/south promenade route through the centre of the Campus Heart from Woolf College West/Giles Lane car park to Eliot College and Rutherford College along alignment of Crab and Winkle line from Canterbury and Canterbury West station
- Generally upgrade and extend the existing network of walking and cycling links between the campus and the city to make this journey even more easily available by sustainable means
- Link with diagonal route to Sibson/Brotherhood Square
- University Square, a new arrival square at the junction between University Avenue and Giles Lane
- St Stephens Square, a new arrival square adjoining Darwin Gardens with bus/taxi stop/pull-in
- New Square in front of Library – Templeman Square – to become a more formal University gathering space
- New garden square at Darwin Gardens created with the replacement of the 1980s Darwin Houses
- New Registry Court, linking with Darwin Gardens/St Stephens Square
- New square created at Woolf West framed by new residential and academic buildings and set above Giles Lane decked car park – set into the slope
- All new development proposals should include an ecological survey if appropriate to conserve and enhance biodiversity, and to encourage opportunities to incorporate biodiversity in and around developments

- Future development proposals to incorporate a Sustainable Urban Drainage Systems (SuDS) strategy to help manage run-off rates and reduce the risk of pollution reaching sensitive controlled waters on campus

2 Architecture:
- Buildings should be particularly responsive to setting and Holford's original context
- New buildings should reinforce the established architectural character and share a family resemblance
- The predominant architectural character of the buildings could continue the pattern of prefabricated modular construction using repetitive material components to respond to context (NB: this approach should be considered but may not always be appropriate or essential)
- Front doors must address the main public spaces and pedestrian/cycle routes
- Light service deliveries and recycling collections should be made from shared surfaces into main entrance; heavier goods via service areas accessed from Giles Lane east
- A Heritage Assessment, along with desk-based archaeological assessments, should be undertaken if required at a detailed level to inform the architectural design process and to help determine any appropriate measures of mitigation

3 Building Uses:
- Building uses should vary and enrich the existing pattern of uses
- Appropriate uses include university academic uses, a Students Union and student support, student housing, shops, cafes, cultural and leisure buildings
- Decked car park at Tyler Court accessed from Old Giles Lane junction with St Stephens Hill

4 Building Height:
- Building heights should vary between three-to-four-storeys to match the height of the existing University buildings and to sit comfortably within their neighbouring context
- Darwin student housing: four storeys
- New buildings should not break the ridgeline silhouette. If it is considered appropriate that a small number of new buildings break this rule (for example, to emphasise an important feature of the Masterplan and/or the architecture), justification of this point will form part of the detailed planning consent
- Heights conceived to sit comfortably with neighbouring context and treeline/skyline when viewed from middle and long distances

5 Building Form:
- Buildings should be developed along the ridgeline or on flat land within the ridgeline 'plateau'
- Buildings should be particularly responsive to the setting in the Campus Heart and the historic landscape context of this character area
- Buildings should be arranged to enclose and define a coordinated and coherent public realm of streets, squares, courtyards and gardens
- Detailed studies of any new developments will be undertaken at planning stage to understand the visual impacts of any new construction proposals

6 Building Materials:
- Building materials to be responsive to their setting in the Campus Heart in texture, colour and hue
- They should be responsive to modular construction/character, including brick/masonry/timber/natural metal finishes
- In highly visible locations, new buildings should be finished in muted colours and avoid the use of reflective materials and large expanses of glazing to lessen any impact on distant views of the campus
- Recessing of windows, louvres and brise soleil should be considered to mitigate reflectivity in areas of glazing integrated into new building facades
- Roofs should be flat or pitched and incorporate (wherever possible) green and/or blue roofs, roof gardens, photovoltaic/solar/thermal collectors for sustainable energy provision
- Stepped/garden/landscaped roofs could be employed so the buildings sit comfortably within the landscape

7 Internal & External Lighting:

- Detailed studies should be carried out at planning stage to understand the impact of internal and external illumination of buildings, pathways and carparks in order to mitigate against the harmful or negative effects of internal and external lighting proposals on the local ecology and biodiversity, and to protect the backdrop of the city, the World Heritage Site and distant views of the campus

8 Early Wins:

- East-west promenade route: Holford Walk
- New arrival square: University Square

## 7.5 Landscape Character Area Proposals: Sarre Penn Valley

The Sarre Penn Valley is a great asset to the campus in providing a green setting to the north of the University as well as a more rural landscape character, which is a major part of the University's attractiveness to students, academic staff and visitors. The Sarre Penn Valley contributes to the University's reputation of a very verdant campus and offers an attractive alternative landscape character to University Rise. Similarly, the Sarre Penn Valley provides a punctuation in the landscape between the campus and the outlying villages of Blean and Tyler Hill.

The Framework Masterplan recognises the landscape value of the Sarre Penn Valley. However, this character area is not reaching its full potential in terms of landscape and recreational value. The abundance of green space within the Sarre Penn Valley is relatively inaccessible with the exception of the existing bridleway along the Old Salt Road. While the Sarre Penn Valley lacks any significant built development, there is still significant potential to improve both the natural, built and cultural dimensions of this character area. In terms of amenity value, the Sarre Penn Valley could provide a much more valuable resource for exercise, good health and wellbeing if the green spaces were made more freely accessible to the university community and visitors alike.

The Masterplan proposals therefore maintain the overall agricultural landscape while developing and improving the natural, built and cultural dimensions of this character area. It is also interesting to note that the University hitherto has naturally orientated itself towards Canterbury and the parkland slopes of the Stour Valley. The University somewhat turns its back on these communities and the approach from Blean and Tyler Hill at present is through the University's 'back door'. The Masterplan opens up another aspect to the north, giving it two frontages, such that the University has a more open, outward-looking aspect. Likewise, it aims to create strong connections with neighbouring communities on all four sides of the University (Figure 69 & 70).

1 Landscape Enhancements:

The Sarre Penn Valley is one of the key landscape and ecological features within the campus and yet many of the students appear unaware of its presence. This is unsurprising judging by the relatively overgrown condition of the public footpath that follows the stream as it flows across the campus.

At present, the slopes of the Sarre Penn Valley are primarily given over to agricultural food production. The Masterplan proposes greater environmental and ecological diversity as part of the University's offer of a green campus environment to attract students, staff and visitors. In terms of biodiversity, the existing meadows and hedgerows provide extensive foraging opportunities for pollinators, which help various crop species. However, the existing historic hedgerows that surround these fields are fragmented and disconnected. The Masterplan proposes to restore the hedgerows to create wildlife corridors from the Blean Woodlands to the west and across the campus to the fields south of the village of Tyler Hill. Management and restoration of the hedgerows will enhance the historic landscape character of the area as well as enhance the potential biodiversity. Existing woodland pockets should also be managed to diversify habitats and promote biodiversity.

There is also a need for better eco-connectivity between areas of wildlife habitat through reinforcing and conserving the hedgerow and shelterbelt networks.

# 7 Landscape Character Areas: Proposals

1 Brotherhood Wood
2 Sports Pavilion
3 Blean Primary School
4 West Triangle Wood
5 Sarre Penn Stream
6 Roman Villa Remains
7 St. Cosmus & St. Damian Church
8 Old Salt Road
9 Hothe Court Farm
10 Crab & Winkle Old Railway
11 Foxborough Wood
12 Sarre Penn Shaw

Figure 69: Landscape Character Area: Sarre Penn Valley existing layout

1 Brotherhood Wood
2 Sports Hub
3 Blean Primary School
4 Wetlands Walk
5 Arboretum
6 Roman Villa Remains
7 St. Cosmus & St. Damian Church
8 Hothe Court Farm
9 Crab & Winkle Foot/ Cycle Path
10 Tyler Hill Court
11 Sarre Penn Way
12 Sarre Penn Court

Figure 70: Landscape Character Area: Sarre Penn Valley proposed Masterplan layout

For example, the Sarre Penn stream itself is also a major asset for wildlife and it provides a refuge for a variety of fish and invertebrates. The Masterplan proposes to preserve the connectivity of the bankside vegetation along the Sarre Penn Valley as an eco-highway for fauna in the area. Good management of the bankside vegetation in the future should avoid full-tunnel shading to the stream which currently exists. Designating the stream as a University of Kent nature reserve would provide it with identity and increase usage.

The Masterplan also proposes to create connected ponds and wetlands to better reconnect the stream to its floodplain, diversifying the wetland environment, and also helping attenuate flood water along the stream. These will create new wildlife habitats and promote biodiversity. A larger pond will provide a reservoir for irrigation of the sports pitches during summer months, thereby reducing the requirements for mains water. Careful consultation will be required with the Environment Agency and no measures should be undertaken that might diminish the stream's existing value for *Bullhead*, *Eels* and potentially spawning *Trout*.

Figure 71: Sarre Penn Valley concept sketch

Many opportunities exist to ecologically enhance this land in terms of biodiversity and showcase the principles of sustainable farming. In keeping with local strategies, the ambition is for *Skylarks* and *Yellowhammers* to be singing from every field and hedgerow respectively. Perhaps even the *Turtle Dove* and *Brown Hare*, two of the England's rarest farmland species, could be attracted to the campus.

2 Public Realm and Network of Movement:

The Movement and Transport Strategy seeks to reduce dependency on private cars, to minimise the impact of road traffic, and to promote a wider range of options for movement that are less constrained by the limitations of road transport. Furthermore, the technology of vehicles is changing rapidly. Advances in electric power for vehicles is causing a blurring of boundaries between different forms of private or personalised transport. This rapidly expanding spectrum of vehicles, covering all types of movement, from wheelchairs to delivery vehicles to people transporters, requires a new vocabulary to predict and describe a new generation of route types.

The new shared routes that will provide access to the small clusters of development shown in the Sarre Penn Valley will therefore be designed principally for pedestrian and bicycle use, plus lightweight electric vehicles (Figure 71). Provision will be made for parking for people with disabilities and their vehicles, also for vehicles delivering goods and removing waste/recycling. Parking will be restricted to these particular functions. The low-key nature of these buildings would determine that all vehicular access could be achieved using the small-scale, electric university vehicles or the occasional specialist disabled/delivery vehicle as appropriate.

More generally, existing movement to and within this character area for members of the university community and the people who live locally is limited, and access must be improved to the land for amenity, sustainable transport and other health and wellbeing benefits. The Masterplan therefore proposes to widen the network of walking, cycling and jogging routes in this area to provide for greater health and wellbeing for students, staff and the local community.

Figure 72: Sarre Penn Valley concept sketch

Fortuitously, this character area is bordered in the west by historic routes which have the potential to increase access. To the west, the bridleway along the Old Salt Road (part of NCR 1) is well-used and well-maintained and is very popular with students and members of the public.

The remaining network of footpaths extending across this character area are often badly signposted or overgrown. The Masterplan proposes that this network of footpaths is cleared and extended, and new cycle routes introduced so that staff, students and the local community gain significant access to, and additional amenity value from, the whole of this character area (Figure 72).

The Sarre Penn stream could also become a major public amenity. Although an existing public footpath follows the course of the stream across the university campus, the valley bottom is heavily overgrown and densely shaded by mature trees and shrubs, and there is limited access to this part of the campus. The Masterplan proposes to improve access to the footpath along the stream, and to upgrade it to include a cycle route, so it can become part of the wider network of walking and cycle routes within the campus. The footpath across the centre of the Sarre Penn Valley would remain modest in scale, with a surface treatment to allow use in all weathers. Minor modifications to steeper sections, and the detailing of bridges and

Figure 73: Concept drawing of the proposed 'Circular Cycleway', a five kilometre walking, jogging and cycling route around the campus. Inset: An alternative 7.5 kilometre route

culverts, will allow the route to be used for bicycles, electric wheelchairs and maintenance vehicles. In the wider context, these proposals will also provide a safe, traffic-free connection for walking and cycling between Tyler Hill, the campus and Canterbury city centre.

Wider afield, the Masterplan recognises that Tyler Hill Road, the existing road along the University's northern boundary, is unsafe for pedestrians and cyclists because of the narrowness of the lane and the numerous bends in the road that make long-distance visibility when crossing difficult. The existing NCN1 (a nationally recognised sustainable transport route for walkers and cyclists) crosses Tyler Hill Road without a pedestrian crossing. Masterplan does not propose to introduce a pedestrian crossing at this point on Tyler Hill Road, although proposals aimed at making it safer for pedestrians and cyclists are included. For example, it proposes a series of new linked footpaths adjacent to Tyler Hill Road. These footpaths will be created on University-owned land just inside the existing fence-line and hedgerows alongside Tyler Hill Road as a safe walking and cycling route between the villages of Blean and Tyler Hill. The footpath will cross the road at two points to enable a continuous route between the two villages.

To the north of Blean Church, a new network of paths is proposed on university-owned land to connect Blean Village and Blean Church. It is hoped that this will make it possible to walk and cycle between the two. These footpaths will connect to the existing bridleway along the Old Salt Road with a pedestrian-crossing across Tyler Hill Road, making it possible to walk and cycle between Blean Village and Blean School along a traffic-free route.

The Circular Cycleway: By connecting all these routes together, the opportunity exists to create a new 'Circular Cycleway' encompassing the northern half of the university land-holding.

By linking the Old Salt Road, the former Crab and Winkle railway line, the existing cycle route through Park Wood and the new cycle route along the Sarre Penn stream, with a new linked cycleway, a walking and jogging route is created across this character area. The northern section of the 'Circular Cycleway' will be completed by the new cycle route alongside Tyler Hill Road. Various attractions including picnic areas, viewing points, signage and pocket nature areas (small areas of habitat enhancement between the cycleway and adjoining farmland) will all add variety and interest. This will ultimately link to a much larger circular cycleway, and walking and jogging route, with dedicated routes created through the Campus Heart and the other character areas (Figure 73).

3 Built Environment:

The Framework Masterplan recognises the high value of this character area as predominantly open amenity space and agricultural land, to balance with the consolidation and intensification of the Campus Heart. It intends to conserve and enrich the natural landscape features identified within the Sarre Penn Valley Character Area. The proposals therefore include only very limited development, such as the small-scale building clusters set slightly apart from the Campus Heart.

Appropriate activities in these building clusters might include a centre for quiet study, a writer's retreat, remote meeting/seminar spaces (that could be leased commercially), spaces for nature/agricultural studies and hides for wildlife observation. As an option, these building clusters could provide space for B1 Use.

Income generated by such accommodation might in turn help to pay for improvements to this part of the campus, such as new footpaths and cycle tracks and ecological improvements. The most northerly of the three new development area represents the possible re-planning/rebuilding of Hothe Court Farm, which sits adjacent to Tyler Hill Road. Such a proposal does not necessarily mean the closure of the farm but might include improvement and closer links to academia. Either way, development of this area would be designed so as to not generate any additional traffic on Tyler Hill Road.

The Masterplan also includes an option for a new Blean Primary School on land that is currently within the ownership of the University (Figure 74). The new school in this option would be located further east from its current position, and therefore further away from the traffic-noise and air-pollution of the Whitstable Road. The school would face a new entrance square on its west side which would accommodate drop-off and pick-up by parents and their

# 7 Landscape Character Areas: Proposals

1 Brotherhood Wood
2 Sports Hub
3 New Blean Primary and Housing
4 Wetlands Walk
5 Arboretum
6 Roman Villa Remains
7 St. Cosmus & St. Damian Church
8 Hothe Court Farm
9 Crab & Winkle Foot/ Cycle Path
10 Tyler Hill Court
11 Sarre Penn Way
12 Sarre Penn Court

Figure 74: Landscape Character Area: Sarre Penn Valley proposed Masterplan layout showing option to re-provide Blean School within University land

cars, which would obviate the need to access the school via Park Wood Road (as many parents currently do) and thereby reduce non-university traffic travelling through the campus. To the east, the new school would look over the university playing fields, which could be used by the school by arrangement with the University. Under this option, the new school would be funded in part by income generated by new housing built on school land adjacent to the Whitstable Road.

This option could also provide the benefit of a new vehicle link between Park Wood Road and Whitstable Road. This would provide controlled access for buses from Blean to Canterbury on a regular basis to create more efficient access for public transport and reduce journey times and distances. It would also provide an access route for emergency vehicles and provide more direct and temporary access to the university sports facilities.

The University recognises that this proposal impacts upon land that sits outside the defined campus boundary and that this area is not allocated for additional housing in the Local Plan 2017. However, the University supports the idea because of the many advantages it would bring to the University, the local community and to Blean School. Although sitting beyond the defined campus boundary, these proposals might be delivered as part of the normal planning process or considered as part of the forthcoming Local Plan review.

Heritage: The clusters of development proposed in the Masterplan have been located some distance from the existing Roman/Medieval Scheduled Monument and Listed Church so as not to affect the setting of these structures.

To the east, the Masterplan proposes that the vegetated strip that represents the route of the former Crab and Winkle railway line is opened up for greater amenity use and to provide a pedestrian route to Tyler Hill to the north. By bringing back into use this part of the former Crab and Winkle railway, connectivity will be increased and improved between the northern and southern areas of the campus, and access improved between the campus and the surrounding local communities.

We recognise that for many residents the disused railway forms part of a valuable natural habitat and local wildlife site. Because this route has been largely disused by people for many years, the footpath along the dismantled railway line is currently heavily overgrown and unsuitable for walking and cycling. Also, it has become populated by wildlife and *Nightingales* are regularly heard in the wooded shaw. In opening up this route to easier access for people, excessive paving and lighting will be avoided and planting should be dense to minimise the impact on wildlife. Advice on how this might be achieved successfully will be sought from local nature groups with detailed knowledge of the area's flora and fauna.

The use of the former railway trackbed north of the tunnel depends upon longer-term changes to the main Giles Lane car park, and the ability to provide a lift or other vertical connection between Giles Lane and the trackbed level. With such a connection, the route has the potential to provide a pedestrian and bicycle link to Tyler Hill. Our proposals would transform this historic feature into a new, dedicated sustainable transport network to link the northern areas with the Campus Heart and to encourage more people to connect with the natural environment by making use of the route.

4 Design Guidelines:

The Framework Masterplan proposes the following principles and improvements:

1 Public Realm:

- A new north/south route to connect the three new development clusters between Hothe Court Farm and Park Wood Road adjacent to the new Sports Centre
- Track surfaces will be formed of compressed hogging or gravel, or asphalt/paving on steeper gradients
- Track widths will typically be between two to four metres and divided by central median on steep sections with barriers to limit use by larger vehicles
- Opening up and improving the existing footpaths to enhance access by all
- A new east-west cycle route created alongside the Sarre Penn stream between Canterbury Hill Road and the Old Salt Road

- New routes on university land following Tyler Hill Road to create a safe east west pedestrian and cycle connection between Blean and Tyler Hill
- New routes on University land to create safe pedestrian and cycle connection between Blean and Blean Church and Blean School
- Front doors must address the main public spaces, pedestrian and cycle routes
- Light service deliveries and recycling collections should be made from a new shared surface route connecting to Park Wood Road
- All new development proposals should include an ecological survey if appropriate to conserve and enhance biodiversity, and to encourage opportunities to incorporate biodiversity in and around developments
- Future development proposals to incorporate a Sustainable Urban Drainage Systems (SuDS) strategy to help manage run-off rates and reduce the risk of pollution reaching sensitive controlled waters on campus

2 Spaces and Places for Education:
- Clusters of development identified on the Masterplan located in the Sarre Penn Valley

3 Architecture:
- New buildings to reinforce the established rural architectural character and share a family resemblance as coherent clusters of buildings in the landscape
- Building should be particularly responsive to the rural/agricultural setting and historic context
- A Heritage Assessment, along with desk-based archaeological assessments, should be undertaken if required at a detailed level to inform the architectural design process and to help determine any appropriate measures of mitigation

4 Building Uses:
- Building uses should vary to enrich the existing network of university buildings
- Appropriate uses include academic use such as a centre for quiet research/study, writer's retreats, remote meeting/seminar spaces that could be leased commercially, commercial workspace, spaces for nature/agricultural studies and hides for wildlife observation. Alternatively, these buildings clusters could provide space for B1 Use
- Disabled parking screened within pockets of trees and screening hedges

5 Building Height:
- Building heights should vary between 1 to 1.5 storeys and should be designed to sit comfortably within their neighbouring context when viewed from middle and long distances
- Buildings should nestle comfortably into the existing contours and use pockets of trees and hedges for screening

6 Building Form:
- Building form should be particularly responsive to the rural/agricultural setting and the historic landscape context of this character area, and sit comfortably as a coherent collection of buildings in the landscape
- Buildings should be arranged in clusters or courtyard developments to echo farmstead environments
- Detailed studies of any new developments will be undertaken at planning stage to understand the visual impacts of any new construction proposals

7 Building Materials:
- Building materials to be responsive to the rural/agricultural setting in texture, colour and hue and should be predominantly 'natural' in appearance, including brick/masonry/timber/natural metal finishes
- In highly visible locations, new buildings should be finished in muted colours and avoid the use of reflective materials and large expanses of glazing to lessen any impact on distant views of the campus

- Recessing of windows, louvres and brise soleil should be considered to mitigate reflectivity in areas of glazing integrated into new building facades
- Roofs should be pitched and incorporate green and/or blue roofs, roof gardens, photovoltaic/solar/thermal collectors for sustainable energy provision

8 Internal and External Lighting:
- Detailed studies should be carried out at planning stage to understand the impact of internal and external illumination of buildings, pathways and car parks in order to mitigate against the harmful or negative effects of internal and external lighting proposals on the local ecology and biodiversity, and to protect the backdrop of the city, the World Heritage Site and distant views of the campus

9 Potential Early Wins:
- A new north-south route to connect Hothe Court Farm and Park Wood Road adjacent to the new Sports Centre
- A new east-west cycle route created alongside the Sarre Penn stream between Canterbury Hill Road and the Old Salt Road
- New footpaths/cycle routes on university land following Tyler Hill Road between Blean and Tyler Hill
- New footpaths/cycle routes on university land between Blean and Blean Church and Blean School

## 7.6 Landscape Character Area Proposals: Conclusions and Summary

Each of the mini-masterplans for the individual character areas described above was conceived as a component part of the overall masterplan composition.

The process of working at the big-picture and the particular at the same time is an iterative rather than a linear process. In preparing these mini-masterplans, options were prepared, honed and tested against the aspirations and requirements of the client brief. Schemes for the various parts of the campus were developed separately and a range of options were prepared for assessment. This was a highly intensive and inclusive stage in the masterplan process, where a wide range of options and ideas were generated and tested, and where all members of the client team, the university community, stakeholders from the city and the county and members of the public who attended the community consultation process contributed ideas and opinions.

At the culmination of this process, a 'plan of plans' was assembled from the preferred mini-master plans to provide a draft masterplan for the future of the campus. This overall plan was gradually refined and tested against the aspirations of the concept drawing, ultimately resulting in the final Framework Masterplan drawing (Figure 75).

The gradual evolution and implementation of the proposals in each character area is likely to take place over an extended period of time as demand for space dictates and funding becomes available; consequently development of the campus is unlikely to follow a logical and sequential pattern. The Masterplan has therefore been composed to provide a framework for development to come forward gradually and in no particular order.

What has been seen as more important is that the buildings and the public realm will be implemented in a way that is sensitive to the individual landscape character areas, such that development will gradually enrich the individual parts of the campus. By following these framework proposals, the masterplan will deliver a wide diversity of places and spaces, thereby broadening the opportunities for interaction between staff, students and the surrounding local communities. The places and spaces between the buildings will become the public 'living rooms' where all members of the vniversity community can gather, exchange ideas, and where the sense of community is supported through formal events taking place and where informal encounters are made possible.

In conclusion, the estate as a whole will become the most powerful expression of the academic, cultural and civic life of the University, and an enduring expression of the University's aspirations and achievements.

Figure 75: Proposed Framework Masterplan August 2019

1 University Gate
2 Beverley Court
3 University Square
4 Park Wood Circle
5 Hothe Court Community Garden
6 Brotherhood Square
7 Giles Circus
8 St. Stephens Square
9 Darwin Gardens
10 Registry Court
11 Templeman Square
12 Sports Hub

# 8 Summary of the Framework Masterplan Proposals

1 Cathedral
2 Canterbury West Station
3 Crab & Winkle
4 University Gate
5 Park Wood Circle
6 Brotherhood Square
7 University Square
8 Templeman Square
9 Holford Walk
10 St. Stephens Square
11 Blean
12 Tyler Hill
Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent
Land within Campus Boundary not owned by University

# 8 Summary of the Framework Masterplan Proposals

## 8.1 Overview

In preparing the Masterplan for future campus development (Figure 76), it has been necessary to address a wide variety of issues, ranging from the many pressing practical issues facing the University day-by-day to the bigger picture of the future of universities in our education system. As noted above, the future university campus must adapt and evolve in order to satisfy a range of contemporary expectations that have developed since the time of the 1965 Holford Masterplan: the imperative for a more sustainable attitude toward our planet, greater competition between Universities and therefore greater demand for 'placemaking' in University environments: the academic and business worlds moving towards shared flexible, inclusive and inspiring working environments: a growing reliance upon public transport by environmentally-conscious and financially-sensitive millenial students and staff: and the evolution of retail and other commercial activities leading to a growing interest to co-locate with the University.

In describing the masterplan proposals, a good deal of focus has been placed upon the relationship between the campus and the landscape within which it is set. The variety of distinct but connected landscape character areas described has provided us with a direction for developing the future proposals. This approach has enabled us to give regard to a wide range of issues such as the future provision of sufficient space of the appropriate type, the design of open spaces, improvements to the landscape and its biodiversity, improving access arrangements for pedestrians and traffic locally and addressing the experience and aspirations of the surrounding local communities. It is also essential that the campus as a whole, during every phase of its development, becomes a coherent expression of the University's objectives and values.

However, there are also a number of holistic masterplan issues that need to be addressed, which are over-arching across the whole university and which need a whole-campus overview. Such issues include:

- The University Academic Strategy
- The Architectural and Heritage Strategy
- The Approach to Legibility and Coherence, and
- The Movement and Transport Strategy

## 8.2 The University Academic Strategy

The recent document published by the University titled: *'Kent 2025: Refreshing the University Strategy'* includes an important section itemising the challenges facing the Higher Education sector in relation to the University of Kent and why it needs to respond. The document reaffirms a commitment to the founding university mission to become a great civic university, with a distinctive and fresh approach to high calibre teaching, learning, inclusion and inter-disciplinarity in a modern, collegial environment. The document goes on to set out an inspirational vision for 2025 to support education and research as well as social, economic, cultural, intellectual and public life in ways that will make Kent one of the leading civic Universities.

For the Framework Masterplan to be successful therefore, the university campus must evolve to become the expression of these commitments and values, ensuring that the entire academic community, as well as those who visit the campus, are inspired by the high ideals and values of the University of Kent. For the high objectives of the university strategy to be realised, where faculty and students work in accord with these core values, it is the campus on which those objectives of delivering excellence in research, education and engagement with society can be made operational and visible. The University of Kent Canterbury campus must therefore be considered as more than merely the sum of the buildings and the spaces between them.

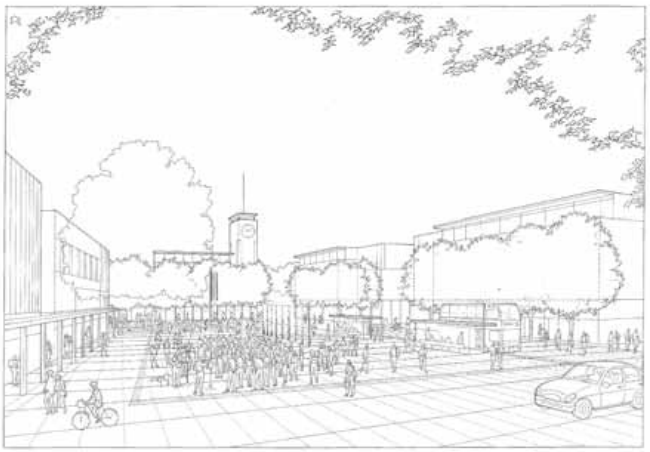


Figure 76: Proposed Framework Masterplan for the Canterbury Campus showing the landscape context

# 8 Summary of the Framework Masterplan Proposals

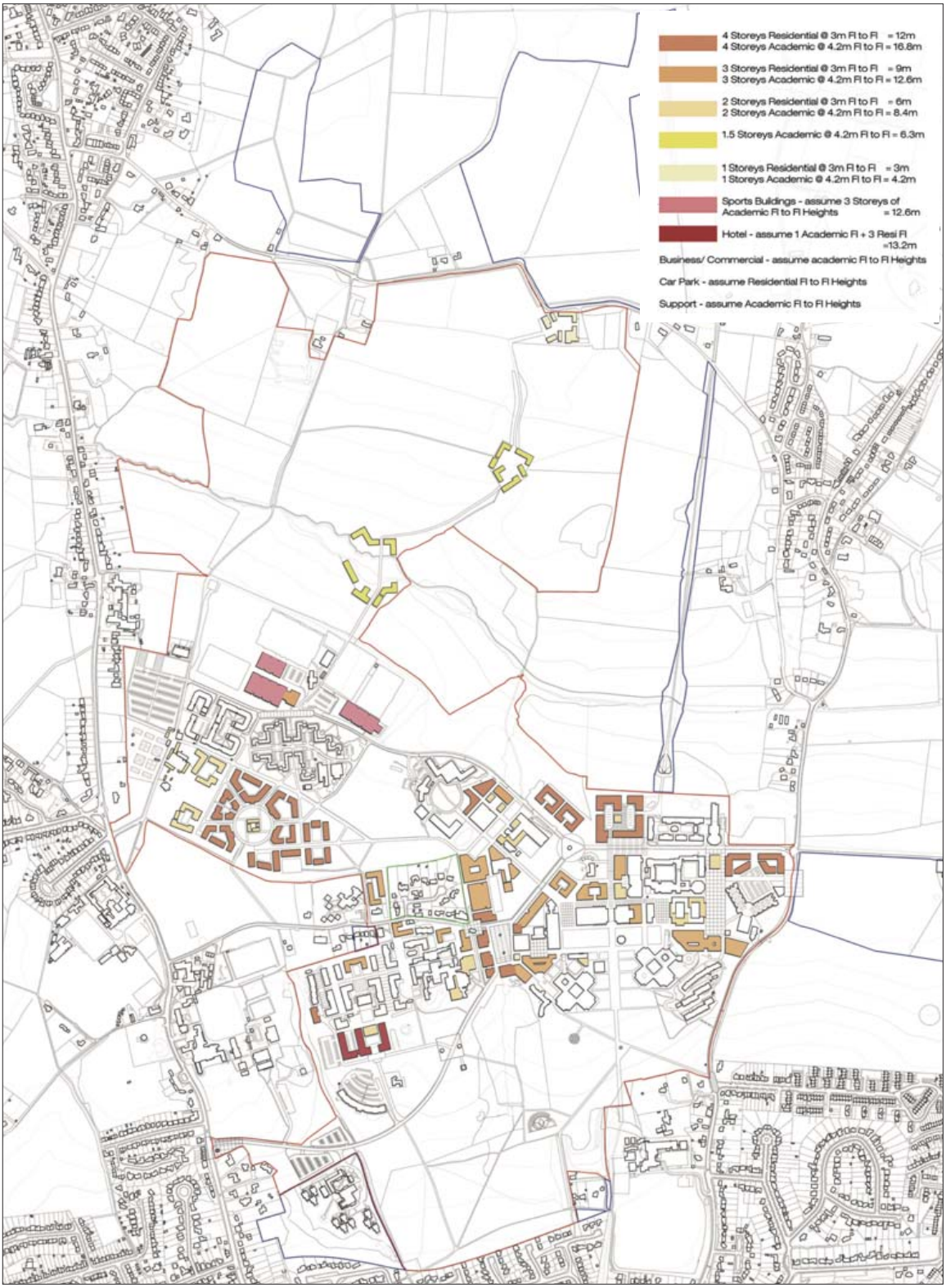



Figure 77: Indicative building heights proposed in the Masterplan

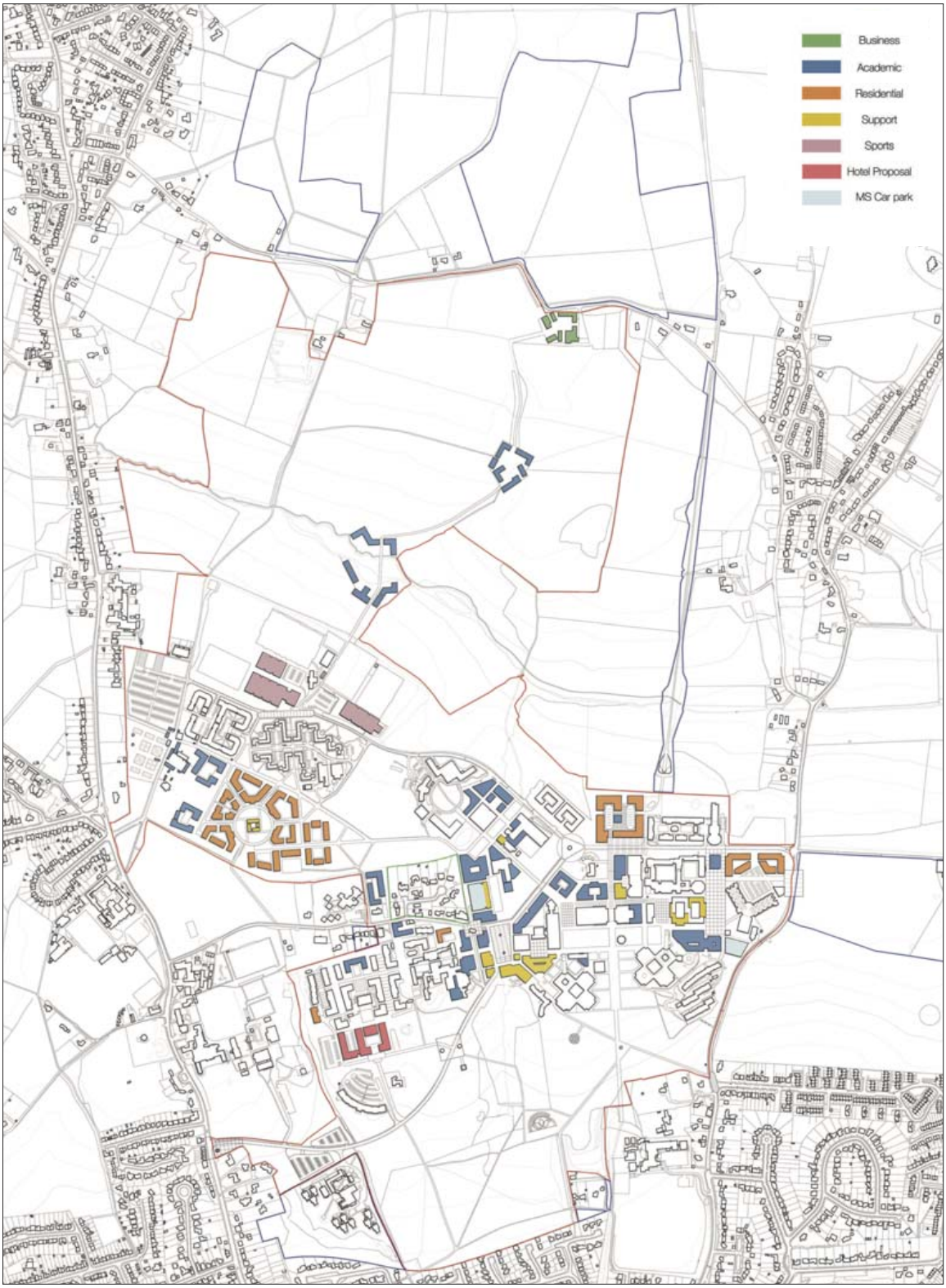



Figure 78: Indicative building uses proposed in the Masterplan

## 8.3 The Architectural and Heritage Strategy

Consideration of the rich landscape and built heritage and how it is embedded in the campus has been an important factor in the composition of the Framework Masterplan. The importance of this component can only be appreciated and understood by taking an overview across the full history of the area, including the evolution of the pre-university landscape in which it is located through to the contribution made by the university campus itself. Considerable significance has been afforded to a deep understanding of the campus character, the history and nature of the campus and its links to its surroundings, including the historic city centre and the World Heritage Site. The University and the masterplan team recognise the importance of heritage as a factor that cuts across all aspects of the campus. This has been recognised in principle in the masterplan proposals.

The landscape patterns dating from before the founding of the University are still legible and profoundly influence the arrangement of the University today, almost as a printer's palimpsest. The origins of the University are clearly rooted in the geology, geography, topography and history of the landscape that it inhabits, and revealed in the etymology of the place names. Everything is there for a reason, and in order to shape the future direction of a place successfully.

The university campus was created in 1965 in open farmland on the ridgeline overlooking the Great Stour Valley and the historic city of Canterbury. However, evidence of the pre-university habitation of this landscape goes back into pre-history, evidenced by the remains from the Bronze Age and Palaeolithic eras found during the construction of Turing College. More detailed evidence of habitation locally in the Roman and Medieval eras is acknowledged in the Scheduled Monuments and Listed Buildings within the campus, noted at length earlier in this document.

The landscape setting of woodlands, farm fields, hedgerows and country lanes, together with some enduring place names, are all part of a memory of the past that were integrated into the campus and continue to endure today in the university environment. The built heritage from the area's agrarian past includes Beverley Farmhouse and Hothe Court Farmhouse and accompanying field pattern, plus the houses and cottages along Giles Lane (Rothford, Tanglewood and Olive Cottages). The group of buildings that remains includes a record of Kentish vernacular farmhouses, farm buildings, oast houses and cottages all of which were integrated within the original masterplan vision. Many of these buildings were adapted to provide some of the first university accommodation, including offices and administrative space in Beverley Farm and living space in Hothe Court. As part of Holford's original plan, the eastern section of Giles Lane was relocated to divert traffic around to the north of the Campus Heart. Sadly, as part of this realignment of Giles Lane, Brotherhood Farm was sacrificed. It was this farm that provided much of the land on which the early campus was developed.

The industrial era is also represented by the Canterbury and Whitstable Railway line which dates back to 1830. This is thought to be the first ever railway in the south of England and possibly the first railway in the world to convey both passengers and goods traffic regularly by mechanical power. Part of this line runs under the campus in a disused tunnel owned by the University. Holford's Masterplan made little or no reference to this important historic feature. Indeed, little attention was paid to this structure until a collapse in a part of the tunnel caused severe damage to the Cornwallis Building in July 1974. The tunnel was subsequently filled with cement/fly ash grout to prevent further damage (Figure 79).

Although this area has been inhabited for thousands of years, the landscape and built heritage is enriched by the dramatic intervention of the University itself, conceived as it was by one of this country's leading architects and town planners. This rich heritage contributes greatly to the quality of place that the campus has become and the result is much greater than the sum of its parts.

The Holford Masterplan was of its time, and a thoughtful and dramatic response to post-war needs; it could even be described in some senses as adventurous and innovative, exploring as it did the fusion of traditional models with new ideas emanating from the urban and architectural theories of that era (figure 80). Individual college buildings were to be located in a landscape setting, a departure from the historic precedents of Oxford

or Cambridge where college buildings are integrated into the town. Each college was to be designed as a self-contained building expressed through a rigorous geometrical plan of interlocking squares and spaces. Students would live, work, eat and enjoy their social activities. The hope was to promote sociability and interdisciplinary exchange.

Recent growth in the campus has been delivered without strict adherence to the Holford's original guiding plan; although buildings have been added to the campus within the confines of the original Campus Heart, they have also begun to appear on available sites within the wider campus. In the process, investment in new buildings, spaces and facilities is eroding functionality and legibility of the campus as a whole, and this in turn is beginning to erode the functionality and quality of faculty and student experience of learning and living at the University of Kent. The current Framework Masterplan takes a big-picture overview of the Canterbury campus, including a consideration of what is of value in the original Masterplan, projections for future growth, appropriate use of the larger land ownership, and the quality of the campus as a place (Figures 81, 82 & 83):

1. Holford's proposal for the Campus Heart (with Templeman Library at its centre) as the working 'core' surrounded by independent college buildings remains the core idea and is reinforced in the Framework Masterplan. It also retains most of the current buildings
2. Holford's overall organisational structure of a simple grid of streets, spaces and places at the heart of the campus is also retained, supporting a very legible and pedestrian-dominant public realm throughout the Campus Heart
3. The grouping of Templeman Library, the Marlowe Building and Eliot and Rutherford Colleges is retained as the core of the Campus Heart
4. The large green space defined and enclosed by this grouping of buildings is celebrated in the Masterplan and expressed as the major green space in the campus – 'Templeman Gardens' will become a space where public events and gatherings can take place in Spring, and where students and staff can continue to take advantage of the incredible views over historic Canterbury
5. A tiered and more formal landscape is introduced to the sloping land between Eliot College and Rutherford College to create a transitional space between the more formal garden layout of the Campus Heart and the parklands to the south. The new tiered garden gives improved connections between the Campus Heart, the new entrance square and Tyler Court student residences
6. The open spaces to the south of the Campus Heart are retained in the Masterplan to provide a green setting to the University as well as a landscape demarcation from the City. Holford's proposal that the layout of colleges should extend down University Road has been abandoned in preference for intensification of development along the ridgeline
7. Lord Holford intended the experience of arrival along University Road to be a spectacular entry point to the campus. Under the Framework Masterplan proposals, University Road will be transformed from a standard estate road to respond more sympathetically to the parkland character of University Rise in its approach to the Campus Heart along the renamed 'University Avenue', very much in the English picturesque tradition
8. Beverley Farmhouse will continue to enjoy an open aspect of green landscape to the south. The introduction of a new hotel and conference centre nearby (to the south of Turing College) will provide an opportunity for Beverley Farm house to develop its existing overnight accommodation into a boutique adjunct to the hotel and perhaps also a restaurant in this unique historic environment
9. At Hothe Court, in order to create a new sense of place and distinct purpose to this part of the campus, the Masterplan proposes the development of a new 'Centre of Excellence' as a destination at Hothe Court. This concept will preserve and reuse the existing listed and historic buildings such as the farmhouse, the barn and the oast houses, and transform historic Hothe Court such that it once again plays an important role in the University Estate. This concept will sit comfortably alongside the restoration of the former Hothe Court kitchen garden currently underway with the development of the Community Oasis Garden

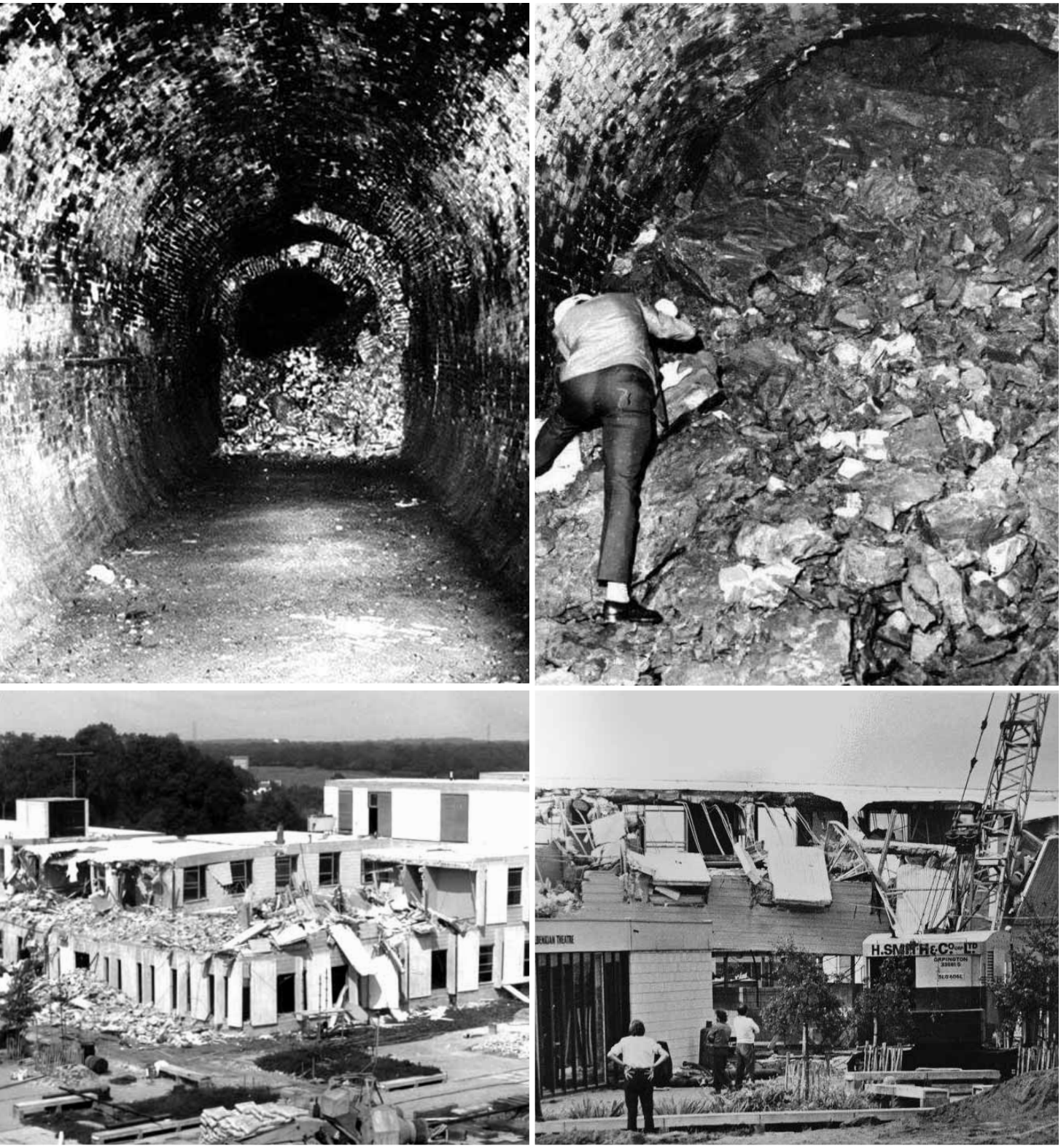



Figure 79: Collapse of the historic Canterbury and Whitstable railway tunnel in July 1974 that caused extensive damage to the Cornwallis Building

Figure 80: William Holford's plan for the University, June 1964

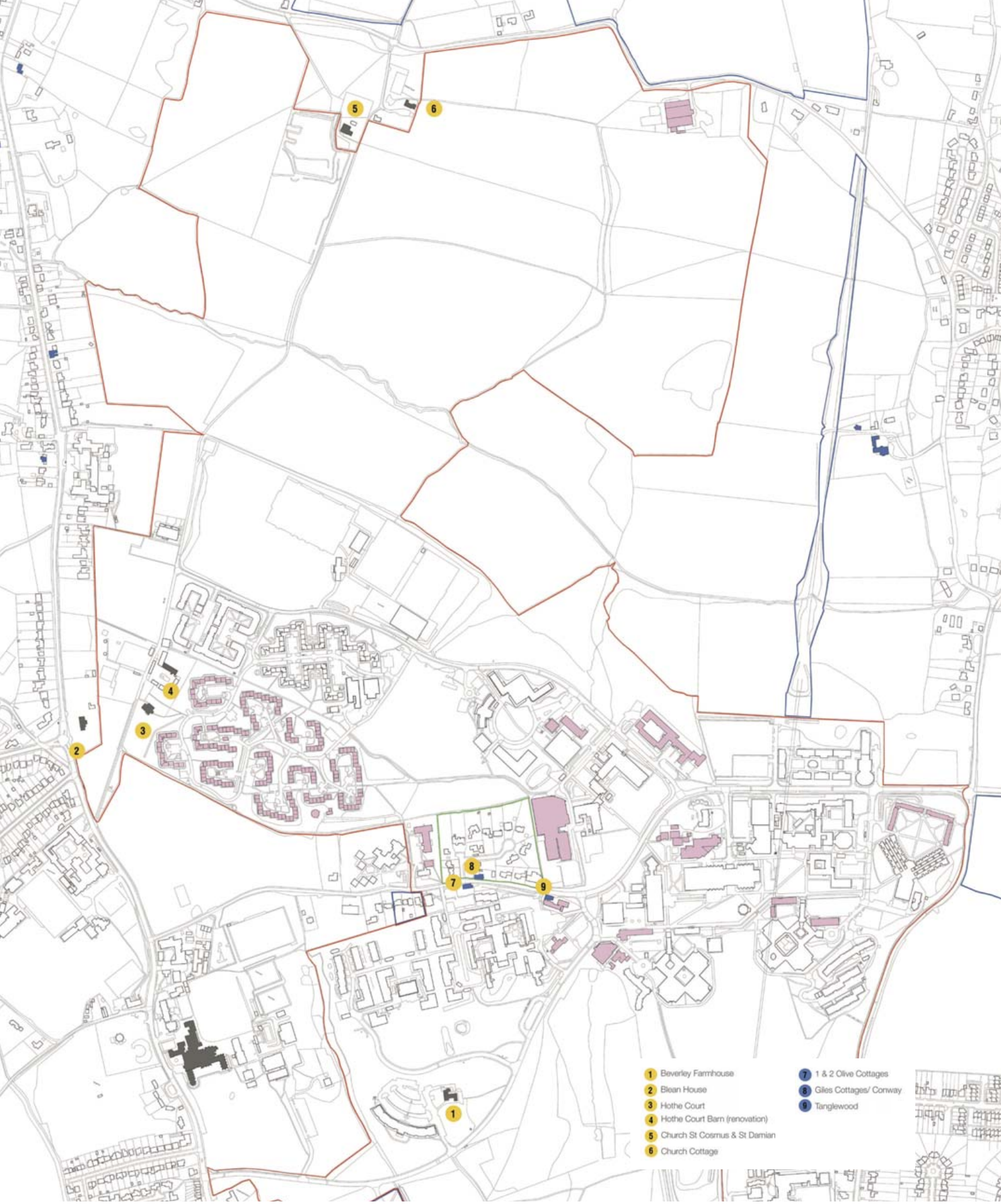



Figure 81: Buildings impacted by the Masterplan; buildings with historical status and those buildings to be removed or replaced

10 The re-opening of the historic Crab and Winkle tunnel as a pedestrian and cycle route has not been included within the scope of the current proposals and emphasis has been placed on keeping pedestrian and cycle routes on the ground surface. However, the Framework Masterplan does nothing to prevent it happening in the future and we are happy to explore the views of the local community to assess whether this is something we should consider in the future

The Heritage Trail: In addition, the masterplan proposals include a major new promenade – 'Holford Walk' connecting east-west along the ridgeline to create a more unified and connected campus. As part of this new pedestrian/cycle link, the original (more southerly) alignment of Giles Lane east will be restored as a cycle/pedestrian route. This promenade will be emphasised by an avenue of blossom trees that will celebrate Spring and the approach of the conclusion of the academic year. The promenade will also form part of a circular network of pedestrian and cycle routes that will link the heritage assets and celebrate the landscape and built heritage of the campus (Figure 84).

This circular route will begin in the core of the Campus Heart, where Holford's legacy is retained and celebrated by the restoration of Templeman Gardens, framed by the Templeman Library and Eliot and Rutherford Colleges. The route will take the visitor in a clockwise direction along the new promenade to the west, past the original Physics Laboratory (Marlowe Building), through the new central University Square and on through to Keynes College and Turing College, where the route will divert to visit Beverley Farmhouse and to enjoy the magnificent view of Canterbury Cathedral. Moving northwest, the route will pass through the Ancient Woodland of Park Wood on its way to historic Hothe Court Farm, Barn, Oast Houses and kitchen garden. The route will then travel north along the Old Salt Road and cross the Sarre Penn Valley, where the visitor can enjoy the listed Blean Church and the adjacent Scheduled Monument. The heritage route will then turn eastwards across the farm fields until it connects with the footpath and cycle route along the trackbed of the former 'Crab and Winkle' Railway Line. Travelling south along this route, the visitor will see the Grade II* listed north portal of the former Canterbury and Whitstable Railway tunnel. Re-

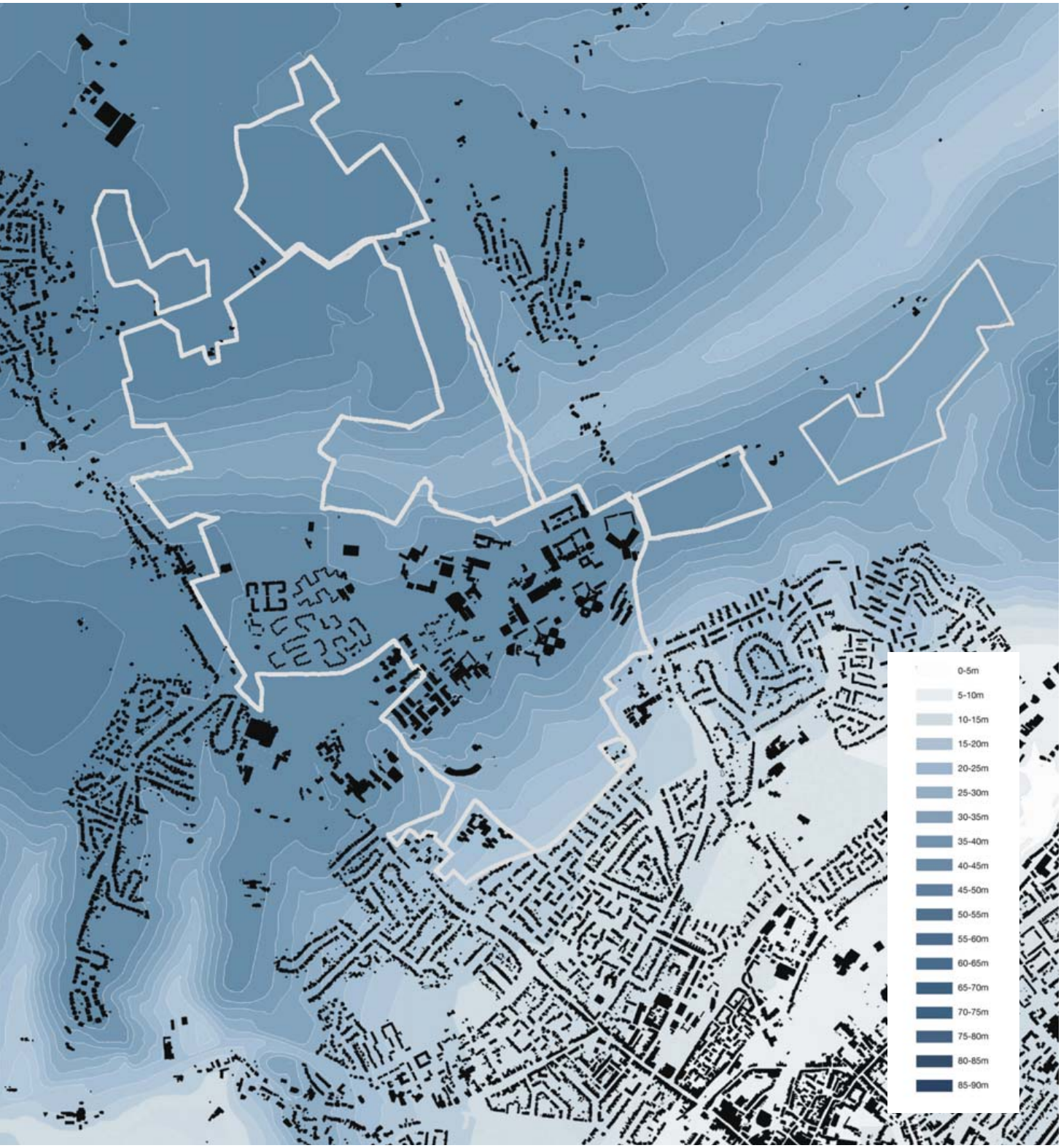



Figure 82: Figure ground drawing of the University campus superimposed over a contour map

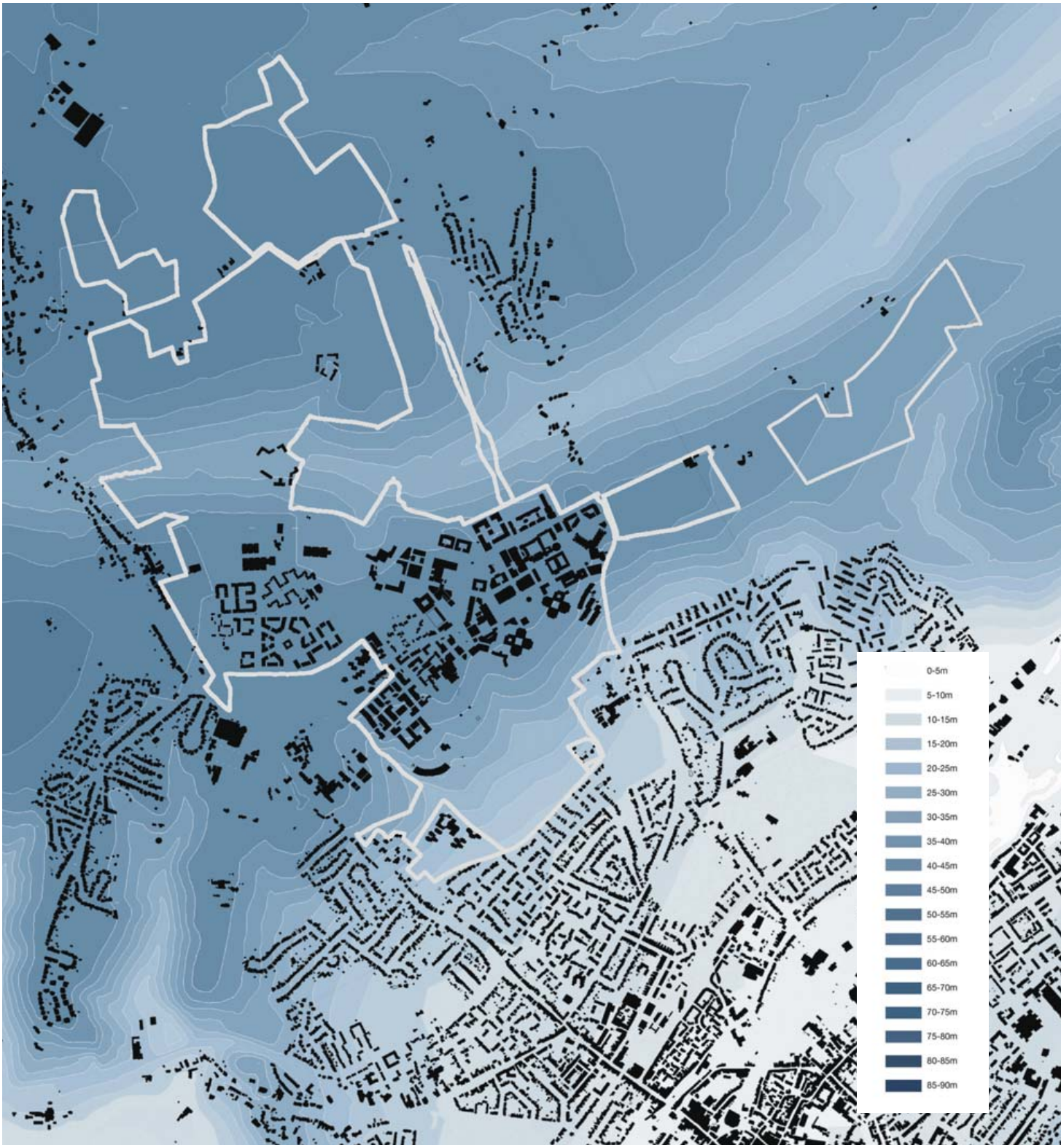



Figure 83: Figure ground drawing of the University campus superimposed over a contour map; the masterplan proposals will consolidate future development along the ridgeline

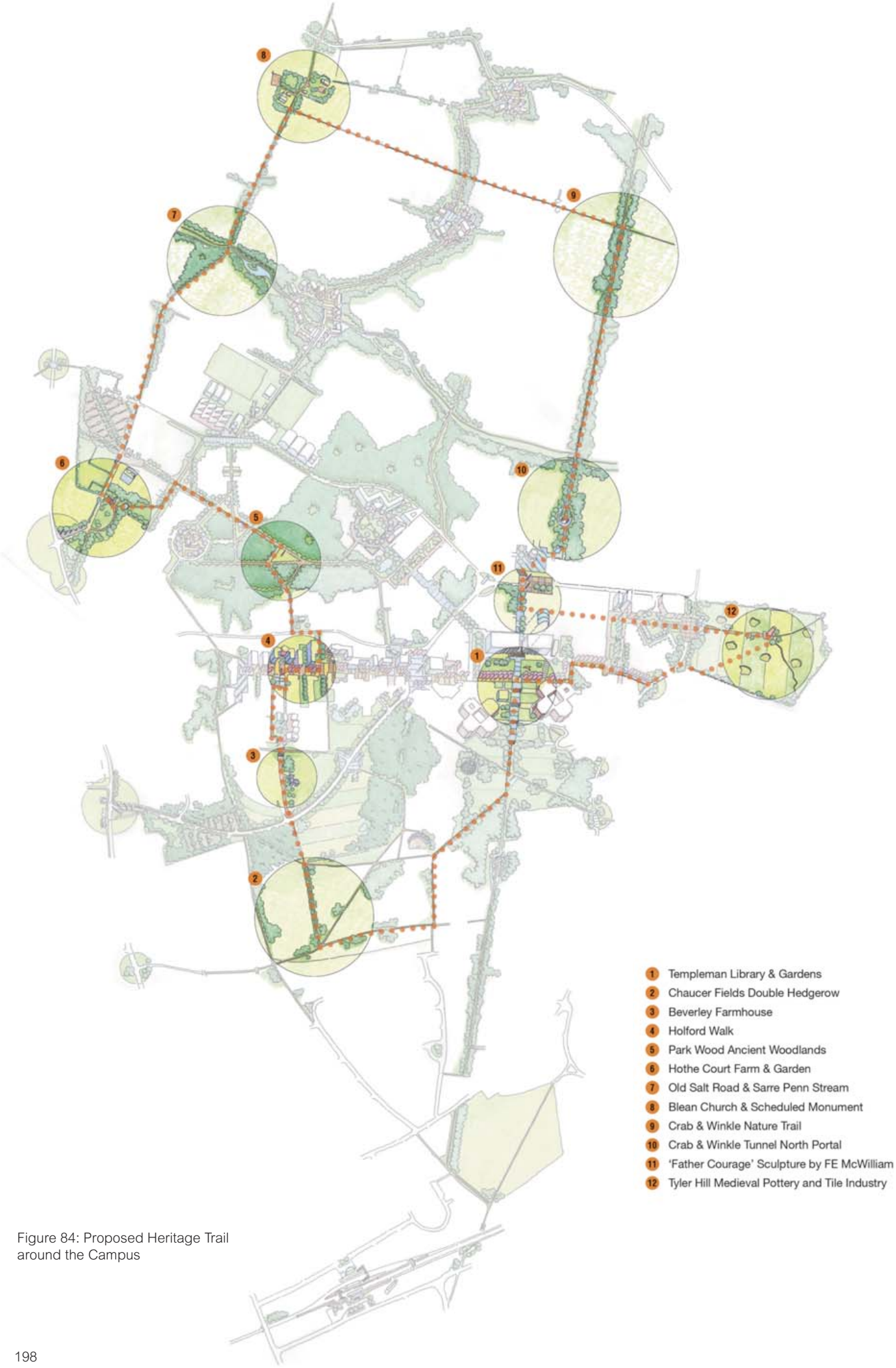



Figure 84: Proposed Heritage Trail around the Campus

Figure 85: Contemporary views of the University campus emphasising the importance of quality spaces between buildings

entering the Campus Heart at Woolf College, the route will continue down to the entrance to the Gulbenkian Theatre, where it will turn eastwards and pass through the gardens of Darwin College. On arrival at St Stephens Hill, the route will pass through a new entrance square welcoming visitors to the campus, and also forming an entrance portal to the new Scheduled Monument of the Tyler Hill Medieval Pottery and Tile Industry. The route will continue from here along the historic alignment of Giles Lane, where it will return the visitor to Templeman Gardens in the heart of the campus, surrounded by the legacy of the 1965 Holford planning and architecture.

Holford's masterplan concept was to create a new built environment independent from its host city. The University was conceived as an idealised academic community on the Giles Lane ridgeline overlooking Canterbury to the south. There is visual connectivity between the two communities at the same time as physical separation. This relative isolation has been eroded over time as the University has consolidated on the ridgeline and the neighbouring communities around the University have edged ever closer. Also, a significant number of university students and staff have settled in the area. As a result, the University has become inextricably linked with the city and with the surrounding communities. A very important part of the masterplan thinking is a direct response to this evolutionary process, in that it makes the campus more welcoming and accessible to all. Legibility is improved within the University itself and connectivity is opened up in every direction around the campus perimeter. Through this process, Holford's Masterplan and the University as a whole will be more fully integrated with the city, the surrounding communities, the outlying villages and the wider landscape.

The Framework Masterplan has set out to provide a flexible spatial framework for the Canterbury campus that is intended to ensure an appropriate response to the rich and complex nature of the campus heritage. Looking ahead, as future developments are brought forward through the normal planning process, heritage assessments will be undertaken at a more detailed level as required and in line with the National Planning Policy Framework and legislative requirements. The approach to heritage will conform to the established process of preserving and enhancing the heritage assets,

Figure 86: Sketch view showing Templeman Gardens in the foreground retaining important views of historic Canterbury between Eliot College and Rutherford College

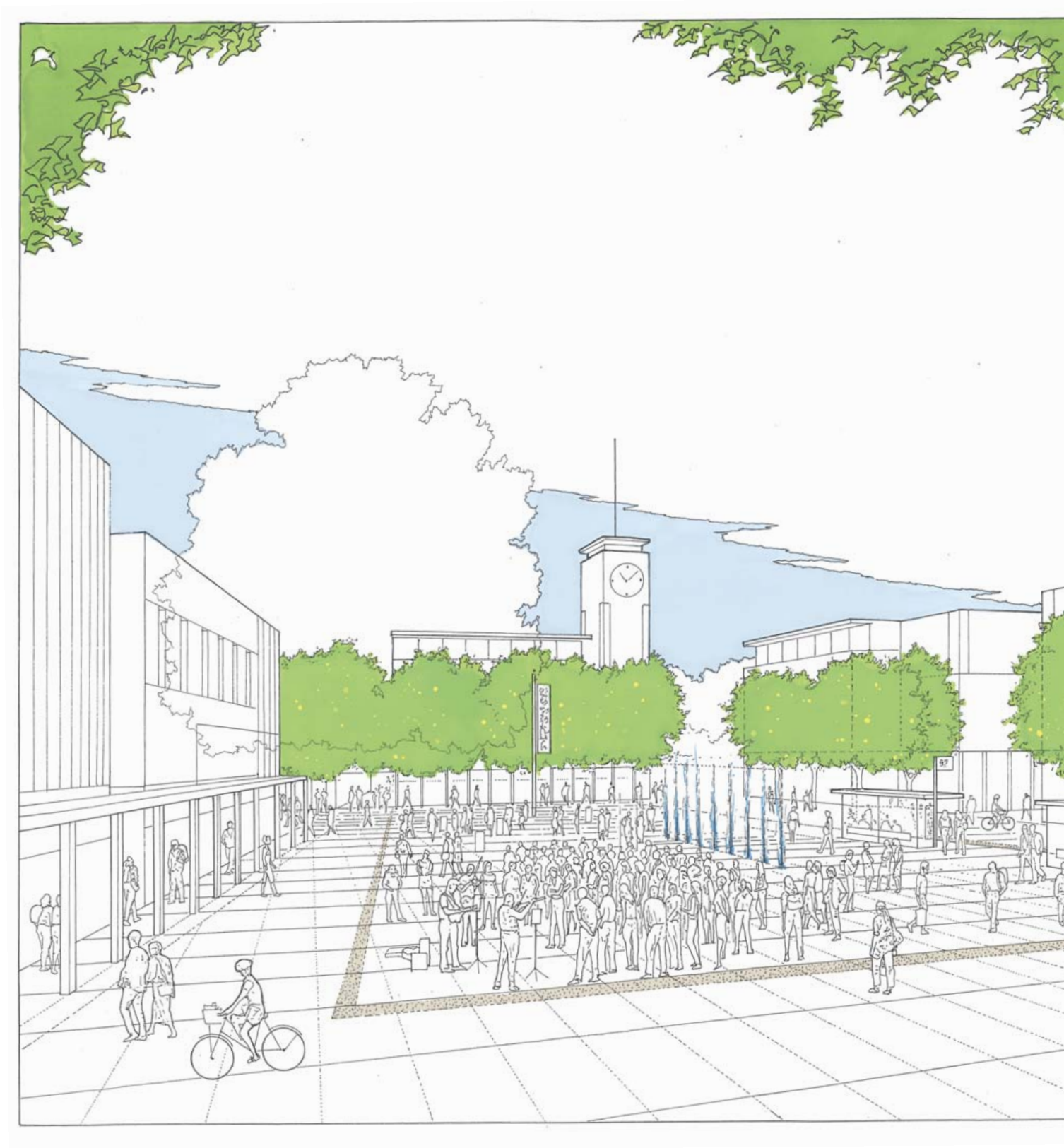


Figure 87: Sketch view showing the new University Square at the junction between University Avenue and Giles Lane. This space will mark an important arrival square within the campus and provide a space for gatherings for the university community

undertaken to inform the design process and to help determine any appropriate measures of mitigation. Future development proposals will also be informed by archaeological desk-based assessments of the application sites where appropriate.

## 8.4 A Rich Mix of Spaces and Uses

The Masterplan provides a clear 'framework' or 'template' within which buildings and spaces can be developed as and when needs dictate and budgets allow, and the right balance between built development and open space can be struck at every stage of growth and development. By developing the character areas and emphasising the differences between them, the Masterplan will deliver a structured and coherent campus layout, guiding the creation of a great variety of new spaces and places between buildings for the enjoyment and productivity of the whole university community (Figures 85, 86 & 87).

The key will be to create a green campus of great variety and diversity, and might include some or all of these:

- Formal spaces for ceremonial use
- Planting that frames views of Canterbury and the Cathedral
- A 'high street' of shops and cafes along 'Holford Walk'
- Informal, relaxed spaces, quiet quadrangles and spaces for social interaction and debate
- A 'Speakers Corner'
- Spaces for outdoor gymnasia, children's play and outdoor performances of drama and music
- Spaces for displaying art, which are 'curated' as an outdoor gallery
- Spaces for outdoor festivals, markets and entertainment
- Spaces for outdoor study and teaching spaces
- Eco-spaces that generate greater ecological and amenity interest
- A biodiverse and ecologically designed wetland feature to provide a new focal landscape attraction and where a diversity of flora and fauna could thrive
- Gardens of floral displays
- Productive' gardens, such as allotments and orchards
- Planting that change with the seasons

- Trees with strong autumnal colours to welcome students to a new academic year
- An avenue of blossom trees to celebrate graduation in Spring
- Trees and shrubs decorated with lights to brighten the dark winter nights
- Spaces and courts for a wider variety of outdoor sports and games

By bringing a focus on the laying out of a wonderful new and enhanced public realm, the Masterplan will distinguish the University of Kent as a campus of unparalleled landscape character. Already one of the greenest campuses around, set in the most wonderful parklands and surrounded by some of Kent's most attractive countryside, the University is taking the opportunity to create a clear and unique brand as a great place to be for potential new students and staff in an increasingly competitive market. In this way, the University has the potential to not only secure sufficient expansion space to suit its future needs, it also has the opportunity to build a reputation as 'The University of Kent in the Garden of England'.

## 8.5 The Approach to Legibility and Coherence

The University of Kent's Canterbury campus was developed around a network of roads, routes and paths. This network has evolved over time and covers a spectrum of lines of movement ranging from the busy strategic roads such as Whitstable Road, to informal paths criss-crossing the university campus and extending to the surrounding landscapes. During the lifetime of the campus, the simplicity and coherence of Lord Holford's original plan has inevitably become compromised by the imperative for growth experienced over the 50+ years since the University was established.

In considering how such a network might evolve and extend in future years, and in the process become better connected and more legible, it is necessary to consider how to adapt the underlying movement structure, as well as which parts of the network are likely to remain fully-trafficked roads, and which routes are capable of adaptation to different roles and character:

- University Road is likely to remain the principal route for traffic approaching the University from the city centre to the south
- The major east-west ridgeline route through the estate, Giles Lane, is a publicly adopted highway and likely to remain an integral part of the surrounding public highway network; as such it must remain accessible for all travel modes. The character of Giles Lane as a road, open to general traffic, is therefore likely to continue for the foreseeable future. Some changes to the surface treatment are suggested on the masterplan drawing, including shared surfaces, traffic-calming tables and edge detailing, to enhance the relationship between Giles Lane and the surrounding university context. However, any changes of this nature will be subject to detailed discussion, and agreement with, the Highways Authority during the gradual development of the Masterplan
- There is little appetite and few opportunities within the immediate surroundings for new large-scale, strategic highways to change the pattern of traffic movement. None are planned or proposed, and the topography, landscape and pattern of routes limit the likelihood of significant new road building in the immediate surroundings
- As we have already identified, vehicles dominate the campus both in terms of roads and parking. The apparent lack of alternative transport modes means that visitors and many members of staff drive to the campus on a daily basis. Car parks are distributed across the campus, including many in the campus heart. The daily search for a parking place creates campus-wide congestion, air-pollution, consumes valuable time and fuel and generates frustration all round. It is difficult to move around the campus as a pedestrian or cyclist without encountering conflict with fast-moving vehicular traffic

However, the technology of vehicles is changing rapidly. Advances in electric power for vehicles is causing a blurring of boundaries between different forms of private or personalised transport. For example, it is increasingly difficult to define the point at which an electric-powered bicycle becomes an electric motorcycle. This rapidly expanding spectrum of vehicles, covering all types of

movement, from wheelchairs to delivery vehicles, to people transporters, requires a new vocabulary to predict and describe a new generation of route types. Vehicle recognition technology combined with sophisticated control mechanisms will increasingly enable such a spectrum of routes and paths to be used for selected vehicle types and specific users.

In seeking to achieve a more coherent campus therefore, the Masterplan proposes a number of improvements to both the university movement network that will form a clear and legible structure of key lines of connectivity, which will help visitors to easily form a 'mental map' of the campus and anticipate emerging and predicted changes in future vehicle use, design and controls. These can be summarised as follows:

- A change in character for University Road from a largely utilitarian length of highway to 'University Avenue' – a distinctive tree-lined street, interspersed and punctuated by a sequence of places where routes intersect with the avenue
- The extension and completion of a consistent east-west traffic-free pedestrian and cycle route across the Campus Heart from Turing College in the west to Darwin College in the east
- A new and largely traffic-free north-south pedestrian and cycle route running at ground level (and as far as possible) along the former 'Crab and Winkle railway line, to connect the Campus Heart to to Canterbury in the south and Tyler Hill Road in the north
- More prominence for, and greater use of, the Old Salt Road as a coherent traffic-free pedestrian and cycle route link between Blean Village, Blean Church, Blean School and the Oaks Nursery
- A new controlled vehicular connection into the campus from Whitstable Road, linking the south end of the Old Salt Road to Park Wood Road. This will allow buses to enter and leave the campus using Park Wood Road, and allow vehicle entry to the car park south of the Oaks Nursery

The Framework Masterplan therefore envisages the adaptation of the campus to create a clear and legible structure of movement along key lines of connectivity and a new generation of route types. Such routes respond to a movement strategy that promotes greater connectivity for all throughout the University Estate, giving much greater emphasis and status to walking, cycling and small-scale, slow-speed vehicles, with less reliance on conventionally-powered cars and lorries. The approach takes account of current changes in technology, and the potential for a secondary fleet of electric vehicles managed by the University Estate. Many of the routes will be capable of carrying occasional conventional motor traffic, but such use will be subject to access control systems.

## 8.6 The Movement, Transport and Car Parking Strategy

Connections form the foundation of a successful University. The expansion of knowledge and skills depends upon the ability of individuals and organisations to connect and interact with one another and to engage with an ever-expanding body of knowledge. Such connections, both physical and virtual, provide the University with the essential structure for its activities of learning and knowledge distribution.

The Framework Masterplan addresses such connections to achieve a variety of goals:

- to support the long-term aspirations of the University
- to align the future development of the University's estate with the broader transport objectives of Canterbury City Council and Kent County Council, and
- to maximise opportunities for connections within the University, between the University and the City, and within the wider regional, national and international context

While recognising that the motor vehicle in its various forms is likely to continue to play a major transport role well into the future, the Framework Masterplan seeks to reduce dependency on private cars, to minimise the impact of road traffic, and to promote a wide range of forms of movement that are less constrained by the environmental, spatial and capacity limitations of road transport. In seeking to reduce dependency wherever possible on the private car, the Masterplan also builds upon the long-established and considered University Travel Plan.

# 8 Summary of the Framework Masterplan Proposals

### Shifting the Movement and Transport Narrative:

The Movement and Transport strategy that underpins the Framework Masterplan places sustainable travel firmly at the top of the travel hierarchy. It contains a suite of walking, cycling and public transport improvements all aimed towards reducing the historic dominance of the car within the campus. These schemes are listed in full in the Movement and Transport Strategy and in summary they include (among others):

- new and improved east-west and north-south walking and cycling routes and crossing points within the campus and wider estate
- implementation of infrastructure, wayfinding and signage that increases the visual prominence of non-car modes within the campus
- creation of a closer visual relationship between the bus turnaround and the Campus Heart, delivering high quality modal interchanges
- supporting wider connectivity improvements for walking and cycling beyond the Campus, for example routes to Canterbury West Rail Station and Sturry Road Park and Ride
- a new link to Whitstable Road to deliver improved permeability of the Campus for bus services, and
- a commitment to harness opportunities provided by technology as it develops and expands, for example electric vehicles, electric bicycles and in the long-term, autonomous transit opportunities

The timing of these measures are summarised in the supporting Movement and Transport Strategy document by PBA/Stantec.

In the recent past, the University of Kent Travel Plan has played a significant role in shifting staff and student travel towards sustainable non-car modes, thereby creating the headroom for growth. The University is also currently developing a Parking Management Strategy that will inform and support the Travel Plan. Both documents will be regularly reviewed and updated and will continue to play an integral role in realising the ambitions of the Masterplan, actively monitoring and managing the impacts of growth through the timely delivery of appropriate proposals set out in the Movement and Transport Strategy.

### Addressing a Legacy of Car-Dominance

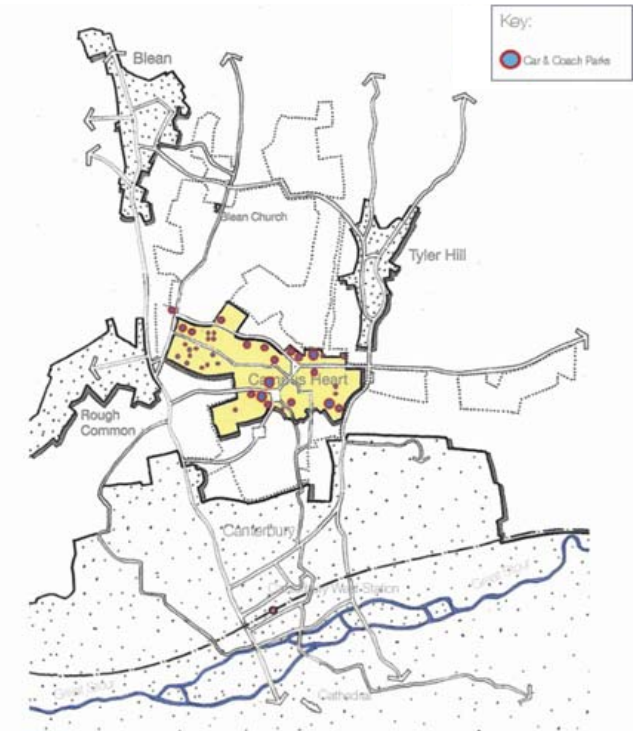
One of the major issues facing the quality of the public realm in today's campus is that motor vehicles tend to dominate the university environment. There are currently 2,234 car parking spaces spread across some 70 separate parking areas. Car parks infiltrate into the very heart of the campus, a legacy of the 1965 Holford Masterplan, created in an era when the private motor car was seen to be the answer to our transport needs and growth in car ownership increased dramatically (Figure 89).

As noted earlier in this document, the campus has grown considerably since the University was opened in 1965 and the focus has been on developing the built environment, perhaps at the expense of developing spaces of equal quality between them. The ever-pressing demand for car parking has seen surface parking areas retained in the Campus Heart and others constructed with each new phase, resulting in the prevalence of car parks we see today. Furthermore, the campus roads are not particularly urban, often busy in peak times and intimidating to pedestrians and cyclists due to vehicle speeds.

The design of the roads does nothing to discourage high speeds and these circumstances legislate towards greater unnecessary use of motor vehicles to undertake journeys of even modest distances. Giles Lane and University Road are used by non-university motorists to bypass the city centre and Park Wood Road is used by non-university motorists to deliver and collect Blean Primary School pupils. Because of the large number and wide distribution of different car park locations across the campus, journeys are often extended by searching for a parking space, causing driver frustration, higher speeds, greater fuel consumption and consequently a reduction in air quality.

The main point is that growth and other changes made to the University over time have been delivered in the absence of a policy to balance growth with quality of environment. Future emphasis on campus planning must therefore be focussed on growth, balanced with good placemaking.

The Framework Masterplan proposes to redress this imbalance by introducing the following measures to limit car use and to deter people from driving short-distance journeys:



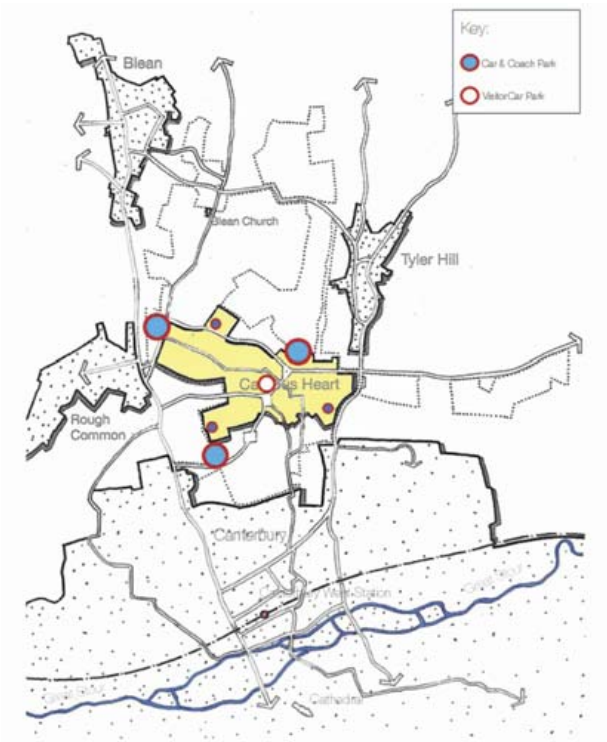




Figure 88: Concept drawings showing how the Masterplan reduces the overall number of carparks and relocates them to the edge of the Campus Heart

- The 70 car parking areas that currently exist on Campus (excluding the Innovation Centre and Estates Management Maintenance Vehicle Car Park) will be consolidated into eight principal car parking areas for university staff, students and visitors. An additional car park will be provided for the exclusive use of the proposed conferencing hotel. These are identified in the accompanying illustration (Figures 88, 89 & 90)
- The new consolidated car parks will be located close to five vehicle entry-points onto campus (ie: Whitstable Road/University Avenue, Whitstable Road/Giles Lane West and St Stephens Hill/Giles Lane East) to discourage car use and to reduce congestion within the campus, thereby improving air quality
- Encouraging cars to be left at vehicle entry-points will make the campus a safer environment for pedestrians and cyclists, and encourage car drivers to use healthier and more sustainable forms of travel such as walking, cycling or public transport
- The network of walking and cycling routes within the campus will complement the strategy to rationalise and consolidate parking, especially if the car parks are provided with cycle compounds or racks of rental cycles
- Sizes of car parks will be as equal as possible in order to ensure that access to car parking spaces is distributed as evenly as possible, to prevent any single entry-point from attracting more traffic than another, to discourage unnecessary car use on campus and to reduce search time and travel for spaces

- Car parks will generally be at grade and at one single level wherever possible to assist with accessibility for all. Rapid advances in personal transport technology and the increasing trend away from private car ownership means that multi-storey car parks may become obsolete in the near future, with pool vehicles and car clubs becoming increasingly popular in university locations. Furthermore, this approach will ensure that the high costs of multi-storey car park construction does not divert funds inappropriately away from the primary objective of education. Neither will it limit the University's ability to deliver the car parks as and when they are needed, as well as protecting the campus from the visual blight of tall car parking structures
- The phased delivery of these spaces will require careful management to ensure an adequate amount of car and coach parking at any one time. These eight principal car parks do not, of course, represent all the car parking associated with university uses, as spaces will also be required for those with disabilities who need to park close to their place of work or study or the venue they are visiting
- The proposed consolidation strategy will remove car parking areas from the Campus Heart and create space for the development of new buildings as well as squares, gardens, courts – the public 'living rooms' where human interaction can take place. This will invest the University with a greater 'sense of place' and encourage greater productivity, attractiveness, economy, health and wellbeing
- The reduction in the number of car parks across the campus will be accompanied by the use of electronic signage and satnav technology to direct drivers to available spaces. This will help to improve the management of vehicles on the estate, to reduce distances and time spent looking for a space to park. In the medium and longer-term, opportunities to introduce Electric Vehicle Charging Points will be considered to encourage and support the use of electric cars to improve air quality

Figure 89: Car parking locations across the existing campus; currently parking is spread across 70 separate carparks within the Campus Heart

on 74 Cars
Chipperfield
40 Cars
Sibson 26 Cars
Maintenance
23 Cars
Giles Lane
555 Cars
6 Cars
Wood
Cars
3 Cars
Estates
29 Cars
Woolf Quad
5 Cars
Woolf 20 Cars
Sports Centre
Road 79 Cars
Central Visitors
63 Cars
9 Cars
5 Cars
2 Cars
Registry 12 Cars
Sports Centre
99 Cars
Darwin Road 8 Cars
3 Cars
Rutherford 120 Cars
Darwin 37 Cars
Tyler Court 68 Cars
Eliot 46 Cars
Keynes 209 Cars
(inc Monkswell & Careers & Rothford)
8 Cars
2 Cars
9 Cars
7 Cars
tion Centre
ars
Beverley Farm
22 Cars

# 8 Summary of the Framework Masterplan Proposals

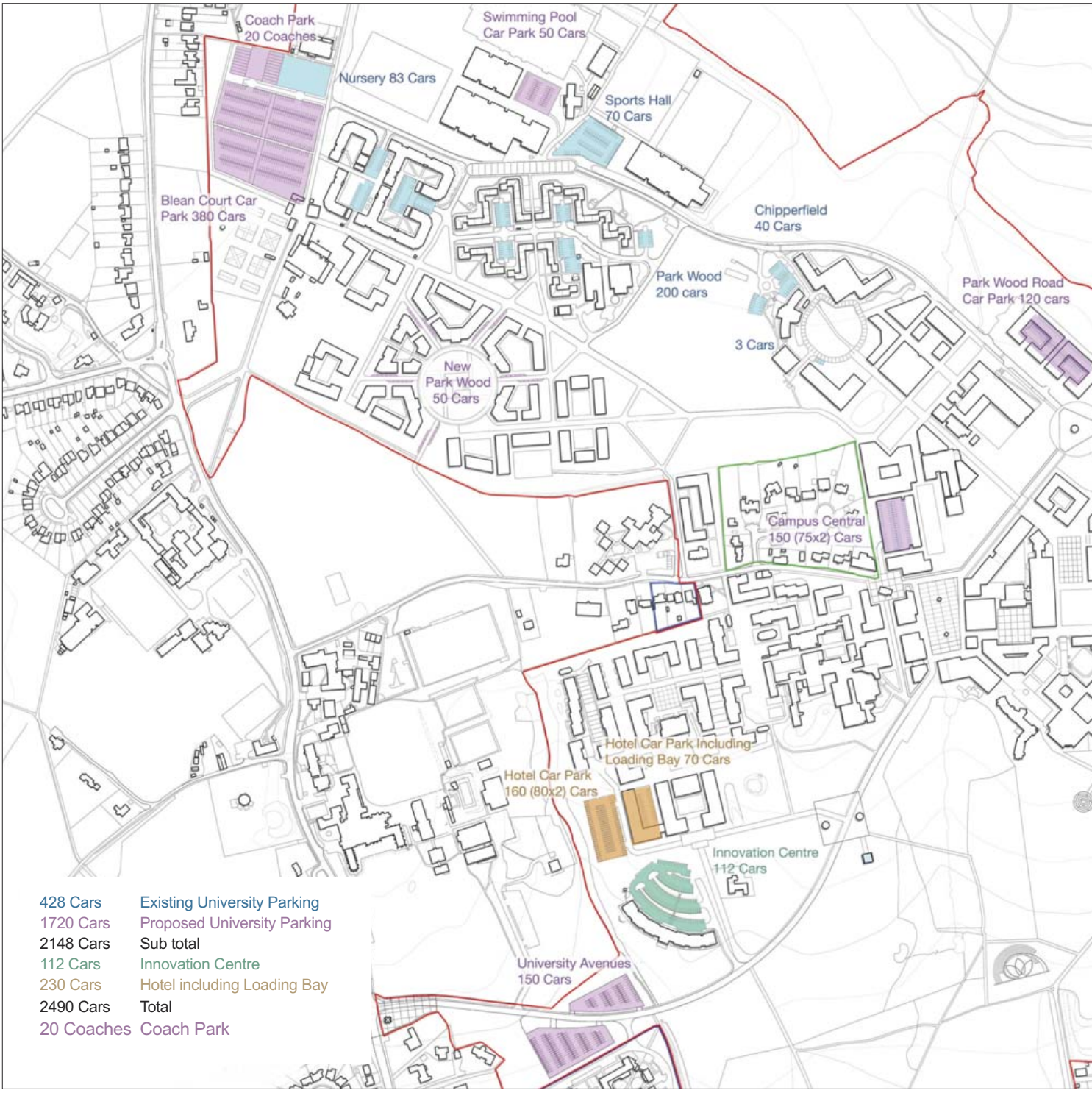



Figure 90: In the masterplan, new car parking locations will be located around the edge of the Campus Heart, reducing the number of carparks from 70 to 8 principal parking areas for staff, students and visitors

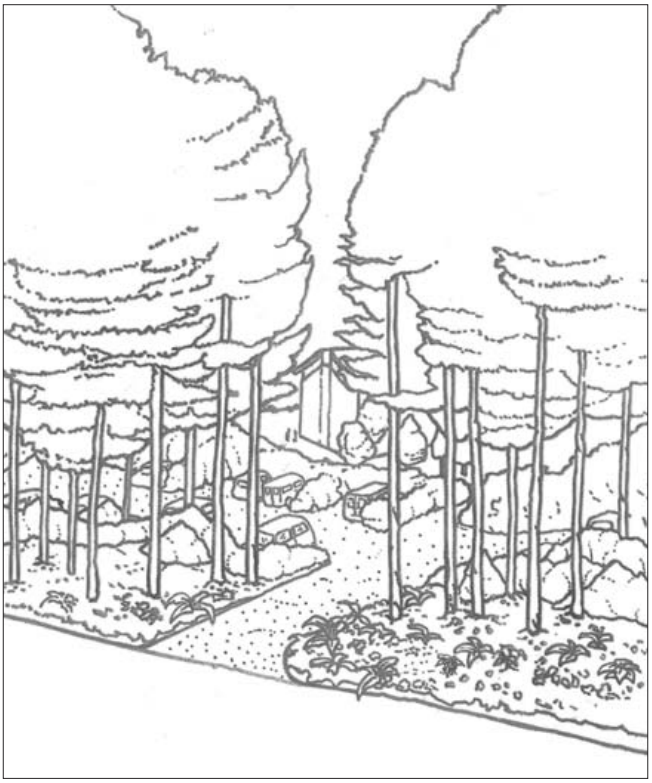
Developing the Long-Term Strategy for Consolidation of Parking Spaces:

The locations of the proposed new car parks have been chosen with great care in order to deliver the strategy described above, and to fit comfortably into the rest of the Masterplan. Despite the large size of the campus, the choice of where car parks can be reasonably located is relatively limited:

1 University Rise:
The open landscape of the University Rise Character Area plays an important role in providing a green setting to the University as well as a landscape demarcation from the city, which is a major part of the University's attractiveness to students, academic staff and visitors.

The exposure of this area as the northern backdrop to historic Canterbury and the World Heritage Site also suggests that the location of a car park in either the open grassland of Chaucer Fields, or in Bluebell Wood, would be totally inappropriate. The intense local opposition to earlier proposals to build a conferencing hotel in this location bears this out. Similarly, the location of car parking on the apron of space to the south of Beverley Farmhouse would be inappropriate in its impact on the setting of this historic listed building. Available space for parking in Turing South is limited by the proposed intervention of the conferencing hotel; also the requirement for hotel expansion and its own parking will consume the remaining space in this part of the campus. The remaining space in this character area is already taken up by Keynes College and Turing College, and by the private housing along Giles Lane West.

The proposed location of a new car park at University Avenue West provides an opportunity for a discreet area of parking close to the entrance to the campus from Whitstable Road, in an area of developing woodland in an unobtrusive space between Chaucer College and St Edmunds School, already screened by high hedges on each side. This car park location is already in close proximity to a network of existing tracks and footpaths that criss-cross this area and link it to other parts of the campus. The sensitive introduction of high hedges and



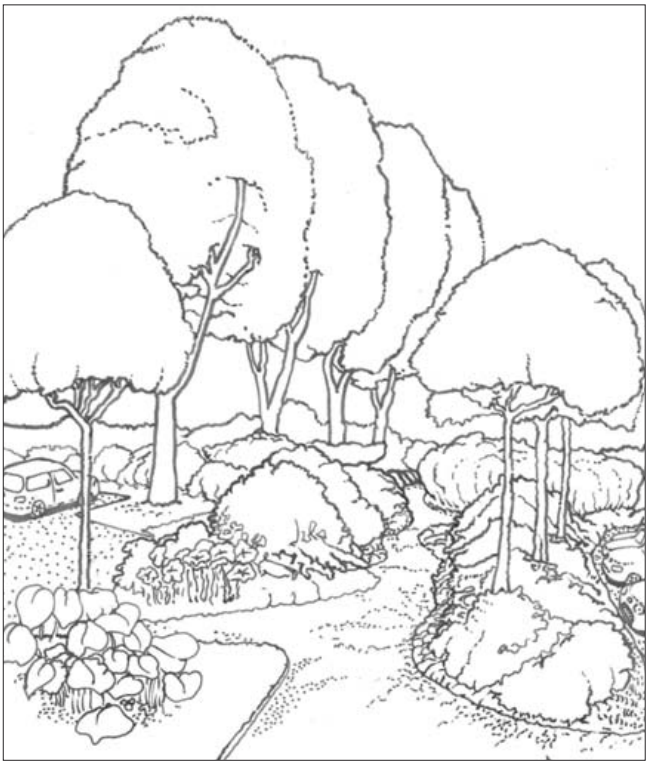
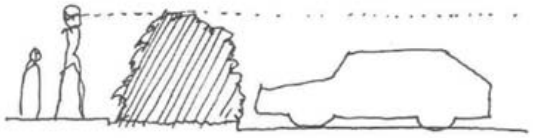
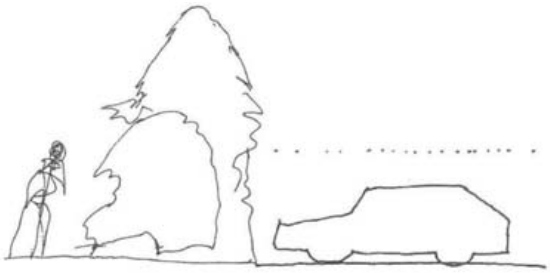


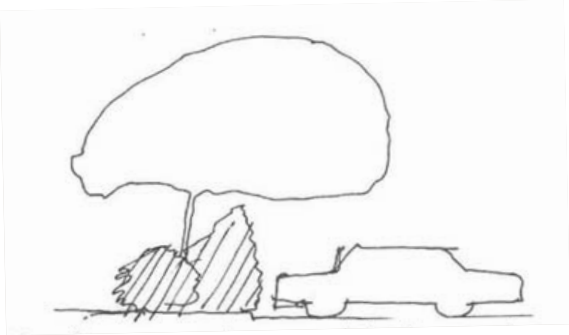
Figure 91: Where new car parks are located in areas of particular heritage or landscape quality, the impact will be mitigated by dense screening planting



Shrub screening up to 1.5m such as dog rose, hawthorn, beech blackthorn to give all year round screening



Shrub hedges can be planted which achieve 3-4m high screen



Small ornamental trees and shrubs may be combined to give greater screening and shade

green landscape screening, along with perforate paving and load-bearing grass reinforcement, will enable vehicle parking here for daily or overspill use without interrupting the flow of rainwater into the ground. In addition, 'swales' could be introduced to filter out contamination from vehicles.

2 Whitstable Road

This landscape character area is mainly comprised of the historic woodlands of Park Wood and Brotherhood Wood, plus the remnants of Hothe Court Farm; consequently, it is the woodland environment which dominates and distinguishes this part of the campus from the remainder of the University.

The masterplan proposal to create a new controlled vehicle entry point in this location, with associated areas of car parking, provides a significant opportunity to solve some of the serious problems of vehicle circulation and parking that blight the campus today. At present, there are only two vehicle entry points to the campus from the west, and neither serve the north-west area at all well. Consequently, those needing to access this area by motor vehicle (for example, parents delivering children to and from Blean School and the Oaks Nursery) must drive through the centre of the Campus to reach them. Visitor coaches wishing to gain access to the sports pavilions and sports fields in this part of the campus must also drive through the centre of the campus to reach them. These factors are currently also adding to traffic in the centre of the University. A new vehicle access point here, with access onto Park Wood Road restricted to buses only, would obviate the need for all these motorists to access the main part of the campus.

The predominance of Ancient Woodland means that the location of a car park in either Park Wood or Brotherhood Wood would be totally inappropriate. Available space for parking in the Whitstable Road Character Area is therefore limited to its western edge.

The proposed location of a new (albeit modest-sized) car park immediately adjacent to the new entry point from Whitstable Road provides an opportunity for a discreet area of parking close to the entrance to the campus. In addition, the proposed car park directly to the south of the Oaks Nursery provides an opportunity for an area of parking where it is most needed – close to the nursery, Blean School and the sports fields. A car and coach park in this location will obviate the need for vehicles to drive through the Campus Heart to reach these facilities. Furthermore, an additional small area of car parking is proposed adjacent to the relocated sports pavilion and new swimming pool just north of Park Wood Road to serve the needs of day-to-day visitors to these facilities.

This area is already extremely well-served by the network of existing cycle tracks and footpaths that link it to the heart of the Campus. Although close to the listed Hothe Court Farmhouse and Barn, the sensitive introduction of high hedges and green landscape screening, along with screening by the existing and proposed buildings and the Community Garden would enable vehicle parking here for daily or occasional use without interrupting the enjoyment or setting of these historic structures.

3 The Campus Heart

The heart of the University sits in an exposed location along the ridgeline overlooking the Great Stour Valley. This character area takes advantage of exceptional views to both historic Canterbury to the south and the Kent Downs beyond, as well as the views north across open countryside towards Whitstable and the coast.

The proposal to greatly diminish the scale of car parking in this area is an underlying principle of the Framework Masterplan to create space for the development of new squares, gardens, courts and other spaces as well as new buildings. It would seem inappropriate therefore to create new car parking facilities in this area. However, the existing Giles Lane car park and the Estates Department site do provide opportunities to expand parking on sloping ground at the edges of this part of the campus, by providing car parking at low level that will be screened in due course by new developments built above them. Decking over part of the existing Giles Lane car park will provide approximately 250 additional spaces. These car parking areas both benefit from being close to the Campus entry point from St Stephens Hill.

Another location for parking in the Campus Heart is provided by the sloping ground in the east of the campus to the south of Darwin College and north of Tyler Court student housing. This car park will have its own entry point

for traffic turning left as it travels up St Stephens Hill. In this location, this new car park will again take advantage of a slope in the site to accommodate a simple two-storey decked structure.

Otherwise, the role of this area as the northern backdrop to historic Canterbury and the World Heritage Site means that locating a car park elsewhere in the Campus would be very challenging. The exposed open grassland to the south of Eliot College and Rutherford College would not be an appropriate location, and neither would it seem sensible to devote space in the heart of the campus for car parking.

4 Sarre Penn Valley

This character area occupies the small valley north of the Campus Heart and Whitstable Road character areas and is located between the ridgelines of Giles Lane and Tyler Hill Road in the northernmost part of the university campus. It consists predominantly of enclosed and active agricultural land and is punctuated by hedgerows and small belts of woodland.

The masterplan recognises this area as a great asset to the campus in providing a green setting to the north of the University as well as a more rural landscape character. Any consideration of adding car parking into this area needs to take into account the following issues:

- No additional vehicle entry points are proposed in this character area to avoid placing any additional traffic loads onto Tyler Hill Road to the north
- This area is protected as part of the Blean Farmlands as an area of high landscape value
- The valley is overlooked on all sides and it would be difficult to screen parking in this area
- Rainwater run-off from car parks would threaten the biodiversity of the existing stream

We have therefore concluded that it would be inappropriate for car parking to be included in the Sarre Penn Valley, other than parking for those with disabilities and delivery vehicles associated with the small clusters of development proposed in this area.

**Summary:** It is worth noting that some of the proposed parking locations will have an impact upon certain landscape and heritage assets. It is also clear that the car parking locations proposed in the Framework Masterplan have been chosen with care and sensitivity and that alternative locations have been considered and discarded as inappropriate.

The proposed new access from Whitstable Road (if not provided as part of any reconfiguration of Blean School) will have some impact upon the heritage setting of Hothe Court. The University has always taken its responsibilities toward the heritage of the campus very seriously. At an appropriate point in the future (and prior to the vehicle connection from Whitstable Road being implemented), the University will study the impact upon Hothe Court in more depth and undertake a more detailed design exercise to determine appropriate measures of mitigation. Among the issues that will be considered, the University will investigate options to determine the best way to preserve and enhance the setting, including the character, width and scale of the existing route (the Old Salt Road) and the appropriate location and type of controls to be installed to limit vehicle types, speed, size and quantum.

Such impacts have to be balanced against the benefits of opening up this part of the campus to become more active and productive, enabling the University to establish appropriate and sensitive new uses for the heritage structures to ensure their long-term future. The Masterplan proposals will also help to re-balance traffic movement and its impact on the heart of the campus, discouraging car use and thereby ensuring a safer and less polluted environment overall.

Concerns have been raised about possible visual intrusion resulting from the introduction of car parking near the south-west vehicle entry point from Whitstable Road on University Avenue. Once again, at an appropriate point in the future, this issue will be studied in depth and detailed proposals brought forward for an appropriate level of screening planting supported by reasoned justifications to determine that this is the best strategy. The introduction of screening planting, for example, must also be carefully considered to achieve an appropriate balance between screening of cars and personal safety through passive surveillance and over-looking (Figure 91). These proposals and their impacts have to be considered in balance against the negative impact that motor vehicles currently have upon the Campus Heart, including traffic speeds,

congestion and air pollution, and the visual intrusion of the numerous open car parks that currently exist without screening or visual protection.

### The University of Kent's Parking Management Strategy

While the Framework Masterplan advocates consolidation of the car parking, the strategy for managing these parking areas is important to the success of the proposals. A review of the current parking management practices at the University has recently been completed and recommendations prepared for changes in the short, medium and long-term. These findings are reported in PBA's 'Parking Management Strategy' document dated April 2019. It is proposed that the Parking Management Strategy becomes a 'live' document that works in conjunction with the Travel Plan and is reviewed on a regular basis, thus ensuring movement and transport issues across the Campus and the implementation of the Masterplan measures are considered jointly.

The 'Parking Management Strategy' is intended to implement measures that seek to reduce the demand for car parking within the site in the short-term, which will rebalance the costs of travel more in favour of sustainable modes of transport. The measures focus on managing the conflicts between staff and student parking alongside the demands of associates and visitors. These measures include:

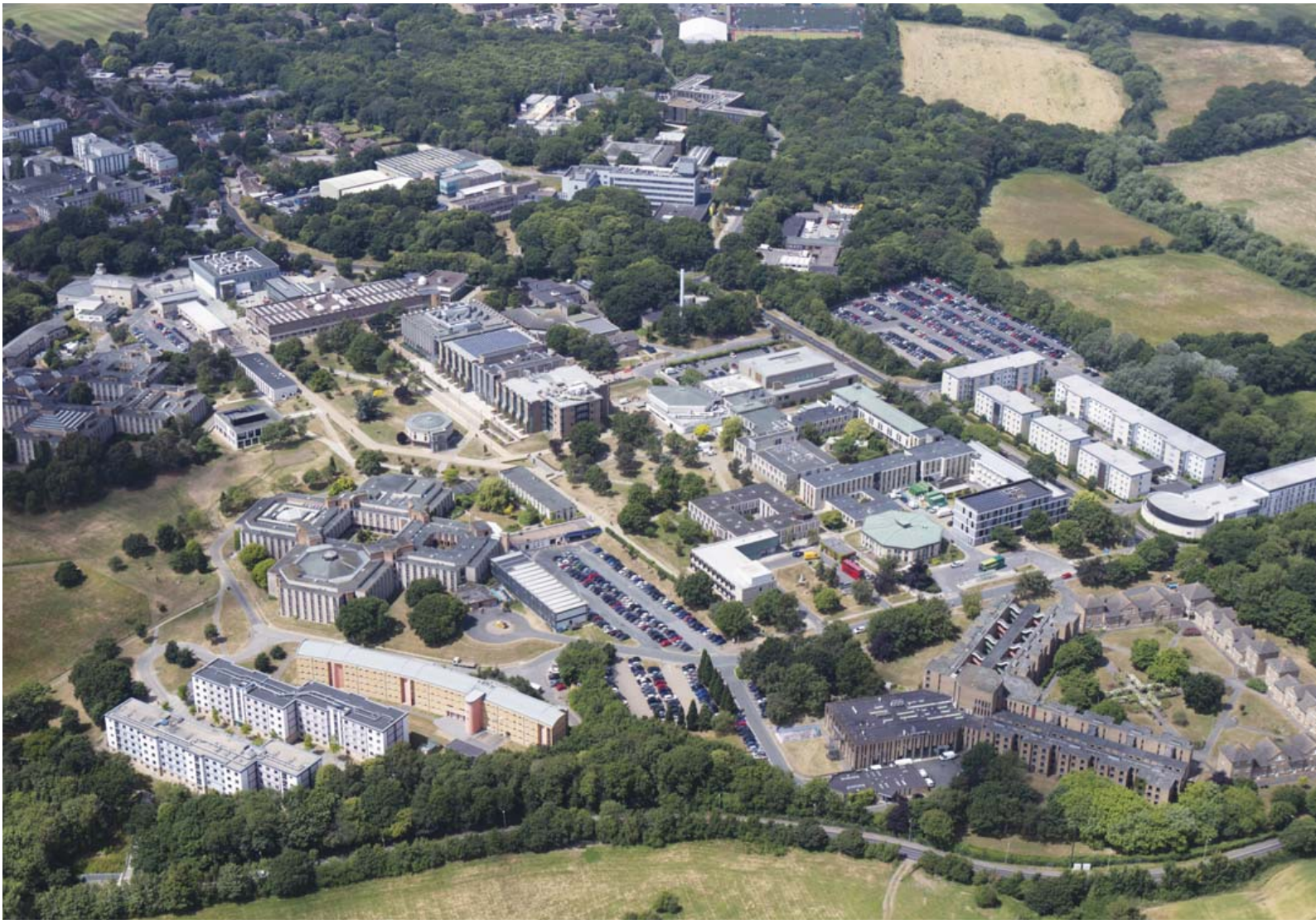
- Increasing current parking permit prices to bring the pricing structure for staff, students and associates to a level more comparable with sustainable mode costs and with other universities
- Introducing a management system and booking process for visitor parking supported by a charging system for visitors not using the pay and display facilities (for example when large events occur or for coach parking)
- Increasing the effectiveness of parking enforcement through the use of credit control procedures where necessary
- Establishing a set of key performance indicators that can be used to measure the success of the strategy

As the Framework Masterplan anticipates gradual growth in capacity at the University, a failure to address the existing management and pricing issues will not only increase the financial deficit occurred by operational and maintenance costs of the provision of parking, it may also limit the ability for growth within the Masterplan due to unacceptable impacts on the local road network.

Medium to Long-Term: In the medium and longer-term, the Parking Management Strategy focuses on supporting the rationalisation and consolidation of vehicle parking across the campus primarily through stricter criteria for all permit-holders. This includes a review and extension of the existing student exclusion zones, the gradual introduction of staff exclusion zones and/or restrictions with differential pricing, increased permit prices and a cap on the number of permits issued. As consolidation occurs, barrier technology will be implemented alongside variable message signs to direct permit-holders and visitors to appropriate spaces.

As part of the medium to long term strategy, a Trip Management System is also proposed. This would be a development planning and programming tool for Estates Management that comprises a spreadsheet that will indicate the current and future trip demand and the adequacy of facilities. Over the course of the masterplan, this will enable assessment of the quantity of car parking provision and any anticipated deficiencies. By forecasting vehicular demand, temporary provision may be enabled, and the need for further incentivising or encouraging sustainable travel modes may be identified to ensure the traffic impacts of new proposals are managed.

The Parking Management Strategy will require an ongoing review of the university permit systems and promotion of sustainable modes of travel through the Travel Plan, in order to ensure there are suitable alternatives available to car travel. Strategies are also required to monitor and manage the movement of servicing and delivery vehicles within the campus, to consolidate these to reduce their impact on key roads and other movement corridors, particularly those intended for sustainable modes of transport. New buildings will need to ensure that servicing and deliveries are generally rear-of-building activities and do not encroach on the enjoyment of the campus walking and cycling networks.



Summary of the Proposed Movement Pattern:

The Masterplan outlines a number of wider initiatives relating to movement and transport, to support the diversity of the identified character areas and to find solutions to the key challenges associated with the existing campus (Figures 92, 93 & 94). In principle, it proposes a simpler and more coherent picture of traffic flows, and explores options for alleviating the most pressing areas of concern both within the university campus and on the surrounding road network.

To deliver this proposition in accordance with these principles, the Masterplan delivers improvements to the campus in line with the following development protocols:

- Existing entry points to the campus will be reconfigured to be more prominent and welcoming, and new entry points will be created
- Car parking will be moved away from the centre and relocated on the periphery of the Campus Heart
- New buildings in the Campus Heart will be deliberately arranged to define a network of clear and coherent routes

# 8 Summary of the Framework Masterplan Proposals

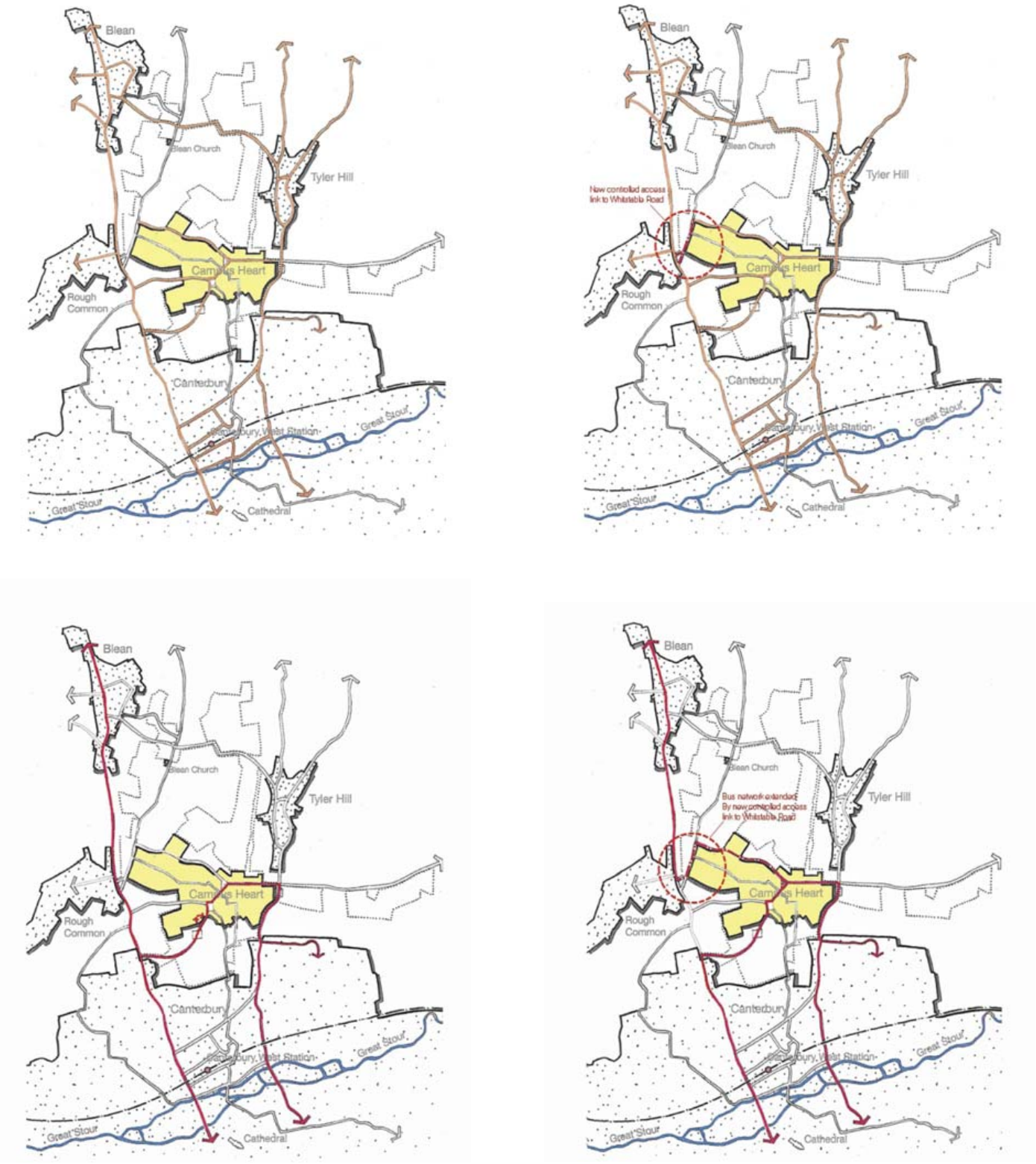



Figure 92: Concept drawings showing the impact of the Masterplan upon the movement and transport patterns

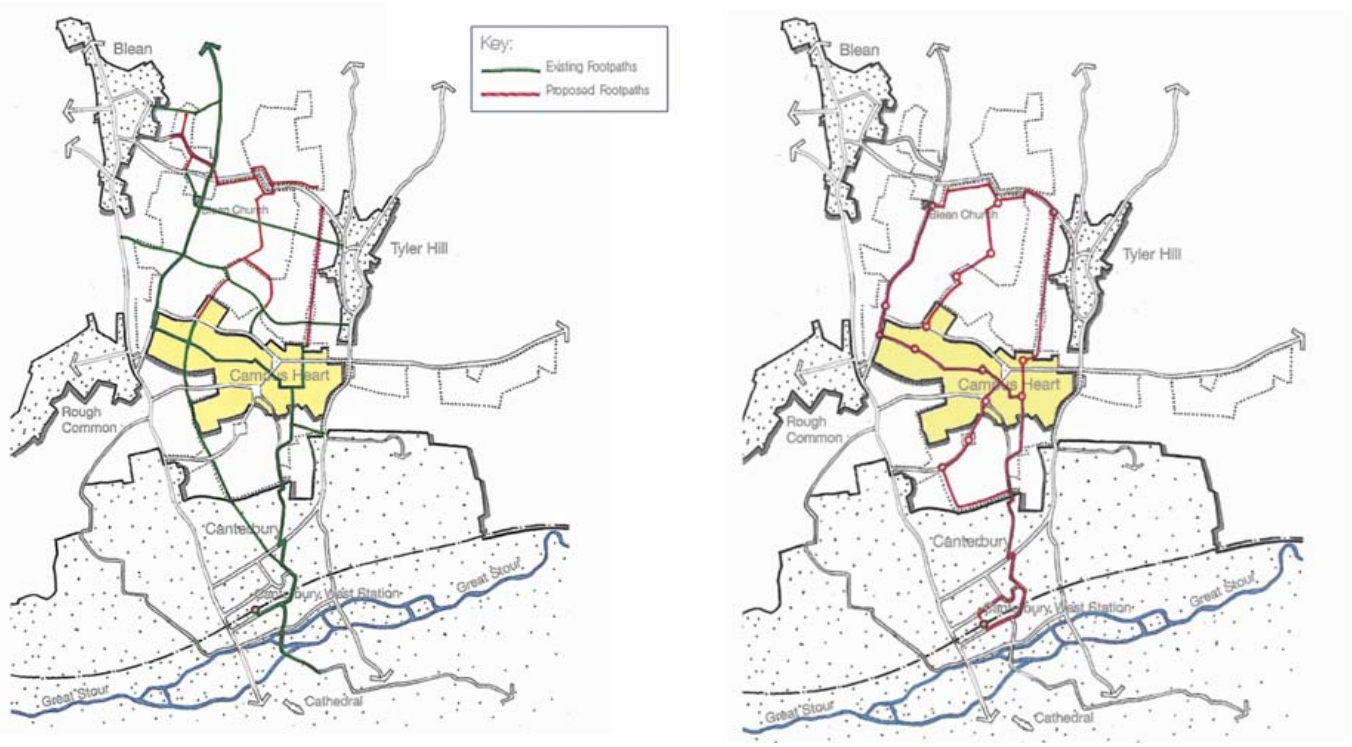



Figure 93: Concept drawings showing the Masterplan proposals for increased connectivity throughout the university campus

- A variety of places and spaces of different scale will be created – gardens, courts, quads and squares – to promote and reinforce interaction between all members of the academic community
- The intensified Campus Heart will accommodate more cultural attractions and visitor facilities for local people to use and enjoy
- New buildings will also create opportunities to deliver excellence in teaching, research and enterprise
- The Masterplan will achieve a balance between welcoming openness and sheltered enclosure for all faculty, students and visitors

Technological changes in vehicles and fuel types, especially the shift towards electrical power and autonomous vehicles, will influence the infrastructure and requirements associated with public transport during the timescales covered by the Framework Masterplan. The campus-wide options are generated, in part, around a shift towards a greater reliance on walking and cycling, combined with the use of smaller, low-speed electric-powered vehicles to connect the Campus Heart with peripheral areas. This wider range of transport options will continue to form an important part of the University's travel planning.

Other Opportunities for Movement and Transport:

A Northern Park and Ride Service: The Park and Ride services provided in the Canterbury District are outside of the scope of the Framework Masterplan, as they fall within the responsibilities of Canterbury City Council rather than the University. The current District Transport Strategy proposes no additional provision of Park and Ride services to the north of the city. The University is willing to

work with partners to explore the provision of a North Canterbury Park and Ride facility to help ease traffic pressures on the North Canterbury road network to benefit the University, the city and the nearby communities of Blean and Tyler Hill. This work would align well with the Framework Masterplan objectives to improve and promote sustainable transport options.

One option worthy of further exploration would build upon the potential and spare capacity of the Old Salt Road and promote it as a key component of the transport and access opportunities for both the University and the city. To this end, the feasibility of a new Park and Ride car parking site could be explored within close proximity to the A299. This would allow drivers seeking access to the University and Canterbury from the M2, the A299 and the urban areas of Whitstable and Herne Bay to park close to the main highway network. Park and Ride buses could provide a shuttle service to the City Centre on the A290, via the University. As an alternative to the bus service, drivers and passengers could transfer to bicycles (either their own or from a hire centre), or to smaller electric vehicles, for the three-to-four mile journey to the University.

Connectivity with the Wider Area: To complement the strategy to rationalise car parking across the campus, the Movement and Transport Strategy places strong emphasis on the need to improve sustainable links between Canterbury West Station and the University. The creation of passenger access into the station from the north is included within this aim. Such an improvement will provide the opportunity for a new public space to serve as a welcoming 'front door' for north Canterbury as a whole, as well as for the University. In the interim, minor measures could greatly improve wayfinding along the existing (and circuitous) route under the railway. The longer-term strategy is predicated on the need to create a strongly-modelled arrival space, served from Roper Road. The space would follow a route using the former Crab and Winkle Line as much as practically possible and might incorporate a range of sustainable transport options. The station arrival point aims to establish a stronger link between the University and Canterbury West Station, providing information, waymarking and a high standard of public realm design.

The Movement and Transport Strategy also supports the provision of improved links on foot, by bicycle and by bus to the existing Park and Ride sites at Wincheap and Sturry Road. The University is keen to work in collaboration with Canterbury City Council to help facilitate these wider connections where possible within the university land-holdings.

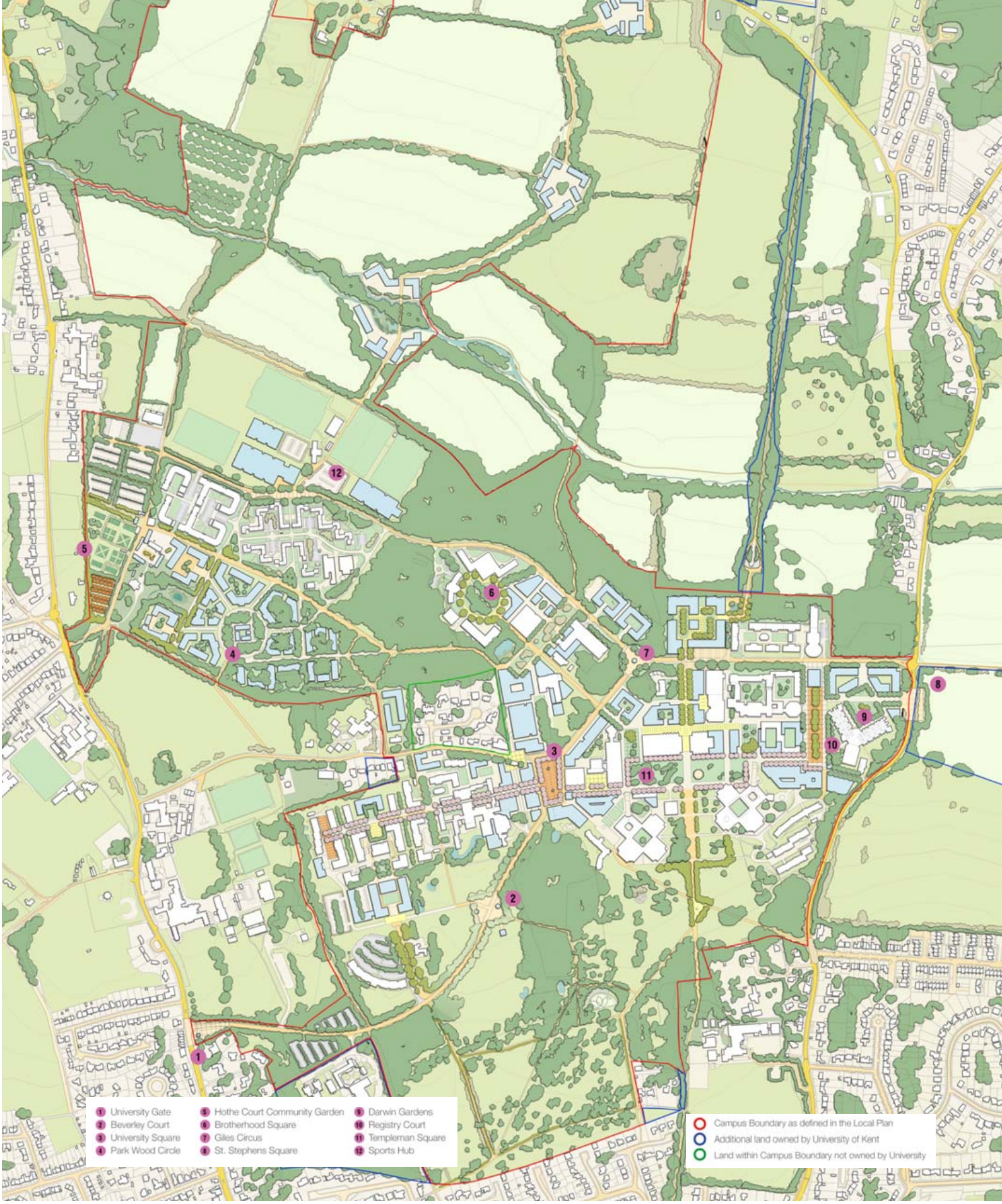



Figure 94: Proposed Framework Masterplan for the Canterbury campus highlighting the creation of a more legible and coherent Campus Heart through consolidation of development along the ridgeline

Concept Sketch

# 9 The Way Forward

# 9 The Way Forward

## 9.1 Overview

The Framework Masterplan is intended to provide a direction for the future evolution of the 'physical' campus to best meet the needs of the University of Kent and of the wider city and region. It will provide the University with a template to enable decisions about the future of the campus.

Future development will respect the quality of life and day to day activities of people living and working in the surrounding villages and residential neighbourhoods and avoid any significant negative impacts upon the wider surrounding area in terms of traffic, car parking, demand for recreation or air quality (NB: The impact of future development proposals on air quality will be dealt with at planning application stage, through air quality assessments (AQA)). The Masterplan will enable the long-term stewardship of the campus and ensure that the estate is managed and maintained in ways that sustain the outstanding place that is created. The campus and development on nearby university-owned land will be outward facing and seek to improve the lives of local people as well as being an exemplar for environmental sustainability by reducing energy use and carbon emissions, adopting high standards for water usage and waste and recycling and creating an environment that promotes healthy living and physical and mental wellbeing.

While some areas in the Masterplan might appear to be full of proposed buildings, that is meant to demonstrate how much the University could look to intensify the campus should they need to. It is important to note that much of that capacity would be met by replacing buildings that are reaching the end of their usual life, as well as by building on land currently occupied by open car parks; to enable this, car parking is consolidated in the Masterplan and moved to the edge of the Campus Heart.

The Framework Masterplan is also intended to describe to Canterbury City Council and the people of the district how the University might use its land should the need and necessary funding be identified, although it is important to note that the Framework Masterplan is a University document and not a planning application within itself. The Masterplan will provide a framework within which future planning applications can be assessed by Canterbury City Council. When and if aspects of the plan are funded, they will go through the usual planning process and members of the public will be able to provide feedback in the usual way as part of that process.

This document therefore describes the framework within which the University will make decisions on the future development of its estate in the short, medium and long-term, including the period defined within the Canterbury District Local Plan.

## 9.2 Possible Early Building and Public Realm Projects in the Short/Medium Term

Of necessity, this masterplan document has been focussed on providing a long-term strategy for the evolution of the campus over the coming decades. In order to make the plan more tangible however, and to demonstrate its deliverability, it is also important to provide some guidance as to how the long-term goals can be delivered sequentially during the current Local Plan period and beyond. This section, and the one that follows, therefore set out how the University might grow and evolve, and the steps that need to be taken to set the campus on the right trajectory in delivering the masterplan vision.

The University is currently in a period of consolidation, characterised by limited growth in academic facilities and student accommodation, although a new student social and study facility (Woody's Pub and Café) was completed in Park Wood in 2018. At present, within the estate development strategy, emphasis is being placed upon the refurbishment and improvement of existing buildings and the re-organisation, consolidation and improvement of car parking, the creation of new and improved cycle and pedestrian routes and landscaping and conserving parts of the campus

Looking ahead, the University has ambitions to deliver a number of building projects along with a variety of public realm improvements and projects. As part of this aspiration, planning permission has been achieved for a new building to house the Kent and Medway Medical School (KMMS). This three-story building will be situated between the Ingram and Sibson buildings on the Park

Wood Road; it will provide teaching space for up to 300 students as well as offices for clinical, academic and administrative staff. Construction of this building began in the summer of 2019. In addition, the University is currently working with Kent Enterprise Trust and others on the creation of a community garden in the former kitchen garden of Hothe Court Farmhouse (in the west of the Campus).

Mindful of the District Plan period (2017 to 2031) and the need to set out a framework for the campus that goes beyond this timeframe, the anticipated programme for implementation of the Masterplan is given below. It reflects the scale of change that may happen over the years ahead and helps bring some focus on what can be achieved. In order to illustrate the possible sequencing of the University of Kent Capital Projects, the accompanying drawings (figures 96, 97 & 98) have been prepared. Please note that these drawings have been produced entirely for illustrative purposes; the timing and sequencing of building and public realm projects on campus will be subject to change according to funding availability and priorities.

9.2.1 Development aspirations for the short term (subject to review and availability of funding) are illustrated in figure 96 (figure 95 illustrates the existing campus for comparison purposes), which shows the possible building and public realm projects that might be realised across the Campus in the short-term:

- The University's approved Capital Programme is currently looking to develop additional academic and administrative floorspace. This period of investment will include the development of major projects and associated public realm, such as a new Economics Building (work underway on site), a new Kent and Medway Medical School Building (noted above), a new Student Social and Study facility, a Science Student Hub building, expansion of sports-related activities and an additional floor to the Jennison Workshop
- In 2020 the University will be hosting the Lambeth Conference (an assembly of bishops of the Anglican Communion convened by the Archbishop of Canterbury that takes place every 10 years) and in preparation for this the tennis court enclosures will be upgraded to provide a facility for this conference as well as making it suitable to become a major exhibition conference facility for the East Kent region

9.2.2 The University has identified a number of projects that it would like to realise on its Canterbury Campus in the medium-term, subject to review and availability of funding (Figure 97):

- The development of a high-quality conference centre and hotel, which could have a major positive impact on the local economy and augment the already significant contribution the University makes to providing visitor accommodation outside of term-time. The University already has an award-winning conference business, which this year welcomed more than 200,000 people from around the world to its residential provision. It is clear that there is an ever-increasing demand for a high-quality conference venue in East Kent. The proposed location north of University Road and south of Turing College offers maximum flexibility for the size of building and scale of conferences that could be held there
- The provision of up to a further 2000 student bed spaces in stages to provide overseas students with a three-year guarantee of student accommodation during the whole of their course
- New Student Services and Kent Union buildings near to Keynes College
- New teaching and academic buildings
- The development of a Centre for Studies in Cyber Security and Conflict, to be located within existing buildings
- The development of a Ballistics Facility adjacent to the School of Biosciences in the Stacey Building
- New leisure and sports-related facilities
- A new road, cycle and pedestrian link between Whitstable Road and Park Wood Road to include a controlled bus link onto campus and improvements to footpaths and cycle routes
- The University will continue to consolidate and improve the management of campus car parking, as well as continue to improve and expand the network of footpaths and cycle routes

The possible sequencing of the University of Kent Capital Projects described above is described in accompanying drawings (Figures 96, 97 & 98).

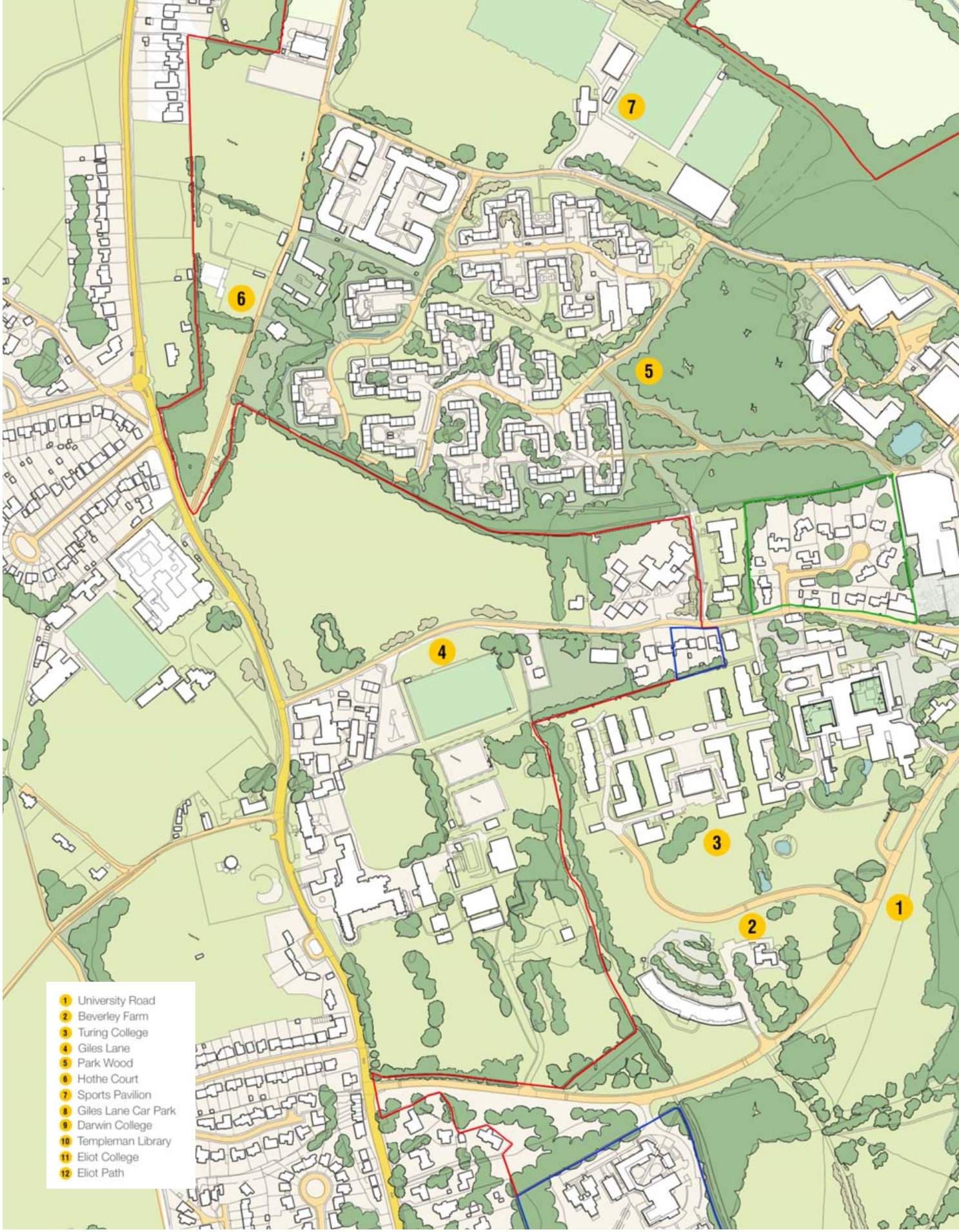
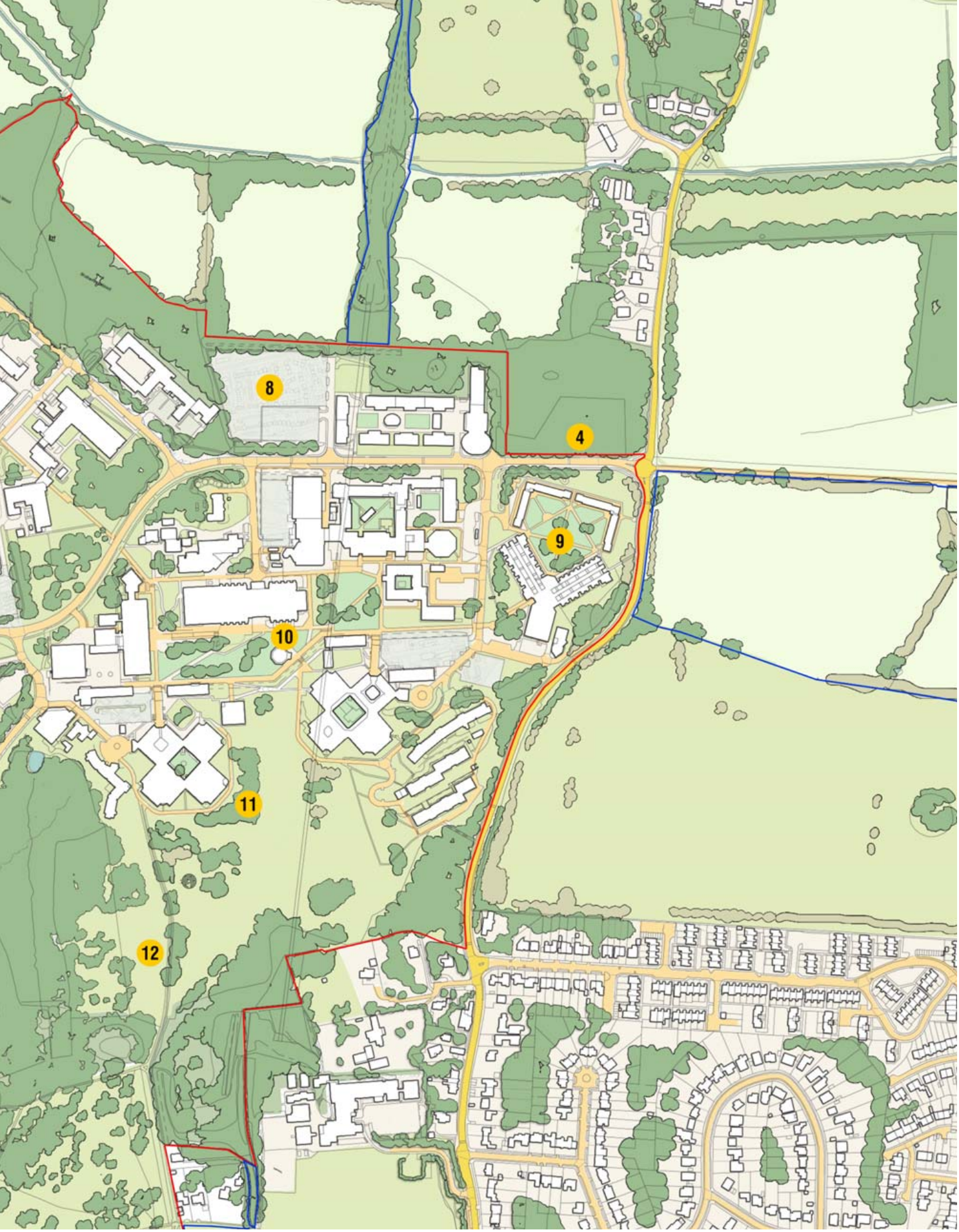



Figure 95: Existing campus plan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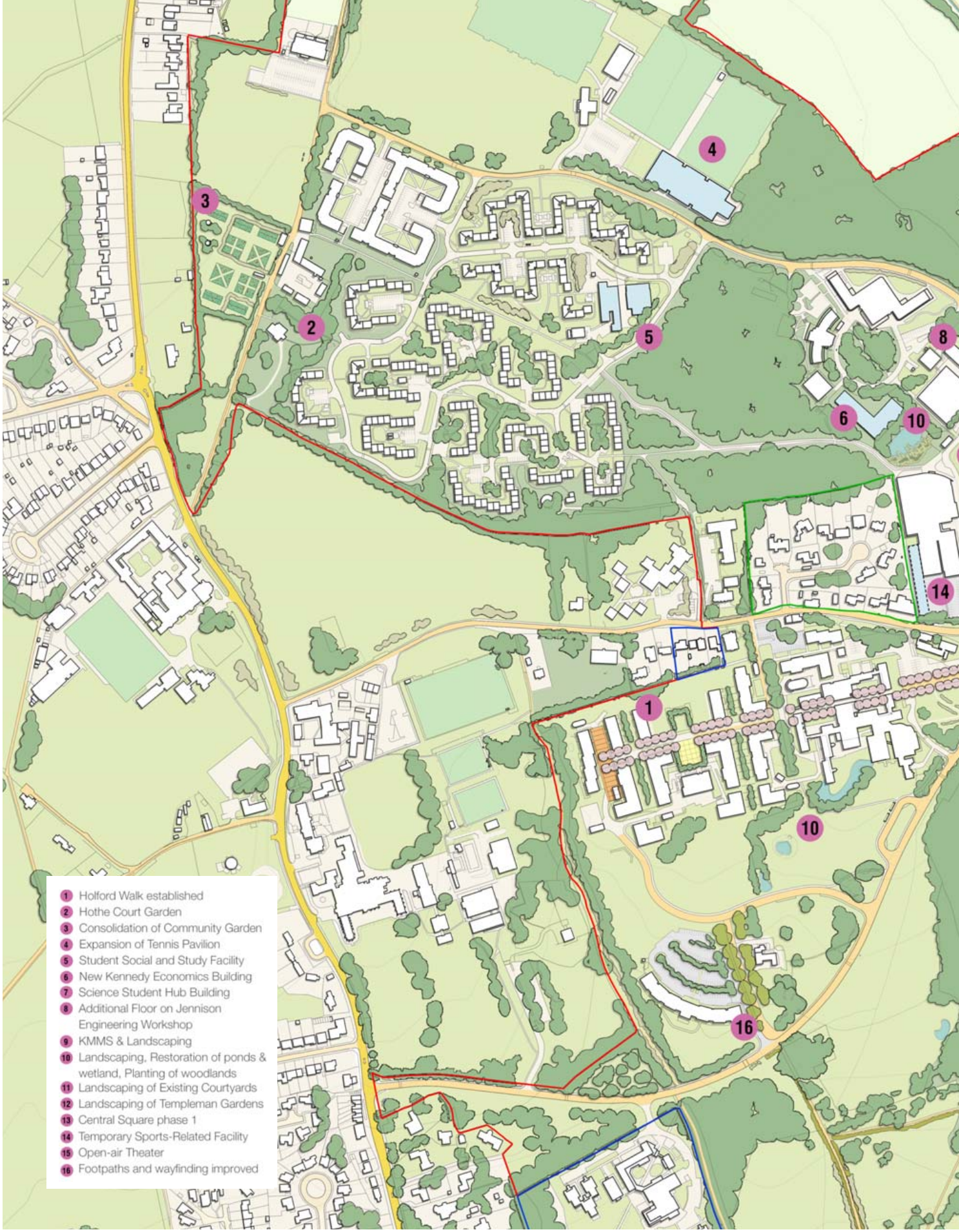


Figure 96: Possible early built and public realm projects in the short-term

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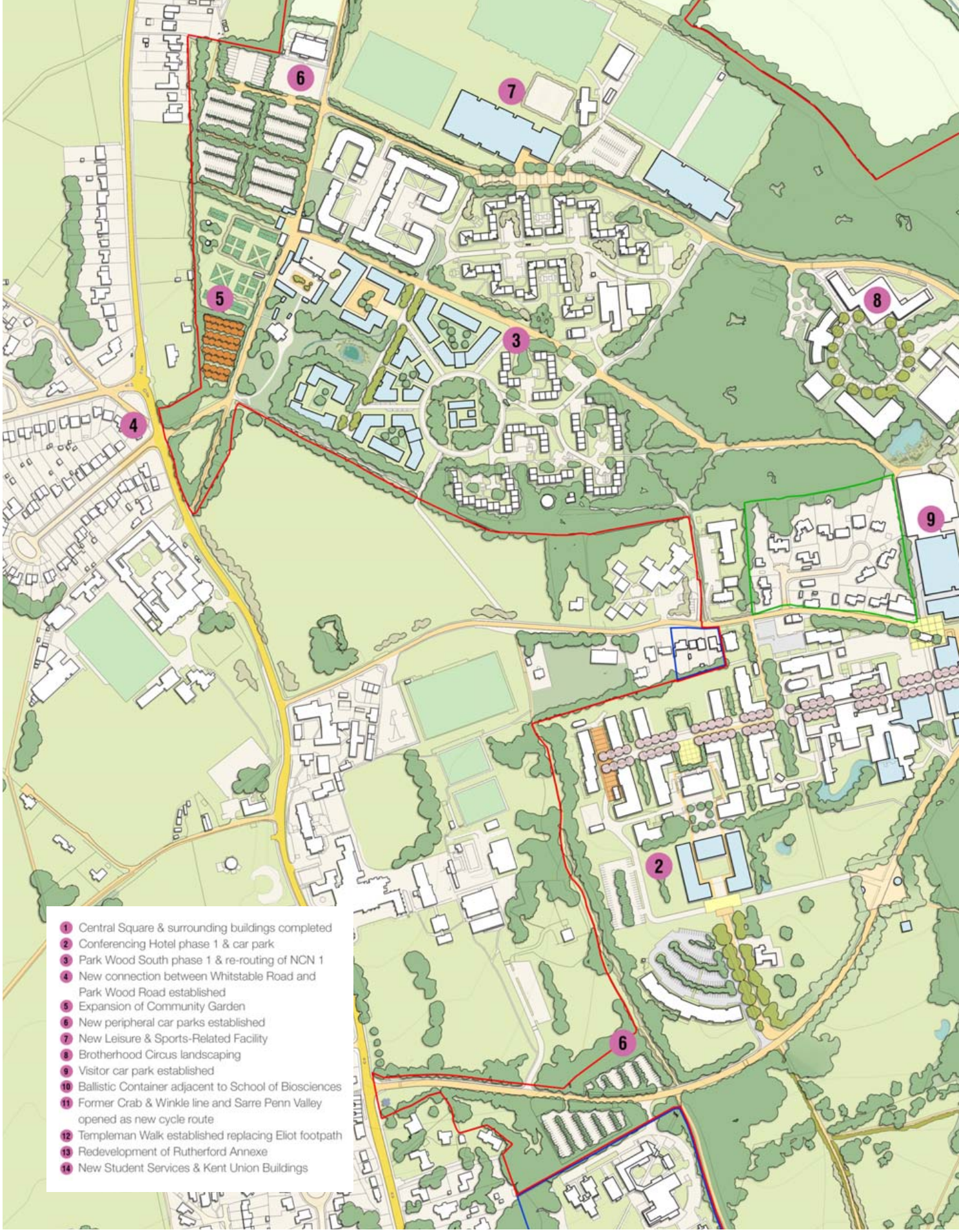


Figure 97: Possible early built and public realm projects in the medium-term

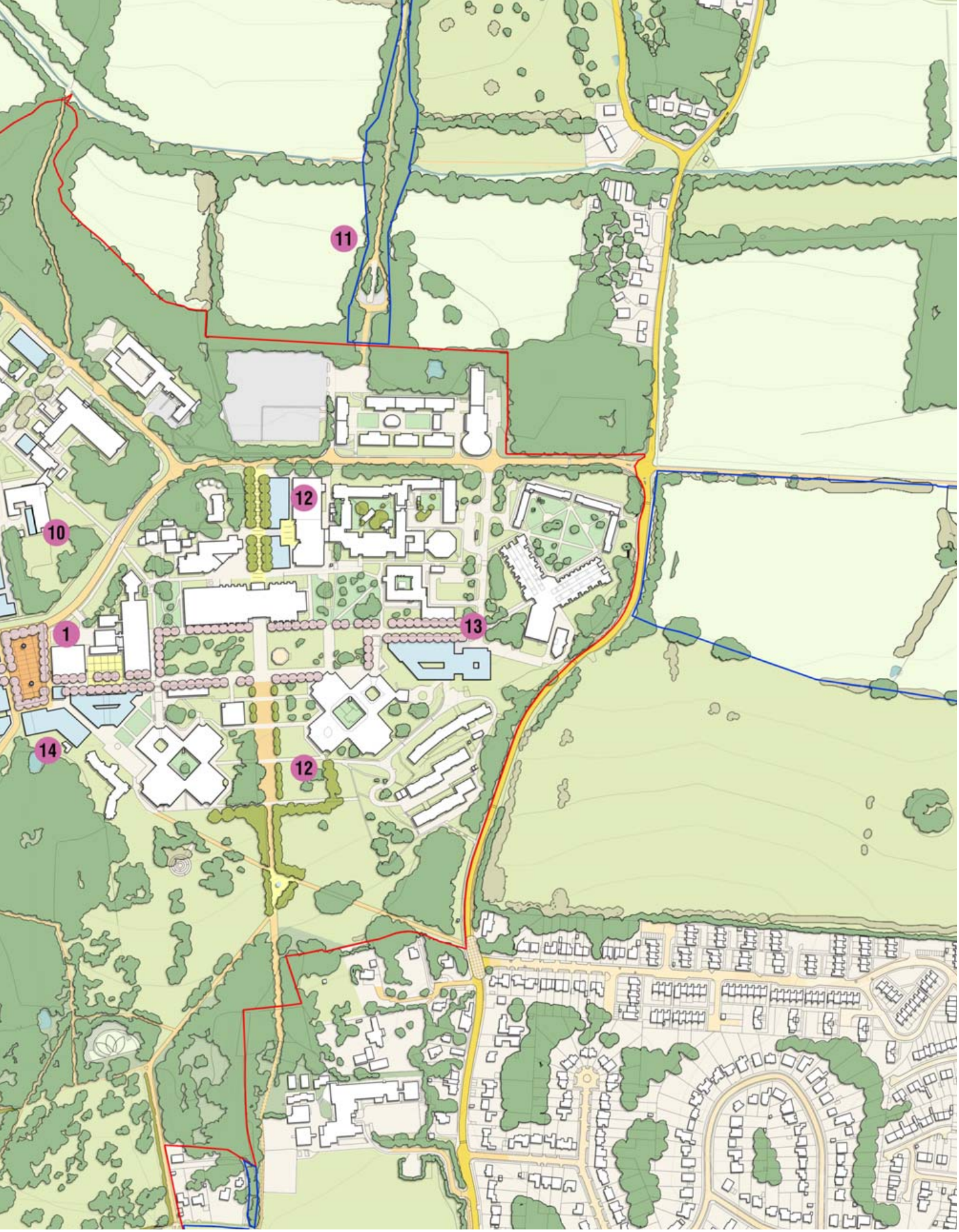
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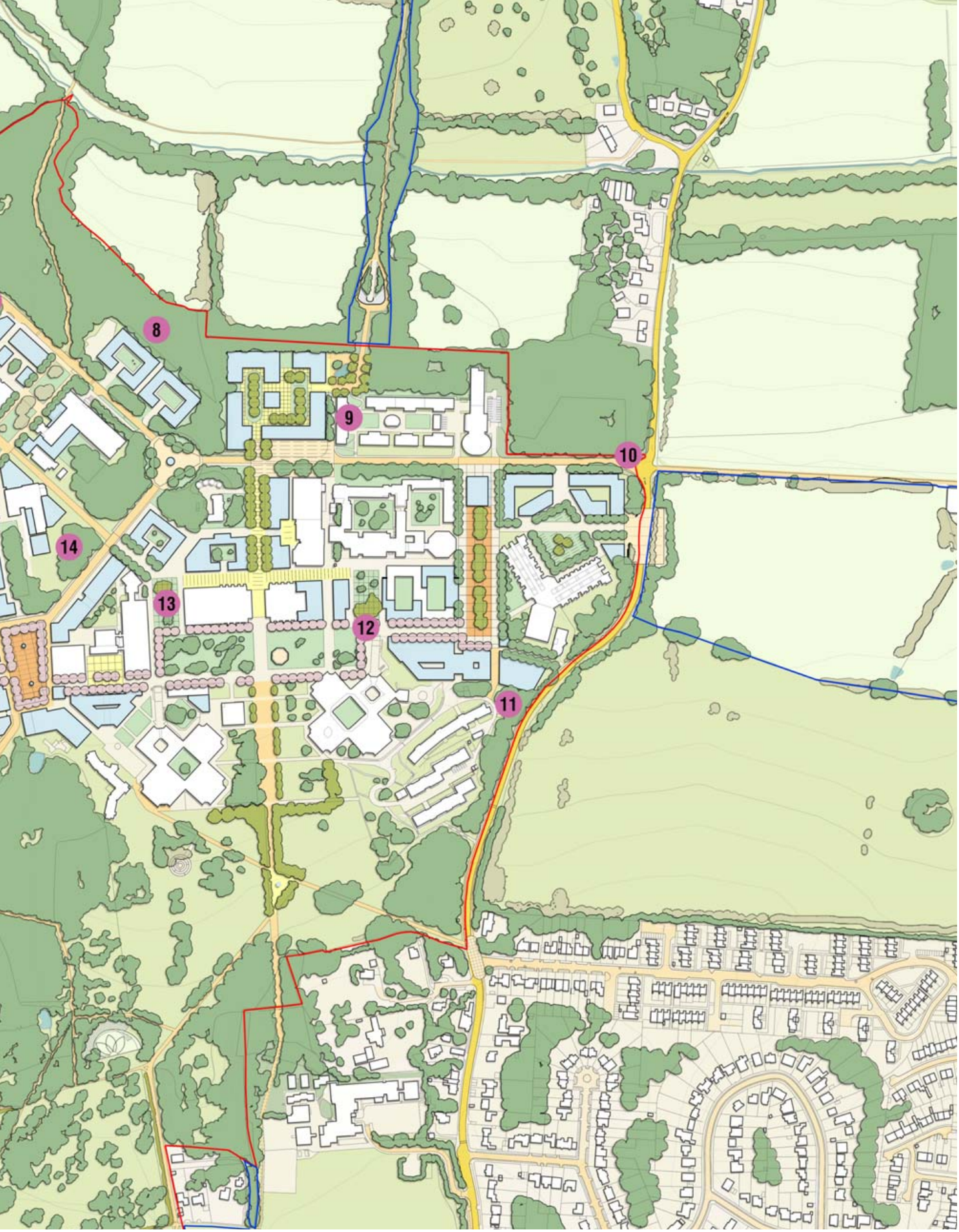
Figure 98: Possible early built and public realm projects in the longer-term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## 9.3 Proposals for the Longer-Term

Clearly, given the many social, economic and political factors that are currently influencing Higher Education, the degree of certainty of development decreases over time and the University inevitably becomes less certain about the delivery of specific projects. However, the notes below attempt to provide some guidance as to the development aspirations of the University of Kent in the longer-term:

9.3.1 In the longer-term the University hopes to realise a number of further projects on its Canterbury Campus, subject to review and availability of funding at that time. These proposals are illustrated in figure 98:

- The development of a University of Kent Life Science Building (formerly identified in the 2025 Strategy Document as the Institute for Biotechnology & Molecular Medicine)
- Possible expansion of the number of bed-spaces in the conference centre and hotel
- Continued phasing-in of student bed spaces
- The development of additional leisure and sports-related facilities, including a Swimming Pool
- Continued expansion of teaching and academic buildings in available infill sites
- Building clusters for academic purposes and/or start-up business/innovation space in the Sarre Penn Valley
- Continued consolidation and improvements to car parking
- Continued improvements to footpaths and cycle routes

The Framework Masterplan also accommodates the possible re-provision of Blean Primary School, to include car parking, and the development of new homes as a funding stratagem. Although such a development is outside the Capital Projects Budget, the University would be open to a discussion with Kent Education Authority and the Governors of Blean School to explore this development.

Throughout the development of the Canterbury campus, the University also intends to work with utility companies in assessing and providing any necessary upgrades to utility services. In the longer term for example, there may be the need to upgrade existing foul sewerage or provide a private sewer to Canterbury Waste Water Treatment Works (Sturry Road) and (working with others) it may be possible to provide a 'park and ride' facility to serve the University and the City Centre. Given this uncertainty, the Framework Masterplan seeks to provide a flexible framework, so that the University of Kent can take advantage of development opportunities as and when they arise.

## 9.4 How the Framework Masterplan Delivers the Key Strategic Objectives

Early in the masterplan process, a number of key Strategic Objectives were identified to guide the development of the campus. These were compiled from the brief provided by the University, from advice given by regional partners in the masterplan process (such as CCC and KCC) and from feedback received from university staff, students and the local community in initial public consultation events. In summarising the Masterplan therefore, it was thought beneficial to link the short, medium and long-term masterplan proposals to the 12 Strategic Objectives, in order to demonstrate how the masterplan principles will be met and how the Framework Masterplan will deliver the Strategic Spatial Vision set out earlier in section 4.1 of this report.

| Strategic Objective | Masterplan Response | Reference |
|---|---|---|
| 1 A Plan for Future Evolution:<br><br>A flexible plan to accommodate growth of the Canterbury campus, taking account of future plans for the Medway Campus | Academic and Research Facilities:<br>• New Economics Building — Short-Term<br>• KMMS — Short-Term<br>• Expansion of Jennison Engineering Workshop — Short-Term<br>• Centre for Studies in Cyber Security & Conflict — Med-Term<br>• A Ballistics Facility (Stacey Building) — Med-Term<br>• Life Sciences Building — Long-Term<br>• Start-up business and innovation space — Long-Term<br><br>Student Housing:<br>• 2,000 additional student bed spaces — Med/Long-Term<br><br>Shared Amenities:<br>• Student Social & Study Facility (Woody's) — Short-Term<br>• Science Student Hub — Short-Term<br>• Student Services and Kent Union Buildings — Med-Term<br><br>Sports/Cultural facilities that encourage year-round use:<br>• Expanded Tennis Pavilion — Short-Term<br>• Hotel and Conference Centre — Med-Term<br>• Leisure and Sports Facilities — Med-Term<br>• Swimming Pool — Long-Term<br><br>Landscape Infrastructure:<br>• Kent Community Oasis Garden (KentCOG) — Short-Term<br>• New and improved pedestrian and cycle routes — Short-Term<br>• Restoration of ponds and wetlands — Short-Term<br>• Planting of new woodland — Short-Term<br>• Open-Air theatre — Med-Term<br>• Whitstable Road and Park Wood Road link — Med-Term<br>• Consolidation of car parking — Med/Long-Term | Sections<br>9.1<br>9.3<br>9.5 |
| 2 Enhance the Potential and Quality of the University Estate:<br><br>Make best use of existing built resources | • The Framework Masterplan has integrated what is of value in the original University Masterplan to satisfy projections for future growth, the appropriate distribution of uses within the University land ownership and consideration of the campus as a 'place'<br>• The Masterplan has integrated the strengths of the original Holford-designed campus and arranged new buildings sensitively to enhance the estate as a whole<br>• As a component part of this process, the Masterplan has been developed to enhance the interface with neighbours and improve linkages with local communities, including the City of Canterbury | Section 8.3 |

| Strategic Objective | Masterplan Response | Reference |
|---|---|---|
| 3 Make 'Place-Making' a Top Priority | • The Masterplan emphasises the importance of the rich landscape and built heritage, and how both are embedded and intertwined within the existing campus<br>• In seeking to nurture and enhance the campus as a more inclusive and vital place, the Masterplan has taken an overview across the full history of the area, including the evolution of the pre-university landscape, the present-day landscape setting of woodlands, farm fields, hedgerows and country lanes, as well as the industrial-era features, and integrated them with future projections for growth<br>• The Framework Masterplan proposals strengthen the University's reputation as a great place to be, through the quality and diversity of its overall environment | Chapters 7.0 8.0 |
| 4 Ensure Flexibility to accommodate an Evolving, Mixed-use, Knowledge-based Economy | • The Framework Masterplan has responded positively to the University's own document: *'Kent 2025: Refreshing the University Strategy'* which sets out a vision to make Kent one of the leading universities:<br>- To become a great civic university with a distinctive and fresh approach to high-calibre teaching, learning, inclusivity and inter-disciplinarity in a modern, collegial environment<br>- To support education and research<br>- To support social, economic, cultural, intellectual and public life<br>• The Framework Masterplan sets down a route map to become the physical expression of these commitments and values and a coherent whole | Section 8.2 |
| 5 Establish the University's Reputation for Excellence in all Aspects of Sustainability | • The Masterplan proposes to consollidate the Campus Heart to make best use of brownfield land and safeguard the surrounding landscape context<br>• Co-location of buildings will aid energy efficiency and limit heat waste<br>• A higher-density campus will provide improved conditions for co-generation of power<br>• Carefully considered spaces between buildings will enable executive architects to take advantage of natural light, shading, natural ventilation and shelter in the design of the buildings and landscape<br>• The creation of a very walkable and cyclable campus will encourage healthier lifestyles and increased wellbeing among students and staff<br>• Safeguarding natural habitats and nurturing biodiversity will increase the inherent value of the campus as a 'place' and enrich the surrounding area<br>• Taming traffic to limit the impact on a predominantly pedestrian environment and rationalising car parking will make it more efficient, less reliant on fossil-fuels and reduce impacts on air quality and noise<br>• Use of Passive Design Principles will take account of landform, layout, building orientation, massing and landscaping during detailed design to minimise energy consumption and overheating to combat climate change<br>• Flexibility and resilience is built into the Masterplan to increase adaptability to respond to climate change and other challenges<br>• During detailed design, attention should be given to providing natural | Section 1.4 |

| Strategic Objective | | Masterplan Response | Reference |
|---|---|---|---|
| | | ventilation and a comfortable indoor temperature to ensure well-being<br>• Good air quality will be prioritised in line with CCC's draft Air Quality Action Plan (April 2018) to ensure that there are no significant adverse impacts on air quality from future development. This includes promoting walking and cycling and managing car parking provision. The impact of future development proposals on air quality will be dealt with at planning application stage, through air quality assessments (AQA)<br>• Holistic development principles will be applied across the Campus to promote healthy and sustainable lifestyles, including incorporating facilities into the landscape that encourage walking and cycling, sport and play. Buildings should encourage the use of stairs rather than lifts for those that can use them<br>• The District Heating Network will be expanded to serve new buildings within the Campus Heart where practicable<br>• Photovoltaics will be incorporated into buildings to generate low carbon electricity for the campus<br>• Appropriate renewable energy technologies will be incorporated within specific developments where feasible and viable<br>• Sustainable Urban Drainage Systems (SuDS) will be incorporated to help manage run-off rates and reduce the risk of pollution reaching sensitive controlled waters on campus. Future development proposals will be covered by detailed planning applications that will be accompanied by a detailed SuDS strategy<br>• The University's Carbon Management Plan will be implemented to set new targets for the future including, in line with CDLP Policy DBE1, requiring new buildings to meet BREEAM 'Very Good' as a minimum<br>• The University's investment in (and commitment to) its own Travel Plan in response to a growing reliance upon public transport<br>• The creation of a very walkable and cyclable campus to encourage healthier lifestyles and increased wellbeing among students and staff<br>• Taming traffic to limit the impact on a predominantly pedestrian environment and rationalising car parking will make the campus safer and more transport-efficient, much less reliant on fossil-fuels and reduce impacts on air quality and noise | |
| 6 | Strengthen the University's Unique Attributes to Distinguish it from its Competitors | • Already one of the greenest campuses around, set in the most wonderful parklands and surrounded by some of Kent's most attractive countryside, the University is taking the opportunity to create a clear and unique brand as a great place to be<br>• By focusing on creating a wonderful new and enhanced public realm, the Masterplan will distinguish the University of Kent as a campus of unparalleled landscape character<br>• By emphasising the different character areas, with their variety and distinctiveness, the Masterplan will deliver a green campus of great variety and diversity<br>• The University has the opportunity to build a reputation as 'The University of Kent in the Garden of England' | Section 8.4 |

| Strategic Objective | Masterplan Response | Reference |
|---|---|---|
| 7 Develop an Environment for Social Interaction & Responsibility | • The Framework Masterplan will help to deliver new spaces and places between buildings where the university community can thrive and interact<br>• The creation of quality spaces between buildings is intended to enhance economy, productivity, health and wellbeing and encourage healthy lifestyles in both staff and students<br>• By this means, the Masterplan seeks to develop the character of its students beyond the purely academic, and encourages the development of the Kent students as socially-aware members of society to prepare them for post-university careers | Section 8.4 |
| 8 Create a Remarkable Public Realm:<br>The Framework Masterplan should enable the development of a safe and sustainable public realm | • The Masterplan places great emphasis on creating a wonderful and enhanced public realm to distinguish the University of Kent as a campus of unparalleled landscape character<br>• The Masterplan challenges the University to take the opportunity to create a clear and unique brand as a great place to be for students and staff to interact in a safe environment<br>• A more coherent public realm will encourage social interaction and leisure activities, provide space for formal and informal teaching and learning activities and support university events and commercial activities | Section 8.4 |
| 9 Strengthen Connections with the Surrounding Context:<br>A holistic and considered approach to the Campus | • The Masterplan reinforces the relationship between the University and the city ('Town and Gown') by strengthening intellectual, cultural and physical connections between the University and the surrounding context<br>• Proposals have been formulated to benefit, enhance and complement surrounding local communities. Examples of 'good neighbourliness' include:<br>- Providing new footpaths and cycle routes to connect Blean, Blean Church and Tyler Hill, the campus and the city<br>- An alternative location for Blean School away from the noise and air pollution of Whitstable Road, with off-street parking, drop-off space and access to the University sports fields<br>- A new entry point to the Scheduled Ancient Monument on St Stephen's Hill<br>- Safer pedestrian and cycle access across St Stephen's Hill<br>- Improved walking and cycle access to Mayton Lane to the east<br>- A new open-air theatre in Chaucer Fields<br>- Safeguarding existing views to and from historic Canterbury<br>- New and additional sports and leisure facilities<br>- Improved landscaping, habitats and biodiversity<br>- An improved setting for Hothe Court<br>- More options for sustainable travel<br>• The Masterplan will ensure the campus becomes an integrated and connected part of the city, with cultural, leisure and sports facilities within the campus that will serve the needs of the wider city | Appendices 3.3 & 3.4<br>Chapters 7, 8, 9 & 10<br>Section 8.6 |

| Strategic Objective | Masterplan Response | Reference |
|---|---|---|
| 10 Create a Home for a Vibrant Academic Community | • In putting forward a Masterplan for a coherent and legible campus, with a network of outdoor places and spaces and a wider variety of uses within the buildings, we set out to foster intellectual exchange and allow students and staff to develop their careers and academic pursuits within a stimulating, safe and supportive environment<br>• The Masterplan describes an environment where a network of spaces and facilities are created that can support student societies, group-working, activities, volunteering and increased productivity | Section 8.4 |
| 11 Create a Compact & Consolidated Campus Heart:<br>The Campus Heart should be the first choice for locating new academic buildings and public realm | • Future growth of buildings and spaces in the Masterplan is focussed within the Campus Heart Character Area (and parts of the Whitstable Road Character Area)<br>• New buildings, and the spaces between them, will consolidate new development within the low-density/loose-knit Campus Heart rather than continuing to allow development to sprawl across the campus<br>• A compact Campus Heart will enable a focus on good placemaking in the centre of the campus, create an accessible, inclusive and more coherent campus and safeguard the surrounding open landscapes | Section 7.4.3 |
| 12 Safeguard the potential of adjoining land:<br>Proposals must benefit & complement surrounding land & communities, and not prejudice access and facilitate future access to adjoining land | • The Masterplan is outward-facing, ensuring good-neighbourliness and good connectivity with the surrounding context:<br>- North of the Campus: New footpaths and cycle routes are proposed to better connect the campus, Blean Village, Blean Church and Tyler Hill by sustainable means<br>- South: The Masterplan enhances walking and cycling routes between the Campus Heart/Canterbury West station/the city. This route anticipates the opening of a northern entrance into Canterbury West Station from Roper Road at some point in the future and the possible regeneration and re-use of disused sections of the Crab and Winkle Line<br>- East: A new campus entry-point is proposed at St Stephens Hill for pedestrian and cyclists, along with space for new bus stops. This would provide a new entry point to the Scheduled Ancient Monument, and would also provide safer pedestrian and cycle access across St Stephen's Hill to enable a cycle route to Mayton Lane to the east<br>- West: Proposals include the introduction of vehicular traffic (including buses) to a short section of the Old Salt Road adjacent to Hothe Court (between Whitstable Road and Park Wood Road). In addition, the Masterplan includes an option for a new Blean Primary School on university-owned land, away from traffic noise and air-pollution of Whitstable Road. The school would accommodate drop-off and pick-up by parents by car. The new school would look over the University playing fields, which could be used by the school by arrangement with the University. This option could also provide the benefit of a new vehicle link to Park Wood Road to provide controlled access for public transport and emergency vehicles, and reduce journey times and distances | Sections<br>7.2.2<br>7.3.2<br>7.4.2<br>7.5.2<br>7.5.3 |

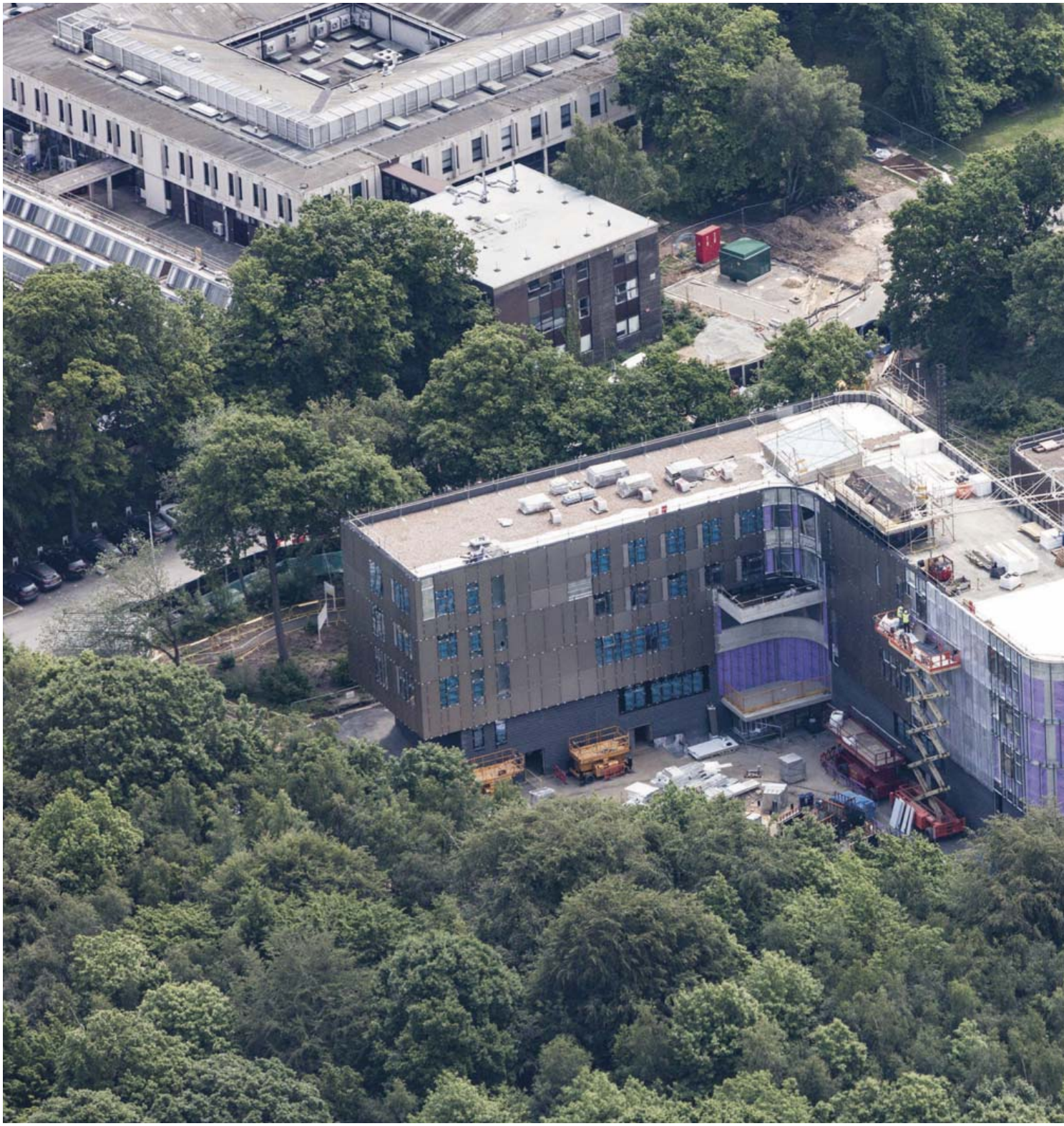

Figure 99: The Sibson Building in Brotherhood Wood nearing completion in 2017. Brotherhood Square is gradually taking shape in the top of the photograph

# 10 Making It Happen: Implementation, Monitoring and Review

# 10 Making It Happen: Implementation, Monitoring & Review

## 10.1 University Decision-Making

The primary purpose of this Framework Masterplan is to inform how the University of Kent will identify and define projects and develop the Canterbury campus, given consideration of the Strategic Spatial Vision, Objectives and Principles embedded within the University's decision-making processes regarding future development.

Detailed masterplanning will continue through the life of the Framework Masterplan and will involve the detailed design of the landscape, movement and infrastructure across the site. Future masterplanning will define the phasing of the infrastructure and landscape works to co-ordinate with phased building construction. Detailed cost-checking and value-engineering will also form part of this stage of the work.

The University's decision-making process will also include:

- Preparing Design Guidelines that direct and shape the development of buildings, places and spaces, in order to provide a flexible framework for the local planning authority when judging the merits of future design proposals
- Selecting individual building designers taking into account their understanding of and commitment to the Framework Masterplan objectives and principles
- Individual designers preparing Design and Access Statements as part of future planning applications that explain how their proposals conform with the Framework Masterplan, with any deviation from the Masterplan being fully justified and agreed with the University, the masterplanner and Canterbury City Council in advance of submitting a planning application
- Responding positively to relevant Development Plans and other designations, with any departures being justified in Planning Statements that support future planning applications
- Creating additional detailed mini-masterplans that are deliverable in phases, and yet deliver places of high quality at every stage

## 10.2 Partnership Working

The University will work collaboratively with a wide range of partners in the public, private and voluntary sectors to bring about positive change and to implement the Framework Masterplan, including:

- The University's business partners, such as the University Partnerships Programme in relation to the provision of student housing
- Existing tenants and businesses within the campus
- Neighbouring institutions, businesses and landowners
- Canterbury City Council as the Local Planning and Housing Authority, and in its key roles in relation to economic development and transport
- Kent County Council as the Highway, Public Rights of Way, Education, Lead Flood, Waste and Minerals Authority and in its key roles in relation to economic development, biodiversity and archaeology
- The Environment Agency in relation to flooding and drainage
- Canterbury Sustainable Transport Forum on transport related matters
- Network Rail and the relevant train operating companies in relation to Canterbury West Station
- Kent Enterprise Trust, Whitstable and Herne Bay Bee Keepers and others in relation to the Community Garden Project
- Kent Wildlife Trust, Woodland Trust, CPRE, and Natural England in relation to landscape and biodiversity
- Local Residents' Associations, Parish Councils and community organisations to minimise negative impacts locally and to maximise local involvement in the campus
- Canterbury City Council and others in implementing the recommendations of the Higher and Further Education Impact Review.

## 10.3 Phasing and Triggers

As outlined earlier in this document, given the many social, economic and political factors that impact Higher Education, the degree of certainty surrounding projects decreases over time and the University of Kent has not identified any specific projects post-2031. The accompanying table includes the expected phasing of short-term projects, setting out when these projects are

expected to be completed. This table also identifies the proposed and possible key medium-term projects. However, the size and scope of these proposed projects need to be defined and the possible projects are to be the subject of further investigation with partners. As such, the University is unable to set out with any meaningful degree of accuracy when and in some cases whether the medium-term projects will happen. The University will provide updates to Canterbury City Council, other partners and local people as to the progress of these proposed/possible projects.

## 10.4 Development Management

The Framework Masterplan has been prepared in order to meet the broad principles set out within policy EMP7 of the Local Plan 2017 and to align with both local and national planning policies wherever possible. The Masterplan is intended to be an important link to the Local Plan and given significant weight when considering planning applications.

Planning applications for future development proposals will be accompanied by the Framework Masterplan, along with an explanation on how the proposed development delivers the Masterplan Vision and Objectives. The University is always keen to engage in pre-application discussions with the local planning authorities.

## 10.5 Detailed Assessment

Where permission is required to implement a project, planning applications will be prepared having regard to the Masterplan as a material consideration, and in the context of the relevant development plan policies in place at the time.

Projects that are the subject of planning applications will need to be supported by more detailed studies, strategies and assessments in accordance with Canterbury City Council's reasonable requirements and an Environmental Impact Assessment where necessary.

Possible Building and Public Realm Projects in the Short Term

- Creation of the new Kennedy Building (Economics) to be opened in time for the 2019-20 academic year
- Kent and Medway Medical School building (completion projected in September 2020)
- Student Social and Study Facility (completed August 2018)
- Science Student Hub building (completed in time for the 2019-20 academic year)
- Expansion of sports-related activities
- Additional floor on the Jennison Engineering Workshop
- Upgrade and extension to the tennis court enclosures
- Landscaping, restoration of ponds and wetlands, planting of woodland
- Creation of new and improved cycle and pedestrian routes to improve links with the city by sustainable means
- Creation of a community garden (underway)

Possible Building and Public Realm Projects in the Medium-Term

- The development of a high-quality Hotel and Conference Centre (phase 1: 150 beds)
- Phased delivery of an additional 2,000 student bed spaces (through the redevelopment of Park Wood South and conversion of existing buildings)
- New Student Services and Kent Union Buildings at the main arrival point to the campus
- New teaching and academic buildings
- A Centre for Studies in Cyber Security & Conflict (located within existing buildings)
- A Ballistics Facility adjacent to the Stacey Building
- New leisure and sports-related facilities
- A new controlled vehicle, cycle and pedestrian link between Whitstable Road and Park Wood Road
- Consolidation and relocation of car parking
- Continued improvements to footpaths and cycle routes

Possible Building and Public Realm Projects in the Long-Term

- Life Sciences Building (formerly identified as 'The Institute for Biotechnology & Molecular Medicine')
- Expansion of the Hotel and Conference Centre (phase 2: 50 beds)
- Continued phasing-in of student bed spaces (within Park Wood and conversion of existing buildings)

- Additional leisure and sports-related facilities, including a Swimming Pool
- New teaching and academic buildings
- Building clusters for academic purposes and/or start-up business/innovation space
- Continued consolidation and relocation of car parking
- Continued improvements to footpaths and cycle routes

*(NB: The above list is subject to review and availability of funding)*

## 10.6 Good Stewardship

The University is the custodian of a major estate at the Canterbury campus. The potential for successful placemaking is inevitably improved when estate owners take a long-term view. At each stage of campus development,manuals will be prepared that set out a sustainable management and maintenance regime of the buildings, places and spaces as a whole, to ensure that they are looked after in a positive way to help ensure the creation of high-quality places.

## 10.7 Construction Impacts

The University will ensure that when letting contracts for development, contractors put in place suitable strategies and plans to manage demolition and construction works in ways that reduce adverse impacts on traffic on the campus and wider road network, and safeguard air quality and residential amenity.

## 10.8 Monitoring and Review

Masterplanning is not a linear process; good masterplanning inevitably involves periodic updates and adjustments to the plan as each phase of the project is realised. By their very nature, masterplans are long term projects implemented over many years and they require considerable commitment from all concerned. The long term success of any masterplan is heavily dependent upon the detailed understanding of all issues (for example, political, commercial, environmental and ecological sustainability, town planning, the views of local communities, as well as national objectives and climate change) which of course evolve and adapt over time. The Framework Masterplan should therefore anticipate (and be capable of) adaptation and evolution, as impacts and influences emerge that could not have been anticipated when the Masterplan was first prepared.

Adjustments to the plan arising from detailed (and as yet unknown) circumstances will continue through the life of the Framework Masterplan. This process will naturally occur as the phasing and coordination of projects, infrastructure and landscape works becomes better known. Availability of funding, detailed cost checking and value engineering will also form an important part of this process.

The University will monitor progress as the Framework Masterplan is implemented, and review and update it as and where necessary. Analysis and evaluation will be carried out at both project conception and completion stages to ensure that proposals meet the masterplan objectives and to learn lessons.

The Masterplan will undergo monitoring and review by the University team as a normal part of the development process, and the plan will gradually adjust and adapt over time. Best practice in this area will be followed and will include updating of the masterplan on the University website, which will be used as a repository of all information about the masterplan and its development. The website will continue as a resource of information for the local authorities and local communities as the plan develops, as an educational resource for local schools and as a promotional device announcing new developments in the campus to attract prospective new students and staff.

## 10.9 Campus Designation

The Canterbury District Local Plan recognises that the extent of the campus boundary may be reconsidered when the Local Plan is reviewed. The University has not identified a need to extend the designated campus area at this stage, although it will keep this under review as part of reviewing and updating the Masterplan and will feedback into a future review of the Local Plan where necessary. In any event, the University will fully engage with all relevant stakeholders, including Canterbury City Council and local people, over any proposals it brings forward for land that it owns.

Figure 100: The Sibson Building in Brotherhood Wood; an example of a building designed to sit comfortably into the landscape

# Appendices

# Appendices

## Appendix 1: The Masterplan Team

1 University of Kent Client Team

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Peter Czarnomski
Juliet Thomas
Teresa Curteis
Neil Higginson
John Morley
Gary Law
Catherine Collins
Catherine Morris
Richard Cottam

Public Consultation: Corporate Communications, University of Kent
Posie Bogan
Miles Banbury
Michelle Ulyatt
Tim Davies
Sophia Cheraitia

2 Masterplanning: John Letherland Limited and Birds Portchmouth Russum

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Richard Portchmouth
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Steven Smith
Toby Denham
Duncan Whatmore
Harvey Van Sickle
Rosie Seamen
Elise Tinn
John Cook
Sanna Rautio
Rachael Ho
Ting Ting Ng
Charlie Chen
Ralph Berryman
Kevin Poon

3 Town Planning & Project Management: CMA Planning

Charles Moran
Graham Harrington

4 Movement and Transport Studies

Hamilton-Baillie Associates:
Ben Hamilton-Baillie

PBA/Stantec:
Elliot Page
Katie Stannard
Kinga Wec
Sam Cavanagh

5 Landscape Setting and Views Appraisal: LUC

Rebecca Knight
Ben Gurney
Ben Packham

The masterplan team are grateful to Studio Engleback and Biodiversity by Design for their valuable appraisal of the campus landscape setting and biodiversity, as well as for their contribution to the landscape thinking in the early stages of this study.

The masterplan team also appreciates the feedback provided by many people from the local community, such as Clive Bowley and Bob Richards, who contributed their time and knowledge of the area to this study, as well as contributing historic photos, maps, etc, such as Clive Bowley and Bob Richards.

From the University team, thanks also go to Catherine Morris from the University Estates team for her guidance on the landscape and biodiversity of the campus, to Teresa Curteis for her contribution to the movement and transport strategy, to Neil Higginson for his knowledge of the heritage assets at Hothe Court and to Luke Lavan for his advice on the archaeology. Particular thanks also go to graphic designer Lesley Farr for her patience and hard work in bringing the masterplan documents to life.

The masterplan team are also grateful to Professor Don Gray (former Head of the Kent School of Architecture) for his support during the master plan process, to David Lane of Canterbury City Council and Hugo Nowell of Urban Initiatives in their roles as our 'critical friends', and to Stephen Burke, Master of Eliot College, for his knowledge of Lord Holford's work and access to his Holford archive.

Last but not least, thanks must also go to our client team of Denise Everitt, Peter Czarnomski and Juliet Thomas of the University Estates Department for their forbearance, guidance and leadership

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| 1 | Concept Masterplan Study | Farrells | Nov 15 |
| 2 | Baseline Studies: | | |
| | 1 Initial Baseline Mapping | JLL/BPR | Nov 17 |
| | 2 Building Analysis Schedule | JLL/BPR | Jan 18 |
| | 3 Historical Evolution | JLL/BPR/Harvey Van Sickle | Nov 17 |
| | 4 Benchmarking Study: University & Campus Landscapes | JLL/BPR/CMA | Feb 18 |
| | 5 Preliminary Ecology Appraisal and Guidance | JLL/BPR/CMA | Feb 18 |
| 3 | Spatial Strategies: | | |
| | 1 Planning & Environment Strategy | CMA | Mar 18 |
| | 2 Placemaking Strategy | JLL/BPR | Mar 18 |
| | 3 Movement & Transport Strategy | Hamilton-Baillie Associates | Mar 18 |
| | 4 Landscape & Biodiversity Strategy | JLL/BPR/CMA/Studio Engleback/Biodiversity by Design | Mar 18 |
| 4 | Landscape Setting and Views Appraisal | LUC | Apr 19 |
| 5 | Movement & Transport Strategy | PBA/Stantec | May 19 |
| 6.1 | Public Consultation Reports: | | |
| | 1 Concept Masterplan Consultation Statement | University of Kent/CMA Planning | Apr 17 |
| | 2 Discussion Document/Canterbury Campus Strategic Spatial Vision | University of Kent/CMA Planning | Jul 17 |
| | 3 Canterbury Campus Framework Masterplan/ Step 1 Workshop Report | University of Kent/CMA Planning | Aug 17 |
| | 4 University of Kent Masterplan/Staff Focus Group | University of Kent/CMA Planning | Sep 17 |
| | 5 Canterbury Campus Framework Masterplan/ Step 1 Strategic Spatial Vision Consultation Statement | University of Kent/CMA Planning | Nov 17 |
| 6.2 | 6 Canterbury Campus Framework Masterplan/ Step 2 Presentation: The Emerging Framework Masterplan | JLL/BPR | Sep 18 |
| | 7 Canterbury Campus Framework Masterplan/ Step 2 Consultation Content | University of Kent/CMA Planning | Sep 18 |
| | 8 Update on Conferencing Hotel | University of Kent/CMA Planning | Dec 18 |
| | 9 Canterbury Campus Framework Masterplan/ Step 2 Draft Framework Masterplan: Consultation Statement | University of Kent/CMA Planning | Jan 19 |
| | 10 Canterbury Campus Framework Masterplan/ Step 3 Final Consultation Statement | University of Kent/CMA Planning | Oct 19 |
| 7 | Masterplan Drawings: | | |
| | 1 Primary Masterplan Drawings | JLL/BPR | Aug 19 |
| | 2 Supplementary Masterplan Drawings | JLL/BPR | Aug 19 |
| | 3 Baseline Mapping | JLL/BPR | Apr 19 |
| | 4 Explanatory Concept Sketches | JLL/BPR | Apr 19 |

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## Appendix 4: Bibliography


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## Appendix 5: Canterbury Campus Architectural Awards

| No | Building | Award | Year |
|---|---|---|---|
| 1 | Colyer-Fergusson Music Building | • RIBA Regional Award for Architecture<br>• RIBA National Award for Architecture and Stirling Prize mid-list<br>• Wood Awards: Commercial & Public Access | 2013 |
| 2 | Digital Crit Space<br>Kent School of Architecture | • RIBA South-East Award<br>• World Architecture Award for Best Facade | 2013 |
| 3 | Templeman Library Extension | • Canterbury Society Design Award, New Building<br>• Concrete Society Award, Highly Commended | 2016<br>2017 |
| 4 | Sibson Building<br>University of Kent's Business School, School of Mathematics, Statistics and Actuarial Science | • RIBA South East Award, Building of the Year<br>• RIBA National Award<br>• Kent Design and Development Award, Project of the Year<br>• Canterbury Society Design Award, New Building | 2018 |

FINAL REPORT TO HAVE
POCKET FOR PLAN

# Appendix F
# Masterplan Place-making Strategy

# UNIVERSITY OF KENT CANTERBURY CAMPUS FRAMEWORK MASTERPLAN

PLACEMAKING STRATEGY

March 2018

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UNIVERSITY OF KENT CANTERBURY CAMPUS FRAMEWORK MASTERPLAN
PLACEMAKING STRATEGY DRAFT 9
14 March 2018

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**1.0 Executive Summary**

The University of Kent is embarking on the preparation of a Framework Masterplan to guide the future development of its main campus in Canterbury and University-owned land beyond the campus boundary.

The Framework Masterplan is intended as a document to guide the development of the physical estate in support of the *University of Kent Plan 2015-2020* and its core strategic objectives of research development, educational development and engagement with faculty, students and the wider community.

Today the campus is at a *tipping point* between fulfilling the imperative for built space balanced against the resulting quality of environment in the public realm, requiring a new and long-term vision to be determined for the future campus development. The Vice Chancellor and Executive Group recognise that, by taking a big-picture overview, the Framework Masterplan is a once-in-a-generation opportunity to create a campus environment of enduring and unique quality, and one which has a positive impact upon wider Canterbury and the region.

Since the inception of the Holford Masterplan in 1965, the University has experienced great success and has grown significantly as a result. During this period of growth and evolution, the planning of the campus has largely followed a pragmatic project-based approach to development, utilising available sites within the wider campus outside the confines of the original Holford masterplan to deliver the quantum of space required.

This approach has followed a much more pragmatic and tactical development of the campus than envisaged by Holford; the demand for space has resulted in the gradual expansion of the built environment and the consequent erosion of the open parkland setting, without an overall guiding plan. As a result, there has been a loss of coherence - or 'sense of place' - and a subsequent loss of identity offered by the original masterplan. It is our belief that continuing to follow this approach will result in a gradual decline in the quality of campus facilities and experience.

This paper makes the case for following a more strategic plan-based approach, in order to ensure that all future capital and management investment in the campus results in cumulative improvement to the campus environment as a whole.

Consequently, the Masterplan Framework will build on the findings of the Concept Masterplan study completed in 2015, and will explore and identify an alternative strategy based upon consolidation and intensification for the future development of the campus.

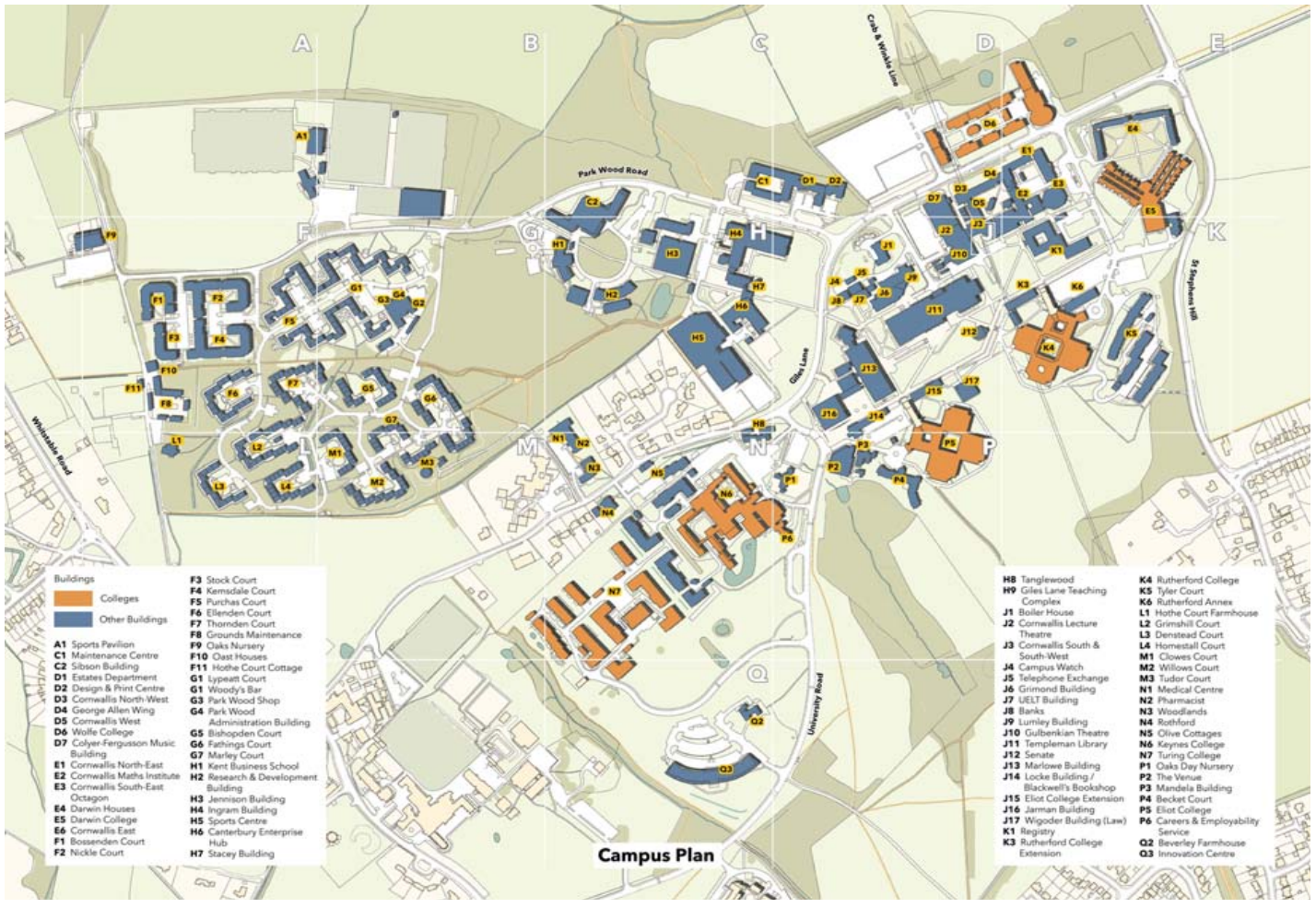


*Fig 1: The Campus is at a 'tipping point'.*

This paper identifies ten objectives for the Framework Masterplan to fulfil:

- A Plan for future Growth
- Enhance the Potential and Value of the University Estate
- Make 'Place-Making' a Top Priority
- Ensure Flexibility to accommodate an Evolving, Mixed-use, Knowledge-based Economy
- Reinforce the University's Reputation for Excellence in all aspects of Sustainability
- Promote a Coherent and Unique Brand for the University
- Develop an Environment where Social Interaction will thrive
- Create a Home for a Vibrant Academic Community
- Strengthen the Symbiotic Relationship with the City
- Create a Remarkable Public Realm

This is one of four spatial strategies that are being prepared to inform the brief for, and to define the direction of, a Framework Masterplan for the University's Canterbury Campus and University-owned land beyond the campus boundary. This paper encompasses all aspects of placemaking and takes the lead in setting the agenda for the other strategies, which are Planning and Environment, Landscape and Biodiversity and Movement and Transport.

**2.0 Introduction**

The fiftieth anniversary of the founding of the University of Kent provided an occasion to both reflect on the astonishing success of the University during its first half century and to speculate on its evolution over the next fifty years.

*Fig 2: The University of Kent Canterbury Campus 2017.*

The University of Kent is an extremely successful organisation which, in the context of significant changes to the funding and direction of higher education in the UK, is now dealing with a great deal of uncertainty. In that context, the Masterplan Study for the Canterbury campus is intended to help and provide a *framework* for development that will enable the University of Kent to cope with change and to continue to be a success going forward.

Future speculation is an endeavour fraught with a very high risk of error and, with an organisation as complex as a University, the problem of future planning is complex indeed. One method that perhaps gives some leverage on this complex issue is to think of the organisation as being composed of many interrelated systems, each of which evolves and changes at different rates. In this model, the time horizon from future planning is particular to each issue at hand. Day to day planning for immediate needs, yearly planning for the academic year, five year plans to set strategic goals and objectives etc. Campus planning evolves very slowly, and to the casual observer may appear permanent and un-changing. As such, it requires a long planning horizon as landscapes, shared spaces and building evolve and change over such long periods.

This strategy paper is concerned with shaping the spatial organisation of the future campus and nearby land, in other words the landscape setting, the shared spaces, the form and location of buildings and the environment that is created as a consequence. It is an issue which is perhaps the slowest changing of all the many issues that the University Vice Chancellor and the Executive Group is charged with managing for the future.

In planning the *strategic direction* of the University of Kent over an extended planning horizon of perhaps fifty years, there are three categories of future change that the Framework Masterplan will need to address:

2.1 **The Knowledge Economy:** Development of a knowledge-based economy in Canterbury, with the University of Kent playing a central role in partnership with the Canterbury City Council, along with other regional, national and international agencies. The economy of the UK is increasingly based upon knowledge, information and creativity, and the role Canterbury plays as a 'City of Learning' is a key provider in that marketplace. Formulation of campus development plans that will enable the University to successfully address and fulfil the economic imperatives of the Knowledge Economy, will require ever closer collaboration between the University and the City, to develop a shared economic vision that will benefit both organisations and make both stronger.

2.2 **Strategic Planning**: The long-term strategic planning of the campus over a fifty-year planning horizon and beyond, will inevitably need to address a variety of complex issues beyond the campus boundary. Canterbury City Council have identified Movement and Transport, Education and Air-Quality as some of the most significant issues to resolve in preparing a Framework Masterplan for the Canterbury Campus. Other issues are likely to include strategic land acquisition, infrastructure development (both within and beyond campus), defining and influencing patterns of growth beyond the designated campus boundary, long term policy strategies on sustainability, the environment, health and well-being. Taking a 360° overview across Canterbury and the District will therefore be essential in developing long-term partnerships of trust with local communities, businesses and the City of Canterbury.

2.3 **Adaptability & Flexibility:** The Framework Masterplan will also need to deal with the unforeseen, and to respond to urgent or unexpected contingencies that might arise, such as:

- developing facilities for research into new areas of knowledge or technology that require innovative specialist facilities
- responding to unexpected peaks and troughs in the demand for space
- diversifying to broaden the University's economic base
- responding to opportunities to form partnerships with commercial businesses
- accommodating new facilities supported by an unexpected endowment

These kinds of issues will require a strategic planning response to be considered as part of the Framework Masterplan.

This strategy paper explores what form that evolved campus masterplan might take and ways in which we might flexibly plan for the future, whilst acknowledging our lack of certain knowledge about the details of what will be needed in fifty years' time. The masterplan will be based upon good *'placemaking'* principles, in order to achieve a successful and enduring environment that will enrich the experience of working, studying and visiting the campus, and that will allow for the future accommodation needs of the University to be met.

Collaboration and positive public engagement with local communities will be critical to the success of the Framework Masterplan. The *University of Kent Plan 2015-2020* states that a strategic objective is that of engagement between the University, the community and wider society. For the Framework Masterplan to be enduring, it must set out a clear direction for the future development of the campus for the next fifty years, and its endorsement by the immediate local community, as well as by Canterbury City Council, will be key.

**3.0 The University of Kent Canterbury Campus: A Brief History**

The future is never a direct extrapolation from the past, and new circumstances demand new approaches or at least adjustment to 'best-laid' plans. However, an understanding of history is an important part of placemaking in respecting continuity with the past and in the preserving of memory. There are lessons we can learn from the past that will enrich the Framework Masterplan and the pre-University era, as well as the thinking behind the original masterplan for the campus, needs to be factored into our thinking.

The University of Kent was granted its Royal Charter January 1965 and received its first cohort of five hundred students later that year. It is easy to assume that this new University campus emerged fully-formed in the landscape without respect for, or connection with, the past. This is very far from the truth, as the Canterbury campus emerged from the remnants of several large estates that pre-existed the University.

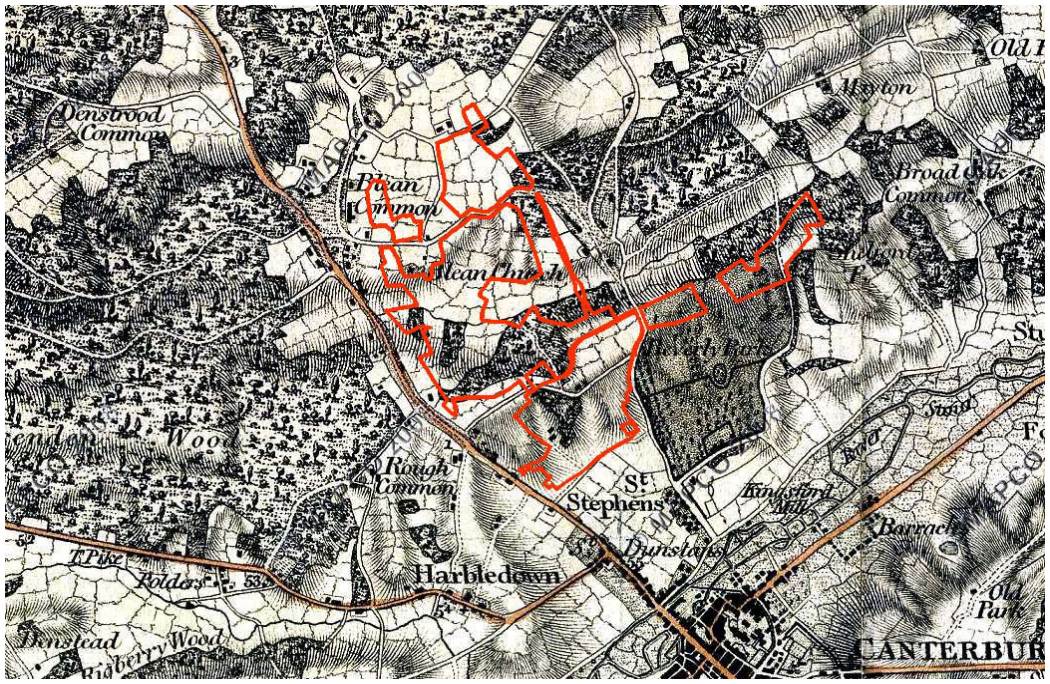


*Fig 3: William Mudge Survey 1801. The approximate area of the University estate is indicated in red*

In 1962, after consideration of many alternative options a large site was assembled for the new university on a ridgeline overlooking the historic city of Canterbury on open farmland along Giles Lane, a rural road connecting Whitstable Road with St Stephen's Hill. Holford immediately got to work on the urgent task of transforming the spectacular open site into a working university.

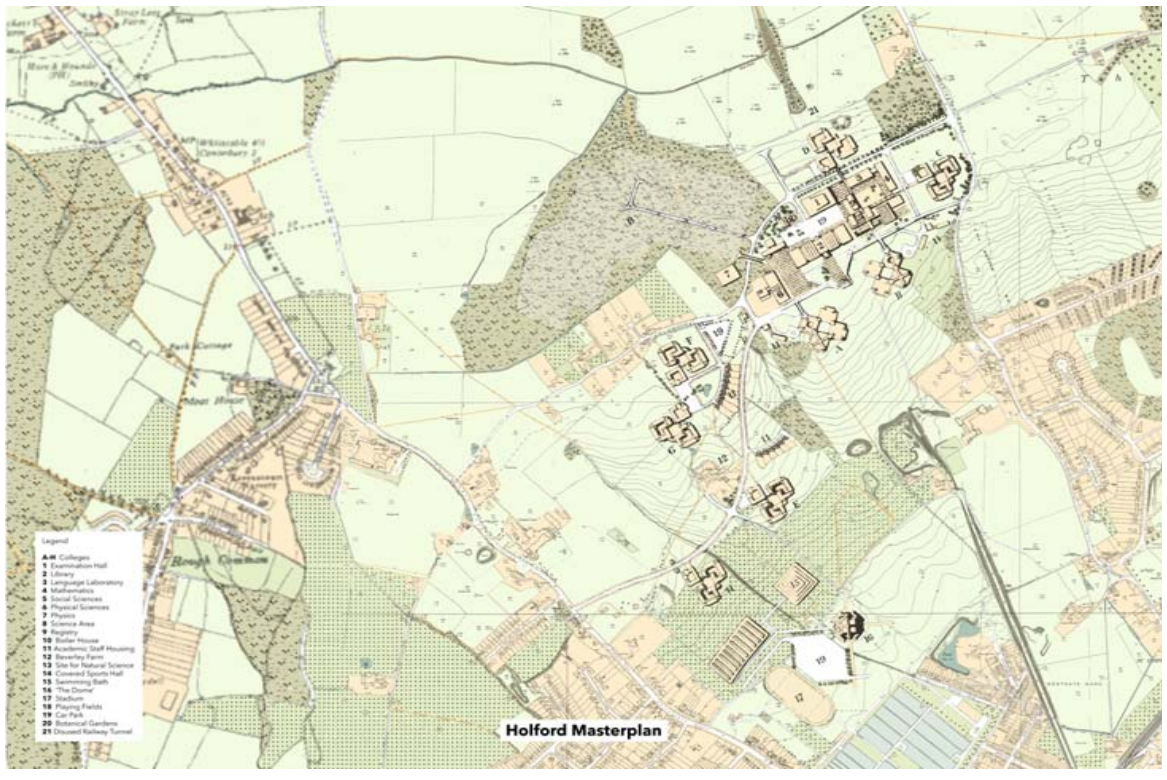


*Fig 4: Masterplan by Lord Holford, 1965*

The Holford University Masterplan developed out of an understanding of the University accommodation brief and his response to a remarkable setting. It was underpinned by two key ideas:

3.1 First and foremost the University plan was to be based upon a collegiate organisational model following the long-established tradition of much older institutions. The idea was to create compact, cross-disciplinary learning communities, in which students would live would work, eat and enjoy their social activities. The hope was to promote sociability and interdisciplinary exchange. Each college was designed as a self-contained building expressed through a rigorous geometrical plan of interlocking squares and spaces.

3.2 The second idea was a to conceive of the University campus heart placed within an open parkland landscape, with the college buildings distributed strategically around it to emphasise their importance, and to frame significant views and vistas - most notably towards the ancient Cathedral in the valley below. Here the idea was for individual colleges in a landscape, and in this respect the planning was a departure from the historic precedents of Oxford or Cambridge where college buildings are integrated into the town.

The original campus designed by Holford was of its time, and a thoughtful and dramatic response to post war needs; it could even be described in some senses as adventurous and innovative, exploring as it did new ideas and new models emanating from the urban and architectural theories of that era.

However, based as it was on symmetry of arrangement and grand axes centred on the Cathedral, the plan was not universally liked; its detractors criticised the bleakness of the setting and the

*"…curiously old-fashioned attempted grandeur and formality…".*

Critics were also disparaging of the low-density nature of the University in which the buildings were widely dispersed, leaving students large distances to negotiate whilst exposed to the weather:

*"…students trudge down endless unprotected paths from one monumental building to another…. There is none of the interplay of buildings and the spaces between them that should make a university site an exhilarating place in which to move about."*

There were other shortfalls in the plan and the planning by Holford. Despite the significance of the landscape in the setting of the Canterbury campus, the landscape architect was a late appointment and therefore the landscape design was not developed until late in the design process. As such, it was a rather open and raw landscape into which the first buildings were placed. In addition, the buildings are set as objects in this landscape and seen in the round - they therefore lack any hidden back yard space to deal with the pragmatics of servicing; as such these normally discrete essential activities are on full view to all.

Despite the criticism, the Holford Plan delivered a working university in a remarkably short planning period, and it laid the building foundations around which the University of Kent has grown and prospered over its first half century.

**4.0 The Evolving Canterbury Campus**

The Holford plan set out a clear vision for the campus as a collection of discrete colleges in a parkland landscape, with common facilities shared centrally between them. After half a century since the inception of the campus, the extent of tree cover has increased very significantly and is now a dominant feature, replacing the openness of the campus experienced on the opening day. Perhaps in this regard the setting is now closer to what Holford had imagined in the early 1960's. Future growth, in so far as it was known or anticipated, was to be accommodated by the addition of more college buildings distributed along the hill top ridge and down University Road, with large landscape spaces in-between creating the college settings.

*Fig 5: The Evolving University Campus, 2017*

However, the campus has evolved in quite different ways from that which Holford intended for several important reasons:

4.1 The University of Kent experienced a thirty-fold increase in faculty and student numbers since its inception in 1965.

4.2 The original collegiate system has been replaced by a more subject-based departmental system, along with a wide range of alternative ways to accommodate residential students, including shared apartments, halls of residence and many students living off campus in Canterbury.

4.3 Season-by-season the landscape has matured and developed, such that large areas of planting and maturing woodland now distinguish the formerly bleak and exposed ridgeline.

4.4 Finally and perhaps most importantly, the approach to providing accommodation has been much more pragmatic and tactical than envisaged by Holford. Buildings have been added within the confines of the original Holford campus heart, as well as on available sites within the wider campus. Some original structures have been extensively modified or replaced, and many of the buildings that have been realised are good, if not excellent, works of architecture. At the same time, the focus has been on developing good buildings perhaps at the expense of developing spaces of equal quality between them, and the ever-pressing demand for car parking has seen large surface parking areas retained and expanded. The main point here is that growth and the dramatic other changes have been delivered without strict adherence to an overall guiding plan.

This raises an interesting question: if such a tactical approach has served the University well to date why should it change to a masterplan guided approach to accommodate future change?

The answer to that key question is that the University of Kent Campus has arrived at a tipping point in its evolution, (it may indeed be somewhat beyond such a tipping point), where the investment in new buildings, spaces and facilities is eroding functionality and legibility of the campus as a whole. This in turn is beginning to erode the functionality and quality of faculty and student experience of learning and living at the University of Kent.

In addition, the process of land acquisition has continued over the decades since the University first opened, and this has led to a substantial growth in the estate; for example, the University estate now includes significantly more land to the north of the campus heart up to and beyond Tyler Hill Road and a large area of land to the east of St Stephen's Hill, as well as the corridor of land once occupied by the former Crab & Winkle rail line (between the campus heart and Tyler Hill Road). Conversely, the area of land to the south of the campus heart (designated on Holford's plan as playing fields) was never acquired.

In this time of greater uncertainty, when growth has levelled out and universities are competing for more limited student numbers, an opportunity is available to take a big-picture overview of the Canterbury campus, including projections for future growth, appropriate use of the larger land ownership, and the quality of the campus as a place. Through the Framework masterplan, the University is taking stock of the potential of the campus, not only to deliver future growth but also to evolve as a more inclusive and vital place. Urban theorists worldwide now recognise the positive and measurable

impacts of good placemaking, including its relevance to productivity, economy, health, well-being and the desirability of a location. Future emphasis on campus planning must therefore be focussed on growth balanced with flexibility and good placemaking.

*"Place is actually more important to the world's economy than ever before"*

Professor Richard Florida, Urban Studies Theorist, University of Toronto

The Canterbury Campus Framework Masterplan must therefore be directed toward arresting and reversing the erosion of campus quality, in order to ensure that all future capital and estate management investment is channelled towards delivering cumulative improvement to the campus environment for the benefit of the whole University and the wider community.

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**5.0 The University of Kent Canterbury Campus and wider University Estate Today**

*Fig 6: The University Campus and wider University Estate in Context, 2017*

The Canterbury Campus is one of a number of new suburban satellites that developed around the perimeter of the historic city in the post-war era, as Canterbury continued to grow well beyond the original city walls. Not only is the University of Kent considered to be the UK's European University, it is also now within the 'magic hour' from London by train. While it is physically independent from Canterbury, it is only a mile away from the city centre. As a result, it is free from the hustle and bustle of the city, whilst being only a 25-minute walk away from the Cultural Capital of Kent.

The University is well known as a very verdant campus with plenty of open space, located within a semi-rural landscape setting, and the names of Brotherhood Farm, Beverley Farm, Hothe Court Farm Park Wood, Brotherhood Wood and Hospital Wood suggest the very rural character of the area prior to the arrival of the University campus.

However, a review of the Canterbury Campus today reveals a number of shortcomings both in the campus environment and in its relationship with the wider context, and the current University estate faces several issues that need to be addressed:

- The campus lacks a strong mental map; the buildings are arranged as 'objects' in the landscape rather than being arranged to define and enclose the 'spaces' between them.
- Motor vehicles tend to dominate the campus layout and car parks infiltrate into the very heart of the campus. The campus roads are not particularly urban, but are often busy and intimidating, and carry fast-moving traffic. The design of the roads does nothing to discourage high speeds, and Giles Lane and University Road are used by non-university motorists to bypass the city centre.
- The design of the landscape was not sufficiently well addressed in Holford's day. Whilst blessed with an abundance of green spaces, the campus today still lacks a sense of coherence and an organised public realm. Furthermore, the green spaces within the campus are rather homogenous and repetitious, and this lack of variety means that the University under-achieves in terms of landscape character and personality.
- The hill-top location dictates that, for much of the academic year, the campus is very exposed to the weather. It is only in the Summer Term that students benefit from the green open spaces. The public realm and outdoor spaces would benefit from a linked network of civic spaces and more sheltered outdoor spaces.
- The low-density and dispersed campus environment means that paths that connect the core with the outer campus are long, lack animation or passive surveillance. As a result, they do not feel safe.
- Emerging tensions between the University and its neighbours where development pressure, traffic and other nuisances provide the focus for potential dispute.

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*Fig 7: The University Campus Core in detail, 2017*

These criticisms should be set against the many delights of the current campus, which include the quality of landscape setting, the quality of many of the facilities and buildings and the spectacular views of Canterbury.

The University is currently taking stock of the future potential of the University estate, not only to deliver future growth but also to evolve as a more inclusive and vital place. It is a time of great uncertainty, when growth has levelled out and universities are competing for more limited student numbers, so flexibility and adaptability are key.

With the benefit of fifty years of experience, based on the campus development to date, we may confidently predict that much of the campus of fifty years hence is already constructed and that the future campus plan will be in the form of an evolved version of the current spatial arrangements. Whilst the Framework Masterplan proposals themselves will be strictly focussed upon the Campus as designated in the Canterbury District Local Plan, the Masterplan document will also take the opportunity to identify additional proposals for adjoining areas outside of the Campus boundary. By taking a big-picture and long term overview of Canterbury and district, the masterplan might also generate opportunities to realise city-wide benefits on land beyond the designated campus boundary.

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**6.0 Campus Architecture**

*Fig 8: Campus Architecture*

Like many of the 1960s UK universities, the architectural legacy of the University of Kent in Canterbury is distinguished by predominantly Brutalist and Modernist buildings, some of which were designed by Lord Holford himself. This era, described by some as a 'golden age' of university building, is currently undergoing a reappraisal in the architectural criticism. A more sympathetic view of this period is now emerging recognising the radically new

approach taken to town planning in the 1960's, the striking new architecture it generated, and the innovative use of modern building materials and new industrialised methods used in the construction. The writer and film-maker Jonathan Meades has described the Brutalist period as important because:

> *"…it was one of those rare periods when British architecture abandoned its habitual stance of offensively inoffensive "good manners", of strenuous politeness."*

Many buildings from this period are rightly considered to be unique and the finest of their type. Certainly, Holford's concept for Eliot College (and later reprised for its near-identical 'twin' Rutherford College) is a fascinating exploration of a flexible, mixed-use building typology that simply would not have been created in the private sector or outside of a University campus.

Today's campus has emerged from a (more or less) continuous process of design and construction, and yet the architectural character has remained relatively consistent in its height, scale and choice of materials. Although many of the buildings can be described as 'iconic' through their uniqueness, overall the architectural composition of the campus is delightfully modest and does not rely upon showy, over-scaled or extrovert architecture. This is a place where academic endeavour takes place in thoughtfully designed buildings within a predominantly green landscape setting.

The Canterbury Campus has evolved as a somewhat diverse collection of buildings since the University was founded in the mid 1960s, and this trend continues to this day. The development of the University can be divided into several quite discreet eras of development. In addition to remaining architectural fragments from the pre-University use of the land, each group covers a period of campus development of approximately one decade.

**The legacy of the pre-University era**

The University campus was created in open farmland on the ridgeline overlooking the Stour Valley and the historic city of Canterbury. Built evidence of the former agrarian use of the land still exist and contribute greatly to the quality of place that the campus has become. These include Beverley Farm, Brotherhood Farm, Hothe Court, and the houses and cottages along Giles Lane (Rothford & Olive). The group includes a record of Kentish vernacular farmhouses, farm buildings, oast houses and cottages. The landscape settings of woodland and country lanes, together with enduring place names, are all part of the early architectural legacy of the campus.

**The 1960's, and the Founding of the University**

Holford's central idea for the University was of a campus set in a landscape, yet interestingly the masterplan can be described as very 'architectural' in nature. It was composed of a central campus core of academic buildings, arranged around a largely orthogonal grid of streets and spaces that ran at right angles to St Stephens Hill and parallel to (the newly aligned) Giles Lane. At the centre of the core sits the Templeman Library, clearly expressed on the ridgeline as the backbone to the campus heart.

The working 'heart' of the campus core was to be surrounded in plan by a collection of eight independent college buildings, arranged around the perimeter of the core in such a way that the core could be 'contained' - and therefore defined by - the most important college buildings.
This approach to the masterplan enabled Holford to create a clearly defined architectural hierarchy in which the library and the college buildings were expressed as the most important buildings. These college buildings are generally taller than the other buildings but set slightly apart and downhill from the campus heart, such that their height does not dominate. They are connected to the core but at the same time independent from it, located as they are at the threshold between the campus core and the surrounding green landscape.

Whereas the core is 'urban' in nature, the colleges are intentionally located as 'objects' in space. It is an architectural language of contrast between geometric order with a free flowing picturesque landscape. It is the landscape setting that dominates the final result, with the buildings carefully located to avoid breaking ridgeline or dominating the natural setting. The relationship of geometric forms in landscape, together with the planned layout for Darwin and future colleges to the west and north, created an informal campus edge to the parkland to the south with views to Canterbury and beyond.

As with all general rules, there is of course an exception; Holford anticipated expansion of the masterplan to the north-west of the campus heart, so a gap was created in the otherwise regular disposition of college buildings around the perimeter of the core (now manifest between Woolf College and Keynes College) to allow for the campus to expand into Park Wood.

Holford translated his campus idea into architecture and each building was designed in strict adherence to a geometric order. The founding buildings were built to Holford's design and included Eliot & Rutherford Colleges, the Marlowe Building and the Templeman Library. The planning of the colleges in particular was based on overlapping squares forming courtyards and circulation routes, around which the functional spaces were arranged.

The masterplan anticipated a relatively modest first phase followed by gradual growth. This approach enabled the colleges to be developed gradually over time, and the University grew incrementally as funding became available. The Holford masterplan layout suggested that subsequent college buildings should also adopt the same overlapping courtyard expression.

Holford was not retained to guide the development of the masterplan beyond the first phase. Although his influence on the architectural expression of the college buildings waned, the masterplan proved flexible enough to allow each college to develop its own architectural personality and expression over time. It is instructive to note that patterns set out in the Holford masterplan at the foundation of the University, fifty years ago, are still vividly present in the form and functioning of the campus today despite the complete transformation of so many other aspects of the University and its organisation. Indeed, the landscape patterns from the period before the founding of the university are still legible and profoundly influence the arrangement of the University today.

The selection of materials in these early buildings, together with architectural modelling and detail, help to embed them into their context. Windows are grouped in vertical bands and recessed behind the sculpted concrete wall panels, which reduce their impact on distant views. Earthy brick colours at the upper levels and chamfered corners soften the building outline against the landscape skyline and wooded backdrop.

The Marlowe Building makes use of similar architectural techniques and façade modelling, with recessed narrow windows set within an earthy brick and an over-sailing horizontal upper storey supported on a cantilevered structure.

This collection of buildings began to create a garden setting on the plateau overlooking Canterbury, formed on its western edge by the Marlowe Building and loosely defined on its southern edge by Eliot & Rutherford Colleges, framing the views back to the historic city. The space was finally defined with the completion of the Templeman Library on its northern edge, which echoed the forms of the neighbouring colleges but created a more formal, civic expression with heavily buttressed brick piers and intermittent vertical bands of glazing.

During the late 1960's, the campus was further enlarged with the addition of the Chemical Laboratory (now adapted as Ingram), the Electronics Laboratory (Jennison) and Sports Hall to the north west of Giles Lane, the Cornwallis Building & Gulbenkian Theatre in the central campus and Keynes College to the West of the junction of Giles Lane with University Road.

The Cornwallis and Jennison buildings are both two storey horizontally expressed buildings, formed of textured concrete panels set parallel with (and at right angles to) the facades to provide solar shading. Keynes College is formed of twin courtyards and expressed stair towers reminiscent of more traditional university architecture. Fenestration patterns and building materials follow the precedent set by Holford's founding Eliot & Rutherford College buildings.

All these buildings, whilst different in form, use, construction and appearance, share a family resemblance and sit comfortably as a coherent collection of buildings in the landscape, as Holford had envisaged.

**1970's Campus Expansion**

During the 1970's the University campus was enlarged eastwards up to St. Stephen's Hill and exhibited the first departures from the founding masterplan principles. Darwin College, The Registry, The Senate building and the Rutherford Extension were added to the central campus and the Department of Biosciences (Stacey) Building was developed to the north west.

The Registry, designed in the architectural language of the earlier Cornwallis building, together with the Templeman Library and Gulbenkian Theatre, frame an open landscaped courtyard, connected diagonally with the original central campus garden to the south west. The Senate, with its geometric octagonal form in concrete and brick, sits as a pavilion comfortably alongside this family of buildings.

The experimental 'Y-plan' used at Darwin College breaks with the courtyard form used elsewhere on the campus. The use of brickwork, with rectangular windows vertically aligned, is also a departure from the modular panelised architecture used elsewhere. The modelling on the facades is created by a regular rhythm of setback segments of the brick wall, to express a crenelated series of masonry blocks.

Darwin College bears little relationship with the site or neighbouring buildings. The design ignores the symbiotic relationship of architecture and landscape that the Holford masterplan and early buildings had established.

**1980's Further Expansion**
The 1980's saw a great increase in amount of student residential accommodation on campus, with the development of the Darwin Houses and Park Wood as a satellite community away from the campus heart (thereby stretching of the campus). In addition to student housing, general faculty and college extensions were developed in the campus heart at Cornwallis (Octagon), European & Foreign Language Studies (Cornwallis North West), Grimmond and Eliot.

The Darwin Houses form a continuous terrace that returns on its west and east edges to enclose (with Darwin College) an expansive courtyard garden. By contrast, the Park Wood housing, planned as a series of suburban-style clusters arranged around car parking courts and cul-de-sacs within a woodland setting, is a complete departure from the collegiate forms of the earlier buildings.

The idea of a unified campus architecture as envisaged by Holford was decisively abandoned during this period. Buildings were designed utilising an eclectic mix of different architectural languages constructed from a diverse range of materials. The resulting architecture is of varying quality.

**1990's: Further Expansion**
This period saw the continued expansion of student housing on campus with the development of Becket Court to the west, adjacent to Eliot, and Tyler Court (Phase1) to the east of Rutherford College. Park Wood (Phase2) extended the phase one layout. The Sports Pavilion was also built at this time to the north side of Park Wood Road.

Becket Court is a cranked 'L-form' block, with folded roofs and expressed in a 'modern vernacular' style. Tyler Court is a long slab/finger block cut into the hill, and it's siting significantly obstructs views out of the eastern end of the campus. The large-scale building massing, small windows, brick colour and texture create the appearance of an urban scale apartment block, alien to the landscape setting.

Also during the 1980's, additional faculties were developed in the campus heart in Cornwallis, together with the Templeman Library (Phase2), in an architectural language that refers to the earlier neighbouring buildings.

North west of the campus core, the Canterbury (now Kent) Business School was the first building to be developed around a 'garden circus', in a woodland clearing at the termination of a footpath linked to the central campus garden.

**2000's: Further Expansion**
After the millennium, the process of adding new campus buildings established in the previous decades continued, and each building was designed independently without an apparent unifying architectural language. Additions included the Keynes College lecture theatre, the School for Sociology (Beverley?), the extension of the Sports Centre and the extension to the Gulbenkian Theatre.

During this period, large student housing projects were also completed, including Tyler Court (Phase2). This development comprised two stepped long finger blocks cut into the landscape and set parallel to the first phase. The blocks step down the hillside creating unsatisfactory ambiguous landscaped spaces between them.

Woolf College, constructed in 2008, was first new college building to be competed since Darwin College in the 1970's. The design of the new college revived the courtyard form of Holford's original college buildings, although the layout is at a much larger scale than the original buildings. This, together with the flat and somewhat featureless architecture, creates the impression of a modern urban mansion block rather than the intimacy of a collegiate courtyard.

**2010 Onwards**
During the last decade, the process of campus growth has continued with the addition of a number of notable buildings.

The Colyer-Fergusson Music building respects the form and scale of its neighbours, particularly the strong horizontal layering of the Marlowe Building. The building is finished in exposed washed aggregate concrete blocks similar to those used at Keynes College.

The Jarman Building is a large, square composition that dominates the western arrival space to the campus at the summit of University Road. Despite this gateway location, the facades lack animation and the building misses the opportunity to animate the spaces that surround it. Also, the unique design, using contemporary materials and detailing, makes little reference to other campus buildings.

Turing College is the latest college to be completed (2014), and further extends the campus along the ridgeline to the west. It comprises a series of parallel finger and 'C-shaped' blocks spaced apart to allow the garden spaces to pass between them. At the centre is a square, which contains communal and social facilities. The use of gabion walls, wood and dark cladding help to soften the impact of the buildings into the landscape, however the predominant use of lighter render does make the buildings a prominent feature on the skyline.

The Wigoder Building, a small white frame clad block, is located next to Eliot College. Although modest in size, this building has a significant and negative impact on the architectural dialogue between the early Eliot & Rutherford Colleges and interrupts the landscape connection between the Parklands and the campus heart. Views to the historic city are also partially blocked by the building.

The Sibson Building fronts onto the circus garden at the end of the northwest link to the campus core, and represents another one-off architectural innovation within the campus. The architectural language in this case is created from organic curvilinear forms, and irregular pattern of vertical fin louvres and rich mixture of coloured zinc cladding to reflect the natural woodland colours.

As a place of innovation, it is entirely appropriate that the University of Kent should continue to push architectural boundaries and support innovation in architecture, alongside an appreciation of the relevant issues of memory and continuity with the past in this particular location. These issues will continue to be explored as part of the Framework Masterplan process and flexible guidance provided on future development, layout, scale and massing of buildings that will distinguish, and reinforce the differences between, one character area from another.

**7.0 The Way Forward**

In 2014, the University of Kent commissioned Farrells to prepare a Concept Masterplan for their Canterbury Campus, as well as the University-owned land beyond the campus boundary, to provide a high-level blueprint for its future development and to articulate a vision for the next 50 years, recognising the critical relationship with Canterbury and the wider district and to provide the foundation for a more detailed masterplan. A Concept Masterplan Report was presented to the University and to the City in July 2015.

*Fig 9: Concept Masterplan by Sir Terry Farrell, 2015*

In the preparation of this report, three alternative options were considered:

*7.1 The Holford Plan Restored*

This option explored the idea of returning to the principles of Holford's founding masterplan of colleges in a landscape. The approach was soon rejected as it:

- Would not reflect current approaches to teaching and learning
- Would require considerable additional dispersal of the campus over a much wider geographical area
- Would require very substantial investment to re-provide existing facilities within a mode dispersed environment

One Idea from the Holford plan that was thought useful to reinforce was the idea of the campus supporting the development of an interdisciplinary learning community, but at the scale of the campus as a whole rather than at the college building scale envisaged by Holford.

*7.2 A Continued Pragmatic Response*

This option envisaged a continuing of the tactical and pragmatic planning approach that has guided much of the development over the last half-century. The approach has many great attractions:

- Flexibility
- Responsive to changing financial pressures
- Responsiveness to changing needs

This approach was rejected because the erosion in campus quality that is beginning to occur as noted above.

*7.3 Consolidation and Intensification*

The Concept Masterplan study concluded that the absolute priority should be to intensify activity in the heart of the campus with the objective of:

- Creating places of vibrancy and quality
- Unlocking the inherent development capacity at the university's core
- Protecting the green landscapes to the north and south of the campus.

This final option was recommended as strategy that retains the advantages of a pragmatic approach while ensuring that each development stage delivers cumulative, campus wide benefits.

Along with a number of physical propositions, the following *'Urban Design Principles'* were put forward as an inherent part of the Concept Masterplan:

- Unlock the development capacity at the heart of the campus
- Create 'places' of quality and variety in the spaces between buildings
- Create a clear and legible mental map
- Define a hierarchy of streets, spaces and places

- Create a diversity of green landscapes of value and character
- Make the pedestrian the king of the public realm.
- Strengthen physical and intellectual links between the university and the city
- Safeguard existing views of historic Canterbury
- Reveal the historic narrative of the campus linking together its past, present and future
- Deliver the 'best garden campus in the UK'

The University carried out extensive consultation on its Concept Masterplan between April and September 2016, and subsequently published a Consultation Statement that identifies the range and breadth of comments received, both positive and negative, and the key themes and messages to be learnt from what has been said.

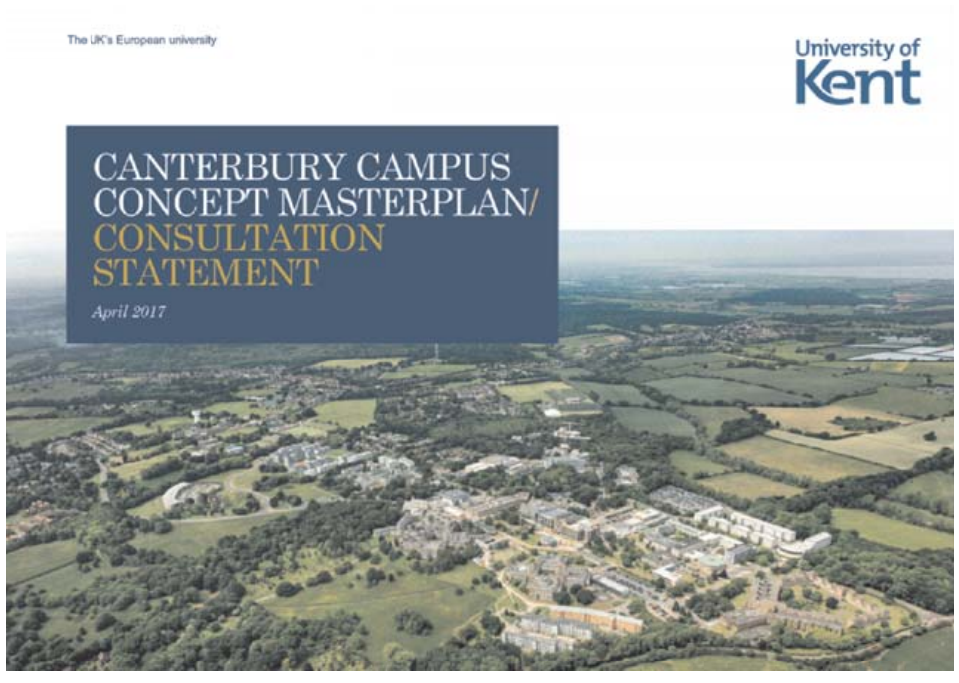


*Fig 10: Consultation Statement on the Concept Masterplan, 2017*

The University is now developing the concept masterplan into a more detailed '*Framework Masterplan'* in collaboration with Canterbury City Council, local residents, businesses and other stakeholders. This is to ensure that the masterplan is informed by local knowledge and opinion so that the city council, as the Local Planning Authority, can afford significant weight to the final document when determining future planning applications. In parallel, it is also important that the University are able to have a greater degree of certainty regarding the outcome of future planning approval submissions.

The 'Strategic Spatial Vision Discussion Document' sets out the reasons behind, and the proposed template for, the process of creating a Framework Masterplan. This document also describes the process to be followed in setting out the 'building blocks' of the Vision, the 'Objectives' behind the Vision, and the various Spatial Strategies that will be followed in order to achieve this Vision.

The following sections of this report describe the objectives and strategies for placemaking that will inform the development of the Campus Framework Masterplan together with and outline of the ways in which the plan will be implemented.

**8.0 Placemaking Objectives**

The following strategic objectives have been identified to guide the development of the proposed Campus Framework Masterplan, as well as the University-owned land beyond the campus boundary, based upon the conclusions from the 2015 Farrell study and the subsequent campus review.

8.1 *A Plan for Future Evolution*
A flexible plan to accommodate growth of:

- academic and research facilities
- student housing
- much needed new shared amenities
- infrastructure

8.2 *Enhance the Potential and Quality of the University Estate*
Make best use of existing building resources in order to:

- deliver future growth balanced with flexibility and good placemaking
- evolve as a more inclusive and vital place
- locate new facilities to enhance the estate as a whole
- deliver the positive and measurable impacts of good placemaking
- improve the quality of spaces between buildings to enhance productivity, economy, health and well-being
- develop the campus to enhance the interface with neighbours and improve linkages with local communities as well as Canterbury

8.3 *Make 'Place-Making' a Top Priority*
The masterplan should:

- nurture and enhance the renown and appeal of the University and its campus as a 'Place'
- strengthen the University's reputation as a great place to be, through the quality and diversity of its overall environment
- inspire a greater celebration of arrival at the campus from all directions

8.4 *Ensure Flexibility to accommodate an Evolving, Mixed-use, Knowledge-based Economy*
The campus Framework Masterplan must:

- be flexible to accommodate mixed-uses
- create partner space for companies in the knowledge-based and commercial research economy

8.5 *Reinforce the University's Reputation for Excellence in all aspects of Sustainability*
Facilities should be consolidated to:

- promote energy efficiency and limit heat waste
- provide conditions for cogeneration of power
- take advantage of natural light, shading and shelter in the design of the buildings and landscape
- promote the creation of a walkable campus to encourage a safe, healthy connections to all facilities
- traffic should be tamed to limit the impact on a predominantly pedestrian environment

8.6 *Strengthen the University's Unique Attributes to Distinguish it from its Competitors*
Recognising its reputation as the UK's European University, the masterplan should:

- strengthen the university's unique attributes
- distinguish the University of Kent from its competitors

8.7 *Develop an Environment for Social Interaction*
The masterplan must help deliver an environment that will enable and encourage:

- spaces and facilities that support student societies, group working, activities and volunteering
- the character of Kent students as socially aware members of the community to prepare them for post-university careers

8.8 *Create a Remarkable Public Realm*
The Framework Masterplan should enable the development of a safe and sustainable public realm that:

- encourages social interaction and leisure activities
- supports university events and commercial activities
- can be used for formal and informal teaching and learning activities

8.9 *Strengthen connections with the Surrounding Context*
The preparation of a masterplan provides the opportunity for:

- a holistic and considered approach towards the campus as a whole
- integration with the Canterbury District Local Plan and influence its review and refinement to guide future development needs
- maintaining the campus character whilst respecting the setting of the wider countryside
- establishing key facilities within the campus that will serve the needs of the wider city

8.10 *Create a Home for a Vibrant Academic Community*
The campus should:

- foster intellectual exchange
- allow its students and staff to develop their careers and academic pursuits within a stimulating, safe and supportive environment

In this context, there is a clear case for a more compact, consolidated campus heart. This approach would be entirely consistent with the Holford proposal for a collegiate university and the creation of compact learning communities promoting interaction, social spaces, interdisciplinary exchange etc. With that in mind the university's strategic priorities towards research, teaching and engagement should become a clear and integrated expression within the masterplan.

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**9.0 Principles and Strategies**

Whilst new University buildings will provide an environment for enhanced learning and academic excellence, the masterplan concept advocates a wider diversity of landscaped spaces to broaden the opportunity for the interaction of the University community. The places and spaces between the buildings will be the public 'living rooms' where all members of the University community can gather to exchange ideas, where formal events take place and informal encounters are made possible.

Overall, the University estate must adapt and evolve in order to satisfy a range of contemporary expectations that have developed since the time of the Holford master plan: a growing reliance upon public transport by environmentally and financially sensitive millennial students and staff, the academic and business worlds moving towards shared flexible, inclusive and inspiring working environments, and the evolution of retail and other commercial activities leading to a growing interest to co-locate with the University.

In conclusion, the estate as a whole will be the most powerful expression of the academic, cultural and civic life of the University, an enduring expression of the University's aspirations and achievements.

Considering all of the above, the Framework Masterplan will follow a set of guiding principles and strategies to deliver a successful 'Place':

9.1 *Planning*

- Reinforce and extend development of the campus heart along hill ridge line to form a coherent silhouette
- Increase density within the Campus Core and the Whitstable Road Character Areas to sustain a vibrant and vital heart
- Focus new development (including student accommodation) within the Campus Heart and the Whitstable Road Character Areas to consolidate the 'core' of the University and Park Wood
- Conserve and enrich the pastoral landscape of the University Rise and the rural landscape of the Sarre Penn valley Character Areas
- Managed growth in student/staff numbers in the longer-term (2031 onwards), with development continued to be focused in the Campus Heart and Whitstable Road Character Areas
- Investigate opportunities to work in partnership with the City Council to improve the City's cultural leisure and tourism offer
- Safeguard and promote the Canterbury Innovation Centre and the University's Hub for Innovation and Enterprise
- Investigate opportunities to provide additional space, including small-scale business clusters in the Sarre Penn, Blean Common, Tyler Hill and Little Hall Farm Character Areas.
- Aim to keep in productive use farm land that exists in the Sarre Penn, Blean Common, Tyler Hill, St. Stephens and Little Hall Farm Character Areas until such times as it is needed for development

9.2 *Architecture & Built Form*

- Create a masterplan informed by the landscape character and the history of the site, and which respects the setting of the site, the landscape, social history etc
- Focus development along the ridgelines in line with the historic landscape character of the area, and in order to preserve the open landscapes
- Ensure that future development respects, and where possible enhances, the setting of the University Estate in the wider context, including Canterbury Cathedral World Heritage Site, the Scheduled Ancient Monument to the south-west of St Cosmus and St Damian's Church, Conservation Areas, Listed and Locally-Listed Buildings
- Develop a masterplan that more clearly defines the places, spaces and built development of high quality within the masterplan, and that has been tested and informed by a visual impact assessment
- Bring University-owned buildings and structures of historical or heritage value back to life by giving them appropriate new uses wherever possible, and undertaking sensitive conservation-led interventions where necessary
- Enhance and strengthen the architecture and built form within the character areas
- Provide flexible guidance on the future development, layout, scale and massing of buildings that will distinguish, and reinforce the differences between, one character area from another

9.3 *Landscape & Biodiversity*

- Create a University Estate rooted in the geology, geography, topography, history and biodiversity of the landscape that it inhabits
- Clearly define and distinguish between the various Landscape Character Areas to enable a masterplan that supports and builds upon the variety of defining local characteristics
- Create a masterplan that acknowledges and responds positively to the sensitive context and setting of Ancient Woodlands and diverse historic landscapes, and seamless integration with the *Blean Living Landscape*
- Develop a language for the public realm throughout the campus, informed by the natural characteristics of the location and context
- Ensure ecological enhancement of the Sarre Penn Valley and develop it as a primary recreational resource
- Restore agricultural land as a haven for flagship farmland species such as the brown hare, the yellow hammer and the skylark
- Restore and expand the existing ponds and drainage features to create a network of wetlands facilitating the movement of great crested newts and other amphibians, dragonflies etc.
- Create a new, large attractively planted, biodiverse, wetland feature to become a centre-stage landscape attraction, creating a true 'living' heart for Campus.
- Reveal and express the natural water courses and run off areas through the man-made landscape including swales; rain gardens, retention ponds etc

- Establish a landscape that clearly defines the edge of the Campus Heart and distinguishes it from the rest of the University Estate
- Reinforce the network of cycle and footpaths throughout the campus to maximise access to new, and newly revealed, landscape attractions

9.4 *Movement & Legibility*

- Create a clear, coherent and hierarchical network of routes within the Campus Heart and throughout the University Estate, giving priority to walking and cycling routes
- Create clear entry places to highlight the points of access onto the Campus to contribute towards a distinctive, low-speed environment placemaking principles to highlight key buildings, landmarks, and intersections with the pedestrian and cycle route network
- Create a West/East promenade - a campus 'High Street'
- Reinforce the significance of NCN Route 1 as the principal route through the University Estate, connecting the City Centre and Canterbury West Railway Station to the campus core and continuing northwards towards Whitstable
- Establish and enhance places that allow access to NCN Route 1 and transfer from other modes of transport (eg. Park-and-Ride sites, or bicycle support hubs)
- Increase north-south connections through the Estate, making maximum use of existing paths and routes, and bringing back into use elements of the trackbed of the former Crab & Winkle Railway.
- Create and enhance a network of legible, attractive, safe pedestrian and cycle routes to all parts of the campus
- Seek a clear arrangement to clarify front and back doors, and to distinguish public and private access and servicing routes

9.5 *Transport & Connectivity*

- Improve connectivity between the University, the City and the surrounding district through enhanced physical links and route legibility
- Improve bicycle infrastructure through enhanced bike parking, bike hire, servicing and charging points across the University Estate
- Create well defined campus arrival points to the west, south, east & north
- Create a stronger connection between the Campus Heart and Canterbury West Station
- Investigate the potential for a new northern entrance to Canterbury West Station
- Increase the range of transport options and forms of movement available on Campus and at key points of transport interchange
- Extend the penetration of bus services throughout the Campus by creating additional turning options. Explore options for additional campus entry point near Blean School
- Extend small-scale routes for walking, cycling and lightweight vehicles across Sarre Penn Valley to connect Tyler Hill and Giles Lane ridgelines

9.6 *Parking*

- Sensitively accommodate car and coach parking in consolidated areas at the fringes of the Campus Heart and the points of entry, sympathetically integrated into the landscape and topography, such that parking does not negatively impact upon the campus environment or setting
- Explore the potential to extend the existing park and ride schemes serving the city, particularly in the north of Canterbury

9.7 *Views & Vistas*

- Identify and protect key views throughout all parts of the campus
- Reinforce existing, and frame new, views to historic Canterbury
- Create new views and vistas across the campus to improve legibility and orientation throughout the public realm; new buildings and landscape features as points of visual interest will be carefully located in order to achieve this
- Flexible guidelines on the layout, scale and massing of buildings will define the views and vistas to be delivered within the Framework Masterplan

9.8 *Infrastructure Constraints*

- Respond practically and pragmatically to constraints above & below ground including telecommunications, power lines, drainage and services, the Crab & Winkle Tunnel, water courses, springs etc

*9.9 Implementation and Phasing*

Detailed master planning will continue through the life of the masterplan and will involve the detail design of the landscape, movement and infrastructure across the site. The future stages of the masterplan will define the phasing of the infrastructure and landscape works to co-ordinate with phased building construction. Detailed cost checking and value engineering will also form part of this stage of the work.

- Assemble and publish Design Guidelines that direct and shape the development of buildings, places and spaces, in order to provide a flexible framework for the local planning authority when judging the merits of future design proposals
- Individual designers will be selected based on their understanding of and commitment to the Framework Masterplan principles
- Design & Access Statements prepared by individual designers as part of future planning applications must explain how their proposals conform with the Framework Masterplan. Any deviation from the masterplan should be fully justified and agreed with the University, the masterplanner and CCC in advance of submitting a planning application
- Create a masterplan that is deliverable in phases, and yet delivers places of quality at every stage
- Create a masterplan that acknowledges the life expectancy of the existing university facilities and that can accommodate either refurbishment or replacement as necessary

- Create a masterplan that is sufficiently flexible to adapt over time, to enable the University to respond to future growth and change.

In order to ensure efficient delivery of the Framework Masterplan, it should become an integral part of University policy and decision-making process such that it becomes a key consideration in developing projects.

*9.10 Good Stewardship*

The Canterbury Campus of the University of Kent encompasses almost 600 acres (240 hectares) of land, buildings, roads, parkland, woodland and farmland - by comparison the Olympic Park in Stratford, London is 560 acres and nearby Sissinghurst Park is 460 acres. The walled Roman City of Canterbury is 130 acres, which is approximately the same size as campus heart. By any standards, the University of Kent is the custodian of a major estate at the Canterbury campus.

The desirability of high quality placemaking is, it could be argued, a universal concern - the reality depends on the definition of placemaking and the degree to which it is planned with long term sustainability in mind. The potential for successful placemaking is inevitably improved when estate owners take a long-term view.

The Framework Masterplan will therefore advocate that, at each stage of campus development going forward, manuals are assembled and published that set out a sustainable management and maintenance regime of the buildings, places and spaces as a whole, to ensure that they are looked after in a positive way to help ensure high-quality places.

**10.0 Conclusion**

Good placemaking is becoming more relevant to the global economy and our individual lives than ever before. The choice of where to live, work and play is arguably the most important decision we make and exerts a powerful influence over the jobs we have access to, the people we meet, and our ability to lead happy and fulfilled lives. It is also recognised as a key driver for the desirability or 'livability' of an area.

In taking a long-term overview, the Framework Masterplan is a once-in-a-generation opportunity to fulfil the *University of Kent Plan 2015-2020* and its core strategic objectives to create a campus environment of enduring and unique quality, and one which has a positive impact upon wider Canterbury and the region. The Masterplan Study will provide the University with a framework to facilitate a shift from a tactical project-based approach to development, to a more strategic plan-based approach to evolution. This 360° approach to managing future changes to the campus landscape and buildings will be essential in delivering a masterplan to the benefit of the University, the local communities located around the Campus and the City of Canterbury.

In planning policy terms, mixing different land uses in the same geographical area has increasingly been seen as a positive thing for placemaking. This is based on the belief that increasing the variety of land uses and creating environments that mix opportunities for learning, teaching, working, leisure and living, will lead to more sustainable lifestyles with reduced car usage and greater adoption of public transport. In addition, places that have a mix of uses are perceived to be more attractive, viable and safer to live and work.

**Benefits to the University**

The University will benefit by:

- More closely aligning the management of the campus with the University's strategic policy objectives - in particular commitments to societal engagement and to environmental sustainability
- Ensuring that future changes provide incremental and measurable improvements to the campus environment as a whole, for the benefit of all who study, work or visit the campus
- Ensuring an orderly and efficient use of all University resources over time, including the use of building space, specialist facilities, finance, infrastructure, landscape and open spaces
- Building an even closer relationship with the City Council

**Benefits to the local communities**

The surrounding local communities will benefit by:

- More open and active communication with the University

- An open and collaborative approach to manage impacts (both positive and negative) that the presence of the University may have on neighbours
- The conservation of the landscape setting of the University as an asset for neighbours to enjoy

**Benefits to the Canterbury District**

The City of Canterbury will benefit by:

- Building an even closer relationship with the University
- The future-proofing of a world class University as part of modern economy and identity of the City of Canterbury
- Promoting greater openness of the University campus facilities and landscapes for the use and amenity of the citizen of Canterbury
- An open and collaborative approach to campus planning integrated with plans for the future social, economic and environmental development of the City of Canterbury as a whole

# Appendix G
# Masterplan Planning and Environment Strategy

UNIVERSITY OF KENT CANTERBURY CAMPUS FRAMEWORK MASTERPLAN
PLANNING & ENVIRONMENT STRATEGY
March 2018

# Canterbury Campus Framework Masterplan:
# Planning and Environment Strategy

March 2019 (updated)

## 1. Introduction

This is one of four spatial strategies that have been prepared to inform and support a Framework Masterplan for the Canterbury Campus . The others relate to Place-making, Landscape and Biodiversity and Movement and Transport. Section 2 comprises a baseline report and Sections 3 to 12 comprise a strategy.

## 2. Planning Framework

### Canterbury District Plan

Canterbury City Council (CCC) (full Council) adopted the Canterbury District Local Plan (CDLP) on 13 July 2017. The Plan covers the period up to 2031.

There was discussion at the Examination in Public over the use of Sub National Housing Projections (SNHP) in the calculation of the Objectively Assessed Need for housing – with CCC using the 2012 projections. The Inspector's Report (paras. 60-75) considers this issue and requires the Council to commit within a fixed timescale to a thorough assessment of the implications of the new SNHP with a partial review of the plan if this shows that further housing sites are needed. As a consequence, paragraph 1.78 of the CDLP states:

> "In addition to the ongoing monitoring of the delivery of the Plan strategy, the Council will also have regard to demographic projections that from time to time will be issued by Government, and the implications these may have for housing need in Canterbury District's Housing Market Area. In the context of the Department for Communities and Local Government's 2014-based sub national household projections, the Council will within one year of the Plan being adopted, undertake and publish an assessment of the current evidence on demographic change, how it relates to assumptions around student populations, and any impact on the overall housing need for which the Local Plan makes provision. If the Council's assessment indicates an early partial review of the Plan is necessary, this will commence two years from the date of adoption of the Plan."

The CDLP is supported by a number relevant planning guidance, with further relevant guidance proposed, as set out in Figure 1.

Figure 1: CDLP and related Planning Guidance

**Kent Mineral and Waste Local Plan**
Kent County Council adopted the Local Plan in July 2016. It covers the period 2013 to 2030 and forms part of the statutory 'development plan' for Canterbury District. The Plan is supported by the KMWLP Safeguarding Supplementary Planning Document, adopted in April 2017.

**Neighbourhood Planning**
Neighbourhood Plans also form part of the 'development plan.' The UoK campus is located within Blean Forest Ward and Blean Parish. The residential streets to the south of the campus fall within St Stephen's and Eastgate Wards. No neighbourhood plans are currently being prepared for these Wards.

**Community Infrastructure Levy**
CCC is introducing a local Community Infrastructure Levy (CIL) as consulted on a Draft CIL Charging Schedule (January 2019), with the intention of adopting and implementing Cil by winter 2019.

**Relevant Development Plan and other Designations**
A separate Constraints Plan sets out all of the site designations listed below.

| Campus Designations – Development Plan |
|---|
| • The southern boundary of the Campus forms the boundary between Urban and Rural Areas).<br>• HD6 - Within proposed HMO Article 4 Direction area (A Direction is in place).<br>• EMP1 – The Business Innovation Park is identified for protection (N.B. This washes over Turin Court – which was built within this designation).<br>• EMP7 – The University of Kent Campus boundary is defined on the Proposals Map (N.B. The Proposals Map also identifies specific development plots within the Campus. However, this is a hangover from the Submission Version of Policy EMP7 and these are due to be removed from the Proposals Map).<br>• CC4 – The Campus is wholly within Flood Zone 1 (Little or no risk with an annual probability of flooding from rivers and the sea of less than 0.1 %). The Campus is not within a Source Protection Zone.<br>• HE4- The following Listed Buildings are within the Campus |

| Campus Designations – Development Plan |
|---|
| o St. Thomas's Hill, Beverley Farmhouse (Grade 2)<br>o Tyler Hill Railway tunnel, including north and south portals, under Tyler Hill (former Canterbury and Whitstable Railway) (Grade 2*)<br>o Whitstable Road, Barn adjoining Hothe Court on the north (Grade 2)<br>o Whitstable Road, Hothe Court K/A Hothe Court Farmhouse (Grade 2)<br>• HE6 – The Campus is partly within the following 4 Conservation Areas:<br>o Blean<br>o Canterbury and Whitstable Railway (Hackington & Blean)<br>o Hothe Court<br>o Tyler Hill<br>• HE11 - Scheduled Ancient Monument (Dispersed Medieval Settlement Remains and a Roman Building Immediately South West of St Cosmus and St Damian's Church).<br>• LB2 – Area of High Landscape Value southern part of the Campus as identified on the Proposals Map.<br>• LB7 – Local Wildlife Sites – An area of land to the west of the footpath/cycle route running between the Park Wood playing fields and St Cosmus and St Damian's Church (Blean Pastures).<br>• LB10 – The following Tree Preservation Orders (TPOs) are in place:<br>o TPO No 4, 1988 / W1, 4/1988/HAC - Woodland at junction Giles Lane and Canterbury Hill -Mixed hardwoods consisting mainly of Hornbeam, hawthorn, Holly, Oak and Ash.<br>o TPO No 24, 1990 / W2, 24/1990/BLE - Parkwood/Brotherhood Wood, Blean - Mixed deciduous woodland consisting mainly of Oak with Beech, Hornbeam and Sweet Chestnut.<br>o TPO No 24, 1990 / A1, 24/1990/BLE - Parkwood/Brotherhood Wood, Blean - An area of trees, consisting mainly of Willows, also Alder, Ash and Oak.<br>o TPO No 24, 1990 / W1, 24/1990/BLE - Parkwood/Brotherhood Wood, Blean - Mixed deciduous woodland consisting mainly of Oak, Ash and maple.<br>o TPO No 4, 1970 / A2, 4/1970/BLE - Hothe Court, Blean - The several Oak, Ash, poplar and Willow trees standing in the area numbered A2.<br>o TPO No 24, 1990 / W3, 24/1990/BLE - Parkwood/Brotherhood Wood, Blean - Mixed deciduous woodland consisting mainly of Oak, Ash and Sycamore with Sweet Chestnut and Hazel. |

| Campus Designations – Development Plan |
|---|
| o TPO No 2, 1970 / G1, 2/1970/BLE - Hothe Court, Blean - Group consisting of 3 Holm Oak, 3 maples and 1 Sycamore.<br>o TPO No 2, 1970 / G2, 2/1970/BLE - Hothe Court, Blean - Group consisting of 2 False Acacia, 2 Holly, 1 Horse Chestnut, 1 Lawsons Cypress, 2 Lime, 2 Maple, 1.<br>o TPO No 2, 1970 / G3, 2/1970/BLE - Hothe Court, Blean – Group consisting of 1 Maple, 1 Oak, 4 Scots Pine and 1 Sycamore.<br>o TPO No 1, 1965 / G1-9, 1/1965/HAC - Boiler House Site, University of Kent at Canterbury - 9 Groups.<br>o TPO No 3, 1970 / G1, 3/1970/BLE - Tyler Hill House, Blean - Group consisting of 1 Alder and 12 Oak.<br>• OS6 – The following part of the Campus is designated as part of a Green Gap:<br>o Area between Bossenden and Nickle Courts and Tile Kiln Hill (part of a wider Gap up to Rough Common).<br>• SP6 – Northern part of the Campus within the Thanet Coast and Sandwich Bay 7.2km Zone of Influence and Thames Medway & Swale Estuaries 6km Zone of Influence (Special Policy Areas – European Sites).<br>• T2 – Park Wood and path/cycle route down to Hackington Path.<br>• Kent Minerals & Waste Local Plan Mineral Safeguarding Area covers large parts of the adopted Campus Boundary - River Terrace, Storm Beach Gravel and some Brick Earth deposits<br>• Brick Earth deposits to the north of Tyler Hill Road covering all of the Northern Landholdings and Chaucer College (outside of the adopted Campus boundary)<br>• Brick Earth deposits on land owned by Brett Aggregates to the south of the Eastern Landholdings. |
| **Campus Designations - Other** |
| • Crab & Winkle Way forms part of Sustrans Route 1 (long-distance cycle route connecting Dover with the Shetland Islands – via the east coast of England and Scotland).<br>• Public Footpaths<br>o CB12, CB12A, CB13, CB25, CB30, CB31, CB32, CB33, CC5, CC6 and CC69.<br>• Public Bridleways<br>o CC8 and CB24A. |

| Campus Designations – Development Plan |
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| • Parts of the Campus comprise Ancient Woodland (Policy LB8).<br>• Parts of the Campus are identified as 'High' and 'Intermediate' on the Environment Agency's groundwater vulnerability maps.<br>• The Biodiversity Action Plan (BAP) designates the northern part of the Campus as the Blean Biodiversity Opportunity Area.<br>• The northern part of the Campus is identified as forming part of the Blean Living Landscape Area. |

| Nearby Designations (including University landholdings) – Development Plan |
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| • HD6 - Within proposed HMO Article 4 Direction area (A Direction is in place).<br>• CC4 – Nearby area is within Flood Zone 1 (Little or no risk with an annual probability of flooding from rivers and the sea of less than 0.1 %). The neighbouring areas, including the Northern and Eastern Landholdings, are not within a Source Protection Zone.<br>• HE2 & HE3 - Canterbury Cathedral, St Augustine's Abbey and St Martin's Church World Heritage Site.<br>• HE4 – The following Listed Buildings are within approx. 500m of the Campus<br>  o Calais Hill, No. 13, Tyler Hill House (Grade 2)<br>  o Cherry Garden Road, No. 20 (Cherry Garden Farmhouse) (Grade 2)<br>  o Hales Drive Hackington, Church of St. Stephen (Grade 1)<br>  o Leycroft Close No.1 (Grade 2)<br>  o Link Road, No. 9 Wayfair (Grade 2)<br>  o Link Road, Nos. 12, 14 and 16 (Taylors Cottages) (Grade 2)<br>  o Neal's Place Road, Neal's Place (Grade 2)<br>  o Rough Common Road, Moat House (Grade 2)<br>  o School Lane, No. 20 (Yew Lodge) (Grade 2)<br>  o St. Stephens Green Hackington, Old St. Stephens School (Grade 2)<br>  o St Stephens Green Hackington, Ye Olde Beverlie Inn (Grade 2*)<br>  o St. Stephens Green Hackington, Nos. 1 to 6 (consec) Manwoods Hospital (Grade 2*)<br>  o St. Stephens Green Hackington, Nos. 1 to 3 (consec) (Glebe Cottage) (Grade 2) |

| Nearby Designations (including University landholdings) – Development Plan |
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| o St. Stephens Road Hackington, The Glebe House (formerly listed as The Rectory) (Grade 2)<br>o St. Stephens Road, Hackington, No. 103 (Harflete) (Grade 2)<br>o St. Stephens Road Hackington, No. 101 (The Manor House) (Grade 2)<br>o St. Stephens Road Hackington, No. 99 (The Old Vicarage Hackington) (Grade 2)<br>o St. Thomas's Hill, former Headmasters House St. Edmunds School (Grade 2)<br>o St. Thomas's Hill, St. Edmunds School (previously Clergy Orphans School) (Grade 2)<br>o Tenterden Drive, Hales Place Jesuit Chapel (Grade 2)<br>o Tyler Hill Road, Church of St. Cosmus and St. Damian (Grade 2*)<br>o Tyler Hill Road, Church Cottage (Grade 2)<br>o Tyler Hill Road, Tyler Hill Cottage (Grade 2)<br>o Whitstable Road, Blean House (Grade 2)<br>• HE4 – The following Locally Listed Buildings are within 500m of the Campus<br>o Blean Hill, No. 36 – Hillside Farm<br>o Calais Hill, St. Cosmos and St. Damian in Blean (No. 9 Oakwell in the Blean)<br>o Calais Hill, St. Cosmos and St. Damian in Blean (No. 11 Oakwell in the Blean)<br>o School Lane, Nos. 40/42/44 (previously known as Browning Cottages No. 1 to 4)<br>o School Lane, Woodlands.<br>o Tile Kiln Hill, Nos. 28 & 30.<br>o Whitstable Road, No.51 The Firs.<br>o Whitstable Road, No. 121.<br>• HE6 – The Campus is within 500m of the following 12 Conservation Areas:<br>o Allcroft Grange (Hackington) (includes the eastern most Eastern Landholding).<br>o Amery Court (Blean) (includes frontage to track that gives access to the western most Northern Landholding).<br>o Blean (includes immediately to south of western most Northern Landholding).<br>o Canterbury City<br>o Canterbury (London Road)<br>o Canterbury St. Stephen's No. 2<br>o Canterbury West Station<br>o Canterbury and Whitstable Railway (Hackington & Blean) |

| Nearby Designations (including University landholdings) – Development Plan |
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| o Canterbury & Whitstable Railway (St. Stephen's)<br>o Canterbury & Whitstable Railway (Hackington)<br>o Canterbury (Whitstable Road)<br>o Hothe Court<br>o Tyler Hill (includes the Eastern Landholdings next to St Stephens Hill)<br>• HE11 - Scheduled Ancient Monument (Part of the Tyler Hill medieval pottery and tile industry (on east side of Canterbury Hill and St Stephens Hill).<br>• SP6 – University landholdings to north of Tyler Hill Road within the Thanet Coast and Sandwich Bay 7.2km Zone of Influence and the Thames Medway & Swale Estuaries 6km Zone of Influence (Special Policy Areas – European Sites).<br>• LB2 – Area of High Landscape Value east of Campus (including Eastern Landholdings).<br>• LB5 & LB6 – The Blean Complex (to the west of Whitstable Road) is a Special Area of Conservation (SAC), Site of Special Scientific Interest (SSSI) and National Nature Reserve NNR).<br>• LB6 – West Blean & Thornden Woods is a SSSI (immediately adjacent to the eastern most Eastern landholdings).<br>• LB7 – Local Wildlife Sites<br>o Little Hall & Kemberland Woods and Pasture (immediately to the north and south of the eastern most Eastern Landholdings).<br>o Land between Campus boundary and Tile Kiln Lane (Blean Pastures).<br>• OS6 – The following area is designated as a Green Gap<br>o Land to the north and east of Woolf College (Land between boundary of UKC and Tyler Hill, Blean).<br>o Area between Bossenden and Nickle Courts and Tile Kiln Hill (part of a wider Gap up to Rough Common).<br>• OS9 – Protection of Existing Open Spaces - area to south west of Campus - including Chaucer College.<br>• SP4 – Blean is identified as a 'Local Centre' in the Rural Settlement Hierarchy ('Rural Service Centre', 'Local centres', 'Villages' and 'Hamlets').<br>• SP6 - University landholdings to the east of St. Stephens Hill are within the Thanet Coast and Sandwich Bay 7.2km Zone of Influence. |

| Nearby Designations (including University landholdings) – Development Plan |
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| • T2 – Cycle & Pedestrian Route along track that serves the Eastern landholdings.<br>• Kent Minerals & Waste Local Plan Mineral Safeguarding Area as follows:<br>  o Brick Earth deposits to the north of Tyler Hill Road covering all of the Northern Landholdings and Chaucer College (outside of the adopted Campus boundary)<br>  o Brick Earth deposits on land owned by Brett Aggregates to the south of the Eastern Landholdings. |
| **Nearby Designations (including University landholdings) - Other** |
| • The Blean Complex to the west, Clowes Wood to the north and Honey Wood to the east comprise Ancient Woodland (Policy LB8)<br>• St. Stephen's Controlled Parking Zone (streets to north-east of Canterbury West Station) – waiting limited to 4 hours between 08.00 and 16.00. https://www.canterbury.gov.uk/parking-travel-roads/apply-for-a-parking-permit/parking-zones/<br>• Numerous Public Footpaths and Public Bridleways.<br>• The graveyard at Church of St. Cosmus and St. Damian contains registered Commonwealth War Graves.<br>• The Biodiversity Action Plan (BAP) designates the northern part of the area as the Blean Biodiversity Opportunity Area.<br>• The northern part of the area is identified as forming part of the Blean Living Landscape Area. |

The above designations are illustrated within the Baseline Mapping booklet.

**Hedgerows**

Policy LB10 (Trees, Hedgerows and Woodland) makes clear that development should be designed to retain hedgerows that make an important contribution to the amenity of the site and the surrounding area and which are important to wild flora and fauna. No specific hedgerows are identified on the Proposals Map or on CCC's Planning Constraints Map. Countryside Hedgerows are protected by the Hedgerow Regulations 1997 if, it is:

- More than 20m long with gaps of 20m or less in its length;
- Less than 20m long, but meets another hedge at each end;
- Less than 5m at its base; and
- Is on or next to, amongst other things:
    - Land used for agriculture or forestry
    - Land used for keeping horses, ponies or donkeys
    - A public right of way

An 'important hedgerow' must be protected. These are hedgerows that are at least 30 years old and is at least one of the following:

- Marks all or part of a parish boundary that existed before 1850;
- Contains an archaeological feature such as a scheduled monument;
- Is completely or partly in or next to an archaeological site listed on the Historic Environment Record (HER);
- Marks the boundary of an estate or manor or looks to be related to any building or other feature that is part of the estate or manor that existed before 1600;
- Is part of a field system or looks to be related to any building or other feature associated with the field system that existed before the Enclosure Acts (that is before 1845);
- Contains protected species listed in the Wildlife and Countryside Act 1981;
- Contains species that are endangered, vulnerable and rare (British Red Data books); and
- Includes woody species and associated features as specified in the Regulations.

**Key Relevant Development Plan Policies**

**Canterbury District Local Plan**
A summary of the key relevant policies is set out below, in the same order as in the CDLP. The actual polices and justifying text should be referred to.

Policy SP2 (Development Requirements)
This sets out floorspace requirements over the plan period for housing, employment land and retail (comparison and convenience goods). It does not identify a need for leisure.

Policy SP4 (Strategic approach to location of development)
The urban areas of Canterbury, Herne Bay and Whitstable will continue to be the principal focus for development, with a particular focus at Canterbury, together with development at the rural service centres and local centres. Policy SP3 identifies the key sites for mixed-use development

In addition to the development allocations set out in this plan:
New housing that is of a design, scale, character and location appropriate to the character and built form of the service centres of Barham, Blean, Bridge, Chartham, Hersden, Littlebourne and Sturry will be supported provided that such proposals are not in conflict with other local plan policies relating to transport, environmental and flood zone protection and design, and those of the Kent Downs AONB Management Plan, where applicable.

The justifying text for this policy includes the following:

"1.47. Development in addition to the sites identified in this Plan will be judged against the District settlement hierarchy. The Settlement Hierarchy Study (2011) identified the broad tiers of settlement in the District, based on the size of settlements and the range of services they possess. Canterbury District does not possess a large number of larger villages, but rather many settlements that are small in scale.

1.48. The Study recommends that there should continue to be a sequential approach to the allocation of land for development; that is, that new housing development should primarily be concentrated in the urban centres of the District, with new development in the rural settlements limited, proportionate to their scale and position in the settlement hierarchy. However, the Local Plan should also be sufficiently flexible to respond to identified local needs, where this is supported by the relevant Parish
Council, or where appropriate, community forum.

1.49. Thus, in this Plan, the allocation of land for new development in the District seeks to make best use of previously developed land and buildings, where available, and to follow a sequential approach to the sustainable location of new development, subject to other planning factors. The distribution of new development also broadly reflects the settlement hierarchy and the outcomes from the Ipsos MORI public opinion research and is broadly commensurate with the role and function of settlements in the hierarchy.

1.50. It is important and appropriate that the distribution of new housing sites in rural settlements reflects such a settlement pattern, and that rural allocations made as part of the Plan are generally small in scale, except in the rural service centre and local centres, where a higher level of development might be supported. Historically rural settlements have grown gradually over time and the Study concluded that such a pattern of organic small-scale growth remains appropriate for the majority of the rural settlements of Canterbury District.

1.51. In this context, infilling is generally defined as the completion of an otherwise substantially built up frontage by the filling of a narrow gap. However, infilling may not always be acceptable as open spaces between development can often make an important contribution to the character and setting of the village. Development needs to be considered in context with the size and character of the village it is planned for. For example, a proposed development of a vacant site with five to ten homes within a larger village (such as the rural service centre of Sturry or one of the local centres) might be considered acceptable development. Therefore, the scale, quality and location of appropriate development will be dependent on the individual characteristics of each village.

1.52. The City Council does not identify the built confines of villages by a line on the Proposals Map, as to do this would infer that any vacant plot within this boundary is suitable for development, which may not necessarily be the case as the openness could be part of the character of the village."

Policy SP5 Infrastructure Delivery Plan
This commits the Council to prepare an Infrastructure Delivery Plan for the allocations set out in the plan, and to set out its proposals for the use of s106 agreements and similar mechanisms, and Community Infrastructure Levy.

Policy SP6 Strategic Access Management and Monitoring (SAMM) Mitigation Measures for the coastal Special Protection Areas and Ramsar sites
No development will be permitted which may have an adverse effect on the integrity of the coastal sites being the Thanet Coast and Sandwich Bay SPA or Ramsar and Swale SPA and Ramsar, alone, or in combination with other plans or projects, through an increase in recreational disturbance on the over-wintering bird populations for which these sites are designated. As such, the strategic development sites identified in the Plan and any other developments within the identified Zone
of Influence, as shown on the District Proposals Maps (Thanet Coast and Sandwich Bay SPA 7.2km and the Swale SPA 6km), which would lead to an increase in recreational disturbance, are required to fund, in-perpetuity, access management and monitoring measures to mitigate these impacts.

*Note:* The policy does not limit mitigation, to be by the way of one-off payment to housing – although the current guidance on CCC's website relates just to housing.

Policy HD6 Housing in Multiple Occupation (HMO)
The proportion of multiple occupancies should not exceed 10% of the total number of dwellings within a 100m radius of any application property. The City Council will not permit changes of use to HMOs, or extensions to existing HMOs, where that proportion would be exceeded.

The Housing in Multiple Occupation (HMO) Article 4 Direction came into effect in February 2016. This means that planning permission is required for changes of use from residential (C3) to small HMO (C4) uses the following wards (or parts of wards) Barton; Blean Forest; Chartham and Stone Street; Northgate; St Stephens; Sturry; Westgate and Wincheap.

Policy HD7 (Purpose Built Student Accommodation)
This states that all future increases in academic or administrative floorspace resulting in increased student numbers by the universities, should be matched by a corresponding increase in purpose-built student accommodation.

Proposals for purpose-built managed student accommodation will be granted if:
a. It is the acceptable redevelopment of a non-residential site, where there is no longer a proven need for the existing use;
b. The site is not already allocated for general housing;
c. The proposal would not lead to a concentration of students in an otherwise residential area and therefore conflict with the purpose of HMO policy HD6;
d. The site is well served by pedestrian and cycle routes and public transport and, if applicable will have adequate transport links to the establishment's existing educational facilities;
e. Parking requirements on site are kept to the operational minimum, and must include servicing and drop-off facilities;
f. The proposal would not lead to an unacceptable level of car parking on the surrounding street;
g. The development is to be a car free development
h. The proposal respects the character of the surrounding area and satisfies the criteria in policies DBE3 and DBE4;
i. Provision is made for cycle storage;

The City Council will support proposals on campus, subject to other relevant plan policies.

Policy HD8 (Retention of Housing Accommodation)
The City Council will only permit the loss of housing accommodation where:
a. The existing accommodation is unsuitable for residential use; or
b. The existing residential accommodation is incompatible with adjoining uses; or
c. The change of use will ensure the retention and refurbishment of a building which makes a significant contribution to the character or appearance of the area, where it could not be achieved if the residential use remained; or
d. The proposed use will meet an identified community, business, tourism, or other residential need, which would be compatible with the character and amenity of the area.

Policy EMP1 Employment Land Allocations (Innovation Centre, University of Kent)
This identifies and protects for business purposes (B1 only) the Innovation Centre, University of Kent (3.45ha). Note: This includes land to the north of the existing Phase 1 Innovation centre (including parts of Turing College).

Policy EMP2 (Other Business Uses)
This makes clear that hotels and other uses that are significant in terms of the local economy will be permitted, including on allocated business sites) subject to the provisions of Policy EMP1 and the following criteria
a. Not being contrary to Local Plan policies relating to landscape and nature conservation;
b. There not being significant transport impacts that cannot be mitigated;
c. There not being unacceptable disturbance to residential amenity; and
d. The development not resulting in the loss of sites allocated for other forms of development.

Policy EMP4 Protection of Employment Sites (Innovation Centre, University of Kent)
To support the wider economic strategy for the District, the Council:
(a) will only permit the loss of existing or allocated employment sites, as identified on the Proposals Map where:
It would be in compliance with the non-Class B provisions of Policy EMP1;
Part redevelopment for other uses would trigger the development of one of the district's other key employment sites identified in the Plan;
It would secure the reinvestment of an existing significant employer within the district; or
It would meet identified community needs where no alternative provision is made in this plan.

Policy EMP7 (University of Kent) (Campus boundary & Masterplan)
"Within the campus of the University of Kent identified on the proposals map, the City Council will support development of educational buildings for teaching and office space; student accommodation; business accommodation (compatible with the University's role in research and development and business innovation); sports facilities and other facilities directly related to the University's core business.

The City Council will expect a masterplan to be prepared for the whole identified campus site, prior to any significant development within the site. Such a masterplan should: maintain the campus character of the university; respect the setting of the site in the wider countryside; identify the key uses and their disposition within the site and any relocation of uses within the wider campus area. It should also set out a landscape and biodiversity strategy for the whole site.

Significant development proposals at the University will also be subject to updating of the University's Transport Impact Assessment, and a review of the University Travel Plan.

The City Council will grant planning permission for educational and ancillary uses within the campus boundary; subject to design, siting, transport and access considerations."

Justifying text Paragraph 3.62 that supports this policy:

"The City Council supports the preparation of long-term strategies for the University sites, and will work with the Universities to facilitate their preparation. The boundary of the campus of the University of Kent is shown on the Proposals Map. However, it is recognised that should the current masterplan process identify a need to include proposals beyond the campus boundary, this could be dealt with through the planning process and the extent of the campus boundary may also be reconsidered when the Local Plan is reviewed. The City Council will also support and work to promote links between the Universities and local businesses, and also the development of new business ideas emerging from the Universities. Policy HD7 requires all future increases in academic or administrative floorspace resulting in an increase in student numbers to be matched by a corresponding increase in purpose-built accommodation. "

Policy EMP12 Agricultural Land

The City Council will seek to protect the best and most versatile farmland for the longer term. Where significant development of unallocated agricultural land is demonstrated to be necessary to meet a housing, business or community need, planning permission may be granted on best and most versatile land if a suitable site within the urban area or on poorer quality land cannot be identified.

Policy EMP14 (Other Rural Businesses)

This makes clear that the City Council will grant planning permission for well-designed new buildings that support the development and expansion of business in suitable locations in the rural areas based on a number of criteria. These include: (a) Preferably, in or on the edges of existing settlements; (d) Access and parking provisions are acceptable and the use does not significantly increase traffic to the detriment of the area or highway safety; (e) There is no detrimental impact on landscape interests, protected species, sites or features of nature conservation interest or on sites of architectural or historic importance, or their settings where appropriate; and (f) There is no detrimental impact on residential amenity.

Policy TCL (A) Retail Hierarchy and Network

To ensure the long-term vitality and viability of the Canterbury centres, the Council will apply a 'town centre first' approach to proposals for retail, leisure *and another main town centre uses*. Development should be appropriate to the size and function of the centre within which it is to be located. The District's retail hierarchy includes the defined city, district and local centres. The wider retail network also includes other retailing locations across the district.

The NPPF glossary defines 'main town centre uses.' This includes leisure, entertainment facilities and the more intensive sport and recreation uses (including health and fitness centres) and tourism development (including hotels and conference facilities).

Justifying text paragraph 4.14 that supports this policy:

"Canterbury, Whitstable and Herne Bay have designated town centres, which are shown on the Proposals Map. A strong town centre policy enables and encourages a full range of town centre uses to be implemented within them, but also allows the Council to reject proposals that do not add to the vitality and viability of the town centre or which conflict with other policies and objectives. Such town centre uses include, retail, leisure, entertainment facilities, intensive sport and recreation uses, offices, arts, culture and tourism development. Indeed, the Council will support the provision of a diverse range of uses which appeal to a wide range of age and social groups. It is social and cultural experiences which provide critical reasons to go into town. Uses such as restaurants, cafés and pubs can complement the retail offer of a town."

Policy TCL6 Main Town Centre Uses

Planning permission for main town centre uses outside the identified centre boundaries, will be granted where the applicant has successfully demonstrated:
a. That there are no other more suitably located and available sites nearer to the identified centres or Primary Shopping Area (as relevant for Canterbury City Centre) for the town centre use(s) proposed, using a sequential approach to site identification;
b. Flexibility in terms of format and scale;
c. The site is accessible and well connected to the town centre through a range of transport modes other than the car, including good local public transport services, walking and cycling; and
d. The proposed development does not have a significant detrimental effect on the highway network in terms of congestion, road safety and pollution.

When assessing applications for main town centre uses outside the identified centres boundaries, which are not in accordance with the adopted Local Plan and with a floorspace that meets or exceeds 2,500sqm, the City Council will also require an impact assessment. Should a planning application be made for an amount of retail floorspace that exceeds the total identified in Policy SP2 and taking account of any future retail capacity studies, it should be accompanied by an impact assessment relating to the additional floorspace. An Impact assessment will include an assessment of:
e. The impact of the development on existing, committed and planned public and private investment (including regeneration schemes) in a centre or centres in the catchment area of the proposal;
f. The impact of the proposal on town centre vitality and viability, including local consumer choice and trade in the town centre and wider area; up to five years (ten for major schemes) from the time the application is made.

Development that fails the sequential approach to development or gives rise to significant adverse impacts will be refused.

Justifying text paragraphs 4.40 to 4.44 that supports this policy:
4.40 The City Council will positively focus new development in the City and District centres. Any development will be expected to be of an appropriate scale and design for the particular centre. Proposals outside these areas will be assessed according to the sequential test, the requirement for good accessibility by walking, cycling and public transport, and their impact on committed and planned public and private investment.

4.41 The City Council will apply the sequential test to main town centre uses set out in Policy TCL6 in the following order:

- Town Centre locations;
- Edge of centre locations (within 300m of the Primary Shopping Area in Canterbury and town centre boundary in Herne Bay and Whitstable);
- Out of Centre locations.

4.42 Proposals at out of centre locations will only be permitted if suitable sites are not sequentially available in town centre, or edge of centre locations. Preference will be given to accessible sites that are well connected to the town centre.

4.43 Proposals for other main town centre uses should also meet the sequential test, seeking available sites in the town centre, followed by edge of centre locations. Only if suitable sites are not available should out-of-centre sites be considered.

4.44 Testing the impact of development will focus on the impact of the development on in-centre investment and vitality and viability (including trading impact). For major schemes, this impact assessment should be an assessment up to 10 years from the time the application is made. For such schemes, the cumulative impact of committed development must be considered as part of this assessment.

Policy TCL11 Commercial Leisure and Cultural Activities (Campus and Eastern Landholdings)
Planning permission will normally be granted for proposals for new leisure and cultural activities and replacement and enhancement of existing facilities on allocated sites, in areas where there is an identified shortfall, or where facilities are provided as part of joint-use community proposals.
Major commercial leisure and cultural facilities serving the City should be located within or close to the town centre, or if this is not achievable, at other locations within the urban area that are highly accessible by all modes of transport, particularly public transport.

Planning permission for change of use involving the loss of existing indoor sport, leisure and cultural facilities will only be granted where the applicant clearly demonstrates that there is no longer a need for that facility and that there are sufficient similar facilities in the local area. The property should be actively marketed at a reasonable market rate for a period of at least 2 years.

Policy TCL7 (Wincheap Retail Area)
This policy makes clear that The Wincheap Retail Area will be regenerated predominantly as a retail area, complementary to the existing Canterbury City Centre offer, to include larger format retail and leisure provision. It goes on to note that the area will accommodate up to 33,800sqm (net) of large format comparison retail and leisure floorspace as identified by the Canterbury Retail and Leisure Study 2015and phased in accordance with Policy SP2.

Policy T1 Transport Strategy
In considering the location of new development, or the relocation of existing activities, the Council will always take account of the following principles of the Draft Transport Strategy:
a. Controlling the level and environmental impact of vehicular traffic including air quality;
b. Providing alternative modes of transport to the car by extending provision for pedestrians, cyclists and the use of public transport;
c. Reducing cross-town traffic movements in the historic centre of Canterbury;
d. Providing public car parking and having regard to the Parking Strategy;
e. Assessing development proposals in the light of transport demands and the scope for choice between transport modes; and
f. Seeking the construction of new roads and/or junction improvements which will improve environmental conditions and/or contribute towards the economic well-being of the District.

Justifying text paragraph 5.17 that supports Policy T1 (Transport Strategy) lists the priorities for Canterbury as follows:

- Sturry Link Road
- Herne Relief Road
- Wincheap: A2 off-slip, relief road and new traffic management scheme
- South Canterbury – fast bus link and improved walking and cycling links
- New A2 interchange at Bridge
- Completion of A28 Sturry Road bus link
- A28 Sturry Road integrated transport package
- Vauxhall Road/Broad Oak Road junction capacity improvements
- Expansion of park and ride sites
- Extension to Crab and Winkle Way
- Tourtel Road roundabout improvements
- Improved access to Canterbury West station
- Expansion of Urban Traffic Control
- Herne Bay to Canterbury cycle route
- Whitstable traffic management

Policy T2 Pedestrian and Cycle Routes
Land will be safeguarded for the proposed pedestrian and cycle routes, as shown on the Proposals Map (key relevant routes are identified above under key development plan and other designations).

Policy T3 Bus Improvement Measures
Planning permission will not be granted for proposals that prejudice the effective implementation of bus improvement measures and fast bus links.

Policy T9 Parking Standards
The City Council will have regard to the local parking standards as set out in Appendix 4 of this Local Plan. Where provided, cycle parking should be convenient, secure, covered and where possible complemented by showering and changing facilities, as set out in Appendix 4.

Policy T16 Rural Lanes
Rural lanes which are of landscape amenity, nature conservation, historic or archaeological importance will be protected from changes and management practises which would damage their character, and where possible be enhanced.

Policy T17 Transport Assessments and Travel Plans
Development proposals considered by the Council to have significant transport implications are to be supported by a Transport Assessment and where applicable a Travel Plan. These should show how multi-modal access options will be achieved, and how transport infrastructure arising from the expected demand will be provided. Such measures will be the subject of or included in a legal agreement or undertaking.

Policy TV8 Rural Tourist Accommodation, Attractions and Facilities
The Council will permit new development, change of use, conversion or extension of existing buildings in the countryside and villages, to provide tourist accommodation, attractions or facilities provided that:
a. The nature and scale of the proposal is in keeping with the rural surroundings;
b. Access and parking provisions are acceptable, the use does not significantly increase traffic to the detriment of the rural area or highway safety and the applicant has considered accessibility by a range of transport modes;
c. The development can be implemented with no adverse effect on the character of the building or its setting, or the open character of the area;
d. There is no adverse impact upon residential amenity;
e. There is no detrimental impact on landscape interests, protected species, sites or features of nature conservation interest or on sites of archaeological or historical importance;
f. There is no overriding conflict with other policies in the Plan, such as the loss of village facilities.

Where tourism attractions and facilities are proposed in new buildings, the Council will ensure that the new development is related to an existing settlement and is not isolated in the open countryside so as to have an adverse impact upon its character and appearance. This should also improve the proposal in sustainability terms and reduce the need for travelling by car.

Policy CC1 Renewable and Low Carbon Energy Production Development (apart from wind energy development) (Solar farm)
Proposals for the utilisation, distribution and development of renewable and low-carbon sources of energy, including freestanding installations, will be encouraged in appropriate locations. In considering such proposals, the Council will give significant weight to their environmental, community and economic benefits, alongside consideration of public health and safety and impacts on biodiversity, air quality, landscape character, the historic environment, residential amenity of the surrounding area and the protection of the best and most versatile agricultural land. Specific considerations are outlined in Policy DBE2.

Permission will only be granted for large scale or commercial renewable and low carbon energy installations and associated equipment and buildings if there are commitments to ensure their removal after the use has ceased and land restored to its previous use and, where relevant, productive condition.

Policy CC2 Reducing Carbon Emissions from New Development
Development in the Canterbury District should include proportionate measures to reduce carbon dioxide and greenhouse gas emissions (as outlined table D1 and Policy DBE1). The justifying text refers to fabric energy efficiency first, followed by carbon compliance (use of on-site low and zero carbon energy technologies for heat and power).

As well as incorporating measures to reduce carbon emissions development proposals shall show how they have taken account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

Policy CC3 Local/District Renewable and Low Carbon Energy and Heat Production Schemes Combined Heat and Power
Within the Strategic Sites (as shown on the Proposals Map) and other development sites over 200 units, health facilities, education institutions and schools or substantial commercial developments the development will be required to should provide site wide local renewable or low carbon energy and/or heat generation schemes, such as Combined Heat and Power (CHP).

If a local renewable/low carbon scheme or district heating scheme is not proposed it will need to be demonstrated that the provision would not be viable or feasible, or it can be demonstrated that an alternative carbon reduction strategy would be more appropriate

Policy CC4 Flood Risk (Flood Zone 1)
All development proposals within the areas at risk of flooding or increased surface water run-off shall be subject to a Flood Risk Assessment and/or Drainage Impact Assessment, where relevant.

Policy CC11 Sustainable Drainage Systems
All development applications should include drainage provision. This will ensure that surface water is appropriately controlled within the development site, manage flood risk on-site and off-site, and not exacerbate any existing flood risk in the locality. Within major development sustainable drainage systems that deliver other benefits, such as biodiversity, water quality improvements and amenity, are expected to be included, except where they are demonstrated to be inappropriate. All developments should achieve as close to possible to the City Council's stipulated greenfield runoff rates, mimic natural flows and drainage pathways and ensure that surface water run-off is managed as close to its source as possible using a specified hierarchy.

On major and strategic developments, it should be shown how this infrastructure will be delivered over the different building phases to ensure that schemes are delivered as envisaged and that ongoing and future flood risk is managed.

Approval of the design and long-term management and maintenance of SUDS will be required prior to the development commencing.

Policy CC13 Water Resources (Waste water infrastructure)
Amongst other things, this seeks to ensure that development is phased using appropriate time scales
for the construction of any necessary water and/or wastewater infrastructure associated with development proposals. All new housing or commercial development will need to incorporate suitable arrangements for the disposal of foul water into a sewerage system, at the nearest point of adequate capacity, in consultation with the service provider.

Policy DBE1 (Sustainable Design & Construction)
All development should respond to the objectives of sustainable development and reflect the need to safeguard and improve the quality of life for residents, conserve resources such as energy, reduce/minimise waste and protect and enhance the environment.

The City Council will require development schemes to incorporate sustainable design and construction measures, to show how development should respond to the objectives of sustainable development. and reflect the need to safeguard and improve the quality of life for residents, conserve resources such as energy, reduce/minimise waste and protect and enhance the environment.

Non-residential developments should at least meet a 'very good' BREEAM rating from 2012 and provide evidence as to why an 'excellent' rating from 2015 cannot be achieved.

New developments will also need to be resilient to climate change. Appropriate climate change adaptation measures, include flood resilient measures, solar shading and drought resistant planting, limiting water runoff, reducing water consumption and reducing air pollution

Table D1: Sustainable Design and Construction Measures Checklist**.** *This should be referred to in full*.

Policy DBE2 (Renewable Energy)
In determining applications for the development of renewable or micro-generation equipment (apart from wind energy development), the City Council will expect applicants to:
a. Avoid any significant adverse impacts (visual, aural, olfactory noise, odour and amenity impacts) or cumulative impact where appropriate;
b. Have given weight to the environmental, social and economic benefits;
c. Have minimised the visual impacts by providing the optimum in respect of the layout and design of the development including screening;
d. Ensure that the development will not have a significant adverse effect on the amenity of local residents;
e. Ensure that the installation would not have an adverse cumulative impact on the environment by reason of proximity to other existing or proposed renewable energy developments.
f. Show there is no adverse impact on heritage assets (Policy HE1);
g. Demonstrate that there is no significant impact on the landscape setting, habitats, biodiversity, wildlife or designations such as the AONB, AHLV, Ramsar, SACs or SPAs as outlined in Chapter 10;
h. Ensure protection of the best and most versatile agricultural land unless it is demonstrated that it is necessary and no alternative poor-quality land is available.

Policy DBE3 (Principles of Design)
This sets out key considerations for promoting and protecting distinctive character, diversity and quality of the Canterbury District. Proposals for development, which are of a high-quality design, will be granted planning permission having regard to other plan policies and the following considerations:
a. The character, setting and context of the site and the way the development is integrated into the landscape;

b. The conservation, integration, extension, connection and management of existing natural and historic features including trees and hedgerows, pathways and boundaries to strengthen local distinctiveness, character, habitats and biodiversity;
c. The visual impact including the impact on local townscape character and landscape and the skyline;
d. High quality design solutions appropriate to the site;
e. The form and density of the development including: the efficient use of land, layout, landscape, density and mix, building heights, scale, massing, materials, finishing and architectural details including proposed lighting schemes;
f. The provision of visually interesting frontages at street level;
g. The privacy and amenity of neighbouring buildings and future occupiers (including overshadowing, outlook and sunlight);
h. The provision of appropriate hard and soft landscaping;
i. The impact of polluting elements, such as noise, dust, odour, light, and vibration and air pollution from the development or neighbouring uses including polluting elements; such as noise, air, and light;
j. The provision of appropriate amenity and open space;
k. The safe movement of pedestrians, cyclists and cars within and around the proposed development;
l. The accessibility of: buildings and places should meet the highest standards of access and inclusion;
m. Parking arrangements conform having regard to the latest adopted vehicle parking standards;
n. That the proposed development does not have a detrimental effect on the highway network in terms of congestion, road safety and air quality; and
o. The compatibility of the proposed development with other adjacent uses.

Policy DBE5 Inclusive Design
The City Council will require developments to meet the highest standards of accessibility and inclusion Policy DBE7 (Public Realm)
In order to achieve high quality design, development proposals will be expected to:
a. Reinforce or enhance the established character of the area;
b. Integrate with existing path, circulation networks and patterns of activity and permeability;
c. Integrate with the existing landscape setting;
d. Respond to contextual features and be locally distinctive;
e. Contribute to a safe and secure environment;
f. Be accessible and usable to people with varying mobility requirements;
g. Create attractive, manageable, well-functioning spaces within the site.

Policy DBE8 (Public Open Space)
In order to ensure that functional, visually successful public open space is created with a strong sense of place, the Council will expect developments to incorporate the following: -
a. The retention and incorporation of public rights of way and the creation of a connected open space and pedestrian/cyclist circulation system related, where appropriate, to a landscape framework having regard to safety and security;

b. The maximising of opportunity for all areas of the public realm to be subject to natural surveillance;
c. The incorporation of landscape design to the frontage of development sites, particularly where they border principal roads;
d. In order to improve the physical environment of the public realm the Council will expect the promotion of public art, subject to appropriate consultative and planning considerations. Where new development changes or creates new public places, the Council will expect the provision of public art to be included as part of the proposal.

Policy HE2 (World Heritage Site and Buffer Zone)
This states that CCC will protect and enhance the Universal Value of the inscribed Canterbury World Heritage Site (WHS) and Policy HE3 (Significant Views of the City and WHS) makes clear that CCC will seek to protect views, including from the Canterbury AHLV. Both are supported by the WHS Management Plan (2002).

Policy HE3 (Significant views of the city and World Heritage Site)
This makes clear (amongst other things) that ...” Through the careful siting and design of buildings and appropriate landscaping, developers should demonstrate how their proposals will respect or enhance the landscape and topographical features which contribute to the Outstanding Universal Value of World Heritage Site.

Justifying text 9.24 states “Canterbury's valley location results in a large number of viewpoints that allow broad vistas across the City's roofscape and some of the most important viewpoints are described in the Canterbury Conservation Area Appraisal. 'Long distance view' locations were selected for their accessibility from a public space and their advantage of providing the best views to illustrate the historic significance of the city and the World Heritage Site. The locations are described and depicted in detail in the Canterbury Conservation Area Appraisal, but include the view from specified locations at Tonford Meadows, Harbledown, St. Thomas Hill, St. Martin's Hill, St. George's Field, New House Lane, Neal's Place, the University Road/University Slopes and Beaconsfield Road/St. Stephen's playing fields. Planning permission will not be granted for development of buildings or structures within or close to the areas that are of special importance for the preservation of views of Canterbury (the view cones), unless it can be shown that the development will not affect one of the identified 'long distance view' locations and/or, significantly change the skyline.”

Policy HE4 (Listed Buildings)
This makes clear that alterations and extensions to listed buildings and development affecting the setting of listed buildings and locally listed buildings should preserve and enhance their
character and appearance and the special features for which they are designated.

Policy HE5 Development Affecting and Changes to Listed Buildings
In considering proposals for external or internal alterations to a listed building and external alterations to a locally listed building the Council will, if the alterations are required or desirable, ensure that the building is fit for its purpose whilst having special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest, which it possesses.

Policy HE6 (Conservation Areas)
This makes clear that CCC will not normally permit development which would harm the character, appearance, or setting of an adjoining conservation area. This policy is supported by CCC's Heritage Archaeology and Conservation SPD (October 2007) and Conservation Area Appraisal (October 2010).

Policy HE11 (Archaeology)
The archaeological and historic integrity of designated heritage assets such as Scheduled Ancient Monuments and other important archaeological sites, together with their settings, will be protected and, where possible, enhanced. Development which would adversely affect them will not be permitted.

Policy LB2 (Areas of High Landscape Value)
This designates the most of the Campus Heart and the Southern Slopes as part of an Area of High Landscape Value (AHLV). Policy LB2 and its sister Policy LB4 (Landscape Character Areas) both set out criteria for considering development proposals in relation to landscape and biodiversity and the justifying text for both refer to the intended role of the Canterbury District Landscape and Biodiversity Appraisal in determining planning applications. *These should be referred to in full*.

Within the Canterbury AHLV, development proposals should have particular regard to the historic setting of the City and the World Heritage Site.

Policy LB4 (Landscape Character Areas)
Proposals for development, and associated land use change or land management, must demonstrate that they are informed by, and sympathetic to, the landscape character of the locality. In considering development proposals, the Council will take every opportunity to reinforce, restore, conserve or improve, as appropriate, the landscape character of the area in which development is proposed.

- Development will only be permitted if the following criteria can be satisfied:
- Development would be appropriate to the economic and social wellbeing of the area;
- The site selection can be adequately justified, with the siting of development minimising the impact;
- Development would safeguard or strengthen tranquillity, features and patterns that contribute to the landscape character and local distinctiveness of the area;
- The scale, design, materials and landscaping measures are appropriate and would lead to an enhancement of the character of the landscape; and
- Development will promote maintenance, enhancement, and restoration of biodiversity as appropriate in accordance with policy LB9.

All development must take into account the sensitivity of the particular landscape to accommodate change. Development, or associated land use change or land management, which would adversely affect the landscape character of an area, will not normally be allowed. The development should appropriately address the findings of the Landscape Character and Biodiversity Appraisal condition and sensitivity guidelines of the particular landscape policy character areas affected.

Policy LB5 (Sites of International Conservation Importance) (Blean Complex Special Area of Conservation (SAC), Thames, Medway and Swale Estuary two Special Policy Area (SPA) and the Thanet Coast and Sandwich Bay SPA)
Sites of international nature conservation importance must receive the highest levels of protection. No development will be permitted which may have an adverse impact on the integrity of an SAC, SPA or Ramsar site, alone or in combination with other plans or projects, as it would not be in accordance with the aims and objectives of this local plan. Where a likely significant effect of a plan or project on European sites cannot be excluded, during Habitat Regulations Assessment Screening, an Appropriate Assessment in line with the Habitats Directive and associated regulations will be required.

Any development (plan or project) considered likely to have a significant effect on a SAC, SPA or Ramsar site will need early consultation with Canterbury City Council and any other appropriate Statutory Consultee or authority as to the likely impacts and to identify appropriate mitigation as necessary. Where mitigation measures are agreed by the City Council, the development will be required to fund and/or implement such mitigation measures. Any residual impacts may still require
in-combination assessment.

In the event that the City Council is unable to conclude that there will be no adverse effect on the integrity of any internationally designated site, the plan, or project will be refused unless the tests of no alternative sites and the imperative reasons of overriding public interest in accordance with Regulation 62 of the Habitats Regulations 2010 (as amended) are proven.

The policy commits CCC to preparing a Strategic Mitigation and Monitoring Plan (or, as also referred to, Strategy) for Thames, Medway and Swale Estuary two SPA and the Thanet Coast and Sandwich Bay SPA.

Policy LB6 (Sites of Special Scientific Interest) (Blean Wood & West Blean & Thornden Woods SSSI)
Planning permission will not be granted for development which would materially harm the scientific or nature conservation interest, either directly, indirectly or cumulatively, of sites designated as a site of Special Scientific Interest (SSSI) or National Nature Reserve (NNR)for their nature conservation, geological, or geomorphological value. Support will be given for enhancement.

Policy LB7 (Locally Designated Sites) (Identified site on Campus and in neighbouring areas)
Development or land-use changes likely to have an adverse effect, either directly
or indirectly, on (amongst other things) Local Wildlife Sites will only be permitted if the justification for the proposals clearly outweighs any harm to the intrinsic nature conservation and/or scientific value of the site.

Policy LB8 (Landscape Scale Biodiversity Networks) (Areas of Ancient Woodland)
New development will need to (amongst other things):
a. avoids the fragmentation of existing habitats and support the creation of coherent ecological networks through both urban and rural areas; and

b. retain, protect and enhance notable ecological features of conservation value such as ancient woodland, neutral grassland, hedgerows, trees, wetlands, river corridors and other water bodies, and habitats that offer breeding or feeding sites of local importance to populations of protected or targeted species. Only lighting that has been sensitively designed to minimise disturbance to protected species and their food sources (e.g. low level, directed, warm, tinted lighting) will be permitted.

Policy LB9 (Protection, Mitigation, Enhancement and Increased Connectivity for Species and Habitats of Principal Importance).
All development should avoid a net loss of biodiversity/nature conservation value and actively pursue opportunities to achieve a net gain, particularly where:
1. There are wildlife habitats/species identified as Species or Habitats of Principal Importance;
2. There are habitats/species that are protected under wildlife legislation;
3. The site forms a link between or buffer to designated wildlife sites.

This will be secured by:
a. Ensuring that site evaluation is undertaken to establish the nature conservation value of proposed development sites. Developers will be expected to carry out appropriate ecological survey/s and present proposals for mitigation and enhancement prior to determination of a planning application. Planning permission will only be granted where the City Council is satisfied that mitigation measures proposed represent an appropriate response to the habitat or species interest of the site. Where on-site mitigation is not possible, adequate compensatory habitat enhancement, creation schemes or other measures will be required to ensure that the impacts of the development on valued natural features and wildlife have been offset to their fullest practical extent.

b. In some cases, where wildlife impacts are significant, it may be necessary to find an alternative location for the development. For European protected species, planning permission will only be granted where the three tests set out in the Habitats Regulations are satisfied.

c. Delivering positive opportunities for habitat restoration and creation through the development process: identifying, safeguarding and managing existing and potential land (or landscape features of
major importance for wild flora and fauna) for nature conservation as part of development proposals, particularly where a connected series of sites can be achieved.

Development which may harm (either directly or indirectly) Habitats or Species of Principal Importance will only be permitted if:
d. There are no reasonable alternatives and there are clear demonstrable social or economic benefits of the development which clearly outweigh the need to safeguard the site or species; and adequate mitigation and compensation measures are provided when damage to biodiversity interests are unavoidable. Any mitigation measures must be within the control of the developer. The
developer must take responsibility for ensuring mitigation measures are fully implemented.

Policy LB10 (Trees, Hedgerows and Woodland)
Development should be designed to retain trees, hedgerows and woodland that make an important contribution to the amenity of the site and the surrounding area and which are important to wild flora and fauna. New development should incorporate trees, in areas of appropriate landscape character, help restore and enhance degraded landscapes, screen noise and pollution, provide recreational opportunities, help mitigate climate change and contribute to floodplain management. The value and character of woodland and hedgerow networks should be maintained and enhanced, particularly where this would improve the landscape, biodiversity or link existing woodland habitats. The policy goes on to identify specific measure for achieving this.

Policy LB11 (The Blean Complex)
The Council will support projects that restore, enhance and connect the valued woodland habitat complex of the Blean. The Council will give particular support to projects that benefit the landscape through sensitive and traditional woodland practices and which support the timber market and wider local economy. The City Council will refuse proposals for development that would result in the loss, deterioration or damages the character or and integrity of the Blean Complex. Development should provide or which would will prevent important opportunities for biodiversity improvement within the identified Biodiversity Improvement Areas.

Policy LB13 (River Corridors)
Development shall show how the environment within river corridors and river catchments, including the landscape, water environment and wildlife habitats, will be conserved and enhanced. Supply of water, treatment and disposal of waste water and flood risk management should be shown to be sustainable and deliver environmental benefits, within the water environment.

Policy OS6 (Green Gaps) (parts of the Campus and neighbouring areas are covered by a Green Gaps)
Within the Green Gaps identified on the Proposals Map development will only be permitted where it does not: a. Significantly affect the open character of the Green Gap, or lead to coalescence
between existing settlements; or b. Result in new isolated and obtrusive development within the Green Gap.

Policy OS11 (Outdoor Space Provision)
Makes clear that new housing development shall make provision for appropriate outdoor space, including semi-natural areas, strategic urban parks and green corridors, amenity greenspace, children's play areas, open space for sport, allotments or community gardens proportionate to the likely number of people who will live there. Where this is not possible, financial contributions will be sought.

Paragraph 11.67 refers to the Public Open Space in New Housing Development Best Practise Paper (2014) which forms part of the Open Space Strategy. See Key Relevant Evidence Base below.

Policy OS12 Green Infrastructure
Proposals for new development should ensure that:

a. Green infrastructure is planned, designed and managed to conserve and enhance the distinctive character and special qualities of, rural and urban landscapes, and the identity of settlements. Where feasible as part of all new developments and proposals, developers will need to establish and extend green space networks as corridors for movement by foot and cycle, as havens for wildlife and natural habitats and for leisure, amenity and recreational use. Where practicable green linkages should be encouraged from within existing settlements to the open countryside.
b. Existing open space is conserved and enhanced as part of these networks, which where possible, should extend through major new development sites and connect directly with community facilities, employment areas and transport hubs in order to deliver sustainable development and support the health and well-being of residents.

Policy QL11 (Air Quality)
Development that could directly or indirectly result in material additional air pollutants and worsening levels of air quality within the area surrounding the development site or impact on the existing Air Quality Management Area will not be permitted unless acceptable measures to offset or mitigate any potential impacts have been agreed as part of the proposal. An air quality assessment will be required if the proposal is likely to have a significant effect taking account of the cumulative
effects on individual sites

**Other Relevant CDLP Policies**

The Other relevant CDLP policies are summarised in Appendix 1.

**Kent Minerals and Waste Local Plan**
A summary of the key relevant policies is set out below. The actual polices and justifying text should be referred to.

Policy CSM 5 (Land-won Mineral Safeguarding)
Economic mineral resources are safeguarded from being unnecessarily sterilised by other development by the identification of (amongst other things):
1. Mineral Safeguarding Areas for the areas of brickearth, sharp sand and gravel, soft sand (including silica sand), ragstone and building stone as defined on the Mineral Safeguarding Area Policies Maps in Chapter 9

Policy DM 7 (Safeguarding Mineral Resources)
Planning permission will only be granted for non-mineral development that is incompatible with minerals safeguarding (as identified within a Mineral Safeguarding Area shown in the policies map in Section 9), where it is demonstrated that either:
1. the mineral is not of economic value or does not exist; or
2. that extraction of the mineral would not be viable or practicable; or
3. the mineral can be extracted satisfactorily, having regard to Policy DM9, prior to the non-minerals development taking place without adversely affecting the viability or deliverability of the non-minerals development; or

4. the incompatible development is of a temporary nature that can be completed and the site returned to a condition that does not prevent mineral extraction within the timescale that the mineral is likely to be needed; or
5. material considerations indicate that the need for the development overrides the presumption for mineral safeguarding such that sterilisation of the mineral can be permitted following the exploration of opportunities for prior extraction; or
6. it constitutes development that is exempt from mineral safeguarding policy, namely householder applications, infill development of a minor nature in existing built up areas, advertisement applications, reserved matters applications, minor extensions and changes of use of buildings, minor works, non-material amendments to current planning permissions; or
7. it constitutes development on a site allocated in the adopted development plan Further guidance on the application of this policy will be included in a SPD.

The Canterbury Mineral Safeguarding Area map identifies the following:

- River Terrace, Storm Beach Gravel and some Brick Earth deposits across large parts of the identified Campus (noting that the former/smaller Campus area is identified)
- Brick Earth deposits to the north of Tyler Hill Road covering all of the Northern Landholdings and Chaucer College (Eastern Landholdings - outside of the adopted Campus boundary).
- Brick Earth deposits on land owned by Brett Aggregates to the south of the Eastern Landholdings – outside of the adopted Campus boundary.

**Key Relevant Planning Guidance**

World Heritage Site Management Plan (April 2002). Canterbury Cathedral, St Augustine's Abbey and St Martin's Church were inscribed as a Cultural Site on the World Heritage List in 1988. The World Heritage Site (WHS) is located some way to the south east of the campus. The primary aim of the Management Plan is the sustainable protection, conservation and presentation of the Site; the Plan sets out objectives and a programme of actions to protect and maintain the Site's overall significance.

Paras 2.2.15 to 2.2.17 of the Plan outline the approach taken to establishing a 'buffer zone' to highlight the importance of, and help protect, the WHS' setting. This notes that at Canterbury, statutory protection is afforded by the current designations and local plan policies, but that the Management Plan is useful to draw attention to the significance of the historic and visual links and the areas which form the immediate setting of the WHS. The nearest part of the UoK campus is some way from the 'Buffer Zone' that is identified on Plan 1. The Plan makes clear that the 'Buffer Zone' does not have statutory status, nor does it bring with it any additional controls or restrictions. However, it highlights the need to take into account the impact on the WHS of any proposals or developments in this area.
https://www.canterbury.gov.uk/media/946354/canterburywhsmanagementplan-1.pdf

Heritage Archaeology and Conservation SPD (October 2007). The scope of this guidance does not include the Canterbury World Heritage Site (WHS). However, it refers to discussion in policy BE4 of the Local Plan and the WHS Management Plan that deals in detail with the proposals and policies for the Site from 2002 to 2007 and beyond.
https://www.canterbury.gov.uk/media/512515/heritagespdv2.pdf

Conservation Area Appraisal (October 2010). This sets out a detailed appraisal of the Canterbury Urban Area's 15 Conservation Areas. Section 5 (The Landscape Setting and Views) identifies nine long-distance viewing places with the aim of securing the maintenance and enhancement of existing views of the Cathedral. View 8 (University Slopes) identifies a view from University Road across the slopes to the Cathedral (Bell Harry tower).
https://www.canterbury.gov.uk/media/1005783/Canterbury-City-conservation-appraisal.pdf

A Heritage Strategy for Canterbury District (DRAFT January 2019)
The draft strategy seeks to to explore the contributions that heritage makes to life in the district, identify ways in which CCC can realise the potential of heritage and afford it the protection it deserves. It identifies and overarching visions and three objectives to Protect, Promote and Prosper.

Innovation Park Development Brief SPD (September 2004). The Brief was prepared for the University but adopted by CCC as SPD. It sets out guidance for the development of an Innovation Park on what was then Beverley Farm. Phase 1A, the Innovation Centre has been built. Some of the land identified for subsequent phases has been used to accommodate Turing College. Paragraph 2.26 refers to an extensive assessment of views that was undertaken by Lloyd Bore Landscape Architects between August and October 2002 and their report dated January 2003.
https://www.canterbury.gov.uk/media/512762/UniofKentInovationPark.pdf

The use of planning obligations for the provision of community infrastructure SPD (November 2007).
Sets out guidance on affordable housing, education, transport and open space.
https://www.canterbury.gov.uk/media/512499/devtconsspdfinala.pdf

Sustainable Construction SPD (October 2007). This sets out the sustainable standards which CCC will apply to new developments in terms of sustainable construction techniques.
https://www.canterbury.gov.uk/media/512507/SustainableConstructionSPD.pdf

Strategic Access Management and Monitoring Plan (2014). Following significant decline for important bird species in Kent, CCC has worked with Natural England to develop Strategic Access Management and Monitoring Strategies (SAMMS) for protected sites. This assesses likely visitor numbers and costs to mitigate the adverse effects of visitors on the SPAs in the District (including the Swale SPA). According to CCC's Constraints Map, the northern part of the Campus and University-owned to the north of Tyler Hill Road is within the Thanet Coast and Sandwich Bay 7.2km Zone of Influence.
Canterbury West Regeneration Zone: Development Brief (July 2011). This provides a framework for future development around the station. The key significant guidance relates to the potential to create a northern entrance to the station from Roper Road – via a new pedestrian footbridge link and the redevelopment of Site 10 (Graham's Building Supplies).
https://www.canterbury.gov.uk/media/512824/StationRoadWestfinalversionJuly.pdf

Guidelines to control residential intensification (April 2008). Adopted as a material consideration for development control purposes. This sets out design guidelines for new housing – including site and layout and design.
https://www.canterbury.gov.uk/media/1050706/20150909123112.pdf

Crime prevention through design (September 2003). Adopted as Supplementary Planning Guidance to encourage all practitioners engaged in design, development and management to consider the impact the design or use of a development will have on crime and disorder.
https://www.canterbury.gov.uk/media/512685/crimespg.pdf

Trees and development SPG (September 2003). The aim of this guidance is to provide advice and examples of best practice, and to assist applicants in the identification and successful retention of appropriate trees within development sites.
https://www.canterbury.gov.uk/media/512523/treesanddevelopmentspg.pdf

This SPG is augmented by CCC's Tree Management Policy (2017) on how the Council will look after the health of trees and promote the natural habitat and wildlife that lives around them.

Outdoor Lighting SPD (2006). The guidance seeks to inform the District-wide approach to improving the appearance of buildings and public places by the use of innovative and creative lighting schemes with the potential of well-designed and coordinated lighting to ensure the following: good personal safety and

security, a more aesthetic treatment of buildings and the spaces between them, an improvement to the night time economy, a reduction in overall energy consumption and reduced light pollution
https://www2.canterbury.gov.uk/media/512491/OutdoorLightingcopycleaned.pdf

Kent Deign Guide (2006). The Kent Design Guide was prepared by the 'Kent Design Initiative' in 2006. It which aims to create a showcase of great buildings, memorable and attractive new places that reinforce Kent's distinctive character
http://www.kent.gov.uk/about-the-council/strategies-and-policies/regeneration-policies/kent-design-guide

Kent Minerals and Waste Local Plan – Safeguarding SPD (April 2017). This SPD provides guidance on how the policies on mineral and waste infrastructure safeguarding as set out in the adopted Kent MWLP will be implemented. It provides guidance to LPAs and developers/applicants on the procedures to be followed when development is proposed to be located within or in close proximity to safeguarded areas or safeguarded mineral or waste infrastructure assets.

Policy DM7 describes the types of development that are excluded from mineral safeguarding. This includes: (7) it constitutes development on a site allocated in the adopted development plan. Guidance
makes clear that applications for such development should be accompanied by information demonstrating that development is exempt from mineral safeguarding. This should relate to all development within the defined Campus boundary (noting that the campus boundary shown on the Canterbury Mineral Safeguarding Area map in Section 9 of the MWLP is the former/smaller boundary and needs to be updated to reflect this and other allocations in the adopted CDLP).

The key relevant guidance relates to 'development potentially incompatible with Mineral Safeguarding'. This includes the University's Northern Landholdings and some of the Brett Aggregates-owned land to the south of the University's Eastern Landholdings. Here the guidance is that: "Where an applicant seeks to satisfy these clauses and override the presumption to safeguard the mineral, it is necessary for the proposal to be accompanied by a 'Minerals Assessment.' The SPD sets out guidance as to what should be included within an Assessment and encourages pre-application discussions.
http://www.kent.gov.uk/__data/assets/pdf_file/0019/69310/Supplementary-Planning-Document-SPD-on-Minerals-and-Waste-Safeguarding.pdf

Water. People.Places – A guide for master planning sustainable drainage into developments (September 2013). Prepared by the Lead Flood Authorities of the South East of England, this sets out guidance on integrating SuDS ibn to the master planning of development.
http://www.kent.gov.uk/__data/assets/pdf_file/0018/12429/SE7-suds-masterplanning_low_res_Part1.pdf

Development and Infrastructure – Creating quality Places (2013). This sets out a framework by which KCC will work together with Districts to deliver necessary community infrastructure. It is informed by the Growth and Infrastructure Framework (GIF), which provides a comprehensive picture of growth and infrastructure at a strategic level across Kent and Medway to help prioritise investment to create new jobs, homes and infrastructure
http://www.kent.gov.uk/__data/assets/pdf_file/0020/15455/development-and-infrastructure.pdf

http://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/growth-and-infrastructure-framework-gif

Biodiversity Action Plan (August 2015). Prepared by the Kent Biodiversity Partnership, this identifies Biodiversity Opportunity Areas are areas where conservation action, such as habitat creation, restoration or expansion, is likely to have the greatest benefit for biodiversity. They are centred on existing areas of biodiversity interest, but have a key role as areas which offer strategic opportunities for biodiversity enhancement and are expected to contribute towards the UKBAP priority habitat targets identified in regional and local Biodiversity Strategies and Action Plans. The northern part of the Campus and adjoining lands have been designated as the Blean Biodiversity Opportunity Area. Biodiversity target for the Blean BOA are set out below.

1. No loss of ancient semi-natural woodland and its mosaic of associated habitats.
2. Enhance and reconnect woodland to create a very extensive block of habitat, particularly through the maintenance and restoration of coppice management.
3. Restore conifer plantations on ancient woodland sites to suitable, wooded habitat including up to 25% early successional stages.
4. By 2020, at least 50ha of heath and acid grassland (including grazed wooded heath) should be restored or enhanced as part of the wood land matrix, in blocks of at least 2ha in extent. Additional opportunities should be pursued for creation of acid grassland and heathland where this would contribute to the county-wide target of creating up to 37ha.
5. Pursue opportunities for creation of species-rich neutral grassland where this would contribute to the county-wide target of creating 37ha of new lowland meadow in blocks of at least 2ha by 2020. Enhance at least 13ha of species-rich neutral grassland to bring it to UK BAP priority habitat Lowland Meadow quality.
6. Action for naturally widely dispersed habitats and species will need to focus across the whole of the area and not just within the Biodiversity Opportunity Area boundary.

Blean Living Landscape Area. A Living Landscape is a recovery plan for nature championed by The Wildlife Trusts since 2006. It is a new way of thinking about how we manage land to do more for wildlife, people and the economy. The northern part of the masterplan area is within Blean Living Landscape Area. The Blean Living Landscape includes one of the biggest complexes of Ancient semi-natural woodland in England, covering ca. 1,000ha. The Blean Woodland Complex is of particular importance for birds and several threatened butterfly species. The Blean Living Landscape aims to expand and reconnect nature reserves within the area, preserving and enhancing the area's rich biodiversity. Key actions include:

- Natural ecological processes such as grazing are being restored, in order to re-create a diverse mixture of habitats including broadleaved woodland, wooded heath, grassland and wetland.
- Wildlife corridors are being established to encourage the dispersal of some of the UK's rarest species.
- Habitat will be enhanced for species such as the Nightjar Caprimulgus europaeus (S. 41; Amber list), Nightingale Luscinia megarhynchos (Red list) and the rare Honey Buzzard Pernis apivorus, and one of the largest colonies of the Heath Fritillary Butterfly in Britain will be established.
- More than 1,000 hectares of woodland have been brought into conservation management and a programme has been started to restore native deciduous woodland from pine plantation.

Draft Canterbury Landscape Character & Biodiversity Appraisal (August 2012)
https://www.canterbury.gov.uk/media/942095/CDLP-91-CanterburyLandscapeCharacterBiodiversityAppraisalDraft-Jacobs-August2012.pdf

The two Landscape Character Areas covering the UoK site are the Stour Valley Slopes and Blean Farmlands. A short summary of general guidance, followed by recommendations for these two areas from the Appraisal document are summarised below.

Overview

• For biodiversity, the conservation of the existing resource must be done in concert with the creation of new areas of habitat, where such creation can provide district and county-wide linkage.
• As an adaptation to climate change and to rectify past losses, the development of well-connected habitat networks at the landscape scale should be given a clear priority.
• The active involvement of local landowners, farmers, national and local government, special interest groups and all those who live in, work in and visit the countryside will be vital to secure these measures to protect and enhance the countryside around Canterbury.

Farmland landscapes

• Where these landscapes [farmland] are in poor condition opportunities should be sought to enhance natural features such as the enclosure pattern.
• Where grazing of grasslands is prevalent, consideration should be given to managing grazing for enhanced biodiversity.
• Mechanisms for the enhancement of the [farmland] landscape include the application of appropriate design through the normal planning process and land management initiatives such as woodland and environmental stewardship grant schemes.

Valley and Wetland Landscapes

• The improvement of the condition of these areas should be encouraged through the appropriate retention and management of areas of woodland, heath and pasture.
• The long term aim for The Blean is to bring the different parts of The Blean together. This will be achieved through The Blean Initiative, which is a partnership of landowners, local authorities, conservation bodies and community groups working together to look after this unique landscape for both wildlife and people.
• Particular objectives include improving access and enabling people to explore the landscape on both foot and by bike.

Stour Valley Slopes

- There is significant opportunity in this area to extend and buffer the woodlands of The Blean southwards into the Stour valley, towards Canterbury. This would also link the small blocks of woodland scattered throughout this area between the University of Kent and Broad Oak.
- Encourage the restoration of the historic parkland planting.
- Strengthen the boundary on the edge of Hales Place housing estate in a manner that reflects the historic connections.
- Strengthen and recreate the traditional field pattern.

- Conserve and restore open grass slopes overlooking the City.
- Promote active coppice management of designated woodland habitat where appropriate.
- Resist further fragmentation and seek to create new woodland or woodland corridors where significant opportunity exists between the University and Broad Oak village.
- Strengthen the structure of the field pattern on the slopes beneath the University resisting the further introduction of scattered ornamental planting.
- Resist the introduction of dominant features on the visually sensitive ridgeline.

Blean Farmlands

• There is great woodland habitat network opportunity in this area, mainly around the periphery, as shown on the graphic showing detailed habitat network potential (see Figure 3.1).
• In addition, to the north east, there is a significant zone highlighted as having acid grassland and heath network potential
• Conserve grazed pasture.
• Maintain and improve the traditional character of hedgerow planting along lanes and roads.
• Reinforce and conserve the hedgerow and shelterbelt networks.
• Encourage suitable planting around visually prominent farm buildings (particularly large, modern sheds) to soften the visual impact.
• New development should be of local scale and character and relate to existing settlements.

Key Relevant Evidence Base

The Landscape Assessment of Kent (October 2004)
https://www.canterbury.gov.uk/media/942127/CDLP-95-Landscape-Assessment-of-Kent-Jacobs-Babtie-Oct-2004.pdf

The Assessment is a landscape character-based study that draws together existing assessments and updates them. Additional work on the condition and sensitivity of the Kent landscape was used to formulate character-based strategies to ensure the continued distinctiveness of the Kent landscape. The Character Area Report for the Stour Valley (p216) describes the Valley's condition as "Poor" (within a range of "Poor", "Moderate" and "Good") and its sensitivity as "Moderate" (within a range of "Low", "Moderate" and "High"). The identified 'Landscape Actions' comprise:

- Conserve ditches and the pattern of sinuous pastures.
- Conserve the strong ecological corridor of the river, wetlands and ditch network, and enhance it with sensitive management.
- Conserve areas of non-intensive use within farmland.
- Restore managed tree cover in and around areas of settlement.
- Conserve and restore tree lines along water courses.

Woodland Inventory for Canterbury District, Kent – Report & Inventory Maps (August 2012)
http://www.highweald.org/downloads/publications/project-reports/weald-a-down-ancient-woodland-survey/1072-canterbury-district-ancient-woodland-inventory/file.html

This sets out a revised Ancient Woodland Inventory for the Canterbury District. It identifies part of the Campus as comprising Ancient semi-natural woodland (ASNW). ASNW stands are those that are composed predominantly of trees and shrubs native to the site that do not obviously originate from planting. They include stands that may have been managed by coppicing or pollarding in the past, as well as those where the tree and shrub layer has grown up by natural regeneration.

Draft Open Space Strategy for the Canterbury District (2014 to 2019)
This is a comprehensive strategy for open space provision in the District. The most relevant part is Appendix 13 -Public open space in new housing developments best practice paper – which can be accessed vi the second link.
https://www.canterbury.gov.uk/media/942111/CDLP-93-draft-open-space-strategy-2014-to-2019-CCC.pdf

https://serco.canterbury.gov.uk/media/861104/New-housing-development-policy-2014-appendix-13.pdf

**Key Relevant Wider Strategies**

There are a number of wider strategies that are relevant and these are set out in Appendix 2.

**Key Relevant Planning History**

Set out below is a summary of the key relevant recent decisions:

- CA/19/00469 Proposed single-storey side extensions along with new roofing, external cladding, access ramp and stairs to north elevation together with new vehicle access and paving. Jennison Building. Submitted March 2019
- CA/18/02560 Proposed three-storey medical school building with associated landscaping, infrastructure and ancillary works. Park Wood. Approved March 2019.
- CA/18/02224 Proposed two-storey detached science hub to provide student learning space, offices, a meeting room, IT and welfare facilities. Department of Biosciences, Giles Lane. Approved December 2018
- CA/18/01067 Proposed extension to indoor tennis centre & associated plant, new access road and car parking. Sports Centre, Parkwood Road. Approved August 2018

- CA/14/010302 Kent Business School and School of Mathematics, Statistics and Actuarial Science. Granted permission February 2015 – subject to ancient woodland compensation planting. See Ancient Woodland Compensation & Mitigation Report April 2014.
- CA/16/02147/FUL School of Anthropology & Conservation, Marlowe Building proposed extension to create a new entrance, social areas and additional offices; to allow alterations to external elevations. Approved June 2017.
- CA/17/01087 Kent Business School. Proposed replacement of existing east entrance extension with new extension and landscaping. Approved June 2017.
- CA/17/00745 - School of Economics -Proposed 3-storey academic building, with associated landscaping, infrastructure and other works following demolition of the existing KRDC building. Approved August 2017.

## Planning Strategy

**3. Status of Framework Masterplan**

CDLP Paragraph 8.30 which supports Policy DBE3 (Principles of Design) reads as follows: "Where design statements, masterplans, development briefs or design codes/guides have been prepared, or adopted, these will form the background design guidance for assessing development proposals and will be a material consideration when determining planning applications."

1. Work collaboratively with CCC with the aim of a Framework Masterplan being given as much weight as possible for the determination of planning applications.

**4. Evidence Base and Assessment**

The Masterplan relates to the designated Campus is in response to CDLP EMP7 which, along with the CDLP as a whole, has already been subject to Sustainability Appraisal (SA) which incorporates the requirement of Strategic Environment Assessment (SEA). Likewise, the CDLP was subject to a Habitats Regulations Assessment (HRA), which resulted in a number of modifications to policies during the plan preparation period. This concludes that the adopted policies along with the avoidance, monitoring and mitigation measures to be put in place will ensure that the development proposals outlined in the CDLP will not have a likely significant effect on a European site or Ramsar site.

The Masterplan is supported by appropriate and proportionate evidence. Future planning applications will need to be supported by more detailed evidence in accordance with CCC's reasonable validation requirements.

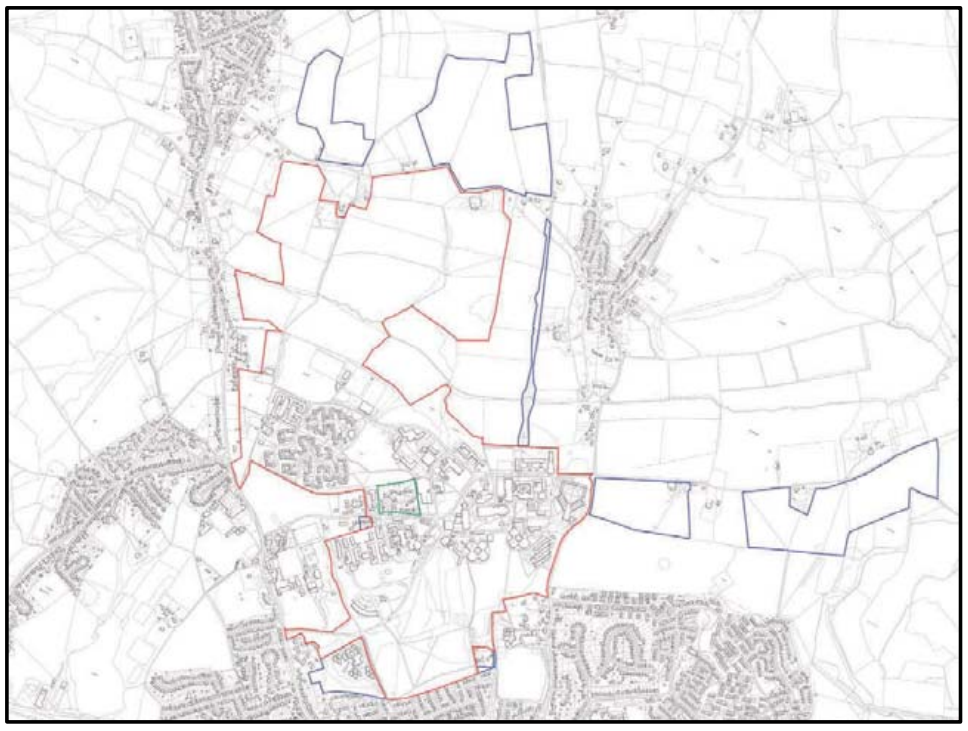
2. The Framework Masterplan is informed and supported by an appropriate and proportionate evidence base – in the form of environmental data and spatial strategies on Place-making, Planning & Environment, Landscape and Biodiversity and Movement and Transport.

3. Subsequent planning applications will be the subject of Environmental Impact Assessment, where necessary, and in all cases, will be supported by more detailed studies, strategies and assessments in accordance with CCC's reasonable validation requirements.

**5. Masterplan Area**

CDLP Policy EMP7 and the proposals Map define a Campus boundary. This is outlined in red in Figure 2.

Figure 2: Campus and nearby University-owned land



The defined Campus area includes a number of privately owned houses along Giles Lane (Oversdale, Elsinore and Giles Cottages) and 12 houses at Nos. 1 to 11 Woodand Way (outlined in green in Figure 2). CDLP Policy HD8 sets out a clear presumption against the loss of existing residential accommodation. The exceptions include where a proposed use would meet an identified community, business, tourism or other residential need which would be compatible with the character and amenity of the area. The Masterplan will not include proposals for these homes, which are assumed to remain.

CDLP justifying text Paragraph 3.62 states "… The boundary of the campus of the University of Kent is shown on the Proposals Map. However, it is recognised that should the current masterplan process identify a need to include proposals beyond the campus boundary, this could be dealt with through the planning process and the extent of the campus boundary may also be reconsidered when the Local Plan is reviewed."

It is clear that a Masterplan prepared under the auspices of Policy EMP7 can only relate to the defined Campus. However, the justifying text that supports the policy anticipates proposals beyond the campus boundary – stating that these could be dealt with through the planning process (taken as being by way of a planning application(s)) and that the boundary may also be reconsidered when the Local Plan is reviewed. In accordance with the Planning Inspector's instructions, a partial review focusing on housing has begun and is due to be completed within the first two years.

4. The Strategic Spatial Vision and Spatial Strategies will relate to the designated Campus and the nearby University-owned land.

5. The Masterplan proposals themselves will be limited to the Campus (red boundary), excluding the privately-owned houses within the defined Campus along Giles Lane and Woodland Way (green boundary). Any proposals for University owned land outside the Campus (blue boundary s do not benefit from Policy EMP7 and would need to be promoted and determined in relation to relevant planning policies, guidance and all other material considerations.

6.
The University has not identified a need to extend the designated Campus area at this stage, although it will keep this under review as part of reviewing and updating the masterplan and will feedback into a future review of the Local Plan where necessary. In any event, the University will fully engage with all relevant stakeholders, including Canterbury City Council and local people, over any proposals it brings forward for land that it owns.

**6. Scope of Masterplan**

Justifying text Paragraph 8.31 of the District Plan reads as follows: "Where design statements, masterplans, development briefs or design codes/guides are not prepared by the City Council, the landowner or developer is advised to seek guidance on its content because different types of site are likely to require different approaches. In general, they should set out the key constraints and contextual characteristics of the site and establish design parameters for the proposed development. These might include infrastructure needs, opportunities for external spaces and other environmental enhancements."

CDLP Policy EMP7 states that the Masterplan should maintain the campus character of the university; respect the setting of the site in the wider countryside; identify the key uses and their disposition within the site and any relocation of uses within the wider campus area. It should also set out a landscape and biodiversity strategy for the whole site.

Policy EMP 7 provides in-principle support for development of educational buildings for teaching and office space; student accommodation; business accommodation (compatible with the University's role in research and development and business innovation); sports facilities and other facilities directly related to the University's core business.

The CDLP (Policy SP4) adopts a sequential approach to the location of new development, with development to be concentrated in the main urban areas (Canterbury, Herne Bay and Whitstable) and be limited in villages. Whilst this policy focuses on housing, in line with guidance in the NPPF, Policy TCL (A) sets out a clear 'town centre first' approach to proposals for retail, leisure and other 'main town centre uses' (which includes hotels and conference facilities). CDLP Policies TCL6 and TCL11 and their justifying text expand on this approach.

7. The Masterplan is to cover the issues explicitly referred to in CDLP Paragraph 8.31 and Policy EMP7.

**7. Land Use and Disposition**

The NPPF confirms that when determining planning applications that significant weight should be placed on the need to support economic growth through the planning system.

CDLP Policy EMP7 requires a masterplan to identify the key uses and their disposition within the site and any relocation of uses within the wider campus area. The policy gives in-principle support
For educational buildings for teaching and office space; student accommodation; business accommodation (compatible with the University's role in research and development and business innovation) and sports facilities and other facilities directly related to the University's core business. It does not give in-principle support for other uses, including general housing. The CDLP general relevant policies apply for such proposals.

KCC's Waste and Mineral Local Plan identifies large parts of the Campus and all of the Northern Landholdings as falling within a Mineral Safeguarding Area.

CDLP Policy HD7 states that all future increases in academic or administrative floorspace resulting in increased student numbers by the universities, should be matched by a corresponding increase in purpose-built student accommodation. N.B. the wording was modified during the examination process and 'must' was replaced by 'should.'

The 2006 Student Impact Scrutiny Review included Recommendation 13 which included: "As a minimum the higher education institutions should aim to accommodate 50 per cent of non-local full-time students who would otherwise be likely to seek rented accommodation in the city.' This has effectively been superseded by the 2017 Impact Review. The 2017 Review discusses this issue in detail and finds (Page 90) that in 2016 the UoK provided accommodation for 5,394 of the 11,865 full-time students who have moved to the Canterbury area to study This is 45.5% (up from 42.8% in 2006).

Following discussion of PBSA in the private sector and future development of PBSA in Canterbury, the 2017 Review does not repeat the 2006 recommendation. Instead, it recommends (18) that "The council, as part of its housing strategy, will seek information to recommend the appropriate type, size and affordability of future private PBSA developments."

The Impact Review (January 2017) Higher education and growth of the knowledge economy The number of knowledge workers (employees within industries that deal extensively with the processing, exchange and communication of information and knowledge) has increased steadily in Canterbury district since 2006, constituting a higher percentage than the national and county average. The increase in percentage of knowledge workers is also a trend

seen in other similar university towns, whilst cities with a similar sized economy but with no higher education presence has generally not seen an increase in knowledge workers. The presence of higher education institutions makes the area attractive to a range of investment types and this knowledge economy is likely to grow.

The Estate Strategy includes a Space Management Policy, which aims to facilitate the co-locating of related academic disciplines and encourages the sharing of spaces to foster inter-school communication and collaboration. Reducing the amount of often geographically diverse spaces that exist for every school, and creating larger shared spaces will facilitate interactions that may
currently not happen, as well as improving overall utilisation.

Activity levels vary throughout the academic year and tend to be cyclical – with the highest levels of activity and movement tending to be around the first 2 and last 2 weeks of the academic years as students arrive and leave and during 'parent days'.

The Campus is used throughout the calendar year – including making a significant contribution towards providing tourist-related accommodation (Bed and breakfast) for the City outside of term-times – particularly over the summer. The Impact Review notes that (in January 2017), the city has around 600 commercially available 'bed spaces' in and around the city centre, which equates to an available annual capacity of 219,000 bed nights. In 2016, UoK took bookings for 140,000 bed nights over the 13-week summer period, at a time when bed nights in the city centre are frequently filled to capacity. This accommodation also supports other significant 'one off' events in the wider region - for example, in 2011 the Open Golf tournament at Royal St George's in Sandwich utilised 2,000 beds at UoK for its support staff. In addition, the UoK is the largest conference venue in the south-east. The pattern of University use may change over time, with compressed 2-year degree courses leading to greater use of the full calendar year for teaching.

Blean Primary School was raised by some delegates at the Strategic Spatial Vision Workshop (19 July 2017) in terms of its current vehicular access arrangements, which results in traffic movements through the campus as parents/ carers drive to and from the car park near Oaks Nursery and the School's side-gate to drop-off and pick up. The possible relocation and re-building of the school was identified as a way of facilitating a vehicular access on to Whitstable Road, improving existing access issues, providing a new/larger school.

8. Where possible, facilitate the co-locating of related academic disciplines and encourage the sharing of spaces to foster inter-school communication and collaboration. Consider the Campus as a 'living lab' to allow opportunities for students to engage with spaces as part of their taught curriculum – for example using appropriate parts of the campus for archaeological studies, such as University Rise, the Sarre Penn Vally and St Stepehns Hill.

9. To avoid undue pressure on the local housing market, net increases in academic or administrative floorspace that result in increased student numbers may where appropriate be matched by a corresponding increase in purpose-built student accommodation on the campus to be focused within the Campus Heart and Whitstable Road Character Areas.

10. The University will continue to promote business and research opportunities to foster the knowledge-based economy by safeguarding and promoting the Canterbury Innovation Centre and the University's Hub for Innovation and Enterprise.Develop the designated Business Innovation Park land for either Business (B1) or a hotel and conference centre.

11. Continue to provide sports, community and cultural facilities that are open to local people and look for opportunities to increase such provision by improving and expanding existing Campus facilities and investigating other opportunities to work in partnership with the City Council to improve the City's cultural leisure and tourism offer.

12. Aim to keep in productive use farm land that exists in the Sarre Penn Valley and other parts of the University Estate until such times as it is needed for development.

13..

14. Facilitate full commercial use of the Campus throughout the year, including residential conferences and tourist-related accommodation outside of term times by managing and promoting accommodation for these uses, particularly over the 13-week summer period.

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**8. Economic Development & Procurement**

The 2016 Budget established the Thames Estuary 2050 Growth Commission to prepare an ambitious vision and delivery plan for North Kent, South Essex and East London Initially set up under the chairmanship of Michael Heseltine, it is now chaired by Sir John Armitt. The Autumn Budget 2017 states that the Commission will publish its final report by Spring 2018. In December 2017, the Government announced that the Commission will be focusing on the following priorities:

- Sectors – creating internationally-competitive centres of excellence that build on the corridor's sector strengths, for example in ports and logistics, and making the most of growth sectors such as the creative industries;
- Connectivity – making the most of planned investments such as the Lower Thames Crossing, and assessing the case for other investments that have been proposed, such as further river crossings and extending the Elizabeth Line to Ebbsfleet;
- Communities – ensuring that people right across the corridor benefit from expected growth, including equipping them with the right skills, making sure high-quality housing is available, promoting use of the river, and enhancing the Thames Estuary's natural environment; and
- Delivery – working closely with organisations/communities to deliver the vision, aligning with the Government's intention to explore ambitious housing deals in the area.

Currently under review, the Strategic Economic Plan sets out the South East Local Enterprise Partnership's ambition to spearhead with the Government a £10billion investment programme into East Sussex, Essex, Kent, Medway, Southend and Thurrock to generate 200,000 private sector jobs and finance 100,000 new homes by 2021. The goals expressed within the 2014 SEP are to:

- Establish a SEFUND revolving property investment fund
- Deliver the biggest local transport programme in the country, transforming connectivity for our businesses and residents unlocking jobs and homes
- Boost the productivity of our businesses by bringing together local and national business support services, supplementing access to finance and encouraging closer links to be forged between business and the HE and FE sector;
- Invest in skills capital projects aligned to our growth opportunities, stimulating new competition and further strengthening employer influence over wider skills provision; and,
- Increase the pace of housing construction by piloting a new model of housing delivery that will give quicker results, better value for money and greater returns on HCA investments.
- Accelerate development in the Thames Gateway securing further investment, addressing market failure and supporting business innovation.

In February 2017, the Mayor of London and South East Local Enterprise Partnership unveiled a vision to transform the Thames Estuary into a hub for creative and cultural industries.

East Kent Regeneration Board (Leaders of Kent County Council and East Kent District Councils) published a Final Draft East Kent Growth Framework in December 2017. This was approved by CCC in February 2018. This identifies higher education, tourism, creative, healthcare and professional services as the main growth sectors for Canterbury. It also identifies four key objectives as the 'building blocks' for driving continued and sustained growth and focusing future investment across East Kent:

- Unlocking growth through infrastructure;
- Delivery of business space;
- Supporting productivity within business; and
- Place making and shaping.

The Growth Framework identifies 70 projects or interventions across East Kent. Road infrastructure projects include local junction improvements (Milton Manor roundabout, A2 slip at Bridge, A2 off slip and park and ride relocation and the Wincheap Traffic Management Scheme) and more strategic new roads (Sturry Link Road and a longer-term Canterbury Eastern by-pass – which would link the A28 near the Sturry Road Park and Ride with the A2 at a new interchange near Bridge).

A number of projects are promoted under the 'Canterbury Knowledge City' banner. These aim to improve the supply of high quality business space and facilities in order to promote business development, high level skills and support productivity. These include:

- Kent Medical School and Research Complex - medical complex to deliver clinical capacity, training and research to support medical services across the county;
- Canterbury Innovation Centre Phase II - which replicates the successful formula of the existing facility, providing more serviced offices/workshops for innovative firms; and
- Makers Space and Hot House - specialist facilities and equipment for new makers, creatives, programmers, scientists and engineers.

The Impact Review notes that UoK and Canterbury Christ Church University make a significant economic contribution to the district, with up to 28 per cent of all economic output in the district generated by the universities and four out of the top ten largest employers in the district are related to the higher education sector. It goes on to acknowledge that during the recent recession, the district's higher education sector helped to insulate Canterbury's economy by providing a relatively stable and resilient supply of high value jobs locally.

The Impact Review notes that a number of schemes have been put in place aimed at encouraging graduate retention and whilst it would be economically beneficial for large numbers of graduates remaining to work in the district, many leave to seek out economic opportunities elsewhere. There is the opportunity to work with others to improve the current situation.

The University is a significant developer and procurer of services. The UoK is a member of the Southern Universities Purchasing Consortium, a membership-based buying organisation for universities and further education colleges that develops and manages framework agreements. It provides details on its website for prospective suppliers, with applications to supply open to relevant local suppliers through online e-tendering systems and tender opportunities exceeding EU tender thresholds (£164,000) are advertised by Notice on the Official Journal of the European Union (OJEU). It uses a number of produce suppliers in the district including Forager, Foodari, Kent Coastal Eggs, E.T Wilmshurst and Sons, Lansdell Drinks, and Manor Wines. As part of its "Simplifying Kent Procurement" activity, the UoK will be looking at, amongst other elements:

- Corporate Social Responsibility including Environmental Activity (in line with the regulations and legislation);
- Sourcing Suppliers ethical and responsibly, including efficient travel activity and environmentally sound activity around packaging, use of resources, slavery / manufacturing processes etc.; and
- Redesigning its processes to represent Best Practice in the area.

Some delegates at the Strategic Spatial Vision Workshop (19 July 2017) raised Blean Primary School in terms of its current vehicular access arrangements, which results in traffic movements through the campus as parents/ carers drive to and from the car park near Oaks Nursery and the School's side-gate to drop-off and pick up. The possible relocation and re-building of the school was identified as a way of facilitating a vehicular access on to Whitstable Road, improving existing access issues, providing a new/larger school and providing vehicular access to Northern Land Holdings.

KCC's Commissioning Plan for Education Provision in Kent (2017-221) does not identify the need to expand primary provision in this part of the District. However, Paragraph 6.6 in its Planning Guidelines (Expansion of Popular Schools and New Provision) states that:

- We support diversity in the range of education provision available to children and young people.
- We recognise that new providers are entering the market, and that parents and communities are able to make free school applications.
- We also recognise that popular schools may wish to expand or be under pressure from the local community to do so.
- As the Strategic Commissioner of Education Provision, we welcome proposals from existing schools and new providers that address the needs identified in this Plan, which include new provision to meet increased demand, and new provision to address concerns about quality.
- In order for us to support any such proposal, they must meet an identified need and adhere to the planning principles and guidelines set out above.

15. Continue to work with the South East Local Enterprise Partnership (SELEP), the Thames Estuary 2050 Growth Commission, East Kent Regeneration Board and other regional bodies on how the UoK can increase its positive economic impact as a Global Anchor and make a positive contribution towards strategic regional initiatives.

16. Implement HFEIR Recommendation 3 by working with the City Council, Canterbury 4 Business and others to review and continually look to improve the support on offer in the district to enable people, including graduates, to start their own businesses.

17. Implement HFEIR Recommendation 5 by working with the City Council and others to review best practice at other UK universities and investigate the feasibility of developing an overarching local procurement framework.

18. Highlight the option for a new Blean Primary School and new vehicle link linking Park Wood with Whitstable Road in a way which:

- Delivers a replacement and potentially larger school;
- Improves vehicular access to the school from the west;
- Helps provide vehicular access to the Campus;
- Makes a positive contribution to pedestrian and cycle movement, bus movements and route coverage and traffic management within the Campus and the wider area; and
- Strengthen links between the University and the local community.

**9. Environment and Well-Being**

The UoK's Environment Policy (October 2016) sets out the following main objectives and commitments:

- Reduce carbon emissions in accordance with the University's Carbon Management Plan
- Improve energy and water efficiency and reduce reliance on fossil fuels
- Protect the environment and prevent pollution
- Optimise reduction, reuse, recycling and disposal of waste
- Reduce the impacts of transport and travel and encourage sustainable alternatives
- Manage the use, storage and disposal of materials to reduce environmental impact
- Manage our campuses to protect and enhance biodiversity
- Promote sustainable procurement, both internally and through the University's supply chains
- Communicate with staff, students and relevant interested parties and promote sustainable behaviour.

The University's Carbon Management Plan (November 2010) states that by 2020, the University plans to reduce its emissions of CO2 by 23% in absolute terms, against a 2005 baseline, by

1. Reducing the University's demand for energy;
2. Investing in schemes that improve energy efficiency throughout the University's residential and non-residential estate, especially through refurbishment schemes;
3. Requiring all new buildings to achieve a BREEAM rating of at least "very good";
4. Introducing energy systems based on renewable sources;
5. Promoting awareness of the need to effect behavioural change in the consumption of energy.

The Carbon Management Plan will need to be kept under review and targets strengthened to take account of the requirements of the Climate Change Act 2007 andt the Paris Climate Agreement (2016) – including revised national targets that will come from this.

Section 11 of The University's Estate Strategy addresses environmental sustainability issues, including energy and carbon, water resources and waste management and recycling.

*Energy & Carbon***.** The Estate Strategy includes a commitment to improve the energy efficiency of existing buildings, replace those that are not fit for purpose with low carbon buildings, upgrade inefficient plant, services and infrastructure and invest in renewable energy alternatives to fossil fuels. The district heating distribution mains that serve around 75% of the central Campus buildings have been replaced. These are currently served by High Temperature Hot Water (HTHW) boilers, but their design allows for future Low Temperature Hot Water (LTHW) boilers. The ES aims to install LTHW boilers and also install a 2MWe Combined Heat & Power (CHP) unit that will generate electricity for the Canterbury campus with waste heat being recovered to supplement the heat.

*Water.* Since 2005 over three kilometres of underground water mains have been replaced on the Canterbury campus resulting in a significant reduction in leakage. Flush controls, water efficient fittings and automatic taps have been installed to reduce water consumption at the point of use. This has seen an 18% absolute reduction in water consumption and a 40% relative reduction in water (per FTE student) over this period. Going forward, the ES commits to investment in remote monitoring of water meters to aid leak detection, a rolling programme of building refurbishments and upgrading of campus infrastructure to ensure the efficient use of water resources.

*Waste.* As part of the Waste Management Strategy incremental targets have been set to reduce the total waste production by 20% by 2020 compared to 2012/13 levels, and to reuse 10% of its waste by 2020. In 2015, recycling rates on Campus were approximately 60%. The Estate Strategy commits the University to make continuous improvements in recycling performance to achieve a target of 80% recycling by 2020.

*Air Quality*. There have been continued exceedances of NO2 limits within Canterbury's Air Quality Management Area (AQMA) in the Broad Street and Military Road part of the City. The High Court judgement in ClientEarth (No 2) v Secretary of State for the Environment, Food and Rural Affairs [2016] EWHC 2740 (Admin) declared that the Government's proposals for achieving compliance with the EU limit values for NO2 was inadequate in extent and timescale for compliance. The Inspector examining the draft CDLP sought the views of consultees as to whether the judgement has any implications for the Local Plan and various groups and individuals made comments. The Government has since published its Air Quality Plan for Nitrogen Dioxide in UK (July 2017).

The Inspector's report (paragraphs 386 and 387) make clear that, on the basis of evidence at the time, he did not consider that the overall amount and pattern of development should be changed as a result of air quality considerations. However, it does refer to CCC's proposed strengthening of Policy QL11 and the need for it to refer to cumulative impacts (which it now does).

Air quality is a particular issue for the Blean Complex, which is susceptible to changes in air quality and the emerging Landscape and Biodiversity Strategy (7D) seeks to safeguard the Complex by, amongst other things, ensuring that there are no significant increases in traffic or negative impacts on air quality associated with University campus growth. The emerging Movement and Transport Strategy seeks to encourage walking and cyclcling and bus use and to reduce car use and deter people from driving short-distance journys. .

The University is also developing a set of Sustainable Design Principles to inform masterplanning and detailed design.

19. Take account of landform, layout, building orientation, massing and landscaping when masterplanning and during detailed design to minimise energy consumption and overheating, taking account of climate change.

20. Build flexibility and resilience into the Masterpan to increase adaptability to respond to climate change and other challenges.

21. When masterplanning and during detailed design, prioritise good air quality. During detailed design, attention should be given to providing natural ventilation and a comfortable indoor temperature to ensure well-being and incorporate adaptable spaces and furniture to promote collaborative learning and social connection

22. Play its part in improving air quality in the District, in line with CCC's draft Air Quality Action Plan (April 2018) and ensure that there are no significant adverse impacts on air quality from future development. This includes promoting walking and cycling, managing car parking provision.

23. When masterplanning and during detailed design, apply holistic sustainable development principles across the Campus to promote healthy and sustainable lifestyles including creating a landscape and incorporating facilities that encourages walking and cycling, sport and play and buildings that encourage use of stairs rather than lifts for those that can use them.

24. Expand the District Heating Network to serve all new buildings within the Campus Heart where practicable.

25. Incorporate photovoltaics to generate low carbon electricity for the Campus

26. Incorporate appropriate renewable energy technologies within specific developments where feasible and viable.

27. Incorporate Sustainable Urban Drainage Systems (SUDS) to help manage run-off rates and reduce the risk of pollution reaching sensitive controlled waters on campus.

28. Implement the University's Carbon Management Plan and set new targets for the future including, in line with CDLP Policy DBE1, requiring new buildings to meet BREEAM 'Very Good' as a minimum.

**10. Infrastructure**

Significant improvements have been made in recent years. These include the renewal of the district heating main that serves 75% of the central campus buildings; substantial renewal of water and gas mains; the replacement of the original, buried HV electrical cables that form the University's owned ring mains; and the renewal and repair of substantial parts of the University's privately owned road system.

Necessary improvements and/or changes to the pedestrian, cycle and highway network and car parking areas will be informed by the masterplan. The University will also work with CCC, KCC, Network Rail and the train operating company to secure improvements to train services and facilities at Canterbury

West Station – including the possibility of a northern entrance to the station on to Roper Road. To this end, the University has submitted comments to the Department for Transport in relation to the new franchise of train services and is hoping to meet with South-eastern Trains (the incumbent train operating company and bidder).

The next phase of infrastructure improvements is likely to include the repair and renewal of the University's foul drainage system. Due to a lack of investment in the public sewerage system, Southern Water's sewerage network can no longer accommodate any significant expansion of the Canterbury campus. Following negotiations between the University and Southern Water, it has been agreed that the University can install its own private sewerage main directly to the Canterbury Waste Water Treatment Works (Sturry Road). Such a main is expected to be able to accommodate any future, envisaged expansion of the campus.

The importance of air quality considerations is discussed under the Environment and Well-Being heading above.

29. Work collaboratively with, the County and City Councils, the Bus Partnership, utility companies and others to ensure that that physical infrastructure (transport, electricity, gas, water and sewerage, telecommunications and broadband) keeps pace with additional development.

30. Work collaboratively with, the County and City Councils, Network Rail and the train operating company to secure a northern access to Canterbury West Station from Roper Road.

31. In the short and medium terms, undertake a capacity review of foul drainage, electricity, gas and water infrastructure.

32. In the longer-term, subject to the above and further discussions with Southern Water, there may be the need to upgrade exisitngl foul sewerage or provide a private sewer to Canterbury Waste Water Treatment Works (Sturry Road) and (working with others) it may be possible to provide a 'park and ride' facility to serve the University and the City Centre.

33. In the medium and longer-term, Electric Vehicle Charging Points will be considered to encourage and support the use of electric cars to improve air quality.

**11. Phasing**

CDLP Policy SP2 (Development Requirements) breaks down the plan period in to four x five-year periods for the purposes of allocating land to meet identified land requirements. These are 2011-2016, 2016-2021, 2021-2026 and 2026-2031.

UoK's current Estate Strategy covers the period 2015-2025. The UoK is mindful of the CDLP plan period but needs to set out a framework for the Campus that goes beyond 2031, with the Concept Masterplan providing a conceptual framework for the next 50 years (up to 2065).

34. The Framework Masterplan will be to be framed around the following time periods, recognising that the level of certainty decreases over time:

- 2017 to 2021 (short-term)
- 2021 to 2031 (medium term)
- 2031 onwards (long-term)

35. Consolidation with no significant growth in student/staff numbers in the short and medium-term (up to 2031) – with all development being located within the University Rise, Campus Heart and Whitstable Road Character Areas.

36. Managed growth in student/staff numbers in the longer-term (2031 onwards) - with development continued to be focused in the University Rise, Campus Heart and Whitstable Road Character Areas.

**12. Implementation, Monitoring and Review**

The primary purpose of the Framework Masterplan is to inform how the University develops its estate and needs to be embedded within the University's development decion-making processes.

The masterplan will also provide a bridge between Policy EMP7 and future planning applications by interpreting the policy and providing context for individual proposals.

The masterplan needs to maintian an appropriate balance between providing certainty whilst still allowing for flexibility to allows the University to achieve its full potential within a changing political, economic, social and environmental context. It also provides a vehicle for testing the existing Campus boundary and recommending any changes.

37. The UoK will use the Framework Masterplan as a planning and decision-making tool by giving spatial expression to its Estate Strategy in the short-term and by providing a vision for the Campus in the medium and longer-terms.

38. Future UoK planning applications will be accompanied by a Design & Access Statement that demonstrates how the proposal development complies with the Framework Masterplan – justifying any proposed differences in approach.

39. The UoK will work collaboratively with partners where necessary to bring about positive change in order to achieve the Framework masterplan's strategic vision.

40.The UoK will factor in adequate on-going management and maintenance requirements in to all Framework Masterplan proposals.

41. UoK to monitor progress on implementing Framework Masterplan and review and update it where necessary.

**Appendix 1: Other relevant CDLP Policies**

EMP6 New Digital Infrastructure
TCL11 Commercial Leisure and Cultural Activities
TV1 Cultural and Arts Facilities (including public art)
CC12 Water Quality
DBE5 Design and Access Statements
DBE13 Outdoor Lighting
HE1 Historic Environment and Heritage Assets
HE5 Development Affecting and Changes to Listed Buildings
HE7 Highways and Streetscene Works Affecting Heritage Assets
HE8 Heritage Assets in Conservation Areas

OS2 Playing Fields
OS8 Sports and Recreation in the Countryside
QL1 Social Infrastructure

**Appendix 2: Key Relevant Wider Strategies**

Canterbury Open Space Strategy 2014-2019
https://www.canterbury.gov.uk/media/942111/CDLP-93-draft-open-space-strategy-2014-to-2019-CCC.pdf

Canterbury Environment Strategy (2013- 2016)
https://www.canterbury.gov.uk/media/942468/CDLP-142-Environment-Strategy-2013-CCC.pdf

CCC Corporate Plan (2016-2020)
https://www.canterbury.gov.uk/media/1146368/Corporate-Plan-2016-2020.pdf

Canterbury Local Economic Policy and new District Economic Strategy (2011)
https://www.canterbury.gov.uk/media/892158/ce-policy-suite_final-v2a.pdf

Canterbury Housing Strategy (2012)
https://www.canterbury.gov.uk/media/941931/CDLP-53-Canterbury-Housing-Strategy-2012-2016.pdf

Canterbury District Transport Strategy (2014-2031) (Joint CCC/KCC adopted July 2017)
https://www.canterbury.gov.uk/your-council/policy-and-plans/parking-travel-and-roads/transport-strategy/

Canterbury Parking Strategy (2006-2016)
https://www.canterbury.gov.uk/your-council/policy-and-plans/parking-travel-and-roads/parking-strategy/

East Kent Growth Framework – Final Draft Report (December 2017)
http://moderngov.dover.gov.uk/documents/s23366/East%20Kent%20Growth%20Framework%20-%20Appendix%201.pdf

Higher and Further Education Impact Review (2017)
https://www.canterbury.gov.uk/media/1453849/HEFE-final-report-MASTER-CCC.pdf

Kent CC Kent & Medway Growth & Infrastructure Framework

http://www.kent.gov.uk/__data/assets/pdf_file/0012/50124/Growth-and-Infrastructure-Framework-GIF.pdf

Kent CC Local Transport Plan for Kent (2100-16)
http://www.kent.gov.uk/__data/assets/pdf_file/0008/5939/local-transport-plan.pdf

Kent CC/CCC Walking and Cycling Strategy (Draft 2003)
https://www.canterbury.gov.uk/media/282387/walkingandcyclingstrategy.pdf

KCC Kent Environment Strategy (2016)
http://www.kent.gov.uk/__data/assets/pdf_file/0020/10676/KES_Final.pdf

Kent CC Renewable Energy Action Plan (2013-2018)
http://www.kent.gov.uk/__data/assets/pdf_file/0020/11954/Renewable-Energy-Action-Plan-August-2013.pdf

KCC Canterbury District Surface Water Managemetn Plan Stage 1 (2012)
http://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/flooding-and-drainage-policies

KCC Local Flood Risk Management Plan (2013)
http://www.kent.gov.uk/about-the-council/strategies-and-policies/environment-waste-and-planning-policies/flooding-and-drainage-policies

# Appendix H
# Masterplan Bio-diversity and Landscape Strategy

# Landscape Biodiversity Strategy

UNIVERSITY OF KENT CANTERBURY CAMPUS FRAMEWORK MASTERPLAN

*LANDSCAPE & BIODIVERSITY STRATEGY*

March 2018

UNIVERSITY OF KENT CANTERBURY CAMPUS FRAMEWORK MASTERPLAN
LANDSCAPE AND BIODIVERSITY STRATEGY
(DRAFT 4: 06 March 2018)

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**1.0 Preface**

This report was prepared from studies produced by Studio Engleback and Biodiversity by Design on behalf of the University of Kent. The approach of this team is to promote a whole system, evidence-based approach to design that they term *'Eco-urbanism'*; this approach is considered to be an integral part of their contribution to the Framework Masterplan project for the campus and surrounding land holdings.

Studio Engleback and Biodiversity by Design were commissioned by the University of Kent to provide landscape and ecological input to Step 1 of the Framework Masterplan, building upon the Concept Masterplan developed by Sir Terry Farrell in 2015. The Farrell strategy sought to promote 'a wider diversity of landscape spaces' within the core campus area which 'will be the public living rooms where all members of the University community can gather to exchange ideas, where formal events take place and informal encounters are made possible'.

The Concept Masterplan report set out a vision for the University of Kent's (UoK) ongoing development in the long term, which concluded that the priorities for the growth should be:

1. To intensify development in the heart of the campus, and
2. To develop a place-making strategy based around the concept of enhancing the landscape and biodiversity

This is one of four spatial strategies that are being prepared to inform and support a Framework Masterplan for the Canterbury Campus and adjoining University-owned land. The others relate to Place-making, Planning and Environment and Movement and Transport.

***Notice:***

*This strategy paper has been adapted and prepared from work undertaken by landscape and environmental design team Studio Engleback in collaboration with Biodiversity by Design on behalf of the University of Kent and their design team, to progress the Framework Plan project for the University of Kent Campus and surrounding land holdings.*

*In producing this paper, it is acknowledged that Biodiversity by Design/Studio Engleback accept no responsibility or liability for reliance upon or use of this report (whether or not permitted) other than by University of Kent and their design team for the purposes for which it was originally commissioned and prepared.*

*The work of Biodiversity by Design/Studio Engleback relied upon information provided by others. The completeness or accuracy of this information is not guaranteed by Studio Engleback/Biodiversity by Design.*

*The landscape and environmental design team included landscape architects Luke Engleback, Louise Hooper, Lisa Rue, and ecologists Dr Mike Wells and Dr Lincoln Garland*

**2.0 Introduction: Weaving the Landscape Tapestry**

Placemaking, like cloth, requires manipulation of warp and weft. The *warp* is fixed at the outset on the loom and is the basis for the fabric, and cannot be changed once the loom is threaded, but the *weft* can be altered.

Understanding the *warp* of a landscape - the site assets, their context, function, history and time depth - are an essential part of place making. In order to understand this particular aspect of 'place' requires a forensic approach to landscape characterisation; this must include an analysis of the *'signature'* of a given landscape, in addition to the Ecological Appraisal, and the Landscape and Visual Impact baseline studies. In order to understand a particular place, and to provide a basis for amplifying qualities that are specific to a given locale, it is important to look within the site and also to the surrounding area to examine its context. This is especially important in a landscape as rich as that around Canterbury.

This Landscape and Biodiversity Strategy pulls together the diverse issues addressed by the Studio Engleback/Biodiversity by Design team in the summer of 2017, to provide a basis for a holistic and sensitive way forward:

- To recognise what you have and why it is like that
- To establish how to strengthen the fundamental nature of the existing landscape
- To recognise and seek to strengthen existing eco-systems
- To protect cultural heritage
- To promote diversity and to increase resilience
- To include climate change adaptation/mitigation and resource scarcity as a vital part of the thinking
- To improve ecosystems, as well as human health and wellbeing

By adopting this landscape and biodiversity approach, the UoK team intends to work with Local Stakeholders and the City Council to develop a more detailed 'Framework Masterplan' which will explore new opportunities to enhance the landscape, ecology, movement, environmental and economic infrastructure, and ultimately be recognised by achieving formal masterplan status.

The Landscape and Biodiversity Strategy will be based upon fieldwork-based baseline studies, plus a desktop review of what other campuses offer, in a consideration of wider landscape, environmental and ecological issues.

**3.0 The Context for the Landscape and Biodiversity Strategy**

The University of Kent has recognised that enhancing sense of place, through the enhancement of its landscape setting in particular, will play an important part in attracting new students and staff to the campus, as well as differentiating the UoK from competing universities.

**Planning Framework**

Chapter 10 of the Canterbury District Local Plan sets out Canterbury's Landscape and Biodiversity Policy, a key objective of which is to:
*"…protect and enhance the countryside, acknowledging its own intrinsic value, the diversity of its landscapes, heritage and wildlife and recognising that a high quality of rural environment contributes to the economic, social and cultural wellbeing of the District."*

The Planning Strategy includes a detailed audit of key relevant planning policy, designations and guidance and this strategy takes full account of this.
In summary these are:

- Policy EMP7 (University of Kent) requires a masterplan for the whole identified campus site prior to any significant development within the site and explicitly calls for this to set out a landscape and biodiversity strategy;
- Policy LB2 (Area of High Landscape Value) – the southern part of the area is within an AHLV;
- Policy LB4 (Landscape Character Areas) with reference to the Canterbury Landscape Character and Biodiversity Appraisal (2012);
- Policy LB5 (Sites of International Conservation Character) – Blean Complex SAC and Thames, Medway and Swale Estuary and the Thanet Coast and Sandwich Bay SPAs
- Policy LB6 (Sites of Special Scientific Interest) – Blean Wood and Blean and Thornden Woods
- Policy LB7 (Locally Designated Sites) – parts of the area are designated Local Wildlife Sites;
- Policy LB8 (Landscape Scale Biodiversity Networks) – a number of areas of Ancient Woodland;
- Policy LB9 (Protection, Mitigation, Enhancement and Increased Connectivity for Species and Habitats of Principal Importance);
- Policy LB10 (Trees, Hedgerows and Woodland) – there are a number of relevant Tree Preservation Orders);
- Policy LB11 (The Blean Complex);
- Policy LB13 (River Corridors) – Sarre Penn;
- Policy OS6 (Green Gaps) – designated Green Gaps cover two different parts of the Campus;
- OS12 (Green Infrastructure);
- Policy SP6 (Strategic Access Management and Monitoring (SAMM) Mitigation Measures for the coastal Special Protection Areas and Ramsar Sites) – parts of the area are within Zones of Influence;
- World Heritage Site Management Plan (April 2002);
- Heritage Archaeology and Conservation SPD (October 2007);
- Conservation Area Appraisal (October 2010);

- Draft Canterbury Landscape Character and Biodiversity Appraisal (2012);
- Strategic Access Management and Monitoring Plan (2014).
- Trees and development SPG (September 2003) and Tree Management Policy (2017);
- Outdoor Lighting SPD (2006);
- The Landscape Assessment of Kent (October 2004);
- Water.People.Places – A guide for master planning SUDS (September 2013);
- Biodiversity Action Plan (August 2015) and the Blean Biodiversity Opportunity Area; and
- Kent Wildlife Trust's Blean Living Landscape Area.

Draft Canterbury Landscape Character & Biodiversity Appraisal (August 2012)
A more complete summary of this draft SPD is set out in the Planning Strategy. However, the guidance is particularly relevant and is summarised here:

Stour Valley Slopes

- There is significant opportunity in this area to extend and buffer the woodlands of The Blean southwards into the Stour valley, towards Canterbury. This would also link the small blocks of woodland scattered throughout this area between the University of Kent and Broad Oak.
- Encourage the restoration of the historic parkland planting.
- Strengthen the boundary on the edge of Hales Place housing estate in a manner that reflects the historic connections.
- Strengthen and recreate the traditional field pattern.
- Conserve and restore open grass slopes overlooking the City.
- Promote active coppice management of designated woodland habitat where appropriate.
- Resist further fragmentation and seek to create new woodland or woodland corridors where significant opportunity exists between the University and Broad Oak village.
- Strengthen the structure of the field pattern on the slopes beneath the University resisting the further introduction of scattered ornamental planting.
- Resist the introduction of dominant features on the visually sensitive ridgeline.

Blean Farmlands

- There is great woodland habitat network opportunity in this area, mainly around the periphery, as shown on the graphic showing detailed habitat network potential (see Figure 3.1).
- In addition, to the north east, there is a significant zone highlighted as having acid grassland and heath network potential
- Conserve grazed pasture.
- Maintain and improve the traditional character of hedgerow planting along lanes and roads.
- Reinforce and conserve the hedgerow and shelterbelt networks.

- Encourage suitable planting around visually prominent farm buildings (particularly large, modern sheds) to soften the visual impact.
- New development should be of local scale and character and relate to existing settlements.

Biodiversity Action Plan (August 2015)

Prepared by the Kent Biodiversity Partnership, this identifies Biodiversity Opportunity Areas are areas where conservation action, such as habitat creation, restoration or expansion, is likely to have the greatest benefit for biodiversity. They are centred on existing areas of biodiversity interest but have a key role as areas which offer strategic opportunities for biodiversity enhancement and are expected to contribute towards the UKBAP priority habitat targets identified in regional and local Biodiversity Strategies and Action Plans. The northern part of the Campus and adjoining lands have been designated as the Blean Biodiversity Opportunity Area (BOA). Biodiversity target for the Blean BOA are set out below:

1. No loss of ancient semi-natural woodland and its mosaic of associated habitats.
2. Enhance and reconnect woodland to create a very extensive block of habitat, particularly through the maintenance and restoration of coppice management.
3. Restore conifer plantations on ancient woodland sites to suitable, wooded habitat including up to 25% early successional stages.
4. By 2020, at least 50ha of heath and acid grassland (including grazed wooded heath) should be restored or enhanced as part of the wood land matrix, in blocks of at least 2ha in extent. Additional opportunities should be pursued for creation of acid grassland and heathland where this would contribute to the county-wide target of creating up to 37ha.
5. Pursue opportunities for creation of species-rich neutral grassland where this would contribute to the county-wide target of creating 37ha of new lowland meadow in blocks of at least 2ha by 2020. Enhance at least 13ha of species-rich neutral grassland to bring it to UK BAP priority habitat Lowland Meadow quality.
6. Action for naturally widely dispersed habitats and species will need to focus across the whole of the area and not just within the Biodiversity Opportunity Area boundary.

Blean Living Landscape Area

A Living Landscape is a recovery plan for nature championed by The Wildlife Trusts since 2006. It is a new way of thinking about how we manage land to do more for wildlife, people and the economy. The northern part of the masterplan area is within Blean Living Landscape Area. The Blean Living Landscape includes one of the biggest complexes of Ancient semi-natural woodland in England, covering ca. 1,000ha. The Blean Woodland Complex is of particular importance for birds and several threatened butterfly species. The Blean Living Landscape aims to expand and reconnect nature reserves within the area, preserving and enhancing the area's rich biodiversity. Key actions include:

- Natural ecological processes such as grazing are being restored, in order to re-create a diverse mixture of habitats including broadleaved woodland, wooded heath, grassland and wetland.

- Wildlife corridors are being established to encourage the dispersal of some of the UK's rarest species.
- Habitat will be enhanced for species such as the Nightjar Caprimulgus europaeus (S. 41; Amber list), Nightingale Luscinia megarhynchos (Red list) and the rare Honey Buzzard Pernis apivorus, and one of the largest colonies of the Heath Fritillary Butterfly in Britain will be established.
- More than 1,000 hectares of woodland have been brought into conservation management and a programme has been started to restore native deciduous woodland from pine plantation.

Green Gap and Village Green Proposals

Previous proposals by CCC to designate the Southern Slopes an additional Green Gap were resisted by the University on the basis that there were sufficient policies/designations to manage development and that the masterplan process was the best planning tool to consider the long-term future of this area. The Planning Inspectorate agreed, and such a designation was not included in the CDLP. A request by some local people to designate the southern slopes as a 'Village Green' was also unsuccessful.

**Land Management Plans**

In addition to the above, the University has produced the following**:**

- University of Kent Biodiversity Management Plan (UoK, 2016);
- Woodland Management Strategy (LUC, 2016);
- University of Kent Estates Environmental Plan (UoK, 2015);
- Woodland Mitigation and Enhancement (LUC, 2014); and
- Canterbury Campus: Ponds and Recommended Management Actions (2012).

**Summary**

The University Campus either sits within or adjacent to a series of important landscape and ecological designations; an evidence-based approach is therefore essential to feed into the landscape and biodiversity vision for the emerging University Framework Plan. The University campus, by virtue of its elevated position, is also the backdrop to the Word Heritage and Conservation Areas within the city, and the University Estate as a whole is located in a key area highlighted in the Kent Living Landscapes Strategy that seeks to link and to reinforce the biodiversity of the Blean Woodlands. At a sub-regional scale, two landscape character areas traverse the University's land holdings - the ***Blean Farmlands*** to the north, and the ***Stour Valley Slopes*** on which the campus heart is located. The Blean is one of the largest areas of Ancient Woodland in the country, and it is a key character attribute here giving the context for enhanced place-making and environmental repair.

The Landscape and Biodiversity Strategy seeks to ensure that both the landscape character and nature conservation interests of the site are safeguarded and enhanced. In order to do this, work has begun to prepare an evidence-base from the outset, including an extended Step 1 Habitat Survey of the University

Estate, a Benchmarking Study of contemporary University & Campus Landscapes, a Landscape and Visual Impact baseline study, and an initial assessment of the overall landscape character; these studies will establish the parameters for future decision making and a framework for those decisions.

Because there are also national and international considerations overarching those at sub-regional and local level, the Landscape and Biodiversity Strategy will review larger scale issues of *'natural capital'*, such as adaptation to climate change, ecosystem services, carbon emissions reduction and carbon capture opportunities, a water sensitive urban design approach, continuous productive landscapes together into a holistic approach to green and blue infrastructure provision. This strategy will also respond to the increasing evidence-base about the need for creating healthy and productive landscapes in which to learn and to live, combined with an approach to social sustainability through convivial and 'biophilic' place-making.

Since the scales of landscape issues are interconnected and interdependent, an early appreciation of them is needed to ensure we help to inform a robust approach to water, energy, carbon, biodiversity, health and wellbeing. These issues will be set out as the landscape thinking evolves, because the issues raised will require an integrated approach to design, space, and choreography requirements.

This holistic, simultaneous consideration from micro to macro scales - often known as 'eco-urbanism' - is a whole system approach to landscape design that aims to do more with less. Biodiversity and 'ecosystem services' deriving from our natural capital are essential in respecting life and landscape, and they are important aspects of 'eco-urbanism'.

**4.0 Re-imagining the Learning Environment**

The University of Kent is one of a number of 'new' universities founded more than half a century ago. During this era the number of universities in the UK more than doubled from 22 to 46. Sometimes referred to as the *Plate-Glass Universities* (to distinguish them from the *Red Brick Universities*), they were established on the recommendation of the Robbins Report on Higher Education (1961-1963). Nine completely new universities were built, plus a further ten converted from existing Colleges of Advanced Technology.

Many of the Plate-Glass Universities were created in the grounds of former stately or grand homes (UEA, Keele, York, Stirling, Bath), but with low maintenance parkland landscapes comprising trees and grass, without livestock. However, mowing low grass swards is labour intensive, and uses hydrocarbons that can emit the same level of pollution per hour of mowing as a car travelling 100-200 miles (University of Vermont study). The low swards also have low ecological value. This is the essence of the garden village/city design ethic passed down to us since the 1920s, but we can reconsider how for this can be articulated in this century. The suburban model presented a sanitised vision of town and country and this has infected our collective view of landscape as something to be kept tidy, yet nature tends to be more unruly than this, and there is a significant global movement towards the 're-wilding' of our landscapes.

The concerns driving our attitudes toward landscape today include a wide diversity of issues such as climate change, resource depletion and food security in a global economy. The University of Kent Estate was derived from the land of three productive farms and woodlands and this is significantly different to other universities of the time that were located in the decorative 'parklands' of grand houses. Where universities were located on farmland (e.g. the University of East Anglia and Lancaster University), their locations tended to be quite exposed and tree planting for shelter was needed from fast growing species. At UEA, the original pine and birch shelter planting is already looking in need of rejuvenation, whereas at Canterbury it is the former woodland that has been eroded and is in need of rejuvenation and the productive landscape taken away and replaced by the civic *'garden-esque'*. This is a good time to reconsider the approach to land management, starting by seeing the landscape as *'Natural Capital'* that provides a range of ecosystem services.

Today green issues are to the fore and have informed the landscape design at the campuses of Nottingham, and Seattle, as well as retrofitting of SUDs at the University of Bath. In Wageningen University, Holland, they look at the potential for nature to improve quality of life and put this statement on the front of their brochure. In the business world the same *'biophilic'* approach informs campus designs for IBM, Microsoft, Apple and Orange. At Shenyang University, an existing productive landscape (i.e.: rice-growing) was retained as a pragmatic measure; in Seattle native woodland planting and rain gardens provide a biodiverse and lush campus; in Warsaw the buildings are colonised by plants. Somewhere between these solutions is the sustainable and resilient path we should consider for the Framework Plan for Kent University. We should examine the landscape of layers that already exists here and adapt it to the present and future needs of the University of Kent. We can move away from hidden, carbon intense, traditionally engineered infrastructure, to a lower tech approach, which can also help improve the wellbeing and productivity of students and staff.

**5.0 Establishing Baselines and Sensitivities**

The landscape and ecological baselines that need to be established for the planning of the landscape and biodiversity will mesh the interconnected and interdependent issues of:

1. Landscape Character and Sensitivities
2. Ecological Overview and Biodiversity Sensitivities
3. Landscape and Visual Impact (LVIA)

These three areas of study will run simultaneously because landscape character is a consequence of landscape management, which together with a wider consideration of the landscape infrastructure, can affect habitats and their potential sensitivity to adjacent development impacts. Work done to date has informed the strategic spatial vision and this and further work will inform the development of option studies and the Framework Masterplan itself.

**Landscape Character and Sensitivities**

The zone around the city is considered to be an area of High Landscape Value in the Canterbury Local Plan 2017 and the northern wedge, as well as the city centre, are both conservation areas. To the south is the Kent Downs AONB. There are also a number of trees within the University Estate protected by Tree Preservation Orders. The Draft Canterbury Landscape Character and Biodiversity Appraisal (2012), divides the District in to 48 Landscape Character Areas. The Campus and adjoining University-owned lands straddle two of these – the Stour Valley Slopes and Blean Farmlands. The draft guidance for these Character Areas is summarised above in Section 3.

All this combines to form the setting for the Scheduled Ancient Monument and World Heritage Site. In this context, observation and analysis of the landscape character, including elements such as tree cover, habitat network, clarity of pattern and grain and replace-ability of man-made elements will be essential.

An analysis of the landscape character is included in chapter 8.0 of this document.

**Ecological Overview and Biodiversity Sensitivities**

The University campus is located to the north of Canterbury within the North Kent Plain Natural Area, which sits between the North Downs to the south and the Thames Estuary to the north. Whilst this area is characterised by a good deal of productive farmland, it also includes large areas of woodland most notably the large Blean Woodland Complex to the west of the campus. This woodland is designated as a Special Area of Conservation, National Nature Reserve and as a Site of Special Scientific Interest (SSSI). West Blean and Thornden Woods SSSI are also a short distance to the north-east of the campus.

There are also a number of important biodiversity designations encircling the city, but especially in and around the University Estate, including Sites of Special Scientific Interest, National Nature Reserves, Special Protection Areas for Birds, Local Nature Reserves, and Local Wildlife Sites. To make these designations function better and more resiliently in the face of climate, there are proposals in the Kent Living Landscapes study to 'restore and to create' Habitat Net-works. There are also a number of existing BAP (Biodiversity Action Plan) Habitats set within the network, which are to be both 'conserved and enhanced'.

A *'Preliminary Ecology Appraisal and Guidance'* document has already been prepared as part of the baseline work carried out in Step 1 of the Framework Masterplan. It reports on the findings of an Extended Phase 1 Habitat Survey.

**Landscape, Visual and Heritage Impact Assessment**

A Landscape, Visual and Heritage Impact Assessment (LVHIA) will be undertaken in two parts:

1. Options Stage - a review of the strategic factors likely to affect the initial option development (such as the setting of the WHS, AHLV, views from the AONB and Conservation Areas) rather than documenting all details of every landscape and heritage constraint at the detailed level.

2. Masterplan Report Stage - an appraisal to report on the effect of the final Masterplan proposal on the landscape and heritage issues, including a summary of the effects on landscape character, the Kent Downs AONB, the AGLV, the WHS, conservation areas and views. This will be a formal technical assessment, drawing out how adverse effects have been minimised and positive benefits have been maximised and illustrate the effects through a number of verified views of the masterplan proposals.

The LVHIA process will be carried out by Chartered Members of the Landscape Institute and in line with the GLVIA guidelines (Third Edition) and will include consideration of form and colour as well as planting as an integral part of the design process. This first of these studies has been commissioned will establish the methodology and will establish key views to the campus and a notional zone of visual influence. The LVIA will be carried out in winter as well as summer, because of the increased visual porosity of the winter woodland scene.

**Other Landscape-related Issues**

- *Estate Management:* The management of the landscape will be a further and important factor to reconsider, together with a wider consideration of the landscape infrastructure, as this can affect habitats and their potential sensitivity to adjacent development impacts). University Grounds Maintenance Team will be consulted from an early stage to ensure all proposals are both effective in terms of nature conservation and practical in terms of estate management.
- *Community Gardening:* The Framework Masterplan will explore the potential for promoting university community gardening and the masterplan team will consult with local voluntary interest/community groups/the university community/nature conservation volunteer societies/etc in this regard. The University (working in partnership with Kent Enterprise Trust) are currently investigating the development of a community garden, to incorporate the existing derelict Hothe Court Kitchen Garden Bee keeping (Whitstable & Herne Bay Beekeepers), science area (telescopes), DICE (newt research) and the possibility of developing community allotments in the long term.

**6.0 Framing the Approach to a Sustainable Landscape**

As a centre of academic excellence, reaching out to Europe and globally, the University of Kent aspires to high standards of environmental sustainability and leads by example in both academic research and the practical application of environmental themes on campus. One measure of this read by prospective students is in the People and Planet University League, which currently places the University of Kent 84th out of 150 UK institutions. Jonathan Porritt, founder of Forum for the future and Chancellor at Keele University (15th in the league) has noted that:

*"There are still too many universities who do not give sustainability the attention or significance it deserves. Never has this information been more urgently needed or more valuable - especially from a student perspective"*

The University of Kent has recently published its first environmental sustainability overview for 2015-16, which sets out an ambition to embed a more holistic sustainability approach to the environmental management system. This is a significant move, and notes that the University is one of the highest performing Higher Education Institutions with regard to recycling and carbon emissions management. To date 8000tonnes of waste diverted from landfill has already saved the University over £32,000 and carbon emissions have been reduced by 14.4% on the baseline year of 2005-6 - the target by 2020 is a 23% reduction.

Considering the enormous environmental challenges we now face as a world community, the University of Kent is absolutely right to take the opportunity to 're-imagine' its future and to pursue a more long-term and sustainable agenda in the shaping and maintenance of its estate. Looking ahead, sustainability must be at the heart at every level of thinking. Quality of place is clearly relevant to university performance, and it is no accident that the top 8 universities in the UK include those particularly noted for the quality of their campus environments: Oxford, Cambridge, St Andrews, LSE, Imperial, Durham, Bath and Warwick. In addition, Kent's peer group universities of Sussex, East Anglia and Lancaster all share a parkland landscape campus and have a similar student population. It is interesting to note that, in each case, the density of these comparators is either equal to or greater than that of the University of Kent.

**A Vision for a Sustainable Campus**

The University also recognises that environment plays a key role in health and well-being of students and staff, and it is interlinked and interdependent with 'sustainable' design. The University of Kent has set out its ambitions in a *'Sustainable Design Principles'* document. This report notes that its Environment Policy first began to be developed in 2004 and its commitment to these ideas since 2012 has led to be University being one of the first Higher Education institutions to have been awarded the Certification of an Environmental Management System to the International Standard ISO14001:2015.

The University now offers Masters Degrees in Architecture, Urban Design and Sustainable Environment (MAUD and MASE), which are aimed at professionals and academics world-wide, including architects, engineers, geographers, surveyors, historians, and urban designers. The course content develops an understanding of the critical relationship between landscape and urbanity and focuses on the development of appropriate design skills and the technical and scientific understanding to develop 'sustainable solutions for new and existing buildings', to analyse historic buildings and past environmental technologies, as well as promoting a critical exploration of both the historical and cultural context of sustainability and environmental design.

Environmental sustainability is addressed in more detail in the Planning and Environment Strategy. The term 'sustainability' requires definition and a set of clear aims embodied in the Framework Masterplan. Certainly, it includes addressing climate change and carbon emissions (both of which have to underpin the approach to the future growth of the University), but there is much bigger palette that could enrich the landscape canvas. Having outlined the particular issues that will be studied as an essential part of the evolution of the University campus and nearby land, this list below includes a number of the broader issues that will also need to be embodied in the Framework Plan.

**The 'Living Landscapes' Movement**

Nature conservation in the UK has generally been focussed on the preservation of specific sites, but because natural habitats have been eroded at an unprecedented scale in recent decades many species (both common and rare) have been lost. The Living Landscapes mission promoted by the Kent Wildlife Trust, aims to extend and to link up sites that are increasingly becoming isolated to create a more resilient system. Currently there are some 150 Living Landscape Schemes around the UK and each Living Landscape scheme comprises a core area of high quality wildlife habitat, often with protected areas, nature reserves and so forth. Continuous corridors of suitable habitat are created to act as wildlife highways passing through open or developed landscapes. The habitat connections may be contiguous or as a series of 'stepping stones'. Permeability across whole landscapes is important to increase resilience, especially to the effects of climate change. The Living Landscapes idea also seeks to reconnect people with nature and to the promote the benefits of reinforcing Natural Capital.

**Small is Beautiful**

The influential economist and thinker Ernst Friedrich Schumacher was a pioneer of the Green Movement, who had escaped Nazi Germany and settled in the UK, was contemporaneous with John Maynard Keynes. He contributed to the Beveridge Report in the 1940s and to the Marshall Plan, but his main legacy is his book Small is Beautiful: A study of economics as if people mattered published in 1973 at the time of the energy crisis. He argued that the modern economy is unsustainable, noted that natural resources were treated as expendable income not as capital subject to eventual depletion, and argued that Nature's resistance to pollution is limited. His philosophy of 'enoughness' grew out of study of village-based economies - something that may have resonance for a campus university which is in effect a learning village.

**Natural Capital Accounting**

Natural Capital is a term used to describe our world's stocks of natural assets that includes geology, soil, air, water, and all living things; the spaces between the buildings on the campus contains the bulk of the natural capital at the University of Kent. From this capital we derive a series of ecosystem services that contribute to making our life possible. The concept was recognised in a major way in the United Nations study '*The Economics of Ecosystems and Biodiversity - TEEB'* (2010) and in the *'UK National Ecological Assessment'* (UK NEA - 2011 and updated 2014). The UK NEA was the first analysis of this county's environment in terms of the benefits it provides to society and our continuing prosperity, and it was important in highlighting the value of local action to meet the challenge of global change. Just as spending too much financial capital incurs debt, so does an excessive draw-down of stock from the natural environment; this needs to be paid back in order to achieve balance in the environment, because poorly managed Natural Capital becomes not only an ecological liability but a social and economic one as well. TEEB estimated that the total value of the world's ecosystem services amounted to twice as much as the global aggregate GDP - some $125 trillion each year. The University's land holding should be fully catalogued and monitored in order to become recognised as a valuable asset under Natural Capital Accounting.

**Cradle to Cradle**

For many people, sustainability means being 'less bad' rather than doing 'more good'. Cradle to Cradle (C2C) is a philosophy about rethinking how we make things and was the subject of a best-selling book first published in 2002 by Michael Braungart and William McDonough. They noted that the early farmers accepted the 'law of return' in which the land was repaid for what was taken from it. The Industrial Revolution broke this connection and caused many other problems. Cradle to Cradle can apply to any industrial process including the design of buildings. The substitution of one material for another is not the whole answer, it is a matter of how synergetic the changes are alongside other components - in other words the thinking required is at multiple scales. C2C opened an office in the Netherlands in 2008, and from 2008-13 Braungart was the chair of the Erasmus University in Rotterdam and linked to the University at Delft where a masters course for C2C is being established. This 'close-loop' philosophy should inform the University of Kent Framework Masterplan.

**Biophilic Design: Health and Wellbeing**

The idea behind Biophilia is the linking of biodiversity to the health and wellbeing of people, along with better learning outcomes and efficiency. This fundamental concept, about our inherent affiliation with nature, along with the mental and physiological well-being aspects of biophilic design, was first articulated by the eminent scientist Edward O Wilson in 1984.

**Continuous Productive Urban Landscapes (CPUL's)**

Continuous Productive Urban Landscapes are another constant and should be an integral part of the University campus since it is located in the 'Garden of England' and close to the North Kent fruit growing belt. In essence, this involves the integration of food bearing plants into schemes, an initiative that has become increasingly important in sustainable design over the past two decades.

## 7.0 The Environmental Vision for the Campus

Since the University of Kent was conceived, there have been major changes in how we understand the environment and our planet. In this time the global human population has doubled, with over half of humanity now living in urban areas. Humans are now established firmly urban species; this is something that most students experience and understand and will have to address in their respective post graduate careers. The majority of people now also acknowledge the challenges of anthropogenic climate change and diminishing global resources.

It is 25 years since the UK signed up to the tenets of the Rio Earth Summit; its most significant message was articulated in Agenda 21 (relating to 21st Century sustainable development), which stated that *"A country's ability to develop more sustainably depends on the capacity of its people and institutions to understand complex environment and development issues so that they can make the right development choices".* This must be our starting point in considering the way ahead for the Framework Masterplan for the University of Kent campus.

There are three key types of global resources:

- Natural (raw materials supplied by nature)
- Human (people who produce goods and services), and
- Capital (money, products and supplies used in the production of goods or services).

Inevitably the Framework Masterplan plan will need to consider all three; bearing in mind the University's role in nurturing human capital (health, culture, knowledge and institutions), these issues should be embodied in the evolution of the Framework Masterplan and made manifest at all scales of thinking. The Planning and Environment Strategy addresses environment and well-being in more detail, including climate change, energy and carbon, water, waste, air quality and sustainable design principles.

**Campus Choreography**

Movement and transport conventions must be challenged to improve local air quality, surface water run-off from large parking areas, carbon emissions and the creation of space for people and buildings. Behavioural change must be firmly encouraged; for example, phasing out use of cars generally could be speeded up by edge of campus parking. This could be part of an enabling process for future development where low-impact, green, porous long-term parking areas are planted for future screening of new buildings, and as part of the University's carbon sequestration plan. Perhaps free bicycle hire could be introduced for those with a University ID.

**The Environment and Health**

In recent decades there has been a huge increase in the data available showing the link between a green biophilic environment and both physical and mental well-being and productivity. Easy wins may include creating recreation circuits for social cycling with 'destinations' such as outdoor gyms, orchards and areas for forest bathing. Fun and joy should be a part of this including fun things such as 'listening ears', seesaw benches, tree canopy walks and board walks, interactive water spaces, colour, perfume and delight. In particular we need to create a network of social synapses - a variety of social and convivial spaces for meeting and sitting or being by oneself to commune with Nature.

Land management in the campus heart can be altered to improve health of both operatives and students and staff. For example, the City of Lyon has achieved this in all its public spaces by eradicating the use of herbicides. This is now being taken up as a goal by other cities such as Paris. Because the core of the academic year lies in the winter months, we should consider winter gardens and verandas to extend the connection with nature, as this is often the time when depression occurs as day lengths shrink and light levels fall.

**The Environment and the Framework Masterplan**

The University's Environmental Policy is a good starting point. Overall, we need to seek to do no harm to key assets, to limit and mitigate any damage, and to meet the key objective in the Canterbury District Local Plan for Landscape and Biodiversity:

*'To protect and enhance the country- side, acknowledging its own intrinsic value, the diversity of its landscapes, heritage and wildlife and recognizing the high quality of rural environment contributes to the economic, social and cultural wellbeing of the District.'*

The unique selling point for this campus is a combination of its location near World Heritage Sites, proximity to Europe, and its landscape that should provide a biophilic setting in which to live and to study. Environmental sensitivities can be a constraint, but they can also be the catalyst for making the natural systems more robust, more resilient to change, and can inform the very basis of reinforcing the quality of place. If the University is to celebrate both environmental and student health and well-being, it must be a leader in Sustainable Ecological and Social Design. A good starting point is to implement the Kent Lifescapes concept to improve both campus and hinterland biodiversity and landscape quality.

**8.0 The Character of the Landscape in the Wider Context**

The development of successful human habitat - wherever in the world that may be - has invariably been shaped and influenced by the natural landscape in which it is located; landscape is the primary infrastructure, and it shapes our lives and culture.

The natural landscape is indelibly ingrained in the urban landscapes we create. Everything is there for a reason; the shapes and patterns of human settlement and embedded in - and derived from - the landscape and if we are to design successful communities for the future, it is important that we understand the ways in which landscape and urbanity relate and fit together.

**The Shapes and Patterns in the Landscape**

The origins of the University Estate are rooted in the geology, geography, topography and history of the landscape that it inhabits. An understanding of the distinctive geology of Kent, and the way it has influenced the topography of this region is very revealing.

Few places are defined so markedly by its geology as East Kent, whose dramatic landscape is an expression one of the most famous rock formations in the world. A large Cretaceous era chalk 'dome' once existed across this part of the UK and connected the UK to mainland Europe via a land bridge. The White Cliffs of Dover and the Alabaster Coast of Normandy are both part of the same geological system. Only 10,000 years ago, at the end of the last major ice age, rising sea levels in the North Sea cut a path through the land bridge and disconnected this western peninsula from the rest of Europe.

Over time, the cretaceous dome has been eroded to reveal the sands and clay of The Weald, an extremely fertile and productive landscape from which is derived Kent's reputation as the 'Garden of England'. The geological formation that results gives rise to Kent's distinctive 'saw-tooth' topography of ridges and valleys, which represents a cross section through a time period of some 70 million years.

As is evident from the accompanying geological plan and section, this geological formation largely follows an east-west orientation between the Thames Basin in the north and the Downs along the south coast of England. This pattern is very evident in the landscape around Canterbury, which sits on the threshold of the Thames Estuarine Belt to the north and the North Downs to the south; the Great Stour river flows eastward along this geological junction.

Between the valley of the Great Stour and the North Kent Coast, the landscape consists of a series of wooded ridges and valleys. Traditional rural settlements in this area (such as Blean Common, Rough Common and Tyler Hill) inevitably took root along these east-west ridgelines, where the forests provided hunting, foraging and building materials and the well-drained high ridgelines provided level, building land in woodland clearings and with the added benefit of a south-facing aspect. By contrast, the valleys between these ridges are largely settlement-free; the valley sides provided difficult building land and the south facing slopes were more valuable for fruit and hop-growing; the valley floors were occupied by watercourses, wetlands, streams and ponds and liable to flooding.

**Continuity with the Past**

Looking at the campus today, it is easy to imagine that one day in 1965 the University appeared fully formed. However, we know from our research that this is far from the truth and that the process of selecting the host city, followed by choosing a suitable site for the University and building it out, was a long and carefully considered process. During the 50 years since its emergence, the University has grown considerably; today the University is the custodian of an estate that continues to grow, partly to provide future building or amenity land and partly to protect and control the estate as an asset.

As highlighted earlier in this document, many (possibly most) of the universities that emerged in the 1960's were located in the former grounds of grand houses, often gifted to the host cities by estate owners who lacked the funds to maintain them. This was not the case at Canterbury, where the land chosen for the campus was farmland and woodlands deliberately chosen for its proximity to its host city, on land considered to be of low-grade agricultural quality.

The Saxon roots of many of the places and geographical features are revealed in the etymology of the names we see today. For example, the **Sarre Penn**, the name of the stream between the Giles Lane ridge and Tyler Hill ridge, means the 'head or top' of the River Wantsum (into which it flows); **Tyler Hill** is named for the tile-making industry in this location; **Blean** in early English meant 'rough ground'; **Beverley Farm** is thought to refer to a field or a patch of cleared land (rather than a naturally open meadow); **Hothe** (from Hothe Court Farm) meant wood or 'heath'. The parish of Hothe was described by Edward Hasted in his 1799 History of Kent as *"situated in a lonely unfrequented country, both unwholesome and unpleasant, the soil being for the most part a deep stiff clay".*

**Blean** is mentioned in the Canterbury Tales, when the pilgrims were overtaken by a canon and his yeoman in "Boghtoun under Blee" (now Boughton under Blean). The names **Brotherhood Farm**, **Brotherhood Woods** and **Hospital Wood** refer to the religious order who once owned them and the asylums they founded in the 1080s. **Hale's Place Estate** (to the east of the University) was purchased by the Hale family in 1675, where a Carmelite convent, a church and

farm offices were designed by Pugin in 1863. It was sold to the Jesuits in 1880 (as 'St Mary's College'), but the buildings were demolished in the late 1920's. The property was subsequently developed with houses, but a memory of the estate is preserved in the formal layout of some of the streets.

**Land Ownership, Field Patterns and Land Use**
Comparisons between today's maps and those of the 19th century are very interesting indeed and they confirm that, in large part, the historic pattern of rural field boundaries survive, both within and outside of the University Estate.

They also confirm a strong relationship between historic and present-day field boundaries and land ownership boundaries, so little has changed in that respect over a long period of time. They indicate that a very limited number of landowners existed historically and show clearly that the University ownership is based largely upon land once owned by the Brothers of St John's Hospital and Mary Ann Baker.

The substantial part of the University Estate was pieced together over time from the three existing farms (Brotherhood Farm, Beverley Farm and Hothe Court Farm) that survived from the pre-Conquest era, as well as three existing woodlands (known as Brotherhood Wood, Park Wood and Bluebell Wood/Hospital Wood). Not an historic estate in itself by any means, but certainly the ***productive land*** of earlier estates that existed to the north of Canterbury.

Certainly, there would have been a strong and symbiotic relationship between the city, the church and these productive estates, and it is interesting to note that the tradition of productivity carries on today - putting the land to the productive growth of *knowledge.* There remains a strong link therefore between the existing University Estate - and continuity with - the estates that preceded it.

Perhaps not surprisingly, the use of the land became more *intense* with closer proximity to Canterbury, with market gardens, orchards and hop fields occupying south-facing slopes and helping to feed the growing city. Conversely, this land-use pattern reverses with greater distance from the city, where enclosed fields, pasture and woodlands predominate, and where one of the largest areas of Ancient Woodlands has survived in Blean Woods.

**Routes through the Landscape**
Historically Canterbury developed to defend the lowest bridging point of what was once a navigable river, at an important intersection of trade routes across the county; its subsequent role as a major market town and religious centre grew from there.

Traditionally, Canterbury's line of supply for goods had been along the River Stour which flows to Pegwell Bay on the east coast of Kent. Land routes leading in and out of Canterbury emerged in a radial pattern following the lines of least resistance through the landscape; along the valley floor (now the A28), Watling Street (now the A2) and the ridgeline route of the North Downs Way.

To the north of Canterbury, the east-west ridgelines (high ground that was free from flooding year-round) provided a convenient network of movement to early settlers. Subsequently ridgeline routes became farm tracks, which in turn evolved into roads (such as Giles Lane and Tyler Hill Road) that connect the radial routes emanating out of Canterbury.

Interestingly, two very historic routes also cut their way north-south across the open landscape of ridges and valleys described above:

1. **The Old Salt Road**: An ancient route between Canterbury and Whitstable, a route used to transport the valuable commodity of salt from the village of Seasalter on the north coast. Like Hothe Court Farm, Seasalter did not impress Hasted, who in his 1799 History of Kent described it as *"in an obscure out of the way situation, bounded by the sea northward, but the large tract of marshes which adjoin it westward, as well as the badness of the water, make it very unhealthy".*
2. **The Crab and Winkle Line:** With industrialisation came the railways, and in 1830 the Canterbury and Whitstable Railway line was opened. This was extremely early in the history of railways; it is thought to be the first ever railway in the south of England and the first railway in the world to convey both passengers and goods traffic regularly by mechanical power. Nicknamed the **'Crab and Winkle Line'** it was built primarily to carry fish and seafood to market in Canterbury. The six-mile-long, single-track railway follows a straight line between Canterbury and Whitstable and ingenious engineering techniques were employed to climb the hills and to tunnel under the Giles Lane ridgeline. It was closed to all traffic in 1952 and parts of the line were then sold off (the University owns the former track bed north of the Tyler Hill tunnel). The railway and tunnel were largely forgotten until 1974, when the University's Cornwallis Building was undermined by a partial collapse of the tunnel, after which all but a short length at the south end of the tunnel was then filled in.

The Crab & Winkle Line and the Old Salt Road became publicly prominent again in 1997-99, when The Crab & Winkle Line Trust was founded and a seven-mile footpath and cycleway (now called **'The Crab & Winkle Way'**) was opened. This now forms part of National Cycle Route no.1. In spite of its name, the popular route uses only a short length of the abandoned track bed through Clowes Wood and combines that with parts of the Old Salt Road. A picnic/rest area incorporating one of the surviving railway Winding Ponds.

Importantly, two radial routes also emerge north from Canterbury: Whitstable Road to the west (the A290) and St Stephen's Hill to the east. These routes sit to the east and west of the two historic routes described above and define a segment of the north part of the city in which the University Estate figures most prominently, and on which the Framework Masterplan is focussed.

**The Landscape Components of the University Estate**
In summary, there is a rich and complex relationship between the shapes and patterns in the landscape, and the pattern of human intervention and settlement through time in this segment of north Canterbury.

From the analysis above, the following list is a summary of the components that make this landscape distinctive and unique; these must become the main 'ingredients' of the landscape and biodiversity thinking within the evolving Framework Masterplan:

- *the forests and woodlands*
- *the soil types and orientation to the sun*
- *the settlement of the ridgelines and open landscape in the valleys*
- *the network of tracks, footpaths on year-round flood-free routes*
- *the valley-bottom watercourses, wetlands, streams and ponds*

- *the field patterns and land use*
- *fruit and hop-growing on south facing slopes*
- *new cycleways on historic routes and the disused rail line*
- *the public realm, open space, squares, gardens and allotments*
- *the buildings and structures*
- *the network of roads*
- *the network of services and utilities*

If the University community is to be truly sustainable, we must read and understand the landscape character that shaped it in the first place and apply that knowledge in guiding and shaping its evolution. Understanding and balancing the relationship between the built environment and the landscape in which it makes its home will be the key to a successful University Estate of the future.

The settlement of the ridgelines was shaped directly from the landscape character of this particular area, and this pattern remains very strong and clear in the area north of Canterbury. The pattern of settlement remained intact throughout the medieval period and changed little between the 19th century and the development of the University in the 1960s. Even today these hill-top settlements remain largely separated by swathes of open landscape and the rural nature of the area north of Canterbury holds to the original pattern.

This analysis of the relationship between the landscape and the communities that came to inhabit it described above, provide us with a direction for the future. It represents the *Genius Loci* of this landscape, and there is a compelling argument for following this pattern of sensitive, incremental development along the ridgelines north of Canterbury in the future evolution of the University Estate.

**Summary: The Emerging Landscape Character Areas**
It was into the distinctive and unique landscape pattern described above that the University of Kent arrived in 1965. Unsurprisingly, after consideration of many alternative options, the new university found a suitable home on the relatively flat, well-drained land along the ridgeline overlooking the historic city of Canterbury.

The built environment of the Canterbury Campus is set within a variety of different landscape characters:

- The University campus heart sits astride Giles Lane, a rural road connecting Whitstable Road with St Stephen's Hill, in what was open farmland. The campus heart takes advantage of exceptional views both to the historic city to the south and the Kent Downs beyond, as well as the views north over open countryside towards Whitstable and the coast. Distant views of the campus on the ridgeline are moderated by its setting amongst, or adjacent to, mature (and in some cases historic) woodlands. Buildings are carefully located to avoid breaking ridgeline or dominating the natural setting
- To the west, Parkwood student housing and the Business School are set within long-established woodland
- Open parklands and extensive views over historic Canterbury embellish the campus to the south and reach down to meet the residential suburbs of north Canterbury

- Agricultural land to the north and east provide yet another landscape character within the extensive campus

It is clear from this that the landscape setting that dominates the University Estate and also clear that the landscape character must continue to give direction to the Estate. The following Landscape Character Areas have therefore been identified and will form the framework around which the evolution of the Framework Masterplan thinking will be based: The Tyler Hill Ridgeline, the Sarre Penn Valley, The Giles Land Ridgeline and the Southern Slopes. The next steps in the masterplan thinking will therefore focus on ideas to develop and reinforce these character areas.

**9.0 Ecology and Biodiversity in the Landscape**

*"Human well-being and most economic activity depend on a healthy environment. A focus on nature's benefits – ecosystem services – allows us to see the direct and indirect ways in which we depend on the natural environment, providing in-sight that can substantially support local policy and public management."*

TEEB (2010) A Quick Guide to The Economics of Ecosystems and Biodiversity for Local and Regional Policy Makers

The University of Kent's landholdings can be divided into five broad habitat types:

1. **Amenity grassland/scattered trees/ornamental planting mosaic:**
   This habitat mosaic is the dominant habitat type within and around the buildings, roads and carparks of the Campus Heart. In addition to more recently planted ornamental trees there are many mature English Oaks that are possibly remnants of former Ancient Woodland and old hedgerows.
2. **Woodland:**
   A number of mature woodlands are present within the Campus Heart, Parklands and Agricultural Land. Dominant canopy species include Oak, Hornbeam and Sweet Chestnut, which are also characteristic of the wider Blean Woodland Complex. Ash and Birch are also locally dominant. Key woodland areas, most of which appear to be Ancient or include components of Ancient Woodland, include Brotherhood Wood, Park Wood, Bluebell Wood (also known as Hospital Wood), Giles Lane Wood and West Triangle Wood.
   *Note: West Triangle Wood is one component of Blean Pastures Local Wildlife Site*
3. **Meadow and Parkland:**
   The Parklands include a number of extensive meadow areas, some of which include scattered trees and copses creating a Parkland effect. No grazing (other than by rabbits) is evident and they are mown once or twice annually. Although these grasslands appear relatively old, they are not for most part rich in herbs. Recently sown wildflower meadow is present to the southwest of the Campus Heart around the Innovation Centre and to the south of Turing College.

4. **The Sarre Penn Stream:**
   The Sarre Penn Stream, which is also known locally as the Fishbourne Stream, is a tributary of the River Stour. It forms an east-west aligned shallow-sided 'V' shaped valley across the centre of the Northern Land Holdings. The river is generally 2-3m wide, shallow (5-20cm), gently meandering and includes glide and riffle sequences (riffles formed over substrate of gravel/small cobbles). The Sarre Penn valley is densely shaded by trees and shrubs for its entire length across the University of Kent's landholding. The western most section of the stream within the University of Kent landholding forms part of Blean Pastures Local Wildlife Site.
5. **Agricultural Land:**
   To the north of the Campus Heart is a large area of agricultural land referred to as the Northern Land Holding. It is part of the Blean Farmlands landscape character area, which consists of a mosaic of Improved pasture, Poor Semi-improved grassland and Arable land. Fields are lined by hedgerows and treelines, some of which are relatively species-rich. Treelines are quite wide in places (10-30m) and could almost be described as linear woodlands, most notably along the Sarre Penn river corridor and along the dismantled railway line. Many field boundaries, ditches and rivulets feed into the Sarre Penn.

**Desktop Study**

The collation and review of 'desk-top' information was carried out through June and July 2017. The aim was to collate local records of protected or notable species and habitats. Desk records and comments were requested from Kent and Medway Biological Records Centre (KMBRC). The search area was a 10km radius for sites designated for nature conservation at the European level (Natura 2000 sites) and Annex II bat roost records and 2km for all other ecological data. KMBRC subsequently provided data including records from Kent Bat Group and Kent Ornithological Group. Kent Wildlife Trust was contacted specifically with respect to the Blean Living Landscape Area. In addition, various biodiversity planning policy documents and biodiversity strategies and initiatives have also been reviewed.

**Field Survey**

Fieldwork followed standard Phase 1 Habitat Survey protocol (JNCC 2010), extended in accordance with the Institute of Environmental Assessment (1995) to include an assessment of the potential presence of legally protected flora and fauna. All accessible land within the University Estate was walked and habitat types were classified and mapped as fully as possible using standard codes. The survey was undertaken by an experienced ecologist, Dr Lincoln Garland MCIEEM, between the 13th and 16th July 2017 inclusive. A map of habitats was drawn up and target notes were used to describe features of particular ecological interest. Land adjacent to the Site was mapped at a more basic level of detail from the campus boundary were visible to provide context. No detailed Phase 2 surveys (e.g. for protected species) were undertaken as part of these initial investigations.

**Assessment of Ecological Importance**

The approach to the assessment of ecological importance and impact assessment has followed guidance prescribed by the Chartered Institute for Ecology and Environmental Management (2016). The ecological importance of areas of land, and assemblages/populations of species and taxa has been categorised as follows:

- International (Special Areas of Conservation, Special Protection Areas, Ramsar sites)
- National (e.g. Sites of Special Scientific Interest and National Nature Reserves) - Regional, County
- Local (District) – Canterbury City Council
- Local (Parish) - Blean Forest Ward and Blean Parish
- Within the Immediate Zone of Influence of the Site only

**Gap Analysis**

**Protective Species Surveys**

Whether further ecological survey work is required depends in large part on the nature and arrangement of specific development proposals and the habitats that would be potentially affected. Having said this, further survey work should also be carried out to better understand the ecology of the campus, thereby informing green infrastructure restoration, enhancement and management proposals.

Detailed surveys of the following protected species are likely to be required at some time during future development:

- **Bats:** If potential roost sites are destroyed (e.g.: buildings and/or mature trees). Bat activity surveys may also be required if there are major proposals to change the landscape which might impact on foraging and commuting corridors.
- **Dormice:** Survey data will be required if woodland and hedgerow habitat is potentially being lost or fragmented. Even if woodland areas are not being directly affected, consideration should be given to carrying out a site-wide Dormouse survey to assess indirect impacts (such as recreational attrition) and inform management proposals.
- **Badgers:** No signs of Badger were noted during the survey, although precautionary checks for their presence will be made in relation to all new development.
- **Great Crested Newts:** Survey data will be required if ponds are affected or if there is potential significant loss of associated terrestrial habitat. A detailed survey was undertaken in 2014, however this data is likely to be considered out of date for Natural England licensing purposes.
- **Reptiles:** Survey data will be required **i**f significant areas of suitable habitat are affected, e.g. meadow, hedgerow, scrub and woodland edge.
- **Breeding Birds:** A breeding bird survey is proposed given the large area of Ancient Woodland within the campus and in the wider landscape, and because the noteworthy species associated with this habitat type. Note also that the campus is home to scarce farmland bird species. Even where there is no direct threat to the Ancient Woodland, a survey will be needed to inform management and potential indirect disturbance impacts.

- **Fish:** A survey is proposed to assess which fish species are present in the Sarre Penn and, in particular, whether Brown/Sea Trout are spawning within the University Estate.
- **Invertebrates:** An invertebrate survey of the campus' woodlands and Sarre Penn is proposed for similar reasons.
- **Hedgehogs:** For species such as Hedgehog, their presence in all suitable habitat will be assumed when developing mitigation or enhancement proposals.

*NB: Surveys for all these species are seasonally constrained and would need to be scheduled the moment reasonably specific development proposals have been formulated to avoid delay to the project programme.*

**10.0 The Way Ahead: Articulating the Vision**

Our strategy takes a 'whole system' approach to green infrastructure and biodiversity, which includes integrating environmental sustainability, health and well-being and simultaneous consideration of the future of the area at 'local', regional' and 'global' scales (known as ecourbanism). As such, there are clear synergies with the Place-making, Planning and Environment and Movement and Transport Strategies.

As outlined in Section 3 above, there are a series of important local, national and international landscape and ecological designations, which the Campus and adjoining University-owned land either sits within or adjacent to and an assessment of these will be an important part of developing the strategy.

There are six key stands to our Landscape and Biodiversity Strategy

1. **Evidence and Assessment**
2. **Accommodating the Spatial Strategy**
3. **Landscape**
4. **Biodiversity**
5. **Environment and Well-being**
6. **Long-term Stewardship.**

**10.01 Evidence and Assessmnet**

The strategy has been informed by an initiial Step 1 habitat survey, and an assessment of the landscape character, in association with a review of larger issues such as climate change adaptation and carbon emissions reduction that impact on the conservation of existing landscapes and ecology. This evidence will help shape local parameters for future development in the following ways when developing masterplan studies/options and developing a preferred option and Framework Masterplan:

- Taking full account of landscape and biodiversity designations policy and guidance, including Areas of High Landscape Value and Areas of Outstanding Natural Beauty (AONB), Local Wildlife Sites, Tree Preservation Orders, Ancient Woodland and hedgerows
- Taking full account of heritage assets: including the World Heritage Site, the conservation areas that cover parts of the area and those adjacent to them, the Scheduled Ancient Monument and listed buildings, along with non-designated heritage assets (including locally listed buildings) and the potential for archaeological constraints
- Taking full account of the impact on the landscape character of the area, using LVIA as an iterative tool to help shape and assess masterplan studies and options leading to a preferred option and a final masterplan
- Further habitat surveys will be needed to support planning applications

**10.02 Accommodating the Spatial Strategy**

*To be added…*

- *Draw on historical analysis and revised place-making strategy to articulate the strategy of focusing development on the ridgelines.*
- *Set out how this has been informed by an understanding of landscape.*
- *Include cross section diagram*

**10.03 Landscape**

The setting of the Campus in the wider countryside will be respected to safeguard and to enhance both the landscape character and nature conservation interests of the area, and to inform a biodiverse biophilic approach to the public realm on the Campus.

Proposals will respond positively to the character of the Blean Farmland and will seek to reinforce the biodiveristy of the Blean Woodlands by:

- Taking opportunities to improve woodland habitat, particularly around the periphery of the campus and adjoining University-owned land
- Balancing the development potential of the Sarre Penn valley slopes and land to the north of Tyler Hill Road with the opportunity to conserve and enhance grassland areas
- Ensuring that development safeguards high quality agricultural land where possible and is sensitive to the needs of farmers, whilst reinforcing and conserving hedgerow and shelterbelt networks (drawing on good practice by the National Trust and others)
- Maintaining and improving the traditional character of hedgerow planting along lanes and roads
- Providing suitable planting around visually prominent farm buildings and proposed development to soften the visual impact
- Promoting new development that is sensitive to the scale and character of existing development and relates well with Blean, Tyler Hill and Rough Common

Proposals will respect the character of the Stour Valley Slopes and reinforce the biodiveristy of the Blean Woodlands by:

- Extending the network of woodlands of Blean southwards into the Stour valley, towards Canterbury, and by linking scattered small blocks of woodland across the Campus and adjoining areas with woodland corridors
- Restoring the historic planting of the Parklands
- Strengthening and recreating the traditional field pattern where possible
- Conserving and restoring the open grass slopes overlooking the City and augmenting these with orchards.
- Managing woodland habitat by active coppice management where appropriate

The elevated position of the Campus will continue to provide an appropriate landscape backdrop to the Word Heritage Site and other heritage assets in the centre of the City, by ensuring that:

- Proposals do not significantly change the skyline and protect/enhance the visual amenity of people at important viewpoints
- Development of the visually sensitive ridgeline does not introduce dominant features by way of careful siting, scale and massing, choice of external materials and colour and landscaping.
- Development conserves the scenic quality of important views from the surrounding area and the visual setting of the City, Blean, Tyler Hill and Rough Common
- Any external lighting introduced to create a safe environment or to floodlight sports pitches etc., will be designed to minimise glare and avoid a negative impact on the visually sensitive ridgeline

**10.04 Biodiversity**

The creation of a rich, biodiverse landscape tends, by default, to comprise many ecosystem services. Biodiverse living systems tend to be more robust in the face of climate change, disease and other challenges. Such systems in turn can enrich our environment, bringing direct health benefits such as enriched air quality and microclimate improvements, psychological benefits, hydrological and edaphic services, as well as supporting native wildlife for its own sake.

A green/blue landscape infrastructure strategy has therefore been developed for the University Estate, with the aim of maximising these functions wherever possible, making the landscape 'work hard' in its special context for both people and wildlife. The special biodiversity value of the local landscape will be safeguarded by ensuring that there are no significant increases in traffic or negative impacts on air quality, surface water runoff, or distrubance associated with the University campus growth, and by providing attractive recreation and leisure opportunities for staff and students on Campus.

The following eight key strategies for maximising opportunities for biodiversity enhancement and provision of ecosystem services are therefore put forward:

- *Integration of the Campus with the Blean Living Landscape*
- *Bringing back traditional coppice management and the 'Woodman's Follower' (i.e.: The Heath Fritillary Butterfly)*
- *'Wild and Wonderful Wetlands', restoring and celebrating the Sarre Penn Valley and creating a new wildlife rich wetland network*
- *'Fantastic Farmland', creating a productive, educational, accessible and biodiverse campus*

- *'Nature Nearby', an accessible biodiverse Campus including a new Campus-wide Circular Cycleway and welcoming woodland*
- *A Biodiverse and Productive Campus Heart*
- *Creating 'Living Architecture', and*
- *Managing out Invasive Species*

These principles respond directly to existing local biodiversity policies and strategies aimed at restoring and re-creating a diverse mixture of habitats, including woodland, meadow and wetland, and will establish a coherent ecological network to encourage some of the UK's rarest species to inhabit the local landscape. Each of these approaches is expanded upon below, and each strategy will be developed in detail throughout the Framework Masterplan.

*Integrating the Campus with the Blean Living Landscape*
The UoK is situated in a strategically important location with respect to implementation of the Blean Living Landscape initiative, being roughly bound by its core woodland areas to the east, west and north. Indeed, we contend that the campus woodlands and other semi-natural habitats should be viewed as integral elements of the wider Blean Woodland Complex. Given this, there is great opportunity to work with the Blean Initiative to create new woodland, meadow and wetland habitat within the University Estate to help strengthen connectivity between fragmented components of this internationally valuable landscape and ecosystem.

In addition to improving habitat connectivity, the University of Kent should be ambitious and in the long term aim to establish its own sub-populations of iconic species such nightjar, nightingale and heath fritillary butterfly.

The Blean is more than just woodland; significant areas are retained as heathland and meadow through extensive grazing using Konik ponies, Soay sheep, feral goats and highland cattle, all of which are hardy animals able to subsist on a tough, nutrient-deficient diet. The introduction of extensive grazing regimes within the campus, perhaps even within the Parklands where swards are mostly uniform and species-poor, should be considered. Low intensity grazing promotes botanical and structural grassland diversity due to the unequally distributed movements of grazing animals (trampling, lying and rolling) and also because of their selective feeding, which focusses on more dominant plant species allowing less competitive plants to flourish. Their dung creates a whole ecosystem by itself, particularly benefitting birds and bats which feed on associated insects. The introduction of livestock would also create a more visually stimulating pastoral/heathland appeal to the Parklands, particularly in the vicinity of Bluebell Wood and Eliot Path.

*Bringing back the Traditional Coppice Cycle and the 'Woodman's Follower'*
In addition to creating new habitats, traditional woodland coppice management should be re-established in keeping with existing management recommendations to benefit a wide range of woodland species. Recently coppiced areas are vital to maintain the Heath Fritillary's primary larval food plant, Cow-wheat. Note that the butterfly was locally known as 'Woodman's Follower' as it followed the traditional coppice cycle. Coppice management would also benefit other woodland ground flora including Bluebells and Wood Anemones, and coppicing will generally attract a greater diversity of woodland fauna including Dormice and a variety of shrub-nesting birds.

*Wild and Wonderful Wetlands*
While the wooded Sarre Penn Stream corridor is already noteworthy habitat, there are opportunities for ecological enhancement, creating new habitats and strengthening connectivity with Blean Pastures, as well as Little Hall and Kemberland Woods, and Pasture Local Wildlife Sites, upstream and downstream respectively. Such enhancements might include:

- Creating a buffer strip between the adjoining arable fields and the woodland edge
- The creation of additional woodland in select locations, while also scalloping the heavily wooded banksides in other places to allow light to reach the water
- The creation of one or two adjoining wetlands to better reconnect the stream to its floodplain, diversifying the wetland environment as well as helping attenuate flood water. Careful consultation would be undertaken with the Environment Agency and no measures would be undertaken that might diminish the stream's existing value for bullhead, eels and potentially spawning trout

The Sarre Penn Valley is one of the key landscape and ecological features within the Campus and yet many of the students appear unaware of its presence, which is perhaps not surprising given the relatively overgrown condition of the public footpath which follows the stream. Designating the stream as a University 'nature reserve' would accentuate its identity and increase its usage.

The Campus Heart includes several major squares and spaces but none of these areas truly represents the 'heart' of the campus. Perhaps a relatively large biodiverse and ecologically designed wetland feature could be created in a prime location to take 'centre stage'; not only would a wetland feature become the University's focal landscape attraction, it would showcase the University's commitment to biodiversity. Access to the water and its wildlife could be maximised through multiple seating areas and boardwalks winding around the margins and even across the wetland.

The University's many drainage features have been sown with amenity grassland and are tightly mown, and hence have very little biodiversity or aesthetic interest. These could however be transformed relatively simply through richly planting a range of colourful and nectar-rich riparian plant species, which in turn would attract butterflies, dragonflies and maybe even the UoK's flagship species, the Great Crested Newt, while also educating and exciting students and staff. Most of the ponds on campus are in a neglected state, being (to varying degrees) inaccessible, silted, polluted, overgrown by trees/shrubs and in some cases inhabited by non-native invasive species. There is therefore considerable opportunity for enhancing their ecological value, accessibility, signage and visual appearance. Thought might also be given to creating new wetland linkages so that Great Crested Newts and other wetland wildlife can readily disperse across the Campus Heart and also into Sarre Penn Valley.

*Fantastic Farmland*
A large part of the University's landholding is currently active farmland. Many opportunities exist to ecologically enhance this land in terms of biodiversity, as well as to showcase the principles of sustainable farming, in keeping with local strategies. Potential opportunities for the University of Kent to enter into agri-environmental schemes should be investigated. Perhaps new environmentally-friendly management techniques could be linked to particular University

course modules such as geography, ecology, and agriculture. Particularly on the northern side of the Sarre Penn there are many opportunities for native species-rich hedgerow restoration.

In terms of biodiversity, the ambition should be for Skylarks and Yellowhammers to be singing from every field and hedgerow respectively. Perhaps even the Turtle Dove and Brown Hare, two of the England's rarest farmland species, could be attracted to the Campus.

The Crab and Winkle Link cycle-way (Sustrans Route 1) is very popular with students and members of the public alike. The opportunity exists to use the cycle-way to create a new Circular Cycleway encompassing the northern half of the University landholding to the dismantled railway line which extends up the eastern side of the University Estate. Currently, the footpath along the dismantled railway line is heavily overgrown and unsuitable for cycling and walking. This historic feature could be transformed to become part of a new, dedicated sustainable transport network, with new linking sections created through the Campus Heart. The northern section of the Circular Cycleway would be completed by a cycle-friendly route established inside the hedgerows, running parallel to Tyler Hill Road. Various attractions including picnic areas, viewing points, signage and pocket nature areas (small areas of habitat enhancement between the cycleway and adjoining farmland) would all add variety and interest. A much larger network of cycle routes could be created by linking with existing cycle-ways through the Parklands, and various miniature circular links could be created elsewhere, particularly through the Campus Heart.

*Welcoming Woodland*
Much of the University's woodland is densely shaded and unwelcoming to visitors. The creation of a carefully positioned network of open rides and glades would not only benefit wildlife such as the Heath Fritillary but would also greatly improve access and enhance this amenity for students and staff. Blean Pastures Local Wildlife Site provides a good reference site in this regard, in particular with respect to potential improvements to the northern half of Park Wood, which is largely inaccessible. Although Blean Pastures is only a small site, the winding footpath and network of sunny glades creates a sense of anticipation and the illusion of a much larger site.

*A Biodiverse, Accessible and Productive Campus Heart*
The intensively used amenity spaces within the Campus Heart could be ecologically enriched; this area includes a good deal of homogenous, tightly mown amenity grassland where there are many other opportunities for creating a more ecologically rich and inspiring environment. Although species-rich native plant communities will nearly always have greater conservation importance due to the food webs and food plants present, the introduction of non-native planting can be highly beneficial to target wildlife if carefully chosen and add considerable year-round biophilic appeal.

In the first instance, we suggest that additional planting be concentrated along primary pedestrian and cycle routes. Wildflower meadow areas created in conspicuous locations might need to be more regularly maintained to avoid negative feedback following peak flowering periods. There are probably also opportunities for tree planting and the creation of other habitats between sports pitches.

Amenity grassland should be made more botanically diverse by the establishment of flowering lawns wherever possible. Encouragingly, flower-rich lawns are already found seen in a few locations within the Campus. Flowering lawns can be easily established as pre-grown turf around newly-developed or refurbished existing buildings. Locally occurring, low-growing flowers include Creeping Buttercup, Creeping Cinquefoil, Bird's-foot Trefoil, Black Medick, Field Bindweed,

Daisy, Speedwells, Selfheal, Mouse-ear Hawkweed, Red Clover and White Clover; all these could be introduced in bespoke turf.

Urban food production - the practice of cultivating, processing and distributing food in an urban context - takes many forms, from animal husbandry, to aquaculture, agroforestry, urban beekeeping and horticulture, and all are strongly promoted by planning policy. There are of course multiple benefits to be derived from urban food production, including:

- Enhanced biodiversity
- Reduced food miles/reduced CO2 footprint (in support of the 'locavore' concept)
- Financial (sale of produce)
- Recreation and leisure
- Health and well-being
- Education; and environmental restoration

Given that this is the case, the Framework Masterplan for a landscape-enhanced campus should incorporate food growing areas, such as orchards and woodland gardens for food, which could be established between the accommodation blocks rather than being confined to the campus margins.

An allotment area already exists in the former Hothe Court Kitchen Garden on the western edge of the Campus Heart, currently managed by a small group of enthusiastic and environmentally conscious students and locals. The University is currently giving its support to expanding this facility and to attracting greater use and participation to include:

- A new Community Garden (in association with the Kent Enterprise Trust)
- Bee Keeping (in association with the Whitstable & Herne Bay Beekeepers)
- A Science Area/Observatory
- Newt Research (in association with the Durrell Institute of Conservation and Ecology)
- Community Allotments

Consequently, the University could begin to develop targets to produce an increasing proportion of its own food from this food growing area and also from the farmland; perhaps the University could begin selling UoK honey and other produce.

*Living Architecture*

Green roofs and facades should be included on new buildings wherever possible, and many of the older buildings could be visually softened and ecologically enriched through retrofitting of living architecture. While food growing areas will generally be at ground level, they could also be established on building roofs, especially communal blocks.

*Managing out Invasive Species*

The extended Habita Survey and recent amphibian surveys have identified a number of invasive species, including:

- Japanese Knotweed - Eliot Footpath Woodland
- Rhododendron
- Giant Hogweed, and
- Alpine Newts

The University will continue to implement its Biodiversity Management Plan to manage out these inasive species.

**10.05 Environment and Well-being**
Our stratgey will integrate the themes of climate change adaptation, Natural Capital Accounting, ecosystem services, carbon emissions reduction, SUDS and continuous productive landscapes in a holistic approach to green and blue infrastructure provision.

It will make a positive contribution to the health and well-being of staff and students by creating healthy and productive landscapes for learning and living in combination with an approach to social sustainability through convivial place-making that helps connect people with nature. This includes the location of car parking, connectivity and way-finding and place naming (as addressed in the Place-Making and Movement and Transport Strategies).

**10.06 Long-term Stewardship**
The University will use its long-term stewardship of the Campus to implement, monitor and revise its future land management plans in ways which will safeguard and enhance landscape character and biodiversity and ensure safe and accessible environment for staff and students.

**Summary of the Landscape & Biodiversity Strategy**
The Campus sits in a strategically important location from a landscape and biodiversity perspective, being encompassed by extensive areas of Ancient Woodland to the east, west and north. In combination, these woods form the Blean Woodland Complex, which is one of the largest area of contiguous/semi-contiguous Ancient Woodland in England.

The Campus itself includes a number of pockets of Ancient Woodlands which, together with other semi-natural habitats, should be should be viewed as integral to the wider woodland complex. Woodland cover on the University Estate had been more extensive in the recent past, as maps from 1816 attest, and certainly the on-site Ancient Woodland has been greatly fragmented since 1963. The Campus also includes many free-standing mature trees, hedgerows, meadows (in the Parklands), ponds and the Sarre Penn Stream. A section of the Sarre Penn Stream and adjoining woodland forms part of Blean Pastures County Wildlife Site. The Campus' faunal assemblage includes badgers, dormice, bats, amphibians (including great crested newts), reptiles, various fish species (including brown/sea trout, bullhead and eel) and invertebrates.

In spite of these various ecological assets, the University Estate environment is suffering from a variety of pressures including recent built developments. For example, coppice management of the woodlands has been neglected; many of the ponds are heavily silted, polluted, overgrown by tree/shrubs and colonised by alien invasive species. Also, many hedgerows in the north of the estate exhibit substantial gaps, thus fragmenting the farmland landscape corridors.

In addition, other components of the Estate are not realising their full ecological potential. Large areas of the Campus Heart (including drainage features) for example are managed as low-cut amenity grassland, while the Parklands area will probably take many years to achieve a botanically rich sward due to the mowing regime being undertaken biannually, not least because arisings are often left in place.

The University Estate has the capacity to become an ecologically rich, multifunctional public realm that provides by default a range of ecosystem services. Key to success in achieving this goal will be:

- Seamless integration with the *Blean Living Landscape*, achieved through ecologically informed management and enhancement of existing woodlands, meadows and wetlands. This in turn might attract colonisation by charismatic species including the heath fritillary butterfly, as well as less-common species of bird such as the nightjar and the nightingale.

- Low-intensity grazing introduced to the Parklands to diversify the grassland community and create a more attractive pastoral/heathland management effect. A regime such as this is being used to good effect on other publicly accessible sites in Kent (e.g.: Hothfield Common, a biological Site of Special Scientific Interest located to the north-east of Ashford in Kent).

- Ecological enhancement of the Sarre Penn Valley in particular, and celebration of it as a primary recreational resource, and for supporting spawning trout and a wealth of other aquatic/riparian species.

- An Ecological approach to the restoration of agricultural land as a haven for flagship farmland species such as the brown hare, the yellow hammer and the skylark, and the restoration and expansion of ponds and drainage features to create a new wetlands network facilitating the movement of great crested newts and other amphibians, dragonflies etc.

- The Creation of new wetland features as well as other biodiverse habitat types, including broadleaf woodlands. Given the large expanse of amenity grassland and hardstanding within the Campus Heart, there is an opportunity for a new large attractively planted, biodiverse, wetland feature that could become a centre-stage landscape attraction, creating a true 'living' heart for Campus.

- Finally, we also recognise the potential for a new network of cycle and footpaths criss-crossing the campus maximising access to new, and newly revealed, landscape attractions. Key amongst these might be a new circuit of walkways, cycle-ways and jogging routes around the Northern Land Holdings, achieved by opening up the overgrown part of the Crab and Winkle Railway Line, linking it to the existing footpaths and bridle ways such as the Crab and Winkle Link (the former Salt Road).

Should these ideas be realised, they would go a significant way towards achieving the Concept Master Plan goal of creating a 'landscape environment that is visually appealing, which encourages leisure activities and social interaction', to creating 'eco-spaces where a diversity of flora and fauna can thrive' and also play a part in lifting the University's ranking in the Green League.

# Appendix I
# Masterplan Movement and Transport Strategy

now part of

# University of Kent Masterplan

## Movement and Transport Strategy

On behalf of **The University of Kent**

Project Ref: 44137/5501 | Rev: | Date: May 2019

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## Document Control Sheet

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| | | | | | |

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# 1 Introduction

## 1.1 Introduction

1.1.1 Peter Brett Associates LLP (PBA now part of Stantec) has been commissioned by the University of Kent to provide the Movement and Transport Strategy as part of the wider Framework Masterplan for the University of Kent's Canterbury Campus.

1.1.2 This Movement and Transport Strategy document forms one of the four spatial strategies to support the Framework Masterplan. The other three spatial strategies have been prepared separately and are listed below:

- Place Making
- Planning and Environment. and
- Biodiversity and Landscape.

1.1.3 This structure is illustrated in Figure 1.1 below and also shows how the University's own Travel Plan and Parking Management Strategy contribute towards the Framework Masterplan objectives.

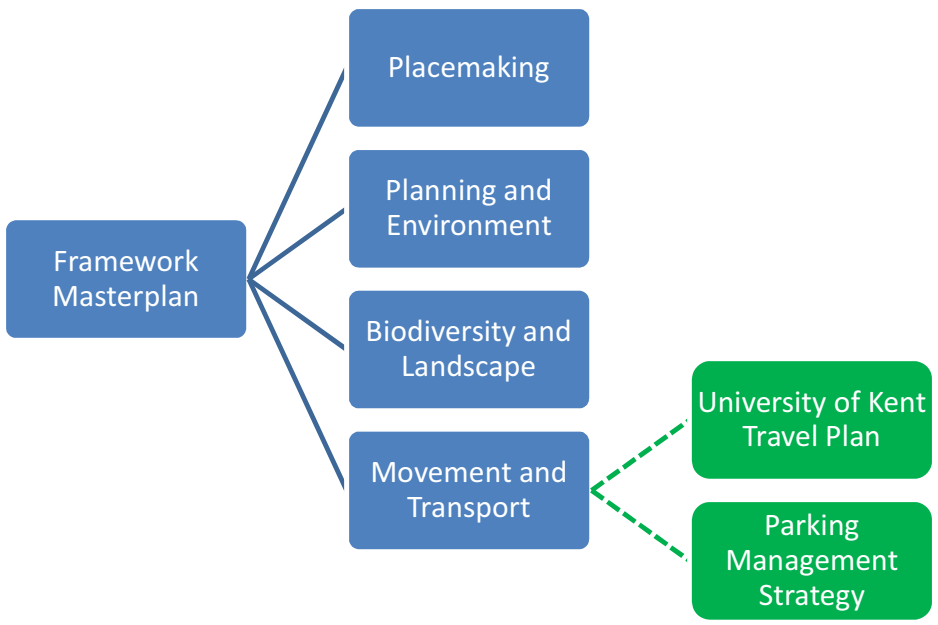



Figure 1.1 | Context for Movement and Transport Strategy

1.1.4 This report has been prepared in conjunction with the University of Kent, CMA Planning and John Letherland Ltd and has worked up collaboratively through ongoing consultation and discussion with Canterbury City Council, Kent County Council and Urban Initiatives Studio. It has also been prepared alongside comments made by local individuals and groups in response to public consultation on the Strategic Vision (Step 1) and emerging Framework Masterplan (Step 2).

## 1.2 Background: The need for a Masterplan

1.2.1 University of Kent was established in 1965 on a hill top overlooking the city of Canterbury. The campus was master planned by the architect Lord William Holford. The Holford plan set out a clear vision for the campus as a collection of discrete colleges in a parkland landscape, with common facilities shared centrally between them. The campus was established rapidly, and the University received its first cohort of 500 students in 1965. The original masterplan for the Canterbury Campus was prepared during a time where motor vehicles were viewed as the future of transport. The Campus was therefore designed to accommodate and encourage travel by motor vehicles.

1.2.2 Since its foundation in the 1960s, the Canterbury Campus has gradually increased in size over the years. Future growth, in so far as it was known or anticipated, was to be accommodated by the addition of more college buildings distributed along the hill top ridge and down University Road, with large landscape spaces in-between creating the college settings. However, the campus has evolved in quite different ways from that which Holford intended for several important reasons.

1.2.3 The growth of the Campus size is highlighted by the thirtyfold increase in student numbers from the first cohort of 500 to over 16,000 in 2016[1]. The increase in the number of students was accompanied by the development of new accommodations and new academic and research facilities on campus.

1.2.4 The original collegiate system has been replaced by a more subject-based departmental system, along with a wide range of alternative ways to accommodate residential students, including shared apartments, halls of residence and many students living off campus in Canterbury.

1.2.5 Finally, the approach to providing accommodation has been much more pragmatic and tactical than envisaged by Holford. Buildings have been added within the confines of the original Holford campus heart, as well as on available sites within the wider campus. Some original structures have been extensively modified or replaced and the ever-pressing demand for car parking has seen large surface parking areas retained and expanded.

1.2.6 Generally, the new developments were often developed on a pragmatic project-based approach and lacked strategic direction.

1.2.7 The University of Kent is an ambitious university with aspirations for further growth. The education sector is a significant contributor to the local economy of the area and the University plays an important part. Despite the economic uncertainties between 2008 and 2010, the education sector created 1,500 jobs (+13% growth) so that by 2010 it provided a total of 13,100 local jobs, meaning one in five of all local jobs were in education[2].

1.2.8 The Canterbury District Local Plan (July 2017) further emphasises the importance of the education sector and Universities to the local economy:

- Firstly, they are considerable users of office and other space in Canterbury itself.
- Secondly, the education institutions act as driver of physical regeneration and attractors of important commercial investment.
- Thirdly, they form an important part of a diversified local economy, supporting the growth of knowledge-based business in the area.

[1] Student numbers sourced from *"University of Kent Canterbury Campus - 2022 Travel Plan"*

[2] Paragraph 3.55 – *"Canterbury District Local Plan – Adopted July 2017"*

1.2.9 To help facilitate growth and to ensure it is delivered in a planned fashion, the adopted Canterbury District Local Plan (July 2017) expects a new masterplan to be prepared for the Canterbury Campus prior to significant development within the site. Policy EMP7 sets out the City Council's approach to growth at the Canterbury Campus and University of Kent in more detail as follows:

*"Within the campus of the University of Kent, identified on the proposals map, the City Council will support development of educational buildings for teaching and office space; student accommodation; business accommodation (compatible with the University's role in research and development and business innovation); sports facilities and other facilities directly related to the University's core business.*

*The City Council will expect a masterplan to be prepared for the whole identified campus site, prior to any significant development within the site. Such a masterplan should maintain the campus character of the university; respect the setting of the site in the wider countryside; identify the key uses and their disposition within the site and any relocation of uses within the wider campus area. It should also set out a landscape and biodiversity strategy for the whole site.*

*Significant development proposals at the University will be subject to updating of the University's Transport Impact Assessment and a review of the University Travel Plan.*

*The City Council will grant planning permission for educational and ancillary uses within the campus boundary; subject to design, siting, transport and access considerations".*

1.2.10 The new masterplan aims to understand and mitigate existing issues on campus, provide a long-term vision for the future of the Campus and establish a framework for bringing forward future development.

1.2.11 As set out in the adopted Canterbury District Local Plan, Canterbury City Council (CCC) recognises that the fiscal environment for further and tertiary education is also changing rapidly, and that long-term planning may be complicated. It supports the preparation of long-term strategies for the University sites and will continue to work with the Universities to facilitate their preparation.

1.2.12 This Movement and Transport Strategy report forms one of the four key strands of the overall Framework Masterplan document and is intended to establish an appropriate balance between providing certainty whilst still allowing necessary flexibility when bringing forward growth within the campus over the longer term.

1.2.13 The Policy within the Local Plan shows a boundary for the University of Kent for which the masterplan must cover, albeit the University of Kent's landholdings extend beyond this boundary. Whilst this Movement and Transport Strategy relates to the boundary shown on the Local Plan Proposals Map, it is recognised that if an opportunity arose outside the campus boundary, this can come forward through the planning process or the boundary could be sought to be extended at the next Local Plan review.

## 1.3 The benefits of the Masterplan

1.3.1 The overarching Framework Masterplan document prepared by CMA Planning outlines a vision for the evolution of the campus that aims to bring benefits to the University, the city of Canterbury, and the wider region. Among the benefits that are intended to be realised through the masterplan are:

- Supporting the green economy strands of the Canterbury District Local Plan through the protection of the natural conservation and heritage building assets of the campus and a commitment to high environmental and sustainability standards for new buildings.

- Supporting economic growth with a focus on knowledge-based services, through the creation of new business space and support services on campus.
- Expanding Canterbury's experience economy by providing additional leisure facilities focused on culture, sport and learning, and offering new community amenities.
- Helping to grow Canterbury's visitor economy by offering 20% more capacity for overnight stays with a new hotel and conference centre.
- Relieving pressure on the city's transport system by promoting green travel options, improving pedestrian and cycle access to the campus and proposing new public transport links.
- Providing more purpose-built student accommodation on campus to help relieve pressure on the local housing market.
- Providing a home for the new Kent and Medway Medical School, which will attract aspiring doctors from within the local community and beyond, offering training and development opportunities that will help to keep that talent in Kent and Medway.

1.3.2 The overall purpose of the Masterplan is to:

- Harness the role of the University as an economic driver for the city and region and maximise its potential to nurture business and innovation.
- Establish a stronger spatial relationship with Canterbury District and with the University's Medway campus.
- Provide a once in a generation opportunity to set out a planning and decision-making tool for the University by giving spatial expression to its Estate Strategy in the short-term, a strategy up to the end of the Canterbury District Local Plan period (2031) in the medium term and a long-term vision for the campus beyond this.
- Provide CCC as Local Planning Authority with a framework for determining planning applications.
- Enable a broad mix of uses and their disposition within the heart of the campus and throughout the campus area to make the most of land and ensure that the campus is active all year.
- Maintain and strengthen the campus character of the University by establishing a clear place-making strategy – including layout, scale and massing.
- Ensure that future development respects, and where possible enhances, the setting of the site in the wider countryside, Canterbury's World Heritage Site, the Scheduled Ancient Monument, Conservation Areas, Listed and Locally-Listed buildings and the University's other heritage assets.
- Establish a Landscape and Biodiversity Strategy that ensures that the landscape character and nature conservation interests of the whole site, including Ancient Woodland, trees covered by Tree Preservation Orders and important hedgerows, and the Blean Complex are safeguarded and wherever possible enhanced;
- Establish an effective Movement and Transport Strategy that enables updates to the University Travel Plan and sets the context for detailed Transport Assessments as and when planning applications are made for elements of the Masterplan;
- Encourage healthy lifestyles and nurture well-being for staff and students

- Set out indicative phasing, overall delivery and infrastructure requirements and identifies a mechanism for monitoring progress on implementing and reviewing the masterplan;
- Provide a bridge between Policy EMP7 (see Section 4 below) and planning applications establishing an appropriate balance between providing certainty whilst still allowing necessary flexibility.

## 1.4 The role of this Movement and Transport Strategy

1.4.1 To support the objectives of the masterplan outlined above, the Movement and Transport Strategy incorporates its own specific principles which follow through into the modal strategies set out in the remainder of this document:

- Improve connectivity between the University, the City and the surrounding district through enhanced physical links and improved route legibility for sustainable modes.
- Enhance the accessibility of the main campus.
- Improve the quality and safety of the transport infrastructure related to the University.
- Promote a stronger connection between the campus and Canterbury West Station and support and promote a new northern entrance to Canterbury West Station in the long-term.
- Improve the sustainable mode accessibility of the campus for visitors.
- Reduce the demand for highway capacity and for centralised parking by building upon the successes of the existing Travel Plan and maintaining the number of University car park spaces at approximately 2018 levels.
- Provide a framework for bring forward future planning applications.

1.4.2 This report sets out the modal strategies which have been worked up collaboratively alongside CCC and KCC and underpin the masterplan from a transport and movement perspective. It also sets out how the transport impacts associated with growth at the University will be managed, allowing the masterplan to be sufficiently flexible to respond to longer term change in both the transport and education sectors.

## 1.5 Report Structure

1.5.1 The remainder of this document is structured as follows:

- Section 2: Existing Movement and Transport Context - Sets out the existing transport context at the University and outlines identified barriers to sustainable transport use according to staff and student surveys.
- Section 3: Growth Ambitions - Sets out the University's aspirations for growth in headline terms.
- Section 4: Modal Strategy – Walking & Cycling – sets out the walking and cycling strategy to support growth of the campus.
- Section 5: Modal Strategy – Public Transport – sets out the public transport strategy to support growth of the campus.
- Section 6: Modal Strategy – Vehicular – sets out the vehicular strategy (including parking) to support the growth of the campus.

- Section 7: Managing Highways Impacts - Sets out the strategy for managing the highways impacts arising from growth coming forward within the Masterplan.
- Section 8: Supporting Management Plans – sets out the management strategies which support the modal strategies within the Movement and Transport strategy.
- Section 9: Summary of Measures – provides a summary of measures within the Movement and Transport Strategy.
- Section 10: Summary

# 2 Existing Movement and Transport Context

## 2.1 Introduction

2.1.1 This section provides a brief overview of the Campus and how it operates as well as a summary of recent data collection exercises. The section identifies the key issues that the masterplan is to address in terms of movement and transport.

## 2.2 Strategic Overview of Campus

### Canterbury Campus Location

2.2.1 Canterbury Campus is located 1.5km north of Canterbury City Centre and is loosely bordered by Canterbury Hill / St Stephens Hill to the east, agricultural land to the north, the A920 (St Thomas's Hill / Whitstable Road) to the west and the city of Canterbury to the south.

2.2.2 The location of the Campus is indicated on Figure 2.1.

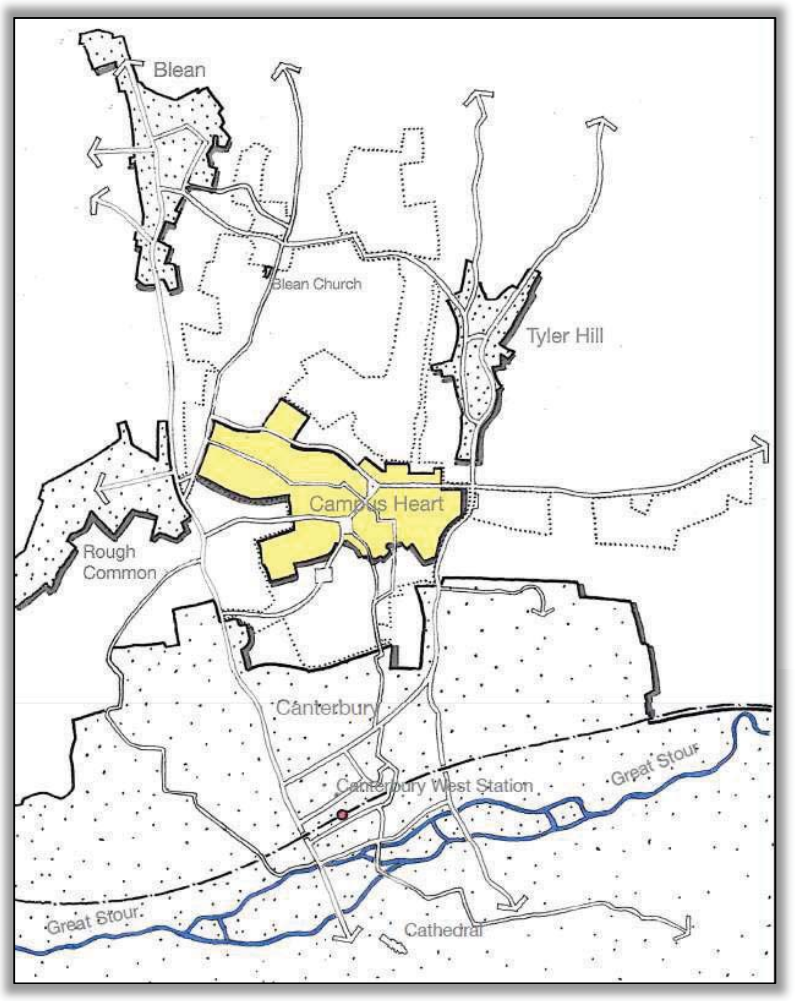



Figure 2.1 | Location Plan – University of Kent Campus

### Student and Staff Numbers

2.2.3 The 2016 student headcount for the Canterbury Campus was:

- Full time – 15,325
- Part time – 3,190

2.2.4 The 2016 staff headcount for the Canterbury Campus was:

- Full time – 2,156
- Part time – 3,190

### Visitors

2.2.5 The Campus provides academic, retail, hospitality and sport facilities which attracts many visitors to the Campus. All visitors to the Campus are encouraged to use public transport where possible as parking spaces on Campus are limited.

2.2.6 No information is available within the existing University of Kent Travel Plan regarding the number of visitors to the Campus in a typical year.

2.2.7 Visitors who decide to drive to the Campus can park in any of the five existing pay & display car parks. The parking rules and regulations for visitors are as follows:

- Parking is free outside of 8am to 5pm on Monday to Friday. Parking is also free on Saturday and Sunday;
- Parking costs £3 for up to 3 hours and £5 or £6 for the whole day depending on the car park;
- Government Blue Badge Holders are permitted to park for free at any time within any marked bay when displaying their blue badge;
- Associates to the University who come to campus 4+ times per month or 24+ times per year can purchase a permit to park which is valid for the pink and blue zones. Pink zone permits cost £30/ academic year (pro rata) or £4/month or 50p/day. Blue zone permits cost £20/ academic year (pro rata) or £4/month or 50p/day.
- University business visitors and visitors attending an event or conference are entitled to free parking.

2.2.8 On open days for the University, specific traffic management measures are implemented across the Campus to accommodate the large number of visitors during these periods.

### Servicing and Deliveries

2.2.9 Data from a traffic survey conducted by Hamilton Ballie Associates (2018) identified that light good vans made up between 5-7% of the traffic flow on the Campus. Larger heavy goods vehicles form a very small proportion of the overall Campus traffic flows. Most of these vehicles enter and exit the Campus via University Road and Giles Lane East due to the narrow width of Giles Lane West.

2.2.10 Due to the way the campus has evolved and grown over the years since the 1960s, the design of the buildings to accommodate servicing and deliveries is inconsistent and often not

provided at "back of house" locations. The areas around the older buildings within the campus are dominated by cars and large areas of car parking.

2.2.11 It is understood that although the University Postal service and logistics team have a delivery and collection schedule for incoming and outgoing internal post or furniture collection, there is no site-wide delivery and servicing plan in place for all other services that Schools, Departments and Students have requested on campus.

## 2.3 On- and off-site Trip Generators

### On-Campus

2.3.1 Understanding where the key trip generators are within the Campus and beyond are key to building a picture of important movement corridors both within the Campus and off-site. The key traffic generators on Campus are as follows:

- Academic space (49,000sqm) – this is generally focused around the Giles Lane (east) area.
- Student Union – this is around the Giles Lane (east) / University Road area.
- Indoor (7,600sqm) and outdoor sports facilities – located off Parkwood Road;
- Student accommodation – the most significant clusters are off Parkwood Avenue, and University Road.
- The Gulbenkian Arts Centre (300 seat theatre and 340 seat cinema) – open to the public;
- The Canterbury Innovation Centre (3,600sqm) – located off University Road, open to the public;
- The University Medical Centre – off Giles Lane west.

2.3.2 There is also an existing children's nursery (Oak's Children's Nursery) to the west of the Campus near Whitstable Road. Observations indicate that the car parking within the University Campus is often used by parents dropping and collecting children from the Nursery.

2.3.3 Overall the heart of the teaching facilities and student facilities are to the east of the Campus. Some of the older student accommodation buildings are located here also, integrating within the Campus. There is a separate concentration of student accommodation west along Parkwood Road and on University Road. Whilst there are sports facilities provided here on the Campus, it is relatively distant from the main teaching hub to the east. This therefore creates a strong east-west movement within the campus.

2.3.4 The Campus and many of its facilities are open for public use. The Campus is busiest during the academic term time (and particularly at the beginning and end of terms). The Campus does, however, host conferences and events throughout the year and provides important tourist accommodation outside of term-time. The cultural, business and recreational facilities referred to above are also open throughout the year.

2.3.5 The key off site trip generators are the immediate residential areas that house the students and staff that study or work at the Campus. Canterbury City Centre is another major off-site trip generator. The City Centre hosts an array of amenities such as pubs, restaurants and shops. These amenities cater for the needs of the students living on Campus.

2.3.6 As many off-site generators are located to the south of the Campus, there is an important movement corridor north and south through the campus also.

2.3.7 Figure 2.2 summarises the key movement corridors within the campus based on these key locations.

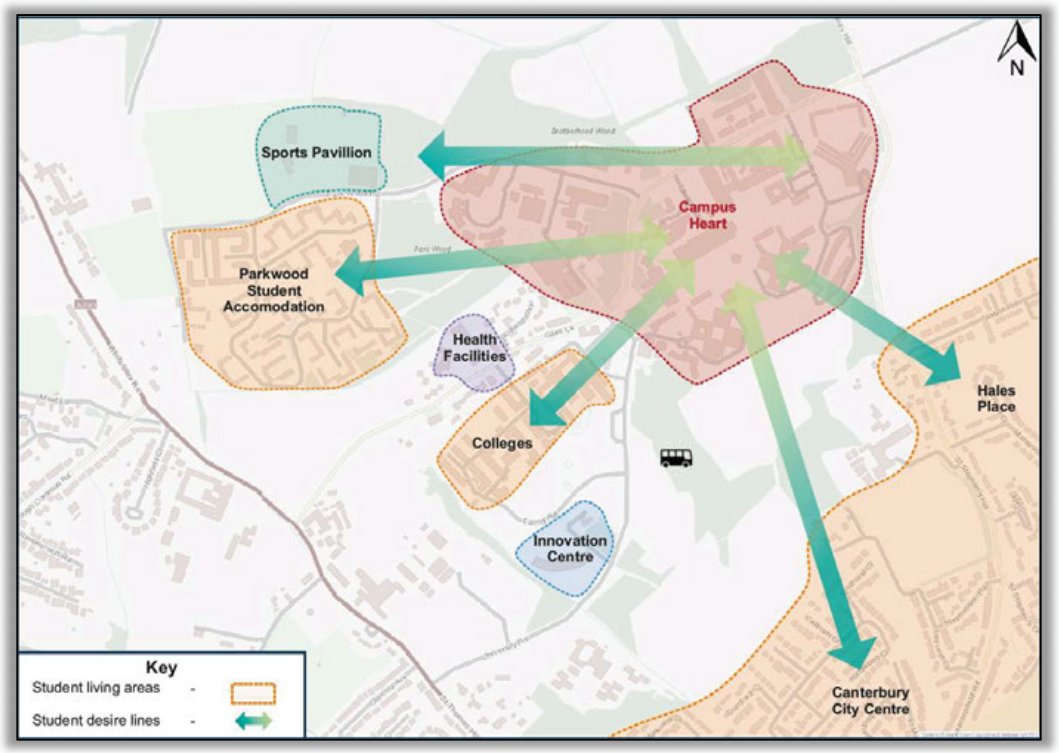



Figure 2.2 | Key Campus Movement Corridors

2.3.8 As illustrated on Figure 2.2, there is a strong campus heart to the east of the campus, but existing connectivity is currently poor between the areas of student accommodation both within and immediately off campus in Parkwood, Turing College, Keynes College, Hales Place and towards Canterbury City Centre.

2.3.9 In terms of on-site public transport connectivity, whilst there is a regular and frequent service into Canterbury City Centre and Herne Bay and Whitstable provided by Stagecoach, the main bus stop within the site is relatively distant from the campus heart. Other stops are available on Giles Lane and Parkwood Road, but few have shelters or seats to wait for a service comfortably in a relatively exposed campus when it comes to weather. Further details about the existing bus services are set out later in this report.

### Off-site Trip Generation – Staff and Student Locations

2.3.10 Postcode maps of all the student and staff studying or working at the Campus in 2016 with the journey times to the Campus by cycling, public transport and driving is included within the 2022 University of Kent Travel Plan.

2.3.11 Figure 2.3 produced by BaseMap, shows the location of staff and students in relation to public transport accessibility.

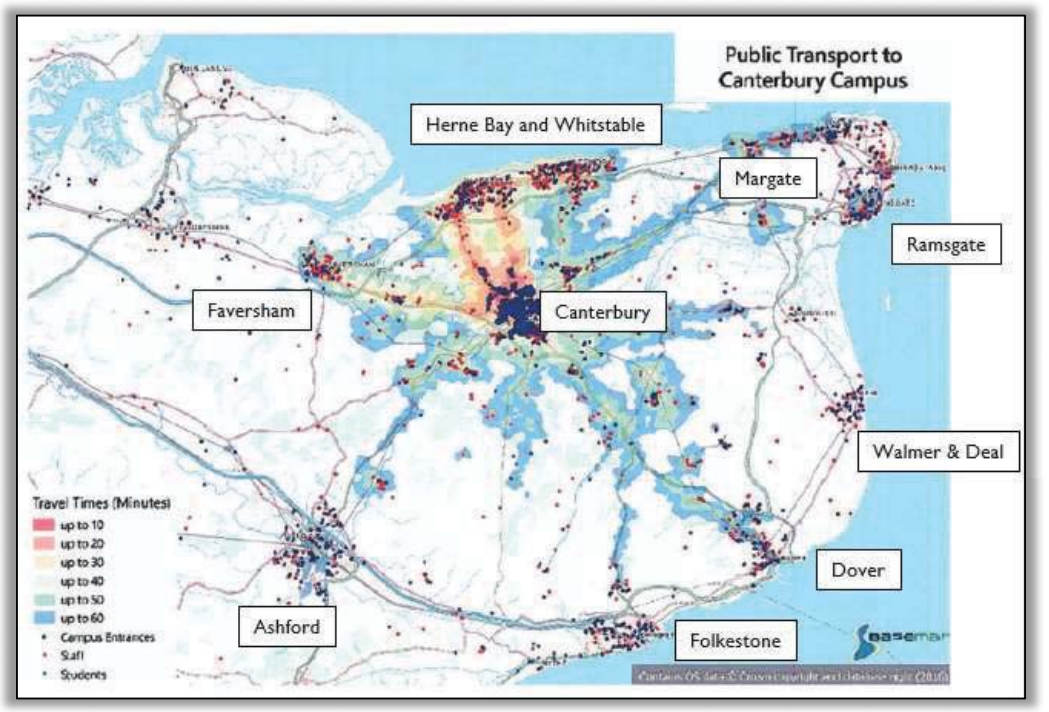



Figure 2.3 | Staff and Student Postcodes and journey time by public transport

2.3.12 The postcode map illustrates that:

- The areas with the highest concentrations of students are within Canterbury itself, Herne Bay and Whitstable. There are pockets of students in Folkestone, Dover, Margate, Ramsgate, Ashford and Ramsgate but these are at a much lower density and fairly spread, rather than in compact concentrations easily served by public transport. Concentrations of students are lowest towards the west of the County.

- The areas with the highest concentrations of staff postcodes are to the north of Canterbury in Herne Bay and Whitstable as well as some within the city itself. Staff are generally more dispersed across the rural parts of the County than students, with relatively fewer areas with distinct pockets of staff. Faversham to the west and Broadstairs to the north-east are the main two pockets of staff after Herne Bay and Whitstable.

2.3.13 It is estimated that up to 5,400 students live on Campus.

## Key Movement Corridors

Vehicular

2.3.14 The key vehicular movement corridors within the Campus are the roads of Giles Lane East, Giles Lane West, Park Wood Road and University Road. Giles Lane West and University Road are access roads off the A290 (St Thomas Hill / Whitstable Road) whilst Giles Lane East is an access road off the Giles Lane / St Canterbury Hill / St Stephens Hill roundabout.

2.3.15 Giles Lane West provides access to St Edmunds School before connecting to the Giles Lane / Park Wood Road roundabout. University Road is a private road which provides access to the Canterbury Innovation Centre, Turing College, Keynes College and the main university bus stop before connecting to Giles Lane West. Giles Lane East provides access to the Giles Lane Car Park and the Gulbenkian Theatre before connecting to the Giles Lane / Park Wood Road roundabout. Park Wood Road connects The Pavilion, student accommodations and The Oaks Day nursery located to the west. Parkwood Road and University Road are the responsibility of the University whereas Giles Lane is an adopted road so the responsibility of Kent County Council to maintain.

2.3.16 The roads within the Campus allows traffic to move through the Campus between the A290 Whitstable Road and St Canterbury Hill / St Stephens Hill. The access roads are therefore currently being utilised as an east-west corridor by through traffic.

2.3.17 The A290 and St Canterbury Hill / St Stephens Hill are the arterial routes into Canterbury City Centre from the north. The roads are therefore key in facilitating north-south movement for the City itself.

2.3.18 There are currently approximately 70 car parks spread across the University Campus which result in circulating traffic within the campus as cars search for car park spaces. Further details about existing car parks are set out later in this report.

2.3.19 On Tuesday 16th October 2018, turning counts were undertaken at the access points to the University during term time, i.e. Giles Lane East, Giles Lane West and University Road. Automatic Number Plate Recognition (ANPR) surveys were undertaken to allow trips associated with the University to be separated from general through-movements at the Campus.

2.3.20 Figure 2.4 illustrates the main routes taken by vehicles to access the campus during the morning peak hour and the proportionate usage of the three University accesses. This excludes for any through traffic.

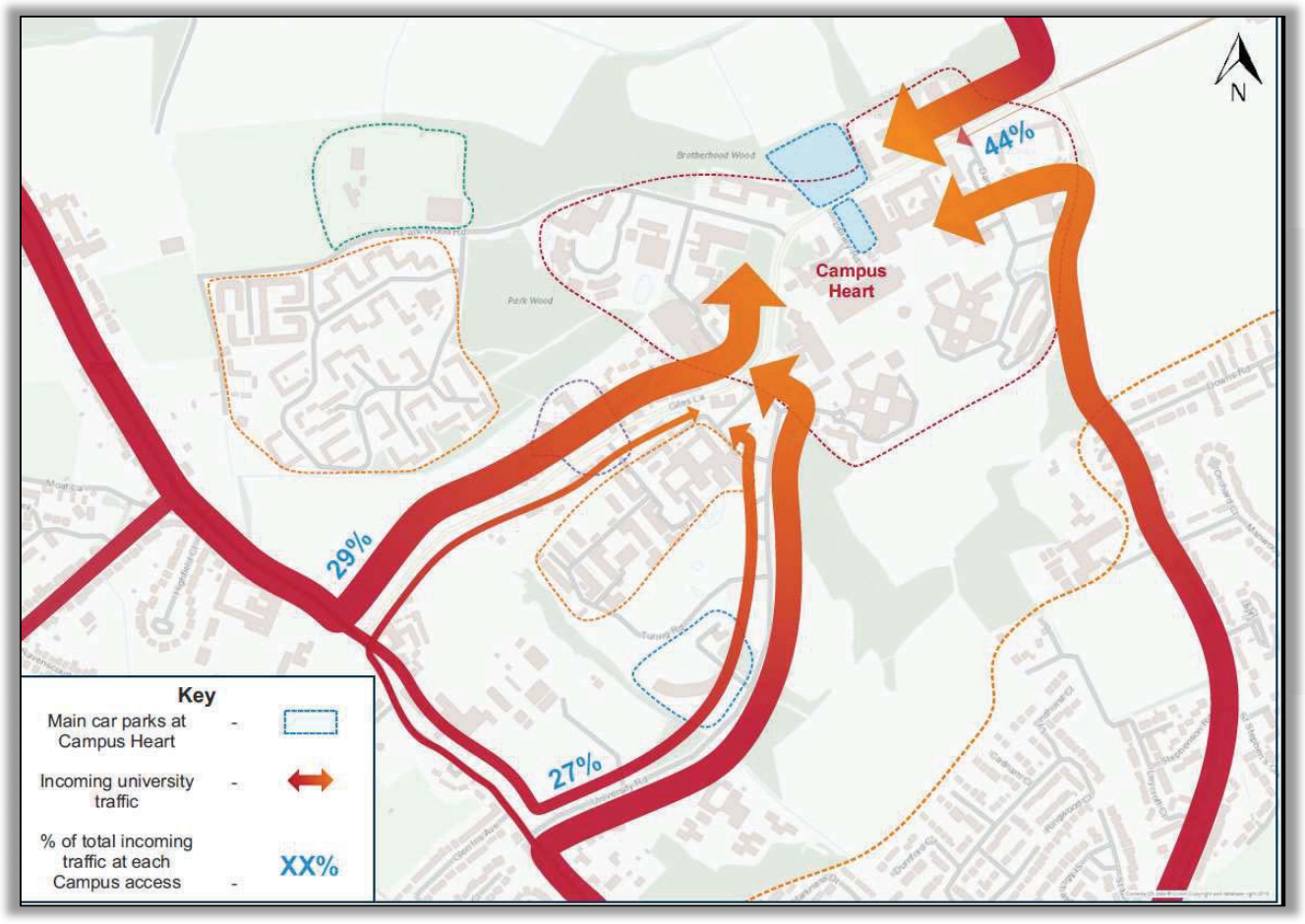



Figure 2.4 | Incoming vehicle trips to the University – Tuesday 16th October 2018 – AM Peak Hour (0800 – 0900) (Excludes through traffic)

2.3.21 Figure 2.4 indicates a relatively even balance between trips entering from the west of the campus via Giles Lane west and University Road (56%) and from the east of the campus via Giles Lane East (44%). Further analysis of the arrivals indicates that there is also a relatively even balance between trips entering the campus from destinations to the north of Canterbury (54%) and south (46%).

2.3.22 The Giles Lane East access is the most used access of all three accesses as it is the only access from the east.

2.3.23 The results of the PBA ANPR survey identified that

- 10% of incoming traffic in the AM peak is through traffic.
- 32% of outgoing traffic in the AM peak is through traffic.
- 23% of incoming traffic in the PM peak is through traffic.
- 10% of outgoing traffic in the PM peak is through traffic.

2.3.24 The most used road within the University for through-traffic is Giles Lane.

2.3.25 An assessment of through traffic was undertaken by Hamilton Baillie Associates in May 2017 the results of which are contained in Appendix A. The survey was conducted between 07:30 – 09:30 and 16:30 – 18:30. Cameras were mounted on masts at the main entry points to the Campus. The cameras identified any vehicles entering or leaving the Campus. The cameras also recorded the registration plate of the vehicles entering and exiting the Campus. This allowed the vehicle passing time through the Campus to be identified. Any vehicle that enters and exits via different points within a 10 minute interval was assumed to be through traffic.

2.3.26 The traffic survey indicated that over the longer AM and PM peak periods (rather than peak hours), through traffic makes up a larger proportion of trips with 17% of the morning peak traffic and 43% of the evening peak traffic being through traffic. The through traffic was found to be relatively evenly distributed between University Road and Giles Lane. There were also no significant differences in the direction of the through traffic flow i.e. east or west.

2.3.27 The reasons for this through traffic is not known, albeit there is a limited movement junction on the A2 to the west of Canterbury. Southbound traffic is unable to exit at Wincheap to use the A28 towards Sturry. Drivers therefore must exit a junction earlier and use alternative routes to access Sturry, for example the A2050 and the Rough Common Road. There is no outer ring road around the north of Canterbury so it is possible that drivers are using this as a through route, particularly those travelling between north Canterbury, Herne Bay, Sturry and the A2.

2.3.28 Given the role of Giles Lane for through traffic and given that it is an adopted highway, careful consideration has been given to how this road will continue to function within the Masterplan. Its role as a through route and as an access to the University are an important consideration.

Walking and Cycling

2.3.29 As illustrated on the desire lines plan earlier in this section, the key corridors for movement for walking and cycling are:

- East to west between the Park Wood Road accommodation and the campus heart.
- South-west to north-east between Turing and Keynes College and the campus heart.
- South and south-east to north between Canterbury City Centre, Hales Place and the campus heart.

2.3.30 The main walking and cycling route into the campus from the City arrives within the Campus at the rear of Eliot College, in a car park. This is one of a few examples through the campus where the design of servicing to a building inadvertently increases the risk of conflict between pedestrians and cyclists and large goods vehicles.

2.3.31 This is also the case for cycle parking. Parking for cyclists is provided for in different ways across the campus, in large plastic shelters, brick shelters and in lockable sheds. The quality of these facilities varies and often the cycle parking is not provided close to the front of buildings, meaning they are not overlooked and more susceptible to security problems.

2.3.32 Existing permeability and connectivity for pedestrians and cyclists could be improved, both for connections from the Campus to the south in the City itself, as well as improved connectivity within the Campus along the desire lines mentioned above.

2.3.33 The campus benefits from an extensive network of public rights of way immediately surrounding the campus but the majority of these are focused towards recreational use. These offer connections between the Campus and Tyler Hill as well as Blean. There are public rights of way that connect the two settlements of Tyler Hill and Blean.

2.3.34 There are footways available on the Whitstable Road and St Stephen's Hill which link the Campus with Canterbury City, but there is no segregated provision for cyclists.

2.3.35 National Cycle Route 1 (NCR1) runs through the Campus, facilitating north-south movement for pedestrians and cyclists to and from the Campus. NCR1 runs through the Campus from Whitstable to the north (via Crab and Winkle Way) and Canterbury City Centre to the south (via Parkwood Road, University Road, St Michaels Road and Lyndhurst Close).

2.3.36 Generally, whilst walking and cycling are popular modes of travel within the University Campus, the networks lack a clear hierarchy. Signage is inconsistent. Footways adjacent carriageways in the Campus are discontinuous and the vehicle generally dominates the street environment, particularly along University Road.

## 2.4 University Travel – Existing Staff / Student Views

2.4.1 As part of the University of Kent Travel Plan, questionnaires are undertaken of staff and student to understand current attitudes towards travel. Some of the key observations from staff and students regarding travel were:

- More storage places are required for cycles closer to the University buildings and that more staff showers are needed for those that cycle.
- More cycle lanes were welcomed, as well as better lighting and maintenance of the existing paths.
- The bus services at the campus were generally considered reliable, but it would be helpful to have more information available at the stops.
- Staff and students generally felt that the frequency of bus services in the evenings and weekends particularly to Hales Place (an off-site student residential area in Canterbury) was poor and concerns were expressed by staff that peak hour morning services were full by the time they wished to board.
- Staff were particularly unhappy with the timetabling of buses in relation to the end of the lectures, meaning they had to wait longer than they would like for a bus.
- Bus services that covered more areas east of Canterbury and the Park and Ride sites were welcomed.

- Over 40% of staff surveyed didn't use their personal car for work business after arriving at the Campus.
- The existing University shuttle service to University of Kent Medway Campus is generally well used.

## 2.5 Summary of Campus Issues

2.5.1 Figure 2.5 provides a summary of the current challenges for movement and transport within the University of Kent.

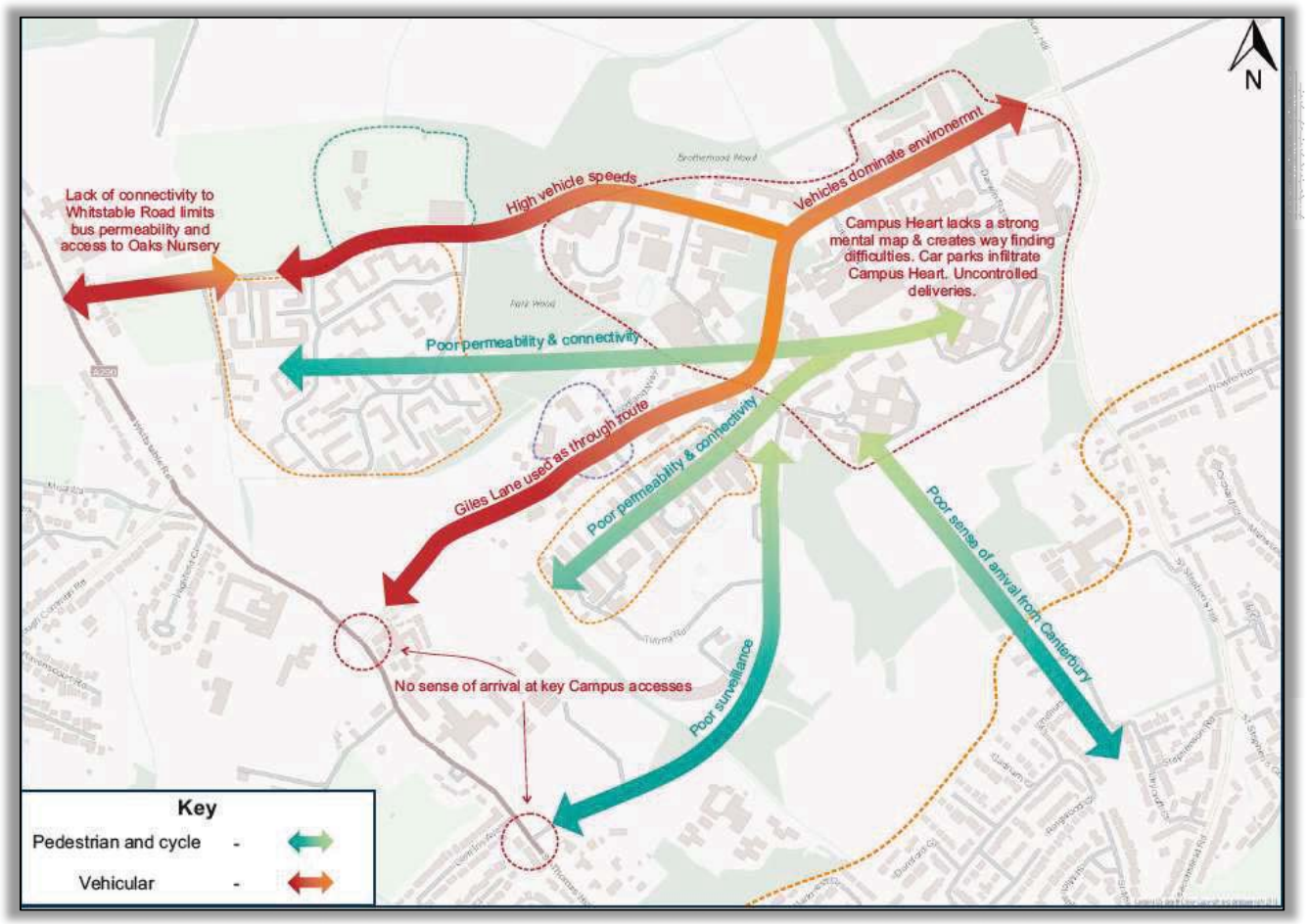



Figure 2.5 | Summary of existing Movement and Transport Challenges.

# 3 Growth Ambitions

## 3.1 Introduction

3.1.1 Based on the review of the operation of the existing campus in transport terms, over the period of growth of the University more recently, the Travel Plan has worked successfully at promoting sustainable modes amongst staff and students, playing a significant role in limiting the traffic impact associated with the University growth over this period.

3.1.2 For example, between 2006 and 2016 staff numbers (full and part time) increased by 68% (from c3,100 to c 5,300). Yet over this same period, the number of car parking permits issued to staff has reduced by 5%. Between 2011 and 2016, student numbers increased by 7% to over 16,000 students yet during the same period, the number of student car park permits issued has reduced by 21%.

3.1.3 The Travel Plan will therefore remain a critical element of the transport strategy supporting the Masterplan.

3.1.4 This section sets out the current aspirations for growth within the University in the short term. These ambitions have the full support of the University and will come forward through the planning process in the period to 2021.

3.1.5 In the medium to longer term, the growth ambitions are not yet clear due to the rapid changes that can occur in terms of funding in the further and higher education sectors. Some aspirations are identified later in this section for the medium to longer term, but these are subject to change for this reason.

3.1.6 As a result of this uncertainty within the sector, it is essential that the Masterplan and its supporting strategies are flexible to respond to this ever-changing environment.

## 3.2 The Capital Programme (Short-term 2018 to 2021)

3.2.1 The University is currently within a period of consolidation, characterised by limited growth in academic facilities and student accommodation, refurbishment or improvement of current buildings, and re-organisation and rationalisation of car parking across the Campus.

3.2.2 The University's approved Capital Programme will see the development of around 12,000sqm of academic and administrative floorspace, representing an investment in excess of £100m. This period of investment will include the development of major projects such as a new student social and study facility (completed August 2018) a new Economics Building (work underway on site and due for completion April 2019), a Science Student Hub building (complete May 2019), a new Kent and Medway Medical School Building (complete September 2020), a Life Sciences Building (complete May 2021), plus an additional floor to the Jennison Workshop.

3.2.3 In 2020 the University will be hosting the Lambeth Conference (an assembly of bishops of the Anglican Communion convened by the Archbishop of Canterbury that takes place every 10 years) and in preparation for this, the tennis court enclosures will be upgraded to provide a facility for this conference as well as making it suitable to become a major exhibition conference facility for the East Kent region.

3.2.4 In addition, the University is working with Kent Enterprise Trust and others over the creation of a community garden in the west of the Campus, in the former kitchen garden of Hothe Court Farmhouse (near Rough Common).

3.2.5 A summary of the short-term building projects within the capital programme is provided in Table 3.1. In bringing these projects forward, they will also include proposals that support the

wider aims of the University to consolidate car parking within the campus, provide improved connectivity for pedestrians and cyclists, landscaping, planting of woodland and conservation of existing sensitive areas.

Table 3.1 | University of Kent – Capital Projects (2018 – 2021)

| Project | Anticipated Timing |
|---|---|
| Student social and study facility | Complete |
| Creation of a Community Garden | Underway currently |
| Economics Building | Underway (complete April 2019) |
| Science Student Hub building | Underway (complete May 2019) |
| Upgrade and extension to the tennis court enclosures | July 2020 |
| Kent and Medway Medical School building | September 2020 |
| Life Sciences Building | May 2021 |
| Extension to the Jennison workshop | September 2020 |
| Car parking, pedestrian and cycle route, landscaping/woodland planting upgrades/improvements | Various |

3.2.6 Based on the types of projects set out in Table 3.1, it is likely that the vehicular impacts associated with these projects could continue to be mitigated by creating the necessary headroom on the road network through the continued promotion of alternative modes of travel as part of the continuing success of the University of Kent Masterplan. Where applicable, specific sustainable mode infrastructure would come forward as part of these proposals as well as necessary consolidation of car parking where appropriate.

## 3.3 Medium (2021 – 2031) and Long Term (Beyond 2031)

3.3.1 Whilst this section sets out some of the medium and longer-term aspirations of the University, due to the rapid changes that can occur in the sector, the scope and timing of these commitments is likely to continue to evolve and change. New schemes will undoubtedly come forward that have not been considered to date, existing schemes may accelerate or slow down depending on the market conditions.

3.3.2 Clearly, given the many social, economic and political factors that impact Higher Education, the degree of certainty of development decreases over time and the University of Kent (UoK) has therefore not identified any projects beyond 2031.

3.3.3 Given the likelihood of change in the medium to long term, the Masterplan seeks to provide a flexible framework, so that the UoK can take advantage of development opportunities as they arise.

3.3.4 Outside the immediate capital projects, the University wishes to develop a conference centre and hotel which could have a major positive impact on the local economy and augment the already significant contribution the University makes to providing visitor accommodation outside of term-time.

3.3.5 The University is considering a possible partnership with KCC Education and Blean Primary School to re-provide Blean Primary School with possible additional housing served by a new access from Whitstable Road. It is also considering the provision of up to a further 2000 student bed spaces to provide overseas students with a three-year guarantee of a student accommodation during the whole of their course.

3.3.6 The University has allocated £6.5m for additional innovation facilities reflecting the aspirations for additional employment growth at the on-site innovation centre set out within Policy EMP1 of the adopted Canterbury District Local Plan. This could help deliver a Canterbury Innovation Centre Phase II, or alternative business space to help business start-ups. It also hopes to develop new student services and Kent Union buildings, deliver new teaching and academic buildings, provide additional leisure and sports facilities (including a swimming pool) and provide additional student bed spaces.

It will be necessary for these medium- and longer-term projects to continue to contribute to the wider objectives of the University to consolidate and improve the management of car parking within the campus, alongside other infrastructure and landscaping, place-making and biodiversity objectives.

3.2.5 A summary of the aspirations beyond the immediate short term is provided in Table 3.2.

Table 3.2 | University of Kent – Project Aspirations

| Project Description |
|---|
| Development of new student services and Kent Union buildings near Keynes College |
| New teaching and academic buildings |
| Innovation facilities and business space |
| Additional leisure and sports facilities, including a swimming pool |
| Additional 2,000 student bed spaces |
| Possible development of a conference centre and hotel |
| Possible re-provision of Blean Primary School, to include improved car parking and up to 30 additional homes |
| Possible new road, cycle and pedestrian link between Whitstable Road and Park Wood Road |
| new bus-only link between Whitstable Road and Park Wood Road |
| Improvements to footpaths and cycle routes |

## 3.4 Conclusions

3.4.1 The University of Kent aspires both in the short term and beyond to enhance and develop its offer, both in terms of enhanced academic and teaching facilities, but also bringing forward development that can provide significant benefit to the local economy through additional jobs and diversification of the job offer in the City.

3.4.2 The University of Kent Travel Plan has played a significant role in facilitating growth over the recent past, shifting staff and student travel towards sustainable modes thus creating the headroom for growth. The Travel Plan will continue to play an important role in facilitating growth in the longer term and will be integral to realising the growth aspirations of the masterplan.

3.4.3 The following sections of this report set out the modal strategies that support the masterplan, the main objective of these being to facilitate the growth aspirations of the University alongside the Travel Plan.

# 4 Modal Strategy – Walking and Cycling

## 4.1 Introduction

4.1.1 This section sets out the walking and cycling strategy both to support the short-term capital projects identified at the University, as well as the medium to longer term strategy for growth beyond this.

4.1.2 It is anticipated that as the capital project programme is reviewed, and new building projects come to light, the measures proposed within the applications to support these new projects should refer to the walking and cycling measures set out within this Movement and Transport Strategy document so that the objectives of the Masterplan are realised.

4.1.3 The timing of the medium and longer-term walking and cycling measures will need to relate to the type and timing of projects that they support. For example, for schemes anticipated to have significant additional trip generation associated with them, the sustainable infrastructure package required to support these will be more extensive than those which are not anticipated to generate additional car trips.

4.1.4 Further details about how the masterplan provides a framework for bringing forward future planning applications is set out in Section 7 of this report.

## 4.2 Existing Usage

4.2.1 The campus is interspersed with walking routes. Connectivity for pedestrians between key destinations within the campus is provided through a mix of route types including:

- Footways alongside the main carriageways
- Paved footpaths away from the carriageways
- Green walking routes with no surfacing

4.2.2 Many footways within the campus are provided on one side of the carriageway only, except for Giles Lane within the central heart of the campus. As the distance from the central heart of the campus increases, the continuity of footways decreases. This can be seen on University Road, Parkwood Road and to the west on Giles Lane where the footway reduces to only having footways on one side of the carriageway.

4.2.3 During visits to the site, it was observed that the grass verges alongside the carriageways were often well worn, suggesting there is a regular demand for pedestrians to use routes where there are currently no paved surfaces.

4.2.4 It was observed that the off-carriageway footpaths were well used by pedestrians, although wayfinding was difficult without any clear hierarchy of routes through the campus. Signage within the campus was generally unclear, with destinations included on some signage and not on others.

4.2.5 In terms of provision for cyclists, except for the shared footway cycle path on Giles Lane in the central part of the campus and the shared route leading down into the northern boundary of the edge of Canterbury, the routes within the campus for cyclists are unclear. During visits to the site, cyclists were observed using the off-road footpaths which can be very narrow in places, plus cyclists were also observed travelling directly across the green spaces or in the grass verges.

4.2.6 In terms of cycle parking, the quality and age of the provision varies across the campus. Locked wooden sheds are provided outside much of the modern accommodation, with larger higher volume plastic shelters provided near the larger buildings and bricked shelters provided within the Park Wood accommodation. Generally, the location of the cycle parking relative to the main building is reflective of the age of the campus, being at the back of the buildings, rather than in prime location outside the front, offering priority over other modes.

4.2.7 There are no dock-based bike hire hubs within the campus currently, although the University operates a successful hire scheme for older abandoned bicycles as well as regular Dr Bike sessions and an active bicycle user group. However, one of the measures within the 2022 Travel Plan for the University is to explore for the provision of a bike hire scheme across the campus and it is understood from the University work is underway to understand the requirements for such a scheme.

4.2.8 Figure 4.1 provides an overview of the principal walking routes surrounding the campus. Figure 4.2 provides an overview of the principal cycle routes surrounding the campus, specifically National Cycle Route 1.

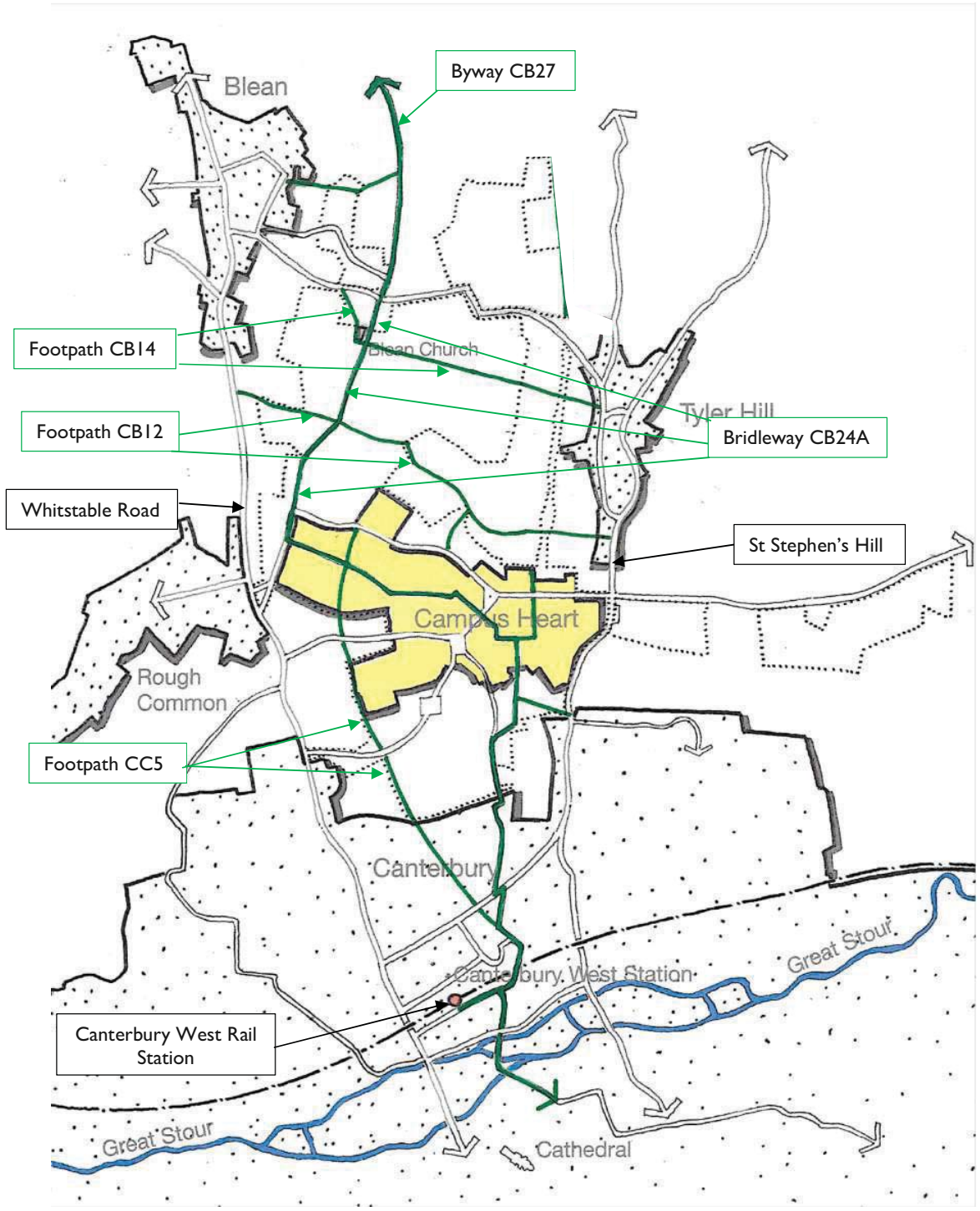



Figure 4.1 | Principal existing walking routes

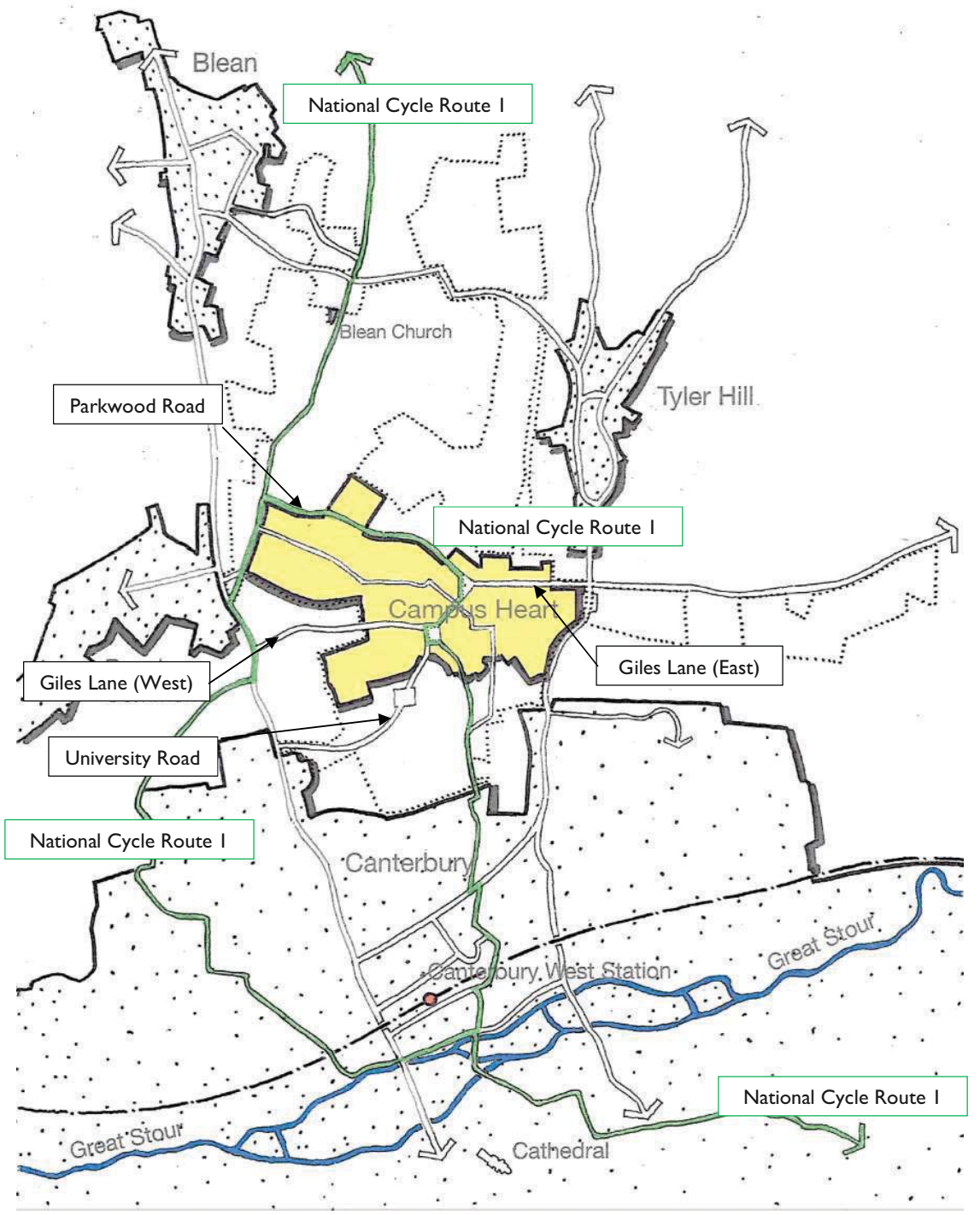



Figure 4.2 | Principal existing cycle routes

4.2.9 The key desire lines are repeated in Figure 4.3 below.

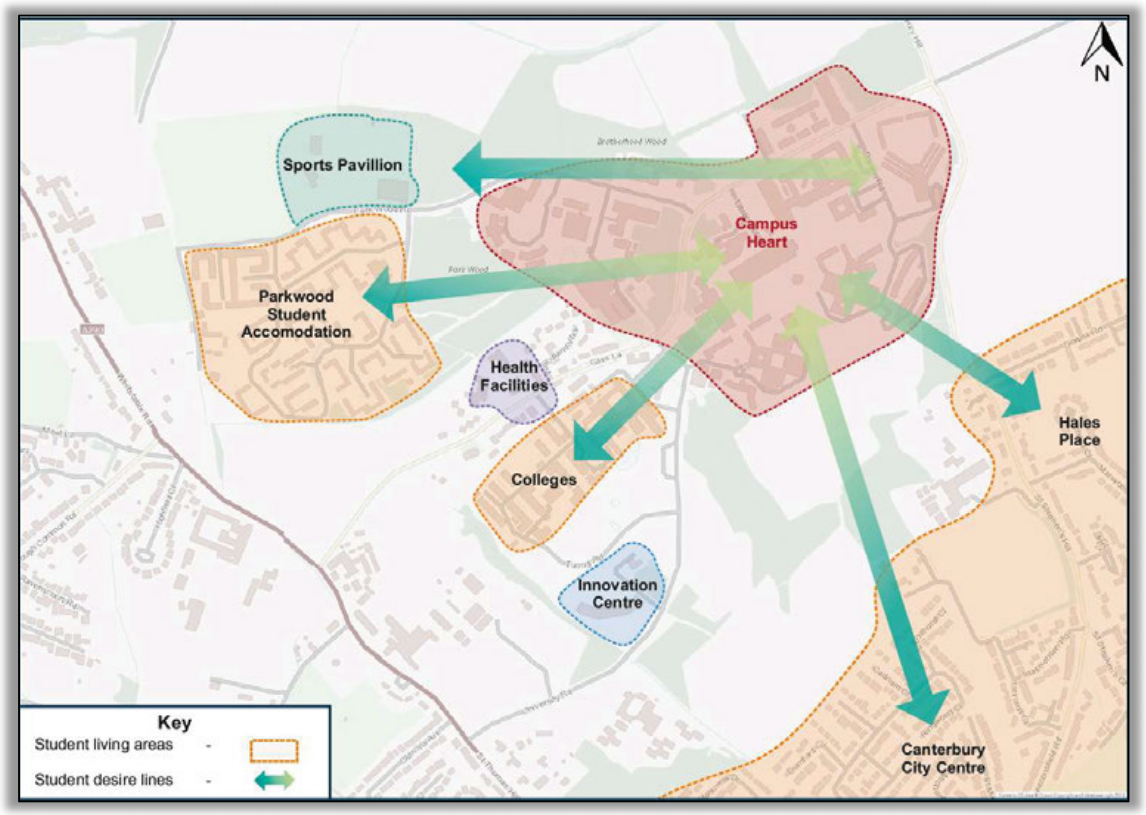



Figure 4.3 | Key Desire Lines

4.2.10 Overall in terms of walking and cycling, the key observations are:

- There are very few dedicated cycle lanes or cycle paths within the Campus or off-site.
- National Cycle Route 1 isn't very prominent within the Campus.
- It is generally unclear within the campus which paths and routes can and can't be used by cyclists, introducing the potential for conflict.
- Whilst staff and students come to know the campus well over time, wayfinding is poor for visitors and those new to the Campus and there is no clear hierarchy of routes or consistent signage.
- Park Wood, Turing College and Keynes College feel relatively disconnected from the heart of the Campus. As predominantly residential areas, the areas do not offer destinations of activities that would offer better surveillance of routes across the Campus.
- Cycle parking varies in quality and in its location relative to the building, potentially increasing conflicts with vehicles.

## 4.3 Short term strategy

4.3.1 The measures set out in this section are aimed at supporting the immediate short-term capital projects programme at the University.

4.3.2 As each application comes forward within the capital programme, the proposals within the application will consider how to best promote sustainable travel to and from the new building. This will include consideration of the following:

- a review of the quality of existing walking and cycling routes and crossing points to and from the new building / proposal;
- identification of potential improvements to the quality of the existing route infrastructure for both cyclists and pedestrians, e.g. surfacing, signage, path widths, crossing points.
- Identification of new infrastructure where beneficial, for example new crossing points, new routes. A few suggestions for on- and off-site improvements to cycle paths were received as part of the public consultation process which will also be reviewed as part of this.
- A review of the adequacy of existing cycle provision and identify improvements to the quality, location and volume of cycle parking in accordance with anticipated demand.
- A review of the existing car parking arrangements and consideration of measures to be implemented to help contribute to overall car parking consolidation across the University.

4.3.3 Any new infrastructure provision as part of these capital projects will be consistent with the overall Masterplan objectives and deliver Masterplan infrastructure where feasible, although the measures for these short-term projects will be directly related in the first instance to the proposals coming forward. The requirements for medium and longer-term growth ambitions are set out later in this section.

4.3.4 In addition to the measures above, the University of Kent Travel Plan includes a commitment and list of supporting measures aimed at promoting more sustainable modes of travel most of which will be implemented over the period to 2022 subject to funding.

4.3.5 The measures currently set out in the University Travel Plan for walking and cycling are summarised in Table 4.1. The implementation of these measures will be led by the University and it is expected that individual proposals coming forward within the capital programme to contribute towards these.

Table 4.1 | University of Kent Travel Plan (2022) – Walking and Cycling Measures (to 2022)

| Proposed Project | Progress<br>Green: Complete<br>Amber: Underway<br>Red: Not yet commenced |
|---|---|
| Update pedestrian wayfinding maps for the Canterbury Campus | |
| To provide an online application to access lockable cycles. Also, to record bikes being used on campus | |
| Review street-lighting along walking and cycling routes on campus to establish if/where improvements are needed and implement during the TP period to 2025 subject to funding. | |

| Proposed Project | Progress<br>Green: Complete<br>Amber: Underway<br>Red: Not yet commenced |
|---|---|
| Review walking and cycling accessibility routes and wayfinding across the campus and produce a report which identifies any concerns and sets out a maintenance programme. | |
| Work with Local Authorities to establish whether the public right of way footpaths linking Giles Lane / St Stephen's Hill to Heel Lane / Mayton Lane in Broad Oak could become a cycle route. | |
| Investigate an online app / map which will assist with wayfinding around campus and implement during the TP period to 2025. | |
| Investigate the potential for a cycle hire scheme within the campus. If viable, to be implemented during the TP period to 2025 subject to funding. | |
| Develop a policy on cycle behaviour and expectation of cycle use on campus. | |
| Develop and implement a plan on how to grow the cycling community within the campus focusing on the Sports Centre Cycle Hub. | |
| Establish whether there is a need for electric bike charging points and if demand is proven, implement these subject to funding. | |
| Develop a cycle parking and cycle way strategy which demonstrates any improvements required for cycle access, bicycle parking, maintenance, the impact of abandoned bikes and bike theft. Incorporate recommendations into Travel Plan for implementation in TP period to 2025. | |
| Review current shower facilities and identify if any improvements possible. Implement on a building by building basis subject to funding. | |
| Introduce a bicycle repair stand in central locations of the campus. | |
| Continue Dr Bike service and monitor number of people using the service | Ongoing |
| Continue to support national cycle to work scheme by encouraging bike purchase through tax free salary deductions | Ongoing |

| Proposed Project | Progress<br>Green: Complete<br>Amber: Underway<br>Red: Not yet commenced |
|---|---|
| Continue to support and promote the Canterbury Campus Bicycle User Group (KUBUG) | Ongoing |
| Continue the student bike hire scheme and monitor usage | Ongoing |
| Continue the promotion and integration of walking and cycling within staff and student health and wellbeing policies, procedures and events | Ongoing |
| Continue to provide an on-campus walking taxi service | Ongoing |
| Continue to support and promote the safety app known as SafeZone | Ongoing |
| Continue with existing partnerships with local bike stores and develop new ones to offer discounts to staff and students | Ongoing |

## 4.4 Walking and Cycling Objectives within the Medium and Longer-Term Strategy

4.4.1 Based on a review of the operation of the existing campus, objectives have been set in relation to walking and cycling within the Masterplan to guide development as it comes forward through the Masterplan.

4.4.2 These objectives are:

- To create a clear and coherent hierarchy of walking and cycling routes within the Campus heart and throughout the University Estate.
- Improve the legibility and quality of walking and cycling routes within the campus.
- Improve the arrival experience for those walking and cycling to the campus and create an overall street-scape within the campus that is more balanced in its approach to provision of space for road users.
- Build upon the existing public rights of way networks, improving the quality of north-south and east-west connections towards Canterbury rail station and between existing settlements north of Canterbury.

## 4.5 Masterplan Proposals

4.5.1 As set out in Section 4.4, the strategy for walking and cycling includes the identification of improvements to existing infrastructure within the campus heart itself, but also explores opportunities to improve off-site connectivity. The timing of these measures will depend upon when different parts of the masterplan come forward and in which location. Longer term aspirations relating to wider connectivity with Sturry Road Park and Ride and a northern

entrance to Canterbury West Rail Station will continue to be promoted and pursued but are outside the control of the University to deliver.

### General Principles

4.5.2 Several general principles have been adopted within the masterplan, which are also reflected in other strategies supporting the Masterplan:

- Integration of transport with the place-making strategy to help create a clear identity for different parts of the campus, introducing improved wayfinding facilities and signage for both pedestrians and cyclists.
- Reducing the dominance of the car within the campus through effective street-design, creating “streets” within the campus rather than “roads” creating a stronger visual emphasis on the pedestrian environment.

### Walking and Cycling Measures

4.5.3 In terms of specific walking and cycling infrastructure, the following are proposed as part of the Masterplan, the suggested timing / implementation which is set out in Section 9:

- Bring the existing pedestrian and cycle route which runs towards the campus from Canterbury to emerge between Rutherford and Elliot College rather than to the car park at the rear of Elliot College. This creates a better sense of arrival for those travelling from Canterbury towards the campus. This is shown on Figure 4.4.
- Explore opportunity to provide a new pedestrian and cycle link along the line of the dismantled railway, connecting Woolf College and the Campus Heart with Tyler Hill Road as shown on Figure 4.4. Also upgrade existing footpath CB12 from a footpath to bridleway to facilitate a new east-west cycle link. Existing cycle routes are shown in green, new cycle routes are shown in red dash. These opportunities will require further work in due course to understand the potential impacts and how these would be minimised.

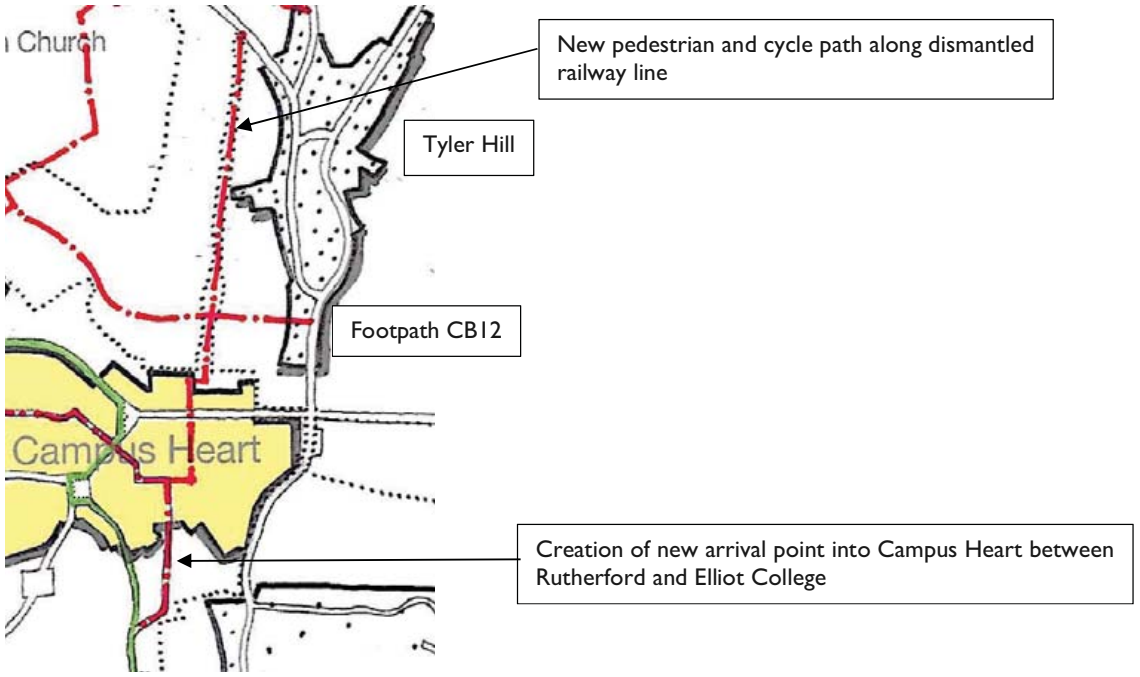


Figure 4.4 | Pedestrian and Cycle Connections – East Campus

- Provide new pedestrian and cycle paths in the northern land-holdings of the University around Tyler Hill Road, creating a new east-west cycle link between NCR1, Blean Village and Tyler Hill. These new connections are shown in red on Figure 4.5. Existing footpath connections are shown in green.

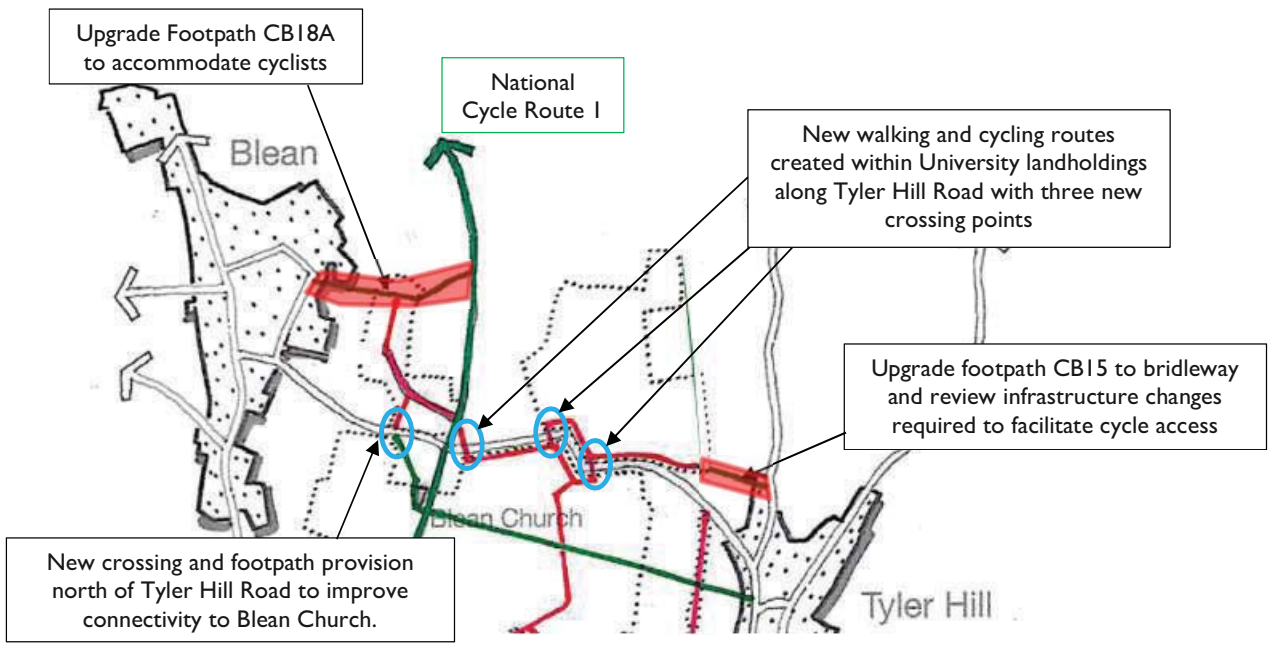



Figure 4.5 | Proposed Walking and Cycling Improvements – Tyler Hill Road

- Due to the University land-holdings in this location, three new crossings will be required at the locations indicated in Figure 4.5. The form of these crossings (uncontrolled / controlled) would be subject to discussion and agreement with the Highway Authority. To facilitate movements by cyclists as well as pedestrians, an upgrade will be required of public right of way footpath CB18A to a bridleway, as well as a review of the features along the route to ensure they are compatible for cyclists. There is an existing pinch point where the existing footpath CB18A emerges between the two properties on School Lane. It is likely that cyclists would be required to dismount at this point due to the constrained width. Some localised vegetation removal is likely to be required in the vicinity of the new crossing points to provide appropriate visibility for pedestrians and approaching drivers.

- Provide a new crossing of Tyler Hill Road at the location shown on Figure 4.5 where footpath CB14 emerges onto Tyler Hill Road where the existing signs for the church are. A new footpath connection will then be provided on the opposite side of the road within the University land holdings to link in with the upgraded footpath CB18A which connects into Blean village on the corner of Bourne Lodge Close and School Lane. This will provide a walking connection between the village and the church which is not currently possible unless pedestrians walk in the carriageway along Tyler Hill Road. The form of these crossings (uncontrolled / controlled) would be subject to discussion and agreement with the Highway Authority.

- Within the Campus heart, reinforcing the significance of National Cycle Route 1 through the University Estate. National Cycle Route 1 is to be afforded greater visual prominence through the University Campus both through signage, cycle lanes and off-carriageway infrastructure where applicable. This is shown on Figure 4.6.

- Improvements to the existing east-west spine route to better accommodate cyclists, providing an alternative off-road connection between the main campus heart and the Parkwood Road accommodation buildings. This is shown on Figure 4.6.

- Consideration of the introduction of cycle hire hubs limited to staff and visitors only. These could be electric-fed docks on the periphery of the campus, encouraging interchange between car and bicycle or bus/coach and bicycle. Students would continue to use the existing cycle hire club for standard (i.e. non-electric powered) bicycles. The potential locations of these are indicated on Figure 4.6 and link to both car parking areas and topography.

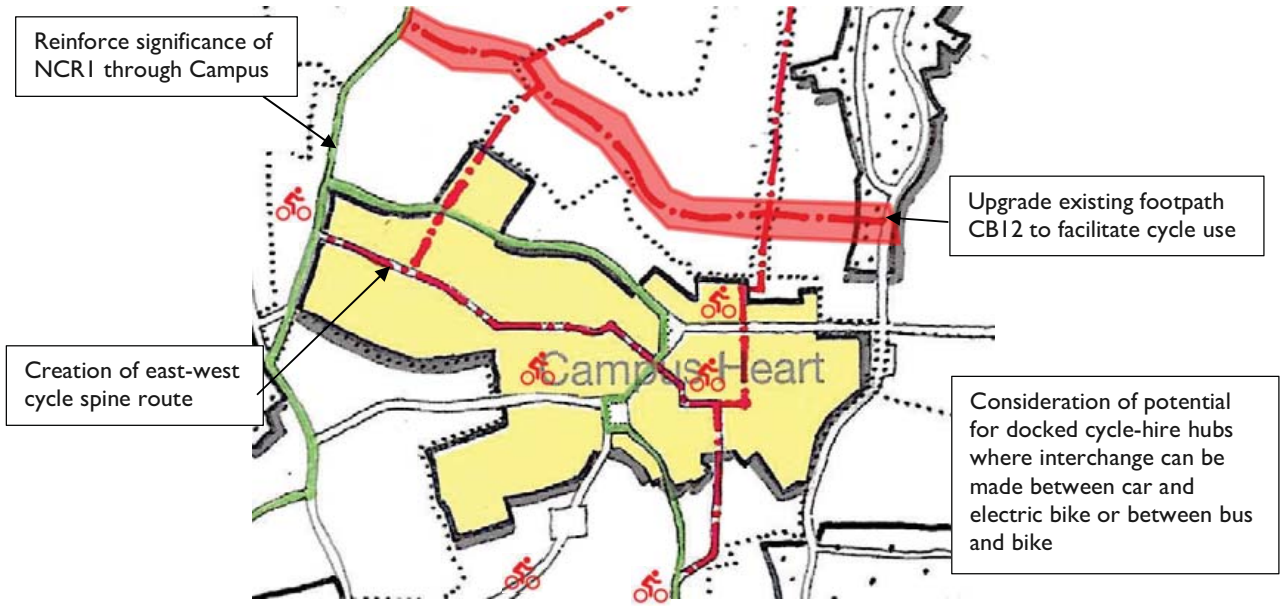



Figure 4.6 | Walking and Cycling Measures – Campus Heart

- Review the quality of existing cycle parking provision throughout the campus and focus on providing high quality, secure and sheltered facilities close to the building entrances exploring opportunities for consolidation where possible, to reduce visual clutter.

- Supporting the provision of improved linkages between the north of Canterbury and the Campus, particularly from a wayfinding and signage perspective.

## Long Term Aspirations

- Work will continue with relevant stakeholders to explore opportunities to provide new cycle connections to the existing Sturry Road Park and Ride site using existing public rights of way where possible. An illustrative route is indicated on Figure 4.7 although it is understood that other options are also being explored, for example via Broad Oak.

- Supporting and promoting the case for a northern entrance to Canterbury West station to enable more direct connections and an avoidance of the existing underpass under the railway.

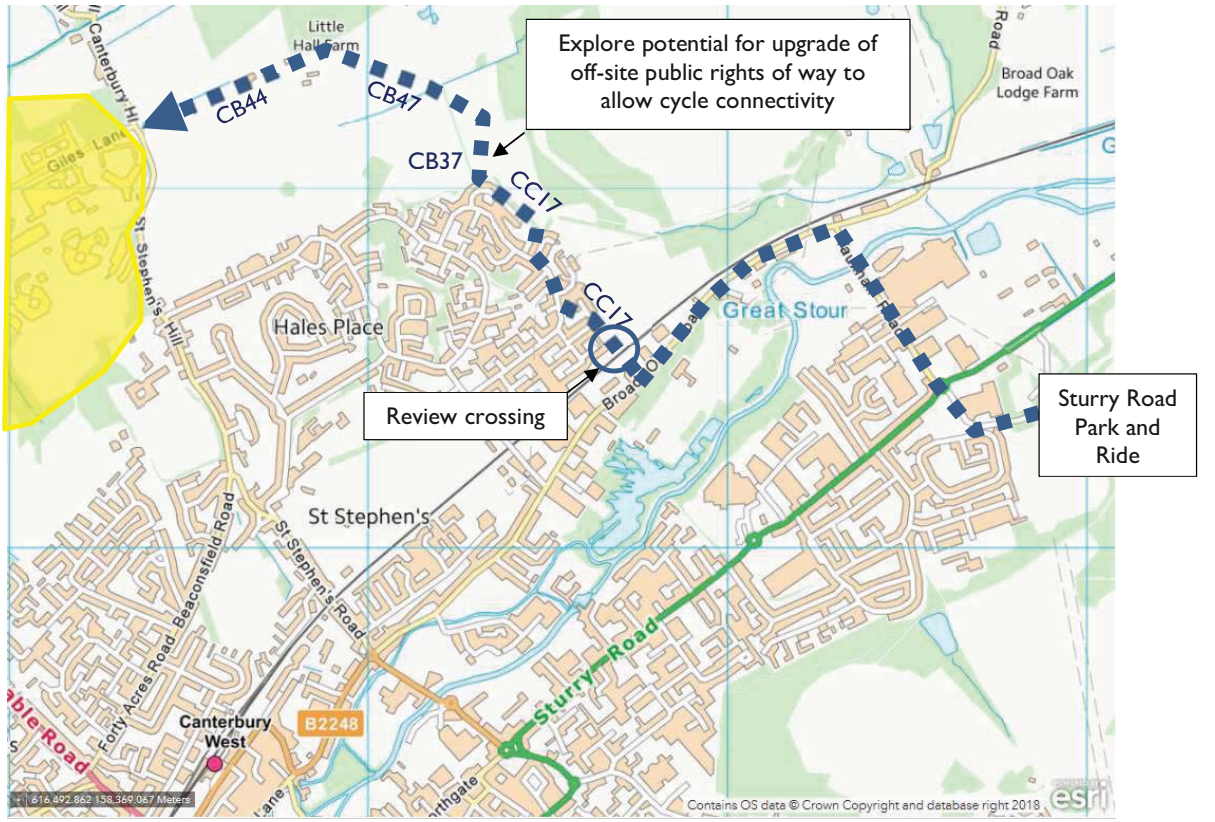



Figure 4.7 | Potential cycle connectivity between Sturry Road Park and Ride and University Campus

## 4.6 Summary

4.6.1 The short-term focus of the walking and cycling strategy is to ensure that proposals coming forward place a specific priority on improving the quality of existing walking and cycling infrastructure and provide new connections where beneficial. Importantly to promote sustainable modes and support the aims and objectives set out in the University of Kent Travel plan.

4.6.2 Over the medium to long term, the walking and cycling strategy incorporates improved north-south and east-west linkages for pedestrians and cyclists. These are aimed primarily at improving wider connectivity to Canterbury City and railway station by sustainable modes, both for those within the campus, but also those in the villages beyond. Within the campus itself, the strategy focuses on creating distinct places and environments more focused towards pedestrians and cyclists, reducing the dominance of the car.

In the long term, opportunities will continue to be explored to harness new technologies within campus operations, for example running electric (and possibly autonomous) shuttle pods into the heart of the campus from the peripheral locations and off-site destinations. These technological prospects as well as the opportunities to explore new routes towards Sturry Road Park and Ride and a northern entrance to Canterbury West station will form part of the longer-term aspirations for the Masterplan and the University will continue to work with the local authorities and local stakeholders to explore these opportunities and influence these where the University is able.

# 5 Modal Strategy – Public Transport

## 5.1 Introduction

5.1.1 This section sets out the public transport strategy for the site, both to support the short-term capital projects identified at the University, as well as the medium to longer term strategy for growth beyond this. The strategy considers both bus routing and infrastructure and rail.

## 5.2 Existing Usage

5.2.1 The University of Kent works with Stagecoach buses to provide discounted bus travel and to make journeys by bus quick and easy within the campus. At the time of writing, there are four services that operate regularly within the campus:

- Uni 1 Service – towards the City Centre
- Uni 2 Services – via Hales Place to the City Centre
- Triangle service to Whitstable and Herne Bay
- Service 4 and 6 to Whitstable and Herne Bay (the routes only vary north in Whitstable)

5.2.2 There is also an additional service (26a) which provides a connection from the campus to local grocery stores on a Saturday. Figure 5.1 is extracted from the University of Kent Transport website and shows the routing of the key services within the site (excluding service 26a). There is also a National Express Coach Service 022 that stops at Canterbury Campus three times a day on its way to London.

5.2.3 Collectively these services mean that the campus is connected to Canterbury by 12 services per hour on a weekday. Bus connections to Canterbury run for 24 hours 6 days per week.

5.2.4 Through the University Travel Plan, both students and staff can purchase discounted bus tickets. Staff are also able to purchase through salary deductions.

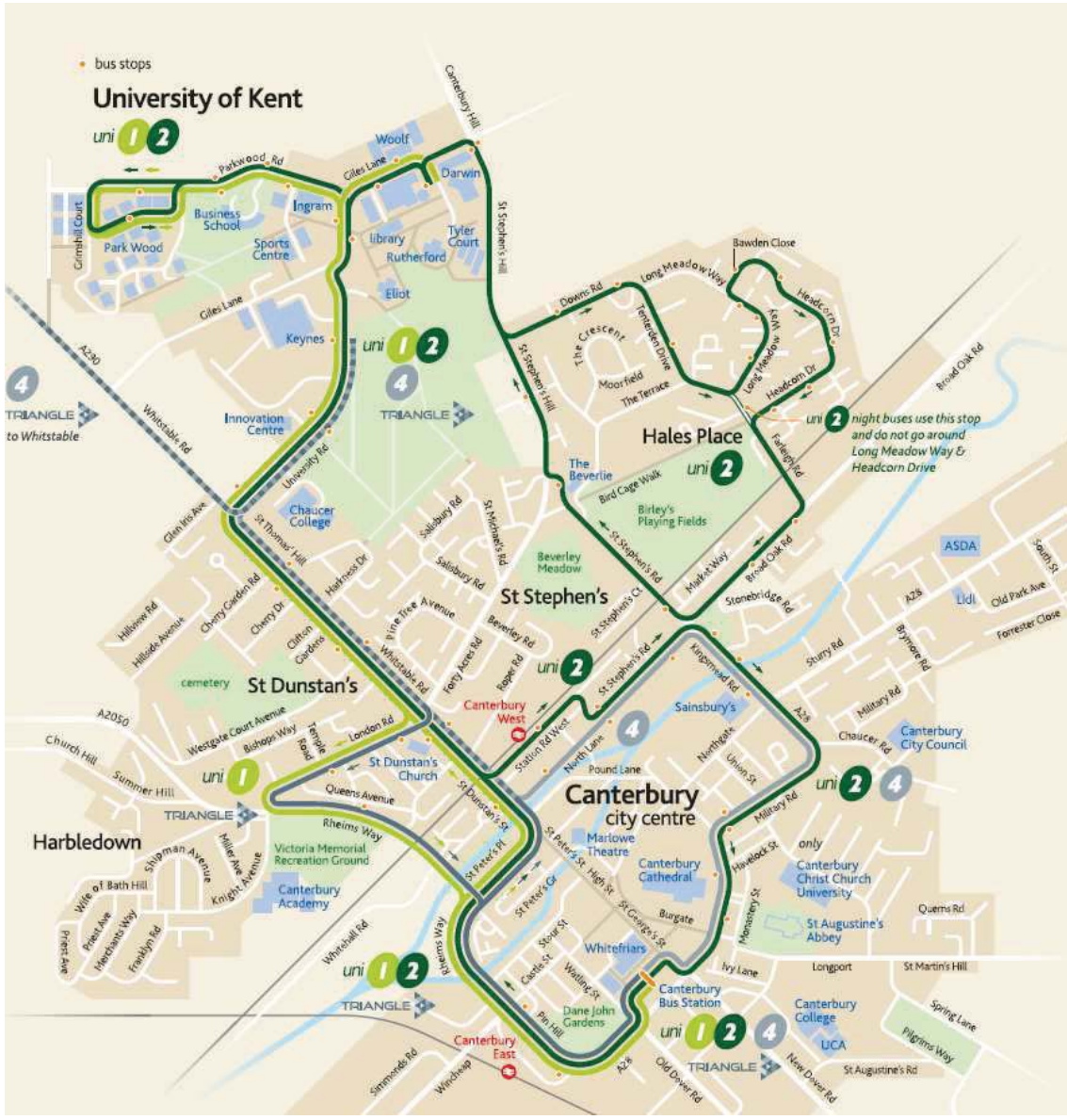



Figure 5.1 | Existing Bus Services within the Campus (Jan 2019)

5.2.5 The location of bus stops within the campus is shown on Figure 5.2, highlighting stops where shelters are provided (black) and those where only a pole and flag is provided (blue).

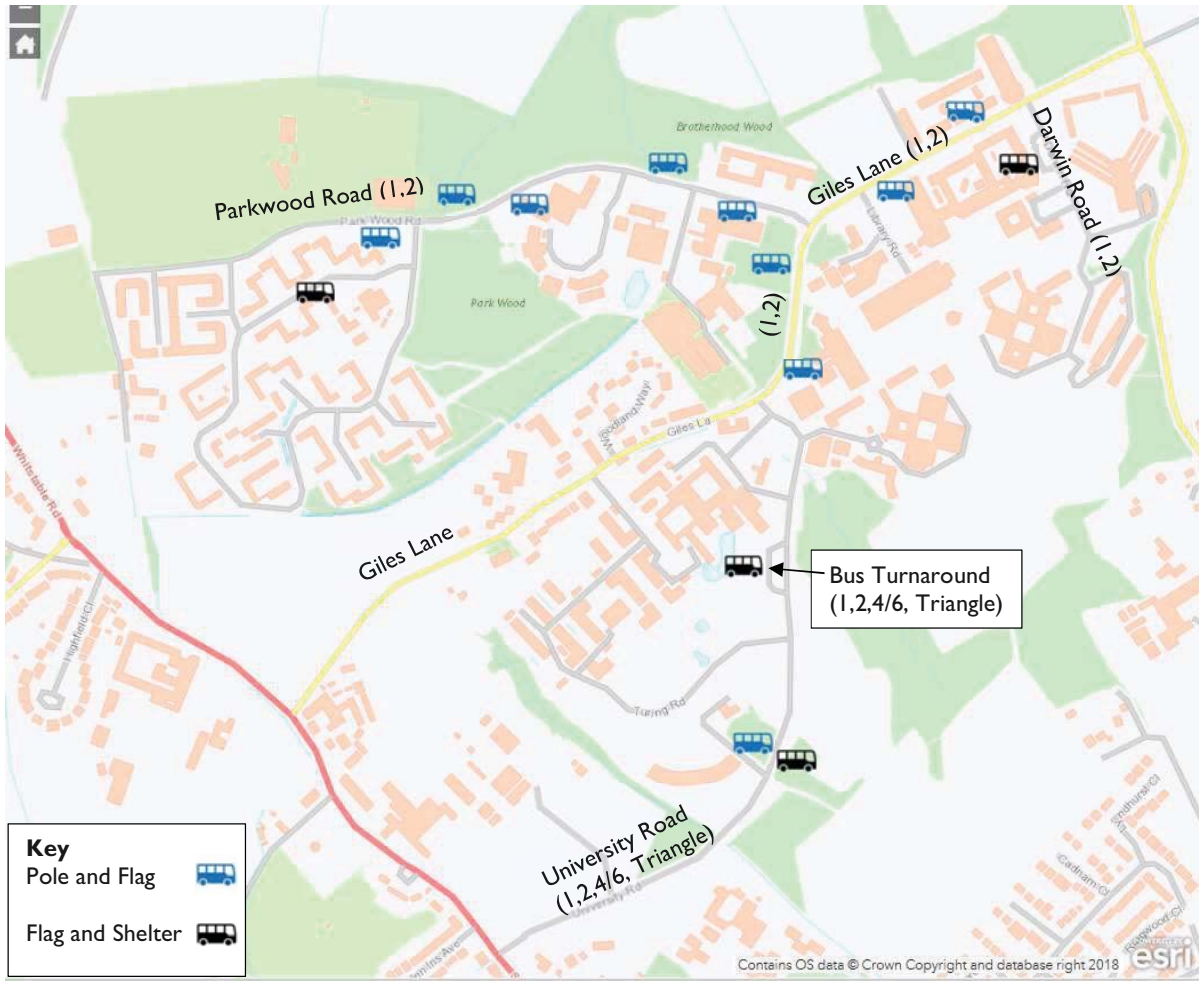



Figure 5.2 | Bus Stop locations within the Campus

5.2.6 During the site visit, the stop at the bus turnaround was popular for both students and staff, providing the most direct services into Canterbury City Centre. Bus travel is particularly popular amongst students, with a threefold increase in Unirider ticket sales between 2006 and 2016.

5.2.7 The key findings suggest:

- Whilst frequencies are high and coverage across Campus is good, permeability for buses could be improved through exploring connections to Whitstable Road to the west.
- Whilst stops are well used by students, waiting facilities throughout the Campus are limited, with shelters and seats only provided at a handful of stops. These stops are not currently equipped with real-time information.
- The main bus stop on University Road is relatively distant from the heart of activities at the University and is relatively exposed to the wind, despite having shelters.
- Very few stops have cycle parking at the bus stops to allow for interchange.

## 5.3 Short Term Strategy

5.3.1 The measures set out in this section are aimed at supporting the immediate short-term capital projects programme at the University.

5.3.2 As each application comes forward within the capital programme, the proposals within the application will consider how to best promote sustainable travel to and from the new building. This will include consideration of the following:

- The number of bus services accessible within walking distance of the proposal;
- The frequency of these services, the destinations served and the adequacy of the services for staff and students. For example, if a new teaching building is proposed, how far do the existing services match the home locations of staff and potential students.
- A review of the adequacy of bus stop infrastructure. Could any improvements be provided to provide more attractive services, e.g. introduction of shelters, raised kerbs, cycle parking, electronic information.

5.3.3 As part of the University of Kent Travel Plan, the University will continue to work with Stagecoach to understand whether service improvements can be offered to complement what currently exists. Discussions will continue to be held with the rail operators also to understand the potential for integrated ticketing for bus and rail, to benefit both staff, students and visitors.

5.3.4 In addition to the measures above, the University of Kent Travel Plan includes a commitment and list of supporting measures aimed at promoting more sustainable modes of travel the majority of which are to be implemented over the period to 2022 subject to funding.

5.3.5 The measures currently set out in the University Travel Plan for public transport are summarised in Table 5.1. The implementation of these measures will be led by the University and it is expected that individual proposals coming forward within the capital programme to contribute towards these.

Table 5.1 | University of Kent Travel Plan (2022) – Public Transport Measures (to 2022)

| Proposed Project | Progress<br>Green: Complete<br>Amber: Underway<br>Red: Not yet commenced |
|---|---|
| Enhance the promotion of the bus online information for 'at the time' disruptions and journey planning. | |
| To develop a partnership with the new local train service provider | New service provider not yet confirmed |
| To establish the feasibility to allow staff to purchase rail season tickets through salary deductions and offer these once available | Awaiting confirmation of service provider |
| Investigate how to improve seating and poster boards at bus stops on campus and implement on an incremental basis in the TP periods up to 2025 subject to funding. | |

| Proposed Project | Progress<br>Green: Complete<br>Amber: Underway<br>Red: Not yet commenced |
|---|---|
| To work with Stagecoach to improve direct routes from Whitstable and Faversham and any other service which could redirect to campus | |
| To work with Stagecoach to introduce external information boards where viable, e.g. live information at key locations as part of the bus stop upgrades to 2025. | |
| To work with Stagecoach to establish the feasibility of introducing a simple system for visitors to the University to be encouraged to use the bus services and implement during the TP period to 2025 subject to funding. | |
| Continue to work in partnership with bus operators to provide 24-hour services and direct routes to key destinations | Ongoing |
| Continue the shopping service from campus to the grocery stores whilst demand is sufficient | Ongoing |
| Continue to provide subsidies to Stagecoach to provide significant discount for student bus tickets. Also, to provide discounts to University and Kent Union Staff. | Ongoing |
| Continue to provide staff the option to purchase staff bus passes through salary deductions until Stagecoach can take monthly payments | Ongoing |
| Continue to work with Stagecoach to explore new technology for passengers, e.g. Smart ticketing etc | Ongoing |
| Continue to support Stagecoach in applying for grants for lower emission vehicles. | Ongoing |
| Continue to work in partnership with National Express to provide a service that operates to and from Canterbury Campus | Ongoing |

## 5.4 Public Transport Objectives

5.4.1 The following objectives have been set to guide the masterplan in the medium to longer-term.:

- Provide high quality, high frequency bus services that link the campus with important off-site destinations for both staff and students.

- Improve the visibility of public transport within the Campus to bring it to the forefront of the mind when considering travel choice.
- Improve the overall public transport experience for staff, students and visitors from the start to the end of a journey.
- Support the University Travel Plan in exploring integrated ticketing between bus and rail for staff, students and visitors.
- Explore and harness opportunities offered by technology and work with key stakeholders to deliver sustainability improvements to existing fleets, for example electric vehicle technology.
- Support the delivery of more direct connections between off-site public transport hubs and the Campus (e.g. Canterbury West Railway Station, Wincheap and Sturry Park and Ride)

## 5.5 Masterplan Measures

5.5.1 This section provides a summary of the measures within the overall public transport strategy for the University of Kent Masterplan. The key drivers are to bring buses into the heart of the campus, improve the permeability of the Campus for buses, including coaches as well as the experience for those using the bus, particularly staff where use is relatively low currently. The suggested timing / implementation of these measures is set out in Section 9. These measures include:

- The re-design of the existing bus turnaround facility to integrate it with the heart of the campus. The current bus turnaround facility is well used by buses and provides an essential turning point due to the constraints of the existing service patterns (and permeability of the site east to west) although it sits quite starkly within the landscape and does not feel integrated or close to the campus heart. The proposals within the Masterplan are to integrate the turnaround facility better within the Campus heart.

  The first approach that has been considered within the Masterplan is to relocate the turnaround facility further north in the campus and incorporate it into a new public square. As the bus turnaround is well-used by the existing service pattern of buses, relocation would need changes to the bus service patterns to reduce the need for buses to turn around within the campus. It is understood that consultation is ongoing with regards to changing the routes of Uni 1 and Uni 2 to improve their efficiency in serving the campus which would reduce the need for buses to use the turnaround facility significantly. These proposals were originally planned for implementation in January 2019 and involved allowing right turning movements of buses out of Downs Road, Hales Place so that the Uni 2 service can operate an anti-clockwise route through the campus and the Uni 1 service can operate a clock-wise route through the campus. This would remove the need for these services to use a turnaround facility and significantly reduce its frequency of use. The relocation of the turnaround facility would slightly increase the distance that the existing Triangle service would need to penetrate the campus.

  If service patterns are not amended as anticipated above, it is proposed that changes be made to the existing turnaround facility to provide a more sensitive design, like a public square, reducing the dominance of the feature when arriving into the campus from the south but still providing the full functionality that it currently enjoys. Further consultation would be necessary with the bus operators to agree appropriate design requirements for such a facility to ensure that the operation of buses is not significantly compromised.

- Provision of a new vehicular access into the Campus from Whitstable Road. The principle is indicated on Figure 5.3 and access would be controlled, such that only buses would be able to make a connection through into the main campus, thus preventing any

strategic re-assignment of general traffic. As shown on Figure 5.3, this would provide a more direct route into the Campus from Whitstable, reducing the need to use University Road and the turnaround facility for these services as currently. The diversion of such services would be subject to agreement with the relevant operators, including Stagecoach.

The nature of this connection and location of the control system would be subject to further feasibility work in consultation with the highway authority. The University of Kent will be trialling a barrier system which recognises number-plates, so with the existing partnerships with Stagecoach and through partnerships with local coach firms, it is possible that the plates of approved buses could be added into the existing system, meaning the barriers only lift for these approved vehicles.

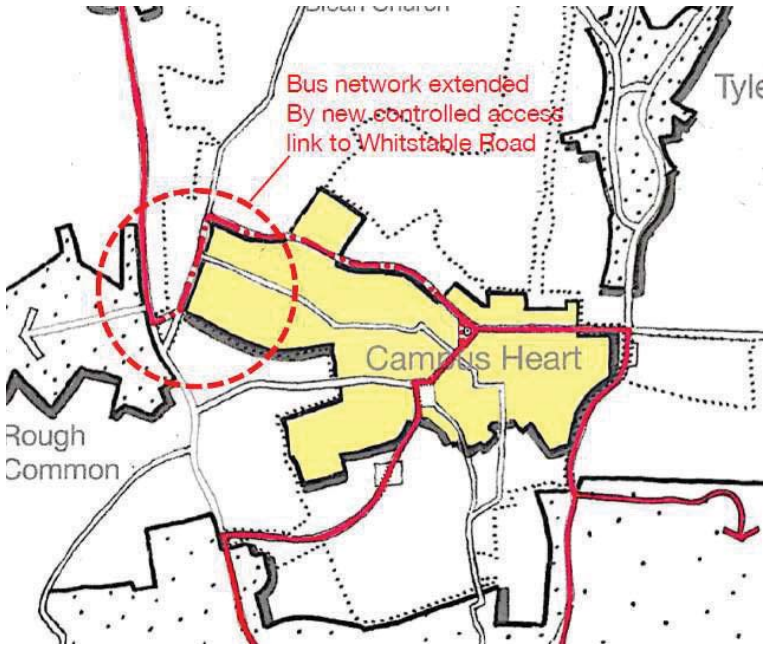



Figure 5.3 | Public Transport Strategy – Principle of New Connection to Whitstable Road

Whilst further detail of the arrangements in this location are subject to further work, a high-level feasibility review has been undertaken of the engineering feasibility of providing vehicular access from Whitstable Road. This review is summarised in Appendix B. This review concludes that a priority junction could be feasible. This would not impact directly on NCR 1. Comments received from the Highway Authority indicate a preference for a left-in left-out junction in this location, subject to further design feasibility work.

As an alternative option, through partnership with Blean School, the Masterplan also includes an option for the reconfiguration of the existing school, which could provide an alternative location for a new bus link from Whitstable Road. The Highway Authority has expressed this to be their preferred option and commented that a signal-controlled junction would most likely be required to facilitate this. This option for a connection via Blean School is illustrated below:

- A parking area for coaches close to the Whitstable Road which could be used on event days. This removes the need to suspend staff and student parking to accommodate coaches which currently occurs.

- Continue to explore the opportunity through the University of Kent Travel plan for integrated ticketing between rail and bus to provide a seamless journey for those arriving by rail at Canterbury West.

- Increasing the visual prominence of public transport opportunities within the Campus, through the creation of transport hubs at the major stops. The hubs would incorporate opportunities for modal interchange, secure cycle parking, information display boards (real time if buses are equipped with the relevant technologies). Existing stops that are only pole and flags should be reviewed and upgraded to include shelters, where this is not considered to introduce maintenance issues through anti-social behaviour.

- Explore opportunities with Stagecoach to implement a trial involving extending a limited number of Park and Ride services from Wincheap and Sturry Road to the Campus during the peak periods to provide a travel alternative for staff currently driving all the way into the Campus from outside Canterbury.

## Longer Term Aspirations

- Support the long-term aspirations within the City for a station entrance to the north of the railway at Canterbury West Rail Station. An entrance to the station from the north would present the opportunity for much more direct linkages to the campus from the railway station and provide the option to avoid the use of the existing underpass.

- Develop options for a system to shuttle people effectively from Canterbury West rail station direct into the University Campus, potentially using existing walk / cycle routes. This system could harness latest technologies, for example autonomous pod technology or similar, particularly using quieter technologies to reduce impacts from noise. Opportunities could then be explored to extend such a system throughout the campus. An illustrative network for such a service within the campus is shown in Figure 5.4 both with and without a northern access into Canterbury West Rail Station.

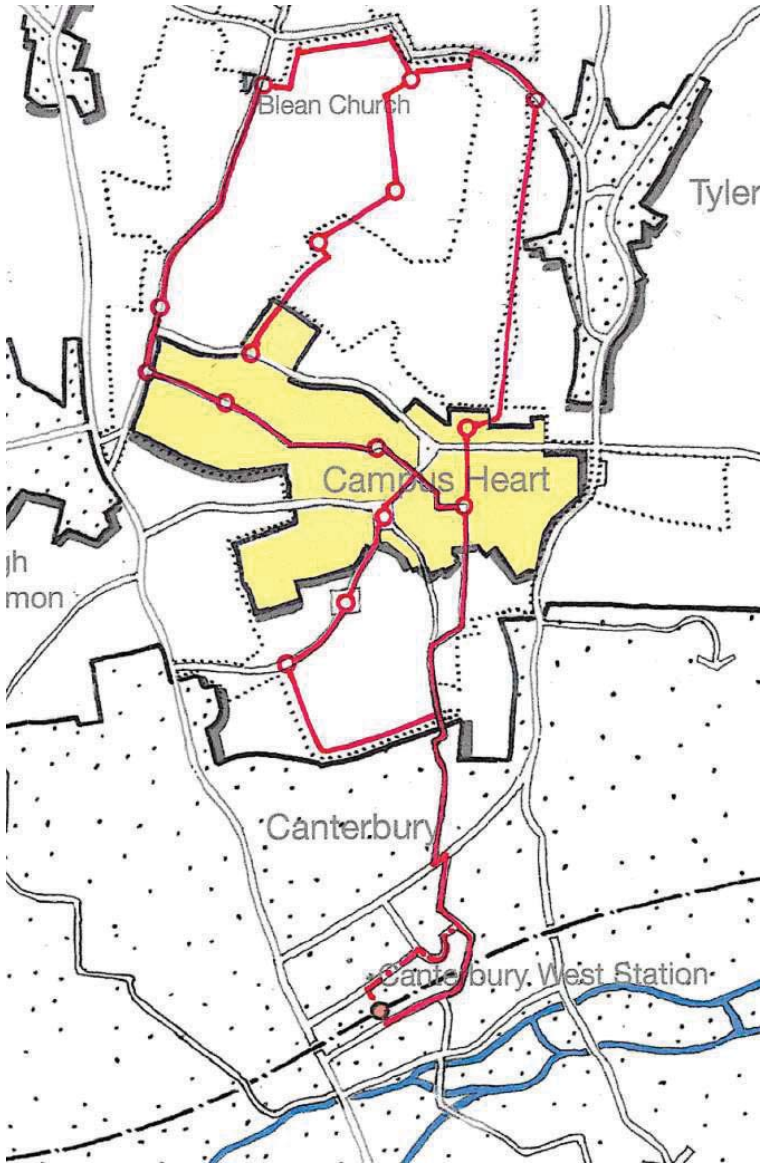



Figure 5.4 | Illustrative network for transporter shuttles.

- Harness the opportunities offered by electric vehicle technologies as they arise, for example the promotion of electric buses and potential consideration of active charging infrastructure. For example, opportunity charging is an emerging technology that instead of plugging in vehicles overnight to recharge at the depot, strategic points are established across a network which provide a rapid, intense charge of power, increasing the range potential of vehicles mid-route and reducing the need for large heavy batteries within the vehicles themselves.

- Work with Kent County Council to explore opportunities in the longer term for a Park and Ride to the north of Canterbury if potential sites exist within the University land-holdings.

## 5.6 Summary

5.6.1 The short-term focus of the public transport strategy is to implement the measures identified within the University of Kent Travel plan and to consider on a site-by-site basis whether there are opportunities to enhance existing bus infrastructure to improve the attractiveness of the mode to staff and students. Proposals for these will be expected to come forward through the individual applications coming forward as part of the Capital programme as well as through the Travel Plan.

5.6.2 In the medium and longer-term, the strategy focuses on rationalising the routes of bus services at the campus to provide a coherent, clear network with more direct connections to key off-site origins / destinations. Part of this involves two options for a new bus link to Whitstable Road. There are longer term aspirations for the incorporation of electric vehicle technologies within the campus, a more direct connection to the campus from the rail station and integration with wider public transport offer in the area, for example the Park and Ride sites. From a design perspective, bus infrastructure will be designed to be integrate more sensitively within the existing visual fabric of the Campus.

# 6 Modal Strategy – Vehicular

## 6.1 Introduction

6.1.1 This section sets out the vehicular strategy for the site, both to support the short-term capital projects identified at the University, as well as the medium to longer term strategy for growth beyond this. The strategy considers car parking as well as wider vehicular access, for example servicing and delivery.

## 6.2 Existing Usage

6.2.1 There are currently three vehicular accesses to the Campus:

- From Giles Lane (east) to St Stephen's Hill;
- From Giles Lane (west) to Whitstable Road; and
- From University Road to Whitstable Road.

6.2.2 External delivery and service vehicles use the same road network, routes and parking as for other car users at the Campus.

6.2.3 The campus currently provides 2,234 parking bays across approximately 70 parking areas (including the Innovation Centre) with parking bay provision in each car parking location ranging from 533 bays in the Giles Lane car park in the north of the campus to 2 bay provisions at the rear of Rutherford College.

6.2.4 There are approximately 36 parking areas along Parkwood Road in the north west of the campus, 9 areas accessible via University Road in the south, 7 further areas accessible from Giles Lane and a further 8 accessible from Darwin Road in the north west.

6.2.5 Parking provisions are currently organised by the university into four permit zones which are:

- Pink zone (pink permit holders only)
- Blue zone (all permit holders)
- Visitor only
- Reserved or restricted parking (including Blue Badge Holders) – approximately 18% of all car parks

6.2.6 Some car parks include a mix of both blue and pink zones.

6.2.7 According to a parking demand assessment carried out by Advanced Transport Research on behalf of the University of Kent on the 16th of October 2018, there is an uneven distribution of parked vehicles throughout the currently provided parking zones. For example, between the 10:00am and 14:00pm survey period, there were 120 parked vehicles on the Rutherford car park in comparison to the 118 actual spaces, whereas the Chipperfield car park, which has a capacity for 40 vehicles, had only 32 parked vehicles in the same period.

6.2.8 The parking demand assessment also highlights that many of the car parks are operating over capacity, suggesting a potentially ineffective enforcement strategy and high dependency on car travel. For example, the Central Pay & Display car park was surveyed to have 66 parked vehicles between the 10:00am to 14:00pm period, but it has a maximum capacity of 60

vehicles. The pavilion car park also had 78 parked vehicles in the 10:00am to 14:00pm period, despite its 72-vehicle capacity.

6.2.9 This suggests that whilst there is a large provision of spaces on the campus, the disparate spread of parking zones is leading to an imbalance of use of spaces, with over-demand affecting the central areas and 'overspill' affecting the wider campus.

6.2.10 It can therefore be concluded that the current parking management strategy in place must be updated to effectively respond to the current pressures and to facilitate further growth of the university campus.

## 6.3 Short Term Strategy

6.3.1 The measures set out in this section are aimed at supporting the immediate short-term programme at the University and are consistent with the measures set out in the University's "Parking Management Strategy" document. This document was prepared by PBA on behalf of the University to advise on short, medium and long-term measures that could be implemented to manage parking. These short-term measures include:

- Increasing current car parking permit prices to help to bring the University's pricing structure in line with other comparable sites.
- Introducing a management system for booking visitor parking and introduce charges to visitors not using pay and display car parks.
- Increasing the effectiveness of parking enforcement through using credit control process where necessary.
- Introducing term time coach parking and associated charging structure.
- Introducing additional incentives through the Travel Plan to reduce the amount of car trips generated by staff.

6.3.2 The University of Kent Travel Plan also sets out additional short-term measures that are being implemented in relation to cars over the current travel plan period to 2022 subject to funding. Some of these relevant to the Masterplan are summarised in Table 6.1.

Table 6.1 | University of Kent Travel Plan (2022) – Vehicular Measures (to 2022)

| Proposed Project | Progress<br>Green: Complete<br>Amber: Underway<br>Red: Not yet commenced |
|---|---|
| Implement car share permits onto new virtual permit system | |
| Investigate potential to introduce dedicated car share bays and implement. | |
| Investigate car share incentives – particularly for ad hoc car sharers and implement subject to funding. | |
| Continue to provide car share database | Ongoing |

| Proposed Project | Progress<br>Green: Complete<br>Amber: Underway<br>Red: Not yet commenced |
|---|---|
| Continue to provide guaranteed ride home service | Ongoing |
| Continue to provide lower car parking charges for car sharers | Ongoing |
| Incorporate visitor and associate parking within the online parking database and update procedures. | Meetings with schools/departments have taken place to receive feedback about visitor parking. |
| Produce an updated maintenance programme for traffic signs and car parks. | Annual car park bay count audit incorporated a section to report any concerns about signs within the car parks. However, a programme and reporting system still needs to be developed. |
| Investigate possibility of introducing electronic signs at entrance to University displaying number of available spaces and implement in parallel with proposed long term consolidation. | Giles Lane car park is being upgraded to have a VMS sign display number of available bays by using barriers to access and egress the car park. |
| Improve directional signage within the campus | |
| Investigate potential to introduce electric charging points for staff and students and implement during TP period to 2025 subject to funding. | |
| Develop a plan to reduce the need to use grey fleet to transport items around campus and explore opportunity for electric car-pooling as an alternative. Implement during TP period to 2025 subject to funding. | |
| To continue to develop Traffic Management Plans when large events are being held on campus | Ongoing |
| Continue to promote to students not to bring a car to the City | Ongoing |
| To continue the student parking exclusion zone which restricts student living within certain postcodes around the City to park on campus | Ongoing |

| Proposed Project | Progress<br>Green: Complete<br>Amber: Underway<br>Red: Not yet commenced |
|---|---|
| Continue to improve enforcement and a systematic approach | Daily & weekly reports have been produced for Campus Security to assist them with monitoring what is happening and deployment. |

## 6.4 Vehicular Objectives

6.4.1 The following objectives have been set to guide the masterplan in the medium and longer term:

- Maintain the existing number of university-related car parking bays across the campus so as not to increase overall vehicular trips to and from the University buildings.
- Reduce the visual dominance of the car within the Campus, creating public spaces that promote active modes and moving cars outside the campus heart as far as possible.
- Consolidate the existing car parking within the Campus.
- Separating “back of house” operations / building servicing away from key sustainable movement corridors and design sensitively within the environment.

## 6.5 Masterplan Measures

6.5.1 This section provides a summary of the measures within the overall vehicular strategy for the University of Kent Masterplan. The suggested timing / implementation of these measures is set out in Section 9. These measures include:

- The consolidation of car parking within the Campus area to reduce the number of locations across the campus where vehicles can park. Figure 6.1 indicates the principal locations identified for the consolidation of car parking within the Campus.

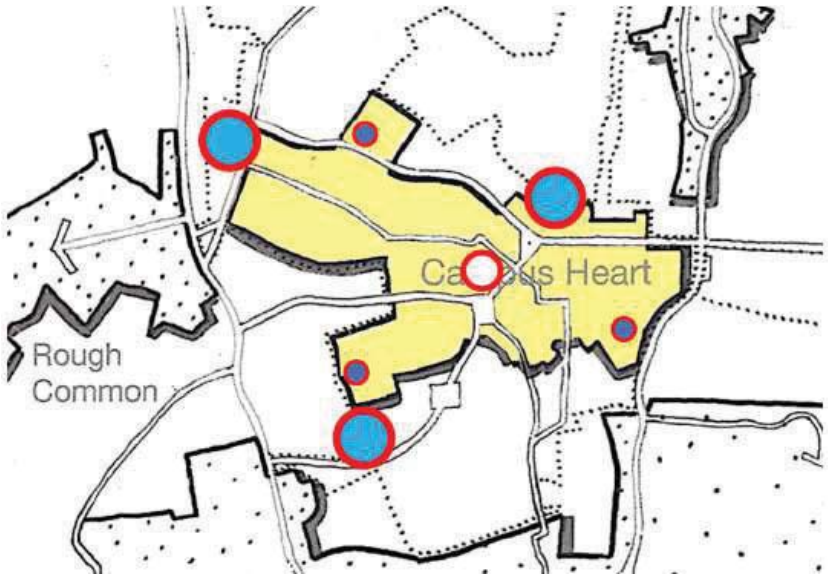



Figure 6.1 | Car Parking Consolidation Locations

The consolidation strategy focuses on re-locating staff and student car parking to locations on the periphery of the campus to help remove circulation within the campus by staff and students trying to find car parking spaces. Blue badge parking will continue to be provided outside the building entrances. The consolidation of the existing 70 parking areas into a smaller number of larger car parks has the following benefits:

- Reduces the need for vehicles to search the Campus for a space, reducing unnecessary circulating traffic.
- Creates an easier system in terms of traffic management and enforcement. This enables barrier systems and information signage about vacant spaces to be installed and enforcement more efficient.
- Makes site-wide monitoring of car park occupancy and dwell time more manageable so that demand can be captured as part of the Travel Plan monitoring.

As well as the key locations identified in Figure 6.1, the masterplan team for the project undertook an assessment to identify locations may be suitable for parking, informed by a wide range of considerations and constraints, including landscape and heritage.

Figure 6.2 provides a summary of the locations considered suitable for consolidation overall, with approximate capacities in each location. As already set out, a primary objective of the car parking strategy for the Masterplan is to maintain the existing total number of spaces across the campus into the future, so no additional car parking will be provided for University-related uses. Priority has been given to surface level car parking where possible, with decked parking at locations considered less visually sensitive.

It is proposed that the locations shown on Figure 6.2 are agreed through the masterplan as suitable zones for car parking. This means that whilst the main consolidation work is underway on key car parks, potentially requiring them to close, there is enough temporary space within the Campus to maintain the existing levels of parking stock currently available within the campus. This temporary parking can be planned and ensure it is sensitive to the landscape constraints across the Campus. Figure 6.2 is therefore not a plan proposing what parking is being delivered through the Masterplan, it is a capacity

assessment exercise which seeks to agree the principles of parking in these locations to facilitate the consolidation work.

- Implement new management systems at the car parks to control who can use the car parks and to move towards a pay as you go system in the long term. Barrier-based systems are to be provided at the main car parks which would use ANPR technology. This will also allow real-time information to be recorded about the occupancy of the main car parks.

- A central car park will be maintained but allocated for visitor use and controlled using barriers also. The barriers at the visitor car park will allow access to all vehicles (and be equipped with ANPR). To monitor and act against students or staff mis-using these visitor spaces, a stricter system for visitor parking will be implemented:

  - Regular visitors to the Campus (more than once a week) will be required to purchase a car parking permit at a reduced rate. The registration plate of these visitors will be recorded in the system as visitors. So, when the car park is regularly used by the vehicle, it is clear they are not staff or students.

  - Less frequent or unplanned occasional visitors to the campus must report to reception where they parked their vehicle and the number plate so that this can be recorded within the system.

  - Vehicles that are flagged in the car park who are not visitors or recorded in the visitor books will be targeted by the enforcement team.

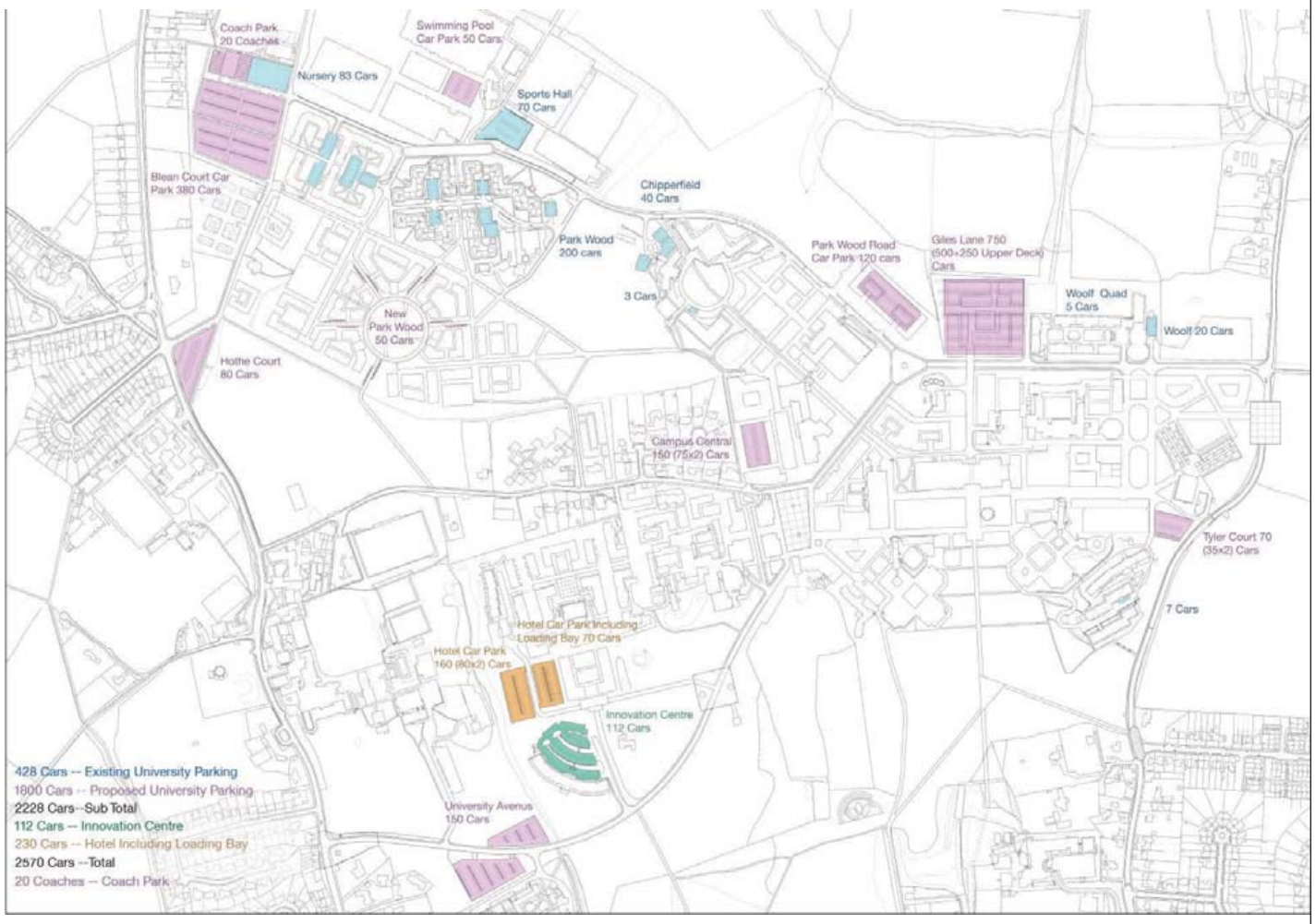



Figure 6.2 | Car Parking Capacity Analysis – Principal Locations for Car Parking

- Prepare and maintain a servicing and delivery plan to monitor the requirements of individual buildings in terms of deliveries, special requirements. Once this is populated use this information to inform a consolidation strategy for the Campus Strategy. Focusing on accepting non-bulky or sensitive deliveries at consolidation zones, to reduce the amount of delivery vehicles routing through the Campus. Further information is provided in Section 8.

- Monitor the use of car parking within the campus on a regular basis alongside the permit eligibility criteria, exclusion zones, sustainable mode incentives and pricing to create necessary headroom for growth.

- Introduce regular coach parking area on campus to remove the need for parking within car parks.

6.5.2 Displaced parking from the University is a concern that has been raised by residents and the Highway Authority. Where complaints are raised to the University about parking off-site, these will be communicated to Canterbury City Council as enforcement authority. If enforcement evidence suggests these infringements are due to University staff or students, the University will work with CCC and KCC to help mitigate these issues where possible.

## 6.6 Summary

6.6.1 The short-term focus of the vehicular strategy is to implement the measures identified within the Parking Management Strategy and University of Kent Travel plan to control demand of car parking within the site and to rebalance the costs of travel more in favour of sustainable modes.

6.6.2 In the medium and longer-term, the strategy focuses on rationalising car parking across the campus and consolidating it, creating an easier system to manage, communicate and enforce. It requires an ongoing review of the permit criteria systems and promotion of sustainable modes through the Travel Plan to ensure there are suitable alternatives available to car travel. Strategies are also required to monitor and manage servicing and deliveries within the campus and seek to consolidate these, to reduce their impact on important movement corridors, particularly for sustainable modes. New buildings will need to ensure that servicing and deliveries are generally rear of building activities and do not encroach on the enjoyment of the Campus walking and cycling networks.

# 7 Managing Highway Impacts

## 7.1 Introduction

7.1.1 In order to facilitate the economic growth of the University, this masterplan proposes that any development related transport impacts will be managed and that a worsening of highway 'performance' as a result of vehicular traffic growth will not occur. This is a position consistent with Kent County Council's 4th Local Transport Plan which proposes to deliver 'Growth without Gridlock' and the Canterbury District Transport Strategy 2014-31 which states in Paragraph 4.15 that:

*'A target of this strategy is that traffic in the city centre will not increase by 2031 and the predicted increase in the demand to travel will be met by increasing the mode shares of walking, cycling, public transport and home/ remote working.'*

7.1.2 This section of the report therefore sets out the detail of the commitment that the University of Kent proposes to make through this masterplan and how the monitoring is proposed.

## 7.2 The Commitment

7.2.1 In October 2018, a comprehensive set of traffic surveys were undertaken. The data collected and as previously reported in Section 2 is included in full in Appendix C. This 2018 data is now considered to be the baseline against which monitoring is undertaken. The summary of the key observations is set out below:

| Target | Metric | 2018 Surveys |
|---|---|---|
| Incoming vehicular trips to the Campus during the AM peak hour to be no more than 2018 levels | Incoming vehicular trips (less through traffic) for three accesses combined for AM peak hour (0800 – 0900) | AM: 1551 vehicles |
| Incoming vehicular trips to the Campus during the PM peak hour to be no more than 2018 levels | Incoming vehicular trips (less through traffic) for three accesses combined for PM peak hour (1630 – 1730) | PM: 454 vehicles |
| Outgoing vehicular trips from the Campus during the AM peak hour to be no more than 2018 levels | Outgoing vehicular trips (less through traffic) for three accesses combined for AM peak hour (0800 – 0900) | AM: 374 vehicles |
| Outgoing vehicular trips from the Campus during the PM peak hour to be no more than 2018 levels | Outgoing vehicular trips (less through traffic) for three accesses combined for PM peak hour (1630 – 1730) | PM: 1191 vehicles |
| Total University-related parking stock to be retained at 2018 levels | Total car parking spaces associated with University buildings (Excludes 112 spaces at Innovation Centre). | 2,122 |

7.2.2 The commitment of this Movement and Transport Strategy is therefore as follows:

*'Over the period to 2031, any development related growth that takes place within the demise of the University of Kent will not result in any growth in private vehicular traffic when compared against the 2018 baseline as presented in Table 7.1.*

*This commitment will ensure that there will be nil detriment in the performance of the highway network as a result of the development growth associated with the University of Kent.'*

7.2.3 By adopting a nil detriment approach to highway impact, this commitment goes beyond NPPF planning requirements where Paragraph 109 states *'Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe. '*

7.2.4 It should be noted that the above commitment relates to the masterplan premise that growth can be accommodated in transport terms through the suppression of highway trips to a level not in excess of the 2018 baseline. It does not however remove the need for planning related Transport Assessments to be produced to support developments as part of the statutory planning process and each transport assessment would need to demonstrate that the mitigation being put in place can help to achieve the commitment or alternatively that the University has already, through the application of the Travel Plan, created the 'headroom' for further planned development to brought forward.

7.2.5 Should development proposals arise that would exceed the 2018 baseline and no reasonable measures can be provided to reduce trips further then discussions with the highway authority on highway mitigation and investments can be undertaken but this predict and provide highway capacity led approach should be considered as an exception rather than as general practice. This approach would adhere to Paragraph 4.16 of the Canterbury District Transport Strategy 2014-31 which states:

*'There will still be a need to consider some new road building directly associated with developments, as well as highway improvements that improve traffic flow'.*

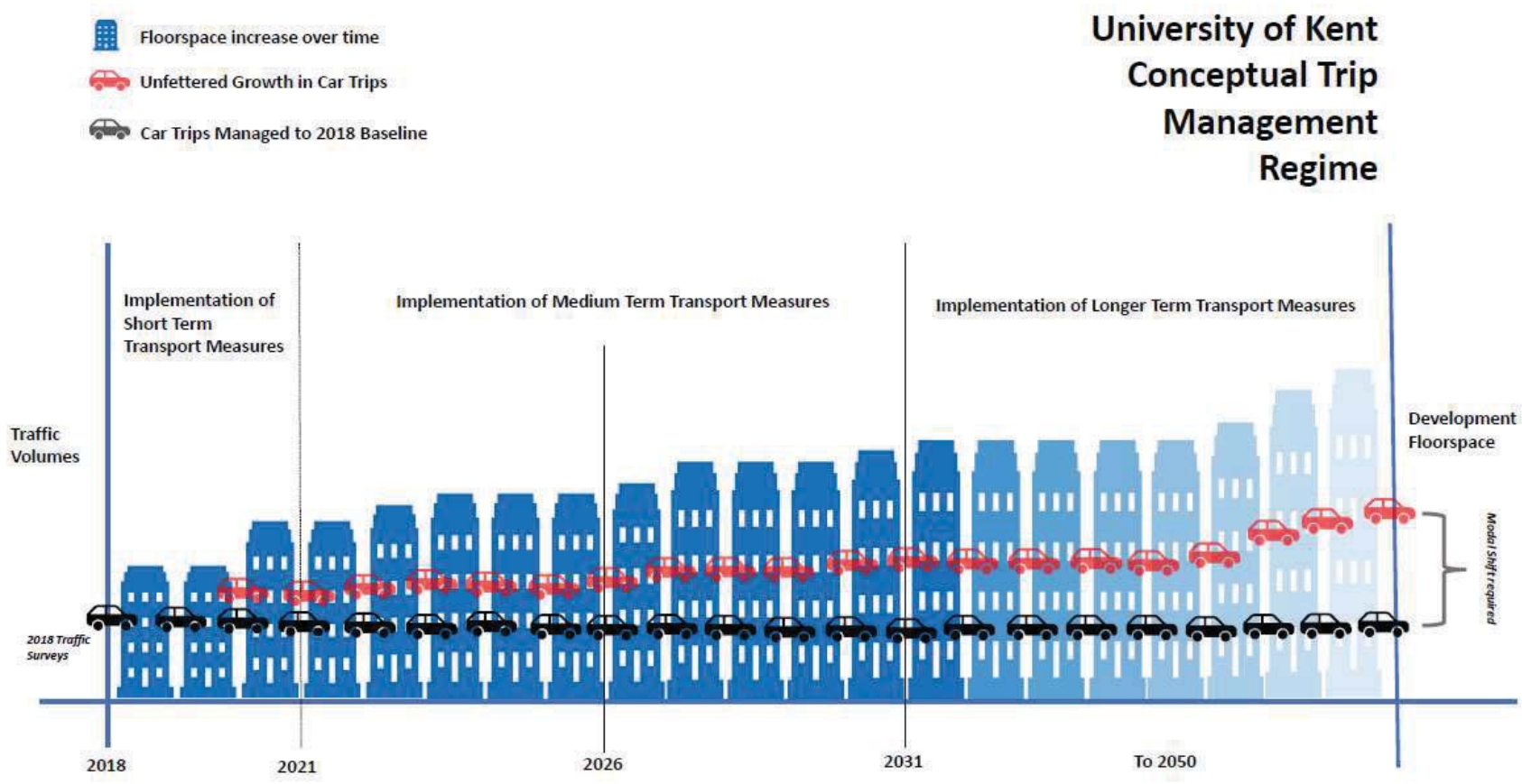
## 7.3 Demand Management Strategy

7.3.1 In order to execute the commitment set out above, the following approach is proposed. This approach allows planning related Transport Assessments to utilise monitoring data as an evidence base for the impact assessments associated with their respective development proposals.

7.3.2 It is proposed that the Travel Plan will be used to generate capacity in advance of planned development growth. However, should annual monitoring indicate that headroom had not been created then the respective Transport Assessment would need to identify a further mitigation package to ensure that headroom is created in conjunction with the land use proposals and the highway and planning authorities will need to consider the merits of the mitigation at this stage.

7.3.3 This demand management strategy is supported by the key objective to retain the same number of University-related car parking spaces across the Local Plan period.

7.3.4 This approach is set out in Figure 7.1 where it should be noted that all aspects are conceptual to demonstrate the process whilst the methodology associated with the monitoring proposed is set out in Section 8 of this report.


Floorspace increase over time
Unfettered Growth in Car Trips
Car Trips Managed to 2018 Baseline
University of Kent Conceptual Trip Management Regime
Implementation of Short Term Transport Measures
Implementation of Medium Term Transport Measures
Implementation of Longer Term Transport Measures
Traffic Volumes
Development Floorspace
Modal Shift required
2018 Traffic Surveys
2018
2021
2026
2031
To 2050

# 8 Supporting Management Plans

## 8.1 Introduction

8.1.1 In addition to the measures set out within the Masterplan, a critical component to the successful delivery of the Masterplan is the success of the supporting Management documents which are set out in this section.

## 8.2 The University of Kent Travel Plan

8.2.1 The University of Kent Travel Plan is critical to the realisation of growth at the University within the Masterplan. With a commitment to maintain levels of car parking and vehicular impact at 2018 levels, for building projects to come forward in a cost-effective and timely manner, the Travel Plan will need to work to create the headroom necessary to accommodate future growth.

8.2.2 The Travel Plan has been successful in delivering travel behaviour change amongst students through a wide range of incentives for travel by sustainable modes supported by the implementation of stricter controls on the issuing of student car parking permits. To enable further growth at the University, this system will need to be introduced to staff. It is proposed that this is undertaken on a gradual basis and is subject to regular review.

8.2.3 As part of the Travel Plan monitoring, it is recommended that measures are put in place to monitor the vehicular trip generation of the University. This can then form a central part of the monitoring for the Travel Plan, providing an indication of how much “headroom” is currently available when compared against 2018 levels. This could be undertaken through the following strategy:

- Automatic traffic counts installed at the site entrance points; Giles Lane east, Giles Lane West, and University Road (excluding Chaucer College traffic and innovation centre traffic) to monitor traffic over the course of a one-week period.
- Automatic number plate recognition survey on one of the days within this one-week period for 12 hours, this would identify the number of vehicles passing through the campus, so these can be netted off the data collected from the automatic traffic surveys.

8.2.4 It is recommended that this monitoring exercise is repeated every two years and the findings reported to the local authorities in the form of an Annual Monitoring report.

8.2.5 The Travel Plan is an important part in facilitating growth within the short-term as part of the capital programme, and its importance is equal in the medium and longer term if significant growth at the University is to be realised.

## 8.3 Delivery and Servicing Management Plan

8.3.1 To reduce the effects of delivery and service vehicle trips on the campus and surrounding network, it is recommended that a Delivery and Servicing Management Plan (DSMP) is prepared.

8.3.2 A DSMP will provide a framework to ensure that servicing and freight activity to and from the campus work effectively. The principal objective is to reduce the number of trips (thus reducing congestion and CO2 emissions) made to departments/facilities by considering consolidation, collaborative arrangements and best practice.

8.3.3 It is proposed the DSMP will provide recommendations on:

- The scheduling and management of all deliveries to reduce the number of trips, particularly during peak hours,
- Where safe loading can take place, thus ensuring the avoidance of public realm spaces during periods of peak usage.
- Commissioning delivery companies who can demonstrate their commitment to best practice.
- The possibility of using electric vehicles and/or non-motorised modes of transport for both servicing and deliveries.
- Opportunities for trip number reductions by consolidating orders from key suppliers into a smaller number of delivery vehicles. This can be achieved by implementing coordinated purchasing plans with key suppliers.

8.3.4 The DSMP will specifically address in detail the following:

- Recommendation for a management system to ensure that all deliveries will need to be pre-arranged with Estates Management and assigned a designated delivery window and location. This will have the following benefits:
- Avoidance of times with peak pedestrian/cycle activity;
- Improve security as only authorised deliveries should be on campus;
- Arrangements for servicing vehicles (for example for building maintenance, IT maintenance, dangerous substances, window cleaning), particularly the need for safety measures to be put in place.
- Provide recommendations for the use of delivery companies that can demonstrate their commitment to best practice. For example, using companies that are members of the Freight Operators Recognition Scheme (FORS). FORS is a membership scheme that aims to improve freight delivery. It provides a quality and performance benchmark in the freight industry and is designed to promote best practice for commercial vehicle operators. This includes all facets of vehicle safety, efficiency and environmental protection by encouraging operators to measure, monitor and improve the performance of their vehicle or fleet.
- Provide recommendations for delivery companies to use environmentally friendly vehicles, preferably zero emission vehicles.
- The possible introduction of electric charging point throughout the campus.
- Opportunities for using suppliers that use non-motorised modes of transport for both servicing and deliveries.

## 8.4 Construction and Demolition Transport Plans

8.4.1 Similarly, during construction or demolition of buildings within the Campus, a transport plan should be prepared by the contractor to demonstrate how the impacts of these processes will be managed and reduced as far as possible. This is to consider impacts on sustainable mode travel in the vicinity of these buildings as well as the traffic impacts of the construction and demolition processes themselves.

## 8.5 Parking Management Strategy

8.5.1 As set out in Section 6 of this report, a Parking Management Strategy has been prepared by PBA for the University of Kent to identify a series of short-term measures that could be implemented to address existing concerns regarding parking. It is recommended that this Parking Management Strategy is periodically reviewed alongside the University of Kent Travel Plan to ensure that the immediate concerns about parking can be addressed in a timely way.

## 8.6 Trip Management Tool

8.6.1 One measure that is recommended for implementation as a long-term action is the Trip Management System (TMS), a development planning and programming tool for Estates Management. This comprises a spreadsheet tool that can indicate the current and future trip demand and the adequacy of facilities.

8.6.2 It will aid with overseeing existing vehicular demand, travel plan statistics, the derivation of trip rates by use, occupant and mode, the composition of the MP's phased buildout by year, will help to identify deficiencies in supply and demand management over the lifespan of the masterplan, and will give a statistical output which could facilitate the management, implementation and securing of planning permission.

8.6.3 It is recommended that meetings are held with the local authorities on a six-monthly basis to communicate the current aspirations for applications within the coming six months. This will keep the local authorities up to date with projects coming forward, as well as an up to date picture of the amount of headroom created through the Travel Plan to date.

# 9 Summary of Measures

## 9.1 Summary of Measures

9.1.1 Figure 9.1 summarises some of the key Movement and Transport principles adopted within the Masterplan.

9.1.2 Table 9.1 provides a summary of the Masterplan measures set out in Sections 4,5 and 6 in terms of their contribution to the overall Masterplan objectives, priority, ease of delivery and anticipated timing. Their impacts on sustainable travel and the wider area are also summarised.

9.1.3 Whilst the delivery of some Masterplan measures are related to the delivery of buildings in the local area, there are infrastructure improvements identified which are not and therefore indicative timings for these have been established.

9.1.4 The timing of the implementation of the measures set out in this Table reflect the current priority of the measures at this point in time. However, it is essential that the timing of the measures in the Table and their priority is flexible to respond to funding opportunities as they arise and to reflect potential building opportunities that are not unknown at present that could help deliver infrastructure that is a lower priority currently.

9.1.5 For this reason, whilst the Table sets out the current position at the point of preparation of the strategy, the Table will become a 'live' document and will be incorporated within the Travel Plan document alongside the 'soft' measures already within the document. This will allow opportunities to deliver infrastructure to be reviewed on a regular basis as part of each planning application and Travel Plan review and to ensure the most up to date situation with regards to progress in delivery of schemes within the Masterplan is recorded within the Travel Plan.

9.1.6 Where there are significant opportunities or projects that could impact on the broader principles already established within the Masterplan Framework, this will be discussed with KCC and CCC to understand whether an update of the Framework Masterplan document and/or Movement and Transport Strategy document is required.

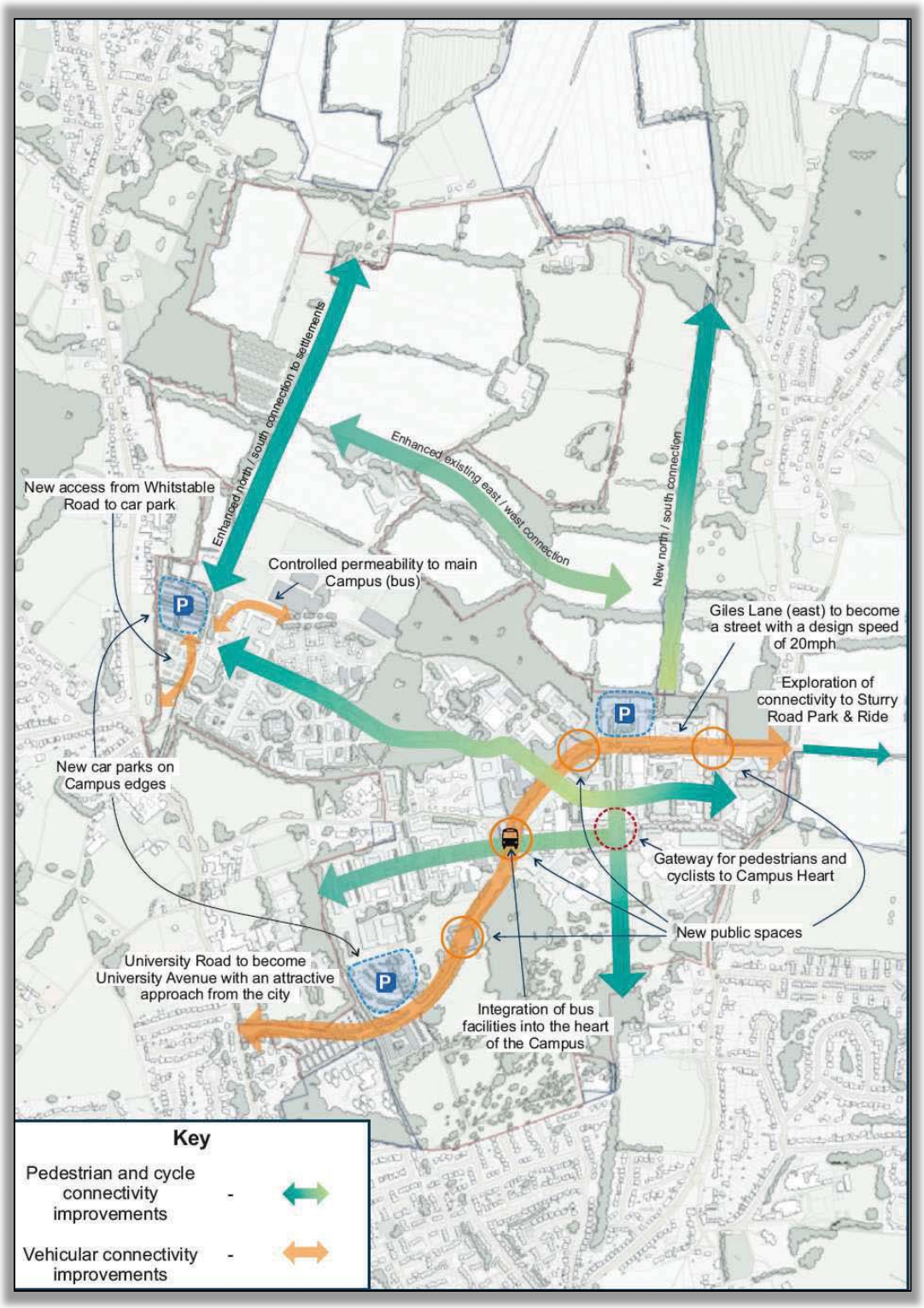



Figure 9.1 | Summary of Key Movement and Transport Principles

Table 9.1 | Summary of Masterplan Measures

| Description | Contribution to sustainable modes | Contribution towards Masterplan Objectives | Cost | Delivery requirements | Wider Impacts | Current Priority | Suggested review period and implementation timing subject to review* |
|---|---|---|---|---|---|---|---|
| Improvements to quality of existing cycle parking and consolidation where possible. | Improved attractiveness of cycling due to quality of parking and convenient locations. | Reduces dependence on car. | Low | Phased approach required. | None | High | New building applications, or if none through TP. |
| Supporting improved linkages to existing built up area north of Canterbury City through wayfinding and signage | Increases awareness of local walking and cycling routes and improves integration of the Campus with Canterbury City. | Improved legibility of sustainable connections in the Campus. Improved connectivity to wider area. Stronger connection with Canterbury. | Low | Approvals process | Improved legibility of sustainable connections between Campus and Canterbury City. | High | During TP period 2022 – 2025 |
| Implement Parking Management Strategy and car park barrier control systems | Improved pricing, management and enforcement of parking provide controls on the vehicles permitted to use the Campus at any one time. | Potential to reduce the dominance of the car within the Campus. Improved air quality within the Campus Heart | Medium | Design / approvals. | Incorporates commitment to work with CCC in the event of off-site parking problems caused directly by staff / students. | High | Implement according to timescales set out in strategy. Short term measures to be implemented during TP period 2020 – 2022. |
| Prepare and maintain a servicing and delivery plan | Plans timings and routes for deliveries that can avoid the busiest periods for pedestrians / cyclists. | Potential to reduce the dominance of the car within the Campus. | Low | Approvals. | Potential for consolidation of movements during quieter periods on the road network. | High | During TP period 2020 – 2022. |
| | | | | | | | |
| Re-locate arrival for pedestrians and cyclists away from rear of Eliot College | Improves arrival experience for pedestrians and cyclists. | Improved connectivity to wider area. Stronger connection with Canterbury | Low - Medium | No third party land constraints. | Improved arrival from Canterbury | Medium | During TP period 2025 - 2028 |
| Reinforcing significance of National Cycle Route 1 through signage and new infrastructure | Improved infrastructure for cyclists and increased visual presence of sustainable modes within Campus. | Improved legibility of sustainable connections in the Campus. | Low - Medium | Design / approvals process due to status as NCR 1. | Improved route for long distance cyclists. | Medium | During TP period 2022 – 2025 |
| Improvements to existing east-west spine route through Campus | Improved infrastructure for pedestrians and cyclists and reduces dependency on car for journeys cross-campus | Improved legibility of sustainable connections in the Campus. | Low - Medium | Design process required. | None | Medium | During TP period 2022 – 2025 |
| Explore opportunities for new cycle connections to Sturry Park and Ride and support the case for a northern entrance to Canterbury West Station | Improves strategic cycle connectivity with area of high travel demand, reducing the need to make journeys by car. | Improved connectivity to wider area. Stronger connection with Canterbury. | V.High | Not within the ability of the University to deliver. Land assembly. Stakeholder liaison and agreements. Wider partnerships and funding streams. | Improved connectivity to wider area, particularly the Rail Station. | Medium | Project not led by University, timing unconfirmed. |
| Offer integrated ticketing between bus and rail. | Provides seamless ticketing experience between the rail station and campus, reducing the need to travel by car. | Potential to reduce the dominance of the car within the Campus | Low | Subject to operator agreement. | Beneficial to the wider public also. | Medium | Review as part of TP and implement once available. |
| Upgrade of existing bus stops to transport hubs | Improves interchange experience for those travelling by bike and by bus. Increases visibility of sustainable modes within the Campus. | Potential to reduce the dominance of the car within the Campus and therefore create an improved sense of place. | Low - Medium | Design / Approvals process and stakeholder engagement. | High quality destination and waiting areas may increase propensity for visitors to travel to Campus sustainably. | Medium | New building applications, or if none in pipeline, to be implemented incrementally through TP |
| Implement electric vehicle charging technologies | Provides opportunity to improve air quality within Campus through change in composition of University Fleet. | Improved air quality within the Campus Heart | Medium | Requires understanding of local electricity infrastructure capacity. | Air quality improvements on routes used by electric vehicles. | Medium | New building applications, or if none in pipeline, TP to implement a trial. |

| Description | Contribution to sustainable modes | Contribution towards Masterplan Objectives | Cost | Delivery requirements | Wider Impacts | Current Priority | Suggested review period and implementation timing subject to review* |
|---|---|---|---|---|---|---|---|
| Consolidation of car parks and introduction of coach parking | Opportunity to displace parking from the heart of the Campus to the outskirts. Improve the environment for pedestrians and cyclists within the main campus. | Potential to reduce the dominance of the car within the Campus. Improved air quality within the Campus Heart | High | Phasing strategy required. | When completed with Whitstable Road access, provides opportunity to reduce vehicles cutting through Campus. | Medium | New building applications and incrementally through Parking Management Strategy. Western car parks linked to Whitstable Road Access. |
| | | | | | | | |
| New north-south pedestrian / cycle route between Tyler Hill Road, Woolf College and the Campus Heart | New infrastructure for pedestrians and cyclists, unlocks wider sustainable connectivity. | Improved connectivity to wider area. | Medium - High | Third party land constraint to north end of route. | Improved connectivity with Tyler Hill Road | Low | Beyond 2031 or with New building applications around Blean or Tyler Hill |
| Upgraded east-west pedestrian / cycle route (Footpath CB12) | Improved infrastructure for pedestrians and cyclists, unlocks wider sustainable connectivity. | Improved connectivity to wider area. | Medium | Legal costs with PROW upgrade. Design / approvals process. | Improved connectivity between Tyler Hill and Blean | Low | |
| Footpath and crossing improvements around Tyler Hill Road and completion of east-west cycle link between Blean Village and Tyler Hill. | Improved infrastructure for pedestrians and cyclists, unlocks wider sustainable connectivity. | Improved connectivity to wider area including Blean Church. | Medium - High | Legal costs with PROW upgrade. Design / approvals process. | Improved connectivity between Tyler Hill and Blean | Low | |
| Cycle hire hubs | Provides an on-site travel alternative for staff or visitors who may have travelled to the Campus by car. Encourages short campus trips by bicycle. | Reduces dependence on car for short journeys. | To be obtained from hire hub operators. Likely to be Medium. | Maintenance considerations and hidden cost of vandalism / lost bikes. Viability assessment required. | None – unless part of a city wide scheme. | Low | Viability assessment programmed during TP period 2020 – 2022. If viable, implemented in TP period 2022 – 2025. |
| Redesign of existing bus turnaround facility | Integrates buses within the heart of the campus, improving visibility of buses and encouraging travel by modes other than the car | Creating an improved sense of place within the Campus heart. | Medium | Stakeholder Liaison. Design / approvals process. | Improved arrival experience for visitors | Low | Linked to provision of a bus access to Whitstable Road |
| New access to Whitstable Road and provision of associated parking | Opportunity to improve bus circulation and penetration and to displace parking from the heart of the Campus to the outskirts. | Improved connectivity to the wider area and opportunity to create an improved sense of place within the Campus heart. | Medium – High | Design / Approvals process. Potential third party involvement if Blean option pursued. | Opportunity to improve drop off-provision at Blean School and Oaks Nursery. | Low | During TP period 2025 – 2028 |
| Trial extensions to existing Park and Ride services (subject to bus operator agreement) | Provides strategic sustainable transport links to key areas of demand, reducing dependence on the car. | Potential to reduce the dominance of the car within the Campus and therefore create an improved sense of place. | Low | Stakeholder approval required. | Provides wider sustainable mode connections to the Campus | Low | During TP period 2025 – 2028 |
| Electric shuttle system | Provides all-weather transport method, can link Campus and potentially beyond, subject to feasibility. | Improved connectivity to the wider area and opportunity to create an improved sense of place within the Campus heart. | High | Technology in infancy currently. Design / approvals requirements also. | Provides wider sustainable mode connections to the Campus | Low | Beyond 2031 or sooner if technology is present. |
| Park and Ride site to the north of Canterbury | Provides opportunity to intercept car trips that would usually travel into Canterbury City Centre | Reduces pressure on local roads. | High | Land assembly. Stakeholder liaison and agreements. Wider partnerships and funding streams. | Potential to intercept trips from north. But also potential to abstract from existing bus services on corridor. | Low | Beyond 2031 or sooner if opportunity arises. Project not led by University. |

* The Table above reflects the measures committed within the Masterplan. The timing of the implementation of the measures set out in the Table reflect the current priority of the measures at this point in time. However, it is essential that the timing of the measures in the Table and their priority is flexible to reflecting funding availability and opportunities as they arise and to reflect potential building opportunities that are not unknown at present that could help deliver infrastructure that is a lower priority. For this reason, whilst the above Table sets out the current position at the point of preparation of the strategy, the above Table will become a 'live' document and will be incorporated within the Travel Plan document. This will allow opportunities to deliver infrastructure to be reviewed on a regular basis as part of each planning application and Travel Plan review and to ensure the most up to date situation with regards to progress in delivery of schemes within the Masterplan is recorded within the Travel Plan.

# 10 Summary

## 10.1 Summary

10.1.1 This report represents the Transport & Movement Strategy associated with the University of Kent's Framework Masterplan which is a requirement of the Canterbury Local Plan.

10.1.2 This document provides detail on the physical transport elements of the proposed masterplan in terms of modal strategies for Walking and Cycling, Public Transport, Vehicular and Car parking. However, and in addition, it also provides a planning related framework for growth based around a commitment to cap traffic at 2018 levels but at the same time accommodate growth in plan led development floorspace through the continued application of the already successful and implemented Travel Plan. This approach is consistent with KCC and CCC policy which looks to support economic growth without the need for significant junction or road building schemes.

10.1.3 The implementation of the physical measures and the management reports will be undertaken throughout the lifetime of the masterplan and these will be used to ensure that the commitment to no development related traffic growth is kept and monitored accordingly.

10.1.4 Whilst the masterplan and the annual transport monitoring provides the framework for planned growth, the statutory planning processes and technical reporting still is required to be undertaken to support developments and the Transport Assessment process needs to be completed in association with the requirements of the Highway and Planning Authorities.

10.1.5 This document, as part of the wider masterplan, represents an opportunity for the University to continue to grow and to contribute to the Canterbury economy, the Canterbury sustainable transport networks and without compromising the ability of people to move around and undertake their daily lives.

# Appendix A Hamilton Baille Traffic Report (2018)

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**UNIVERSITY of KENT**

**Traffic flows in and around the Canterbury Campus**

**Background**
The University of Kent is engaged in the preparation of a Framework Masterplan for the Canterbury Campus and nearby University-owned land. The Framework will bring together a number of spatial, planning and environmental strategies to establish a long-term direction and set of guiding principles for the evolution and enhancement of the Campus.

The Framework builds on a thorough analysis of the widely varying character areas that make up the context and surroundings of the Campus. A key part of this analysis involves developing an understanding of patterns of movement and transport, both within University-owned land and through the network of routes and roads in the surrounding slopes of north Canterbury. The observations and surveys are intended to inform the range of options for consolidation, growth and change, and to understand where interventions may best serve both the University and its activities and the transport network as a whole.

The information concerning movement and travel patterns builds on two sources. The first is an annual survey of the travel patterns and preferences of staff and students within the University, supplemented by information from parking figures and permits and similar sources. The second involves a series of traffic counts and recordings commissioned by the University to gain a snapshot of vehicles and flows on the key through routes surrounding and passing through the University Campus. The information is shared with Kent County Council and with Canterbury City Council.

**Data Collection – Stage One**
Traffic counts have been undertaken in two stages. The first stage focused on the University Campus to obtain a record of traffic flows at the three main entry points at University Road, Giles Lane West, and Giles Lane East, together with a count of flows along the A290 Whitstable Road to the west of the Campus and St. Stephen's Hill to the east. The junction of University Road with Giles Lane at the centre of the Campus was also recorded.

*Figure 1. Stage One collection sites*

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Traffic was recorded over two hour morning and afternoon periods selected to cover the peak periods for traffic flows. These were 7.30 – 9.30 AM, and 4.30 – 6.30 PM. The counts were collected from cameras mounted on masts, and divided into 15 minute intervals. Numbers of all vehicles were recorded, broken down into private cars / taxis, motorcycles, bicycles, light goods vehicles, and two categories of heavy good vehicles.

The cameras mounted at each junction were also able to record and compare registration plates to obtain information about the proportion of through traffic compared to traffic solely associated with the Campus. These identified any vehicles entering and leaving the Campus within a 15 minute interval, including those entering and exiting at the same point.

The comparison of registration plates also allowed information to be recorded on the time taken by vehicles passing through the Campus, allowing some overview of speeds and congestion during the periods recorded.

**Data collection – Stage two**

The second stage of traffic recording was undertaken in January 2018. This aims to complete a wider picture of flows on the network surrounding the Campus, focusing on roads where traffic associated with the University may be a significant component. This included the flows through the nearby communities of Blean, Tyler Hill and Rough Common, as well as traffic using the main routes to and from Canterbury. The survey also gathered some information on speeds on the two busy roads through Blean and Tyler Hill.

*Figure 2. Stage Two collection sites*

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**Stage One – Campus flows**

The summary diagrams below, Figures 3 and 4, provide an overview of typical midweek flows across the Campus. The numbers indicate the volume of all traffic entering and exiting each of the four recorded junctions. Vehicles using the unnamed road ridgeline road east of St Stephen's are so few as to be insignificant.

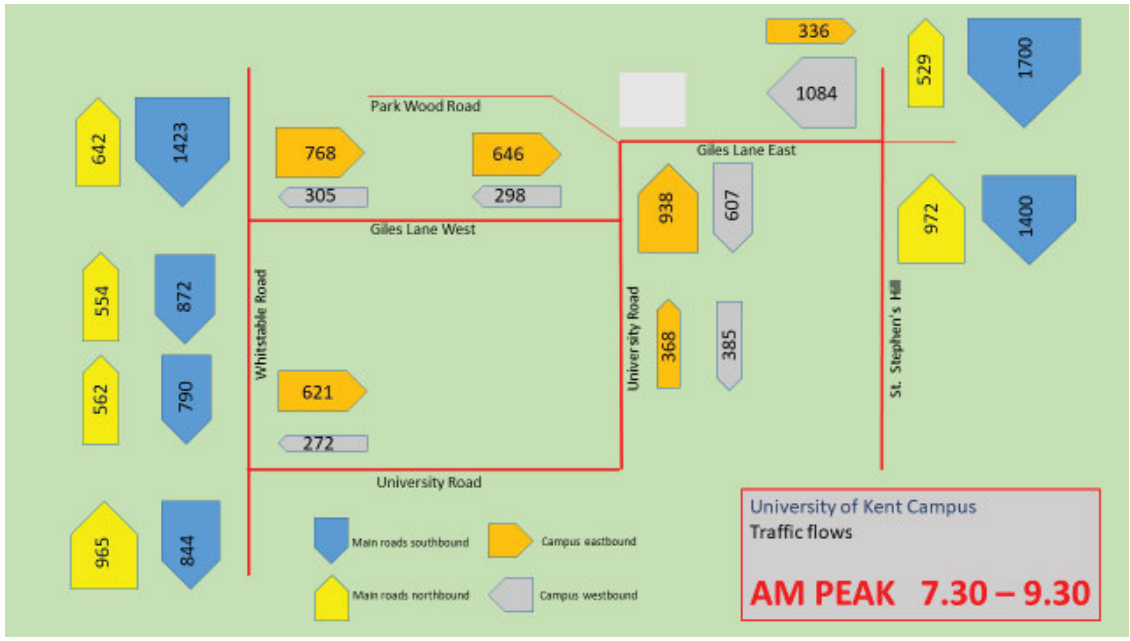


*Figure 3. Total vehicle flows over two-hour AM peak*

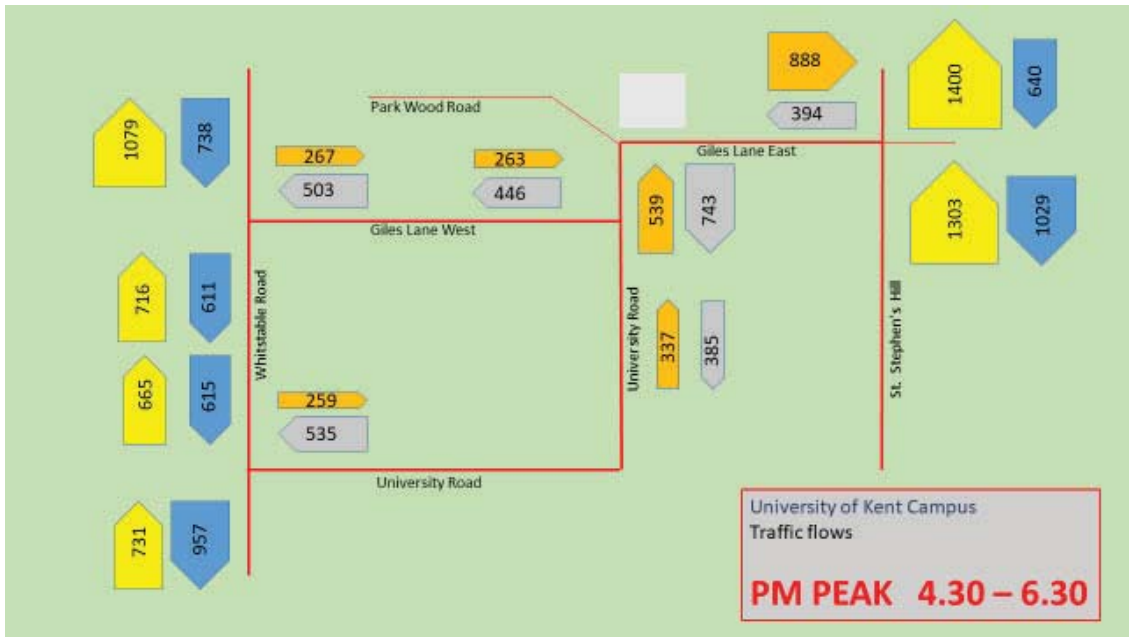


*Figure 4. Total vehicle flows over two-hour PM peak*

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**Observations**
The flows highlight the very high volumes of traffic on both north-south routes in and out of Canterbury. As expected, there is a significant tidal flow into the City during the morning, and out in the evening. But the flows in both directions remain very high in both directions throughout the peak hours. The unclassified St. Stephen's Hill carries higher traffic levels than the A290 Whitstable Road, with numbers that would suggest around 12,000 vehicles per day (vpd) using the former compared to a little over 11,000 vpd on the latter. The variations in numbers reflect the activity around local destinations, and one can observe, for example, the effect of St. Edmund's School on the Whitstable Road flows.

Within the Campus itself, the main observation concerns the volume of overall flows on Giles Lane East during the morning peak hours. Giles Lane car park clearly exercises a significant influence on the patterns of flow. Giles Lane West carries substantially more traffic than the much wider University Road. Relatively little of such traffic disperses to destinations on Giles Lane West. By contrast the Innovation Centre, Turing and Keynes Colleges appear to account for a significant amount of traffic using University Road.

An analysis of traffic flowing into the Campus (Figure 5, below) illustrates the relative weighting of vehicles between the three entry points. Traffic coming in from Whitstable and the A299 and turning into Giles Lane West creates the largest single source of traffic. However Giles Lane East carries incoming traffic evenly split between traffic coming from the north of Tyler Hill and from the City to the south. More traffic approaches the Campus from the north than from the south.

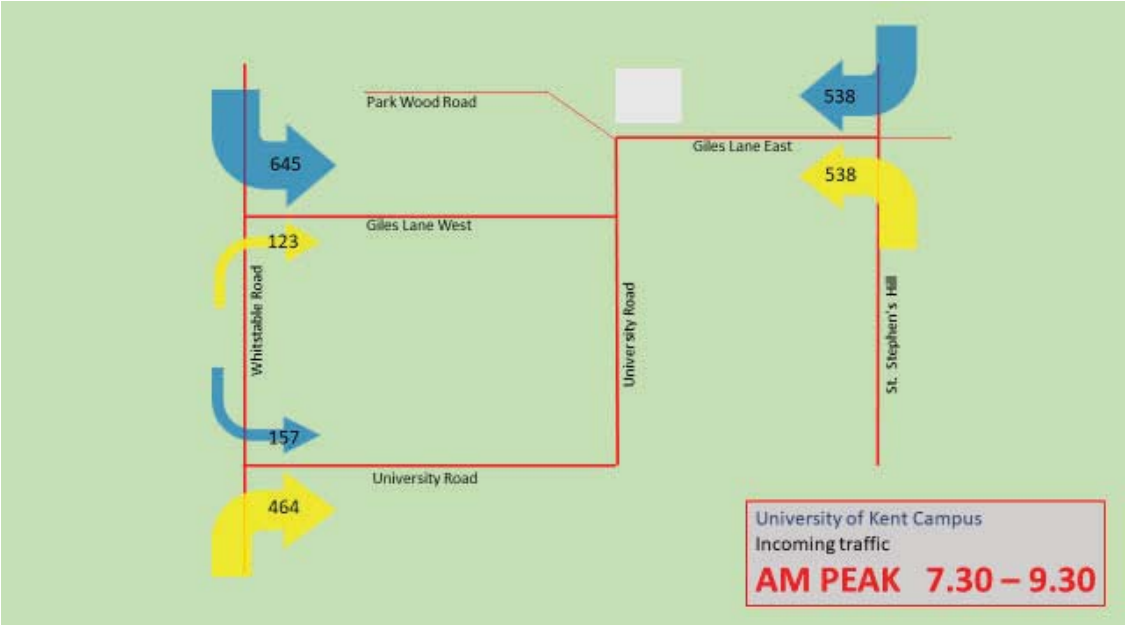


*Figure 5. Vehicle numbers entering campus over two-hour AM peak*

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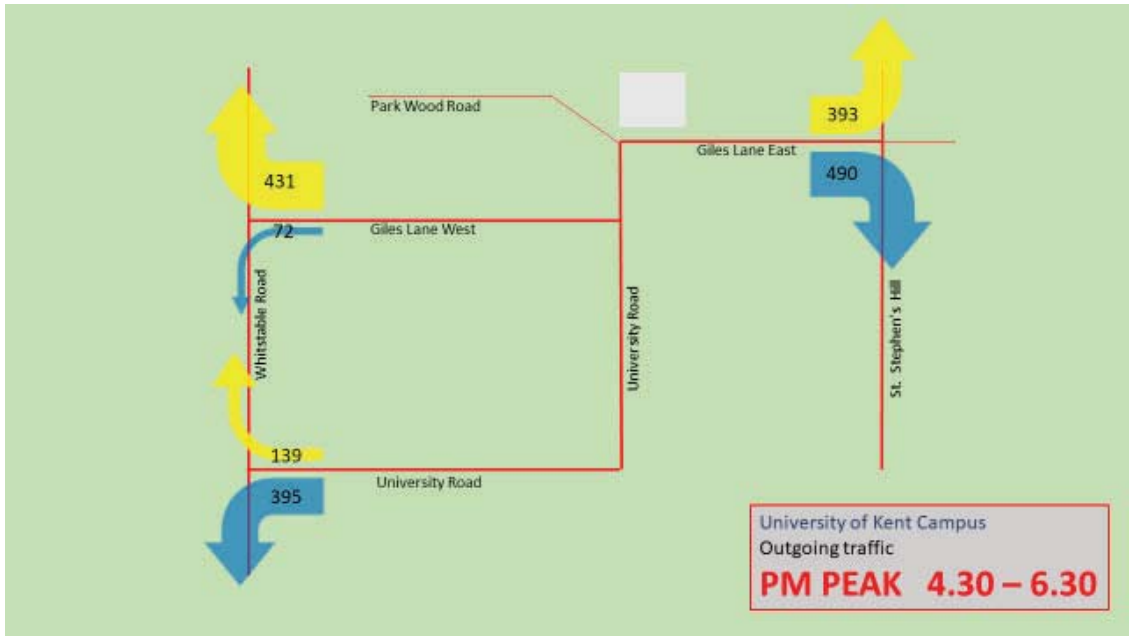


*Figure 6. Vehicles exiting campus over two-hour PM peak*

The afternoon flows of traffic out of the Campus illustrate the relatively even balance between vehicles heading east and those heading west. Again, Giles Lane East carries the highest load. The direction of outgoing traffic is also evenly split between traffic heading north and south out of the Campus.

**Through traffic on the Campus**

It is clear that the Campus network plays a significant role in providing east-west links between Whitstable Road and St. Stephen's Hill for traffic that is not associated with the University. Matching number plates at entry and exit points gives some broad indications of the contribution that through traffic adds to the volume of vehicles generally on the campus roads. To build this picture we have assumed that any vehicle that enters and exits via different points within a 15 minute interval can be assumed to be "through traffic". Of course, some of these may be picking up or dropping off passengers (such as taxis and some buses), and so may be traffic associated with the University. Nevertheless, the information gives a general overview of the volumes cutting through the Campus, using either Giles Lane or University Road.

The survey indicates that through traffic makes up between 20 - 30 % of the morning peak hour traffic, falling off towards the end of the AM peak. 8.00 to 8.30 AM sees the highest proportion during the morning. Through traffic appears to be fairly evenly distributed between both University Road and Giles Lane, and there is no particularly significant differences in direction of flow, east or west.

It is important to note that the survey may not identify those drivers using the Campus roads to access Blean School, and who may either take longer than 15 minutes to drop off pupils, or who

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may then exit by the same route by which they entered. Although not strictly "through traffic", such vehicles may add a significant proportion to the overall Campus traffic during school drop-off and pick-up times.

Fig 7 below illustrates the pattern of through traffic during the morning period, with the higher proportions occuring during the 8.00 – 8.30 period.

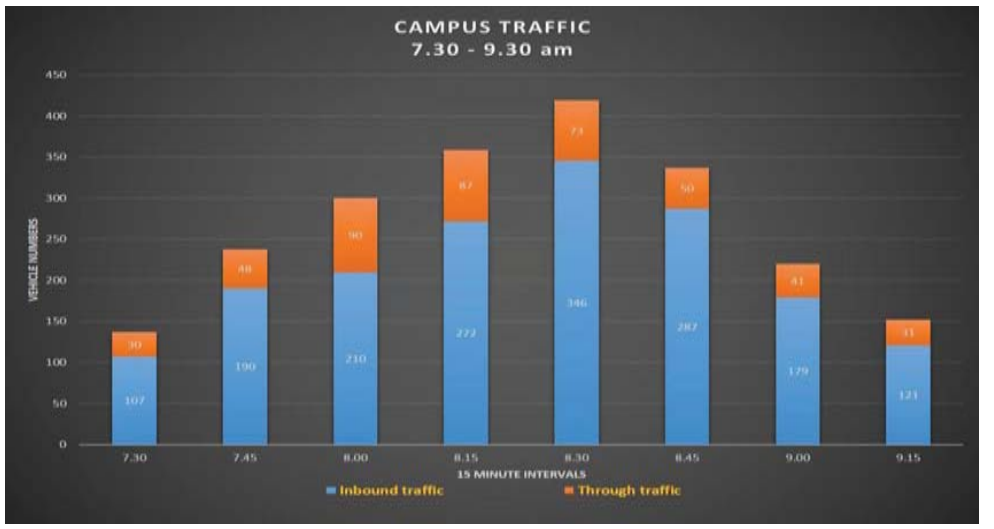


*Figure 7. In-bound and through-traffic. AM Peak*

Through traffic forms a much more significant component of the picture during the PM peak period. Flows are less concentrated than during the AM peak. With congestion and delays consequently lower, it is likely that more drivers calculate that a route through the Campus may save time. During the first part of the afternoon rush hour, through traffic can account for 73% of all traffic, and the proportion could well be even higher in the period before the times recorded.

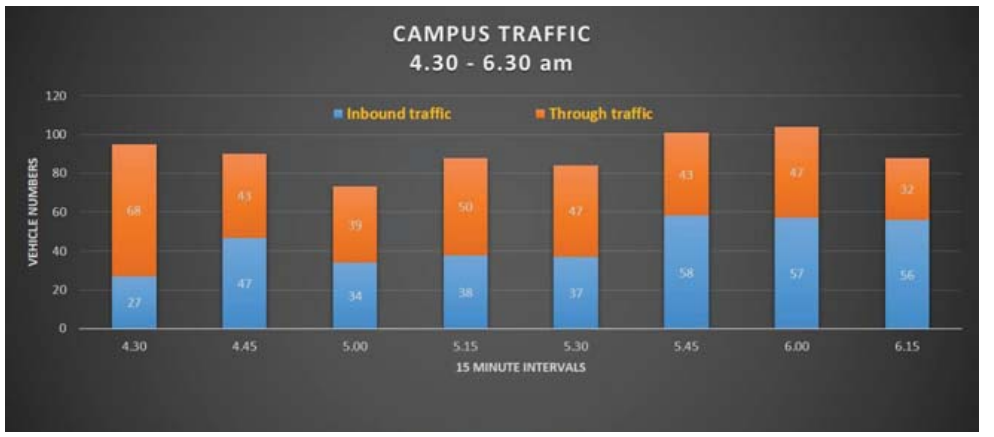


*Figure 8. In-bound and through-traffic. PM Peak*

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Some caution is necessary in drawing conclusions from through-traffic surveys of this kind for two reasons. Firstly, any inaccuracies in the cameras' ability to identify and match vehicle registrations will tend to under-record the numbers. We have no indication from the survey date to suggest any problems, but any failures will tend to under-represent the proportion of through-traffic. Secondly, driver decisions concerning routing (increasingly aided by GPS systems), will be strongly influenced by expectations and perceptions of congestion. Thus through traffic volumes will tend to be lower when University traffic is busiest.

**Traffic growth within the Campus**

Traffic flows were recorded on the three vehicular entrances to the Campus in 2004, as part of the transport assessment for Woolf College. Some caution is required when making comparisons from different times, with inevitable variations in recording techniques. However we have taken care to ensure that the methodology and recording techniques followed the earlier counts as closely as possible. Figure 9 illustrates the comparitive vehicle flows during the peak am and pm periods both into, and out of, the Campus.

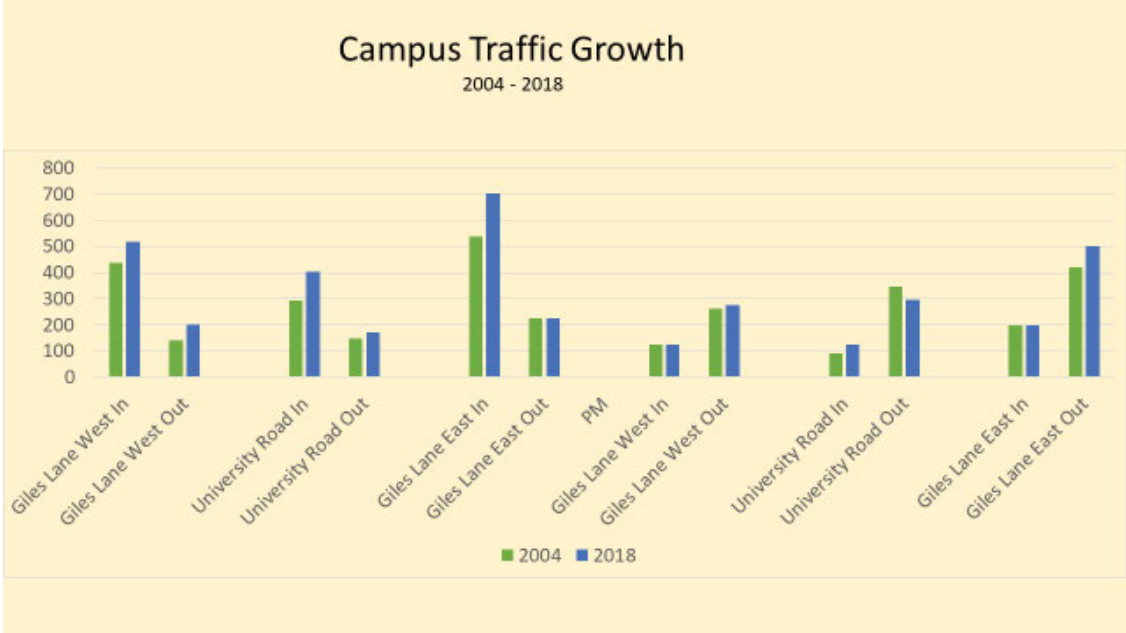


*Figure 9. Comparative Campus flows – 2004 - 2018*

Given the overall increase in students and faculty since 2004 and the additional floorspace created, the growth in vehicle numbers is less than would be expected. This may reflect the ongoing measures introduced as part of the Travel Plan for the University, which has evidently succeeded in supressing overall traffic growth. The figures also illustrate a notable shift in emphasis towards Giles Lane East and St. Stephen's Hill as the increasingly dominant exit and entry point for the Campus.

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**Speeds**

The timings for entry and exit to and from the Campus can give some indication of journey times, and therefore speeds, of vehicles cutting through the Campus. Of course the majority of through trips are determined by minor congestion, and the general speed of traffic movement, and thus will vary throughout the day. The east west routes across the Campus are close to a mile in distance (1.45 km for Giles Lane, and 1.65 km for University Road). The average time for vehicles to cross the Campus is just over 4 minutes, giving speeds average speeds of around 13-14 mph. However, a significant number of cross-Campus trips are recorded at less than 2 minutes, or over 30 mph average speed. The fastest recorded trip was 97 seconds, or close to 45 mph, which suggests that some of the speeds on campus can be alarmingly high. Such extremes tend to take place early in the peak hour, or late afternoon (6.00-6.30 pm), but indicate that some drivers are taking little heed of the Campus context.

Speed data was also captured for traffic moving both northbound and southbound through the villages of Blean and Tyler Hill. The recordings for Blean were made on the A290 Whitstable Road, just south of the junction with Tyler Hill Road, on the slope down towards the Blean Tavern. The recordings for Tyler Hill were also on the south side of the village, just south of the junction of Hackington Hill (the extension of St. Stephen's Hill) with Summer Lane. Both sites are within the 30 mph speed limits.

The significance of typical daytime speed patterns in these two villages lies in understanding the potential for measures to change driver behaviour and expectations on the key roads approaching the University. By observing existing speeds, it is possible to identify the gap between the way traffic responds to the roads as they stand, and speeds that would ideally suit both the specific context and the aspirations for slower, steadier speeds suitable for mixed use by pedestrians, cyclists and others.

Tyler Hill speeds are slightly faster in the southbound direction (approaching Giles Lane), with 85% of traffic just over 32 mph. Such speeds are higher than are appropriate for the relatively narrow, winding carriageway, lacking footways. Speeds are more moderate at around 30mph on the uphill approach to the pub in Tyler Hill.

Speeds through Blean are higher. Here the northbound traffic entering the core of the village is faster,with 85 percentile averages of 42 mph, and instances of speeds as high as 53 mph. Southbound traffic approaching Blean School averages 36 mph, with some instances travelling at 44 mph. These sample recordings provide a benchmark for measures to modify speeds in line with aspirations for longer-term changes in and around the University.

**STAGE 2 – NORTH CANTERBURY TRAFFIC FLOWS**

The University of Kent's location just to the north of Canterbury places it at at the convergence of two significant radial routes serving the City from the north, and at a point where flows between east and west generate substantial movement between these radial routes and across the north of the urban area. Traffic associated with Broad Oak and Sturry to the east and north-

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east combines with traffic from the A2 around Harbledown to generate movement across the radial routes, using various combinations of routes, routes that are much more disjointed and indirect than the more strategic A28 to the south of the City Centre.

A clearer picture of the volumes and characteristics of the major traffic flows in and around the Campus can be gained from morning and early evening counts on the key routes carried out in January 2018. In addition to establishing an understanding of the relative significance of the major routes, the counts were repeated and timed to assess the relative impact of the University activity on overall traffic flows. The counts were timed to record flows both during University termtime, as well as during vacation but when local schools were open.

Figure 2 outlines the location of the counts, and Figure 10 (below) simplifies the basic network for recording purposes. The analysis focuses on the two major north-south routes of Whitstable Road and St. Stephen's Hill, and their main east-west cross routes. These consist of Forty Acres Road / Beaconsfield Road, the University Campus routes of Giles Lane and University Road, and (to a much smaller extent) Tyler Hill Road between Tyler Hill and Blean. In addition, counts were taken for traffic flows through the adjacent communities of Rough Common (a significant route to and from the A2), and through Hayles Place via Downs Road to pick up traffic connecting with Broad Oak Road (the B2248) to the east. A count at Giles Lane East allows the two stages of traffic counts (the Campus flows and the surrounding network) to be correolated and checked.

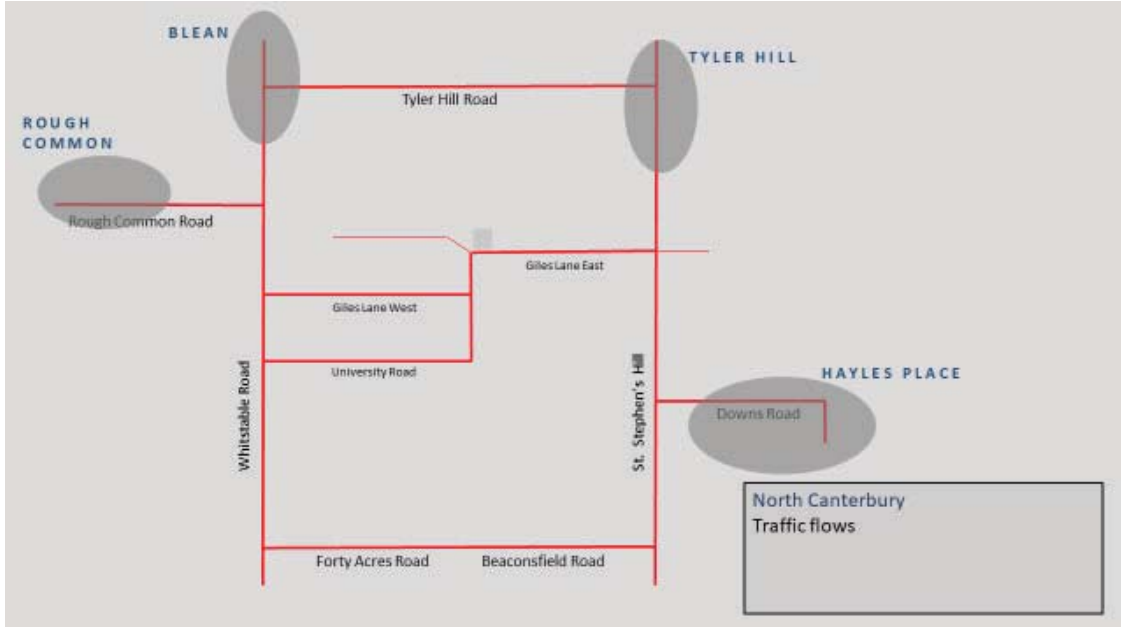


*Figure 10. Diagrammatic network of North Canterbury routes*

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**Observations**

The counts provide a very large set of data to provide analysis of the patterns of movement throughout the busiest periods of weekdays, sub-divided into vehicle classes such as private cars, commercial vehicles, buses/coaches and bicycles. Whilst these allow a great deal of detail to be drawn from the survey, the following diagrams provide an overview of the flows, morning and afternoon, for both vacation time and term time.

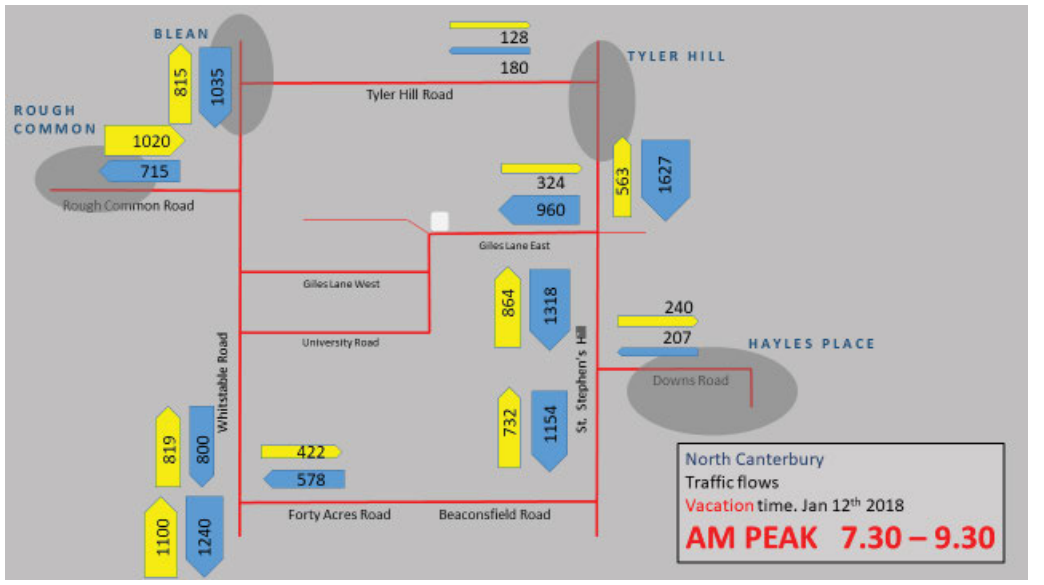


*Figure 11a. Vacation time / school term AM flows*

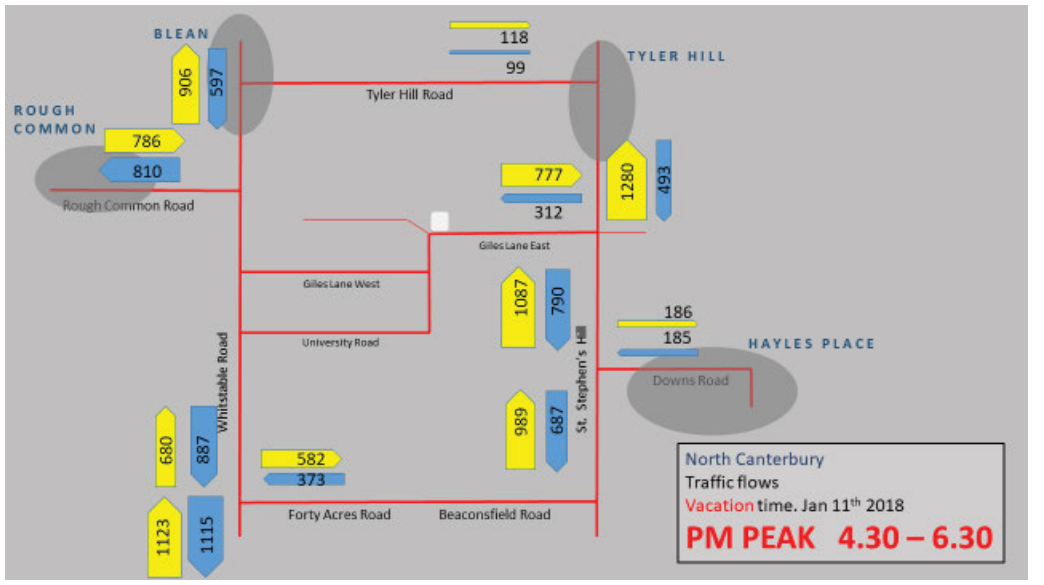


*Figure 11b. Vacation time / school term PM flows*

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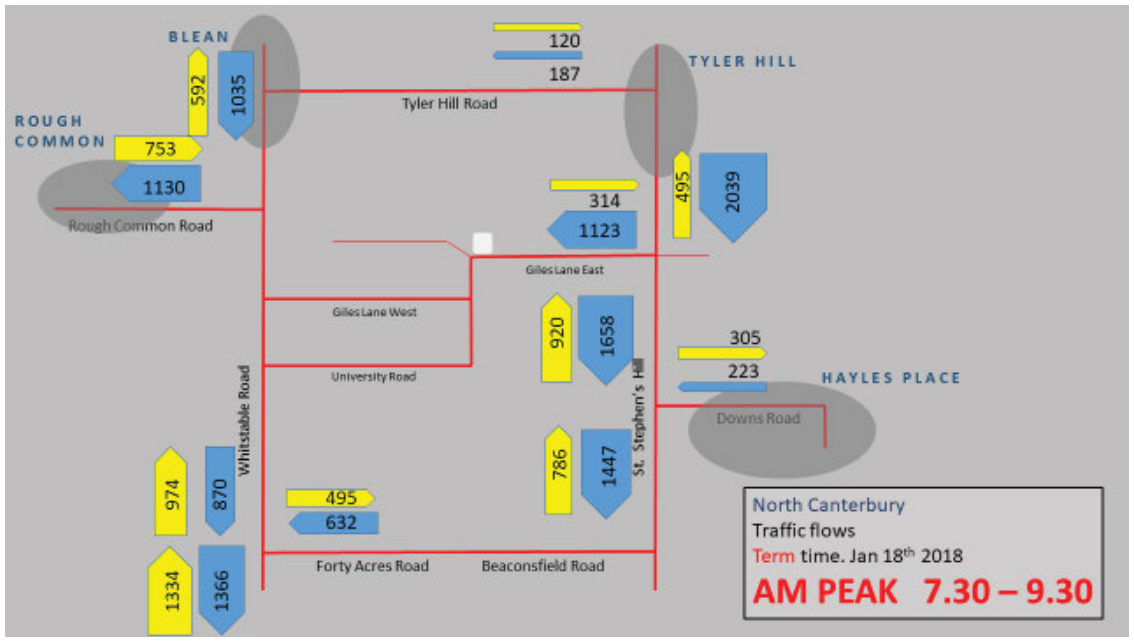


*Figure 12a. Term time AM flows*

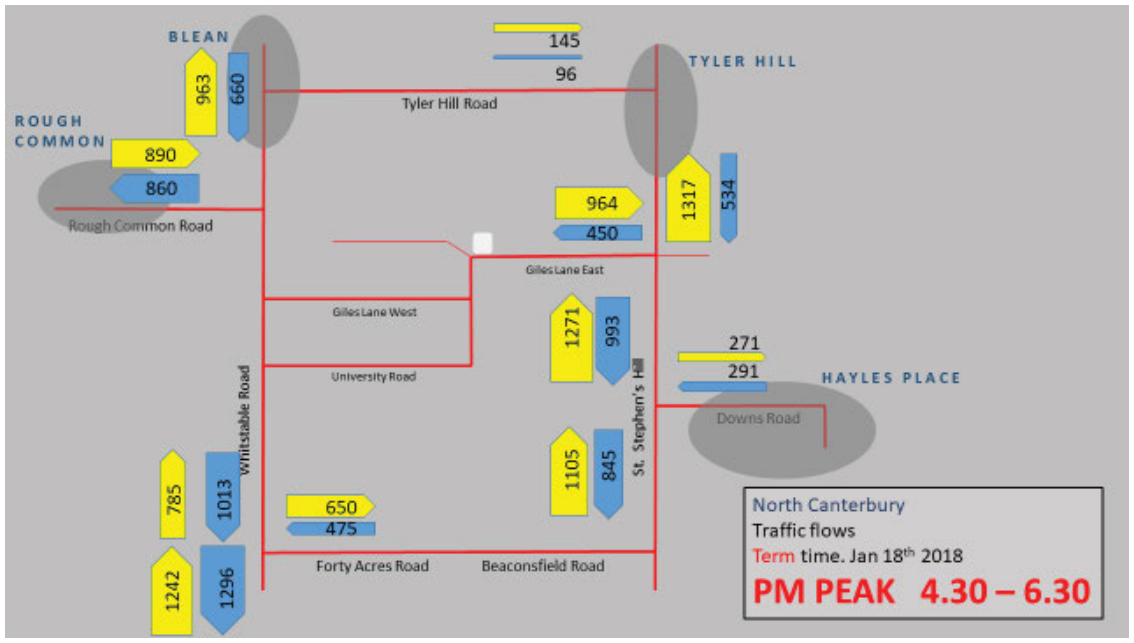


*Figure 12b. Term time PM flows*

For those familiar with the University area and the surrounding roads, the figures themselves do not reveal any major surprises. However a few of the findings are worth highlighting to fill out an overall picture of the traffic flows relevant to long-term masterplanning.

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- The north-south connections between Canterbury and the communities along the north Kent coast connected by the A229 are the dominant flows, in both directions. Although the flows are tidal, with traffic flowing into the City during the morning, busy flows continue in both directions throughout the day. In comparison to the 2004 figures, the flows are becoming LESS tidal, with numbers associated with reverse commuting rising.
- East-west traffic is distributed between the routes through the Campus, and the Forty Acres Road / Beaconsfield Road connection, along with North Lane further to the south. Congestion and expectations of delays appears to supress through traffic across the Campus during term-time mornings, with high volumes continuing to use Giles Lane in particular during University vacation time.
- Tyler Hill Road, the minor rural route to the north of the Campus, carries relatively low flows, both during vacation and term times. There are higher flows from east to west (towards Blean) during the mornings, with the proportions reversing during the afternoons, but the numbers of vehicles (despite a high proportion of light commercial vehicles) remain comparitively low.
- Rough Common Road carries high flows, in both directions, throughout the day. Although used by buses and coaches as the connection with the A2, such vehicles make up only a small propoportion (1 – 2%) of the overall mix. Commercial vehicles, large and small, contribute around 8-9% to the flows.
- The route along Downs Road and Farleigh Road through Hayles Place absorbs between 10 – 15% of the traffic from and to the eastern edge of the City, traffic that otherwise flows to and from St. Stephen's Road / Hill past the Kingsmead area and Broad Oak Road. Along with St. Stephen's Hill more generally, this is a part of the network that shows significant increases in traffic during University term time.

**Traffic generated by the University**

The opportunity to repeat traffic counts during University vacation and term times provides a means to establish an approximate picture of the additional vehicle numbers generated by the University. Of course, University traffic will vary over the course of a year, with special events and other variations, and there will continue to be some movement associated with the Campus out of term time. Nevertheless, as by far the largest employer in the North Canterbury area, it is helpful to have the means to assess the impact of University term-time traffic.

Three major schools on, or close to, Whitstable Road, and the Archbishop's Seconday School accessed off St. Stephen's Hill, are likely to contribute a significant amount of traffic, especially during the AM peak. Nationally, schools can contribute to around 25-30% of AM peak hour traffic, although this proportion is highly dependent on the quality of the bus services.

Analysis of the two sets of traffic counts suggests that overall flows in the immediate surroundings of the Campus increase during term time. But the increase is not as significant as the volume of traffic entering the Campus might suggest. Figures 13 provide an overall summary of the increases over the various sections of the immediate network. The increases are generally higher on the eastern side of the Campus (St. Stephen's Hill and Downs Road).

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Overall University traffic appears to generate somewhere between 11% and 15% of the mix across the day.

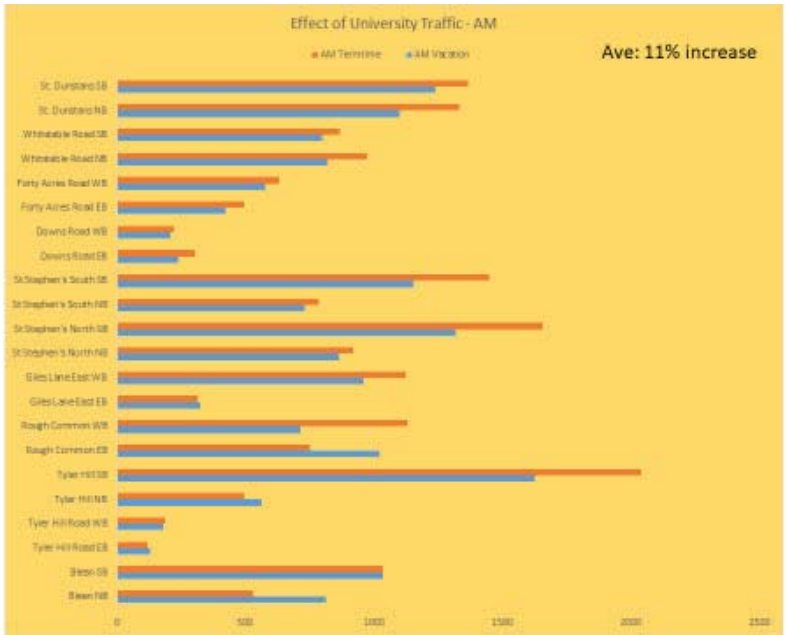


*Figure 13a. University traffic. Vacation & Term time. AM*

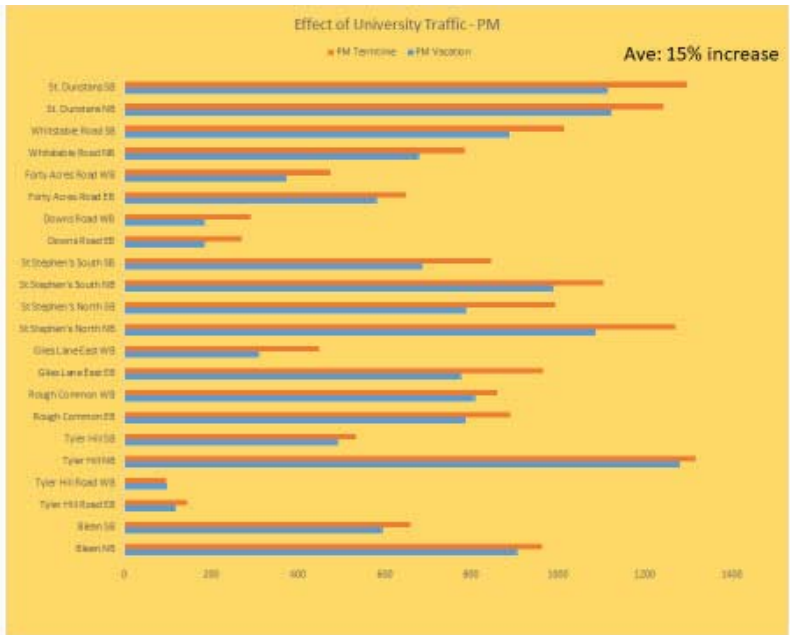


*Figure 13b. University traffic. Vacation & Term time. PM*

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**Bicycle traffic**
The traffic counts record the numbers of cyclists passing through each of the selected junctions. However this provides only a partial picture of bicyle movements generally across the Campus, with numbers only for those using the main road routes. It is likely that most of the cycle trips take place off-road, especially on the Crab & Winkle Way. All three vehicle entry points to the Campus record low, steady flows of cyclists, mostly less than 20 during either of the two-hour recorded periods, with the highest flows using University Road towards the City during the PM peak. Bicycle traffic is busier on Whitstable Road generally, with very few braving the traffic on St. Stephen's Hill. Overall, the proportion of 1-2% of cycle traffic is low for typical university towns or large campus, but this figure only reflects those on-road cyclists mixing with peak-hour traffic on the steep hills.

**Other traffic mix**
Light goods vans make up between 5 – 7% of the traffic flows on the Campus, with higher flows in the 7.30 – 8.30 AM period. Larger heavy goods vehicles form a very small proportion of the overall flows; as expected most of these enter and exit via University Road or Giles Lane East. Public service vehicles such as buses and coaches make up 4 – 5 % of traffic flows, with the highest flows using University Road.

**Conclusions**
The traffic data gathered for both the Campus itself, and for the surrounding highways, does not generate many unexpected findings. The quantity of traffic on the unclassified St Stephen's Hill (and its various names as it winds north of Tyler Hill) is notable, with volumes generally exceeding Whitstable Road to the west. The picture highlights the potential benefits for any initiatives, such as 'Park-and-Ride' facilities, that could intercept and diminish flows, especially from the north close to the A229.

With the volumes of traffic seeking to make east-west connections across the north of Canterbury, the traffic counts highlight key long-term questions about the role of the Campus, and potentially a new connection to Park Wood Road, in meeting or facilitating this aspect of travel demand. There are no realistic options for any additional relief road to the north of the Campus, there is an important debate to be had concerning the potential role of the University in exercising a growing degree of control or filtering in order to supress traffic demand by limiting driver expectations for east-west movement.

Despite the high volumes on the main north-south and east-west routes, the counts do not indicate an expecially high rate of increase overall in traffic numbers. In common with the national picture, traffic loads are spreading out across the day, and the tidal effect of commuting is diminishing as traffic becomes more evenly spread in both directions. The changing patterns of traffic probably reflect the influence that congestion, and expectations of delays, can have on travel choices and timings. Traffic expanding to fill any available capacity in the system may suggest that, as many transport planners observe, become the expected condition of the network, with any additional capacity merely providing short-term relief. In

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such circumstances, limiting the network and the use of filtering and routing controls may become the primary means to cope with changes and expansion in the built environment.

# Appendix B Whitstable Road Access Review

## Introduction

B.1.1 A high-level assessment has been carried out for a proposed access on to Whitstable Road for the University of Kent based on freely available online information, sources of information include OS mapping data and satellite images. The proposed vehicular access is to be used by buses, for all movements excluding right in. The speed limit of Whitstable Road is 30mph, as such the assessment has been carried out in accordance with Manual for Streets (MfS).

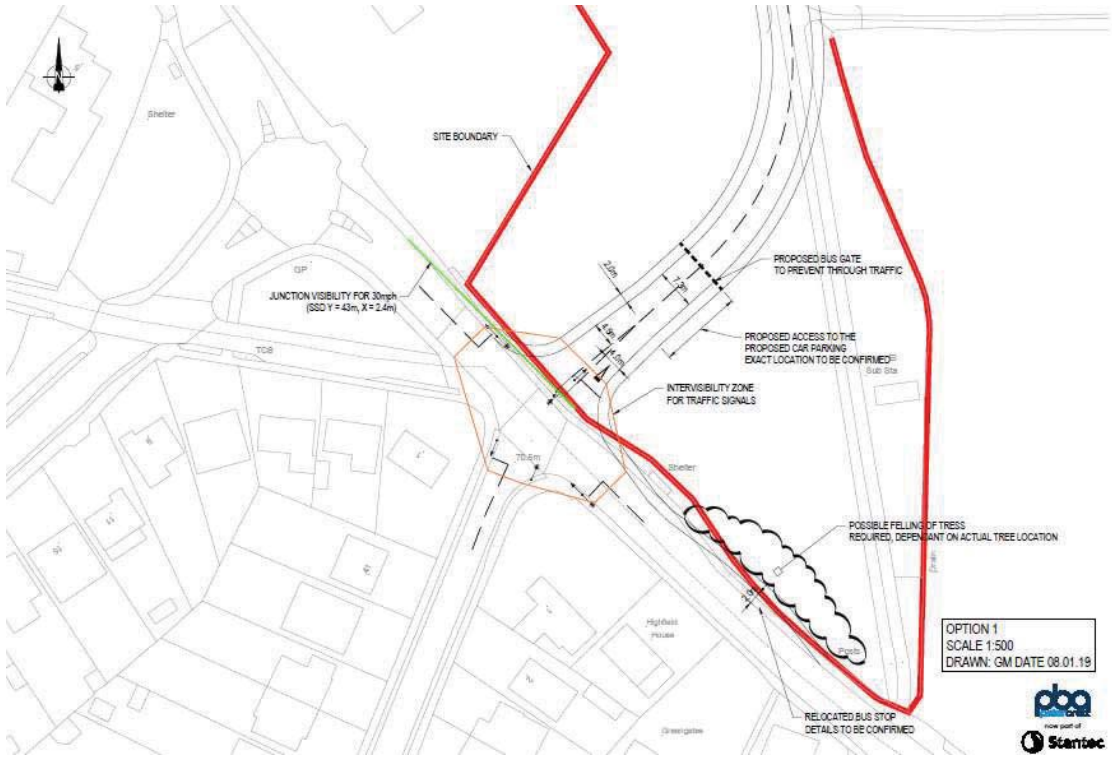
B.1.2 Two options have been considered for this appraisal with the following assumptions:

- Highway boundary at the back of footpath
- Outside of flood zones (based on Planning Constraints Map, Canterbury City Council)
- Outside of designated Rough Common Green Gap (based on Planning Constraints Map, Canterbury City Council)
- Trees not protected by TPO (based on Planning Constraints Map, Canterbury City Council)
- No account has been made for drainage and utilities. Based on satellite imagery, there are a few existing gullies and manhole covers that may need to be relocated.
- Drainage for the new hardstanding area will have to be considered separately. The area to the north of the car parking could be used as a possible location for an attenuation feature, subject to levels design and overall drainage strategy.
- The existing gas main in the footpath to be lowered. Depth of gas main to be confirmed.

## Option 1 – Signalised Junction

B.1.3 This arrangement provides a new signalised junction on to Whitstable Road. An initial signalised junction layout has been provided in Sketch 1. The layout has been tracked using a large bus (12m) and junction visibility has been assessed in accordance with MfS (SSD 43m for 30mph). A pedestrian refuge has been shown so that an adequate crossing facility can be provided for pedestrians.

B.1.4 This arrangement can accommodate all traffic movements and with appropriate signal head / sign layout can control traffic movements using the access. This arrangement would require a Traffic Regulation Order (TRO) along with a bus gate in the vicinity of the junction to restrict unauthorised movements and the relocation of the adjacent bus stop on Whitstable Road. The current option shows substandard intervisibility at the junction on the minor cul-de-sac arm of the junction. If this option were to be pursued, further investigation would be required to understand whether this could be overcome. The Highway Authority has expressed concern about the proximity of a signal controlled junction to the existing roundabout and the impacts this may cause.




**Sketch Concept 1 – Signalised Junction**

## Option 2 – Left in left out

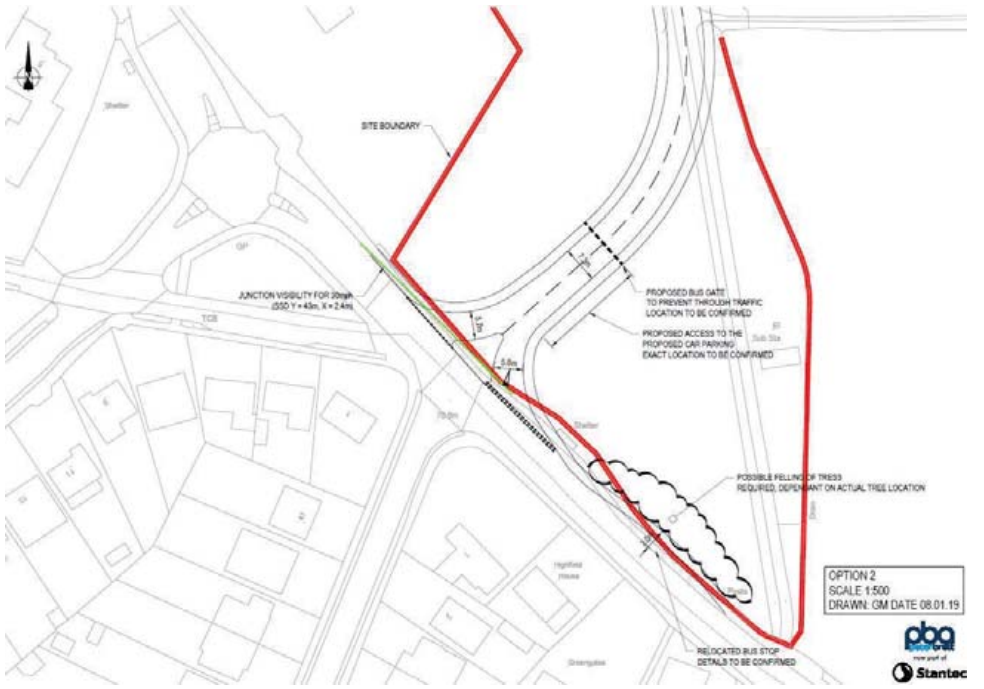
B.1.5 This arrangement is based on a simple t-junction arrangement, with a left in and left out lane separated by an island, which can be used for pedestrians wishing to cross and prevent straight ahead traffic from Highfield close. Land take is like that of the signalised junction above. The junction has been tracked using a large bus (12m) and junction visibility has been assessed in accordance with MfS (SSD 43m for 30mph).

B.1.6 A TRO will not be required for this arrangement. However, the existing bus stop will still need to be relocated.

B.1.7 Based on the options above, it is considered feasible to provide an access point at this location. A priority junction is also likely to be feasible here also. However, to confirm the design the following information would be required:

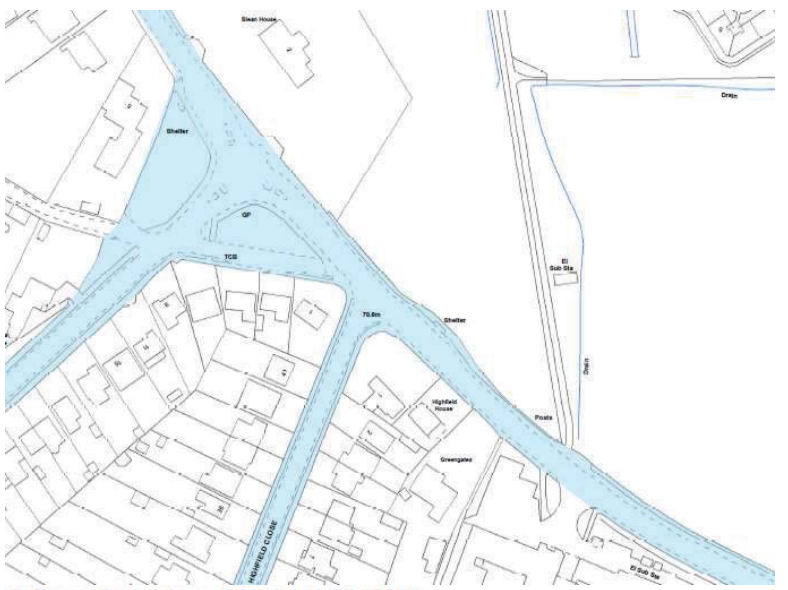
- Proposed traffic model to asses junction capacity / sizing
- Topographical survey with level data
- Utility records / survey. (It is critical to confirm if there are any fibre optic cables within the vicinity of the junction due to the expense and lead time to lower the cables)

B.1.8 It should be noted that the Highway Authority has expressed a preference that a new junction is located further south of the existing junctions in this location, so further exploration would be required as to the optimum location.




**Sketch Concept 2 - Left in Left out signalised junction concept – Whitstable Road**

Highway Boundary Extract (provided by KCC):



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Ordnance Survey 100019238

Highway Definition Team

# Appendix C October 2018 - Traffic Data

| | | | |
|---|---|---|---|
| Advanced Transport Research | | *Job Number & Name:* | 18907 University of Kent |
| University of Kent | | *Date:* | Tuesday 16 Oct 2018 |

| | | | | | |
|---|---|---|---|---|---|
| *Job Type:* | Link Count | | | | |
| *Co-ordinates:* | | *Postcode:* | | *Times:* | 0700-1900 |

*18907 University of Kent ANPR Link Counts Tuesday 16th October 2018\Site Plan*

| Count of Period | Column Labels | |
|---|---|---|
| Row Labels | AM Peak | PM Peak |
| 002 > 001 | 11 | 3 |
| 002 > 003 | 171 | 133 |
| 002 > 006 > 005 > 003 | 1 | |
| 002 > 006 > 008 > 007 > 005 > 001 | 1 | |
| 002 > 006 > 008 > 007 > 005 > 003 | | 1 |
| 002 > 006 > 008 > 011 | 81 | 104 |
| 002 > 006 > 008 > 014 > 015 > 019 | 1 | 1 |
| 002 > 006 > 010 > 013 > 011 | | 1 |
| 002 > 006 > 010 > 015 > 017 | | 1 |
| 002 > 006 > 010 > 015 > 019 | 4 | 9 |
| 002 > 006 > 011 | 16 | 25 |
| 002 > 011 | | 14 |
| 002 > 016 > 010 > 015 > 017 | 1 | |
| 002 > 016 > 015 > 019 | 1 | |
| 002 > 017 | 33 | 2 |
| 002 > 019 | 42 | 11 |
| 004 > 001 | 82 | 224 |
| 004 > 003 | 27 | 10 |
| 004 > 006 > 005 > 001 | 1 | |
| 004 > 006 > 005 > 003 | 5 | |
| 004 > 006 > 008 > 007 > 005 > 001 | 1 | 2 |
| 004 > 006 > 008 > 007 > 005 > 003 | 10 | 5 |
| 004 > 006 > 008 > 011 | 35 | 22 |
| 004 > 006 > 008 > 014 > 013 > 007 > 005 > 001 | 1 | |
| 004 > 006 > 008 > 014 > 013 > 007 > 005 > 003 | | 1 |
| 004 > 006 > 008 > 014 > 015 > 019 | 2 | 1 |
| 004 > 006 > 010 > 009 > 005 > 003 | 3 | 2 |
| 004 > 006 > 010 > 009 > 008 > 011 | 1 | |
| 004 > 006 > 010 > 013 > 007 > 005 > 001 | | 1 |
| 004 > 006 > 010 > 013 > 007 > 005 > 003 | | 2 |
| 004 > 006 > 010 > 013 > 011 | | 3 |
| 004 > 006 > 010 > 015 > 017 | 4 | 9 |
| 004 > 006 > 010 > 015 > 019 | 27 | 15 |
| 004 > 006 > 011 | 14 | 9 |
| 004 > 006 > 015 > 019 | | 1 |
| 004 > 011 | | 9 |
| 012 > 007 > 005 > 001 | 51 | 115 |
| 012 > 007 > 005 > 003 | 51 | 43 |
| 012 > 007 > 005 > 006 > 008 > 011 | 17 | 7 |
| 012 > 007 > 005 > 006 > 010 > 015 > 019 | 2 | |
| 012 > 007 > 008 > 011 | 6 | 2 |
| 012 > 007 > 010 > 009 > 005 > 003 | 2 | |
| 012 > 007 > 010 > 013 > 011 | 1 | |
| 012 > 007 > 010 > 015 > 017 | 1 | 4 |
| 012 > 007 > 010 > 015 > 019 | 3 | 1 |
| 012 > 007 > 011 | 2 | 1 |

| | | |
|---|---|---|
| 012 > 011 | 22 | 22 |
| 012 > 014 > 009 > 005 > 003 | 2 | |
| 012 > 014 > 013 > 005 > 003 | | 1 |
| 012 > 014 > 013 > 007 > 005 > 001 | 3 | |
| 012 > 014 > 013 > 011 | 16 | 6 |
| 012 > 014 > 015 > 017 | 12 | 12 |
| 012 > 014 > 015 > 019 | 10 | 7 |
| 012 > 017 | | 1 |
| 012 > 019 | | 1 |
| 018 > 001 | | 9 |
| 018 > 003 | | 2 |
| 018 > 011 | | 1 |
| 018 > 016 > 009 > 005 > 001 | 3 | |
| 018 > 016 > 009 > 005 > 003 | 18 | 7 |
| 018 > 016 > 009 > 005 > 006 > 008 > 011 | 2 | |
| 018 > 016 > 009 > 005 > 006 > 010 > 015 > 019 | 1 | |
| 018 > 016 > 009 > 008 > 007 > 010 > 015 > 019 | 1 | |
| 018 > 016 > 009 > 008 > 011 | 4 | 1 |
| 018 > 016 > 009 > 010 > 015 > 017 | 4 | |
| 018 > 016 > 011 | 2 | 1 |
| 018 > 016 > 013 > 007 > 005 > 001 | 2 | |
| 018 > 016 > 013 > 007 > 005 > 003 | 2 | |
| 018 > 016 > 013 > 011 | 20 | 13 |
| 018 > 016 > 013 > 014 > 015 > 017 | 9 | |
| 018 > 016 > 013 > 014 > 015 > 019 | 1 | |
| 018 > 016 > 014 > 013 > 015 > 017 | | 1 |
| 018 > 016 > 015 > 017 | 9 | 5 |
| 018 > 016 > 015 > 019 | 5 | 3 |
| 018 > 017 | 3 | 4 |
| 018 > 019 | 472 | 224 |
| 020 > 016 > 005 > 003 | | 1 |
| 020 > 016 > 009 > 005 > 001 | 2 | 9 |
| 020 > 016 > 009 > 005 > 003 | 19 | 20 |
| 020 > 016 > 009 > 005 > 006 > 008 > 011 | 2 | |
| 020 > 016 > 009 > 008 > 011 | 3 | 1 |
| 020 > 016 > 009 > 010 > 015 > 017 | | 1 |
| 020 > 016 > 009 > 010 > 015 > 019 | 2 | |
| 020 > 016 > 011 | | 4 |
| 020 > 016 > 013 > 007 > 005 > 003 | 1 | 1 |
| 020 > 016 > 013 > 011 | 6 | 11 |
| 020 > 016 > 013 > 014 > 015 > 017 | | 1 |
| 020 > 016 > 013 > 014 > 015 > 019 | 2 | |
| 020 > 016 > 015 > 017 | 3 | 5 |
| 020 > 016 > 015 > 019 | 25 | 10 |
| 020 > 017 | 199 | 522 |
| 020 > 019 | 1 | 5 |

| site in | time in | via 5 | via 6 | via 7 | via 8 | via 9 | via 10 | via 13 | via 14 | via 15 | via 16 | site out | time out | al journey T | Chains | Route | Period |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 002 | 07:20:16 | | | | | | | | | | | 001 | 07:35:16 | 00:15:00 | 1 | 002 > 001 | |
| 002 | 07:29:21 | | | | | | | | | | | 001 | 07:38:27 | 00:09:06 | 1 | 002 > 001 | |
| 002 | 07:32:08 | | | | | | | | | | | 001 | 07:44:52 | 00:12:44 | 1 | 002 > 001 | |
| 002 | 07:32:42 | | | | | | | | | | | 001 | 07:33:37 | 00:00:55 | 1 | 002 > 001 | |
| 002 | 07:41:15 | | | | | | | | | | | 001 | 07:50:45 | 00:09:30 | 1 | 002 > 001 | |
| 002 | 07:45:41 | | | | | | | | | | | 001 | 07:52:24 | 00:06:43 | 1 | 002 > 001 | |
| 002 | 07:53:43 | | | | | | | | | | | 001 | 08:02:30 | 00:08:47 | 1 | 002 > 001 | |
| 002 | 07:53:48 | | | | | | | | | | | 001 | 08:02:32 | 00:08:44 | 1 | 002 > 001 | |
| 002 | 07:57:12 | | | | | | | | | | | 001 | 08:04:14 | 00:07:02 | 1 | 002 > 001 | |
| 002 | 07:58:02 | | | | | | | | | | | 001 | 08:01:09 | 00:03:07 | 1 | 002 > 001 | |
| 002 | 07:58:29 | | | | | | | | | | | 001 | 08:09:46 | 00:11:17 | 1 | 002 > 001 | |
| 002 | 08:02:03 | | | | | | | | | | | 001 | 08:10:30 | 00:08:27 | 1 | 002 > 001 | AM Peak |
| 002 | 08:04:01 | | | | | | | | | | | 001 | 08:14:44 | 00:10:43 | 1 | 002 > 001 | AM Peak |
| 002 | 08:04:51 | | | | | | | | | | | 001 | 08:17:20 | 00:12:29 | 1 | 002 > 001 | AM Peak |
| 002 | 08:05:53 | | | | | | | | | | | 001 | 08:19:35 | 00:13:42 | 1 | 002 > 001 | AM Peak |
| 002 | 08:09:02 | | | | | | | | | | | 001 | 08:18:13 | 00:09:11 | 1 | 002 > 001 | AM Peak |
| 002 | 08:13:31 | | | | | | | | | | | 001 | 08:27:07 | 00:13:36 | 1 | 002 > 001 | AM Peak |
| 002 | 08:14:15 | | | | | | | | | | | 001 | 08:25:07 | 00:10:52 | 1 | 002 > 001 | AM Peak |
| 002 | 08:14:51 | | | | | | | | | | | 001 | 08:28:24 | 00:13:33 | 1 | 002 > 001 | AM Peak |
| 002 | 08:32:17 | | | | | | | | | | | 001 | 08:38:37 | 00:06:20 | 1 | 002 > 001 | AM Peak |
| 002 | 08:35:29 | | | | | | | | | | | 001 | 08:45:46 | 00:10:17 | 1 | 002 > 001 | AM Peak |
| 002 | 08:47:48 | | | | | | | | | | | 001 | 08:49:25 | 00:01:37 | 1 | 002 > 001 | AM Peak |
| 002 | 09:04:55 | | | | | | | | | | | 001 | 09:11:33 | 00:06:38 | 1 | 002 > 001 | |
| 002 | 09:06:08 | | | | | | | | | | | 001 | 09:08:14 | 00:02:06 | 1 | 002 > 001 | |
| 002 | 09:07:48 | | | | | | | | | | | 001 | 09:13:17 | 00:05:29 | 1 | 002 > 001 | |
| 002 | 09:09:26 | | | | | | | | | | | 001 | 09:17:22 | 00:07:56 | 1 | 002 > 001 | |
| 002 | 09:32:34 | | | | | | | | | | | 001 | 09:40:24 | 00:07:50 | 1 | 002 > 001 | |
| 002 | 09:34:05 | | | | | | | | | | | 001 | 09:39:11 | 00:05:06 | 1 | 002 > 001 | |
| 002 | 09:40:49 | | | | | | | | | | | 001 | 09:44:42 | 00:03:53 | 1 | 002 > 001 | |
| 002 | 09:41:48 | | | | | | | | | | | 001 | 09:47:56 | 00:06:08 | 1 | 002 > 001 | |
| 002 | 09:45:52 | | | | | | | | | | | 001 | 09:49:22 | 00:03:30 | 1 | 002 > 001 | |
| 002 | 09:54:10 | | | | | | | | | | | 001 | 09:58:52 | 00:04:42 | 1 | 002 > 001 | |
| 002 | 09:55:48 | | | | | | | | | | | 001 | 10:05:15 | 00:09:27 | 1 | 002 > 001 | |
| 002 | 10:20:10 | | | | | | | | | | | 001 | 10:33:11 | 00:13:01 | 1 | 002 > 001 | |
| 002 | 10:24:44 | | | | | | | | | | | 001 | 10:26:09 | 00:01:25 | 1 | 002 > 001 | |
| 002 | 10:36:04 | | | | | | | | | | | 001 | 10:44:50 | 00:08:46 | 1 | 002 > 001 | |
| 002 | 10:58:23 | | | | | | | | | | | 001 | 11:08:22 | 00:09:59 | 1 | 002 > 001 | |
| 002 | 11:11:14 | | | | | | | | | | | 001 | 11:14:01 | 00:02:47 | 1 | 002 > 001 | |
| 002 | 11:33:20 | | | | | | | | | | | 001 | 11:34:55 | 00:01:35 | 1 | 002 > 001 | |
| 002 | 11:39:30 | | | | | | | | | | | 001 | 11:46:48 | 00:07:18 | 1 | 002 > 001 | |
| 002 | 11:50:15 | | | | | | | | | | | 001 | 11:59:05 | 00:08:50 | 1 | 002 > 001 | |
| 002 | 12:03:45 | | | | | | | | | | | 001 | 12:17:06 | 00:13:21 | 1 | 002 > 001 | |
| 002 | 12:31:34 | | | | | | | | | | | 001 | 12:35:15 | 00:03:41 | 1 | 002 > 001 | |
| 002 | 13:04:46 | | | | | | | | | | | 001 | 13:16:52 | 00:12:06 | 1 | 002 > 001 | |
| 002 | 13:13:28 | | | | | | | | | | | 001 | 13:26:36 | 00:13:08 | 1 | 002 > 001 | |
| 002 | 13:25:27 | | | | | | | | | | | 001 | 13:30:12 | 00:04:45 | 1 | 002 > 001 | |
| 002 | 13:35:05 | | | | | | | | | | | 001 | 13:43:59 | 00:08:54 | 1 | 002 > 001 | |
| 002 | 13:59:48 | | | | | | | | | | | 001 | 14:08:49 | 00:09:01 | 1 | 002 > 001 | |
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| 002 | 14:24:31 | | | | | | | | | | | 001 | 14:28:07 | 00:03:36 | 1 | 002 > 001 | |
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| 002 | 15:18:54 | | | | | | | | | | | 001 | 15:23:47 | 00:04:53 | 1 | 002 > 001 | |
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| 002 | 15:45:43 | | | | | | | | | | | 001 | 15:51:42 | 00:05:59 | 1 | 002 > 001 | |
| 002 | 15:50:20 | | | | | | | | | | | 001 | 15:58:22 | 00:08:02 | 1 | 002 > 001 | |
| 002 | 15:55:43 | | | | | | | | | | | 001 | 16:03:12 | 00:07:29 | 1 | 002 > 001 | |
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| 002 | 16:16:49 | | | | | | | | | | | 001 | 16:29:29 | 00:12:40 | 1 | 002 > 001 | |
| 002 | 16:23:13 | | | | | | | | | | | 001 | 16:29:33 | 00:06:20 | 1 | 002 > 001 | |
| 002 | 16:25:03 | | | | | | | | | | | 001 | 16:29:58 | 00:04:55 | 1 | 002 > 001 | |
| 002 | 16:29:03 | | | | | | | | | | | 001 | 16:39:13 | 00:10:10 | 1 | 002 > 001 | |
| 002 | 16:30:35 | | | | | | | | | | | 001 | 16:38:21 | 00:07:46 | 1 | 002 > 001 | PM Peak |
| 002 | 16:41:42 | | | | | | | | | | | 001 | 16:52:56 | 00:11:14 | 1 | 002 > 001 | PM Peak |
| 002 | 17:20:16 | | | | | | | | | | | 001 | 17:27:53 | 00:07:37 | 1 | 002 > 001 | PM Peak |
| 002 | 17:34:56 | | | | | | | | | | | 001 | 17:45:19 | 00:10:23 | 1 | 002 > 001 | |
| 002 | 17:40:16 | | | | | | | | | | | 001 | 17:51:54 | 00:11:38 | 1 | 002 > 001 | |
| 002 | 17:42:08 | | | | | | | | | | | 001 | 17:47:16 | 00:05:08 | 1 | 002 > 001 | |
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| 002 | 18:07:22 | | | | | | | | | | | 001 | 18:17:19 | 00:09:57 | 1 | 002 > 001 | |
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| 002 | 18:10:00 | | | | | | | | | | | 001 | 18:21:37 | 00:11:37 | 1 | 002 > 001 | |
| 002 | 18:11:08 | | | | | | | | | | | 001 | 18:19:58 | 00:08:50 | 1 | 002 > 001 | |
| 002 | 18:12:52 | | | | | | | | | | | 001 | 18:19:30 | 00:06:38 | 1 | 002 > 001 | |
| 002 | 18:14:59 | | | | | | | | | | | 001 | 18:19:24 | 00:04:25 | 1 | 002 > 001 | |
| 002 | 18:28:11 | | | | | | | | | | | 001 | 18:30:01 | 00:01:50 | 1 | 002 > 001 | |
| 002 | 18:33:46 | | | | | | | | | | | 001 | 18:36:33 | 00:02:47 | 1 | 002 > 001 | |
| 002 | 07:01:18 | | | | | | | | | | | 003 | 07:03:21 | 00:02:03 | 1 | 002 > 003 | |
| 002 | 07:02:40 | | | | | | | | | | | 003 | 07:04:40 | 00:02:00 | 1 | 002 > 003 | |
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| 002 | 07:07:29 | | | | | | | | | | | 003 | 07:09:25 | 00:01:56 | 1 | 002 > 003 | |
| 002 | 07:07:41 | | | | | | | | | | | 003 | 07:09:42 | 00:02:01 | 1 | 002 > 003 | |
| 002 | 07:09:16 | | | | | | | | | | | 003 | 07:11:29 | 00:02:13 | 1 | 002 > 003 | |
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| 002 | 07:12:57 | | | | | | | | | | | 003 | 07:14:48 | 00:01:51 | 1 | 002 > 003 | |
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| 002 | 07:24:18 | | | | | | | | | | | 003 | 07:26:20 | 00:02:02 | 1 | 002 > 003 | |

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| 003 | 08:49:13 | 00:04:43 | 1 002 > 003 | AM Peak |
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| 003 | 16:48:42 | 00:03:43 | 1 002 > 003 | PM Peak |
| 003 | 16:48:51 | 00:03:39 | 1 002 > 003 | PM Peak |
| 003 | 16:49:51 | 00:04:09 | 1 002 > 003 | PM Peak |
| 003 | 16:49:53 | 00:04:09 | 1 002 > 003 | PM Peak |
| 003 | 16:50:48 | 00:04:49 | 1 002 > 003 | PM Peak |
| 003 | 16:50:49 | 00:04:48 | 1 002 > 003 | PM Peak |
| 003 | 16:50:52 | 00:04:45 | 1 002 > 003 | PM Peak |
| 003 | 16:51:31 | 00:04:26 | 1 002 > 003 | PM Peak |
| 003 | 16:51:37 | 00:04:07 | 1 002 > 003 | PM Peak |
| 003 | 16:51:43 | 00:04:11 | 1 002 > 003 | PM Peak |
| 003 | 16:52:12 | 00:04:17 | 1 002 > 003 | PM Peak |
| 003 | 16:52:33 | 00:04:26 | 1 002 > 003 | PM Peak |
| 003 | 16:53:01 | 00:04:03 | 1 002 > 003 | PM Peak |
| 003 | 16:53:19 | 00:04:14 | 1 002 > 003 | PM Peak |
| 003 | 16:53:48 | 00:03:58 | 1 002 > 003 | PM Peak |
| 003 | 16:53:52 | 00:03:58 | 1 002 > 003 | PM Peak |
| 003 | 16:54:19 | 00:03:57 | 1 002 > 003 | PM Peak |

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| 002 | 16:50:29 | | | |
| 002 | 16:50:45 | | | |
| 002 | 16:51:38 | | | |
| 002 | 16:52:09 | | | |
| 002 | 16:52:11 | | | |
| 002 | 16:54:26 | | | |
| 002 | 16:55:47 | | | |
| 002 | 16:56:40 | | | |
| 002 | 16:56:46 | | | |
| 002 | 16:56:59 | | | |
| 002 | 16:57:49 | | | |
| 002 | 16:57:51 | | | |
| 002 | 16:58:25 | | | |
| 002 | 16:58:31 | | | |
| 002 | 16:59:18 | | | |
| 002 | 17:01:48 | | | |
| 002 | 17:01:50 | | | |
| 002 | 17:02:10 | | | |
| 002 | 17:03:24 | | | |
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| 002 | 17:03:30 | | | |
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| 002 | 17:04:13 | | | |
| 002 | 17:05:03 | | | |
| 002 | 17:05:14 | | | |
| 002 | 17:05:34 | | | |
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| 002 | 17:06:04 | | | |
| 002 | 17:06:05 | | | |
| 002 | 17:06:10 | | | |
| 002 | 17:06:21 | | | |
| 002 | 17:06:49 | | | |
| 002 | 17:09:06 | | | |
| 002 | 17:09:34 | | | |
| 002 | 17:09:36 | | | |
| 002 | 17:10:13 | | | |
| 002 | 17:10:18 | | | |
| 002 | 17:10:36 | | | |
| 002 | 17:11:05 | | | |
| 002 | 17:11:07 | | | |
| 002 | 17:11:39 | | | |
| 002 | 17:11:41 | | | |
| 002 | 17:11:58 | | | |
| 002 | 17:13:48 | | | |
| 002 | 17:13:51 | | | |
| 002 | 17:13:53 | | | |
| 002 | 17:13:55 | | | |
| 002 | 17:14:12 | | | |
| 002 | 17:14:33 | | | |
| 002 | 17:15:07 | | | |
| 002 | 17:15:18 | | | |
| 002 | 17:16:00 | | | |
| 002 | 17:16:03 | | | |
| 002 | 17:16:15 | | | |
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| 002 | 17:16:39 | | | |
| 002 | 17:16:49 | | | |
| 002 | 17:16:52 | | | |
| 002 | 17:17:23 | | | |
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| 002 | 17:17:29 | | | |
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| 002 | 17:19:03 | | | |
| 002 | 17:19:13 | | | |
| 002 | 17:20:07 | | | |
| 002 | 17:20:14 | | | |
| 002 | 17:20:56 | | | |
| 002 | 17:21:23 | | | |
| 002 | 17:22:28 | | | |
| 002 | 17:22:31 | | | |
| 002 | 17:22:47 | | | |
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| 002 | 17:24:58 | | | |
| 002 | 17:26:23 | | | |
| 002 | 17:27:32 | | | |
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| 002 | 17:39:46 | | | |
| 002 | 17:40:23 | | | |
| 002 | 17:41:07 | | | |
| 002 | 17:41:09 | | | |
| 002 | 17:41:29 | | | |
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| 002 | 17:42:05 | | | |
| 002 | 17:42:13 | | | |
| 002 | 17:42:25 | | | |
| 002 | 17:42:38 | | | |
| 002 | 17:42:59 | | | |
| 002 | 17:43:03 | | | |
| 002 | 17:43:04 | | | |
| 002 | 17:43:09 | | | |
| 002 | 17:44:01 | | | |
| 002 | 17:44:13 | | | |
| 002 | 17:44:38 | | | |
| 002 | 17:44:40 | | | |
| 003 | 16:54:23 | 00:03:54 | 1 002 > 003 | PM Peak |
| 003 | 16:58:18 | 00:07:33 | 1 002 > 003 | PM Peak |
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| 003 | 16:54:47 | 00:02:38 | 1 002 > 003 | PM Peak |
| 003 | 16:54:50 | 00:02:39 | 1 002 > 003 | PM Peak |
| 003 | 16:56:53 | 00:02:27 | 1 002 > 003 | PM Peak |
| 003 | 16:58:13 | 00:02:26 | 1 002 > 003 | PM Peak |
| 003 | 16:58:54 | 00:02:14 | 1 002 > 003 | PM Peak |
| 003 | 16:59:03 | 00:02:17 | 1 002 > 003 | PM Peak |
| 003 | 16:59:09 | 00:02:10 | 1 002 > 003 | PM Peak |
| 003 | 17:01:20 | 00:03:31 | 1 002 > 003 | PM Peak |
| 003 | 17:01:52 | 00:04:01 | 1 002 > 003 | PM Peak |
| 003 | 17:02:03 | 00:03:38 | 1 002 > 003 | PM Peak |
| 003 | 17:08:36 | 00:10:05 | 1 002 > 003 | PM Peak |
| 003 | 17:03:27 | 00:04:09 | 1 002 > 003 | PM Peak |
| 003 | 17:04:53 | 00:03:05 | 1 002 > 003 | PM Peak |
| 003 | 17:04:54 | 00:03:04 | 1 002 > 003 | PM Peak |
| 003 | 17:05:12 | 00:03:02 | 1 002 > 003 | PM Peak |
| 003 | 17:06:30 | 00:03:06 | 1 002 > 003 | PM Peak |
| 003 | 17:06:32 | 00:03:05 | 1 002 > 003 | PM Peak |
| 003 | 17:06:35 | 00:03:05 | 1 002 > 003 | PM Peak |
| 003 | 17:06:48 | 00:03:09 | 1 002 > 003 | PM Peak |
| 003 | 17:06:55 | 00:03:05 | 1 002 > 003 | PM Peak |
| 003 | 17:07:16 | 00:03:03 | 1 002 > 003 | PM Peak |
| 003 | 17:07:34 | 00:02:31 | 1 002 > 003 | PM Peak |
| 003 | 17:07:38 | 00:02:24 | 1 002 > 003 | PM Peak |
| 003 | 17:07:59 | 00:02:25 | 1 002 > 003 | PM Peak |
| 003 | 17:08:24 | 00:02:27 | 1 002 > 003 | PM Peak |
| 003 | 17:08:51 | 00:02:47 | 1 002 > 003 | PM Peak |
| 003 | 17:09:10 | 00:03:05 | 1 002 > 003 | PM Peak |
| 003 | 17:09:13 | 00:03:03 | 1 002 > 003 | PM Peak |
| 003 | 17:09:15 | 00:02:54 | 1 002 > 003 | PM Peak |
| 003 | 17:09:39 | 00:02:50 | 1 002 > 003 | PM Peak |
| 003 | 17:11:41 | 00:02:35 | 1 002 > 003 | PM Peak |
| 003 | 17:12:20 | 00:02:46 | 1 002 > 003 | PM Peak |
| 003 | 17:12:21 | 00:02:45 | 1 002 > 003 | PM Peak |
| 003 | 17:13:02 | 00:02:49 | 1 002 > 003 | PM Peak |
| 003 | 17:13:28 | 00:03:10 | 1 002 > 003 | PM Peak |
| 003 | 17:13:38 | 00:03:02 | 1 002 > 003 | PM Peak |
| 003 | 17:13:54 | 00:02:49 | 1 002 > 003 | PM Peak |
| 003 | 17:13:57 | 00:02:50 | 1 002 > 003 | PM Peak |
| 003 | 17:14:05 | 00:02:26 | 1 002 > 003 | PM Peak |
| 003 | 17:15:25 | 00:03:44 | 1 002 > 003 | PM Peak |
| 003 | 17:14:26 | 00:02:28 | 1 002 > 003 | PM Peak |
| 003 | 17:16:05 | 00:02:17 | 1 002 > 003 | PM Peak |
| 003 | 17:16:08 | 00:02:17 | 1 002 > 003 | PM Peak |
| 003 | 17:16:11 | 00:02:18 | 1 002 > 003 | PM Peak |
| 003 | 17:16:16 | 00:02:21 | 1 002 > 003 | PM Peak |
| 003 | 17:16:55 | 00:02:43 | 1 002 > 003 | PM Peak |
| 003 | 17:17:45 | 00:03:12 | 1 002 > 003 | PM Peak |
| 003 | 17:17:50 | 00:02:43 | 1 002 > 003 | PM Peak |
| 003 | 17:18:48 | 00:03:30 | 1 002 > 003 | PM Peak |
| 003 | 17:18:55 | 00:02:55 | 1 002 > 003 | PM Peak |
| 003 | 17:19:01 | 00:02:58 | 1 002 > 003 | PM Peak |
| 003 | 17:19:12 | 00:02:57 | 1 002 > 003 | PM Peak |
| 003 | 17:19:15 | 00:02:56 | 1 002 > 003 | PM Peak |
| 003 | 17:20:00 | 00:03:21 | 1 002 > 003 | PM Peak |
| 003 | 17:20:36 | 00:03:47 | 1 002 > 003 | PM Peak |
| 003 | 17:20:41 | 00:03:49 | 1 002 > 003 | PM Peak |
| 003 | 17:21:35 | 00:04:12 | 1 002 > 003 | PM Peak |
| 003 | 17:21:38 | 00:04:12 | 1 002 > 003 | PM Peak |
| 003 | 17:21:53 | 00:04:24 | 1 002 > 003 | PM Peak |
| 003 | 17:22:19 | 00:03:24 | 1 002 > 003 | PM Peak |
| 003 | 17:22:24 | 00:03:21 | 1 002 > 003 | PM Peak |
| 003 | 17:22:39 | 00:03:26 | 1 002 > 003 | PM Peak |
| 003 | 17:22:42 | 00:02:35 | 1 002 > 003 | PM Peak |
| 003 | 17:23:02 | 00:02:48 | 1 002 > 003 | PM Peak |
| 003 | 17:23:29 | 00:02:33 | 1 002 > 003 | PM Peak |
| 003 | 17:24:26 | 00:03:03 | 1 002 > 003 | PM Peak |
| 003 | 17:25:22 | 00:02:54 | 1 002 > 003 | PM Peak |
| 003 | 17:25:25 | 00:02:54 | 1 002 > 003 | PM Peak |
| 003 | 17:26:06 | 00:03:19 | 1 002 > 003 | PM Peak |
| 003 | 17:28:38 | 00:03:44 | 1 002 > 003 | PM Peak |
| 003 | 17:28:42 | 00:03:44 | 1 002 > 003 | PM Peak |
| 003 | 17:29:22 | 00:02:59 | 1 002 > 003 | PM Peak |
| 003 | 17:30:01 | 00:02:29 | 1 002 > 003 | PM Peak |
| 003 | 17:31:47 | 00:03:31 | 1 002 > 003 | PM Peak |
| 003 | 17:33:15 | 00:04:06 | 1 002 > 003 | PM Peak |
| 003 | 17:33:23 | 00:04:10 | 1 002 > 003 | PM Peak |
| 003 | 17:33:25 | 00:04:10 | 1 002 > 003 | PM Peak |
| 003 | 17:33:32 | 00:04:04 | 1 002 > 003 | PM Peak |
| 003 | 17:33:37 | 00:03:57 | 1 002 > 003 | PM Peak |
| 003 | 17:34:03 | 00:03:50 | 1 002 > 003 | |
| 003 | 17:34:05 | 00:03:45 | 1 002 > 003 | |
| 003 | 17:34:21 | 00:03:03 | 1 002 > 003 | |
| 003 | 17:34:22 | 00:02:57 | 1 002 > 003 | |
| 003 | 17:35:51 | 00:03:05 | 1 002 > 003 | |
| 003 | 17:35:55 | 00:03:07 | 1 002 > 003 | |
| 003 | 17:36:23 | 00:03:26 | 1 002 > 003 | |
| 003 | 17:36:30 | 00:03:16 | 1 002 > 003 | |
| 003 | 17:37:33 | 00:02:50 | 1 002 > 003 | |
| 003 | 17:37:44 | 00:02:49 | 1 002 > 003 | |
| 003 | 17:37:50 | 00:02:52 | 1 002 > 003 | |
| 003 | 17:38:19 | 00:02:39 | 1 002 > 003 | |
| 003 | 17:38:44 | 00:02:25 | 1 002 > 003 | |
| 003 | 17:41:39 | 00:03:16 | 1 002 > 003 | |
| 003 | 17:42:58 | 00:04:29 | 1 002 > 003 | |
| 003 | 17:43:13 | 00:03:27 | 1 002 > 003 | |
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| 003 | 17:44:14 | 00:02:14 | 1 002 > 003 | |
| 003 | 17:44:34 | 00:02:29 | 1 002 > 003 | |
| 003 | 17:44:46 | 00:02:33 | 1 002 > 003 | |
| 003 | 17:44:54 | 00:02:29 | 1 002 > 003 | |
| 003 | 17:45:15 | 00:02:37 | 1 002 > 003 | |
| 003 | 17:46:49 | 00:03:50 | 1 002 > 003 | |
| 003 | 17:46:51 | 00:03:48 | 1 002 > 003 | |
| 003 | 17:46:54 | 00:03:50 | 1 002 > 003 | |
| 003 | 17:47:00 | 00:03:51 | 1 002 > 003 | |
| 003 | 17:47:18 | 00:03:17 | 1 002 > 003 | |
| 003 | 17:48:00 | 00:03:47 | 1 002 > 003 | |
| 003 | 17:48:36 | 00:03:58 | 1 002 > 003 | |
| 003 | 17:48:43 | 00:04:03 | 1 002 > 003 | |

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| 002 | 17:44:41 | | | | | | |
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| 002 | 18:10:56 | | | | | | |
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| 002 | 18:22:09 | | | | | | |
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| 002 | 18:42:59 | | | | | | |
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| 002 | 18:54:12 | | | | | | |
| 002 | 18:55:43 | | | | | | |
| 002 | 18:56:37 | | | | | | |
| 002 | 07:58:55 | 08:08:02 | 08:03:00 | | | | |
| 002 | 07:59:47 | 08:06:17 | 08:03:46 | | | | |
| 002 | 08:33:46 | 08:39:45 | 08:37:09 | | | | |
| 002 | 09:41:44 | | 09:44:07 | 09:44:27 | | | |
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| 002 | 13:56:01 | | 13:59:36 | 13:59:55 | | | |
| 002 | 14:41:16 | | 14:43:55 | 14:44:16 | | | |
| 002 | 15:42:33 | | 15:46:24 | 15:46:36 | | | |
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| 002 | 08:00:01 | 08:10:44 | 08:03:48 | | 08:04:01 | | |
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| 002 | 07:53:22 | 08:03:04 | 07:57:10 | 08:02:49 | 07:57:27 | | |
| 002 | 07:56:28 | 08:04:55 | 07:59:18 | 08:04:43 | 07:59:52 | | |
| 002 | 16:24:38 | 16:34:34 | 16:28:55 | 16:34:28 | 16:29:23 | | |
| 002 | 07:50:45 | 08:00:21 | 07:53:53 | 08:00:16 | 07:54:02 | | |
| 002 | 16:41:08 | 16:55:25 | 16:43:45 | 16:55:20 | 16:43:53 | | |
| 002 | 13:28:17 | | 13:30:30 | | 13:30:39 | 13:32:05 | 13:33:41 |
| 002 | 07:03:59 | | 07:06:03 | | 07:06:15 | | |
| 002 | 07:05:54 | | 07:08:20 | | 07:08:29 | | |
| 002 | 07:06:22 | | 07:08:47 | | 07:08:56 | | |
| 002 | 07:06:28 | | 07:08:51 | | 07:09:00 | | |

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| 003 | 17:48:45 | 00:04:04 | 1 002 > 003 | |
| 003 | 17:48:48 | 00:04:04 | 1 002 > 003 | |
| 003 | 17:48:51 | 00:04:03 | 1 002 > 003 | |
| 003 | 17:49:06 | 00:02:49 | 1 002 > 003 | |
| 003 | 17:52:25 | 00:03:50 | 1 002 > 003 | |
| 003 | 17:52:36 | 00:03:59 | 1 002 > 003 | |
| 003 | 17:52:48 | 00:03:29 | 1 002 > 003 | |
| 003 | 17:52:51 | 00:03:01 | 1 002 > 003 | |
| 003 | 17:52:59 | 00:02:55 | 1 002 > 003 | |
| 003 | 17:53:41 | 00:03:23 | 1 002 > 003 | |
| 003 | 17:53:45 | 00:03:24 | 1 002 > 003 | |
| 003 | 17:54:20 | 00:02:56 | 1 002 > 003 | |
| 003 | 17:54:26 | 00:02:45 | 1 002 > 003 | |
| 003 | 17:54:48 | 00:02:36 | 1 002 > 003 | |
| 003 | 17:55:16 | 00:02:37 | 1 002 > 003 | |
| 003 | 17:57:21 | 00:02:40 | 1 002 > 003 | |
| 003 | 17:57:33 | 00:02:50 | 1 002 > 003 | |
| 003 | 17:57:35 | 00:02:50 | 1 002 > 003 | |
| 003 | 17:59:30 | 00:02:58 | 1 002 > 003 | |
| 003 | 18:00:52 | 00:02:08 | 1 002 > 003 | |
| 003 | 18:01:52 | 00:02:43 | 1 002 > 003 | |
| 003 | 18:04:01 | 00:02:27 | 1 002 > 003 | |
| 003 | 18:04:34 | 00:01:55 | 1 002 > 003 | |
| 003 | 18:06:58 | 00:03:17 | 1 002 > 003 | |
| 003 | 18:07:03 | 00:02:52 | 1 002 > 003 | |
| 003 | 18:08:11 | 00:02:34 | 1 002 > 003 | |
| 003 | 18:08:15 | 00:02:33 | 1 002 > 003 | |
| 003 | 18:09:37 | 00:02:18 | 1 002 > 003 | |
| 003 | 18:11:25 | 00:02:45 | 1 002 > 003 | |
| 003 | 18:11:42 | 00:02:50 | 1 002 > 003 | |
| 003 | 18:11:55 | 00:02:55 | 1 002 > 003 | |
| 003 | 18:13:43 | 00:02:47 | 1 002 > 003 | |
| 003 | 18:15:08 | 00:02:41 | 1 002 > 003 | |
| 003 | 18:15:27 | 00:02:04 | 1 002 > 003 | |
| 003 | 18:17:35 | 00:03:14 | 1 002 > 003 | |
| 003 | 18:17:43 | 00:03:07 | 1 002 > 003 | |
| 003 | 18:18:07 | 00:03:06 | 1 002 > 003 | |
| 003 | 18:18:10 | 00:03:06 | 1 002 > 003 | |
| 003 | 18:18:12 | 00:03:01 | 1 002 > 003 | |
| 003 | 18:18:14 | 00:02:49 | 1 002 > 003 | |
| 003 | 18:18:16 | 00:02:49 | 1 002 > 003 | |
| 003 | 18:18:22 | 00:02:45 | 1 002 > 003 | |
| 003 | 18:18:39 | 00:02:39 | 1 002 > 003 | |
| 003 | 18:20:26 | 00:02:54 | 1 002 > 003 | |
| 003 | 18:21:16 | 00:03:41 | 1 002 > 003 | |
| 003 | 18:21:17 | 00:03:41 | 1 002 > 003 | |
| 003 | 18:21:22 | 00:03:43 | 1 002 > 003 | |
| 003 | 18:21:25 | 00:03:39 | 1 002 > 003 | |
| 003 | 18:22:20 | 00:01:52 | 1 002 > 003 | |
| 003 | 18:22:27 | 00:01:56 | 1 002 > 003 | |
| 003 | 18:23:51 | 00:02:57 | 1 002 > 003 | |
| 003 | 18:24:49 | 00:02:40 | 1 002 > 003 | |
| 003 | 18:24:57 | 00:02:40 | 1 002 > 003 | |
| 003 | 18:25:00 | 00:02:35 | 1 002 > 003 | |
| 003 | 18:26:26 | 00:02:46 | 1 002 > 003 | |
| 003 | 18:26:36 | 00:02:32 | 1 002 > 003 | |
| 003 | 18:30:24 | 00:02:40 | 1 002 > 003 | |
| 003 | 18:30:57 | 00:02:19 | 1 002 > 003 | |
| 003 | 18:31:01 | 00:02:16 | 1 002 > 003 | |
| 003 | 18:32:49 | 00:02:44 | 1 002 > 003 | |
| 003 | 18:33:20 | 00:02:39 | 1 002 > 003 | |
| 003 | 18:37:19 | 00:06:34 | 1 002 > 003 | |
| 003 | 18:33:31 | 00:02:43 | 1 002 > 003 | |
| 003 | 18:33:34 | 00:02:44 | 1 002 > 003 | |
| 003 | 18:35:21 | 00:02:22 | 1 002 > 003 | |
| 003 | 18:35:23 | 00:02:12 | 1 002 > 003 | |
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| 003 | 18:37:10 | 00:02:12 | 1 002 > 003 | |
| 003 | 18:38:15 | 00:02:35 | 1 002 > 003 | |
| 003 | 18:38:25 | 00:02:29 | 1 002 > 003 | |
| 003 | 18:39:18 | 00:02:16 | 1 002 > 003 | |
| 003 | 18:40:28 | 00:02:53 | 1 002 > 003 | |
| 003 | 18:43:12 | 00:01:52 | 1 002 > 003 | |
| 003 | 18:43:53 | 00:02:24 | 1 002 > 003 | |
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| 003 | 18:48:00 | 00:02:34 | 1 002 > 003 | |
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| 003 | 18:50:22 | 00:02:28 | 1 002 > 003 | |
| 003 | 18:50:51 | 00:02:21 | 1 002 > 003 | |
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| 003 | 18:51:04 | 00:02:21 | 1 002 > 003 | |
| 003 | 18:51:19 | 00:02:33 | 1 002 > 003 | |
| 003 | 18:51:47 | 00:02:25 | 1 002 > 003 | |
| 003 | 18:51:59 | 00:02:22 | 1 002 > 003 | |
| 003 | 18:53:06 | 00:02:35 | 1 002 > 003 | |
| 003 | 18:53:50 | 00:02:24 | 1 002 > 003 | |
| 003 | 18:54:38 | 00:02:24 | 1 002 > 003 | |
| 003 | 18:56:36 | 00:02:28 | 1 002 > 003 | |
| 003 | 18:56:39 | 00:02:27 | 1 002 > 003 | |
| 003 | 18:58:29 | 00:02:46 | 1 002 > 003 | |
| 003 | 18:59:16 | 00:02:39 | 1 002 > 003 | |
| 001 | 08:10:40 | 00:11:45 | 3 002 > 006 > 005 > 001 | |
| 003 | 08:06:53 | 00:07:06 | 3 002 > 006 > 005 > 003 | |
| 003 | 08:40:18 | 00:06:32 | 3 002 > 006 > 005 > 003 | AM Peak |
| 011 | 09:44:57 | 00:03:13 | 3 002 > 006 > 007 > 011 | |
| 011 | 11:29:54 | 00:03:37 | 3 002 > 006 > 007 > 011 | |
| 011 | 14:00:30 | 00:04:29 | 3 002 > 006 > 007 > 011 | |
| 011 | 14:44:44 | 00:03:28 | 3 002 > 006 > 007 > 011 | |
| 011 | 15:47:10 | 00:04:37 | 3 002 > 006 > 007 > 011 | |
| 011 | 15:47:11 | 00:04:36 | 3 002 > 006 > 007 > 011 | |
| 011 | 16:18:57 | 00:05:20 | 3 002 > 006 > 007 > 011 | |
| 001 | 08:13:13 | 00:13:12 | 4 002 > 006 > 008 > 007 > 005 > 001 | AM Peak |
| 001 | 17:53:08 | 00:12:40 | 4 002 > 006 > 008 > 007 > 001 | |
| 001 | 08:05:30 | 00:12:08 | 5 002 > 006 > 008 > 007 > 005 > 001 | |
| 001 | 08:07:27 | 00:10:59 | 5 002 > 006 > 008 > 007 > 005 > 001 | |
| 001 | 16:37:43 | 00:13:05 | 5 002 > 006 > 008 > 007 > 005 > 001 | |
| 003 | 08:00:52 | 00:10:07 | 5 002 > 006 > 008 > 007 > 005 > 003 | |
| 003 | 16:55:59 | 00:14:51 | 5 002 > 006 > 008 > 007 > 005 > 003 | PM Peak |
| 019 | 13:34:49 | 00:06:32 | 5 002 > 006 > 008 > 010 > 015 > 019 | |
| 011 | 07:06:48 | 00:02:49 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:09:01 | 00:03:07 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:09:28 | 00:03:06 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:09:34 | 00:03:06 | 3 002 > 006 > 008 > 011 | |

| | | | |
|---|---|---|---|
| 002 | 07:07:22 | 07:11:13 | 07:11:26 |
| 002 | 07:09:07 | 07:11:38 | 07:11:50 |
| 002 | 07:16:55 | 07:19:22 | 07:19:31 |
| 002 | 07:16:58 | 07:19:25 | 07:19:34 |
| 002 | 07:17:31 | 07:20:17 | 07:20:26 |
| 002 | 07:18:26 | 07:21:03 | 07:21:12 |
| 002 | 07:18:33 | 07:21:09 | 07:21:18 |
| 002 | 07:19:21 | 07:21:51 | 07:21:59 |
| 002 | 07:23:44 | 07:26:17 | 07:26:26 |
| 002 | 07:23:47 | 07:26:19 | 07:26:28 |
| 002 | 07:24:54 | 07:27:22 | 07:27:31 |
| 002 | 07:24:59 | 07:27:26 | 07:27:34 |
| 002 | 07:26:56 | 07:29:41 | 07:29:50 |
| 002 | 07:27:00 | 07:29:46 | 07:29:55 |
| 002 | 07:28:16 | 07:30:45 | 07:30:55 |
| 002 | 07:30:22 | 07:32:38 | 07:32:45 |
| 002 | 07:32:04 | 07:34:42 | 07:34:51 |
| 002 | 07:32:13 | 07:34:51 | 07:34:59 |
| 002 | 07:32:25 | 07:35:24 | 07:35:35 |
| 002 | 07:33:16 | 07:36:00 | 07:36:08 |
| 002 | 07:34:30 | 07:36:36 | 07:36:47 |
| 002 | 07:36:04 | 07:40:30 | 07:40:41 |
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| 002 | 07:36:52 | 07:39:37 | 07:39:48 |
| 002 | 07:37:14 | 07:40:40 | 07:40:55 |
| 002 | 07:37:18 | 07:40:45 | 07:40:59 |
| 002 | 07:37:22 | 07:40:49 | 07:41:03 |
| 002 | 07:37:30 | 07:41:00 | 07:41:10 |
| 002 | 07:37:36 | 07:41:13 | 07:41:23 |
| 002 | 07:37:42 | 07:41:17 | 07:41:27 |
| 002 | 07:37:47 | 07:41:24 | 07:41:33 |
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| 002 | 07:39:04 | 07:43:05 | 07:43:15 |
| 002 | 07:39:47 | 07:43:34 | 07:43:43 |
| 002 | 07:40:30 | 07:44:22 | 07:44:30 |
| 002 | 07:41:06 | 07:44:41 | 07:44:51 |
| 002 | 07:42:14 | 07:45:22 | 07:45:33 |
| 002 | 07:42:15 | 07:45:24 | 07:45:34 |
| 002 | 07:42:20 | 07:45:26 | 07:45:37 |
| 002 | 07:44:07 | 07:48:38 | 07:48:56 |
| 002 | 07:44:35 | 07:48:47 | 07:49:04 |
| 002 | 07:44:51 | 07:48:53 | 07:49:09 |
| 002 | 07:45:23 | 07:49:16 | 07:49:33 |
| 002 | 07:45:32 | 07:49:19 | 07:49:35 |
| 002 | 07:45:47 | 07:49:37 | 07:49:44 |
| 002 | 07:46:05 | 07:49:42 | 07:49:50 |
| 002 | 07:46:09 | 07:49:46 | 07:49:54 |
| 002 | 07:46:11 | 07:49:54 | 07:50:02 |
| 002 | 07:46:46 | 07:50:25 | 07:50:33 |
| 002 | 07:46:57 | 07:50:31 | 07:50:39 |
| 002 | 07:47:39 | 07:50:53 | 07:51:05 |
| 002 | 07:47:43 | 07:50:54 | 07:51:06 |
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| 002 | 07:50:15 | 07:53:03 | 07:53:12 |
| 002 | 07:50:30 | 07:53:28 | 07:53:38 |
| 002 | 07:50:58 | 07:54:08 | 07:54:25 |
| 002 | 07:51:05 | 07:54:20 | 07:54:31 |
| 002 | 07:51:10 | 07:54:25 | 07:54:35 |
| 002 | 07:51:14 | 07:54:33 | 07:54:43 |
| 002 | 07:51:27 | 07:55:03 | 07:55:13 |
| 002 | 07:51:29 | 07:55:05 | 07:55:15 |
| 002 | 07:51:38 | 07:55:24 | 07:55:34 |
| 002 | 07:52:01 | 07:55:54 | 07:56:18 |
| 002 | 07:52:27 | 07:56:11 | 07:56:24 |
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| 002 | 07:53:52 | 07:58:07 | 07:58:16 |
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| 002 | 07:55:36 | 08:00:20 | 08:00:33 |
| 002 | 07:56:07 | 07:59:06 | 07:59:38 |
| 002 | 07:57:19 | 08:00:13 | 08:00:23 |
| 002 | 07:57:41 | 08:00:46 | 08:01:02 |
| 002 | 07:57:47 | 08:00:51 | 08:01:06 |
| 002 | 07:58:00 | 08:00:58 | 08:01:10 |
| 002 | 07:58:04 | 08:01:30 | 08:01:47 |
| 002 | 07:58:08 | 08:01:34 | 08:01:49 |
| 002 | 07:58:11 | 08:01:38 | 08:01:52 |
| 002 | 07:58:15 | 08:01:40 | 08:01:54 |
| 002 | 07:58:34 | 08:02:15 | 08:02:33 |
| 002 | 07:58:39 | 08:03:35 | 08:03:42 |
| 002 | 07:58:46 | 08:02:42 | 08:02:59 |
| 002 | 07:58:48 | 08:03:58 | 08:04:30 |
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| 002 | 08:01:31 | 08:06:27 | 08:06:41 |
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| 002 | 08:01:45 | 08:06:36 | 08:06:48 |
| 002 | 08:01:50 | 08:06:39 | 08:06:50 |
| 002 | 08:02:17 | 08:07:26 | 08:07:37 |
| 002 | 08:02:44 | 08:10:22 | 08:10:34 |
| 002 | 08:02:49 | 08:09:04 | 08:09:33 |
| 002 | 08:03:32 | 08:10:14 | 08:10:26 |
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| 002 | 08:05:58 | 08:16:20 | 08:16:47 |
| 002 | 08:09:26 | 08:18:49 | 08:19:00 |

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|---|---|---|---|---|
| 011 | 07:12:23 | 00:05:01 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:12:28 | 00:03:21 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:20:03 | 00:03:08 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:20:06 | 00:03:08 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:21:01 | 00:03:30 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:21:45 | 00:03:19 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:21:51 | 00:03:18 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:22:42 | 00:03:21 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:26:59 | 00:03:15 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:27:02 | 00:03:15 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:28:03 | 00:03:09 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:28:06 | 00:03:07 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:30:25 | 00:03:29 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:30:29 | 00:03:29 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:31:28 | 00:03:12 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:33:13 | 00:02:51 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:35:22 | 00:03:18 | 3 002 > 006 > 008 > 011 | |
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| 011 | 07:36:04 | 00:03:39 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:36:48 | 00:03:32 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:37:18 | 00:02:48 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:41:32 | 00:05:28 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:40:13 | 00:03:25 | 3 002 > 006 > 008 > 011 | |
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| 011 | 07:41:35 | 00:04:21 | 3 002 > 006 > 008 > 011 | |
| 011 | 07:41:39 | 00:04:21 | 3 002 > 006 > 008 > 011 | |
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| 011 | 07:45:22 | 00:04:16 | 3 002 > 006 > 008 > 011 | |
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| 011 | 07:46:05 | 00:03:50 | 3 002 > 006 > 008 > 011 | |
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| 011 | 07:50:24 | 00:04:15 | 3 002 > 006 > 008 > 011 | |
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| 011 | 07:57:20 | 00:04:31 | 3 002 > 006 > 008 > 011 | |
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| 011 | 08:01:32 | 00:05:56 | 3 002 > 006 > 008 > 011 | |
| 011 | 08:00:06 | 00:03:59 | 3 002 > 006 > 008 > 011 | |
| 011 | 08:00:56 | 00:03:37 | 3 002 > 006 > 008 > 011 | |
| 011 | 08:01:40 | 00:03:59 | 3 002 > 006 > 008 > 011 | |
| 011 | 08:01:45 | 00:03:58 | 3 002 > 006 > 008 > 011 | |
| 011 | 08:01:48 | 00:03:48 | 3 002 > 006 > 008 > 011 | |
| 011 | 08:02:18 | 00:04:14 | 3 002 > 006 > 008 > 011 | |
| 011 | 08:02:24 | 00:04:16 | 3 002 > 006 > 008 > 011 | |
| 011 | 08:02:28 | 00:04:17 | 3 002 > 006 > 008 > 011 | |
| 011 | 08:03:17 | 00:05:02 | 3 002 > 006 > 008 > 011 | |
| 011 | 08:03:39 | 00:05:05 | 3 002 > 006 > 008 > 011 | |
| 011 | 08:04:15 | 00:05:36 | 3 002 > 006 > 008 > 011 | |
| 011 | 08:03:53 | 00:05:07 | 3 002 > 006 > 008 > 011 | |
| 011 | 08:05:02 | 00:06:14 | 3 002 > 006 > 008 > 011 | |
| 011 | 08:03:55 | 00:04:51 | 3 002 > 006 > 008 > 011 | |
| 011 | 08:04:13 | 00:04:34 | 3 002 > 006 > 008 > 011 | |
| 011 | 08:06:09 | 00:06:17 | 3 002 > 006 > 008 > 011 | |
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| 011 | 08:07:19 | 00:05:38 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:07:22 | 00:05:37 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:07:24 | 00:05:34 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:08:29 | 00:06:12 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:11:12 | 00:08:28 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:10:07 | 00:07:18 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:11:05 | 00:07:33 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:11:24 | 00:07:49 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:13:01 | 00:08:51 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:13:14 | 00:09:03 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:13:17 | 00:09:03 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:13:23 | 00:09:01 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:13:26 | 00:09:01 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:14:17 | 00:09:22 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:14:26 | 00:09:23 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:14:36 | 00:09:17 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:15:11 | 00:09:47 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:16:59 | 00:11:03 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:17:38 | 00:11:40 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:19:35 | 00:10:09 | 3 002 > 006 > 008 > 011 | AM Peak |

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|---|---|---|---|
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| 002 | 08:10:13 | 08:19:40 | 08:19:55 |
| 002 | 08:11:12 | 08:20:12 | 08:20:42 |
| 002 | 08:11:15 | 08:20:15 | 08:20:45 |
| 002 | 08:12:05 | 08:20:37 | 08:21:11 |
| 002 | 08:12:53 | 08:21:12 | 08:21:41 |
| 002 | 08:13:09 | 08:21:44 | 08:21:58 |
| 002 | 08:13:16 | 08:23:49 | 08:24:05 |
| 002 | 08:13:25 | 08:21:56 | 08:22:19 |
| 002 | 08:14:49 | 08:22:51 | 08:23:25 |
| 002 | 08:15:28 | 08:23:35 | 08:23:55 |
| 002 | 08:16:41 | 08:24:03 | 08:24:17 |
| 002 | 08:16:59 | 08:24:13 | 08:24:26 |
| 002 | 08:17:09 | 08:24:21 | 08:24:47 |
| 002 | 08:17:12 | 08:24:25 | 08:24:50 |
| 002 | 08:17:33 | 08:25:13 | 08:25:49 |
| 002 | 08:17:39 | 08:30:24 | 08:30:44 |
| 002 | 08:17:44 | 08:25:23 | 08:25:59 |
| 002 | 08:18:24 | 08:25:35 | 08:26:01 |
| 002 | 08:18:41 | 08:26:02 | 08:26:21 |
| 002 | 08:18:43 | 08:26:23 | 08:26:42 |
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| 002 | 08:20:31 | 08:28:00 | 08:28:30 |
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| 002 | 08:21:44 | 08:28:57 | 08:29:10 |
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| 002 | 08:23:46 | 08:29:46 | 08:30:01 |
| 002 | 08:25:06 | 08:29:57 | 08:30:10 |
| 002 | 08:25:18 | 08:31:33 | 08:32:07 |
| 002 | 08:25:29 | 08:30:16 | 08:30:30 |
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| 002 | 08:26:12 | 08:31:18 | 08:31:27 |
| 002 | 08:26:59 | 08:31:20 | 08:31:29 |
| 002 | 08:27:50 | 08:31:44 | 08:32:29 |
| 002 | 08:28:05 | 08:32:34 | 08:33:07 |
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| 002 | 08:29:05 | 08:32:13 | 08:32:39 |
| 002 | 08:29:12 | 08:32:23 | 08:32:46 |
| 002 | 08:30:08 | 08:33:07 | 08:33:35 |
| 002 | 08:30:10 | 08:33:12 | 08:33:40 |
| 002 | 08:30:28 | 08:33:31 | 08:33:51 |
| 002 | 08:31:06 | 08:43:32 | 08:43:54 |
| 002 | 08:31:07 | 08:34:13 | 08:34:33 |
| 002 | 08:31:40 | 08:34:48 | 08:35:00 |
| 002 | 08:32:21 | 08:35:24 | 08:35:33 |
| 002 | 08:33:48 | 08:37:14 | 08:37:26 |
| 002 | 08:33:56 | 08:37:21 | 08:37:36 |
| 002 | 08:35:01 | 08:38:39 | 08:38:58 |
| 002 | 08:36:11 | 08:41:35 | 08:41:52 |
| 002 | 08:37:29 | 08:42:00 | 08:42:29 |
| 002 | 08:37:40 | 08:42:38 | 08:42:58 |
| 002 | 08:39:02 | 08:43:20 | 08:43:43 |
| 002 | 08:40:37 | 08:46:24 | 08:46:37 |
| 002 | 08:41:22 | 08:46:49 | 08:47:01 |
| 002 | 09:01:24 | 09:04:15 | 09:04:27 |
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| 002 | 09:21:41 | 09:24:22 | 09:24:30 |
| 002 | 09:22:14 | 09:24:41 | 09:24:48 |
| 002 | 09:22:25 | 09:24:57 | 09:25:08 |
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| 002 | 09:23:04 | 09:26:03 | 09:26:15 |
| 002 | 09:23:34 | 09:26:17 | 09:26:27 |
| 002 | 09:24:47 | 09:27:48 | 09:27:55 |
| 002 | 09:25:25 | 09:28:25 | 09:28:34 |
| 002 | 09:26:05 | 09:28:34 | 09:28:42 |
| 002 | 09:28:42 | 09:31:55 | 09:32:04 |
| 002 | 09:30:02 | 09:32:37 | 09:32:51 |
| 002 | 09:30:18 | 09:32:50 | 09:32:59 |
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| 002 | 09:36:31 | 09:38:51 | 09:38:58 |
| 002 | 09:36:34 | 09:38:53 | 09:39:01 |
| 002 | 09:38:32 | 09:40:39 | 09:40:47 |
| 002 | 09:38:34 | 09:40:41 | 09:40:49 |
| 002 | 09:39:04 | 09:41:17 | 09:41:28 |
| 002 | 09:40:44 | 09:43:35 | 09:43:44 |
| 002 | 09:42:17 | 09:46:41 | 09:46:49 |
| 002 | 09:43:07 | 09:45:51 | 09:45:58 |
| 002 | 09:43:47 | 09:48:26 | 09:48:36 |
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| 002 | 09:44:48 | 09:47:32 | 09:47:40 |
| 002 | 09:45:27 | 09:47:56 | 09:48:03 |
| 002 | 09:45:56 | 09:48:34 | 09:48:43 |
| 002 | 09:46:02 | 09:48:38 | 09:48:48 |
| 002 | 09:46:27 | 09:49:10 | 09:49:20 |
| 002 | 09:49:10 | 09:52:16 | 09:52:26 |
| 002 | 09:49:12 | 09:52:19 | 09:52:29 |
| 002 | 09:49:23 | 09:52:43 | 09:52:54 |
| 002 | 09:50:56 | 09:53:49 | 09:54:02 |
| 002 | 09:50:58 | 09:53:57 | 09:54:09 |

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|---|---|---|---|---|
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| 011 | 08:21:26 | 00:10:14 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:25:10 | 00:13:55 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:21:59 | 00:09:54 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:22:56 | 00:10:03 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:23:00 | 00:09:51 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:25:00 | 00:11:44 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:23:06 | 00:09:41 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:24:01 | 00:09:12 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:24:36 | 00:09:08 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:25:27 | 00:08:46 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:25:32 | 00:08:33 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:25:45 | 00:08:36 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:25:48 | 00:08:36 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:26:21 | 00:08:48 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:31:29 | 00:13:50 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:26:33 | 00:08:49 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:26:37 | 00:08:13 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:26:55 | 00:08:14 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:27:18 | 00:08:35 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:27:20 | 00:08:33 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:27:22 | 00:08:21 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:27:46 | 00:08:26 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:28:49 | 00:08:25 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:29:04 | 00:08:33 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:29:09 | 00:07:42 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:29:44 | 00:08:00 | 3 002 > 006 > 008 > 011 | AM Peak |
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| 011 | 08:30:46 | 00:07:00 | 3 002 > 006 > 008 > 011 | AM Peak |
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| 011 | 08:33:11 | 00:05:21 | 3 002 > 006 > 008 > 011 | AM Peak |
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| 011 | 08:34:10 | 00:04:02 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:34:13 | 00:04:03 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:34:24 | 00:03:56 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:44:32 | 00:13:26 | 3 002 > 006 > 008 > 011 | AM Peak |
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| 011 | 08:35:39 | 00:03:59 | 3 002 > 006 > 008 > 011 | AM Peak |
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| 011 | 08:39:34 | 00:04:33 | 3 002 > 006 > 008 > 011 | AM Peak |
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| 011 | 08:43:33 | 00:05:53 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:44:14 | 00:05:12 | 3 002 > 006 > 008 > 011 | AM Peak |
| 011 | 08:47:12 | 00:06:35 | 3 002 > 006 > 008 > 011 | AM Peak |
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| 011 | 09:13:09 | 00:08:08 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:10:51 | 00:02:47 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:13:13 | 00:03:31 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:16:44 | 00:03:57 | 3 002 > 006 > 008 > 011 | |
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| 011 | 09:20:09 | 00:03:36 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:20:39 | 00:03:23 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:20:42 | 00:03:18 | 3 002 > 006 > 008 > 011 | |
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| 011 | 09:21:54 | 00:03:25 | 3 002 > 006 > 008 > 011 | |
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| 011 | 09:22:47 | 00:03:29 | 3 002 > 006 > 008 > 011 | |
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| 011 | 09:25:19 | 00:03:05 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:25:46 | 00:03:21 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:26:25 | 00:03:44 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:26:40 | 00:03:42 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:26:42 | 00:03:40 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:26:47 | 00:03:43 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:26:57 | 00:03:23 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:28:26 | 00:03:39 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:29:13 | 00:03:48 | 3 002 > 006 > 008 > 011 | |
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| 011 | 09:32:38 | 00:03:56 | 3 002 > 006 > 008 > 011 | |
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| 011 | 09:35:33 | 00:03:41 | 3 002 > 006 > 008 > 011 | |
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| 011 | 09:37:06 | 00:03:40 | 3 002 > 006 > 008 > 011 | |
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| 011 | 09:37:28 | 00:03:32 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:39:27 | 00:02:57 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:39:29 | 00:02:58 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:39:33 | 00:02:59 | 3 002 > 006 > 008 > 011 | |
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| 011 | 09:41:21 | 00:02:47 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:41:58 | 00:02:54 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:44:15 | 00:03:31 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:52:10 | 00:09:53 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:46:28 | 00:03:21 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:49:12 | 00:05:25 | 3 002 > 006 > 008 > 011 | |
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| 011 | 09:47:47 | 00:03:40 | 3 002 > 006 > 008 > 011 | |
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| 011 | 09:53:03 | 00:03:51 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:53:21 | 00:03:58 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:54:35 | 00:03:39 | 3 002 > 006 > 008 > 011 | |
| 011 | 09:54:45 | 00:03:47 | 3 002 > 006 > 008 > 011 | |

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|---|---|---|---|
| 002 | 09:52:05 | 09:54:11 | 09:54:20 |
| 002 | 09:52:08 | 09:54:18 | 09:54:25 |
| 002 | 09:52:12 | 09:54:29 | 09:54:36 |
| 002 | 09:52:26 | 09:54:54 | 09:55:03 |
| 002 | 09:52:38 | 09:55:03 | 09:55:12 |
| 002 | 09:53:24 | 09:55:31 | 09:55:39 |
| 002 | 09:53:59 | 09:57:01 | 09:57:11 |
| 002 | 09:54:05 | 09:57:06 | 09:57:17 |
| 002 | 09:54:38 | 09:57:45 | 09:57:53 |
| 002 | 09:54:45 | 09:58:24 | 09:58:35 |
| 002 | 09:56:00 | 09:58:34 | 09:58:46 |
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| 002 | 11:57:10 | 11:59:28 | 11:59:34 |
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| 002 | 11:57:36 | 11:59:48 | 11:59:57 |
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| 002 | 11:57:53 | 12:00:37 | 12:00:46 |
| 002 | 11:58:27 | 12:01:23 | 12:01:32 |
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|---|---|---|---|
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| 002 | 12:53:52 | 12:56:52 | 12:57:00 |
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| 002 | 13:26:07 | 13:28:23 | 13:28:30 |
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| 011 | 14:31:45 | 00:03:50 | 3 002 > 006 > 008 > 011 |
| 011 | 14:31:46 | 00:03:49 | 3 002 > 006 > 008 > 011 |
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| 011 | 14:36:20 | 00:04:20 | 3 002 > 006 > 008 > 011 |

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| 002 | 14:35:51 | 14:38:36 | 14:38:43 |
| 002 | 14:35:52 | 14:38:37 | 14:38:45 |
| 002 | 14:35:56 | 14:38:43 | 14:38:51 |
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| 002 | 14:37:14 | 14:40:10 | 14:40:19 |
| 002 | 14:37:41 | 14:40:42 | 14:41:16 |
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| 002 | 15:03:09 | 15:05:43 | 15:05:50 |
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|---|---|---|---|
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| 002 | 16:27:50 | 16:32:49 | 16:33:05 |
| 002 | 16:27:53 | 16:32:52 | 16:33:07 |
| 002 | 16:27:57 | 16:32:56 | 16:33:22 |
| 002 | 16:28:54 | 16:33:18 | 16:33:36 |
| 002 | 16:28:58 | 16:33:20 | 16:33:38 |
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| 002 | 16:34:44 | 16:37:54 | 16:38:03 |
| 002 | 16:35:36 | 16:39:25 | 16:39:51 |
| 002 | 16:35:38 | 16:39:39 | 16:44:44 |
| 002 | 16:36:44 | 16:40:01 | 16:40:25 |
| 002 | 16:36:45 | 16:40:04 | 16:40:27 |
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| 002 | 16:39:21 | 16:42:31 | 16:42:39 |
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| 002 | 16:40:31 | 16:43:30 | 16:43:40 |
| 002 | 16:40:36 | 16:43:33 | 16:43:42 |
| 002 | 16:42:09 | 16:46:57 | 16:47:16 |
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| 002 | 16:43:35 | 16:47:39 | 16:47:47 |
| 002 | 16:43:39 | 16:47:37 | 16:47:45 |
| 002 | 16:44:30 | 16:48:32 | 16:48:39 |
| 002 | 16:44:50 | 16:48:50 | 16:48:59 |
| 002 | 16:45:32 | 16:50:05 | 16:50:14 |
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| 002 | 16:57:46 | 17:01:35 | 17:01:43 |
| 002 | 16:58:17 | 17:02:14 | 17:02:23 |
| 002 | 16:59:06 | 17:03:29 | 17:03:42 |
| 002 | 16:59:12 | 17:03:42 | 17:03:50 |
| 002 | 16:59:14 | 17:03:45 | 17:03:53 |
| 002 | 16:59:52 | 17:03:59 | 17:04:11 |
| 002 | 17:00:38 | 17:05:04 | 17:05:16 |
| 002 | 17:01:33 | 17:05:12 | 17:05:23 |
| 002 | 17:03:33 | 17:07:12 | 17:12:49 |
| 002 | 17:03:48 | 17:07:19 | 17:07:33 |
| 002 | 17:04:08 | 17:07:26 | 17:07:38 |
| 002 | 17:04:11 | 17:07:31 | 17:07:44 |
| 002 | 17:04:40 | 17:07:42 | 17:07:52 |
| 002 | 17:06:47 | 17:10:00 | 17:10:09 |
| 002 | 17:07:54 | 17:10:51 | 17:11:00 |
| 002 | 17:08:00 | 17:11:25 | 17:11:34 |
| 002 | 17:08:34 | 17:11:42 | 17:11:54 |
| 002 | 17:08:49 | 17:11:50 | 17:12:05 |
| 002 | 17:10:22 | 17:14:07 | 17:14:17 |
| 002 | 17:10:51 | 17:14:11 | 17:14:20 |
| 002 | 17:11:33 | 17:14:18 | 17:14:26 |

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|---|---|---|---|---|
| 011 | 16:00:24 | 00:03:47 | 3 002 > 006 > 008 > 011 | |
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| 011 | 16:01:51 | 00:03:35 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:01:53 | 00:03:27 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:02:15 | 00:03:07 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:04:25 | 00:04:06 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:04:28 | 00:04:07 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:05:23 | 00:04:43 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:05:27 | 00:04:23 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:05:53 | 00:04:25 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:09:21 | 00:07:52 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:05:57 | 00:04:08 | 3 002 > 006 > 008 > 011 | |
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| 011 | 16:09:20 | 00:03:49 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:10:48 | 00:03:44 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:11:05 | 00:03:58 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:11:08 | 00:04:00 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:12:09 | 00:03:50 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:13:17 | 00:03:58 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:13:20 | 00:03:58 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:13:52 | 00:04:13 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:14:34 | 00:03:55 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:15:35 | 00:04:16 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:19:41 | 00:05:20 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:19:52 | 00:04:24 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:20:00 | 00:04:03 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:20:02 | 00:04:03 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:21:57 | 00:04:26 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:22:09 | 00:04:33 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:24:40 | 00:04:57 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:23:25 | 00:03:40 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:24:43 | 00:04:46 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:24:46 | 00:04:31 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:26:30 | 00:04:49 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:27:13 | 00:05:25 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:27:49 | 00:04:22 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:30:16 | 00:05:36 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:30:18 | 00:05:33 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:30:21 | 00:05:34 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:30:32 | 00:05:39 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:30:34 | 00:05:23 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:33:36 | 00:05:56 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:33:41 | 00:05:54 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:33:44 | 00:05:54 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:33:46 | 00:05:53 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:33:53 | 00:05:56 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:34:17 | 00:05:23 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:34:22 | 00:05:24 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:34:51 | 00:05:17 | 3 002 > 006 > 008 > 011 | |
| 011 | 16:35:44 | 00:03:57 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:36:55 | 00:04:42 | 3 002 > 006 > 008 > 011 | PM Peak |
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| 011 | 16:38:22 | 00:04:04 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:38:25 | 00:04:01 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:38:27 | 00:03:53 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:38:45 | 00:04:01 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:40:23 | 00:04:47 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:45:16 | 00:09:38 | 3 002 > 006 > 008 > 011 | PM Peak |
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| 011 | 16:41:10 | 00:04:25 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:43:12 | 00:04:11 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:43:16 | 00:03:55 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:43:26 | 00:04:01 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:44:19 | 00:03:48 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:44:20 | 00:03:44 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:47:51 | 00:05:42 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:47:59 | 00:05:00 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:48:12 | 00:04:45 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:48:20 | 00:04:51 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:48:24 | 00:04:49 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:48:22 | 00:04:43 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:49:08 | 00:04:38 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:49:37 | 00:04:47 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:50:52 | 00:05:20 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:55:54 | 00:10:19 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:50:55 | 00:05:15 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:51:52 | 00:05:40 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:51:55 | 00:05:42 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:52:10 | 00:05:29 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:52:31 | 00:05:29 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:52:52 | 00:05:17 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:52:54 | 00:05:18 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:53:09 | 00:05:13 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:53:14 | 00:05:12 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:53:55 | 00:05:40 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:53:57 | 00:05:00 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:54:49 | 00:04:57 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:55:20 | 00:04:56 | 3 002 > 006 > 008 > 011 | PM Peak |
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| 011 | 16:55:46 | 00:03:34 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:58:10 | 00:03:04 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:59:26 | 00:03:23 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 16:59:53 | 00:03:28 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:02:01 | 00:04:20 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:02:19 | 00:04:33 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:02:55 | 00:04:38 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:04:24 | 00:05:18 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:04:28 | 00:05:16 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:04:30 | 00:05:16 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:04:40 | 00:04:48 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:05:57 | 00:05:19 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:06:05 | 00:04:32 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:17:10 | 00:13:37 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:08:11 | 00:04:23 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:08:14 | 00:04:06 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:08:18 | 00:04:07 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:08:26 | 00:03:46 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:10:47 | 00:04:00 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:11:45 | 00:03:51 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:12:16 | 00:04:16 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:12:37 | 00:04:03 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:12:46 | 00:03:57 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:14:43 | 00:04:21 | 3 002 > 006 > 008 > 011 | PM Peak |
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| 011 | 17:14:59 | 00:03:26 | 3 002 > 006 > 008 > 011 | PM Peak |

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|---|---|---|---|
| 002 | 17:13:19 | 17:15:44 | 17:15:54 |
| 002 | 17:13:58 | 17:16:40 | 17:16:55 |
| 002 | 17:14:01 | 17:17:05 | 17:17:14 |
| 002 | 17:14:03 | 17:20:55 | 17:21:02 |
| 002 | 17:14:23 | 17:18:09 | 17:18:21 |
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| 002 | 17:27:30 | 17:30:17 | 17:30:26 |
| 002 | 17:27:49 | 17:30:50 | 17:31:02 |
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| 002 | 17:35:12 | 17:38:35 | 17:38:43 |
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| 002 | 17:38:21 | 17:41:39 | 17:41:47 |
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| 002 | 17:55:19 | 17:58:28 | 17:58:43 |
| 002 | 17:58:30 | 18:00:52 | 18:01:00 |
| 002 | 17:59:08 | 18:02:10 | 18:02:19 |
| 002 | 17:59:32 | 18:02:34 | 18:02:42 |
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| 002 | 18:01:04 | 18:03:54 | 18:04:03 |
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| 002 | 18:03:29 | 18:07:14 | 18:07:22 |
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| 002 | 18:07:24 | 18:10:02 | 18:10:12 |
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| 002 | 18:22:13 | 18:25:12 | 18:25:21 |
| 002 | 18:22:15 | 18:25:16 | 18:25:25 |
| 002 | 18:22:27 | 18:25:19 | 18:25:28 |
| 002 | 18:23:42 | 18:26:47 | 18:26:55 |
| 002 | 18:24:54 | 18:27:40 | 18:27:49 |
| 002 | 18:25:30 | 18:27:56 | 18:28:04 |
| 002 | 18:26:29 | 18:29:15 | 18:29:24 |
| 002 | 18:27:45 | 18:31:03 | 18:31:11 |
| 002 | 18:28:36 | 18:31:15 | 18:31:22 |
| 002 | 18:30:02 | 18:32:50 | 18:33:00 |

| | | | | |
|---|---|---|---|---|
| 011 | 17:16:31 | 00:03:12 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:17:28 | 00:03:30 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:17:48 | 00:03:47 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:21:30 | 00:07:27 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:19:02 | 00:04:39 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:19:52 | 00:03:51 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:21:49 | 00:05:03 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:22:42 | 00:05:21 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:23:35 | 00:05:40 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:23:57 | 00:04:52 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:24:41 | 00:03:41 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:25:36 | 00:04:23 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:25:50 | 00:03:58 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:30:20 | 00:05:47 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:30:22 | 00:05:37 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:30:27 | 00:05:36 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:30:37 | 00:05:35 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:38:14 | 00:13:10 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:30:39 | 00:05:32 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:30:41 | 00:05:13 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:30:43 | 00:04:50 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:30:46 | 00:03:53 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:31:03 | 00:03:33 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:31:48 | 00:03:59 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:32:24 | 00:04:30 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:33:46 | 00:05:17 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:33:48 | 00:04:54 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:34:25 | 00:05:18 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:34:29 | 00:05:19 | 3 002 > 006 > 008 > 011 | PM Peak |
| 011 | 17:35:04 | 00:04:54 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:35:05 | 00:04:53 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:35:36 | 00:04:38 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:36:28 | 00:03:48 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:37:32 | 00:04:40 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:37:49 | 00:03:45 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:39:14 | 00:04:02 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:39:21 | 00:03:37 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:42:23 | 00:04:02 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:43:00 | 00:04:34 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:44:14 | 00:05:42 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:44:29 | 00:05:52 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:44:33 | 00:05:53 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:44:39 | 00:04:48 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:44:46 | 00:04:20 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:45:49 | 00:03:39 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:45:52 | 00:03:36 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:46:43 | 00:03:45 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:49:26 | 00:05:18 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:49:28 | 00:05:19 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:49:29 | 00:05:18 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:50:12 | 00:04:18 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:50:16 | 00:04:16 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:50:18 | 00:04:02 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:51:50 | 00:03:20 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:54:03 | 00:05:25 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:54:06 | 00:05:26 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:54:08 | 00:05:15 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:54:19 | 00:04:13 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:55:14 | 00:03:55 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:55:15 | 00:03:55 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:55:23 | 00:04:01 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:55:26 | 00:03:48 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:56:04 | 00:03:48 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:58:58 | 00:04:31 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:59:05 | 00:04:32 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:59:06 | 00:04:33 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:59:14 | 00:04:06 | 3 002 > 006 > 008 > 011 | |
| 011 | 17:59:18 | 00:03:59 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:01:32 | 00:03:02 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:02:54 | 00:03:46 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:03:22 | 00:03:50 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:03:38 | 00:04:03 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:03:40 | 00:04:02 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:04:43 | 00:03:39 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:04:45 | 00:03:39 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:04:47 | 00:03:39 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:05:38 | 00:03:00 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:07:44 | 00:04:18 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:08:00 | 00:04:31 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:08:10 | 00:04:39 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:08:53 | 00:04:08 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:08:58 | 00:04:09 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:09:25 | 00:03:45 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:10:42 | 00:03:21 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:10:44 | 00:03:20 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:11:58 | 00:03:39 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:12:44 | 00:03:56 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:12:53 | 00:03:59 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:14:03 | 00:04:01 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:14:04 | 00:03:59 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:14:08 | 00:03:25 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:15:36 | 00:03:28 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:15:43 | 00:03:33 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:15:56 | 00:03:42 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:16:17 | 00:03:42 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:16:24 | 00:03:34 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:16:52 | 00:03:24 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:19:19 | 00:04:33 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:19:22 | 00:04:25 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:19:29 | 00:03:50 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:19:48 | 00:04:03 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:21:35 | 00:04:04 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:22:43 | 00:04:43 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:22:56 | 00:04:15 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:23:05 | 00:03:32 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:25:56 | 00:03:43 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:26:03 | 00:03:48 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:26:05 | 00:03:38 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:27:26 | 00:03:44 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:28:28 | 00:03:34 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:28:40 | 00:03:10 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:29:59 | 00:03:30 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:31:46 | 00:04:01 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:31:53 | 00:03:17 | 3 002 > 006 > 008 > 011 | |
| 011 | 18:33:46 | 00:03:44 | 3 002 > 006 > 008 > 011 | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 002 | 18:32:13 | | 18:34:52 | | 18:35:00 | | | | | 011 | 18:35:35 | 00:03:22 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:32:29 | | 18:35:25 | | 18:35:32 | | | | | 011 | 18:36:05 | 00:03:36 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:32:55 | | 18:35:39 | | 18:35:47 | | | | | 011 | 18:36:25 | 00:03:30 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:32:56 | | 18:35:41 | | 18:35:49 | | | | | 011 | 18:36:26 | 00:03:30 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:34:55 | | 18:37:24 | | 18:37:31 | | | | | 011 | 18:38:04 | 00:03:09 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:35:10 | | 18:43:13 | | 18:43:27 | | | | | 011 | 18:44:01 | 00:08:51 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:35:41 | | 18:38:38 | | 18:38:45 | | | | | 011 | 18:39:20 | 00:03:39 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:37:37 | | 18:40:49 | | 18:40:55 | | | | | 011 | 18:41:25 | 00:03:48 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:38:31 | | 18:41:06 | | 18:41:23 | | | | | 011 | 18:42:00 | 00:03:29 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:38:34 | | 18:41:07 | | 18:41:24 | | | | | 011 | 18:42:03 | 00:03:29 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:40:27 | | 18:43:08 | | 18:43:22 | | | | | 011 | 18:43:55 | 00:03:28 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:41:36 | | 18:44:16 | | 18:44:23 | | | | | 011 | 18:44:57 | 00:03:21 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:41:38 | | 18:44:18 | | 18:44:25 | | | | | 011 | 18:45:03 | 00:03:25 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:42:16 | | 18:45:00 | | 18:45:08 | | | | | 011 | 18:45:43 | 00:03:27 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:43:25 | | 18:46:31 | | 18:46:40 | | | | | 011 | 18:47:25 | 00:04:00 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:43:27 | | 18:46:33 | | 18:46:42 | | | | | 011 | 18:47:26 | 00:03:59 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:44:20 | | 18:46:45 | | 18:46:58 | | | | | 011 | 18:47:34 | 00:03:14 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:44:27 | | 18:47:07 | | 18:47:15 | | | | | 011 | 18:47:49 | 00:03:22 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:44:57 | | 18:47:48 | | 18:47:56 | | | | | 011 | 18:48:35 | 00:03:38 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:44:59 | | 18:47:50 | | 18:47:58 | | | | | 011 | 18:48:37 | 00:03:38 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:45:17 | | 18:48:15 | | 18:48:24 | | | | | 011 | 18:49:00 | 00:03:43 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:45:21 | | 18:48:20 | | 18:48:28 | | | | | 011 | 18:49:06 | 00:03:45 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:45:28 | | 18:48:27 | | 18:48:34 | | | | | 011 | 18:49:08 | 00:03:40 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:46:24 | | 18:49:09 | | 18:49:17 | | | | | 011 | 18:49:50 | 00:03:26 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:46:25 | | 18:49:11 | | 18:49:20 | | | | | 011 | 18:49:52 | 00:03:27 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:46:31 | | 18:49:42 | | 18:49:50 | | | | | 011 | 18:50:28 | 00:03:57 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:46:40 | | 18:49:44 | | 18:49:52 | | | | | 011 | 18:50:30 | 00:03:50 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:47:42 | | 18:50:30 | | 18:50:40 | | | | | 011 | 18:51:24 | 00:03:42 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:48:18 | | 18:50:44 | | 18:50:51 | | | | | 011 | 18:51:27 | 00:03:09 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:48:22 | | 18:50:46 | | 18:50:53 | | | | | 011 | 18:51:30 | 00:03:08 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:48:34 | | 18:51:17 | | 18:51:24 | | | | | 011 | 18:51:59 | 00:03:25 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:49:13 | | 18:52:07 | | 18:52:18 | | | | | 011 | 18:52:54 | 00:03:41 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:49:30 | | 18:52:15 | | 18:52:23 | | | | | 011 | 18:52:58 | 00:03:28 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:49:32 | | 18:52:17 | | 18:52:25 | | | | | 011 | 18:53:01 | 00:03:29 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:51:08 | | 18:54:05 | | 18:54:13 | | | | | 011 | 18:54:50 | 00:03:42 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:52:15 | | 18:55:14 | | 18:55:26 | | | | | 011 | 18:56:02 | 00:03:47 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:52:20 | | 18:55:21 | | 18:55:30 | | | | | 011 | 18:56:15 | 00:03:55 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:54:04 | | 18:56:52 | | 18:57:03 | | | | | 011 | 18:57:44 | 00:03:40 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:54:06 | | 18:56:53 | | 18:57:05 | | | | | 011 | 18:57:46 | 00:03:40 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:54:34 | | 18:57:10 | | 18:57:19 | | | | | 011 | 18:57:55 | 00:03:21 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:54:51 | | 18:57:53 | | 18:58:00 | | | | | 011 | 18:58:38 | 00:03:47 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:55:03 | | 18:58:00 | | 18:58:08 | | | | | 011 | 18:58:44 | 00:03:41 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:55:17 | | 18:58:01 | | 18:58:10 | | | | | 011 | 18:58:46 | 00:03:29 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 18:55:26 | | 18:58:41 | | 18:58:49 | | | | | 011 | 18:59:22 | 00:03:56 | 3 | 002 > 006 > 008 > 011 | |
| 002 | 09:15:40 | 09:25:12 | 09:18:31 | 09:25:04 | 09:18:42 | | 09:23:25 | 09:19:57 | | 001 | 09:28:02 | 00:12:22 | 7 | 002 > 006 > 008 > 014 > 013 > 007 > 005 > 001 | |
| 002 | 07:19:08 | | 07:23:20 | | 07:23:32 | | 07:27:01 | 07:25:06 | | 011 | 07:27:49 | 00:08:41 | 5 | 002 > 006 > 008 > 014 > 013 > 011 | |
| 002 | 07:49:52 | | 07:52:32 | | 07:52:45 | | 07:55:05 | 07:53:47 | | 011 | 07:55:50 | 00:05:58 | 5 | 002 > 006 > 008 > 014 > 013 > 011 | |
| 002 | 07:57:08 | | 08:01:50 | | 08:02:04 | | 08:06:29 | 08:04:19 | | 011 | 08:07:59 | 00:10:51 | 5 | 002 > 006 > 008 > 014 > 013 > 011 | |
| 002 | 09:16:45 | | 09:19:27 | | 09:19:39 | | 09:23:59 | 09:20:57 | | 011 | 09:24:41 | 00:07:56 | 5 | 002 > 006 > 008 > 014 > 013 > 011 | |
| 002 | 10:15:15 | | 10:19:15 | | 10:19:23 | | 10:22:13 | 10:20:29 | | 011 | 10:22:58 | 00:07:43 | 5 | 002 > 006 > 008 > 014 > 013 > 011 | |
| 002 | 10:34:43 | | 10:37:05 | | 10:37:14 | | 10:45:05 | 10:38:11 | | 011 | 10:45:48 | 00:11:05 | 5 | 002 > 006 > 008 > 014 > 013 > 011 | |
| 002 | 11:12:01 | | 11:16:07 | | 11:16:16 | | 11:20:20 | 11:17:30 | | 011 | 11:21:09 | 00:09:08 | 5 | 002 > 006 > 008 > 014 > 013 > 011 | |
| 002 | 13:13:07 | | 13:16:01 | | 13:16:11 | | 13:21:08 | 13:17:31 | | 011 | 13:22:11 | 00:09:04 | 5 | 002 > 006 > 008 > 014 > 013 > 011 | |
| 002 | 14:12:28 | | 14:15:41 | | 14:15:50 | | 14:22:38 | 14:17:15 | | 011 | 14:23:26 | 00:10:58 | 5 | 002 > 006 > 008 > 014 > 013 > 011 | |
| 002 | 16:12:44 | | 16:17:54 | | 16:18:06 | | 16:23:20 | 16:20:01 | | 011 | 16:24:13 | 00:11:29 | 5 | 002 > 006 > 008 > 014 > 013 > 011 | |
| 002 | 07:47:18 | | 07:50:37 | | 07:50:46 | | | 07:57:10 | 08:00:28 | 017 | 08:00:41 | 00:13:23 | 5 | 002 > 006 > 008 > 014 > 015 > 017 | |
| 002 | 08:18:28 | | 08:25:41 | | 08:26:03 | | | 08:29:06 | 08:32:13 | 019 | 08:33:16 | 00:14:48 | 5 | 002 > 006 > 008 > 014 > 015 > 019 | AM Peak |
| 002 | 11:57:14 | | 11:59:36 | | 11:59:44 | | | 12:00:43 | 12:02:44 | 019 | 12:03:34 | 00:06:20 | 5 | 002 > 006 > 008 > 014 > 015 > 019 | |
| 002 | 12:02:16 | | 12:04:34 | | 12:04:45 | | | 12:05:42 | 12:07:55 | 019 | 12:08:40 | 00:06:24 | 5 | 002 > 006 > 008 > 014 > 015 > 019 | |
| 002 | 12:15:04 | | 12:18:16 | | 12:18:22 | | | 12:19:06 | 12:20:31 | 019 | 12:21:38 | 00:06:34 | 5 | 002 > 006 > 008 > 014 > 015 > 019 | |
| 002 | 14:27:26 | | 14:30:02 | | 14:30:10 | | | 14:31:17 | 14:34:55 | 019 | 14:35:53 | 00:08:27 | 5 | 002 > 006 > 008 > 014 > 015 > 019 | |
| 002 | 15:09:09 | | 15:11:50 | | 15:11:59 | | | 15:13:05 | 15:15:28 | 019 | 15:16:35 | 00:07:26 | 5 | 002 > 006 > 008 > 014 > 015 > 019 | |
| 002 | 15:18:49 | | 15:21:42 | | 15:21:50 | | | 15:22:51 | 15:24:47 | 019 | 15:25:40 | 00:06:51 | 5 | 002 > 006 > 008 > 014 > 015 > 019 | |
| 002 | 17:22:18 | | 17:25:36 | | 17:25:43 | | | 17:30:49 | 17:33:42 | 019 | 17:34:48 | 00:12:30 | 5 | 002 > 006 > 008 > 014 > 015 > 019 | PM Peak |
| 002 | 18:26:48 | | 18:29:21 | | | | 18:30:03 | | | 001 | 18:34:05 | 00:07:17 | 3 | 002 > 006 > 010 > 001 | |
| 002 | 18:04:50 | | 18:08:11 | | | 18:09:31 | 18:08:47 | | | 003 | 18:10:33 | 00:05:43 | 4 | 002 > 006 > 010 > 009 > 003 | |
| 002 | 10:38:04 | 10:42:51 | 10:40:41 | | | 10:42:05 | 10:41:30 | | | 003 | 10:43:32 | 00:05:28 | 5 | 002 > 006 > 010 > 009 > 005 > 003 | |
| 002 | 11:42:04 | 11:55:47 | 11:44:17 | | | 11:55:13 | 11:44:58 | | | 003 | 11:56:20 | 00:14:16 | 5 | 002 > 006 > 010 > 009 > 005 > 003 | |
| 002 | 07:39:01 | | 07:43:02 | | 07:49:00 | 07:48:12 | 07:43:46 | | | 011 | 07:50:01 | 00:11:00 | 5 | 002 > 006 > 010 > 009 > 008 > 011 | |
| 002 | 17:07:25 | | 17:10:38 | | | | 17:11:28 | | | 011 | 17:17:59 | 00:10:34 | 3 | 002 > 006 > 010 > 013 > 011 | PM Peak |
| 002 | 07:46:35 | | 07:50:17 | | | | 07:51:01 | 07:57:00 | | 011 | 07:57:47 | 00:11:12 | 4 | 002 > 006 > 010 > 013 > 011 | |
| 002 | 10:18:57 | | 10:21:21 | | | | 10:21:58 | 10:23:40 | | 011 | 10:24:30 | 00:05:33 | 4 | 002 > 006 > 010 > 013 > 011 | |
| 002 | 09:12:42 | | 09:15:49 | | | | 09:16:42 | | 09:23:44 | 017 | 09:24:01 | 00:11:19 | 4 | 002 > 006 > 010 > 015 > 017 | |
| 002 | 13:04:11 | | 13:09:47 | | | | 13:10:38 | | 13:13:08 | 017 | 13:13:30 | 00:09:19 | 4 | 002 > 006 > 010 > 015 > 017 | |
| 002 | 13:43:09 | | 13:46:12 | | | | 13:46:52 | | 13:51:11 | 017 | 13:51:29 | 00:08:20 | 4 | 002 > 006 > 010 > 015 > 017 | |
| 002 | 14:15:47 | | 14:18:23 | | | | 14:19:03 | | 14:21:15 | 017 | 14:21:27 | 00:05:40 | 4 | 002 > 006 > 010 > 015 > 017 | |
| 002 | 16:24:35 | | 16:28:42 | | | | 16:36:29 | | 16:38:54 | 017 | 16:39:05 | 00:14:30 | 4 | 002 > 006 > 010 > 015 > 017 | |
| 002 | 16:35:29 | | 16:39:19 | | | | 16:42:20 | | 16:44:15 | 017 | 16:44:24 | 00:08:55 | 4 | 002 > 006 > 010 > 015 > 017 | PM Peak |
| 002 | 18:01:41 | | 18:04:21 | | | | 18:05:01 | | 18:08:02 | 017 | 18:08:18 | 00:06:37 | 4 | 002 > 006 > 010 > 015 > 017 | |
| 002 | 07:42:12 | | 07:45:20 | | | | 07:46:03 | | 07:50:12 | 019 | 07:51:13 | 00:09:01 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 07:44:13 | | 07:50:47 | | | | 07:51:29 | | 07:53:14 | 019 | 07:54:09 | 00:09:56 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 07:46:26 | | 07:51:12 | | | | 07:51:55 | | 07:54:16 | 019 | 07:55:10 | 00:08:44 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 07:47:45 | | 07:51:04 | | | | 07:51:45 | | 07:53:21 | 019 | 07:54:17 | 00:06:32 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 07:54:01 | | 07:58:19 | | | | 08:00:41 | | 08:02:12 | 019 | 08:03:05 | 00:09:04 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 08:00:39 | | 08:04:52 | | | | 08:05:38 | | 08:07:41 | 019 | 08:08:38 | 00:07:59 | 4 | 002 > 006 > 010 > 015 > 019 | AM Peak |
| 002 | 08:47:05 | | 08:53:34 | | | | 08:54:46 | | 09:00:04 | 019 | 09:00:51 | 00:13:46 | 4 | 002 > 006 > 010 > 015 > 019 | AM Peak |
| 002 | 08:47:17 | | 08:54:22 | | | | 08:55:13 | | 09:00:32 | 019 | 09:01:25 | 00:14:08 | 4 | 002 > 006 > 010 > 015 > 019 | AM Peak |
| 002 | 08:47:55 | | 08:54:42 | | | | 08:55:42 | | 09:00:39 | 019 | 09:01:36 | 00:13:41 | 4 | 002 > 006 > 010 > 015 > 019 | AM Peak |
| 002 | 09:22:48 | | 09:25:41 | | | | 09:26:25 | | 09:28:42 | 019 | 09:29:30 | 00:06:42 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 09:23:09 | | 09:26:07 | | | | 09:26:46 | | 09:29:16 | 019 | 09:30:07 | 00:06:58 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 09:26:45 | | 09:29:13 | | | | 09:29:52 | | 09:31:58 | 019 | 09:32:55 | 00:06:10 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 09:32:41 | | 09:34:56 | | | | 09:35:37 | | 09:37:47 | 019 | 09:38:42 | 00:06:01 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 09:39:22 | | 09:41:37 | | | | 09:42:18 | | 09:44:19 | 019 | 09:45:17 | 00:05:55 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 09:39:25 | | 09:41:40 | | | | 09:42:20 | | 09:44:22 | 019 | 09:45:20 | 00:05:55 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 09:41:21 | | 09:44:02 | | | | 09:44:50 | | 09:46:34 | 019 | 09:47:34 | 00:06:13 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 09:44:39 | | 09:47:28 | | | | 09:48:03 | | 09:49:36 | 019 | 09:50:30 | 00:05:51 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 09:58:58 | | 10:05:03 | | | | 10:05:46 | | 10:08:03 | 019 | 10:08:58 | 00:10:00 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 10:02:00 | | 10:04:19 | | | | 10:05:01 | | 10:07:07 | 019 | 10:08:05 | 00:06:05 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 10:06:01 | | 10:08:04 | | | | 10:08:44 | | 10:10:29 | 019 | 10:11:34 | 00:05:33 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 10:06:12 | | 10:08:32 | | | | 10:09:12 | | 10:10:43 | 019 | 10:11:36 | 00:05:24 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 10:31:32 | | 10:34:42 | | | | 10:36:23 | | 10:38:22 | 019 | 10:39:20 | 00:07:48 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 10:31:58 | | 10:34:48 | | | | 10:35:35 | | 10:37:44 | 019 | 10:38:37 | 00:06:39 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 10:39:35 | | 10:41:59 | | | | 10:42:35 | | 10:44:43 | 019 | 10:45:33 | 00:05:58 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 10:49:27 | | 10:51:54 | | | | 10:52:34 | | 10:54:24 | 019 | 10:55:20 | 00:05:53 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 10:49:39 | | 10:51:58 | | | | 10:52:37 | | 10:54:35 | 019 | 10:55:33 | 00:05:54 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 10:51:45 | | 10:54:14 | | | | 10:55:10 | | 10:57:23 | 019 | 10:58:28 | 00:06:43 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 11:01:59 | | 11:04:46 | | | | 11:05:29 | | 11:15:19 | 019 | 11:16:24 | 00:14:25 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 11:11:12 | | 11:13:46 | | | | 11:14:19 | | 11:15:43 | 019 | 11:16:36 | 00:05:24 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 11:21:22 | | 11:23:38 | | | | 11:24:10 | | 11:25:24 | 019 | 11:26:10 | 00:04:48 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 11:26:46 | | 11:29:24 | | | | 11:30:05 | | 11:32:31 | 019 | 11:33:24 | 00:06:38 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 11:29:39 | | 11:32:06 | | | | 11:32:52 | | 11:34:37 | 019 | 11:35:38 | 00:05:59 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 11:38:23 | | 11:41:21 | | | | 11:41:53 | | 11:43:44 | 019 | 11:44:36 | 00:06:13 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 11:46:58 | | 11:49:42 | | | | 11:50:19 | | 11:52:22 | 019 | 11:53:14 | 00:06:16 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 12:00:23 | | 12:02:47 | | | | 12:03:22 | | 12:05:03 | 019 | 12:10:50 | 00:10:27 | 4 | 002 > 006 > 010 > 015 > 019 | |
| 002 | 12:09:01 | | 12:11:48 | | | | 12:12:42 | | 12:15:33 | 019 | 12:16:25 | 00:07:24 | 4 | 002 > 006 > 010 > 015 > 019 | |

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|---|---|---|---|---|
| 002 | 12:14:32 | 12:17:02 | 12:17:43 | 12:19:59 |
| 002 | 12:28:03 | 12:31:10 | 12:31:52 | 12:33:50 |
| 002 | 12:29:33 | 12:31:51 | 12:32:33 | 12:34:02 |
| 002 | 12:30:27 | 12:32:54 | 12:33:39 | 12:36:11 |
| 002 | 12:38:25 | 12:40:43 | 12:41:28 | 12:43:55 |
| 002 | 12:59:21 | 13:05:01 | 13:05:37 | 13:07:54 |
| 002 | 13:05:46 | 13:10:22 | 13:11:03 | 13:13:18 |
| 002 | 13:21:51 | 13:24:19 | 13:25:03 | 13:27:59 |
| 002 | 13:43:35 | 13:49:06 | 13:49:52 | 13:51:39 |
| 002 | 14:32:58 | 14:35:53 | 14:36:42 | 14:38:40 |
| 002 | 14:48:49 | 14:51:42 | 14:52:22 | 14:55:02 |
| 002 | 15:37:25 | 15:40:14 | 15:41:07 | 15:42:52 |
| 002 | 15:44:24 | 15:47:30 | 15:48:11 | 15:50:00 |
| 002 | 16:01:50 | 16:05:19 | 16:05:55 | 16:07:38 |
| 002 | 16:04:45 | 16:08:12 | 16:09:04 | 16:11:10 |
| 002 | 16:13:50 | 16:18:08 | 16:18:55 | 16:20:49 |
| 002 | 16:16:50 | 16:19:30 | 16:20:07 | 16:22:19 |
| 002 | 16:41:29 | 16:44:10 | 16:45:39 | 16:47:51 |
| 002 | 16:48:04 | 16:52:37 | 16:53:30 | 16:56:27 |
| 002 | 16:51:36 | 16:54:48 | 16:55:43 | 16:58:09 |
| 002 | 16:57:53 | 17:02:09 | 17:02:51 | 17:05:58 |
| 002 | 17:08:24 | 17:11:35 | 17:12:23 | 17:16:50 |
| 002 | 17:15:15 | 17:18:56 | 17:20:06 | 17:22:51 |
| 002 | 17:20:12 | 17:23:15 | 17:24:18 | 17:26:01 |
| 002 | 17:27:57 | 17:31:35 | 17:32:27 | 17:34:56 |
| 002 | 17:29:42 | 17:33:57 | 17:34:43 | 17:36:27 |
| 002 | 18:08:47 | 18:11:53 | 18:12:46 | 18:14:46 |
| 002 | 18:17:53 | 18:21:49 | 18:22:32 | 18:24:44 |
| 002 | 18:40:25 | 18:43:07 | 18:43:51 | 18:45:36 |
| 002 | 09:02:59 | 09:06:08 | 09:06:59 | |
| 002 | 11:58:35 | 12:01:32 | 12:02:06 | |
| 002 | 13:47:56 | 13:50:47 | 13:51:20 | |
| 002 | 07:13:00 | 07:15:10 | | |
| 002 | 07:26:55 | 07:29:39 | | |
| 002 | 07:37:28 | 07:40:56 | | |
| 002 | 07:49:24 | 07:52:07 | | |
| 002 | 07:53:51 | 07:58:05 | | |
| 002 | 07:56:12 | 08:06:46 | | |
| 002 | 08:01:01 | 08:05:59 | | |
| 002 | 08:01:18 | 08:06:07 | | |
| 002 | 08:02:22 | 08:07:32 | | |
| 002 | 08:02:37 | 08:07:59 | | |
| 002 | 08:02:41 | 08:10:11 | | |
| 002 | 08:03:02 | 08:08:44 | | |
| 002 | 08:03:14 | 08:09:19 | | |
| 002 | 08:03:16 | 08:09:51 | | |
| 002 | 08:03:29 | 08:10:03 | | |
| 002 | 08:03:43 | 08:10:43 | | |
| 002 | 08:04:07 | 08:11:19 | | |
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| 002 | 10:29:29 | 10:31:50 | | |
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| 002 | 11:48:58 | 11:51:18 | | |
| 002 | 11:49:55 | 11:53:08 | | |
| 002 | 11:50:55 | 11:53:33 | | |
| 002 | 11:54:26 | 11:57:21 | | |
| 002 | 11:54:31 | 11:57:22 | | |
| 002 | 12:04:13 | 12:06:14 | | |
| 002 | 12:10:09 | 12:13:21 | | |
| 002 | 12:10:21 | 12:13:23 | | |
| 002 | 12:10:44 | 12:13:35 | | |
| 002 | 12:13:38 | 12:16:33 | | |
| 002 | 12:16:17 | 12:25:41 | | |
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| 002 | 12:47:27 | 12:50:00 | | |
| 002 | 12:57:03 | 13:03:48 | | |
| 002 | 13:02:16 | 13:09:03 | | |
| 002 | 13:35:33 | 13:38:01 | | |
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| 002 | 14:07:08 | 14:10:17 | | |
| 002 | 14:15:55 | 14:18:37 | | |
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| 002 | 15:32:16 | 15:35:58 | | |
| 002 | 15:32:22 | 15:36:01 | | |
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| 002 | 16:21:27 | 16:24:51 | | |
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| 002 | 16:26:18 | 16:30:42 | | |
| 002 | 16:28:13 | 16:33:05 | | |
| 002 | 16:30:04 | 16:34:03 | | |
| 002 | 16:37:37 | 16:40:40 | | |
| 002 | 16:50:20 | 16:54:19 | | |
| 002 | 16:54:35 | 16:57:22 | | |
| 002 | 16:56:44 | 16:59:13 | | |
| 002 | 16:56:49 | 16:59:23 | | |
| 002 | 16:57:39 | 17:01:09 | | |
| 002 | 16:57:55 | 17:02:12 | | |
| 002 | 17:00:13 | 17:05:01 | | |
| 002 | 17:03:18 | 17:06:48 | | |

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|---|---|---|---|---|
| 019 | 12:20:53 | 00:06:21 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 12:34:52 | 00:06:49 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 12:34:56 | 00:05:23 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 12:37:19 | 00:06:52 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 12:44:47 | 00:06:22 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 13:08:49 | 00:09:28 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 13:14:14 | 00:08:28 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 13:28:59 | 00:07:08 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 13:52:34 | 00:08:59 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 14:39:38 | 00:06:40 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 14:56:05 | 00:07:16 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 15:43:43 | 00:06:18 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 15:50:49 | 00:06:25 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 16:08:40 | 00:06:50 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 16:12:07 | 00:07:22 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 16:21:39 | 00:07:49 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 16:23:04 | 00:06:14 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 16:48:55 | 00:07:26 | 4 002 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 16:57:21 | 00:09:17 | 4 002 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 16:59:04 | 00:07:28 | 4 002 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 17:07:09 | 00:09:16 | 4 002 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 17:17:45 | 00:09:21 | 4 002 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 17:23:52 | 00:08:37 | 4 002 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 17:27:03 | 00:06:51 | 4 002 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 17:36:10 | 00:08:13 | 4 002 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 17:37:18 | 00:07:36 | 4 002 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 18:15:54 | 00:07:07 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 18:25:36 | 00:07:43 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 18:46:52 | 00:06:27 | 4 002 > 006 > 010 > 015 > 019 | |
| 019 | 09:12:49 | 00:09:50 | 3 002 > 006 > 010 > 019 | |
| 019 | 12:12:41 | 00:14:06 | 3 002 > 006 > 010 > 019 | |
| 019 | 13:54:01 | 00:06:05 | 3 002 > 006 > 010 > 019 | |
| 011 | 07:15:50 | 00:02:50 | 2 002 > 006 > 011 | |
| 011 | 07:30:22 | 00:03:27 | 2 002 > 006 > 011 | |
| 011 | 07:41:47 | 00:04:19 | 2 002 > 006 > 011 | |
| 011 | 07:52:54 | 00:03:30 | 2 002 > 006 > 011 | |
| 011 | 07:58:47 | 00:04:56 | 2 002 > 006 > 011 | |
| 011 | 08:07:29 | 00:11:17 | 2 002 > 006 > 011 | |
| 011 | 08:06:53 | 00:05:52 | 2 002 > 006 > 011 | AM Peak |
| 011 | 08:06:58 | 00:05:40 | 2 002 > 006 > 011 | AM Peak |
| 011 | 08:08:31 | 00:06:09 | 2 002 > 006 > 011 | AM Peak |
| 011 | 08:08:46 | 00:06:09 | 2 002 > 006 > 011 | AM Peak |
| 011 | 08:11:03 | 00:08:22 | 2 002 > 006 > 011 | AM Peak |
| 011 | 08:09:27 | 00:06:25 | 2 002 > 006 > 011 | AM Peak |
| 011 | 08:10:16 | 00:07:02 | 2 002 > 006 > 011 | AM Peak |
| 011 | 08:10:37 | 00:07:21 | 2 002 > 006 > 011 | AM Peak |
| 011 | 08:11:00 | 00:07:31 | 2 002 > 006 > 011 | AM Peak |
| 011 | 08:11:32 | 00:07:49 | 2 002 > 006 > 011 | AM Peak |
| 011 | 08:12:03 | 00:07:56 | 2 002 > 006 > 011 | AM Peak |
| 011 | 08:18:30 | 00:11:13 | 2 002 > 006 > 011 | AM Peak |
| 011 | 08:21:15 | 00:11:29 | 2 002 > 006 > 011 | AM Peak |
| 011 | 08:21:00 | 00:09:54 | 2 002 > 006 > 011 | AM Peak |
| 011 | 08:23:08 | 00:08:56 | 2 002 > 006 > 011 | AM Peak |
| 011 | 08:47:34 | 00:06:14 | 2 002 > 006 > 011 | AM Peak |
| 011 | 09:16:49 | 00:03:14 | 2 002 > 006 > 011 | |
| 011 | 09:40:03 | 00:02:48 | 2 002 > 006 > 011 | |
| 011 | 10:32:46 | 00:03:17 | 2 002 > 006 > 011 | |
| 011 | 10:57:28 | 00:03:07 | 2 002 > 006 > 011 | |
| 011 | 10:57:56 | 00:02:29 | 2 002 > 006 > 011 | |
| 011 | 11:28:22 | 00:03:30 | 2 002 > 006 > 011 | |
| 011 | 11:29:48 | 00:03:47 | 2 002 > 006 > 011 | |
| 011 | 11:46:07 | 00:03:13 | 2 002 > 006 > 011 | |
| 011 | 11:50:20 | 00:03:25 | 2 002 > 006 > 011 | |
| 011 | 11:51:53 | 00:02:55 | 2 002 > 006 > 011 | |
| 011 | 11:53:46 | 00:03:51 | 2 002 > 006 > 011 | |
| 011 | 11:54:20 | 00:03:25 | 2 002 > 006 > 011 | |
| 011 | 11:58:12 | 00:03:46 | 2 002 > 006 > 011 | |
| 011 | 11:58:13 | 00:03:42 | 2 002 > 006 > 011 | |
| 011 | 12:06:47 | 00:02:34 | 2 002 > 006 > 011 | |
| 011 | 12:15:16 | 00:05:07 | 2 002 > 006 > 011 | |
| 011 | 12:15:24 | 00:05:03 | 2 002 > 006 > 011 | |
| 011 | 12:15:35 | 00:04:51 | 2 002 > 006 > 011 | |
| 011 | 12:17:17 | 00:03:39 | 2 002 > 006 > 011 | |
| 011 | 12:26:28 | 00:10:11 | 2 002 > 006 > 011 | |
| 011 | 12:22:10 | 00:03:40 | 2 002 > 006 > 011 | |
| 011 | 12:32:45 | 00:03:05 | 2 002 > 006 > 011 | |
| 011 | 12:46:41 | 00:03:40 | 2 002 > 006 > 011 | |
| 011 | 12:49:57 | 00:03:26 | 2 002 > 006 > 011 | |
| 011 | 12:50:46 | 00:03:19 | 2 002 > 006 > 011 | |
| 011 | 13:04:32 | 00:07:29 | 2 002 > 006 > 011 | |
| 011 | 13:09:44 | 00:07:28 | 2 002 > 006 > 011 | |
| 011 | 13:38:43 | 00:03:10 | 2 002 > 006 > 011 | |
| 011 | 13:43:49 | 00:06:44 | 2 002 > 006 > 011 | |
| 011 | 13:43:09 | 00:03:20 | 2 002 > 006 > 011 | |
| 011 | 13:52:33 | 00:04:10 | 2 002 > 006 > 011 | |
| 011 | 13:55:31 | 00:03:10 | 2 002 > 006 > 011 | |
| 011 | 13:55:50 | 00:03:18 | 2 002 > 006 > 011 | |
| 011 | 14:00:02 | 00:04:25 | 2 002 > 006 > 011 | |
| 011 | 14:00:35 | 00:03:51 | 2 002 > 006 > 011 | |
| 011 | 14:11:00 | 00:03:52 | 2 002 > 006 > 011 | |
| 011 | 14:19:17 | 00:03:22 | 2 002 > 006 > 011 | |
| 011 | 14:42:49 | 00:04:22 | 2 002 > 006 > 011 | |
| 011 | 14:45:20 | 00:03:26 | 2 002 > 006 > 011 | |
| 011 | 14:58:24 | 00:03:31 | 2 002 > 006 > 011 | |
| 011 | 15:36:52 | 00:04:36 | 2 002 > 006 > 011 | |
| 011 | 15:36:56 | 00:04:34 | 2 002 > 006 > 011 | |
| 011 | 15:40:40 | 00:03:35 | 2 002 > 006 > 011 | |
| 011 | 15:47:13 | 00:04:06 | 2 002 > 006 > 011 | |
| 011 | 15:47:49 | 00:04:18 | 2 002 > 006 > 011 | |
| 011 | 16:07:05 | 00:04:33 | 2 002 > 006 > 011 | |
| 011 | 16:26:29 | 00:05:02 | 2 002 > 006 > 011 | |
| 011 | 16:27:26 | 00:04:27 | 2 002 > 006 > 011 | |
| 011 | 16:31:50 | 00:05:41 | 2 002 > 006 > 011 | |
| 011 | 16:31:58 | 00:05:40 | 2 002 > 006 > 011 | |
| 011 | 16:34:12 | 00:05:59 | 2 002 > 006 > 011 | |
| 011 | 16:35:14 | 00:05:10 | 2 002 > 006 > 011 | PM Peak |
| 011 | 16:41:16 | 00:03:39 | 2 002 > 006 > 011 | PM Peak |
| 011 | 16:55:04 | 00:04:44 | 2 002 > 006 > 011 | PM Peak |
| 011 | 16:58:02 | 00:03:27 | 2 002 > 006 > 011 | PM Peak |
| 011 | 16:59:54 | 00:03:10 | 2 002 > 006 > 011 | PM Peak |
| 011 | 17:00:04 | 00:03:15 | 2 002 > 006 > 011 | PM Peak |
| 011 | 17:01:47 | 00:04:08 | 2 002 > 006 > 011 | PM Peak |
| 011 | 17:02:53 | 00:04:58 | 2 002 > 006 > 011 | PM Peak |
| 011 | 17:05:49 | 00:05:36 | 2 002 > 006 > 011 | PM Peak |
| 011 | 17:08:05 | 00:04:47 | 2 002 > 006 > 011 | PM Peak |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 002 | 12:51:56 | | | | | | | | | 011 | 12:58:46 | 00:06:50 | 1 | 002 > 011 | |
| 002 | 13:09:20 | | | | | | | | | 011 | 13:14:56 | 00:05:36 | 1 | 002 > 011 | |
| 002 | 13:23:18 | | | | | | | | | 011 | 13:28:16 | 00:04:58 | 1 | 002 > 011 | |
| 002 | 13:36:42 | | | | | | | | | 011 | 13:43:24 | 00:06:42 | 1 | 002 > 011 | |
| 002 | 13:40:57 | | | | | | | | | 011 | 13:44:29 | 00:03:32 | 1 | 002 > 011 | |
| 002 | 13:42:36 | | | | | | | | | 011 | 13:53:25 | 00:10:49 | 1 | 002 > 011 | |
| 002 | 13:49:15 | | | | | | | | | 011 | 13:52:44 | 00:03:29 | 1 | 002 > 011 | |
| 002 | 13:54:52 | | | | | | | | | 011 | 14:00:45 | 00:05:53 | 1 | 002 > 011 | |
| 002 | 13:57:43 | | | | | | | | | 011 | 14:01:02 | 00:03:19 | 1 | 002 > 011 | |
| 002 | 14:07:44 | | | | | | | | | 011 | 14:12:14 | 00:04:30 | 1 | 002 > 011 | |
| 002 | 14:09:18 | | | | | | | | | 011 | 14:13:01 | 00:03:43 | 1 | 002 > 011 | |
| 002 | 14:09:48 | | | | | | | | | 011 | 14:13:27 | 00:03:39 | 1 | 002 > 011 | |
| 002 | 14:22:34 | | | | | | | | | 011 | 14:27:33 | 00:04:59 | 1 | 002 > 011 | |
| 002 | 14:23:23 | | | | | | | | | 011 | 14:26:24 | 00:03:01 | 1 | 002 > 011 | |
| 002 | 14:31:00 | | | | | | | | | 011 | 14:34:20 | 00:03:20 | 1 | 002 > 011 | |
| 002 | 14:38:18 | | | | | | | | | 011 | 14:42:47 | 00:04:29 | 1 | 002 > 011 | |
| 002 | 14:38:52 | | | | | | | | | 011 | 14:44:58 | 00:06:06 | 1 | 002 > 011 | |
| 002 | 14:50:20 | | | | | | | | | 011 | 14:58:34 | 00:08:14 | 1 | 002 > 011 | |
| 002 | 15:01:21 | | | | | | | | | 011 | 15:04:54 | 00:03:33 | 1 | 002 > 011 | |
| 002 | 15:09:05 | | | | | | | | | 011 | 15:14:27 | 00:05:22 | 1 | 002 > 011 | |
| 002 | 15:18:45 | | | | | | | | | 011 | 15:22:20 | 00:03:35 | 1 | 002 > 011 | |
| 002 | 15:19:59 | | | | | | | | | 011 | 15:23:45 | 00:03:46 | 1 | 002 > 011 | |
| 002 | 15:24:57 | | | | | | | | | 011 | 15:28:52 | 00:03:55 | 1 | 002 > 011 | |
| 002 | 15:26:25 | | | | | | | | | 011 | 15:32:15 | 00:05:50 | 1 | 002 > 011 | |
| 002 | 15:30:45 | | | | | | | | | 011 | 15:34:31 | 00:03:46 | 1 | 002 > 011 | |
| 002 | 15:37:28 | | | | | | | | | 011 | 15:41:12 | 00:03:44 | 1 | 002 > 011 | |
| 002 | 15:41:34 | | | | | | | | | 011 | 15:47:46 | 00:06:12 | 1 | 002 > 011 | |
| 002 | 15:45:52 | | | | | | | | | 011 | 15:48:51 | 00:02:59 | 1 | 002 > 011 | |
| 002 | 15:48:18 | | | | | | | | | 011 | 15:52:04 | 00:03:46 | 1 | 002 > 011 | |
| 002 | 15:51:25 | | | | | | | | | 011 | 15:54:56 | 00:03:31 | 1 | 002 > 011 | |
| 002 | 16:00:24 | | | | | | | | | 011 | 16:04:31 | 00:04:07 | 1 | 002 > 011 | |
| 002 | 16:00:33 | | | | | | | | | 011 | 16:04:44 | 00:04:11 | 1 | 002 > 011 | |
| 002 | 16:01:35 | | | | | | | | | 011 | 16:08:24 | 00:06:49 | 1 | 002 > 011 | |
| 002 | 16:02:45 | | | | | | | | | 011 | 16:07:27 | 00:04:42 | 1 | 002 > 011 | |
| 002 | 16:03:06 | | | | | | | | | 011 | 16:07:46 | 00:04:40 | 1 | 002 > 011 | |
| 002 | 16:07:59 | | | | | | | | | 011 | 16:14:00 | 00:06:01 | 1 | 002 > 011 | |
| 002 | 16:17:00 | | | | | | | | | 011 | 16:20:24 | 00:03:24 | 1 | 002 > 011 | |
| 002 | 16:24:33 | | | | | | | | | 011 | 16:32:15 | 00:07:42 | 1 | 002 > 011 | |
| 002 | 16:34:54 | | | | | | | | | 011 | 16:38:48 | 00:03:54 | 1 | 002 > 011 | PM Peak |
| 002 | 16:35:12 | | | | | | | | | 011 | 16:38:49 | 00:03:37 | 1 | 002 > 011 | PM Peak |
| 002 | 16:44:04 | | | | | | | | | 011 | 16:56:29 | 00:12:25 | 1 | 002 > 011 | PM Peak |
| 002 | 16:45:55 | | | | | | | | | 011 | 16:51:50 | 00:05:55 | 1 | 002 > 011 | PM Peak |
| 002 | 16:57:37 | | | | | | | | | 011 | 17:04:21 | 00:06:44 | 1 | 002 > 011 | PM Peak |
| 002 | 16:59:47 | | | | | | | | | 011 | 17:04:32 | 00:04:45 | 1 | 002 > 011 | PM Peak |
| 002 | 17:05:32 | | | | | | | | | 011 | 17:09:04 | 00:03:32 | 1 | 002 > 011 | PM Peak |
| 002 | 17:08:52 | | | | | | | | | 011 | 17:12:48 | 00:03:56 | 1 | 002 > 011 | PM Peak |
| 002 | 17:10:16 | | | | | | | | | 011 | 17:14:41 | 00:04:25 | 1 | 002 > 011 | PM Peak |
| 002 | 17:13:40 | | | | | | | | | 011 | 17:19:25 | 00:05:45 | 1 | 002 > 011 | PM Peak |
| 002 | 17:17:52 | | | | | | | | | 011 | 17:23:33 | 00:05:41 | 1 | 002 > 011 | PM Peak |
| 002 | 17:24:13 | | | | | | | | | 011 | 17:34:18 | 00:10:05 | 1 | 002 > 011 | PM Peak |
| 002 | 17:24:49 | | | | | | | | | 011 | 17:32:06 | 00:07:17 | 1 | 002 > 011 | PM Peak |
| 002 | 17:29:59 | | | | | | | | | 011 | 17:34:42 | 00:04:43 | 1 | 002 > 011 | PM Peak |
| 002 | 17:37:56 | | | | | | | | | 011 | 17:45:10 | 00:07:14 | 1 | 002 > 011 | |
| 002 | 17:39:45 | | | | | | | | | 011 | 17:44:36 | 00:04:51 | 1 | 002 > 011 | |
| 002 | 18:02:53 | | | | | | | | | 011 | 18:07:12 | 00:04:19 | 1 | 002 > 011 | |
| 002 | 18:04:36 | | | | | | | | | 011 | 18:08:44 | 00:04:08 | 1 | 002 > 011 | |
| 002 | 18:07:40 | | | | | | | | | 011 | 18:11:10 | 00:03:30 | 1 | 002 > 011 | |
| 002 | 18:08:51 | | | | | | | | | 011 | 18:12:50 | 00:03:59 | 1 | 002 > 011 | |
| 002 | 18:10:47 | | | | | | | | | 011 | 18:14:45 | 00:03:58 | 1 | 002 > 011 | |
| 002 | 18:17:48 | | | | | | | | | 011 | 18:22:28 | 00:04:40 | 1 | 002 > 011 | |
| 002 | 18:30:07 | | | | | | | | | 011 | 18:34:08 | 00:04:01 | 1 | 002 > 011 | |
| 002 | 18:38:40 | | | | | | | | | 011 | 18:42:04 | 00:03:24 | 1 | 002 > 011 | |
| 002 | 18:45:11 | | | | | | | | | 011 | 18:48:55 | 00:03:44 | 1 | 002 > 011 | |
| 002 | 18:51:10 | | | | | | | | | 011 | 18:54:51 | 00:03:41 | 1 | 002 > 011 | |
| 002 | 18:51:42 | | | | | | | | | 011 | 18:55:24 | 00:03:42 | 1 | 002 > 011 | |
| 002 | 18:54:54 | | | | | | | | | 011 | 18:58:42 | 00:03:48 | 1 | 002 > 011 | |
| 002 | 09:14:02 | | | | | 09:22:18 | 09:18:08 | | | 011 | 09:22:56 | 00:08:54 | 3 | 002 > 014 > 013 > 011 | |
| 002 | 17:41:04 | | | | | 17:52:38 | 17:50:33 | | | 011 | 17:53:37 | 00:12:33 | 3 | 002 > 014 > 013 > 011 | |
| 002 | 18:12:05 | | | | | 18:25:13 | 18:19:18 | | | 011 | 18:26:13 | 00:14:08 | 3 | 002 > 014 > 013 > 011 | |
| 002 | 18:28:33 | | | | | 18:38:13 | 18:34:28 | | | 011 | 18:39:15 | 00:10:42 | 3 | 002 > 014 > 013 > 011 | |
| 002 | 13:44:05 | | | | | | | 13:49:18 | | 019 | 13:50:15 | 00:06:10 | 2 | 002 > 015 > 019 | |
| 002 | 10:01:36 | 10:12:50 | 10:12:04 | 10:12:06 | | | | | 10:10:00 | 011 | 10:13:22 | 00:11:46 | 5 | 002 > 016 > 009 > 010 > 008 > 011 | |
| 002 | 08:11:48 | | | 08:18:22 | | | | 08:23:11 | 08:16:30 | 017 | 08:23:23 | 00:11:35 | 4 | 002 > 016 > 010 > 015 > 017 | AM Peak |
| 002 | 08:02:54 | | | | | | | 08:09:24 | 08:07:18 | 019 | 08:10:18 | 00:07:24 | 3 | 002 > 016 > 015 > 019 | AM Peak |
| 002 | 07:38:04 | | | | | | | | | 017 | 07:41:45 | 00:03:41 | 1 | 002 > 017 | |
| 002 | 07:40:55 | | | | | | | | | 017 | 07:44:32 | 00:03:37 | 1 | 002 > 017 | |
| 002 | 07:44:01 | | | | | | | | | 017 | 07:50:11 | 00:06:10 | 1 | 002 > 017 | |
| 002 | 07:46:39 | | | | | | | | | 017 | 07:50:37 | 00:03:58 | 1 | 002 > 017 | |
| 002 | 07:46:55 | | | | | | | | | 017 | 07:51:15 | 00:04:20 | 1 | 002 > 017 | |
| 002 | 07:49:48 | | | | | | | | | 017 | 07:53:42 | 00:03:54 | 1 | 002 > 017 | |
| 002 | 07:56:14 | | | | | | | | | 017 | 08:00:02 | 00:03:48 | 1 | 002 > 017 | |
| 002 | 07:57:24 | | | | | | | | | 017 | 08:02:05 | 00:04:41 | 1 | 002 > 017 | |
| 002 | 07:58:31 | | | | | | | | | 017 | 08:02:49 | 00:04:18 | 1 | 002 > 017 | |
| 002 | 08:01:56 | | | | | | | | | 017 | 08:06:03 | 00:04:07 | 1 | 002 > 017 | AM Peak |
| 002 | 08:02:19 | | | | | | | | | 017 | 08:06:18 | 00:03:59 | 1 | 002 > 017 | AM Peak |
| 002 | 08:04:41 | | | | | | | | | 017 | 08:08:41 | 00:04:00 | 1 | 002 > 017 | AM Peak |
| 002 | 08:06:44 | | | | | | | | | 017 | 08:11:08 | 00:04:24 | 1 | 002 > 017 | AM Peak |
| 002 | 08:09:20 | | | | | | | | | 017 | 08:13:46 | 00:04:26 | 1 | 002 > 017 | AM Peak |
| 002 | 08:14:23 | | | | | | | | | 017 | 08:18:31 | 00:04:08 | 1 | 002 > 017 | AM Peak |
| 002 | 08:14:55 | | | | | | | | | 017 | 08:20:00 | 00:05:05 | 1 | 002 > 017 | AM Peak |
| 002 | 08:15:03 | | | | | | | | | 017 | 08:20:30 | 00:05:27 | 1 | 002 > 017 | AM Peak |
| 002 | 08:15:23 | | | | | | | | | 017 | 08:20:57 | 00:05:34 | 1 | 002 > 017 | AM Peak |
| 002 | 08:15:26 | | | | | | | | | 017 | 08:21:02 | 00:05:36 | 1 | 002 > 017 | AM Peak |
| 002 | 08:17:47 | | | | | | | | | 017 | 08:22:39 | 00:04:52 | 1 | 002 > 017 | AM Peak |
| 002 | 08:18:01 | | | | | | | | | 017 | 08:23:05 | 00:05:04 | 1 | 002 > 017 | AM Peak |
| 002 | 08:18:21 | | | | | | | | | 017 | 08:23:12 | 00:04:51 | 1 | 002 > 017 | AM Peak |
| 002 | 08:18:58 | | | | | | | | | 017 | 08:23:54 | 00:04:56 | 1 | 002 > 017 | AM Peak |
| 002 | 08:19:23 | | | | | | | | | 017 | 08:24:11 | 00:04:48 | 1 | 002 > 017 | AM Peak |
| 002 | 08:19:30 | | | | | | | | | 017 | 08:24:26 | 00:04:56 | 1 | 002 > 017 | AM Peak |
| 002 | 08:19:36 | | | | | | | | | 017 | 08:26:10 | 00:06:34 | 1 | 002 > 017 | AM Peak |
| 002 | 08:20:09 | | | | | | | | | 017 | 08:25:33 | 00:05:24 | 1 | 002 > 017 | AM Peak |
| 002 | 08:22:26 | | | | | | | | | 017 | 08:26:55 | 00:04:29 | 1 | 002 > 017 | AM Peak |
| 002 | 08:23:45 | | | | | | | | | 017 | 08:28:46 | 00:05:01 | 1 | 002 > 017 | AM Peak |
| 002 | 08:26:14 | | | | | | | | | 017 | 08:30:02 | 00:03:48 | 1 | 002 > 017 | AM Peak |
| 002 | 08:26:22 | | | | | | | | | 017 | 08:30:20 | 00:03:58 | 1 | 002 > 017 | AM Peak |
| 002 | 08:27:03 | | | | | | | | | 017 | 08:31:00 | 00:03:57 | 1 | 002 > 017 | AM Peak |
| 002 | 08:27:55 | | | | | | | | | 017 | 08:31:45 | 00:03:50 | 1 | 002 > 017 | AM Peak |
| 002 | 08:29:39 | | | | | | | | | 017 | 08:35:02 | 00:05:23 | 1 | 002 > 017 | AM Peak |
| 002 | 08:38:05 | | | | | | | | | 017 | 08:42:32 | 00:04:27 | 1 | 002 > 017 | AM Peak |
| 002 | 08:41:45 | | | | | | | | | 017 | 08:46:16 | 00:04:31 | 1 | 002 > 017 | AM Peak |
| 002 | 08:42:04 | | | | | | | | | 017 | 08:47:18 | 00:05:14 | 1 | 002 > 017 | AM Peak |
| 002 | 08:47:06 | | | | | | | | | 017 | 08:50:37 | 00:03:31 | 1 | 002 > 017 | AM Peak |
| 002 | 08:48:42 | | | | | | | | | 017 | 08:56:17 | 00:07:35 | 1 | 002 > 017 | AM Peak |
| 002 | 08:49:33 | | | | | | | | | 017 | 08:53:24 | 00:03:51 | 1 | 002 > 017 | AM Peak |
| 002 | 08:49:43 | | | | | | | | | 017 | 08:53:48 | 00:04:05 | 1 | 002 > 017 | AM Peak |

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| 002 | 08:49:47 | | | |
| 002 | 09:29:32 | | | |
| 002 | 09:30:04 | | | |
| 002 | 09:41:53 | | | |
| 002 | 09:43:08 | | | |
| 002 | 10:02:18 | | | |
| 002 | 10:15:37 | | | |
| 002 | 10:26:54 | | | |
| 002 | 10:48:11 | | | |
| 002 | 11:53:29 | | | |
| 002 | 12:07:03 | | | |
| 002 | 12:14:43 | | | |
| 002 | 12:17:42 | | | |
| 002 | 13:33:57 | | | |
| 002 | 13:43:21 | | | |
| 002 | 13:48:25 | | | |
| 002 | 14:03:16 | | | |
| 002 | 14:26:14 | | | |
| 002 | 14:28:46 | | | |
| 002 | 15:24:44 | | | |
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| 002 | 15:53:02 | | | |
| 002 | 16:11:21 | | | |
| 002 | 17:11:37 | | | |
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| 002 | 18:01:03 | | | |
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| 002 | 18:22:11 | | | |
| 002 | 18:23:51 | | | |
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| 002 | 07:01:22 | | | |
| 002 | 07:09:09 | | | |
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| 002 | 07:47:41 | | | |
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| 002 | 08:01:35 | | | |
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| 002 | 08:16:07 | | | |
| 002 | 08:16:23 | | | |
| 002 | 08:17:04 | | | |
| 002 | 08:17:07 | | | |
| 002 | 08:17:50 | | | |
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| 019 | 17:22:12 | 00:04:38 | 1 002 > 019 | PM Peak |
| 019 | 17:25:30 | 00:05:25 | 1 002 > 019 | PM Peak |
| 019 | 17:25:52 | 00:04:47 | 1 002 > 019 | PM Peak |
| 019 | 17:33:13 | 00:05:48 | 1 002 > 019 | PM Peak |
| 019 | 18:02:48 | 00:04:15 | 1 002 > 019 | |
| 019 | 18:11:18 | 00:06:06 | 1 002 > 019 | |
| 019 | 18:09:29 | 00:04:16 | 1 002 > 019 | |
| 019 | 18:18:00 | 00:05:29 | 1 002 > 019 | |
| 019 | 18:23:03 | 00:05:12 | 1 002 > 019 | |
| 019 | 18:48:44 | 00:04:12 | 1 002 > 019 | |
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| 001 | 07:04:00 | 00:01:34 | 1 004 > 001 | |
| 001 | 07:06:50 | 00:01:59 | 1 004 > 001 | |
| 001 | 07:08:27 | 00:02:07 | 1 004 > 001 | |
| 001 | 07:09:29 | 00:01:48 | 1 004 > 001 | |

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| 004 | 07:10:38 | | | |
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| 004 | 07:28:23 | | | |
| 004 | 07:28:56 | | | |
| 004 | 07:28:58 | | | |
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| 004 | 07:39:37 | | | |
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| 004 | 08:35:45 | | | |
| 001 | 07:09:31 | 00:01:45 | 1 004 > 001 | |
| 001 | 07:11:28 | 00:01:57 | 1 004 > 001 | |
| 001 | 07:12:37 | 00:01:59 | 1 004 > 001 | |
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| 001 | 07:13:18 | 00:01:44 | 1 004 > 001 | |
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| 001 | 07:32:26 | 00:02:08 | 1 004 > 001 | |
| 001 | 07:34:35 | 00:01:59 | 1 004 > 001 | |
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| 001 | 07:42:56 | 00:01:57 | 1 004 > 001 | |
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| 001 | 09:13:58 | 00:02:43 | 1 004 > 001 | |
| 001 | 09:14:01 | 00:02:37 | 1 004 > 001 | |
| 001 | 09:14:56 | 00:02:16 | 1 004 > 001 | |
| 001 | 09:14:59 | 00:02:17 | 1 004 > 001 | |
| 001 | 09:15:40 | 00:02:06 | 1 004 > 001 | |
| 001 | 09:16:04 | 00:01:54 | 1 004 > 001 | |
| 001 | 09:17:55 | 00:02:27 | 1 004 > 001 | |
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| 001 | 09:46:28 | 00:02:02 | 1 004 > 001 | |
| 001 | 09:47:24 | 00:02:37 | 1 004 > 001 | |
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| 004 | 11:45:33 | | |

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| 001 | 10:42:11 | 00:06:24 | 1 004 > 001 |
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| 001 | 11:53:29 | 00:01:55 | 1 004 > 001 |
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| 004 | 15:20:06 |
| 004 | 15:20:11 |
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| 004 | 15:20:54 |
| 004 | 15:20:59 |
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| 004 | 15:21:20 |
| 004 | 15:21:41 |
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| 001 | 14:37:12 | 00:02:04 | 1 004 > 001 |
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| 004 | 16:25:51 | | | |
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| 004 | 16:27:35 | | | |
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| 004 | 16:36:16 | | | |
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| 004 | 16:36:54 | | | |
| 004 | 16:37:17 | | | |
| 004 | 16:37:23 | | | |
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| 004 | 16:38:05 | | | |
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| 004 | 16:38:48 | | | |
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| 004 | 16:39:10 | | | |
| 004 | 16:39:12 | | | |
| 004 | 16:39:25 | | | |
| 004 | 16:39:31 | | | |
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| 004 | 16:39:58 | | | |
| 004 | 16:41:14 | | | |
| 004 | 16:41:32 | | | |
| 004 | 16:41:46 | | | |
| 004 | 16:41:56 | | | |
| 004 | 16:42:17 | | | |
| 004 | 16:42:32 | | | |
| 004 | 16:42:45 | | | |
| 004 | 16:42:48 | | | |
| 004 | 16:42:50 | | | |
| 004 | 16:43:04 | | | |
| 004 | 16:44:14 | | | |
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| 004 | 16:44:59 | | | |

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| 001 | 16:12:39 | 00:02:23 | 1 004 > 001 | |
| 001 | 16:13:04 | 00:02:22 | 1 004 > 001 | |
| 001 | 16:13:53 | 00:02:22 | 1 004 > 001 | |
| 001 | 16:13:55 | 00:02:11 | 1 004 > 001 | |
| 001 | 16:14:24 | 00:02:33 | 1 004 > 001 | |
| 001 | 16:14:30 | 00:02:33 | 1 004 > 001 | |
| 001 | 16:14:32 | 00:02:24 | 1 004 > 001 | |
| 001 | 16:14:53 | 00:02:17 | 1 004 > 001 | |
| 001 | 16:15:01 | 00:02:16 | 1 004 > 001 | |
| 001 | 16:15:09 | 00:02:20 | 1 004 > 001 | |
| 001 | 16:15:11 | 00:02:19 | 1 004 > 001 | |
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| 001 | 16:16:26 | 00:03:07 | 1 004 > 001 | |
| 001 | 16:16:28 | 00:03:01 | 1 004 > 001 | |
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| 001 | 16:17:13 | 00:02:41 | 1 004 > 001 | |
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| 001 | 16:17:20 | 00:02:35 | 1 004 > 001 | |
| 001 | 16:23:35 | 00:08:48 | 1 004 > 001 | |
| 001 | 16:17:34 | 00:02:41 | 1 004 > 001 | |
| 001 | 16:17:36 | 00:02:39 | 1 004 > 001 | |
| 001 | 16:17:42 | 00:02:39 | 1 004 > 001 | |
| 001 | 16:17:48 | 00:02:03 | 1 004 > 001 | |
| 001 | 16:18:05 | 00:02:06 | 1 004 > 001 | |
| 001 | 16:18:10 | 00:02:05 | 1 004 > 001 | |
| 001 | 16:18:20 | 00:02:00 | 1 004 > 001 | |
| 001 | 16:18:32 | 00:02:05 | 1 004 > 001 | |
| 001 | 16:18:33 | 00:02:04 | 1 004 > 001 | |
| 001 | 16:19:02 | 00:02:24 | 1 004 > 001 | |
| 001 | 16:19:23 | 00:02:00 | 1 004 > 001 | |
| 001 | 16:32:59 | 00:14:55 | 1 004 > 001 | |
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| 001 | 16:26:11 | 00:07:42 | 1 004 > 001 | |
| 001 | 16:20:41 | 00:02:09 | 1 004 > 001 | |
| 001 | 16:20:44 | 00:02:06 | 1 004 > 001 | |
| 001 | 16:20:46 | 00:02:03 | 1 004 > 001 | |
| 001 | 16:21:01 | 00:01:29 | 1 004 > 001 | |
| 001 | 16:22:49 | 00:03:00 | 1 004 > 001 | |
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| 001 | 16:28:10 | 00:03:06 | 1 004 > 001 | |
| 001 | 16:28:39 | 00:03:00 | 1 004 > 001 | |
| 001 | 16:28:41 | 00:02:50 | 1 004 > 001 | |
| 001 | 16:28:54 | 00:02:52 | 1 004 > 001 | |
| 001 | 16:28:57 | 00:02:46 | 1 004 > 001 | |
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| 001 | 16:29:03 | 00:02:29 | 1 004 > 001 | |
| 001 | 16:29:13 | 00:02:36 | 1 004 > 001 | |
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| 001 | 16:35:51 | 00:02:27 | 1 004 > 001 | PM Peak |
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| 001 | 16:50:40 | 00:07:50 | 1 004 > 001 | PM Peak |
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| 001 | 16:46:55 | 00:02:23 | 1 004 > 001 | PM Peak |
| 001 | 16:47:21 | 00:02:46 | 1 004 > 001 | PM Peak |
| 001 | 16:47:36 | 00:02:37 | 1 004 > 001 | PM Peak |

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| 001 | 16:49:07 | 00:02:28 | 1 004 > 001 | PM Peak |
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| 001 | 16:49:44 | 00:02:34 | 1 004 > 001 | PM Peak |
| 001 | 16:49:45 | 00:02:32 | 1 004 > 001 | PM Peak |
| 001 | 16:51:17 | 00:02:31 | 1 004 > 001 | PM Peak |
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| 001 | 16:51:20 | 00:02:16 | 1 004 > 001 | PM Peak |
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| 001 | 16:51:40 | 00:02:18 | 1 004 > 001 | PM Peak |
| 001 | 16:51:57 | 00:02:20 | 1 004 > 001 | PM Peak |
| 001 | 16:51:58 | 00:02:18 | 1 004 > 001 | PM Peak |
| 001 | 16:52:23 | 00:02:25 | 1 004 > 001 | PM Peak |
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| 001 | 16:53:19 | 00:02:24 | 1 004 > 001 | PM Peak |
| 001 | 16:53:49 | 00:02:36 | 1 004 > 001 | PM Peak |
| 001 | 16:53:54 | 00:02:38 | 1 004 > 001 | PM Peak |
| 001 | 16:53:56 | 00:02:37 | 1 004 > 001 | PM Peak |
| 001 | 16:53:59 | 00:02:33 | 1 004 > 001 | PM Peak |
| 001 | 16:54:05 | 00:02:36 | 1 004 > 001 | PM Peak |
| 001 | 16:54:40 | 00:03:08 | 1 004 > 001 | PM Peak |
| 001 | 16:54:42 | 00:02:54 | 1 004 > 001 | PM Peak |
| 001 | 16:54:52 | 00:02:55 | 1 004 > 001 | PM Peak |
| 001 | 16:54:55 | 00:02:50 | 1 004 > 001 | PM Peak |
| 001 | 16:55:11 | 00:02:26 | 1 004 > 001 | PM Peak |
| 001 | 16:55:13 | 00:02:26 | 1 004 > 001 | PM Peak |
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| 001 | 17:06:22 | 00:02:37 | 1 004 > 001 | PM Peak |
| 001 | 17:06:54 | 00:02:06 | 1 004 > 001 | PM Peak |
| 001 | 17:07:32 | 00:02:22 | 1 004 > 001 | PM Peak |
| 001 | 17:07:34 | 00:02:17 | 1 004 > 001 | PM Peak |
| 001 | 17:07:37 | 00:02:13 | 1 004 > 001 | PM Peak |
| 001 | 17:07:39 | 00:02:12 | 1 004 > 001 | PM Peak |
| 001 | 17:07:42 | 00:02:12 | 1 004 > 001 | PM Peak |
| 001 | 17:07:44 | 00:02:12 | 1 004 > 001 | PM Peak |
| 001 | 17:08:30 | 00:02:17 | 1 004 > 001 | PM Peak |
| 001 | 17:08:31 | 00:02:16 | 1 004 > 001 | PM Peak |
| 001 | 17:08:33 | 00:02:12 | 1 004 > 001 | PM Peak |
| 001 | 17:08:49 | 00:02:22 | 1 004 > 001 | PM Peak |
| 001 | 17:09:27 | 00:02:24 | 1 004 > 001 | PM Peak |
| 001 | 17:09:29 | 00:02:20 | 1 004 > 001 | PM Peak |
| 001 | 17:09:46 | 00:02:12 | 1 004 > 001 | PM Peak |
| 001 | 17:10:06 | 00:02:03 | 1 004 > 001 | PM Peak |
| 001 | 17:11:02 | 00:02:53 | 1 004 > 001 | PM Peak |
| 001 | 17:11:05 | 00:02:43 | 1 004 > 001 | PM Peak |
| 001 | 17:11:07 | 00:02:41 | 1 004 > 001 | PM Peak |
| 001 | 17:11:16 | 00:02:48 | 1 004 > 001 | PM Peak |
| 001 | 17:11:20 | 00:02:28 | 1 004 > 001 | PM Peak |
| 001 | 17:11:25 | 00:02:07 | 1 004 > 001 | PM Peak |
| 001 | 17:11:50 | 00:02:18 | 1 004 > 001 | PM Peak |
| 001 | 17:11:57 | 00:02:16 | 1 004 > 001 | PM Peak |
| 001 | 17:12:29 | 00:02:16 | 1 004 > 001 | PM Peak |
| 001 | 17:12:31 | 00:02:09 | 1 004 > 001 | PM Peak |
| 001 | 17:12:36 | 00:02:10 | 1 004 > 001 | PM Peak |
| 001 | 17:13:24 | 00:02:08 | 1 004 > 001 | PM Peak |
| 001 | 17:13:26 | 00:02:06 | 1 004 > 001 | PM Peak |
| 001 | 17:13:30 | 00:02:04 | 1 004 > 001 | PM Peak |
| 001 | 17:14:01 | 00:02:11 | 1 004 > 001 | PM Peak |
| 001 | 17:14:03 | 00:02:11 | 1 004 > 001 | PM Peak |
| 001 | 17:14:08 | 00:02:09 | 1 004 > 001 | PM Peak |
| 001 | 17:14:20 | 00:02:08 | 1 004 > 001 | PM Peak |
| 001 | 17:14:21 | 00:02:00 | 1 004 > 001 | PM Peak |
| 001 | 17:14:24 | 00:01:59 | 1 004 > 001 | PM Peak |
| 001 | 17:14:27 | 00:01:56 | 1 004 > 001 | PM Peak |
| 001 | 17:16:11 | 00:03:35 | 1 004 > 001 | PM Peak |

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| 004 | 17:12:39 | | | |
| 004 | 17:13:21 | | | |
| 004 | 17:13:28 | | | |
| 004 | 17:13:30 | | | |
| 004 | 17:13:32 | | | |
| 004 | 17:13:43 | | | |
| 004 | 17:13:46 | | | |
| 004 | 17:14:05 | | | |
| 004 | 17:14:10 | | | |
| 004 | 17:14:18 | | | |
| 004 | 17:14:20 | | | |
| 004 | 17:14:55 | | | |
| 004 | 17:15:41 | | | |
| 004 | 17:16:29 | | | |
| 004 | 17:16:31 | | | |
| 004 | 17:16:35 | | | |
| 004 | 17:17:26 | | | |
| 004 | 17:18:12 | | | |
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| 004 | 17:18:42 | | | |
| 004 | 17:18:53 | | | |
| 004 | 17:20:27 | | | |
| 004 | 17:20:30 | | | |
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| 004 | 17:21:20 | | | |
| 004 | 17:21:25 | | | |
| 004 | 17:21:34 | | | |
| 004 | 17:21:59 | | | |
| 004 | 17:22:07 | | | |
| 004 | 17:22:16 | | | |
| 004 | 17:22:42 | | | |
| 004 | 17:23:00 | | | |
| 004 | 17:23:02 | | | |
| 004 | 17:24:11 | | | |
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| 004 | 17:24:43 | | | |
| 004 | 17:24:47 | | | |
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| 004 | 17:26:01 | | | |
| 004 | 17:26:03 | | | |
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| 004 | 17:26:50 | | | |
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| 004 | 17:27:08 | | | |
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| 004 | 17:31:03 | | | |
| 004 | 17:31:06 | | | |
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| 004 | 17:32:53 | | | |
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| 004 | 17:32:57 | | | |
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| 004 | 17:34:02 | | | |
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| 004 | 17:34:54 | | | |
| 004 | 17:35:00 | | | |
| 004 | 17:35:02 | | | |
| 004 | 17:35:06 | | | |
| 004 | 17:35:09 | | | |
| 004 | 17:35:37 | | | |
| 004 | 17:37:30 | | | |
| 004 | 17:37:37 | | | |
| 004 | 17:37:44 | | | |
| 004 | 17:37:47 | | | |
| 004 | 17:37:56 | | | |
| 004 | 17:38:20 | | | |
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| 004 | 17:38:57 | | | |
| 004 | 17:39:01 | | | |
| 004 | 17:39:04 | | | |
| 004 | 17:39:10 | | | |
| 004 | 17:39:21 | | | |
| 004 | 17:40:25 | | | |
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| 004 | 17:40:56 | | | |
| 004 | 17:41:26 | | | |
| 004 | 17:41:56 | | | |
| 004 | 17:42:24 | | | |
| 004 | 17:42:30 | | | |
| 004 | 17:43:12 | | | |
| 004 | 17:43:39 | | | |

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| 001 | 17:14:58 | 00:02:19 | 1 004 > 001 | PM Peak |
| 001 | 17:15:42 | 00:02:21 | 1 004 > 001 | PM Peak |
| 001 | 17:15:45 | 00:02:17 | 1 004 > 001 | PM Peak |
| 001 | 17:15:47 | 00:02:17 | 1 004 > 001 | PM Peak |
| 001 | 17:15:48 | 00:02:16 | 1 004 > 001 | PM Peak |
| 001 | 17:16:02 | 00:02:19 | 1 004 > 001 | PM Peak |
| 001 | 17:16:06 | 00:02:20 | 1 004 > 001 | PM Peak |
| 001 | 17:16:15 | 00:02:10 | 1 004 > 001 | PM Peak |
| 001 | 17:16:16 | 00:02:06 | 1 004 > 001 | PM Peak |
| 001 | 17:16:22 | 00:02:04 | 1 004 > 001 | PM Peak |
| 001 | 17:16:24 | 00:02:04 | 1 004 > 001 | PM Peak |
| 001 | 17:16:45 | 00:01:50 | 1 004 > 001 | PM Peak |
| 001 | 17:17:49 | 00:02:08 | 1 004 > 001 | PM Peak |
| 001 | 17:18:40 | 00:02:11 | 1 004 > 001 | PM Peak |
| 001 | 17:18:49 | 00:02:18 | 1 004 > 001 | PM Peak |
| 001 | 17:18:51 | 00:02:16 | 1 004 > 001 | PM Peak |
| 001 | 17:19:32 | 00:02:06 | 1 004 > 001 | PM Peak |
| 001 | 17:20:16 | 00:02:04 | 1 004 > 001 | PM Peak |
| 001 | 17:20:17 | 00:01:55 | 1 004 > 001 | PM Peak |
| 001 | 17:20:42 | 00:02:06 | 1 004 > 001 | PM Peak |
| 001 | 17:20:45 | 00:02:03 | 1 004 > 001 | PM Peak |
| 001 | 17:20:47 | 00:01:54 | 1 004 > 001 | PM Peak |
| 001 | 17:22:18 | 00:01:51 | 1 004 > 001 | PM Peak |
| 001 | 17:22:26 | 00:01:56 | 1 004 > 001 | PM Peak |
| 001 | 17:25:33 | 00:04:52 | 1 004 > 001 | PM Peak |
| 001 | 17:23:25 | 00:02:05 | 1 004 > 001 | PM Peak |
| 001 | 17:23:28 | 00:02:03 | 1 004 > 001 | PM Peak |
| 001 | 17:23:42 | 00:02:08 | 1 004 > 001 | PM Peak |
| 001 | 17:24:10 | 00:02:11 | 1 004 > 001 | PM Peak |
| 001 | 17:24:14 | 00:02:07 | 1 004 > 001 | PM Peak |
| 001 | 17:24:19 | 00:02:03 | 1 004 > 001 | PM Peak |
| 001 | 17:24:33 | 00:01:51 | 1 004 > 001 | PM Peak |
| 001 | 17:24:51 | 00:01:51 | 1 004 > 001 | PM Peak |
| 001 | 17:24:54 | 00:01:52 | 1 004 > 001 | PM Peak |
| 001 | 17:26:49 | 00:02:38 | 1 004 > 001 | PM Peak |
| 001 | 17:27:46 | 00:03:08 | 1 004 > 001 | PM Peak |
| 001 | 17:27:48 | 00:03:05 | 1 004 > 001 | PM Peak |
| 001 | 17:27:50 | 00:03:03 | 1 004 > 001 | PM Peak |
| 001 | 17:28:07 | 00:03:14 | 1 004 > 001 | PM Peak |
| 001 | 17:28:09 | 00:03:14 | 1 004 > 001 | PM Peak |
| 001 | 17:28:36 | 00:02:54 | 1 004 > 001 | PM Peak |
| 001 | 17:28:37 | 00:02:49 | 1 004 > 001 | PM Peak |
| 001 | 17:28:40 | 00:02:48 | 1 004 > 001 | PM Peak |
| 001 | 17:28:47 | 00:02:46 | 1 004 > 001 | PM Peak |
| 001 | 17:28:52 | 00:02:49 | 1 004 > 001 | PM Peak |
| 001 | 17:28:56 | 00:02:43 | 1 004 > 001 | PM Peak |
| 001 | 17:30:47 | 00:04:23 | 1 004 > 001 | PM Peak |
| 001 | 17:29:06 | 00:02:16 | 1 004 > 001 | PM Peak |
| 001 | 17:29:09 | 00:02:05 | 1 004 > 001 | PM Peak |
| 001 | 17:29:11 | 00:02:03 | 1 004 > 001 | PM Peak |
| 001 | 17:29:13 | 00:02:02 | 1 004 > 001 | PM Peak |
| 001 | 17:30:45 | 00:02:33 | 1 004 > 001 | PM Peak |
| 001 | 17:30:49 | 00:02:33 | 1 004 > 001 | PM Peak |
| 001 | 17:30:58 | 00:02:38 | 1 004 > 001 | PM Peak |
| 001 | 17:31:00 | 00:02:35 | 1 004 > 001 | PM Peak |
| 001 | 17:31:12 | 00:02:40 | 1 004 > 001 | PM Peak |
| 001 | 17:31:13 | 00:02:38 | 1 004 > 001 | PM Peak |
| 001 | 17:32:06 | 00:03:11 | 1 004 > 001 | PM Peak |
| 001 | 17:32:20 | 00:03:13 | 1 004 > 001 | PM Peak |
| 001 | 17:32:38 | 00:02:26 | 1 004 > 001 | |
| 001 | 17:32:56 | 00:02:32 | 1 004 > 001 | |
| 001 | 17:32:59 | 00:02:09 | 1 004 > 001 | |
| 001 | 17:33:02 | 00:02:10 | 1 004 > 001 | |
| 001 | 17:37:24 | 00:06:24 | 1 004 > 001 | |
| 001 | 17:33:13 | 00:02:10 | 1 004 > 001 | |
| 001 | 17:33:17 | 00:02:11 | 1 004 > 001 | |
| 001 | 17:33:39 | 00:02:27 | 1 004 > 001 | |
| 001 | 17:33:58 | 00:02:27 | 1 004 > 001 | |
| 001 | 17:34:43 | 00:02:49 | 1 004 > 001 | |
| 001 | 17:34:49 | 00:02:11 | 1 004 > 001 | |
| 001 | 17:34:54 | 00:02:05 | 1 004 > 001 | |
| 001 | 17:34:57 | 00:02:07 | 1 004 > 001 | |
| 001 | 17:34:59 | 00:02:06 | 1 004 > 001 | |
| 001 | 17:35:01 | 00:02:06 | 1 004 > 001 | |
| 001 | 17:37:21 | 00:04:24 | 1 004 > 001 | |
| 001 | 17:36:02 | 00:02:04 | 1 004 > 001 | |
| 001 | 17:36:03 | 00:02:01 | 1 004 > 001 | |
| 001 | 17:36:05 | 00:02:00 | 1 004 > 001 | |
| 001 | 17:36:08 | 00:02:00 | 1 004 > 001 | |
| 001 | 17:36:11 | 00:02:01 | 1 004 > 001 | |
| 001 | 17:36:15 | 00:01:59 | 1 004 > 001 | |
| 001 | 17:37:11 | 00:02:17 | 1 004 > 001 | |
| 001 | 17:37:16 | 00:02:16 | 1 004 > 001 | |
| 001 | 17:37:18 | 00:02:16 | 1 004 > 001 | |
| 001 | 17:37:19 | 00:02:13 | 1 004 > 001 | |
| 001 | 17:37:25 | 00:02:16 | 1 004 > 001 | |
| 001 | 17:38:00 | 00:02:23 | 1 004 > 001 | |
| 001 | 17:46:59 | 00:09:29 | 1 004 > 001 | |
| 001 | 17:39:39 | 00:02:02 | 1 004 > 001 | |
| 001 | 17:39:40 | 00:01:56 | 1 004 > 001 | |
| 001 | 17:39:49 | 00:02:02 | 1 004 > 001 | |
| 001 | 17:39:51 | 00:01:55 | 1 004 > 001 | |
| 001 | 17:40:44 | 00:02:24 | 1 004 > 001 | |
| 001 | 17:40:55 | 00:02:09 | 1 004 > 001 | |
| 001 | 17:41:17 | 00:02:28 | 1 004 > 001 | |
| 001 | 17:41:20 | 00:02:28 | 1 004 > 001 | |
| 001 | 17:41:22 | 00:02:28 | 1 004 > 001 | |
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| 001 | 17:42:54 | 00:02:29 | 1 004 > 001 | |
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| 001 | 17:43:17 | 00:02:28 | 1 004 > 001 | |
| 001 | 17:43:19 | 00:02:23 | 1 004 > 001 | |
| 001 | 17:43:32 | 00:02:06 | 1 004 > 001 | |
| 001 | 17:45:18 | 00:03:22 | 1 004 > 001 | |
| 001 | 17:45:38 | 00:03:14 | 1 004 > 001 | |
| 001 | 17:45:43 | 00:03:13 | 1 004 > 001 | |
| 001 | 17:46:30 | 00:03:18 | 1 004 > 001 | |
| 001 | 17:46:34 | 00:02:55 | 1 004 > 001 | |

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| 004 | 18:17:21 | | |
| 004 | 18:17:38 | | |
| 004 | 18:18:26 | | |
| 004 | 18:18:29 | | |
| 004 | 18:18:33 | | |
| 001 | 17:47:26 | 00:02:39 | 1 004 > 001 |
| 001 | 17:47:44 | 00:02:18 | 1 004 > 001 |
| 001 | 17:47:47 | 00:02:17 | 1 004 > 001 |
| 001 | 17:48:03 | 00:02:24 | 1 004 > 001 |
| 001 | 17:48:08 | 00:02:26 | 1 004 > 001 |
| 001 | 17:48:20 | 00:02:33 | 1 004 > 001 |
| 001 | 17:49:03 | 00:02:30 | 1 004 > 001 |
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| 001 | 17:49:50 | 00:02:03 | 1 004 > 001 |
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| 001 | 17:50:53 | 00:02:07 | 1 004 > 001 |
| 001 | 17:50:56 | 00:02:07 | 1 004 > 001 |
| 001 | 17:50:59 | 00:02:06 | 1 004 > 001 |
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| 001 | 17:51:02 | 00:02:00 | 1 004 > 001 |
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| 001 | 18:06:44 | 00:01:56 | 1 004 > 001 |
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| 001 | 18:20:38 | 00:02:09 | 1 004 > 001 |
| 001 | 18:20:46 | 00:02:13 | 1 004 > 001 |

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| 004 | 18:19:26 | | | |
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| 004 | 18:20:41 | | | |
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| 004 | 18:21:11 | | | |
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| 004 | 09:05:26 | | | |
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| 001 | 18:23:54 | 00:02:09 | 1 004 > 001 | |
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| 001 | 18:24:00 | 00:02:05 | 1 004 > 001 | |
| 001 | 18:24:30 | 00:01:56 | 1 004 > 001 | |
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| 001 | 18:26:11 | 00:01:53 | 1 004 > 001 | |
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| 003 | 09:06:52 | 00:01:26 | 1 004 > 003 | |
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| 004 | 08:38:13 | | 08:38:56 | | | | | |
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| 004 | 08:01:29 | 08:04:51 | 08:02:08 | | | | | |
| 004 | 16:27:52 | 16:40:13 | 16:28:36 | | | | | |
| 004 | 07:54:52 | 08:06:37 | 07:55:25 | | | | | |
| 004 | 08:01:26 | 08:14:13 | 08:02:06 | | | | | |
| 004 | 08:09:37 | 08:14:48 | 08:10:38 | | | | | |
| 004 | 08:21:31 | 08:30:54 | 08:22:38 | | | | | |
| 004 | 08:29:23 | 08:33:02 | 08:30:32 | | | | | |
| 004 | 18:05:12 | | 18:05:56 | 18:06:17 | | | | |
| 004 | 16:29:45 | 16:39:40 | 16:30:30 | 16:31:11 | | | | |
| 004 | 16:29:48 | | 16:30:35 | 16:31:17 | | | | |
| 004 | 17:02:52 | | 17:03:24 | | 17:03:33 | | | |
| 004 | 18:05:21 | | 18:06:02 | 18:06:19 | | | | |
| 004 | 18:05:41 | | 18:06:16 | 18:06:27 | | | | |
| 004 | 10:30:39 | | 10:31:25 | 10:31:35 | | | 10:32:25 | 10:34:35 |
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| 004 | 16:02:56 | | 16:03:29 | | 16:03:37 | | | |
| 004 | 17:29:36 | | 17:30:32 | | 17:30:58 | | | |
| 004 | 08:47:28 | 08:53:41 | 08:48:34 | | 08:49:05 | | | |
| 004 | 08:02:04 | 08:07:23 | 08:02:40 | | 08:02:57 | | | |
| 004 | 10:17:48 | 10:26:43 | 10:18:16 | | 10:18:22 | | | |
| 004 | 17:20:54 | | 17:21:41 | 17:26:23 | 17:21:50 | | | |
| 004 | 17:46:59 | | 17:47:34 | 17:51:42 | 17:47:43 | | | |
| 004 | 17:51:48 | | 17:52:21 | 18:01:10 | 17:52:31 | | | |
| 004 | 18:04:30 | | 18:05:13 | 18:16:53 | 18:05:22 | | | |
| 004 | 07:51:17 | 07:56:35 | 07:51:53 | 07:56:29 | 07:52:02 | | | |
| 004 | 12:28:17 | 12:35:39 | 12:28:49 | 12:35:28 | 12:28:59 | | | |
| 004 | 16:43:06 | 16:53:02 | 16:43:40 | 16:53:00 | 16:43:48 | | | |
| 004 | 17:08:00 | 17:19:01 | 17:08:35 | 17:18:56 | 17:08:44 | | | |
| 004 | 07:40:29 | 07:46:17 | 07:41:09 | 07:46:13 | 07:41:17 | | | |
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| 004 | 08:11:12 | 08:14:41 | 08:12:34 | 08:14:36 | 08:12:46 | | | |
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| 004 | 08:22:07 | 08:31:53 | 08:23:24 | 08:31:27 | 08:23:39 | | | |
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| 004 | 08:43:45 | 08:52:56 | 08:44:51 | 08:52:51 | 08:45:15 | | | |
| 004 | 08:50:54 | 08:56:35 | 08:52:19 | 08:56:32 | 08:52:31 | | | |
| 004 | 09:47:52 | 10:00:14 | 09:48:30 | 10:00:10 | 09:48:39 | | | |
| 004 | 10:02:34 | 10:08:21 | 10:03:50 | 10:08:17 | 10:04:00 | | | |
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| 004 | 16:24:07 | 16:35:45 | 16:24:49 | 16:35:40 | 16:35:44 | | | |
| 004 | 16:29:27 | 16:34:46 | 16:30:15 | 16:34:42 | 16:30:29 | | | |
| 004 | 16:33:01 | 16:45:03 | 16:33:47 | 16:44:59 | 16:34:21 | | | |
| 004 | 17:24:05 | 17:33:02 | 17:24:53 | 17:32:48 | 17:25:04 | | | |
| 004 | 09:33:44 | | 09:34:15 | 09:36:30 | 09:34:44 | 09:37:06 | | 09:39:19 |
| 004 | 10:54:13 | | 10:54:47 | 11:02:45 | 10:55:11 | 11:03:27 | | 11:05:24 |
| 004 | 16:22:30 | | 16:23:07 | 16:29:36 | 16:23:22 | 16:30:51 | | 16:33:14 |
| 004 | 13:45:16 | | 13:45:44 | | 13:45:54 | 13:46:40 | 13:48:39 | |
| 004 | 07:06:51 | | 07:07:25 | | 07:07:36 | | | |
| 004 | 07:10:12 | | 07:10:39 | | 07:10:47 | | | |
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| 004 | 07:39:12 | | 07:39:41 | | 07:39:49 | | | |

| | | | | |
|---|---|---|---|---|
| 003 | 09:25:10 | 00:02:17 | 1 004 > 003 | |
| 003 | 09:59:36 | 00:05:09 | 1 004 > 003 | |
| 003 | 10:28:00 | 00:06:27 | 1 004 > 003 | |
| 003 | 10:38:33 | 00:09:12 | 1 004 > 003 | |
| 003 | 11:00:51 | 00:14:31 | 1 004 > 003 | |
| 003 | 10:51:32 | 00:03:57 | 1 004 > 003 | |
| 003 | 11:02:18 | 00:11:56 | 1 004 > 003 | |
| 003 | 11:02:45 | 00:02:19 | 1 004 > 003 | |
| 003 | 11:18:07 | 00:04:34 | 1 004 > 003 | |
| 003 | 11:42:09 | 00:03:38 | 1 004 > 003 | |
| 003 | 11:49:07 | 00:07:35 | 1 004 > 003 | |
| 003 | 11:51:16 | 00:04:02 | 1 004 > 003 | |
| 003 | 12:19:18 | 00:11:32 | 1 004 > 003 | |
| 003 | 12:19:39 | 00:05:58 | 1 004 > 003 | |
| 003 | 13:06:03 | 00:13:32 | 1 004 > 003 | |
| 003 | 13:18:23 | 00:07:03 | 1 004 > 003 | |
| 003 | 14:08:50 | 00:12:26 | 1 004 > 003 | |
| 003 | 14:15:29 | 00:13:35 | 1 004 > 003 | |
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| 003 | 15:04:13 | 00:12:21 | 1 004 > 003 | |
| 003 | 15:14:48 | 00:10:11 | 1 004 > 003 | |
| 003 | 15:46:52 | 00:01:50 | 1 004 > 003 | |
| 003 | 16:04:34 | 00:06:39 | 1 004 > 003 | |
| 003 | 16:08:47 | 00:02:58 | 1 004 > 003 | |
| 003 | 16:24:30 | 00:10:29 | 1 004 > 003 | |
| 003 | 16:24:46 | 00:02:09 | 1 004 > 003 | |
| 003 | 16:28:38 | 00:01:51 | 1 004 > 003 | |
| 003 | 16:27:41 | 00:00:38 | 1 004 > 003 | |
| 003 | 16:45:54 | 00:14:15 | 1 004 > 003 | PM Peak |
| 003 | 16:36:53 | 00:03:40 | 1 004 > 003 | PM Peak |
| 003 | 16:37:49 | 00:01:40 | 1 004 > 003 | PM Peak |
| 003 | 16:47:17 | 00:05:15 | 1 004 > 003 | PM Peak |
| 003 | 16:50:06 | 00:02:44 | 1 004 > 003 | PM Peak |
| 003 | 17:04:44 | 00:04:58 | 1 004 > 003 | PM Peak |
| 003 | 17:19:18 | 00:13:08 | 1 004 > 003 | PM Peak |
| 003 | 17:12:38 | 00:05:59 | 1 004 > 003 | PM Peak |
| 003 | 17:15:27 | 00:02:20 | 1 004 > 003 | PM Peak |
| 003 | 17:25:18 | 00:09:47 | 1 004 > 003 | PM Peak |
| 003 | 17:40:00 | 00:06:53 | 1 004 > 003 | |
| 003 | 17:50:20 | 00:03:57 | 1 004 > 003 | |
| 003 | 17:49:08 | 00:02:41 | 1 004 > 003 | |
| 003 | 17:49:59 | 00:02:33 | 1 004 > 003 | |
| 003 | 18:03:01 | 00:11:27 | 1 004 > 003 | |
| 003 | 18:03:04 | 00:10:53 | 1 004 > 003 | |
| 003 | 18:05:35 | 00:10:26 | 1 004 > 003 | |
| 003 | 18:03:34 | 00:08:16 | 1 004 > 003 | |
| 003 | 18:08:51 | 00:07:21 | 1 004 > 003 | |
| 003 | 18:43:10 | 00:10:21 | 1 004 > 003 | |
| 003 | 08:01:35 | 00:06:54 | 2 004 > 006 > 003 | |
| 003 | 08:08:59 | 00:09:32 | 2 004 > 006 > 003 | |
| 003 | 08:42:40 | 00:04:27 | 2 004 > 006 > 005 > 003 | AM Peak |
| 003 | 15:55:28 | 00:02:35 | 2 004 > 006 > 003 | |
| 001 | 08:07:24 | 00:05:55 | 3 004 > 006 > 005 > 001 | AM Peak |
| 001 | 16:42:37 | 00:14:45 | 3 004 > 006 > 005 > 001 | |
| 003 | 08:07:08 | 00:12:16 | 3 004 > 006 > 005 > 003 | |
| 003 | 08:14:47 | 00:13:21 | 3 004 > 006 > 005 > 003 | AM Peak |
| 003 | 08:15:26 | 00:05:49 | 3 004 > 006 > 005 > 003 | AM Peak |
| 003 | 08:31:23 | 00:09:52 | 3 004 > 006 > 005 > 003 | AM Peak |
| 003 | 08:33:33 | 00:04:10 | 3 004 > 006 > 005 > 003 | AM Peak |
| 003 | 18:17:07 | 00:11:55 | 3 004 > 006 > 007 > 003 | |
| 003 | 16:40:12 | 00:10:27 | 4 004 > 006 > 007 > 005 > 003 | |
| 011 | 16:31:52 | 00:02:04 | 3 004 > 006 > 007 > 011 | |
| 011 | 17:04:07 | 00:01:15 | 3 004 > 006 > 008 > 011 | PM Peak |
| 011 | 18:06:58 | 00:01:37 | 3 004 > 006 > 007 > 011 | |
| 011 | 18:09:29 | 00:03:48 | 3 004 > 006 > 007 > 011 | |
| 019 | 10:35:22 | 00:04:43 | 5 004 > 006 > 007 > 014 > 015 > 019 | |
| 003 | 08:08:56 | 00:14:52 | 3 004 > 006 > 008 > 003 | |
| 003 | 16:07:24 | 00:04:28 | 3 004 > 006 > 008 > 003 | |
| 003 | 17:36:45 | 00:07:09 | 3 004 > 006 > 008 > 007 > 005 > 003 | PM Peak |
| 001 | 08:56:26 | 00:08:58 | 4 004 > 006 > 008 > 007 > 005 > 001 | AM Peak |
| 003 | 08:07:53 | 00:05:49 | 4 004 > 006 > 008 > 007 > 005 > 003 | AM Peak |
| 003 | 10:27:09 | 00:09:21 | 4 004 > 006 > 008 > 005 > 003 | |
| 003 | 17:27:07 | 00:06:13 | 4 004 > 006 > 008 > 007 > 005 > 003 | PM Peak |
| 003 | 17:52:16 | 00:05:17 | 4 004 > 006 > 008 > 007 > 003 | |
| 003 | 18:01:56 | 00:10:08 | 4 004 > 006 > 008 > 007 > 003 | |
| 003 | 18:17:53 | 00:13:23 | 4 004 > 006 > 008 > 007 > 003 | |
| 001 | 07:59:23 | 00:08:06 | 5 004 > 006 > 008 > 007 > 005 > 001 | |
| 001 | 12:38:05 | 00:09:48 | 5 004 > 006 > 008 > 007 > 005 > 001 | |
| 001 | 16:55:38 | 00:12:32 | 5 004 > 006 > 008 > 007 > 005 > 001 | PM Peak |
| 001 | 17:21:37 | 00:13:37 | 5 004 > 006 > 008 > 007 > 005 > 001 | PM Peak |
| 003 | 07:46:43 | 00:06:14 | 5 004 > 006 > 008 > 007 > 005 > 003 | |
| 003 | 08:15:06 | 00:10:04 | 5 004 > 006 > 008 > 007 > 005 > 003 | AM Peak |
| 003 | 08:16:48 | 00:05:36 | 5 004 > 006 > 008 > 007 > 005 > 003 | AM Peak |
| 003 | 08:18:22 | 00:06:06 | 5 004 > 006 > 008 > 007 > 005 > 003 | AM Peak |
| 003 | 08:32:27 | 00:10:20 | 5 004 > 006 > 008 > 007 > 005 > 003 | AM Peak |
| 003 | 08:32:50 | 00:07:49 | 5 004 > 006 > 008 > 007 > 005 > 003 | AM Peak |
| 003 | 08:36:03 | 00:06:45 | 5 004 > 006 > 008 > 007 > 005 > 003 | AM Peak |
| 003 | 08:53:56 | 00:10:11 | 5 004 > 006 > 008 > 007 > 005 > 003 | AM Peak |
| 003 | 08:57:10 | 00:06:16 | 5 004 > 006 > 008 > 007 > 005 > 003 | AM Peak |
| 003 | 10:00:50 | 00:12:58 | 5 004 > 006 > 008 > 007 > 005 > 003 | |
| 003 | 10:10:01 | 00:07:27 | 5 004 > 006 > 008 > 007 > 005 > 003 | |
| 003 | 16:12:02 | 00:08:54 | 5 004 > 006 > 008 > 007 > 005 > 003 | |
| 003 | 16:34:03 | 00:12:20 | 5 004 > 006 > 008 > 007 > 005 > 003 | |
| 003 | 16:36:21 | 00:12:14 | 5 004 > 006 > 008 > 007 > 005 > 003 | |
| 003 | 16:35:21 | 00:05:54 | 5 004 > 006 > 008 > 007 > 005 > 003 | |
| 003 | 16:45:37 | 00:12:36 | 5 004 > 006 > 008 > 007 > 005 > 003 | PM Peak |
| 003 | 17:33:44 | 00:09:39 | 5 004 > 006 > 008 > 007 > 005 > 003 | PM Peak |
| 017 | 09:39:28 | 00:05:44 | 6 004 > 006 > 008 > 007 > 010 > 015 > 017 | |
| 019 | 11:06:17 | 00:12:04 | 6 004 > 006 > 008 > 007 > 010 > 015 > 019 | |
| 019 | 16:34:06 | 00:11:36 | 6 004 > 006 > 008 > 007 > 010 > 015 > 019 | |
| 011 | 13:49:15 | 00:03:59 | 5 004 > 006 > 008 > 010 > 013 > 011 | |
| 011 | 07:08:12 | 00:01:21 | 3 004 > 006 > 008 > 011 | |
| 011 | 07:11:17 | 00:01:05 | 3 004 > 006 > 008 > 011 | |
| 011 | 07:12:59 | 00:01:11 | 3 004 > 006 > 008 > 011 | |
| 011 | 07:13:11 | 00:01:11 | 3 004 > 006 > 008 > 011 | |
| 011 | 07:19:50 | 00:01:09 | 3 004 > 006 > 008 > 011 | |
| 011 | 07:20:25 | 00:01:11 | 3 004 > 006 > 008 > 011 | |
| 011 | 07:29:44 | 00:01:12 | 3 004 > 006 > 008 > 011 | |
| 011 | 07:35:17 | 00:01:09 | 3 004 > 006 > 008 > 011 | |
| 011 | 07:39:45 | 00:01:11 | 3 004 > 006 > 008 > 011 | |
| 011 | 07:39:53 | 00:01:13 | 3 004 > 006 > 008 > 011 | |
| 011 | 07:40:24 | 00:01:12 | 3 004 > 006 > 008 > 011 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 004 | 07:43:12 | 07:43:44 | 07:43:58 | | 011 | 07:44:29 | 00:01:17 | 3 004 > 006 > 008 > 011 | |
| 004 | 07:44:47 | 07:45:29 | 07:45:40 | | 011 | 07:46:16 | 00:01:29 | 3 004 > 006 > 008 > 011 | |
| 004 | 07:51:28 | 07:52:05 | 07:52:16 | | 011 | 07:57:53 | 00:06:25 | 3 004 > 006 > 008 > 011 | |
| 004 | 07:54:08 | 07:54:40 | 07:54:49 | | 011 | 07:55:34 | 00:01:26 | 3 004 > 006 > 008 > 011 | |
| 004 | 07:54:23 | 07:55:00 | 07:59:43 | | 011 | 08:00:17 | 00:05:54 | 3 004 > 006 > 008 > 011 | |
| 004 | 07:54:59 | 07:55:30 | 07:55:42 | | 011 | 07:56:32 | 00:01:33 | 3 004 > 006 > 008 > 011 | |
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| 004 | 07:58:08 | 07:58:47 | 07:59:05 | | 011 | 07:59:41 | 00:01:33 | 3 004 > 006 > 008 > 011 | |
| 004 | 07:59:16 | 08:00:56 | 08:01:08 | | 011 | 08:01:47 | 00:02:31 | 3 004 > 006 > 008 > 011 | |
| 004 | 07:59:47 | 08:00:41 | 08:00:57 | | 011 | 08:04:24 | 00:04:37 | 3 004 > 006 > 008 > 011 | |
| 004 | 08:00:43 | 08:01:23 | 08:01:43 | | 011 | 08:02:15 | 00:01:32 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:01:55 | 08:02:36 | 08:02:51 | | 011 | 08:03:47 | 00:01:52 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:01:57 | 08:02:38 | 08:02:53 | | 011 | 08:03:48 | 00:01:51 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:07:14 | 08:07:46 | 08:17:18 | | 011 | 08:17:47 | 00:10:33 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:08:40 | 08:10:57 | 08:11:25 | | 011 | 08:12:01 | 00:03:21 | 3 004 > 006 > 008 > 011 | AM Peak |
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| 004 | 08:11:33 | 08:12:50 | 08:13:02 | | 011 | 08:16:21 | 00:04:48 | 3 004 > 006 > 008 > 011 | AM Peak |
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| 004 | 08:13:56 | 08:14:59 | 08:15:21 | | 011 | 08:16:03 | 00:02:07 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:14:35 | 08:15:44 | 08:16:11 | | 011 | 08:16:44 | 00:02:09 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:16:37 | 08:17:45 | 08:18:01 | | 011 | 08:18:40 | 00:02:03 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:16:48 | 08:17:58 | 08:24:09 | | 011 | 08:25:07 | 00:08:19 | 3 004 > 006 > 008 > 011 | AM Peak |
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| 004 | 08:19:05 | 08:20:09 | 08:20:40 | | 011 | 08:22:37 | 00:03:32 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:20:21 | 08:21:35 | 08:21:50 | | 011 | 08:22:58 | 00:02:37 | 3 004 > 006 > 008 > 011 | AM Peak |
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| 004 | 08:22:38 | 08:23:45 | 08:24:01 | | 011 | 08:28:31 | 00:05:53 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:22:46 | 08:24:10 | 08:24:21 | | 011 | 08:25:29 | 00:02:43 | 3 004 > 006 > 008 > 011 | AM Peak |
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| 004 | 08:26:24 | 08:28:54 | 08:29:07 | | 011 | 08:29:40 | 00:03:16 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:29:37 | 08:30:42 | 08:30:59 | | 011 | 08:31:44 | 00:02:07 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:30:21 | 08:31:22 | 08:31:32 | | 011 | 08:32:05 | 00:01:44 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:30:45 | 08:31:48 | 08:32:31 | | 011 | 08:33:13 | 00:02:28 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:31:50 | 08:32:38 | 08:33:09 | | 011 | 08:33:50 | 00:02:00 | 3 004 > 006 > 008 > 011 | AM Peak |
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| 004 | 08:37:22 | 08:38:04 | 08:38:22 | | 011 | 08:38:57 | 00:01:35 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:37:59 | 08:38:50 | 08:40:56 | | 011 | 08:41:30 | 00:03:31 | 3 004 > 006 > 008 > 011 | AM Peak |
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| 004 | 08:39:44 | 08:41:50 | 08:42:23 | | 011 | 08:43:08 | 00:03:24 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:40:30 | 08:41:09 | 08:41:42 | | 011 | 08:42:26 | 00:01:56 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:40:51 | 08:42:48 | 08:43:05 | | 011 | 08:43:40 | 00:02:49 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:41:25 | 08:42:23 | 08:42:39 | | 011 | 08:44:09 | 00:02:44 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 08:43:35 | 08:56:40 | 08:56:53 | | 011 | 08:57:51 | 00:14:16 | 3 004 > 006 > 008 > 011 | AM Peak |
| 004 | 09:05:36 | 09:06:29 | 09:06:47 | | 011 | 09:07:25 | 00:01:49 | 3 004 > 006 > 008 > 011 | |
| 004 | 09:08:03 | 09:12:16 | 09:12:25 | | 011 | 09:20:57 | 00:12:54 | 3 004 > 006 > 008 > 011 | |
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| 004 | 09:13:05 | 09:13:33 | 09:13:41 | | 011 | 09:14:11 | 00:01:06 | 3 004 > 006 > 008 > 011 | |
| 004 | 09:16:00 | 09:16:40 | 09:16:49 | | 011 | 09:17:24 | 00:01:24 | 3 004 > 006 > 008 > 011 | |
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| 004 | 09:25:51 | 09:35:28 | 09:35:36 | | 011 | 09:36:09 | 00:10:18 | 3 004 > 006 > 008 > 011 | |
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|---|---|---|---|
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| 004 | 11:37:10 | 11:37:47 | 11:37:59 |
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| 004 | 11:50:48 | 11:51:20 | 11:51:37 |
| 004 | 11:54:31 | 11:55:04 | 11:55:13 |
| 004 | 11:59:41 | 12:00:13 | 12:00:21 |
| 004 | 11:59:57 | 12:00:31 | 12:00:40 |
| 004 | 12:03:28 | 12:04:16 | 12:04:26 |
| 004 | 12:06:15 | 12:10:06 | 12:10:12 |
| 004 | 12:07:00 | 12:07:37 | 12:07:45 |
| 004 | 12:07:52 | 12:08:31 | 12:08:40 |
| 004 | 12:08:56 | 12:09:33 | 12:09:41 |
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| 004 | 12:24:12 | 12:24:53 | 12:25:02 |
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| 004 | 13:54:14 | 13:54:54 | 13:55:02 |
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| 004 | 14:09:10 | 14:21:21 | 14:21:28 |
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| 004 | 16:05:19 | 16:05:52 | 16:06:02 |
| 004 | 16:06:06 | 16:06:41 | 16:06:54 |
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|---|---|---|---|---|
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| 011 | 12:39:13 | 00:01:18 | 3 004 > 006 > 008 > 011 | |
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| 011 | 14:59:45 | 00:01:18 | 3 004 > 006 > 008 > 011 | |
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| 011 | 15:13:53 | 00:01:19 | 3 004 > 006 > 008 > 011 | |
| 011 | 15:18:57 | 00:01:36 | 3 004 > 006 > 008 > 011 | |
| 011 | 15:24:18 | 00:01:09 | 3 004 > 006 > 008 > 011 | |
| 011 | 15:26:00 | 00:01:17 | 3 004 > 006 > 008 > 011 | |
| 011 | 15:28:45 | 00:01:18 | 3 004 > 006 > 008 > 011 | |
| 011 | 15:30:25 | 00:01:18 | 3 004 > 006 > 008 > 011 | |
| 011 | 15:33:51 | 00:01:14 | 3 004 > 006 > 008 > 011 | |
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| 011 | 15:39:17 | 00:01:18 | 3 004 > 006 > 008 > 011 | |
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| 011 | 16:09:12 | 00:08:50 | 3 004 > 006 > 008 > 011 | |
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| 011 | 17:25:31 | 00:01:38 | 3 004 > 006 > 008 > 011 | PM Peak |
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| 011 | 17:30:17 | 00:02:37 | 3 004 > 006 > 008 > 011 | PM Peak |
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| 011 | 17:30:59 | 00:01:32 | 3 004 > 006 > 008 > 011 | PM Peak |
| 011 | 17:31:01 | 00:01:30 | 3 004 > 006 > 008 > 011 | PM Peak |
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| 011 | 17:32:22 | 00:02:02 | 3 004 > 006 > 008 > 011 | |
| 011 | 17:32:49 | 00:01:27 | 3 004 > 006 > 008 > 011 | |
| 011 | 17:35:25 | 00:01:46 | 3 004 > 006 > 008 > 011 | |
| 011 | 17:36:07 | 00:01:35 | 3 004 > 006 > 008 > 011 | |
| 011 | 17:38:43 | 00:01:22 | 3 004 > 006 > 008 > 011 | |
| 011 | 17:39:37 | 00:02:12 | 3 004 > 006 > 008 > 011 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 004 | 17:37:28 | | 17:38:07 | | 17:38:15 | | | | | | | | | | |
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| 004 | 18:25:59 | | 18:26:34 | | 18:26:46 | | | | | | | | | | |
| 004 | 18:26:19 | | 18:37:56 | | 18:38:08 | | | | | | | | | | |
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| 004 | 07:51:52 | | 07:52:24 | | | 07:53:06 | 07:53:08 | 07:56:02 | | | | | | | |
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| 004 | 16:21:01 | 16:30:44 | 16:21:57 | 16:30:25 | | 16:23:01 | | 16:28:49 | | | | | | | |
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| 004 | 10:55:30 | 11:08:54 | 10:56:03 | | | 11:08:18 | 10:56:45 | | | | | | | | |
| 004 | 10:59:35 | 11:06:06 | 11:00:06 | | | 11:00:38 | 11:00:40 | | | | | | | | |
| 004 | 11:27:34 | 11:38:08 | 11:28:10 | | | 11:28:46 | 11:28:48 | | | | | | | | |
| 004 | 13:49:19 | 13:55:52 | 13:49:50 | | | 13:55:15 | 13:50:28 | | | | | | | | |
| 004 | 14:36:39 | 14:47:48 | 14:37:11 | | | 14:47:09 | 14:37:47 | | | | | | | | |
| 004 | 15:17:30 | 15:25:44 | 15:18:07 | | | 15:24:41 | 15:18:56 | | | | | | | | |
| 004 | 08:12:29 | | 08:13:43 | | 08:25:44 | 08:24:25 | 08:14:35 | | | | | | | | |
| 004 | 16:53:59 | | 16:54:30 | | | | 16:55:36 | | | | | | | | |
| 004 | 17:33:43 | 17:45:24 | 17:34:34 | | | 17:35:29 | 17:35:32 | | | | | | | | |
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| 004 | 09:17:33 | | 09:18:08 | | 09:23:05 | 09:22:27 | 09:18:49 | | | | | | | | |
| 004 | 09:48:31 | | 09:49:07 | | 09:53:50 | 09:52:54 | 09:49:46 | | | | | | | | |
| 004 | 10:37:16 | | 10:37:54 | | 10:44:06 | 10:43:15 | 10:38:32 | | | | | | | | |
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| 004 | 12:23:13 | | 12:23:48 | | 12:29:08 | 12:28:28 | 12:24:23 | | | | | | | | |
| 004 | 13:51:08 | | 13:51:42 | | 13:58:51 | 13:58:06 | 13:52:22 | | | | | | | | |
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| 004 | 15:27:11 | | 15:27:43 | | | | 15:28:17 | | | | | | | | |
| 004 | 16:52:23 | 17:01:19 | 16:52:53 | 17:01:17 | | | 16:53:36 | 17:00:04 | | | | | | | |
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| 004 | 18:15:47 | | 18:16:21 | | | | 18:17:04 | 18:24:35 | 18:24:43 | | | | | | |
| 004 | 07:03:02 | | 07:05:59 | | | | 07:06:42 | | | 07:08:25 | | | | | |
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| 011 | 17:51:34 | 00:01:17 | 3 004 > 006 > 008 > 011 | |
| 011 | 18:05:39 | 00:15:02 | 3 004 > 006 > 008 > 011 | |
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| 011 | 18:14:59 | 00:13:02 | 3 004 > 006 > 008 > 011 | |
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| 011 | 18:07:15 | 00:01:23 | 3 004 > 006 > 008 > 011 | |
| 011 | 18:07:26 | 00:01:25 | 3 004 > 006 > 008 > 011 | |
| 011 | 18:12:39 | 00:01:37 | 3 004 > 006 > 008 > 011 | |
| 011 | 18:21:17 | 00:01:19 | 3 004 > 006 > 008 > 011 | |
| 011 | 18:22:40 | 00:01:18 | 3 004 > 006 > 008 > 011 | |
| 011 | 18:27:16 | 00:01:17 | 3 004 > 006 > 008 > 011 | |
| 011 | 18:38:48 | 00:12:29 | 3 004 > 006 > 008 > 011 | |
| 011 | 18:31:32 | 00:01:27 | 3 004 > 006 > 008 > 011 | |
| 011 | 18:32:06 | 00:01:11 | 3 004 > 006 > 008 > 011 | |
| 011 | 18:34:29 | 00:01:15 | 3 004 > 006 > 008 > 011 | |
| 011 | 18:35:29 | 00:01:24 | 3 004 > 006 > 008 > 011 | |
| 011 | 18:42:08 | 00:01:27 | 3 004 > 006 > 008 > 011 | |
| 011 | 18:48:06 | 00:01:12 | 3 004 > 006 > 008 > 011 | |
| 011 | 18:51:22 | 00:01:35 | 3 004 > 006 > 008 > 011 | |
| 011 | 18:57:09 | 00:01:19 | 3 004 > 006 > 008 > 011 | |
| 011 | 18:58:32 | 00:01:25 | 3 004 > 006 > 008 > 011 | |
| 001 | 08:02:34 | 00:08:54 | 7 004 > 006 > 008 > 014 > 013 > 007 > 005 > 001 | |
| 001 | 09:00:08 | 00:12:45 | 7 004 > 006 > 008 > 014 > 013 > 007 > 005 > 001 | AM Peak |
| 003 | 13:26:23 | 00:10:56 | 7 004 > 006 > 008 > 014 > 013 > 007 > 005 > 003 | |
| 003 | 17:31:36 | 00:09:33 | 7 004 > 006 > 008 > 014 > 013 > 007 > 005 > 003 | PM Peak |
| 011 | 09:55:34 | 00:05:02 | 5 004 > 006 > 008 > 014 > 013 > 011 | |
| 011 | 10:31:59 | 00:11:37 | 5 004 > 006 > 008 > 014 > 013 > 011 | |
| 011 | 18:09:12 | 00:07:59 | 5 004 > 006 > 008 > 014 > 013 > 011 | |
| 011 | 18:08:23 | 00:03:49 | 5 004 > 006 > 008 > 014 > 013 > 011 | |
| 017 | 17:51:25 | 00:05:09 | 5 004 > 006 > 008 > 014 > 015 > 017 | |
| 019 | 07:44:27 | 00:06:58 | 5 004 > 006 > 008 > 014 > 015 > 019 | |
| 019 | 07:50:46 | 00:09:18 | 5 004 > 006 > 008 > 014 > 015 > 019 | |
| 019 | 08:02:32 | 00:06:17 | 5 004 > 006 > 008 > 014 > 015 > 019 | |
| 019 | 08:29:13 | 00:12:17 | 5 004 > 006 > 008 > 014 > 015 > 019 | AM Peak |
| 019 | 08:25:58 | 00:07:45 | 5 004 > 006 > 008 > 014 > 015 > 019 | AM Peak |
| 019 | 10:11:28 | 00:09:33 | 5 004 > 006 > 008 > 014 > 015 > 019 | |
| 019 | 16:49:38 | 00:04:12 | 5 004 > 006 > 008 > 014 > 015 > 019 | PM Peak |
| 017 | 18:12:50 | 00:04:16 | 4 004 > 006 > 008 > 015 > 017 | |
| 019 | 07:55:29 | 00:07:57 | 4 004 > 006 > 008 > 015 > 019 | |
| 011 | 15:51:10 | 00:06:26 | 4 004 > 006 > 009 > 010 > 011 | |
| 011 | 07:58:55 | 00:07:45 | 5 004 > 006 > 009 > 010 > 013 > 011 | |
| 011 | 07:56:46 | 00:04:54 | 5 004 > 006 > 009 > 010 > 013 > 011 | |
| 011 | 14:28:53 | 00:06:20 | 5 004 > 006 > 009 > 010 > 013 > 011 | |
| 011 | 15:59:39 | 00:11:34 | 5 004 > 006 > 009 > 010 > 013 > 011 | |
| 003 | 16:31:27 | 00:10:26 | 6 004 > 006 > 009 > 013 > 007 > 005 > 003 | |
| 003 | 08:23:40 | 00:10:42 | 5 004 > 006 > 010 > 009 > 005 > 003 | AM Peak |
| 017 | 15:23:23 | 00:03:52 | 4 004 > 006 > 009 > 015 > 017 | |
| 003 | 08:54:52 | 00:14:42 | 5 004 > 006 > 010 > 009 > 005 > 003 | AM Peak |
| 001 | 18:09:14 | 00:09:23 | 4 004 > 006 > 010 > 009 > 001 | |
| 003 | 18:19:39 | 00:05:42 | 4 004 > 006 > 010 > 009 > 003 | |
| 003 | 08:51:57 | 00:10:58 | 5 004 > 006 > 010 > 009 > 005 > 003 | AM Peak |
| 003 | 17:08:53 | 00:11:21 | 5 004 > 006 > 010 > 009 > 005 > 003 | PM Peak |
| 003 | 17:17:15 | 00:11:35 | 5 004 > 006 > 010 > 009 > 005 > 003 | PM Peak |
| 003 | 09:45:13 | 00:09:40 | 5 004 > 006 > 010 > 009 > 005 > 003 | |
| 003 | 09:43:49 | 00:04:28 | 5 004 > 006 > 010 > 009 > 005 > 003 | |
| 003 | 10:39:58 | 00:07:00 | 5 004 > 006 > 010 > 009 > 005 > 003 | |
| 003 | 10:44:43 | 00:07:04 | 5 004 > 006 > 010 > 009 > 005 > 003 | |
| 003 | 10:51:23 | 00:12:44 | 5 004 > 006 > 010 > 009 > 005 > 003 | |
| 003 | 11:09:25 | 00:13:55 | 5 004 > 006 > 010 > 009 > 005 > 003 | |
| 003 | 11:06:40 | 00:07:05 | 5 004 > 006 > 010 > 009 > 005 > 003 | |
| 003 | 11:38:46 | 00:11:12 | 5 004 > 006 > 010 > 009 > 005 > 003 | |
| 003 | 13:56:27 | 00:07:08 | 5 004 > 006 > 010 > 009 > 005 > 003 | |
| 003 | 14:48:34 | 00:11:55 | 5 004 > 006 > 010 > 009 > 005 > 003 | |
| 003 | 15:26:21 | 00:08:51 | 5 004 > 006 > 010 > 009 > 005 > 003 | |
| 011 | 08:26:18 | 00:13:49 | 5 004 > 006 > 010 > 009 > 008 > 011 | AM Peak |
| 011 | 17:03:47 | 00:09:48 | 3 004 > 006 > 010 > 013 > 011 | PM Peak |
| 003 | 17:46:00 | 00:12:17 | 5 004 > 006 > 010 > 009 > 005 > 003 | |
| 003 | 17:36:37 | 00:06:38 | 5 004 > 006 > 010 > 013 > 007 > 005 > 003 | PM Peak |
| 011 | 09:23:38 | 00:06:05 | 5 004 > 006 > 010 > 009 > 008 > 011 | |
| 011 | 09:54:23 | 00:05:52 | 5 004 > 006 > 010 > 009 > 008 > 011 | |
| 011 | 10:44:37 | 00:07:21 | 5 004 > 006 > 010 > 009 > 008 > 011 | |
| 011 | 11:34:37 | 00:07:36 | 5 004 > 006 > 010 > 009 > 008 > 011 | |
| 011 | 12:29:48 | 00:06:35 | 5 004 > 006 > 010 > 009 > 008 > 011 | |
| 011 | 13:59:26 | 00:08:18 | 5 004 > 006 > 010 > 009 > 008 > 011 | |
| 011 | 15:26:39 | 00:13:22 | 5 004 > 006 > 010 > 009 > 008 > 011 | |
| 011 | 15:37:42 | 00:10:31 | 3 004 > 006 > 010 > 011 | |
| 001 | 17:04:02 | 00:11:39 | 6 004 > 006 > 010 > 013 > 007 > 005 > 001 | PM Peak |
| 011 | 17:16:37 | 00:05:30 | 4 004 > 006 > 010 > 013 > 011 | PM Peak |
| 011 | 17:30:56 | 00:10:07 | 4 004 > 006 > 010 > 013 > 011 | PM Peak |
| 011 | 09:11:55 | 00:09:04 | 4 004 > 006 > 010 > 013 > 011 | |
| 011 | 09:18:03 | 00:10:27 | 4 004 > 006 > 010 > 013 > 011 | |
| 011 | 09:16:37 | 00:05:04 | 4 004 > 006 > 010 > 013 > 011 | |
| 011 | 09:34:21 | 00:12:59 | 4 004 > 006 > 010 > 013 > 011 | |
| 011 | 10:00:40 | 00:04:15 | 4 004 > 006 > 010 > 013 > 011 | |
| 011 | 16:00:11 | 00:08:41 | 4 004 > 006 > 010 > 013 > 011 | |
| 017 | 08:25:58 | 00:14:27 | 4 004 > 006 > 010 > 015 > 017 | AM Peak |
| 011 | 18:28:01 | 00:10:15 | 4 004 > 006 > 010 > 013 > 011 | |
| 011 | 18:25:18 | 00:09:31 | 5 004 > 006 > 010 > 013 > 014 > 011 | |
| 017 | 07:08:36 | 00:05:34 | 4 004 > 006 > 010 > 015 > 017 | |
| 017 | 08:55:07 | 00:14:50 | 4 004 > 006 > 010 > 015 > 017 | AM Peak |
| 017 | 16:41:56 | 00:07:58 | 4 004 > 006 > 010 > 015 > 017 | PM Peak |
| 017 | 09:11:26 | 00:07:23 | 4 004 > 006 > 010 > 015 > 017 | |
| 017 | 09:17:02 | 00:04:36 | 4 004 > 006 > 010 > 015 > 017 | |
| 017 | 09:19:17 | 00:04:52 | 4 004 > 006 > 010 > 015 > 017 | |
| 017 | 09:23:09 | 00:03:27 | 4 004 > 006 > 010 > 015 > 017 | |
| 017 | 09:23:44 | 00:03:55 | 4 004 > 006 > 010 > 015 > 017 | |
| 017 | 09:23:46 | 00:03:38 | 4 004 > 006 > 010 > 015 > 017 | |
| 017 | 09:42:12 | 00:04:12 | 4 004 > 006 > 010 > 015 > 017 | |
| 017 | 09:55:56 | 00:03:23 | 4 004 > 006 > 010 > 015 > 017 | |
| 017 | 10:19:12 | 00:03:01 | 4 004 > 006 > 010 > 015 > 017 | |
| 017 | 10:39:37 | 00:03:15 | 4 004 > 006 > 010 > 015 > 017 | |
| 017 | 10:50:34 | 00:11:58 | 4 004 > 006 > 010 > 015 > 017 | |
| 017 | 11:14:51 | 00:02:45 | 4 004 > 006 > 010 > 015 > 017 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 004 | 11:18:24 | 11:18:51 | 11:19:29 | 11:21:14 | 017 | 11:21:23 | 00:02:59 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 11:28:08 | 11:29:00 | 11:29:43 | 11:31:26 | 017 | 11:31:38 | 00:03:30 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 11:35:05 | 11:35:37 | 11:36:18 | 11:38:34 | 017 | 11:38:45 | 00:03:40 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 11:48:00 | 11:48:30 | 11:49:13 | 11:50:52 | 017 | 11:51:01 | 00:03:01 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 12:08:14 | 12:08:43 | 12:09:24 | 12:11:15 | 017 | 12:11:25 | 00:03:11 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 13:00:16 | 13:00:48 | 13:01:24 | 13:03:25 | 017 | 13:03:38 | 00:03:22 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 13:11:17 | 13:11:47 | 13:12:27 | 13:14:17 | 017 | 13:14:31 | 00:03:14 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 13:15:21 | 13:15:53 | 13:16:31 | 13:18:01 | 017 | 13:18:11 | 00:02:50 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 13:25:57 | 13:26:26 | 13:27:02 | 13:29:00 | 017 | 13:29:11 | 00:03:14 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 13:56:13 | 13:56:45 | 13:57:27 | 13:59:48 | 017 | 14:00:13 | 00:04:00 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 13:56:51 | 13:57:25 | 13:58:10 | 14:00:42 | 017 | 14:00:54 | 00:04:03 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 14:06:22 | 14:06:51 | 14:07:27 | 14:09:23 | 017 | 14:09:33 | 00:03:11 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 14:06:50 | 14:07:20 | 14:07:55 | 14:09:34 | 017 | 14:09:45 | 00:02:55 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 14:11:05 | 14:11:43 | 14:12:24 | 14:14:41 | 017 | 14:14:52 | 00:03:47 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 14:49:13 | 14:49:52 | 14:50:23 | 14:51:49 | 017 | 14:51:59 | 00:02:46 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 14:53:09 | 14:53:35 | 14:54:13 | 14:56:31 | 017 | 14:56:40 | 00:03:31 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 15:02:00 | 15:02:33 | 15:03:28 | 15:05:19 | 017 | 15:05:30 | 00:03:30 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 15:33:05 | 15:33:42 | 15:34:26 | 15:36:37 | 017 | 15:36:49 | 00:03:44 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 15:39:37 | 15:40:15 | 15:41:10 | 15:43:29 | 017 | 15:43:42 | 00:04:05 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 15:47:08 | 15:47:40 | 15:48:28 | 15:50:23 | 017 | 15:50:53 | 00:03:45 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 16:07:50 | 16:08:24 | 16:09:12 | 16:11:15 | 017 | 16:11:26 | 00:03:36 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 16:12:02 | 16:12:37 | 16:13:20 | 16:15:56 | 017 | 16:16:12 | 00:04:10 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 16:23:59 | 16:24:38 | 16:26:26 | 16:28:43 | 017 | 16:29:07 | 00:05:08 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 16:44:08 | 16:44:46 | 16:46:07 | 16:48:06 | 017 | 16:48:16 | 00:04:08 | 4 004 > 006 > 010 > 015 > 017 | PM Peak |
| 004 | 16:56:16 | 16:56:50 | 16:58:06 | 17:00:20 | 017 | 17:00:34 | 00:04:18 | 4 004 > 006 > 010 > 015 > 017 | PM Peak |
| 004 | 16:57:36 | 16:58:07 | 16:58:51 | 17:00:58 | 017 | 17:01:09 | 00:03:33 | 4 004 > 006 > 010 > 015 > 017 | PM Peak |
| 004 | 17:03:47 | 17:04:15 | 17:04:49 | 17:08:16 | 017 | 17:08:30 | 00:04:43 | 4 004 > 006 > 010 > 015 > 017 | PM Peak |
| 004 | 17:12:04 | 17:12:38 | 17:13:38 | 17:17:40 | 017 | 17:17:57 | 00:05:53 | 4 004 > 006 > 010 > 015 > 017 | PM Peak |
| 004 | 17:15:45 | 17:16:34 | 17:25:20 | 17:27:01 | 017 | 17:27:15 | 00:11:30 | 4 004 > 006 > 010 > 015 > 017 | PM Peak |
| 004 | 17:19:13 | 17:19:48 | 17:20:51 | 17:23:10 | 017 | 17:23:20 | 00:04:07 | 4 004 > 006 > 010 > 015 > 017 | PM Peak |
| 004 | 08:08:47 | 08:09:32 | 08:11:28 | 08:18:54 | 019 | 08:19:43 | 00:10:56 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 17:43:54 | 17:44:33 | 17:45:21 | 17:47:24 | 017 | 17:47:34 | 00:03:40 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 17:57:51 | 17:58:35 | 17:59:22 | 18:01:21 | 017 | 18:01:31 | 00:03:40 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 18:00:43 | 18:01:12 | 18:01:52 | 18:03:48 | 017 | 18:03:57 | 00:03:14 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 18:03:44 | 18:04:18 | 18:04:59 | 18:07:59 | 017 | 18:08:16 | 00:04:32 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 18:04:53 | 18:05:27 | 18:06:10 | 18:08:27 | 017 | 18:09:04 | 00:04:11 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 18:13:55 | 18:14:30 | 18:15:21 | 18:17:41 | 017 | 18:17:52 | 00:03:57 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 18:25:37 | 18:26:10 | 18:26:50 | 18:28:25 | 017 | 18:28:38 | 00:03:01 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 18:32:32 | 18:33:07 | 18:33:59 | 18:36:09 | 017 | 18:36:26 | 00:03:54 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 18:38:48 | 18:39:24 | 18:40:00 | 18:41:47 | 017 | 18:42:05 | 00:03:17 | 4 004 > 006 > 010 > 015 > 017 | |
| 004 | 07:08:55 | 07:09:21 | 07:09:56 | 07:11:21 | 019 | 07:12:11 | 00:03:16 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 07:34:46 | 07:35:22 | 07:36:02 | 07:37:38 | 019 | 07:38:35 | 00:03:49 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 07:39:00 | 07:39:30 | 07:40:14 | 07:42:13 | 019 | 07:43:03 | 00:04:03 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 07:39:15 | 07:39:43 | 07:40:17 | 07:42:15 | 019 | 07:43:05 | 00:03:50 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 07:45:38 | 07:46:07 | 07:46:45 | 07:48:30 | 019 | 07:49:23 | 00:03:45 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 07:46:32 | 07:47:09 | 07:47:50 | 07:53:04 | 019 | 07:54:03 | 00:07:31 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 07:46:43 | 07:47:22 | 07:47:55 | 07:50:15 | 019 | 07:51:16 | 00:04:33 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 07:47:35 | 07:48:27 | 07:50:45 | 07:52:31 | 019 | 07:53:27 | 00:05:52 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 07:54:00 | 07:54:28 | 07:55:02 | 07:56:48 | 019 | 07:57:36 | 00:03:36 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 07:56:17 | 07:56:58 | 07:57:43 | 08:10:03 | 019 | 08:10:52 | 00:14:35 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 07:56:45 | 07:57:21 | 07:58:13 | 08:00:31 | 019 | 08:01:23 | 00:04:38 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 07:58:15 | 07:58:57 | 07:59:43 | 08:01:38 | 019 | 08:02:38 | 00:04:23 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 07:59:43 | 08:00:37 | 08:01:20 | 08:10:26 | 019 | 08:11:12 | 00:11:29 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 08:02:43 | 08:03:18 | 08:12:27 | 08:14:52 | 019 | 08:15:40 | 00:12:57 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:08:37 | 08:09:14 | 08:19:28 | 08:21:27 | 019 | 08:22:23 | 00:13:46 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:10:01 | 08:11:15 | 08:12:08 | 08:14:48 | 019 | 08:15:36 | 00:05:35 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:11:56 | 08:13:05 | 08:13:46 | 08:16:22 | 019 | 08:17:10 | 00:05:14 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:13:34 | 08:14:45 | 08:15:48 | 08:17:35 | 019 | 08:18:26 | 00:04:52 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:13:46 | 08:14:49 | 08:15:52 | 08:17:39 | 019 | 08:18:29 | 00:04:43 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:14:57 | 08:16:22 | 08:17:24 | 08:19:53 | 019 | 08:20:47 | 00:05:50 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:15:26 | 08:16:32 | 08:17:28 | 08:19:56 | 019 | 08:20:49 | 00:05:23 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:22:04 | 08:23:03 | 08:24:15 | 08:26:16 | 019 | 08:27:07 | 00:05:03 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:27:24 | 08:28:40 | 08:29:33 | 08:37:42 | 019 | 08:38:32 | 00:11:08 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:28:31 | 08:30:26 | 08:31:15 | 08:33:28 | 019 | 08:34:28 | 00:05:57 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:35:05 | 08:35:38 | 08:36:19 | 08:38:31 | 019 | 08:39:29 | 00:04:24 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:35:51 | 08:36:22 | 08:37:05 | 08:39:31 | 019 | 08:40:30 | 00:04:39 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:41:22 | 08:43:23 | 08:44:17 | 08:47:04 | 019 | 08:48:02 | 00:06:40 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:42:10 | 08:43:11 | 08:44:07 | 08:47:01 | 019 | 08:47:58 | 00:05:48 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:43:09 | 08:44:05 | 08:44:58 | 08:51:55 | 019 | 08:52:48 | 00:09:39 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:43:12 | 08:44:12 | 08:45:12 | 08:48:35 | 019 | 08:49:45 | 00:06:33 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:44:29 | 08:45:27 | 08:46:26 | 08:50:22 | 019 | 08:51:20 | 00:06:51 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:45:40 | 08:46:52 | 08:47:49 | 08:56:19 | 019 | 08:57:15 | 00:11:35 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:46:39 | 08:47:53 | 08:48:55 | 08:54:50 | 019 | 08:55:44 | 00:09:05 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:51:07 | 08:52:26 | 08:53:13 | 08:58:21 | 019 | 08:59:09 | 00:08:02 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:56:02 | 08:57:29 | 08:58:16 | 09:03:09 | 019 | 09:03:57 | 00:07:55 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:57:14 | 08:58:17 | 08:59:06 | 09:06:19 | 019 | 09:07:07 | 00:09:53 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:57:43 | 08:58:47 | 08:59:47 | 09:04:53 | 019 | 09:05:52 | 00:08:09 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 08:58:07 | 08:59:20 | 09:00:11 | 09:05:03 | 019 | 09:06:02 | 00:07:55 | 4 004 > 006 > 010 > 015 > 019 | AM Peak |
| 004 | 09:04:34 | 09:05:14 | 09:05:52 | 09:10:52 | 019 | 09:11:45 | 00:07:11 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 09:07:53 | 09:08:27 | 09:09:17 | 09:14:48 | 019 | 09:15:58 | 00:08:05 | 4 004 > 006 > 010 > 015 > 019 | |
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| 004 | 09:23:15 | 09:23:48 | 09:24:29 | 09:26:04 | 019 | 09:26:53 | 00:03:38 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 09:24:23 | 09:24:59 | 09:25:37 | 09:27:25 | 019 | 09:28:16 | 00:03:53 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 09:27:08 | 09:27:34 | 09:28:08 | 09:29:38 | 019 | 09:30:23 | 00:03:15 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 09:33:33 | 09:34:05 | 09:34:42 | 09:36:40 | 019 | 09:37:30 | 00:03:57 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 09:39:16 | 09:39:44 | 09:40:22 | 09:42:26 | 019 | 09:43:45 | 00:04:29 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 09:43:45 | 09:44:17 | 09:44:56 | 09:46:39 | 019 | 09:47:38 | 00:03:53 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 09:51:24 | 09:51:57 | 09:52:39 | 09:57:59 | 019 | 09:58:50 | 00:07:26 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 10:04:25 | 10:05:00 | 10:05:44 | 10:07:58 | 019 | 10:08:55 | 00:04:30 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 10:10:23 | 10:10:56 | 10:11:35 | 10:13:37 | 019 | 10:14:29 | 00:04:06 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 10:12:17 | 10:12:57 | 10:13:38 | 10:16:00 | 019 | 10:16:57 | 00:04:40 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 10:33:24 | 10:33:54 | 10:34:29 | 10:36:00 | 019 | 10:36:57 | 00:03:33 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 11:06:14 | 11:06:51 | 11:07:29 | 11:09:35 | 019 | 11:10:25 | 00:04:11 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 11:21:00 | 11:21:44 | 11:22:21 | 11:23:57 | 019 | 11:24:37 | 00:03:37 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 11:21:45 | 11:22:16 | 11:22:57 | 11:24:30 | 019 | 11:25:18 | 00:03:33 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 11:30:53 | 11:31:24 | 11:32:01 | 11:36:45 | 019 | 11:37:39 | 00:06:46 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 11:31:15 | 11:31:50 | 11:32:33 | 11:34:33 | 019 | 11:35:36 | 00:04:21 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 11:45:17 | 11:46:01 | 11:46:42 | 11:48:43 | 019 | 11:49:42 | 00:04:25 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 11:58:08 | 11:58:37 | 11:59:12 | 12:01:40 | 019 | 12:02:36 | 00:04:28 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 12:07:31 | 12:08:03 | 12:08:42 | 12:10:39 | 019 | 12:11:40 | 00:04:09 | 4 004 > 006 > 010 > 015 > 019 | |
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| 004 | 12:43:59 | 12:44:33 | 12:45:18 | 12:47:21 | 019 | 12:48:16 | 00:04:17 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 12:44:02 | 12:44:47 | 12:45:29 | 12:47:23 | 019 | 12:48:18 | 00:04:16 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 12:54:08 | 12:54:37 | 12:55:15 | 12:57:18 | 019 | 12:58:18 | 00:04:10 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 12:56:19 | 12:56:46 | 12:57:21 | 12:59:23 | 019 | 13:00:28 | 00:04:09 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 13:02:59 | 13:03:32 | 13:04:12 | 13:06:29 | 019 | 13:07:31 | 00:04:32 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 13:07:48 | 13:08:20 | 13:08:59 | 13:11:44 | 019 | 13:12:35 | 00:04:47 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 13:13:29 | 13:14:04 | 13:14:41 | 13:16:49 | 019 | 13:17:40 | 00:04:11 | 4 004 > 006 > 010 > 015 > 019 | |
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| 004 | 13:36:14 | 13:36:45 | 13:37:21 | 13:39:09 | 019 | 13:40:07 | 00:03:53 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 13:48:12 | 13:48:45 | 13:49:27 | 13:51:15 | 019 | 13:52:11 | 00:03:59 | 4 004 > 006 > 010 > 015 > 019 | |
| 004 | 13:50:51 | 13:51:29 | 13:52:10 | 13:54:52 | 019 | 13:55:53 | 00:05:02 | 4 004 > 006 > 010 > 015 > 019 | |

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|---|---|---|---|---|
| 004 | 13:54:18 | 13:55:00 | 13:55:39 | 13:57:30 |
| 004 | 14:03:02 | 14:03:46 | 14:04:30 | 14:06:57 |
| 004 | 14:18:52 | 14:19:23 | 14:20:01 | 14:21:52 |
| 004 | 14:25:56 | 14:26:26 | 14:27:02 | 14:28:58 |
| 004 | 14:27:53 | 14:28:21 | 14:28:56 | 14:34:25 |
| 004 | 14:27:59 | 14:28:32 | 14:29:11 | 14:30:42 |
| 004 | 14:29:58 | 14:30:56 | 14:31:36 | 14:37:31 |
| 004 | 14:36:22 | 14:36:48 | 14:37:15 | 14:38:59 |
| 004 | 15:20:51 | 15:21:27 | 15:22:11 | 15:34:11 |
| 004 | 15:27:22 | 15:27:55 | 15:28:37 | 15:30:15 |
| 004 | 16:08:24 | 16:15:10 | 16:16:15 | 16:18:52 |
| 004 | 16:13:43 | 16:14:17 | 16:15:04 | 16:16:59 |
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| 004 | 16:40:49 | 16:41:30 | 16:42:40 | 16:44:49 |
| 004 | 16:43:09 | 16:44:06 | 16:45:37 | 16:47:34 |
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| 004 | 18:06:56 | 18:07:33 | 18:08:16 | 18:11:02 |
| 004 | 18:08:29 | 18:09:10 | 18:09:56 | 18:12:36 |
| 004 | 18:13:53 | 18:14:29 | 18:15:19 | 18:17:40 |
| 004 | 18:14:00 | 18:14:38 | 18:15:29 | 18:17:44 |
| 004 | 18:17:26 | 18:18:10 | 18:19:01 | 18:20:50 |
| 004 | 18:28:29 | 18:29:02 | 18:29:43 | 18:31:46 |
| 004 | 18:43:37 | 18:44:11 | 18:44:46 | 18:46:11 |
| 004 | 18:43:57 | 18:44:29 | 18:45:09 | 18:47:08 |
| 004 | 18:46:16 | 18:46:49 | 18:47:35 | 18:49:22 |
| 004 | 18:48:22 | 18:48:53 | 18:49:34 | 18:51:02 |
| 004 | 18:53:37 | 18:54:08 | 18:54:37 | 18:56:18 |
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| 004 | 18:24:06 | 18:24:40 | 18:25:25 | |
| 004 | 08:43:57 | 08:44:57 | 08:45:52 | |
| 004 | 13:25:36 | 13:26:09 | 13:26:51 | |
| 004 | 07:58:35 | 07:59:15 | | |
| 004 | 08:03:28 | 08:04:00 | | |
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| 004 | 08:04:43 | 08:05:15 | | |
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| 004 | 10:32:21 | 10:32:54 | | |
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| 004 | 16:02:49 | 16:03:25 | | |
| 004 | 16:25:26 | 16:26:41 | | |
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| 004 | 17:59:56 | 18:00:28 | | |
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| 004 | 18:46:47 | 18:47:22 | | |
| 004 | 08:50:11 | 08:51:24 | | 08:57:46 |
| 004 | 08:54:15 | 08:55:57 | | 09:01:24 |
| 004 | 10:50:35 | 10:51:03 | | 10:53:14 |
| 004 | 12:17:05 | 12:17:34 | | 12:20:02 |
| 004 | 12:47:17 | 12:47:49 | | 12:50:26 |
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| 004 | 15:59:18 | 15:59:52 | | 16:03:31 |
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| 004 | 15:03:27 | 15:04:07 | | 15:07:28 |
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|---|---|---|---|---|
| 019 | 13:58:23 | 00:04:05 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 14:08:05 | 00:05:03 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 14:22:48 | 00:03:56 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 14:30:06 | 00:04:10 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 14:35:07 | 00:07:14 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 14:31:31 | 00:03:32 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 14:38:22 | 00:08:24 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 14:39:48 | 00:03:26 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 15:35:05 | 00:14:14 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 15:31:07 | 00:03:45 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 16:19:47 | 00:11:23 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 16:17:53 | 00:04:10 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 16:20:32 | 00:04:31 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 16:27:14 | 00:04:39 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 16:33:28 | 00:04:42 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 16:41:20 | 00:12:29 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 16:35:22 | 00:04:50 | 4 004 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 16:45:51 | 00:05:02 | 4 004 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 16:48:37 | 00:05:28 | 4 004 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 16:49:46 | 00:04:17 | 4 004 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 17:00:58 | 00:04:56 | 4 004 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 17:17:41 | 00:06:57 | 4 004 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 17:22:27 | 00:05:36 | 4 004 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 17:34:21 | 00:13:07 | 4 004 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 17:34:13 | 00:07:46 | 4 004 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 17:36:12 | 00:04:57 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 17:36:48 | 00:04:21 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 17:50:35 | 00:04:25 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 17:54:17 | 00:04:15 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 18:11:38 | 00:05:11 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 18:12:09 | 00:05:13 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 18:13:35 | 00:05:06 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 18:18:43 | 00:04:50 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 18:18:44 | 00:04:44 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 18:22:05 | 00:04:39 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 18:32:42 | 00:04:13 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 18:47:02 | 00:03:25 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 18:48:01 | 00:04:04 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 18:50:17 | 00:04:01 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 18:51:57 | 00:03:35 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 18:57:03 | 00:03:26 | 4 004 > 006 > 010 > 015 > 019 | |
| 019 | 18:58:53 | 00:03:51 | 4 004 > 006 > 010 > 015 > 019 | |
| 017 | 18:28:27 | 00:04:21 | 3 004 > 006 > 010 > 017 | |
| 019 | 08:50:21 | 00:06:24 | 3 004 > 006 > 010 > 015 > 019 | AM Peak |
| 019 | 13:32:45 | 00:07:09 | 3 004 > 006 > 010 > 019 | |
| 011 | 08:04:44 | 00:06:09 | 2 004 > 006 > 011 | |
| 011 | 08:05:04 | 00:01:36 | 2 004 > 006 > 011 | AM Peak |
| 011 | 08:06:41 | 00:02:51 | 2 004 > 006 > 011 | AM Peak |
| 011 | 08:06:13 | 00:01:30 | 2 004 > 006 > 011 | AM Peak |
| 011 | 08:09:19 | 00:02:41 | 2 004 > 006 > 011 | AM Peak |
| 011 | 08:08:28 | 00:01:45 | 2 004 > 006 > 011 | AM Peak |
| 011 | 08:08:43 | 00:01:23 | 2 004 > 006 > 011 | AM Peak |
| 011 | 08:10:29 | 00:02:59 | 2 004 > 006 > 011 | AM Peak |
| 011 | 08:09:21 | 00:01:17 | 2 004 > 006 > 011 | AM Peak |
| 011 | 08:11:16 | 00:02:51 | 2 004 > 006 > 011 | AM Peak |
| 011 | 08:12:16 | 00:02:01 | 2 004 > 006 > 011 | AM Peak |
| 011 | 08:12:25 | 00:01:56 | 2 004 > 006 > 011 | AM Peak |
| 011 | 08:12:29 | 00:01:57 | 2 004 > 006 > 011 | AM Peak |
| 011 | 08:21:21 | 00:07:14 | 2 004 > 006 > 011 | AM Peak |
| 011 | 08:17:56 | 00:02:27 | 2 004 > 006 > 011 | AM Peak |
| 011 | 09:21:13 | 00:01:15 | 2 004 > 006 > 011 | |
| 011 | 09:24:48 | 00:04:33 | 2 004 > 006 > 011 | |
| 011 | 09:25:56 | 00:01:14 | 2 004 > 006 > 011 | |
| 011 | 09:42:40 | 00:01:03 | 2 004 > 006 > 011 | |
| 011 | 09:43:34 | 00:01:20 | 2 004 > 006 > 011 | |
| 011 | 09:57:37 | 00:01:18 | 2 004 > 006 > 011 | |
| 011 | 10:29:23 | 00:01:18 | 2 004 > 006 > 011 | |
| 011 | 10:33:38 | 00:01:17 | 2 004 > 006 > 011 | |
| 011 | 10:46:24 | 00:01:13 | 2 004 > 006 > 011 | |
| 011 | 11:50:41 | 00:10:29 | 2 004 > 006 > 011 | |
| 011 | 11:54:36 | 00:01:02 | 2 004 > 006 > 011 | |
| 011 | 12:02:15 | 00:01:31 | 2 004 > 006 > 011 | |
| 011 | 12:51:40 | 00:01:30 | 2 004 > 006 > 011 | |
| 011 | 13:11:21 | 00:01:09 | 2 004 > 006 > 011 | |
| 011 | 14:00:29 | 00:01:35 | 2 004 > 006 > 011 | |
| 011 | 14:09:09 | 00:07:10 | 2 004 > 006 > 011 | |
| 011 | 14:45:38 | 00:01:25 | 2 004 > 006 > 011 | |
| 011 | 14:55:54 | 00:01:06 | 2 004 > 006 > 011 | |
| 011 | 15:13:14 | 00:01:12 | 2 004 > 006 > 011 | |
| 011 | 16:00:23 | 00:01:24 | 2 004 > 006 > 011 | |
| 011 | 16:04:13 | 00:01:24 | 2 004 > 006 > 011 | |
| 011 | 16:28:01 | 00:02:35 | 2 004 > 006 > 011 | |
| 011 | 16:28:27 | 00:02:08 | 2 004 > 006 > 011 | |
| 011 | 16:35:59 | 00:07:04 | 2 004 > 006 > 011 | |
| 011 | 16:43:05 | 00:01:36 | 2 004 > 006 > 011 | PM Peak |
| 011 | 16:59:03 | 00:01:07 | 2 004 > 006 > 011 | PM Peak |
| 011 | 17:03:22 | 00:01:23 | 2 004 > 006 > 011 | PM Peak |
| 011 | 17:10:26 | 00:01:47 | 2 004 > 006 > 011 | PM Peak |
| 011 | 17:10:29 | 00:01:41 | 2 004 > 006 > 011 | PM Peak |
| 011 | 17:15:32 | 00:01:33 | 2 004 > 006 > 011 | PM Peak |
| 011 | 17:23:00 | 00:01:22 | 2 004 > 006 > 011 | PM Peak |
| 011 | 17:27:37 | 00:05:54 | 2 004 > 006 > 011 | PM Peak |
| 011 | 17:29:08 | 00:07:14 | 2 004 > 006 > 011 | PM Peak |
| 011 | 17:38:40 | 00:01:46 | 2 004 > 006 > 011 | |
| 011 | 17:59:13 | 00:02:09 | 2 004 > 006 > 011 | |
| 011 | 18:05:27 | 00:05:31 | 2 004 > 006 > 011 | |
| 011 | 18:14:57 | 00:01:25 | 2 004 > 006 > 011 | |
| 011 | 18:54:27 | 00:07:40 | 2 004 > 006 > 011 | |
| 017 | 08:57:54 | 00:07:43 | 3 004 > 006 > 010 > 015 > 017 | AM Peak |
| 017 | 09:01:40 | 00:07:25 | 3 004 > 006 > 010 > 015 > 017 | AM Peak |
| 017 | 10:53:23 | 00:02:48 | 3 004 > 006 > 015 > 017 | |
| 017 | 12:20:12 | 00:03:07 | 3 004 > 006 > 015 > 017 | |
| 017 | 12:50:38 | 00:03:21 | 3 004 > 006 > 015 > 017 | |
| 017 | 14:54:07 | 00:03:12 | 3 004 > 006 > 015 > 017 | |
| 017 | 16:03:55 | 00:04:37 | 3 004 > 006 > 015 > 017 | |
| 017 | 18:55:53 | 00:03:07 | 3 004 > 006 > 015 > 017 | |
| 019 | 09:54:28 | 00:04:34 | 3 004 > 006 > 015 > 019 | |
| 019 | 13:25:42 | 00:03:24 | 3 004 > 006 > 015 > 019 | |
| 019 | 14:13:04 | 00:04:06 | 3 004 > 006 > 015 > 019 | |
| 019 | 15:08:27 | 00:05:00 | 3 004 > 006 > 015 > 019 | |
| 019 | 16:12:43 | 00:03:50 | 3 004 > 006 > 015 > 019 | |
| 019 | 16:26:27 | 00:04:41 | 3 004 > 006 > 015 > 019 | |
| 019 | 16:36:58 | 00:05:21 | 3 004 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 16:42:51 | 00:05:50 | 3 004 > 006 > 010 > 015 > 019 | PM Peak |
| 019 | 16:49:03 | 00:05:36 | 3 004 > 006 > 010 > 015 > 019 | PM Peak |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 004 | 17:38:27 | | 17:39:16 | | | | | | 17:42:03 | 019 | 17:43:05 | 00:04:38 | 3 | 004 > 006 > 015 > 019 | |
| 004 | 17:41:31 | | 17:42:18 | | | | | | 17:45:24 | 019 | 17:46:17 | 00:04:46 | 3 | 004 > 006 > 015 > 019 | |
| 004 | 18:10:25 | | 18:11:06 | | | | | | 18:14:31 | 019 | 18:15:35 | 00:05:10 | 3 | 004 > 006 > 015 > 019 | |
| 004 | 18:25:56 | | 18:26:32 | | | | | | 18:36:05 | 019 | 18:37:10 | 00:11:14 | 3 | 004 > 006 > 015 > 019 | |
| 004 | 14:30:21 | | 14:31:08 | | | | | | | 017 | 14:34:08 | 00:03:47 | 2 | 004 > 006 > 017 | |
| 004 | 11:11:37 | | | 11:21:29 | 11:12:19 | | | | | 003 | 11:22:15 | 00:10:38 | 3 | 004 > 007 > 008 > 003 | |
| 004 | 14:56:10 | | | 15:06:23 | 14:56:57 | | | | | 003 | 15:07:03 | 00:10:53 | 3 | 004 > 007 > 008 > 003 | |
| 004 | 16:22:01 | | | 16:27:54 | 16:22:44 | | | | | 003 | 16:29:35 | 00:07:34 | 3 | 004 > 007 > 008 > 003 | |
| 004 | 17:11:30 | | | | 17:12:15 | | | | | 003 | 17:26:22 | 00:14:52 | 2 | 004 > 006 > 008 > 007 > 005 > 003 | PM Peak |
| 004 | 08:26:11 | 08:36:45 | | | 08:27:33 | | | | | 003 | 08:37:20 | 00:11:09 | 3 | 004 > 006 > 008 > 007 > 005 > 003 | AM Peak |
| 004 | 17:05:49 | | | | 17:06:38 | | 17:07:46 | | 17:17:30 | 019 | 17:18:35 | 00:12:46 | 4 | 004 > 006 > 010 > 015 > 019 | PM Peak |
| 004 | 09:41:20 | 09:41:53 | | | 09:42:01 | | | | | 011 | 09:42:38 | 00:01:18 | 3 | 004 > 008 > 005 > 011 | |
| 004 | 16:48:52 | | | | 16:49:41 | | | | | 011 | 16:50:06 | 00:01:14 | 2 | 004 > 006 > 008 > 011 | PM Peak |
| 004 | 07:18:45 | | | | 07:19:26 | | | | | 011 | 07:28:56 | 00:10:11 | 2 | 004 > 008 > 011 | |
| 004 | 07:20:17 | | | | 07:20:56 | | | | | 011 | 07:21:34 | 00:01:17 | 2 | 004 > 008 > 011 | |
| 004 | 09:36:03 | | | | 09:36:42 | | | | | 011 | 09:37:17 | 00:01:14 | 2 | 004 > 008 > 011 | |
| 004 | 10:22:29 | | | | 10:23:16 | | | | | 011 | 10:23:53 | 00:01:24 | 2 | 004 > 008 > 011 | |
| 004 | 10:32:33 | | | | 10:33:15 | | | | | 011 | 10:33:49 | 00:01:16 | 2 | 004 > 008 > 011 | |
| 004 | 11:31:54 | | | | 11:32:36 | | | | | 011 | 11:33:10 | 00:01:16 | 2 | 004 > 008 > 011 | |
| 004 | 12:05:19 | | | | 12:05:59 | | | | | 011 | 12:06:30 | 00:01:11 | 2 | 004 > 008 > 011 | |
| 004 | 12:37:36 | | | | 12:39:06 | | | | | 011 | 12:39:37 | 00:02:01 | 2 | 004 > 008 > 011 | |
| 004 | 13:11:52 | | | | 13:12:32 | | | | | 011 | 13:13:07 | 00:01:15 | 2 | 004 > 008 > 011 | |
| 004 | 14:02:33 | | | | 14:03:21 | | | | | 011 | 14:04:00 | 00:01:27 | 2 | 004 > 008 > 011 | |
| 004 | 14:11:09 | | | | 14:18:33 | | | | | 011 | 14:19:05 | 00:07:56 | 2 | 004 > 008 > 011 | |
| 004 | 15:22:18 | | | | 15:35:06 | | | | | 011 | 15:35:40 | 00:13:22 | 2 | 004 > 008 > 011 | |
| 004 | 15:39:55 | | | | 15:40:46 | | | | | 011 | 15:41:26 | 00:01:31 | 2 | 004 > 008 > 011 | |
| 004 | 16:22:11 | | | | 16:22:53 | | | | | 011 | 16:23:27 | 00:01:16 | 2 | 004 > 008 > 011 | |
| 004 | 18:07:06 | | | | 18:07:51 | | | | | 011 | 18:08:27 | 00:01:21 | 2 | 004 > 008 > 011 | |
| 004 | 18:31:39 | | | | 18:32:25 | | | | | 011 | 18:32:57 | 00:01:18 | 2 | 004 > 008 > 011 | |
| 004 | 18:57:54 | | | | 18:58:28 | | | | | 011 | 18:58:57 | 00:01:03 | 2 | 004 > 008 > 011 | |
| 004 | 14:47:15 | | | | 14:47:59 | | | 14:51:55 | 14:49:15 | 011 | 14:52:55 | 00:05:40 | 4 | 004 > 008 > 014 > 013 > 011 | |
| 004 | 17:06:55 | | | | | | 17:08:45 | | 17:14:08 | 017 | 17:14:20 | 00:07:25 | 3 | 004 > 006 > 010 > 015 > 017 | PM Peak |
| 004 | 07:03:16 | | | | | | 07:04:16 | | 07:05:36 | 017 | 07:05:45 | 00:02:29 | 3 | 004 > 010 > 015 > 017 | |
| 004 | 09:59:32 | | | | | | 10:01:06 | | 10:04:17 | 017 | 10:04:29 | 00:04:57 | 3 | 004 > 010 > 015 > 017 | |
| 004 | 14:07:48 | | | | | | 14:08:53 | | 14:10:50 | 017 | 14:11:02 | 00:03:14 | 3 | 004 > 010 > 015 > 017 | |
| 004 | 09:11:30 | | | | | | 09:12:43 | | 09:16:10 | 019 | 09:17:06 | 00:05:36 | 3 | 004 > 010 > 015 > 019 | |
| 004 | 09:31:31 | | | | | | 09:32:39 | | 09:34:09 | 019 | 09:34:57 | 00:03:26 | 3 | 004 > 010 > 015 > 019 | |
| 004 | 09:34:19 | | | | | | 09:35:35 | | 09:37:44 | 019 | 09:38:40 | 00:04:21 | 3 | 004 > 010 > 015 > 019 | |
| 004 | 09:52:37 | | | | | | 09:54:02 | | 09:55:48 | 019 | 09:56:37 | 00:04:00 | 3 | 004 > 010 > 015 > 019 | |
| 004 | 10:35:59 | | | | | | 10:37:01 | | 10:38:52 | 019 | 10:39:44 | 00:03:45 | 3 | 004 > 010 > 015 > 019 | |
| 004 | 11:16:18 | | | | | | 11:17:27 | | 11:19:23 | 019 | 11:20:17 | 00:03:59 | 3 | 004 > 010 > 015 > 019 | |
| 004 | 11:25:18 | | | | | | 11:26:25 | | 11:28:14 | 019 | 11:29:10 | 00:03:52 | 3 | 004 > 010 > 015 > 019 | |
| 004 | 12:42:28 | | | | | | 12:43:43 | | 12:45:28 | 019 | 12:46:20 | 00:03:52 | 3 | 004 > 010 > 015 > 019 | |
| 004 | 13:00:22 | | | | | | 13:01:36 | | 13:04:07 | 019 | 13:05:03 | 00:04:41 | 3 | 004 > 010 > 015 > 019 | |
| 004 | 13:23:25 | | | | | | 13:24:38 | | 13:26:31 | 019 | 13:27:30 | 00:04:05 | 3 | 004 > 010 > 015 > 019 | |
| 004 | 14:19:57 | | | | | | 14:29:26 | | 14:31:10 | 019 | 14:32:02 | 00:12:05 | 3 | 004 > 010 > 015 > 019 | |
| 004 | 14:30:32 | | | | | | 14:32:02 | | 14:33:49 | 019 | 14:34:48 | 00:04:16 | 3 | 004 > 010 > 015 > 019 | |
| 004 | 14:40:07 | | | | | | 14:42:50 | | 14:44:19 | 019 | 14:45:16 | 00:05:09 | 3 | 004 > 010 > 015 > 019 | |
| 004 | 15:20:57 | | | | | | 15:29:29 | | 15:31:26 | 019 | 15:32:28 | 00:11:31 | 3 | 004 > 010 > 015 > 019 | |
| 004 | 16:04:26 | | | | | | 16:05:42 | | 16:11:06 | 019 | 16:12:03 | 00:07:37 | 3 | 004 > 010 > 015 > 019 | |
| 004 | 16:30:59 | | | | | | 16:35:39 | | 16:38:15 | 019 | 16:39:25 | 00:08:26 | 3 | 004 > 006 > 010 > 015 > 019 | PM Peak |
| 004 | 17:22:28 | | | | | | 17:23:46 | | 17:25:50 | 019 | 17:26:39 | 00:04:11 | 3 | 004 > 006 > 010 > 015 > 019 | PM Peak |
| 004 | 18:31:34 | | | | | | 18:33:01 | | 18:34:52 | 019 | 18:35:50 | 00:04:16 | 3 | 004 > 010 > 015 > 019 | |
| 004 | 07:20:25 | | | | | | | | | 011 | 07:21:43 | 00:01:18 | 1 | 004 > 011 | |
| 004 | 07:25:35 | | | | | | | | | 011 | 07:26:43 | 00:01:08 | 1 | 004 > 011 | |
| 004 | 07:31:38 | | | | | | | | | 011 | 07:32:49 | 00:01:11 | 1 | 004 > 011 | |
| 004 | 07:35:35 | | | | | | | | | 011 | 07:36:50 | 00:01:15 | 1 | 004 > 011 | |
| 004 | 09:03:41 | | | | | | | | | 011 | 09:05:06 | 00:01:25 | 1 | 004 > 011 | |
| 004 | 11:46:53 | | | | | | | | | 011 | 11:48:19 | 00:01:26 | 1 | 004 > 011 | |
| 004 | 12:10:22 | | | | | | | | | 011 | 12:11:34 | 00:01:12 | 1 | 004 > 011 | |
| 004 | 12:10:29 | | | | | | | | | 011 | 12:11:41 | 00:01:12 | 1 | 004 > 011 | |
| 004 | 13:00:26 | | | | | | | | | 011 | 13:01:43 | 00:01:17 | 1 | 004 > 011 | |
| 004 | 13:03:40 | | | | | | | | | 011 | 13:04:52 | 00:01:12 | 1 | 004 > 011 | |
| 004 | 13:13:42 | | | | | | | | | 011 | 13:14:59 | 00:01:17 | 1 | 004 > 011 | |
| 004 | 13:19:34 | | | | | | | | | 011 | 13:20:56 | 00:01:22 | 1 | 004 > 011 | |
| 004 | 13:25:28 | | | | | | | | | 011 | 13:26:42 | 00:01:14 | 1 | 004 > 011 | |
| 004 | 13:33:18 | | | | | | | | | 011 | 13:35:13 | 00:01:55 | 1 | 004 > 011 | |
| 004 | 13:48:40 | | | | | | | | | 011 | 13:55:40 | 00:07:00 | 1 | 004 > 011 | |
| 004 | 13:49:21 | | | | | | | | | 011 | 13:50:35 | 00:01:14 | 1 | 004 > 011 | |
| 004 | 13:51:41 | | | | | | | | | 011 | 13:53:08 | 00:01:27 | 1 | 004 > 011 | |
| 004 | 14:03:08 | | | | | | | | | 011 | 14:04:34 | 00:01:26 | 1 | 004 > 011 | |
| 004 | 14:10:15 | | | | | | | | | 011 | 14:11:40 | 00:01:25 | 1 | 004 > 011 | |
| 004 | 14:25:47 | | | | | | | | | 011 | 14:27:05 | 00:01:18 | 1 | 004 > 011 | |
| 004 | 14:34:49 | | | | | | | | | 011 | 14:36:40 | 00:01:51 | 1 | 004 > 011 | |
| 004 | 14:37:31 | | | | | | | | | 011 | 14:38:46 | 00:01:15 | 1 | 004 > 011 | |
| 004 | 14:38:47 | | | | | | | | | 011 | 14:40:06 | 00:01:19 | 1 | 004 > 011 | |
| 004 | 15:34:54 | | | | | | | | | 011 | 15:37:16 | 00:02:22 | 1 | 004 > 011 | |
| 004 | 15:36:23 | | | | | | | | | 011 | 15:37:32 | 00:01:09 | 1 | 004 > 011 | |
| 004 | 15:41:23 | | | | | | | | | 011 | 15:42:36 | 00:01:13 | 1 | 004 > 011 | |
| 004 | 15:42:00 | | | | | | | | | 011 | 15:43:46 | 00:01:46 | 1 | 004 > 011 | |
| 004 | 16:12:13 | | | | | | | | | 011 | 16:13:48 | 00:01:35 | 1 | 004 > 011 | |
| 004 | 16:16:53 | | | | | | | | | 011 | 16:18:19 | 00:01:26 | 1 | 004 > 011 | |
| 004 | 16:32:35 | | | | | | | | | 011 | 16:34:13 | 00:01:38 | 1 | 004 > 011 | PM Peak |
| 004 | 16:33:43 | | | | | | | | | 011 | 16:35:20 | 00:01:37 | 1 | 004 > 011 | PM Peak |
| 004 | 16:45:10 | | | | | | | | | 011 | 16:46:32 | 00:01:22 | 1 | 004 > 011 | PM Peak |
| 004 | 16:49:18 | | | | | | | | | 011 | 16:50:48 | 00:01:30 | 1 | 004 > 011 | PM Peak |
| 004 | 17:04:31 | | | | | | | | | 011 | 17:06:08 | 00:01:37 | 1 | 004 > 011 | PM Peak |
| 004 | 17:11:46 | | | | | | | | | 011 | 17:18:05 | 00:06:19 | 1 | 004 > 011 | PM Peak |
| 004 | 17:22:22 | | | | | | | | | 011 | 17:23:48 | 00:01:26 | 1 | 004 > 011 | PM Peak |
| 004 | 17:23:33 | | | | | | | | | 011 | 17:25:25 | 00:01:52 | 1 | 004 > 011 | PM Peak |
| 004 | 17:24:22 | | | | | | | | | 011 | 17:25:56 | 00:01:34 | 1 | 004 > 011 | PM Peak |
| 004 | 17:32:33 | | | | | | | | | 011 | 17:34:09 | 00:01:36 | 1 | 004 > 011 | |
| 004 | 17:41:06 | | | | | | | | | 011 | 17:42:35 | 00:01:29 | 1 | 004 > 011 | |
| 004 | 17:51:22 | | | | | | | | | 011 | 17:52:46 | 00:01:24 | 1 | 004 > 011 | |
| 004 | 18:05:58 | | | | | | | | | 011 | 18:07:23 | 00:01:25 | 1 | 004 > 011 | |
| 004 | 18:07:10 | | | | | | | | | 011 | 18:08:30 | 00:01:20 | 1 | 004 > 011 | |
| 004 | 18:07:56 | | | | | | | | | 011 | 18:09:23 | 00:01:27 | 1 | 004 > 011 | |
| 004 | 18:09:07 | | | | | | | | | 011 | 18:17:33 | 00:08:26 | 1 | 004 > 011 | |
| 004 | 18:13:10 | | | | | | | | | 011 | 18:14:29 | 00:01:19 | 1 | 004 > 011 | |
| 004 | 18:28:35 | | | | | | | | | 011 | 18:29:55 | 00:01:20 | 1 | 004 > 011 | |
| 004 | 18:33:38 | | | | | | | | | 011 | 18:35:04 | 00:01:26 | 1 | 004 > 011 | |
| 004 | 18:36:10 | | | | | | | | | 011 | 18:37:31 | 00:01:21 | 1 | 004 > 011 | |
| 004 | 18:36:47 | | | | | | | | | 011 | 18:37:55 | 00:01:08 | 1 | 004 > 011 | |
| 004 | 18:55:26 | | | | | | | | | 011 | 18:56:58 | 00:01:32 | 1 | 004 > 011 | |
| 004 | 18:55:40 | | | | | | | | | 011 | 18:57:06 | 00:01:26 | 1 | 004 > 011 | |
| 004 | 17:28:47 | | | 17:36:37 | | | | 17:35:25 | | 003 | 17:37:22 | 00:08:35 | 3 | 004 > 006 > 010 > 013 > 007 > 005 > 003 | PM Peak |
| 004 | 16:24:15 | | | | | | | | 16:27:47 16:35:11 | 017 | 16:35:34 | 00:11:19 | 3 | 004 > 014 > 015 > 017 | |
| 004 | 12:30:58 | | | | | | | | 12:33:53 | 017 | 12:34:08 | 00:03:10 | 2 | 004 > 015 > 017 | |
| 004 | 13:09:14 | | | | | | | | 13:12:06 | 017 | 13:12:18 | 00:03:04 | 2 | 004 > 015 > 017 | |
| 004 | 11:42:51 | | | | | | | | 11:46:21 | 019 | 11:47:16 | 00:04:25 | 2 | 004 > 015 > 019 | |
| 004 | 14:46:13 | | | | | | | | 14:49:33 | 019 | 14:50:23 | 00:04:10 | 2 | 004 > 015 > 019 | |
| 004 | 18:06:30 | | | | | | | | 18:10:45 | 019 | 18:11:41 | 00:05:11 | 2 | 004 > 015 > 019 | |
| 004 | 18:50:07 | | | | | | | | 18:52:41 | 019 | 18:53:44 | 00:03:37 | 2 | 004 > 015 > 019 | |
| 004 | 14:55:00 | | | | | | | | | 017 | 14:58:38 | 00:03:38 | 1 | 004 > 017 | |
| 004 | 16:12:11 | | | | | | | | | 017 | 16:16:43 | 00:04:32 | 1 | 004 > 017 | |

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| 004 | 17:41:35 | | | |
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| 004 | 13:44:56 | | | |
| 004 | 14:24:00 | | | |
| 004 | 14:51:57 | | | |
| 004 | 15:22:05 | | | |
| 004 | 15:57:10 | | | |
| 004 | 16:06:31 | | | |
| 004 | 16:14:12 | | | |
| 004 | 17:22:19 | | | |
| 004 | 17:39:11 | | | |
| 004 | 17:53:14 | | | |
| 012 | 07:10:10 | | | |
| 012 | 07:14:35 | | | |
| 012 | 08:12:42 | | | |
| 012 | 08:56:01 | | | |
| 012 | 09:19:19 | | | |
| 012 | 09:45:45 | | | |
| 012 | 09:47:48 | | | |
| 012 | 10:10:09 | | | |
| 012 | 10:16:57 | | | |
| 012 | 10:33:02 | | | |
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| 012 | 11:06:10 | | | |
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| 012 | 17:38:46 | | | |
| 012 | 17:39:22 | | | |
| 012 | 17:50:21 | | | |
| 012 | 17:50:23 | | | |
| 012 | 17:50:35 | | | |
| 012 | 17:53:18 | | | |
| 012 | 17:55:30 | | | |
| 012 | 18:09:16 | | | |
| 012 | 18:10:57 | | | |
| 012 | 18:19:42 | | | |
| 012 | 18:28:29 | | | |
| 012 | 18:33:13 | | | |
| 012 | 18:35:27 | | | |
| 012 | 18:35:43 | | | |
| 012 | 18:47:59 | | | |
| 012 | 18:49:21 | | | |
| 012 | 18:55:32 | | | |
| 012 | 08:23:51 | | | |
| 012 | 08:34:34 | | | |
| 012 | 08:42:50 | | | |
| 012 | 08:52:13 | | | |
| 012 | 08:59:13 | | | |
| 012 | 10:43:40 | | | |
| 012 | 12:14:40 | | | |
| 012 | 12:56:30 | | | |
| 012 | 12:59:48 | | | |
| 012 | 13:13:51 | | | |
| 012 | 13:24:48 | | | |
| 012 | 13:54:55 | | | |
| 012 | 14:16:28 | | | |
| 012 | 14:21:44 | | | |
| 012 | 14:23:18 | | | |
| 012 | 14:53:25 | | | |
| 012 | 15:47:59 | | | |
| 012 | 15:54:43 | | | |
| 012 | 16:17:35 | | | |
| 012 | 16:36:57 | | | |
| 017 | 17:56:05 | 00:14:30 | 1 004 > 017 | |
| 019 | 10:04:36 | 00:12:59 | 1 004 > 019 | |
| 019 | 13:37:48 | 00:03:49 | 1 004 > 019 | |
| 019 | 13:48:11 | 00:03:15 | 1 004 > 019 | |
| 019 | 14:27:58 | 00:03:58 | 1 004 > 019 | |
| 019 | 14:56:10 | 00:04:13 | 1 004 > 019 | |
| 019 | 15:36:42 | 00:14:37 | 1 004 > 019 | |
| 019 | 16:03:08 | 00:05:58 | 1 004 > 019 | |
| 019 | 16:11:14 | 00:04:43 | 1 004 > 019 | |
| 019 | 16:19:09 | 00:04:57 | 1 004 > 019 | |
| 019 | 17:26:38 | 00:04:19 | 1 004 > 006 > 015 > 019 | PM Peak |
| 019 | 17:43:23 | 00:04:12 | 1 004 > 019 | |
| 019 | 18:01:08 | 00:07:54 | 1 004 > 019 | |
| 001 | 07:12:50 | 00:02:40 | 1 012 > 001 | |
| 001 | 07:17:59 | 00:03:24 | 1 012 > 001 | |
| 001 | 08:15:29 | 00:02:47 | 1 012 > 007 > 005 > 001 | AM Peak |
| 001 | 08:59:43 | 00:03:42 | 1 012 > 007 > 005 > 001 | AM Peak |
| 001 | 09:30:20 | 00:11:01 | 1 012 > 001 | |
| 001 | 09:48:57 | 00:03:12 | 1 012 > 001 | |
| 001 | 09:52:04 | 00:04:16 | 1 012 > 001 | |
| 001 | 10:13:37 | 00:03:28 | 1 012 > 001 | |
| 001 | 10:20:24 | 00:03:27 | 1 012 > 001 | |
| 001 | 10:43:30 | 00:10:28 | 1 012 > 001 | |
| 001 | 11:05:48 | 00:05:05 | 1 012 > 001 | |
| 001 | 11:08:45 | 00:02:35 | 1 012 > 001 | |
| 001 | 11:16:59 | 00:04:10 | 1 012 > 001 | |
| 001 | 11:33:19 | 00:06:30 | 1 012 > 001 | |
| 001 | 11:49:03 | 00:05:07 | 1 012 > 001 | |
| 001 | 12:03:31 | 00:05:18 | 1 012 > 001 | |
| 001 | 12:19:33 | 00:09:28 | 1 012 > 001 | |
| 001 | 12:18:43 | 00:04:45 | 1 012 > 001 | |
| 001 | 12:37:08 | 00:04:54 | 1 012 > 001 | |
| 001 | 12:43:18 | 00:08:49 | 1 012 > 001 | |
| 001 | 13:05:50 | 00:05:01 | 1 012 > 001 | |
| 001 | 13:04:49 | 00:03:17 | 1 012 > 001 | |
| 001 | 13:32:41 | 00:05:06 | 1 012 > 001 | |
| 001 | 13:39:41 | 00:02:53 | 1 012 > 001 | |
| 001 | 13:45:29 | 00:02:57 | 1 012 > 001 | |
| 001 | 13:51:13 | 00:05:16 | 1 012 > 001 | |
| 001 | 13:58:08 | 00:03:11 | 1 012 > 001 | |
| 001 | 13:58:14 | 00:03:05 | 1 012 > 001 | |
| 001 | 14:33:26 | 00:03:15 | 1 012 > 001 | |
| 001 | 14:43:21 | 00:09:28 | 1 012 > 001 | |
| 001 | 14:45:04 | 00:04:07 | 1 012 > 001 | |
| 001 | 14:46:44 | 00:03:11 | 1 012 > 001 | |
| 001 | 14:52:17 | 00:02:56 | 1 012 > 001 | |
| 001 | 14:54:11 | 00:02:44 | 1 012 > 001 | |
| 001 | 15:15:33 | 00:09:28 | 1 012 > 001 | |
| 001 | 15:16:33 | 00:03:12 | 1 012 > 001 | |
| 001 | 15:23:00 | 00:05:48 | 1 012 > 001 | |
| 001 | 15:37:32 | 00:05:10 | 1 012 > 001 | |
| 001 | 15:43:14 | 00:03:06 | 1 012 > 001 | |
| 001 | 15:49:49 | 00:03:29 | 1 012 > 001 | |
| 001 | 15:53:10 | 00:04:23 | 1 012 > 001 | |
| 001 | 15:56:08 | 00:03:10 | 1 012 > 001 | |
| 001 | 16:08:26 | 00:05:37 | 1 012 > 001 | |
| 001 | 16:17:01 | 00:04:08 | 1 012 > 001 | |
| 001 | 16:27:45 | 00:04:57 | 1 012 > 001 | |
| 001 | 16:32:47 | 00:05:42 | 1 012 > 001 | |
| 001 | 16:34:26 | 00:03:36 | 1 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:37:35 | 00:03:48 | 1 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:44:16 | 00:06:00 | 1 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:49:20 | 00:08:12 | 1 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:53:07 | 00:03:40 | 1 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:53:16 | 00:03:33 | 1 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:03:37 | 00:05:13 | 1 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:02:35 | 00:03:30 | 1 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:10:51 | 00:04:22 | 1 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:13:07 | 00:02:45 | 1 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:18:38 | 00:03:27 | 1 012 > 007 > 005 > 001 | PM Peak |
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| 001 | 17:24:09 | 00:03:03 | 1 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:30:43 | 00:05:40 | 1 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:32:34 | 00:03:57 | 1 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:32:47 | 00:03:21 | 1 012 > 007 > 005 > 001 | PM Peak |
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| 001 | 17:35:45 | 00:03:22 | 1 012 > 001 | |
| 001 | 17:40:11 | 00:03:47 | 1 012 > 001 | |
| 001 | 17:42:41 | 00:03:55 | 1 012 > 001 | |
| 001 | 17:45:28 | 00:06:06 | 1 012 > 001 | |
| 001 | 17:53:27 | 00:03:06 | 1 012 > 001 | |
| 001 | 17:53:30 | 00:03:07 | 1 012 > 001 | |
| 001 | 17:58:47 | 00:08:12 | 1 012 > 001 | |
| 001 | 17:56:16 | 00:02:58 | 1 012 > 001 | |
| 001 | 17:59:20 | 00:03:50 | 1 012 > 001 | |
| 001 | 18:14:03 | 00:04:47 | 1 012 > 001 | |
| 001 | 18:14:11 | 00:03:14 | 1 012 > 001 | |
| 001 | 18:22:58 | 00:03:16 | 1 012 > 001 | |
| 001 | 18:31:26 | 00:02:57 | 1 012 > 001 | |
| 001 | 18:36:28 | 00:03:15 | 1 012 > 001 | |
| 001 | 18:40:31 | 00:05:04 | 1 012 > 001 | |
| 001 | 18:39:15 | 00:03:32 | 1 012 > 001 | |
| 001 | 18:51:02 | 00:03:03 | 1 012 > 001 | |
| 001 | 18:52:32 | 00:03:11 | 1 012 > 001 | |
| 001 | 18:58:37 | 00:03:05 | 1 012 > 001 | |
| 003 | 08:25:40 | 00:01:49 | 1 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:35:49 | 00:01:15 | 1 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:43:54 | 00:01:04 | 1 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:53:59 | 00:01:46 | 1 012 > 007 > 005 > 003 | AM Peak |
| 003 | 09:03:19 | 00:04:06 | 1 012 > 007 > 005 > 003 | AM Peak |
| 003 | 10:47:02 | 00:03:22 | 1 012 > 003 | |
| 003 | 12:16:14 | 00:01:34 | 1 012 > 003 | |
| 003 | 12:57:34 | 00:01:04 | 1 012 > 003 | |
| 003 | 13:00:58 | 00:01:10 | 1 012 > 003 | |
| 003 | 13:15:22 | 00:01:31 | 1 012 > 003 | |
| 003 | 13:26:10 | 00:01:22 | 1 012 > 003 | |
| 003 | 14:03:19 | 00:08:24 | 1 012 > 003 | |
| 003 | 14:17:45 | 00:01:17 | 1 012 > 003 | |
| 003 | 14:22:53 | 00:01:09 | 1 012 > 003 | |
| 003 | 14:24:25 | 00:01:07 | 1 012 > 003 | |
| 003 | 14:54:27 | 00:01:02 | 1 012 > 003 | |
| 003 | 15:51:32 | 00:03:33 | 1 012 > 003 | |
| 003 | 16:02:00 | 00:07:17 | 1 012 > 003 | |
| 003 | 16:18:42 | 00:01:07 | 1 012 > 003 | |
| 003 | 16:38:16 | 00:01:19 | 1 012 > 007 > 005 > 003 | PM Peak |

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|---|---|---|---|---|---|---|---|
| 012 | 16:40:15 | | | | | | |
| 012 | 16:57:22 | | | | | | |
| 012 | 17:02:07 | | | | | | |
| 012 | 17:25:11 | | | | | | |
| 012 | 17:36:22 | | | | | | |
| 012 | 17:43:31 | | | | | | |
| 012 | 17:45:08 | | | | | | |
| 012 | 17:47:34 | | | | | | |
| 012 | 17:52:24 | | | | | | |
| 012 | 17:57:00 | | | | | | |
| 012 | 17:59:01 | | | | | | |
| 012 | 18:17:14 | | | | | | |
| 012 | 18:21:45 | | | | | | |
| 012 | 18:25:02 | | | | | | |
| 012 | 18:51:58 | | | | | | |
| 012 | 07:20:03 | 07:20:41 | | | | | |
| 012 | 07:20:59 | 07:21:34 | | | | | |
| 012 | 07:39:35 | 07:40:08 | | | | | |
| 012 | 08:09:45 | 08:10:42 | | | | | |
| 012 | 08:18:04 | 08:18:42 | | | | | |
| 012 | 08:18:54 | 08:19:35 | | | | | |
| 012 | 08:32:54 | 08:33:40 | | | | | |
| 012 | 08:47:05 | 08:48:09 | | | | | |
| 012 | 08:50:02 | 08:50:53 | | | | | |
| 012 | 08:59:08 | 08:59:47 | | | | | |
| 012 | 09:21:10 | 09:21:40 | | | | | |
| 012 | 10:12:03 | 10:19:57 | | | | | |
| 012 | 11:03:47 | 11:04:33 | | | | | |
| 012 | 11:17:09 | 11:17:48 | | | | | |
| 012 | 11:22:07 | 11:23:02 | | | | | |
| 012 | 11:39:07 | 11:39:50 | | | | | |
| 012 | 11:58:58 | 11:59:46 | | | | | |
| 012 | 13:17:35 | 13:18:09 | | | | | |
| 012 | 14:04:46 | 14:05:28 | | | | | |
| 012 | 15:22:53 | 15:23:22 | | | | | |
| 012 | 15:36:30 | 15:37:14 | | | | | |
| 012 | 16:11:51 | 16:17:08 | | | | | |
| 012 | 16:13:18 | 16:13:53 | | | | | |
| 012 | 16:24:09 | 16:25:10 | | | | | |
| 012 | 16:32:06 | 16:32:49 | | | | | |
| 012 | 16:41:38 | 16:42:29 | | | | | |
| 012 | 16:58:43 | 16:59:47 | | | | | |
| 012 | 17:23:11 | 17:23:44 | | | | | |
| 012 | 18:16:13 | 18:17:01 | | | | | |
| 012 | 07:19:32 | 07:20:06 | | | | | |
| 012 | 08:23:32 | 08:24:50 | | | | | |
| 012 | 08:37:34 | 08:38:39 | | | | | |
| 012 | 08:51:32 | 08:52:24 | | | | | |
| 012 | 09:05:51 | 09:06:27 | | | | | |
| 012 | 09:10:56 | 09:11:35 | | | | | |
| 012 | 10:45:06 | 10:45:47 | | | | | |
| 012 | 11:38:01 | 11:38:38 | | | | | |
| 012 | 12:43:04 | 12:48:56 | | | | | |
| 012 | 13:06:22 | 13:07:02 | | | | | |
| 012 | 14:13:37 | 14:14:31 | | | | | |
| 012 | 16:19:48 | 16:20:24 | | | | | |
| 012 | 16:53:55 | 16:54:30 | | | | | |
| 012 | 17:03:55 | 17:04:28 | | | | | |
| 012 | 08:19:40 | | 08:28:27 | 08:28:41 | | | |
| 012 | 08:25:38 | | 08:28:14 | 08:26:16 | | | |
| 012 | 18:14:26 | | 18:19:38 | | 18:20:21 | 18:21:53 | |
| 012 | 16:19:52 | | 16:26:43 | | | | |
| 012 | 07:27:43 | | | 07:28:14 | | | |
| 012 | 08:10:24 | | | 08:10:52 | | | |
| 012 | 08:26:38 | | | 08:27:16 | | | |
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| 012 | 10:48:26 | | | 10:48:57 | | | |
| 012 | 11:20:01 | | | 11:20:36 | | | |
| 012 | 11:25:38 | | | 11:26:12 | | | |
| 012 | 11:39:11 | | | 11:39:52 | | | |
| 012 | 11:41:47 | | | 11:42:17 | | | |
| 012 | 11:46:45 | | | 11:47:22 | | | |
| 012 | 11:54:55 | | | 11:55:32 | | | |
| 012 | 12:47:27 | | | 12:47:57 | | | |
| 012 | 12:59:34 | | | 13:00:04 | | | |
| 012 | 13:01:41 | | | 13:02:14 | | | |
| 012 | 13:17:54 | | | 13:18:31 | | | |
| 012 | 13:19:23 | | | 13:19:50 | | | |
| 012 | 13:22:54 | | | 13:23:27 | | | |
| 012 | 13:25:43 | | | 13:26:13 | | | |
| 012 | 13:40:02 | | | 13:40:33 | | | |
| 012 | 13:49:39 | | | 13:50:10 | | | |
| 012 | 14:04:10 | | | 14:09:46 | | | |
| 012 | 14:10:24 | | | 14:10:54 | | | |
| 012 | 14:13:44 | | | 14:14:35 | | | |
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| 012 | 14:34:57 | | | 14:35:30 | | | |
| 012 | 14:42:48 | | | 14:43:27 | | | |
| 012 | 14:43:17 | | | 14:43:56 | | | |
| 012 | 14:48:54 | | | 14:49:31 | | | |
| 012 | 14:49:24 | | | 14:49:59 | | | |
| 012 | 14:53:10 | | | 14:53:43 | | | |
| 012 | 14:57:14 | | | 14:57:52 | | | |
| 012 | 14:57:36 | | | 14:58:09 | | | |
| 012 | 15:03:59 | | | 15:04:42 | | | |
| 012 | 15:14:02 | | | 15:14:36 | | | |
| 012 | 15:21:49 | | | 15:22:17 | | | |
| 012 | 16:23:15 | | | 16:23:54 | | | |
| 012 | 16:23:53 | | | 16:24:23 | | | |
| 012 | 16:35:23 | | | 16:36:02 | | | |
| 012 | 16:50:22 | | | 16:50:58 | | | |
| 012 | 17:06:52 | | | 17:07:39 | | | |
| 012 | 17:07:14 | | | 17:07:46 | | | |
| 012 | 17:08:06 | | | 17:08:38 | | | |
| 012 | 17:13:32 | | | 17:14:06 | | | |
| 012 | 17:16:16 | | | 17:16:48 | | | |
| 012 | 17:26:56 | | | 17:27:40 | | | |
| 012 | 17:27:02 | | | 17:27:46 | | | |
| 012 | 17:27:13 | | | 17:27:49 | | | |
| 012 | 17:27:43 | | | 17:28:40 | | | |
| 012 | 17:30:39 | | | 17:31:11 | | | |
| 012 | 17:33:10 | | | 17:33:43 | | | |

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|---|---|---|---|---|
| 003 | 16:41:37 | 00:01:22 | 1 012 > 007 > 005 > 003 | PM Peak |
| 003 | 16:58:36 | 00:01:14 | 1 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:03:14 | 00:01:07 | 1 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:33:27 | 00:08:16 | 1 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:37:38 | 00:01:16 | 1 012 > 003 | |
| 003 | 17:44:49 | 00:01:18 | 1 012 > 003 | |
| 003 | 17:46:15 | 00:01:07 | 1 012 > 003 | |
| 003 | 17:49:43 | 00:02:09 | 1 012 > 003 | |
| 003 | 17:53:49 | 00:01:25 | 1 012 > 003 | |
| 003 | 17:58:04 | 00:01:04 | 1 012 > 003 | |
| 003 | 18:00:02 | 00:01:01 | 1 012 > 003 | |
| 003 | 18:18:56 | 00:01:42 | 1 012 > 003 | |
| 003 | 18:30:05 | 00:08:20 | 1 012 > 003 | |
| 003 | 18:26:02 | 00:01:00 | 1 012 > 003 | |
| 003 | 18:53:16 | 00:01:18 | 1 012 > 003 | |
| 001 | 07:22:59 | 00:02:56 | 2 012 > 005 > 001 | |
| 001 | 07:23:40 | 00:02:41 | 2 012 > 005 > 001 | |
| 001 | 07:42:20 | 00:02:45 | 2 012 > 005 > 001 | |
| 001 | 08:13:07 | 00:03:22 | 2 012 > 007 > 005 > 001 | AM Peak |
| 001 | 08:21:20 | 00:03:16 | 2 012 > 007 > 005 > 001 | AM Peak |
| 001 | 08:22:26 | 00:03:32 | 2 012 > 007 > 005 > 001 | AM Peak |
| 001 | 08:36:11 | 00:03:17 | 2 012 > 007 > 005 > 001 | AM Peak |
| 001 | 08:50:41 | 00:03:36 | 2 012 > 007 > 005 > 001 | AM Peak |
| 001 | 08:53:10 | 00:03:08 | 2 012 > 007 > 005 > 001 | AM Peak |
| 001 | 09:02:55 | 00:03:47 | 2 012 > 007 > 005 > 001 | AM Peak |
| 001 | 09:23:50 | 00:02:40 | 2 012 > 005 > 001 | |
| 001 | 10:22:04 | 00:10:01 | 2 012 > 005 > 001 | |
| 001 | 11:07:07 | 00:03:20 | 2 012 > 005 > 001 | |
| 001 | 11:20:07 | 00:02:58 | 2 012 > 005 > 001 | |
| 001 | 11:25:40 | 00:03:33 | 2 012 > 005 > 001 | |
| 001 | 11:42:20 | 00:03:13 | 2 012 > 005 > 001 | |
| 001 | 12:02:53 | 00:03:55 | 2 012 > 005 > 001 | |
| 001 | 13:20:49 | 00:03:14 | 2 012 > 005 > 001 | |
| 001 | 14:08:10 | 00:03:24 | 2 012 > 005 > 001 | |
| 001 | 15:25:37 | 00:02:44 | 2 012 > 005 > 001 | |
| 001 | 15:39:41 | 00:03:11 | 2 012 > 005 > 001 | |
| 001 | 16:20:26 | 00:08:35 | 2 012 > 005 > 001 | |
| 001 | 16:17:09 | 00:03:51 | 2 012 > 005 > 001 | |
| 001 | 16:28:29 | 00:04:20 | 2 012 > 005 > 001 | |
| 001 | 16:35:22 | 00:03:16 | 2 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:45:18 | 00:03:40 | 2 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:02:28 | 00:03:45 | 2 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:26:42 | 00:03:31 | 2 012 > 007 > 005 > 001 | PM Peak |
| 001 | 18:19:34 | 00:03:21 | 2 012 > 005 > 001 | |
| 003 | 07:20:36 | 00:01:04 | 2 012 > 005 > 003 | |
| 003 | 08:25:30 | 00:01:58 | 2 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:39:14 | 00:01:40 | 2 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:52:58 | 00:01:26 | 2 012 > 007 > 005 > 003 | AM Peak |
| 003 | 09:07:00 | 00:01:09 | 2 012 > 005 > 003 | |
| 003 | 09:12:06 | 00:01:10 | 2 012 > 005 > 003 | |
| 003 | 10:46:37 | 00:01:31 | 2 012 > 005 > 003 | |
| 003 | 11:39:08 | 00:01:07 | 2 012 > 005 > 003 | |
| 003 | 12:49:34 | 00:06:30 | 2 012 > 005 > 003 | |
| 003 | 13:07:34 | 00:01:12 | 2 012 > 005 > 003 | |
| 003 | 14:15:05 | 00:01:28 | 2 012 > 005 > 003 | |
| 003 | 16:21:00 | 00:01:12 | 2 012 > 005 > 003 | |
| 003 | 16:58:48 | 00:04:53 | 2 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:08:13 | 00:04:18 | 2 012 > 007 > 005 > 003 | PM Peak |
| 011 | 08:29:11 | 00:09:31 | 3 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 011 | 08:29:07 | 00:03:29 | 3 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 017 | 18:22:05 | 00:07:39 | 4 012 > 006 > 010 > 015 > 017 | |
| 011 | 16:28:02 | 00:08:10 | 2 012 > 006 > 011 | |
| 001 | 07:30:35 | 00:02:52 | 2 012 > 007 > 001 | |
| 001 | 08:13:51 | 00:03:27 | 2 012 > 007 > 005 > 001 | AM Peak |
| 001 | 08:30:19 | 00:03:41 | 2 012 > 007 > 005 > 001 | AM Peak |
| 001 | 08:31:52 | 00:02:50 | 2 012 > 007 > 005 > 001 | AM Peak |
| 001 | 09:08:47 | 00:02:59 | 2 012 > 007 > 001 | |
| 001 | 10:03:39 | 00:10:55 | 2 012 > 007 > 001 | |
| 001 | 10:21:11 | 00:03:27 | 2 012 > 007 > 001 | |
| 001 | 10:51:02 | 00:02:36 | 2 012 > 007 > 001 | |
| 001 | 11:23:14 | 00:03:13 | 2 012 > 007 > 001 | |
| 001 | 11:28:37 | 00:02:59 | 2 012 > 007 > 001 | |
| 001 | 11:42:49 | 00:03:38 | 2 012 > 007 > 001 | |
| 001 | 11:45:36 | 00:03:49 | 2 012 > 007 > 001 | |
| 001 | 11:49:58 | 00:03:13 | 2 012 > 007 > 001 | |
| 001 | 11:58:06 | 00:03:11 | 2 012 > 007 > 001 | |
| 001 | 12:50:38 | 00:03:11 | 2 012 > 007 > 001 | |
| 001 | 13:03:23 | 00:03:49 | 2 012 > 007 > 001 | |
| 001 | 13:04:52 | 00:03:11 | 2 012 > 007 > 001 | |
| 001 | 13:21:13 | 00:03:19 | 2 012 > 007 > 001 | |
| 001 | 13:21:52 | 00:02:29 | 2 012 > 007 > 001 | |
| 001 | 13:26:02 | 00:03:08 | 2 012 > 007 > 001 | |
| 001 | 13:28:34 | 00:02:51 | 2 012 > 007 > 001 | |
| 001 | 13:43:13 | 00:03:11 | 2 012 > 007 > 001 | |
| 001 | 13:52:31 | 00:02:52 | 2 012 > 007 > 001 | |
| 001 | 14:13:35 | 00:09:25 | 2 012 > 007 > 001 | |
| 001 | 14:16:02 | 00:05:38 | 2 012 > 007 > 001 | |
| 001 | 14:17:07 | 00:03:23 | 2 012 > 007 > 001 | |
| 001 | 14:36:32 | 00:02:56 | 2 012 > 007 > 001 | |
| 001 | 14:38:02 | 00:03:05 | 2 012 > 007 > 001 | |
| 001 | 14:45:57 | 00:03:09 | 2 012 > 007 > 001 | |
| 001 | 14:46:17 | 00:03:00 | 2 012 > 007 > 001 | |
| 001 | 14:51:49 | 00:02:55 | 2 012 > 007 > 001 | |
| 001 | 14:52:32 | 00:03:08 | 2 012 > 007 > 001 | |
| 001 | 14:56:18 | 00:03:08 | 2 012 > 007 > 001 | |
| 001 | 15:00:32 | 00:03:18 | 2 012 > 007 > 001 | |
| 001 | 15:00:36 | 00:03:00 | 2 012 > 007 > 001 | |
| 001 | 15:15:51 | 00:11:52 | 2 012 > 007 > 001 | |
| 001 | 15:17:32 | 00:03:30 | 2 012 > 007 > 001 | |
| 001 | 15:24:38 | 00:02:49 | 2 012 > 007 > 001 | |
| 001 | 16:27:57 | 00:04:42 | 2 012 > 007 > 001 | |
| 001 | 16:27:59 | 00:04:06 | 2 012 > 007 > 001 | |
| 001 | 16:39:08 | 00:03:45 | 2 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:54:37 | 00:04:15 | 2 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:10:59 | 00:04:07 | 2 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:11:04 | 00:03:50 | 2 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:11:23 | 00:03:17 | 2 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:16:40 | 00:03:08 | 2 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:19:29 | 00:03:13 | 2 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:31:19 | 00:04:23 | 2 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:31:41 | 00:04:39 | 2 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:31:44 | 00:04:31 | 2 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:32:28 | 00:04:45 | 2 012 > 007 > 005 > 001 | PM Peak |
| 001 | 17:34:37 | 00:03:58 | 2 012 > 007 > 001 | |
| 001 | 17:36:13 | 00:03:03 | 2 012 > 007 > 001 | |

| | | |
|---|---|---|
| 012 | 17:34:35 | 17:35:16 |
| 012 | 17:34:37 | 17:35:17 |
| 012 | 17:35:04 | 17:35:35 |
| 012 | 17:37:41 | 17:38:09 |
| 012 | 17:38:50 | 17:39:32 |
| 012 | 17:39:48 | 17:40:26 |
| 012 | 17:40:09 | 17:40:42 |
| 012 | 17:41:31 | 17:42:06 |
| 012 | 17:42:11 | 17:42:46 |
| 012 | 17:42:46 | 17:43:19 |
| 012 | 17:43:28 | 17:43:59 |
| 012 | 17:44:05 | 17:44:42 |
| 012 | 17:44:08 | 17:44:45 |
| 012 | 17:44:46 | 17:45:15 |
| 012 | 17:44:52 | 17:45:18 |
| 012 | 17:44:57 | 17:45:29 |
| 012 | 17:45:19 | 17:45:46 |
| 012 | 17:45:52 | 17:46:22 |
| 012 | 17:47:01 | 17:47:34 |
| 012 | 17:48:00 | 17:48:32 |
| 012 | 17:48:03 | 17:48:52 |
| 012 | 17:48:51 | 17:49:31 |
| 012 | 17:49:31 | 17:50:08 |
| 012 | 17:50:56 | 17:51:34 |
| 012 | 17:50:59 | 17:51:36 |
| 012 | 17:51:58 | 17:52:30 |
| 012 | 17:53:39 | 17:54:11 |
| 012 | 17:53:49 | 17:54:21 |
| 012 | 17:56:29 | 17:56:55 |
| 012 | 17:56:53 | 17:57:21 |
| 012 | 17:57:19 | 17:57:46 |
| 012 | 17:58:42 | 17:59:15 |
| 012 | 17:59:20 | 17:59:52 |
| 012 | 18:00:05 | 18:00:35 |
| 012 | 18:00:18 | 18:00:49 |
| 012 | 18:01:02 | 18:01:34 |
| 012 | 18:02:04 | 18:02:43 |
| 012 | 18:02:25 | 18:02:55 |
| 012 | 18:04:21 | 18:04:55 |
| 012 | 18:07:56 | 18:08:27 |
| 012 | 18:08:56 | 18:09:28 |
| 012 | 18:09:02 | 18:09:35 |
| 012 | 18:10:30 | 18:11:00 |
| 012 | 18:10:58 | 18:11:27 |
| 012 | 18:11:58 | 18:12:24 |
| 012 | 18:14:28 | 18:15:03 |
| 012 | 18:14:32 | 18:15:10 |
| 012 | 18:14:37 | 18:15:11 |
| 012 | 18:15:17 | 18:15:51 |
| 012 | 18:15:31 | 18:16:01 |
| 012 | 18:15:40 | 18:16:10 |
| 012 | 18:16:45 | 18:17:14 |
| 012 | 18:17:09 | 18:17:42 |
| 012 | 18:17:25 | 18:18:00 |
| 012 | 18:18:01 | 18:18:30 |
| 012 | 18:19:00 | 18:19:31 |
| 012 | 18:19:38 | 18:20:17 |
| 012 | 18:19:40 | 18:20:19 |
| 012 | 18:21:20 | 18:22:04 |
| 012 | 18:21:57 | 18:22:33 |
| 012 | 18:22:51 | 18:23:23 |
| 012 | 18:23:56 | 18:24:33 |
| 012 | 18:24:15 | 18:24:45 |
| 012 | 18:24:18 | 18:24:49 |
| 012 | 18:24:22 | 18:24:53 |
| 012 | 18:24:53 | 18:25:15 |
| 012 | 18:25:08 | 18:25:40 |
| 012 | 18:25:28 | 18:25:57 |
| 012 | 18:29:07 | 18:29:51 |
| 012 | 18:29:35 | 18:30:13 |
| 012 | 18:29:40 | 18:30:17 |
| 012 | 18:30:51 | 18:31:18 |
| 012 | 18:31:57 | 18:32:37 |
| 012 | 18:32:38 | 18:33:12 |
| 012 | 18:33:48 | 18:34:20 |
| 012 | 18:34:18 | 18:34:49 |
| 012 | 18:34:35 | 18:35:14 |
| 012 | 18:35:02 | 18:35:26 |
| 012 | 18:35:10 | 18:35:45 |
| 012 | 18:36:11 | 18:36:49 |
| 012 | 18:36:13 | 18:36:52 |
| 012 | 18:36:45 | 18:37:30 |
| 012 | 18:40:06 | 18:40:35 |
| 012 | 18:41:02 | 18:41:33 |
| 012 | 18:41:25 | 18:41:56 |
| 012 | 18:41:42 | 18:42:09 |
| 012 | 18:45:07 | 18:45:40 |
| 012 | 18:45:28 | 18:46:04 |
| 012 | 18:45:38 | 18:46:05 |
| 012 | 18:47:45 | 18:48:19 |
| 012 | 18:47:54 | 18:48:26 |
| 012 | 18:48:38 | 18:49:07 |
| 012 | 18:50:13 | 18:50:36 |
| 012 | 18:50:34 | 18:51:10 |
| 012 | 18:50:56 | 18:51:30 |
| 012 | 18:51:07 | 18:51:42 |
| 012 | 18:51:11 | 18:51:47 |
| 012 | 18:52:27 | 18:52:56 |
| 012 | 18:53:28 | 18:54:15 |
| 012 | 18:53:32 | 18:54:17 |
| 012 | 18:53:45 | 18:54:24 |
| 012 | 18:54:07 | 18:54:45 |
| 012 | 18:55:59 | 18:56:35 |
| 012 | 18:56:16 | 18:56:49 |
| 012 | 18:56:40 | 18:57:13 |
| 012 | 08:13:41 | 08:14:22 |
| 012 | 08:31:00 | 08:31:58 |
| 012 | 08:38:45 | 08:39:26 |
| 012 | 09:39:49 | 09:40:33 |
| 012 | 11:12:34 | 11:13:17 |
| 012 | 11:23:17 | 11:23:48 |
| 012 | 11:36:21 | 11:36:56 |
| 012 | 12:34:45 | 12:35:22 |
| 012 | 12:49:21 | 12:49:52 |
| 012 | 12:51:30 | 12:52:11 |

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|---|---|---|---|---|
| 001 | 17:43:46 | 00:09:11 | 2 012 > 007 > 001 | |
| 001 | 17:38:31 | 00:03:54 | 2 012 > 007 > 001 | |
| 001 | 17:38:33 | 00:03:29 | 2 012 > 007 > 001 | |
| 001 | 17:40:47 | 00:03:06 | 2 012 > 007 > 001 | |
| 001 | 17:42:43 | 00:03:53 | 2 012 > 007 > 001 | |
| 001 | 17:43:29 | 00:03:41 | 2 012 > 007 > 001 | |
| 001 | 17:43:39 | 00:03:30 | 2 012 > 007 > 001 | |
| 001 | 17:45:52 | 00:04:21 | 2 012 > 007 > 001 | |
| 001 | 17:46:32 | 00:04:21 | 2 012 > 007 > 001 | |
| 001 | 17:46:42 | 00:03:56 | 2 012 > 007 > 001 | |
| 001 | 17:47:06 | 00:03:38 | 2 012 > 007 > 001 | |
| 001 | 17:47:33 | 00:03:28 | 2 012 > 007 > 001 | |
| 001 | 17:47:35 | 00:03:27 | 2 012 > 007 > 001 | |
| 001 | 17:48:05 | 00:03:19 | 2 012 > 007 > 001 | |
| 001 | 17:48:06 | 00:03:14 | 2 012 > 007 > 001 | |
| 001 | 17:48:13 | 00:03:16 | 2 012 > 007 > 001 | |
| 001 | 17:48:24 | 00:03:05 | 2 012 > 007 > 001 | |
| 001 | 17:49:18 | 00:03:26 | 2 012 > 007 > 001 | |
| 001 | 17:50:09 | 00:03:08 | 2 012 > 007 > 001 | |
| 001 | 17:51:26 | 00:03:26 | 2 012 > 007 > 001 | |
| 001 | 17:51:38 | 00:03:35 | 2 012 > 007 > 001 | |
| 001 | 17:52:02 | 00:03:11 | 2 012 > 007 > 001 | |
| 001 | 17:53:04 | 00:03:33 | 2 012 > 007 > 001 | |
| 001 | 17:54:07 | 00:03:11 | 2 012 > 007 > 001 | |
| 001 | 17:54:08 | 00:03:09 | 2 012 > 007 > 001 | |
| 001 | 17:55:08 | 00:03:10 | 2 012 > 007 > 001 | |
| 001 | 17:56:32 | 00:02:53 | 2 012 > 007 > 001 | |
| 001 | 17:56:46 | 00:02:57 | 2 012 > 007 > 001 | |
| 001 | 17:59:46 | 00:03:17 | 2 012 > 007 > 001 | |
| 001 | 18:00:04 | 00:03:11 | 2 012 > 007 > 001 | |
| 001 | 18:00:13 | 00:02:54 | 2 012 > 007 > 001 | |
| 001 | 18:01:57 | 00:03:15 | 2 012 > 007 > 001 | |
| 001 | 18:02:11 | 00:02:51 | 2 012 > 007 > 001 | |
| 001 | 18:03:06 | 00:03:01 | 2 012 > 007 > 001 | |
| 001 | 18:03:36 | 00:03:18 | 2 012 > 007 > 001 | |
| 001 | 18:03:56 | 00:02:54 | 2 012 > 007 > 001 | |
| 001 | 18:05:33 | 00:03:29 | 2 012 > 007 > 001 | |
| 001 | 18:05:38 | 00:03:13 | 2 012 > 007 > 001 | |
| 001 | 18:07:29 | 00:03:08 | 2 012 > 007 > 001 | |
| 001 | 18:11:06 | 00:03:10 | 2 012 > 007 > 001 | |
| 001 | 18:12:00 | 00:03:04 | 2 012 > 007 > 001 | |
| 001 | 18:12:04 | 00:03:02 | 2 012 > 007 > 001 | |
| 001 | 18:14:07 | 00:03:37 | 2 012 > 007 > 001 | |
| 001 | 18:14:12 | 00:03:14 | 2 012 > 007 > 001 | |
| 001 | 18:14:54 | 00:02:56 | 2 012 > 007 > 001 | |
| 001 | 18:17:47 | 00:03:19 | 2 012 > 007 > 001 | |
| 001 | 18:17:54 | 00:03:22 | 2 012 > 007 > 001 | |
| 001 | 18:17:55 | 00:03:18 | 2 012 > 007 > 001 | |
| 001 | 18:18:26 | 00:03:09 | 2 012 > 007 > 001 | |
| 001 | 18:18:45 | 00:03:14 | 2 012 > 007 > 001 | |
| 001 | 18:18:47 | 00:03:07 | 2 012 > 007 > 001 | |
| 001 | 18:20:16 | 00:03:31 | 2 012 > 007 > 001 | |
| 001 | 18:20:43 | 00:03:34 | 2 012 > 007 > 001 | |
| 001 | 18:20:57 | 00:03:32 | 2 012 > 007 > 001 | |
| 001 | 18:21:08 | 00:03:07 | 2 012 > 007 > 001 | |
| 001 | 18:21:48 | 00:02:48 | 2 012 > 007 > 001 | |
| 001 | 18:22:51 | 00:03:13 | 2 012 > 007 > 001 | |
| 001 | 18:22:56 | 00:03:16 | 2 012 > 007 > 001 | |
| 001 | 18:24:17 | 00:02:57 | 2 012 > 007 > 001 | |
| 001 | 18:25:13 | 00:03:16 | 2 012 > 007 > 001 | |
| 001 | 18:25:41 | 00:02:50 | 2 012 > 007 > 001 | |
| 001 | 18:27:15 | 00:03:19 | 2 012 > 007 > 001 | |
| 001 | 18:27:18 | 00:03:03 | 2 012 > 007 > 001 | |
| 001 | 18:27:24 | 00:03:06 | 2 012 > 007 > 001 | |
| 001 | 18:27:26 | 00:03:04 | 2 012 > 007 > 001 | |
| 001 | 18:27:32 | 00:02:39 | 2 012 > 007 > 001 | |
| 001 | 18:28:38 | 00:03:30 | 2 012 > 007 > 001 | |
| 001 | 18:28:42 | 00:03:14 | 2 012 > 007 > 001 | |
| 001 | 18:32:20 | 00:03:13 | 2 012 > 007 > 001 | |
| 001 | 18:32:53 | 00:03:18 | 2 012 > 007 > 001 | |
| 001 | 18:32:56 | 00:03:16 | 2 012 > 007 > 001 | |
| 001 | 18:33:35 | 00:02:44 | 2 012 > 007 > 001 | |
| 001 | 18:35:51 | 00:03:54 | 2 012 > 007 > 001 | |
| 001 | 18:35:55 | 00:03:17 | 2 012 > 007 > 001 | |
| 001 | 18:37:00 | 00:03:12 | 2 012 > 007 > 001 | |
| 001 | 18:37:25 | 00:03:07 | 2 012 > 007 > 001 | |
| 001 | 18:38:40 | 00:04:05 | 2 012 > 007 > 001 | |
| 001 | 18:37:35 | 00:02:33 | 2 012 > 007 > 001 | |
| 001 | 18:38:06 | 00:02:56 | 2 012 > 007 > 001 | |
| 001 | 18:39:27 | 00:03:16 | 2 012 > 007 > 001 | |
| 001 | 18:39:29 | 00:03:16 | 2 012 > 007 > 001 | |
| 001 | 18:40:35 | 00:03:50 | 2 012 > 007 > 001 | |
| 001 | 18:42:51 | 00:02:45 | 2 012 > 007 > 001 | |
| 001 | 18:44:04 | 00:03:02 | 2 012 > 007 > 001 | |
| 001 | 18:44:14 | 00:02:49 | 2 012 > 007 > 001 | |
| 001 | 18:44:15 | 00:02:33 | 2 012 > 007 > 001 | |
| 001 | 18:47:49 | 00:02:42 | 2 012 > 007 > 001 | |
| 001 | 18:48:38 | 00:03:10 | 2 012 > 007 > 001 | |
| 001 | 18:48:39 | 00:03:01 | 2 012 > 007 > 001 | |
| 001 | 18:50:54 | 00:03:09 | 2 012 > 007 > 001 | |
| 001 | 18:50:57 | 00:03:03 | 2 012 > 007 > 001 | |
| 001 | 18:51:34 | 00:02:56 | 2 012 > 007 > 001 | |
| 001 | 18:52:34 | 00:02:21 | 2 012 > 007 > 001 | |
| 001 | 18:53:37 | 00:03:03 | 2 012 > 007 > 001 | |
| 001 | 18:53:46 | 00:02:50 | 2 012 > 007 > 001 | |
| 001 | 18:54:24 | 00:03:17 | 2 012 > 007 > 001 | |
| 001 | 18:54:46 | 00:03:35 | 2 012 > 007 > 001 | |
| 001 | 18:55:32 | 00:03:05 | 2 012 > 007 > 001 | |
| 001 | 18:57:34 | 00:04:06 | 2 012 > 007 > 001 | |
| 001 | 18:57:36 | 00:04:04 | 2 012 > 007 > 001 | |
| 001 | 18:57:40 | 00:03:55 | 2 012 > 007 > 001 | |
| 001 | 18:57:49 | 00:03:42 | 2 012 > 007 > 001 | |
| 001 | 18:59:14 | 00:03:15 | 2 012 > 007 > 001 | |
| 001 | 18:59:16 | 00:03:00 | 2 012 > 007 > 001 | |
| 001 | 18:59:57 | 00:03:17 | 2 012 > 007 > 001 | |
| 003 | 08:15:01 | 00:01:20 | 2 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:32:39 | 00:01:39 | 2 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:40:07 | 00:01:22 | 2 012 > 007 > 005 > 003 | AM Peak |
| 003 | 09:41:12 | 00:01:23 | 2 012 > 007 > 003 | |
| 003 | 11:14:02 | 00:01:28 | 2 012 > 007 > 003 | |
| 003 | 11:24:20 | 00:01:03 | 2 012 > 007 > 003 | |
| 003 | 11:37:32 | 00:01:11 | 2 012 > 007 > 003 | |
| 003 | 12:36:13 | 00:01:28 | 2 012 > 007 > 003 | |
| 003 | 12:50:28 | 00:01:07 | 2 012 > 007 > 003 | |
| 003 | 12:52:43 | 00:01:13 | 2 012 > 007 > 003 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 012 | 12:57:23 | | 12:57:57 | 003 | 13:00:55 | 00:03:32 | 2 | 012 > 007 > 003 | |
| 012 | 14:00:15 | | 14:00:52 | 003 | 14:01:19 | 00:01:04 | 2 | 012 > 007 > 003 | |
| 012 | 14:04:40 | | 14:05:19 | 003 | 14:06:01 | 00:01:21 | 2 | 012 > 007 > 003 | |
| 012 | 14:16:25 | | 14:17:05 | 003 | 14:17:43 | 00:01:18 | 2 | 012 > 007 > 003 | |
| 012 | 14:20:46 | | 14:21:22 | 003 | 14:21:59 | 00:01:13 | 2 | 012 > 007 > 003 | |
| 012 | 15:02:51 | | 15:03:31 | 003 | 15:04:07 | 00:01:16 | 2 | 012 > 007 > 003 | |
| 012 | 15:04:38 | | 15:05:08 | 003 | 15:05:38 | 00:01:00 | 2 | 012 > 007 > 003 | |
| 012 | 15:10:39 | | 15:11:18 | 003 | 15:12:09 | 00:01:30 | 2 | 012 > 007 > 003 | |
| 012 | 15:24:09 | | 15:24:48 | 003 | 15:25:27 | 00:01:18 | 2 | 012 > 007 > 003 | |
| 012 | 15:41:14 | | 15:41:49 | 003 | 15:42:21 | 00:01:07 | 2 | 012 > 007 > 003 | |
| 012 | 15:50:20 | | 15:50:51 | 003 | 15:51:28 | 00:01:08 | 2 | 012 > 007 > 003 | |
| 012 | 15:54:39 | | 15:55:12 | 003 | 15:55:42 | 00:01:03 | 2 | 012 > 007 > 003 | |
| 012 | 16:48:09 | | 16:48:47 | 003 | 16:49:27 | 00:01:18 | 2 | 012 > 007 > 005 > 003 | PM Peak |
| 012 | 17:18:55 | | 17:19:28 | 003 | 17:20:09 | 00:01:14 | 2 | 012 > 007 > 005 > 003 | PM Peak |
| 012 | 17:21:53 | | 17:22:28 | 003 | 17:23:18 | 00:01:25 | 2 | 012 > 007 > 005 > 003 | PM Peak |
| 012 | 17:22:14 | | 17:22:51 | 003 | 17:24:07 | 00:01:53 | 2 | 012 > 007 > 005 > 003 | PM Peak |
| 012 | 17:27:49 | | 17:28:49 | 003 | 17:30:04 | 00:02:15 | 2 | 012 > 007 > 005 > 003 | PM Peak |
| 012 | 17:35:17 | | 17:35:53 | 003 | 17:36:54 | 00:01:37 | 2 | 012 > 007 > 003 | |
| 012 | 17:46:35 | | 17:47:09 | 003 | 17:50:03 | 00:03:28 | 2 | 012 > 007 > 003 | |
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| 012 | 17:50:42 | | 17:51:31 | 003 | 17:52:09 | 00:01:27 | 2 | 012 > 007 > 003 | |
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| 012 | 17:59:50 | | 18:00:19 | 003 | 18:01:40 | 00:01:50 | 2 | 012 > 007 > 003 | |
| 012 | 18:02:02 | | 18:10:54 | 003 | 18:11:32 | 00:09:30 | 2 | 012 > 007 > 003 | |
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| 012 | 18:38:05 | | 18:38:28 | 003 | 18:38:53 | 00:00:48 | 2 | 012 > 007 > 003 | |
| 012 | 18:46:33 | | 18:47:05 | 003 | 18:47:43 | 00:01:10 | 2 | 012 > 007 > 003 | |
| 012 | 18:46:51 | | 18:47:24 | 003 | 18:48:04 | 00:01:13 | 2 | 012 > 007 > 003 | |
| 012 | 18:46:59 | | 18:47:30 | 003 | 18:48:07 | 00:01:08 | 2 | 012 > 007 > 003 | |
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| 012 | 18:50:38 | | 18:57:50 | 003 | 18:58:35 | 00:07:57 | 2 | 012 > 007 > 003 | |
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| 012 | 18:53:35 | | 18:54:19 | 003 | 18:55:04 | 00:01:29 | 2 | 012 > 007 > 003 | |
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| 012 | 07:13:47 | 07:14:29 | 07:14:25 | 001 | 07:17:17 | 00:03:30 | 3 | 012 > 007 > 005 > 001 | |
| 012 | 07:18:31 | 07:19:05 | 07:19:00 | 001 | 07:21:05 | 00:02:34 | 3 | 012 > 007 > 005 > 001 | |
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| 012 | 07:24:17 | 07:24:52 | 07:24:47 | 001 | 07:27:19 | 00:03:02 | 3 | 012 > 007 > 005 > 001 | |
| 012 | 07:26:55 | 07:27:32 | 07:27:28 | 001 | 07:29:38 | 00:02:43 | 3 | 012 > 007 > 005 > 001 | |
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| 012 | 07:31:49 | 07:32:30 | 07:32:25 | 001 | 07:46:24 | 00:14:35 | 3 | 012 > 007 > 005 > 001 | |
| 012 | 07:34:01 | 07:34:43 | 07:34:33 | 001 | 07:36:55 | 00:02:54 | 3 | 012 > 007 > 005 > 001 | |
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| 012 | 07:37:54 | 07:38:29 | 07:38:24 | 001 | 07:41:16 | 00:03:22 | 3 | 012 > 007 > 005 > 001 | |
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| 012 | 07:38:51 | 07:39:38 | 07:39:25 | 001 | 07:42:18 | 00:03:27 | 3 | 012 > 007 > 005 > 001 | |
| 012 | 07:40:29 | 07:41:01 | 07:40:57 | 001 | 07:43:19 | 00:02:50 | 3 | 012 > 007 > 005 > 001 | |
| 012 | 07:40:36 | 07:41:09 | 07:41:04 | 001 | 07:43:38 | 00:03:02 | 3 | 012 > 007 > 005 > 001 | |
| 012 | 07:41:30 | 07:42:12 | 07:42:07 | 001 | 07:44:40 | 00:03:10 | 3 | 012 > 007 > 005 > 001 | |
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| 012 | 07:43:26 | 07:44:02 | 07:43:58 | 001 | 07:47:00 | 00:03:34 | 3 | 012 > 007 > 005 > 001 | |
| 012 | 07:43:45 | 07:44:21 | 07:44:17 | 001 | 07:47:24 | 00:03:39 | 3 | 012 > 007 > 005 > 001 | |
| 012 | 07:45:22 | 07:45:55 | 07:45:51 | 001 | 07:48:04 | 00:02:42 | 3 | 012 > 007 > 005 > 001 | |
| 012 | 07:45:34 | 07:46:08 | 07:46:03 | 001 | 07:48:16 | 00:02:42 | 3 | 012 > 007 > 005 > 001 | |
| 012 | 07:49:21 | 07:49:58 | 07:49:54 | 001 | 07:52:27 | 00:03:06 | 3 | 012 > 007 > 005 > 001 | |
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| 012 | 07:55:58 | 07:59:51 | 07:59:44 | 001 | 08:02:41 | 00:06:43 | 3 | 012 > 007 > 005 > 001 | |
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| 012 | 07:56:48 | 07:57:27 | 07:57:21 | 001 | 07:59:54 | 00:03:06 | 3 | 012 > 007 > 005 > 001 | |
| 012 | 07:59:32 | 08:00:14 | 08:00:08 | 001 | 08:02:44 | 00:03:12 | 3 | 012 > 007 > 005 > 001 | |
| 012 | 07:59:38 | 08:00:18 | 08:00:11 | 001 | 08:02:46 | 00:03:08 | 3 | 012 > 007 > 005 > 001 | |
| 012 | 08:32:47 | | 08:33:32 | 003 | 08:34:12 | 00:01:25 | 2 | 012 > 007 > 005 > 003 | AM Peak |
| 012 | 08:34:38 | | 08:35:16 | 003 | 08:35:50 | 00:01:12 | 2 | 012 > 007 > 005 > 003 | AM Peak |
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| 012 | 08:06:09 | 08:06:46 | 08:06:42 | 001 | 08:09:18 | 00:03:09 | 3 | 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:06:48 | 08:07:27 | 08:07:21 | 001 | 08:09:57 | 00:03:09 | 3 | 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:09:00 | 08:09:36 | 08:09:31 | 001 | 08:12:01 | 00:03:01 | 3 | 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:09:56 | 08:11:08 | 08:10:32 | 001 | 08:13:50 | 00:03:54 | 3 | 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:10:43 | 08:11:27 | 08:11:22 | 001 | 08:13:56 | 00:03:13 | 3 | 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:11:18 | 08:11:54 | 08:11:50 | 001 | 08:14:07 | 00:02:49 | 3 | 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:11:22 | 08:11:59 | 08:11:55 | 001 | 08:14:28 | 00:03:06 | 3 | 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:13:15 | 08:13:57 | 08:13:51 | 001 | 08:16:23 | 00:03:08 | 3 | 012 > 007 > 005 > 001 | AM Peak |
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| 012 | 08:20:35 | 08:21:21 | 08:21:16 | 001 | 08:24:16 | 00:03:41 | 3 | 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:21:12 | 08:21:54 | 08:21:48 | 001 | 08:25:11 | 00:03:59 | 3 | 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:22:10 | 08:23:12 | 08:22:52 | 001 | 08:26:07 | 00:03:57 | 3 | 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:22:25 | 08:23:21 | 08:23:01 | 001 | 08:26:11 | 00:03:46 | 3 | 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:23:45 | 08:24:56 | 08:24:35 | 001 | 08:27:35 | 00:03:50 | 3 | 012 > 007 > 005 > 001 | AM Peak |
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| 012 | 08:46:52 | 08:47:43 | 08:47:30 | 001 | 08:50:23 | 00:03:31 | 3 | 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:51:37 | 08:52:27 | 08:52:23 | 001 | 08:54:50 | 00:03:13 | 3 | 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:54:16 | 08:55:29 | 08:55:08 | 001 | 08:58:05 | 00:03:49 | 3 | 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:54:25 | 08:55:35 | 08:55:14 | 001 | 08:58:33 | 00:04:08 | 3 | 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:54:30 | 08:55:38 | 08:55:17 | 001 | 08:58:36 | 00:04:06 | 3 | 012 > 007 > 005 > 001 | AM Peak |

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|---|---|---|---|
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| 012 | 09:02:29 | 09:03:38 | 09:03:35 |
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|---|---|---|---|
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| 001 | 09:18:19 | 00:03:29 | 3 012 > 007 > 005 > 001 |
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| 001 | 11:16:21 | 00:03:45 | 3 012 > 007 > 005 > 001 |
| 001 | 11:17:35 | 00:03:06 | 3 012 > 007 > 005 > 001 |
| 001 | 11:18:00 | 00:02:59 | 3 012 > 007 > 005 > 001 |
| 001 | 11:18:02 | 00:02:58 | 3 012 > 007 > 005 > 001 |
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| 001 | 11:38:52 | 00:02:41 | 3 012 > 007 > 005 > 001 |
| 001 | 11:39:49 | 00:03:08 | 3 012 > 007 > 005 > 001 |
| 001 | 11:40:47 | 00:02:59 | 3 012 > 007 > 005 > 001 |
| 001 | 11:41:47 | 00:02:51 | 3 012 > 007 > 005 > 001 |
| 001 | 11:42:47 | 00:03:37 | 3 012 > 007 > 005 > 001 |
| 001 | 11:42:54 | 00:03:38 | 3 012 > 007 > 005 > 001 |
| 001 | 11:49:06 | 00:09:49 | 3 012 > 007 > 005 > 001 |

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|---|---|---|---|
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| 012 | 11:42:57 | 11:43:39 | 11:43:35 |
| 012 | 11:43:01 | 11:43:42 | 11:43:38 |
| 012 | 11:43:33 | 11:44:14 | 11:44:10 |
| 012 | 11:44:25 | 11:44:53 | 11:44:52 |
| 012 | 11:45:58 | 11:46:30 | 11:46:28 |
| 012 | 11:47:47 | 11:48:23 | 11:48:19 |
| 012 | 11:47:49 | 11:48:24 | 11:48:22 |
| 012 | 11:48:03 | 11:48:37 | 11:48:34 |
| 012 | 11:48:10 | 11:48:49 | 11:48:45 |
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| 012 | 12:11:41 | 12:12:23 | 12:12:19 |
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| 012 | 12:13:00 | 12:13:36 | 12:13:29 |
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| 012 | 12:14:25 | 12:15:14 | 12:15:08 |
| 012 | 12:14:46 | 12:15:33 | 12:15:28 |
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| 012 | 12:29:36 | 12:30:17 | 12:30:15 |
| 012 | 12:30:53 | 12:31:40 | 12:31:37 |
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| 012 | 12:54:16 | 12:54:57 | 12:54:54 |
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| 012 | 12:59:45 | 13:05:43 | 13:05:40 |
| 012 | 12:59:46 | 13:00:22 | 13:00:20 |
| 012 | 13:03:16 | 13:03:58 | 13:03:46 |
| 012 | 13:04:46 | 13:05:26 | 13:05:23 |
| 012 | 13:05:23 | 13:05:51 | 13:05:49 |
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| 012 | 13:11:27 | 13:11:51 | 13:11:51 |
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| 012 | 13:15:33 | 13:16:05 | 13:16:02 |

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|---|---|---|---|
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| 001 | 11:58:09 | 00:03:09 | 3 012 > 007 > 005 > 001 |
| 001 | 11:58:11 | 00:02:32 | 3 012 > 007 > 005 > 001 |
| 001 | 11:58:17 | 00:02:35 | 3 012 > 007 > 005 > 001 |
| 001 | 12:00:47 | 00:03:55 | 3 012 > 007 > 005 > 001 |
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| 001 | 12:03:00 | 00:03:49 | 3 012 > 007 > 005 > 001 |
| 001 | 12:03:04 | 00:03:21 | 3 012 > 007 > 005 > 001 |
| 001 | 12:03:06 | 00:03:17 | 3 012 > 007 > 005 > 001 |
| 001 | 12:03:53 | 00:03:32 | 3 012 > 007 > 005 > 001 |
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| 001 | 12:05:25 | 00:03:21 | 3 012 > 007 > 005 > 001 |
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| 001 | 12:16:47 | 00:02:56 | 3 012 > 007 > 005 > 001 |
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| 001 | 12:19:08 | 00:03:36 | 3 012 > 007 > 005 > 001 |
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| 001 | 12:35:47 | 00:02:53 | 3 012 > 007 > 005 > 001 |
| 001 | 12:36:52 | 00:03:29 | 3 012 > 007 > 005 > 001 |
| 001 | 12:36:54 | 00:03:18 | 3 012 > 007 > 005 > 001 |
| 001 | 12:38:04 | 00:03:14 | 3 012 > 007 > 005 > 001 |
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| 001 | 12:43:03 | 00:03:59 | 3 012 > 007 > 005 > 001 |
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| 001 | 13:06:54 | 00:07:28 | 3 012 > 007 > 005 > 001 |
| 001 | 13:03:25 | 00:03:49 | 3 012 > 007 > 005 > 001 |
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| 001 | 13:14:51 | 00:02:33 | 3 012 > 007 > 005 > 001 |
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| 001 | 13:18:32 | 00:02:59 | 3 012 > 007 > 005 > 001 |

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| 012 | 13:19:27 | 13:19:59 | 13:19:58 |
| 012 | 13:19:35 | 13:20:08 | 13:20:06 |
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| 012 | 13:23:16 | 13:23:45 | 13:23:44 |
| 012 | 13:25:40 | 13:26:13 | 13:26:11 |
| 012 | 13:27:17 | 13:28:01 | 13:27:58 |
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| 012 | 14:42:43 | 14:43:25 | 14:43:22 |
| 012 | 14:42:46 | 14:43:26 | 14:43:24 |
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| 012 | 14:59:02 | 14:59:35 | 14:59:31 |
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| 012 | 15:00:38 | 15:01:20 | 15:01:17 |
| 012 | 15:01:35 | 15:02:14 | 15:02:11 |
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| 012 | 15:03:38 | 15:04:12 | 15:04:11 |

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| 001 | 13:32:43 | 00:03:31 | 3 012 > 007 > 005 > 001 |
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| 001 | 13:34:17 | 00:02:43 | 3 012 > 007 > 005 > 001 |
| 001 | 13:34:59 | 00:03:08 | 3 012 > 007 > 005 > 001 |
| 001 | 13:35:16 | 00:02:46 | 3 012 > 007 > 005 > 001 |
| 001 | 13:35:37 | 00:02:53 | 3 012 > 007 > 005 > 001 |
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| 001 | 13:38:05 | 00:03:10 | 3 012 > 007 > 005 > 001 |
| 001 | 13:38:08 | 00:03:04 | 3 012 > 007 > 005 > 001 |
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| 001 | 13:52:03 | 00:03:12 | 3 012 > 007 > 005 > 001 |
| 001 | 13:53:21 | 00:02:50 | 3 012 > 007 > 005 > 001 |
| 001 | 13:53:51 | 00:03:03 | 3 012 > 007 > 005 > 001 |
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| 001 | 14:14:51 | 00:04:50 | 3 012 > 007 > 005 > 001 |
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| 001 | 14:20:09 | 00:02:58 | 3 012 > 007 > 005 > 001 |
| 001 | 14:26:10 | 00:08:41 | 3 012 > 007 > 005 > 001 |
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| 001 | 14:22:16 | 00:02:49 | 3 012 > 007 > 005 > 001 |
| 001 | 14:26:26 | 00:04:58 | 3 012 > 007 > 005 > 001 |
| 001 | 14:24:38 | 00:03:00 | 3 012 > 007 > 005 > 001 |
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| 001 | 14:29:47 | 00:03:05 | 3 012 > 007 > 005 > 001 |
| 001 | 14:30:23 | 00:02:56 | 3 012 > 007 > 005 > 001 |
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| 001 | 15:06:41 | 00:03:03 | 3 012 > 007 > 005 > 001 |

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|---|---|---|---|
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| 012 | 15:09:47 | 15:10:28 | 15:10:25 |
| 012 | 15:12:52 | 15:13:25 | 15:13:23 |
| 012 | 15:13:04 | 15:13:37 | 15:13:35 |
| 012 | 15:14:07 | 15:14:43 | 15:14:41 |
| 012 | 15:15:20 | 15:15:56 | 15:15:53 |
| 012 | 15:18:52 | 15:19:37 | 15:19:35 |
| 012 | 15:19:57 | 15:20:32 | 15:20:29 |
| 012 | 15:21:17 | 15:21:56 | 15:21:52 |
| 012 | 15:22:12 | 15:22:52 | 15:22:49 |
| 012 | 15:23:04 | 15:23:36 | 15:23:34 |
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| 012 | 15:24:03 | 15:24:48 | 15:24:45 |
| 012 | 15:24:39 | 15:25:11 | 15:25:07 |
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| 012 | 15:33:38 | 15:34:10 | 15:34:08 |
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| 012 | 15:38:33 | 15:39:36 | 15:39:08 |
| 012 | 15:40:04 | 15:40:44 | 15:40:41 |
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| 012 | 15:41:02 | 15:41:40 | 15:41:36 |
| 012 | 15:41:12 | 15:41:49 | 15:41:48 |
| 012 | 15:46:13 | 15:46:50 | 15:46:47 |
| 012 | 15:47:31 | 15:48:12 | 15:48:07 |
| 012 | 15:47:54 | 15:48:28 | 15:48:26 |
| 012 | 15:48:03 | 15:48:38 | 15:48:35 |
| 012 | 15:48:54 | 15:49:43 | 15:49:34 |
| 012 | 15:51:11 | 15:51:40 | 15:51:39 |
| 012 | 15:51:40 | 15:52:11 | 15:52:10 |
| 012 | 15:52:14 | 15:52:46 | 15:52:43 |
| 012 | 15:53:06 | 15:53:36 | 15:53:35 |
| 012 | 15:53:23 | 15:53:54 | 15:53:53 |
| 012 | 15:54:32 | 15:55:09 | 15:55:03 |
| 012 | 15:55:14 | 15:55:49 | 15:55:47 |
| 012 | 15:55:39 | 15:56:18 | 15:56:10 |
| 012 | 15:56:17 | 15:57:06 | 15:56:54 |
| 012 | 15:57:20 | 15:57:56 | 15:57:54 |
| 012 | 15:57:39 | 15:58:12 | 15:58:10 |
| 012 | 15:57:41 | 15:58:14 | 15:58:11 |
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| 012 | 15:58:31 | 15:59:13 | 15:59:11 |
| 012 | 16:00:11 | 16:00:51 | 16:00:48 |
| 012 | 16:01:01 | 16:01:41 | 16:01:39 |
| 012 | 16:01:22 | 16:02:47 | 16:02:44 |
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| 012 | 16:02:57 | 16:03:32 | 16:03:27 |
| 012 | 16:03:07 | 16:03:45 | 16:03:42 |
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| 012 | 16:03:59 | 16:04:32 | 16:04:30 |
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| 012 | 16:05:31 | 16:06:06 | 16:06:04 |
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| 012 | 16:07:29 | 16:08:01 | 16:07:59 |
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| 012 | 16:10:08 | 16:10:58 | 16:10:53 |
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| 012 | 16:13:02 | 16:13:36 | 16:13:33 |
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| 012 | 16:15:42 | 16:16:21 | 16:16:19 |
| 012 | 16:16:23 | 16:17:03 | 16:16:57 |
| 012 | 16:16:25 | 16:17:04 | 16:16:59 |
| 012 | 16:16:32 | 16:17:10 | 16:17:07 |
| 012 | 16:19:08 | 16:20:05 | 16:20:03 |
| 012 | 16:20:46 | 16:21:25 | 16:21:23 |
| 012 | 16:23:00 | 16:23:50 | 16:23:36 |
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| 012 | 16:24:44 | 16:27:13 | 16:26:04 |
| 012 | 16:25:11 | 16:27:25 | 16:26:28 |
| 012 | 16:25:13 | 16:27:28 | 16:26:46 |
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| 012 | 16:26:56 | 16:29:36 | 16:28:50 |
| 012 | 16:28:45 | 16:30:27 | 16:29:53 |
| 012 | 08:58:46 | 08:59:36 | 08:59:31 |
| 012 | 08:59:24 | 09:00:00 | 08:59:57 |
| 012 | 08:59:51 | 09:00:21 | 09:00:19 |
| 012 | 16:30:06 | 16:31:13 | 16:30:49 |
| 012 | 16:30:56 | 16:31:44 | 16:31:29 |
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| 012 | 16:31:29 | 16:32:06 | 16:32:03 |
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| 012 | 16:32:41 | 16:33:10 | 16:33:08 |
| 012 | 16:33:45 | 16:34:19 | 16:34:14 |
| 012 | 16:35:18 | 16:35:56 | 16:35:53 |
| 012 | 16:35:26 | 16:36:07 | 16:36:04 |
| 012 | 16:39:07 | 16:39:42 | 16:39:36 |
| 012 | 16:39:10 | 16:39:44 | 16:39:40 |
| 012 | 16:39:20 | 16:40:16 | 16:40:00 |
| 012 | 16:39:48 | 16:40:44 | 16:40:41 |
| 012 | 16:39:53 | 16:40:49 | 16:40:45 |
| 012 | 16:40:54 | 16:41:31 | 16:41:27 |
| 012 | 16:41:26 | 16:42:21 | 16:41:56 |
| 012 | 16:42:29 | 16:43:08 | 16:43:03 |
| 012 | 16:43:00 | 16:43:36 | 16:43:33 |
| 012 | 16:43:41 | 16:44:19 | 16:44:17 |
| 012 | 16:43:46 | 16:44:25 | 16:44:22 |
| 012 | 16:44:31 | 16:45:07 | 16:45:03 |
| 012 | 16:44:43 | 16:45:20 | 16:45:17 |
| 012 | 16:46:52 | 16:47:24 | 16:47:21 |

| | | | | |
|---|---|---|---|---|
| 001 | 15:07:35 | 00:03:40 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:07:37 | 00:03:36 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:08:07 | 00:04:00 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:08:39 | 00:03:10 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:08:41 | 00:03:09 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:11:52 | 00:03:01 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:13:10 | 00:03:33 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:13:14 | 00:03:29 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:14:23 | 00:04:36 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:15:58 | 00:03:06 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:16:15 | 00:03:11 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:17:34 | 00:03:27 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:18:54 | 00:03:34 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:22:30 | 00:03:38 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:23:09 | 00:03:12 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:24:37 | 00:03:20 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:25:23 | 00:03:11 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:25:55 | 00:02:51 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:26:29 | 00:03:13 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:28:55 | 00:04:52 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:28:02 | 00:03:23 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:28:30 | 00:03:12 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:29:30 | 00:03:35 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:30:59 | 00:03:36 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:32:08 | 00:03:36 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:36:47 | 00:03:09 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:37:00 | 00:03:14 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:37:25 | 00:03:16 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:38:05 | 00:02:47 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:39:55 | 00:03:17 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:40:35 | 00:03:12 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:42:11 | 00:03:38 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:43:11 | 00:03:07 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:44:06 | 00:03:45 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:44:08 | 00:03:30 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:44:41 | 00:03:39 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:44:44 | 00:03:32 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:49:47 | 00:03:34 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:50:29 | 00:02:58 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:50:43 | 00:02:49 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:51:07 | 00:03:04 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:52:07 | 00:03:13 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:54:10 | 00:02:59 | 3 012 > 007 > 005 > 001 | |
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| 001 | 15:55:07 | 00:02:53 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:56:09 | 00:03:03 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:56:11 | 00:02:48 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:57:26 | 00:02:54 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:58:15 | 00:03:01 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:59:17 | 00:03:38 | 3 012 > 007 > 005 > 001 | |
| 001 | 15:59:30 | 00:03:13 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:00:18 | 00:02:58 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:00:54 | 00:03:15 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:00:57 | 00:03:16 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:01:51 | 00:03:23 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:01:53 | 00:03:24 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:01:55 | 00:03:24 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:03:05 | 00:02:54 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:04:06 | 00:03:05 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:05:42 | 00:04:20 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:06:00 | 00:04:31 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:07:11 | 00:04:50 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:08:29 | 00:05:32 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:08:32 | 00:05:25 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:08:39 | 00:05:13 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:08:48 | 00:04:49 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:08:49 | 00:04:41 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:09:16 | 00:03:45 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:09:42 | 00:03:13 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:10:16 | 00:02:47 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:11:46 | 00:03:16 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:13:40 | 00:03:32 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:16:31 | 00:04:36 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:17:05 | 00:04:03 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:17:44 | 00:03:36 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:19:04 | 00:03:22 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:19:20 | 00:02:57 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:19:21 | 00:02:56 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:20:00 | 00:03:28 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:22:37 | 00:03:29 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:24:03 | 00:03:17 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:26:35 | 00:03:35 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:27:51 | 00:04:43 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:29:47 | 00:05:03 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:34:58 | 00:09:47 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:30:24 | 00:05:11 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:30:59 | 00:05:31 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:32:45 | 00:05:49 | 3 012 > 007 > 005 > 001 | |
| 001 | 16:33:05 | 00:04:20 | 3 012 > 007 > 005 > 001 | |
| 001 | 09:02:53 | 00:04:07 | 3 012 > 007 > 005 > 001 | AM Peak |
| 001 | 09:03:29 | 00:04:05 | 3 012 > 007 > 005 > 001 | AM Peak |
| 001 | 09:03:30 | 00:03:39 | 3 012 > 007 > 005 > 001 | AM Peak |
| 001 | 16:33:52 | 00:03:46 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:34:27 | 00:03:31 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:34:41 | 00:03:13 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:34:42 | 00:03:13 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:35:15 | 00:03:22 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:36:05 | 00:03:24 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:37:34 | 00:03:49 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:39:04 | 00:03:46 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:39:09 | 00:03:43 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:42:03 | 00:02:56 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:42:05 | 00:02:55 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:42:39 | 00:03:19 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:43:59 | 00:04:11 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:44:02 | 00:04:09 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:44:40 | 00:03:46 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:44:59 | 00:03:33 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:46:15 | 00:03:46 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:46:41 | 00:03:41 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:47:26 | 00:03:45 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:47:32 | 00:03:46 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:48:25 | 00:03:54 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:48:33 | 00:03:50 | 3 012 > 007 > 005 > 001 | PM Peak |
| 001 | 16:50:27 | 00:03:35 | 3 012 > 007 > 005 > 001 | PM Peak |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 012 | 16:47:00 | 16:47:33 | 16:47:31 | 001 | 16:50:29 | 00:03:29 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 16:47:52 | 16:48:23 | 16:48:20 | 001 | 16:51:13 | 00:03:21 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 16:48:06 | 16:48:46 | 16:48:43 | 001 | 16:51:29 | 00:03:23 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 16:48:11 | 16:48:54 | 16:48:50 | 001 | 16:51:32 | 00:03:21 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 16:49:24 | 16:55:58 | 16:55:54 | 001 | 17:00:10 | 00:10:46 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 16:49:37 | 16:50:21 | 16:50:18 | 001 | 16:53:12 | 00:03:35 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 16:50:17 | 16:50:56 | 16:50:53 | 001 | 16:54:03 | 00:03:46 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 16:50:20 | 16:50:58 | 16:50:55 | 001 | 16:54:08 | 00:03:48 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 16:52:46 | 16:53:45 | 16:53:32 | 001 | 16:56:04 | 00:03:18 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 16:52:57 | 16:53:49 | 16:53:41 | 001 | 16:56:40 | 00:03:43 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 16:55:07 | 16:55:37 | 16:55:35 | 001 | 16:58:03 | 00:02:56 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 16:56:21 | 16:57:06 | 16:56:54 | 001 | 17:09:24 | 00:13:03 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 16:57:11 | 16:57:47 | 16:57:41 | 001 | 17:00:32 | 00:03:21 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 16:57:17 | 16:57:52 | 16:57:46 | 001 | 17:04:09 | 00:06:52 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 16:59:15 | 16:59:55 | 16:59:50 | 001 | 17:02:47 | 00:03:32 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 16:59:29 | 17:00:08 | 17:00:05 | 001 | 17:02:49 | 00:03:20 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 16:59:39 | 17:00:14 | 17:00:11 | 001 | 17:02:56 | 00:03:17 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:00:26 | 17:01:09 | 17:01:05 | 001 | 17:04:01 | 00:03:35 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:01:06 | 17:13:16 | 17:01:37 | 001 | 17:16:04 | 00:14:58 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:02:16 | 17:03:03 | 17:02:47 | 001 | 17:05:43 | 00:03:27 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:02:32 | 17:03:21 | 17:03:10 | 001 | 17:06:25 | 00:03:53 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:07:22 | 17:08:04 | 17:08:00 | 001 | 17:11:12 | 00:03:50 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:08:31 | 17:09:13 | 17:09:05 | 001 | 17:11:55 | 00:03:24 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:08:51 | 17:09:29 | 17:09:25 | 001 | 17:12:07 | 00:03:16 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:09:27 | 17:10:16 | 17:09:58 | 001 | 17:12:38 | 00:03:11 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:09:30 | 17:10:18 | 17:10:00 | 001 | 17:12:39 | 00:03:09 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:09:50 | 17:10:32 | 17:10:29 | 001 | 17:12:55 | 00:03:05 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:10:02 | 17:10:37 | 17:10:35 | 001 | 17:13:02 | 00:03:00 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:10:24 | 17:10:54 | 17:10:53 | 001 | 17:13:08 | 00:02:44 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:10:40 | 17:11:16 | 17:11:12 | 001 | 17:13:57 | 00:03:17 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:13:31 | 17:14:07 | 17:14:05 | 001 | 17:16:39 | 00:03:08 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:13:40 | 17:14:11 | 17:14:09 | 001 | 17:16:43 | 00:03:03 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:14:10 | 17:14:53 | 17:14:42 | 001 | 17:17:26 | 00:03:16 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:14:42 | 17:15:19 | 17:15:16 | 001 | 17:18:06 | 00:03:24 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:14:48 | 17:15:26 | 17:15:23 | 001 | 17:18:22 | 00:03:34 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:14:50 | 17:15:28 | 17:15:25 | 001 | 17:18:26 | 00:03:36 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:15:29 | 17:16:03 | 17:16:01 | 001 | 17:18:44 | 00:03:15 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:15:31 | 17:16:05 | 17:16:02 | 001 | 17:18:46 | 00:03:15 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:16:10 | 17:16:45 | 17:16:42 | 001 | 17:19:54 | 00:03:44 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:16:24 | 17:17:03 | 17:17:00 | 001 | 17:19:34 | 00:03:10 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:16:40 | 17:17:16 | 17:17:13 | 001 | 17:19:50 | 00:03:10 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:18:10 | 17:18:51 | 17:18:47 | 001 | 17:21:31 | 00:03:21 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:18:15 | 17:19:03 | 17:18:58 | 001 | 17:21:40 | 00:03:25 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:18:20 | 17:19:07 | 17:19:03 | 001 | 17:21:42 | 00:03:22 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:18:38 | 17:19:14 | 17:19:12 | 001 | 17:21:57 | 00:03:19 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:19:15 | 17:20:04 | 17:19:47 | 001 | 17:22:40 | 00:03:25 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:19:38 | 17:20:18 | 17:20:13 | 001 | 17:23:10 | 00:03:32 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:21:28 | 17:22:06 | 17:22:04 | 001 | 17:24:31 | 00:03:03 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:21:34 | 17:27:27 | 17:27:22 | 001 | 17:32:17 | 00:10:43 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:21:44 | 17:22:42 | 17:22:25 | 001 | 17:25:23 | 00:03:39 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:21:56 | 17:22:50 | 17:22:42 | 001 | 17:25:28 | 00:03:32 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:22:24 | 17:23:22 | 17:22:59 | 001 | 17:25:54 | 00:03:30 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:24:25 | 17:25:02 | 17:24:59 | 001 | 17:28:18 | 00:03:53 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:24:29 | 17:25:04 | 17:25:01 | 001 | 17:29:18 | 00:04:49 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:24:38 | 17:25:09 | 17:25:07 | 001 | 17:28:32 | 00:03:54 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:25:19 | 17:26:18 | 17:25:58 | 001 | 17:29:00 | 00:03:41 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:25:21 | 17:26:22 | 17:26:00 | 001 | 17:29:04 | 00:03:43 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:26:34 | 17:27:09 | 17:27:06 | 001 | 17:30:14 | 00:03:40 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:30:13 | 17:31:00 | 17:30:42 | 001 | 17:33:57 | 00:03:44 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:30:36 | 17:31:16 | 17:31:09 | 001 | 17:34:35 | 00:03:59 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:30:47 | 17:31:21 | 17:31:14 | 001 | 17:34:38 | 00:03:51 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:30:58 | 17:39:35 | 17:39:06 | 001 | 17:42:35 | 00:11:37 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:33:37 | 17:34:11 | 17:34:09 | 001 | 17:36:49 | 00:03:12 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:34:14 | 17:35:12 | 17:35:06 | 001 | 17:38:05 | 00:03:51 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:37:11 | 17:37:46 | 17:37:43 | 001 | 17:45:11 | 00:08:00 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:37:16 | 17:37:47 | 17:37:44 | 001 | 17:40:30 | 00:03:14 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:37:22 | 17:37:52 | 17:37:50 | 001 | 17:40:34 | 00:03:12 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:39:05 | 17:39:56 | 17:39:43 | 001 | 17:53:58 | 00:14:53 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:39:07 | 17:39:57 | 17:39:46 | 001 | 17:42:45 | 00:03:38 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:39:31 | 17:40:28 | 17:40:14 | 001 | 17:43:03 | 00:03:32 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:40:07 | 17:40:47 | 17:40:40 | 001 | 17:43:38 | 00:03:31 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:40:15 | 17:40:52 | 17:40:45 | 001 | 17:43:41 | 00:03:26 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:42:44 | 17:43:19 | 17:43:17 | 001 | 17:46:37 | 00:03:53 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:46:38 | 17:47:28 | 17:47:12 | 001 | 17:50:06 | 00:03:28 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:47:17 | 17:47:51 | 17:47:50 | 001 | 17:50:21 | 00:03:04 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:47:51 | 17:48:48 | 17:48:27 | 001 | 17:51:19 | 00:03:28 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:47:54 | 17:48:50 | 17:48:29 | 001 | 17:51:21 | 00:03:27 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:48:50 | 17:49:23 | 17:49:21 | 001 | 17:52:01 | 00:03:11 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:49:09 | 17:49:50 | 17:49:47 | 001 | 17:52:37 | 00:03:28 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:49:16 | 17:50:07 | 17:49:55 | 001 | 17:52:50 | 00:03:34 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:50:03 | 17:50:50 | 17:50:36 | 001 | 17:53:21 | 00:03:18 | 3 012 > 007 > 005 > 001 | |
| 012 | 17:56:15 | 17:56:45 | 17:56:43 | 001 | 17:59:33 | 00:03:18 | 3 012 > 007 > 005 > 001 | |
| 012 | 18:02:45 | 18:03:25 | 18:03:21 | 001 | 18:06:11 | 00:03:26 | 3 012 > 007 > 005 > 001 | |
| 012 | 18:14:10 | 18:15:00 | 18:14:58 | 001 | 18:17:45 | 00:03:35 | 3 012 > 007 > 005 > 001 | |
| 012 | 07:13:45 | 07:14:27 | 07:14:22 | 003 | 07:14:59 | 00:01:14 | 3 012 > 007 > 005 > 003 | |
| 012 | 07:17:23 | 07:17:56 | 07:17:52 | 003 | 07:18:40 | 00:01:17 | 3 012 > 007 > 005 > 003 | |
| 012 | 07:20:52 | 07:21:30 | 07:21:26 | 003 | 07:21:59 | 00:01:07 | 3 012 > 007 > 005 > 003 | |
| 012 | 07:25:10 | 07:25:49 | 07:25:45 | 003 | 07:33:05 | 00:07:55 | 3 012 > 007 > 005 > 003 | |
| 012 | 07:26:53 | 07:27:30 | 07:27:26 | 003 | 07:28:01 | 00:01:08 | 3 012 > 007 > 005 > 003 | |
| 012 | 07:27:42 | 07:28:17 | 07:28:13 | 003 | 07:28:51 | 00:01:09 | 3 012 > 007 > 005 > 003 | |
| 012 | 07:43:50 | 07:44:26 | 07:44:21 | 003 | 07:45:03 | 00:01:13 | 3 012 > 007 > 005 > 003 | |
| 012 | 07:51:59 | 07:52:38 | 07:52:32 | 003 | 07:53:10 | 00:01:11 | 3 012 > 007 > 005 > 003 | |
| 012 | 07:52:46 | 07:53:23 | 07:53:17 | 003 | 07:54:02 | 00:01:16 | 3 012 > 007 > 005 > 003 | |
| 012 | 07:54:37 | 07:56:00 | 07:55:42 | 003 | 07:56:31 | 00:01:54 | 3 012 > 007 > 005 > 003 | |
| 012 | 07:55:55 | 08:04:47 | 08:04:36 | 003 | 08:05:26 | 00:09:31 | 3 012 > 007 > 005 > 003 | |
| 012 | 07:56:46 | 07:57:23 | 07:57:19 | 003 | 07:57:58 | 00:01:12 | 3 012 > 007 > 005 > 003 | |
| 012 | 07:56:49 | 07:57:28 | 07:57:23 | 003 | 07:58:46 | 00:01:57 | 3 012 > 007 > 005 > 003 | |
| 012 | 07:58:01 | 07:58:54 | 07:58:34 | 003 | 08:00:44 | 00:02:43 | 3 012 > 007 > 005 > 003 | |
| 012 | 17:26:58 | 17:27:45 | 17:27:41 | 001 | 17:31:34 | 00:04:36 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:27:45 | 17:28:46 | 17:28:44 | 001 | 17:32:30 | 00:04:45 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 17:29:38 | 17:30:13 | 17:30:11 | 001 | 17:32:52 | 00:03:14 | 3 012 > 007 > 005 > 001 | PM Peak |
| 012 | 08:12:19 | 08:12:57 | 08:12:55 | 001 | 08:15:27 | 00:03:08 | 3 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:14:20 | 08:15:02 | 08:14:57 | 001 | 08:17:23 | 00:03:03 | 3 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:26:35 | 08:27:26 | 08:27:16 | 001 | 08:30:17 | 00:03:42 | 3 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:29:39 | 08:30:23 | 08:30:21 | 001 | 08:40:36 | 00:10:57 | 3 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:32:58 | 08:34:12 | 08:34:04 | 001 | 08:36:23 | 00:03:25 | 3 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:36:55 | 08:37:33 | 08:37:32 | 001 | 08:39:50 | 00:02:55 | 3 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:44:35 | 08:45:20 | 08:45:13 | 001 | 08:48:19 | 00:03:44 | 3 012 > 007 > 005 > 001 | AM Peak |
| 012 | 08:04:48 | 08:14:58 | 08:05:22 | 003 | 08:15:36 | 00:10:48 | 3 012 > 007 > 005 > 003 | AM Peak |
| 012 | 08:06:23 | 08:07:21 | 08:06:58 | 003 | 08:08:54 | 00:02:31 | 3 012 > 007 > 005 > 003 | AM Peak |
| 012 | 08:07:16 | 08:07:55 | 08:07:50 | 003 | 08:09:12 | 00:01:56 | 3 012 > 007 > 005 > 003 | AM Peak |
| 012 | 08:10:52 | 08:15:05 | 08:14:56 | 003 | 08:15:40 | 00:04:48 | 3 012 > 007 > 005 > 003 | AM Peak |
| 012 | 08:11:25 | 08:12:05 | 08:12:00 | 003 | 08:13:26 | 00:02:01 | 3 012 > 007 > 005 > 003 | AM Peak |
| 012 | 08:13:19 | 08:14:03 | 08:13:56 | 003 | 08:15:33 | 00:02:14 | 3 012 > 007 > 005 > 003 | AM Peak |
| 012 | 08:13:33 | 08:14:26 | 08:14:20 | 003 | 08:14:58 | 00:01:25 | 3 012 > 007 > 005 > 003 | AM Peak |

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|---|---|---|---|
| 012 | 08:15:11 | 08:15:45 | 08:15:41 |
| 012 | 08:18:21 | 08:18:58 | 08:18:52 |
| 012 | 08:21:17 | 08:22:07 | 08:21:56 |
| 012 | 08:24:35 | 08:25:45 | 08:25:15 |
| 012 | 08:24:38 | 08:25:48 | 08:25:18 |
| 012 | 08:26:44 | 08:30:49 | 08:30:44 |
| 012 | 08:28:54 | 08:29:53 | 08:29:49 |
| 012 | 08:31:39 | 08:32:31 | 08:32:25 |
| 012 | 08:31:44 | 08:32:34 | 08:32:28 |
| 012 | 08:33:33 | 08:34:22 | 08:34:16 |
| 012 | 08:33:52 | 08:34:28 | 08:34:23 |
| 012 | 08:34:05 | 08:34:47 | 08:34:41 |
| 012 | 08:36:58 | 08:37:36 | 08:37:32 |
| 012 | 08:40:29 | 08:41:28 | 08:41:05 |
| 012 | 08:41:23 | 08:51:44 | 08:41:51 |
| 012 | 08:41:30 | 08:42:11 | 08:42:02 |
| 012 | 08:42:21 | 08:42:55 | 08:42:51 |
| 012 | 08:42:37 | 08:43:15 | 08:43:11 |
| 012 | 08:43:59 | 08:44:50 | 08:44:37 |
| 012 | 09:04:10 | 09:04:46 | 09:04:43 |
| 012 | 09:05:58 | 09:06:31 | 09:06:28 |
| 012 | 09:14:26 | 09:15:15 | 09:15:10 |
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| 012 | 09:20:27 | 09:21:07 | 09:21:03 |
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| 012 | 09:31:49 | 09:32:41 | 09:32:34 |
| 012 | 09:31:56 | 09:32:56 | 09:32:38 |
| 012 | 09:38:41 | 09:39:31 | 09:39:25 |
| 012 | 09:42:32 | 09:43:09 | 09:43:06 |
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| 012 | 10:15:24 | 10:16:06 | 10:16:02 |
| 012 | 10:17:04 | 10:17:51 | 10:17:47 |
| 012 | 10:40:21 | 10:40:59 | 10:40:55 |
| 012 | 10:43:15 | 10:44:03 | 10:43:58 |
| 012 | 10:44:56 | 10:45:40 | 10:45:36 |
| 012 | 10:48:30 | 10:49:05 | 10:49:02 |
| 012 | 10:51:06 | 10:51:37 | 10:51:34 |
| 012 | 10:51:36 | 10:52:16 | 10:52:09 |
| 012 | 10:55:34 | 10:56:29 | 10:56:20 |
| 012 | 10:57:05 | 10:58:04 | 10:57:58 |
| 012 | 10:57:45 | 10:58:21 | 10:58:19 |
| 012 | 11:00:47 | 11:01:32 | 11:01:28 |
| 012 | 11:04:06 | 11:04:36 | 11:04:33 |
| 012 | 11:06:46 | 11:07:16 | 11:07:13 |
| 012 | 11:12:41 | 11:13:28 | 11:13:22 |
| 012 | 11:17:37 | 11:18:17 | 11:18:13 |
| 012 | 11:20:09 | 11:20:42 | 11:20:39 |
| 012 | 11:21:15 | 11:22:00 | 11:21:55 |
| 012 | 11:23:29 | 11:24:29 | 11:24:25 |
| 012 | 11:30:39 | 11:31:24 | 11:31:21 |
| 012 | 11:32:15 | 11:32:46 | 11:32:44 |
| 012 | 11:32:22 | 11:32:55 | 11:32:52 |
| 012 | 11:40:30 | 11:41:05 | 11:41:03 |
| 012 | 11:41:08 | 11:41:50 | 11:41:47 |
| 012 | 11:43:05 | 11:43:43 | 11:43:40 |
| 012 | 11:45:42 | 11:46:15 | 11:46:11 |
| 012 | 11:50:39 | 11:51:10 | 11:51:08 |
| 012 | 11:50:55 | 11:51:34 | 11:51:28 |
| 012 | 11:55:47 | 11:56:23 | 11:56:20 |
| 012 | 11:59:01 | 11:59:48 | 11:59:38 |
| 012 | 12:00:24 | 12:02:46 | 12:01:11 |
| 012 | 12:00:35 | 12:01:48 | 12:01:45 |
| 012 | 12:03:34 | 12:04:21 | 12:04:18 |
| 012 | 12:03:41 | 12:04:32 | 12:04:25 |
| 012 | 12:03:57 | 12:04:34 | 12:04:30 |
| 012 | 12:05:02 | 12:05:37 | 12:05:33 |
| 012 | 12:09:38 | 12:10:16 | 12:10:13 |
| 012 | 12:11:43 | 12:12:25 | 12:12:21 |
| 012 | 12:14:43 | 12:15:28 | 12:15:25 |
| 012 | 12:15:08 | 12:16:14 | 12:15:45 |
| 012 | 12:16:47 | 12:17:25 | 12:17:23 |
| 012 | 12:18:03 | 12:18:51 | 12:18:46 |
| 012 | 12:18:21 | 12:18:54 | 12:18:50 |
| 012 | 12:19:03 | 12:19:36 | 12:19:33 |
| 012 | 12:20:06 | 12:20:36 | 12:20:34 |
| 012 | 12:23:35 | 12:24:26 | 12:24:22 |
| 012 | 12:26:09 | 12:26:48 | 12:26:45 |
| 012 | 12:26:12 | 12:26:50 | 12:26:47 |
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| 012 | 12:50:11 | 12:50:57 | 12:50:53 |
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| 012 | 13:01:16 | 13:02:00 | 13:01:56 |
| 012 | 13:03:08 | 13:03:42 | 13:03:40 |
| 012 | 13:05:56 | 13:06:43 | 13:06:40 |
| 012 | 13:07:34 | 13:08:06 | 13:08:05 |
| 012 | 13:08:33 | 13:09:05 | 13:09:04 |
| 012 | 13:09:30 | 13:09:59 | 13:09:57 |
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| 012 | 13:28:38 | 13:32:01 | 13:31:59 |
| 012 | 13:30:37 | 13:31:20 | 13:31:16 |
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| 012 | 13:46:14 | 13:46:56 | 13:46:53 |
| 012 | 13:48:16 | 13:48:48 | 13:48:46 |
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| 012 | 13:53:24 | 13:53:56 | 13:53:54 |
| 012 | 13:54:52 | 13:55:29 | 13:55:26 |
| 012 | 13:57:52 | 13:58:37 | 13:58:34 |
| 012 | 13:59:11 | 13:59:47 | 13:59:44 |

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|---|---|---|---|---|
| 003 | 08:16:15 | 00:01:04 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:21:31 | 00:03:10 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:22:37 | 00:01:20 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:26:22 | 00:01:47 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:26:25 | 00:01:47 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:31:21 | 00:04:37 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:31:08 | 00:02:14 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:33:03 | 00:01:24 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:33:10 | 00:01:26 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:34:55 | 00:01:22 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:35:58 | 00:02:06 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:36:17 | 00:02:12 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:38:06 | 00:01:08 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:42:12 | 00:01:43 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:52:17 | 00:10:54 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:50:23 | 00:08:53 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:43:28 | 00:01:07 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:43:47 | 00:01:10 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:51:16 | 00:07:17 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 09:05:23 | 00:01:13 | 3 012 > 007 > 005 > 003 | |
| 003 | 09:07:03 | 00:01:05 | 3 012 > 007 > 005 > 003 | |
| 003 | 09:15:57 | 00:01:31 | 3 012 > 007 > 005 > 003 | |
| 003 | 09:16:14 | 00:01:17 | 3 012 > 007 > 005 > 003 | |
| 003 | 09:21:49 | 00:01:22 | 3 012 > 007 > 005 > 003 | |
| 003 | 09:23:10 | 00:01:05 | 3 012 > 007 > 005 > 003 | |
| 003 | 09:31:41 | 00:01:16 | 3 012 > 007 > 005 > 003 | |
| 003 | 09:32:43 | 00:01:18 | 3 012 > 007 > 005 > 003 | |
| 003 | 09:33:22 | 00:01:33 | 3 012 > 007 > 005 > 003 | |
| 003 | 09:33:35 | 00:01:39 | 3 012 > 007 > 005 > 003 | |
| 003 | 09:40:10 | 00:01:29 | 3 012 > 007 > 005 > 003 | |
| 003 | 09:43:40 | 00:01:08 | 3 012 > 007 > 005 > 003 | |
| 003 | 10:05:57 | 00:01:07 | 3 012 > 007 > 005 > 003 | |
| 003 | 10:15:28 | 00:01:06 | 3 012 > 007 > 005 > 003 | |
| 003 | 10:27:36 | 00:12:12 | 3 012 > 007 > 005 > 003 | |
| 003 | 10:18:37 | 00:01:33 | 3 012 > 007 > 005 > 003 | |
| 003 | 10:41:29 | 00:01:08 | 3 012 > 007 > 005 > 003 | |
| 003 | 10:44:41 | 00:01:26 | 3 012 > 007 > 005 > 003 | |
| 003 | 10:46:32 | 00:01:36 | 3 012 > 007 > 005 > 003 | |
| 003 | 10:49:36 | 00:01:06 | 3 012 > 007 > 005 > 003 | |
| 003 | 10:52:05 | 00:00:59 | 3 012 > 007 > 005 > 003 | |
| 003 | 10:58:44 | 00:07:08 | 3 012 > 007 > 005 > 003 | |
| 003 | 10:57:07 | 00:01:33 | 3 012 > 007 > 005 > 003 | |
| 003 | 10:58:54 | 00:01:49 | 3 012 > 007 > 005 > 003 | |
| 003 | 10:58:58 | 00:01:13 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:02:02 | 00:01:15 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:05:07 | 00:01:01 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:07:42 | 00:00:56 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:14:06 | 00:01:25 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:19:02 | 00:01:25 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:21:21 | 00:01:12 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:22:43 | 00:01:28 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:25:00 | 00:01:31 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:31:56 | 00:01:17 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:33:12 | 00:00:57 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:33:24 | 00:01:02 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:41:35 | 00:01:05 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:42:27 | 00:01:19 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:44:16 | 00:01:11 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:46:44 | 00:01:02 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:51:38 | 00:00:59 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:52:01 | 00:01:06 | 3 012 > 007 > 005 > 003 | |
| 003 | 11:56:57 | 00:01:10 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:00:16 | 00:01:15 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:03:19 | 00:02:55 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:02:22 | 00:01:47 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:04:52 | 00:01:18 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:05:01 | 00:01:20 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:05:06 | 00:01:09 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:07:05 | 00:02:03 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:10:50 | 00:01:12 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:13:10 | 00:01:27 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:16:00 | 00:01:17 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:16:49 | 00:01:41 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:17:55 | 00:01:08 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:19:32 | 00:01:29 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:19:36 | 00:01:15 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:20:05 | 00:01:02 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:21:06 | 00:01:00 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:24:57 | 00:01:22 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:28:14 | 00:02:05 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:27:23 | 00:01:11 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:34:38 | 00:01:13 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:41:59 | 00:01:05 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:51:32 | 00:01:21 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:54:11 | 00:01:24 | 3 012 > 007 > 005 > 003 | |
| 003 | 12:56:08 | 00:01:20 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:05:00 | 00:03:44 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:04:14 | 00:01:06 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:07:24 | 00:01:28 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:08:37 | 00:01:03 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:09:37 | 00:01:04 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:10:35 | 00:01:05 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:11:35 | 00:01:25 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:15:51 | 00:01:24 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:16:05 | 00:01:10 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:19:19 | 00:01:14 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:20:09 | 00:01:09 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:25:04 | 00:01:07 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:31:59 | 00:06:23 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:29:00 | 00:01:28 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:32:32 | 00:03:54 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:31:54 | 00:01:17 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:32:14 | 00:01:04 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:34:40 | 00:01:13 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:40:05 | 00:01:24 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:40:06 | 00:01:18 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:40:10 | 00:01:17 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:42:30 | 00:00:54 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:47:28 | 00:01:14 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:49:22 | 00:01:06 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:54:04 | 00:01:29 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:54:27 | 00:01:03 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:56:07 | 00:01:15 | 3 012 > 007 > 005 > 003 | |
| 003 | 13:59:15 | 00:01:23 | 3 012 > 007 > 005 > 003 | |
| 003 | 14:00:16 | 00:01:05 | 3 012 > 007 > 005 > 003 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 012 | 14:01:42 | 14:02:25 | | 14:02:22 | | | | | | | | | | | |
| 012 | 14:02:29 | 14:03:06 | | 14:02:56 | | | | | | | | | | | |
| 012 | 14:08:41 | 14:09:22 | | 14:09:18 | | | | | | | | | | | |
| 012 | 14:10:42 | 14:11:12 | | 14:11:09 | | | | | | | | | | | |
| 012 | 14:16:58 | 14:17:32 | | 14:17:31 | | | | | | | | | | | |
| 012 | 14:21:51 | 14:22:26 | | 14:22:24 | | | | | | | | | | | |
| 012 | 14:22:52 | 14:23:25 | | 14:23:23 | | | | | | | | | | | |
| 012 | 14:32:10 | 14:32:42 | | 14:32:40 | | | | | | | | | | | |
| 012 | 14:34:06 | 14:34:47 | | 14:34:44 | | | | | | | | | | | |
| 012 | 14:37:43 | 14:38:19 | | 14:38:16 | | | | | | | | | | | |
| 012 | 14:43:11 | 14:43:58 | | 14:43:53 | | | | | | | | | | | |
| 012 | 14:46:27 | 14:46:59 | | 14:46:56 | | | | | | | | | | | |
| 012 | 14:47:02 | 14:47:45 | | 14:47:40 | | | | | | | | | | | |
| 012 | 14:47:38 | 14:48:15 | | 14:48:12 | | | | | | | | | | | |
| 012 | 14:50:18 | 14:50:50 | | 14:50:49 | | | | | | | | | | | |
| 012 | 14:50:33 | 15:03:11 | | 14:51:04 | | | | | | | | | | | |
| 012 | 15:07:43 | 15:08:34 | | 15:08:16 | | | | | | | | | | | |
| 012 | 15:14:44 | 15:15:22 | | 15:15:18 | | | | | | | | | | | |
| 012 | 15:25:50 | 15:26:27 | | 15:26:24 | | | | | | | | | | | |
| 012 | 15:26:29 | 15:27:05 | | 15:27:03 | | | | | | | | | | | |
| 012 | 15:30:17 | 15:30:52 | | 15:30:49 | | | | | | | | | | | |
| 012 | 15:32:39 | 15:33:18 | | 15:33:16 | | | | | | | | | | | |
| 012 | 15:34:18 | 15:34:50 | | 15:34:47 | | | | | | | | | | | |
| 012 | 15:41:30 | 15:42:00 | | 15:41:59 | | | | | | | | | | | |
| 012 | 15:49:00 | 15:49:50 | | 15:49:38 | | | | | | | | | | | |
| 012 | 15:51:42 | 15:52:13 | | 15:52:12 | | | | | | | | | | | |
| 012 | 15:58:58 | 15:59:28 | | 15:59:27 | | | | | | | | | | | |
| 012 | 16:00:04 | 16:00:49 | | 16:00:44 | | | | | | | | | | | |
| 012 | 16:03:52 | 16:04:21 | | 16:04:19 | | | | | | | | | | | |
| 012 | 16:04:40 | 16:05:13 | | 16:05:11 | | | | | | | | | | | |
| 012 | 16:09:57 | 16:10:45 | | 16:10:34 | | | | | | | | | | | |
| 012 | 16:11:58 | 16:13:06 | | 16:12:51 | | | | | | | | | | | |
| 012 | 16:16:40 | 16:17:16 | | 16:17:14 | | | | | | | | | | | |
| 012 | 16:16:54 | 16:17:41 | | 16:17:32 | | | | | | | | | | | |
| 012 | 16:17:23 | 16:17:55 | | 16:17:53 | | | | | | | | | | | |
| 012 | 16:20:39 | 16:21:22 | | 16:21:19 | | | | | | | | | | | |
| 012 | 16:22:52 | 16:23:32 | | 16:23:30 | | | | | | | | | | | |
| 012 | 16:26:19 | 16:29:07 | | 16:28:02 | | | | | | | | | | | |
| 012 | 16:26:34 | 16:29:09 | | 16:28:08 | | | | | | | | | | | |
| 012 | 16:26:40 | 16:29:17 | | 16:28:43 | | | | | | | | | | | |
| 012 | 16:27:55 | 16:30:16 | | 16:29:32 | | | | | | | | | | | |
| 012 | 16:29:05 | 16:30:40 | | 16:30:17 | | | | | | | | | | | |
| 012 | 08:44:40 | 08:45:39 | | 08:45:23 | | | | | | | | | | | |
| 012 | 08:48:04 | 08:48:53 | | 08:48:42 | | | | | | | | | | | |
| 012 | 08:48:19 | 08:49:07 | | 08:49:02 | | | | | | | | | | | |
| 012 | 08:49:46 | 08:50:26 | | 08:50:22 | | | | | | | | | | | |
| 012 | 08:51:12 | 08:52:02 | | 08:51:59 | | | | | | | | | | | |
| 012 | 08:52:31 | 08:53:27 | | 08:53:06 | | | | | | | | | | | |
| 012 | 08:53:34 | 08:54:59 | | 08:54:37 | | | | | | | | | | | |
| 012 | 08:53:40 | 08:55:19 | | 08:54:40 | | | | | | | | | | | |
| 012 | 08:59:06 | 08:59:46 | | 08:59:41 | | | | | | | | | | | |
| 012 | 08:59:28 | 09:00:02 | | 08:59:59 | | | | | | | | | | | |
| 012 | 16:31:48 | 16:32:33 | | 16:32:17 | | | | | | | | | | | |
| 012 | 16:33:52 | 16:34:25 | | 16:34:21 | | | | | | | | | | | |
| 012 | 16:36:40 | 16:37:19 | | 16:37:15 | | | | | | | | | | | |
| 012 | 16:41:49 | 16:46:02 | | 16:45:59 | | | | | | | | | | | |
| 012 | 16:44:05 | 16:44:40 | | 16:44:37 | | | | | | | | | | | |
| 012 | 16:44:12 | 16:46:12 | | 16:46:09 | | | | | | | | | | | |
| 012 | 16:47:25 | 16:48:01 | | 16:47:58 | | | | | | | | | | | |
| 012 | 16:48:46 | 16:49:15 | | 16:49:12 | | | | | | | | | | | |
| 012 | 16:50:54 | 16:51:33 | | 16:51:29 | | | | | | | | | | | |
| 012 | 16:51:04 | 16:51:42 | | 16:51:39 | | | | | | | | | | | |
| 012 | 16:52:42 | 16:53:32 | | 16:53:29 | | | | | | | | | | | |
| 012 | 16:52:43 | 17:05:55 | | 16:53:31 | | | | | | | | | | | |
| 012 | 16:55:42 | 16:56:20 | | 16:56:16 | | | | | | | | | | | |
| 012 | 16:56:11 | 16:56:43 | | 16:56:39 | | | | | | | | | | | |
| 012 | 16:56:41 | 16:57:17 | | 16:57:14 | | | | | | | | | | | |
| 012 | 16:58:02 | 16:58:33 | | 16:58:31 | | | | | | | | | | | |
| 012 | 17:01:26 | 17:02:13 | | 17:02:10 | | | | | | | | | | | |
| 012 | 17:02:18 | 17:03:05 | | 17:02:52 | | | | | | | | | | | |
| 012 | 17:05:17 | 17:06:01 | | 17:05:57 | | | | | | | | | | | |
| 012 | 17:06:47 | 17:07:27 | | 17:07:25 | | | | | | | | | | | |
| 012 | 17:07:01 | 17:07:44 | | 17:07:41 | | | | | | | | | | | |
| 012 | 17:33:58 | 17:34:59 | | 17:34:44 | | | | | | | | | | | |
| 012 | 17:34:06 | 17:35:08 | | 17:35:03 | | | | | | | | | | | |
| 012 | 17:38:45 | 17:42:33 | | 17:42:30 | | | | | | | | | | | |
| 012 | 17:39:12 | 17:39:59 | | 17:39:52 | | | | | | | | | | | |
| 012 | 17:39:26 | 17:40:11 | | 17:40:08 | | | | | | | | | | | |
| 012 | 17:39:37 | 17:40:33 | | 17:40:19 | | | | | | | | | | | |
| 012 | 17:41:06 | 17:41:40 | | 17:41:38 | | | | | | | | | | | |
| 012 | 17:47:49 | 17:48:46 | | 17:48:25 | | | | | | | | | | | |
| 012 | 17:49:58 | 17:50:48 | | 17:50:33 | | | | | | | | | | | |
| 012 | 17:50:40 | 17:51:32 | | 17:51:28 | | | | | | | | | | | |
| 012 | 10:14:17 | 10:14:51 | 10:15:51 | 10:14:48 | 10:16:00 | | | | 10:17:01 | 10:19:18 | | | | | |
| 012 | 17:07:16 | 17:07:53 | | 17:07:50 | | | | | | | | | | | |
| 012 | 16:25:15 | 16:27:30 | | 16:26:51 | | | 16:31:58 | | | | | | | | |
| 012 | 07:59:52 | 08:00:23 | | 08:00:18 | | | | | | | | | | | |
| 012 | 09:39:09 | 09:40:08 | | 09:40:04 | | | | | | | | | | | |
| 012 | 14:45:43 | 14:46:18 | | 14:46:15 | | | | | | | | | | | |
| 012 | 15:47:24 | 15:48:09 | | 15:47:56 | | | | | | | | | | | |
| 012 | 14:57:38 | 14:58:20 | | 14:58:11 | | | | | | | | | | | |
| 012 | 15:25:43 | | 15:27:20 | 15:26:19 | | | | | | | | | | | |
| 012 | 14:07:53 | | 14:12:53 | 14:08:25 | | | 14:13:41 | | | 14:15:51 | | | | | |
| 012 | 15:30:21 | | 15:36:40 | 15:30:51 | | | | | | | | | | | |
| 012 | 18:19:11 | | 18:27:45 | 18:19:46 | 18:19:49 | | | | | | | | | | |
| 012 | 18:23:51 | | 18:32:01 | 18:24:31 | 18:32:09 | | | | | | | | | | |
| 012 | 18:25:10 | | 18:29:39 | 18:25:43 | 18:29:48 | | | | | | | | | | |
| 012 | 18:41:53 | | 18:42:38 | 18:42:26 | 18:42:29 | | | | | | | | | | |
| 012 | 18:44:29 | | 18:52:19 | 18:44:56 | 18:44:59 | | | | | | | | | | |
| 012 | 18:47:40 | | 18:50:05 | 18:48:18 | 18:50:12 | | | | | | | | | | |
| 012 | 18:51:18 | | 18:54:31 | 18:51:50 | 18:54:39 | | | | | | | | | | |
| 012 | 07:56:03 | | | 07:56:37 | 08:03:55 | | | | | | | | | | |
| 012 | 07:58:09 | | | 07:58:48 | 08:01:37 | | | | | | | | | | |
| 012 | 17:08:48 | 17:09:26 | | 17:09:23 | | | | | | | | | | | |
| 012 | 17:13:29 | 17:14:06 | | 17:14:03 | | | | | | | | | | | |
| 012 | 17:14:12 | 17:14:55 | | 17:14:46 | | | | | | | | | | | |
| 012 | 17:15:09 | 17:15:44 | | 17:15:41 | | | | | | | | | | | |
| 012 | 17:16:18 | 17:25:13 | | 17:25:10 | | | | | | | | | | | |
| 012 | 17:24:14 | 17:24:55 | | 17:24:52 | | | | | | | | | | | |
| 012 | 17:25:16 | 17:26:16 | | 17:25:55 | | | | | | | | | | | |
| 012 | 17:26:48 | 17:27:35 | | 17:27:32 | | | | | | | | | | | |
| 012 | 17:55:43 | | | 17:56:19 | 17:56:22 | | | | | | | | | | |
| 012 | 18:08:59 | | | 18:09:32 | 18:12:48 | | | | | | | | | | |
| 012 | 18:23:44 | | | 18:24:21 | 18:32:33 | | | | | | | | | | |
| 012 | 18:03:10 | | | 18:03:44 | | 18:04:08 | 18:04:10 | | | | | | | | |

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|---|---|---|---|---|
| 003 | 14:03:08 | 00:01:26 | 3 012 > 007 > 005 > 003 | |
| 003 | 14:03:35 | 00:01:06 | 3 012 > 007 > 005 > 003 | |
| 003 | 14:10:18 | 00:01:37 | 3 012 > 007 > 005 > 003 | |
| 003 | 14:12:02 | 00:01:20 | 3 012 > 007 > 005 > 003 | |
| 003 | 14:18:03 | 00:01:05 | 3 012 > 007 > 005 > 003 | |
| 003 | 14:22:56 | 00:01:05 | 3 012 > 007 > 005 > 003 | |
| 003 | 14:23:54 | 00:01:02 | 3 012 > 007 > 005 > 003 | |
| 003 | 14:33:11 | 00:01:01 | 3 012 > 007 > 005 > 003 | |
| 003 | 14:35:23 | 00:01:17 | 3 012 > 007 > 005 > 003 | |
| 003 | 14:38:55 | 00:01:12 | 3 012 > 007 > 005 > 003 | |
| 003 | 14:44:37 | 00:01:26 | 3 012 > 007 > 005 > 003 | |
| 003 | 14:47:33 | 00:01:06 | 3 012 > 007 > 005 > 003 | |
| 003 | 14:48:33 | 00:01:31 | 3 012 > 007 > 005 > 003 | |
| 003 | 14:48:47 | 00:01:09 | 3 012 > 007 > 005 > 003 | |
| 003 | 14:51:29 | 00:01:11 | 3 012 > 007 > 005 > 003 | |
| 003 | 15:03:48 | 00:13:15 | 3 012 > 007 > 005 > 003 | |
| 003 | 15:19:40 | 00:11:57 | 3 012 > 007 > 005 > 003 | |
| 003 | 15:15:55 | 00:01:11 | 3 012 > 007 > 005 > 003 | |
| 003 | 15:27:01 | 00:01:11 | 3 012 > 007 > 005 > 003 | |
| 003 | 15:27:37 | 00:01:08 | 3 012 > 007 > 005 > 003 | |
| 003 | 15:31:33 | 00:01:16 | 3 012 > 007 > 005 > 003 | |
| 003 | 15:33:59 | 00:01:20 | 3 012 > 007 > 005 > 003 | |
| 003 | 15:35:25 | 00:01:07 | 3 012 > 007 > 005 > 003 | |
| 003 | 15:42:33 | 00:01:03 | 3 012 > 007 > 005 > 003 | |
| 003 | 15:50:25 | 00:01:25 | 3 012 > 007 > 005 > 003 | |
| 003 | 15:52:43 | 00:01:01 | 3 012 > 007 > 005 > 003 | |
| 003 | 15:59:58 | 00:01:00 | 3 012 > 007 > 005 > 003 | |
| 003 | 16:01:25 | 00:01:21 | 3 012 > 007 > 005 > 003 | |
| 003 | 16:05:02 | 00:01:10 | 3 012 > 007 > 005 > 003 | |
| 003 | 16:05:47 | 00:01:07 | 3 012 > 007 > 005 > 003 | |
| 003 | 16:12:25 | 00:02:28 | 3 012 > 007 > 005 > 003 | |
| 003 | 16:16:09 | 00:04:11 | 3 012 > 007 > 005 > 003 | |
| 003 | 16:18:03 | 00:01:23 | 3 012 > 007 > 005 > 003 | |
| 003 | 16:18:20 | 00:01:26 | 3 012 > 007 > 005 > 003 | |
| 003 | 16:18:27 | 00:01:04 | 3 012 > 007 > 005 > 003 | |
| 003 | 16:21:51 | 00:01:12 | 3 012 > 007 > 005 > 003 | |
| 003 | 16:24:24 | 00:01:32 | 3 012 > 007 > 005 > 003 | |
| 003 | 16:30:04 | 00:03:45 | 3 012 > 007 > 005 > 003 | |
| 003 | 16:29:49 | 00:03:15 | 3 012 > 007 > 005 > 003 | |
| 003 | 16:29:58 | 00:03:18 | 3 012 > 007 > 005 > 003 | |
| 003 | 16:33:12 | 00:05:17 | 3 012 > 007 > 005 > 003 | |
| 003 | 16:31:20 | 00:02:15 | 3 012 > 007 > 005 > 003 | |
| 003 | 08:46:13 | 00:01:33 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:49:27 | 00:01:23 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:49:43 | 00:01:24 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:54:17 | 00:04:31 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:52:35 | 00:01:23 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:54:04 | 00:01:33 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:55:28 | 00:01:54 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 08:55:55 | 00:02:15 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 09:00:25 | 00:01:19 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 09:00:38 | 00:01:10 | 3 012 > 007 > 005 > 003 | AM Peak |
| 003 | 16:33:17 | 00:01:29 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 16:35:11 | 00:01:19 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 16:39:01 | 00:02:21 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 16:46:35 | 00:04:46 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 16:45:16 | 00:01:11 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 16:46:49 | 00:02:37 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 16:48:35 | 00:01:10 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 16:49:56 | 00:01:10 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 16:52:14 | 00:01:20 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 16:52:24 | 00:01:20 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 16:54:09 | 00:01:27 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:06:41 | 00:13:58 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 16:56:59 | 00:01:17 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 16:57:21 | 00:01:10 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 16:57:50 | 00:01:09 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 16:59:14 | 00:01:12 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:02:49 | 00:01:23 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:03:40 | 00:01:22 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:06:54 | 00:01:37 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:08:02 | 00:01:15 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:08:22 | 00:01:21 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:35:38 | 00:01:40 | 3 012 > 007 > 005 > 003 | |
| 003 | 17:35:59 | 00:01:53 | 3 012 > 007 > 005 > 003 | |
| 003 | 17:43:07 | 00:04:22 | 3 012 > 007 > 005 > 003 | |
| 003 | 17:40:38 | 00:01:26 | 3 012 > 007 > 005 > 003 | |
| 003 | 17:40:45 | 00:01:19 | 3 012 > 007 > 005 > 003 | |
| 003 | 17:41:07 | 00:01:30 | 3 012 > 007 > 005 > 003 | |
| 003 | 17:42:30 | 00:01:24 | 3 012 > 007 > 005 > 003 | |
| 003 | 17:49:27 | 00:01:38 | 3 012 > 007 > 005 > 003 | |
| 003 | 17:51:19 | 00:01:21 | 3 012 > 007 > 005 > 003 | |
| 003 | 17:52:07 | 00:01:27 | 3 012 > 007 > 005 > 003 | |
| 017 | 10:19:34 | 00:05:17 | 7 012 > 007 > 005 > 006 > 008 > 014 > 016 > 017 | |
| 003 | 17:08:32 | 00:01:16 | 3 012 > 007 > 005 > 003 | PM Peak |
| 011 | 16:36:26 | 00:11:11 | 4 012 > 007 > 005 > 010 > 011 | |
| 011 | 08:03:14 | 00:03:22 | 3 012 > 007 > 005 > 011 | |
| 011 | 09:42:16 | 00:03:07 | 3 012 > 007 > 005 > 011 | |
| 011 | 14:56:52 | 00:11:09 | 3 012 > 007 > 005 > 011 | |
| 011 | 15:51:41 | 00:04:17 | 3 012 > 007 > 005 > 011 | |
| 017 | 15:06:43 | 00:09:05 | 3 012 > 007 > 005 > 017 | |
| 003 | 15:34:28 | 00:08:45 | 3 012 > 007 > 006 > 003 | |
| 017 | 14:16:10 | 00:08:17 | 5 012 > 007 > 006 > 010 > 015 > 017 | |
| 011 | 15:37:22 | 00:07:01 | 3 012 > 007 > 006 > 011 | |
| 011 | 18:28:34 | 00:09:23 | 4 012 > 007 > 008 > 006 > 011 | |
| 011 | 18:32:40 | 00:08:49 | 4 012 > 007 > 008 > 006 > 011 | |
| 011 | 18:30:30 | 00:05:20 | 4 012 > 007 > 008 > 006 > 011 | |
| 011 | 18:50:13 | 00:08:20 | 4 012 > 007 > 008 > 006 > 011 | |
| 011 | 18:53:03 | 00:08:34 | 4 012 > 007 > 008 > 006 > 011 | |
| 011 | 18:50:49 | 00:03:09 | 4 012 > 007 > 008 > 006 > 011 | |
| 011 | 18:55:12 | 00:03:54 | 4 012 > 007 > 008 > 006 > 011 | |
| 011 | 08:04:29 | 00:08:26 | 3 012 > 007 > 008 > 011 | |
| 011 | 08:02:13 | 00:04:04 | 3 012 > 007 > 008 > 011 | |
| 003 | 17:10:02 | 00:01:14 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:14:45 | 00:01:16 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:15:36 | 00:01:24 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:16:28 | 00:01:19 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:25:52 | 00:09:34 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:25:38 | 00:01:24 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:26:49 | 00:01:33 | 3 012 > 007 > 005 > 003 | PM Peak |
| 003 | 17:28:19 | 00:01:31 | 3 012 > 007 > 005 > 003 | PM Peak |
| 011 | 18:02:20 | 00:06:37 | 3 012 > 007 > 008 > 011 | |
| 011 | 18:13:25 | 00:04:26 | 3 012 > 007 > 008 > 011 | |
| 011 | 18:33:05 | 00:09:21 | 3 012 > 007 > 008 > 011 | |
| 001 | 18:09:11 | 00:06:01 | 4 012 > 007 > 009 > 010 > 001 | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 012 | 14:08:43 | | | 14:09:20 | 14:13:29 | 14:10:03 | 14:10:05 | | | 011 | 14:14:02 | 00:05:19 | 5 | 012 > 007 > 009 > 010 > 008 > 011 | |
| 012 | 17:59:22 | | | 17:59:55 | | 18:07:29 | 18:00:34 | | | 011 | 18:08:50 | 00:09:28 | 4 | 012 > 007 > 009 > 010 > 011 | |
| 012 | 17:28:14 | 17:37:08 | | 17:37:04 | | | | | | 003 | 17:37:47 | 00:09:33 | 3 | 012 > 007 > 005 > 003 | PM Peak |
| 012 | 16:22:54 | | | 16:23:33 | 16:35:19 | | 16:24:40 | | | 011 | 16:35:53 | 00:12:59 | 4 | 012 > 007 > 010 > 008 > 011 | |
| 012 | 10:51:38 | 11:03:45 | | 10:52:11 | | 11:03:17 | 10:52:50 | | | 001 | 11:05:51 | 00:14:13 | 5 | 012 > 007 > 010 > 009 > 005 > 001 | |
| 012 | 08:26:22 | 08:27:17 | | 08:27:01 | | | | | | 003 | 08:29:45 | 00:03:23 | 3 | 012 > 007 > 005 > 003 | AM Peak |
| 012 | 08:17:09 | 08:17:43 | 08:17:50 | 08:17:38 | | | 08:20:36 | | 08:22:20 | 019 | 08:23:10 | 00:06:01 | 6 | 012 > 007 > 005 > 006 > 010 > 015 > 019 | AM Peak |
| 012 | 12:35:40 | 12:42:32 | | 12:36:14 | | 12:41:46 | 12:37:09 | | | 003 | 12:43:06 | 00:07:26 | 5 | 012 > 007 > 010 > 009 > 005 > 003 | |
| 012 | 09:18:06 | | | 09:18:38 | | | 09:19:14 | | | 011 | 09:26:35 | 00:08:29 | 3 | 012 > 007 > 010 > 011 | |
| 012 | 07:53:35 | | | 07:54:05 | | | 07:54:43 | 07:58:23 | | 011 | 07:59:00 | 00:05:25 | 4 | 012 > 007 > 010 > 013 > 011 | |
| 012 | 16:15:03 | | | 16:15:39 | | | 16:19:51 | 16:22:13 | | 011 | 16:23:02 | 00:07:59 | 4 | 012 > 007 > 010 > 013 > 011 | |
| 012 | 18:25:29 | | | 18:27:21 | | | 18:27:59 | 18:31:35 | | 011 | 18:32:09 | 00:06:40 | 4 | 012 > 007 > 010 > 013 > 011 | |
| 012 | 07:45:43 | | | 07:46:16 | | | 07:46:49 | | 07:48:34 | 017 | 07:48:49 | 00:03:06 | 4 | 012 > 007 > 010 > 015 > 017 | |
| 012 | 10:08:05 | | | 10:08:42 | | | 10:09:38 | | 10:11:48 | 017 | 10:12:00 | 00:03:55 | 4 | 012 > 007 > 010 > 015 > 017 | |
| 012 | 10:56:43 | | | 10:57:20 | | | 10:58:07 | | 11:01:42 | 017 | 11:02:00 | 00:05:17 | 4 | 012 > 007 > 010 > 015 > 017 | |
| 012 | 11:00:58 | | | 11:01:33 | | | 11:02:12 | | 11:03:57 | 017 | 11:04:08 | 00:03:10 | 4 | 012 > 007 > 010 > 015 > 017 | |
| 012 | 11:36:32 | | | 11:37:00 | | | 11:37:36 | | 11:39:05 | 017 | 11:39:15 | 00:02:43 | 4 | 012 > 007 > 010 > 015 > 017 | |
| 012 | 12:24:45 | | | 12:25:15 | | | 12:26:13 | | 12:28:26 | 017 | 12:28:37 | 00:03:52 | 4 | 012 > 007 > 010 > 015 > 017 | |
| 012 | 14:09:51 | | | 14:10:25 | | | 14:11:07 | | 14:13:20 | 017 | 14:13:32 | 00:03:41 | 4 | 012 > 007 > 010 > 015 > 017 | |
| 012 | 14:36:01 | | | 14:36:32 | | | 14:37:10 | | 14:38:55 | 017 | 14:39:13 | 00:03:12 | 4 | 012 > 007 > 010 > 015 > 017 | |
| 012 | 15:36:24 | | | 15:36:56 | | | 15:38:02 | | 15:39:58 | 017 | 15:40:10 | 00:03:46 | 4 | 012 > 007 > 010 > 015 > 017 | |
| 012 | 15:40:05 | | | 15:40:43 | | | 15:41:20 | | 15:43:38 | 017 | 15:43:50 | 00:03:45 | 4 | 012 > 007 > 010 > 015 > 017 | |
| 012 | 16:01:10 | | | 16:01:46 | | | 16:02:31 | | 16:05:30 | 017 | 16:05:41 | 00:04:31 | 4 | 012 > 007 > 010 > 015 > 017 | |
| 012 | 16:03:05 | | | 16:04:07 | | | 16:04:41 | | 16:06:25 | 017 | 16:06:35 | 00:03:30 | 4 | 012 > 007 > 010 > 015 > 017 | |
| 012 | 16:24:31 | | | 16:25:06 | | | 16:27:02 | | 16:28:54 | 017 | 16:29:21 | 00:04:50 | 4 | 012 > 007 > 010 > 015 > 017 | |
| 012 | 08:21:36 | 08:22:19 | 08:24:16 | 08:22:16 | | | 08:25:11 | | 08:26:56 | 019 | 08:27:55 | 00:06:19 | 6 | 012 > 007 > 005 > 006 > 010 > 015 > 019 | AM Peak |
| 012 | 08:00:46 | | | 08:01:18 | 08:01:22 | | | | | 011 | 08:05:15 | 00:04:29 | 3 | 012 > 007 > 008 > 011 | AM Peak |
| 012 | 08:05:04 | | | 08:05:40 | 08:09:10 | | | | | 011 | 08:09:44 | 00:04:40 | 3 | 012 > 007 > 008 > 011 | AM Peak |
| 012 | 08:05:30 | | | 08:06:06 | 08:06:11 | | | | | 011 | 08:09:47 | 00:04:17 | 3 | 012 > 007 > 008 > 011 | AM Peak |
| 012 | 08:14:19 | | | 08:14:52 | 08:24:45 | | | | | 011 | 08:25:38 | 00:11:19 | 3 | 012 > 007 > 008 > 011 | AM Peak |
| 012 | 08:21:53 | | | 08:22:35 | 08:34:21 | | | | | 011 | 08:34:58 | 00:13:05 | 3 | 012 > 007 > 008 > 011 | AM Peak |
| 012 | 09:45:42 | | | 09:46:13 | | | 09:47:02 | | 09:53:36 | 019 | 09:54:30 | 00:08:48 | 4 | 012 > 007 > 010 > 015 > 019 | |
| 012 | 12:09:05 | | | 12:09:39 | | | 12:10:16 | | 12:12:21 | 019 | 12:13:12 | 00:04:07 | 4 | 012 > 007 > 010 > 015 > 019 | |
| 012 | 15:37:29 | | | 15:38:00 | | | 15:38:47 | | 15:40:55 | 019 | 15:41:47 | 00:04:18 | 4 | 012 > 007 > 010 > 015 > 019 | |
| 012 | 16:05:40 | | | 16:06:12 | | | 16:06:59 | | 16:14:50 | 019 | 16:16:03 | 00:10:23 | 4 | 012 > 007 > 010 > 015 > 019 | |
| 012 | 08:23:29 | | | 08:24:22 | 08:27:18 | | | | | 011 | 08:27:56 | 00:04:27 | 3 | 012 > 007 > 008 > 011 | AM Peak |
| 012 | 18:17:34 | | | 18:18:04 | | | 18:19:07 | | 18:28:32 | 019 | 18:29:27 | 00:11:53 | 4 | 012 > 007 > 010 > 015 > 019 | |
| 012 | 12:35:27 | | | 12:35:55 | | | 12:36:31 | | | 017 | 12:46:58 | 00:11:31 | 3 | 012 > 007 > 010 > 017 | |
| 012 | 16:35:30 | | | 16:36:08 | 16:37:25 | | | | | 011 | 16:38:01 | 00:02:31 | 3 | 012 > 007 > 008 > 011 | PM Peak |
| 012 | 17:02:21 | | | 17:02:56 | 17:13:47 | | | | | 011 | 17:14:16 | 00:11:55 | 3 | 012 > 007 > 008 > 011 | PM Peak |
| 012 | 11:44:48 | | | 11:45:15 | | | | | | 011 | 11:51:40 | 00:06:52 | 2 | 012 > 007 > 011 | |
| 012 | 12:03:37 | | | 12:04:23 | | | | | | 011 | 12:17:38 | 00:14:01 | 2 | 012 > 007 > 011 | |
| 012 | 16:18:05 | | | 16:18:41 | | | | | | 011 | 16:26:54 | 00:08:49 | 2 | 012 > 007 > 011 | |
| 012 | 08:32:28 | 08:33:25 | | 08:33:14 | | 08:41:04 | 08:35:31 | | | 003 | 08:42:57 | 00:10:29 | 5 | 012 > 007 > 010 > 009 > 005 > 003 | AM Peak |
| 012 | 08:47:45 | 08:55:27 | | 08:48:25 | | 08:49:04 | 08:54:38 | | | 003 | 08:56:07 | 00:08:22 | 5 | 012 > 007 > 010 > 009 > 005 > 003 | AM Peak |
| 012 | 11:14:39 | | | 11:15:14 | | | | | 11:17:19 | 017 | 11:17:34 | 00:02:55 | 3 | 012 > 007 > 015 > 017 | |
| 012 | 14:40:20 | | | 14:40:57 | | | | | 14:44:24 | 017 | 14:44:34 | 00:04:14 | 3 | 012 > 007 > 015 > 017 | |
| 012 | 15:03:22 | | | 15:03:53 | | | | | 15:06:16 | 017 | 15:06:28 | 00:03:06 | 3 | 012 > 007 > 015 > 017 | |
| 012 | 16:24:33 | | | 16:25:08 | | | | | 16:30:40 | 017 | 16:30:55 | 00:06:22 | 3 | 012 > 007 > 015 > 017 | |
| 012 | 08:08:40 | | | 08:09:10 | | | 08:11:26 | 08:15:44 | | 011 | 08:16:25 | 00:07:45 | 4 | 012 > 007 > 010 > 013 > 011 | AM Peak |
| 012 | 17:41:35 | | | 17:42:08 | | | | | 17:53:37 | 017 | 17:53:49 | 00:12:14 | 3 | 012 > 007 > 015 > 017 | |
| 012 | 09:28:44 | | | | 09:29:22 | | | | | 001 | 09:33:43 | 00:04:59 | 2 | 012 > 008 > 001 | |
| 012 | 12:27:14 | | | | 12:27:51 | | | | | 001 | 12:30:21 | 00:03:07 | 2 | 012 > 008 > 001 | |
| 012 | 13:12:59 | | | | 13:14:03 | | | | | 001 | 13:18:19 | 00:05:20 | 2 | 012 > 008 > 001 | |
| 012 | 16:25:35 | | | | 16:27:41 | | | | | 001 | 16:31:04 | 00:05:29 | 2 | 012 > 008 > 001 | |
| 012 | 16:51:40 | | | 16:52:12 | | | 16:53:00 | | 16:55:46 | 017 | 16:55:56 | 00:04:16 | 4 | 012 > 007 > 010 > 015 > 017 | PM Peak |
| 012 | 17:20:03 | | | 17:20:33 | | | 17:21:36 | | 17:23:31 | 017 | 17:23:42 | 00:03:39 | 4 | 012 > 007 > 010 > 015 > 017 | PM Peak |
| 012 | 17:28:47 | | | 17:29:14 | | | 17:30:25 | | 17:32:19 | 017 | 17:32:29 | 00:03:42 | 4 | 012 > 007 > 010 > 015 > 017 | PM Peak |
| 012 | 08:12:43 | | | 08:13:11 | | | 08:16:42 | | 08:19:04 | 019 | 08:20:21 | 00:07:38 | 4 | 012 > 007 > 010 > 015 > 019 | AM Peak |
| 012 | 08:15:58 | | | 08:16:32 | | | 08:19:02 | | 08:21:14 | 019 | 08:22:04 | 00:06:06 | 4 | 012 > 007 > 010 > 015 > 019 | AM Peak |
| 012 | 08:16:11 | | | 08:16:44 | | | 08:20:05 | | 08:22:10 | 019 | 08:23:01 | 00:06:50 | 4 | 012 > 007 > 010 > 015 > 019 | AM Peak |
| 012 | 17:10:36 | | | 17:11:08 | | | 17:12:15 | | 17:16:32 | 019 | 17:17:39 | 00:07:03 | 4 | 012 > 007 > 010 > 015 > 019 | PM Peak |
| 012 | 08:00:02 | | | 08:00:36 | | | | | | 011 | 08:10:17 | 00:10:15 | 2 | 012 > 007 > 011 | AM Peak |
| 012 | 08:05:26 | | | 08:06:03 | | | | | | 011 | 08:08:57 | 00:03:31 | 2 | 012 > 007 > 011 | AM Peak |
| 012 | 16:39:51 | | | 16:40:44 | | | | | | 011 | 16:43:53 | 00:04:02 | 2 | 012 > 007 > 011 | PM Peak |
| 012 | 09:00:18 | 09:00:51 | | | 09:00:50 | | | | | 001 | 09:03:40 | 00:03:22 | 3 | 012 > 008 > 005 > 001 | |
| 012 | 09:03:12 | 09:03:59 | | | 09:03:55 | | | | | 001 | 09:06:55 | 00:03:43 | 3 | 012 > 008 > 005 > 001 | |
| 012 | 09:53:50 | 09:54:40 | | | 09:54:32 | | | | | 001 | 09:57:18 | 00:03:28 | 3 | 012 > 008 > 005 > 001 | |
| 012 | 11:15:07 | 11:15:40 | | | 11:15:40 | | | | | 001 | 11:18:05 | 00:02:58 | 3 | 012 > 008 > 005 > 001 | |
| 012 | 14:14:03 | 14:14:44 | | | 14:14:43 | | | | | 001 | 14:17:55 | 00:03:52 | 3 | 012 > 008 > 005 > 001 | |
| 012 | 08:31:18 | | | 08:32:13 | | | | | 08:35:29 | 017 | 08:35:41 | 00:04:23 | 3 | 012 > 007 > 010 > 015 > 017 | AM Peak |
| 012 | 09:00:00 | 09:00:41 | | | 09:00:34 | | | | | 003 | 09:01:17 | 00:01:17 | 3 | 012 > 008 > 005 > 003 | |
| 012 | 15:53:34 | 15:54:13 | | | 15:54:12 | | | | | 003 | 15:54:47 | 00:01:13 | 3 | 012 > 008 > 005 > 003 | |
| 012 | 17:16:21 | | | 17:16:54 | | | | | 17:25:20 | 017 | 17:25:35 | 00:09:14 | 3 | 012 > 007 > 010 > 015 > 017 | PM Peak |
| 012 | 08:21:31 | 08:22:17 | | | 08:22:14 | | | | | 011 | 08:25:26 | 00:03:55 | 3 | 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 012 | 08:26:55 | 08:27:32 | | | 08:32:41 | | | | | 011 | 08:33:20 | 00:06:25 | 3 | 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 012 | 08:28:58 | 08:29:56 | | | 08:29:54 | | | | | 011 | 08:32:30 | 00:03:32 | 3 | 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 012 | 08:42:45 | 08:43:20 | | | 08:46:41 | | | | | 011 | 08:47:15 | 00:04:30 | 3 | 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 012 | 16:08:53 | 16:09:39 | | | 16:22:42 | | | | | 011 | 16:23:18 | 00:14:25 | 3 | 012 > 008 > 005 > 011 | |
| 012 | 16:59:55 | 17:07:19 | | | 17:11:42 | | | | | 011 | 17:12:18 | 00:12:23 | 3 | 012 > 007 > 005 > 006 > 008 > 011 | PM Peak |
| 012 | 07:09:34 | 07:10:13 | | 07:10:08 | 07:17:31 | | | | | 011 | 07:18:06 | 00:08:32 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 07:18:48 | 07:19:19 | | 07:19:15 | 07:32:01 | | | | | 011 | 07:32:29 | 00:13:41 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 07:43:55 | 07:44:28 | | 07:44:23 | 07:58:19 | | | | | 011 | 07:58:52 | 00:14:57 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 07:50:03 | 07:50:42 | | 07:50:36 | 07:52:52 | | | | | 011 | 07:53:27 | 00:03:24 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 07:55:42 | 07:56:24 | | 07:56:18 | 07:57:48 | | | | | 011 | 07:58:22 | 00:02:40 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 07:56:22 | 07:57:03 | | 07:56:58 | 07:58:36 | | | | | 011 | 07:59:10 | 00:02:48 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 08:03:47 | 08:04:29 | | 08:04:20 | 08:06:39 | | | | | 011 | 08:07:09 | 00:03:22 | 4 | 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 012 | 08:13:53 | 08:14:31 | | 08:14:25 | 08:16:29 | | | | | 011 | 08:17:02 | 00:03:09 | 4 | 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 012 | 08:14:31 | 08:15:15 | | 08:15:09 | 08:16:39 | | | | | 011 | 08:18:29 | 00:03:58 | 4 | 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 012 | 08:14:39 | 08:15:21 | | 08:15:15 | 08:18:04 | | | | | 011 | 08:18:42 | 00:04:03 | 4 | 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 012 | 08:17:03 | 08:17:39 | | 08:17:34 | 08:22:41 | | | | | 011 | 08:23:37 | 00:06:34 | 4 | 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 012 | 08:18:23 | 08:19:00 | | 08:18:54 | 08:22:04 | | | | | 011 | 08:23:02 | 00:04:39 | 4 | 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 012 | 08:19:15 | 08:20:13 | | 08:19:56 | 08:20:01 | | | | | 011 | 08:24:22 | 00:05:07 | 4 | 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 012 | 08:23:21 | 08:24:20 | | 08:24:15 | 08:26:32 | | | | | 011 | 08:27:05 | 00:03:44 | 4 | 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 012 | 08:31:24 | 08:32:28 | | 08:32:15 | 08:33:59 | | | | | 011 | 08:34:31 | 00:03:07 | 4 | 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 012 | 08:32:39 | 08:33:31 | | 08:33:18 | 08:33:22 | | | | | 011 | 08:38:19 | 00:05:40 | 4 | 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 012 | 09:18:04 | 09:18:40 | | 09:18:37 | 09:18:39 | | | | | 011 | 09:22:03 | 00:03:59 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 09:29:36 | 09:30:09 | | 09:30:06 | 09:30:08 | | | | | 011 | 09:40:00 | 00:10:24 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 10:17:52 | 10:18:40 | | 10:18:32 | 10:18:36 | | | | | 011 | 10:20:32 | 00:02:40 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 11:01:24 | 11:02:03 | | 11:01:58 | 11:07:35 | | | | | 011 | 11:08:06 | 00:06:42 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 11:16:39 | 11:17:14 | | 11:17:11 | 11:17:14 | | | | | 011 | 11:27:18 | 00:10:39 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 12:00:11 | 12:05:29 | | 12:04:50 | 12:12:12 | | | | | 011 | 12:15:06 | 00:14:55 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 12:21:02 | 12:32:19 | | 12:32:17 | 12:35:21 | | | | | 011 | 12:35:48 | 00:14:46 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 13:37:37 | 13:38:18 | | 13:38:14 | 13:40:37 | | | | | 011 | 13:41:09 | 00:03:32 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 14:02:17 | 14:03:03 | | 14:02:45 | 14:13:41 | | | | | 011 | 14:14:17 | 00:12:00 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 14:52:49 | 14:53:26 | | 14:53:22 | 15:03:35 | | | | | 011 | 15:04:11 | 00:11:22 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 15:06:09 | 15:06:47 | | 15:06:45 | 15:11:35 | | | | | 011 | 15:12:04 | 00:05:55 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 16:39:55 | 16:40:53 | | 16:40:49 | 16:43:07 | | | | | 011 | 16:43:45 | 00:03:50 | 4 | 012 > 007 > 005 > 006 > 008 > 011 | PM Peak |
| 012 | 16:41:36 | 16:42:27 | | 16:42:10 | 16:54:40 | | | | | 011 | 16:55:13 | 00:13:37 | 4 | 012 > 007 > 005 > 006 > 008 > 011 | PM Peak |
| 012 | 17:08:35 | 17:09:16 | | 17:09:08 | 17:12:44 | | | | | 011 | 17:13:15 | 00:04:40 | 4 | 012 > 007 > 005 > 006 > 008 > 011 | PM Peak |
| 012 | 17:12:42 | 17:13:13 | | 17:13:10 | 17:17:57 | | | | | 011 | 17:20:52 | 00:08:10 | 4 | 012 > 007 > 005 > 006 > 008 > 011 | PM Peak |
| 012 | 17:23:06 | 17:23:42 | | 17:23:39 | 17:27:07 | | | | | 011 | 17:27:39 | 00:04:33 | 4 | 012 > 007 > 005 > 006 > 008 > 011 | PM Peak |
| 012 | 17:27:46 | 17:28:49 | | 17:28:47 | 17:35:06 | | | | | 011 | 17:35:57 | 00:08:11 | 4 | 012 > 007 > 005 > 006 > 008 > 011 | PM Peak |
| 012 | 17:39:49 | 17:40:40 | | 17:40:30 | 17:40:39 | | | | | 011 | 17:43:08 | 00:03:19 | 4 | 012 > 008 > 007 > 005 > 011 | |
| 012 | 17:45:06 | 17:45:40 | | 17:45:38 | 17:45:41 | | | | | 011 | 17:48:06 | 00:03:00 | 4 | 012 > 008 > 007 > 005 > 011 | |

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|---|---|---|---|---|---|---|---|
| 012 | 08:33:57 | | 08:34:37 | | | | |
| 012 | 11:17:02 | | 11:27:31 | | | | |
| 012 | 18:26:42 | | 18:27:22 | | | 18:35:28 | |
| 012 | 13:21:26 | | | 13:31:50 | | | |
| 012 | 18:18:42 | | | 18:23:11 | | | |
| 012 | 09:13:15 | 09:16:30 | | 09:14:37 | 09:14:38 | | |
| 012 | 13:31:59 | | 13:40:41 | 13:39:51 | 13:39:53 | | |
| 012 | 11:21:45 | | | 11:23:00 | 11:23:02 | | 11:28:18 |
| 012 | 13:21:25 | | | 13:24:08 | | | |
| 012 | 16:27:23 | | | | 16:37:52 | 16:39:38 | |
| 012 | 07:11:37 | | | | 07:12:29 | | 07:13:52 |
| 012 | 18:03:12 | | | | 18:04:27 | | 18:06:30 |
| 012 | 12:38:01 | | | | 12:39:12 | | 12:40:50 |
| 012 | 07:15:10 | | | | | | |
| 012 | 07:25:02 | | | | | | |
| 012 | 07:48:32 | | | | | | |
| 012 | 07:51:37 | | | | | | |
| 012 | 07:55:35 | | | | | | |
| 012 | 07:55:45 | | | | | | |
| 012 | 07:58:17 | | | | | | |
| 012 | 07:58:39 | | | | | | |
| 012 | 08:00:32 | | | | | | |
| 012 | 08:02:06 | | | | | | |
| 012 | 08:02:25 | | | | | | |
| 012 | 08:03:53 | | | | | | |
| 012 | 08:04:02 | | | | | | |
| 012 | 08:08:41 | | | | | | |
| 012 | 08:09:41 | | | | | | |
| 012 | 08:11:14 | | | | | | |
| 012 | 08:11:30 | | | | | | |
| 012 | 08:12:36 | | | | | | |
| 012 | 08:13:04 | | | | | | |
| 012 | 08:19:51 | | | | | | |
| 012 | 08:20:15 | | | | | | |
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| 012 | 08:22:51 | | | | | | |
| 012 | 08:25:25 | | | | | | |
| 012 | 08:26:23 | | | | | | |
| 012 | 08:28:50 | | | | | | |
| 012 | 08:29:34 | | | | | | |
| 012 | 08:30:18 | | | | | | |
| 012 | 08:31:33 | | | | | | |
| 012 | 09:10:49 | | | | | | |
| 012 | 09:15:01 | | | | | | |
| 012 | 09:21:43 | | | | | | |
| 012 | 09:33:55 | | | | | | |
| 012 | 09:34:11 | | | | | | |
| 012 | 09:34:49 | | | | | | |
| 012 | 09:35:20 | | | | | | |
| 012 | 09:36:34 | | | | | | |
| 012 | 09:47:30 | | | | | | |
| 012 | 09:53:25 | | | | | | |
| 012 | 09:55:48 | | | | | | |
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| 012 | 10:10:07 | | | | | | |
| 012 | 10:10:34 | | | | | | |
| 012 | 10:15:46 | | | | | | |
| 012 | 10:17:13 | | | | | | |
| 012 | 10:19:50 | | | | | | |
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| 012 | 10:48:07 | | | | | | |
| 012 | 10:54:53 | | | | | | |
| 012 | 10:54:56 | | | | | | |
| 012 | 11:01:20 | | | | | | |
| 012 | 11:12:37 | | | | | | |
| 012 | 11:12:52 | | | | | | |
| 012 | 11:13:49 | | | | | | |
| 012 | 11:19:19 | | | | | | |
| 012 | 11:30:33 | | | | | | |
| 012 | 11:39:28 | | | | | | |
| 012 | 11:41:22 | | | | | | |
| 012 | 11:42:00 | | | | | | |
| 012 | 12:16:45 | | | | | | |
| 012 | 12:30:49 | | | | | | |
| 012 | 12:34:32 | | | | | | |
| 012 | 12:34:41 | | | | | | |
| 012 | 12:39:59 | | | | | | |
| 012 | 12:40:17 | | | | | | |
| 012 | 13:00:08 | | | | | | |
| 012 | 13:04:49 | | | | | | |
| 012 | 13:08:55 | | | | | | |
| 012 | 13:09:28 | | | | | | |
| 012 | 13:13:37 | | | | | | |
| 012 | 13:14:12 | | | | | | |
| 012 | 13:19:42 | | | | | | |
| 012 | 13:27:38 | | | | | | |
| 012 | 13:38:03 | | | | | | |
| 012 | 13:38:26 | | | | | | |
| 012 | 13:40:09 | | | | | | |
| 012 | 13:55:15 | | | | | | |
| 012 | 13:55:22 | | | | | | |
| 012 | 13:57:29 | | | | | | |
| 012 | 13:57:55 | | | | | | |
| 012 | 14:04:49 | | | | | | |
| 012 | 14:08:50 | | | | | | |
| 012 | 14:09:55 | | | | | | |
| 012 | 14:19:42 | | | | | | |
| 012 | 14:41:31 | | | | | | |
| 012 | 14:42:25 | | | | | | |
| 012 | 14:49:17 | | | | | | |
| 012 | 14:51:30 | | | | | | |
| 012 | 14:54:26 | | | | | | |
| 012 | 15:00:43 | | | | | | |
| 012 | 15:03:57 | | | | | | |
| 012 | 15:04:25 | | | | | | |
| 012 | 15:09:33 | | | | | | |
| 012 | 15:10:04 | | | | | | |
| 012 | 15:14:00 | | | | | | |
| 012 | 15:15:53 | | | | | | |
| 012 | 15:15:56 | | | | | | |
| 012 | 15:20:43 | | | | | | |
| 012 | 15:28:33 | | | | | | |
| 012 | 15:29:58 | | | | | | |

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|---|---|---|---|---|
| 011 | 08:47:57 | 00:14:00 | 2 012 > 007 > 005 > 006 > 008 > 011 | AM Peak |
| 011 | 11:28:04 | 00:11:02 | 2 012 > 008 > 011 | |
| 011 | 18:36:21 | 00:09:39 | 3 012 > 008 > 013 > 011 | |
| 003 | 13:33:18 | 00:11:52 | 2 012 > 009 > 003 | |
| 003 | 18:24:26 | 00:05:44 | 2 012 > 009 > 003 | |
| 003 | 09:17:06 | 00:03:51 | 4 012 > 009 > 010 > 005 > 003 | |
| 011 | 13:41:14 | 00:09:15 | 4 012 > 009 > 010 > 008 > 011 | |
| 019 | 11:29:17 | 00:07:32 | 4 012 > 009 > 010 > 015 > 019 | |
| 011 | 13:25:27 | 00:04:02 | 2 012 > 009 > 011 | |
| 011 | 16:42:20 | 00:14:57 | 3 012 > 010 > 013 > 011 | |
| 017 | 07:14:00 | 00:02:23 | 3 012 > 010 > 015 > 017 | |
| 017 | 18:06:49 | 00:03:37 | 3 012 > 010 > 015 > 017 | |
| 019 | 12:41:44 | 00:03:43 | 3 012 > 010 > 015 > 019 | |
| 011 | 07:16:59 | 00:01:49 | 1 012 > 011 | |
| 011 | 07:26:48 | 00:01:46 | 1 012 > 011 | |
| 011 | 07:50:37 | 00:02:05 | 1 012 > 011 | |
| 011 | 07:53:48 | 00:02:11 | 1 012 > 011 | |
| 011 | 08:00:23 | 00:04:48 | 1 012 > 011 | |
| 011 | 07:58:07 | 00:02:22 | 1 012 > 011 | |
| 011 | 08:10:40 | 00:12:23 | 1 012 > 011 | |
| 011 | 08:03:28 | 00:04:49 | 1 012 > 011 | |
| 011 | 08:09:25 | 00:08:53 | 1 012 > 011 | AM Peak |
| 011 | 08:08:20 | 00:06:14 | 1 012 > 011 | AM Peak |
| 011 | 08:05:09 | 00:02:44 | 1 012 > 011 | AM Peak |
| 011 | 08:06:48 | 00:02:55 | 1 012 > 011 | AM Peak |
| 011 | 08:08:05 | 00:04:03 | 1 012 > 011 | AM Peak |
| 011 | 08:11:27 | 00:02:46 | 1 012 > 011 | AM Peak |
| 011 | 08:14:07 | 00:04:26 | 1 012 > 011 | AM Peak |
| 011 | 08:14:51 | 00:03:37 | 1 012 > 011 | AM Peak |
| 011 | 08:24:17 | 00:12:47 | 1 012 > 011 | AM Peak |
| 011 | 08:18:16 | 00:05:40 | 1 012 > 011 | AM Peak |
| 011 | 08:17:10 | 00:04:06 | 1 012 > 011 | AM Peak |
| 011 | 08:23:11 | 00:03:20 | 1 012 > 011 | AM Peak |
| 011 | 08:23:50 | 00:03:35 | 1 012 > 011 | AM Peak |
| 011 | 08:23:52 | 00:03:07 | 1 012 > 011 | AM Peak |
| 011 | 08:23:22 | 00:01:53 | 1 012 > 011 | AM Peak |
| 011 | 08:26:08 | 00:03:17 | 1 012 > 011 | AM Peak |
| 011 | 08:27:58 | 00:02:33 | 1 012 > 011 | AM Peak |
| 011 | 08:39:43 | 00:13:20 | 1 012 > 011 | AM Peak |
| 011 | 08:32:27 | 00:03:37 | 1 012 > 011 | AM Peak |
| 011 | 08:40:17 | 00:10:43 | 1 012 > 011 | AM Peak |
| 011 | 08:36:43 | 00:06:25 | 1 012 > 011 | AM Peak |
| 011 | 08:34:19 | 00:02:46 | 1 012 > 011 | AM Peak |
| 011 | 09:24:53 | 00:14:04 | 1 012 > 011 | |
| 011 | 09:18:55 | 00:03:54 | 1 012 > 011 | |
| 011 | 09:30:46 | 00:09:03 | 1 012 > 011 | |
| 011 | 09:47:12 | 00:13:17 | 1 012 > 011 | |
| 011 | 09:46:17 | 00:12:06 | 1 012 > 011 | |
| 011 | 09:39:18 | 00:04:29 | 1 012 > 011 | |
| 011 | 09:43:06 | 00:07:46 | 1 012 > 011 | |
| 011 | 09:48:44 | 00:12:10 | 1 012 > 011 | |
| 011 | 10:02:31 | 00:15:01 | 1 012 > 011 | |
| 011 | 10:07:32 | 00:14:07 | 1 012 > 011 | |
| 011 | 09:58:39 | 00:02:51 | 1 012 > 011 | |
| 011 | 10:08:54 | 00:04:12 | 1 012 > 011 | |
| 011 | 10:14:11 | 00:08:05 | 1 012 > 011 | |
| 011 | 10:22:26 | 00:12:19 | 1 012 > 011 | |
| 011 | 10:23:45 | 00:13:11 | 1 012 > 011 | |
| 011 | 10:22:52 | 00:07:06 | 1 012 > 011 | |
| 011 | 10:20:37 | 00:03:24 | 1 012 > 011 | |
| 011 | 10:20:57 | 00:01:07 | 1 012 > 011 | |
| 011 | 10:44:47 | 00:04:23 | 1 012 > 011 | |
| 011 | 10:53:33 | 00:05:26 | 1 012 > 011 | |
| 011 | 11:09:53 | 00:15:00 | 1 012 > 011 | |
| 011 | 11:00:17 | 00:05:21 | 1 012 > 011 | |
| 011 | 11:03:37 | 00:02:17 | 1 012 > 011 | |
| 011 | 11:17:47 | 00:05:10 | 1 012 > 011 | |
| 011 | 11:17:00 | 00:04:08 | 1 012 > 011 | |
| 011 | 11:20:01 | 00:06:12 | 1 012 > 011 | |
| 011 | 11:30:13 | 00:10:54 | 1 012 > 011 | |
| 011 | 11:44:50 | 00:14:17 | 1 012 > 011 | |
| 011 | 11:52:38 | 00:13:10 | 1 012 > 011 | |
| 011 | 11:50:01 | 00:08:39 | 1 012 > 011 | |
| 011 | 11:49:50 | 00:07:50 | 1 012 > 011 | |
| 011 | 12:21:30 | 00:04:45 | 1 012 > 011 | |
| 011 | 12:44:13 | 00:13:24 | 1 012 > 011 | |
| 011 | 12:37:08 | 00:02:36 | 1 012 > 011 | |
| 011 | 12:36:30 | 00:01:49 | 1 012 > 011 | |
| 011 | 12:51:47 | 00:11:48 | 1 012 > 011 | |
| 011 | 12:44:19 | 00:04:02 | 1 012 > 011 | |
| 011 | 13:14:53 | 00:14:45 | 1 012 > 011 | |
| 011 | 13:11:26 | 00:06:37 | 1 012 > 011 | |
| 011 | 13:13:30 | 00:04:35 | 1 012 > 011 | |
| 011 | 13:12:12 | 00:02:44 | 1 012 > 011 | |
| 011 | 13:23:59 | 00:10:22 | 1 012 > 011 | |
| 011 | 13:18:15 | 00:04:03 | 1 012 > 011 | |
| 011 | 13:27:05 | 00:07:23 | 1 012 > 011 | |
| 011 | 13:34:48 | 00:07:10 | 1 012 > 011 | |
| 011 | 13:52:17 | 00:14:14 | 1 012 > 011 | |
| 011 | 13:41:55 | 00:03:29 | 1 012 > 011 | |
| 011 | 13:42:55 | 00:02:46 | 1 012 > 011 | |
| 011 | 14:08:10 | 00:12:55 | 1 012 > 011 | |
| 011 | 13:58:23 | 00:03:01 | 1 012 > 011 | |
| 011 | 14:02:46 | 00:05:17 | 1 012 > 011 | |
| 011 | 14:02:23 | 00:04:28 | 1 012 > 011 | |
| 011 | 14:09:20 | 00:04:31 | 1 012 > 011 | |
| 011 | 14:11:13 | 00:02:23 | 1 012 > 011 | |
| 011 | 14:24:18 | 00:14:23 | 1 012 > 011 | |
| 011 | 14:23:32 | 00:03:50 | 1 012 > 011 | |
| 011 | 14:45:46 | 00:04:15 | 1 012 > 011 | |
| 011 | 14:47:57 | 00:05:32 | 1 012 > 011 | |
| 011 | 15:03:37 | 00:14:20 | 1 012 > 011 | |
| 011 | 15:03:27 | 00:11:57 | 1 012 > 011 | |
| 011 | 15:01:16 | 00:06:50 | 1 012 > 011 | |
| 011 | 15:07:20 | 00:06:37 | 1 012 > 011 | |
| 011 | 15:07:37 | 00:03:40 | 1 012 > 011 | |
| 011 | 15:13:36 | 00:09:11 | 1 012 > 011 | |
| 011 | 15:22:17 | 00:12:44 | 1 012 > 011 | |
| 011 | 15:17:23 | 00:07:19 | 1 012 > 011 | |
| 011 | 15:28:07 | 00:14:07 | 1 012 > 011 | |
| 011 | 15:26:44 | 00:10:51 | 1 012 > 011 | |
| 011 | 15:18:43 | 00:02:47 | 1 012 > 011 | |
| 011 | 15:26:49 | 00:06:06 | 1 012 > 011 | |
| 011 | 15:41:52 | 00:13:19 | 1 012 > 011 | |
| 011 | 15:44:24 | 00:14:26 | 1 012 > 011 | |

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| 012 | 15:36:45 | | | | | | | | | | | | |
| 012 | 15:38:48 | | | | | | | | | | | | |
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| 012 | 15:56:13 | | | | | | | | | | | | |
| 012 | 16:05:56 | | | | | | | | | | | | |
| 012 | 16:06:13 | | | | | | | | | | | | |
| 012 | 16:13:24 | | | | | | | | | | | | |
| 012 | 16:17:26 | | | | | | | | | | | | |
| 012 | 16:18:06 | | | | | | | | | | | | |
| 012 | 16:20:32 | | | | | | | | | | | | |
| 012 | 16:27:34 | | | | | | | | | | | | |
| 012 | 16:29:51 | | | | | | | | | | | | |
| 012 | 16:30:41 | | | | | | | | | | | | |
| 012 | 16:31:42 | | | | | | | | | | | | |
| 012 | 16:34:09 | | | | | | | | | | | | |
| 012 | 16:43:11 | | | | | | | | | | | | |
| 012 | 16:43:31 | | | | | | | | | | | | |
| 012 | 16:45:21 | | | | | | | | | | | | |
| 012 | 16:49:32 | | | | | | | | | | | | |
| 012 | 16:51:22 | | | | | | | | | | | | |
| 012 | 16:53:02 | | | | | | | | | | | | |
| 012 | 16:58:46 | | | | | | | | | | | | |
| 012 | 16:59:52 | | | | | | | | | | | | |
| 012 | 17:02:57 | | | | | | | | | | | | |
| 012 | 17:03:20 | | | | | | | | | | | | |
| 012 | 17:06:36 | | | | | | | | | | | | |
| 012 | 17:06:51 | | | | | | | | | | | | |
| 012 | 17:18:25 | | | | | | | | | | | | |
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| 012 | 17:21:50 | | | | | | | | | | | | |
| 012 | 17:22:15 | | | | | | | | | | | | |
| 012 | 17:25:55 | | | | | | | | | | | | |
| 012 | 17:28:10 | | | | | | | | | | | | |
| 012 | 17:29:11 | | | | | | | | | | | | |
| 012 | 17:32:24 | | | | | | | | | | | | |
| 012 | 17:32:29 | | | | | | | | | | | | |
| 012 | 17:32:30 | | | | | | | | | | | | |
| 012 | 17:34:20 | | | | | | | | | | | | |
| 012 | 17:36:43 | | | | | | | | | | | | |
| 012 | 17:37:48 | | | | | | | | | | | | |
| 012 | 17:39:08 | | | | | | | | | | | | |
| 012 | 17:41:54 | | | | | | | | | | | | |
| 012 | 17:45:22 | | | | | | | | | | | | |
| 012 | 17:46:31 | | | | | | | | | | | | |
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| 012 | 17:49:18 | | | | | | | | | | | | |
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| 012 | 18:21:59 | | | | | | | | | | | | |
| 012 | 18:22:18 | | | | | | | | | | | | |
| 012 | 18:22:48 | | | | | | | | | | | | |
| 012 | 18:26:08 | | | | | | | | | | | | |
| 012 | 18:29:25 | | | | | | | | | | | | |
| 012 | 18:29:42 | | | | | | | | | | | | |
| 012 | 18:39:29 | | | | | | | | | | | | |
| 012 | 18:45:25 | | | | | | | | | | | | |
| 012 | 08:28:47 | | | | | | | | | 08:42:27 | | | |
| 012 | 09:15:30 | | | | | | | | 09:26:10 | | | | |
| 012 | 11:39:37 | | | | | | | | 11:43:07 | | | | |
| 012 | 13:04:06 | | | | | | | | 13:11:57 | | | | |
| 012 | 14:04:21 | | | | | | | | 14:11:15 | | | | |
| 012 | 14:17:46 | | | | | | | | 14:21:16 | | | | |
| 012 | 15:36:39 | | | | | | | | 15:42:01 | | | | |
| 012 | 18:01:08 | | | | | | | | 18:07:33 | | | | |
| 012 | 18:01:38 | | | | | | | | 18:05:33 | | | | |
| 012 | 18:06:00 | | | | | | | | 18:12:36 | | | | |
| 012 | 13:43:30 | | | | | | | | 13:44:11 | 13:44:14 | 13:47:00 | | |
| 012 | 16:23:10 | | | | | | | | 16:23:53 | 16:23:57 | 16:26:23 | | |
| 012 | 15:11:48 | | | | | | | | | 15:12:23 | | | |
| 012 | 15:34:53 | 15:38:35 | | | | | | | | 15:35:34 | | | |
| 012 | 07:19:57 | 07:25:53 | | | | 07:25:04 | | | | 07:20:44 | | | |
| 012 | 08:15:49 | 08:25:42 | | | | 08:24:15 | | | | 08:16:39 | | | |
| 012 | 11:21:02 | 11:24:00 | | | | 11:23:14 | | | | 11:21:38 | | | |
| 012 | 14:08:47 | 14:15:59 | | | | 14:15:15 | | | | 14:09:53 | | | |
| 012 | 15:27:44 | 15:39:38 | | | | 15:38:45 | | | | 15:28:30 | | | |
| 012 | 15:39:07 | 15:52:21 | | | | 15:51:48 | | | | 15:39:42 | | | |
| 012 | 13:30:41 | | | | 13:38:48 | 13:38:13 | | | | 13:31:16 | | | |
| 012 | 09:15:12 | 09:23:28 | | | | 09:22:48 | 09:22:49 | | | 09:15:55 | | | |
| 012 | 13:36:14 | 13:41:08 | | | | 13:40:33 | 13:40:35 | | | 13:36:59 | | | |
| 012 | 08:21:15 | 08:28:25 | | | | 08:27:53 | | | | 08:21:58 | | | |
| 012 | 09:35:12 | 09:40:29 | | | | 09:39:28 | 09:39:30 | | | 09:36:06 | | | |
| 012 | 11:02:53 | 11:10:42 | | | | 11:10:06 | 11:10:07 | | | 11:03:29 | | | |
| 012 | 11:10:26 | 11:23:56 | | | | 11:23:10 | 11:23:12 | | | 11:11:11 | | | |
| 012 | 11:47:53 | 11:52:28 | | | | 11:51:55 | 11:51:57 | | | 11:48:28 | | | |
| 012 | 12:27:26 | 12:36:35 | | | | 12:35:47 | 12:35:49 | | | 12:28:03 | | | |
| 012 | 12:51:42 | 12:55:56 | | | | 12:55:08 | 12:55:10 | | | 12:52:31 | | | |
| 012 | 14:55:07 | 15:07:58 | | | | 15:07:16 | 15:07:18 | | | 14:55:55 | | | |
| 012 | 10:47:17 | | | | 10:59:15 | 10:58:31 | 10:58:33 | | | 10:48:01 | | | |
| 012 | 08:32:03 | | | | | | | | | 08:32:47 | | | |
| 012 | 13:09:45 | | | | | | | | | 13:10:25 | | | |
| 012 | 16:05:42 | | | | | | | | | 16:06:23 | | | |
| 012 | 16:09:40 | | | | | | | | | 16:10:42 | | | |
| 012 | 16:23:17 | | | | | | | | | 16:24:00 | | | |
| 012 | 17:41:33 | | | | | | | | | 17:42:09 | | | |
| 012 | 17:52:48 | | | | | | | | | 17:53:29 | | | |
| 012 | 18:23:41 | | | | | | | | 18:26:44 | 18:24:25 | | | |
| 012 | 16:48:30 | 16:52:05 | | | | | | | 16:50:55 | 16:49:03 | | | |
| 012 | 07:08:27 | 07:13:32 | | 07:13:26 | | | | | 07:11:49 | 07:09:11 | | | |
| 012 | 07:28:35 | 07:33:32 | | 07:33:26 | | | | | 07:32:01 | 07:29:13 | | | |
| 012 | 07:52:25 | 07:58:07 | | 07:57:59 | | | | | 07:56:08 | 07:53:32 | | | |
| 012 | 08:23:11 | 08:30:43 | | 08:30:36 | | | | | 08:28:28 | 08:25:03 | | | |
| 012 | 08:38:26 | 08:46:09 | | 08:45:44 | | | | | 08:44:21 | 08:39:21 | | | |
| 012 | 08:46:50 | 08:49:58 | | 08:49:55 | | | | | 08:48:45 | 08:47:32 | | | |
| 012 | 09:01:50 | 09:08:20 | | 09:08:15 | | | | | 09:06:57 | 09:02:43 | | | |

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|---|---|---|---|---|
| 011 | 15:44:55 | 00:08:10 | 1 012 > 011 | |
| 011 | 15:51:21 | 00:12:33 | 1 012 > 011 | |
| 011 | 15:53:42 | 00:12:25 | 1 012 > 011 | |
| 011 | 15:47:07 | 00:05:32 | 1 012 > 011 | |
| 011 | 16:04:22 | 00:09:32 | 1 012 > 011 | |
| 011 | 16:07:01 | 00:10:49 | 1 012 > 011 | |
| 011 | 16:06:15 | 00:10:02 | 1 012 > 011 | |
| 011 | 16:11:23 | 00:05:27 | 1 012 > 011 | |
| 011 | 16:11:15 | 00:05:02 | 1 012 > 011 | |
| 011 | 16:21:48 | 00:08:24 | 1 012 > 011 | |
| 011 | 16:21:30 | 00:04:04 | 1 012 > 011 | |
| 011 | 16:24:59 | 00:06:53 | 1 012 > 011 | |
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| 011 | 16:32:19 | 00:04:45 | 1 012 > 011 | |
| 011 | 16:33:58 | 00:04:07 | 1 012 > 011 | |
| 011 | 16:36:31 | 00:05:50 | 1 012 > 011 | PM Peak |
| 011 | 16:40:34 | 00:08:52 | 1 012 > 011 | PM Peak |
| 011 | 16:40:45 | 00:06:36 | 1 012 > 011 | PM Peak |
| 011 | 16:50:21 | 00:07:10 | 1 012 > 011 | PM Peak |
| 011 | 16:53:02 | 00:09:31 | 1 012 > 011 | PM Peak |
| 011 | 16:49:17 | 00:03:56 | 1 012 > 011 | PM Peak |
| 011 | 16:53:47 | 00:04:15 | 1 012 > 011 | PM Peak |
| 011 | 16:58:24 | 00:07:02 | 1 012 > 011 | PM Peak |
| 011 | 16:58:15 | 00:05:13 | 1 012 > 011 | PM Peak |
| 011 | 17:01:03 | 00:02:17 | 1 012 > 011 | PM Peak |
| 011 | 17:04:52 | 00:05:00 | 1 012 > 011 | PM Peak |
| 011 | 17:17:16 | 00:14:19 | 1 012 > 011 | PM Peak |
| 011 | 17:05:53 | 00:02:33 | 1 012 > 011 | PM Peak |
| 011 | 17:13:59 | 00:07:23 | 1 012 > 011 | PM Peak |
| 011 | 17:09:52 | 00:03:01 | 1 012 > 011 | PM Peak |
| 011 | 17:26:35 | 00:08:10 | 1 012 > 011 | PM Peak |
| 011 | 17:24:23 | 00:03:48 | 1 012 > 011 | PM Peak |
| 011 | 17:25:22 | 00:03:32 | 1 012 > 011 | PM Peak |
| 011 | 17:27:42 | 00:05:27 | 1 012 > 011 | PM Peak |
| 011 | 17:27:21 | 00:01:26 | 1 012 > 011 | PM Peak |
| 011 | 17:42:30 | 00:14:20 | 1 012 > 011 | PM Peak |
| 011 | 17:36:05 | 00:06:54 | 1 012 > 011 | PM Peak |
| 011 | 17:36:24 | 00:04:00 | 1 012 > 011 | |
| 011 | 17:43:54 | 00:11:25 | 1 012 > 011 | |
| 011 | 17:35:14 | 00:02:44 | 1 012 > 011 | |
| 011 | 17:43:56 | 00:09:36 | 1 012 > 011 | |
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| 011 | 17:42:26 | 00:04:38 | 1 012 > 011 | |
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| 011 | 17:53:32 | 00:11:38 | 1 012 > 011 | |
| 011 | 18:00:08 | 00:14:46 | 1 012 > 011 | |
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| 011 | 18:07:30 | 00:14:49 | 1 012 > 011 | |
| 011 | 18:01:01 | 00:02:51 | 1 012 > 011 | |
| 011 | 18:05:13 | 00:07:00 | 1 012 > 011 | |
| 011 | 18:16:03 | 00:13:11 | 1 012 > 011 | |
| 011 | 18:09:01 | 00:05:45 | 1 012 > 011 | |
| 011 | 18:25:40 | 00:07:28 | 1 012 > 011 | |
| 011 | 18:24:01 | 00:05:24 | 1 012 > 011 | |
| 011 | 18:25:53 | 00:04:32 | 1 012 > 011 | |
| 011 | 18:35:15 | 00:13:40 | 1 012 > 011 | |
| 011 | 18:30:05 | 00:08:06 | 1 012 > 011 | |
| 011 | 18:27:44 | 00:05:26 | 1 012 > 011 | |
| 011 | 18:29:51 | 00:07:03 | 1 012 > 011 | |
| 011 | 18:39:35 | 00:13:27 | 1 012 > 011 | |
| 011 | 18:42:12 | 00:12:47 | 1 012 > 011 | |
| 011 | 18:33:09 | 00:03:27 | 1 012 > 011 | |
| 011 | 18:40:34 | 00:01:05 | 1 012 > 011 | |
| 011 | 18:50:06 | 00:04:41 | 1 012 > 011 | |
| 011 | 08:43:19 | 00:14:32 | 2 012 > 014 > 013 > 011 | AM Peak |
| 011 | 09:26:50 | 00:11:20 | 2 012 > 013 > 011 | |
| 011 | 11:43:42 | 00:04:05 | 2 012 > 013 > 011 | |
| 011 | 13:12:45 | 00:08:39 | 2 012 > 013 > 011 | |
| 011 | 14:11:59 | 00:07:38 | 2 012 > 013 > 011 | |
| 011 | 14:21:59 | 00:04:13 | 2 012 > 013 > 011 | |
| 011 | 15:42:51 | 00:06:12 | 2 012 > 013 > 011 | |
| 011 | 18:08:40 | 00:07:32 | 2 012 > 013 > 011 | |
| 011 | 18:06:13 | 00:04:35 | 2 012 > 013 > 011 | |
| 011 | 18:13:51 | 00:07:51 | 2 012 > 013 > 011 | |
| 017 | 13:47:19 | 00:03:49 | 4 012 > 013 > 014 > 015 > 017 | |
| 017 | 16:26:36 | 00:03:26 | 4 012 > 013 > 014 > 015 > 017 | |
| 003 | 15:25:32 | 00:13:44 | 2 012 > 014 > 003 | |
| 003 | 15:39:11 | 00:04:18 | 3 012 > 014 > 005 > 003 | |
| 003 | 07:26:27 | 00:06:30 | 4 012 > 014 > 009 > 005 > 003 | |
| 003 | 08:26:18 | 00:10:29 | 4 012 > 014 > 009 > 005 > 003 | AM Peak |
| 003 | 11:24:33 | 00:03:31 | 4 012 > 014 > 009 > 005 > 003 | |
| 003 | 14:16:33 | 00:07:46 | 4 012 > 014 > 009 > 005 > 003 | |
| 003 | 15:40:15 | 00:12:31 | 4 012 > 014 > 009 > 005 > 003 | |
| 003 | 15:52:52 | 00:13:45 | 4 012 > 014 > 009 > 005 > 003 | |
| 011 | 13:39:19 | 00:08:38 | 4 012 > 014 > 009 > 008 > 011 | |
| 001 | 09:26:01 | 00:10:49 | 5 012 > 014 > 009 > 010 > 005 > 001 | |
| 001 | 13:43:45 | 00:07:31 | 5 012 > 014 > 009 > 010 > 005 > 001 | |
| 003 | 08:28:59 | 00:07:44 | 4 012 > 014 > 009 > 005 > 003 | AM Peak |
| 003 | 09:41:09 | 00:05:57 | 5 012 > 014 > 009 > 010 > 005 > 003 | |
| 003 | 11:11:10 | 00:08:17 | 5 012 > 014 > 009 > 010 > 005 > 003 | |
| 003 | 11:24:30 | 00:14:04 | 5 012 > 014 > 009 > 010 > 005 > 003 | |
| 003 | 11:53:04 | 00:05:11 | 5 012 > 014 > 009 > 010 > 005 > 003 | |
| 003 | 12:37:09 | 00:09:43 | 5 012 > 014 > 009 > 010 > 005 > 003 | |
| 003 | 12:56:33 | 00:04:51 | 5 012 > 014 > 009 > 010 > 005 > 003 | |
| 003 | 15:08:34 | 00:13:27 | 5 012 > 014 > 009 > 010 > 005 > 003 | |
| 011 | 10:59:51 | 00:12:34 | 5 012 > 014 > 009 > 010 > 008 > 011 | |
| 011 | 08:36:12 | 00:04:09 | 2 012 > 014 > 013 > 011 | AM Peak |
| 011 | 13:21:38 | 00:11:53 | 2 012 > 014 > 011 | |
| 011 | 16:10:20 | 00:04:38 | 2 012 > 014 > 011 | |
| 011 | 16:14:13 | 00:04:33 | 2 012 > 014 > 011 | |
| 011 | 16:28:47 | 00:05:30 | 2 012 > 014 > 011 | |
| 011 | 17:54:34 | 00:13:01 | 2 012 > 014 > 011 | |
| 011 | 18:07:47 | 00:14:59 | 2 012 > 014 > 011 | |
| 001 | 18:32:46 | 00:09:05 | 3 012 > 014 > 013 > 001 | |
| 003 | 16:52:41 | 00:04:11 | 4 012 > 014 > 013 > 005 > 003 | PM Peak |
| 001 | 07:18:20 | 00:09:53 | 5 012 > 014 > 013 > 007 > 005 > 001 | |
| 001 | 07:38:18 | 00:09:43 | 5 012 > 014 > 013 > 007 > 005 > 001 | |
| 001 | 08:02:26 | 00:10:01 | 5 012 > 014 > 013 > 007 > 005 > 001 | |
| 001 | 08:33:40 | 00:10:29 | 5 012 > 014 > 013 > 007 > 005 > 001 | AM Peak |
| 001 | 08:48:53 | 00:10:27 | 5 012 > 014 > 013 > 007 > 005 > 001 | AM Peak |
| 001 | 08:52:15 | 00:05:25 | 5 012 > 014 > 013 > 007 > 005 > 001 | AM Peak |
| 001 | 09:12:19 | 00:10:29 | 5 012 > 014 > 013 > 007 > 005 > 001 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 012 | 10:04:45 | 10:10:10 | 10:10:07 | | 10:08:41 | 10:06:41 | | 001 | 10:12:31 | 00:07:46 | 5 | 012 > 014 > 013 > 007 > 005 > 001 | |
| 012 | 10:07:43 | 10:14:21 | 10:14:17 | | 10:12:22 | 10:08:32 | | 001 | 10:17:43 | 00:10:00 | 5 | 012 > 014 > 013 > 007 > 005 > 001 | |
| 012 | 12:49:13 | 12:53:10 | 12:53:07 | | 12:51:30 | 12:49:58 | | 001 | 12:55:51 | 00:06:38 | 5 | 012 > 014 > 013 > 007 > 005 > 001 | |
| 012 | 15:40:33 | 15:45:44 | 15:45:39 | | 15:43:38 | 15:41:22 | | 001 | 15:49:45 | 00:09:12 | 5 | 012 > 014 > 013 > 007 > 005 > 001 | |
| 012 | 09:04:41 | 09:16:04 | 09:16:02 | | 09:14:48 | 09:05:19 | | 003 | 09:16:33 | 00:11:52 | 5 | 012 > 014 > 013 > 007 > 005 > 003 | |
| 012 | 11:40:20 | 11:46:32 | 11:46:30 | | 11:45:31 | 11:40:56 | | 003 | 11:47:00 | 00:06:40 | 5 | 012 > 014 > 013 > 007 > 005 > 003 | |
| 012 | 12:59:50 | 13:05:47 | 13:05:46 | | 13:04:27 | 13:00:36 | | 003 | 13:06:15 | 00:06:25 | 5 | 012 > 014 > 013 > 007 > 005 > 003 | |
| 012 | 07:16:12 | | | | 07:20:21 | 07:16:51 | | 011 | 07:21:05 | 00:04:53 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 07:23:52 | | | | 07:35:46 | 07:24:37 | | 011 | 07:36:42 | 00:12:50 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 07:41:28 | | | | 07:48:36 | 07:42:37 | | 011 | 07:49:19 | 00:07:51 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 08:01:36 | | | | 08:06:02 | 08:02:17 | | 011 | 08:07:02 | 00:05:26 | 3 | 012 > 014 > 013 > 011 | AM Peak |
| 012 | 08:02:19 | | | | 08:05:29 | 08:03:03 | | 011 | 08:06:22 | 00:04:03 | 3 | 012 > 014 > 013 > 011 | AM Peak |
| 012 | 08:03:13 | | | | 08:15:09 | 08:03:53 | | 011 | 08:15:55 | 00:12:42 | 3 | 012 > 014 > 013 > 011 | AM Peak |
| 012 | 08:03:16 | | | | 08:06:07 | 08:03:55 | | 011 | 08:07:06 | 00:03:50 | 3 | 012 > 014 > 013 > 011 | AM Peak |
| 012 | 08:04:11 | | | | 08:07:51 | 08:04:53 | | 011 | 08:08:35 | 00:04:24 | 3 | 012 > 014 > 013 > 011 | AM Peak |
| 012 | 08:05:28 | | | | 08:13:52 | 08:06:11 | | 011 | 08:14:40 | 00:09:12 | 3 | 012 > 014 > 013 > 011 | AM Peak |
| 012 | 08:15:21 | | | | 08:22:30 | 08:15:59 | | 011 | 08:23:17 | 00:07:56 | 3 | 012 > 014 > 013 > 011 | AM Peak |
| 012 | 08:27:17 | | | | 08:36:57 | 08:28:08 | | 011 | 08:37:40 | 00:10:23 | 3 | 012 > 014 > 013 > 011 | AM Peak |
| 012 | 08:30:16 | | | | 08:39:22 | 08:31:31 | | 011 | 08:40:08 | 00:09:52 | 3 | 012 > 014 > 013 > 011 | AM Peak |
| 012 | 08:30:45 | | | | 08:35:05 | 08:31:48 | | 011 | 08:35:46 | 00:05:01 | 3 | 012 > 014 > 013 > 011 | AM Peak |
| 012 | 08:32:37 | | | | 08:36:39 | 08:33:20 | | 011 | 08:37:22 | 00:04:45 | 3 | 012 > 014 > 013 > 011 | AM Peak |
| 012 | 08:37:00 | | | | 08:45:12 | 08:37:50 | | 011 | 08:45:54 | 00:08:54 | 3 | 012 > 014 > 013 > 011 | AM Peak |
| 012 | 08:41:09 | | | | 08:45:16 | 08:41:49 | | 011 | 08:45:58 | 00:04:49 | 3 | 012 > 014 > 013 > 011 | AM Peak |
| 012 | 08:57:19 | | | | 09:10:26 | 08:58:00 | | 011 | 09:11:13 | 00:13:54 | 3 | 012 > 014 > 013 > 011 | AM Peak |
| 012 | 09:10:07 | | | | 09:20:45 | 09:10:43 | | 011 | 09:21:21 | 00:11:14 | 3 | 012 > 014 > 013 > 011 | |
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| 012 | 10:10:40 | | | | 10:17:41 | 10:11:25 | | 011 | 10:18:32 | 00:07:52 | 3 | 012 > 014 > 013 > 011 | |
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| 012 | 10:48:00 | | | | 10:56:24 | 10:48:41 | | 011 | 10:57:37 | 00:09:37 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 10:48:03 | | | | 10:52:35 | 10:48:44 | | 011 | 10:53:17 | 00:05:14 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 10:57:39 | | | | 11:04:17 | 10:58:22 | | 011 | 11:05:03 | 00:07:24 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 10:58:08 | | | | 11:03:15 | 10:58:41 | | 011 | 11:03:53 | 00:05:45 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 11:00:19 | | | | 11:06:11 | 11:01:03 | | 011 | 11:07:02 | 00:06:43 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 11:13:53 | | | | 11:22:43 | 11:14:29 | | 011 | 11:23:16 | 00:09:23 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 11:15:34 | | | | 11:21:59 | 11:16:15 | | 011 | 11:22:49 | 00:07:15 | 3 | 012 > 014 > 013 > 011 | |
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| 012 | 11:23:13 | | | | 11:29:57 | 11:23:48 | | 011 | 11:30:45 | 00:07:32 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 11:23:24 | | | | 11:32:05 | 11:24:06 | | 011 | 11:33:05 | 00:09:41 | 3 | 012 > 014 > 013 > 011 | |
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| 012 | 11:55:02 | | | | 12:04:20 | 11:55:44 | | 011 | 12:05:07 | 00:10:05 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 11:56:53 | | | | 12:01:00 | 11:57:31 | | 011 | 12:01:41 | 00:04:48 | 3 | 012 > 014 > 013 > 011 | |
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| 012 | 12:00:31 | | | | 12:06:29 | 12:01:20 | | 011 | 12:07:32 | 00:07:01 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 12:11:19 | | | | 12:19:58 | 12:11:54 | | 011 | 12:20:42 | 00:09:23 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 12:14:19 | | | | 12:22:55 | 12:15:04 | | 011 | 12:23:41 | 00:09:22 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 12:45:18 | | | | 12:49:06 | 12:45:51 | | 011 | 12:49:46 | 00:04:28 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 12:45:30 | | | | 12:55:29 | 12:46:04 | | 011 | 12:56:15 | 00:10:45 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 12:49:00 | | | | 12:57:49 | 12:49:46 | | 011 | 12:58:38 | 00:09:38 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 12:55:20 | | | | 12:59:14 | 12:55:59 | | 011 | 12:59:57 | 00:04:37 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 12:56:09 | | | | 13:07:54 | 12:56:42 | | 011 | 13:08:36 | 00:12:27 | 3 | 012 > 014 > 013 > 011 | |
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| 012 | 13:13:13 | | | | 13:16:58 | 13:13:59 | | 011 | 13:17:40 | 00:04:27 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 13:17:43 | | | | 13:24:35 | 13:18:15 | | 011 | 13:25:16 | 00:07:33 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 13:30:02 | | | | 13:35:44 | 13:30:39 | | 011 | 13:36:39 | 00:06:37 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 13:40:51 | | | | 13:46:32 | 13:41:25 | | 011 | 13:47:13 | 00:06:22 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 13:44:43 | | | | 13:54:37 | 13:45:28 | | 011 | 13:55:35 | 00:10:52 | 3 | 012 > 014 > 013 > 011 | |
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| 012 | 13:47:59 | | | | 13:52:05 | 13:48:46 | | 011 | 13:52:51 | 00:04:52 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 13:54:38 | | | | 14:06:18 | 13:55:26 | | 011 | 14:07:04 | 00:12:26 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 13:55:24 | | | | 13:59:59 | 13:56:10 | | 011 | 14:00:59 | 00:05:35 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 13:56:16 | | | | 13:59:54 | 13:56:59 | | 011 | 14:00:53 | 00:04:37 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 14:02:24 | | | | 14:07:23 | 14:03:00 | | 011 | 14:08:19 | 00:05:55 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 14:04:54 | | | | 14:17:08 | 14:05:32 | | 011 | 14:17:57 | 00:13:03 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 14:10:08 | | | | 14:16:14 | 14:10:53 | | 011 | 14:17:05 | 00:06:57 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 14:12:21 | | | | 14:17:53 | 14:12:57 | | 011 | 14:18:29 | 00:06:08 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 14:20:47 | | | | 14:27:25 | 14:21:18 | | 011 | 14:28:01 | 00:07:14 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 14:26:19 | | | | 14:40:27 | 14:27:10 | | 011 | 14:41:11 | 00:14:52 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 15:11:15 | | | | 15:24:29 | 15:11:59 | | 011 | 15:25:21 | 00:14:06 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 15:17:51 | | | | 15:27:00 | 15:18:25 | | 011 | 15:27:38 | 00:09:47 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 15:27:42 | | | | 15:33:31 | 15:28:24 | | 011 | 15:34:22 | 00:06:40 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 15:49:30 | | | | 16:02:07 | 15:50:08 | | 011 | 16:02:47 | 00:13:17 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 15:58:52 | | | | 16:11:12 | 15:59:41 | | 011 | 16:11:57 | 00:13:05 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 16:03:04 | | | | 16:06:38 | 16:03:44 | | 011 | 16:07:32 | 00:04:28 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 16:03:57 | | | | 16:12:46 | 16:04:43 | | 011 | 16:13:44 | 00:09:47 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 16:27:04 | | | | 16:39:11 | 16:27:48 | | 011 | 16:42:04 | 00:15:00 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 16:50:51 | | | | 16:57:59 | 16:51:36 | | 011 | 16:58:40 | 00:07:49 | 3 | 012 > 014 > 013 > 011 | PM Peak |
| 012 | 16:57:25 | | | | 17:01:14 | 16:58:08 | | 011 | 17:01:59 | 00:04:34 | 3 | 012 > 014 > 013 > 011 | PM Peak |
| 012 | 17:03:57 | | | | 17:11:38 | 17:04:44 | | 011 | 17:14:06 | 00:10:09 | 3 | 012 > 014 > 013 > 011 | PM Peak |
| 012 | 17:15:34 | | | | 17:23:08 | 17:16:08 | | 011 | 17:24:36 | 00:09:02 | 3 | 012 > 014 > 013 > 011 | PM Peak |
| 012 | 17:19:49 | | | | 17:24:03 | 17:20:32 | | 011 | 17:26:03 | 00:06:14 | 3 | 012 > 014 > 013 > 011 | PM Peak |
| 012 | 17:29:13 | | | | 17:35:59 | 17:29:49 | | 011 | 17:36:49 | 00:07:36 | 3 | 012 > 014 > 013 > 011 | PM Peak |
| 012 | 17:33:36 | | | | 17:45:40 | 17:34:22 | | 011 | 17:46:28 | 00:12:52 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 17:47:56 | | | | 17:51:52 | 17:48:34 | | 011 | 17:52:35 | 00:04:39 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 17:53:26 | | | | 17:59:44 | 17:54:07 | | 011 | 18:00:42 | 00:07:16 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 17:55:13 | | | | 18:04:37 | 17:55:54 | | 011 | 18:05:24 | 00:10:11 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 17:59:14 | | | | 18:10:13 | 17:59:48 | | 011 | 18:11:02 | 00:11:48 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 18:00:35 | | | | 18:09:01 | 18:01:15 | | 011 | 18:09:47 | 00:09:12 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 18:02:34 | | | | 18:08:52 | 18:03:14 | | 011 | 18:09:33 | 00:06:59 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 18:07:39 | | | | 18:14:45 | 18:08:17 | | 011 | 18:16:40 | 00:09:01 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 18:14:23 | | | | 18:22:57 | 18:15:21 | | 011 | 18:23:59 | 00:09:36 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 18:42:14 | | | | 18:46:56 | 18:47:04 | | 011 | 18:47:53 | 00:05:39 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 18:50:53 | | | | 18:58:50 | 18:51:28 | | 011 | 18:59:30 | 00:08:37 | 3 | 012 > 014 > 013 > 011 | |
| 012 | 07:29:46 | | | | | 07:30:17 | 07:31:54 | 017 | 07:32:04 | 00:02:18 | 3 | 012 > 014 > 015 > 017 | |
| 012 | 07:42:38 | | | | | 07:43:13 | 07:45:15 | 017 | 07:45:26 | 00:02:48 | 3 | 012 > 014 > 015 > 017 | |
| 012 | 07:45:20 | | | | | 07:45:57 | 07:48:55 | 017 | 07:49:04 | 00:03:44 | 3 | 012 > 014 > 015 > 017 | |
| 012 | 07:46:26 | | | | | 07:46:54 | 07:49:44 | 017 | 07:49:58 | 00:03:32 | 3 | 012 > 014 > 015 > 017 | |
| 012 | 08:14:35 | | | | | 08:15:05 | 08:17:08 | 017 | 08:17:19 | 00:02:44 | 3 | 012 > 014 > 015 > 017 | AM Peak |
| 012 | 08:19:33 | | | | | 08:20:08 | 08:22:33 | 017 | 08:22:44 | 00:03:11 | 3 | 012 > 014 > 015 > 017 | AM Peak |
| 012 | 08:20:43 | | | | | 08:21:24 | 08:23:45 | 017 | 08:23:56 | 00:03:13 | 3 | 012 > 014 > 015 > 017 | AM Peak |
| 012 | 08:25:17 | | | | | 08:26:06 | 08:30:09 | 017 | 08:30:19 | 00:05:02 | 3 | 012 > 014 > 015 > 017 | AM Peak |
| 012 | 08:25:56 | | | | | 08:26:39 | 08:30:12 | 017 | 08:30:23 | 00:04:27 | 3 | 012 > 014 > 015 > 017 | AM Peak |
| 012 | 08:29:55 | | | | | 08:30:33 | 08:33:19 | 017 | 08:33:31 | 00:03:36 | 3 | 012 > 014 > 015 > 017 | AM Peak |
| 012 | 08:32:05 | | | | | 08:32:57 | 08:35:39 | 017 | 08:35:50 | 00:03:45 | 3 | 012 > 014 > 015 > 017 | AM Peak |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 012 | 08:32:09 | 08:33:00 | 08:35:41 | 017 | 08:35:52 | 00:03:43 | 3 | 012 > 014 > 015 > 017 | AM Peak |
| 012 | 08:34:54 | 08:35:57 | 08:38:34 | 017 | 08:38:47 | 00:03:53 | 3 | 012 > 014 > 015 > 017 | AM Peak |
| 012 | 08:37:10 | 08:38:00 | 08:48:27 | 017 | 08:48:48 | 00:11:38 | 3 | 012 > 014 > 015 > 017 | AM Peak |
| 012 | 08:45:23 | 08:45:57 | 08:50:54 | 017 | 08:51:05 | 00:05:42 | 3 | 012 > 014 > 015 > 017 | AM Peak |
| 012 | 08:47:17 | 08:48:09 | 08:56:13 | 017 | 08:56:29 | 00:09:12 | 3 | 012 > 014 > 015 > 017 | AM Peak |
| 012 | 09:03:36 | 09:04:18 | 09:13:46 | 017 | 09:14:04 | 00:10:28 | 3 | 012 > 014 > 015 > 017 | |
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| 012 | 13:02:16 | 13:02:53 | 13:06:27 | 017 | 13:06:38 | 00:04:22 | 3 | 012 > 014 > 015 > 017 | |
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| 012 | 15:21:29 | 15:22:14 | 15:24:31 | 017 | 15:24:43 | 00:03:14 | 3 | 012 > 014 > 015 > 017 | |
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| 012 | 16:53:07 | 16:53:48 | 16:56:36 | 017 | 16:56:53 | 00:03:46 | 3 | 012 > 014 > 015 > 017 | PM Peak |
| 012 | 17:02:58 | 17:03:37 | 17:07:07 | 017 | 17:07:22 | 00:04:24 | 3 | 012 > 014 > 015 > 017 | PM Peak |
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| 012 | 17:49:33 | 17:50:12 | 17:59:21 | 017 | 17:59:33 | 00:10:00 | 3 | 012 > 014 > 015 > 017 | |
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| 012 | 18:26:54 | 18:27:41 | 18:30:03 | 017 | 18:30:15 | 00:03:21 | 3 | 012 > 014 > 015 > 017 | |
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| 012 | 18:34:16 | 18:35:01 | 18:37:31 | 017 | 18:37:47 | 00:03:31 | 3 | 012 > 014 > 015 > 017 | |
| 012 | 07:38:04 | 07:38:53 | 07:42:18 | 019 | 07:43:07 | 00:05:03 | 3 | 012 > 014 > 015 > 019 | |
| 012 | 07:44:48 | 07:48:28 | 07:51:11 | 019 | 07:52:16 | 00:07:28 | 3 | 012 > 014 > 015 > 019 | |
| 012 | 08:05:43 | 08:06:23 | 08:19:28 | 019 | 08:20:34 | 00:14:51 | 3 | 012 > 014 > 015 > 019 | AM Peak |
| 012 | 08:17:18 | 08:20:18 | 08:23:04 | 019 | 08:23:59 | 00:06:41 | 3 | 012 > 014 > 015 > 019 | AM Peak |
| 012 | 08:24:05 | 08:25:29 | 08:31:36 | 019 | 08:32:39 | 00:08:34 | 3 | 012 > 014 > 015 > 019 | AM Peak |
| 012 | 08:33:44 | 08:35:02 | 08:45:07 | 019 | 08:46:17 | 00:12:33 | 3 | 012 > 014 > 015 > 019 | AM Peak |
| 012 | 08:33:59 | 08:38:09 | 08:41:48 | 019 | 08:42:43 | 00:08:44 | 3 | 012 > 014 > 015 > 019 | AM Peak |
| 012 | 08:40:38 | 08:41:20 | 08:46:09 | 019 | 08:47:06 | 00:06:28 | 3 | 012 > 014 > 015 > 019 | AM Peak |
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| 012 | 09:48:48 | 09:49:22 | 09:54:44 | 019 | 09:55:43 | 00:06:55 | 3 | 012 > 014 > 015 > 019 | |
| 012 | 09:51:21 | 09:52:12 | 10:05:14 | 019 | 10:06:18 | 00:14:57 | 3 | 012 > 014 > 015 > 019 | |
| 012 | 09:59:54 | 10:00:34 | 10:05:19 | 019 | 10:06:24 | 00:06:30 | 3 | 012 > 014 > 015 > 019 | |
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| 012 | 10:56:59 | 10:57:29 | 11:02:01 | 019 | 11:02:51 | 00:05:52 | 3 | 012 > 014 > 015 > 019 | |
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| 019 | 14:48:17 | 00:08:32 | 3 012 > 014 > 015 > 019 | | |
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| 019 | 16:27:37 | 00:08:35 | 3 012 > 014 > 015 > 019 | | |
| 019 | 16:25:24 | 00:05:57 | 3 012 > 014 > 015 > 019 | | |
| 019 | 16:32:31 | 00:04:47 | 3 012 > 014 > 015 > 019 | | |
| 019 | 16:36:13 | 00:06:19 | 3 012 > 014 > 015 > 019 | | |
| 019 | 16:44:44 | 00:13:51 | 3 012 > 014 > 015 > 019 | | PM Peak |
| 019 | 16:47:13 | 00:08:04 | 3 012 > 014 > 015 > 019 | | PM Peak |
| 019 | 17:19:48 | 00:07:25 | 3 012 > 014 > 015 > 019 | | PM Peak |
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| 019 | 18:01:01 | 00:05:06 | 3 012 > 014 > 015 > 019 | | |
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| 019 | 18:08:16 | 00:04:31 | 3 012 > 014 > 015 > 019 | | |
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| 019 | 08:37:47 | 00:05:32 | 2 012 > 014 > 015 > 019 | | AM Peak |
| 019 | 13:18:22 | 00:06:07 | 2 012 > 014 > 019 | | |
| 019 | 14:23:07 | 00:13:08 | 2 012 > 014 > 019 | | |
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| 019 | 11:09:11 | 00:14:01 | 1 012 > 019 | | |
| 019 | 11:07:25 | 00:06:29 | 1 012 > 019 | | |
| 019 | 11:30:27 | 00:14:59 | 1 012 > 019 | | |
| 019 | 11:59:17 | 00:11:37 | 1 012 > 019 | | |
| 019 | 12:31:12 | 00:14:52 | 1 012 > 019 | | |
| 019 | 13:20:10 | 00:14:11 | 1 012 > 019 | | |
| 019 | 13:21:04 | 00:06:54 | 1 012 > 019 | | |
| 019 | 13:30:52 | 00:13:32 | 1 012 > 019 | | |
| 019 | 14:02:40 | 00:14:48 | 1 012 > 019 | | |
| 019 | 14:29:53 | 00:13:04 | 1 012 > 019 | | |
| 019 | 14:27:36 | 00:03:42 | 1 012 > 019 | | |
| 019 | 14:58:38 | 00:10:07 | 1 012 > 019 | | |
| 019 | 15:32:51 | 00:11:04 | 1 012 > 019 | | |
| 019 | 16:03:33 | 00:13:09 | 1 012 > 019 | | |
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| 001 | 13:59:33 | 00:04:09 | 1 018 > 001 | | |
| 001 | 14:24:34 | 00:04:13 | 1 018 > 001 | | |
| 001 | 15:00:14 | 00:03:56 | 1 018 > 001 | | |
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| 001 | 15:38:11 | 00:03:39 | 1 018 > 001 | | |
| 001 | 16:06:30 | 00:03:36 | 1 018 > 001 | | |
| 001 | 16:16:24 | 00:03:34 | 1 018 > 001 | | |
| 001 | 16:33:11 | 00:03:27 | 1 018 > 001 | | |
| 001 | 16:37:17 | 00:03:29 | 1 018 > 001 | | PM Peak |
| 001 | 16:59:39 | 00:03:51 | 1 018 > 001 | | PM Peak |
| 001 | 17:04:49 | 00:03:50 | 1 018 > 001 | | PM Peak |
| 001 | 17:07:22 | 00:03:23 | 1 018 > 001 | | PM Peak |
| 001 | 17:18:17 | 00:04:42 | 1 018 > 001 | | PM Peak |
| 001 | 17:19:45 | 00:03:48 | 1 018 > 001 | | PM Peak |
| 001 | 17:23:30 | 00:04:55 | 1 018 > 001 | | PM Peak |
| 001 | 17:23:45 | 00:05:02 | 1 018 > 001 | | PM Peak |
| 001 | 17:24:38 | 00:03:46 | 1 018 > 001 | | PM Peak |
| 001 | 17:36:20 | 00:04:59 | 1 018 > 001 | | |
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| 003 | 14:09:10 | 00:04:17 | 1 018 > 003 | | |
| 003 | 15:11:09 | 00:03:30 | 1 018 > 003 | | |
| 003 | 15:31:28 | 00:03:36 | 1 018 > 003 | | |
| 003 | 16:51:14 | 00:09:31 | 1 018 > 003 | | PM Peak |
| 003 | 16:52:29 | 00:09:13 | 1 018 > 003 | | PM Peak |
| 003 | 18:50:55 | 00:03:48 | 1 018 > 003 | | |
| 003 | 16:33:25 | 00:05:58 | 2 018 > 005 > 003 | | |
| 003 | 15:02:59 | 00:04:16 | 3 018 > 009 > 005 > 003 | | |
| 003 | 15:07:15 | 00:03:42 | 3 018 > 009 > 005 > 003 | | |
| 011 | 12:09:12 | 00:03:45 | 3 018 > 009 > 008 > 011 | | |
| 011 | 14:42:33 | 00:04:33 | 3 018 > 009 > 008 > 011 | | |
| 011 | 15:25:53 | 00:03:51 | 2 018 > 010 > 011 | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 018 | 12:58:54 | | | | | | 011 | 13:02:29 | 00:03:35 | 1 018 > 011 | |
| 018 | 15:40:34 | | | | | | 011 | 15:44:15 | 00:03:41 | 1 018 > 011 | |
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| 018 | 15:14:35 | | | 15:18:01 | | | 011 | 15:18:47 | 00:04:12 | 2 018 > 013 > 011 | |
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| 018 | 16:54:07 | | | 17:02:43 | | | 011 | 17:03:42 | 00:09:35 | 2 018 > 016 > 013 > 011 | PM Peak |
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| 018 | 07:31:42 | | | 07:33:32 | | 07:31:56 | 011 | 07:34:06 | 00:02:24 | 3 018 > 013 > 016 > 011 | |
| 018 | 07:33:33 | | | 07:47:53 | | 07:33:46 | 011 | 07:48:33 | 00:15:00 | 3 018 > 013 > 016 > 011 | |
| 018 | 07:41:36 | | | 07:43:55 | | 07:41:50 | 011 | 07:44:44 | 00:03:08 | 3 018 > 013 > 016 > 011 | |
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| 018 | 07:44:02 | | | 07:46:10 | | 07:44:15 | 011 | 07:46:49 | 00:02:47 | 3 018 > 013 > 016 > 011 | |
| 018 | 07:46:43 | | | 07:49:08 | | 07:46:56 | 011 | 07:49:46 | 00:03:03 | 3 018 > 013 > 016 > 011 | |
| 018 | 07:47:43 | | | 07:50:39 | | 07:47:58 | 011 | 07:51:31 | 00:03:48 | 3 018 > 013 > 016 > 011 | |
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| 018 | 17:23:58 | | | 17:26:11 | 17:28:57 | | 017 | 17:31:49 | 00:07:51 | 3 018 > 016 > 014 > 013 > 015 > 017 | PM Peak |
| 018 | 08:33:41 | | 08:44:22 | | | 08:34:10 | 001 | 08:48:26 | 00:14:45 | 3 018 > 016 > 009 > 005 > 001 | AM Peak |
| 018 | 16:51:32 | | | | | 16:59:07 | 017 | 16:59:16 | 00:07:44 | 2 018 > 016 > 015 > 017 | PM Peak |
| 018 | 16:58:03 | | | | | 17:03:26 | 017 | 17:03:48 | 00:05:45 | 2 018 > 016 > 015 > 017 | PM Peak |
| 018 | 08:05:30 | | | | | 08:05:50 | 019 | 08:15:52 | 00:10:22 | 2 018 > 016 > 015 > 019 | AM Peak |
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| 018 | 08:46:50 | | 08:51:58 | | | 08:47:28 | 001 | 08:56:11 | 00:09:21 | 3 018 > 016 > 009 > 005 > 001 | AM Peak |
| 018 | 08:34:20 | 08:45:23 | 08:44:10 | | | 08:34:46 | 001 | 08:48:25 | 00:14:05 | 4 018 > 016 > 009 > 005 > 001 | AM Peak |
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| 018 | 08:14:14 | 08:17:47 | 08:16:50 | | | 08:14:29 | 003 | 08:19:51 | 00:05:37 | 4 018 > 016 > 009 > 005 > 003 | AM Peak |
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| 018 | 08:16:47 | 08:20:25 | 08:19:19 | | | 08:17:03 | 003 | 08:21:05 | 00:04:18 | 4 018 > 016 > 009 > 005 > 003 | AM Peak |
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| 018 | 09:39:24 | | | 09:41:49 | | 09:39:37 | 011 | 09:42:35 | 00:03:11 | 3 018 > 013 > 016 > 011 | |
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| 018 | 10:07:14 | | | 10:09:28 | | 10:07:31 | 011 | 10:10:03 | 00:02:49 | 3 018 > 013 > 016 > 011 | |
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| 018 | 10:40:47 | | | 10:43:21 | | 10:41:03 | 011 | 10:44:04 | 00:03:17 | 3 018 > 013 > 016 > 011 | |
| 018 | 10:53:35 | | | 10:59:35 | | 10:53:48 | 011 | 11:00:23 | 00:06:48 | 3 018 > 013 > 016 > 011 | |
| 018 | 10:53:51 | | | 10:56:27 | | 10:54:05 | 011 | 10:57:42 | 00:03:51 | 3 018 > 013 > 016 > 011 | |
| 018 | 10:58:30 | | | 11:08:19 | | 10:58:45 | 011 | 11:09:40 | 00:11:10 | 3 018 > 013 > 016 > 011 | |
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| 018 | 12:32:55 | | | 12:35:24 | | 12:33:07 | 011 | 12:36:09 | 00:03:14 | 3 018 > 013 > 016 > 011 | |
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| 018 | 16:24:20 | | | 16:26:38 | | 16:24:30 | 011 | 16:28:20 | 00:04:00 | 3 018 > 013 > 016 > 011 | |
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| 018 | 18:21:18 | | | 18:26:09 | | 18:21:27 | 011 | 18:27:04 | 00:05:46 | 3 018 > 013 > 016 > 011 | |
| 018 | 18:23:43 | | | 18:26:38 | | 18:23:52 | 011 | 18:27:41 | 00:03:58 | 3 018 > 013 > 016 > 011 | |
| 018 | 18:30:30 | | | 18:39:01 | | 18:30:38 | 011 | 18:39:56 | 00:09:26 | 3 018 > 013 > 016 > 011 | |
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| 018 | 18:49:39 | | | 18:52:33 | | 18:49:51 | 011 | 18:53:26 | 00:03:47 | 3 018 > 013 > 016 > 011 | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 018 | 18:51:44 | | | | | | | 18:55:02 | | 18:51:57 | 011 | 18:56:07 | 00:04:23 | 3 | 018 > 013 > 016 > 011 | |
| 018 | 18:01:36 | | | | | | | 18:03:29 | | | 017 | 18:15:45 | 00:14:09 | 2 | 018 > 013 > 017 | |
| 018 | 08:12:46 | 08:16:23 | 08:18:57 | | 08:19:12 | 08:15:03 | | | | 08:13:07 | 011 | 08:19:44 | 00:06:58 | 6 | 018 > 016 > 009 > 005 > 006 > 008 > 011 | AM Peak |
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| 018 | 08:23:26 | 08:27:14 | 08:29:53 | | | 08:26:13 | 08:30:38 | | 08:32:57 | 08:23:50 | 019 | 08:33:58 | 00:10:32 | 7 | 018 > 016 > 009 > 005 > 006 > 010 > 015 > 019 | AM Peak |
| 018 | 08:00:59 | | | 08:05:44 | 08:03:52 | 08:03:10 | 08:06:47 | | 08:09:03 | 08:01:25 | 019 | 08:09:54 | 00:08:55 | 7 | 018 > 016 > 009 > 008 > 007 > 010 > 015 > 019 | AM Peak |
| 018 | 08:13:39 | | | | 08:20:48 | 08:16:18 | | | | 08:13:55 | 011 | 08:21:37 | 00:07:58 | 4 | 018 > 016 > 009 > 008 > 011 | AM Peak |
| 018 | 15:07:08 | | | | | | | | 15:16:36 | | 019 | 15:17:38 | 00:10:30 | 2 | 018 > 015 > 019 | |
| 018 | 16:22:08 | | | | | | | | 16:24:37 | | 019 | 16:25:29 | 00:03:21 | 2 | 018 > 015 > 019 | |
| 018 | 08:16:51 | | | | 08:20:53 | 08:19:30 | | | | 08:17:06 | 011 | 08:21:42 | 00:04:51 | 4 | 018 > 016 > 009 > 008 > 011 | AM Peak |
| 018 | 15:14:29 | 15:17:33 | | | | | | | | 15:14:49 | 003 | 15:18:16 | 00:03:47 | 3 | 018 > 016 > 005 > 003 | |
| 018 | 12:35:32 | | | | 12:37:43 | | | | | 12:35:43 | 011 | 12:38:09 | 00:02:37 | 3 | 018 > 016 > 008 > 011 | |
| 018 | 17:57:05 | | | | | 17:59:23 | | | | 17:57:14 | 001 | 18:03:42 | 00:06:37 | 3 | 018 > 016 > 009 > 001 | |
| 018 | 14:09:30 | | | | | 14:11:57 | | | | 14:09:39 | 003 | 14:13:05 | 00:03:35 | 3 | 018 > 016 > 009 > 003 | |
| 018 | 14:16:52 | | | | | 14:19:17 | | | | 14:17:04 | 003 | 14:20:30 | 00:03:38 | 3 | 018 > 016 > 009 > 003 | |
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| 018 | 08:22:06 | | | | 08:35:51 | 08:24:30 | | | | 08:22:25 | 011 | 08:36:23 | 00:14:17 | 4 | 018 > 016 > 009 > 008 > 011 | AM Peak |
| 018 | 09:35:02 | 09:37:49 | | | | 09:37:13 | | | | 09:35:16 | 001 | 09:39:55 | 00:04:53 | 4 | 018 > 016 > 009 > 005 > 001 | |
| 018 | 10:28:02 | 10:33:31 | | | | 10:32:38 | | | | 10:28:21 | 001 | 10:36:02 | 00:08:00 | 4 | 018 > 016 > 009 > 005 > 001 | |
| 018 | 10:43:46 | 10:46:43 | | | | 10:46:00 | | | | 10:43:57 | 001 | 10:53:42 | 00:09:56 | 4 | 018 > 016 > 009 > 005 > 001 | |
| 018 | 11:49:53 | 11:53:05 | | | | 11:52:25 | | | | 11:50:08 | 001 | 11:55:29 | 00:05:36 | 4 | 018 > 016 > 009 > 005 > 001 | |
| 018 | 16:21:13 | 16:25:58 | | | | 16:23:42 | | | | 16:21:22 | 001 | 16:30:28 | 00:09:15 | 4 | 018 > 016 > 009 > 005 > 001 | |
| 018 | 07:17:07 | 07:19:37 | | | | 07:18:49 | | | | 07:17:19 | 003 | 07:20:05 | 00:02:58 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 07:17:09 | 07:19:45 | | | | 07:18:53 | | | | 07:17:21 | 003 | 07:20:16 | 00:03:07 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 07:37:38 | 07:40:13 | | | | 07:39:34 | | | | 07:37:54 | 003 | 07:40:43 | 00:03:05 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 07:45:20 | 07:48:02 | | | | 07:47:16 | | | | 07:45:33 | 003 | 07:48:29 | 00:03:09 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 07:45:50 | 07:48:42 | | | | 07:48:04 | | | | 07:46:05 | 003 | 07:49:14 | 00:03:24 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 07:46:06 | 07:49:24 | | | | 07:48:18 | | | | 07:46:19 | 003 | 07:50:02 | 00:03:56 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 07:50:27 | 07:53:15 | | | | 07:52:33 | | | | 07:50:57 | 003 | 07:53:45 | 00:03:18 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 07:54:25 | 07:57:11 | | | | 07:56:35 | | | | 07:54:42 | 003 | 07:58:36 | 00:04:11 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 07:54:32 | 07:57:15 | | | | 07:56:38 | | | | 07:54:47 | 003 | 07:57:50 | 00:03:18 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 07:58:32 | 08:01:58 | | | | 08:01:05 | | | | 07:58:50 | 003 | 08:03:35 | 00:05:03 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 07:59:06 | 08:11:42 | | | | 08:09:54 | | | | 07:59:22 | 003 | 08:12:11 | 00:13:05 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 17:29:06 | | | | 17:37:33 | 17:31:43 | | | | 17:29:29 | 011 | 17:38:13 | 00:09:07 | 4 | 018 > 016 > 009 > 008 > 011 | PM Peak |
| 018 | 08:01:51 | | | | | 08:04:16 | 08:06:38 | | 08:08:36 | 08:02:31 | 017 | 08:08:47 | 00:06:56 | 5 | 018 > 016 > 009 > 010 > 015 > 017 | AM Peak |
| 018 | 08:22:35 | | | | | 08:24:55 | 08:24:57 | | 08:31:12 | 08:23:00 | 017 | 08:31:22 | 00:08:47 | 5 | 018 > 016 > 009 > 010 > 015 > 017 | AM Peak |
| 018 | 08:27:47 | | | | | 08:30:10 | 08:30:12 | | 08:34:14 | 08:28:06 | 017 | 08:34:26 | 00:06:39 | 5 | 018 > 016 > 009 > 010 > 015 > 017 | AM Peak |
| 018 | 08:31:01 | | | | | 08:33:29 | 08:33:31 | | 08:37:55 | 08:31:18 | 017 | 08:38:21 | 00:07:20 | 5 | 018 > 016 > 009 > 010 > 015 > 017 | AM Peak |
| 018 | 08:03:35 | | | | | 08:06:04 | | | | 08:03:57 | 011 | 08:07:52 | 00:04:17 | 3 | 018 > 016 > 009 > 008 > 011 | AM Peak |
| 018 | 08:16:01 | | | | | | | | | 08:16:14 | 011 | 08:19:21 | 00:03:20 | 2 | 018 > 016 > 011 | AM Peak |
| 018 | 08:54:12 | | | | | | | | | 08:54:23 | 011 | 08:57:41 | 00:03:29 | 2 | 018 > 016 > 011 | AM Peak |
| 018 | 17:20:41 | | | | | | | | | 17:21:03 | 011 | 17:35:42 | 00:15:01 | 2 | 018 > 016 > 011 | PM Peak |
| 018 | 08:32:47 | | | | | | | 08:35:22 | | 08:33:18 | 001 | 08:41:47 | 00:09:00 | 3 | 018 > 016 > 013 > 007 > 005 > 001 | AM Peak |
| 018 | 08:21:15 | 08:28:01 | | 08:27:39 | | | | 08:23:51 | | 08:21:40 | 001 | 08:30:22 | 00:09:07 | 5 | 018 > 016 > 013 > 007 > 005 > 001 | AM Peak |
| 018 | 08:10:14 | 08:14:43 | | 08:14:37 | | | | 08:13:02 | | 08:10:42 | 003 | 08:16:53 | 00:06:39 | 5 | 018 > 016 > 013 > 007 > 005 > 003 | AM Peak |
| 018 | 08:24:46 | 08:28:53 | | 08:28:47 | | | | 08:27:35 | | 08:25:12 | 003 | 08:29:27 | 00:04:41 | 5 | 018 > 016 > 013 > 007 > 005 > 003 | AM Peak |
| 018 | 08:06:36 | | | | | | | 08:09:29 | | 08:07:00 | 011 | 08:15:26 | 00:08:50 | 3 | 018 > 016 > 013 > 011 | AM Peak |
| 018 | 08:11:33 | | | | | | | 08:14:17 | | 08:12:05 | 011 | 08:15:03 | 00:03:30 | 3 | 018 > 016 > 013 > 011 | AM Peak |
| 018 | 08:13:34 | | | | | | | 08:15:55 | | 08:13:48 | 011 | 08:16:30 | 00:02:56 | 3 | 018 > 016 > 013 > 011 | AM Peak |
| 018 | 09:13:55 | 09:17:41 | | | | 09:15:55 | | | | 09:14:12 | 003 | 09:18:15 | 00:04:20 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 09:14:06 | 09:17:49 | | | | 09:16:17 | | | | 09:14:19 | 003 | 09:18:19 | 00:04:13 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 09:27:49 | 09:30:49 | | | | 09:30:01 | | | | 09:28:03 | 003 | 09:31:25 | 00:03:36 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 09:29:20 | 09:32:52 | | | | 09:31:56 | | | | 09:29:36 | 003 | 09:33:31 | 00:04:11 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 09:32:00 | 09:34:39 | | | | 09:34:02 | | | | 09:32:21 | 003 | 09:35:07 | 00:03:07 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 09:36:13 | 09:38:42 | | | | 09:38:08 | | | | 09:36:24 | 003 | 09:39:09 | 00:02:56 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 09:46:35 | 09:48:57 | | | | 09:48:28 | | | | 09:46:50 | 003 | 09:49:24 | 00:02:49 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 10:35:37 | 10:38:33 | | | | 10:37:55 | | | | 10:35:47 | 003 | 10:45:07 | 00:09:30 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 10:38:13 | 10:41:15 | | | | 10:40:34 | | | | 10:38:31 | 003 | 10:41:47 | 00:03:34 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 10:39:58 | 10:43:31 | | | | 10:42:53 | | | | 10:40:35 | 003 | 10:44:04 | 00:04:06 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 10:40:06 | 10:43:52 | | | | 10:42:56 | | | | 10:40:43 | 003 | 10:44:18 | 00:04:12 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 10:43:40 | 10:46:39 | | | | 10:45:58 | | | | 10:43:52 | 003 | 10:47:09 | 00:03:29 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 11:35:16 | 11:38:27 | | | | 11:37:28 | | | | 11:35:27 | 003 | 11:39:00 | 00:03:44 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 11:36:08 | 11:39:33 | | | | 11:38:53 | | | | 11:36:21 | 003 | 11:40:04 | 00:03:56 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 12:48:01 | 12:51:03 | | | | 12:50:26 | | | | 12:48:14 | 003 | 12:51:36 | 00:03:35 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 13:02:53 | 13:06:27 | | | | 13:05:41 | | | | 13:03:03 | 003 | 13:07:01 | 00:04:08 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 13:03:17 | 13:06:52 | | | | 13:06:08 | | | | 13:03:33 | 003 | 13:07:25 | 00:04:08 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 13:06:01 | 13:09:13 | | | | 13:08:37 | | | | 13:06:12 | 003 | 13:09:45 | 00:03:44 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 13:54:11 | 13:57:16 | | | | 13:56:31 | | | | 13:54:24 | 003 | 13:57:49 | 00:03:38 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 14:09:31 | 14:12:40 | | | | 14:11:59 | | | | 14:09:42 | 003 | 14:13:13 | 00:03:42 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 14:39:44 | 14:43:46 | | | | 14:42:07 | | | | 14:39:54 | 003 | 14:44:30 | 00:04:46 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 14:47:50 | 14:50:35 | | | | 14:49:57 | | | | 14:48:00 | 003 | 14:51:17 | 00:03:27 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 14:48:06 | 14:50:41 | | | | 14:50:10 | | | | 14:48:15 | 003 | 14:51:27 | 00:03:21 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 15:14:31 | 15:17:46 | | | | 15:17:03 | | | | 15:14:53 | 003 | 15:18:24 | 00:03:53 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 15:14:32 | 15:18:03 | | | | 15:17:17 | | | | 15:14:54 | 003 | 15:18:31 | 00:03:59 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 15:29:40 | 15:32:04 | | | | 15:31:35 | | | | 15:29:50 | 003 | 15:32:38 | 00:02:58 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 15:39:45 | 15:43:15 | | | | 15:42:29 | | | | 15:40:07 | 003 | 15:43:47 | 00:04:02 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 15:40:08 | 15:43:22 | | | | 15:42:35 | | | | 15:40:18 | 003 | 15:44:00 | 00:03:52 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 15:40:15 | 15:52:43 | | | | 15:51:58 | | | | 15:40:26 | 003 | 15:53:18 | 00:13:03 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 15:44:48 | 15:47:47 | | | | 15:46:50 | | | | 15:45:01 | 003 | 15:48:16 | 00:03:28 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 15:47:33 | 15:50:34 | | | | 15:49:36 | | | | 15:47:42 | 003 | 15:51:09 | 00:03:36 | 4 | 018 > 016 > 009 > 005 > 003 | |
| 018 | 08:13:45 | | | | | | | 08:16:17 | | 08:14:01 | 011 | 08:17:07 | 00:03:22 | 3 | 018 > 016 > 013 > 011 | AM Peak |
| 018 | 08:14:27 | | | | | | | 08:17:06 | | 08:14:44 | 011 | 08:20:15 | 00:05:48 | 3 | 018 > 016 > 013 > 011 | AM Peak |
| 018 | 08:15:58 | | | | | | | 08:18:20 | | 08:16:13 | 011 | 08:19:00 | 00:03:02 | 3 | 018 > 016 > 013 > 011 | AM Peak |
| 018 | 08:16:56 | | | | | | | 08:19:44 | | 08:17:10 | 011 | 08:20:25 | 00:03:29 | 3 | 018 > 016 > 013 > 011 | AM Peak |
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| 018 | 08:25:00 | | | | | | | 08:28:25 | | 08:25:28 | 011 | 08:29:16 | 00:04:16 | 3 | 018 > 016 > 013 > 011 | AM Peak |
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| 018 | 08:29:23 | | | | | | | 08:32:11 | | 08:29:42 | 011 | 08:33:36 | 00:04:13 | 3 | 018 > 016 > 013 > 011 | AM Peak |
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| 018 | 08:33:02 | | | | | | | 08:36:50 | | 08:33:32 | 011 | 08:37:35 | 00:04:33 | 3 | 018 > 016 > 013 > 011 | AM Peak |
| 018 | 07:00:50 | | | | 07:03:10 | 07:02:32 | | | | 07:01:02 | 011 | 07:03:41 | 00:02:51 | 4 | 018 > 016 > 009 > 008 > 011 | |
| 018 | 07:17:10 | | | | 07:19:48 | 07:18:55 | | | | 07:17:24 | 011 | 07:20:19 | 00:03:09 | 4 | 018 > 016 > 009 > 008 > 011 | |
| 018 | 07:40:05 | | | | 07:42:23 | 07:41:52 | | | | 07:40:24 | 011 | 07:42:51 | 00:02:46 | 4 | 018 > 016 > 009 > 008 > 011 | |
| 018 | 07:50:07 | | | | 08:02:19 | 07:52:14 | | | | 07:50:39 | 011 | 08:03:35 | 00:13:28 | 4 | 018 > 016 > 009 > 008 > 011 | |
| 018 | 08:34:41 | | | | | | | 08:37:37 | | 08:35:01 | 011 | 08:38:17 | 00:03:36 | 3 | 018 > 016 > 013 > 011 | AM Peak |
| 018 | 08:35:00 | | | | | | | 08:37:39 | | 08:35:20 | 011 | 08:38:25 | 00:03:25 | 3 | 018 > 016 > 013 > 011 | AM Peak |
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| 018 | 10:21:32 | | | | 10:29:25 | 10:28:48 | | | | 10:21:45 | 011 | 10:29:58 | 00:08:26 | 4 | 018 > 016 > 009 > 008 > 011 | |
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| 018 | 11:42:54 | | | | 11:46:20 | 11:45:35 | | | | 11:43:06 | 011 | 11:46:55 | 00:04:01 | 4 | 018 > 016 > 009 > 008 > 011 | |
| 018 | 11:45:37 | | | | 11:47:47 | 11:47:13 | | | | 11:45:47 | 011 | 11:48:21 | 00:02:44 | 4 | 018 > 016 > 009 > 008 > 011 | |
| 018 | 11:45:48 | | | | 11:48:41 | 11:48:03 | | | | 11:46:00 | 011 | 11:49:13 | 00:03:25 | 4 | 018 > 016 > 009 > 008 > 011 | |
| 018 | 11:56:09 | | | | 11:59:48 | 11:58:54 | | | | 11:56:36 | 011 | 12:00:22 | 00:04:13 | 4 | 018 > 016 > 009 > 008 > 011 | |
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| 018 | 12:03:25 | | | | 12:06:27 | 12:05:50 | | | | 12:03:39 | 011 | 12:07:03 | 00:03:38 | 4 | 018 > 016 > 009 > 008 > 011 | |
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| 018 | 12:30:17 | | | | 12:32:36 | 12:31:52 | | | | 12:30:28 | 011 | 12:33:07 | 00:02:50 | 4 | 018 > 016 > 009 > 008 > 011 | |
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| 018 | 14:38:46 | | | 14:43:02 | 14:40:48 | | | | 14:39:03 | 011 | 14:43:34 | 00:04:48 | 4 | 018 > 016 > 009 > 008 > 011 | |
| 018 | 15:37:56 | | | 15:42:11 | 15:40:43 | | | | 15:38:04 | 011 | 15:42:42 | 00:04:46 | 4 | 018 > 016 > 009 > 008 > 011 | |
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| 018 | 16:24:17 | | | 16:29:20 | 16:26:19 | | | | 16:24:27 | 011 | 16:29:56 | 00:05:39 | 4 | 018 > 016 > 009 > 008 > 011 | |
| 018 | 16:24:51 | | | 16:29:53 | 16:27:07 | | | | 16:24:59 | 011 | 16:30:29 | 00:05:38 | 4 | 018 > 016 > 009 > 008 > 011 | |
| 018 | 08:39:22 | | | | | | 08:42:33 | | 08:39:46 | 011 | 08:43:25 | 00:04:03 | 3 | 018 > 016 > 013 > 011 | AM Peak |
| 018 | 17:47:15 | | | 17:50:13 | 17:49:14 | | | | 17:47:24 | 011 | 17:52:03 | 00:04:48 | 4 | 018 > 016 > 009 > 008 > 011 | |
| 018 | 18:06:39 | | | 18:10:43 | 18:09:48 | | | | 18:06:44 | 011 | 18:11:13 | 00:04:34 | 4 | 018 > 016 > 009 > 008 > 011 | |
| 018 | 18:34:12 | | | 18:36:27 | 18:35:54 | | | | 18:34:22 | 011 | 18:36:58 | 00:02:46 | 4 | 018 > 016 > 009 > 008 > 011 | |
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| 018 | 16:34:17 | | | | | | 16:36:59 | | 16:34:33 | 011 | 16:39:42 | 00:05:25 | 3 | 018 > 016 > 013 > 011 | PM Peak |
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| 018 | 07:27:56 | | | | | | | | 07:28:09 | 011 | 07:37:28 | 00:09:32 | 2 | 018 > 016 > 011 | |
| 018 | 16:54:44 | | | | | | 16:57:34 | | 16:54:54 | 011 | 16:58:32 | 00:03:48 | 3 | 018 > 016 > 013 > 011 | PM Peak |
| 018 | 17:07:44 | | | | | | 17:10:48 | | 17:08:26 | 011 | 17:13:19 | 00:05:35 | 3 | 018 > 016 > 013 > 011 | PM Peak |
| 018 | 11:13:33 | | | | | | | | 11:13:44 | 011 | 11:16:15 | 00:02:42 | 2 | 018 > 016 > 011 | |
| 018 | 15:39:18 | | | | | | | | 15:39:28 | 011 | 15:42:46 | 00:03:28 | 2 | 018 > 016 > 011 | |
| 018 | 15:45:52 | | | | | | | | 15:46:02 | 011 | 15:49:46 | 00:03:54 | 2 | 018 > 016 > 011 | |
| 018 | 17:08:13 | | | | | | 17:11:21 | | 17:08:46 | 011 | 17:13:54 | 00:05:41 | 3 | 018 > 016 > 013 > 011 | PM Peak |
| 018 | 17:08:29 | | | | | | 17:11:18 | | 17:08:53 | 011 | 17:13:51 | 00:05:22 | 3 | 018 > 016 > 013 > 011 | PM Peak |
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| 018 | 17:24:07 | | | | | | 17:26:12 | | 17:24:16 | 011 | 17:28:40 | 00:04:33 | 3 | 018 > 016 > 013 > 011 | PM Peak |
| 018 | 07:47:17 | | | | | | 07:49:41 | 07:56:16 | 07:58:31 | 07:47:32 | 017 | 07:58:48 | 00:11:31 | 5 | 018 > 016 > 013 > 014 > 015 > 017 |
| 018 | 08:06:24 | | | | | | 08:09:27 | 08:14:37 | 08:17:02 | 08:06:52 | 017 | 08:17:11 | 00:10:47 | 5 | 018 > 016 > 013 > 014 > 015 > 017 | AM Peak |
| 018 | 08:10:04 | | | | | | 08:13:01 | 08:16:05 | 08:18:18 | 08:10:29 | 017 | 08:18:33 | 00:08:29 | 5 | 018 > 016 > 013 > 014 > 015 > 017 | AM Peak |
| 018 | 08:14:52 | | | | | | 08:17:17 | 08:20:15 | 08:23:01 | 08:15:13 | 017 | 08:23:16 | 00:08:24 | 5 | 018 > 016 > 013 > 014 > 015 > 017 | AM Peak |
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| 018 | 08:17:17 | | | | | | 08:20:46 | 08:23:09 | 08:26:09 | 08:17:34 | 017 | 08:26:20 | 00:09:03 | 5 | 018 > 016 > 013 > 014 > 015 > 017 | AM Peak |
| 018 | 08:21:17 | | | | | | 08:23:55 | 08:27:14 | 08:30:22 | 08:21:43 | 017 | 08:30:34 | 00:09:17 | 5 | 018 > 016 > 013 > 014 > 015 > 017 | AM Peak |
| 018 | 08:22:26 | | | | | | 08:25:10 | 08:27:46 | 08:31:09 | 08:22:53 | 017 | 08:31:19 | 00:08:53 | 5 | 018 > 016 > 013 > 014 > 015 > 017 | AM Peak |
| 018 | 08:28:37 | | | | | | 08:31:30 | 08:31:35 | 08:38:13 | 08:29:03 | 017 | 08:38:25 | 00:09:48 | 5 | 018 > 016 > 013 > 014 > 015 > 017 | AM Peak |
| 018 | 08:34:01 | | | | | | 08:36:52 | 08:39:27 | 08:44:04 | 08:34:31 | 017 | 08:44:25 | 00:10:24 | 5 | 018 > 016 > 013 > 014 > 015 > 017 | AM Peak |
| 018 | 13:55:35 | | | | | | 13:58:53 | 14:02:35 | 14:05:42 | 13:55:52 | 017 | 14:05:54 | 00:10:19 | 5 | 018 > 016 > 013 > 014 > 015 > 017 | |
| 018 | 07:52:31 | | | | | | 07:54:52 | 07:59:38 | 07:52:46 | 07:52:47 | 019 | 08:02:49 | 00:10:18 | 5 | 018 > 016 > 013 > 014 > 015 > 019 | |
| 018 | 08:15:27 | | | | | | 08:18:04 | 08:24:02 | 08:26:53 | 08:15:47 | 019 | 08:27:52 | 00:12:25 | 5 | 018 > 016 > 013 > 014 > 015 > 019 | AM Peak |
| 018 | 09:41:14 | | | | | | 09:43:52 | | 09:41:25 | 09:41:26 | 011 | 09:44:33 | 00:03:19 | 4 | 018 > 016 > 015 > 013 > 011 | |
| 018 | 07:54:21 | | | | | | | | 07:57:06 | 07:54:40 | 017 | 07:57:17 | 00:02:56 | 3 | 018 > 016 > 015 > 017 | |
| 018 | 07:54:54 | | | | | | | | 08:04:24 | 07:55:07 | 017 | 08:04:34 | 00:09:40 | 3 | 018 > 016 > 015 > 017 | |
| 018 | 07:57:50 | | | | | | | | 08:09:15 | 07:58:12 | 017 | 08:09:27 | 00:11:37 | 3 | 018 > 016 > 015 > 017 | |
| 018 | 07:58:44 | | | | | | | | 08:03:39 | 07:58:59 | 017 | 08:03:48 | 00:05:04 | 3 | 018 > 016 > 015 > 017 | |
| 018 | 08:06:27 | | | | | | | | 08:08:14 | 08:06:53 | 017 | 08:08:25 | 00:01:58 | 3 | 018 > 016 > 015 > 017 | AM Peak |
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| 018 | 08:19:05 | | | | | | | | 08:31:29 | 08:19:44 | 017 | 08:31:57 | 00:12:52 | 3 | 018 > 016 > 015 > 017 | AM Peak |
| 018 | 08:24:51 | | | | | | | | 08:28:33 | 08:25:20 | 017 | 08:28:54 | 00:04:03 | 3 | 018 > 016 > 015 > 017 | AM Peak |
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| 018 | 08:36:27 | | | | | | | | 08:38:57 | 08:36:54 | 017 | 08:39:12 | 00:02:45 | 3 | 018 > 016 > 015 > 017 | AM Peak |
| 018 | 08:37:29 | | | | | | | | 08:41:32 | 08:37:49 | 017 | 08:41:42 | 00:04:13 | 3 | 018 > 016 > 015 > 017 | AM Peak |
| 018 | 08:56:23 | | | | | | | | 09:02:53 | 08:56:47 | 017 | 09:03:05 | 00:06:42 | 3 | 018 > 016 > 015 > 017 | AM Peak |
| 018 | 09:00:20 | | | | | | | | 09:04:50 | 09:00:33 | 017 | 09:05:00 | 00:04:40 | 3 | 018 > 016 > 015 > 017 | |
| 018 | 09:09:59 | | | | | | | | 09:19:23 | 09:10:16 | 017 | 09:19:34 | 00:09:35 | 3 | 018 > 016 > 015 > 017 | |
| 018 | 09:11:14 | | | | | | | | 09:13:43 | 09:11:28 | 017 | 09:13:58 | 00:02:44 | 3 | 018 > 016 > 015 > 017 | |
| 018 | 09:22:07 | | | | | | | | 09:24:51 | 09:22:17 | 017 | 09:25:04 | 00:02:57 | 3 | 018 > 016 > 015 > 017 | |
| 018 | 09:56:07 | | | | | | | | 10:06:30 | 09:56:22 | 017 | 10:06:41 | 00:10:34 | 3 | 018 > 016 > 015 > 017 | |
| 018 | 09:56:14 | | | | | | | | 10:04:27 | 09:56:29 | 017 | 10:04:39 | 00:08:25 | 3 | 018 > 016 > 015 > 017 | |
| 018 | 10:28:09 | | | | | | | | 10:33:38 | 10:28:25 | 017 | 10:33:50 | 00:05:41 | 3 | 018 > 016 > 015 > 017 | |
| 018 | 10:33:31 | | | | | | | | 10:47:50 | 10:33:55 | 017 | 10:48:04 | 00:14:33 | 3 | 018 > 016 > 015 > 017 | |
| 018 | 10:54:09 | | | | | | | | 11:04:52 | 10:54:20 | 017 | 11:05:07 | 00:10:58 | 3 | 018 > 016 > 015 > 017 | |
| 018 | 13:04:22 | | | | | | | | 13:13:25 | 13:04:33 | 017 | 13:13:42 | 00:09:20 | 3 | 018 > 016 > 015 > 017 | |
| 018 | 15:28:01 | | | | | | | | 15:36:11 | 15:28:12 | 017 | 15:36:24 | 00:08:23 | 3 | 018 > 016 > 015 > 017 | |
| 018 | 16:08:38 | | | | | | | | 16:16:14 | 16:08:47 | 017 | 16:16:37 | 00:07:59 | 3 | 018 > 016 > 015 > 017 | |
| 018 | 16:34:16 | | | | | | | | 16:40:04 | 16:34:31 | 017 | 16:40:33 | 00:06:17 | 3 | 018 > 016 > 015 > 017 | PM Peak |
| 018 | 16:44:54 | | | | | | | | 16:52:54 | 16:45:01 | 017 | 16:53:06 | 00:08:12 | 3 | 018 > 016 > 015 > 017 | PM Peak |
| 018 | 17:16:31 | | | | | | | | 17:18:55 | 17:16:52 | 017 | 17:19:07 | 00:02:36 | 3 | 018 > 016 > 015 > 017 | PM Peak |
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| 018 | 08:13:09 | | | | | | | | 08:25:34 | 08:13:27 | 019 | 08:26:40 | 00:13:31 | 3 | 018 > 016 > 015 > 019 | AM Peak |
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| 018 | 08:43:28 | | | | | | | | 08:46:53 | 08:43:49 | 019 | 08:47:53 | 00:04:25 | 3 | 018 > 016 > 015 > 019 | AM Peak |
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| 018 | 10:24:40 | | | | | | | | 10:28:53 | 10:24:58 | 019 | 10:29:46 | 00:05:06 | 3 | 018 > 016 > 015 > 019 | |
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| 018 | 11:39:46 | | | | | | | | 11:49:23 | 11:39:59 | 019 | 11:50:19 | 00:10:33 | 3 | 018 > 016 > 015 > 019 | |
| 018 | 11:58:53 | | | | | | | | 12:03:52 | 11:59:05 | 019 | 12:04:39 | 00:05:46 | 3 | 018 > 016 > 015 > 019 | |
| 018 | 15:20:03 | | | | | | | | 15:28:40 | 15:20:22 | 019 | 15:29:38 | 00:09:35 | 3 | 018 > 016 > 015 > 019 | |
| 018 | 15:55:57 | | | | | | | | 16:03:49 | 15:56:10 | 019 | 16:04:58 | 00:09:01 | 3 | 018 > 016 > 015 > 019 | |
| 018 | 16:58:42 | | | | | | | | 17:00:45 | 16:58:54 | 019 | 17:01:44 | 00:03:02 | 3 | 018 > 016 > 015 > 019 | PM Peak |
| 018 | 17:22:48 | | | | | | | | 17:30:07 | 17:23:07 | 019 | 17:31:13 | 00:08:25 | 3 | 018 > 016 > 015 > 019 | PM Peak |
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| 018 | 13:41:33 | | | | | | | | | 13:41:43 | 017 | 13:49:24 | 00:07:51 | 2 | 018 > 016 > 017 | |
| 018 | 08:31:11 | | | | | | | | | | 017 | 08:36:33 | 00:05:22 | 1 | 018 > 017 | AM Peak |
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| 018 | 10:16:56 | | | | | | | | | | 017 | 10:28:31 | 00:11:35 | 1 | 018 > 017 | |
| 018 | 11:46:28 | | | | | | | | | | 017 | 11:57:36 | 00:11:08 | 1 | 018 > 017 | |
| 018 | 12:31:24 | | | | | | | | | | 017 | 12:37:32 | 00:06:08 | 1 | 018 > 017 | |

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| 019 | 07:46:36 | 00:00:54 | 1 018 > 019 |
| 019 | 07:46:39 | 00:00:53 | 1 018 > 019 |
| 019 | 07:46:42 | 00:00:54 | 1 018 > 019 |
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| 019 | 07:46:48 | 00:00:51 | 1 018 > 019 |
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| 019 | 07:48:06 | 00:01:05 | 1 018 > 019 |
| 019 | 07:48:07 | 00:01:05 | 1 018 > 019 |

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| 018 | 07:57:34 | | | |
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| 019 | 07:58:58 | 00:01:00 | 1 018 > 019 | |
| 019 | 07:59:02 | 00:00:53 | 1 018 > 019 | |
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| 019 | 07:59:36 | 00:00:59 | 1 018 > 019 | |
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| 019 | 07:59:45 | 00:00:56 | 1 018 > 019 | |
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| 019 | 08:00:11 | 00:01:02 | 1 018 > 019 | |
| 019 | 08:00:13 | 00:01:01 | 1 018 > 019 | |
| 019 | 08:00:14 | 00:01:01 | 1 018 > 019 | |
| 019 | 08:00:16 | 00:01:00 | 1 018 > 019 | |
| 019 | 08:00:20 | 00:01:01 | 1 018 > 019 | |
| 019 | 08:00:22 | 00:01:00 | 1 018 > 019 | |
| 019 | 08:00:24 | 00:01:01 | 1 018 > 019 | |
| 019 | 08:00:25 | 00:00:52 | 1 018 > 019 | |
| 019 | 08:00:34 | 00:00:59 | 1 018 > 019 | |
| 019 | 08:00:38 | 00:00:57 | 1 018 > 019 | |
| 019 | 08:00:39 | 00:00:52 | 1 018 > 019 | |
| 019 | 08:00:40 | 00:00:52 | 1 018 > 019 | |
| 019 | 08:00:51 | 00:00:56 | 1 018 > 019 | |
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| 019 | 08:01:02 | 00:01:02 | 1 018 > 019 | AM Peak |
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| 019 | 08:03:13 | 00:01:25 | 1 018 > 019 | AM Peak |
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| 019 | 08:03:22 | 00:01:08 | 1 018 > 019 | AM Peak |
| 019 | 08:03:28 | 00:01:05 | 1 018 > 019 | AM Peak |
| 019 | 08:03:33 | 00:01:03 | 1 018 > 019 | AM Peak |
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| 019 | 08:03:41 | 00:00:58 | 1 018 > 019 | AM Peak |
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| 019 | 08:05:00 | 00:01:04 | 1 018 > 019 | AM Peak |
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| 019 | 08:06:01 | 00:01:01 | 1 018 > 019 | AM Peak |
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| 019 | 08:09:45 | 00:00:53 | 1 018 > 019 | AM Peak |
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| 019 | 08:12:12 | 00:01:16 | 1 018 > 019 | AM Peak |
| 019 | 08:12:17 | 00:01:15 | 1 018 > 019 | AM Peak |
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| 018 | 08:48:58 | | | |
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| 018 | 08:50:17 | | | |
| 018 | 08:50:19 | | | |
| 018 | 08:50:22 | | | |
| 018 | 08:50:26 | | | |
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| 018 | 08:50:43 | | | |
| 018 | 08:51:06 | | | |

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| 019 | 08:43:51 | 00:01:02 | 1 018 > 019 | AM Peak |
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| 019 | 08:46:33 | 00:00:51 | 1 018 > 019 | AM Peak |
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| 019 | 08:47:00 | 00:00:59 | 1 018 > 019 | AM Peak |
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| 019 | 08:51:42 | 00:00:59 | 1 018 > 019 | AM Peak |
| 019 | 08:52:01 | 00:00:55 | 1 018 > 019 | AM Peak |

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| 018 | 09:11:29 | | | |
| 018 | 09:11:33 | | | |

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| 019 | 08:56:19 | 00:00:56 | 1 018 > 019 | AM Peak |
| 019 | 08:56:21 | 00:00:52 | 1 018 > 019 | AM Peak |
| 019 | 08:56:31 | 00:00:55 | 1 018 > 019 | AM Peak |
| 019 | 08:56:35 | 00:00:57 | 1 018 > 019 | AM Peak |
| 019 | 08:56:37 | 00:00:58 | 1 018 > 019 | AM Peak |
| 019 | 08:56:39 | 00:00:56 | 1 018 > 019 | AM Peak |
| 019 | 08:56:42 | 00:00:56 | 1 018 > 019 | AM Peak |
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| 019 | 09:01:46 | 00:01:03 | 1 018 > 019 | |
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| 019 | 09:02:26 | 00:00:57 | 1 018 > 019 | |
| 019 | 09:02:28 | 00:00:57 | 1 018 > 019 | |
| 019 | 09:02:30 | 00:00:57 | 1 018 > 019 | |
| 019 | 09:02:38 | 00:01:03 | 1 018 > 019 | |
| 019 | 09:02:49 | 00:00:58 | 1 018 > 019 | |
| 019 | 09:02:52 | 00:01:00 | 1 018 > 019 | |
| 019 | 09:03:11 | 00:00:55 | 1 018 > 019 | |
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| 019 | 09:03:41 | 00:00:48 | 1 018 > 019 | |
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| 019 | 10:28:48 | 00:00:59 | 1 018 > 019 |
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| 019 | 10:34:23 | 00:01:04 | 1 018 > 019 |
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| 019 | 10:52:14 | 00:00:49 | 1 018 > 019 |
| 019 | 10:52:52 | 00:00:52 | 1 018 > 019 |
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| 019 | 10:54:47 | 00:00:58 | 1 018 > 019 |
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| 019 | 10:54:55 | 00:00:56 | 1 018 > 019 |
| 019 | 10:55:03 | 00:00:48 | 1 018 > 019 |
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| 019 | 10:57:33 | 00:00:50 | 1 018 > 019 |
| 019 | 10:57:34 | 00:00:49 | 1 018 > 019 |
| 019 | 10:58:38 | 00:00:51 | 1 018 > 019 |
| 019 | 10:58:42 | 00:00:52 | 1 018 > 019 |
| 019 | 10:58:47 | 00:00:51 | 1 018 > 019 |
| 019 | 10:58:51 | 00:00:52 | 1 018 > 019 |
| 019 | 10:58:54 | 00:00:50 | 1 018 > 019 |
| 019 | 10:59:32 | 00:00:52 | 1 018 > 019 |
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| 019 | 11:20:47 | 00:00:57 | 1 018 > 019 |
| 019 | 11:20:49 | 00:00:57 | 1 018 > 019 |
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| 019 | 11:27:23 | 00:00:52 | 1 018 > 019 |
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| 019 | 11:34:04 | 00:01:06 | 1 018 > 019 |
| 019 | 11:34:05 | 00:01:06 | 1 018 > 019 |
| 019 | 11:34:08 | 00:01:07 | 1 018 > 019 |
| 019 | 11:34:09 | 00:01:04 | 1 018 > 019 |
| 019 | 11:34:12 | 00:01:03 | 1 018 > 019 |
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| 019 | 11:34:17 | 00:01:03 | 1 018 > 019 |
| 019 | 11:34:20 | 00:01:01 | 1 018 > 019 |
| 019 | 11:34:32 | 00:01:03 | 1 018 > 019 |
| 019 | 11:34:34 | 00:01:02 | 1 018 > 019 |
| 019 | 11:34:38 | 00:00:40 | 1 018 > 019 |
| 019 | 11:35:05 | 00:00:57 | 1 018 > 019 |
| 019 | 11:35:08 | 00:00:58 | 1 018 > 019 |
| 019 | 11:35:25 | 00:01:02 | 1 018 > 019 |
| 019 | 11:35:27 | 00:01:02 | 1 018 > 019 |
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| 019 | 11:42:34 | 00:00:54 | 1 018 > 019 |
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| 018 | 13:19:50 |
| 018 | 13:19:53 |
| 018 | 13:19:55 |
| 018 | 13:20:03 |
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| 018 | 13:21:08 |
| 018 | 13:21:10 |
| 018 | 13:21:24 |
| 018 | 13:21:29 |

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|---|---|---|---|
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| 019 | 12:59:30 | 00:00:58 | 1 018 > 019 |
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| 019 | 13:22:22 | 00:00:53 | 1 018 > 019 |

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| 018 | 13:50:04 |
| 018 | 13:50:55 |
| 018 | 13:50:57 |

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| 019 | 13:33:09 | 00:00:52 | 1 018 > 019 |
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| 019 | 16:21:51 | 00:00:51 | 1 018 > 019 | |
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| 019 | 16:28:23 | 00:00:51 | 1 018 > 019 | |
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| 019 | 16:28:37 | 00:00:50 | 1 018 > 019 | |
| 019 | 16:28:40 | 00:00:50 | 1 018 > 019 | |
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| 019 | 16:54:07 | 00:00:54 | 1 018 > 019 | PM Peak |
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| 019 | 17:02:12 | 00:00:41 | 1 018 > 019 | PM Peak |
| 019 | 17:03:49 | 00:00:49 | 1 018 > 019 | PM Peak |
| 019 | 17:05:39 | 00:00:55 | 1 018 > 019 | PM Peak |
| 019 | 17:05:42 | 00:00:55 | 1 018 > 019 | PM Peak |
| 019 | 17:08:19 | 00:01:34 | 1 018 > 019 | PM Peak |
| 019 | 17:08:28 | 00:01:39 | 1 018 > 019 | PM Peak |
| 019 | 17:08:30 | 00:01:38 | 1 018 > 019 | PM Peak |
| 019 | 17:08:34 | 00:01:38 | 1 018 > 019 | PM Peak |
| 019 | 17:08:42 | 00:01:35 | 1 018 > 019 | PM Peak |
| 019 | 17:08:47 | 00:01:38 | 1 018 > 019 | PM Peak |
| 019 | 17:08:50 | 00:01:38 | 1 018 > 019 | PM Peak |
| 019 | 17:08:52 | 00:01:38 | 1 018 > 019 | PM Peak |
| 019 | 17:08:55 | 00:01:36 | 1 018 > 019 | PM Peak |
| 019 | 17:08:57 | 00:01:36 | 1 018 > 019 | PM Peak |
| 019 | 17:09:01 | 00:01:33 | 1 018 > 019 | PM Peak |
| 019 | 17:09:07 | 00:01:35 | 1 018 > 019 | PM Peak |
| 019 | 17:09:11 | 00:01:36 | 1 018 > 019 | PM Peak |
| 019 | 17:09:16 | 00:01:35 | 1 018 > 019 | PM Peak |
| 019 | 17:09:18 | 00:01:30 | 1 018 > 019 | PM Peak |
| 019 | 17:09:19 | 00:01:08 | 1 018 > 019 | PM Peak |
| 019 | 17:09:38 | 00:01:15 | 1 018 > 019 | PM Peak |
| 019 | 17:09:40 | 00:01:09 | 1 018 > 019 | PM Peak |
| 019 | 17:09:54 | 00:01:03 | 1 018 > 019 | PM Peak |
| 019 | 17:10:00 | 00:00:53 | 1 018 > 019 | PM Peak |
| 019 | 17:10:09 | 00:00:56 | 1 018 > 019 | PM Peak |
| 019 | 17:10:32 | 00:00:59 | 1 018 > 019 | PM Peak |
| 019 | 17:10:34 | 00:01:00 | 1 018 > 019 | PM Peak |
| 019 | 17:10:39 | 00:00:58 | 1 018 > 019 | PM Peak |
| 019 | 17:10:43 | 00:01:00 | 1 018 > 019 | PM Peak |
| 019 | 17:10:50 | 00:01:04 | 1 018 > 019 | PM Peak |
| 019 | 17:11:05 | 00:00:50 | 1 018 > 019 | PM Peak |
| 019 | 17:11:16 | 00:00:50 | 1 018 > 019 | PM Peak |
| 019 | 17:12:18 | 00:00:58 | 1 018 > 019 | PM Peak |
| 019 | 17:12:20 | 00:00:56 | 1 018 > 019 | PM Peak |
| 019 | 17:12:21 | 00:00:52 | 1 018 > 019 | PM Peak |
| 019 | 17:12:25 | 00:00:54 | 1 018 > 019 | PM Peak |
| 019 | 17:12:29 | 00:00:53 | 1 018 > 019 | PM Peak |
| 019 | 17:12:33 | 00:00:53 | 1 018 > 019 | PM Peak |
| 019 | 17:12:35 | 00:00:52 | 1 018 > 019 | PM Peak |
| 019 | 17:12:55 | 00:00:55 | 1 018 > 019 | PM Peak |
| 019 | 17:12:56 | 00:00:55 | 1 018 > 019 | PM Peak |
| 019 | 17:13:05 | 00:00:49 | 1 018 > 019 | PM Peak |
| 019 | 17:13:14 | 00:00:44 | 1 018 > 019 | PM Peak |
| 019 | 17:13:39 | 00:00:54 | 1 018 > 019 | PM Peak |
| 019 | 17:13:49 | 00:00:50 | 1 018 > 019 | PM Peak |
| 019 | 17:13:50 | 00:00:49 | 1 018 > 019 | PM Peak |
| 019 | 17:14:28 | 00:00:57 | 1 018 > 019 | PM Peak |
| 019 | 17:14:45 | 00:00:57 | 1 018 > 019 | PM Peak |
| 019 | 17:14:47 | 00:00:57 | 1 018 > 019 | PM Peak |
| 019 | 17:14:49 | 00:00:57 | 1 018 > 019 | PM Peak |
| 019 | 17:15:35 | 00:00:49 | 1 018 > 019 | PM Peak |
| 019 | 17:16:00 | 00:01:02 | 1 018 > 019 | PM Peak |
| 019 | 17:16:08 | 00:01:07 | 1 018 > 019 | PM Peak |
| 019 | 17:16:16 | 00:01:12 | 1 018 > 019 | PM Peak |
| 019 | 17:16:24 | 00:01:16 | 1 018 > 019 | PM Peak |
| 019 | 17:16:26 | 00:01:15 | 1 018 > 019 | PM Peak |
| 019 | 17:16:30 | 00:01:16 | 1 018 > 019 | PM Peak |
| 019 | 17:16:33 | 00:01:13 | 1 018 > 019 | PM Peak |
| 019 | 17:16:37 | 00:01:14 | 1 018 > 019 | PM Peak |
| 019 | 17:16:40 | 00:01:09 | 1 018 > 019 | PM Peak |
| 019 | 17:16:42 | 00:01:09 | 1 018 > 019 | PM Peak |
| 019 | 17:16:44 | 00:01:08 | 1 018 > 019 | PM Peak |
| 019 | 17:16:47 | 00:01:08 | 1 018 > 019 | PM Peak |
| 019 | 17:16:48 | 00:01:05 | 1 018 > 019 | PM Peak |
| 019 | 17:17:05 | 00:00:57 | 1 018 > 019 | PM Peak |
| 019 | 17:17:14 | 00:01:02 | 1 018 > 019 | PM Peak |
| 019 | 17:17:20 | 00:01:07 | 1 018 > 019 | PM Peak |
| 019 | 17:17:24 | 00:01:06 | 1 018 > 019 | PM Peak |
| 019 | 17:17:26 | 00:01:05 | 1 018 > 019 | PM Peak |
| 019 | 17:17:29 | 00:01:04 | 1 018 > 019 | PM Peak |
| 019 | 17:17:43 | 00:01:11 | 1 018 > 019 | PM Peak |
| 019 | 17:17:55 | 00:01:17 | 1 018 > 019 | PM Peak |
| 019 | 17:17:56 | 00:01:12 | 1 018 > 019 | PM Peak |
| 019 | 17:17:58 | 00:01:09 | 1 018 > 019 | PM Peak |
| 019 | 17:17:59 | 00:00:55 | 1 018 > 019 | PM Peak |
| 019 | 17:18:22 | 00:00:52 | 1 018 > 019 | PM Peak |
| 019 | 17:18:39 | 00:01:04 | 1 018 > 019 | PM Peak |
| 019 | 17:18:42 | 00:01:04 | 1 018 > 019 | PM Peak |

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|---|---|
| 018 | 17:46:21 |
| 018 | 17:46:50 |
| 018 | 17:46:53 |
| 018 | 17:47:12 |
| 018 | 17:47:25 |
| 018 | 17:47:28 |
| 018 | 17:47:30 |
| 018 | 17:47:44 |
| 018 | 17:47:47 |
| 018 | 17:47:57 |
| 018 | 17:48:01 |
| 018 | 17:48:41 |
| 018 | 17:48:59 |
| 018 | 17:49:01 |
| 018 | 17:49:29 |
| 018 | 17:49:39 |
| 018 | 17:49:41 |
| 018 | 17:49:58 |
| 018 | 17:50:17 |
| 018 | 17:50:19 |
| 018 | 17:50:20 |
| 018 | 17:50:23 |
| 018 | 17:51:16 |
| 018 | 17:51:24 |
| 018 | 17:51:26 |
| 018 | 17:51:36 |
| 018 | 17:52:13 |
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| 018 | 17:52:58 |
| 018 | 17:54:15 |
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| 018 | 17:54:23 |
| 018 | 17:54:26 |
| 018 | 17:54:28 |
| 018 | 17:54:31 |
| 018 | 17:54:38 |
| 018 | 17:54:40 |
| 018 | 17:54:41 |
| 018 | 17:54:46 |
| 018 | 17:55:00 |
| 018 | 17:55:31 |
| 018 | 17:56:00 |
| 018 | 17:56:09 |
| 018 | 17:56:48 |
| 018 | 17:57:21 |
| 018 | 17:57:56 |
| 018 | 17:58:07 |
| 018 | 17:59:24 |
| 018 | 17:59:42 |
| 018 | 17:59:46 |
| 018 | 18:00:00 |
| 018 | 18:00:44 |
| 018 | 18:00:47 |
| 018 | 18:01:32 |
| 018 | 18:01:39 |
| 018 | 18:01:41 |
| 018 | 18:01:44 |
| 018 | 18:01:54 |
| 018 | 18:02:04 |
| 018 | 18:02:06 |
| 018 | 18:02:33 |
| 018 | 18:02:41 |
| 018 | 18:03:17 |
| 018 | 18:03:34 |
| 018 | 18:03:58 |
| 018 | 18:04:27 |
| 018 | 18:04:40 |
| 018 | 18:04:45 |
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| 018 | 18:04:52 |
| 018 | 18:05:21 |
| 018 | 18:05:24 |
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| 018 | 18:05:30 |
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| 018 | 18:07:10 |
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| 018 | 18:08:32 |
| 018 | 18:09:07 |
| 018 | 18:09:10 |
| 018 | 18:09:19 |
| 018 | 18:10:53 |
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| 018 | 18:13:29 |
| 018 | 18:14:28 |
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| 018 | 18:14:33 |
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| 018 | 18:16:39 |
| 018 | 18:16:55 |
| 018 | 18:17:02 |
| 018 | 18:18:04 |
| 018 | 18:18:08 |
| 018 | 18:19:09 |
| 018 | 18:19:24 |
| 018 | 18:19:25 |
| 018 | 18:19:54 |
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| 018 | 18:21:07 |
| 018 | 18:21:08 |
| 018 | 18:21:09 |
| 018 | 18:21:46 |
| 018 | 18:21:48 |

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| 019 | 17:47:16 | 00:00:55 | 1 018 > 019 |
| 019 | 17:47:39 | 00:00:49 | 1 018 > 019 |
| 019 | 17:47:42 | 00:00:49 | 1 018 > 019 |
| 019 | 17:48:06 | 00:00:54 | 1 018 > 019 |
| 019 | 17:48:15 | 00:00:50 | 1 018 > 019 |
| 019 | 17:48:16 | 00:00:48 | 1 018 > 019 |
| 019 | 17:48:18 | 00:00:48 | 1 018 > 019 |
| 019 | 17:48:33 | 00:00:49 | 1 018 > 019 |
| 019 | 17:48:35 | 00:00:48 | 1 018 > 019 |
| 019 | 17:48:42 | 00:00:45 | 1 018 > 019 |
| 019 | 17:48:53 | 00:00:52 | 1 018 > 019 |
| 019 | 17:49:20 | 00:00:39 | 1 018 > 019 |
| 019 | 17:49:47 | 00:00:48 | 1 018 > 019 |
| 019 | 17:49:49 | 00:00:48 | 1 018 > 019 |
| 019 | 17:50:29 | 00:01:00 | 1 018 > 019 |
| 019 | 17:50:31 | 00:00:52 | 1 018 > 019 |
| 019 | 17:50:34 | 00:00:53 | 1 018 > 019 |
| 019 | 17:50:42 | 00:00:44 | 1 018 > 019 |
| 019 | 17:51:05 | 00:00:48 | 1 018 > 019 |
| 019 | 17:51:08 | 00:00:49 | 1 018 > 019 |
| 019 | 17:51:09 | 00:00:49 | 1 018 > 019 |
| 019 | 17:51:24 | 00:01:01 | 1 018 > 019 |
| 019 | 17:52:10 | 00:00:54 | 1 018 > 019 |
| 019 | 17:52:14 | 00:00:50 | 1 018 > 019 |
| 019 | 17:52:16 | 00:00:50 | 1 018 > 019 |
| 019 | 17:52:27 | 00:00:51 | 1 018 > 019 |
| 019 | 17:53:14 | 00:01:01 | 1 018 > 019 |
| 019 | 17:53:27 | 00:00:49 | 1 018 > 019 |
| 019 | 17:53:46 | 00:00:48 | 1 018 > 019 |
| 019 | 17:55:18 | 00:01:03 | 1 018 > 019 |
| 019 | 17:55:19 | 00:01:03 | 1 018 > 019 |
| 019 | 17:55:30 | 00:01:07 | 1 018 > 019 |
| 019 | 17:55:31 | 00:01:05 | 1 018 > 019 |
| 019 | 17:55:33 | 00:01:05 | 1 018 > 019 |
| 019 | 17:55:37 | 00:01:06 | 1 018 > 019 |
| 019 | 17:55:48 | 00:01:10 | 1 018 > 019 |
| 019 | 17:55:50 | 00:01:10 | 1 018 > 019 |
| 019 | 17:55:52 | 00:01:11 | 1 018 > 019 |
| 019 | 17:56:09 | 00:01:23 | 1 018 > 019 |
| 019 | 17:56:13 | 00:01:13 | 1 018 > 019 |
| 019 | 17:56:19 | 00:00:48 | 1 018 > 019 |
| 019 | 17:56:57 | 00:00:57 | 1 018 > 019 |
| 019 | 17:57:04 | 00:00:55 | 1 018 > 019 |
| 019 | 17:57:36 | 00:00:48 | 1 018 > 019 |
| 019 | 17:58:22 | 00:01:01 | 1 018 > 019 |
| 019 | 17:58:49 | 00:00:53 | 1 018 > 019 |
| 019 | 17:59:17 | 00:01:10 | 1 018 > 019 |
| 019 | 18:00:30 | 00:01:06 | 1 018 > 019 |
| 019 | 18:00:39 | 00:00:57 | 1 018 > 019 |
| 019 | 18:00:42 | 00:00:56 | 1 018 > 019 |
| 019 | 18:00:46 | 00:00:46 | 1 018 > 019 |
| 019 | 18:01:52 | 00:01:08 | 1 018 > 019 |
| 019 | 18:01:55 | 00:01:08 | 1 018 > 019 |
| 019 | 18:02:25 | 00:00:53 | 1 018 > 019 |
| 019 | 18:02:36 | 00:00:57 | 1 018 > 019 |
| 019 | 18:02:38 | 00:00:57 | 1 018 > 019 |
| 019 | 18:02:42 | 00:00:58 | 1 018 > 019 |
| 019 | 18:02:45 | 00:00:51 | 1 018 > 019 |
| 019 | 18:02:50 | 00:00:46 | 1 018 > 019 |
| 019 | 18:03:01 | 00:00:55 | 1 018 > 019 |
| 019 | 18:03:23 | 00:00:50 | 1 018 > 019 |
| 019 | 18:03:26 | 00:00:45 | 1 018 > 019 |
| 019 | 18:04:06 | 00:00:49 | 1 018 > 019 |
| 019 | 18:04:35 | 00:01:01 | 1 018 > 019 |
| 019 | 18:04:55 | 00:00:57 | 1 018 > 019 |
| 019 | 18:05:20 | 00:00:53 | 1 018 > 019 |
| 019 | 18:05:26 | 00:00:46 | 1 018 > 019 |
| 019 | 18:05:35 | 00:00:50 | 1 018 > 019 |
| 019 | 18:05:41 | 00:00:53 | 1 018 > 019 |
| 019 | 18:05:47 | 00:00:55 | 1 018 > 019 |
| 019 | 18:06:18 | 00:00:57 | 1 018 > 019 |
| 019 | 18:06:22 | 00:00:58 | 1 018 > 019 |
| 019 | 18:06:23 | 00:00:57 | 1 018 > 019 |
| 019 | 18:06:26 | 00:00:57 | 1 018 > 019 |
| 019 | 18:06:28 | 00:00:58 | 1 018 > 019 |
| 019 | 18:07:03 | 00:00:48 | 1 018 > 019 |
| 019 | 18:07:11 | 00:00:48 | 1 018 > 019 |
| 019 | 18:07:13 | 00:00:48 | 1 018 > 019 |
| 019 | 18:08:11 | 00:01:03 | 1 018 > 019 |
| 019 | 18:08:13 | 00:01:03 | 1 018 > 019 |
| 019 | 18:08:52 | 00:00:41 | 1 018 > 019 |
| 019 | 18:09:26 | 00:00:54 | 1 018 > 019 |
| 019 | 18:10:03 | 00:00:56 | 1 018 > 019 |
| 019 | 18:10:06 | 00:00:56 | 1 018 > 019 |
| 019 | 18:10:19 | 00:01:00 | 1 018 > 019 |
| 019 | 18:11:48 | 00:00:55 | 1 018 > 019 |
| 019 | 18:12:13 | 00:00:56 | 1 018 > 019 |
| 019 | 18:12:57 | 00:01:05 | 1 018 > 019 |
| 019 | 18:13:17 | 00:00:53 | 1 018 > 019 |
| 019 | 18:13:52 | 00:00:59 | 1 018 > 019 |
| 019 | 18:14:03 | 00:00:52 | 1 018 > 019 |
| 019 | 18:14:14 | 00:00:49 | 1 018 > 019 |
| 019 | 18:14:26 | 00:00:57 | 1 018 > 019 |
| 019 | 18:15:32 | 00:01:04 | 1 018 > 019 |
| 019 | 18:15:34 | 00:01:03 | 1 018 > 019 |
| 019 | 18:15:37 | 00:01:04 | 1 018 > 019 |
| 019 | 18:15:55 | 00:00:51 | 1 018 > 019 |
| 019 | 18:15:57 | 00:00:51 | 1 018 > 019 |
| 019 | 18:15:59 | 00:00:51 | 1 018 > 019 |
| 019 | 18:16:31 | 00:00:44 | 1 018 > 019 |
| 019 | 18:17:29 | 00:00:50 | 1 018 > 019 |
| 019 | 18:17:56 | 00:01:01 | 1 018 > 019 |
| 019 | 18:18:11 | 00:01:09 | 1 018 > 019 |
| 019 | 18:18:58 | 00:00:54 | 1 018 > 019 |
| 019 | 18:18:59 | 00:00:51 | 1 018 > 019 |
| 019 | 18:20:01 | 00:00:52 | 1 018 > 019 |
| 019 | 18:20:14 | 00:00:50 | 1 018 > 019 |
| 019 | 18:20:17 | 00:00:52 | 1 018 > 019 |
| 019 | 18:20:53 | 00:00:59 | 1 018 > 019 |
| 019 | 18:21:57 | 00:00:53 | 1 018 > 019 |
| 019 | 18:22:03 | 00:00:56 | 1 018 > 019 |
| 019 | 18:22:09 | 00:01:01 | 1 018 > 019 |
| 019 | 18:22:11 | 00:01:02 | 1 018 > 019 |
| 019 | 18:22:43 | 00:00:57 | 1 018 > 019 |
| 019 | 18:22:47 | 00:00:59 | 1 018 > 019 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 020 | 13:59:15 | | | | | | | | | | | | | | | | | | | | | 001 | 14:05:16 | 00:06:01 | 1 | 020 > 001 | | |
| 020 | 15:55:54 | | | | | | | | | | | | | | | | | | | | | 001 | 16:03:00 | 00:07:06 | 1 | 020 > 001 | | |
| 020 | 12:05:00 | | | | | | | | | | | | | | | | | | | | | 003 | 12:09:26 | 00:04:26 | 1 | 020 > 003 | | |
| 020 | 15:35:14 | | | | | | | | | | | | | | | | | | | | | 003 | 15:39:33 | 00:04:19 | 1 | 020 > 003 | | |
| 020 | 15:42:54 | | | | | | | | | | | | | | | | | | | | | 003 | 15:46:37 | 00:03:43 | 1 | 020 > 003 | | |
| 020 | 16:32:00 | | | | | | | | | | | | | | | | | | | | | 003 | 16:41:09 | 00:09:09 | 1 | 020 > 016 > 005 > 003 | | PM Peak |
| 020 | 17:37:46 | | | | | | | | | | | | | | | | | | | | | 003 | 17:45:28 | 00:07:42 | 1 | 020 > 003 | | |
| 020 | 14:31:05 | 14:34:10 | | | | | | | 14:33:23 | | | | | | | 14:31:52 | 003 | 14:34:42 | 00:03:37 | 4 | 020 > 006 > 010 > 015 > 003 | | |
| 020 | 18:36:58 | | | 18:48:53 | | | | | | | | | | | | | 001 | 18:51:32 | 00:14:34 | 2 | 020 > 007 > 001 | | |
| 020 | 13:18:54 | | | | 13:25:04 | | | | | | | | | | | | 011 | 13:25:40 | 00:06:46 | 2 | 020 > 008 > 011 | | |
| 020 | 18:10:58 | | | | 18:15:42 | | | | | | | | | | | | 011 | 18:16:20 | 00:05:22 | 2 | 020 > 008 > 011 | | |
| 020 | 17:35:56 | | | | | 17:38:51 | | | | | | | | | | | 003 | 17:43:18 | 00:07:22 | 2 | 020 > 009 > 003 | | |
| 020 | 17:53:54 | | | | | 18:00:10 | | | | | | | | | | | 003 | 18:01:44 | 00:07:50 | 2 | 020 > 009 > 003 | | |
| 020 | 18:06:25 | | | | | 18:10:02 | | | | | | | | | | | 003 | 18:11:30 | 00:05:05 | 2 | 020 > 009 > 003 | | |
| 020 | 15:19:10 | 15:27:28 | | | | 15:26:56 | | | | | | | | | | | 001 | 15:30:24 | 00:11:14 | 3 | 020 > 009 > 005 > 001 | | |
| 020 | 15:51:10 | 15:56:13 | | | | 15:54:56 | | | | | | | | | | | 001 | 15:59:15 | 00:08:05 | 3 | 020 > 009 > 005 > 001 | | |
| 020 | 14:03:41 | 14:08:18 | | | | 14:07:27 | | | | | | | | | | | 003 | 14:08:48 | 00:05:07 | 3 | 020 > 009 > 005 > 003 | | |
| 020 | 10:27:51 | | | | 10:30:58 | 10:30:25 | | | | | | | | | | | 011 | 10:31:28 | 00:03:37 | 3 | 020 > 009 > 008 > 011 | | |
| 020 | 13:58:56 | | | | 14:03:43 | 14:02:46 | | | | | | | | | | | 011 | 14:04:18 | 00:05:22 | 3 | 020 > 009 > 008 > 011 | | |
| 020 | 16:04:15 | | | | 16:11:38 | 16:09:20 | | | | | | | | | | | 011 | 16:12:11 | 00:07:56 | 3 | 020 > 009 > 008 > 011 | | |
| 020 | 11:32:32 | 11:35:58 | 11:41:27 | | 11:41:36 | | | | 11:35:27 | | | | | | | | 011 | 11:42:08 | 00:09:36 | 5 | 020 > 010 > 005 > 006 > 008 > 011 | | |
| 020 | 11:06:36 | | | | | | | | | | | | | | | | 011 | 11:11:39 | 00:05:03 | 1 | 020 > 011 | | |
| 020 | 11:34:03 | | | | | | | | | | | | | | | | 011 | 11:41:40 | 00:07:37 | 1 | 020 > 011 | | |
| 020 | 11:47:48 | | | | | | | | | | | | | | | | 011 | 11:55:33 | 00:07:45 | 1 | 020 > 011 | | |
| 020 | 13:02:13 | | | | | | | | | | | | | | | | 011 | 13:10:46 | 00:08:33 | 1 | 020 > 011 | | |
| 020 | 13:12:13 | | | | | | | | | | | | | | | | 011 | 13:19:51 | 00:07:38 | 1 | 020 > 011 | | |
| 020 | 13:23:37 | | | | | | | | | | | | | | | | 011 | 13:36:47 | 00:13:10 | 1 | 020 > 011 | | |
| 020 | 13:44:35 | | | | | | | | | | | | | | | | 011 | 13:53:56 | 00:09:21 | 1 | 020 > 011 | | |
| 020 | 14:40:24 | | | | | | | | | | | | | | | | 011 | 14:49:33 | 00:09:09 | 1 | 020 > 011 | | |
| 020 | 15:18:10 | | | | | | | | | | | | | | | | 011 | 15:30:56 | 00:12:46 | 1 | 020 > 011 | | |
| 020 | 15:26:46 | | | | | | | | | | | | | | | | 011 | 15:34:13 | 00:07:27 | 1 | 020 > 011 | | |
| 020 | 15:42:05 | | | | | | | | | | | | | | | | 011 | 15:50:24 | 00:08:19 | 1 | 020 > 011 | | |
| 020 | 16:13:07 | | | | | | | | | | | | | | | | 011 | 16:21:08 | 00:08:01 | 1 | 020 > 011 | | |
| 020 | 16:18:47 | | | | | | | | | | | | | | | | 011 | 16:24:06 | 00:05:19 | 1 | 020 > 011 | | |
| 020 | 18:36:41 | | | | | | | | | | | | | | | | 011 | 18:40:15 | 00:03:34 | 1 | 020 > 011 | | |
| 020 | 09:46:31 | | | | | | | | | 09:51:39 | | | | | | | 011 | 09:52:16 | 00:05:45 | 2 | 020 > 013 > 011 | | |
| 020 | 12:11:10 | | | | | | | | | 12:18:55 | | | | | | | 011 | 12:19:40 | 00:08:30 | 2 | 020 > 013 > 011 | | |
| 020 | 12:12:31 | | | | | | | | | 12:18:57 | | | | | | | 011 | 12:19:45 | 00:07:14 | 2 | 020 > 013 > 011 | | |
| 020 | 13:12:25 | | | | | | | | | 13:16:18 | | | | | | | 011 | 13:17:37 | 00:05:12 | 2 | 020 > 013 > 011 | | |
| 020 | 14:00:49 | | | | | | | | | 14:13:23 | | | | | | | 011 | 14:14:21 | 00:13:32 | 2 | 020 > 013 > 011 | | |
| 020 | 15:29:22 | | | | | | | | | 15:32:25 | | | | | | | 011 | 15:33:18 | 00:03:56 | 2 | 020 > 013 > 011 | | |
| 020 | 16:40:16 | | | | | | | | | 16:43:30 | | | | | | | 011 | 16:45:04 | 00:04:48 | 2 | 020 > 016 > 013 > 011 | | PM Peak |
| 020 | 16:53:18 | | | | | | | | | 17:06:43 | | | | | | | 011 | 17:07:33 | 00:14:15 | 2 | 020 > 016 > 013 > 011 | | PM Peak |
| 020 | 17:16:20 | | | | | | | | | 17:21:49 | | | | | | | 011 | 17:23:28 | 00:07:08 | 2 | 020 > 016 > 013 > 011 | | PM Peak |
| 020 | 17:50:23 | | | | | | | | | 17:53:30 | | | | | | | 011 | 18:03:11 | 00:12:48 | 2 | 020 > 013 > 011 | | |
| 020 | 17:56:20 | | | | | | | | | 18:07:51 | | | | | | | 011 | 18:08:47 | 00:12:27 | 2 | 020 > 013 > 011 | | |
| 020 | 07:25:20 | | | | | | | | | 07:29:11 | | | | | | 07:25:59 | 011 | 07:29:51 | 00:04:31 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 07:37:13 | | | | | | | | | 07:45:12 | | | | | | 07:38:06 | 011 | 07:45:53 | 00:08:40 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 17:00:41 | | | | | | | | | | 17:07:08 | 17:11:37 | | | | | 017 | 17:12:44 | 00:12:03 | 3 | 020 > 016 > 013 > 014 > 015 > 017 | | PM Peak |
| 020 | 16:59:43 | 17:04:17 | | | | | | | | | | | | | | 17:00:25 | 001 | 17:06:57 | 00:07:14 | 3 | 020 > 016 > 009 > 005 > 001 | | PM Peak |
| 020 | 16:41:04 | 16:50:06 | | | | | | | | | | | | | | 16:41:51 | 003 | 16:50:39 | 00:09:35 | 3 | 020 > 016 > 009 > 005 > 003 | | PM Peak |
| 020 | 16:44:05 | 16:52:23 | | | | | | | | | | | | | | 16:44:49 | 003 | 16:52:57 | 00:08:52 | 3 | 020 > 016 > 009 > 005 > 003 | | PM Peak |
| 020 | 17:01:56 | 17:07:09 | | | | | | | | | | | | | | 17:02:39 | 003 | 17:07:46 | 00:05:50 | 3 | 020 > 016 > 009 > 005 > 003 | | PM Peak |
| 020 | 17:11:00 | 17:20:09 | | | | | | | | | | | | | | 17:12:04 | 003 | 17:20:50 | 00:09:50 | 3 | 020 > 016 > 009 > 005 > 003 | | PM Peak |
| 020 | 09:23:09 | | | | | | | | | 09:25:54 | | | | | | 09:23:57 | 011 | 09:26:32 | 00:03:23 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 09:31:56 | | | | | | | | | 09:44:16 | | | | | | 09:32:41 | 011 | 09:45:01 | 00:13:05 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 09:33:38 | | | | | | | | | 09:39:57 | | | | | | 09:34:20 | 011 | 09:40:59 | 00:07:21 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 09:54:49 | | | | | | | | | 10:05:26 | | | | | | 09:56:00 | 011 | 10:06:11 | 00:11:22 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 09:55:50 | | | | | | | | | 10:00:25 | | | | | | 09:56:32 | 011 | 10:01:03 | 00:05:13 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 10:11:35 | | | | | | | | | 10:14:08 | | | | | | 10:12:14 | 011 | 10:14:55 | 00:03:20 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 10:19:59 | | | | | | | | | 10:32:57 | | | | | | 10:20:37 | 011 | 10:33:33 | 00:13:34 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 10:28:52 | | | | | | | | | 10:31:26 | | | | | | 10:29:35 | 011 | 10:32:05 | 00:03:13 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 10:33:57 | | | | | | | | | 10:37:51 | | | | | | 10:34:42 | 011 | 10:38:46 | 00:04:49 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 10:42:24 | | | | | | | | | 10:47:14 | | | | | | 10:43:18 | 011 | 10:47:58 | 00:05:34 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 10:48:51 | | | | | | | | | 11:01:38 | | | | | | 10:49:44 | 011 | 11:02:32 | 00:13:41 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 10:49:48 | | | | | | | | | 10:56:22 | | | | | | 10:50:51 | 011 | 10:57:24 | 00:07:36 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 10:57:12 | | | | | | | | | 11:10:47 | | | | | | 10:58:17 | 011 | 11:11:42 | 00:14:30 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 10:58:07 | | | | | | | | | 11:01:41 | | | | | | 10:58:55 | 011 | 11:02:37 | 00:04:30 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 11:00:18 | | | | | | | | | 11:04:15 | | | | | | 11:01:05 | 011 | 11:05:01 | 00:04:43 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 11:09:08 | | | | | | | | | 11:21:29 | | | | | | 11:09:51 | 011 | 11:22:10 | 00:13:02 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 11:21:40 | | | | | | | | | 11:26:19 | | | | | | 11:22:29 | 011 | 11:27:04 | 00:05:24 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 11:27:16 | | | | | | | | | 11:31:58 | | | | | | 11:28:23 | 011 | 11:32:58 | 00:05:42 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 11:27:59 | | | | | | | | | 11:39:38 | | | | | | 11:28:35 | 011 | 11:40:25 | 00:12:26 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 11:31:24 | | | | | | | | | 11:35:15 | | | | | | 11:32:10 | 011 | 11:36:06 | 00:04:42 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 11:33:41 | | | | | | | | | 11:42:18 | | | | | | 11:39:46 | 011 | 11:43:03 | 00:09:22 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 11:47:04 | | | | | | | | | 11:51:58 | | | | | | 11:47:51 | 011 | 11:52:43 | 00:05:39 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 11:54:06 | | | | | | | | | 11:59:04 | | | | | | 11:54:43 | 011 | 11:59:44 | 00:05:38 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 11:55:35 | | | | | | | | | 12:00:22 | | | | | | 11:56:24 | 011 | 12:05:38 | 00:10:03 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 12:07:03 | | | | | | | | | 12:12:39 | | | | | | 12:07:52 | 011 | 12:13:21 | 00:06:18 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 12:20:28 | | | | | | | | | 12:25:39 | | | | | | 12:21:35 | 011 | 12:26:41 | 00:06:13 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 12:24:22 | | | | | | | | | 12:26:55 | | | | | | 12:25:02 | 011 | 12:27:36 | 00:03:14 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 12:24:37 | | | | | | | | | 12:27:35 | | | | | | 12:25:27 | 011 | 12:33:18 | 00:08:41 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 12:30:20 | | | | | | | | | 12:33:29 | | | | | | 12:31:10 | 011 | 12:34:07 | 00:03:47 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 12:39:25 | | | | | | | | | 12:43:15 | | | | | | 12:40:15 | 011 | 12:44:10 | 00:04:45 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 12:45:47 | | | | | | | | | 12:59:45 | | | | | | 12:46:40 | 011 | 13:00:30 | 00:14:43 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 12:46:49 | | | | | | | | | 12:50:34 | | | | | | 12:47:33 | 011 | 12:51:33 | 00:04:44 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 12:49:53 | | | | | | | | | 12:57:52 | | | | | | 12:50:44 | 011 | 12:58:50 | 00:08:57 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 13:16:38 | | | | | | | | | 13:20:31 | | | | | | 13:17:41 | 011 | 13:21:32 | 00:04:54 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 13:25:29 | | | | | | | | | 13:28:21 | | | | | | 13:26:12 | 011 | 13:29:06 | 00:03:37 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 13:43:57 | | | | | | | | | 13:47:01 | | | | | | 13:44:44 | 011 | 13:47:56 | 00:03:59 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 13:58:36 | | | | | | | | | 14:08:02 | | | | | | 13:59:23 | 011 | 14:08:56 | 00:10:20 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 14:12:30 | | | | | | | | | 14:16:12 | | | | | | 14:13:29 | 011 | 14:17:02 | 00:04:32 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 14:19:20 | | | | | | | | | 14:27:16 | | | | | | 14:20:12 | 011 | 14:27:59 | 00:08:39 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 14:20:53 | | | | | | | | | 14:23:49 | | | | | | 14:21:40 | 011 | 14:24:35 | 00:03:42 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 14:28:25 | | | | | | | | | 14:32:05 | | | | | | 14:29:21 | 011 | 14:33:03 | 00:04:38 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 14:34:41 | | | | | | | | | 14:37:26 | | | | | | 14:35:25 | 011 | 14:38:10 | 00:03:29 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 14:45:17 | | | | | | | | | 14:59:33 | | | | | | 14:45:59 | 011 | 15:00:14 | 00:14:57 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 15:24:40 | | | | | | | | | 15:27:14 | | | | | | 15:25:27 | 011 | 15:28:17 | 00:03:37 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 15:26:10 | | | | | | | | | 15:33:38 | | | | | | 15:26:56 | 011 | 15:34:33 | 00:08:23 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 15:26:15 | | | | | | | | | 15:29:32 | | | | | | 15:27:03 | 011 | 15:30:29 | 00:04:14 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 15:40:39 | | | | | | | | | 15:46:04 | | | | | | 15:41:19 | 011 | 15:46:52 | 00:06:13 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 15:43:17 | | | | | | | | | 15:54:24 | | | | | | 15:44:00 | 011 | 15:55:21 | 00:12:04 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 15:44:48 | | | | | | | | | 15:48:43 | | | | | | 15:45:55 | 011 | 15:49:40 | 00:04:52 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 16:16:06 | | | | | | | | | 16:21:34 | | | | | | 16:16:47 | 011 | 16:22:16 | 00:06:10 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 16:16:56 | | | | | | | | | 16:21:42 | | | | | | 16:17:47 | 011 | 16:22:24 | 00:05:28 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 16:19:34 | | | | | | | | | 16:29:04 | | | | | | 16:20:17 | 011 | 16:29:48 | 00:10:14 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 16:23:12 | | | | | | | | | 16:26:30 | | | | | | 16:23:57 | 011 | 16:27:47 | 00:04:35 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 16:27:31 | | | | | | | | | 16:31:50 | | | | | | 16:28:49 | 011 | 16:37:47 | 00:10:16 | 3 | 020 > 013 > 016 > 011 | | |
| 020 | 16:40:09 | | | | | 16:42:58 | | | | | | | | | | 16:41:01 | 001 | 16:51:55 | 00:11:46 | 3 | 020 > 016 > 009 > 005 > 001 | | PM Peak |
| 020 | 16:46:53 | | | | | 16:50:20 | | | | | | | | | | 16:47:44 | 001 | 16:57:03 | 00:10:10 | 3 | 020 > 016 > 009 > 005 > 001 | | PM Peak |
| 020 | 08:39:34 | | | | | 08:43:00 | | | | | | | | | | 08:40:33 | 003 | 08:44:15 | 00:04:41 | 3 | 020 > 016 > 009 > 005 > 003 | | AM Peak |
| 020 | 17:18:00 | | | | | 17:20:44 | | | | | | | | | | 17:18:44 | 003 | 17:29:40 | 00:11:40 | 3 | 020 > 016 > 009 > 005 > 003 | | PM Peak |
| 020 | 08:11:29 | 08:15:51 | | | | 08:14:33 | | | | | | | | | | 08:12:17 | 001 | 08:18:46 | 00:07:17 | 4 | 020 > 016 > 009 > 005 > 001 | | AM Peak |
| 020 | 08:37:30 | 08:41:24 | | | | 08:40:21 | | | | | | | | | | 08:38:15 | 001 | 08:44:06 | 00:06:36 | 4 | 020 > 016 > 009 > 005 > 001 | | AM Peak |
| 020 | 16:30:21 | 16:38:43 | | | | 16:33:23 | | | | | | | | | | 16:31:09 | 001 | 16:41:29 | 00:11:08 | 4 | 020 > 016 > 009 > 005 > 001 | | PM Peak |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 020 | 16:31:25 | 16:39:37 | | 16:34:20 | | | | 16:32:03 | 001 | 16:42:02 | 00:10:37 | 4 | 020 > 016 > 009 > 005 > 001 | PM Peak |
| 020 | 17:52:47 | | | | 17:56:30 | | | 17:53:22 | 011 | 17:57:09 | 00:04:22 | 3 | 020 > 013 > 016 > 011 | |
| 020 | 17:53:42 | | | | 18:06:21 | | | 17:54:36 | 011 | 18:07:34 | 00:13:52 | 3 | 020 > 013 > 016 > 011 | |
| 020 | 17:59:51 | | | | 18:02:50 | | | 18:00:29 | 011 | 18:04:06 | 00:04:15 | 3 | 020 > 013 > 016 > 011 | |
| 020 | 18:03:30 | | | | 18:07:22 | | | 18:04:11 | 011 | 18:10:00 | 00:06:30 | 3 | 020 > 013 > 016 > 011 | |
| 020 | 18:05:02 | | | | 18:18:53 | | | 18:05:46 | 011 | 18:19:56 | 00:14:54 | 3 | 020 > 013 > 016 > 011 | |
| 020 | 18:05:21 | | | | 18:10:18 | | | 18:06:21 | 011 | 18:11:18 | 00:05:57 | 3 | 020 > 013 > 016 > 011 | |
| 020 | 18:07:02 | | | | 18:10:24 | | | 18:07:40 | 011 | 18:13:55 | 00:06:53 | 3 | 020 > 013 > 016 > 011 | |
| 020 | 18:08:00 | | | | 18:14:23 | | | 18:08:41 | 011 | 18:16:33 | 00:08:33 | 3 | 020 > 013 > 016 > 011 | |
| 020 | 18:08:35 | | | | 18:21:11 | | | 18:09:32 | 011 | 18:22:01 | 00:13:26 | 3 | 020 > 013 > 016 > 011 | |
| 020 | 18:10:33 | | | | 18:13:53 | | | 18:11:15 | 011 | 18:15:08 | 00:04:35 | 3 | 020 > 013 > 016 > 011 | |
| 020 | 18:19:18 | | | | 18:28:07 | | | 18:20:15 | 011 | 18:28:51 | 00:09:33 | 3 | 020 > 013 > 016 > 011 | |
| 020 | 18:25:10 | | | | 18:37:14 | | | 18:25:53 | 011 | 18:38:00 | 00:12:50 | 3 | 020 > 013 > 016 > 011 | |
| 020 | 18:25:20 | | | | 18:36:46 | | | 18:26:08 | 011 | 18:37:37 | 00:12:17 | 3 | 020 > 013 > 016 > 011 | |
| 020 | 18:32:31 | | | | 18:38:28 | | | 18:33:16 | 011 | 18:39:23 | 00:06:52 | 3 | 020 > 013 > 016 > 011 | |
| 020 | 18:36:53 | | | | 18:45:22 | | | 18:37:40 | 011 | 18:46:11 | 00:09:18 | 3 | 020 > 013 > 016 > 011 | |
| 020 | 18:42:40 | | | | 18:50:24 | | | 18:43:25 | 011 | 18:51:16 | 00:08:36 | 3 | 020 > 013 > 016 > 011 | |
| 020 | 16:54:18 | 16:59:12 | | 16:57:22 | | | | 16:55:07 | 001 | 17:01:47 | 00:07:29 | 4 | 020 > 016 > 009 > 005 > 001 | PM Peak |
| 020 | 12:57:14 | | | | | 13:05:48 | | | 019 | 13:09:18 | 00:12:04 | 2 | 020 > 014 > 019 | |
| 020 | 11:13:32 | | | | | | 11:14:16 | | 003 | 11:18:56 | 00:05:24 | 2 | 020 > 015 > 003 | |
| 020 | 12:44:26 | | | | | | 12:50:54 | | 017 | 12:51:09 | 00:06:43 | 2 | 020 > 015 > 017 | |
| 020 | 14:48:11 | | | | | | 14:52:08 | | 017 | 14:52:26 | 00:04:15 | 2 | 020 > 015 > 017 | |
| 020 | 14:08:37 | | | | | | 14:13:52 | | 019 | 14:14:50 | 00:06:13 | 2 | 020 > 015 > 019 | |
| 020 | 15:33:31 | | | | | | 15:37:13 | | 019 | 15:38:04 | 00:04:33 | 2 | 020 > 015 > 019 | |
| 020 | 15:36:58 | | | | | | 15:40:34 | | 019 | 15:41:28 | 00:04:30 | 2 | 020 > 015 > 019 | |
| 020 | 18:18:05 | | | | | | 18:23:39 | | 019 | 18:24:34 | 00:06:29 | 2 | 020 > 015 > 019 | |
| 020 | 14:17:19 | | | | | | | 14:18:04 | 001 | 14:23:29 | 00:06:10 | 2 | 020 > 016 > 001 | |
| 020 | 07:21:49 | | | | | | | 07:22:28 | 003 | 07:24:40 | 00:02:51 | 2 | 020 > 016 > 003 | |
| 020 | 11:43:19 | | | | | | | 11:44:05 | 003 | 11:47:29 | 00:04:10 | 2 | 020 > 016 > 003 | |
| 020 | 15:05:24 | | | | | | | 15:06:17 | 003 | 15:09:52 | 00:04:28 | 2 | 020 > 016 > 003 | |
| 020 | 18:21:22 | | | | | | | 18:22:12 | 003 | 18:25:37 | 00:04:15 | 2 | 020 > 016 > 003 | |
| 020 | 18:37:23 | | | | | | | 18:38:17 | 003 | 18:48:39 | 00:11:16 | 2 | 020 > 016 > 003 | |
| 020 | 18:37:45 | | | | | | | 18:38:30 | 003 | 18:42:37 | 00:04:52 | 2 | 020 > 016 > 003 | |
| 020 | 18:38:07 | | | | | | | 18:38:52 | 003 | 18:42:20 | 00:04:13 | 2 | 020 > 016 > 003 | |
| 020 | 12:15:26 | 12:18:57 | | | | | | 12:16:09 | 001 | 12:21:35 | 00:06:09 | 3 | 020 > 016 > 005 > 001 | |
| 020 | 12:18:37 | 12:21:51 | | | | | | 12:19:20 | 001 | 12:24:10 | 00:05:33 | 3 | 020 > 016 > 005 > 001 | |
| 020 | 14:52:47 | 14:56:21 | | | | | | 14:53:33 | 001 | 14:58:52 | 00:06:05 | 3 | 020 > 016 > 005 > 001 | |
| 020 | 17:04:48 | 17:12:29 | | 17:08:23 | | | | 17:05:27 | 001 | 17:15:05 | 00:10:17 | 4 | 020 > 016 > 009 > 005 > 001 | PM Peak |
| 020 | 17:32:16 | 17:39:42 | | | | | | 17:33:00 | 001 | 17:42:40 | 00:10:24 | 3 | 020 > 016 > 005 > 001 | |
| 020 | 07:36:41 | 07:40:00 | | | | | | 07:37:34 | 003 | 07:40:34 | 00:03:53 | 3 | 020 > 016 > 005 > 003 | |
| 020 | 09:05:11 | 09:09:28 | | | | | | 09:05:49 | 003 | 09:09:54 | 00:04:43 | 3 | 020 > 016 > 005 > 003 | |
| 020 | 10:15:13 | 10:18:46 | | | | | | 10:15:59 | 003 | 10:19:28 | 00:04:15 | 3 | 020 > 016 > 005 > 003 | |
| 020 | 11:37:03 | 11:40:31 | | | | | | 11:37:43 | 003 | 11:41:04 | 00:04:01 | 3 | 020 > 016 > 005 > 003 | |
| 020 | 12:20:49 | 12:26:12 | | | | | | 12:21:54 | 003 | 12:26:40 | 00:05:51 | 3 | 020 > 016 > 005 > 003 | |
| 020 | 12:30:41 | 12:41:20 | | | | | | 12:31:47 | 003 | 12:41:46 | 00:11:05 | 3 | 020 > 016 > 005 > 003 | |
| 020 | 13:49:11 | 13:53:33 | | | | | | 13:50:14 | 003 | 13:54:07 | 00:04:56 | 3 | 020 > 016 > 005 > 003 | |
| 020 | 14:19:16 | 14:22:45 | | | | | | 14:20:10 | 003 | 14:23:17 | 00:04:01 | 3 | 020 > 016 > 005 > 003 | |
| 020 | 17:11:51 | 17:20:48 | | 17:15:58 | | | | 17:12:54 | 001 | 17:23:23 | 00:11:32 | 4 | 020 > 016 > 009 > 005 > 001 | PM Peak |
| 020 | 17:18:35 | 17:28:40 | | 17:21:50 | | | | 17:19:22 | 001 | 17:32:25 | 00:13:50 | 4 | 020 > 016 > 009 > 005 > 001 | PM Peak |
| 020 | 08:05:06 | 08:09:20 | | 08:08:44 | | | | 08:06:12 | 003 | 08:09:51 | 00:04:45 | 4 | 020 > 016 > 009 > 005 > 003 | AM Peak |
| 020 | 08:05:34 | 08:10:41 | | 08:09:09 | | | | 08:06:40 | 003 | 08:11:15 | 00:05:41 | 4 | 020 > 016 > 009 > 005 > 003 | AM Peak |
| 020 | 07:18:25 | | | 07:20:34 | | | | 07:19:15 | 001 | 07:23:04 | 00:04:39 | 3 | 020 > 016 > 009 > 001 | |
| 020 | 10:05:38 | | | 10:08:12 | | | | 10:06:31 | 001 | 10:11:31 | 00:05:53 | 3 | 020 > 016 > 009 > 001 | |
| 020 | 08:10:12 | 08:14:17 | | 08:13:29 | | | | 08:11:03 | 003 | 08:14:49 | 00:04:37 | 4 | 020 > 016 > 009 > 005 > 003 | AM Peak |
| 020 | 08:13:20 | 08:17:36 | | 08:16:23 | | | | 08:14:12 | 003 | 08:18:07 | 00:04:47 | 4 | 020 > 016 > 009 > 005 > 003 | AM Peak |
| 020 | 17:35:21 | | | 17:37:48 | | | | 17:36:02 | 001 | 17:45:21 | 00:10:00 | 3 | 020 > 016 > 009 > 001 | |
| 020 | 17:39:51 | | | 17:42:59 | | | | 17:40:37 | 001 | 17:48:57 | 00:09:06 | 3 | 020 > 016 > 009 > 001 | |
| 020 | 17:42:37 | | | 17:45:29 | | | | 17:43:35 | 001 | 17:55:37 | 00:13:00 | 3 | 020 > 016 > 009 > 001 | |
| 020 | 18:39:32 | | | 18:42:04 | | | | 18:40:22 | 001 | 18:44:48 | 00:05:16 | 3 | 020 > 016 > 009 > 001 | |
| 020 | 18:41:01 | | | 18:50:45 | | | | 18:41:55 | 001 | 18:54:15 | 00:13:14 | 3 | 020 > 016 > 009 > 001 | |
| 020 | 18:41:09 | | | 18:43:54 | | | | 18:41:59 | 001 | 18:47:25 | 00:06:16 | 3 | 020 > 016 > 009 > 001 | |
| 020 | 18:43:17 | | | 18:46:15 | | | | 18:44:04 | 001 | 18:49:08 | 00:05:51 | 3 | 020 > 016 > 009 > 001 | |
| 020 | 18:47:28 | | | 18:50:48 | | | | 18:48:10 | 001 | 18:54:51 | 00:07:23 | 3 | 020 > 016 > 009 > 001 | |
| 020 | 08:16:22 | 08:21:18 | | 08:19:45 | | | | 08:17:29 | 003 | 08:21:55 | 00:05:33 | 4 | 020 > 016 > 009 > 005 > 003 | AM Peak |
| 020 | 11:00:00 | | | 11:02:39 | | | | 11:00:43 | 003 | 11:03:38 | 00:03:38 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 13:16:14 | | | 13:19:24 | | | | 13:17:15 | 003 | 13:20:23 | 00:04:09 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 13:46:29 | | | 13:49:09 | | | | 13:47:16 | 003 | 13:50:23 | 00:03:54 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 15:30:52 | | | 15:33:56 | | | | 15:31:41 | 003 | 15:35:22 | 00:04:30 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 15:52:29 | | | 15:55:46 | | | | 15:53:23 | 003 | 15:57:33 | 00:05:04 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 08:17:52 | 08:22:14 | | 08:21:25 | | | | 08:19:03 | 003 | 08:23:36 | 00:05:44 | 4 | 020 > 016 > 009 > 005 > 003 | AM Peak |
| 020 | 17:34:16 | | | 17:36:49 | | | | 17:34:52 | 003 | 17:42:01 | 00:07:45 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 17:40:29 | | | 17:43:37 | | | | 17:41:08 | 003 | 17:46:57 | 00:06:28 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 17:41:46 | | | 17:44:49 | | | | 17:42:29 | 003 | 17:48:15 | 00:06:29 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 17:43:32 | | | 17:46:18 | | | | 17:44:14 | 003 | 17:49:10 | 00:05:38 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 17:43:57 | | | 17:46:26 | | | | 17:44:42 | 003 | 17:49:16 | 00:05:19 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 17:45:24 | | | 17:48:16 | | | | 17:46:10 | 003 | 17:50:14 | 00:04:50 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 17:46:42 | | | 17:49:27 | | | | 17:47:37 | 003 | 17:51:04 | 00:04:22 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 17:47:35 | | | 17:50:47 | | | | 17:48:19 | 003 | 17:52:40 | 00:05:05 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 17:47:48 | | | 17:50:56 | | | | 17:48:29 | 003 | 17:52:55 | 00:05:07 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 17:55:54 | | | 17:58:11 | | | | 17:56:30 | 003 | 17:59:46 | 00:03:52 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 17:58:03 | | | 18:01:45 | | | | 17:59:00 | 003 | 18:03:12 | 00:05:09 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 18:03:06 | | | 18:06:37 | | | | 18:03:54 | 003 | 18:07:58 | 00:04:52 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 18:09:12 | | | 18:12:33 | | | | 18:10:01 | 003 | 18:13:46 | 00:04:34 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 18:15:36 | | | 18:18:38 | | | | 18:16:28 | 003 | 18:20:06 | 00:04:30 | 3 | 020 > 016 > 009 > 003 | |
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| 020 | 18:41:13 | | | 18:43:55 | | | | 18:42:01 | 003 | 18:45:16 | 00:04:03 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 18:44:34 | | | 18:47:18 | | | | 18:45:17 | 003 | 18:48:35 | 00:04:01 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 18:47:07 | | | 18:49:40 | | | | 18:47:57 | 003 | 18:51:07 | 00:04:00 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 18:48:52 | | | 18:51:52 | | | | 18:49:43 | 003 | 18:53:23 | 00:04:31 | 3 | 020 > 016 > 009 > 003 | |
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| 020 | 18:50:07 | | | 18:52:33 | | | | 18:51:07 | 003 | 18:53:38 | 00:03:31 | 3 | 020 > 016 > 009 > 003 | |
| 020 | 07:43:41 | 07:47:18 | | 07:46:22 | | | | 07:44:40 | 001 | 07:49:52 | 00:06:11 | 4 | 020 > 016 > 009 > 005 > 001 | |
| 020 | 07:52:17 | 07:58:00 | | 07:56:58 | | | | 07:53:02 | 001 | 08:00:14 | 00:07:57 | 4 | 020 > 016 > 009 > 005 > 001 | |
| 020 | 08:18:14 | 08:23:05 | | 08:21:40 | | | | 08:19:10 | 003 | 08:23:42 | 00:05:28 | 4 | 020 > 016 > 009 > 005 > 003 | AM Peak |
| 020 | 08:23:50 | 08:28:06 | | 08:27:06 | | | | 08:24:40 | 003 | 08:28:41 | 00:04:51 | 4 | 020 > 016 > 009 > 005 > 003 | AM Peak |
| 020 | 09:03:26 | 09:13:43 | | 09:07:23 | | | | 09:04:17 | 001 | 09:15:58 | 00:12:32 | 4 | 020 > 016 > 009 > 005 > 001 | |
| 020 | 09:45:05 | 09:48:19 | | 09:47:39 | | | | 09:45:45 | 001 | 09:50:43 | 00:05:38 | 4 | 020 > 016 > 009 > 005 > 001 | |
| 020 | 09:51:09 | 09:55:33 | | 09:54:46 | | | | 09:52:05 | 001 | 09:58:27 | 00:07:18 | 4 | 020 > 016 > 009 > 005 > 001 | |
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| 020 | 10:23:33 | 10:26:56 | | 10:26:04 | | | | 10:24:22 | 001 | 10:29:47 | 00:06:14 | 4 | 020 > 016 > 009 > 005 > 001 | |
| 020 | 10:58:11 | 11:02:10 | | 11:01:16 | | | | 10:58:58 | 001 | 11:04:30 | 00:06:19 | 4 | 020 > 016 > 009 > 005 > 001 | |
| 020 | 11:24:12 | 11:27:01 | | 11:26:26 | | | | 11:24:55 | 001 | 11:28:54 | 00:04:42 | 4 | 020 > 016 > 009 > 005 > 001 | |
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| 020 | 12:20:39 | 12:25:56 | | 12:25:09 | | | | 12:21:45 | 001 | 12:28:40 | 00:08:01 | 4 | 020 > 016 > 009 > 005 > 001 | |
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| 020 | 13:44:09 | 13:54:02 | | 13:53:16 | | | | 13:44:53 | 001 | 13:56:59 | 00:12:50 | 4 | 020 > 016 > 009 > 005 > 001 | |
| 020 | 13:54:52 | 13:58:23 | | 13:57:46 | | | | 13:55:39 | 001 | 14:01:58 | 00:07:06 | 4 | 020 > 016 > 009 > 005 > 001 | |
| 020 | 14:01:17 | 14:05:31 | | 14:04:47 | | | | 14:02:20 | 001 | 14:08:13 | 00:06:56 | 4 | 020 > 016 > 009 > 005 > 001 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 020 | 14:17:21 | 14:20:50 | 14:20:07 | 14:18:06 | 001 | 14:23:32 | 00:06:11 | 4 020 > 016 > 009 > 005 > 001 | |
| 020 | 14:18:48 | 14:22:06 | 14:21:29 | 14:19:50 | 001 | 14:24:10 | 00:05:22 | 4 020 > 016 > 009 > 005 > 001 | |
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| 020 | 15:52:22 | 15:56:49 | 15:55:34 | 15:53:17 | 001 | 15:59:24 | 00:07:02 | 4 020 > 016 > 009 > 005 > 001 | |
| 020 | 16:07:20 | 16:13:13 | 16:11:59 | 16:08:03 | 001 | 16:16:55 | 00:09:35 | 4 020 > 016 > 009 > 005 > 001 | |
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| 020 | 08:25:55 | 08:29:34 | 08:28:54 | 08:27:05 | 003 | 08:30:10 | 00:04:15 | 4 020 > 016 > 009 > 005 > 003 | AM Peak |
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| 020 | 08:42:43 | 08:48:12 | 08:46:48 | 08:44:01 | 003 | 08:48:48 | 00:06:05 | 4 020 > 016 > 009 > 005 > 003 | AM Peak |
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| 020 | 07:53:24 | 07:56:38 | 07:55:51 | 07:54:12 | 003 | 07:57:14 | 00:03:50 | 4 020 > 016 > 009 > 005 > 003 | |
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| 020 | 07:58:35 | 08:02:15 | 08:01:08 | 07:59:34 | 003 | 08:02:47 | 00:04:12 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 08:53:31 | 08:57:26 | 08:56:41 | 08:54:10 | 003 | 08:57:57 | 00:04:26 | 4 020 > 016 > 009 > 005 > 003 | AM Peak |
| 020 | 08:54:04 | 09:00:43 | 09:00:00 | 08:54:45 | 003 | 09:01:19 | 00:07:15 | 4 020 > 016 > 009 > 005 > 003 | AM Peak |
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| 020 | 09:21:27 | 09:24:56 | 09:24:20 | 09:22:08 | 003 | 09:25:27 | 00:04:00 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 09:24:09 | 09:27:40 | 09:26:57 | 09:24:58 | 003 | 09:28:17 | 00:04:08 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 09:25:44 | 09:29:04 | 09:28:23 | 09:26:28 | 003 | 09:29:36 | 00:03:52 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 09:27:16 | 09:31:32 | 09:30:49 | 09:28:10 | 003 | 09:32:18 | 00:05:02 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 09:43:18 | 09:47:01 | 09:46:18 | 09:44:20 | 003 | 09:47:32 | 00:04:14 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 09:55:45 | 10:00:07 | 09:59:29 | 09:56:26 | 003 | 10:00:37 | 00:04:52 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 09:56:46 | 10:05:39 | 10:05:01 | 09:57:41 | 003 | 10:06:11 | 00:09:25 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 09:57:37 | 10:02:09 | 10:01:27 | 09:58:24 | 003 | 10:02:43 | 00:05:06 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 09:57:50 | 10:02:16 | 10:01:31 | 09:58:37 | 003 | 10:02:46 | 00:04:56 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 09:58:07 | 10:02:28 | 10:01:35 | 09:58:58 | 003 | 10:02:59 | 00:04:52 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 10:05:05 | 10:08:54 | 10:08:04 | 10:06:08 | 003 | 10:09:29 | 00:04:24 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 10:19:22 | 10:23:58 | 10:23:22 | 10:20:11 | 003 | 10:24:32 | 00:05:10 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 10:34:27 | 10:37:40 | 10:37:02 | 10:35:08 | 003 | 10:38:20 | 00:03:53 | 4 020 > 016 > 009 > 005 > 003 | |
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| 020 | 10:46:16 | 10:56:21 | 10:55:23 | 10:47:08 | 003 | 10:56:54 | 00:10:38 | 4 020 > 016 > 009 > 005 > 003 | |
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| 020 | 10:57:25 | 11:01:16 | 11:00:23 | 10:58:21 | 003 | 11:01:48 | 00:04:23 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 10:58:32 | 11:05:59 | 11:05:20 | 10:59:25 | 003 | 11:06:36 | 00:08:04 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 11:11:23 | 11:14:39 | 11:14:04 | 11:12:06 | 003 | 11:15:12 | 00:03:49 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 11:20:49 | 11:24:39 | 11:23:51 | 11:21:34 | 003 | 11:25:15 | 00:04:26 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 11:27:42 | 11:32:28 | 11:31:33 | 11:28:30 | 003 | 11:34:44 | 00:07:02 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 11:33:23 | 11:37:08 | 11:36:13 | 11:34:14 | 003 | 11:37:43 | 00:04:20 | 4 020 > 016 > 009 > 005 > 003 | |
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| 020 | 11:40:23 | 11:44:47 | 11:43:59 | 11:41:13 | 003 | 11:45:29 | 00:05:06 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 11:53:25 | 11:57:44 | 11:56:47 | 11:54:16 | 003 | 11:58:19 | 00:04:54 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 12:09:59 | 12:13:11 | 12:12:26 | 12:10:44 | 003 | 12:13:46 | 00:03:47 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 12:15:46 | 12:19:14 | 12:18:18 | 12:16:22 | 003 | 12:19:59 | 00:04:13 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 12:24:34 | 12:28:10 | 12:27:30 | 12:25:25 | 003 | 12:28:43 | 00:04:09 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 12:39:28 | 12:43:11 | 12:42:40 | 12:40:17 | 003 | 12:43:39 | 00:04:11 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 12:41:09 | 12:44:21 | 12:43:40 | 12:41:53 | 003 | 12:45:00 | 00:03:51 | 4 020 > 016 > 009 > 005 > 003 | |
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| 020 | 12:47:00 | 12:50:48 | 12:50:15 | 12:47:51 | 003 | 12:51:20 | 00:04:20 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 12:47:58 | 12:51:14 | 12:50:35 | 12:48:47 | 003 | 12:51:47 | 00:03:49 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 12:52:51 | 12:56:05 | 12:55:33 | 12:53:28 | 003 | 12:56:37 | 00:03:46 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 13:02:10 | 13:06:23 | 13:05:39 | 13:02:59 | 003 | 13:06:59 | 00:04:49 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 13:09:23 | 13:12:51 | 13:12:09 | 13:10:07 | 003 | 13:13:18 | 00:03:55 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 13:12:31 | 13:15:52 | 13:15:08 | 13:13:18 | 003 | 13:16:20 | 00:03:49 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 13:13:30 | 13:17:01 | 13:16:11 | 13:14:26 | 003 | 13:17:32 | 00:04:02 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 13:16:05 | 13:18:48 | 13:18:20 | 13:16:40 | 003 | 13:19:24 | 00:03:19 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 13:17:03 | 13:21:06 | 13:20:30 | 13:17:58 | 003 | 13:21:40 | 00:04:37 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 13:24:03 | 13:26:46 | 13:26:17 | 13:24:58 | 003 | 13:27:10 | 00:03:07 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 13:26:18 | 13:29:37 | 13:29:01 | 13:27:04 | 003 | 13:30:10 | 00:03:52 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 13:28:29 | 13:31:33 | 13:31:00 | 13:29:05 | 003 | 13:32:03 | 00:03:34 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 13:34:27 | 13:38:02 | 13:37:10 | 13:35:09 | 003 | 13:38:36 | 00:04:09 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 13:51:47 | 13:58:34 | 13:57:52 | 13:54:14 | 003 | 13:59:13 | 00:07:26 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 14:07:41 | 14:11:09 | 14:10:25 | 14:08:28 | 003 | 14:11:57 | 00:04:16 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 14:10:26 | 14:13:52 | 14:13:15 | 14:11:18 | 003 | 14:14:19 | 00:03:53 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 14:33:36 | 14:36:44 | 14:36:08 | 14:34:25 | 003 | 14:37:16 | 00:03:40 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 14:34:55 | 14:40:21 | 14:39:30 | 14:35:50 | 003 | 14:40:55 | 00:06:00 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 14:37:22 | 14:41:56 | 14:40:09 | 14:38:08 | 003 | 14:42:29 | 00:05:07 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 14:38:46 | 14:43:17 | 14:41:26 | 14:39:29 | 003 | 14:43:46 | 00:05:00 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 14:43:17 | 14:46:27 | 14:45:51 | 14:43:58 | 003 | 14:46:58 | 00:03:41 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 14:44:22 | 14:48:04 | 14:47:15 | 14:45:05 | 003 | 14:48:37 | 00:04:15 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 14:44:53 | 14:48:38 | 14:48:04 | 14:45:41 | 003 | 14:49:12 | 00:04:19 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 14:56:54 | 15:01:05 | 15:00:04 | 14:57:39 | 003 | 15:01:37 | 00:04:43 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 15:10:25 | 15:14:11 | 15:13:13 | 15:11:06 | 003 | 15:14:51 | 00:04:26 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 15:14:31 | 15:18:45 | 15:17:58 | 15:15:16 | 003 | 15:19:22 | 00:04:51 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 15:26:17 | 15:29:53 | 15:29:07 | 15:27:05 | 003 | 15:30:26 | 00:04:09 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 15:58:25 | 16:02:31 | 16:01:40 | 15:59:16 | 003 | 16:03:06 | 00:04:41 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 16:01:20 | 16:05:33 | 16:04:30 | 16:01:57 | 003 | 16:06:08 | 00:04:48 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 16:02:39 | 16:07:52 | 16:06:52 | 16:03:27 | 003 | 16:08:28 | 00:05:49 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 16:16:00 | 16:21:29 | 16:19:58 | 16:16:42 | 003 | 16:22:06 | 00:06:06 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 16:18:49 | 16:24:21 | 16:21:45 | 16:19:35 | 003 | 16:24:57 | 00:06:08 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 16:19:37 | 16:24:49 | 16:22:36 | 16:20:21 | 003 | 16:25:35 | 00:05:58 | 4 020 > 016 > 009 > 005 > 003 | |
| 020 | 16:25:16 | 16:32:01 | 16:28:19 | 16:26:04 | 003 | 16:32:38 | 00:07:22 | 4 020 > 016 > 009 > 005 > 003 | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 020 | 16:25:55 | 16:32:32 | | | | 16:28:49 | | | | 16:26:31 | 003 | 16:33:15 | 00:07:20 | 4 | 020 > 016 > 009 > 005 > 003 | |
| 020 | 16:28:42 | 16:36:29 | | | | 16:31:34 | | | | 16:29:45 | 003 | 16:36:59 | 00:08:17 | 4 | 020 > 016 > 009 > 005 > 003 | |
| 020 | 17:26:40 | 17:36:28 | | | | 17:29:14 | | | | 17:27:30 | 003 | 17:37:10 | 00:10:30 | 4 | 020 > 016 > 009 > 005 > 003 | PM Peak |
| 020 | 08:18:18 | 08:23:07 | | | | 08:21:44 | | | | 08:19:12 | 003 | 08:24:18 | 00:06:00 | 4 | 020 > 016 > 009 > 005 > 003 | AM Peak |
| 020 | 08:19:58 | 08:25:19 | 08:27:24 | | 08:27:41 | 08:23:27 | | | | 08:21:01 | 011 | 08:28:16 | 00:08:18 | 6 | 020 > 016 > 009 > 005 > 006 > 008 > 011 | AM Peak |
| 020 | 08:28:42 | | 08:35:08 | | 08:35:19 | 08:32:11 | | | | 08:29:28 | 011 | 08:35:55 | 00:07:13 | 5 | 020 > 016 > 009 > 005 > 006 > 008 > 011 | AM Peak |
| 020 | 08:28:17 | | | | 08:40:08 | 08:32:09 | | | | 08:29:18 | 011 | 08:40:43 | 00:12:26 | 4 | 020 > 016 > 009 > 008 > 011 | AM Peak |
| 020 | 16:31:43 | | | | | 16:34:23 | 16:34:26 | | 16:40:28 | 16:32:33 | 017 | 16:40:48 | 00:09:05 | 5 | 020 > 016 > 009 > 010 > 015 > 017 | PM Peak |
| 020 | 08:04:50 | | | | | 08:07:41 | 08:10:14 | | 08:11:44 | 08:05:32 | 019 | 08:12:59 | 00:08:09 | 5 | 020 > 016 > 009 > 010 > 015 > 019 | AM Peak |
| 020 | 08:09:48 | | | | | 08:12:49 | 08:14:37 | | 08:16:39 | 08:10:32 | 019 | 08:17:29 | 00:07:41 | 5 | 020 > 016 > 009 > 010 > 015 > 019 | AM Peak |
| 020 | 08:05:14 | | | | | 08:08:47 | | | | 08:06:17 | 011 | 08:12:20 | 00:07:06 | 3 | 020 > 016 > 009 > 008 > 011 | AM Peak |
| 020 | 08:06:45 | | | | | 08:09:52 | | | | 08:07:30 | 011 | 08:12:32 | 00:05:47 | 3 | 020 > 016 > 009 > 008 > 011 | AM Peak |
| 020 | 17:00:40 | | | | | 17:10:22 | | | | 17:01:20 | 011 | 17:15:03 | 00:14:23 | 3 | 020 > 016 > 009 > 008 > 011 | PM Peak |
| 020 | 16:39:47 | | | | | | | | | 16:40:33 | 011 | 16:45:52 | 00:06:05 | 2 | 020 > 016 > 011 | PM Peak |
| 020 | 16:52:30 | | | | | | | | | 16:53:26 | 011 | 17:03:11 | 00:10:41 | 2 | 020 > 016 > 011 | PM Peak |
| 020 | 17:05:10 | | | | | | | | | 17:06:00 | 011 | 17:17:02 | 00:11:52 | 2 | 020 > 016 > 011 | PM Peak |
| 020 | 17:20:46 | | | | | | | | | 17:21:31 | 011 | 17:25:17 | 00:04:31 | 2 | 020 > 016 > 011 | PM Peak |
| 020 | 17:32:03 | 17:38:33 | | | | 17:34:54 | | | | 17:32:47 | 003 | 17:41:19 | 00:09:16 | 4 | 020 > 016 > 009 > 005 > 003 | |
| 020 | 17:41:37 | 17:47:17 | | | | 17:44:20 | | | | 17:42:19 | 003 | 17:47:54 | 00:06:17 | 4 | 020 > 016 > 009 > 005 > 003 | |
| 020 | 17:48:15 | 17:52:37 | | | | 17:51:12 | | | | 17:49:02 | 003 | 17:53:17 | 00:05:02 | 4 | 020 > 016 > 009 > 005 > 003 | |
| 020 | 08:26:26 | | | 08:30:31 | | | | 08:29:10 | | 08:27:31 | 003 | 08:32:06 | 00:05:40 | 4 | 020 > 016 > 013 > 007 > 005 > 003 | AM Peak |
| 020 | 09:54:53 | 09:59:55 | 10:07:48 | | 10:07:58 | 09:59:25 | | | | 09:56:04 | 011 | 10:08:25 | 00:13:32 | 6 | 020 > 016 > 009 > 005 > 006 > 008 > 011 | |
| 020 | 15:35:46 | 15:39:43 | 15:47:11 | | 15:47:20 | 15:39:01 | | | | 15:36:36 | 011 | 15:47:57 | 00:12:11 | 6 | 020 > 016 > 009 > 005 > 006 > 008 > 011 | |
| 020 | 09:19:13 | 09:23:00 | 09:24:02 | | | 09:22:22 | 09:22:24 | | 09:27:01 | 09:19:51 | 019 | 09:27:56 | 00:08:43 | 7 | 020 > 016 > 009 > 005 > 006 > 010 > 015 > 019 | |
| 020 | 17:22:26 | 17:29:37 | | 17:29:35 | | | | 17:26:43 | | 17:23:11 | 003 | 17:30:18 | 00:07:52 | 5 | 020 > 016 > 013 > 007 > 005 > 003 | PM Peak |
| 020 | 18:15:13 | | 18:23:59 | | 18:24:09 | 18:18:27 | | | | 18:15:54 | 011 | 18:26:52 | 00:11:39 | 5 | 020 > 016 > 009 > 006 > 008 > 011 | |
| 020 | 07:59:33 | | | | 08:13:10 | 08:01:56 | | | | 08:00:19 | 011 | 08:13:43 | 00:14:10 | 4 | 020 > 016 > 009 > 008 > 011 | |
| 020 | 08:09:34 | | | | | | | 08:12:55 | | 08:10:20 | 011 | 08:15:19 | 00:05:45 | 3 | 020 > 016 > 013 > 011 | AM Peak |
| 020 | 10:01:08 | | | | 10:06:32 | 10:04:51 | | | | 10:01:51 | 011 | 10:07:05 | 00:05:57 | 4 | 020 > 016 > 009 > 008 > 011 | |
| 020 | 10:10:24 | | | | 10:17:42 | 10:17:03 | | | | 10:11:10 | 011 | 10:18:15 | 00:07:51 | 4 | 020 > 016 > 009 > 008 > 011 | |
| 020 | 10:25:00 | | | | 10:29:44 | 10:27:48 | | | | 10:25:43 | 011 | 10:30:18 | 00:05:18 | 4 | 020 > 016 > 009 > 008 > 011 | |
| 020 | 10:33:51 | | | | 10:38:58 | 10:38:18 | | | | 10:34:36 | 011 | 10:39:34 | 00:05:43 | 4 | 020 > 016 > 009 > 008 > 011 | |
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| 020 | 14:35:51 | | | | 14:43:36 | 14:41:37 | | | | 14:36:37 | 011 | 14:45:42 | 00:09:51 | 4 | 020 > 016 > 009 > 008 > 011 | |
| 020 | 16:07:03 | | | | 16:12:39 | 16:11:30 | | | | 16:07:47 | 011 | 16:13:15 | 00:06:12 | 4 | 020 > 016 > 009 > 008 > 011 | |
| 020 | 16:13:40 | | | | 16:20:19 | 16:17:05 | | | | 16:14:31 | 011 | 16:25:26 | 00:11:46 | 4 | 020 > 016 > 009 > 008 > 011 | |
| 020 | 18:09:18 | | | | 18:22:59 | 18:22:02 | | | | 18:10:09 | 011 | 18:23:40 | 00:14:22 | 4 | 020 > 016 > 009 > 008 > 011 | |
| 020 | 18:47:47 | | | | 18:52:53 | 18:52:10 | | | | 18:48:23 | 011 | 18:53:20 | 00:05:33 | 4 | 020 > 016 > 009 > 008 > 011 | |
| 020 | 08:10:52 | | | | | | | 08:16:00 | | 08:11:41 | 011 | 08:16:37 | 00:05:45 | 3 | 020 > 016 > 013 > 011 | AM Peak |
| 020 | 08:13:50 | | | | | | | 08:20:41 | | 08:14:34 | 011 | 08:21:30 | 00:07:40 | 3 | 020 > 016 > 013 > 011 | AM Peak |
| 020 | 08:19:03 | | | | | | | 08:28:15 | | 08:20:00 | 011 | 08:29:01 | 00:09:58 | 3 | 020 > 016 > 013 > 011 | AM Peak |
| 020 | 08:31:19 | | | | | | | 08:37:31 | | 08:32:22 | 011 | 08:38:12 | 00:06:53 | 3 | 020 > 016 > 013 > 011 | AM Peak |
| 020 | 08:33:03 | | | | | | | 08:45:53 | | 08:34:34 | 011 | 08:46:36 | 00:13:33 | 3 | 020 > 016 > 013 > 011 | AM Peak |
| 020 | 09:10:32 | | | | | 09:14:33 | | | | 09:11:43 | 011 | 09:16:25 | 00:05:53 | 3 | 020 > 016 > 009 > 011 | |
| 020 | 12:54:10 | | | | | 12:57:08 | | | | 12:54:50 | 011 | 13:06:42 | 00:12:32 | 3 | 020 > 016 > 009 > 011 | |
| 020 | 13:08:26 | | | | | 13:11:42 | | | | 13:09:09 | 011 | 13:13:18 | 00:04:52 | 3 | 020 > 016 > 009 > 011 | |
| 020 | 16:30:06 | | | | | | | 16:33:18 | | 16:30:48 | 011 | 16:44:48 | 00:14:42 | 3 | 020 > 016 > 013 > 011 | PM Peak |
| 020 | 17:58:23 | | | | | | 18:01:49 | | | 17:59:13 | 003 | 18:03:13 | 00:04:50 | 3 | 020 > 016 > 010 > 003 | |
| 020 | 16:33:03 | | | | | | | 16:36:29 | | 16:33:50 | 011 | 16:39:04 | 00:06:01 | 3 | 020 > 016 > 013 > 011 | PM Peak |
| 020 | 12:05:17 | | | | 12:17:32 | | 12:17:02 | | | 12:06:07 | 011 | 12:18:08 | 00:12:51 | 4 | 020 > 016 > 010 > 008 > 011 | |
| 020 | 09:15:19 | | | | | | | | | 09:16:26 | 011 | 09:24:17 | 00:08:58 | 2 | 020 > 016 > 011 | |
| 020 | 12:00:22 | | | | | | | | | 12:01:04 | 011 | 12:14:31 | 00:14:09 | 2 | 020 > 016 > 011 | |
| 020 | 12:15:21 | | | | | | | | | 12:16:05 | 011 | 12:21:36 | 00:06:15 | 2 | 020 > 016 > 011 | |
| 020 | 12:57:38 | | | | | | | | | 12:58:22 | 011 | 13:10:03 | 00:12:25 | 2 | 020 > 016 > 011 | |
| 020 | 13:08:17 | | | | | | | | | 13:09:01 | 011 | 13:18:00 | 00:09:43 | 2 | 020 > 016 > 011 | |
| 020 | 15:44:31 | | | | | | | | | 15:45:13 | 011 | 15:59:02 | 00:14:31 | 2 | 020 > 016 > 011 | |
| 020 | 16:38:13 | | | | | | | 16:45:44 | | 16:39:20 | 011 | 16:47:09 | 00:08:56 | 3 | 020 > 016 > 013 > 011 | PM Peak |
| 020 | 16:43:00 | | | | | | | 16:46:18 | | 16:43:44 | 011 | 16:47:20 | 00:04:20 | 3 | 020 > 016 > 013 > 011 | PM Peak |
| 020 | 16:52:28 | | | | | | | 16:56:42 | | 16:53:25 | 011 | 16:57:27 | 00:04:59 | 3 | 020 > 016 > 013 > 011 | PM Peak |
| 020 | 16:52:43 | | | | | | | 16:56:12 | | 16:53:41 | 011 | 16:56:56 | 00:04:13 | 3 | 020 > 016 > 013 > 011 | PM Peak |
| 020 | 17:57:32 | | | | | | | | | 17:58:10 | 011 | 18:05:07 | 00:07:35 | 2 | 020 > 016 > 011 | |
| 020 | 18:07:06 | | | | | | | | | 18:07:51 | 011 | 18:16:35 | 00:09:29 | 2 | 020 > 016 > 011 | |
| 020 | 18:47:05 | | | | | | | | | 18:47:52 | 011 | 18:51:08 | 00:04:03 | 2 | 020 > 016 > 011 | |
| 020 | 16:55:54 | | | | | | | 16:58:56 | | 16:56:42 | 011 | 16:59:41 | 00:03:47 | 3 | 020 > 016 > 013 > 011 | PM Peak |
| 020 | 17:53:02 | | | 18:04:48 | | | | 18:03:03 | | 17:53:39 | 003 | 18:05:20 | 00:12:18 | 4 | 020 > 016 > 013 > 007 > 003 | |
| 020 | 15:06:05 | 15:10:31 | | 15:10:29 | | | | 15:09:04 | | 15:06:50 | 001 | 15:13:21 | 00:07:16 | 5 | 020 > 016 > 013 > 007 > 005 > 001 | |
| 020 | 07:32:51 | 07:36:48 | | 07:36:45 | | | | 07:35:32 | | 07:33:34 | 003 | 07:37:12 | 00:04:21 | 5 | 020 > 016 > 013 > 007 > 005 > 003 | |
| 020 | 09:08:53 | 09:13:32 | | 09:13:29 | | | | 09:12:11 | | 09:09:58 | 003 | 09:14:09 | 00:05:16 | 5 | 020 > 016 > 013 > 007 > 005 > 003 | |
| 020 | 10:33:47 | 10:39:08 | | 10:39:03 | | | | 10:37:38 | | 10:34:33 | 003 | 10:39:39 | 00:05:52 | 5 | 020 > 016 > 013 > 007 > 005 > 003 | |
| 020 | 13:16:32 | 13:21:53 | | 13:21:49 | | | | 13:20:18 | | 13:17:38 | 003 | 13:22:29 | 00:05:57 | 5 | 020 > 016 > 013 > 007 > 005 > 003 | |
| 020 | 16:24:54 | 16:35:14 | | 16:35:12 | | | | 16:27:32 | | 16:25:32 | 003 | 16:35:43 | 00:10:49 | 5 | 020 > 016 > 013 > 007 > 005 > 003 | |
| 020 | 16:59:46 | | | | | | | 17:03:05 | | 17:00:27 | 011 | 17:04:11 | 00:04:25 | 3 | 020 > 016 > 013 > 011 | PM Peak |
| 020 | 07:45:37 | | | | | | | 07:48:39 | 07:51:38 | 07:53:29 | 07:46:25 | 017 | 07:53:47 | 00:08:10 | 5 | 020 > 016 > 013 > 014 > 015 > 017 | |
| 020 | 07:42:43 | | | | | | | 07:45:15 | 07:47:57 | 07:50:22 | 07:43:26 | 019 | 07:51:21 | 00:08:38 | 5 | 020 > 016 > 013 > 014 > 015 > 019 | |
| 020 | 07:51:40 | | | | | | | 07:54:42 | 07:58:40 | 08:01:36 | 07:52:27 | 019 | 08:02:36 | 00:10:56 | 5 | 020 > 016 > 013 > 014 > 015 > 019 | |
| 020 | 08:18:01 | | | | | | | 08:21:41 | 08:24:58 | 08:28:28 | 08:19:05 | 019 | 08:29:29 | 00:11:28 | 5 | 020 > 016 > 013 > 014 > 015 > 019 | AM Peak |
| 020 | 08:21:55 | | | | | | | 08:25:07 | 08:28:30 | 08:32:09 | 08:22:50 | 019 | 08:33:13 | 00:11:18 | 5 | 020 > 016 > 013 > 014 > 015 > 019 | AM Peak |
| 020 | 11:49:26 | | | | | | | 11:52:36 | 11:57:19 | 11:59:16 | 11:50:11 | 019 | 12:00:07 | 00:10:41 | 5 | 020 > 016 > 013 > 014 > 015 > 019 | |
| 020 | 08:05:53 | | | | | | | | | 08:08:43 | 08:07:03 | 017 | 08:08:57 | 00:03:04 | 3 | 020 > 016 > 015 > 017 | AM Peak |
| 020 | 08:18:54 | | | | | | | | | 08:26:14 | 08:19:58 | 017 | 08:26:24 | 00:07:30 | 3 | 020 > 016 > 015 > 017 | AM Peak |
| 020 | 08:31:18 | | | | | | | | | 08:36:27 | 08:32:21 | 017 | 08:36:39 | 00:05:21 | 3 | 020 > 016 > 015 > 017 | AM Peak |
| 020 | 09:10:33 | | | | | | | | | 09:18:59 | 09:11:44 | 017 | 09:19:12 | 00:08:39 | 3 | 020 > 016 > 015 > 017 | |
| 020 | 11:10:40 | | | | | | | | | 11:25:22 | 11:11:21 | 017 | 11:25:31 | 00:14:51 | 3 | 020 > 016 > 015 > 017 | |
| 020 | 12:41:02 | | | | | | | | | 12:43:19 | 12:41:46 | 017 | 12:43:33 | 00:02:31 | 3 | 020 > 016 > 015 > 017 | |
| 020 | 14:21:14 | | | | | | | | | 14:31:30 | 14:22:08 | 017 | 14:32:02 | 00:10:48 | 3 | 020 > 016 > 015 > 017 | |
| 020 | 14:34:03 | | | | | | | | | 14:38:51 | 14:34:41 | 017 | 14:39:09 | 00:05:06 | 3 | 020 > 016 > 015 > 017 | |
| 020 | 14:44:28 | | | | | | | | | 14:51:35 | 14:45:19 | 017 | 14:51:51 | 00:07:23 | 3 | 020 > 016 > 015 > 017 | |
| 020 | 16:38:10 | | | | | | | | | 16:45:33 | 16:39:18 | 017 | 16:45:45 | 00:07:35 | 3 | 020 > 016 > 015 > 017 | PM Peak |
| 020 | 17:01:23 | | | | | | | | | 17:04:05 | 17:02:09 | 017 | 17:04:34 | 00:03:11 | 3 | 020 > 016 > 015 > 017 | PM Peak |
| 020 | 17:01:53 | | | | | | | | | 17:06:22 | 17:02:36 | 017 | 17:06:37 | 00:04:44 | 3 | 020 > 016 > 015 > 017 | PM Peak |
| 020 | 17:02:36 | | | | | | | | | 17:09:46 | 17:03:22 | 017 | 17:09:57 | 00:07:21 | 3 | 020 > 016 > 015 > 017 | PM Peak |
| 020 | 17:28:10 | | | | | | | | | 17:32:17 | 17:28:57 | 017 | 17:32:27 | 00:04:17 | 3 | 020 > 016 > 015 > 017 | PM Peak |
| 020 | 07:39:55 | | | | | | | | | 07:42:09 | 07:40:45 | 019 | 07:43:01 | 00:03:06 | 3 | 020 > 016 > 015 > 019 | |
| 020 | 07:43:53 | | | | | | | | | 07:50:00 | 07:44:46 | 019 | 07:50:53 | 00:07:00 | 3 | 020 > 016 > 015 > 019 | |
| 020 | 07:49:41 | | | | | | | | | 07:52:57 | 07:50:23 | 019 | 07:53:43 | 00:04:02 | 3 | 020 > 016 > 015 > 019 | |
| 020 | 07:49:46 | | | | | | | | | 08:00:42 | 07:50:29 | 019 | 08:01:36 | 00:11:50 | 3 | 020 > 016 > 015 > 019 | |
| 020 | 07:50:13 | | | | | | | | | 07:55:26 | 07:50:53 | 019 | 07:56:07 | 00:05:54 | 3 | 020 > 016 > 015 > 019 | |
| 020 | 07:53:42 | | | | | | | | | 08:00:39 | 07:54:27 | 019 | 08:01:33 | 00:07:51 | 3 | 020 > 016 > 015 > 019 | |
| 020 | 07:56:25 | | | | | | | | | 08:00:04 | 07:57:30 | 019 | 08:01:07 | 00:04:42 | 3 | 020 > 016 > 015 > 019 | |
| 020 | 08:05:18 | | | | | | | | | 08:06:22 | 08:06:22 | 019 | 08:09:48 | 00:04:30 | 3 | 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:08:18 | | | | | | | | | 08:20:10 | 08:09:11 | 019 | 08:21:02 | 00:12:44 | 3 | 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:08:22 | | | | | | | | | 08:19:49 | 08:09:16 | 019 | 08:20:43 | 00:12:21 | 3 | 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:25:45 | | | | | | | | | 08:32:25 | 08:26:52 | 019 | 08:33:18 | 00:07:33 | 3 | 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:27:58 | | | | | | | | | 08:30:52 | 08:28:48 | 019 | 08:31:40 | 00:03:42 | 3 | 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:30:02 | | | | | | | | | 08:36:32 | 08:31:31 | 019 | 08:37:20 | 00:07:18 | 3 | 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:32:39 | | | | | | | | | 08:42:34 | 08:34:07 | 019 | 08:43:26 | 00:10:47 | 3 | 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:33:43 | | | | | | | | | 08:43:25 | 08:35:26 | 019 | 08:44:19 | 00:10:36 | 3 | 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:34:02 | | | | | | | | | 08:39:08 | 08:36:13 | 019 | 08:40:11 | 00:06:09 | 3 | 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:35:22 | | | | | | | | | 08:45:03 | 08:36:37 | 019 | 08:46:06 | 00:10:44 | 3 | 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:35:39 | | | | | | | | | 08:47:16 | 08:36:43 | 019 | 08:48:08 | 00:12:29 | 3 | 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:39:41 | | | | | | | | | 08:44:40 | 08:40:37 | 019 | 08:45:33 | 00:05:52 | 3 | 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:41:56 | | | | | | | | | 08:49:20 | 08:43:00 | 019 | 08:50:27 | 00:08:31 | 3 | 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:42:32 | | | | | | | | | 08:47:29 | 08:43:52 | 019 | 08:48:20 | 00:05:48 | 3 | 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:44:17 | | | | | | | | | 08:47:44 | 08:45:22 | 019 | 08:48:43 | 00:04:26 | 3 | 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:44:19 | | | | | | | | | 08:55:14 | 08:45:24 | 019 | 08:56:09 | 00:11:50 | 3 | 020 > 016 > 015 > 019 | AM Peak |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 020 | 08:45:07 | 08:48:19 | 08:46:00 | 019 | 08:49:35 | 00:04:28 | 3 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:46:07 | 08:50:50 | 08:47:08 | 019 | 08:51:40 | 00:05:33 | 3 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:49:41 | 09:00:08 | 08:50:31 | 019 | 09:01:02 | 00:11:21 | 3 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:49:47 | 09:00:12 | 08:50:32 | 019 | 09:01:06 | 00:11:19 | 3 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:51:37 | 09:03:20 | 08:52:40 | 019 | 09:04:28 | 00:12:51 | 3 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:54:01 | 08:56:41 | 08:54:43 | 019 | 08:57:32 | 00:03:31 | 3 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:56:00 | 09:09:59 | 08:56:50 | 019 | 09:10:50 | 00:14:50 | 3 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:56:29 | 09:02:29 | 08:57:18 | 019 | 09:03:32 | 00:07:03 | 3 020 > 016 > 015 > 019 | AM Peak |
| 020 | 08:57:17 | 09:00:10 | 08:58:05 | 019 | 09:01:04 | 00:03:47 | 3 020 > 016 > 015 > 019 | AM Peak |
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| 020 | 09:03:37 | 09:15:30 | 09:04:24 | 019 | 09:16:22 | 00:12:45 | 3 020 > 016 > 015 > 019 | |
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| 020 | 09:24:47 | 09:29:57 | 09:25:30 | 019 | 09:30:44 | 00:05:57 | 3 020 > 016 > 015 > 019 | |
| 020 | 09:24:56 | 09:29:19 | 09:25:40 | 019 | 09:30:16 | 00:05:20 | 3 020 > 016 > 015 > 019 | |
| 020 | 09:25:53 | 09:31:53 | 09:26:38 | 019 | 09:32:51 | 00:06:58 | 3 020 > 016 > 015 > 019 | |
| 020 | 09:27:43 | 09:32:05 | 09:28:27 | 019 | 09:32:58 | 00:05:15 | 3 020 > 016 > 015 > 019 | |
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| 020 | 09:42:51 | 09:46:05 | 09:43:46 | 019 | 09:47:06 | 00:04:15 | 3 020 > 016 > 015 > 019 | |
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| 020 | 09:54:42 | 10:01:38 | 09:55:54 | 019 | 10:02:48 | 00:08:06 | 3 020 > 016 > 015 > 019 | |
| 020 | 09:57:15 | 10:02:28 | 09:57:57 | 019 | 10:03:22 | 00:06:07 | 3 020 > 016 > 015 > 019 | |
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| 020 | 10:10:41 | 10:24:38 | 10:11:19 | 019 | 10:25:24 | 00:14:43 | 3 020 > 016 > 015 > 019 | |
| 020 | 10:16:46 | 10:29:08 | 10:17:32 | 019 | 10:30:08 | 00:13:22 | 3 020 > 016 > 015 > 019 | |
| 020 | 10:26:28 | 10:30:34 | 10:27:16 | 019 | 10:31:36 | 00:05:08 | 3 020 > 016 > 015 > 019 | |
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| 020 | 10:47:05 | 10:54:37 | 10:47:52 | 019 | 10:55:36 | 00:08:31 | 3 020 > 016 > 015 > 019 | |
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| 020 | 10:50:49 | 10:55:13 | 10:51:36 | 019 | 10:56:09 | 00:05:20 | 3 020 > 016 > 015 > 019 | |
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| 020 | 10:56:54 | 11:00:23 | 10:57:34 | 019 | 11:01:10 | 00:04:16 | 3 020 > 016 > 015 > 019 | |
| 020 | 11:02:02 | 11:07:24 | 11:02:49 | 019 | 11:08:13 | 00:06:11 | 3 020 > 016 > 015 > 019 | |
| 020 | 11:33:24 | 11:37:23 | 11:34:15 | 019 | 11:38:14 | 00:04:50 | 3 020 > 016 > 015 > 019 | |
| 020 | 11:47:08 | 11:59:50 | 11:47:53 | 019 | 12:00:39 | 00:13:31 | 3 020 > 016 > 015 > 019 | |
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| 020 | 12:20:05 | 12:26:52 | 12:20:53 | 019 | 12:27:50 | 00:07:45 | 3 020 > 016 > 015 > 019 | |
| 020 | 12:36:36 | 12:45:00 | 12:37:21 | 019 | 12:45:54 | 00:09:18 | 3 020 > 016 > 015 > 019 | |
| 020 | 12:40:53 | 12:44:01 | 12:41:42 | 019 | 12:44:51 | 00:03:58 | 3 020 > 016 > 015 > 019 | |
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| 020 | 12:50:07 | 12:58:15 | 12:50:53 | 019 | 12:59:07 | 00:09:00 | 3 020 > 016 > 015 > 019 | |
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| 020 | 13:34:07 | 13:40:50 | 13:34:52 | 019 | 13:41:48 | 00:07:41 | 3 020 > 016 > 015 > 019 | |
| 020 | 13:43:23 | 13:53:50 | 13:44:00 | 019 | 13:54:38 | 00:11:15 | 3 020 > 016 > 015 > 019 | |
| 020 | 13:48:55 | 13:55:24 | 13:50:01 | 019 | 13:56:16 | 00:07:21 | 3 020 > 016 > 015 > 019 | |
| 020 | 14:00:06 | 14:05:55 | 14:00:53 | 019 | 14:07:02 | 00:06:56 | 3 020 > 016 > 015 > 019 | |
| 020 | 14:00:29 | 14:01:01 | 14:01:01 | 019 | 14:09:58 | 00:09:29 | 3 020 > 016 > 015 > 019 | |
| 020 | 14:04:06 | 14:13:24 | 14:04:49 | 019 | 14:14:21 | 00:10:15 | 3 020 > 016 > 015 > 019 | |
| 020 | 14:13:27 | 14:17:11 | 14:14:07 | 019 | 14:17:59 | 00:04:32 | 3 020 > 016 > 015 > 019 | |
| 020 | 14:38:44 | 14:43:06 | 14:39:27 | 019 | 14:43:53 | 00:05:09 | 3 020 > 016 > 015 > 019 | |
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| 020 | 15:00:44 | 15:04:47 | 15:01:26 | 019 | 15:05:52 | 00:05:08 | 3 020 > 016 > 015 > 019 | |
| 020 | 15:14:37 | 15:17:24 | 15:15:28 | 019 | 15:18:23 | 00:03:46 | 3 020 > 016 > 015 > 019 | |
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| 020 | 15:27:29 | 15:31:45 | 15:28:16 | 019 | 15:32:40 | 00:05:11 | 3 020 > 016 > 015 > 019 | |
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| 020 | 15:46:20 | 15:48:02 | 15:46:58 | 019 | 15:49:01 | 00:02:41 | 3 020 > 016 > 015 > 019 | |
| 020 | 15:49:03 | 15:56:06 | 15:49:51 | 019 | 15:56:55 | 00:07:52 | 3 020 > 016 > 015 > 019 | |
| 020 | 15:49:30 | 15:57:43 | 15:50:24 | 019 | 15:58:28 | 00:08:58 | 3 020 > 016 > 015 > 019 | |
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| 020 | 16:26:41 | 16:32:41 | 16:27:42 | 019 | 16:33:56 | 00:07:15 | 3 020 > 016 > 015 > 019 | |
| 020 | 16:39:51 | 16:46:26 | 16:40:37 | 019 | 16:47:18 | 00:07:27 | 3 020 > 016 > 015 > 019 | PM Peak |
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| 017 | 12:34:46 | 00:00:51 | 1 020 > 017 |
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| 020 | 13:38:42 | | |
| 020 | 13:41:03 | | |
| 020 | 13:41:19 | | |

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| 017 | 13:19:39 | 00:00:54 | 1 020 > 017 |
| 017 | 13:19:42 | 00:00:54 | 1 020 > 017 |
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| 017 | 13:27:00 | 00:00:53 | 1 020 > 017 |
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| 017 | 13:27:11 | 00:00:50 | 1 020 > 017 |
| 017 | 13:27:24 | 00:00:45 | 1 020 > 017 |
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| 017 | 13:27:57 | 00:00:49 | 1 020 > 017 |
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| 017 | 13:28:41 | 00:00:47 | 1 020 > 017 |
| 017 | 13:29:04 | 00:00:47 | 1 020 > 017 |
| 017 | 13:29:39 | 00:00:55 | 1 020 > 017 |
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| 017 | 13:34:53 | 00:00:52 | 1 020 > 017 |
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| 017 | 13:36:01 | 00:00:46 | 1 020 > 017 |
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| 017 | 13:36:32 | 00:00:50 | 1 020 > 017 |
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| 017 | 14:14:38 | 00:00:44 | 1 020 > 017 |
| 017 | 14:14:40 | 00:00:44 | 1 020 > 017 |
| 017 | 14:14:43 | 00:00:44 | 1 020 > 017 |
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| 017 | 14:16:18 | 00:00:57 | 1 020 > 017 |
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| 020 | 17:37:24 | | | |
| 020 | 17:37:27 | | | |
| 020 | 17:37:28 | | | |
| 020 | 17:37:30 | | | |
| 020 | 17:37:32 | | | |
| 020 | 17:37:36 | | | |
| 020 | 17:37:48 | | | |
| 020 | 17:37:50 | | | |
| 020 | 17:37:52 | | | |
| 020 | 17:37:54 | | | |
| 020 | 17:37:56 | | | |
| 020 | 17:37:59 | | | |
| 020 | 17:38:11 | | | |
| 020 | 17:38:20 | | | |
| 020 | 17:38:21 | | | |
| 020 | 17:38:26 | | | |
| 020 | 17:38:32 | | | |
| 020 | 17:38:40 | | | |
| 020 | 17:38:43 | | | |
| 020 | 17:38:45 | | | |

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|---|---|---|---|---|
| 017 | 17:27:53 | 00:00:53 | 1 020 > 017 | PM Peak |
| 017 | 17:27:54 | 00:00:47 | 1 020 > 017 | PM Peak |
| 017 | 17:28:08 | 00:00:45 | 1 020 > 017 | PM Peak |
| 017 | 17:28:09 | 00:00:45 | 1 020 > 017 | PM Peak |
| 017 | 17:28:12 | 00:00:45 | 1 020 > 017 | PM Peak |
| 017 | 17:28:14 | 00:00:45 | 1 020 > 017 | PM Peak |
| 017 | 17:28:25 | 00:00:55 | 1 020 > 017 | PM Peak |
| 017 | 17:28:42 | 00:00:54 | 1 020 > 017 | PM Peak |
| 017 | 17:28:46 | 00:00:56 | 1 020 > 017 | PM Peak |
| 017 | 17:28:48 | 00:00:56 | 1 020 > 017 | PM Peak |
| 017 | 17:28:49 | 00:00:55 | 1 020 > 017 | PM Peak |
| 017 | 17:28:51 | 00:00:55 | 1 020 > 017 | PM Peak |
| 017 | 17:28:53 | 00:00:55 | 1 020 > 017 | PM Peak |
| 017 | 17:29:01 | 00:00:58 | 1 020 > 017 | PM Peak |
| 017 | 17:29:05 | 00:00:52 | 1 020 > 017 | PM Peak |
| 017 | 17:29:09 | 00:00:46 | 1 020 > 017 | PM Peak |
| 017 | 17:29:10 | 00:00:46 | 1 020 > 017 | PM Peak |
| 017 | 17:29:26 | 00:00:47 | 1 020 > 017 | PM Peak |
| 017 | 17:29:40 | 00:00:49 | 1 020 > 017 | PM Peak |
| 017 | 17:29:42 | 00:00:50 | 1 020 > 017 | PM Peak |
| 017 | 17:29:47 | 00:00:49 | 1 020 > 017 | PM Peak |
| 017 | 17:29:54 | 00:00:48 | 1 020 > 017 | PM Peak |
| 017 | 17:29:55 | 00:00:48 | 1 020 > 017 | PM Peak |
| 017 | 17:29:56 | 00:00:47 | 1 020 > 017 | PM Peak |
| 017 | 17:29:57 | 00:00:46 | 1 020 > 017 | PM Peak |
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| 017 | 17:30:20 | 00:00:54 | 1 020 > 017 | PM Peak |
| 017 | 17:30:25 | 00:00:53 | 1 020 > 017 | PM Peak |
| 017 | 17:30:27 | 00:00:52 | 1 020 > 017 | PM Peak |
| 017 | 17:30:33 | 00:00:48 | 1 020 > 017 | PM Peak |
| 017 | 17:30:34 | 00:00:47 | 1 020 > 017 | PM Peak |
| 017 | 17:30:40 | 00:00:46 | 1 020 > 017 | PM Peak |
| 017 | 17:30:42 | 00:00:46 | 1 020 > 017 | PM Peak |
| 017 | 17:30:44 | 00:00:41 | 1 020 > 017 | |
| 017 | 17:31:01 | 00:00:49 | 1 020 > 017 | |
| 017 | 17:31:03 | 00:00:50 | 1 020 > 017 | |
| 017 | 17:31:10 | 00:00:48 | 1 020 > 017 | |
| 017 | 17:31:12 | 00:00:48 | 1 020 > 017 | |
| 017 | 17:31:18 | 00:00:51 | 1 020 > 017 | |
| 017 | 17:31:32 | 00:00:52 | 1 020 > 017 | |
| 017 | 17:31:40 | 00:00:51 | 1 020 > 017 | |
| 017 | 17:31:44 | 00:00:48 | 1 020 > 017 | |
| 017 | 17:32:00 | 00:00:45 | 1 020 > 017 | |
| 017 | 17:32:08 | 00:00:40 | 1 020 > 017 | |
| 017 | 17:32:10 | 00:00:41 | 1 020 > 017 | |
| 017 | 17:32:31 | 00:00:43 | 1 020 > 017 | |
| 017 | 17:32:34 | 00:00:45 | 1 020 > 017 | |
| 017 | 17:32:40 | 00:00:47 | 1 020 > 017 | |
| 017 | 17:32:42 | 00:00:47 | 1 020 > 017 | |
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| 017 | 17:33:06 | 00:00:49 | 1 020 > 017 | |
| 017 | 17:33:08 | 00:00:49 | 1 020 > 017 | |
| 017 | 17:33:14 | 00:00:50 | 1 020 > 017 | |
| 017 | 17:33:17 | 00:00:48 | 1 020 > 017 | |
| 017 | 17:33:22 | 00:00:51 | 1 020 > 017 | |
| 017 | 17:33:46 | 00:00:51 | 1 020 > 017 | |
| 017 | 17:33:48 | 00:00:51 | 1 020 > 017 | |
| 017 | 17:33:52 | 00:00:53 | 1 020 > 017 | |
| 017 | 17:33:54 | 00:00:53 | 1 020 > 017 | |
| 017 | 17:33:56 | 00:00:54 | 1 020 > 017 | |
| 017 | 17:34:27 | 00:00:37 | 1 020 > 017 | |
| 017 | 17:34:46 | 00:00:46 | 1 020 > 017 | |
| 017 | 17:34:47 | 00:00:46 | 1 020 > 017 | |
| 017 | 17:35:06 | 00:00:44 | 1 020 > 017 | |
| 017 | 17:35:08 | 00:00:39 | 1 020 > 017 | |
| 017 | 17:35:18 | 00:00:41 | 1 020 > 017 | |
| 017 | 17:35:23 | 00:00:42 | 1 020 > 017 | |
| 017 | 17:35:31 | 00:00:46 | 1 020 > 017 | |
| 017 | 17:35:41 | 00:00:38 | 1 020 > 017 | |
| 017 | 17:36:01 | 00:00:45 | 1 020 > 017 | |
| 017 | 17:36:11 | 00:00:41 | 1 020 > 017 | |
| 017 | 17:36:20 | 00:00:43 | 1 020 > 017 | |
| 017 | 17:36:39 | 00:00:45 | 1 020 > 017 | |
| 017 | 17:36:45 | 00:00:46 | 1 020 > 017 | |
| 017 | 17:36:47 | 00:00:46 | 1 020 > 017 | |
| 017 | 17:36:55 | 00:00:52 | 1 020 > 017 | |
| 017 | 17:36:57 | 00:00:53 | 1 020 > 017 | |
| 017 | 17:36:58 | 00:00:51 | 1 020 > 017 | |
| 017 | 17:37:02 | 00:00:50 | 1 020 > 017 | |
| 017 | 17:37:09 | 00:00:49 | 1 020 > 017 | |
| 017 | 17:38:39 | 00:02:13 | 1 020 > 017 | |
| 017 | 17:37:31 | 00:01:01 | 1 020 > 017 | |
| 017 | 17:37:34 | 00:01:03 | 1 020 > 017 | |
| 017 | 17:37:37 | 00:01:03 | 1 020 > 017 | |
| 017 | 17:37:41 | 00:01:02 | 1 020 > 017 | |
| 017 | 17:37:43 | 00:01:03 | 1 020 > 017 | |
| 017 | 17:37:45 | 00:00:58 | 1 020 > 017 | |
| 017 | 17:37:47 | 00:00:58 | 1 020 > 017 | |
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| 017 | 17:37:51 | 00:00:56 | 1 020 > 017 | |
| 017 | 17:38:09 | 00:01:02 | 1 020 > 017 | |
| 017 | 17:38:12 | 00:01:02 | 1 020 > 017 | |
| 017 | 17:38:17 | 00:01:01 | 1 020 > 017 | |
| 017 | 17:38:19 | 00:01:00 | 1 020 > 017 | |
| 017 | 17:38:21 | 00:00:59 | 1 020 > 017 | |
| 017 | 17:38:24 | 00:01:00 | 1 020 > 017 | |
| 017 | 17:38:43 | 00:01:16 | 1 020 > 017 | |
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| 017 | 17:38:46 | 00:01:16 | 1 020 > 017 | |
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| 017 | 17:38:52 | 00:01:16 | 1 020 > 017 | |
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| 017 | 17:39:03 | 00:01:11 | 1 020 > 017 | |
| 017 | 17:39:06 | 00:01:12 | 1 020 > 017 | |
| 017 | 17:39:07 | 00:01:11 | 1 020 > 017 | |
| 017 | 17:39:12 | 00:01:13 | 1 020 > 017 | |
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| 017 | 17:39:18 | 00:00:57 | 1 020 > 017 | |
| 017 | 17:39:21 | 00:00:55 | 1 020 > 017 | |
| 017 | 17:39:22 | 00:00:50 | 1 020 > 017 | |
| 017 | 17:39:49 | 00:01:09 | 1 020 > 017 | |
| 017 | 17:39:51 | 00:01:08 | 1 020 > 017 | |
| 017 | 17:39:52 | 00:01:07 | 1 020 > 017 | |

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| 020 | 17:38:48 |
| 020 | 17:38:55 |
| 020 | 17:38:59 |
| 020 | 17:39:02 |
| 020 | 17:39:04 |
| 020 | 17:39:08 |
| 020 | 17:39:13 |
| 020 | 17:39:23 |
| 020 | 17:39:37 |
| 020 | 17:39:38 |
| 020 | 17:40:01 |
| 020 | 17:40:07 |
| 020 | 17:40:30 |
| 020 | 17:40:46 |
| 020 | 17:40:53 |
| 020 | 17:41:02 |
| 020 | 17:41:06 |
| 020 | 17:41:07 |
| 020 | 17:41:09 |
| 020 | 17:41:14 |
| 020 | 17:41:29 |
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| 020 | 17:42:11 |
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| 020 | 17:42:23 |
| 020 | 17:42:28 |
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| 020 | 17:42:35 |
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| 020 | 17:42:41 |
| 020 | 17:42:42 |
| 020 | 17:42:44 |
| 020 | 17:42:53 |
| 020 | 17:42:59 |
| 020 | 17:43:05 |
| 020 | 17:43:07 |
| 020 | 17:43:09 |
| 020 | 17:43:11 |
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| 020 | 17:43:37 |
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| 020 | 17:45:59 |
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| 020 | 17:46:58 |
| 020 | 17:47:01 |
| 020 | 17:47:03 |
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| 020 | 17:48:27 |
| 020 | 17:49:02 |
| 020 | 17:49:11 |
| 020 | 17:49:17 |
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| 020 | 17:49:24 |
| 020 | 17:49:27 |
| 020 | 17:49:39 |
| 020 | 17:50:08 |
| 020 | 17:50:09 |
| 020 | 17:50:21 |
| 020 | 17:50:22 |
| 020 | 17:50:25 |
| 020 | 17:50:42 |
| 020 | 17:50:46 |
| 020 | 17:50:47 |
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| 020 | 17:51:58 |
| 020 | 17:52:05 |
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| 020 | 17:52:08 |
| 020 | 17:52:09 |
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| 020 | 17:52:26 |
| 020 | 17:52:28 |
| 020 | 17:52:34 |
| 020 | 17:52:40 |

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|---|---|---|---|
| 017 | 17:39:55 | 00:01:07 | 1 020 > 017 |
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| 017 | 17:40:05 | 00:01:03 | 1 020 > 017 |
| 017 | 17:40:08 | 00:01:04 | 1 020 > 017 |
| 017 | 17:40:10 | 00:01:02 | 1 020 > 017 |
| 017 | 17:40:16 | 00:01:03 | 1 020 > 017 |
| 017 | 17:40:18 | 00:00:55 | 1 020 > 017 |
| 017 | 17:40:24 | 00:00:47 | 1 020 > 017 |
| 017 | 17:40:28 | 00:00:50 | 1 020 > 017 |
| 017 | 17:40:54 | 00:00:53 | 1 020 > 017 |
| 017 | 17:40:59 | 00:00:52 | 1 020 > 017 |
| 017 | 17:41:14 | 00:00:44 | 1 020 > 017 |
| 017 | 17:41:36 | 00:00:50 | 1 020 > 017 |
| 017 | 17:41:41 | 00:00:48 | 1 020 > 017 |
| 017 | 17:41:57 | 00:00:55 | 1 020 > 017 |
| 017 | 17:42:04 | 00:00:58 | 1 020 > 017 |
| 017 | 17:42:05 | 00:00:58 | 1 020 > 017 |
| 017 | 17:42:06 | 00:00:57 | 1 020 > 017 |
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| 017 | 17:42:12 | 00:00:43 | 1 020 > 017 |
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| 017 | 17:43:35 | 00:01:07 | 1 020 > 017 |
| 017 | 17:43:39 | 00:01:07 | 1 020 > 017 |
| 017 | 17:43:41 | 00:01:06 | 1 020 > 017 |
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| 017 | 17:43:51 | 00:01:07 | 1 020 > 017 |
| 017 | 17:43:55 | 00:01:02 | 1 020 > 017 |
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| 017 | 17:44:01 | 00:00:56 | 1 020 > 017 |
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| 017 | 17:44:07 | 00:00:56 | 1 020 > 017 |
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| 017 | 17:44:35 | 00:00:49 | 1 020 > 017 |
| 017 | 17:44:45 | 00:00:52 | 1 020 > 017 |
| 017 | 17:45:19 | 00:00:45 | 1 020 > 017 |
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| 017 | 17:45:45 | 00:00:42 | 1 020 > 017 |
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| 017 | 17:46:35 | 00:00:45 | 1 020 > 017 |
| 017 | 17:46:38 | 00:00:39 | 1 020 > 017 |
| 017 | 17:46:44 | 00:00:38 | 1 020 > 017 |
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| 017 | 17:47:07 | 00:00:37 | 1 020 > 017 |
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| 017 | 17:52:59 | 00:00:53 | 1 020 > 017 |
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| 017 | 17:53:24 | 00:00:44 | 1 020 > 017 |

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| 020 | 18:10:48 |
| 020 | 18:11:02 |
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| 017 | 18:57:52 | 00:00:47 | 1 020 > 017 |
| 017 | 18:58:38 | 00:00:44 | 1 020 > 017 |
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| 017 | 18:59:53 | 00:00:45 | 1 020 > 017 |

| | | | | |
|---|---|---|---|---|
| 020 | 08:48:51 | | | |
| 020 | 09:21:38 | | | |
| 020 | 10:57:00 | | | |
| 020 | 12:07:32 | | | |
| 020 | 12:56:56 | | | |
| 020 | 12:57:14 | | | |
| 020 | 13:00:03 | | | |
| 020 | 13:09:18 | | | |
| 020 | 13:24:14 | | | |
| 020 | 13:31:18 | | | |
| 020 | 13:33:05 | | | |
| 020 | 13:36:00 | | | |
| 020 | 13:53:49 | | | |
| 020 | 13:54:04 | | | |
| 020 | 13:58:58 | | | |
| 020 | 14:10:06 | | | |
| 020 | 14:27:40 | | | |
| 020 | 14:56:18 | | | |
| 020 | 15:00:00 | | | |
| 020 | 15:03:38 | | | |
| 020 | 15:29:57 | | | |
| 020 | 15:32:03 | | | |
| 020 | 15:39:22 | | | |
| 020 | 15:45:43 | | | |
| 020 | 15:47:24 | | | |
| 020 | 15:53:08 | | | |
| 020 | 15:59:41 | | | |
| 020 | 16:04:17 | | | |
| 020 | 16:25:27 | | | |
| 020 | 16:27:54 | | | |
| 020 | 16:37:42 | | | |
| 020 | 16:53:06 | | | |
| 020 | 17:04:25 | | | |
| 020 | 17:26:53 | | | |
| 020 | 17:28:26 | | | |
| 020 | 17:34:13 | | | |
| 020 | 17:43:42 | | | |
| 020 | 17:56:46 | | | |
| 020 | 17:59:38 | | | |
| 020 | 18:01:02 | | | |
| 020 | 18:38:30 | | | |
| 020 | 18:39:09 | | | |
| 020 | 18:39:19 | | | |
| 020 | 18:45:31 | | | |
| 019 | 08:54:35 | 00:05:44 | 1 020 > 019 | AM Peak |
| 019 | 09:29:21 | 00:07:43 | 1 020 > 019 | |
| 019 | 11:06:57 | 00:09:57 | 1 020 > 019 | |
| 019 | 12:13:31 | 00:05:59 | 1 020 > 019 | |
| 019 | 13:04:51 | 00:07:55 | 1 020 > 019 | |
| 019 | 13:09:18 | 00:12:04 | 1 020 > 019 | |
| 019 | 13:07:29 | 00:07:26 | 1 020 > 019 | |
| 019 | 13:16:51 | 00:07:33 | 1 020 > 019 | |
| 019 | 13:38:26 | 00:14:12 | 1 020 > 019 | |
| 019 | 13:34:58 | 00:03:40 | 1 020 > 019 | |
| 019 | 13:42:17 | 00:09:12 | 1 020 > 019 | |
| 019 | 13:37:27 | 00:01:27 | 1 020 > 019 | |
| 019 | 13:59:16 | 00:05:27 | 1 020 > 019 | |
| 019 | 14:05:05 | 00:11:01 | 1 020 > 019 | |
| 019 | 14:02:43 | 00:03:45 | 1 020 > 019 | |
| 019 | 14:23:35 | 00:13:29 | 1 020 > 019 | |
| 019 | 14:38:07 | 00:10:27 | 1 020 > 019 | |
| 019 | 15:04:55 | 00:08:37 | 1 020 > 019 | |
| 019 | 15:05:00 | 00:05:00 | 1 020 > 019 | |
| 019 | 15:13:06 | 00:09:28 | 1 020 > 019 | |
| 019 | 15:43:10 | 00:13:13 | 1 020 > 019 | |
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| 019 | 16:01:09 | 00:08:01 | 1 020 > 019 | |
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| 019 | 16:50:53 | 00:13:11 | 1 020 > 019 | PM Peak |
| 019 | 16:59:35 | 00:06:29 | 1 020 > 019 | PM Peak |
| 019 | 17:11:46 | 00:07:21 | 1 020 > 019 | PM Peak |
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| 019 | 17:29:50 | 00:01:24 | 1 020 > 019 | PM Peak |
| 019 | 17:38:07 | 00:03:54 | 1 020 > 019 | |
| 019 | 17:47:51 | 00:04:09 | 1 020 > 019 | |
| 019 | 18:06:05 | 00:09:19 | 1 020 > 019 | |
| 019 | 18:10:00 | 00:10:22 | 1 020 > 019 | |
| 019 | 18:04:14 | 00:03:12 | 1 020 > 019 | |
| 019 | 18:49:01 | 00:10:31 | 1 020 > 019 | |
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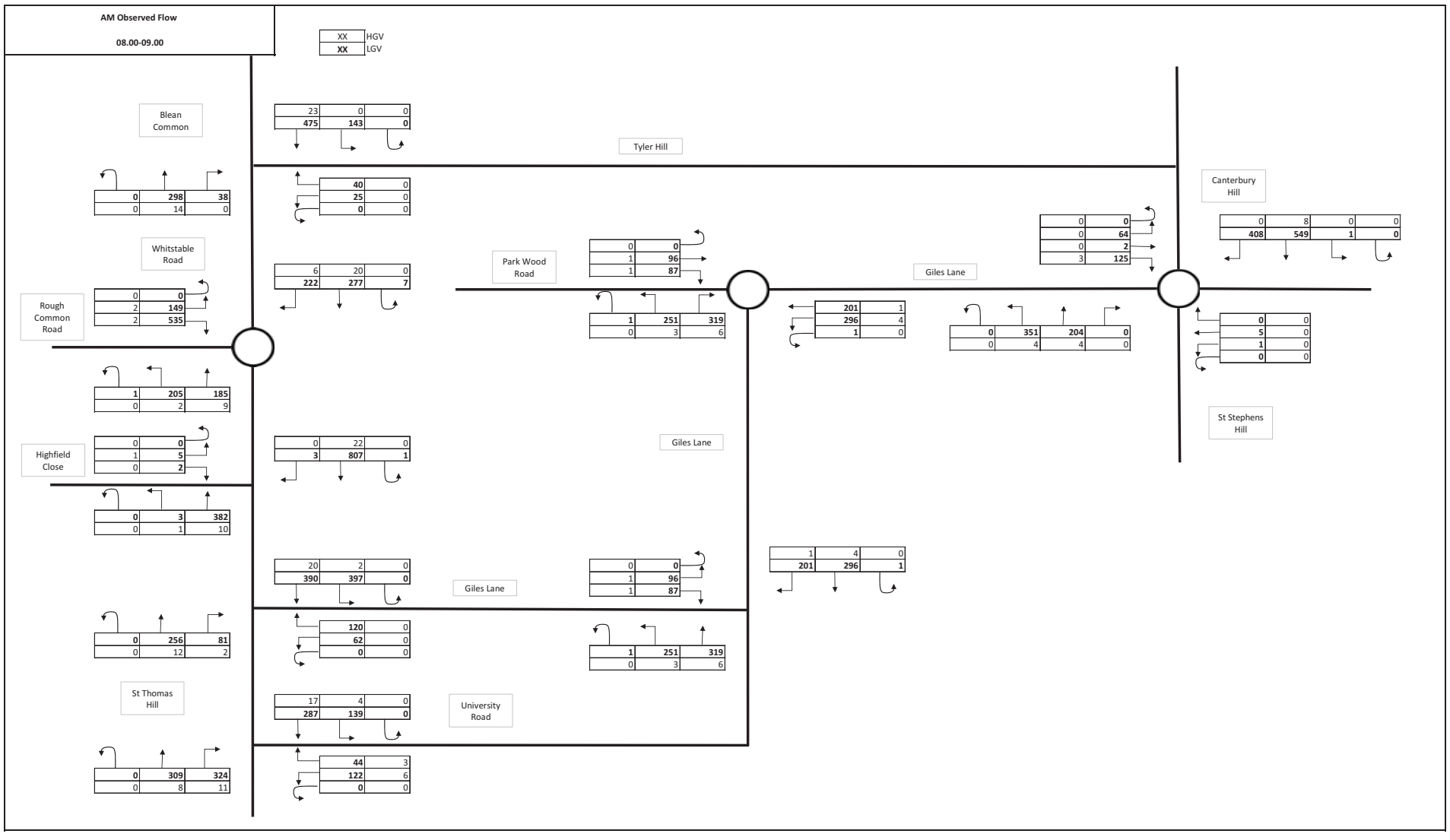
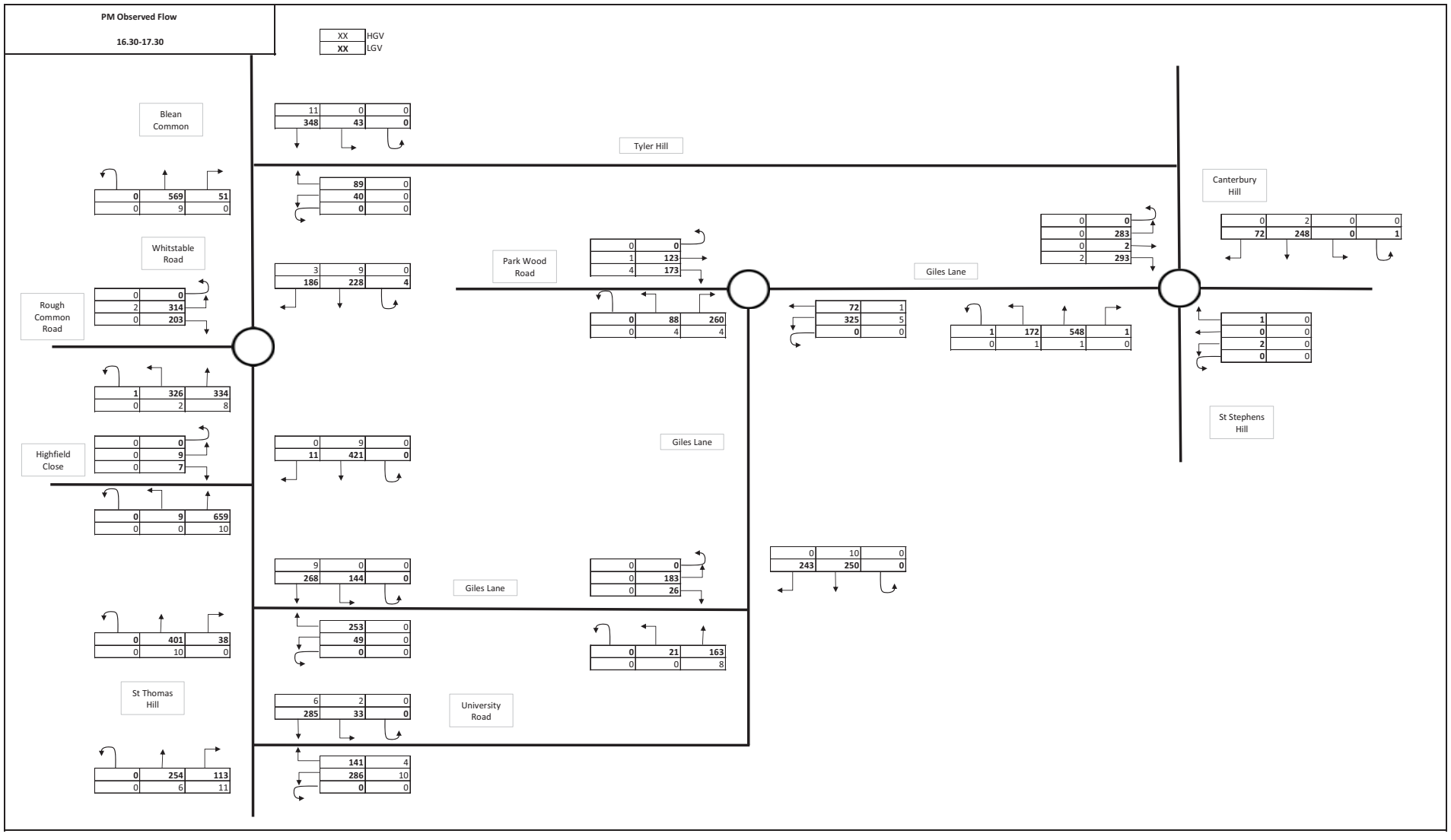
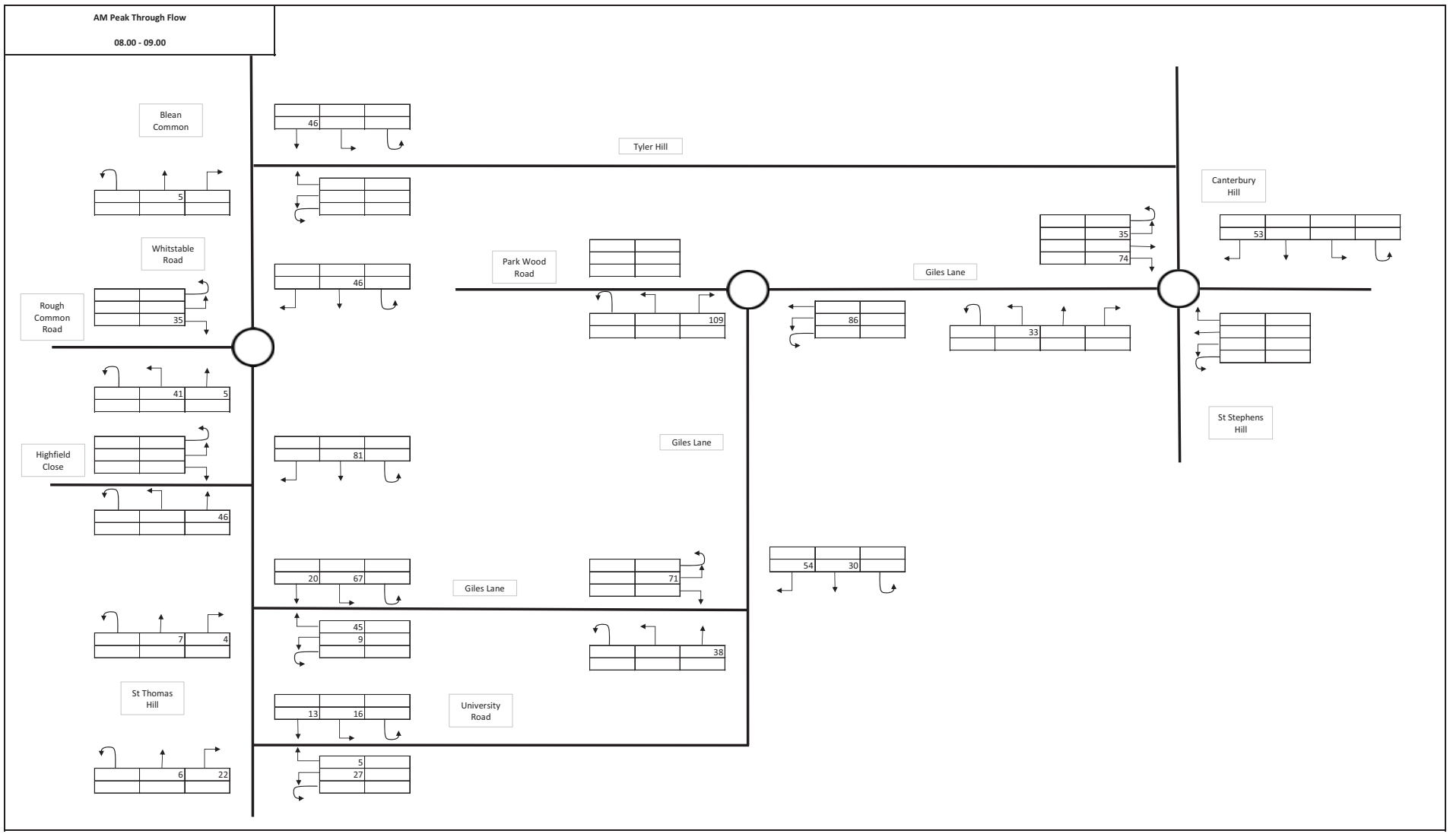

AM Observed Flow
08.00-09.00
XX HGV
XX LGV
Blean Common
Tyler Hill
Canterbury Hill
Whitstable Road
Park Wood Road
Giles Lane
Rough Common Road
St Stephens Hill
Highfield Close
Giles Lane
Giles Lane
St Thomas Hill
University Road


PM Observed Flow
16.30-17.30
XX HGV
XX LGV
Blean Common
Tyler Hill
Canterbury Hill
Whitstable Road
Rough Common Road
Park Wood Road
Giles Lane
St Stephens Hill
Highfield Close
Giles Lane
Giles Lane
St Thomas Hill
University Road


AM Peak Through Flow
08.00 - 09.00
Blean Common
Whitstable Road
Rough Common Road
Highfield Close
St Thomas Hill
Tyler Hill
Park Wood Road
Giles Lane
Giles Lane
Giles Lane
University Road
Canterbury Hill
St Stephens Hill
46
5
46
35
41
5
81
46
20
67
7
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13
16
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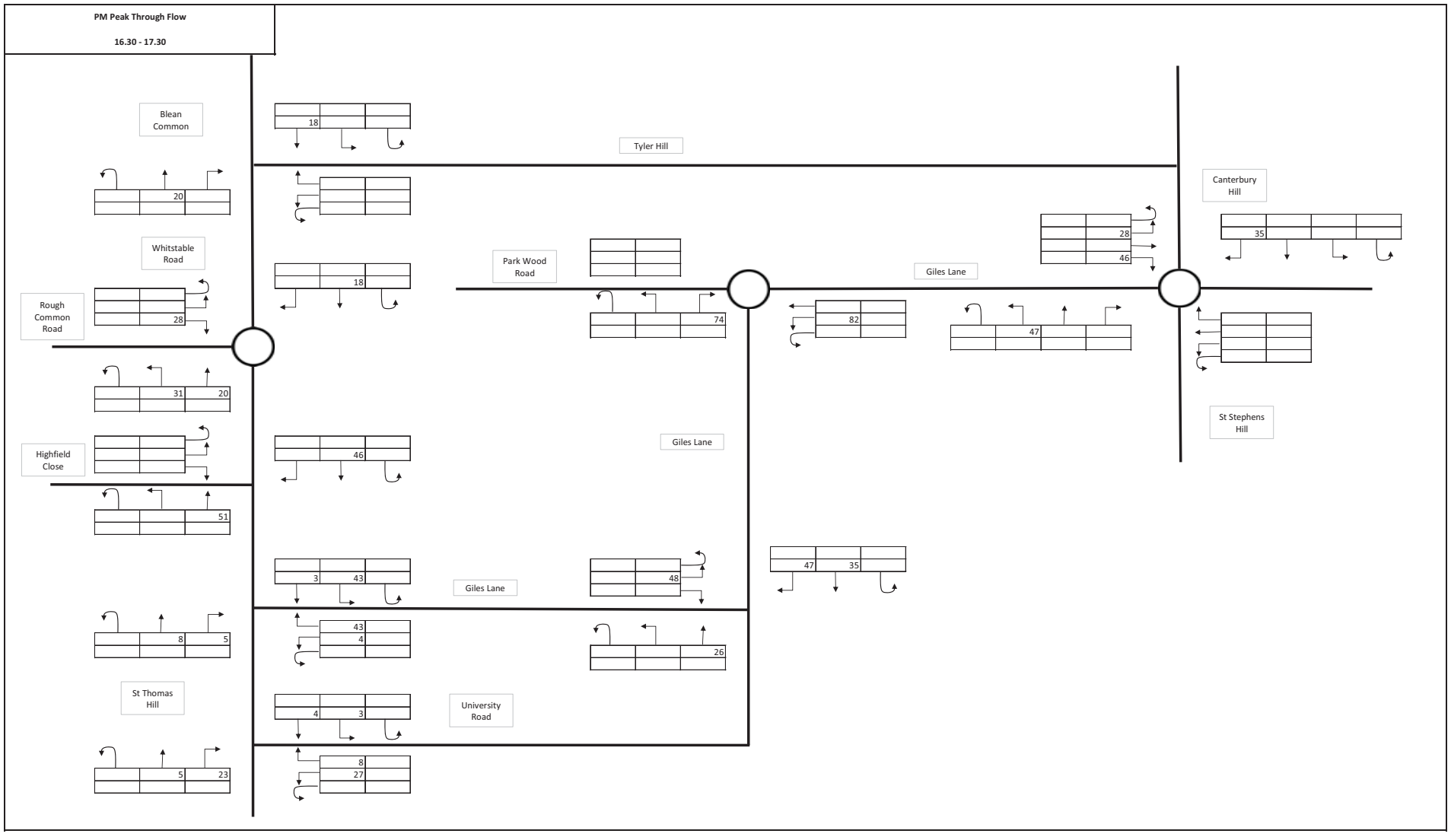
30
71
38


PM Peak Through Flow
16.30 - 17.30
Blean Common
Whitstable Road
Rough Common Road
Highfield Close
St Thomas Hill
Tyler Hill
Park Wood Road
Giles Lane
Giles Lane
Giles Lane
University Road
Canterbury Hill
St Stephens Hill
18
20
18
28
31
20
46
51
3
43
8
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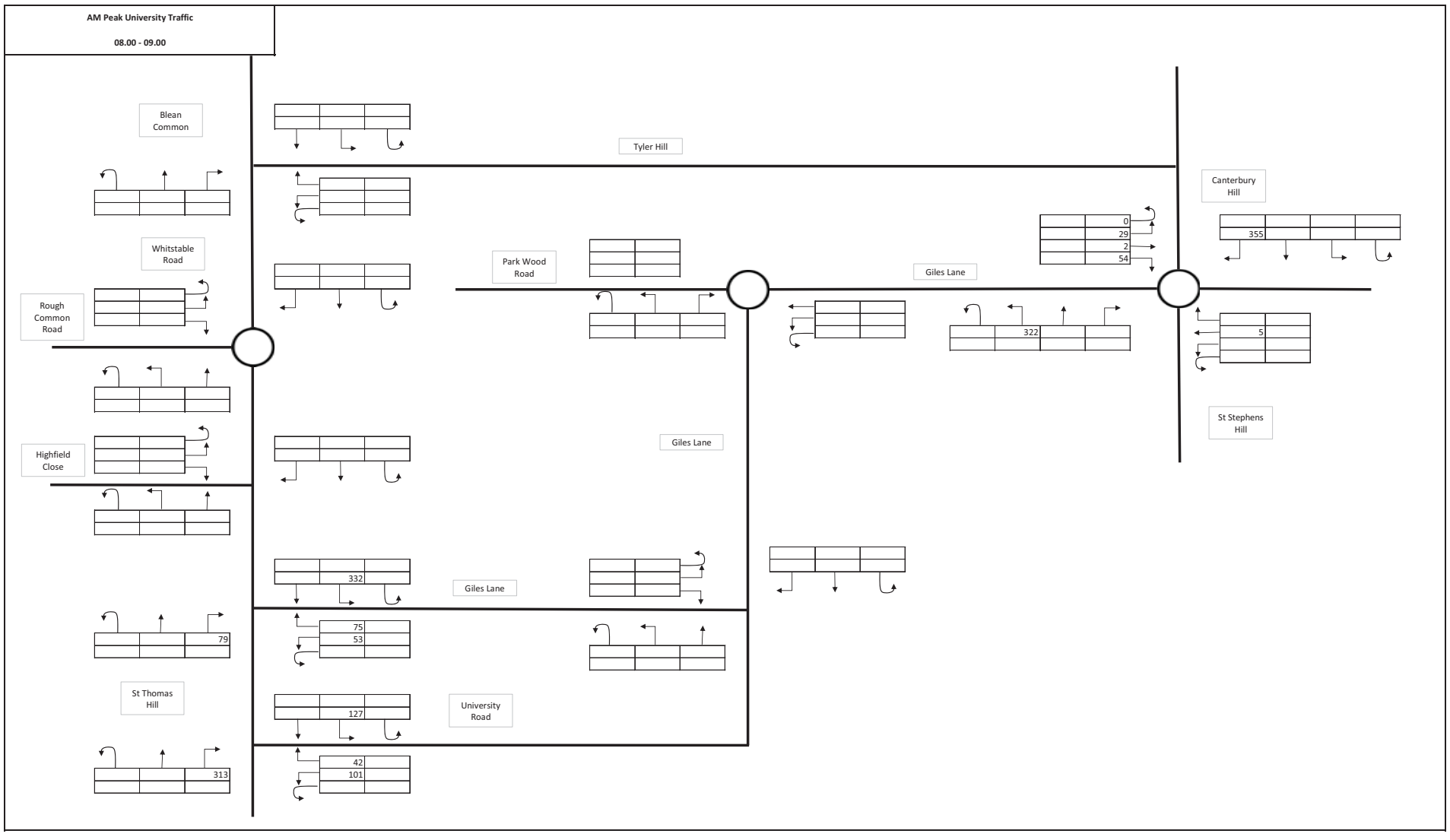
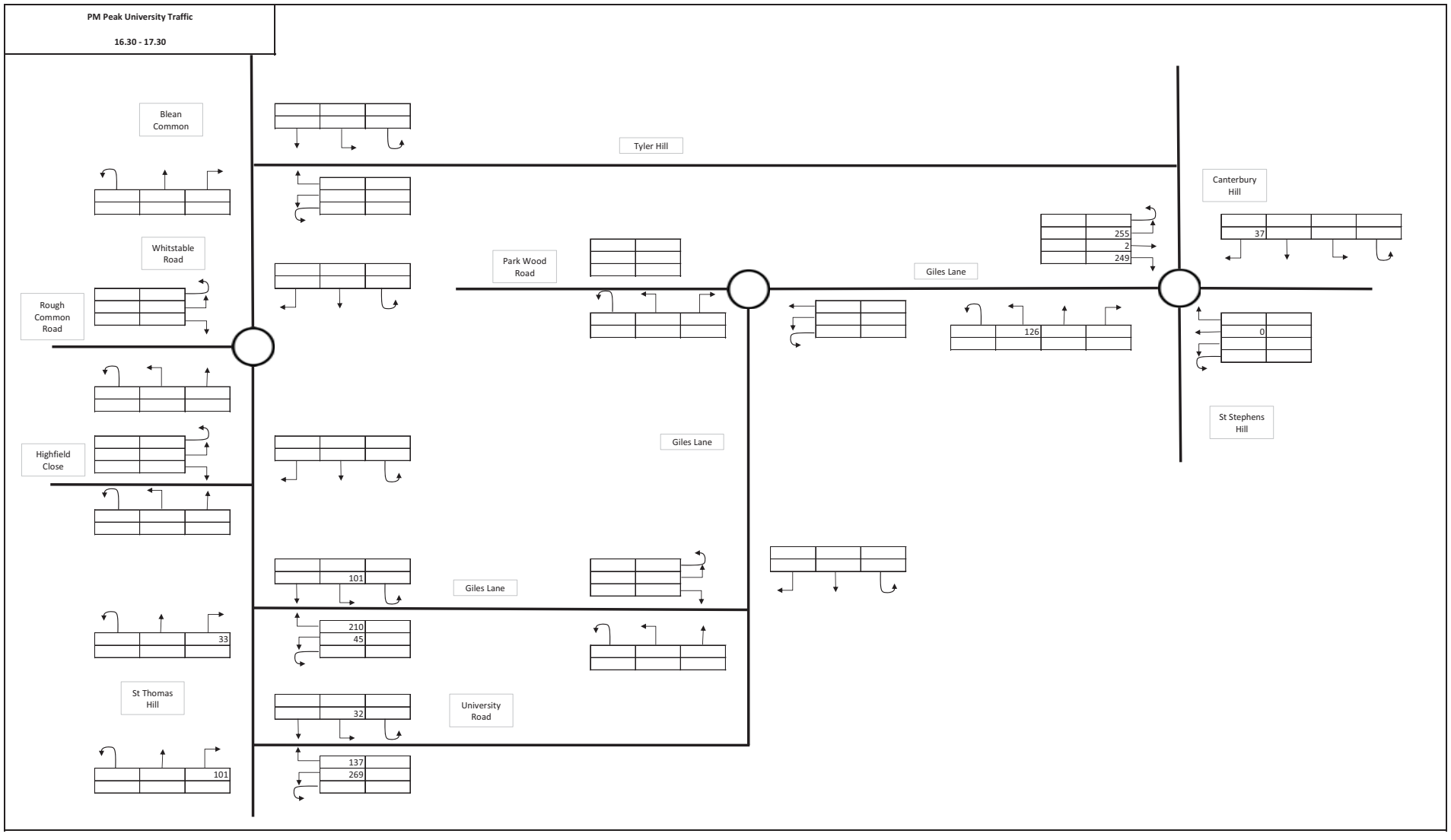
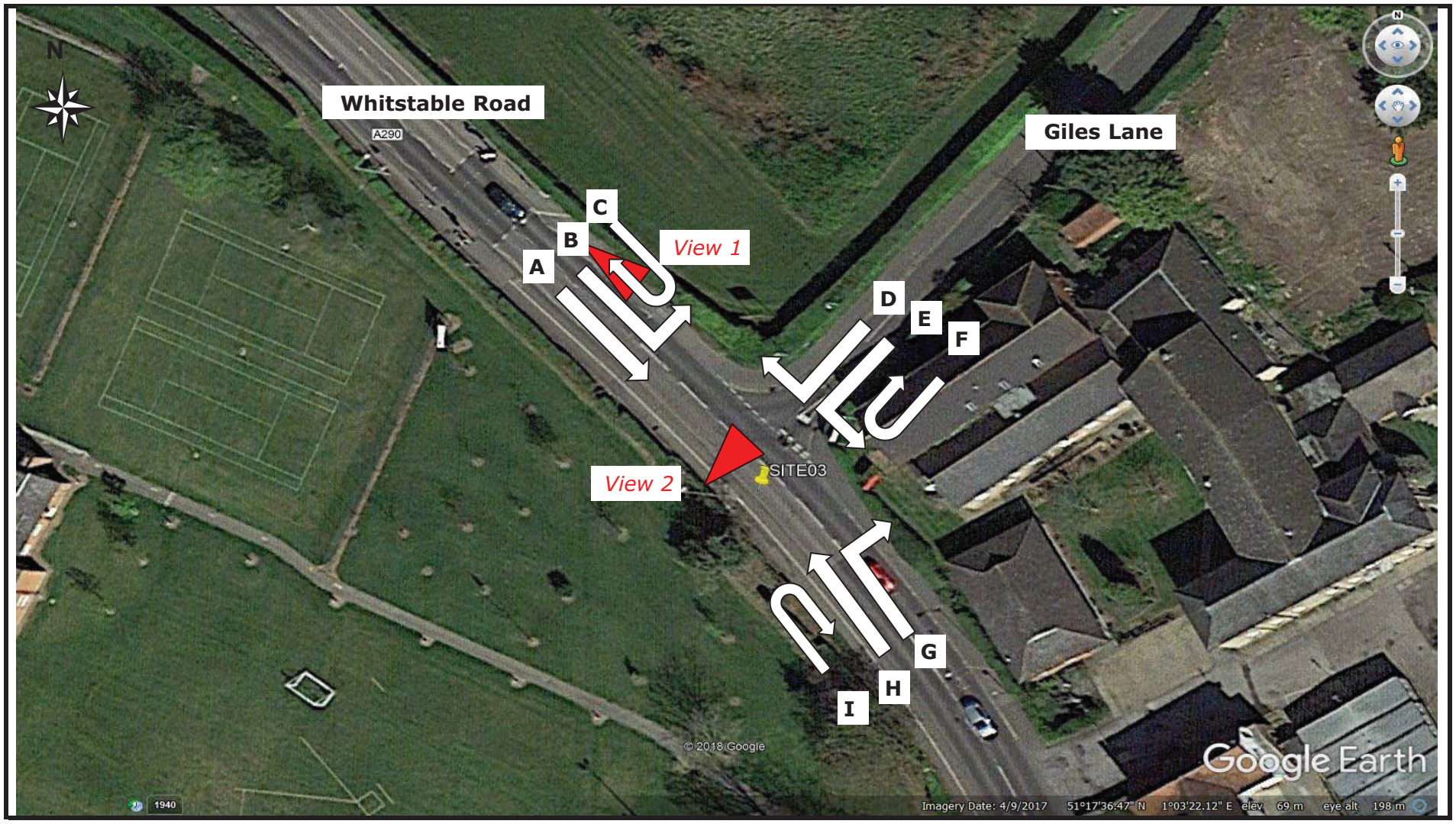
47
35


AM Peak University Traffic
08.00 - 09.00
Blean Common
Tyler Hill
Canterbury Hill
Whitstable Road
Park Wood Road
Giles Lane
Rough Common Road
Highfield Close
St Stephens Hill
Giles Lane
Giles Lane
St Thomas Hill
University Road
0
29
2
54
355
322
5
332
75
53
79
127
42
101
313


PM Peak University Traffic
16.30 - 17.30
Blean Common
Tyler Hill
Canterbury Hill
Whitstable Road
Park Wood Road
Giles Lane
Rough Common Road
Highfield Close
St Stephens Hill
Giles Lane
Giles Lane
St Thomas Hill
University Road
255
2
249
126
37
0
101
210
45
33
32
137
269
101

| | | | |
|---|---|---|---|
| Advanced Transport Research | | *Job Number & Name:* | 18907 University of Kent |
| SITE03 - Giles Lane/ Whitstable Road | | *Date:* | Tuesday 16 Oct 2018 |

| | | | | | |
|---|---|---|---|---|---|
| *Job Type:* | Junction Count | | | | |
| *Co-ordinates:* | 51° 17'34.74"N, 1° 3'26.15"E | *Postcode:* | CT2 8HT | *Times:* | 0700-1900 |



Advanced Transport Research
SITE03 - Giles Lane/ Whitstable Road
Classified Counts

Job Number & Name: 18907 University of Kent
Client: Peter Brett
Date: Tuesday 16 October 2018

| | Movement A | | | | | | | Movement B | | | | | | | Movement C | | | | | | | Movement D | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Times | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc |
| 07:00 - 07:15 | 35 | 4 | 1 | 0 | 1 | 1 | 1 | 17 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 |
| 07:15 - 07:30 | 45 | 9 | 2 | 1 | 2 | 1 | 1 | 24 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 3 | 1 | 0 | 0 | 0 | 0 |
| 07:30 - 07:45 | 54 | 9 | 0 | 0 | 2 | 1 | 4 | 39 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 1 | 0 | 0 | 0 | 0 | 0 |
| 07:45 - 08:00 | 106 | 5 | 2 | 2 | 1 | 0 | 2 | 63 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 2 | 1 | 0 | 0 | 0 | 0 |
| 08:00 - 08:15 | 101 | 8 | 1 | 1 | 5 | 0 | 3 | 79 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 3 | 0 | 0 | 0 | 0 | 0 |
| 08:15 - 08:30 | 103 | 7 | 4 | 1 | 3 | 2 | 4 | 86 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 1 | 0 | 0 | 0 | 0 | 0 |
| 08:30 - 08:45 | 76 | 9 | 0 | 0 | 2 | 0 | 1 | 85 | 5 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 2 | 0 | 0 | 0 | 0 | 0 |
| 08:45 - 09:00 | 77 | 6 | 1 | 0 | 2 | 1 | 0 | 126 | 5 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 3 | 0 | 0 | 0 | 0 | 0 |
| 09:00 - 09:15 | 76 | 9 | 2 | 0 | 0 | 1 | 2 | 90 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 1 | 0 | 0 | 0 | 0 | 0 |
| 09:15 - 09:30 | 63 | 7 | 0 | 0 | 4 | 0 | 2 | 55 | 4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 2 | 1 | 0 | 0 | 0 | 0 |
| 09:30 - 09:45 | 50 | 5 | 0 | 0 | 2 | 2 | 3 | 42 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 1 | 0 | 0 | 0 | 0 | 1 |
| 09:45 - 10:00 | 50 | 3 | 1 | 0 | 3 | 1 | 1 | 39 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 2 | 0 | 0 | 0 | 0 | 0 |
| 10:00 - 10:15 | 42 | 5 | 2 | 0 | 1 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 3 | 0 | 0 | 0 | 0 | 0 |
| 10:15 - 10:30 | 43 | 10 | 0 | 0 | 2 | 0 | 1 | 26 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 1 |
| 10:30 - 10:45 | 50 | 9 | 0 | 1 | 2 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 1 | 0 | 0 | 0 | 0 | 0 |
| 10:45 - 11:00 | 41 | 10 | 0 | 0 | 4 | 0 | 0 | 21 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 2 | 0 | 0 | 0 | 0 | 0 |
| 11:00 - 11:15 | 41 | 8 | 1 | 0 | 0 | 0 | 1 | 18 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 4 | 0 | 0 | 0 | 0 | 0 |
| 11:15 - 11:30 | 46 | 5 | 1 | 0 | 3 | 1 | 1 | 27 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 4 | 0 | 0 | 0 | 0 | 0 |
| 11:30 - 11:45 | 39 | 6 | 1 | 0 | 1 | 0 | 0 | 21 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 1 | 0 | 0 | 0 | 0 |
| 11:45 - 12:00 | 48 | 10 | 2 | 0 | 3 | 0 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 1 | 0 | 0 | 0 | 0 | 0 |
| 12:00 - 12:15 | 49 | 3 | 3 | 0 | 1 | 0 | 0 | 22 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 3 | 1 | 0 | 0 | 0 | 0 |
| 12:15 - 12:30 | 39 | 5 | 3 | 0 | 2 | 1 | 0 | 14 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 3 | 0 | 0 | 0 | 0 | 0 |
| 12:30 - 12:45 | 44 | 4 | 1 | 0 | 2 | 1 | 0 | 16 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 1 | 0 | 0 | 0 | 1 |
| 12:45 - 13:00 | 32 | 3 | 0 | 0 | 3 | 0 | 4 | 18 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 3 | 1 | 0 | 0 | 0 | 0 |
| 13:00 - 13:15 | 49 | 10 | 0 | 0 | 3 | 2 | 0 | 17 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 1 | 1 | 0 | 0 | 1 | 0 |
| 13:15 - 13:30 | 40 | 6 | 1 | 0 | 2 | 0 | 0 | 13 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 2 | 1 | 0 | 0 | 0 | 0 |
| 13:30 - 13:45 | 29 | 6 | 3 | 0 | 3 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 2 | 1 | 1 | 0 | 0 | 0 |
| 13:45 - 14:00 | 57 | 5 | 1 | 0 | 2 | 2 | 2 | 18 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 2 | 0 | 0 | 0 | 0 | 0 |
| 14:00 - 14:15 | 39 | 8 | 0 | 0 | 1 | 2 | 0 | 20 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 1 | 0 | 0 | 0 | 0 | 0 |
| 14:15 - 14:30 | 35 | 3 | 1 | 1 | 2 | 0 | 1 | 19 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 1 | 0 | 0 | 0 | 0 | 0 |
| 14:30 - 14:45 | 47 | 5 | 1 | 0 | 2 | 2 | 1 | 17 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 1 | 0 | 0 | 0 | 0 | 0 |
| 14:45 - 15:00 | 35 | 4 | 1 | 1 | 4 | 0 | 0 | 25 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 4 | 0 | 0 | 0 | 0 | 0 |
| 15:00 - 15:15 | 31 | 1 | 1 | 0 | 1 | 1 | 1 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 2 | 0 | 0 | 0 | 1 | 0 |
| 15:15 - 15:30 | 36 | 9 | 2 | 0 | 3 | 0 | 1 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 4 | 0 | 0 | 0 | 1 | 0 |
| 15:30 - 15:45 | 51 | 3 | 0 | 0 | 2 | 1 | 1 | 23 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 5 | 0 | 0 | 0 | 0 | 0 |
| 15:45 - 16:00 | 51 | 3 | 0 | 0 | 1 | 1 | 2 | 20 | 5 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 51 | 1 | 0 | 0 | 0 | 0 | 1 |
| 16:00 - 16:15 | 48 | 5 | 0 | 0 | 3 | 1 | 0 | 27 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 67 | 3 | 0 | 0 | 0 | 1 | 0 |
| 16:15 - 16:30 | 57 | 4 | 2 | 0 | 1 | 2 | 0 | 32 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 64 | 8 | 0 | 0 | 0 | 0 | 0 |
| 16:30 - 16:45 | 70 | 5 | 0 | 0 | 2 | 1 | 2 | 36 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 49 | 6 | 0 | 0 | 0 | 0 | 0 |
| 16:45 - 17:00 | 51 | 5 | 0 | 0 | 2 | 0 | 0 | 22 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 10 | 0 | 0 | 0 | 0 | 0 |
| 17:00 - 17:15 | 67 | 5 | 0 | 0 | 2 | 0 | 3 | 33 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 66 | 1 | 0 | 0 | 0 | 1 | 1 |
| 17:15 - 17:30 | 59 | 4 | 0 | 0 | 3 | 1 | 1 | 40 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 1 | 0 | 0 | 0 | 0 | 0 |
| 17:30 - 17:45 | 70 | 2 | 0 | 0 | 1 | 0 | 2 | 25 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 61 | 3 | 0 | 0 | 0 | 0 | 0 |
| 17:45 - 18:00 | 59 | 2 | 0 | 0 | 1 | 0 | 0 | 27 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 2 | 0 | 0 | 0 | 0 | 0 |
| 18:00 - 18:15 | 66 | 3 | 0 | 0 | 1 | 0 | 3 | 22 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 49 | 2 | 0 | 0 | 0 | 0 | 0 |
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| | Movement E | | | | | | | Movement F | | | | | | | Movement G | | | | | | | Movement H | | | | | | | Movement I | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Times | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc |
| 07:00 - 07:15 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 14 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 - 07:30 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 21 | 6 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:30 - 07:45 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 27 | 4 | 2 | 1 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 - 08:00 | 8 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 1 | 0 | 0 | 0 | 0 | 0 | 35 | 6 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
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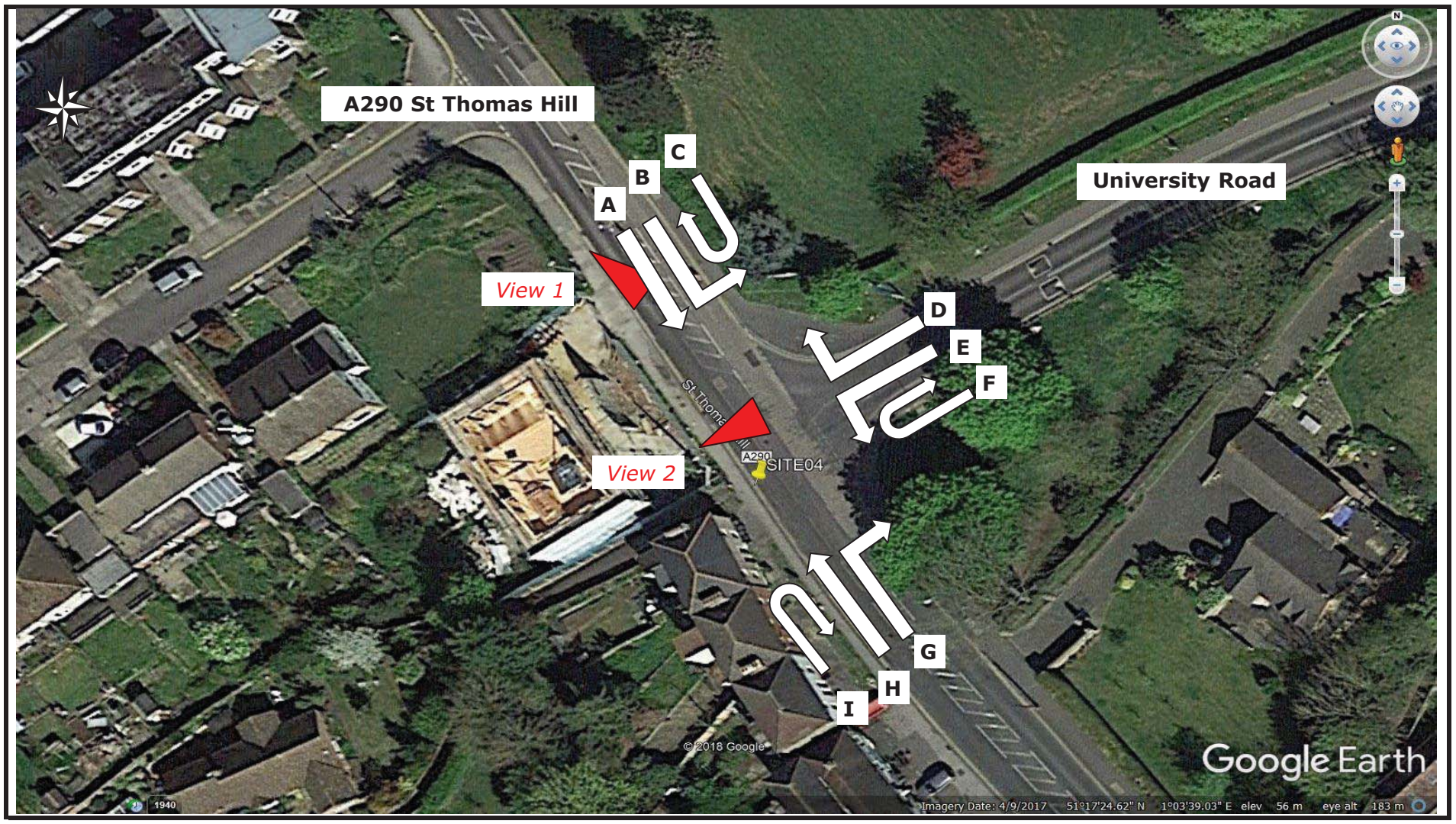
| 08:15 - 08:30 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 5 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:30 - 08:45 | 11 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 1 | 0 | 1 | 0 | 0 | 2 | 68 | 3 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:45 - 09:00 | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 49 | 11 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:00 - 09:15 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 0 | 1 | 29 | 9 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:15 - 09:30 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 2 | 26 | 6 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:30 - 09:45 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 1 | 22 | 5 | 3 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:45 - 10:00 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 2 | 0 | 0 | 0 | 1 | 1 | 22 | 7 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:00 - 10:15 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 30 | 4 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:15 - 10:30 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 1 | 38 | 8 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:30 - 10:45 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 2 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:45 - 11:00 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 2 | 1 | 0 | 0 | 0 | 0 | 30 | 7 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:00 - 11:15 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 21 | 3 | 0 | 0 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:15 - 11:30 | 9 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 5 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:30 - 11:45 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 2 | 0 | 0 | 0 | 0 | 33 | 6 | 1 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:45 - 12:00 | 10 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 8 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:00 - 12:15 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 40 | 3 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:15 - 12:30 | 7 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 42 | 3 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:30 - 12:45 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 4 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:45 - 13:00 | 7 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 34 | 8 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13:00 - 13:15 | 12 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 4 | 1 | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13:15 - 13:30 | 5 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 41 | 6 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13:30 - 13:45 | 7 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 3 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13:45 - 14:00 | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 39 | 5 | 2 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:00 - 14:15 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 50 | 6 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:15 - 14:30 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 5 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:30 - 14:45 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 51 | 6 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:45 - 15:00 | 6 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 1 | 1 | 0 | 0 | 0 | 0 | 43 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:00 - 15:15 | 7 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 47 | 5 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:15 - 15:30 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 1 | 1 | 30 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:30 - 15:45 | 18 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 34 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:45 - 16:00 | 13 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 1 | 65 | 6 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:00 - 16:15 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 55 | 8 | 1 | 0 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:15 - 16:30 | 11 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 1 | 0 | 0 | 0 | 0 | 1 | 62 | 6 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:30 - 16:45 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 1 | 0 | 0 | 0 | 0 | 2 | 95 | 10 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:45 - 17:00 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 83 | 4 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17:00 - 17:15 | 11 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 79 | 6 | 0 | 0 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17:15 - 17:30 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 117 | 4 | 1 | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17:30 - 17:45 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 101 | 5 | 3 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17:45 - 18:00 | 6 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 78 | 5 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18:00 - 18:15 | 10 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 1 | 53 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18:15 - 18:30 | 9 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 73 | 5 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18:30 - 18:45 | 6 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 2 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18:45 - 19:00 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 1 | 0 | 48 | 3 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | | | |
|---|---|---|---|
| Advanced Transport Research | | *Job Number & Name:* | 18907 University of Kent |
| SITE04 - University Road/ A290 St Thomas Hill | | *Date:* | Tuesday 16 Oct 2018 |

| | | | | | |
|---|---|---|---|---|---|
| *Job Type:* | Junction Count | | | | |
| *Co-ordinates:* | 51° 17'24.35"N, 1° 3'39.19"E | *Postcode:* | CT2 8HW | *Times:* | 0700-1900 |



Advanced Transport Research
SITE04 - University Road/ A290 St Thomas Hill
Classified Counts

Job Number & Name: 18907 University of Kent
Client: Peter Brett
Date: Tuesday 16 October 2018

| | Movement A | | | | | | | Movement B | | | | | | | Movement C | | | | | | | Movement D | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Times | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc |
| 07:00 - 07:15 | 33 | 3 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| 07:15 - 07:30 | 38 | 7 | 2 | 1 | 0 | 1 | 0 | 6 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:30 - 07:45 | 48 | 7 | 0 | 0 | 1 | 1 | 5 | 10 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| 07:45 - 08:00 | 65 | 3 | 2 | 1 | 0 | 0 | 1 | 30 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 1 | 0 | 1 | 3 | 0 | 0 |
| 08:00 - 08:15 | 80 | 10 | 1 | 2 | 4 | 0 | 3 | 30 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:15 - 08:30 | 73 | 6 | 4 | 1 | 2 | 2 | 5 | 31 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 1 | 0 | 0 | 1 | 0 | 0 |
| 08:30 - 08:45 | 59 | 10 | 0 | 0 | 1 | 0 | 1 | 40 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:45 - 09:00 | 40 | 6 | 1 | 0 | 1 | 1 | 1 | 36 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 1 | 0 | 1 | 0 | 0 |
| 09:00 - 09:15 | 57 | 5 | 2 | 0 | 0 | 1 | 2 | 25 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 2 | 0 | 0 |
| 09:15 - 09:30 | 59 | 9 | 0 | 0 | 2 | 0 | 2 | 13 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 0 | 0 |
| 09:30 - 09:45 | 46 | 4 | 0 | 0 | 1 | 2 | 3 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 09:45 - 10:00 | 43 | 4 | 1 | 0 | 2 | 1 | 1 | 7 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:00 - 10:15 | 46 | 3 | 1 | 0 | 1 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 |
| 10:15 - 10:30 | 47 | 10 | 1 | 0 | 1 | 0 | 2 | 2 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 10:30 - 10:45 | 50 | 8 | 0 | 1 | 2 | 0 | 0 | 5 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 |
| 10:45 - 11:00 | 42 | 8 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 |
| 11:00 - 11:15 | 47 | 8 | 0 | 0 | 1 | 0 | 1 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 |
| 11:15 - 11:30 | 47 | 6 | 2 | 0 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 |
| 11:30 - 11:45 | 44 | 5 | 1 | 0 | 2 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 1 | 0 | 0 |
| 11:45 - 12:00 | 53 | 10 | 3 | 0 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:00 - 12:15 | 53 | 3 | 4 | 0 | 0 | 0 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 2 | 0 | 0 |
| 12:15 - 12:30 | 46 | 5 | 3 | 0 | 2 | 1 | 1 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 |
| 12:30 - 12:45 | 43 | 5 | 1 | 0 | 2 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 0 |
| 12:45 - 13:00 | 35 | 5 | 0 | 0 | 1 | 0 | 3 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13:00 - 13:15 | 52 | 9 | 0 | 0 | 1 | 0 | 1 | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 1 | 0 | 1 | 0 | 0 |
| 13:15 - 13:30 | 39 | 8 | 1 | 0 | 1 | 0 | 0 | 7 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 1 | 0 | 0 |
| 13:30 - 13:45 | 35 | 9 | 3 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 | 0 | 0 |
| 13:45 - 14:00 | 46 | 6 | 1 | 0 | 0 | 2 | 2 | 5 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:00 - 14:15 | 51 | 9 | 0 | 0 | 2 | 2 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 1 | 0 | 0 |
| 14:15 - 14:30 | 41 | 4 | 1 | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 1 | 0 | 0 | 0 | 0 |
| 14:30 - 14:45 | 48 | 3 | 1 | 0 | 2 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 1 | 0 | 0 |
| 14:45 - 15:00 | 33 | 8 | 1 | 1 | 2 | 0 | 2 | 10 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:00 - 15:15 | 38 | 2 | 2 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 2 | 0 | 0 |
| 15:15 - 15:30 | 38 | 6 | 2 | 0 | 2 | 0 | 1 | 7 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:30 - 15:45 | 68 | 3 | 0 | 0 | 2 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 |
| 15:45 - 16:00 | 58 | 2 | 0 | 0 | 1 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:00 - 16:15 | 63 | 5 | 0 | 0 | 2 | 2 | 0 | 7 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 2 | 0 | 0 | 0 | 0 | 0 |
| 16:15 - 16:30 | 45 | 6 | 1 | 0 | 0 | 3 | 0 | 8 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 2 | 0 | 0 | 1 | 0 | 0 |
| 16:30 - 16:45 | 85 | 6 | 0 | 0 | 2 | 1 | 2 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 2 | 0 | 0 | 0 | 0 | 0 |
| 16:45 - 17:00 | 64 | 5 | 0 | 0 | 1 | 1 | 1 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 1 | 0 | 0 | 2 | 0 | 0 |
| 17:00 - 17:15 | 63 | 6 | 0 | 0 | 1 | 0 | 4 | 9 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35 | 1 | 0 | 0 | 0 | 0 | 0 |
| 17:15 - 17:30 | 48 | 6 | 0 | 0 | 2 | 0 | 1 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 1 | 0 | 0 | 2 | 0 | 0 |
| 17:30 - 17:45 | 89 | 3 | 0 | 0 | 0 | 2 | 2 | 7 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 1 | 0 | 0 | 0 | 0 | 0 |
| 17:45 - 18:00 | 52 | 3 | 0 | 0 | 1 | 0 | 0 | 8 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 1 | 0 | 0 |
| 18:00 - 18:15 | 64 | 2 | 0 | 0 | 1 | 0 | 3 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18:15 - 18:30 | 54 | 4 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 2 | 0 | 0 |
| 18:30 - 18:45 | 58 | 5 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 |
| 18:45 - 19:00 | 70 | 4 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 |

| | Movement E | | | | | | | Movement F | | | | | | | Movement G | | | | | | | Movement H | | | | | | | Movement I | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Times | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc |
| 07:00 - 07:15 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 2 | 1 | 0 | 1 | 0 | 0 | 10 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 - 07:30 | 5 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 2 | 0 | 0 | 1 | 0 | 0 | 32 | 9 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:30 - 07:45 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 3 | 0 | 1 | 0 | 0 | 0 | 34 | 3 | 2 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 - 08:00 | 16 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 47 | 4 | 0 | 0 | 1 | 1 | 0 | 53 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:00 - 08:15 | 27 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 58 | 3 | 0 | 0 | 0 | 0 | 0 | 77 | 3 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:15 - 08:30 | 29 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 84 | 1 | 0 | 0 | 2 | 0 | 1 | 67 | 5 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:30 - 08:45 | 23 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 92 | 7 | 2 | 0 | 2 | 1 | 2 | 79 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:45 - 09:00 | 37 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 76 | 2 | 0 | 0 | 5 | 0 | 0 | 62 | 11 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:00 - 09:15 | 34 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 49 | 3 | 0 | 0 | 3 | 0 | 1 | 20 | 11 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:15 - 09:30 | 20 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 0 | 1 | 0 | 0 | 1 | 0 | 26 | 4 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:30 - 09:45 | 18 | 4 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 2 | 0 | 0 | 7 | 0 | 2 | 25 | 5 | 3 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:45 - 10:00 | 11 | 0 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 3 | 0 | 0 | 3 | 0 | 1 | 31 | 7 | 3 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:00 - 10:15 | 21 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 1 | 0 | 0 | 4 | 0 | 1 | 34 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:15 - 10:30 | 11 | 2 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 0 | 0 | 0 | 3 | 0 | 1 | 38 | 9 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:30 - 10:45 | 17 | 3 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 1 | 1 | 0 | 2 | 0 | 0 | 25 | 2 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:45 - 11:00 | 8 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 3 | 0 | 0 | 4 | 0 | 0 | 37 | 7 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:00 - 11:15 | 31 | 1 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 3 | 0 | 0 | 3 | 0 | 2 | 26 | 4 | 1 | 0 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 11:15 - 11:30 | 22 | 3 | 2 | 0 | 4 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 2 | 0 | 0 | 2 | 0 | 0 | 42 | 4 | 0 | 0 | 1 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 11:30 - 11:45 | 17 | 3 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 3 | 3 | 0 | 5 | 0 | 0 | 37 | 7 | 3 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:45 - 12:00 | 12 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 2 | 2 | 0 | 2 | 1 | 0 | 31 | 6 | 3 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:00 - 12:15 | 27 | 3 | 0 | 0 | 3 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 2 | 0 | 0 | 5 | 1 | 0 | 44 | 6 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:15 - 12:30 | 26 | 0 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 1 | 0 | 0 | 3 | 0 | 1 | 38 | 4 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:30 - 12:45 | 20 | 1 | 1 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 1 | 0 | 0 | 3 | 0 | 0 | 37 | 4 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:45 - 13:00 | 23 | 2 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35 | 2 | 1 | 0 | 3 | 3 | 0 | 39 | 7 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13:00 - 13:15 | 33 | 1 | 0 | 0 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 1 | 0 | 0 | 4 | 0 | 0 | 47 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 13:15 - 13:30 | 26 | 2 | 1 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 3 | 2 | 0 | 2 | 1 | 1 | 35 | 5 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13:30 - 13:45 | 15 | 1 | 2 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 2 | 0 | 3 | 0 | 1 | 40 | 4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13:45 - 14:00 | 26 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 5 | 0 | 0 | 37 | 6 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:00 - 14:15 | 32 | 3 | 0 | 0 | 5 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 3 | 0 | 0 | 3 | 0 | 0 | 43 | 7 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:15 - 14:30 | 21 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 1 | 0 | 0 | 3 | 2 | 0 | 33 | 4 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:30 - 14:45 | 24 | 2 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 5 | 0 | 0 | 4 | 1 | 0 | 53 | 5 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:45 - 15:00 | 15 | 1 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 2 | 0 | 0 | 51 | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:00 - 15:15 | 39 | 0 | 0 | 0 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 1 | 0 | 0 | 4 | 0 | 0 | 43 | 6 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:15 - 15:30 | 24 | 0 | 0 | 0 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 1 | 0 | 0 | 2 | 1 | 1 | 30 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:30 - 15:45 | 64 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 1 | 0 | 0 | 4 | 0 | 0 | 33 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:45 - 16:00 | 37 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 1 | 0 | 0 | 4 | 0 | 0 | 61 | 5 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:00 - 16:15 | 62 | 1 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 | 2 | 0 | 0 | 2 | 1 | 0 | 47 | 7 | 1 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:15 - 16:30 | 51 | 9 | 0 | 0 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 2 | 0 | 0 | 2 | 1 | 0 | 57 | 6 | 0 | 0 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:30 - 16:45 | 73 | 4 | 0 | 0 | 3 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 3 | 0 | 0 | 2 | 0 | 0 | 54 | 8 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:45 - 17:00 | 58 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 0 | 0 | 0 | 3 | 1 | 0 | 52 | 3 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17:00 - 17:15 | 71 | 2 | 0 | 0 | 3 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 | 1 | 0 | 0 | 3 | 0 | 1 | 53 | 5 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17:15 - 17:30 | 73 | 3 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 1 | 0 | 0 | 3 | 0 | 1 | 73 | 4 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17:30 - 17:45 | 51 | 1 | 1 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 1 | 0 | 0 | 3 | 1 | 0 | 58 | 3 | 3 | 0 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17:45 - 18:00 | 44 | 0 | 0 | 0 | 5 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33 | 0 | 0 | 0 | 4 | 1 | 0 | 68 | 6 | 0 | 0 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18:00 - 18:15 | 67 | 2 | 0 | 0 | 2 | 2 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 1 | 0 | 0 | 3 | 0 | 0 | 47 | 2 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18:15 - 18:30 | 52 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 0 | 0 | 0 | 4 | 0 | 1 | 62 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18:30 - 18:45 | 28 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 2 | 0 | 0 | 1 | 2 | 0 | 32 | 1 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18:45 - 19:00 | 25 | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 1 | 1 | 1 | 53 | 4 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

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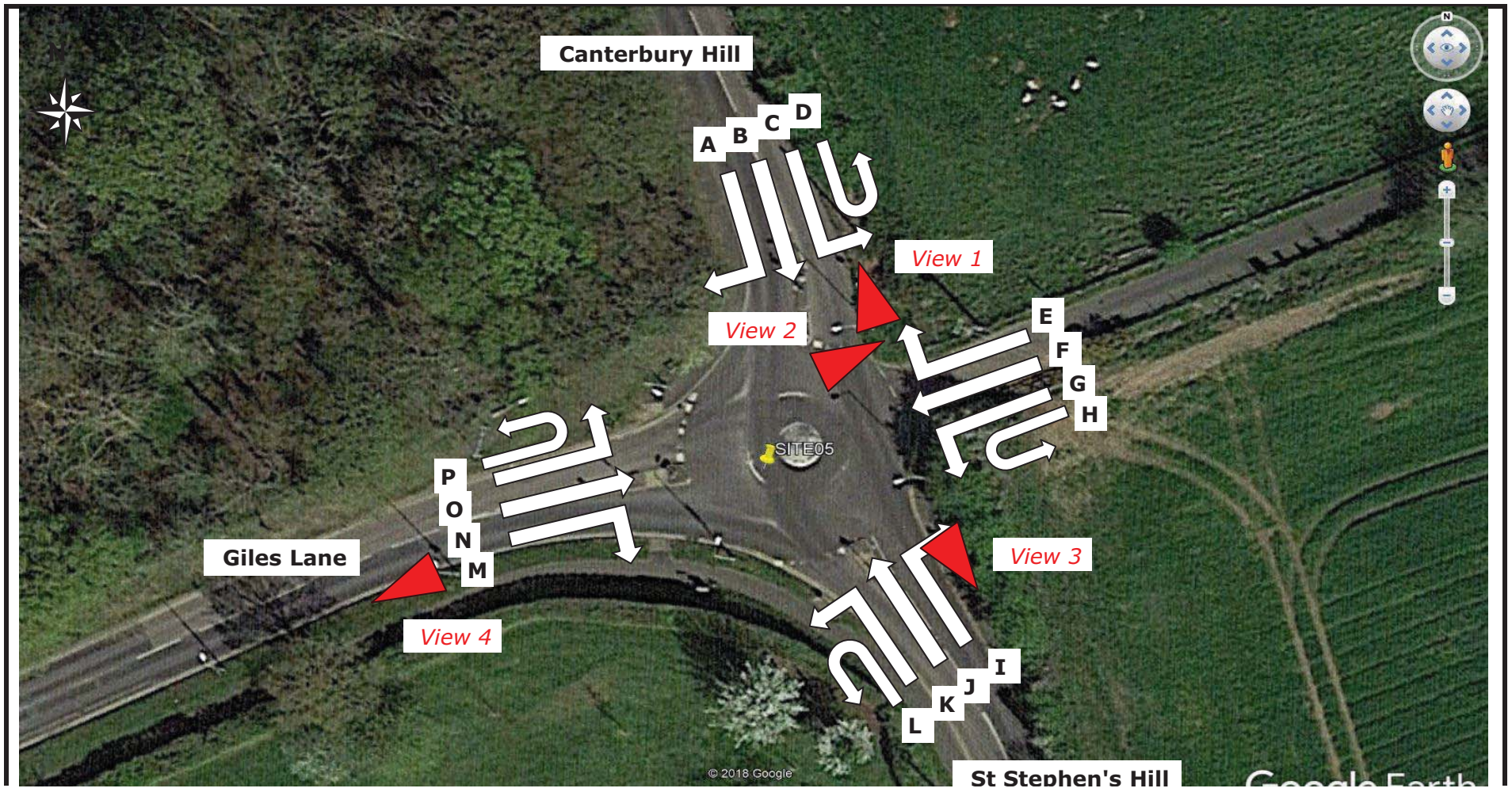
|---|---|---|---|
| Advanced Transport Research | | *Job Number & Name:* | 18907 University of Kent |
| SITE05 - Canterbury Hill/ St Stephen's Hill/ Giles Lane | | *Date:* | Tuesday 16 Oct 2018 |

| | | | | | |
|---|---|---|---|---|---|
| *Job Type:* | Junction Count | | | | |
| *Co-ordinates:* | 51° 18' 1.14"N, 1° 4' 24.32"E | *Postcode:* | CT2 0PQ | *Times:* | 0700-1900 |



Advanced Transport Research
SITE05 - Canterbury Hill/ St Stephen's Hill/ Giles Lane
Classified Counts

| | Movement A | | | | | | | Movement B | | | | | | | Movement C | | | | | | | Movement D | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Times | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc |
| 07:00 - 07:15 | 13 | 1 | 0 | 0 | 0 | 0 | 0 | 53 | 11 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 - 07:30 | 13 | 4 | 0 | 0 | 0 | 1 | 0 | 83 | 18 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:30 - 07:45 | 36 | 3 | 0 | 0 | 0 | 0 | 1 | 155 | 16 | 1 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 - 08:00 | 70 | 6 | 0 | 0 | 0 | 2 | 0 | 158 | 23 | 1 | 0 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:00 - 08:15 | 87 | 3 | 0 | 0 | 0 | 0 | 0 | 157 | 11 | 0 | 0 | 3 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:15 - 08:30 | 127 | 2 | 0 | 0 | 0 | 0 | 0 | 116 | 19 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:30 - 08:45 | 130 | 1 | 0 | 0 | 0 | 0 | 0 | 135 | 10 | 1 | 0 | 1 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:45 - 09:00 | 57 | 1 | 0 | 0 | 0 | 0 | 1 | 80 | 9 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:00 - 09:15 | 30 | 1 | 0 | 0 | 0 | 0 | 0 | 96 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:15 - 09:30 | 26 | 3 | 0 | 0 | 0 | 0 | 2 | 84 | 9 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:30 - 09:45 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 87 | 13 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:45 - 10:00 | 16 | 1 | 0 | 0 | 0 | 0 | 0 | 63 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:00 - 10:15 | 13 | 2 | 0 | 0 | 0 | 0 | 0 | 61 | 6 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:15 - 10:30 | 9 | 0 | 0 | 0 | 0 | 0 | 1 | 63 | 7 | 2 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:30 - 10:45 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:45 - 11:00 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 57 | 8 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:00 - 11:15 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 5 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:15 - 11:30 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | 8 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:30 - 11:45 | 17 | 1 | 0 | 0 | 0 | 0 | 0 | 61 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:45 - 12:00 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 52 | 12 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:00 - 12:15 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 40 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:15 - 12:30 | 10 | 0 | 0 | 0 | 0 | 1 | 0 | 59 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:30 - 12:45 | 15 | 1 | 0 | 0 | 0 | 0 | 0 | 56 | 11 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:45 - 13:00 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 48 | 14 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13:00 - 13:15 | 13 | 3 | 0 | 0 | 0 | 0 | 1 | 51 | 11 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13:15 - 13:30 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 58 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13:30 - 13:45 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 45 | 8 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13:45 - 14:00 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 51 | 15 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:00 - 14:15 | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 58 | 4 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:15 - 14:30 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 12 | 1 | 1 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:30 - 14:45 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 45 | 4 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:45 - 15:00 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 55 | 7 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:00 - 15:15 | 13 | 1 | 0 | 0 | 0 | 0 | 0 | 30 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:15 - 15:30 | 17 | 1 | 0 | 0 | 0 | 1 | 0 | 65 | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:30 - 15:45 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 48 | 5 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:45 - 16:00 | 15 | 2 | 0 | 0 | 0 | 0 | 0 | 48 | 6 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:00 - 16:15 | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 46 | 7 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:15 - 16:30 | 25 | 1 | 0 | 0 | 0 | 1 | 1 | 51 | 7 | 3 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:30 - 16:45 | 14 | 1 | 0 | 0 | 0 | 1 | 0 | 49 | 9 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:45 - 17:00 | 22 | 1 | 0 | 0 | 0 | 0 | 0 | 41 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17:00 - 17:15 | 13 | 1 | 0 | 0 | 0 | 0 | 0 | 44 | 7 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17:15 - 17:30 | 19 | 0 | 0 | 0 | 0 | 0 | 0 | 88 | 4 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17:30 - 17:45 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 55 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17:45 - 18:00 | 19 | 1 | 0 | 0 | 0 | 0 | 0 | 57 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18:00 - 18:15 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 44 | 6 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18:15 - 18:30 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 44 | 6 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 18:30 - 18:45 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 6 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18:45 - 19:00 | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 42 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

| | Movement E | | | | | | | Movement F | | | | | | | Movement G | | | | | | | Movement H | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Times | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc |
| 07:00 - 07:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 - 07:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:30 - 07:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:45 - 08:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:00 - 08:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:15 - 08:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:30 - 08:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:45 - 09:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:00 - 09:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:15 - 09:30 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:30 - 09:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 09:45 - 10:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:00 - 10:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:15 - 10:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:30 - 10:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:45 - 11:00 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:00 - 11:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:15 - 11:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:30 - 11:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11:45 - 12:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:00 - 12:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:15 - 12:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:30 - 12:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12:45 - 13:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13:00 - 13:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13:15 - 13:30 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13:30 - 13:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13:45 - 14:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:00 - 14:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:15 - 14:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:30 - 14:45 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14:45 - 15:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:00 - 15:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:15 - 15:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:30 - 15:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15:45 - 16:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:00 - 16:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:15 - 16:30 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:30 - 16:45 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16:45 - 17:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17:00 - 17:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17:15 - 17:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17:30 - 17:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17:45 - 18:00 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18:00 - 18:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18:15 - 18:30 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18:30 - 18:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 18:45 - 19:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

*Job Number & Name:* 18907 University of Kent
*Client:* Peter Brett
*Date:* Tuesday 16 October 2018

| Movement I | | | | | | | Movement J | | | | | | | Movement K | | | | | | | Movement L | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 2 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 5 | 3 | 0 | 0 | 0 | 1 | 23 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 6 | 1 | 0 | 0 | 0 | 1 | 37 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 37 | 11 | 2 | 0 | 0 | 0 | 1 | 55 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 11 | 1 | 0 | 0 | 0 | 0 | 71 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | 5 | 1 | 0 | 0 | 0 | 1 | 90 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 58 | 7 | 1 | 0 | 0 | 0 | 0 | 80 | 3 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 4 | 0 | 0 | 1 | 0 | 0 | 100 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | 18 | 0 | 0 | 2 | 0 | 0 | 62 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44 | 16 | 1 | 0 | 1 | 1 | 0 | 53 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35 | 14 | 2 | 0 | 0 | 0 | 0 | 33 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 12 | 0 | 0 | 0 | 1 | 0 | 53 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 10 | 1 | 0 | 0 | 0 | 0 | 24 | 4 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 5 | 2 | 0 | 1 | 1 | 0 | 21 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 4 | 0 | 0 | 0 | 1 | 0 | 25 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 9 | 0 | 0 | 0 | 0 | 0 | 43 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 63 | 7 | 3 | 0 | 1 | 1 | 0 | 21 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46 | 9 | 2 | 0 | 0 | 0 | 0 | 19 | 4 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 45 | 4 | 0 | 0 | 0 | 0 | 0 | 28 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 1 | 0 | 53 | 6 | 0 | 0 | 0 | 2 | 0 | 38 | 4 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 59 | 5 | 1 | 0 | 1 | 1 | 1 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 62 | 6 | 0 | 0 | 0 | 1 | 0 | 22 | 4 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48 | 3 | 1 | 0 | 0 | 3 | 0 | 28 | 2 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 7 | 0 | 0 | 0 | 3 | 0 | 37 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 58 | 7 | 0 | 0 | 1 | 0 | 0 | 32 | 3 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 69 | 8 | 2 | 1 | 0 | 3 | 1 | 34 | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 48 | 8 | 0 | 0 | 0 | 2 | 1 | 19 | 1 | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 52 | 3 | 0 | 0 | 0 | 2 | 0 | 31 | 3 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 63 | 8 | 0 | 0 | 1 | 1 | 2 | 28 | 2 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 0 | 0 | 0 | 0 | 0 | 0 | 81 | 7 | 0 | 0 | 0 | 0 | 1 | 22 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 61 | 8 | 1 | 0 | 0 | 0 | 0 | 27 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 65 | 9 | 0 | 0 | 0 | 0 | 0 | 31 | 3 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 72 | 7 | 3 | 0 | 0 | 1 | 2 | 31 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 67 | 12 | 0 | 0 | 2 | 1 | 0 | 36 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 1 | 0 | 0 | 0 | 0 | 0 | 44 | 11 | 0 | 0 | 1 | 3 | 0 | 27 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 106 | 17 | 1 | 0 | 3 | 0 | 0 | 47 | 3 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 80 | 12 | 0 | 0 | 0 | 3 | 0 | 28 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 84 | 10 | 1 | 0 | 3 | 1 | 0 | 24 | 4 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 120 | 19 | 0 | 0 | 0 | 2 | 1 | 39 | 5 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 121 | 9 | 0 | 0 | 0 | 0 | 0 | 46 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 | 11 | 0 | 0 | 0 | 1 | 1 | 42 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 121 | 13 | 0 | 0 | 1 | 3 | 1 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 135 | 13 | 0 | 0 | 1 | 1 | 0 | 34 | 3 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 102 | 7 | 0 | 0 | 0 | 3 | 0 | 51 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 95 | 8 | 0 | 0 | 0 | 1 | 1 | 31 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 84 | 4 | 0 | 0 | 1 | 0 | 1 | 30 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 70 | 0 | 0 | 0 | 1 | 1 | 0 | 33 | 0 | 0 | 0 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53 | 3 | 0 | 0 | 0 | 1 | 0 | 43 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Movement M | | | | | | | Movement N | | | | | | | Movement O | | | | | | | Movement P | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc | Cars | LGV | OGV1 | OGV2 | PSV | M/B | Cyc |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 35 | 2 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | 5 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 17 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29 | 3 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | 3 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | 6 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 25 | 7 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 52 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 36 | 4 | 1 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 43 | 0 | 0 | 0 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 23 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | 4 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 36 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 47 | 3 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 56 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 33 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 17 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 68 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 47 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 66 | 4 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 48 | 4 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 73 | 7 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 64 | 4 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 63 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 72 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 95 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 73 | 2 | 0 | 0 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 56 | 3 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 53 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 40 | 2 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 29 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 79 | 1 | 0 | 0 | 0 | 1 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 42 | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 32 | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# Appendix J
# Baseline Mapping

# Initial Baseline Mapping

# University of Kent, Canterbury

## Initial Baseline Mapping

November 2017

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## Contributors


**Client** : University of Kent

**Planning and Environmental** : CMA Planning
**Urban and Architectural** : John Letherland Ltd with Birds Portchmouth Russum Architects
**Historical Consultant** : Harvey Van Sickle (HVS)
**Transport** : Hamilton-Baillie Associates
**Landscape** : Studio Englebeck

Compiled by John Letherland Ltd with Birds Portchmouth Russum Architects


## Disclaimer

The purpose of this document is to support the University of Kent Canterbury Campus Framework Masterplan.

All maps in this document contain information that has been extracted and interpreted to the best of our knowledge from the following key sources :

1 Canterbury District Local Plan
2 Canterbury City Council Planning Constraints Map
3 'MAGIC' map by DEFRA

This information is up to date at time of issue and may continue to be updated in the future if new information becomes available. Any discrepancies or queries should be raised immediately for incorporation. Any individual use or planning application should verify all data independantly.

# STATUTORY PLANNING DESIGNATIONS

## Conservation Areas

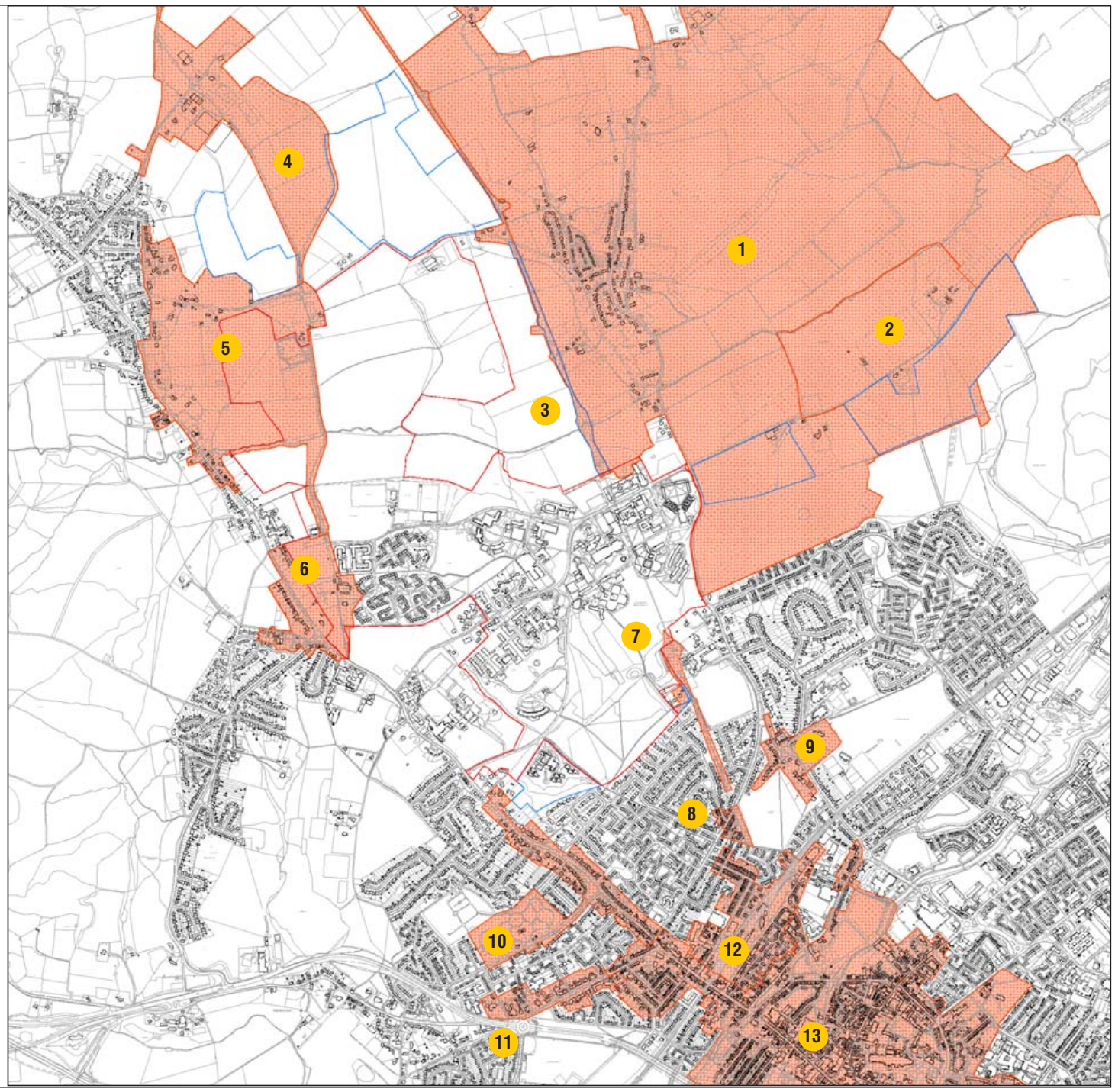
North-East
1 Tyler Hill
2 Allcroft Grange
3 Canterbury and Whitstable Railway (Hackington and Blean)

North-West
4 Amery Court
5 Blean
6 Hothe Court

South
7 Canterbury and Whitstable Railway (St. Stephen's)
8 Canterbury and Whitstable Railway (Hackington)
9 Canterbury St. Stephen's
10 Canterbury (Whitstable Road)
11 Canterbury (London Road)
12 Canterbury West Station
13 Canterbury City

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent

Source : Data interpreted from Kent Interactive Planning Constraints Map : https://mapping.canterbury.gov.uk/webapps/Planning_information/
Date of extracting data from the map : 28 July 2017



## Ancient Monuments

North-East

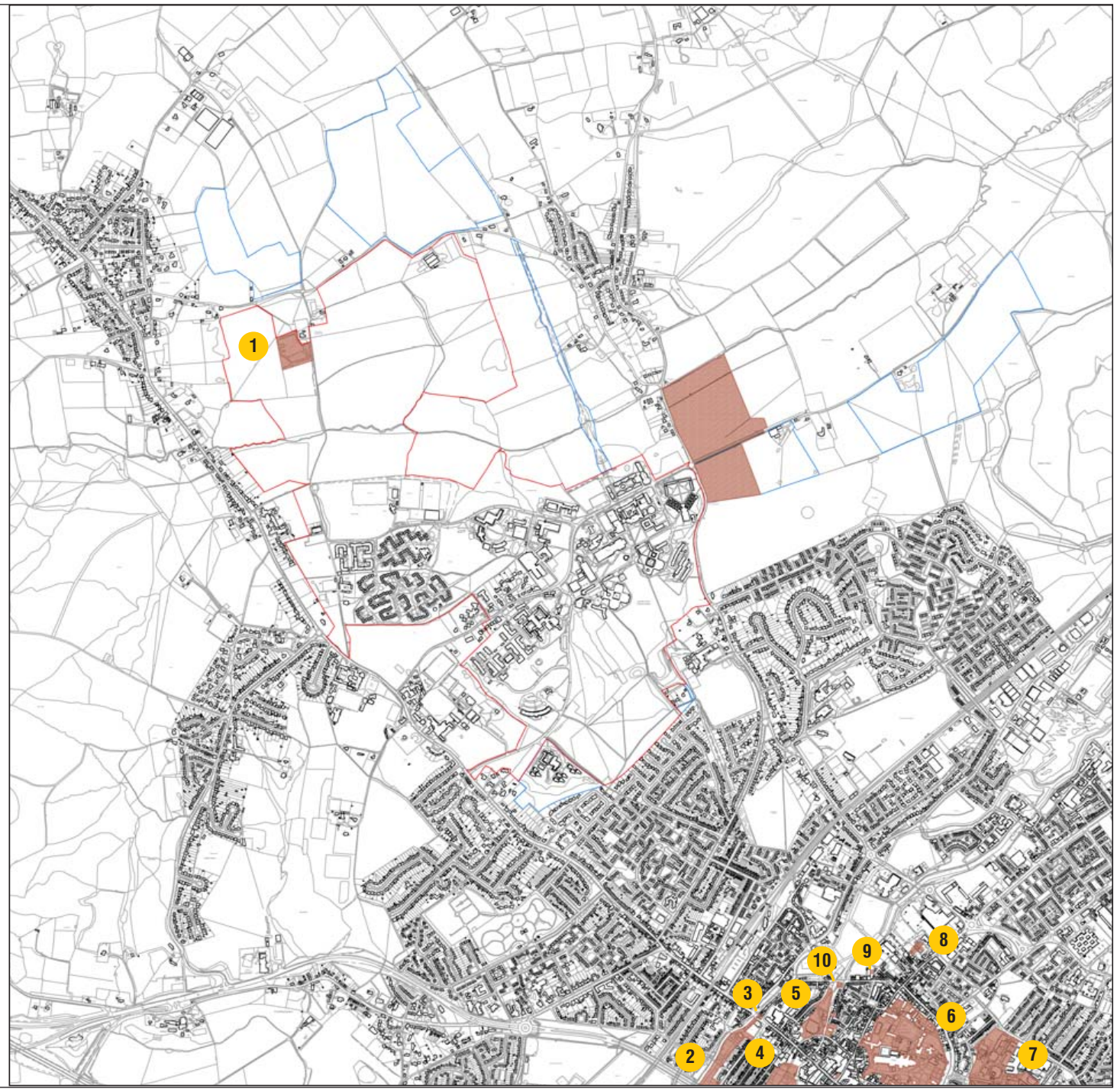
1 Dispersed medieval settlement remains and a Roman building immediately south west of St Cosmus and St Damian's Church

South

2 City wall and bastion in Westgate Gardens
3 Canterbury city walls
4 Greyfriars, Canterbury
5 Blackfriars
6 Christchurch Priory and Archbishop's Palace
7 St Augustine's Abbey
8 Hospital of St John the Baptist
9 Site of St Radigund's Hospice
10 Abbot's Mill and sluice at Blackfriars Street

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent

Source : Data interpreted from Kent Interactive Planning Constraints Map : https://mapping.canterbury.gov.uk/webapps/Planning_information/
Date of extracting data from the map : 28 July 2017



## World Heritage Site and Buffer

1 Canterbury Cathedral
2 St. Augustine's Abbey
3 St. Martin's Church

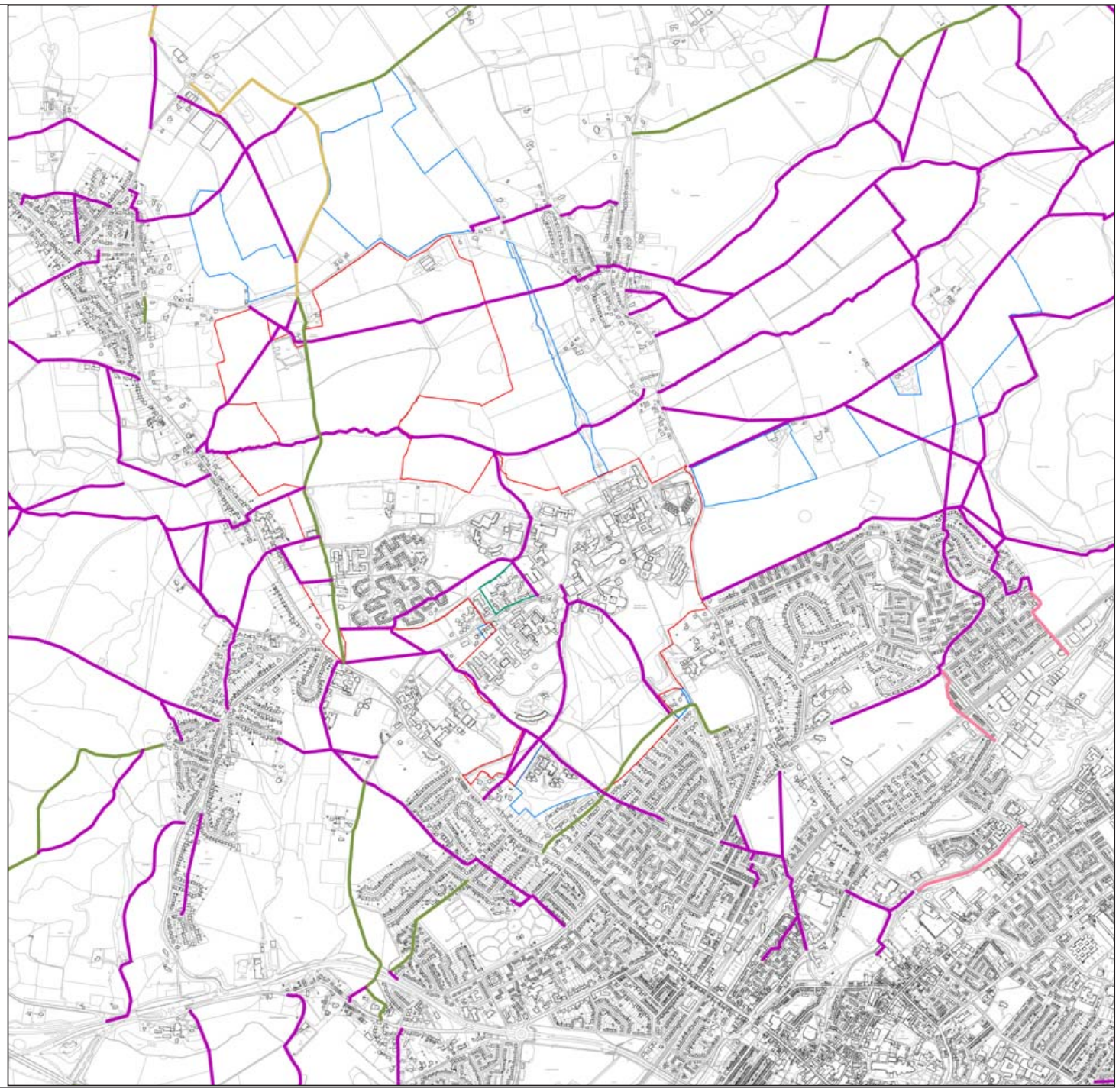
Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent

Source : Data interpreted from Kent Interactive Planning Constraints Map : https://mapping.canterbury.gov.uk/webapps/Planning_information/
Date of extracting data from the map : 28 July 2017

## Public Rights of Way

- Public Footpath
- Public Bridelway
- Byway open to all traffic
- Path closed or use restricted

- Campus Boundary as defined in the Local Plan
- Additional land owned by University of Kent



Source : Kent Interactive Planning Constraints Map : https://mapping.canterbury.gov.uk/webapps/Planning_information/
Date of exporting this map : 28 July 2017

## Local Plan Designations

Boundary of Urban Area

Environment Agency Area at Risk of Flooding Zone 2 CC5, CC6

Environment Agency Area at Risk of Flooding Zone 3 CC5, CC6

Business Innovation Centre EMP1

Education EMP7, EMP10

University Site Boundary EMP7, EMP8

Conservation Area HE6

Scheduled Ancient Monument HE11

Development Opportunity Site HD1

Housing HD1

Area of High Landscape Value LB2

International Wildlife Sites (Special Protection Area, RAMSAR, Special Area for Conservation) LB5

Local Wildlife Sites LB7

National Nature Reserve LB6

Site of Special Scientific Interest LB6

Strategic Access Management and Monitoring SP6

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Open Space OS2, OS4, OS5, OS13

Protection of Existing Open Space OS9

Riverside Path OS12, OS13, T2

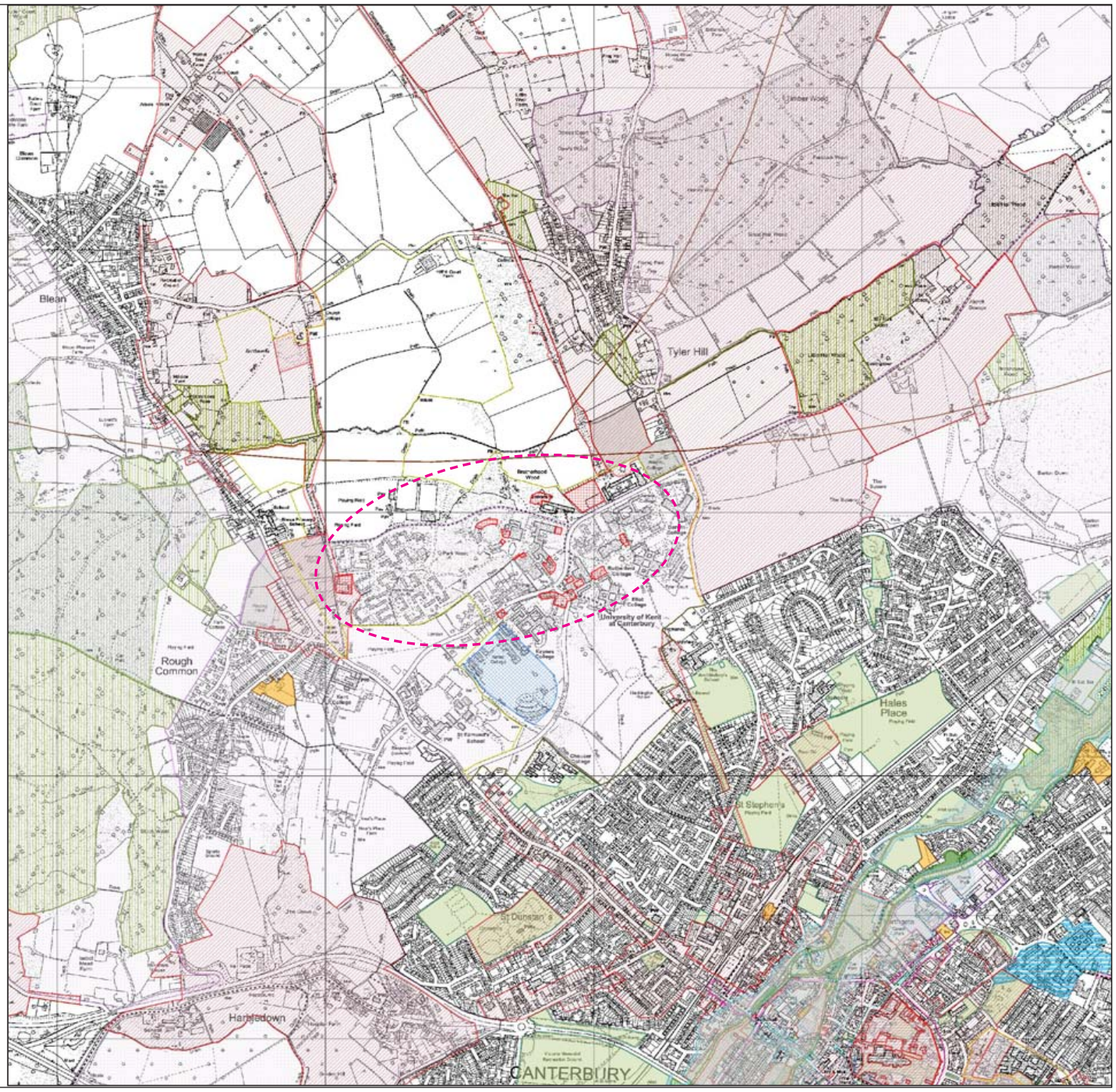
Cultural Enhancement Area TCL4

Canterbury City Centre TCL1

Cycle & Pedestrian Route T2

Note : Drawing to be updated once Draft Policy EMP7 has been updated

Source : Local Plan Proposals Map 2017
https://mapping.canterbury.gov.uk/webapps/Local_Plan_Proposals_2017/
Data of accessing map : 25 August 2017



## Strategic Access Management and Monitoring (SAMM)

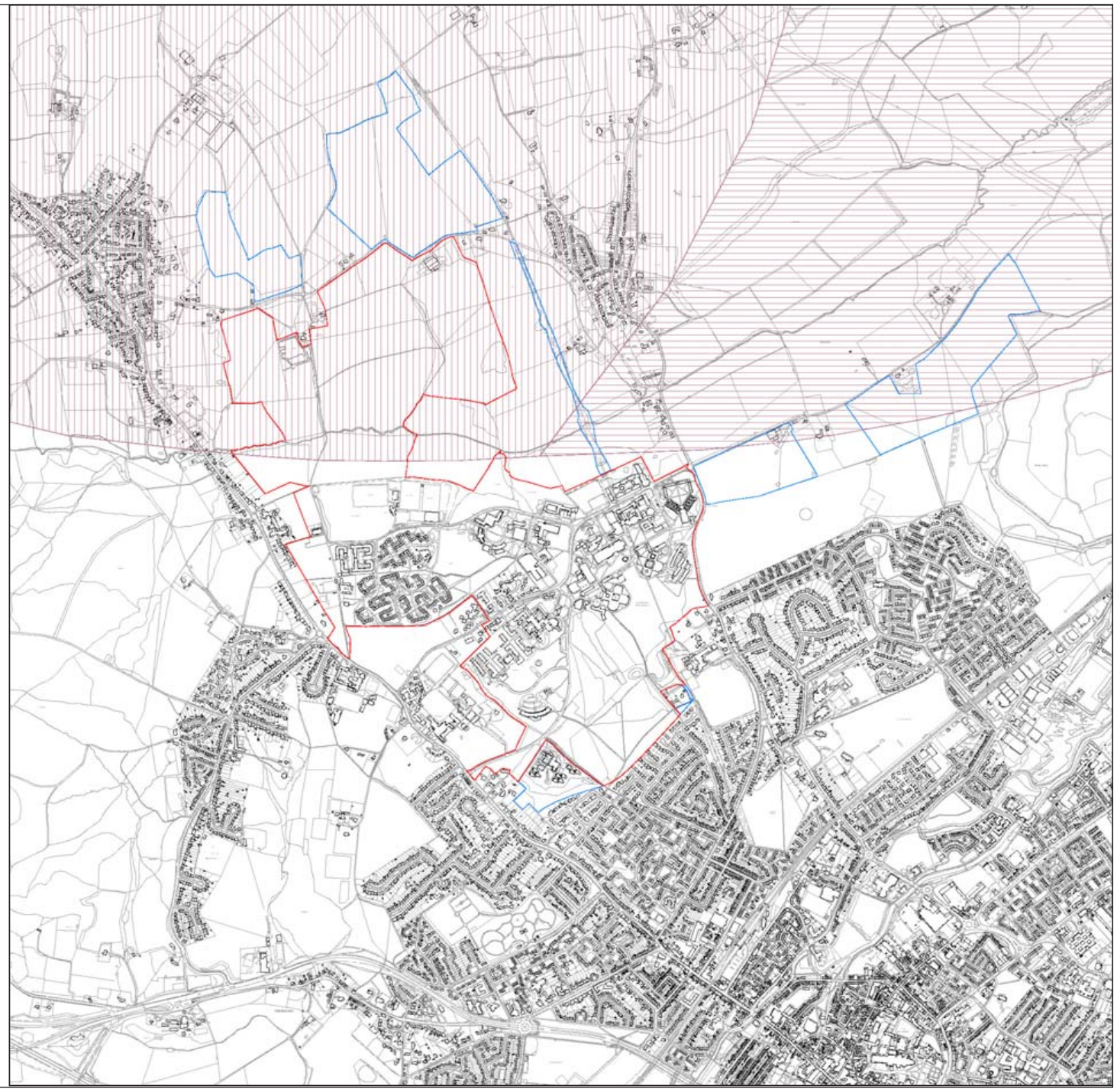
Mitigation Measures to address in combination recreational impacts on the coastal Special Protection Areas (SPA), and Ramsar sites

Thames Medway and Swale Estuaries 6km Zone of Influence

Thanet Coast and Sandwich Bay 7.2km Zone of Influence

Campus Boundary as defined in the Local Plan

Additional land owned by University of Kent



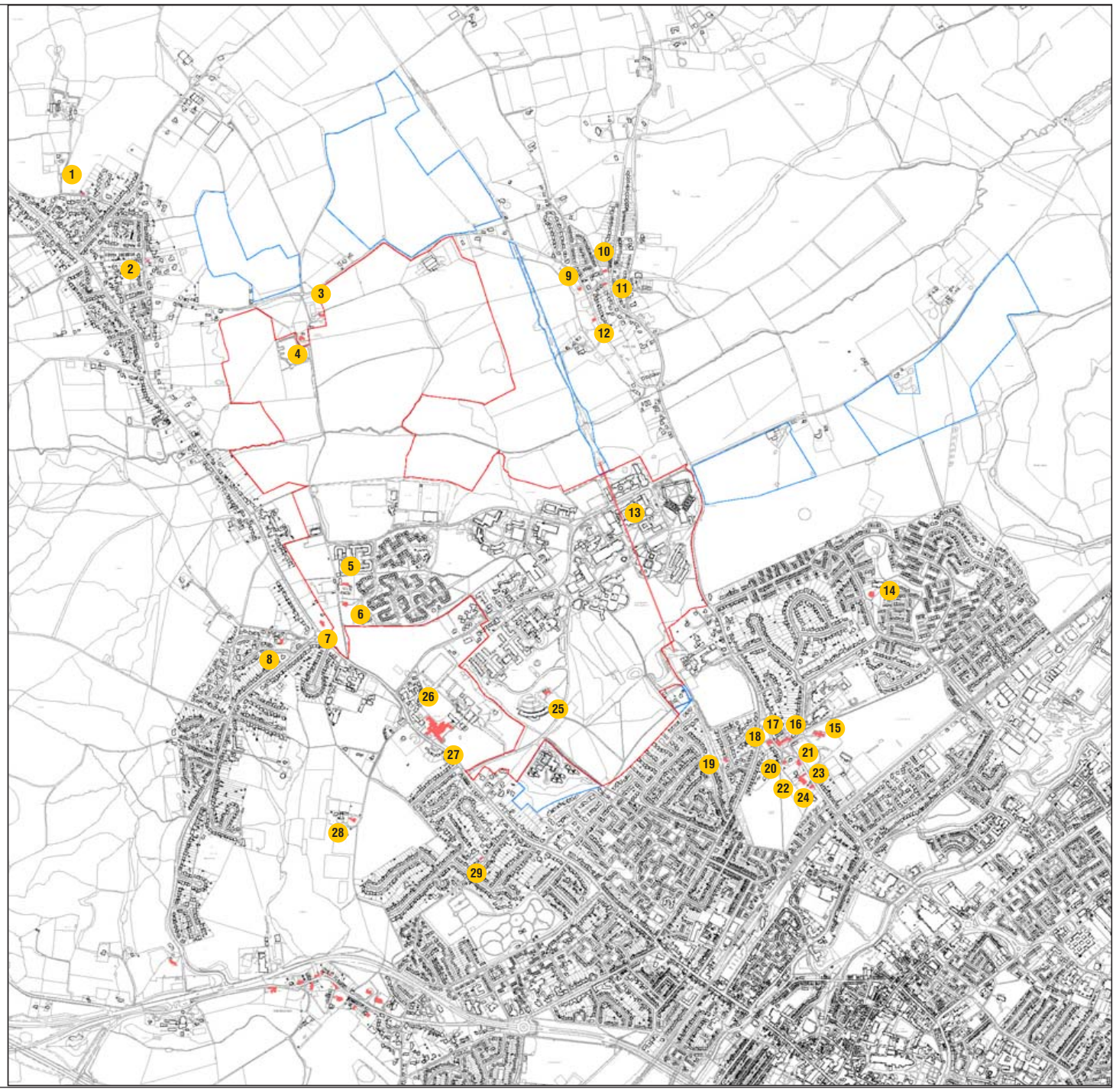
Source : Data interpreted from Kent Interactive Planning Constraints Map : https://mapping.canterbury.gov.uk/webapps/Planning_information/
Date of extracting data from the map : 28 July 2017

## Listed Buildings

1 Badgers Farmhouse, Grade II
2 School Lane, No.20 (Yew Lodge), Grade II
3 Tyler Hill Road, Church Cottage, Grade II
4 Tyler Hill Road, Church of St Cosmus and St Damian, Grade II*
5 Whitstable Road, Barn adjoining Hothe Court on the North, Grade II
6 Whitstable Road, Hothe Court k/a Hothe Court Farmhouse, Grade II
7 Whitstable Road, Blean House, Grade II
8 Rough Common Road, Moat House, Grade II
9 Tyler Hill Road, Tyler Hill Cottage, Grade II
10 Link Road, No.9 Wayfair, Grade II
11 Link Road, Nos. 12, 14 and 16 (Taylors Cottages), Grade II
12 No.13 Calais Hill, Tyler Hill House
13 Tyler Hill Tunnel, including North and South portals, under Tyler Hill (former Canterbury and Whitstable Railway), Grade II*
14 Tenterden Drive, Hales Place Jesuit Chapel, Grade II
15 Hales Drive Hackington, Church of St Stephen, Grade I
16 St Stephens Green Hackington, Nos.1-6 consec (Manwoods Hospital), Grade II*
17 St Stephens Green Hackington, Ye Olde Beverlie Inn, Grade II*
18 St Stephens Green Hackington, Old St Stephens School, Grade II
19 Leycroft Close No.1, Grade II
20 St Stephens Green Hackington, Nos.1-3 consec (Glebe Cottage), Grade II
21 St Stephens Road Hackington, The Glebe House (formerly listed as the Rectory), Grade II
22 St Stephens Road Hackington, No.103 (Harflete), Grade II
23 St Stephens Road Hackington, No.101 (The Manor House), Grade II
24 St Stephens Road Hackington, No.99 (The Old Vicarage Hackington), Grade II
25 St Thomas's Hill, Beverley Farmhouse, Grade II
26 St Thomas's Hill, Former Headmasters House, St Edmunds School, Grade II
27 St Thomas's Hill, St Edmunds School (previously Clergy Orphans School, Grade II
28 Neals Place Road, Neals Place, Grade II
29 Cherry Garden Road, No.20 (Farmhouse), Grade II

Source : Data interpreted from Kent Interactive Planning Constraints Map : https://mapping.canterbury.gov.uk/webapps/Planning_information/
Date of extracting data from the map : 28 July 2017

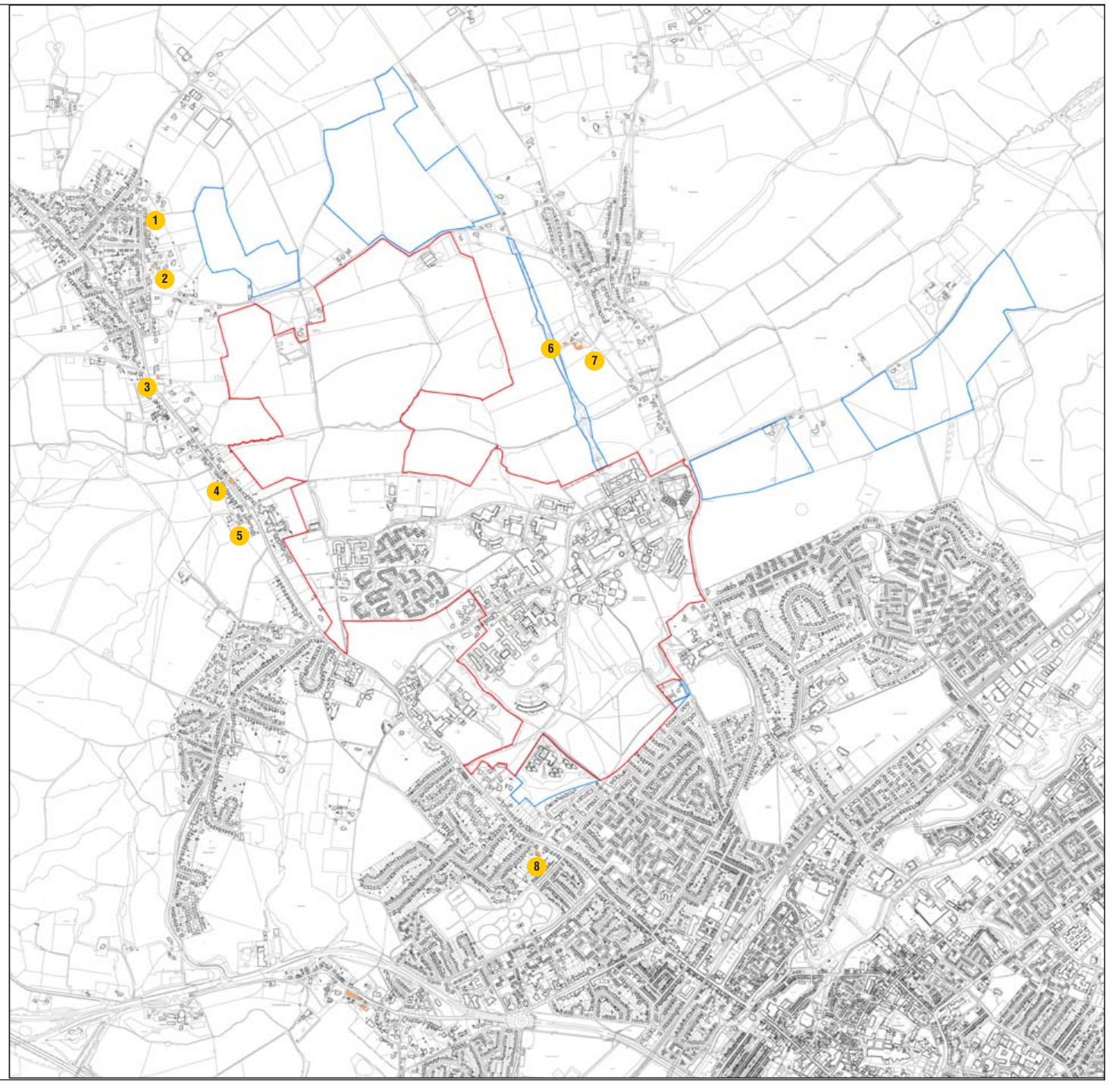
Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent



## Locally Listed Buildings

1 School Lane Blean, No.40,42,44 School Lane (previously known as Browning Cottages Nos.1-4
2 School Lane Blean, Woodlands
3 Blean Hill, Blean, No.36 Hillside Farm
4 The Kiln Hill Blean, No.28+30 The Kiln Hill
5 Whitstable Road Blean, No.51 The Firs
6 Calais Hill St Cosmos and St Damian in the Blean, No.11 Oakwell Farmhouse
7 Calais Hill St Cosmos and St Damian in the Blean, No.9 Oakwell in the Blean
8 Whitstable Road (south west), No.121

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent




Source : Data interpreted from Kent Interactive Planning Constraints Map : https://mapping.canterbury.gov.uk/webapps/Planning_information/
Date of extracting data from the map : 28 July 2017

## Area of Archaeological Importance

Canterbury Area of Archaeological Importance

On 30th March 1984, the Secretary of State for the Environment made a Designation Order for the historic core of Canterbury, to define it as a "protected place", and this still remains in force.

The Canterbury Area of Archaeological Importance encompasses the area within the city walls, together with substantial sections of the extra mural suburbs.

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent

Source : Data interpreted from Kent Interactive Planning Constraints Map : https://mapping.canterbury.gov.uk/webapps/Planning_information/
Date of extracting data from the map : 28 July 2017

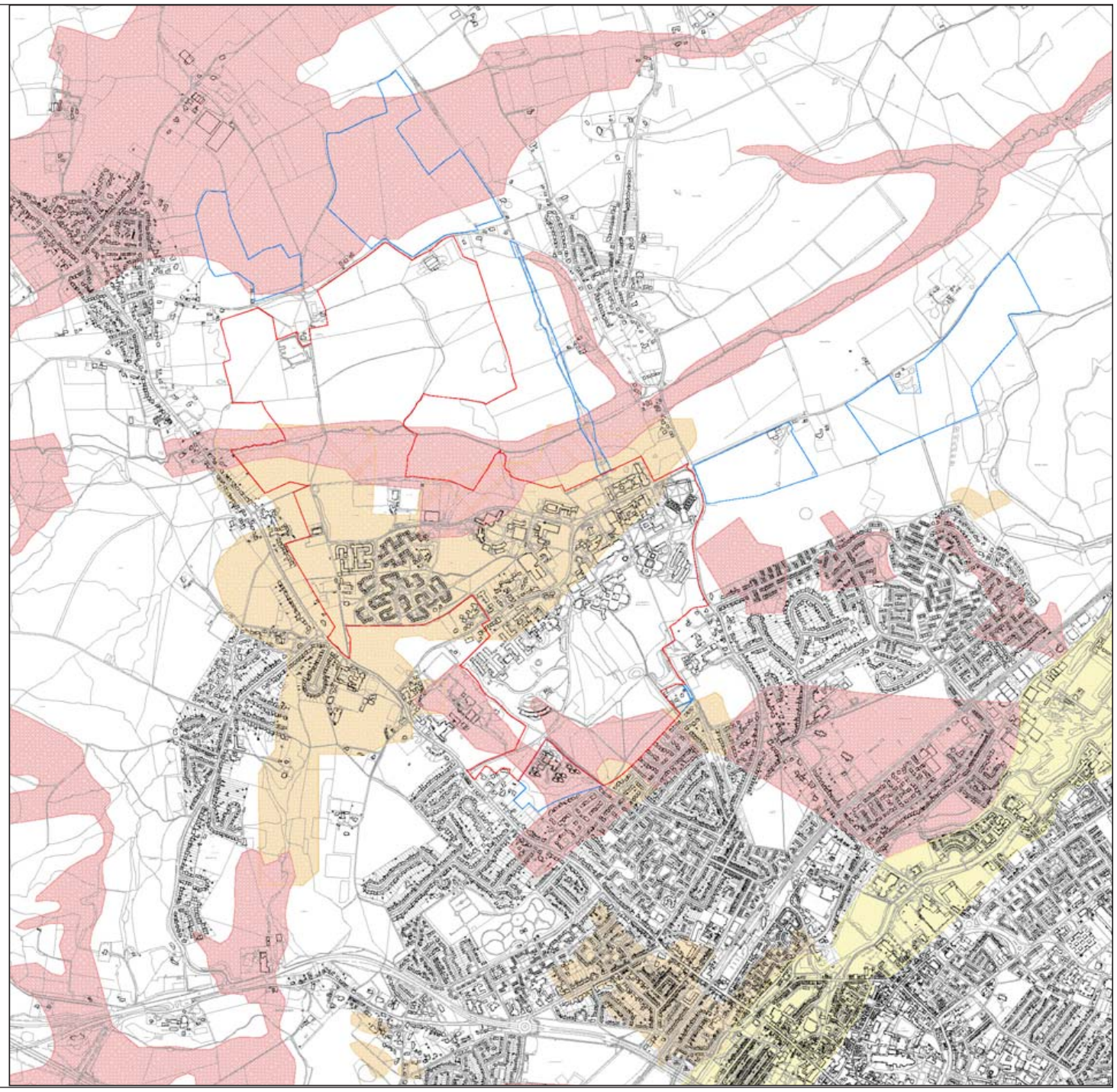
## Mineral Safeguarding Areas

Brickearth - Ashford,Canterbury,Dover,Shepway

River Terrace Deposits

Sub - Alluvial River Terrace Deposits

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent



Source : Data extracted from 'Kent Minerals and Waste Local Plan 2013-30 Adopted July 2016'

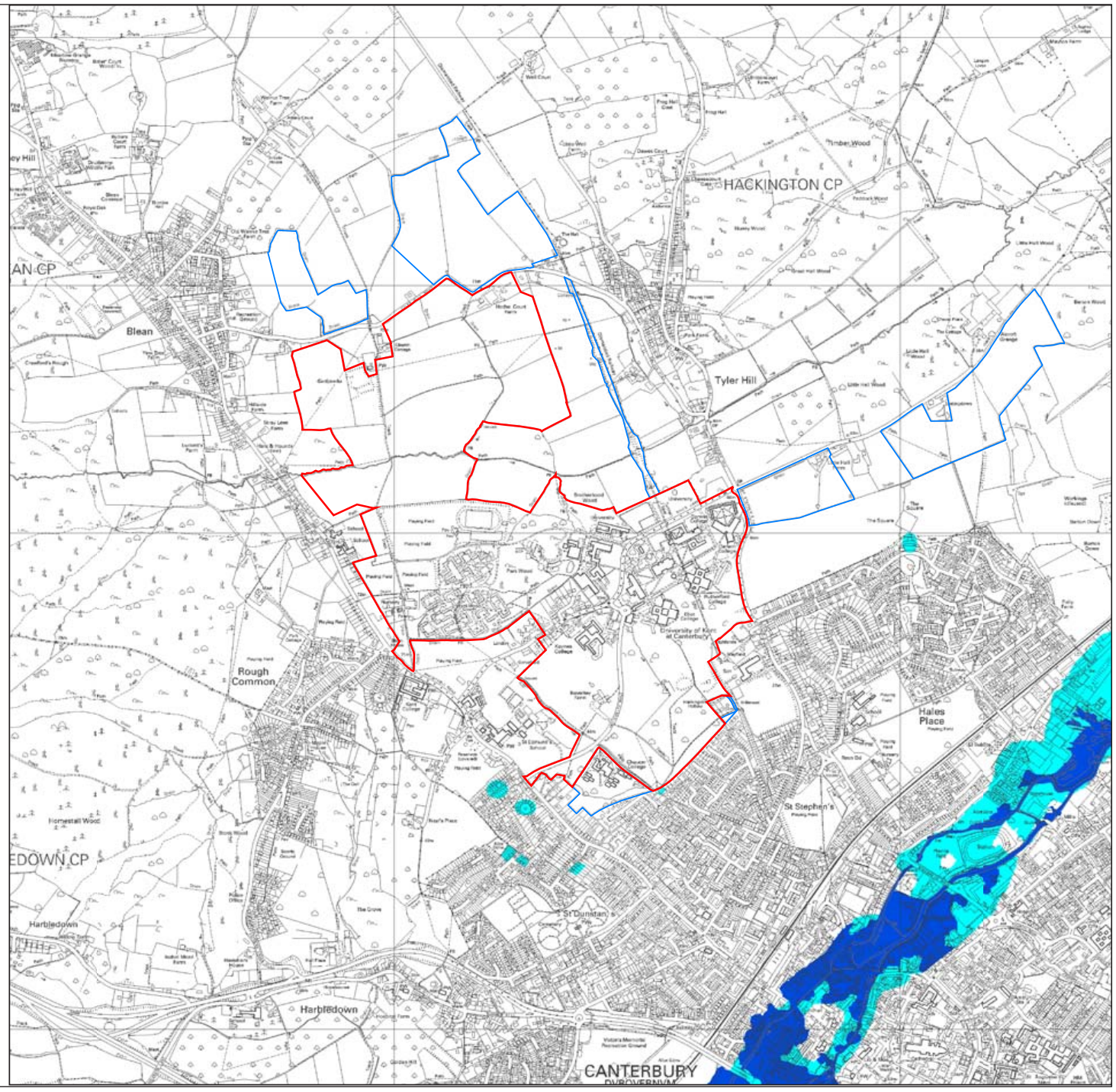
# ENVIRONMENTAL DESIGNATIONS

## Flood Zones

Flood Zone 2

Flood Zone 3

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent




Source : Evironment Agency
https://flood-warning-information.service.gov.uk/long-term-flood-risk/map
Date of extracting data from the map : 2 August 2017

Red and blue lines overlaid for clarity

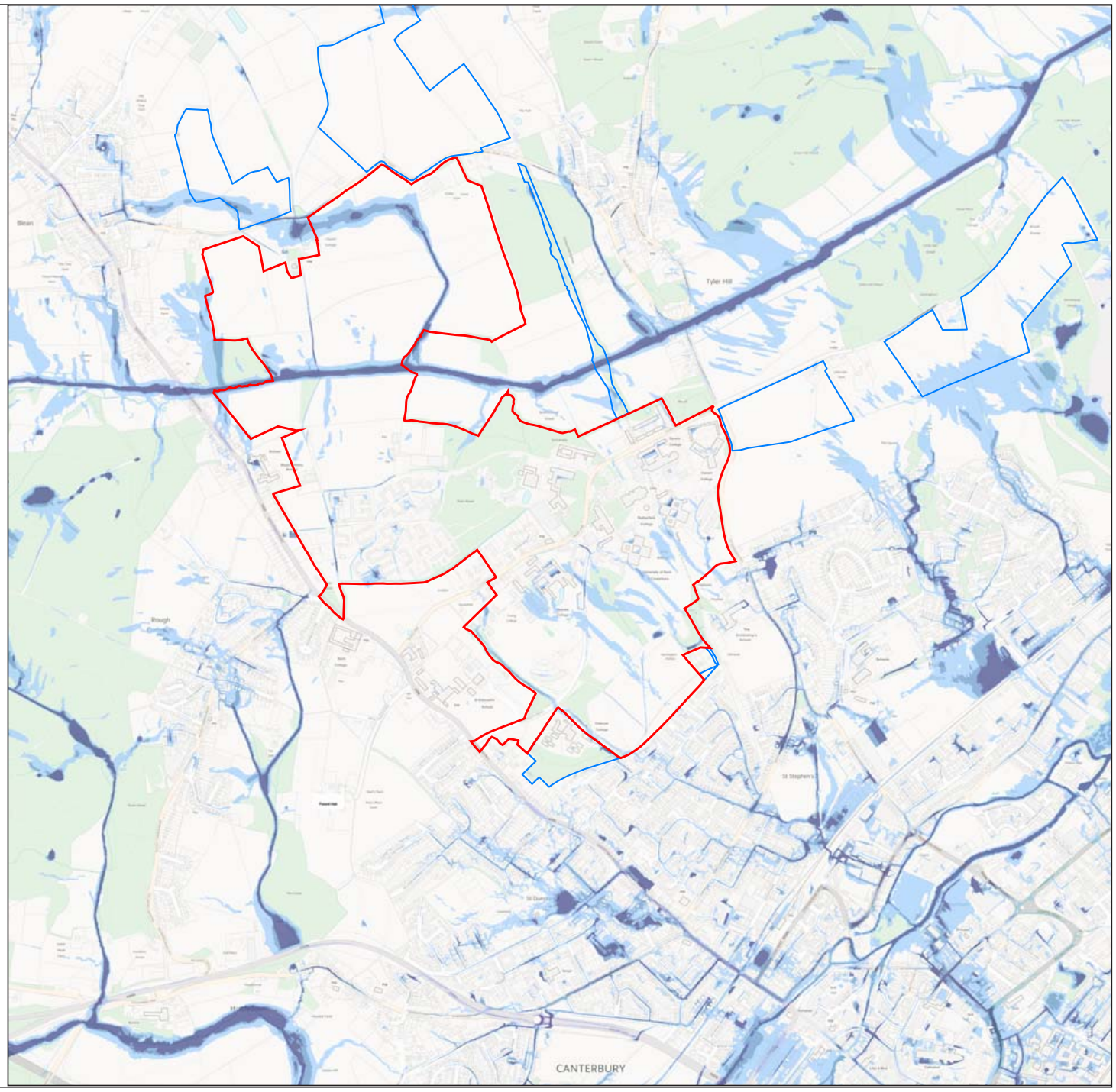
## Flood Risk from Surface Water

- High Risk
- Medium Risk
- Low Risk
- Very Low Risk

- Campus Boundary as defined in the Local Plan
- Additional land owned by University of Kent

Source : Evironment Agency
https://flood-warning-information.service.gov.uk/long-term-flood-risk/map
Date of extracting data from the map : 2 August 2017

Red and blue lines overlaid for clarity



## Ground Water Vulnerability

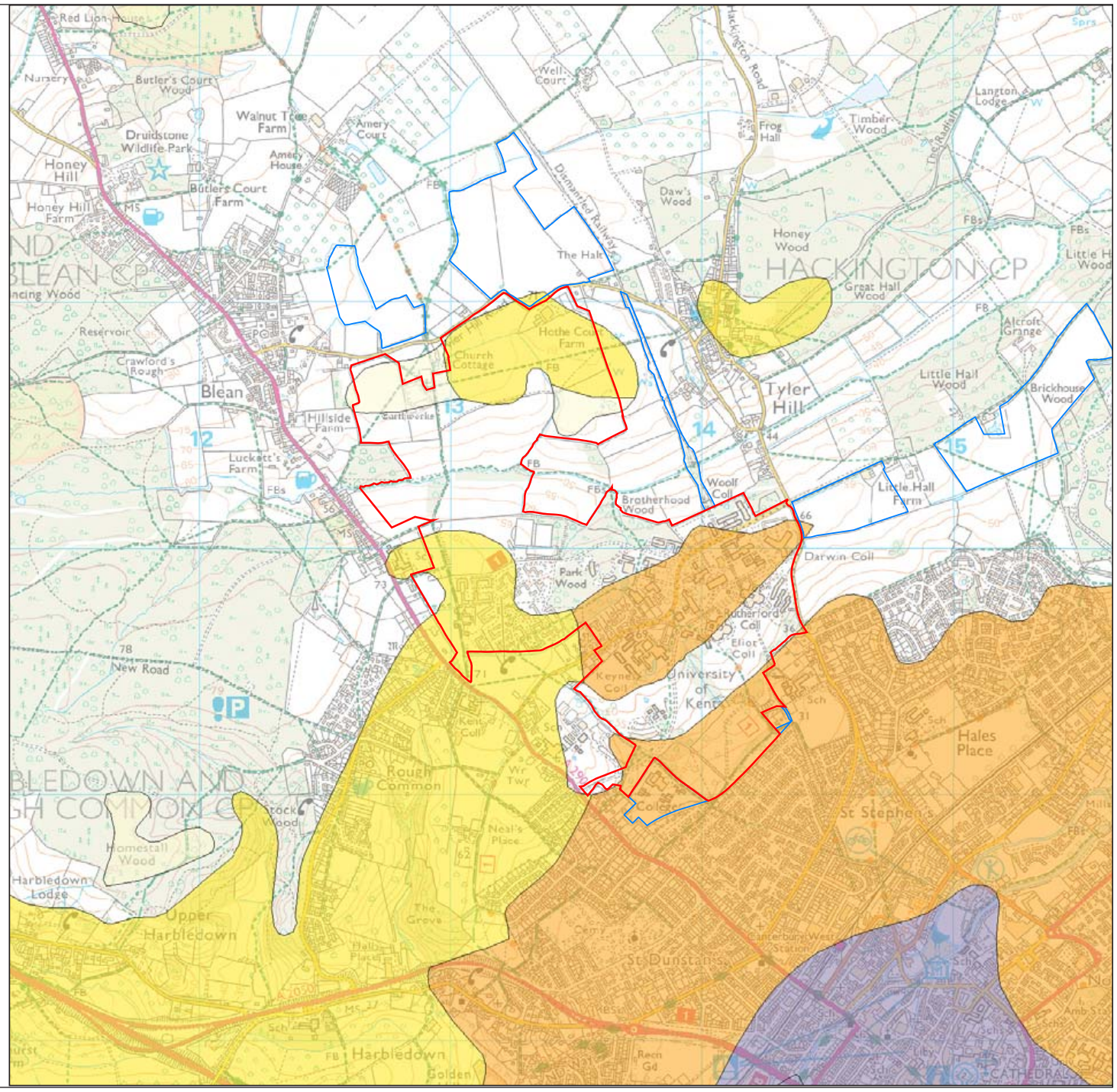
The Environment Agency maps show the vulnerability of groundwater at a location based on the hydrological, geological, hydrogeological and soil properties (i.e. the likelihood of a pollutant discharged at ground level reaching groundwater for superficial and bedrock aquifers. This is expressed as high, Intermediate or low vulnerability. Parts of the Campus are identified as 'High' and 'Intermediate.'

- Major Aquifer High
- Major Aquifer Intermediate
- Major Aquifer Low
- Minor Aquifer High
- Minor Aquifer Intermediate
- Minor Aquifer Low

- Campus Boundary as defined in the Local Plan
- Additional land owned by University of Kent

Source : Evironment Agency
http://maps.environment-agency.gov.uk/
Date of extracting data from the map : 2 August 2017

Red and blue lines overlaid for clarity



# STATUTORY LANDSCAPE + BIODIVERSITY DESIGNATIONS

## Tree Preservation Orders

Around Campus

1 TPO No 4, 1988 / W1
Mixed hardwoods consisting mainly of Hornbeam, hawthorn, Holly, Oak and Ash

2 TPO No 24, 1990 / W3
Mixed deciduous woodland consisting mainly of Oak , Ash and Sycamore with Sweet Chestnut and Hazel

3 TPO No 24, 1990 / A1
An area of trees, consisting mainly of Willows, also Alder, Ash and Oak

4 TPO No 24, 1990 / W2
Mixed deciduous woodland consisting mainly of Oak with Beech, Hornbeam and Sweet Chestnut

5 TPO No 24, 1990 / W1
Mixed deciduous woodland consisting mainly of Oak, Ash and maple

6 TPO No 4, 1970 / A2
Several Oak, Ash, poplar and Willow trees

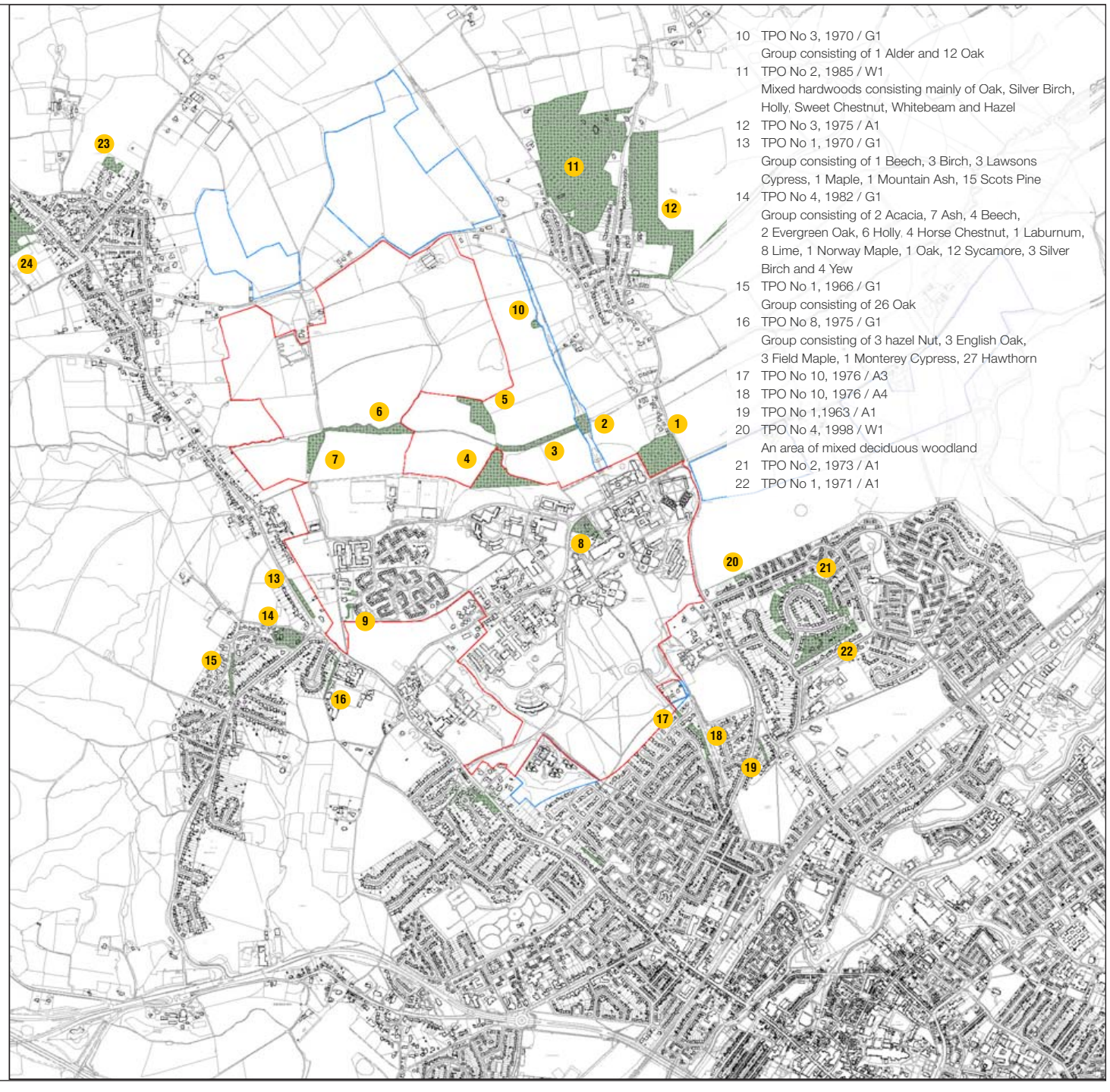
7 TPO No 4, 1970 / A1
Several Ash, Birch, Geam, Hornbeam, Horse Chestnut, Oak and poplar trees

8 TPO No 1, 1965 / G1-9
Boiler House Site

9 TPO No 2, 1970 / T1 : Maple
TPO No 2, 1970 / T2 : Holm Oak
TPO No 2, 1970 / T3 : Scots Pine
TPO No 2, 1970 / T6 : Scots Pine
TPO No 2, 1970 / G1 : 3 Holm Oak, 3 maple and 1 Sycamore
TPO No 2, 1970 / G2 : 2 False Acacia, 2 Holly, 1 Horse Chestnut, 1 Lawsons Cypress, 2 Lime, 2 Maple

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent

Source : Data interpreted from Kent Interactive Planning Constraints Map : https://mapping.canterbury.gov.uk/webapps/Planning_information/
Date of extracting data from the map : 28 July 2017




10 TPO No 3, 1970 / G1
Group consisting of 1 Alder and 12 Oak

11 TPO No 2, 1985 / W1
Mixed hardwoods consisting mainly of Oak, Silver Birch, Holly, Sweet Chestnut, Whitebeam and Hazel

12 TPO No 3, 1975 / A1

13 TPO No 1, 1970 / G1
Group consisting of 1 Beech, 3 Birch, 3 Lawsons Cypress, 1 Maple, 1 Mountain Ash, 15 Scots Pine

14 TPO No 4, 1982 / G1
Group consisting of 2 Acacia, 7 Ash, 4 Beech, 2 Evergreen Oak, 6 Holly, 4 Horse Chestnut, 1 Laburnum, 8 Lime, 1 Norway Maple, 1 Oak, 12 Sycamore, 3 Silver Birch and 4 Yew

15 TPO No 1, 1966 / G1
Group consisting of 26 Oak

16 TPO No 8, 1975 / G1
Group consisting of 3 hazel Nut, 3 English Oak, 3 Field Maple, 1 Monterey Cypress, 27 Hawthorn

17 TPO No 10, 1976 / A3

18 TPO No 10, 1976 / A4

19 TPO No 1,1963 / A1

20 TPO No 4, 1998 / W1
An area of mixed deciduous woodland

21 TPO No 2, 1973 / A1

22 TPO No 1, 1971 / A1

## Designated Ancient Woodland

Ancient semi-natural woodland (ASNW)

Plantations on Ancient Woodland Sites (PAWS)

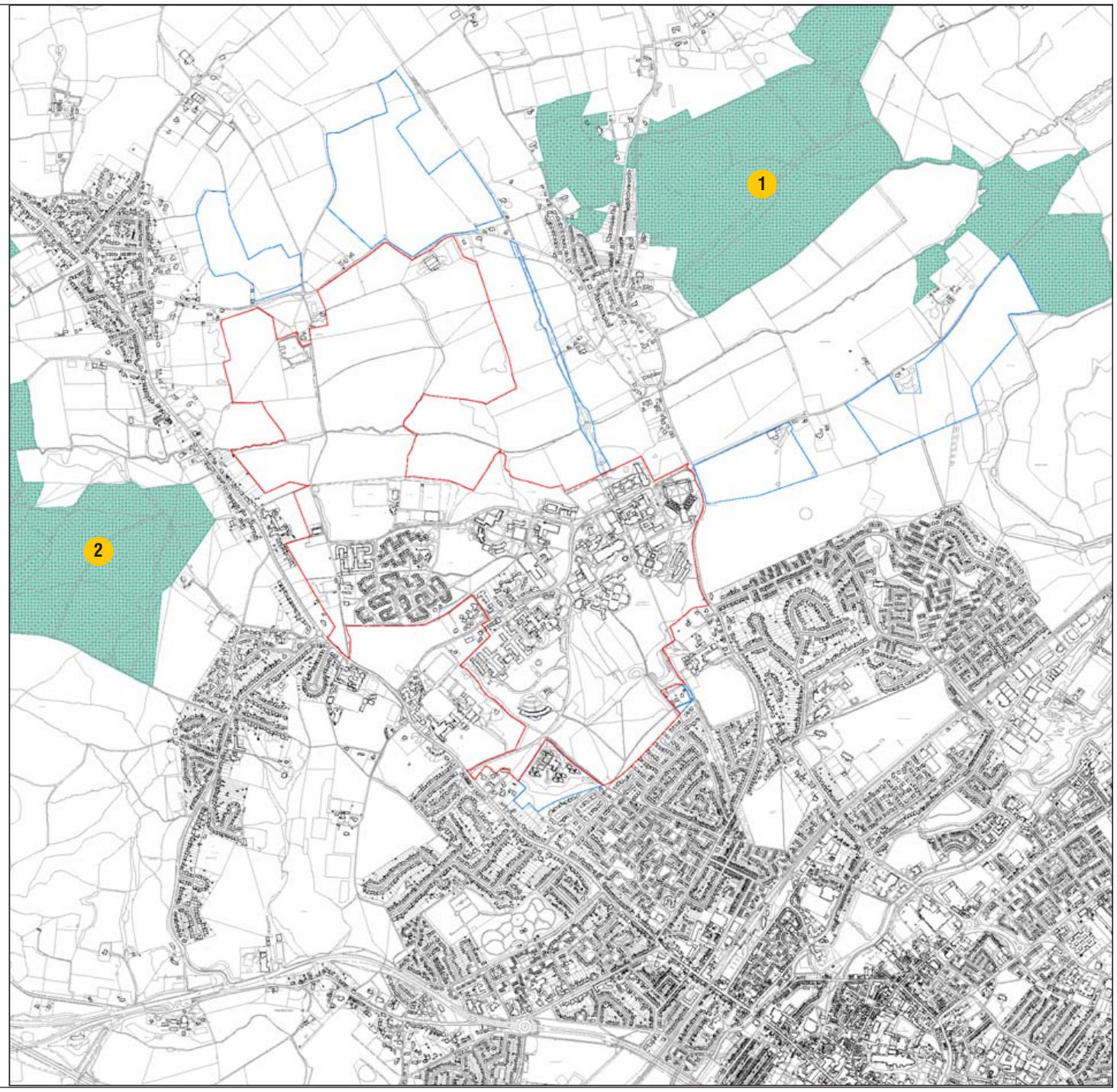
Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent

Source : Data interpreted from 'A revision of the Ancient Woodland Inventory for Canterbury district, Kent' August 2012

## Sites of Special Scientific Interest

1 West Blean & Thornden Woods
2 Church Woods, Blean

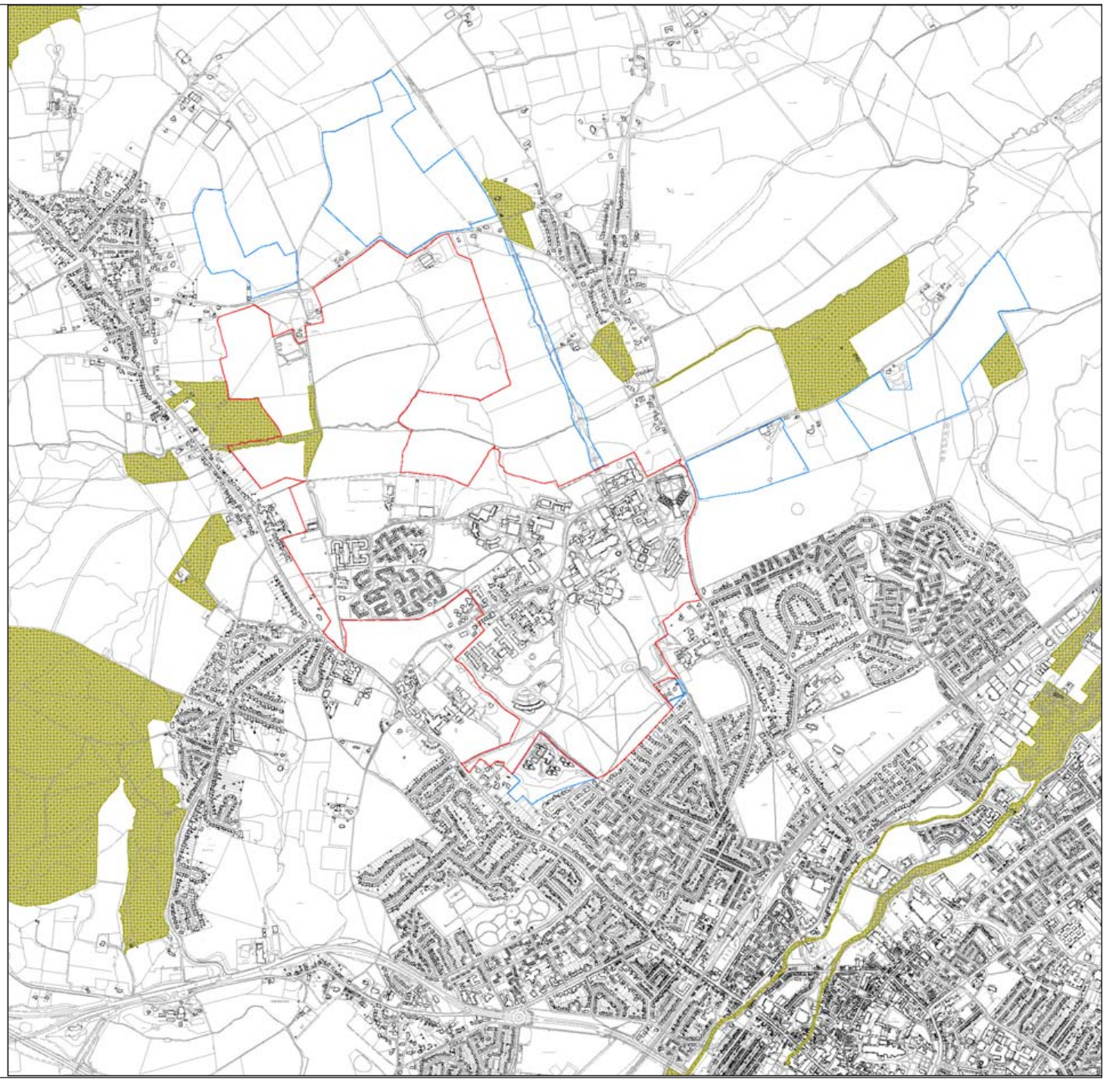
Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent




Source : Data interpreted from Canterbury CC Local Plan https://mapping.canterbury.gov.uk/webapps/Local_Plan_Proposals_2017/
Date of extracting data from the map : 8 August 2017

## Local Wildlife Sites

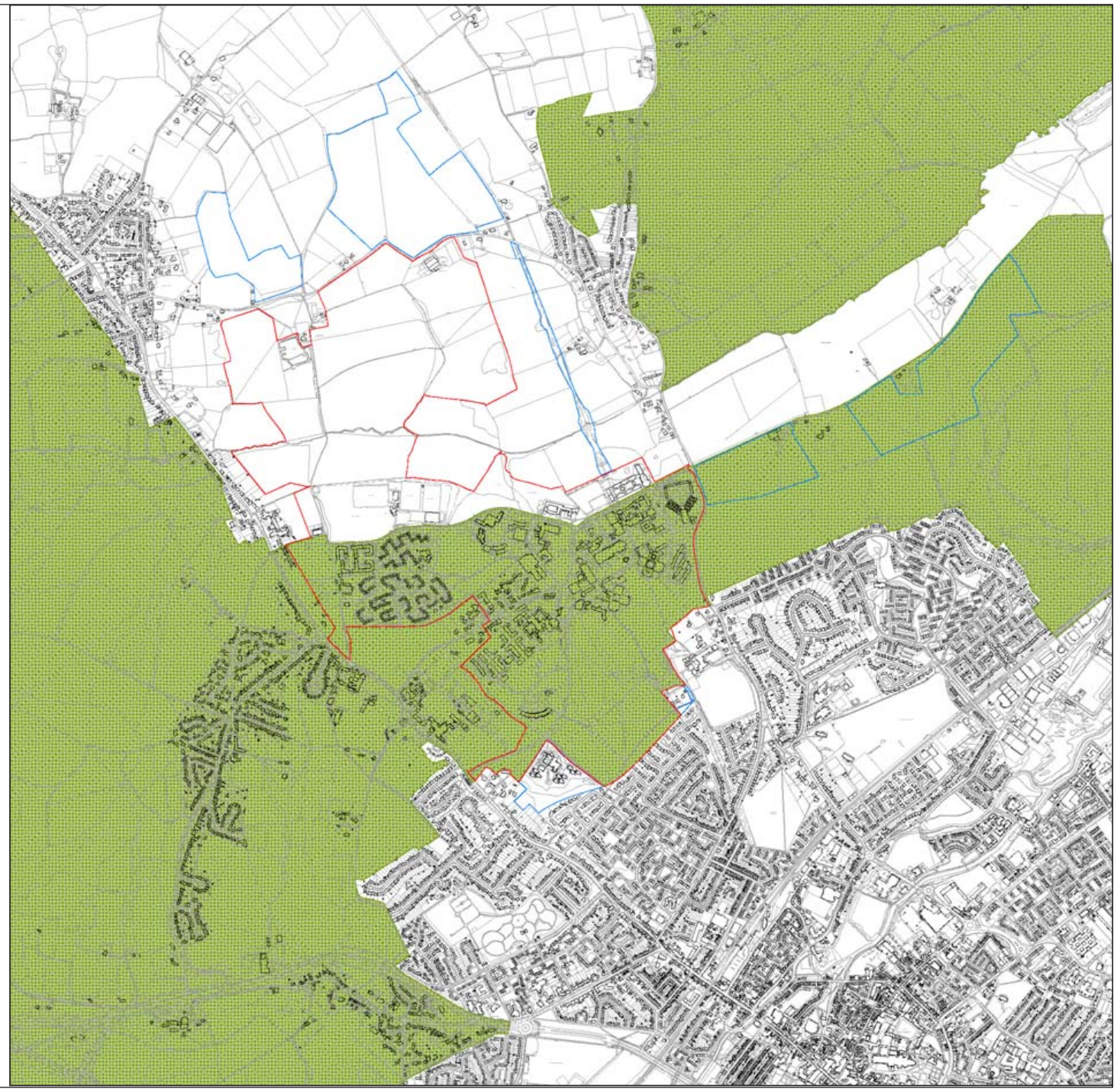
Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent



Source : Data interpreted from Canterbury CC Local Plan https://mapping.canterbury.gov.uk/webapps/Local_Plan_Proposals_2017/
Date of extracting data from the map : 8 August 2017

## Designated Areas of High Landscape Value

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent



Source : Data interpreted from Canterbury CC Local Plan https://mapping.canterbury.gov.uk/webapps/Local_Plan_Proposals_2017/
Date of extracting data from the map : 8 August 2017

## Designated Green Gaps

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent

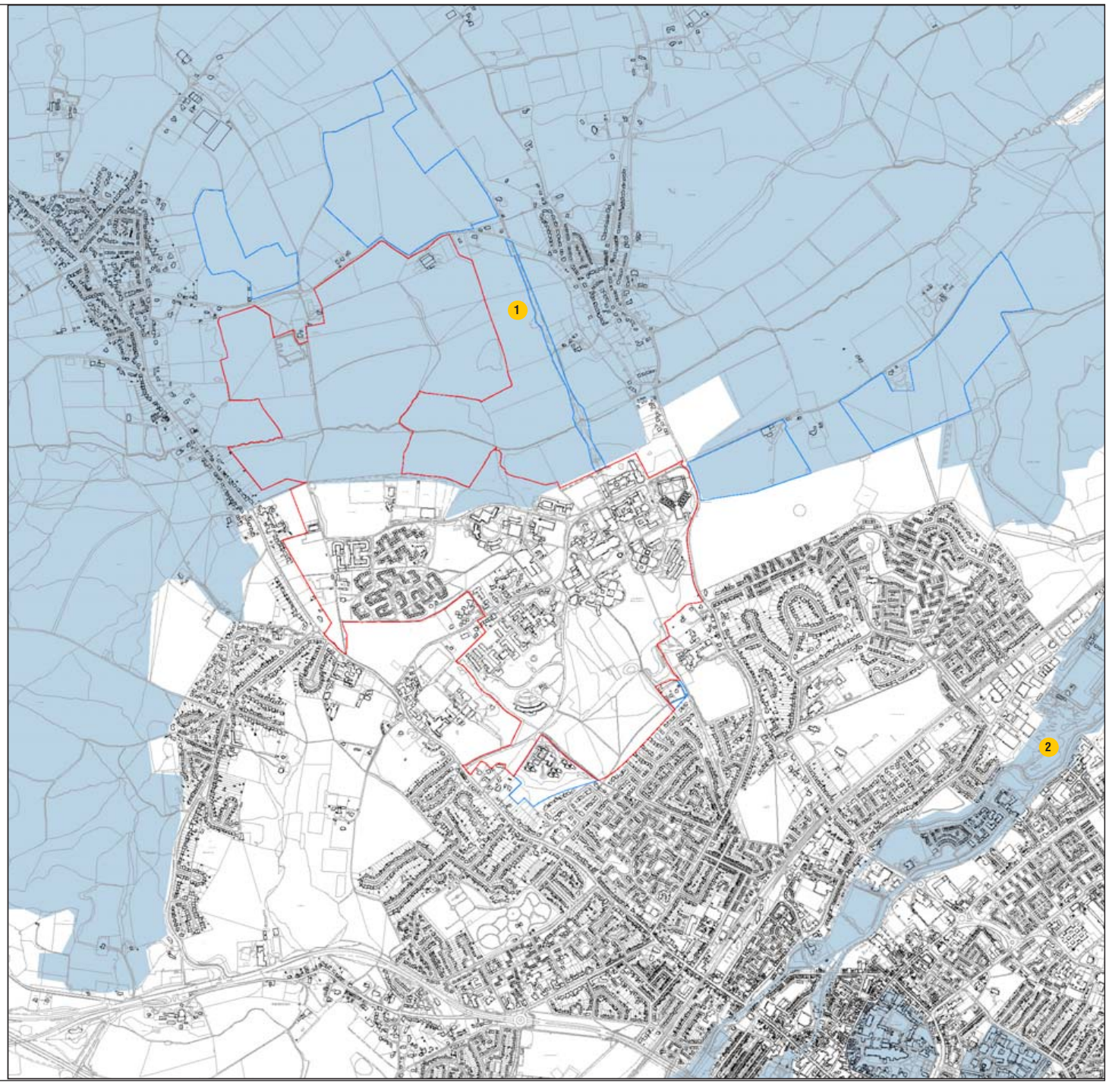
Source : Data interpreted from Canterbury CC Local Plan
https://mapping.canterbury.gov.uk/webapps/Local_Plan_Proposals_2017/
Date of extracting data from the map : 8 August 2017

# NON-STATUTORY LANDSCAPE + BIODIVERSITY DESIGNATIONS

## Biodiversity Opportunity Areas

1 The Blean
2 Lower Stour Wetlands

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent

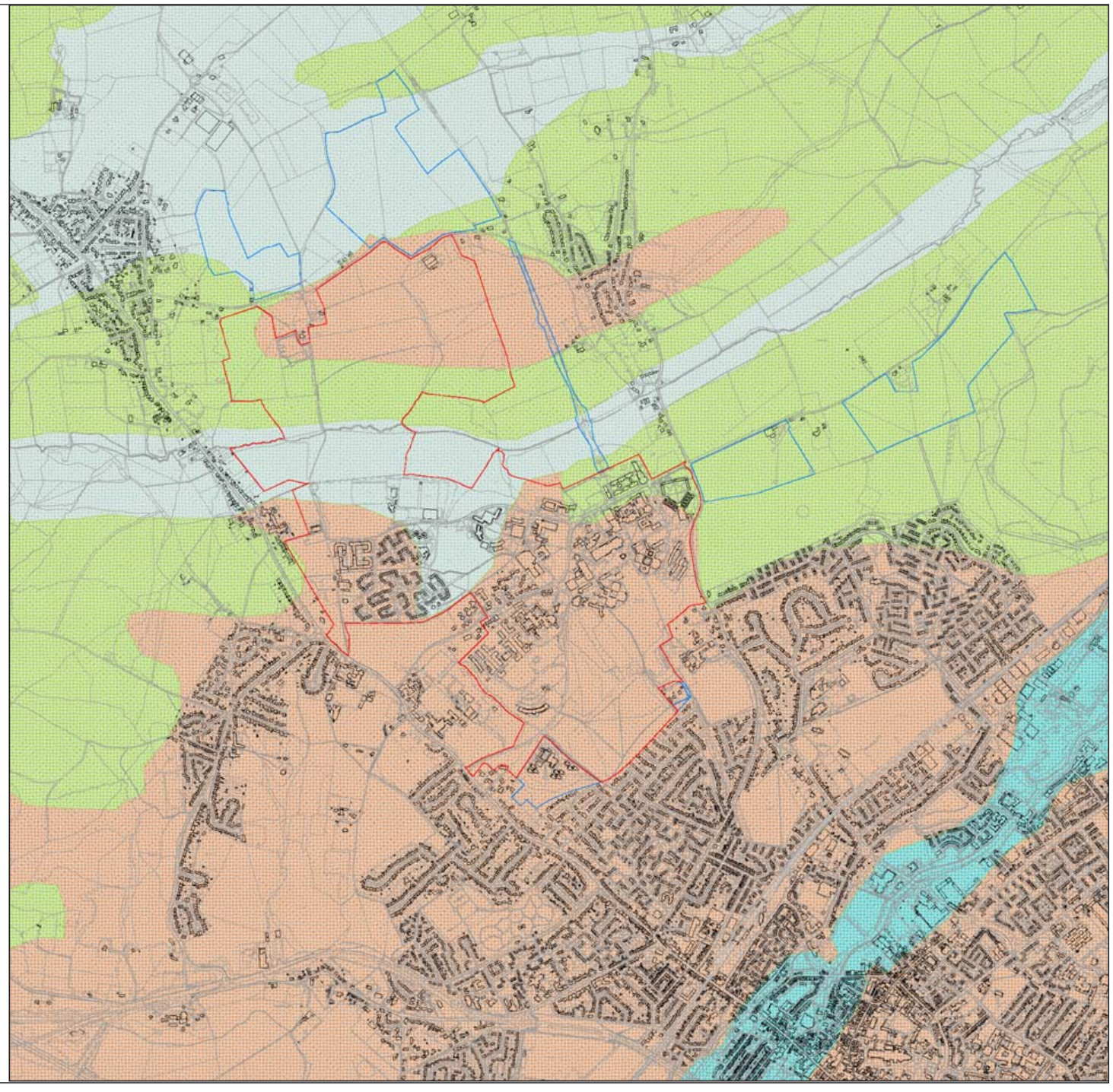



Source : Data interpreted from Kent Nature Partnership
http://www.kentbap.org.uk/kent-boas
Data of extracting data from map : 28 July 2017

## Soilscape

- Freely draining slightly acid loamy soils
- Loamy soils with naturally high groundwater
- Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils
- Loamy and clayey floodplain soils with naturally high groundwater

- Campus Boundary as defined in the Local Plan
- Additional land owned by University of Kent



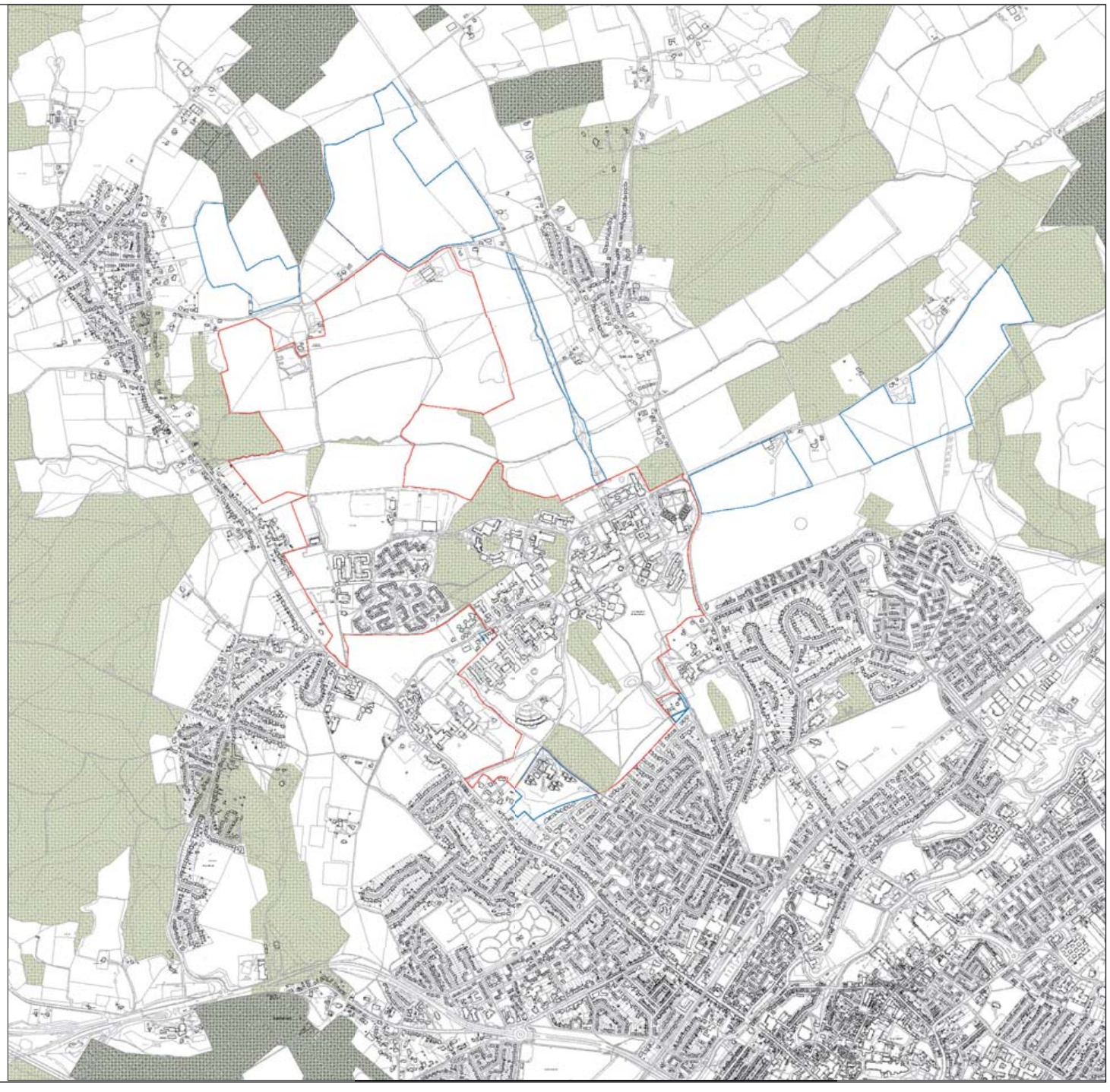
Source : Data interpreted from 'MAGIC' map
http://www.natureonthemap.naturalengland.org.uk/MagicMap.aspx
Date of extracting data from the map : 28 July 2017

## Orchards and Woodland

Woodland

Orchard

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent

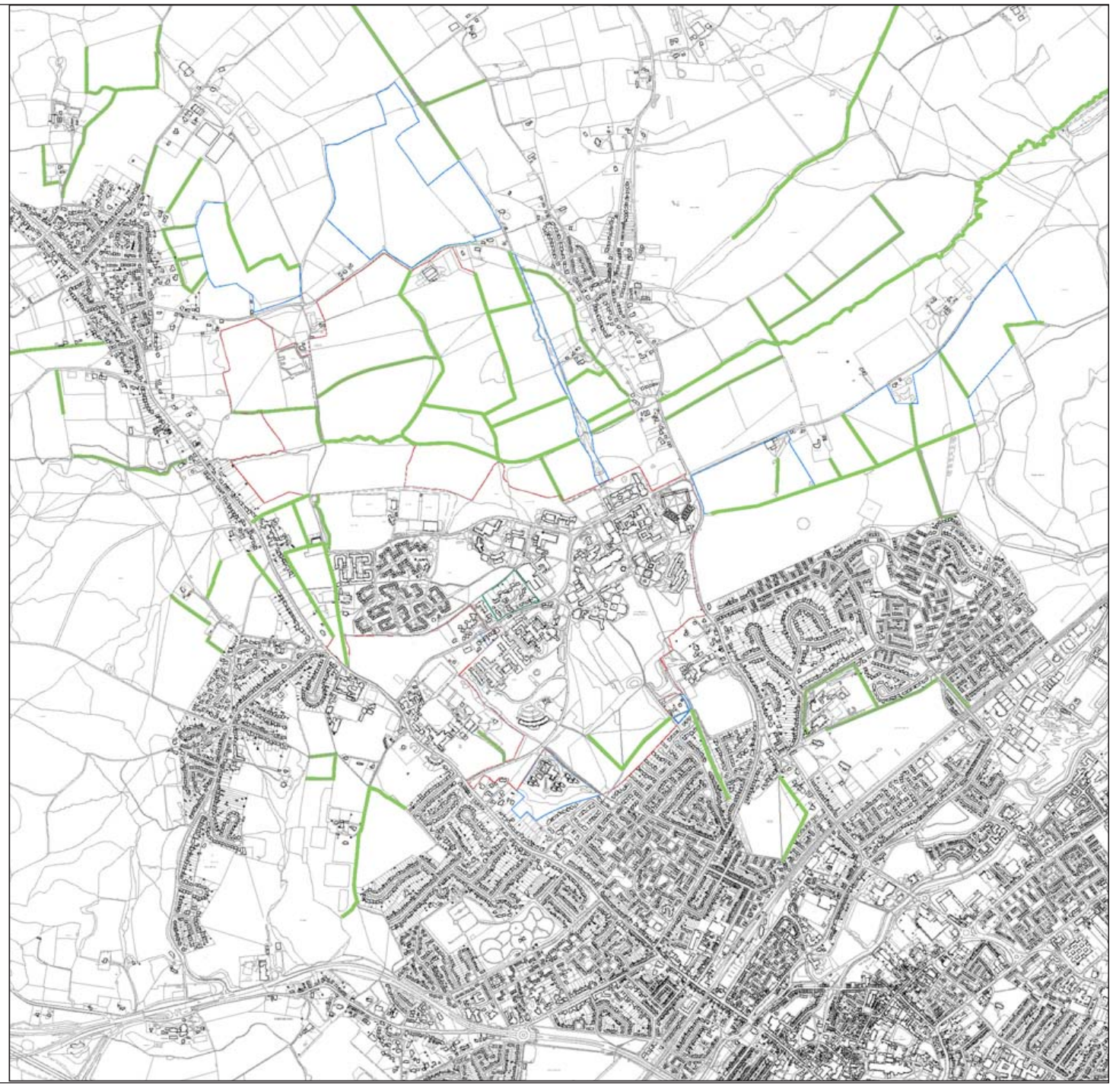


Source : Data interpreted from Studio Englebeck Map

## Hedgerows

Hedgerows

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent



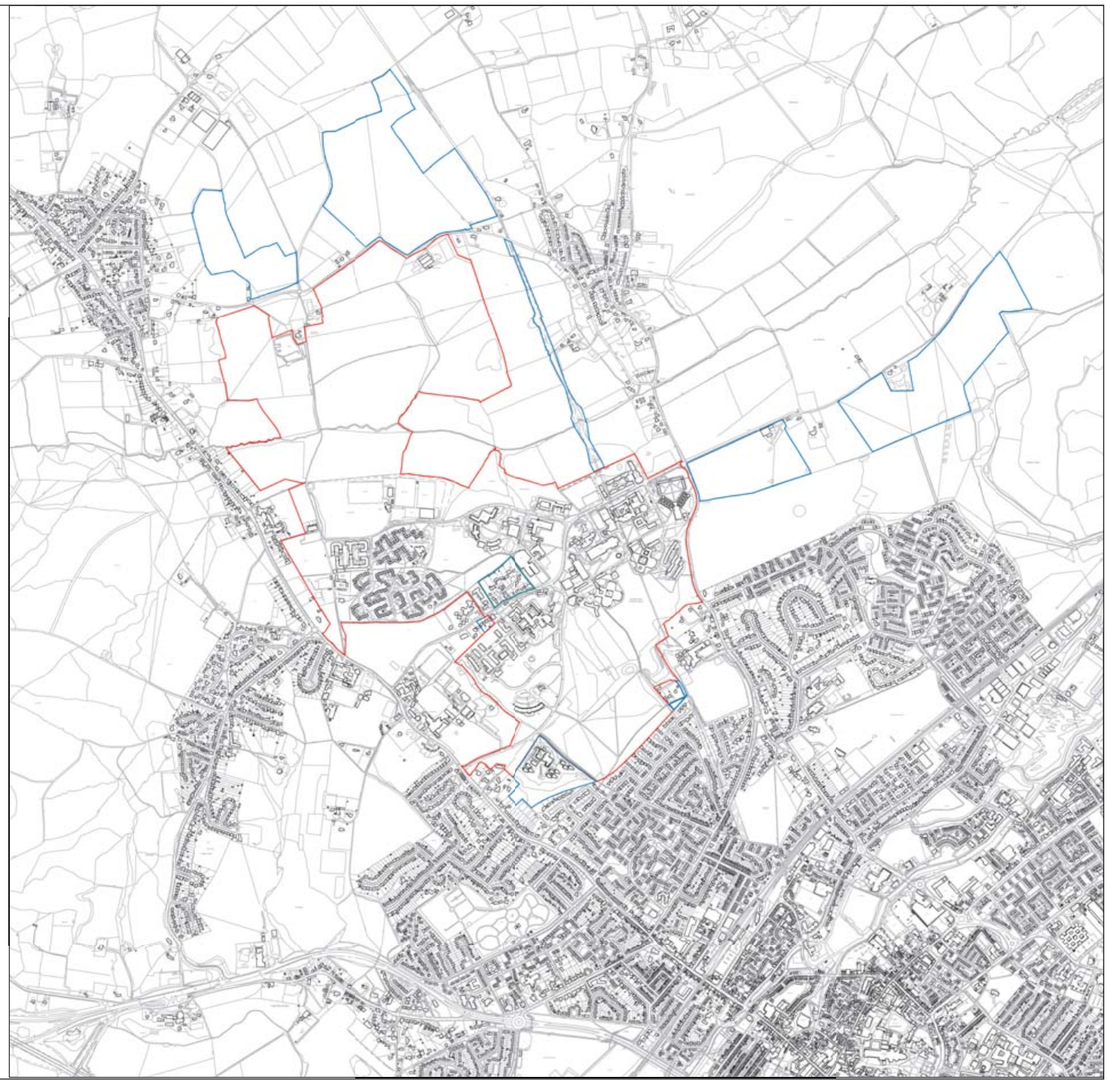
Source : Data interpreted from Studio Englebeck Map

# BACKGROUND CONTEXT

## OS Map : 2017

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent

Not University of Kent owned land but inside Planning Boundary



Source : OS Map data, 2017

## Ownership Boundaries

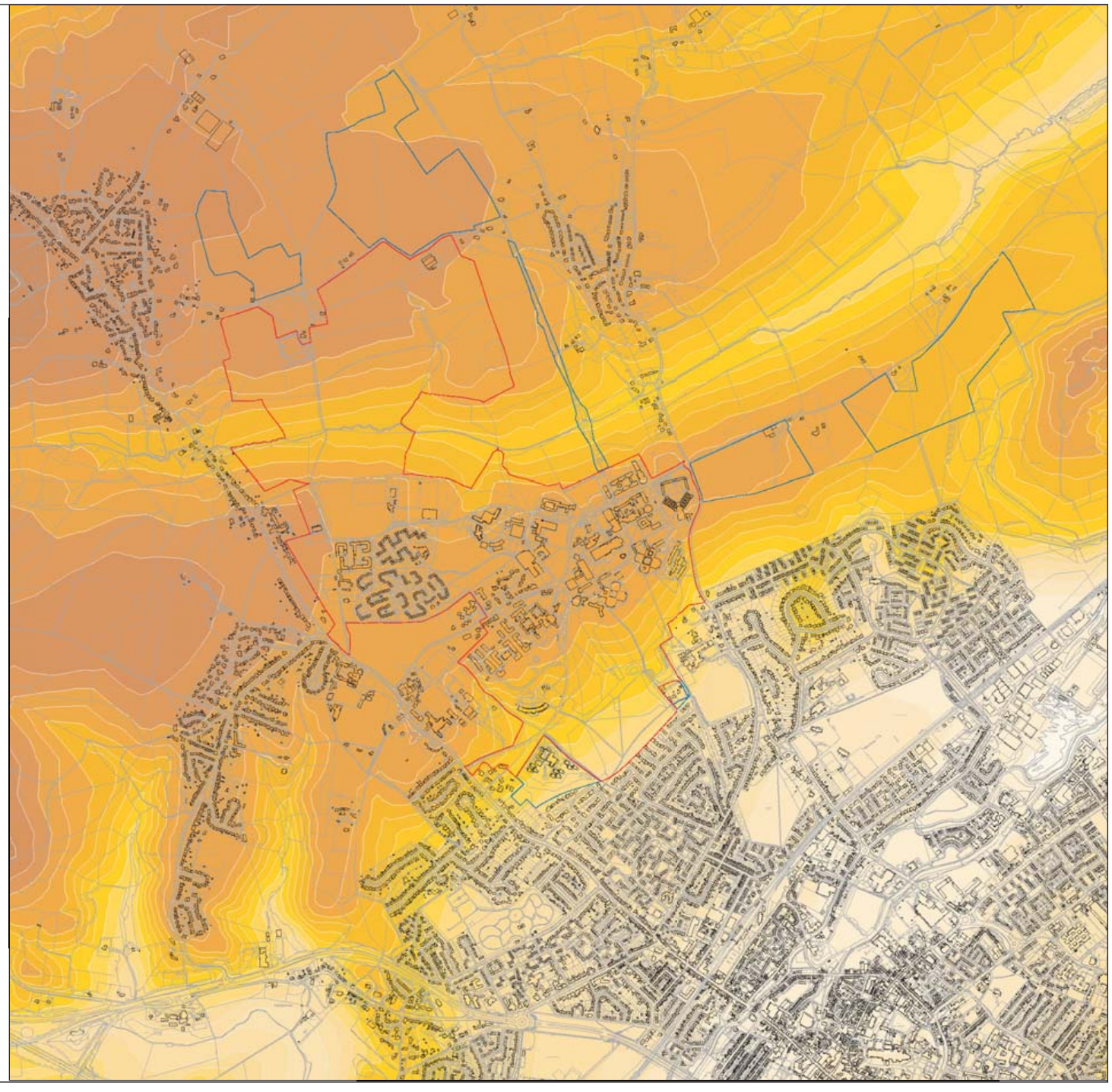
Ownership Boundary

Source : OS Map data, 2017

## Topography

- 0-5m
- 5-10m
- 10-15m
- 15-20m
- 20-25m
- 25-30m
- 30-35m
- 35-40m
- 40-45m
- 45-50m
- 50-55m
- 55-60m
- 60-65m
- 65-70m
- 70-75m
- 75-80m
- 80-85m
- 85-90m
- Campus Boundary as defined in the Local Plan
- Additional land owned by University of Kent

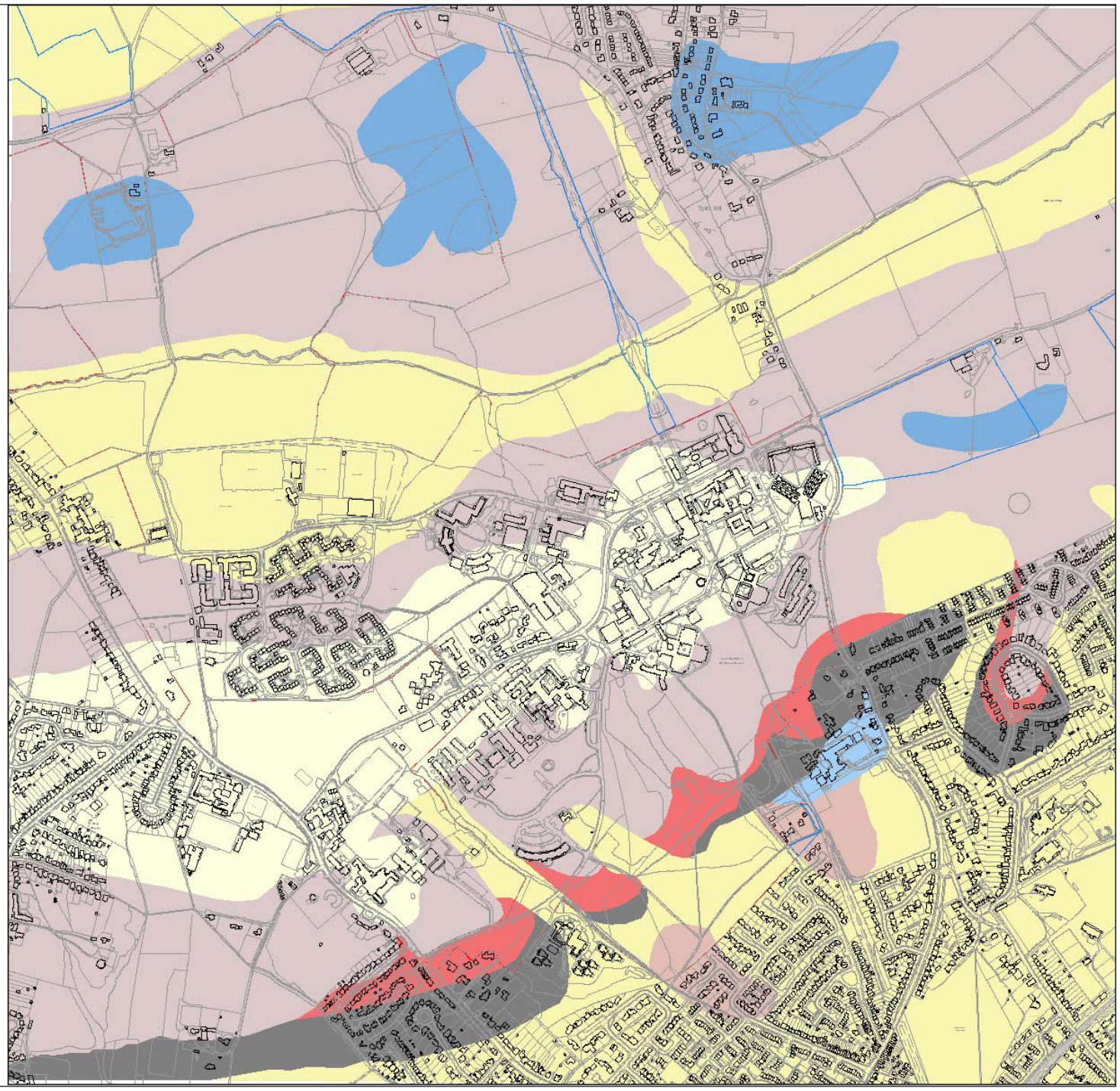
Source : OS Map data, 2017



## Geology

- 4th Terrace
- Brickearth
- Head Gravel
- 2nd River Gravels
- London Clay
- Oldhaven Beds
- Woolwich Beds
- Thanet Beds

- Campus Boundary as defined in the Local Plan
- Additional land owned by University of Kent

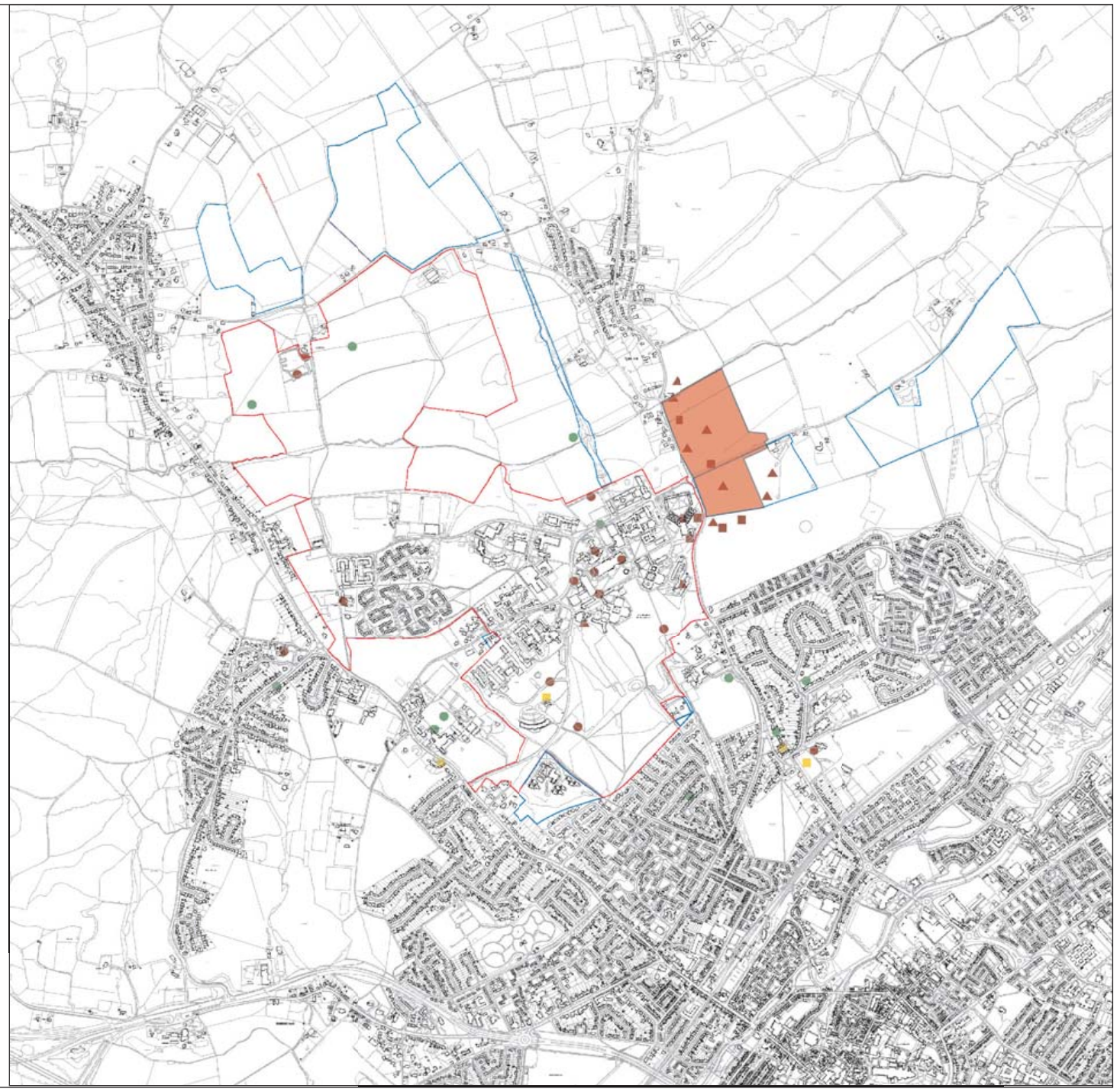


Geology of Kent
Source : An Archaeological and Historical Desk Assessment Survey, July 2003

## Archaeology

- Prehistoric Sites
- Medieval Kilns
- Probable Medieval kiln Sites
- Medieval features/findspots
- Post-Medieval Sites

- Campus Boundary as defined in the Local Plan
- Additional land owned by University of Kent

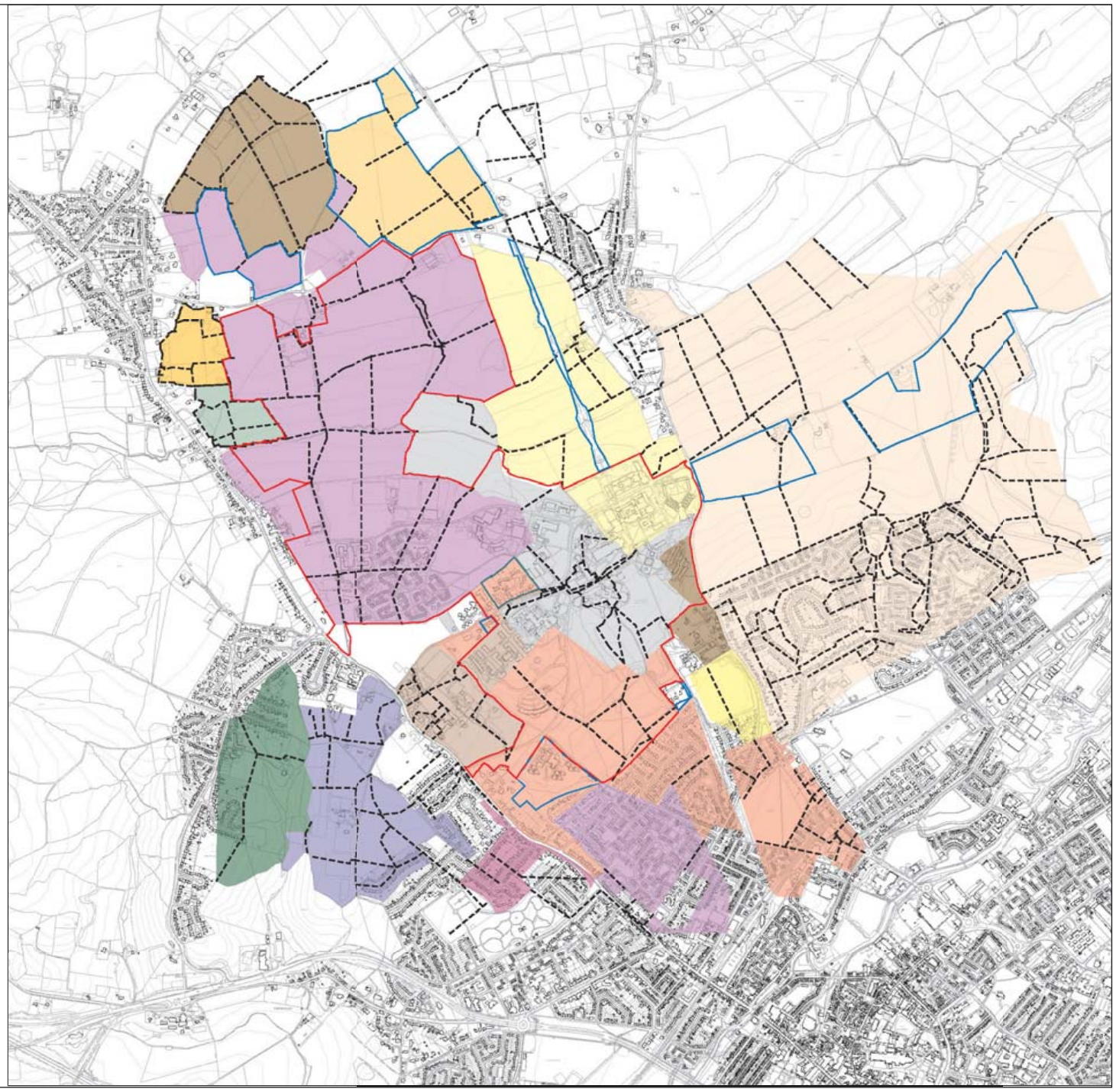


Geology of Kent
Source : An Archaeological and Historical Desk Assessment Survey, July 2003

## Estates and Farms from the 1800s

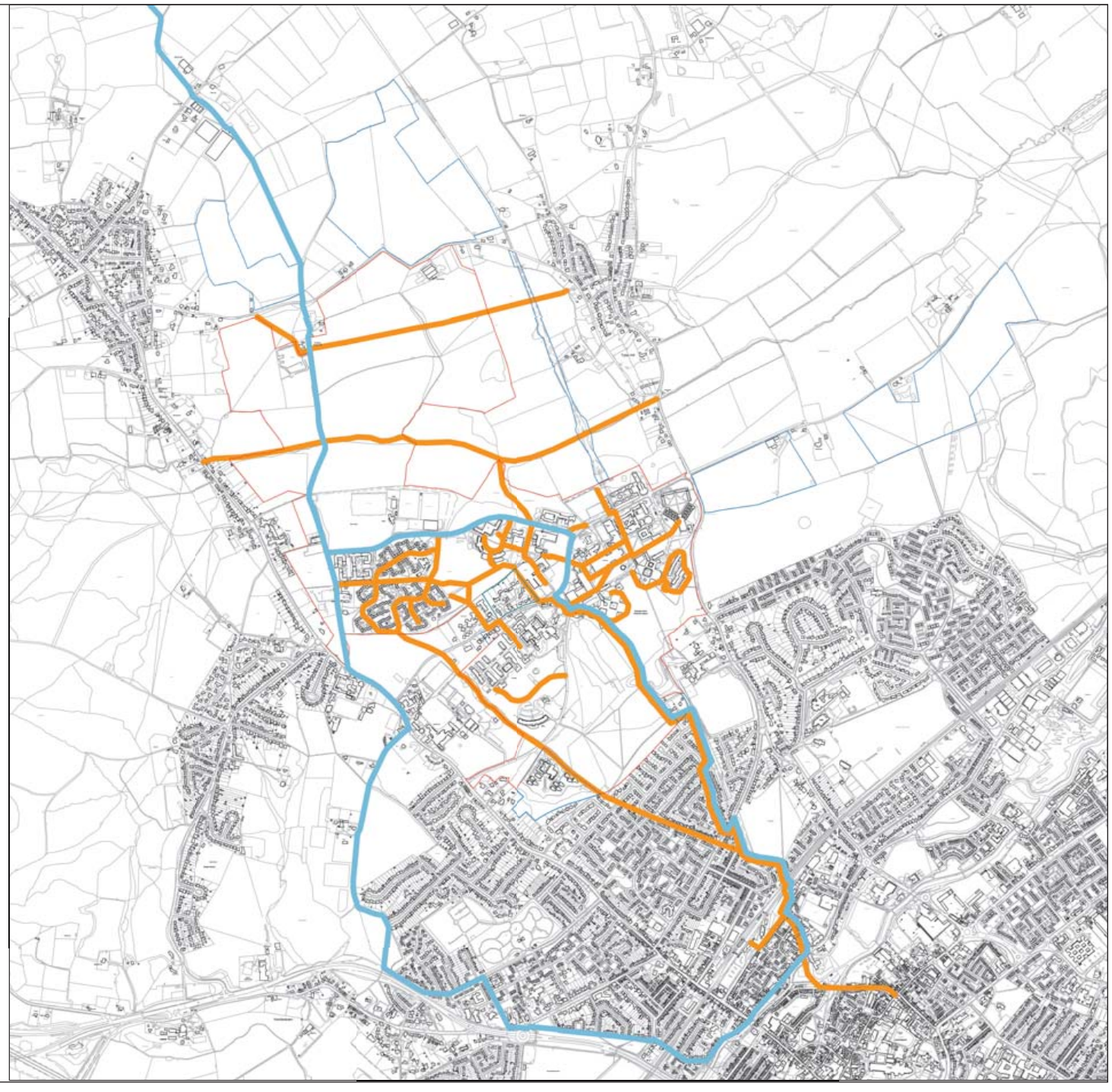
- John Godfrey
- Eastbridge Hospital
- Thomas White
- Thomas Anderson
- Exors of Thomas Fleet
- Hales Place Estate
- Brothers of Saint John's Hospital
- Mary Anne Baker
- Rev James Hamilton
- Thomas Hyde
- Mary Twyman
- Frances Dorvers
- William Newport
- Field Lines
- Campus Boundary as defined in the Local Plan
- Additional land owned by University of Kent

Data interpreted from Harvey Van Sickle Maps



## Foot and Cycle Paths

- Cycle Path
- Foot Path
- Campus Boundary as defined in the Local Plan
- Additional land owned by University of Kent

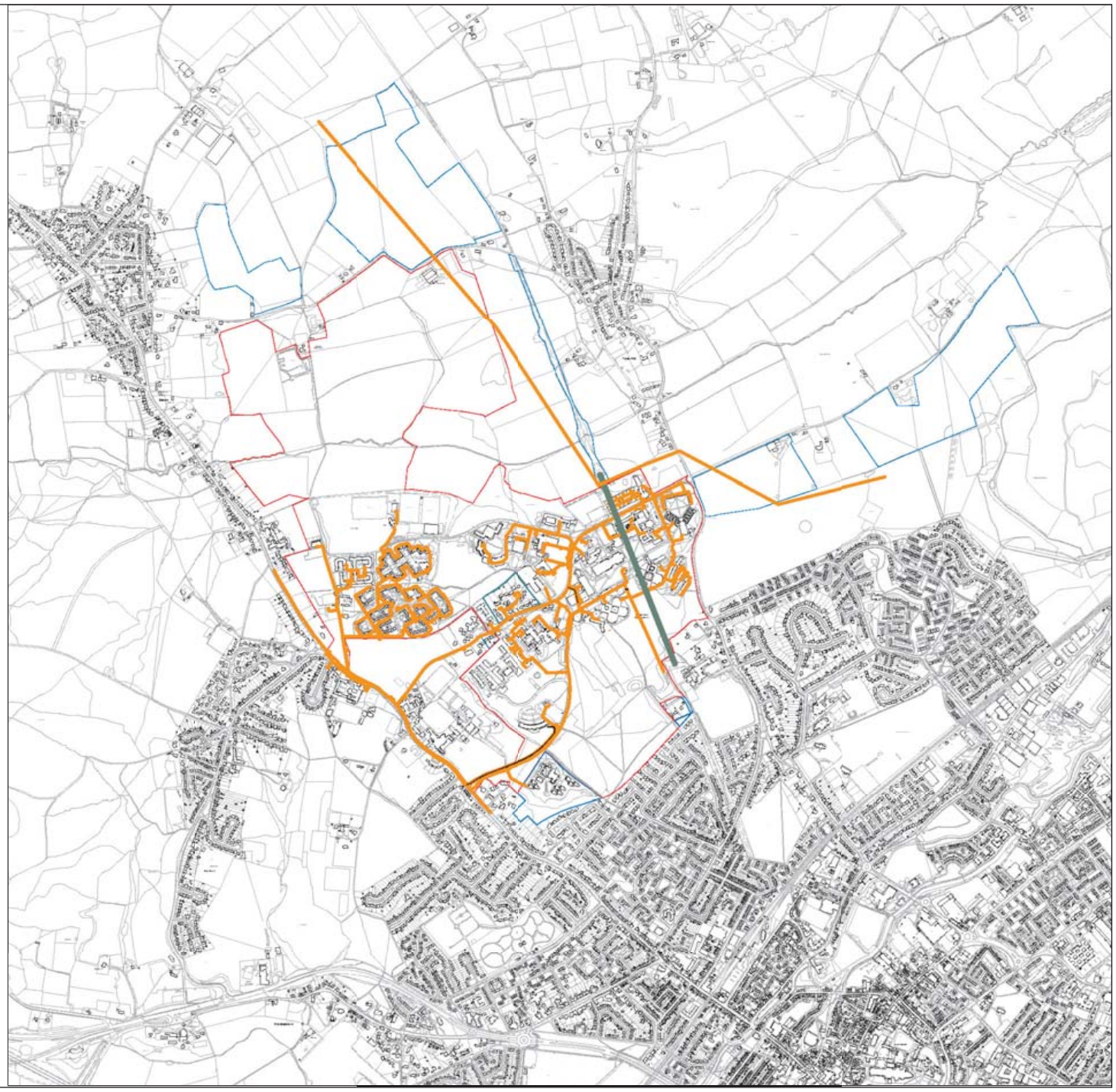


Cycling route source:
https://www.sustrans.org.uk/ncn/map
Footpath route source from Ben Hamilton Bailie Research

## Below Ground : Tunnel

Tunnel
Gas lines

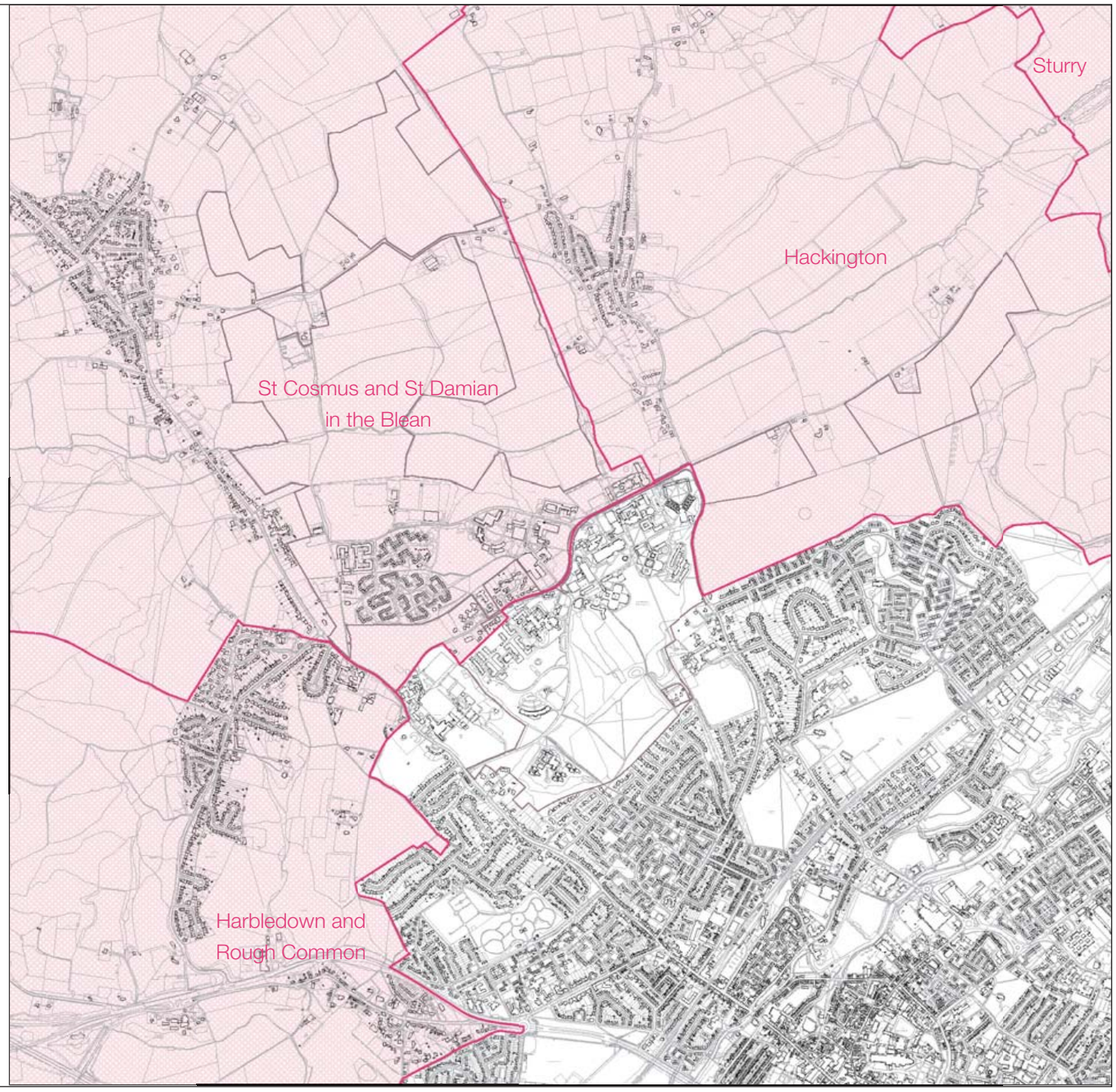
Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent



Underground Information Source:
Laing O'Rourke & Services

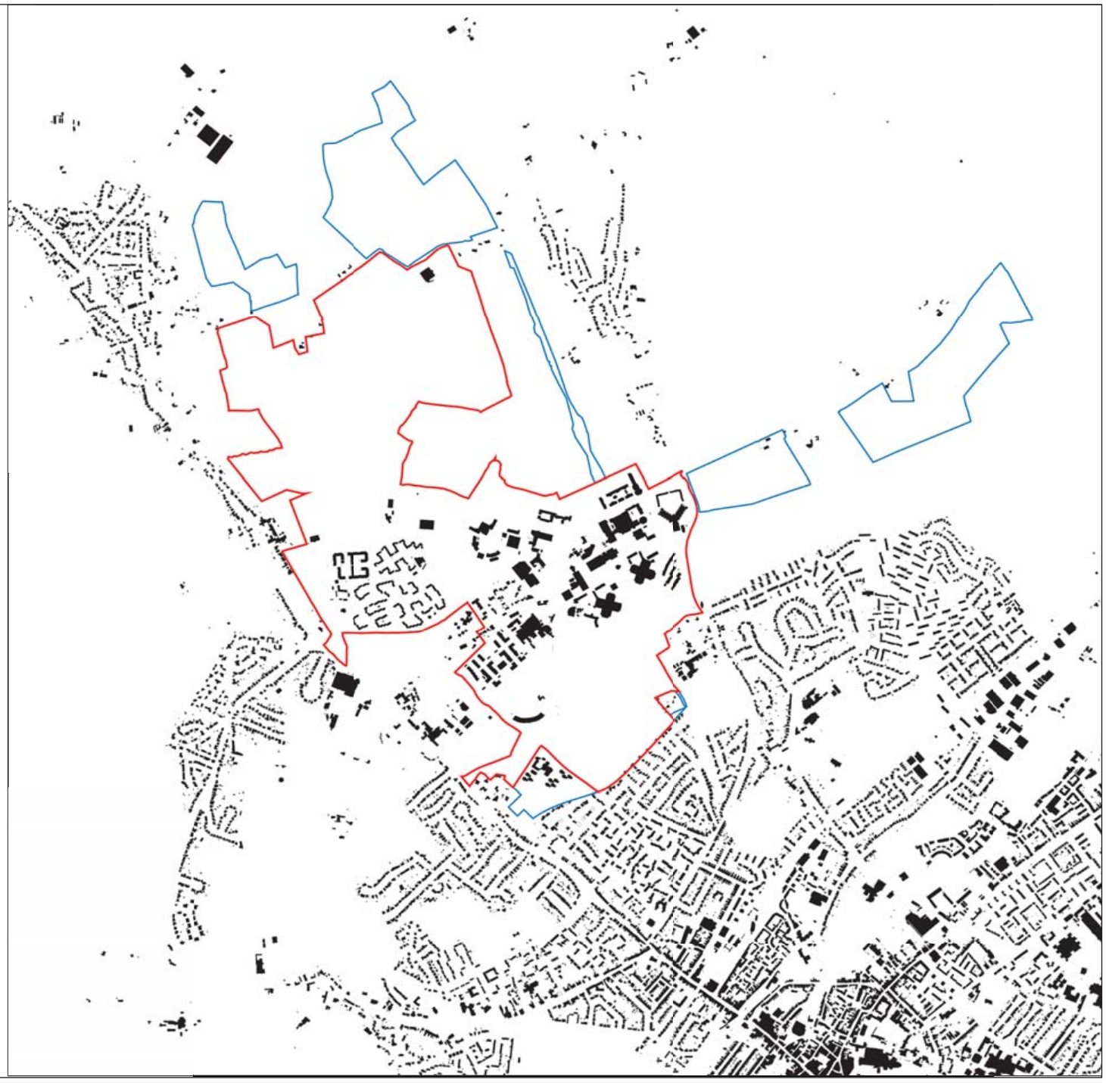
## Parish Boundaries

Land within a Parish
Parish Boundary
Ownership Boundary




Source : https://www.canterbury.gov.uk/media/1511347/CGR-Booklet-FINAL.pdf

Figure Ground : 2017



Source : OS Map data, 2017

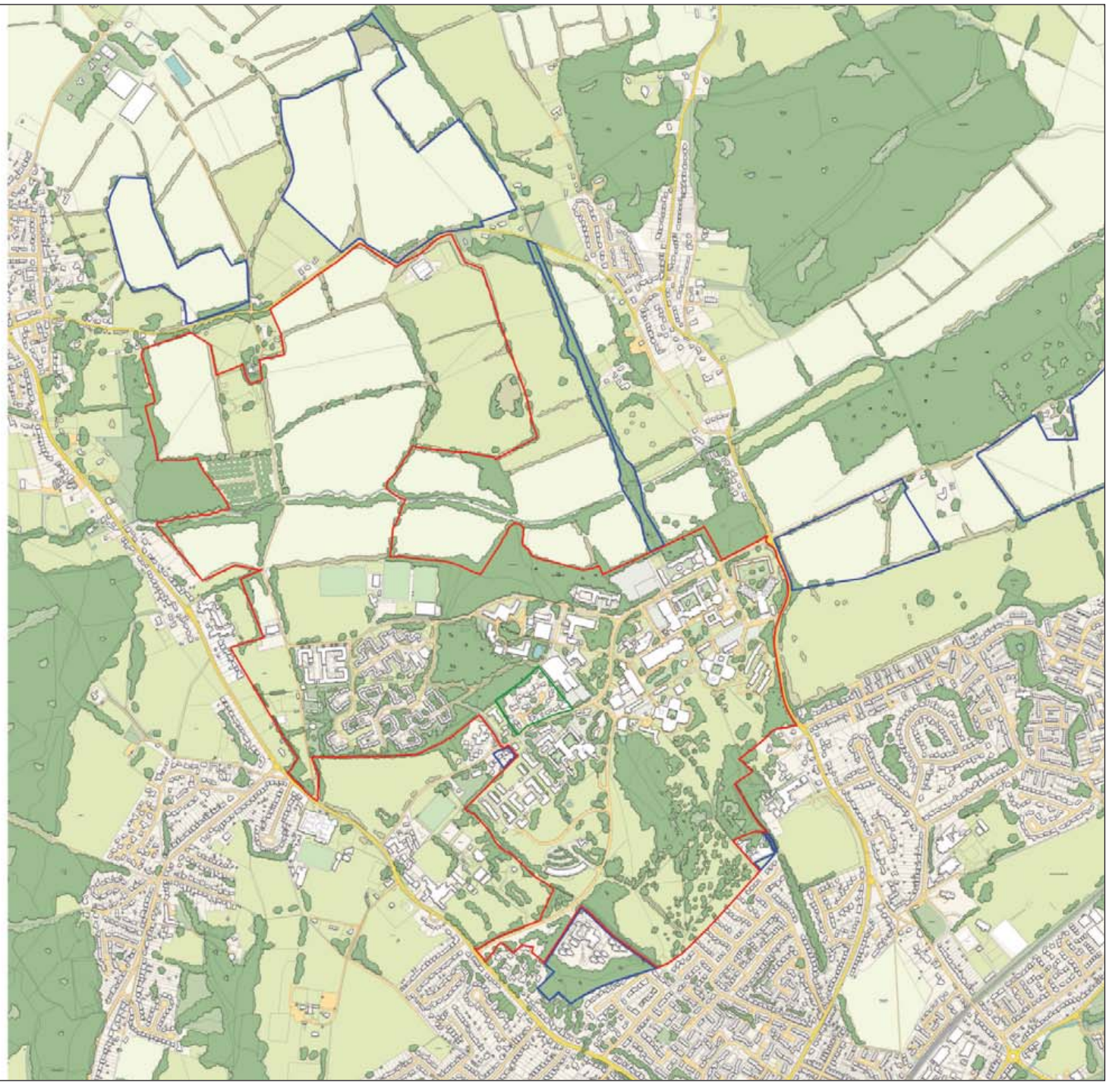
## Aerial Photograph

Ownership Boundary

Source : Google Earth Maps, 2017

## Coloured OS Base

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent



Source : OS Map data, 2017

Concept Masterplan by Farrells

Source : Farrells Concept Masterplan Document, 2015

# UNIVERSITY CAMPUS BUILDING INFORMATION

## Building Heights

- Campus Heart + University Road Corridor
- Park Wood
- 5 Storeys
- 4 Storeys
- 3 Storeys
- 2.5 Storeys
- 2 Storeys
- 1 Storey

## Plot Ratios

Area 1 : 178,721 sqm
Total built area : 129,019 sqm
**Plot Ratio = 0.722**

Area 2 : 47,115 sqm
Total built area : 19,766 sqm
**Plot Ratio = 0.420**

Area 3 : 77,326 sqm
Total built area : 39,695 sqm
**Plot Ratio = 0.513**

Area 4 : 83,017 sqm
Total built area : 54,033 sqm
**Plot Ratio = 0.651**

Area 5 : 135,306 sqm
Total built area : 48,789 sqm
**Plot Ratio = 0.361**

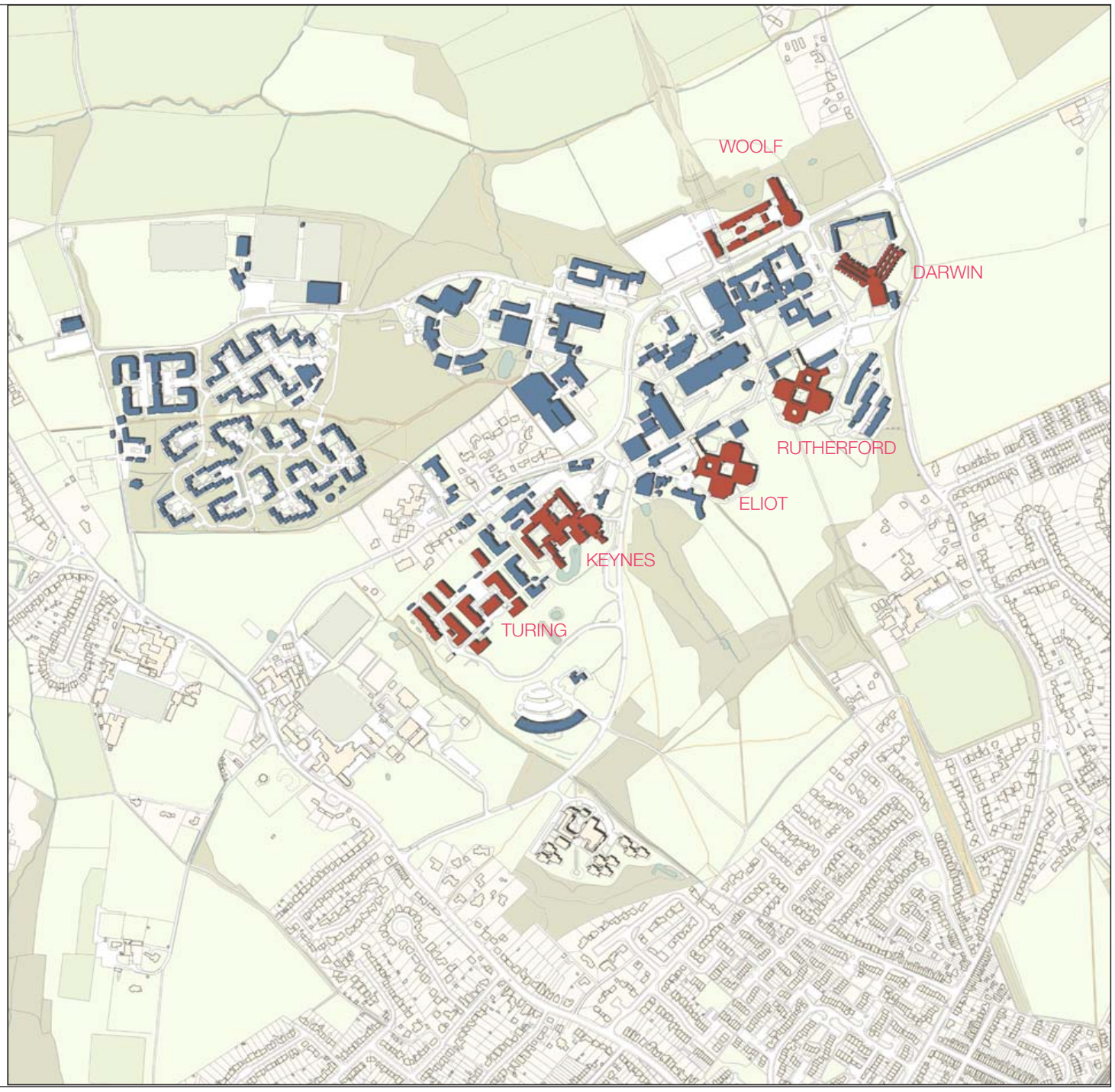
Based on :
1 Site area as outlined in map
2 Gross floorspace (sq m) is approximated from height
3 Ground and above only

- Campus Boundary as defined in the Local Plan
- Additional land owned by University of Kent

## University Colleges

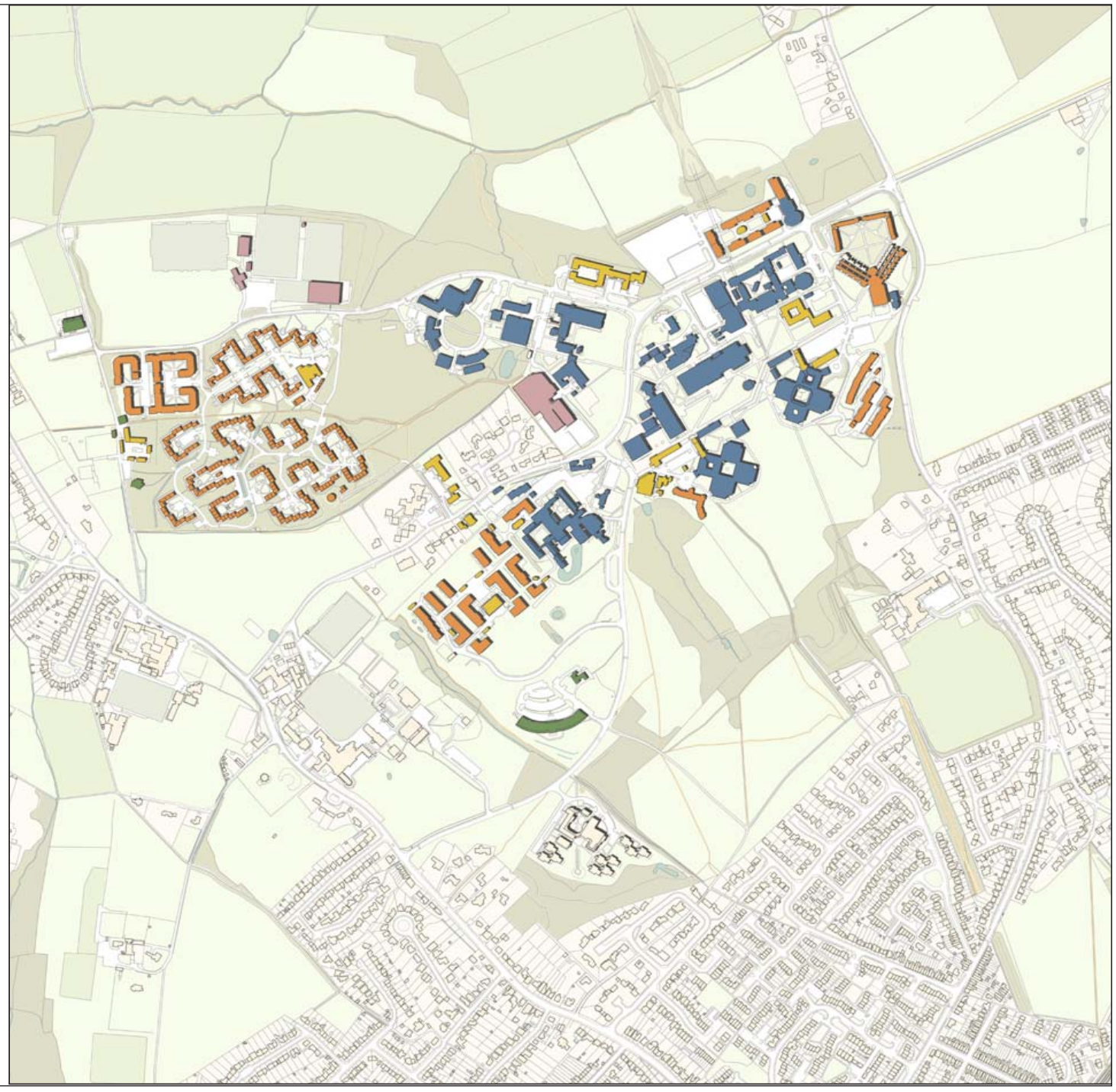
Colleges

Other



## Building Uses

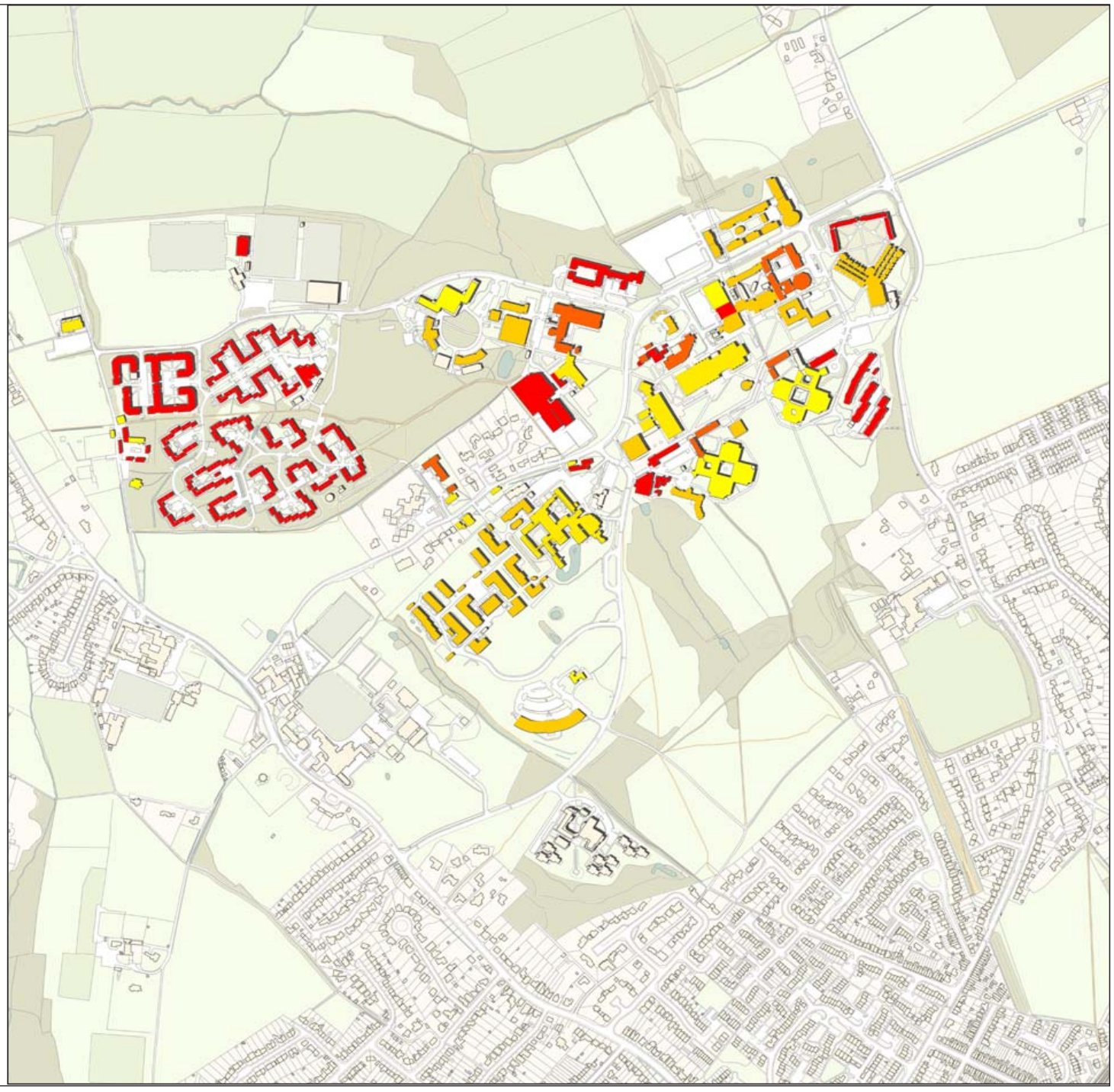
- Academic
- Residential
- Support
- Sports



Source : University of Kent Estates Department

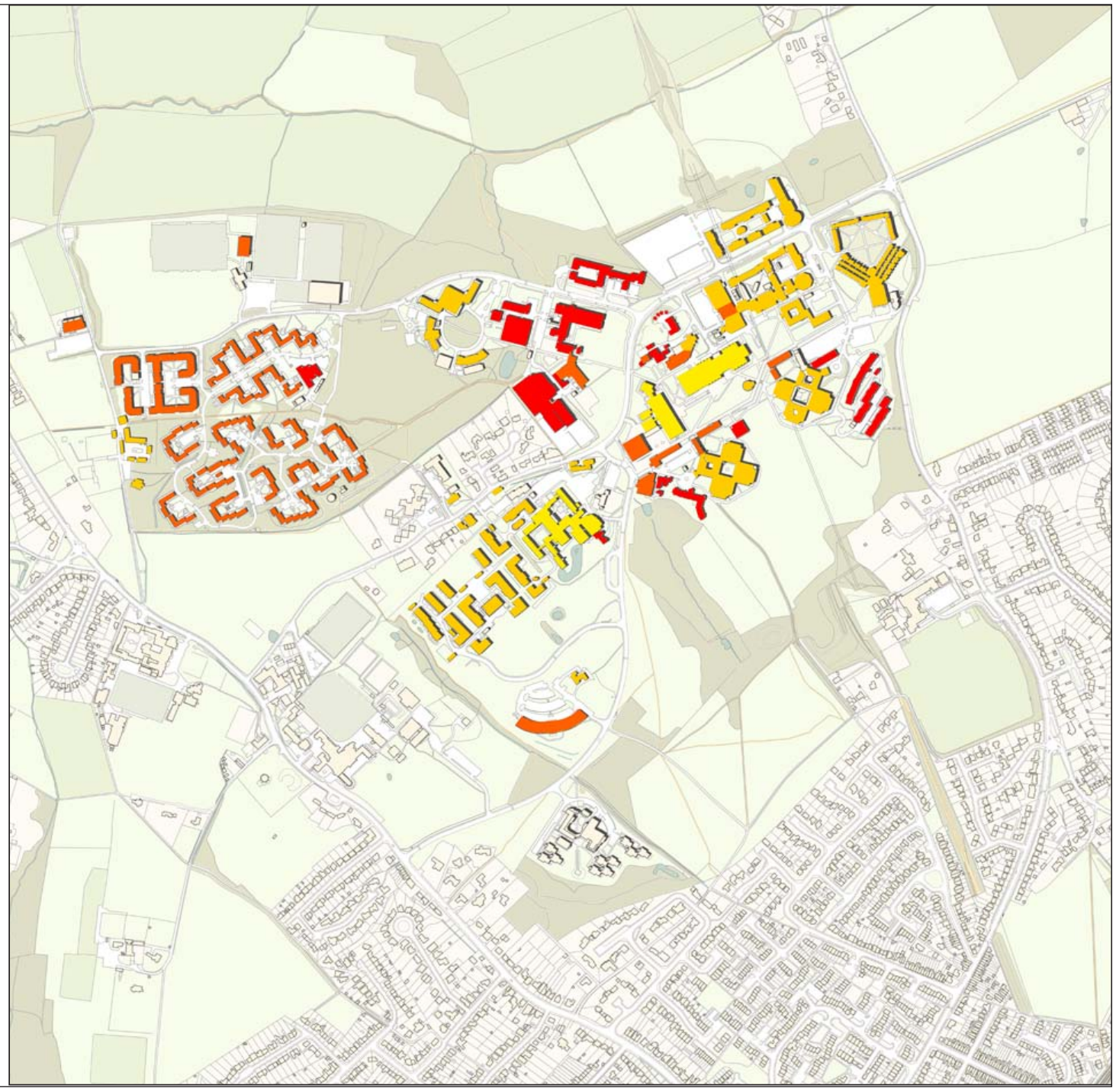
## Contribution to Architectural Character

- High Value
- High-Medium Value
- Medium Value
- Medium-Low Value
- Low Value



## Contribution to Public Realm

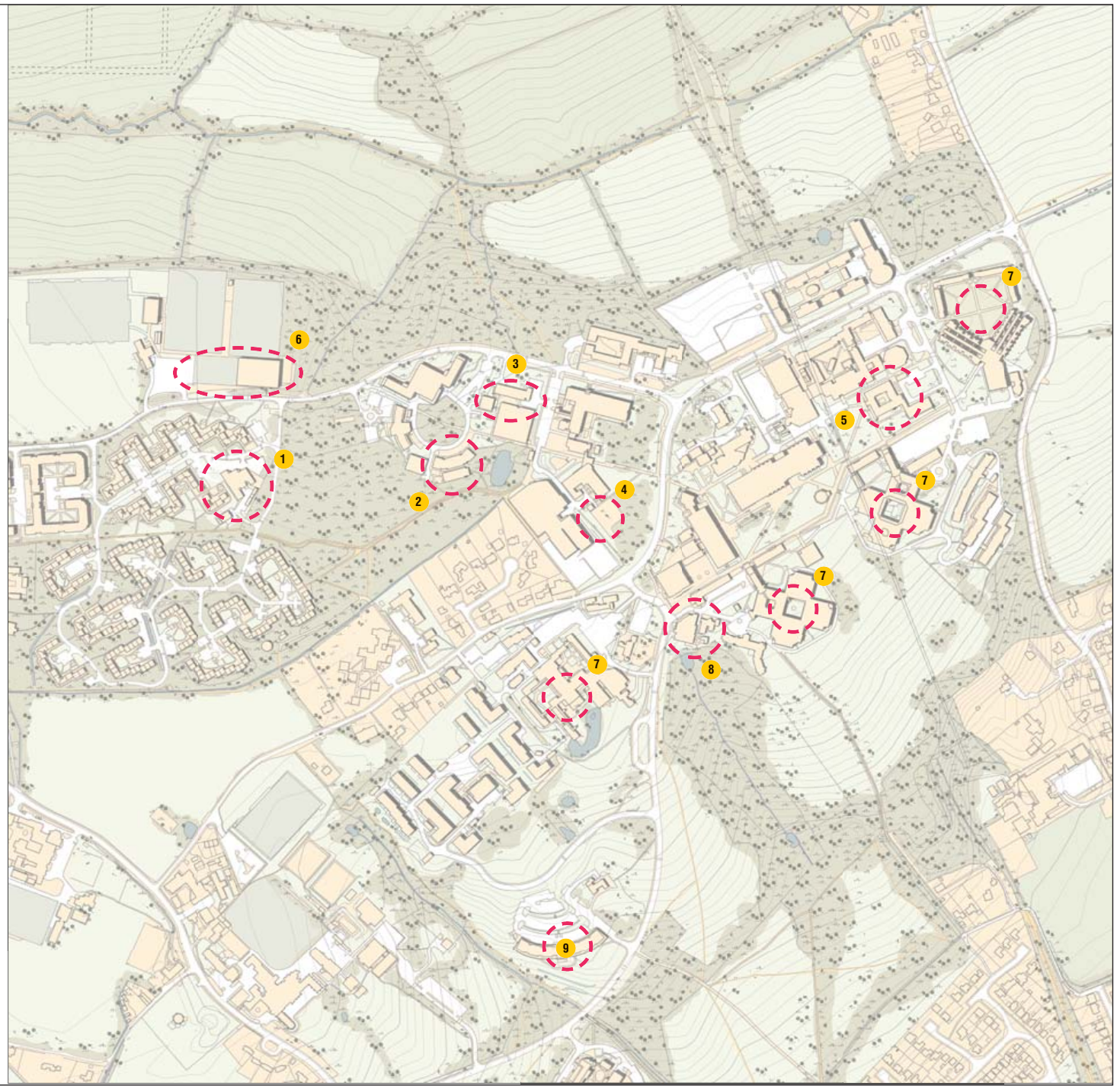
- High Value
- High-Medium Value
- Medium Value
- Medium-Low Value
- Low Value



## Short + Medium Term Projects

1 Demolition of Woody's Student Bar and building of new student social and study facility
2 Economics Building : 2000sqm uplift including demolition of Kent Research and Development Centre
3 Jennison Workshop (1st floor = +600sqm)
4 Science Building : 4000sqm (adjacent to Stacey)
5 Registry Extension : 2500sqm
6 Sport Centre : Tennis court extension and cover
7 Up to 350 beds by converting office back to residential
8 Student Union / Services Building
9 Conference Centre

- Second Academic Building
- Conference Centre
- Swimming Pool
- Extra 2000 beds to provide 3yr guarantee to overseas students
- Aim not to reduce parking spaces
- Begin planning to consolidate car park locations
- CHP Provision, foul sewer upgrade
- Capacity review of foul drainage, electricity, gas and water



# MOVEMENT AND TRANSPORT INFORMATION

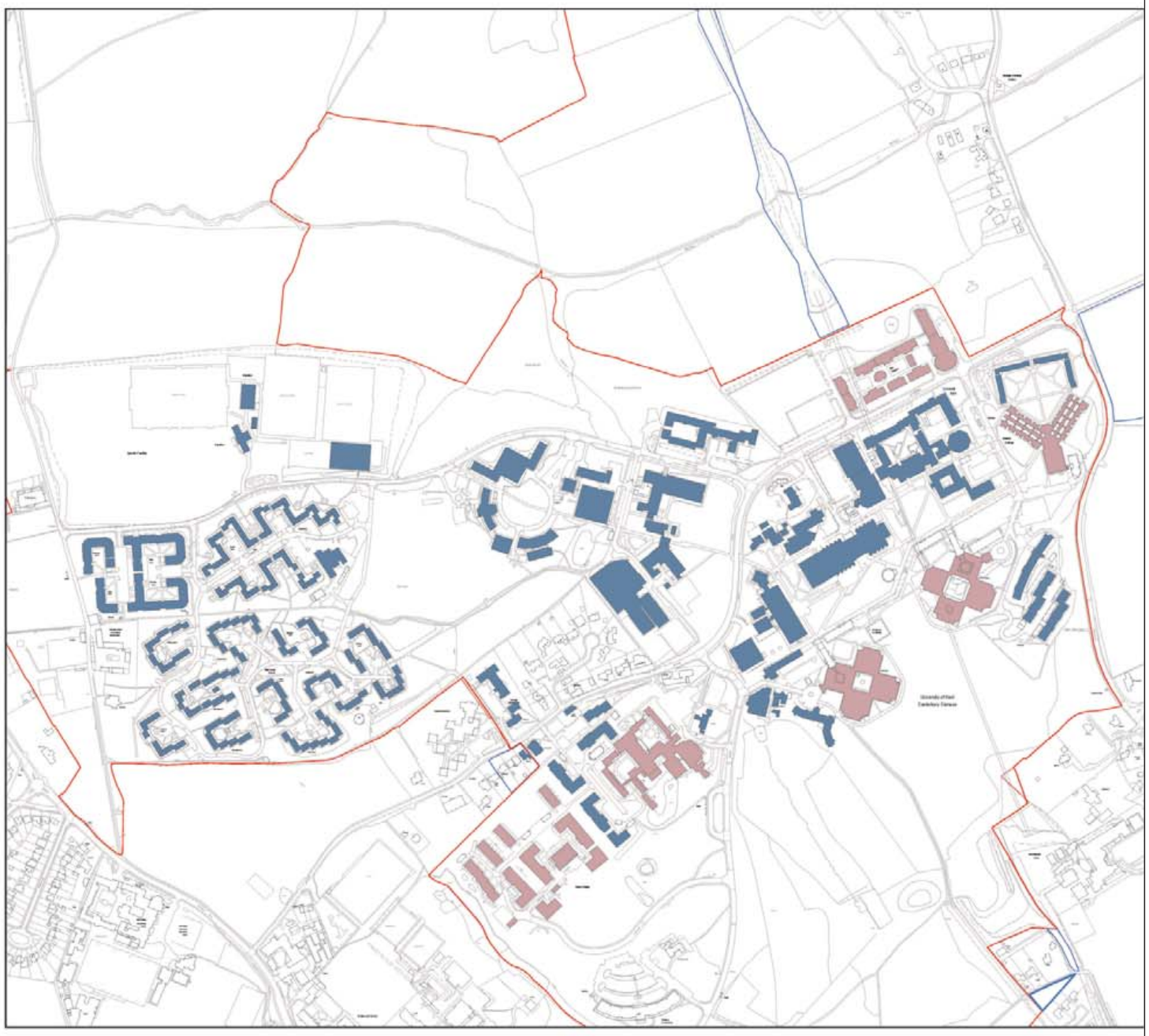
## Canterbury Campus

College

Other building

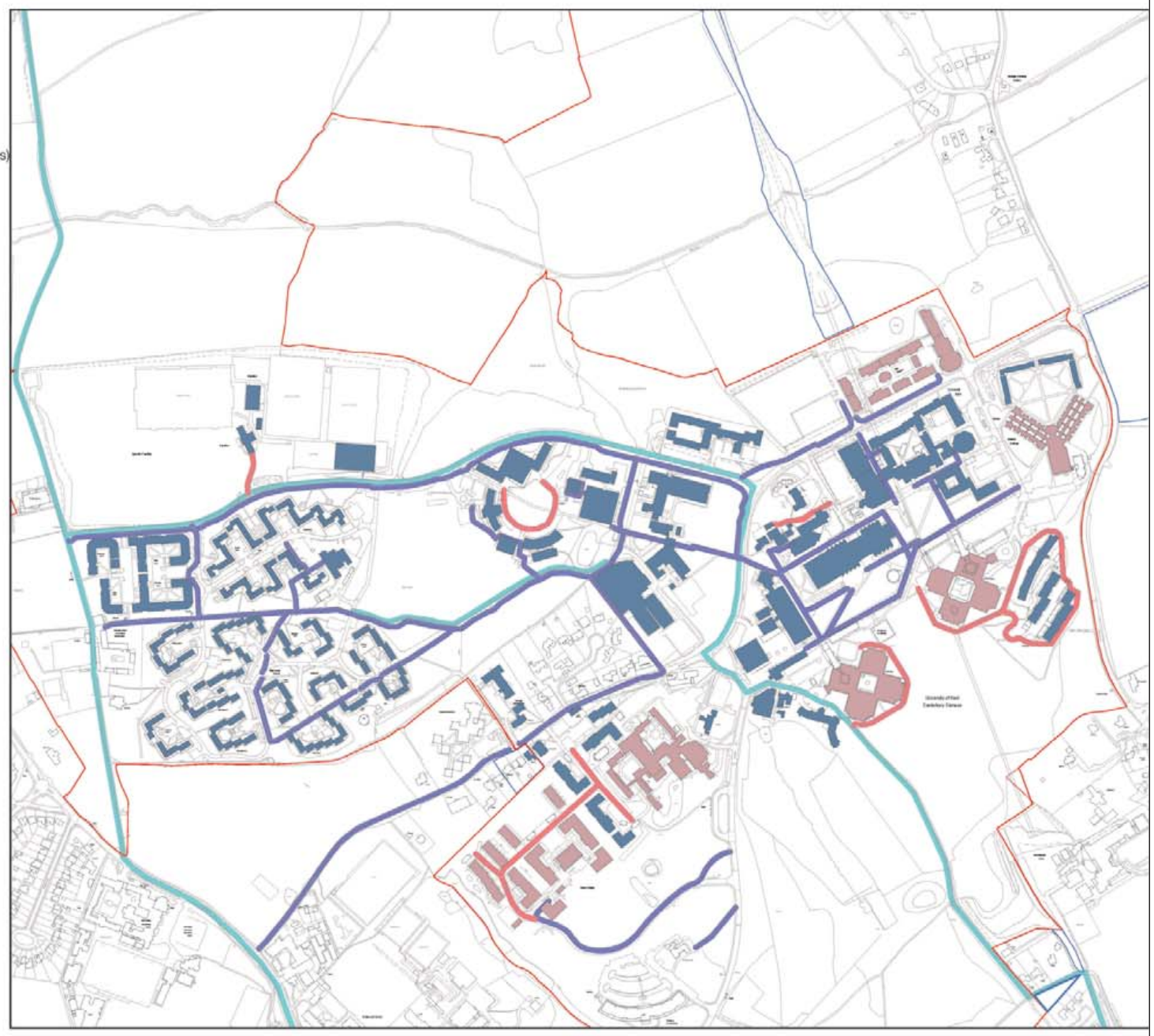
Campus Boundary as defined in the Local Plan

Additional land owned by University of Kent



## Walking and Cycling Map

- Cycle Path
- Recommended Footpath
- Shared Space (pedestrians/cycles/authorised vehicles)
- Campus Boundary as defined in the Local Plan
- Additional land owned by University of Kent



Source : University of Kent Estates Department

## Parking Map

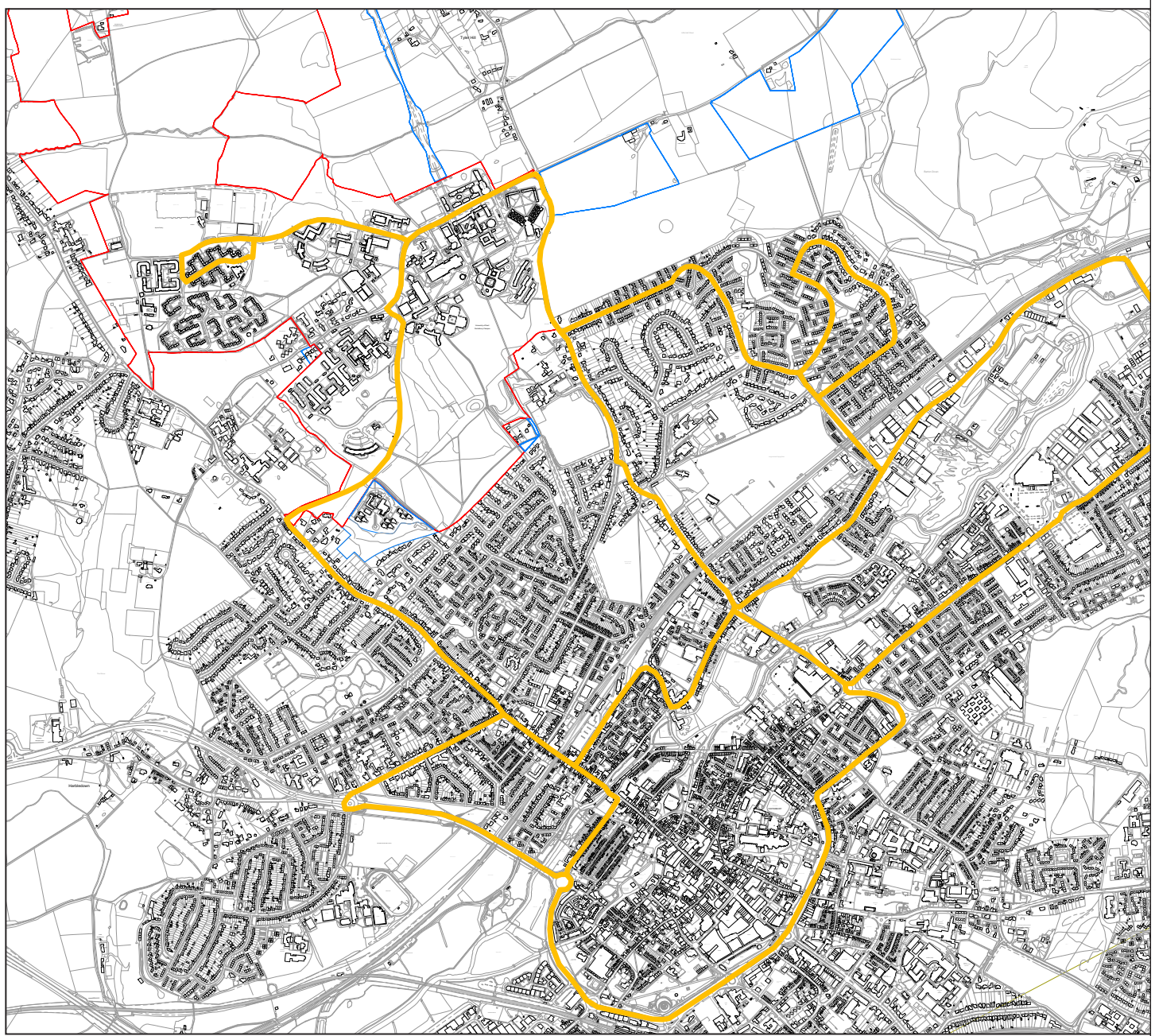
- Cycle Path
- Recommended Footpath
- Car Parking zones (Permit Holders)
- Car Parking zones (All Permit Holders)
- Car Parking zones (Visitor only car parks)
- Bus Stops
- Cycle parking
- Taxi ranks
- Campus Boundary as defined in the Local Plan
- Additional land owned by University of Kent

Source : University of Kent Estates Department

## Bus Route Map

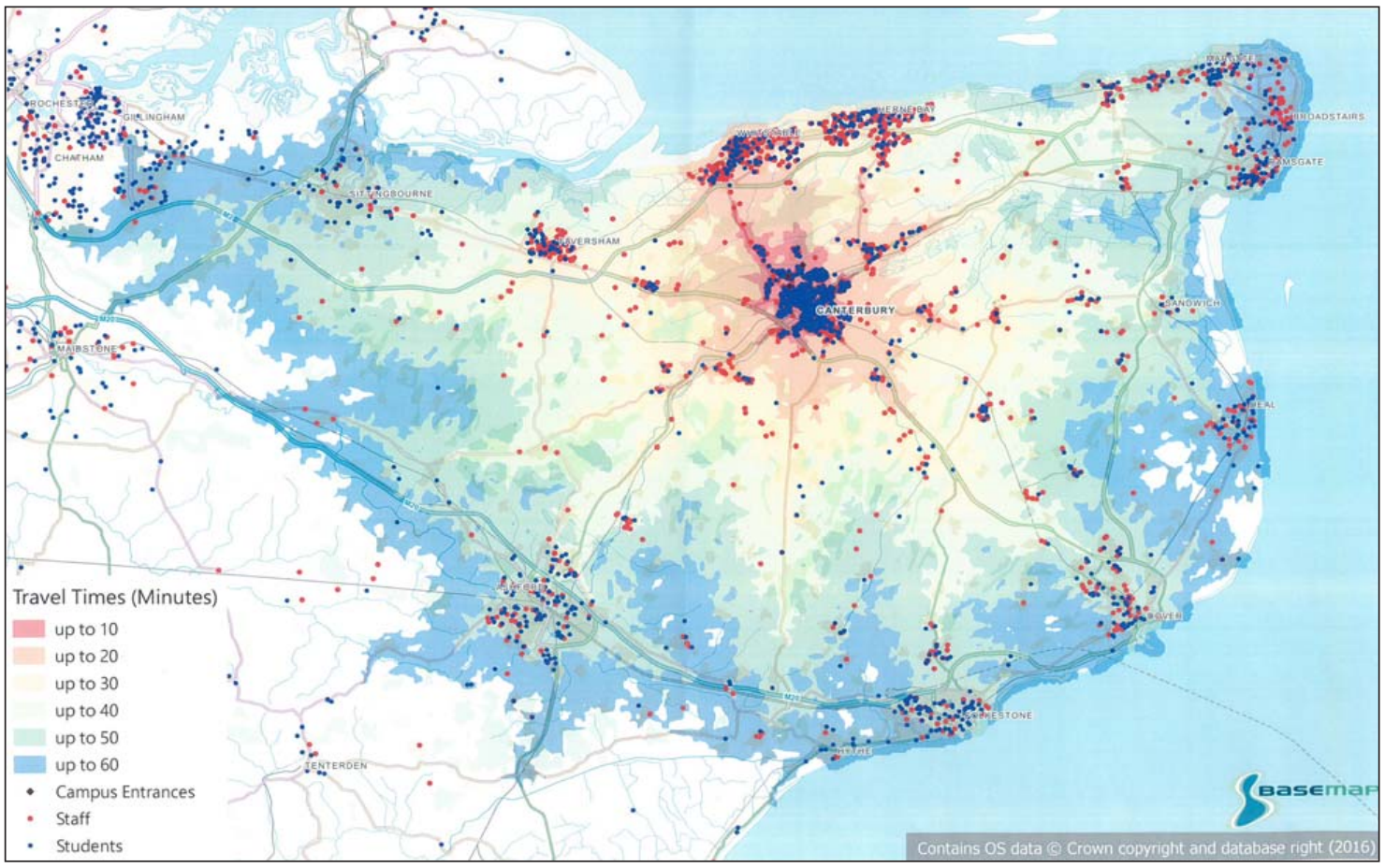
Canterbury Bus Routes

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent



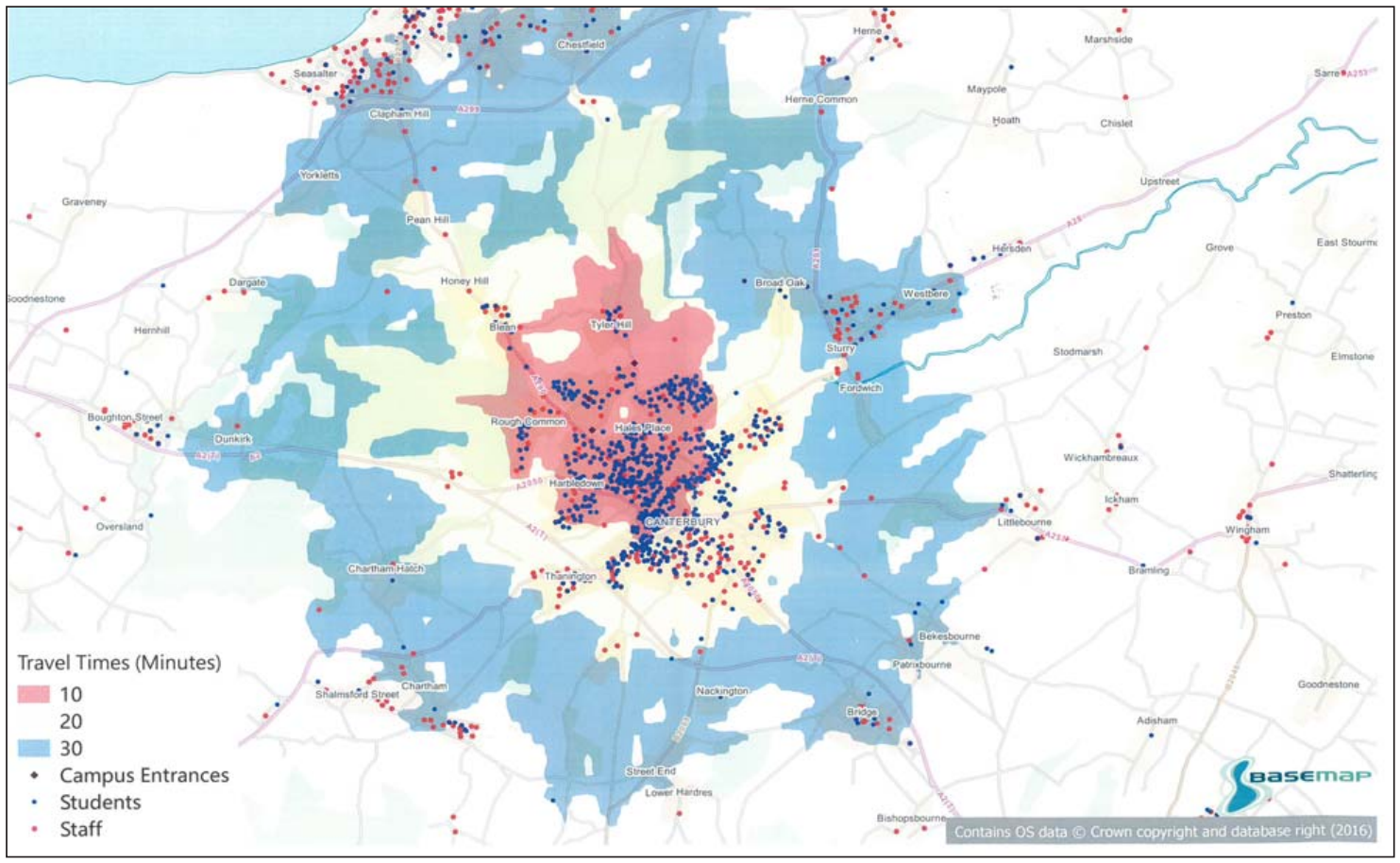
Source : Stagecoach Bus Map

## Drive Times to Canterbury Campus



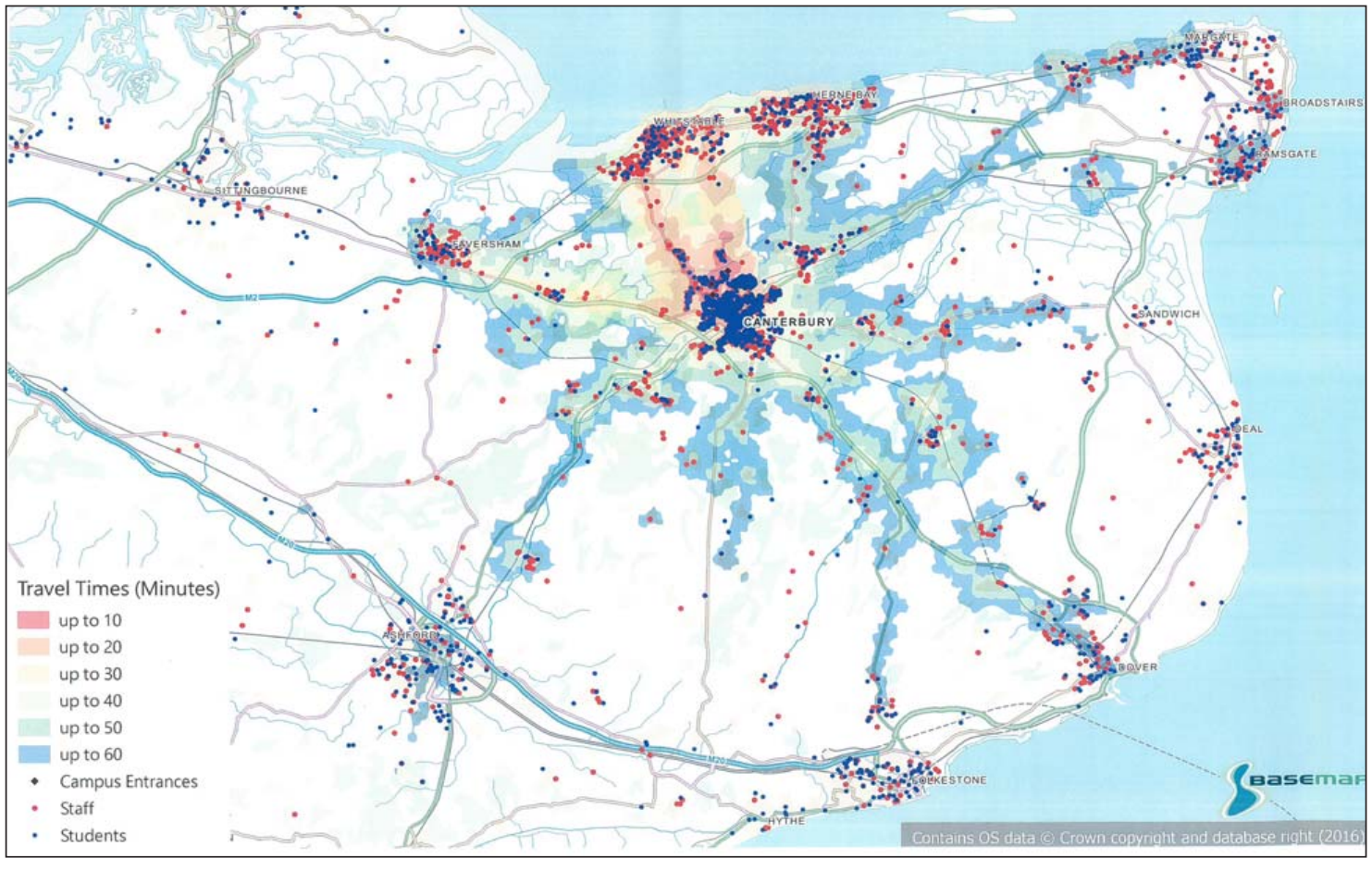

Source : Ben Hamilton Balie

## Cycle Times to Canterbury Campus




Source : Ben Hamilton Balie

## Public Transport to Canterbury Campus




Source : Ben Hamilton Balie

# Appendix K
# Building Analysis (including historical evolution) and University Campus Benchmarking Study

# Building Analysis Schedule

# University of Kent, Canterbury

## Building Analysis Schedule

January 2018

## Disclaimer

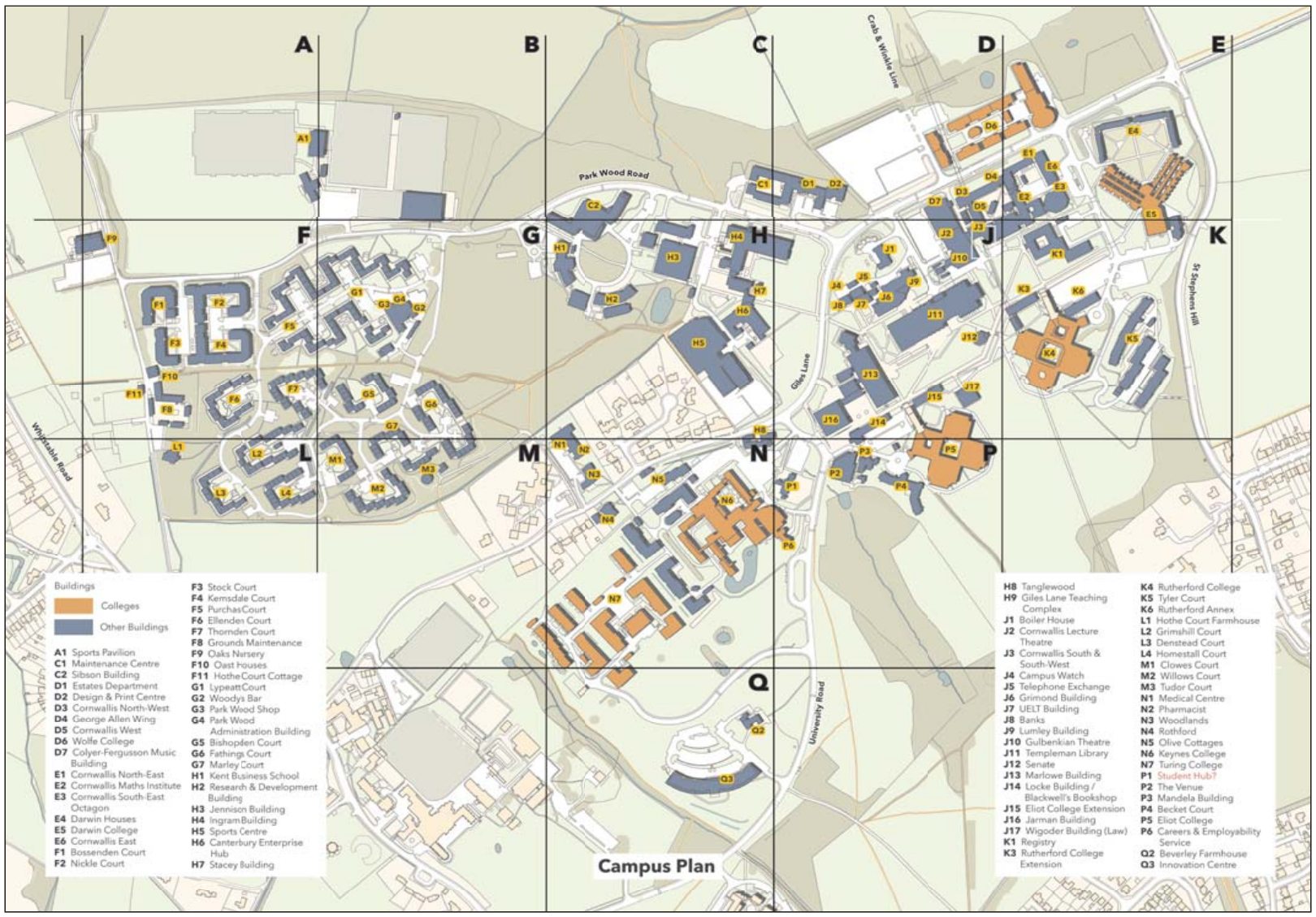
The purpose of this document is to support the University of Kent Canterbury Campus Framework Masterplan. All information has been prepared through the following methodology:

- Site visits including site photography & visual observation
- Google Earth images
- Historical research, Gross Internal Areas (GIA) and information supplied by UoK Canterbury and others

This information is up to date at time of issue and may continue to be updated in the future if new information becomes available. Any discrepancy or queries should be raised immediately. Any individual use or planning application should verify all data independently.

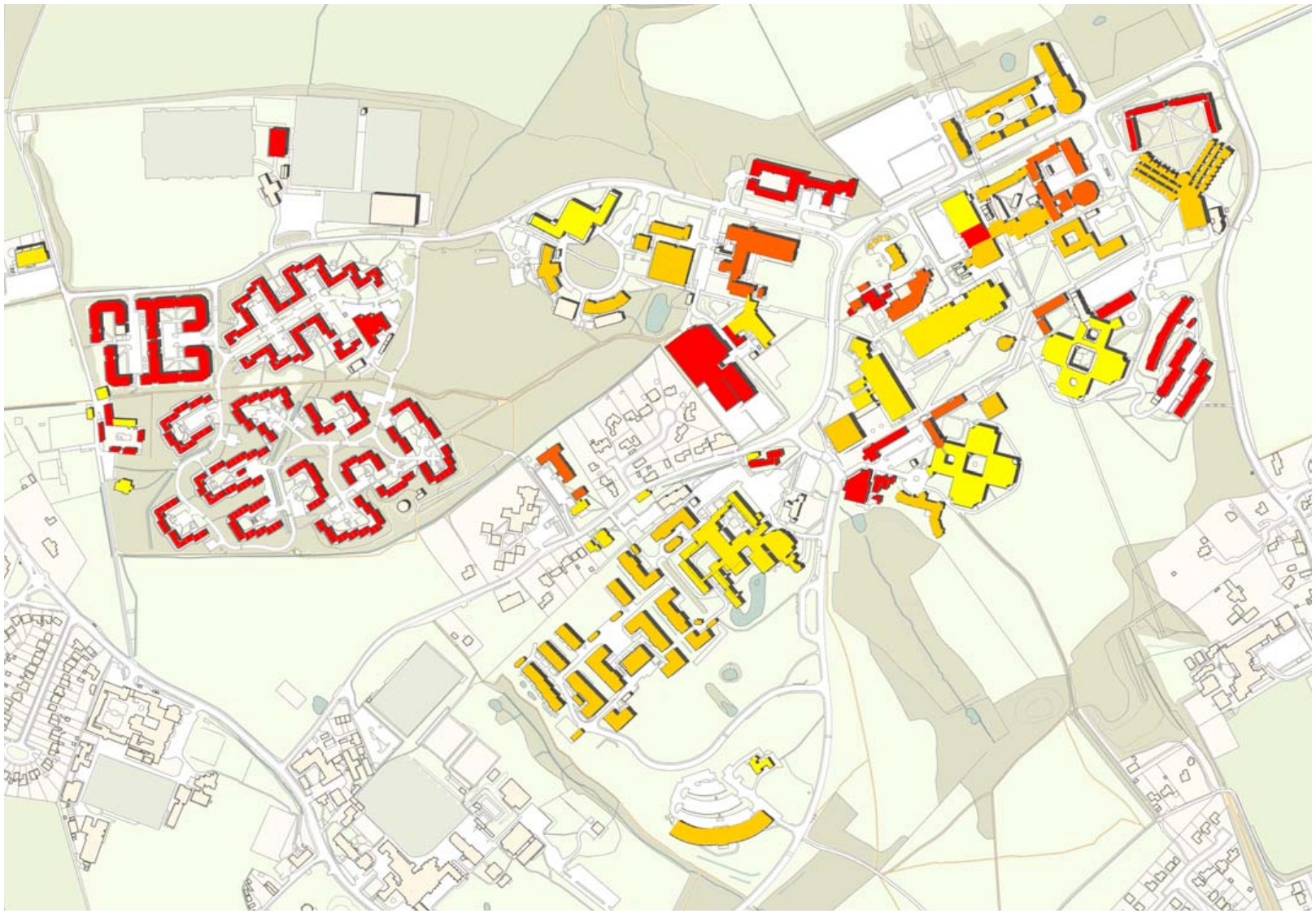
The assessment of 'Contribution to Architectural Character' & 'Contribution to Public Realm' represents our views as Urban Design and Architect Practitioners with over 35 years of experience in these fields.

University of Kent Campus Plan



## Contribution to Architectural Character

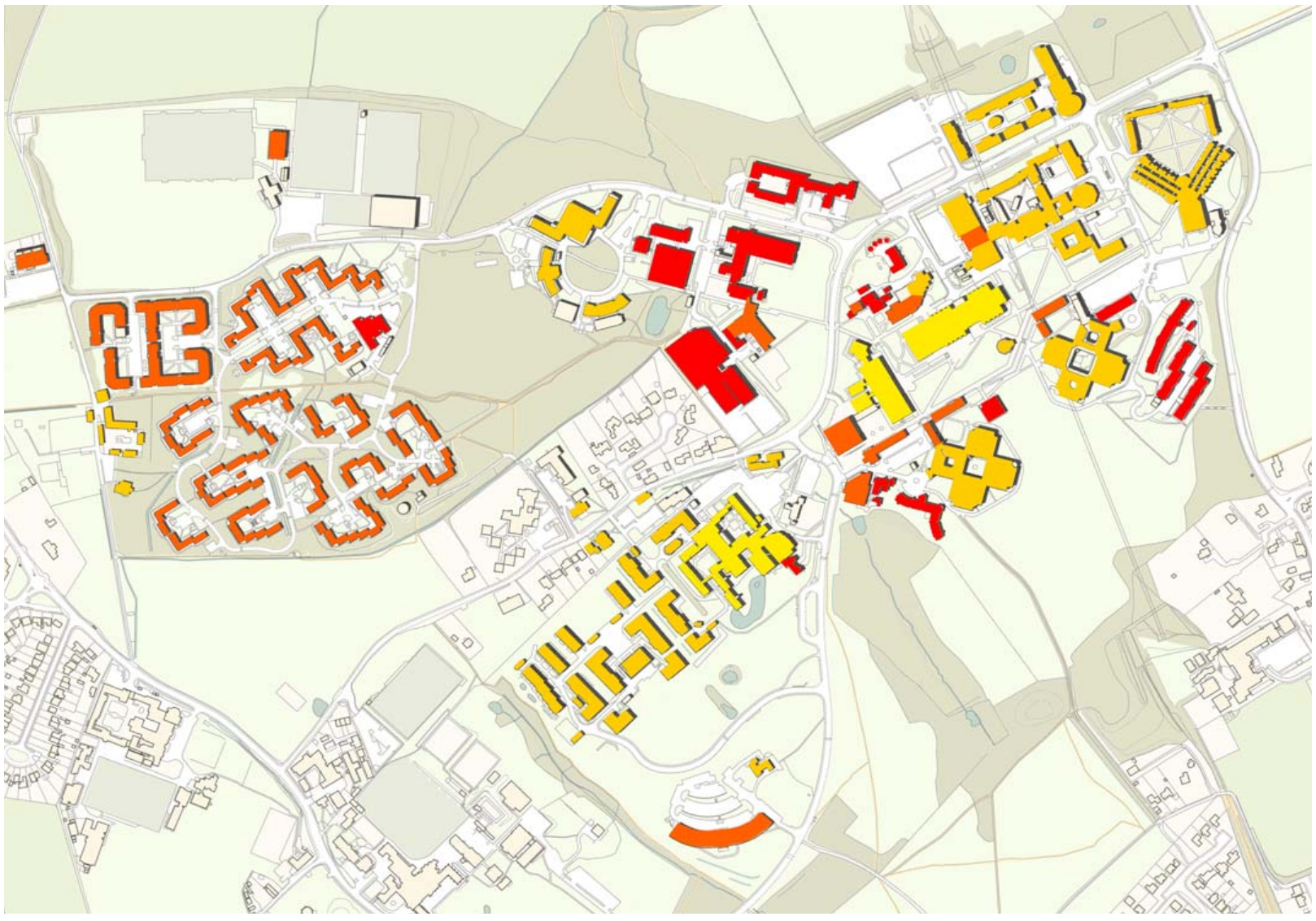
- High Value
- High-Medium Value
- Medium Value
- Medium-Low Value
- Low Value



02

## Contribution to Public Realm

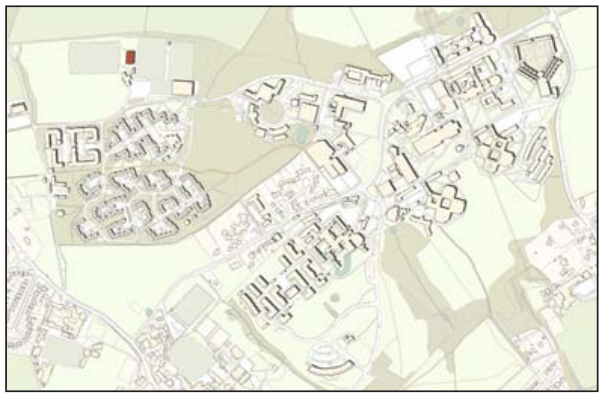
- High Value
- High-Medium Value
- Medium Value
- Medium-Low Value
- Low Value

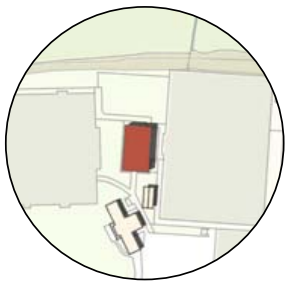


03

A1

| | |
|---|---|
| Building Name | Sports Pavilion, Tennis Court |
| Use | Sports |
| GIA (sqm) | 409 |
| Built Date | 1992 |
| Floors | 2 |
| Typology | Rectangular block |
| Materials | Old Pavilion: Brick<br>New Pavilion: Block, render & glazing<br>Cycle Hub: Timber cladding |
| Roof Form | Flat |
| Character / Architectural expression | Utilitarian / temporary |
| Character Area | Playing Fields |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Medium/Low |

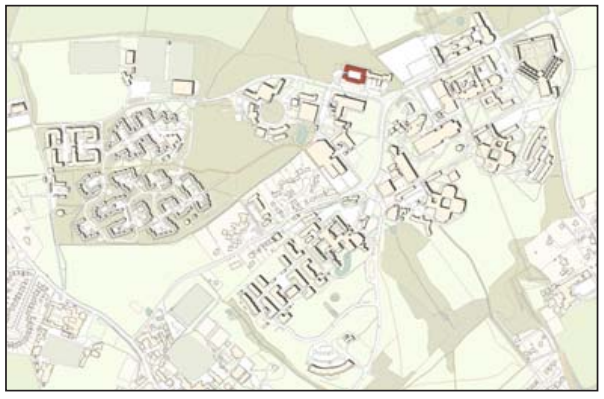


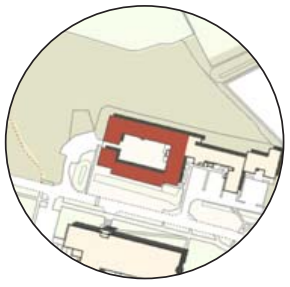


04

C1

| | |
|---|---|
| Building Name | Maintenance Centre |
| Use | Workshops, stores and offices |
| Built Date | 1966 |
| Floors | 1 / 2 |
| Typology | Linear block |
| Materials | Vertical timber boarding |
| Roof Form | Flat |
| Character / Architectural expression | Utilitarian / temporary |
| Character Area | Campus Heart + Brotherhood Wood |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Low |

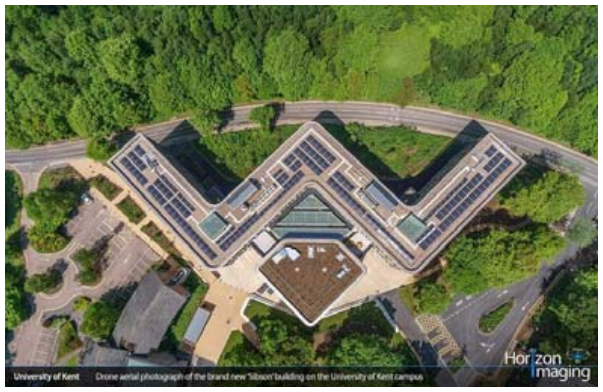


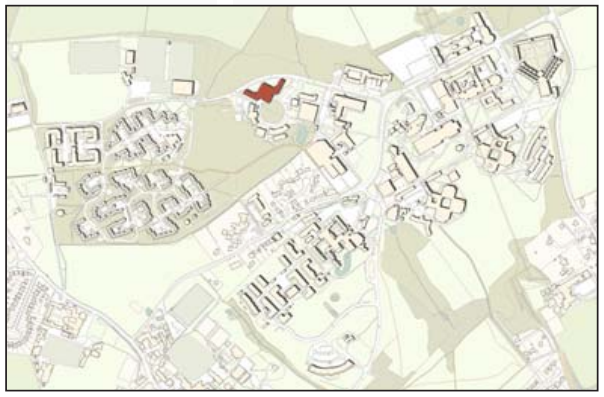


05

C2

| | |
|---|---|
| Building Name | Sibson Building |
| Use | Offices, teaching and meeting rooms and conference facilities |
| GIA (sqm) | 8283 |
| Built Date | 2017 |
| Floors | 5 / 4 / 3 |
| Typology | W-block |
| Materials | Anodized aluminium coloured panels & fins |
| Roof Form | Flat |
| Character / Architectural expression | Organic / contemporary / modern |
| Character Area | Brotherhood Wood |
| Contribution to Architectural Character | High |
| Contribution to Public Realm | High/Medium |
| Architect | Penoyre and Prasad |

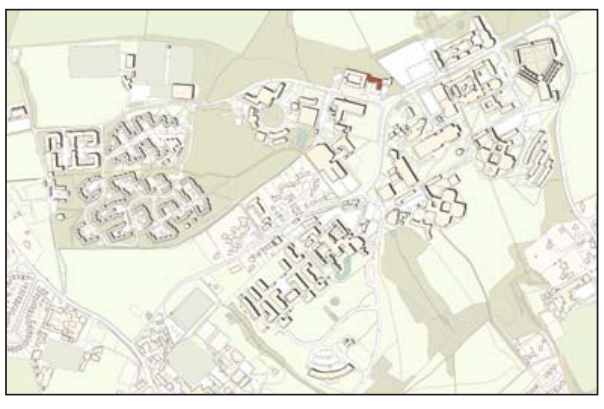




06

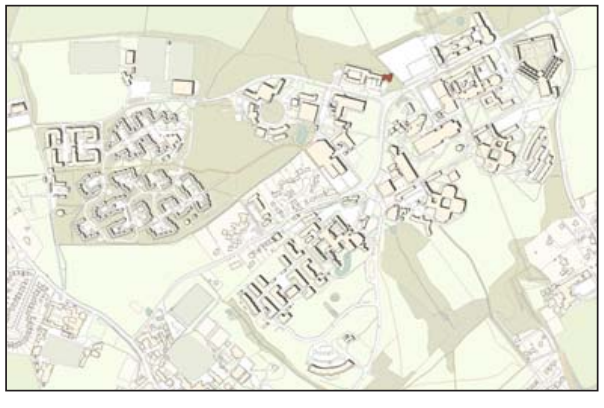
D1

| | |
|---|---|
| Building Name | Estates Department |
| Use | Offices, meeting rooms, reception, storage |
| GIA (sqm) | 3546 |
| Built Date | 2012 |
| Floors | 1 / 2 |
| Typology | Courtyard block |
| Materials | Steel frame with composite insulated panelling |
| Roof Form | Flat |
| Character / Architectural expression | Utilitarian / temporary |
| Character Area | Campus Heart + Brotherhood Wood |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Low |



## D2

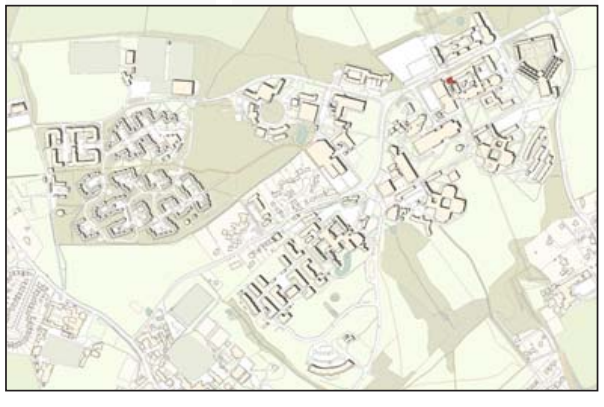
| | |
|---|---|
| Building Name | Estates Department and Design & Print Centre |
| Use | Print Shop and offices |
| Built Date | 1980 |
| Floors | 1 / 2 |
| Typology | Rectangular blocks |
| Materials | Brick/Slate tile roof |
| Roof Form | Pitched |
| Character / Architectural expression | Utilitarian/Workshop |
| Character Area | Campus Heart + Brotherhood Wood |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Low |



08

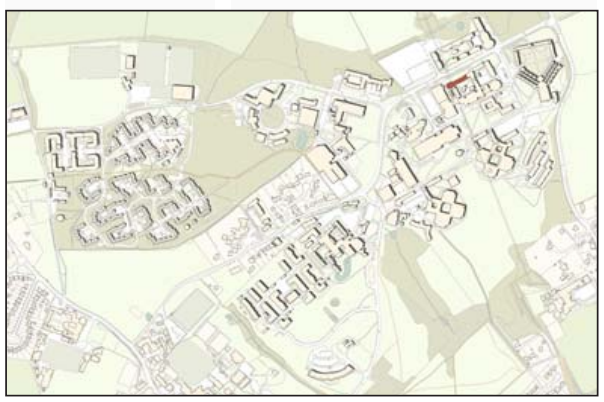
D3

| | |
|---|---|
| Building Name | Cornwallis North- West |
| Use | Offices and Teaching rooms |
| GIA (sqm) | 1,725 |
| Built Date | 1992 |
| Floors | 3 |
| Typology | Cubic Block |
| Materials | Coloured concrete block |
| Roof Form | Copper hipped roof and cupalo roof lantern |
| Character / Architectural expression | Contemporary Vernacular |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Medium |
| Architect | Farmer and Dark |



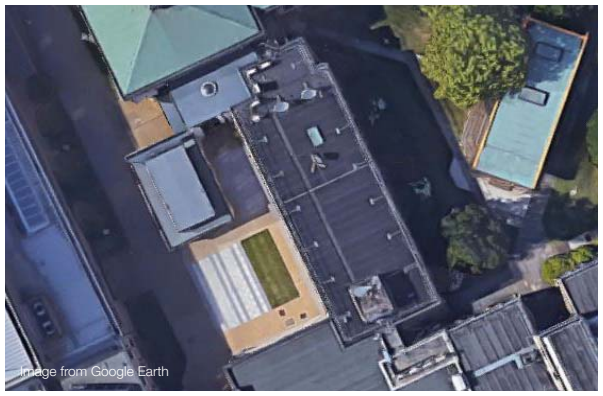
D4

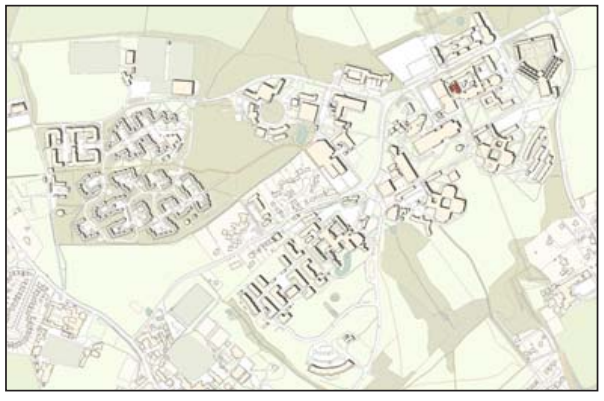
| | |
|---|---|
| Building Name | George Allen Wing |
| Use | Offices |
| GIA (sqm) | 1,238 |
| Built Date | 1991 |
| Floors | 3 |
| Typology | Long block forming part of courtyard |
| Materials | Concrete block |
| Roof Form | Flat |
| Character / Architectural expression | Modern (civic), contemporary |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Medium |
| Architect | Farmer and Dark |



D5

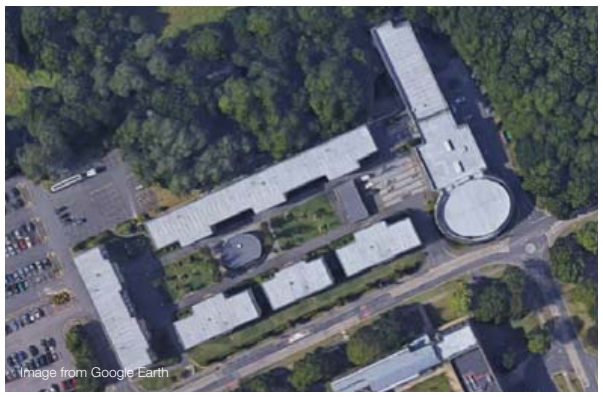
| | |
|---|---|
| Building Name | Cornwallis West |
| Use | Offices and Teaching rooms |
| GIA (sqm) | 604 |
| Built Date | 1968 |
| Floors | 2 |
| Typology | Linear block? |
| Materials | Block precast concrete fins |
| Roof Form | Flat |
| Character / Architectural expression | Contemporary Utilitarian |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Medium |

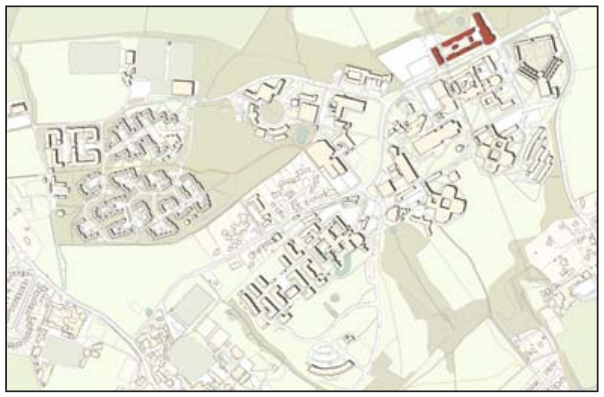




## D6

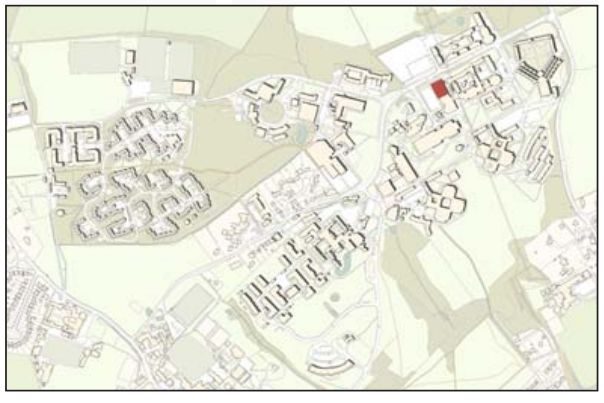
| | |
|---|---|
| Building Name | Woolf College |
| Use | College |
| GIA (sqm) | 2087 |
| Built Date | 2008 |
| Floors | 4 & part 5 |
| Typology | Linear blocks forming courtyard, circular block, circular courtyard pavilion |
| Materials | Coloured concrete block & infil spandrels, timber cladding |
| Roof Form | Flat |
| Character / Architectural expression | Contemporary |
| Character Area | Campus Heart + St.Stephens |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Medium |





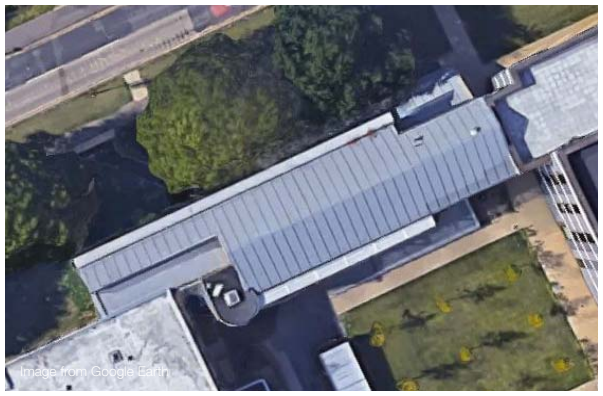
D7

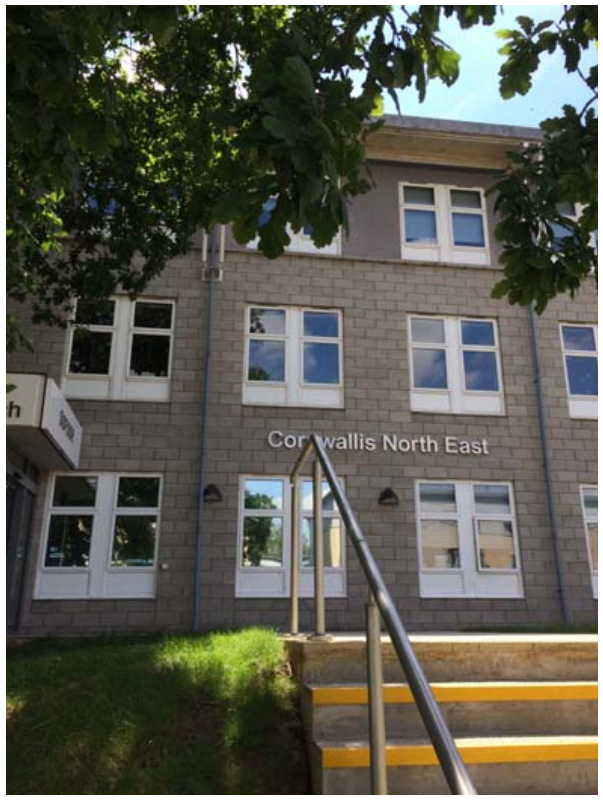
| | |
|---|---|
| Building Name | Colyer-Fergusson Building |
| Use | Music/Concert Hall |
| GIA (sqm) | 2,594 |
| Built Date | 2010 |
| Floors | 2/3 |
| Typology | Longitudinal block |
| Materials | Concrete block with exposed aggregate |
| Roof Form | Flat |
| Character / Architectural expression | Modern contemporary |
| Character Area | Campus Heart |
| Contribution to Architectural Character | High |
| Contribution to Public Realm | Medium |
| Architect | Tim Ronalds Architects |

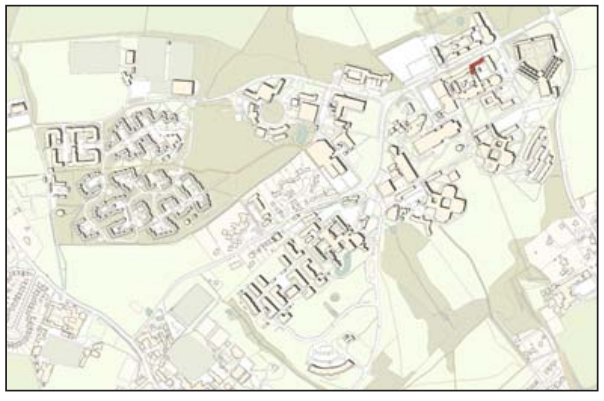


## E1

| | |
|---|---|
| Building Name | Cornwallis North East |
| Use | Offices and teaching spaces |
| GIA (sqm) | 896 |
| Built Date | 2002 |
| Floors | 3 |
| Typology | Longitudinal block |
| Materials | Concrete block, metal window frame and sprandel. |
| Roof Form | Pitched/Metal standing |
| Character / Architectural expression | Modern |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium / low |
| Contribution to Public Realm | Medium |

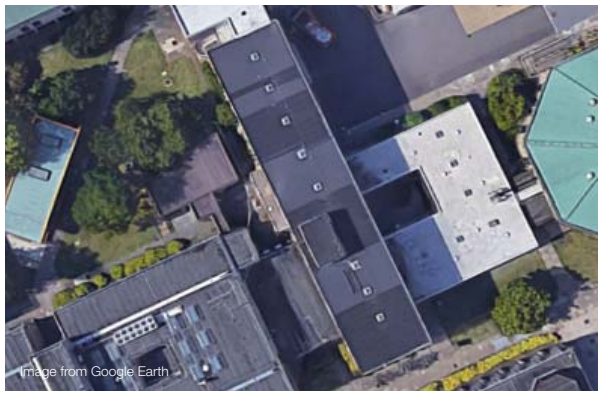


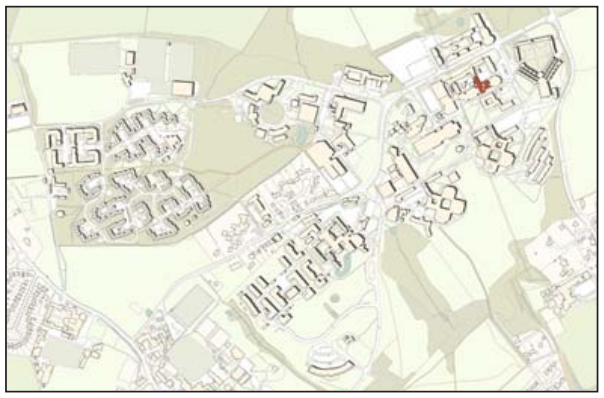


E2

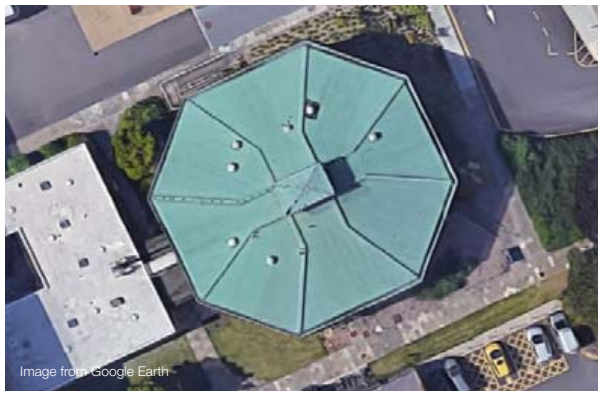
| | |
|---|---|
| Building Name | Cornwallis Central (previously Maths Institute) |
| Use | Offices and teaching spaces |
| GIA (sqm) | 1,294 |
| Built Date | 1971 |
| Floors | 3 & 1 |
| Typology | Longitudinal block |
| Materials | Concrete block, vertical infill windows, spandrel panels |
| Roof Form | Flat |
| Character / Architectural expression | Modern |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium / low |
| Contribution to Public Realm | Medium |

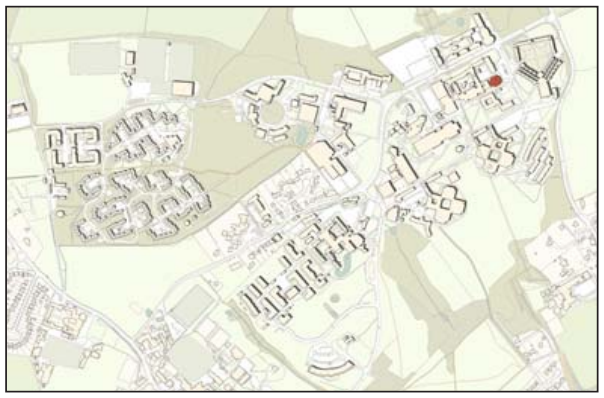




E3

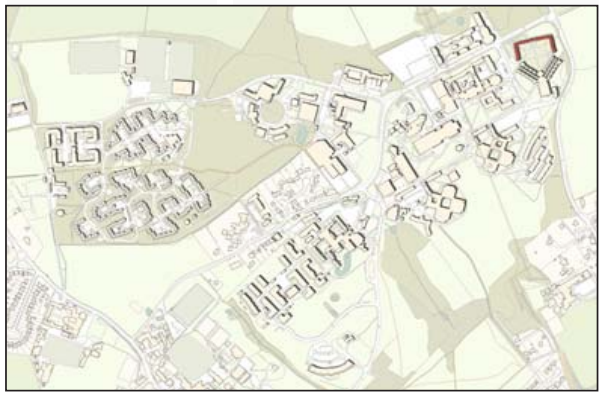
| | |
|---|---|
| Building Name | Cornwallis South East Octagon |
| Use | Offices and teaching spaces |
| GIA (sqm) | 1,301 |
| Built Date | 1986 |
| Floors | 2 |
| Typology | Octagon |
| Materials | Block with intermediate glazing panels |
| Roof Form | Sloped copper with roof lantern |
| Character / Architectural expression | Modern |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium / low |
| Contribution to Public Realm | Medium |

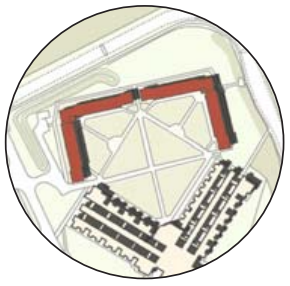




E4

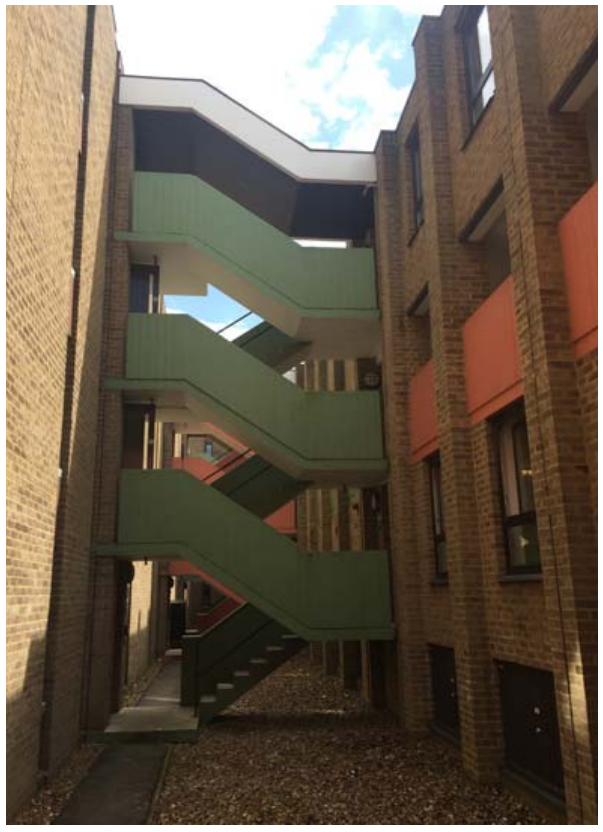
| | |
|---|---|
| Building Name | Darwin Houses |
| Use | Student housing |
| GIA (sqm) | 1,557 |
| Built Date | 1989 |
| Floors | 2/3 |
| Typology | U block forms large external courtyard garden with adjacent college |
| Materials | Brown brick |
| Roof Form | Pitched |
| Character / Architectural expression | Suburban terrace, formal utilitarian institutional housing |
| Character Area | Campus Heart + St.Stephens |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Medium |
| Architect | Greenfield Jones Partnership |

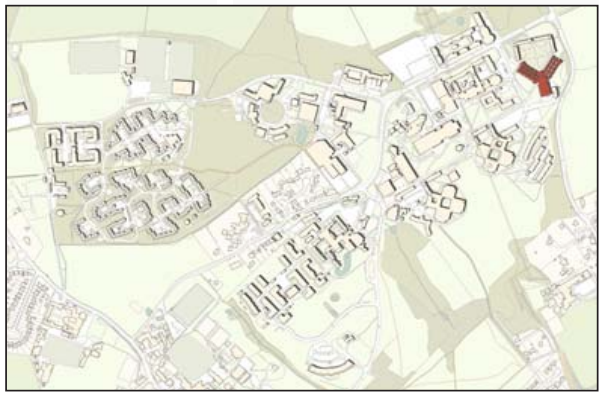


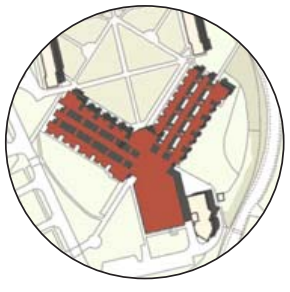


E5

| | |
|---|---|
| Building Name | Darwin College |
| Use | College |
| GIA (sqm) | 10,059 |
| Built Date | 1970 |
| Floors | 4 |
| Typology | Y block / central external circulation |
| Materials | Brown brick |
| Roof Form | Flat |
| Character / Architectural expression | Modern (collegiate) |
| Character Area | Campus Heart + St. Stephens |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Medium / low |
| Architect | Williamson, Faulkner Brown & Partners |

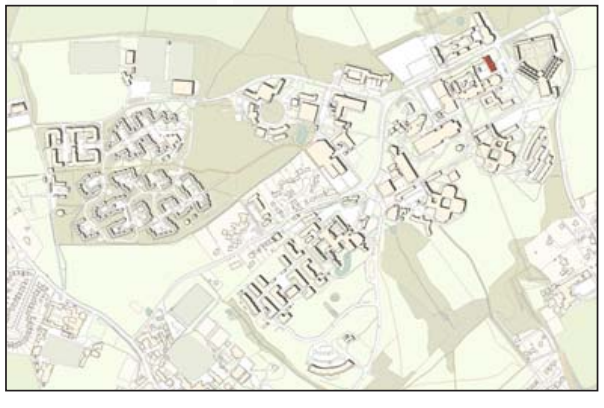






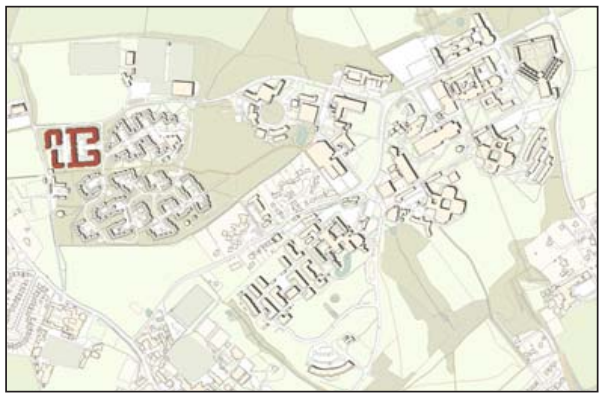
E6

| | |
|---|---|
| Building Name | Cornwallis East |
| Use | Offices and Teaching spaces |
| GIA (sqm) | 2,264 |
| Built Date | 2015 |
| Floors | 4 |
| Typology | Longitudinal block |
| Materials | Composite cladding panels with projecting anodized metal vertical window fins |
| Roof Form | Flat-Solar panels |
| Character / Architectural expression | Modern |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Medium |
| Architect | Hawkins/Brown |



F1 F2 F3 F4

| | |
|---|---|
| Building Name | Park Wood Flats |
| Use | Student Housing |
| GIA (sqm) | F1-3026, F2-5152, F3-1610, F4-5252 |
| Built Date | 2005 |
| Floors | 3 |
| Typology | Suburban terraced blocks forming internal courtyards and cul de sacs |
| Materials | Red / brown bricks, concrete roof tiles |
| Roof Form | Pitched |
| Character / Architectural expression | Suburban (utilitarian) vernacular |
| Character Area | Parkwood |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Medium / low |



F5 F6 F7 G1 G5 G6 G7

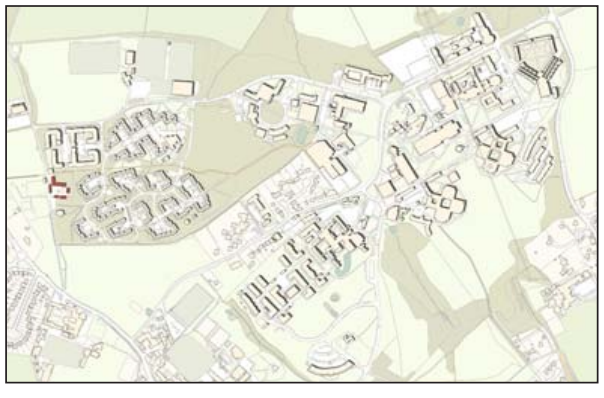
L2 L3 L4 M1 M2 M3

| | |
|---|---|
| Building Name | Park Wood Courts |
| Use | Student Housing |
| GIA (sqm) | F5-3925, F6-2038, F7-2174, G1-3788, G5-1776, G6-2968, G7-1079, L2-2257, L3-1357, L4-1710, M1-1260, M2-1794, M3-718 |
| Built Date | 1980-1993 |
| Floors | 2 |
| Typology | Suburban terraces forming informal open parking courtyards & cul de sacs |
| Materials | Red / brown bricks, concrete roof tiles |
| Roof Form | Pitched |
| Character / Architectural expression | Suburban (utilitarian) vernacular |
| Character Area | Parkwood |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Medium / low |
| Architect | ? |

Image from Google Earth

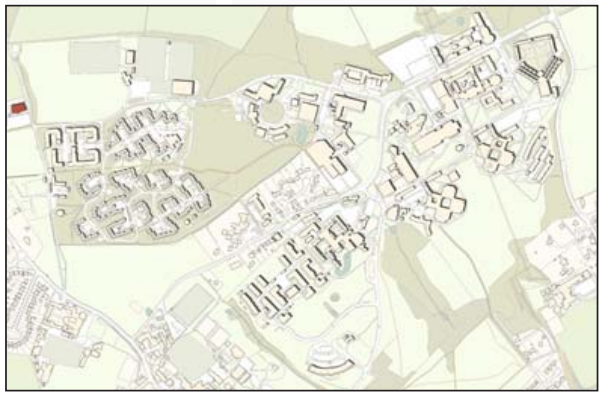
F8

| | |
|---|---|
| Building Name | Hothe Court Barn / Grounds Maintenance |
| Use | Maintenance |
| GIA (sqm) | 813 |
| Built Date | 17th Century |
| Floors | 1 |
| Typology | Farm Cluster |
| Materials | Brick, slate roof |
| Roof Form | Pitched, hipped |
| Character / Architectural expression | Kent vernacular |
| Character Area | Hothe Court |
| Contribution to Architectural Character | High |
| Contribution to Public Realm | Medium |



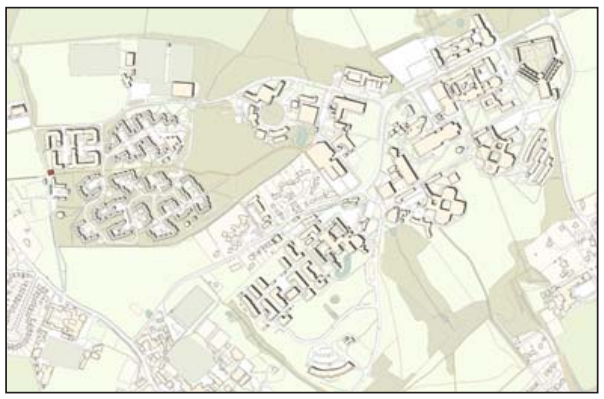
F9

| | |
|---|---|
| Building Name | Oaks Nursery |
| Use | Nursery |
| GIA (sqm) | 704 |
| Built Date | 2016 |
| Floors | 1 |
| Typology | Rectangular block |
| Materials | Vertical timber boarding / coloured cladding, natural vent chimneys |
| Roof Form | Mono-pitch |
| Character / Architectural expression | Contemporary Eco |
| Character Area | Blean School + Nursery |
| Contribution to Architectural Character | High / medium |
| Contribution to Public Realm | Medium / low |
| Architect | ? |



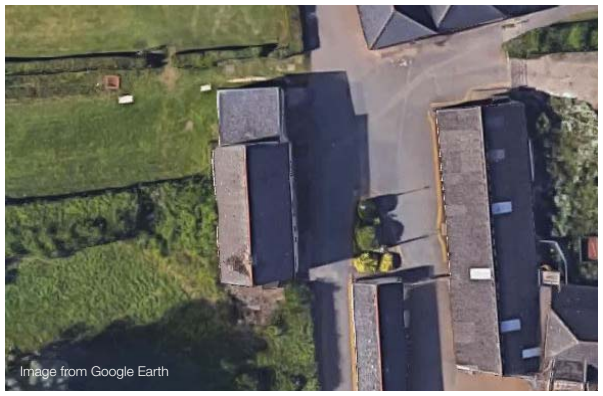
## F10

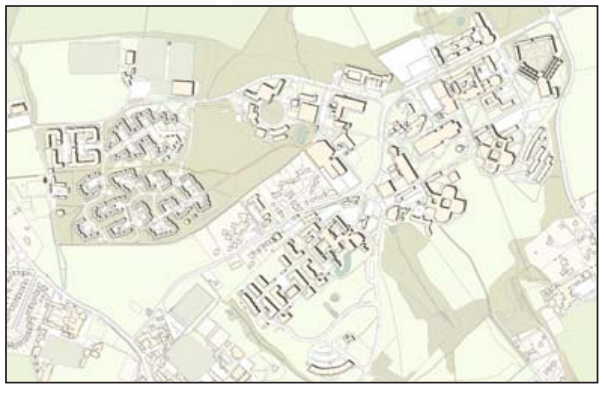
| | |
|---|---|
| Building Name | Hothe Court East Oast House |
| Use | Storage and changing facilities |
| GIA (sqm) | 305 |
| Built Date | c1880 |
| Floors | 2 |
| Typology | Oast House |
| Materials | Brick, shiplap, timber & slate roof |
| Roof Form | Pitched, hipped & pyramidal |
| Character / Architectural expression | Kent vernacular |
| Character Area | Hothe Court |
| Contribution to Architectural Character | High |
| Contribution to Public Realm | Medium |



F11

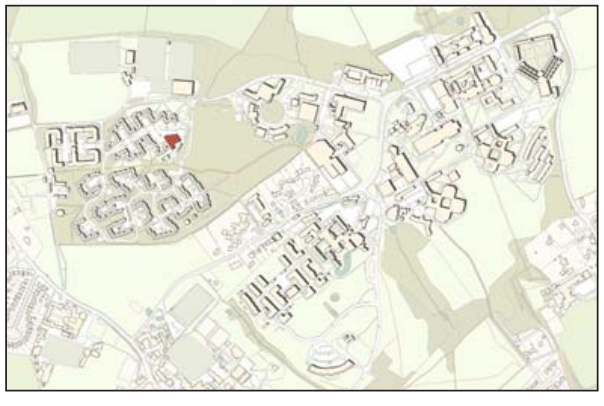
| | |
|---|---|
| Building Name | West Oast |
| Use | Teaching |
| Built Date | 19th Century |
| Floors | 2 |
| Typology | Oast House / Farm Cottage |
| Materials | Brick & slate roof |
| Roof Form | Steep pitch |
| Character / Architectural expression | Kent vernacular |
| Character Area | Hothe Court |
| Contribution to Architectural Character | High |
| Contribution to Public Realm | Medium |





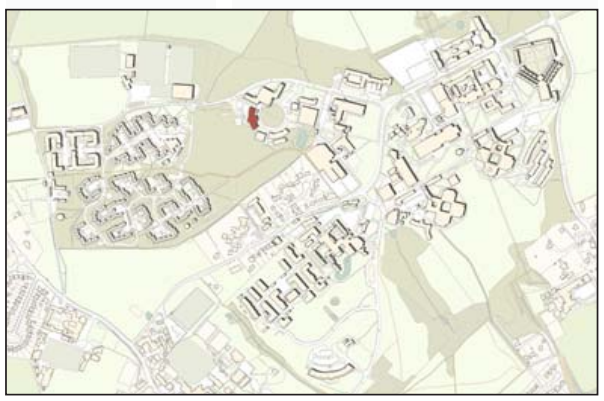
G2 G3 G4

| | |
|---|---|
| Building Name | Student hub, Park Wood Shop & Park Wood Administration Building |
| Use | Student hub, Park Wood Shop & Park Wood Administration Building |
| GIA (sqm) | Parkwood Admin and Social: 904 sqm |
| Built Date | 1993 |
| Floors | 1 |
| Typology | Rectangular blocks |
| Materials | Brick and white cladding panels |
| Roof Form | Pitched |
| Character / Architectural expression | Utilitarian |
| Character Area | Parkwood |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Low |
| Architect | Greenfield Jones Partnership |



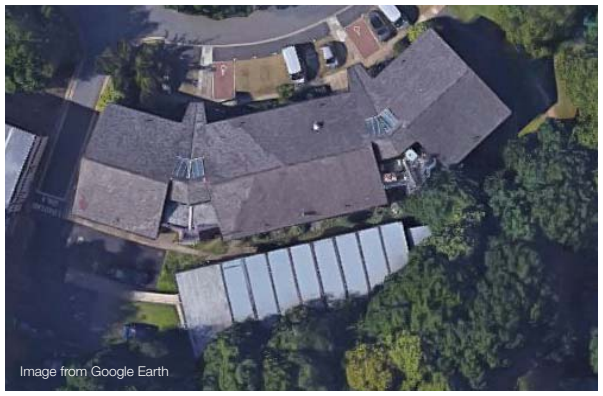
H1

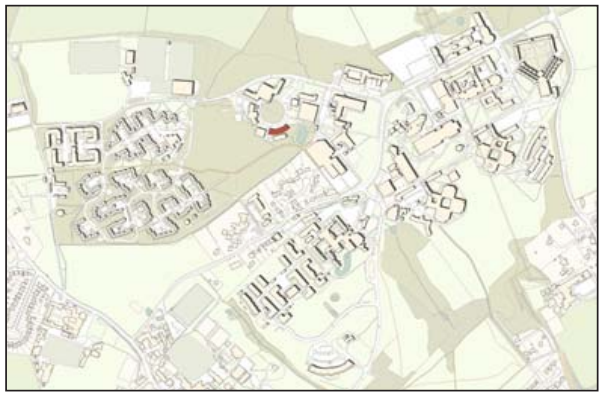
| | |
|---|---|
| Building Name | Kent Business School |
| Use | Academic offices and teaching spaces |
| GIA (sqm) | 1,688 |
| Built Date | 1992 |
| Floors | 2 |
| Typology | Crescent segment |
| Materials | Brick & white cladding panels, external columns |
| Roof Form | Pitched slate roof |
| Character / Architectural expression | Modern vernacular |
| Character Area | Brotherhood Wood |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Medium |
| Architect | Greenfield Jones Partnership |



H2

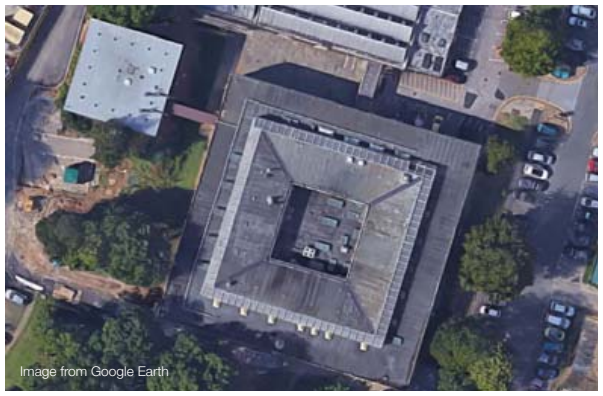
| | |
|---|---|
| Building Name | Research & Development Building<br>Now Demolished |
| Use | ? |
| Built Date | 1986 |
| Floors | 2 |
| Typology | Crescent segment |
| Materials | Brick |
| Roof Form | Pitched tiled roof |
| Character / Architectural expression | Modern vernacular |
| Character Area | Brotherhood Wood |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Medium |
| Architect | ? |

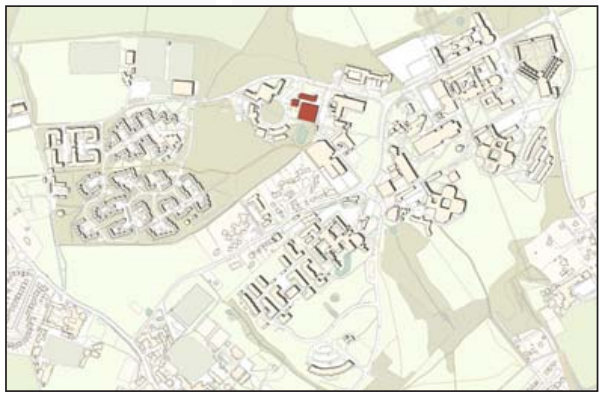




H3

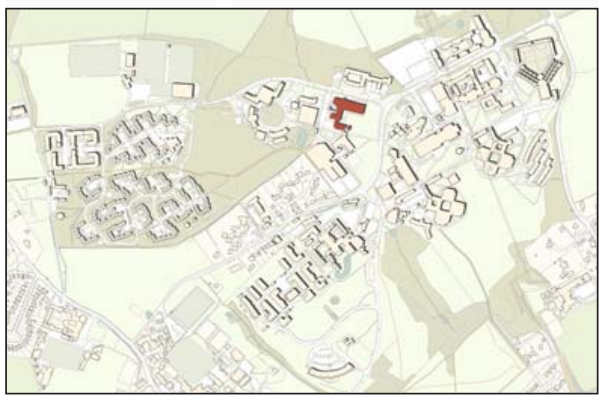
| | |
|---|---|
| Building Name | Jennison Building & Workshops |
| Use | Academic offices, laboratories, workshops and teaching spaces |
| GIA (sqm) | 5,169 |
| Built Date | 1969 |
| Floors | 2 |
| Typology | Square block |
| Materials | Brick & concrete frame, projecting timber boarded concrete panels - upper floor |
| Roof Form | Flat |
| Character / Architectural expression | Modern |
| Character Area | Brotherhood Wood |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Low |
| Architect | Farmer and Dark |





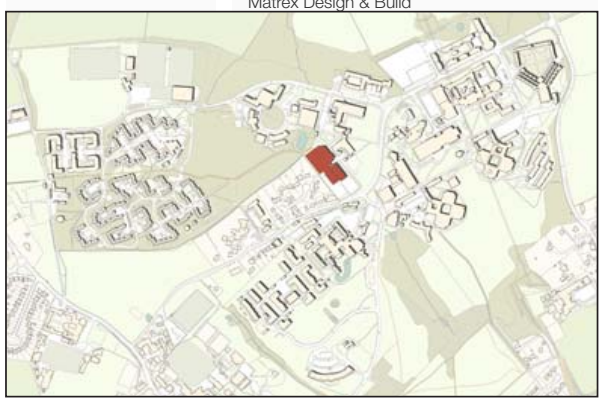
## H4

| | |
|---|---|
| Building Name | Ingram Building |
| Use | Academic offices, laboratories, teaching spaces |
| GIA (sqm) | 8,088 |
| Built Date | 1970s<br>Overclad in 2015 |
| Floors | 5 |
| Typology | L-block |
| Materials | Aluminium cladding panels/metal windows and infill panels |
| Roof Form | Flat |
| Character / Architectural expression | Contemporary / office business park |
| Character Area | Campus Heart + St.Stephens |
| Contribution to Architectural Character | Medium / low |
| Contribution to Public Realm | Low |
| Architect | Easton, Robertson, Preston and Partners |



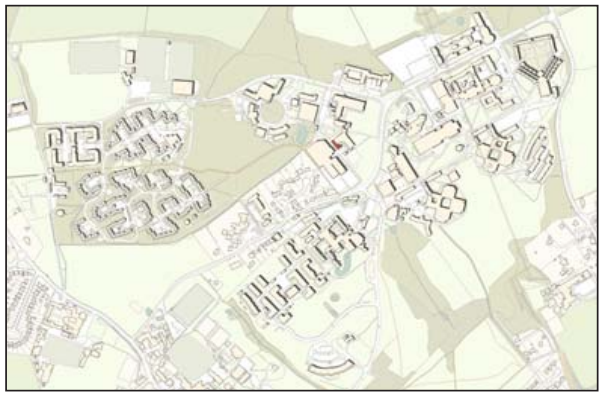
H5

| | |
|---|---|
| Building Name | Sports Centre |
| Use | Sports |
| GIA (sqm) | 6,353 |
| Built Date | 1968, extended and refurbished 1995 and 2003 |
| Floors | 1/2 |
| Typology | Rectangular block |
| Materials | Painted render, brick & copper cladding |
| Roof Form | Flat |
| Character / Architectural expression | Utilitarian / contemporary |
| Character Area | Campus Heart + Whitstable Road |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Low |
| Architect | Williamson/Faulkner Brown& Partners/Terrapin Matrex Design & Build |



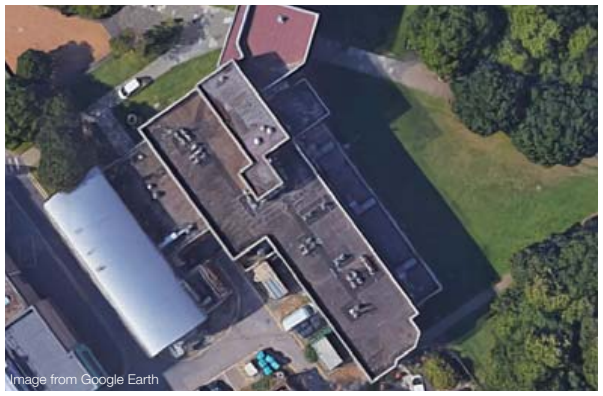
## H6

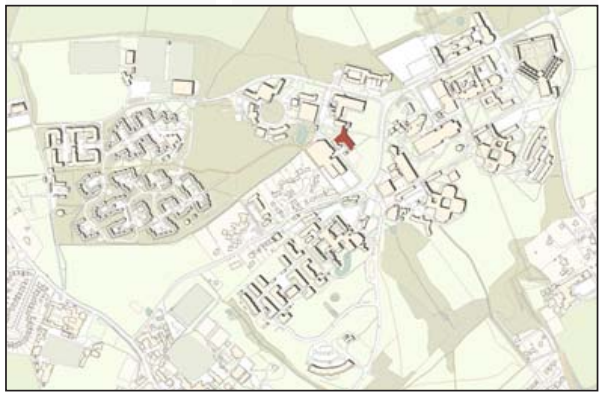
| | |
|---|---|
| Building Name | Stacey Extension |
| Use | Academic offices and laboratories |
| Built Date | 1992 |
| Floors | 2 |
| Typology | Linear building |
| Materials | Brick & profiled metal cladding |
| Roof Form | Shallow barrel vault |
| Character / Architectural expression | Contemporary/Light industrial |
| Character Area | Campus Heart + Whitstable Road |
| Contribution to Architectural Character | Medium-Low |
| Contribution to Public Realm | Low |
| Architect | ? |



H7

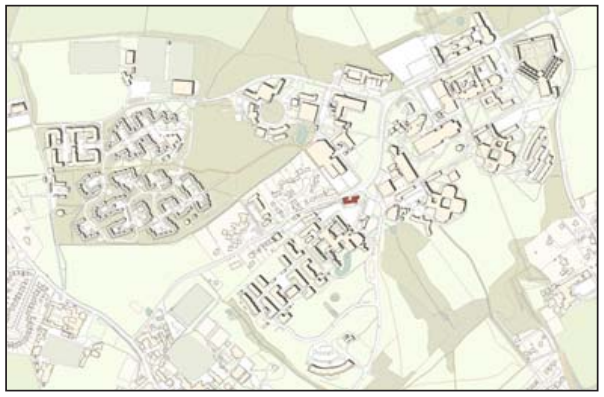
| | |
|---|---|
| Building Name | Stacey Building |
| Use | Academic offices, laboratories and teaching spaces |
| GIA (sqm) | 3,297 |
| Built Date | 1970 |
| Floors | 3/4 |
| Typology | L-block |
| Materials | Brick & expressed concrete frame |
| Roof Form | Flat |
| Character / Architectural expression | Modern |
| Character Area | Campus Heart + Brotherhood Wood |
| Contribution to Architectural Character | Medium / high |
| Contribution to Public Realm | Medium / low |
| Architect | Easton, Robertson, Preston and Partners |





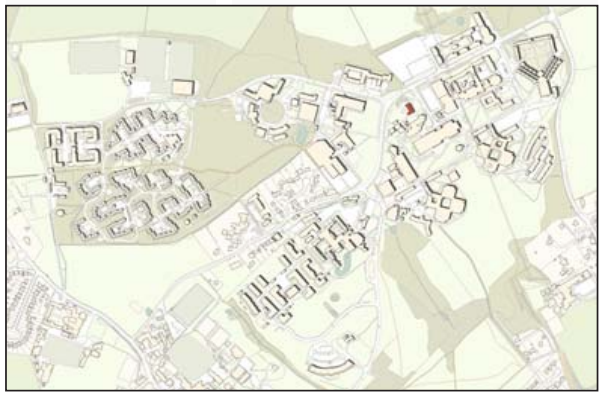
## H8

| | |
|---|---|
| Building Name | Tanglewood |
| Use | Offices |
| GIA (sqm) | 541 |
| Built Date | 17th century, extended 1958 |
| Floors | 2 |
| Typology | House<br>& single storey extensions |
| Materials | House: White shiplap boarding, brick & tile<br>Extensions: Pre-fab / container |
| Roof Form | Pitched |
| Character / Architectural expression | Traditional vernacular<br>Utilitarian / temporary |
| Character Area | Giles Lane |
| Contribution to Architectural Character | High (Original house) |
| Contribution to Public Realm | Medium |



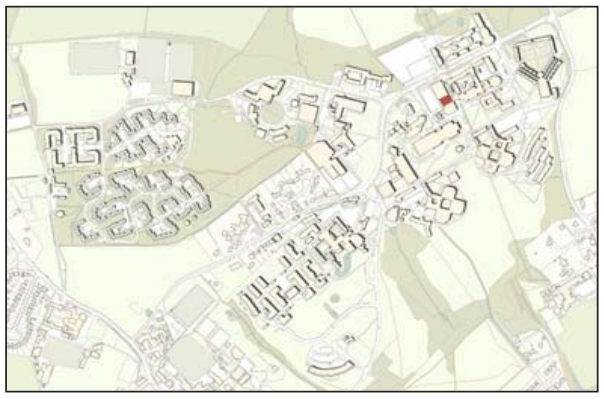
J1

| | |
|---|---|
| Building Name | Boiler House |
| Use | Service |
| GIA (sqm) | 391 |
| Built Date | 1965 |
| Floors | 1 |
| Typology | Small rectangular block. Cylinders and brick chimneys |
| Materials | Brick |
| Roof Form | Flat |
| Character / Architectural expression | Utilitarian |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Low |
| Architect | William Holford and Partners |



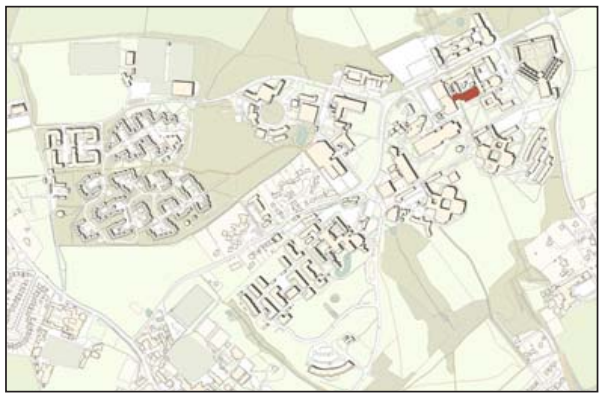
J2

| | |
|---|---|
| Building Name | Cornwallis Lecture Theatre |
| Use | Lecture theatre |
| Built Date | 1968 |
| Floors | 2 |
| Typology | Square block |
| Materials | Exposed aggregate block |
| Roof Form | Flat |
| Character / Architectural expression | Contemporary (collegiate / civic) |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Medium / Low |
| Architect | ? |



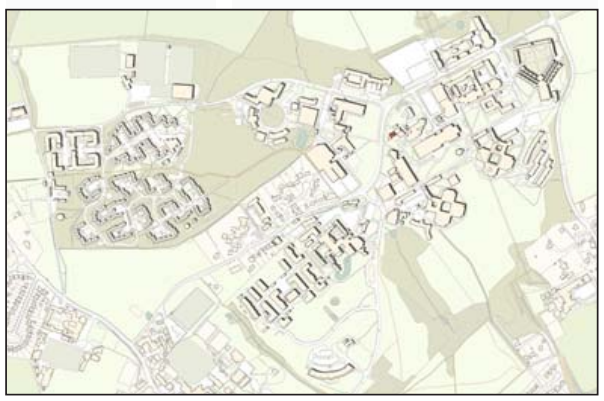
J3

| | |
|---|---|
| Building Name | Cornwallis South & South West |
| Use | Offices and teaching spaces |
| GIA (sqm) | 2,373 + 759 |
| Built Date | 1968 |
| Floors | 2 |
| Typology | Longitudinal block |
| Materials | Exposed aggregate block, precast concrete panels, projecting vertical concrete fins |
| Roof Form | Flat |
| Character / Architectural expression | Contemporary (collegiate / civic) |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Medium |
| Architect | Farmer and Dark |



J4

| | |
|---|---|
| Building Name | Security & Transport building |
| Use | Security and Transport |
| Built Date | 2017 |
| Floors | 1 |
| Typology | Contemporary |
| Materials | Cement board cladding |
| Roof Form | Flat |
| Character / Architectural expression | Modern vernacular / civic precinct |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium / low |
| Contribution to Public Realm | Medium / low |



J5

| | |
|---|---|
| Building Name | Telephone Exchange Group / Lupino Cinema |
| Use | Cinema |
| GIA (sqm) | 133 |
| Built Date | 1965, extended 1970 and 1981 |
| Floors | 2 |
| Typology | Contemporary |
| Materials | Brick and Metal Panel Fascia |
| Roof Form | Flat |
| Character / Architectural expression | Modern vernacular / utilitarian |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium / low |
| Contribution to Public Realm | Low |

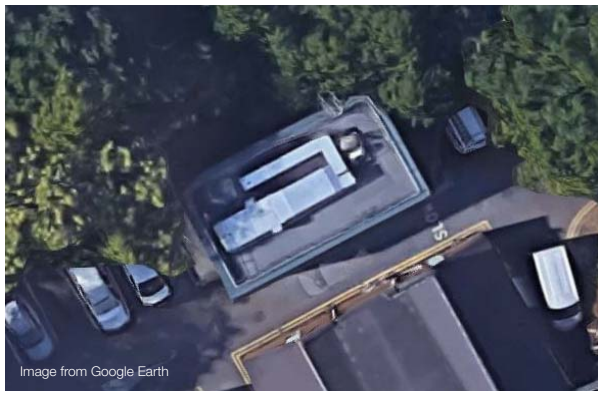
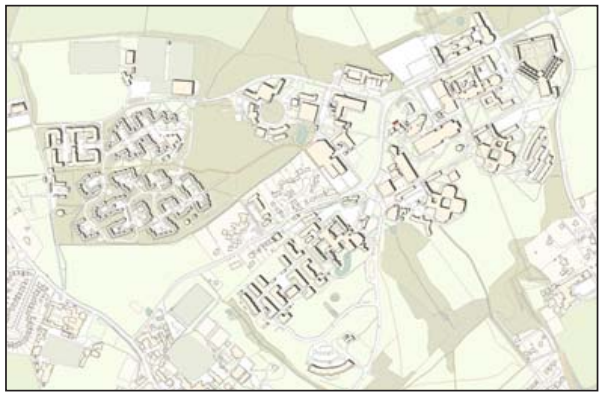
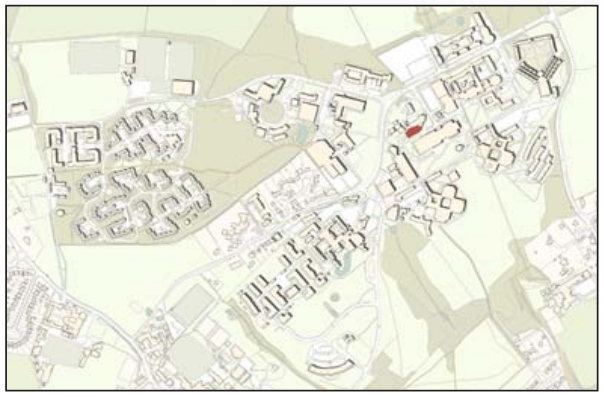


Image from Google Earth



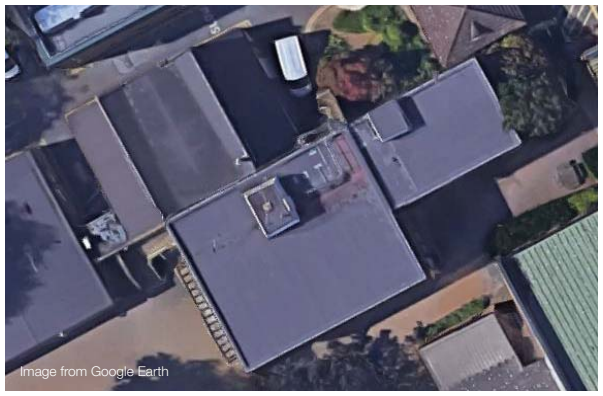
J6

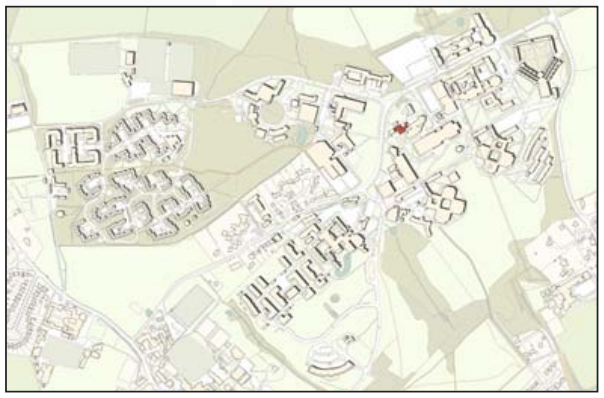
| | |
|---|---|
| Building Name | Grimond Building |
| Use | Teaching spaces |
| GIA (sqm) | 1,375 |
| Built Date | 1989 |
| Floors | 2 |
| Typology | Abutting rectangular block |
| Materials | Brick, timber and living wall |
| Roof Form | Monopitch slate roof, dormer windows |
| Character / Architectural expression | Modern vernacular / utilitarian |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium / low |
| Contribution to Public Realm | Medium / low |
| Architect | Greenfield Jones Partnership |



J7

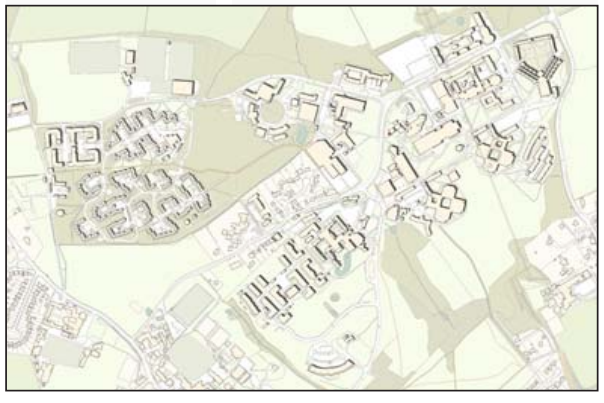
| | |
|---|---|
| Building Name | Telephone Exchange Group/Old Telephone Exchange |
| Use | Offices |
| GIA (sqm) | 967 |
| Built Date | 1965, extended 1970 and 1981 |
| Floors | 2 |
| Typology | Rectangular block |
| Materials | Concrete block |
| Roof Form | Flat |
| Character / Architectural expression | Modern vernacular / utilitarian |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Low |
| Architect | William Holford & Partners/Farmer and Dark |





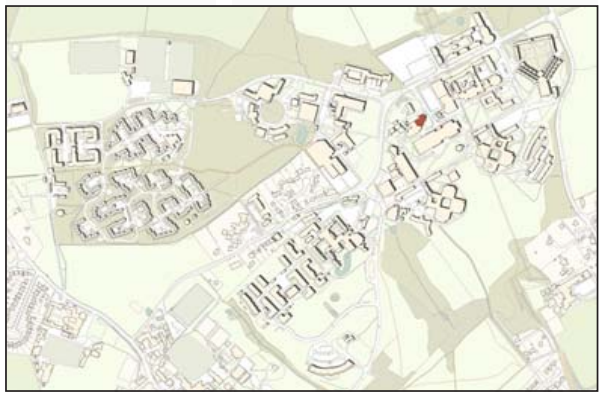
J8

| | |
|---|---|
| Building Name | Telephone Exchange Group/ |
| Use | Banking (to be redeveloped) |
| Built Date | 1965, extended 1970 and 1981 |
| Floors | 1 |
| Typology | Rectangular block |
| Materials | Concrete block |
| Roof Form | Flat |
| Character / Architectural expression | Modern vernacular / utilitarian/civic precinct |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Low |



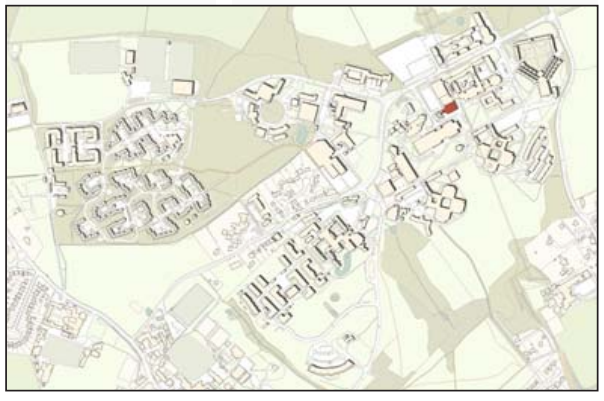
J9

| | |
|---|---|
| Building Name | Lumley Building |
| Use | Teaching space |
| GIA (sqm) | 249 |
| Built Date | 1989, extended 2004 (Aphra) |
| Floors | 1/2 |
| Typology | Small longitudinal block creates courtyard garden with main building |
| Materials | Concrete block, frame & spandrels |
| Roof Form | Flat |
| Character / Architectural expression | Modern vernacular / utilitarian |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium / low |
| Contribution to Public Realm | Medium |
| Architect | ? |



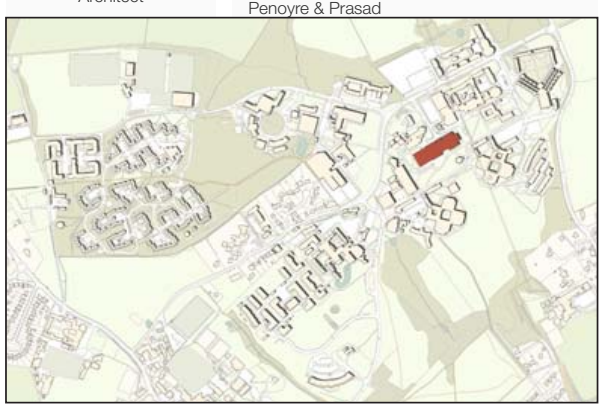
## J10

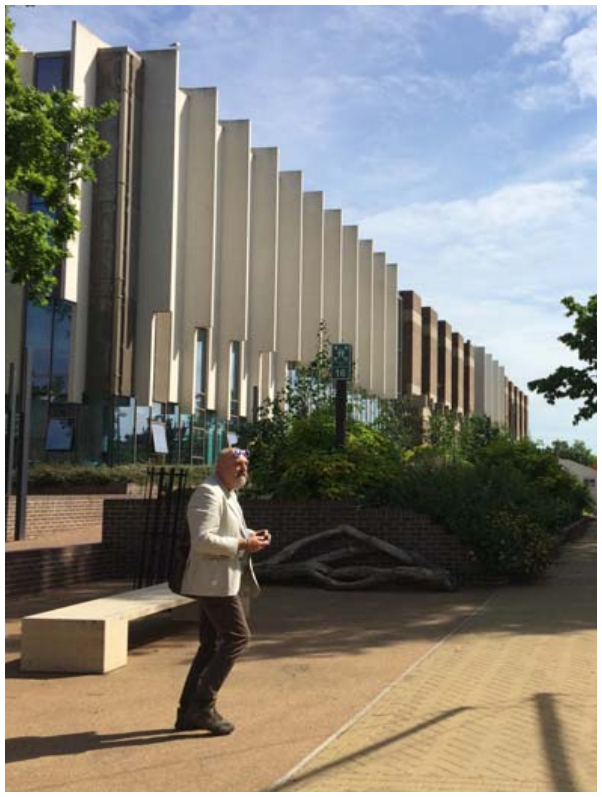
| | |
|---|---|
| Building Name | Gulbenkian Theatre |
| Use | Theatre / cafe |
| GIA (sqm) | 2,139 |
| Built Date | 1969<br>Extended 2005 |
| Floors | 1/2 |
| Typology | Trapezoidal Hexagon |
| Materials | Render, concrete block |
| Roof Form | Flat |
| Character / Architectural expression | Modern (civic), contemporary |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Medium |
| Architect | Farmer and Dark |



J11

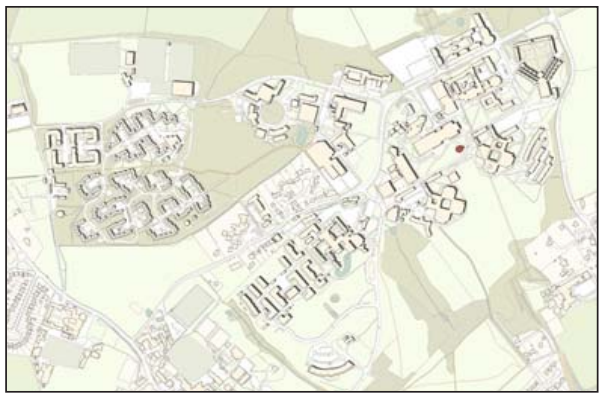
| | |
|---|---|
| Building Name | Templeman Library<br>Library Extensions |
| Use | Library and study space |
| GIA (sqm) | 18,807 |
| Built Date | 1968<br>1995 / 2017 |
| Floors | 4 |
| Typology | Longitudinal block |
| Materials | Brick & concrete<br>Brick, concrete, glass & GRC panel |
| Roof Form | Flat |
| Character / Architectural expression | Modern<br>Modern / Contemporary |
| Character Area | Campus Heart |
| Contribution to Architectural Character | High / medium |
| Contribution to Public Realm | High/Medium |
| Architect | William Holford /Farmer and Dark/ Penoyre & Prasad |





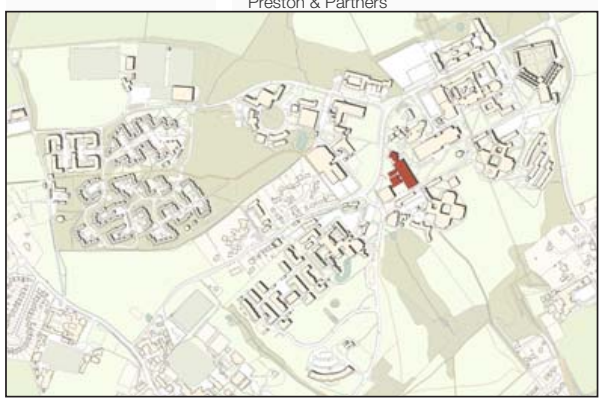
## J12

| | |
|---|---|
| Building Name | Senate |
| Use | Meeting rooms, study space |
| Built Date | 1970 , extended 1972, 1990 and 2017 |
| Floors | 2 |
| Typology | Hexagon |
| Materials | Brick & concrete block with timber.<br>Later curtain wall glazed entrance |
| Roof Form | Flat |
| Character / Architectural expression | Modern (civic) |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Medium |
| Architect | Farmer & Dark |



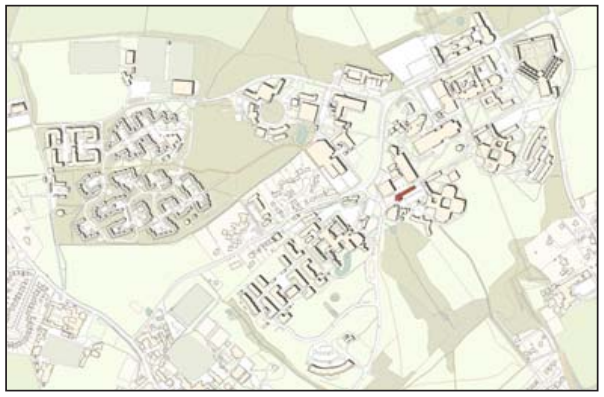
## J13

| | |
|---|---|
| Building Name | Marlowe Building<br>(Formerly Physical Sciences) |
| Use | School of Architecture<br>School of Anthropology and Conservation |
| GIA (sqm) | 6,263 |
| Built Date | 1965, extended 1972, 1990 and 2017 |
| Floors | 2 |
| Typology | Longitudinal block |
| Materials | Brick & concrete<br>Brick & render & kinetic wall extensions |
| Roof Form | Flat |
| Character / Architectural expression | Modern / Brutalist |
| Character Area | Campus Heart |
| Contribution to Architectural Character | High / medium |
| Contribution to Public Realm | High / medium |
| Architect | William Holford & Partners/Easton/Robertson/ Preston & Partners |



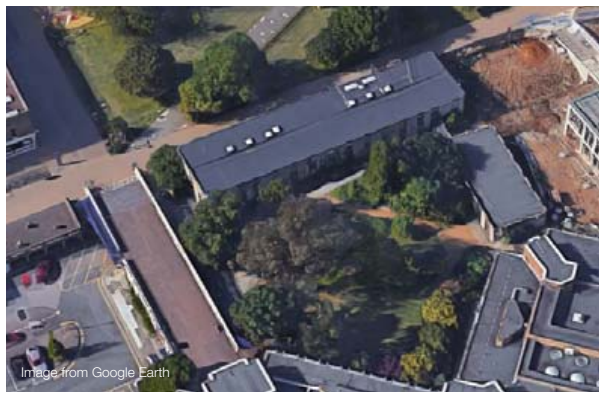
## J14

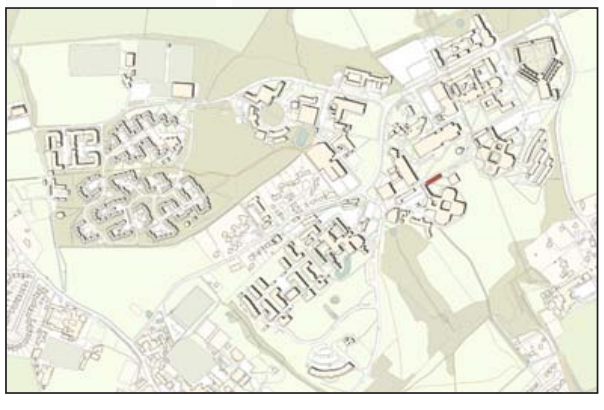
| | |
|---|---|
| Building Name | Locke building |
| Use | Retail / cafe<br>Student Union |
| Built Date | 1998 |
| Floors | 1 / 2 |
| Typology | Thin rectangular block |
| Materials | Concrete block, shopfront, metal roof & expressed external columns |
| Roof Form | Flat & pitched |
| Character / Architectural expression | Modern utilitarian / suburban precinct |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Medium / low |
| Architect | ? |



## J15

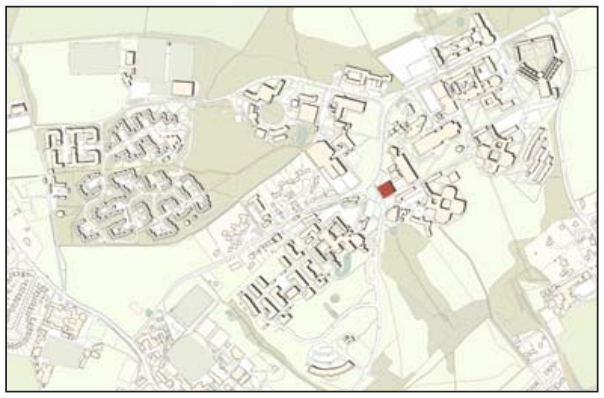
| | |
|---|---|
| Building Name | Elliot College Extension |
| Use | Academic offices, teaching spaces |
| GIA (sqm) | 822 |
| Built Date | 1975 |
| Floors | 1/2 |
| Typology | Small longitudinal block creates courtyard garden with main building |
| Materials | Concrete block, frame & spandrels |
| Roof Form | Flat |
| Character / Architectural expression | Modern utilitarian |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium / low |
| Contribution to Public Realm | Medium |
| Architect | Farmer and Dark |





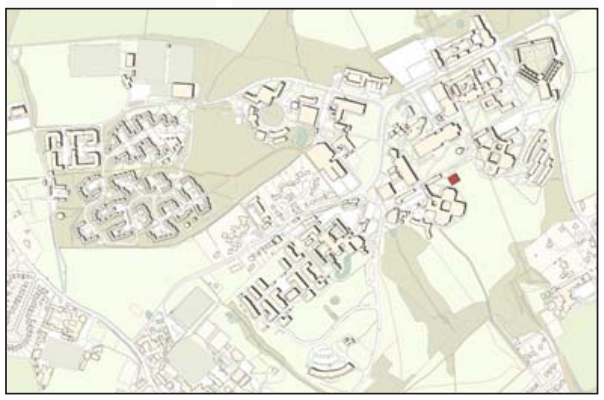
## J16

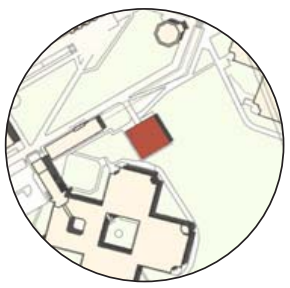
| | |
|---|---|
| Building Name | Jarman Building |
| Use | Academic offices, teaching spaces |
| GIA (sqm) | 2,683 |
| Built Date | 2009 |
| Floors | 3 |
| Typology | Square block |
| Materials | Metal zinc cladding & glass curtain wall<br>Chainlink screen |
| Roof Form | Flat |
| Character / Architectural expression | Modern contemporary |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Medium / low |
| Architect | Hawkins Brown Architects |



J17

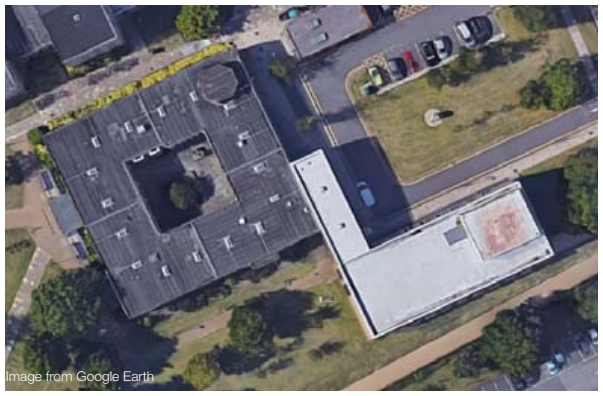
| | |
|---|---|
| Building Name | Wigoder Building |
| Use | Academic offices, teaching spaces |
| GIA (sqm) | 982 |
| Built Date | 2016 |
| Floors | 2 |
| Typology | Small square block |
| Materials | GRC composite panels & glass |
| Roof Form | Flat |
| Character / Architectural expression | Modern |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Low |
| Architect | Hawkins/Brown |

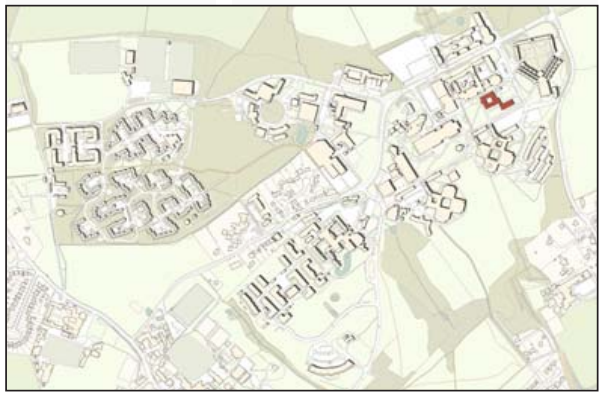




K1

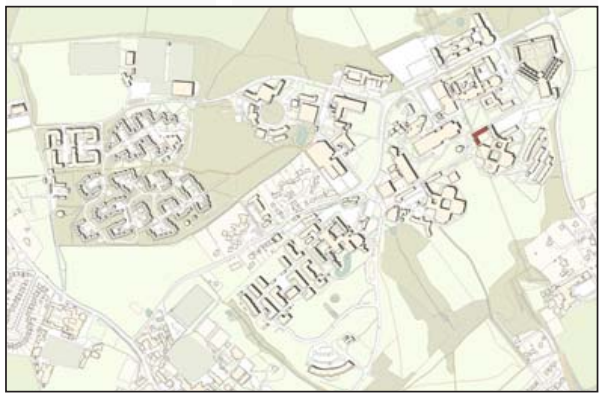
| | |
|---|---|
| Building Name | Registry |
| Use | Visitor reception / administration |
| GIA (sqm) | 3,222 |
| Built Date | 1970<br>Extended 2003 |
| Floors | 2 |
| Typology | Longitudinal block conjoined with courtyard block |
| Materials | Concrete block & expressed concrete frame<br>Reglit glass extension |
| Roof Form | Flat |
| Character / Architectural expression | Modern |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Medium |
| Architect | Farmer and Dark |

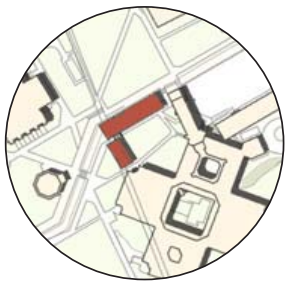




K3

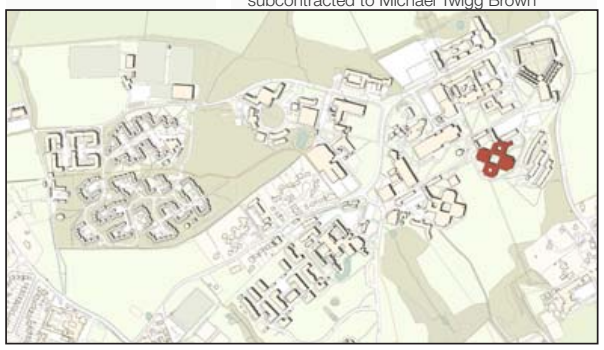
| | |
|---|---|
| Building Name | Rutherford College Extension |
| Use | Academic offices, teaching spaces |
| GIA (sqm) | 929 |
| Built Date | 1979 |
| Floors | 1/2 |
| Typology | Small longitudinal block creates courtyard garden with main building |
| Materials | Concrete block |
| Roof Form | Flat |
| Character / Architectural expression | Modern utilitarian |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Medium / low |
| Contribution to Public Realm | Medium |
| Architect | Farmer and Dark |





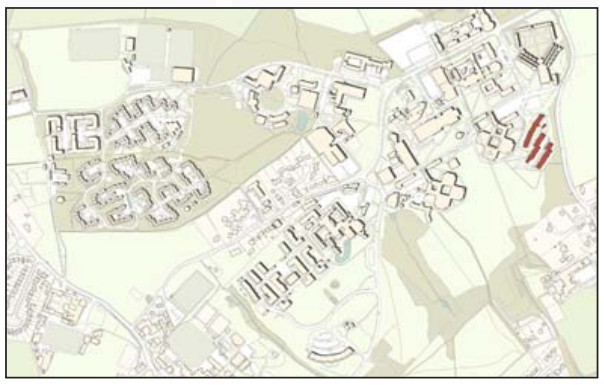
K4

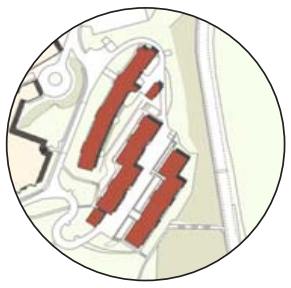
| | |
|---|---|
| Building Name | Rutherford College |
| Use | College |
| GIA (sqm) | 13,973 |
| Built Date | 1966 |
| Floors | 3 / 4 with roof attic |
| Typology | Cruciform around courtyard, mixed college |
| Materials | Precast concrete panel & vertical window spandrels |
| Roof Form | Flat, hexagon |
| Character / Architectural expression | Modern / Brutalist |
| Character Area | Campus Heart |
| Contribution to Architectural Character | High |
| Contribution to Public Realm | Medium |
| Architect | Willam Holford & Partners subcontracted to Michael Twigg Brown |



K5

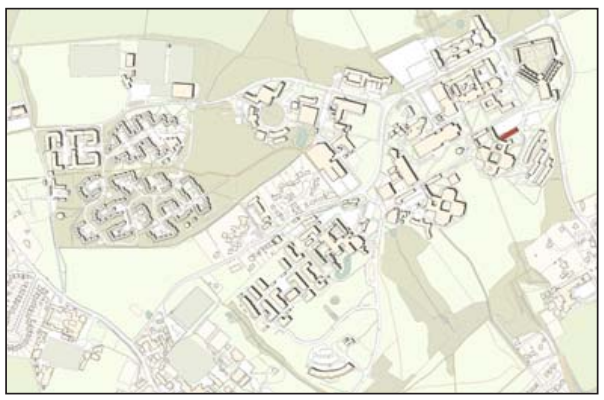
| | |
|---|---|
| Building Name | Tyler Court A,B,C |
| Use | Student Housing |
| GIA (sqm) | A: 3,922/B:4,212/C:4,257 |
| Built Date | Phase 1: 1995<br>Phase 2 and 3: 2015 |
| Floors | Phase 1: 4 Floors<br>Phase 2: 5 Floors |
| Typology | Parallel linear blocks |
| Materials | Phase 1:Brick, painted render<br>Phase 2 and 3: Expressed metal frame, timber building infill, render, green tile and metal spandrel |
| Roof Form | Curved copper & flat |
| Character / Architectural expression | Modern contemporary (institutional) |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Low |
| Architect | A: Robert Hutson Architects |





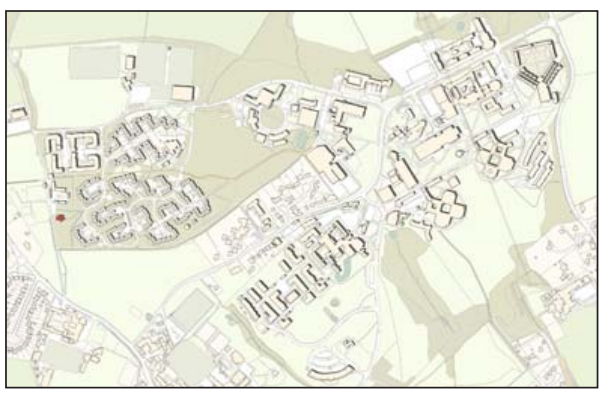
## K6

| | |
|---|---|
| Building Name | Rutherford College Annex |
| Use | Offices |
| GIA (sqm) | 1,116 |
| Built Date | 2013 |
| Floors | 2 |
| Typology | Small longitudinal block |
| Materials | Container / pre-fab |
| Roof Form | Flat |
| Character / Architectural expression | Utilitarian / temporary |
| Character Area | Campus Heart |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Low |



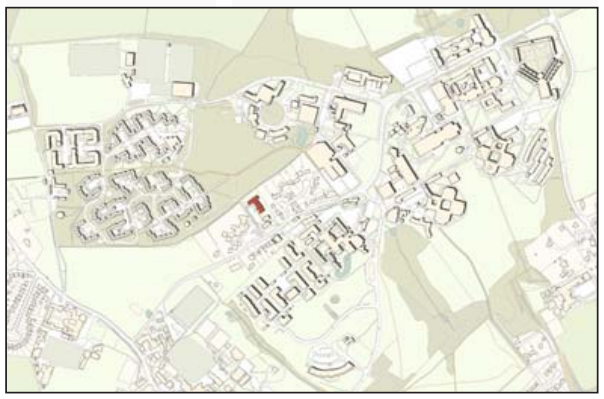
L1

| | |
|---|---|
| Building Name | Hothe Court Farmhouse |
| Use | Vacant, being refurbished |
| GIA (sqm) | 1,999 |
| Built Date | 16th & 18th Century |
| Floors | 2.5 |
| Typology | Victorian farmhouse |
| Materials | Brick, tile hung, half timbered frame & brick infill, render, red tile roof |
| Roof Form | Pitched, hipped |
| Character / Architectural expression | Victorian |
| Character Area | Whitstable Road + Ridgline West + Hothe Court |
| Contribution to Architectural Character | High |
| Contribution to Public Realm | Medium |



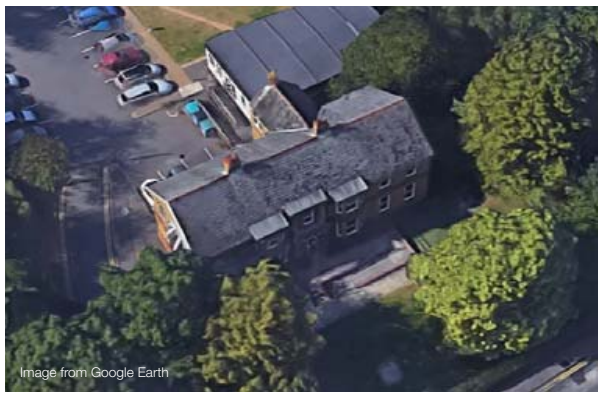
N1 N2

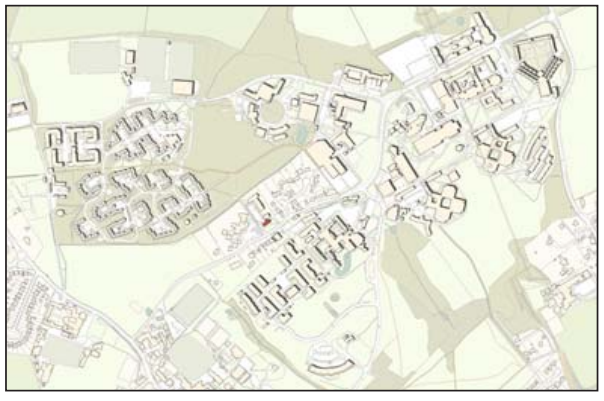
| | |
|---|---|
| Building Name | Medical Centre & Pharmacy<br>Built on land leased from the University, not University owned or operated |
| Use | Health & welfare |
| Built Date | 2004 |
| Floors | 1 /2 |
| Typology | Small L block |
| Materials | Buff brick & slate roof<br>Brick, brown & red slate roof |
| Roof Form | Pitched, hipped |
| Character / Architectural expression | Suburban vernacular |
| Character Area | Whitstable Road+Ridgeline West+Parkwood |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Low |



N3

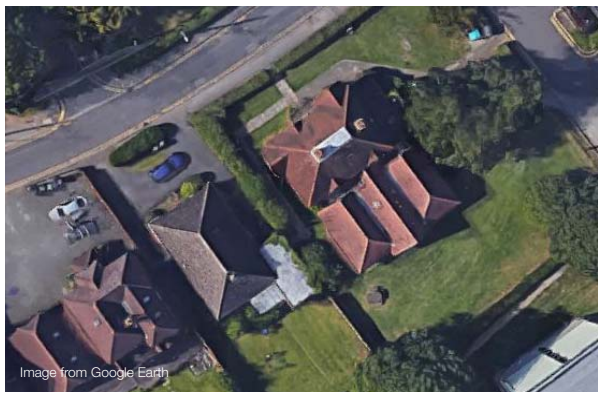
| | |
|---|---|
| Building Name | Woodlands |
| Use | Academic offices |
| GIA (sqm) | 355 |
| Built Date | Late 19th/early 20th Century |
| Floors | 2 |
| Typology | Victorian or Edwardian house |
| Materials | Brick, brown & red slate roof |
| Roof Form | Pitched, hipped |
| Character / Architectural expression | Victorian / Edwardian |
| Character Area | Giles Lane |
| Contribution to Architectural Character | High / medium |
| Contribution to Public Realm | Medium |

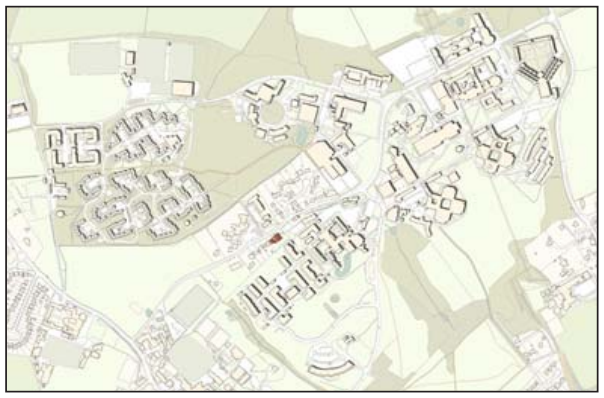




N4

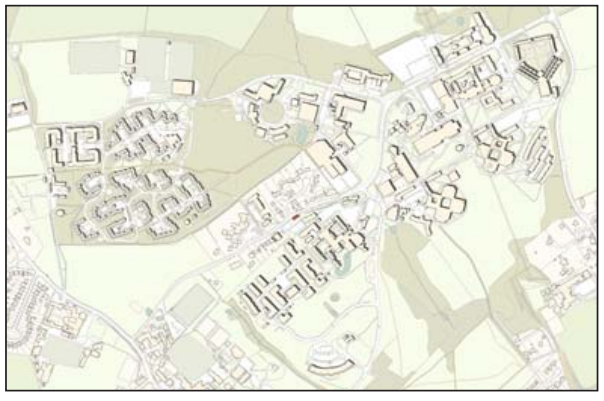
| | |
|---|---|
| Building Name | Rothford |
| Use | Offices |
| GIA (sqm) | 318 |
| Built Date | 1910 |
| Floors | 2 |
| Typology | Victorian / Edwardian house |
| Materials | Red brick, tile hung & red tile roof |
| Roof Form | Pitched, hipped |
| Character / Architectural expression | Suburban vernacular |
| Character Area | Giles Lane |
| Contribution to Architectural Character | High/medium |
| Contribution to Public Realm | Medium |





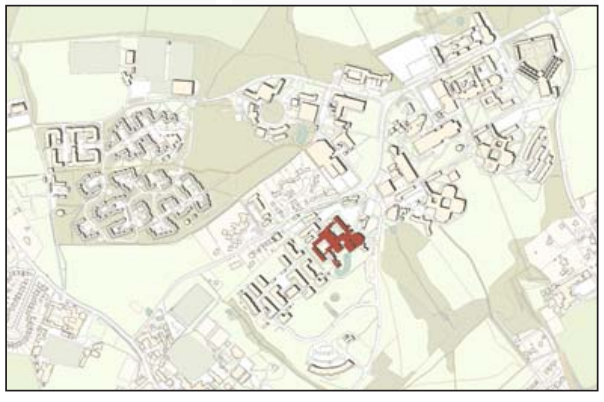
N5

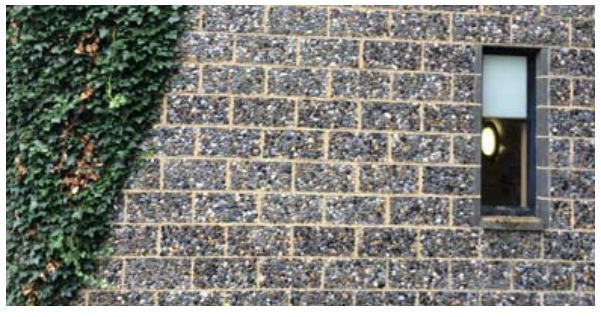
| | |
|---|---|
| Building Name | Olive Cottages |
| Use | Offices |
| GIA (sqm) | 196 |
| Built Date | 19th Century |
| Floors | 2 |
| Typology | Victorian cottages |
| Materials | Brick & render, red tile roof |
| Roof Form | Pitched, hipped |
| Character / Architectural expression | Victorian / Edwardian cottage |
| Character Area | Ridgeline West + Giles Lane |
| Contribution to Architectural Character | High / medium |
| Contribution to Public Realm | Medium |



## N6

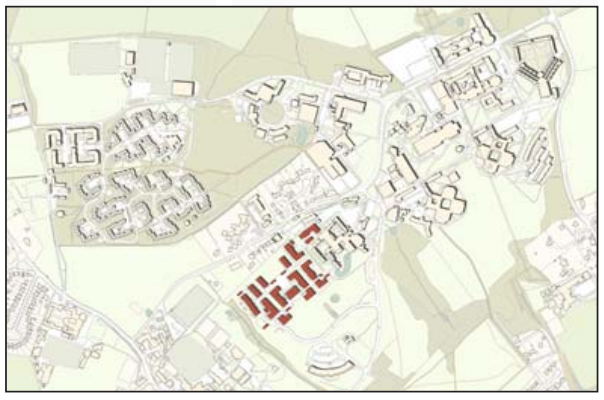
| | |
|---|---|
| Building Name | Keynes College |
| Use | College |
| GIA (sqm) | 15,035 |
| Built Date | 1968<br>Lecture theatre extended 2001 |
| Floors | 4 |
| Typology | Closed & open courtyards |
| Materials | Concrete block, exposed aggregate with intermittent windows & spandrels<br>Lecture theatre: Glass curtain wall |
| Roof Form | Flat |
| Character / Architectural expression | Modern (collegiate) |
| Character Area | Whitstable Road + Ridgeline West |
| Contribution to Architectural Character | High / medium |
| Contribution to Public Realm | High / medium |
| Architect | Farmer & Dark |





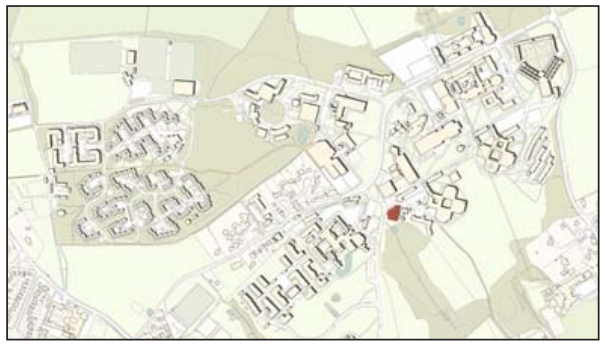
N7

| | |
|---|---|
| Building Name | Turing College |
| Use | College |
| GIA (sqm) | 1,896 |
| Built Date | 2014 |
| Floors | 4 & 1/2 |
| Typology | L & I blocks forming open and semi-enclosed courtyards, square communal facility block |
| Materials | Block & render with vertical window & spandrels<br>1 storey timber & gabion wall communal facility |
| Roof Form | Flat & green roof |
| Character / Architectural expression | Modern contemporary |
| Character Area | Whitstable Road + Ridgeline West |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Medium |
| Architect | ? |



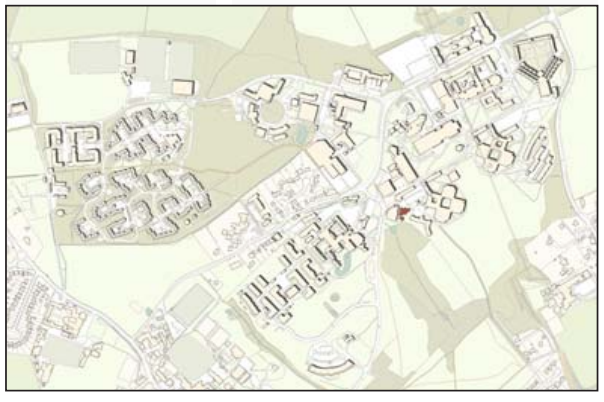
P2

| | |
|---|---|
| Building Name | The Venue / Media Centre |
| Use | Student Union and Support Services |
| Built Date | 1998 |
| Floors | 2 / 3 |
| Typology | Small rectangular block, campanile & lantern |
| Materials | Brown block, exposed metal columns |
| Roof Form | Mono pitch |
| Character / Architectural expression | Modern / Utilitarian |
| Character Areas | Whitstable Road + St.Thomas Hill + Campus Heart+Ridgeline West |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Medium / Low |
| Architect | ? |



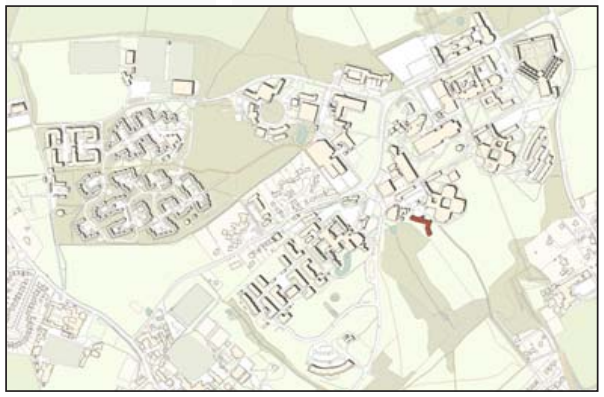
P3

| | |
|---|---|
| Building Name | Mandela Building |
| Use | Student Union offices |
| GIA (sqm) | 536 |
| Built Date | 1979, extended 2011 |
| Floors | 2 |
| Typology | Small square block |
| Materials | Brick & render |
| Roof Form | Flat roof |
| Character / Architectural expression | Modern / utilitarian |
| Character Area | Whitstable Road + St.Thomas Hill + Campus Heart+Ridgeline West |
| Contribution to Architectural Character | Low |
| Contribution to Public Realm | Low |
| Architect | ? |



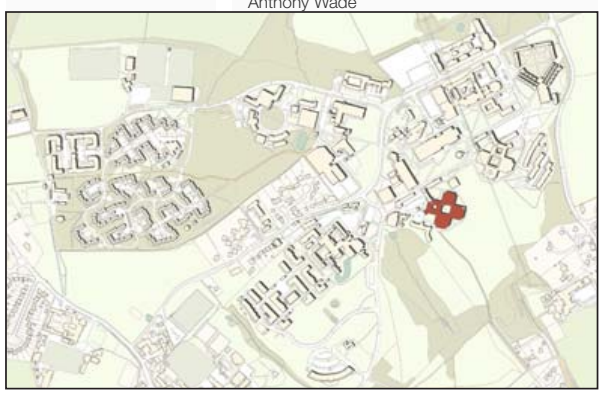
P4

| | |
|---|---|
| Building Name | Becket Court |
| Use | Student Housing |
| GIA (sqm) | 2,598 |
| Built Date | 1990 |
| Floors | 3 / 4 |
| Typology | Cranked L-block |
| Materials | Concrete block/Slate roof |
| Roof Form | Pitched |
| Character / Architectural expression | Modern / utilitarian / vernacular |
| Character Area | Whitstable Road + St.Thomas Hill + Campus Heart+Ridgeline West |
| Contribution to Architectural Character | Medium / low |
| Contribution to Public Realm | Low |
| Architect | Greenfield Jones and Partnership |



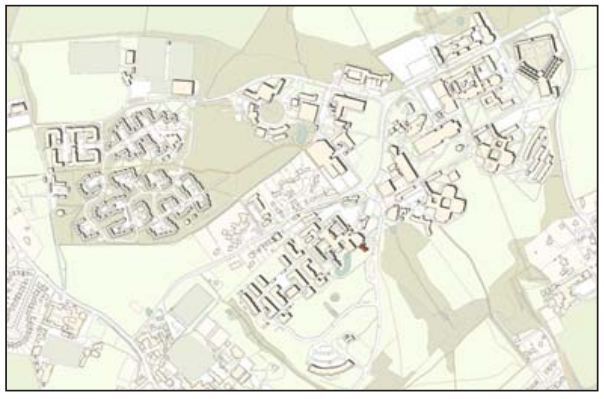
P5

| | |
|---|---|
| Building Name | Eliot College |
| Use | College |
| GIA (sqm) | 14,228 |
| Built Date | 1965 |
| Floors | 3 / 4 with roof attic |
| Typology | Cruciform around courtyard, mixed college |
| Materials | Precast concrete panel & vertical window spandrels |
| Roof Form | Flat |
| Character / Architectural expression | Modern / Brutalist |
| Character Area | St.Thomas Hill + Campus Heart |
| Contribution to Architectural Character | High |
| Contribution to Public Realm | Medium |
| Architect | Lord Holford<br>Anthony Wade |



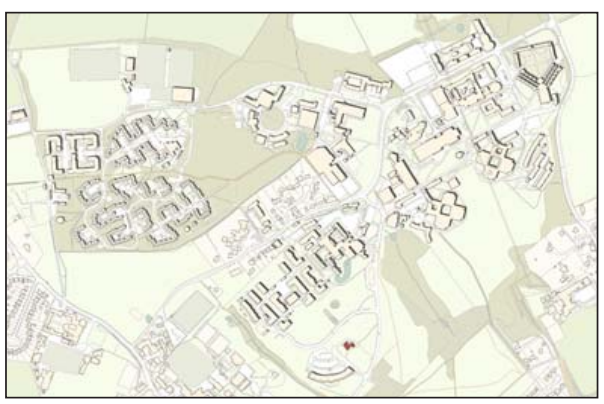
P6

| | |
|---|---|
| Building Name | Careers & Employability Service |
| Use | Offices |
| Built Date | 1968 |
| Floors | 2 |
| Typology | Small square pavilion |
| Materials | Concrete block, zinc standing seam roof |
| Roof Form | Pyramidal |
| Character / Architectural expression | Modern collegiate |
| Character Area | Whitstable Road + Ridgeline West+ St.Thomas Hill |
| Contribution to Architectural Character | Medium / high |
| Contribution to Public Realm | Medium/Low |
| Architect | ? |



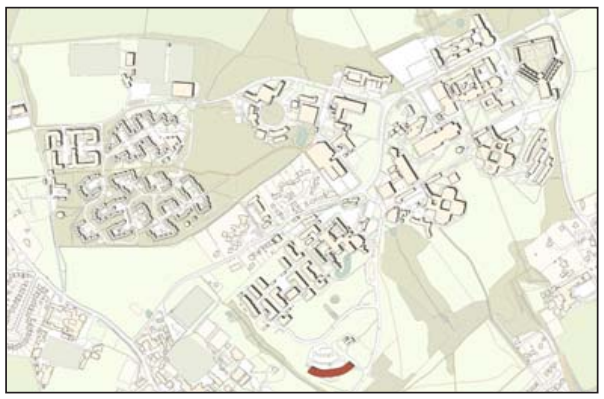
Q2

| | |
|---|---|
| Building Name | Beverley Farmhouse |
| Use | Visitors accommodation |
| GIA (sqm) | 610 |
| Built Date | Late 1400's onwards |
| Floors | 2/3 |
| Typology | Farmhouse |
| Materials | Brick, tile hung, half timbered frame & brick infill, render, red tile roof |
| Roof Form | Pitched |
| Character / Architectural expression | Medieval / Victorian |
| Character Area | Beverley Farmhouse+Whitstable Road +Ridgeline West+ St.Thomas Hill |
| Contribution to Architectural Character | High |
| Contribution to Public Realm | Medium |



Q3

| | |
|---|---|
| Building Name | Canterbury Innovation Centre<br>Built on land leased from the University, not owned or operated by the University |
| Use | Innovation |
| Built Date | 2012 |
| Floors | 2 / 3 |
| Typology | Crescent block |
| Materials | Glass walling, metal louvres, cladding panel, render |
| Roof Form | Shallow mono-pitch, metal |
| Character / Architectural expression | Contemporary/ business park |
| Character Area | University Road+ St.Thomas Hill+ Southern Slopes |
| Contribution to Architectural Character | Medium |
| Contribution to Public Realm | Medium / low |
| Architect | ? |



# Historical evolution

# University of Kent, Canterbury

## Historical Evolution

Researched by W.H.H. Van Sickle, B.A., M.Sc.(Pl.)

University of Kent

November 2017

# PRE-UNIVERSITY CONTEXT

Introduction

The following notes, chronology, plans, and images are intended to raise and clarify discussion points regarding the relationship between the University of Kent at Canterbury – both as planned, and as developed – and the historical topographical context in which the campus sits (and to which it at least partially still relates).

Pre-University Context

The land north of Canterbury's city limits extended over five parishes – Hackington; Harbledown; Sturry; St Dunstan; and St Cosmos and St Damian-in-the-Blean – and included a number of significant topographical features:

- Tyler Hill;
- Sarre Penn, an east/west stream between the campus and village of Blean (crossed by the Whitstable Road at "Fishbourne Bridge");
- the main and secondary roads between Canterbury and Whitstable (including the ancient "Salt Road" between Seasalter and Canterbury);
- Giles Lane, a rural lane running on high ground and providing access to local farms; and
- very extensive woodlands and orchards.

The Saxon and early post-Conquest roots of many of the area's places and geographical features are reflected in current place-names:

Beverley Farm
: Thought possibly from "beavers + lea" (the latter meaning a field – a patch of cleared land, rather than a naturally open meadow)

Blean
: Old English, meaning "rough ground"

Brotherhood Farm/Woods
: Owned by one of the early post-Conquest hospitals (discussed below)

Hospital Wood
: As for Brotherhood Farm and Woods

Hale's Place
: Estate purchased by the Hale family in 1675 from Thomas Culpeper, who in turn had purchased it in 1627 from the Manwood family, who had held it as a grant from Elizabeth I c.1560 (and are still referenced in "Manwoods Hospital"). A Carmelite convent comprising a church, convent, and farm offices designed by Pugin was built at Hale's Place in 1863 by then the-owner, Miss Hales. It was sold to the Jesuits in 1880 (as "St Mary's College"), but the order returned to France c.1924; the buildings were demolished in the late 1920s; and the property was developed with houses.

Hothe Court Farm
: Holt (wood or "heath"). The parish of Hothe was described by Edward Hasted in his 1799 History of Kent as "situated in a lonely unfrequented country, both unwholesome and unpleasant,the soil being for the most part a deep stiff clay".

Sarre Penn
: The name of the stream between the University and Blean (origin not yet established). Apparently also known as the Fishbourne.

Tyler Hill
: Named for the tile-making industry in this location.

Blean is mentioned in the Canterbury Tales, when the pilgrims were overtaken by a canon and his yeoman in "Boghtoun under Blee" (now Boughton under Blean). (The Canon leaves after a servant exposes him as a swindler, and the Canon's Yeoman is left behind to tell a story in his place.) The reference is only in passing, though, as Boughton under Blean lies on Watling Street at the east end of "Boughton Street", just before Dunkirk. The village of Blean north of the University lies 4 or 5 miles east of this, and the reference to "under Blean" is presumably to the intervening Blean Woods (now a National Nature Reserve), rather than to the village.

The village of Blean itself, however, lies on the Salt Road, an ancient route between Canterbury and Whitstable via the village of Seasalter. A Roman villa existed southwest of the site of Blean church from the 1st to the 3rd centuries, and it is thought that in 598 – one year after their arrival – monks accompanying Augustine from Rome set up a shrine to Saints Cosmus and Damian. (Like Hothe Court Farm, Seasalter did not impress Hasted, who in his 1799 History of Kent described it as "in an obscure out of the way situation, bounded by the sea northward, but the large tract of marshes which adjoin it westward, as well as the badness of the water, make it very unhealthy".)

The names of Brotherhood Farm, Park Wood, Brotherhood Wood, and Hospital Wood – which with Beverley Farm comprised the bulk of the University's estate – record ownership by local asylums founded in the 1080s by Archbishop Lanfranc: St Nicholas Hospital in Harbledown (originally the "Hospital of the Forest of Blean", and thought to be the earliest documented leper hospital in England), and St John's Hospital at Northgate (for the infirm). These estates continued after the Dissolution of the mid 1500s, and in the case of Brotherhood Farm and Wood were still in institutional ownership when the tithes were commuted in the mid 1800s.

Beverley Farm was owned by established families – in 1799 it was the estate of two baronets (Sir Edward Dering and Sir Rowland Wynne), and in the early 16th century had belonged to the Roper family (who held extensive estates in Kent) – but by the 19th century the farm was occupied by a farm manager rather than by its owners.

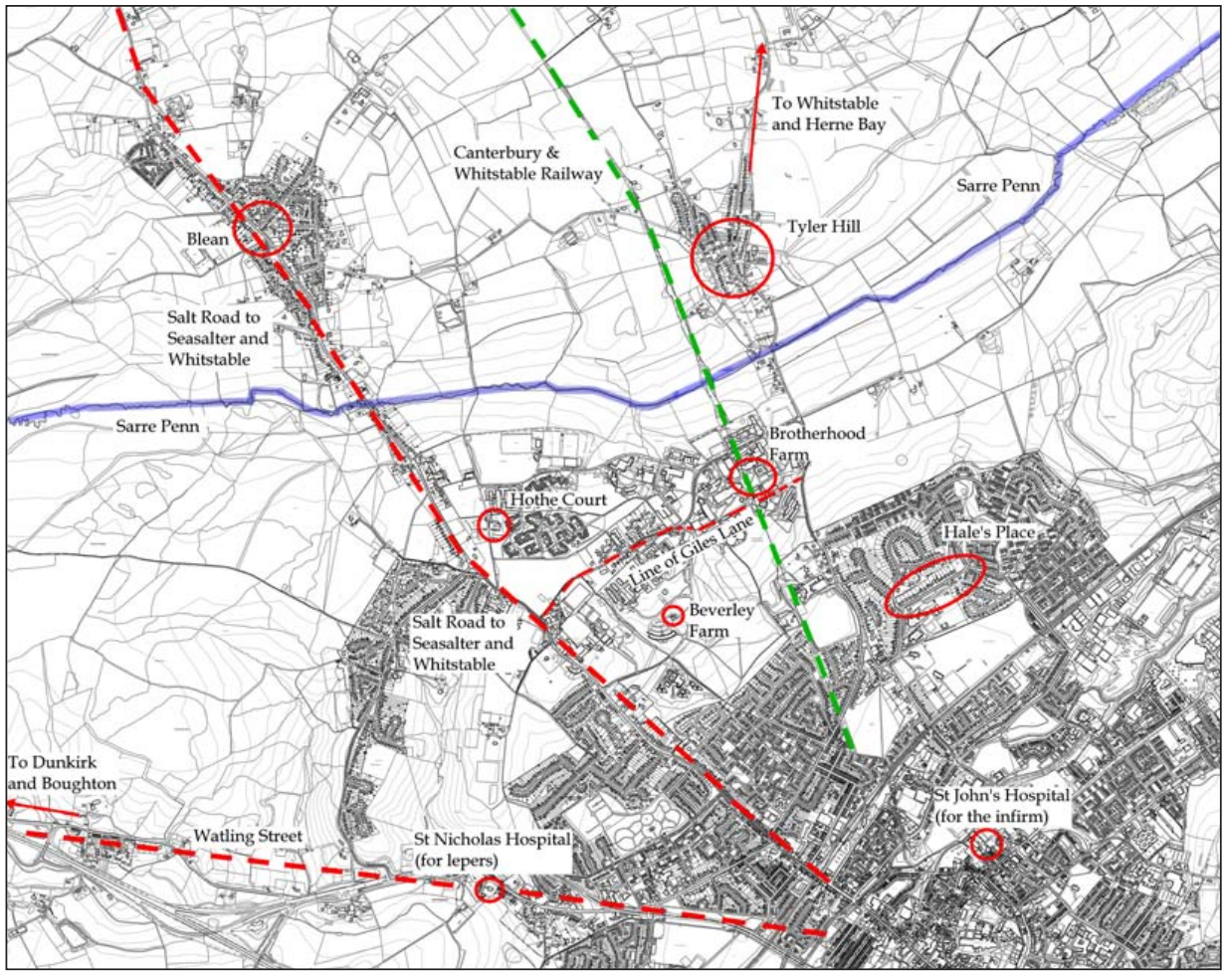
CANTERBURY AND WHITSTABLE RAILWAY

Canterbury and Whitstable Railway

The Canterbury and Whitstable Railway (nicknamed the "Crab & Winkle") was built through the district in the late 1820s, introducing the railway embankment and tunnel. Otherwise, however, the surrounding rural landscape changed little between the 19th century and the development of the University in the 1960s.

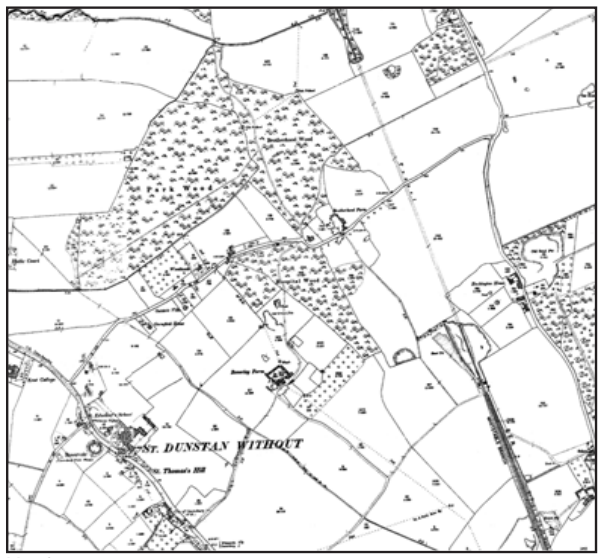
The six-mile-long, single-track railway (including the Tyler Hill tunnel beneath the University campus) was built in the late 1820s and opened in 1830 – an extremely early date in the history of railways, and the first railway in the world to convey both passengers and goods traffic regularly by mechanical power.

The line's early date was reflected in the choice of motive power: only one mile of the line was operated with a locomotive, with the rest run as a cable railway powered by two static winding engines. The 12-horsepower "Invicta" locomotive (now in the Canterbury museum), however, was severely underpowered even for the limited length of track on which it ran, and was replaced in 1839 by a third winding engine. The line was converted to locomotives in 1846, when it was taken over by the South Eastern Railway and relaid with heavier tracks.

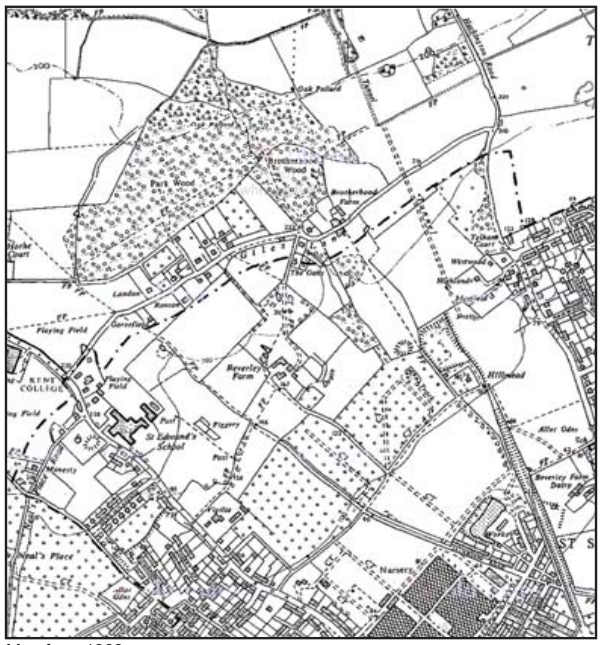


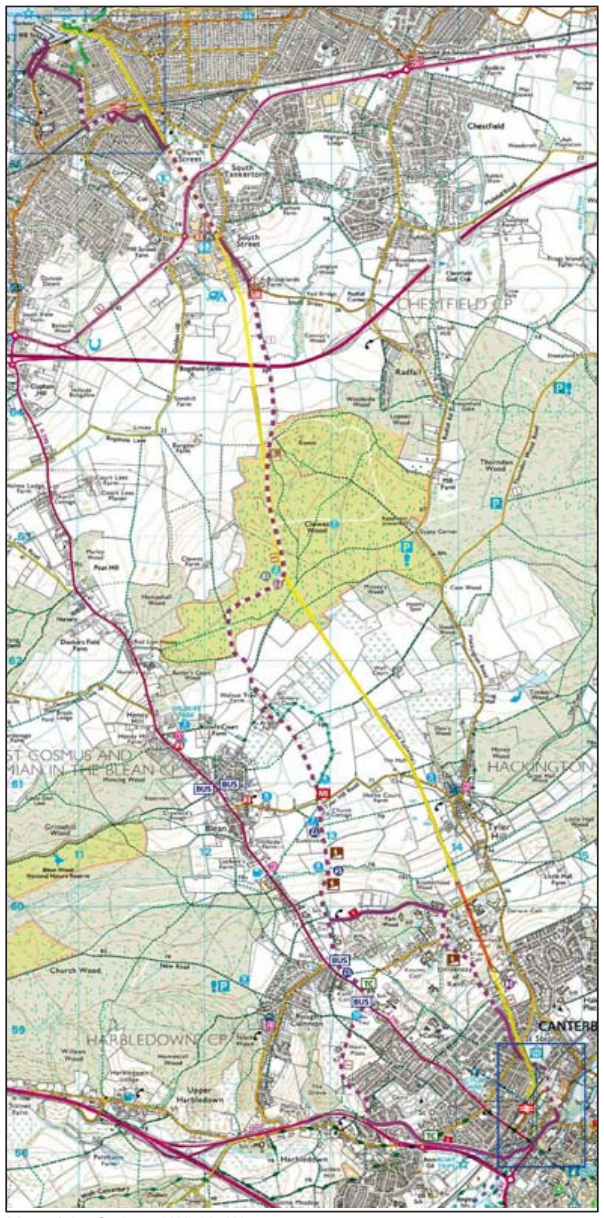
The C&WR line was absorbed into Southern Railways in 1923; continued unchanged until passenger services were abandoned in 1931; was nationalised as part of British Railways in 1948; and closed to all traffic in 1952. Parts of the line were then sold off – the University owns the former trackbed north of the Tyler Hill tunnel – but the railway and tunnel were largely forgotten until 1974, when the university's Cornwallis Building was undermined by a partial collapse of the tunnel. (All but a short length at the south end of the tunnel was then filled in.)

The line became publicly prominent again in 1997-99, when The Crab & Winkle Line Trust was founded and a seven-mile footpath/cycleway (the Crab & Winkle Way) was opened. In spite of its name, however, the footpath follows only a short length of the abandoned trackbed through Clewes Wood, with a picnic/rest area incorporating one of the surviving Winding Ponds.



Map from 1896


Map from 1962



Map of the Crab and Winkle Way

UNIVERSITY OF KENT

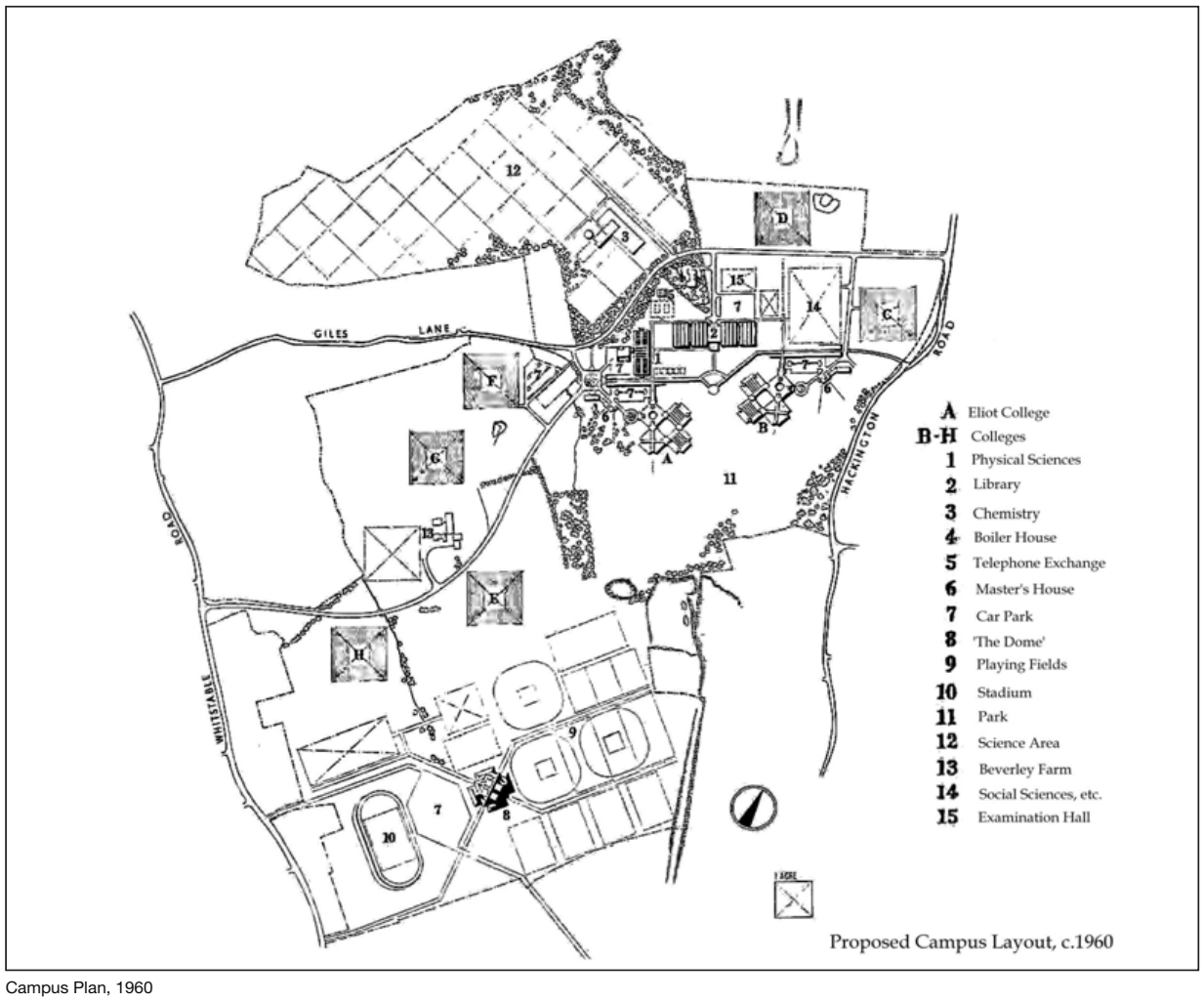
The University of Kent

The university was proposed and approved in 1959-60, and the initial buildings were erected in 1963-65. Charles Holford's original masterplan provided for a stadium and associated sporting and recreational facilities to the south, but this siting was abandoned when the compulsory purchase order valuations were raised on appeal, and the sports facilities were relocated to their existing site on the north side of Giles Lane.

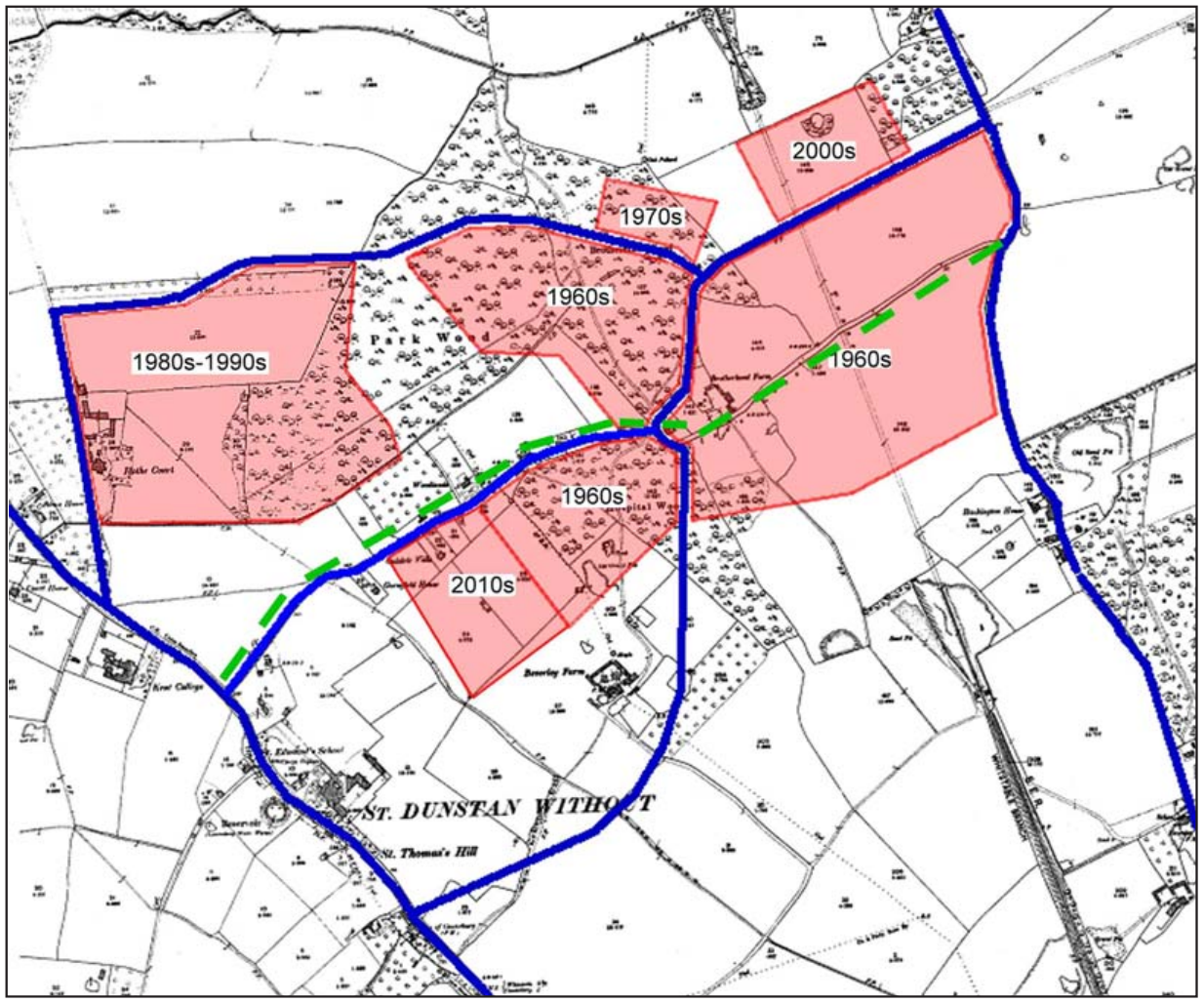
Surviving pre-university elements are minimal. The western half of Giles Lane appears to be unchanged; Beverley Farmhouse was retained (and restored in 1986); and remnant alignments of the original Giles Lane can be traced through the campus. Otherwise, however, development removed the Brotherhood Farm house (the site is now occupied by the Marlowe and Jarman Buildings), the eastern half of Giles Lane was realigned further north; University and Park Wood Roads were created as new access roads; and much of the pre-University woodlands have been removed.

As noted in the chronology and by the campus maps and images appended to these notes, the campus saw steady expansion, with particularly active development periods from 1965 to 1975, 1980 to 1995, and since 2001.

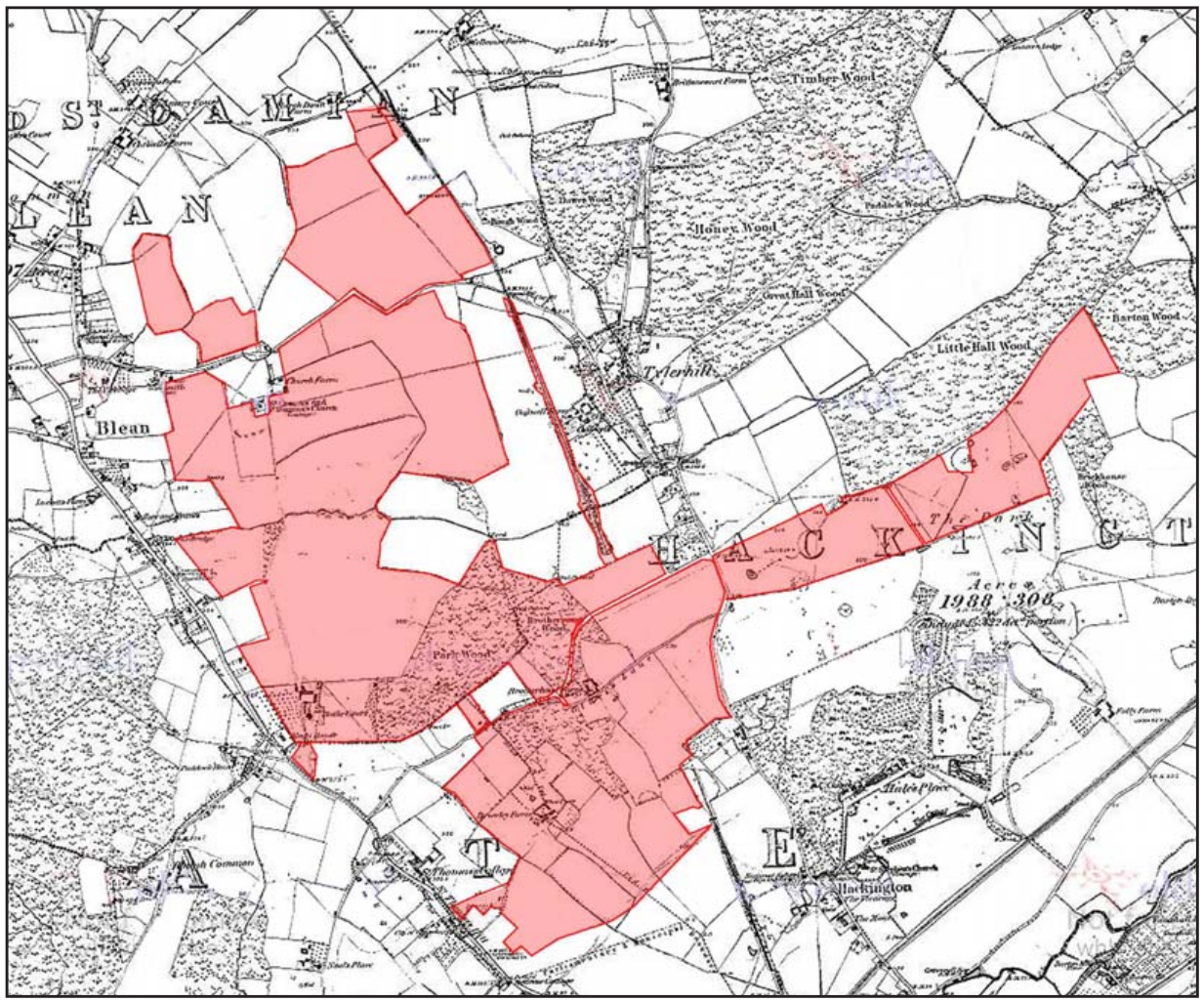
In summary, it appears that aside from locating buildings on the high ground by Tyler Hill, the university's expansion did not respond to pre-existing topographical features. Nonetheless, the internal and external boundaries of the University's landholdings are inevitably based on rural field lines, and other elements – the Sarre Penn stream, the partially-surviving line of the railway, and both of the Canterbury-to-Whitstable roads –reflect long-established topographical features.




Campus Plan, 1960
The southern sports facilities were moved further north




Campus Development Periods
The green dashes show the line of Giles Lane before the University




University Landholdings, 2017, overlaid on 1877 Ordnance Survey

# SUMMARY CHRONOLOGY

Summary Chronology

To c.1800

Ownership of Beverley and Brotherhood Farms by post-Conquest hospitals.

- Archbishop Lanfranc founded hospitals/asylums at Harbledown (St Nicholas, founded 1084 for lepers, and the first documented leper hospital in England), and St John's Northgate (1087, for the infirm)
- Beverley Farm and Brotherhood Farm probably established late 1400s; 1546 survey of hospital estates included Brotherhood Farm
- Hospital buildings and Brotherhood farmhouse, barns, stables, and outbuildings rebuilt/repaired 1685
- Brotherhood Farm still owned by hospitals at commutation of tithes (in four parishes, 1837-51); Beverley Farm privately owned

1825-1952

Canterbury & Whitstable Railway ("Crab & Winkle") ran through district.

- constructed 1825-30 (including Tyler Hill tunnel) – single-track line with two passing loops; initially a cable railway with two static winding engines and one locomotive, but engine was underpowered (12 hp) and was replaced in 1839 by a third winding engine
- absorbed by South Eastern railway in 1845-46; relaid with heavier rails;stationary cable engines replaced with locomotives
- absorbed into Southern Railway, 1923
- passenger services ended 1931; absorbed into British Railways 1948; goods traffic closed 1952, and sections of line sold off late 1950s

1959-1964

Preliminary works to establish university.

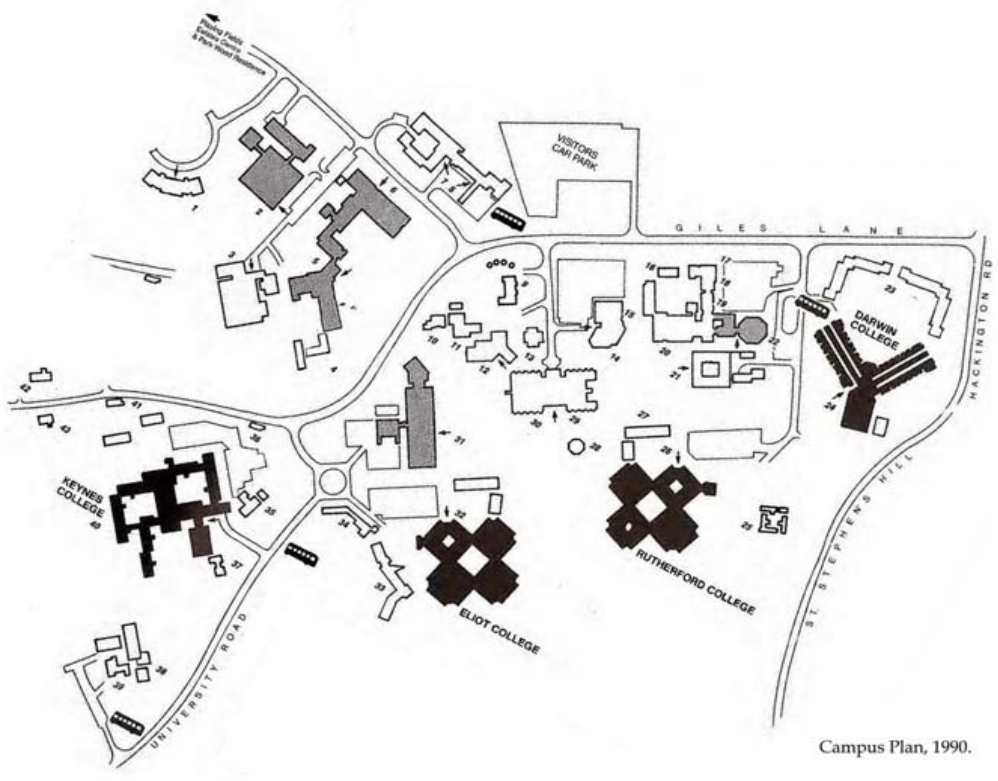
- principle of university accepted by University Grants Committee, 1960 named "University of Kent at Canterbury", 1962
- plan for sporting and recreational facilities to south (abutting city limits,now the "Southern Slopes") abandoned when compulsory purchase valuations were raised on appeal
- site including Beverley Farm and Brotherhood Farm handed over, 1963
- library transferred from Station Road West to Beverley Farm, 1964

1965-1970

Opening and initial expansion of campus.

- Royal Charter granted; Eliot College opened and students admitted, 1965
- Rutherford College, 1966; Chemical Laboratory, 1967; Keynes College,Templeman Library, Cornwallis Building, and Sports Hall, 1968
- Electronics Laboratory (School of Engineering and Digital Arts), Gulbenkian Theatre, and Cinema 3, and Oaks Day Nursery opened, 1969
- Department (now School) of Biosciences, Darwin College, and Registry/Senate buildings opened, 1970

1 Science Research & Development Centre
Canterbury Business School
2 Electronic Engineering Laboratory
3 Sports Centre
4 Language Annexe
5 Biological Laboratory
6 Chemical Laboratory
7 Maintenance Centre
8 Estates and Buildings Office
9 Boiler House
10 Students' Union Shop & Banks
11 Staff Club & Telephone Exchange
12 Grimond Building
13 Drama Building
14 Gulbenkian Theatre
15 Cornwallis Lecture Theatre
16 School of European & Modern Language Studies
17 George Allen Wing
18 Applied Statistics Research Unit
19 Mathematical Institute
20 Cornwallis Building
21 Registry
22 Computing Laboratory
23 Darwin Residences
24 Darwin College
25 Durrell Institute (DICE)
26 Rutherford College
27 School of Continuing Education
28 Senate Building
29 Bookshop
30 Library
31 Physics Laboratory
32 Eliot College
33 Eliot College Residences
34 Students' Union Offices
35 'The Oaks' Day Nursery
36 Information Office
37 Careers Advisory Service
38 Institute of Social & Applied Psychology
39 Beverley Farm
40 Keynes College
41 Olive Cottages
42 'Woodlands'
43 Medical Centre




Campus Plan, 1990.

**Campus Plan, 1960.**

1980-1989
Further expansion.

- Park Wood Student Village opened, 1980
- New School of Continuing Education opened at Tonbridge, and opening of Graphics Gallery and Physics Observatory, 1982
- Information Office (now (now Kent Hospitality and the Accommodation Office) moved to Tanglewood, 1984
  Institute of Social & Applied Psychology, and Centre for Social Anthropology & Computing established, and Beverley Farm restored, 1986
- School of Mathematical Studies superseded by Faculty of Information Technology and new Computing Laboratory opened, 1987
- Development Office, and School of European and Modern Language Studies established, 1988
- Grimond Building, Drama Studio, and Durrell Institute of Conservation and Ecology opened, 1989

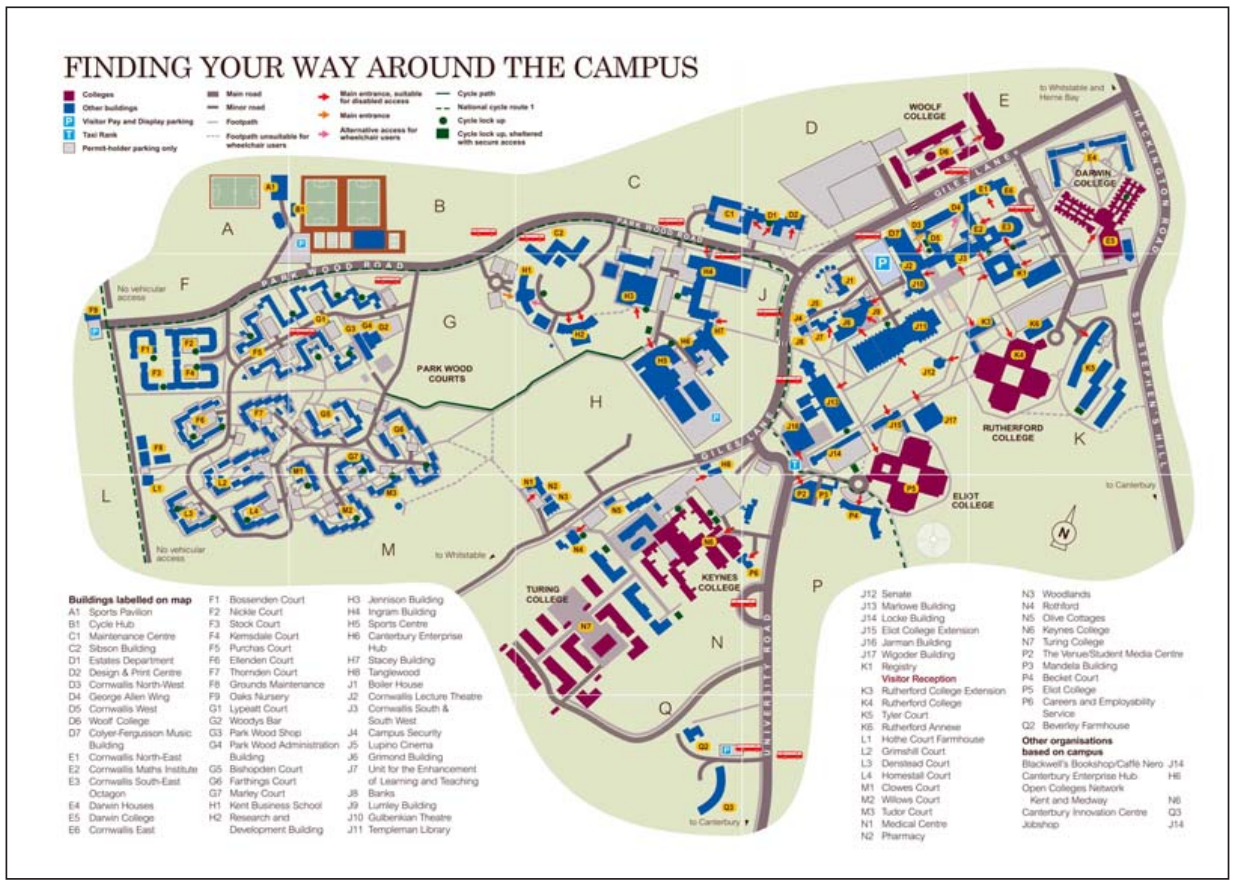
1990-1995
Further expansion.

- Centre for Language and Business in Europe established; Becket Court halls of residence opened, 1990
- North West Cornwallis/George Allen building completed, 1991
- Sports Pavilion, Canterbury Business School, and Phase I of Missing Link (Darwin) completed, 1992
- Phase II of Park Wood student accommodation completed, 1992-93
- South West Cornwallis completed, 1993
- Templeman Library Phase II, and Tyler Court halls of residence next to Rutherford College opened, 1995

1997-1999
Crab and Winkle Line Trust formed;

- 7-mile footpath and cycleway opened, using part of railway trackbed through Clewes Wood.

1998-2009
Development of new campuses and locations, and additional facilities at Canterbury.



1996-2009
Expansion to other locations

- Graduate school of Department of Politics and International Relations opened at Brussels, 1998
- programme for Medway universities introduced to increase higher education participation in the Medway towns, 2000
- University of Kent at Medway opened at Mid Kent College, and Centre for Sports Studies established, 2001
- joint campus opened at Chatham Maritime, 2002
  partnership established between University of Kent, University of Greenwich, and Mid-Kent College, 2002
- formal name changed to University of Kent (dropping "at Canterbury" in 2003 to reflect expansion to Medway and centres in Tonbridge and Brussels
- new campus and School of Pharmacy (with University of Greenwich) opened at Chatham Maritime, 2004-2005
- Gillingham Building (teaching and IT facilities) and Pilkington Building opened at Medway campus, 2006
- Liberty Quays student accommodation opened at Medway, and postgraduate centre opened in Paris, 2009

2001-2008 - additional facilities at Canterbury campus

- 360-seat lecture theatre and student accommodation opened at Keynes College, 2001
- building for School of Social Policy, Sociology, and Social Research completed 2002
- Sports Centre refurbished and extended, 2003
- research centre for study of Law, Gender and Sexuality established, 2004
- new building for University Medical Centre and Pharmacy, 2004
- extension to Gulbenkian Theatre, and new IT Clinic opened, 2005
- Woolf College and new graduate school opened, 2008

2010-2015 Recent developments.

- Colyer-Fergusson Music Building opened next to Gulbenkian centre, 2010
- Turing College opened and Templeman Library redeveloped and further extended, 2013-15

Eliot College (AJ), 1965.

Darwin College, 1970.

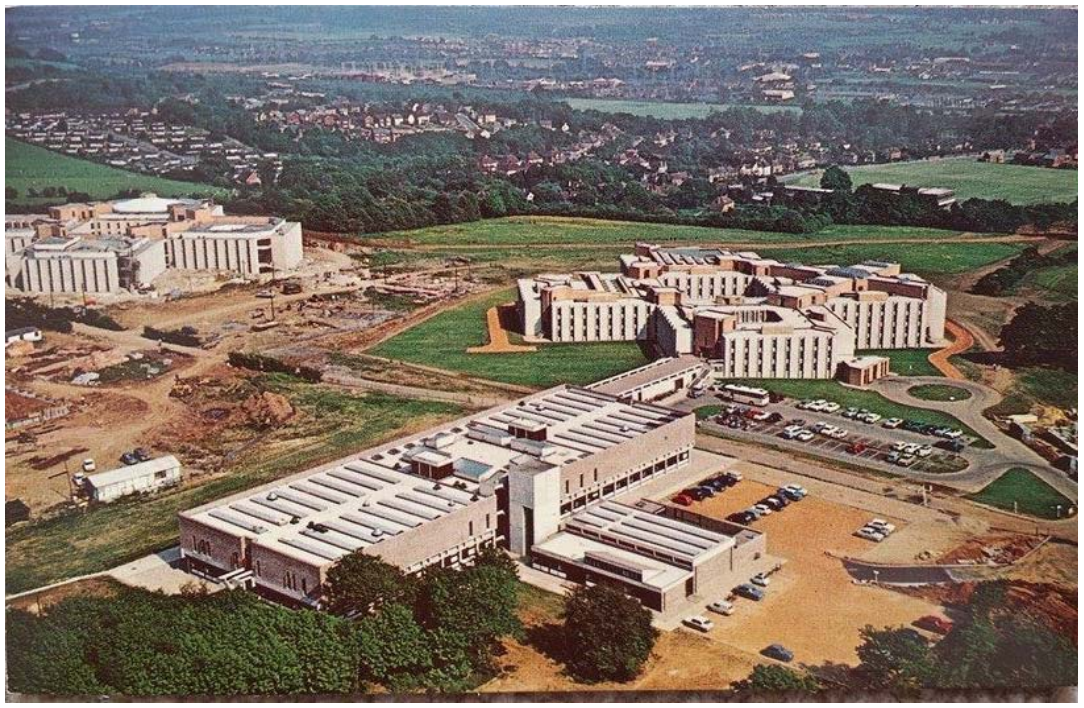
Beverley Farmhouse, 1965.

Senate Building, 1970.

Rutherford College, 1966.

Cornwallis Building - collapse due to railway tunnel, 1974.

Historical Photographs



19th Century Field Lines

## 19th Century Field Lines

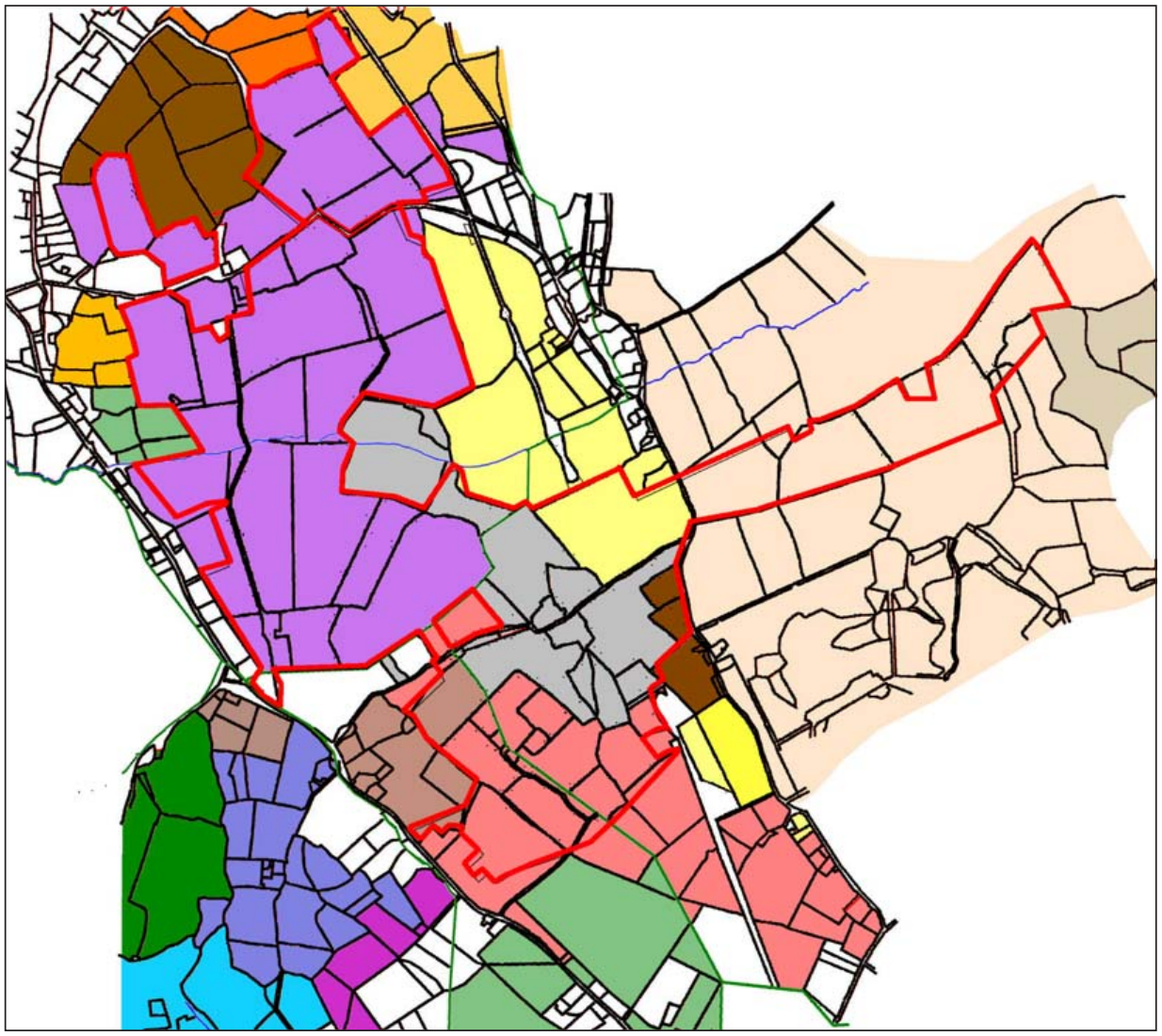
University of Kent Land Holdings

Field Lines

River

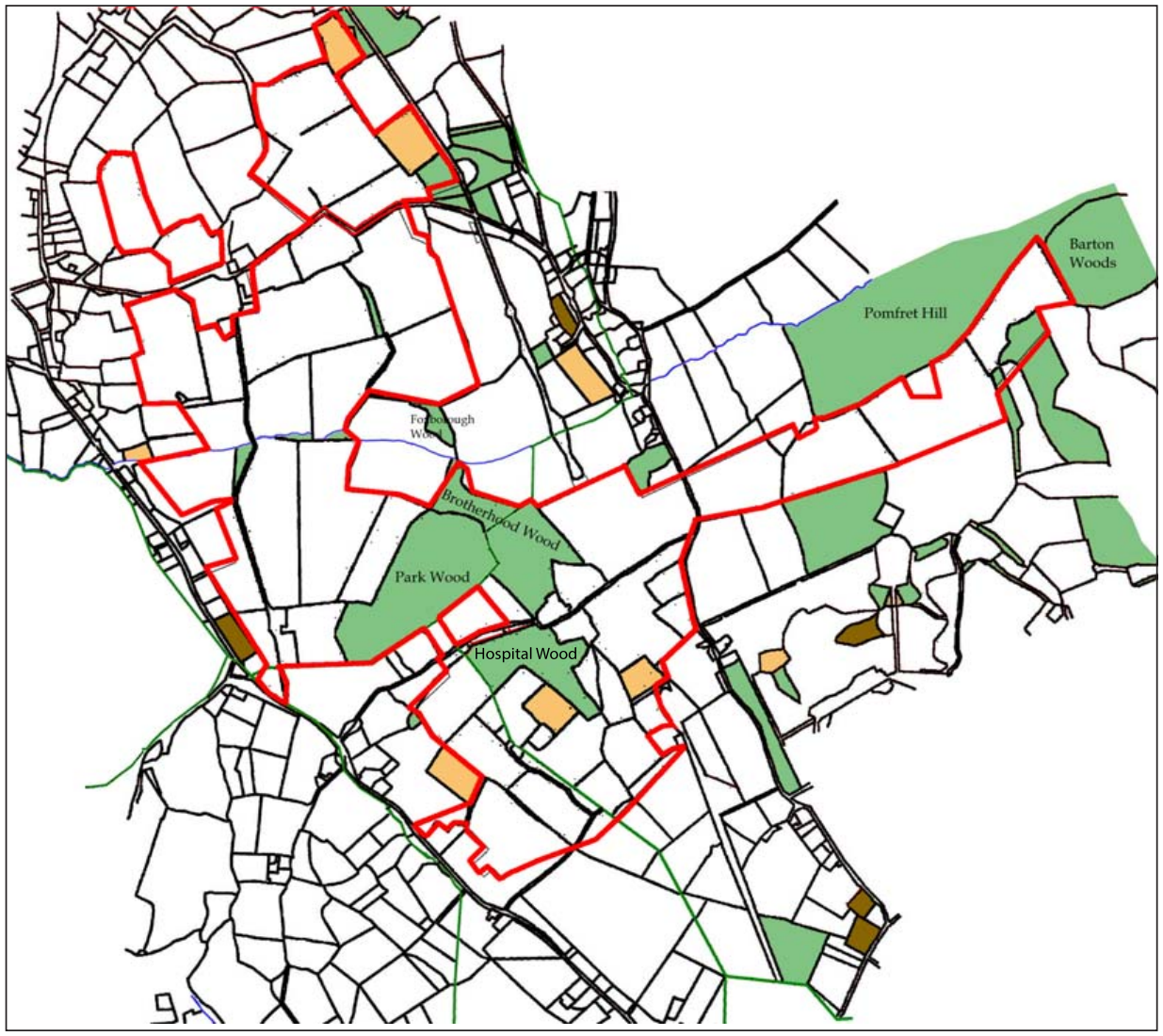
## 19th Century Ownership

- John Godfrey
- Eastbridge Hospital
- Thomas White
- Thomas Anderson
- Exors of Thomas Fleet
- Hales Place Estate
- Brothers of Saint John's Hospital
- Mary Anne Baker
- Rev James Hamilton
- Thomas Hyde
- Mary Twyman
- Frances Dorvers
- William Newport
- Field Lines
- University of Kent Land Holdings



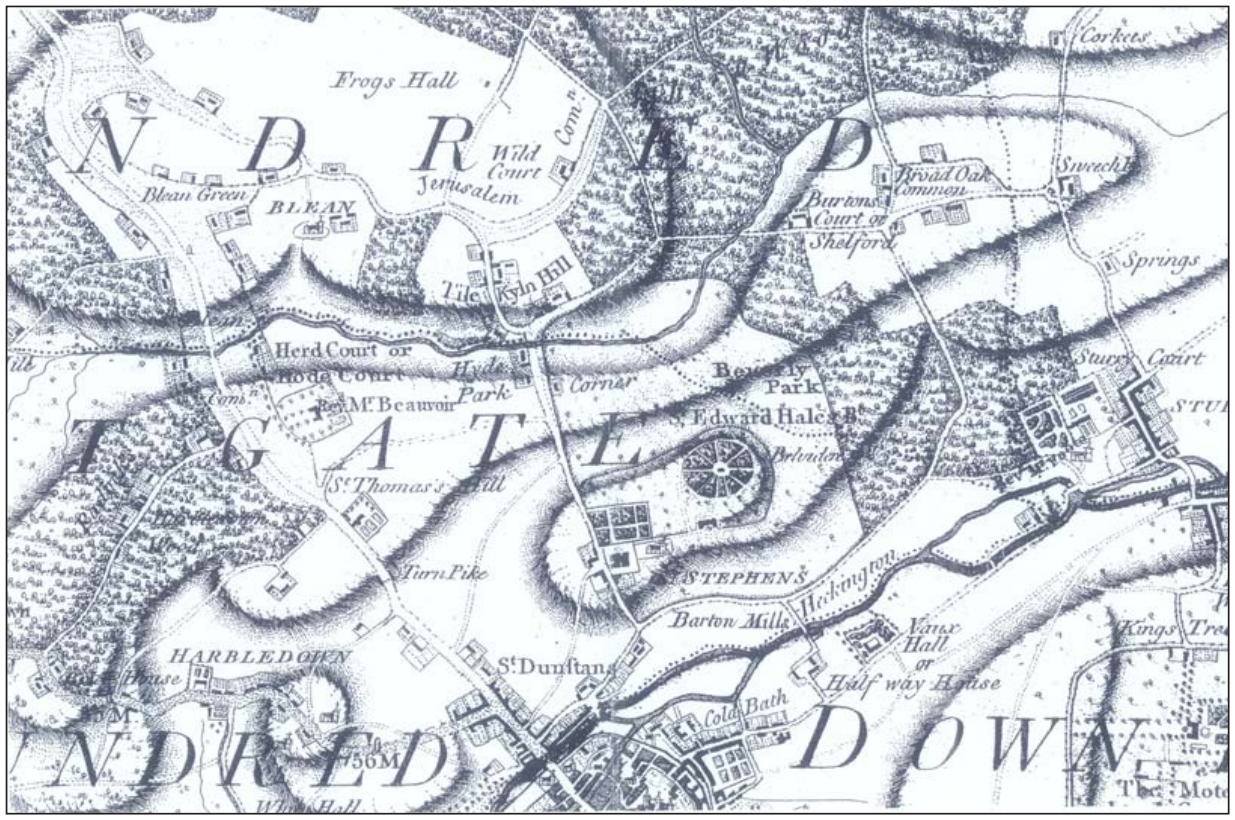
## 19th Century Woods, Hops, Orchards

- Arable/Pasture and Settlement
- Woods
- Hops
- Orchards
- Field Lines
- University of Kent Land Holdings

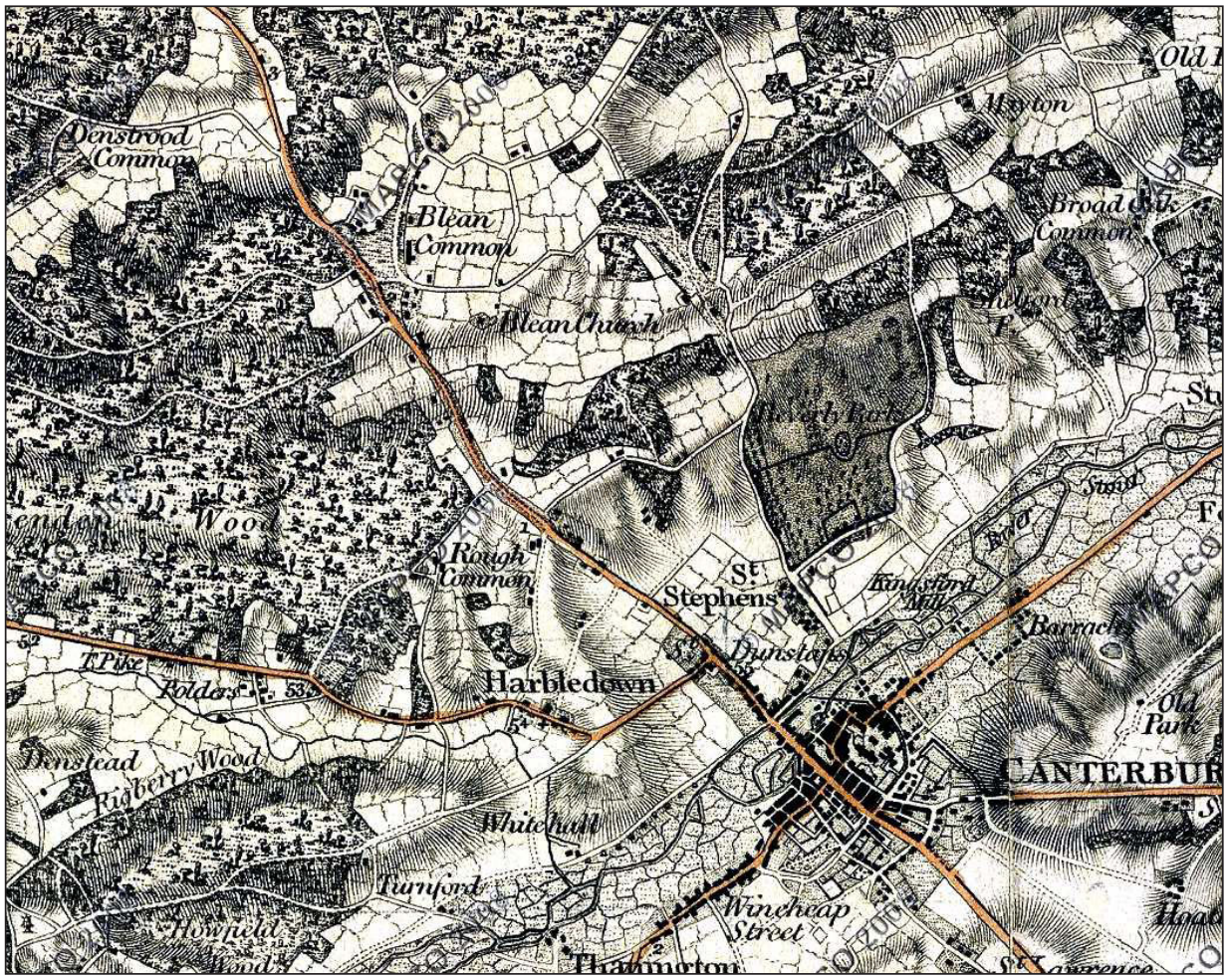


# HISTORICAL MAPS

Historical Maps : 1769 by Dury and Herbert

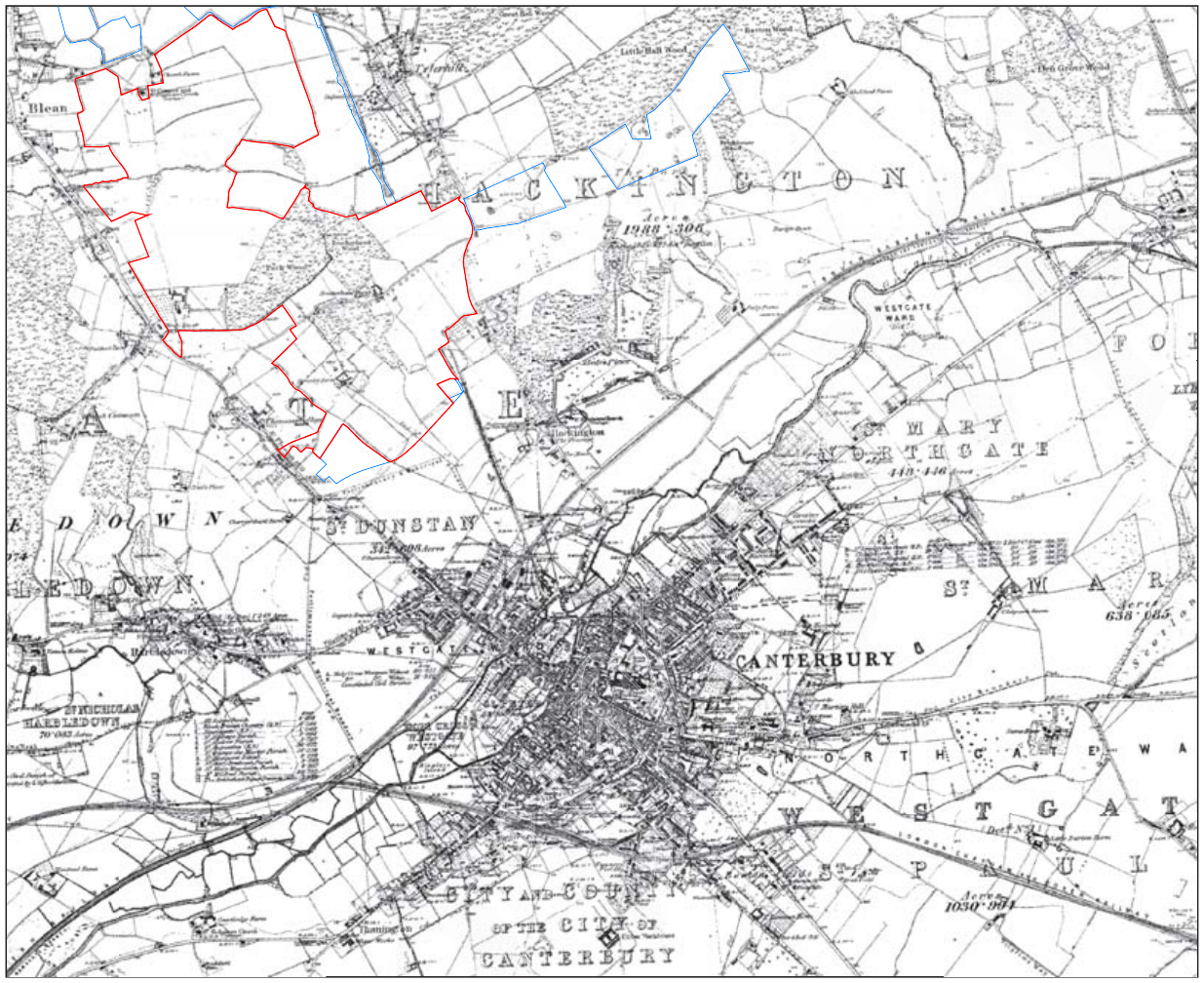


Historical Maps : 1801 by William Mudge for OS



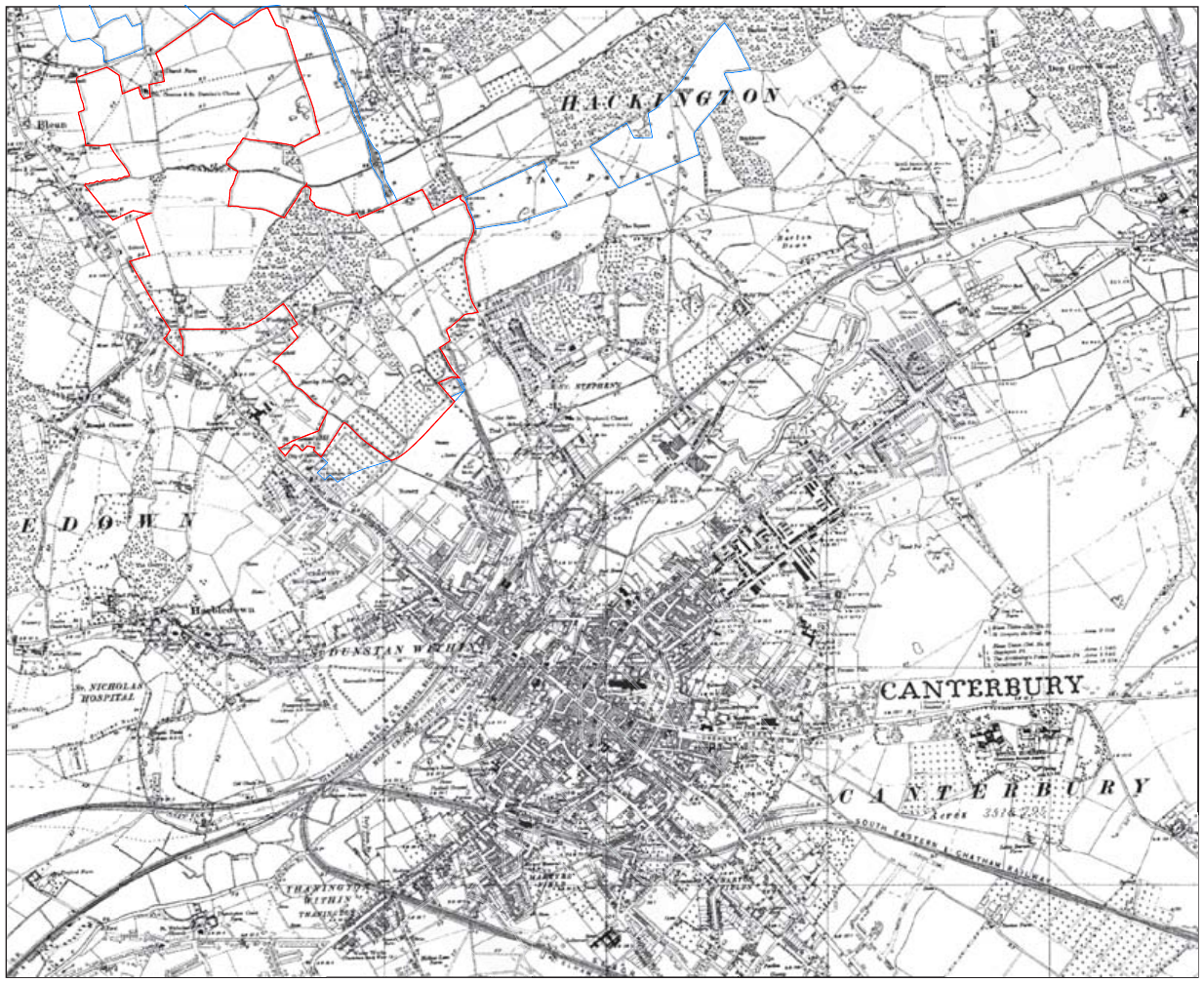
## Historical OS Maps : 1880s

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent



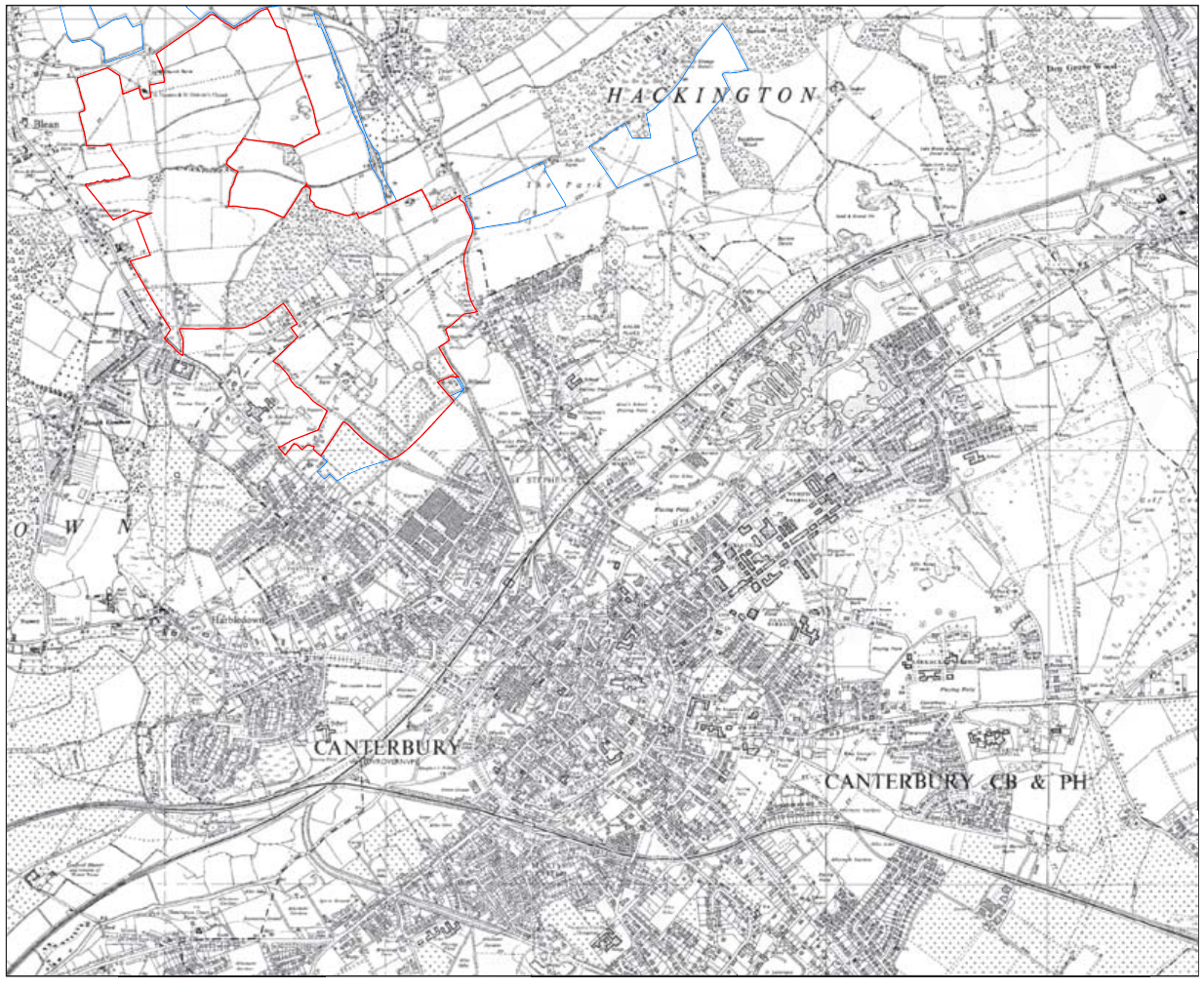
## Historical OS Maps : 1930s

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent



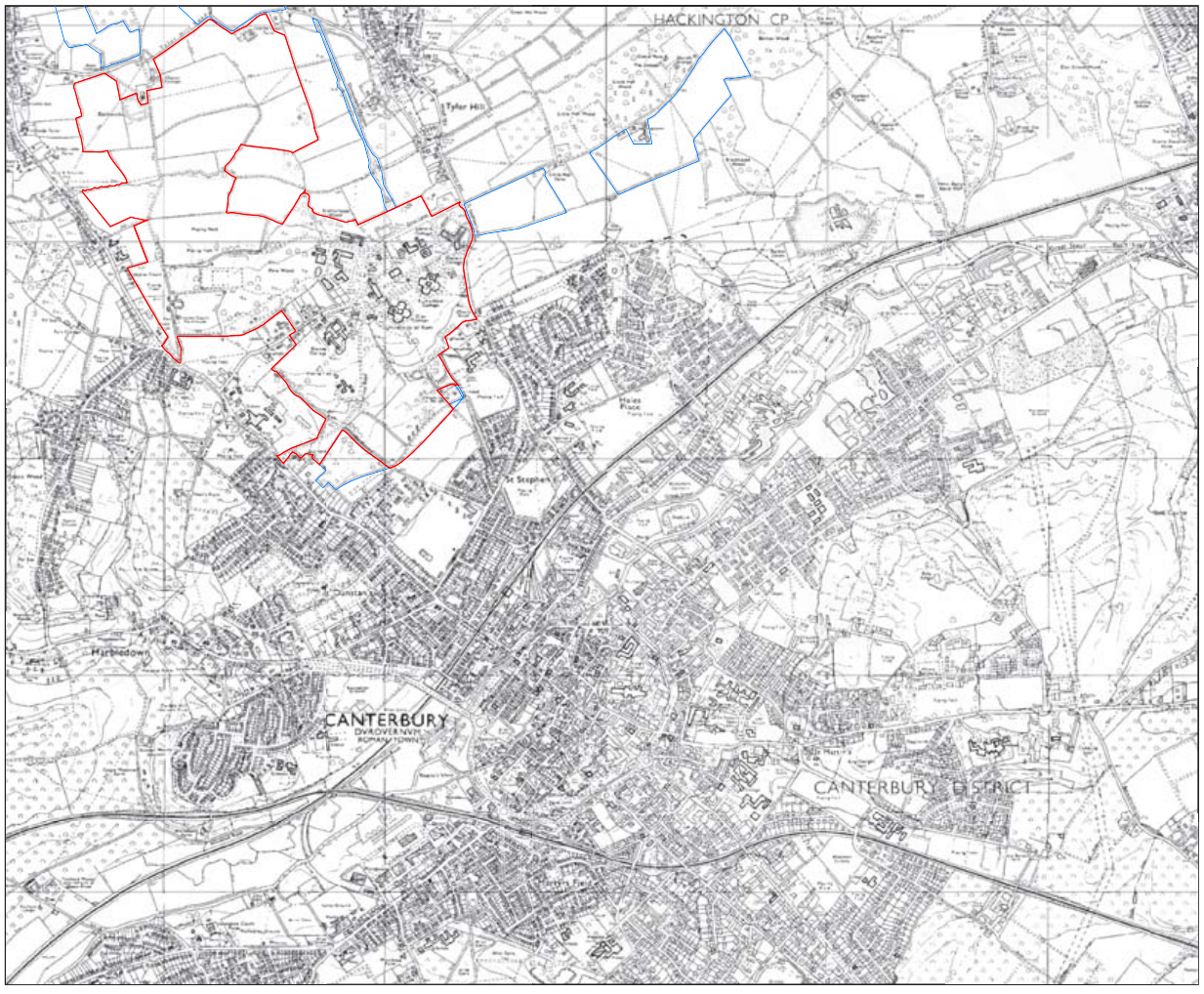
## Historical OS Maps : 1960s

Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent

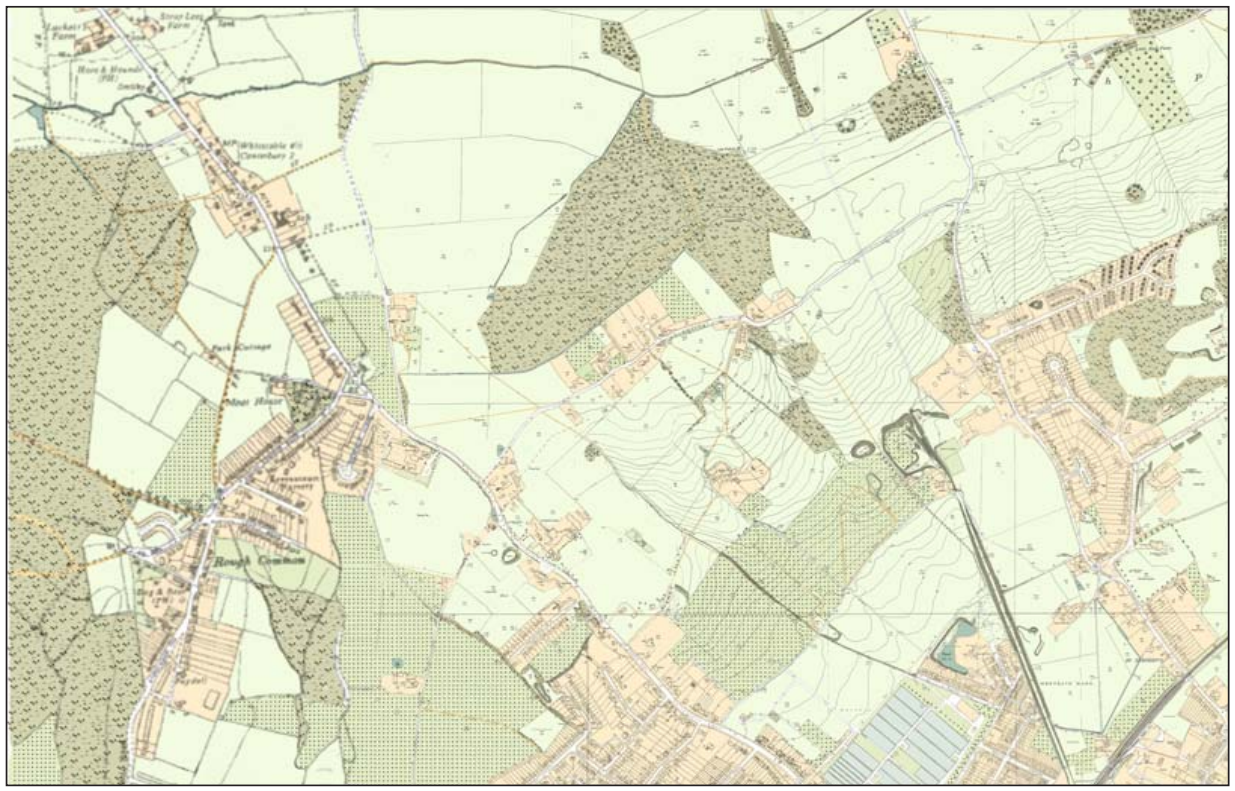


## Historical OS Maps : 1970s

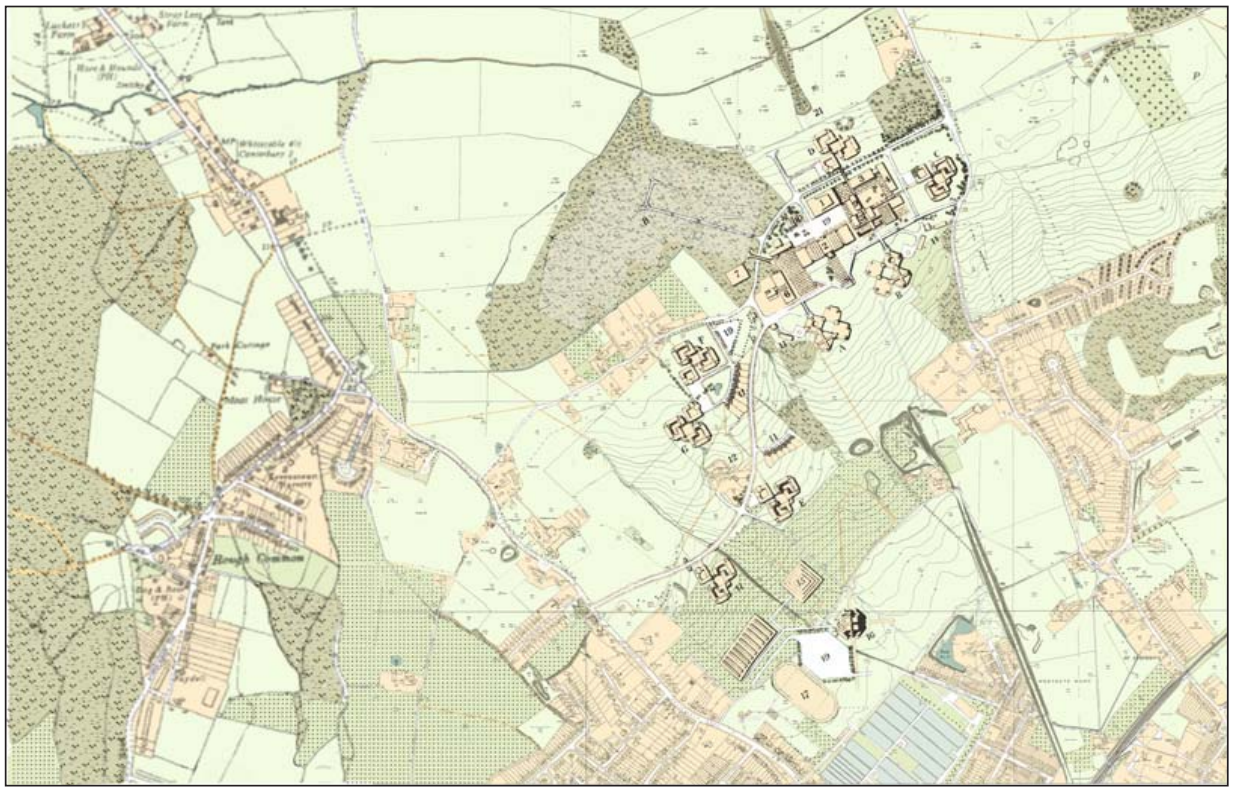
Campus Boundary as defined in the Local Plan
Additional land owned by University of Kent



OS Map : 1963



OS Map : 1963
with Holford Masterplan



# Benchmarking University & campus landscapes

# University of Kent Canterbury Campus Framework Masterplan

## Benchmarking Study: University & Campus Landscapes

February 2018

University of Kent

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# Benchmarking Study: University & Campus Landscapes

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# Biophilic design in the workplace has a clear, measurable impact on employee outcomes including productivity, well-being and creativity

**HUMAN SPACES REPORT:**
**Biophilic Design in the Workplace**

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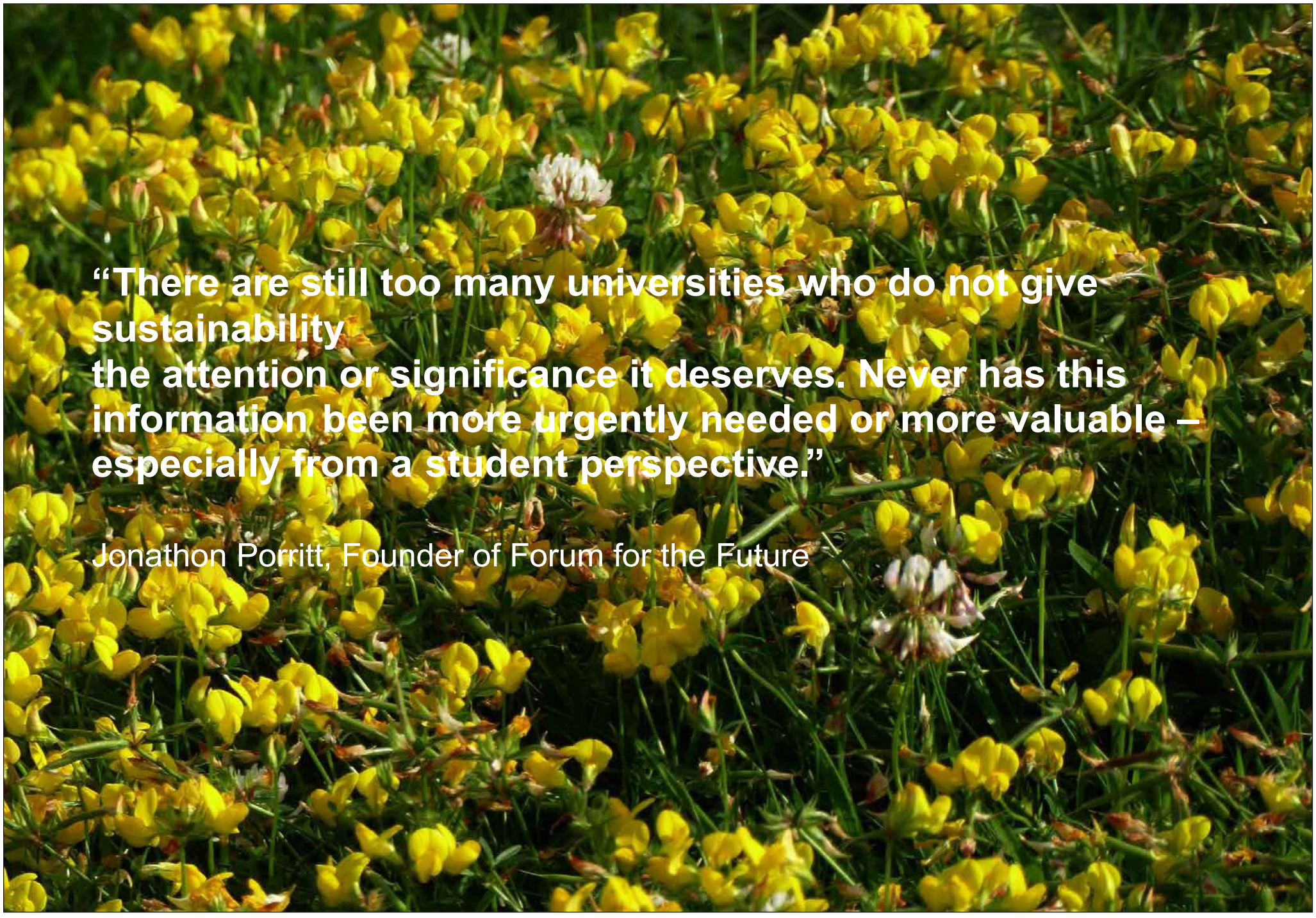


**“There are still too many universities who do not give sustainability
the attention or significance it deserves. Never has this information been more urgently needed or more valuable – especially from a student perspective.”**

Jonathon Porritt, Founder of Forum for the Future

## Introduction: Greening the Learning Setting and its Influences

In this document, we examine numerous universities and other campuses to understand the University of Kent Campus in relation to its landscape context. The new Universities are often attributed the recommendations of the Robbins Report (1961-63), but actually this report was reflecting and adding to work commenced by the University Grants Committee in the mid 1950s. Taking Universities out of cities can be seen as analogous to the removal of hospitals to the countryside over a century earlier and the creation of the first public parks at the same time to address health in a time of rapid urbanisation.

In line with our evidence-based approach, we feel that a baseline is needed against which to both steer and to assess the merits of the emerging Framework Masterplan.

Many of the so-called 'Plate Glass Universities' built in the 1960s were located in the grounds of large country houses, whose usefulness had gone with the passing of the old pre-War social order and the lack of staff and money to run them. Some of these estates became part of the collective National cultural asset through being taken over by the National Trust, others (such as the Universities of East Anglia, Keele, York, Stirling and Bath) became universities.

### Inspiration for the English Landscape Design Style

In the country house estates that formed the basis of new universities the English Landscape style for the setting had been in place in many of those locations already and the aesthetic was simply extended, mostly in simplified form and often involving water bodies at the heart. This landscape style expresses both the British idea of landscape as 'the view', that had its roots in the Grand Tour, the finishing school for the wealthy seen as an extension of a Classical education. The paintings of allegorical figures in landscapes of the Lazio of Nicholas Poussin (1594-1665), and especially the bucolic landscapes Claude Lorrain (1600-1682) became fashionable in this period.

The Heyday of the English Landscape style was from 1660 to the advent of mass transport via the railways in the 1840s, and its popularity had its roots in the rise of British mercantilism post Restoration of the Monarchy in the 1660s under Charles II. This had followed the interregnum after the death of Cromwell in 1658, and the wars of the three kingdoms. The style was consolidated under the Hanovarian period, and it coincided with the Age of Enlightenment and of scientific advance. However, many of those British landscapes were also linked to slavery, with 'new' money earned from the plantations in the West Indies and elsewhere. William Kent (1685-1748), along with his contemporary the poet and gardener Alexander Pope (1688-1744) are generally seen as the founders of the style; but it was Lancelot 'Capability' Brown (1716-1783) who took this more natural picturesque style to the next level, and this was continued in turn by Humphrey Repton (1752-1818). In due course, the plant collecting era that was linked to the expansion of the British Empire rather diluted the '*augmented place-making'* of Kent, Brown and Repton that had been based on an understanding of the *Genius of the Place,* which was inn turn based in the pagan Roman notion of the '*Genius Loci*', or the local spirit of a given location. The post-Reptonian designers, however had a big influence on the emerging institutional 'health-giving' landscapes as they were engaged to design the grounds for the new wave of rural located hospitals that came from the Reform Movement and the need to address the ills of rampant industrialisation. These ideas filtered down into the model villages of Saltaire (1853), Port Sunlight (1888) and Bourneville (1893) and eventually to Ebenezer Howard (1850- 1928) and his vision for Garden Cities expressed in his seminal book *Tomorrow: A Peaceful Path to Real Reform'* (1898), which was first realised in Letchworth commencing in 1903.

The University of Kent campus by contrast is inserted into an ancient managed landscape inhabited since the end of the last Ice Age. It is competing in a world that is changing rapidly and responding to the drivers for change that include re- source scarcity, carbon emissions and climate change, the erosion of Natural Capital and a weakening of Ecosystem Services, and the need for better health and productivity.

Paul Ehrlich (1932-) the American biologist and author of *The Population Bomb* (1968), called for action on degrading of the capacity of the environment to support the population (its carrying capacity), and has continued to place emphasis upon endangered species, cultural evolution, and environmental ethics as well as the conservation of genetic resources. Since 2013 with Dr. Gretchen Daily he has worked on biogeography and the study of making human disturbed areas hospitable to biodiversity. Robert Constanza (1950-) is an ecological economist who has written extensively about 'sustainability, including *Ecosystem Health and New Goals for Environmental Management* (1992) and with Graumlich and Steffen *Sustainability or Collapse? An Integrated History and Future of People on Earth. (2007).* These ideas are permeating new campus design around the world where **place-making** derives from addressing these complex issues. Green League University Tables have been published; in 2013 the University of Kent was ranked 85th out of 152 UK institutions, with Manchester Metropolitan University coming first. In 2016 the University of Kent moved up just one place to 84th in the re-named People and Planet University League, earning a 2:2.

Addressing these wider sustainability, environmental and cultural issues is important as a foundation for place-enhancement and shaping the University of Kent Framework Masterplan. Examples illustrated in this report show a progression from the picturesque English Landscape approach that harks back to an earlier era, towards a much harder working multi-functional *'blue-green'* infrastructure approach allied to creating healthier and more productive places or study and work.

Poussin - Landscape with Diogenes
source: wikipaedia.org

Poussin - Landscape with Man killed by a snake
source: wikipaedia.org

Lorrain - Landscape
source: MyStudios.com

Lorrain - Landscape
source: MyStudios.com

Lorrain - Landscape
source: MyStudios.com

## Designing the Learning Environment

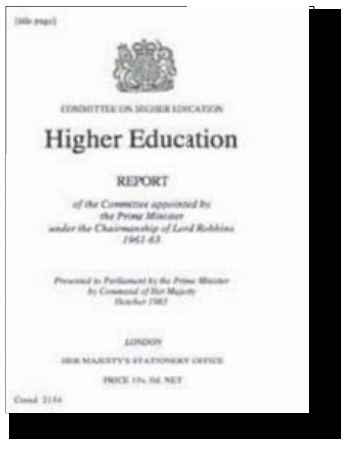
*"We were appointed by Treasury minute dated 8th February, 1961 to review the pattern of full-time higher education in Great Britain and in the light of national needs and resources to advise Her Majesty's Government on what principles its long-term development should be based. In particular, to advise, in the light of these principles, whether there should be any changes in that pattern, whether any new types of institution are desirable and whether any modifications should be made in the present arrangements for planning and coordinating the development of the various types of institution."*

*COMMITTEE ON HIGHER EDUCATION REPORT*
*of the Committee appointed by the Prime*
*Minister under the Chairmanship of Lord*
*Robbins 1961-63*

The University of Kent is one of a number of 'New Universities' founded half a century ago. During this era the number of universities in the UK more than doubled from 22 to 46. Sometimes referred to as the *'Plate Glass Universities',* they were established on the recommendation of the Robbins Report on higher education (1961-1963).

Lord Lionel Robbins was a noted economist and had been based at the LSE since 1925. He advised on the economic conduct of World War II in the UK and was the UK Delegate at the conferences that led to the founding of the Inter- national Monetary Fund. Although his report is often referred to in relation to the new universities, it actually reflected work of the University Grants Committee that had been working since the mid 1950s, and this is why both Sussex and East Anglia Universities had opened prior to his report being published. Nevertheless, the report was sensational and sold more copies than any other government document up until that time[1].

1 McKean, John Maule, "RMJM at Stirling", Architectural Review, 1973, p360


COMMITTEE ON HIGHER EDUCATION

Higher Education

REPORT

*of the Committee appointed by the Prime Minister under the Chairmanship of Lord Robbins 1961-63*

*Presented to Parliament by the Prime Minister by Command of Her Majesty October 1963*

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Nine completely new universities plus a further ten converted from existing Colleges of Advanced Technology, applications for reclassification having been accepted by the University Grants Committee a few years earlier.

The expansion of the higher education system enabled a large number of students who were often the first in their families to go to university, and full-time university students numbers rose by 20,000 between the 1967/8 and 1973/4 academic years to 217,000. This started to break down the elitist and pre-dominantly male student population and by 2011 the full time undergraduate numbers reached 1.92 million.

The Robbins report had set out four main objectives..." essential to any properly balanced system":

- Instruction in skills;
- The promotion of the general powers of the mind so as to produce not mere specialists but rather cultivated men and women;
- To maintain research in balance with teaching, since teaching should not be separated from the advancement of learning and the search for truth, and
- To transmit a common culture and common standards of citizenship.

The design of these new universities embodied these ideas, with a new architectural language; some designs by leading architects of the day were controversial, but now have started to be recognised by Historic England and the Twentieth Century Society amongst others.

The term plate-glass universities was coined by Michael Beloff, for the title of his book about these new universities (1968) - a term that aimed to be evocative, if not especially accurate, of the modern architecture that was in contrast to the ancient and later Victorian red brick universities. The new institutions he wrote about included:

- University of Sussex (1961)
- University of York (1963)
- University of East Anglia (1963)
- Lancaster University (1964)
- University of Essex (1964/5)
- University of Kent (1965)
- University of Warwick (1965)
- Aston University (1966)

*Dates in brackets above refer to of granting university status by Royal Charter rather than the founding of the university

Other new campus universities created during this period include:

- University of Birmingham
- University of Exeter
- Keele University
- University of Nottingham
- University of Reading
- Robert Gordon University
- University of Roehampton
- Royal Holloway, University of London
- Swansea University

Of those listed above, a dozen were located in campuses close to cities, which combined teaching, research and leisure facilities with living accommodation.

The integration of buildings and landscape was an important aspect of these new, optimistic, learning settings. The Times World University Rankings notes that University Estates in the UK now exceed 2,600 hectares, which is only slightly behind the NHS Estate of 3 000 hectares.

## Designing the Learning Environment

Since the time of Wren, many famous architects have contributed to universities, but according to Paul Temple, reader emeritus at the UCL Institute of Education and editor of 'The Physical University: Contours of Space and Place in Higher Education' (2014):

*"When you have an open day to try and recruit students, I suppose there might be a bit of an effect from having the 'wow factor'. But I think students are more looking for a campus that is obviously cared for and feels homely, not some whizzo starchitect-designed glass and steel building that I suspect appeals more to the vice-chancellors than the students."*

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This may be a reflection of altered priorities and sensitivities, and there appears to be a trend of 'adaptive reuse' of assets which can be more environmentally aware, cost effective, and more sensitive to the local landscape, the designed part of which, in many cases, is now 50 years old. Examples of this approach can be seen in Vrije Universiteit Brussel, Belgium where a car park has been re-purposed, and at Eindhoven University of Technology in the Netherlands where a boiler house was converted into offices and laboratories. This approach demonstrated a commitment to sustainable development, and this has been used to add to 'brand value', as has been the case at the Savannah College of Art and Design in the USA.

The role of new thinking in the current century is now centred around the enormous challenges faced by the environment of the world and its immediate future. Climate change adaptation and mitigation is perhaps the best acknowledged challenge, but so is resource use management, a 'cradle to grave' philosophy, conservation of Natural Capital plus the ecosystem services derived from this, and of course the importance of biodiversity cannot be over stated. Appropriate consideration of all these issues can actively contribute to the health and wellbeing of students and staff and there is a considerable body of evidence that shows a significant rise in productivity and learning performance. The key point of campus design is to marry social and ecological sustainability.

## The Plate-Glass Campus Universities: Stirling University

The buildings at Stirling University have been listed by OCOMOS UK as among the top 20th century sites in the UK and are set in 135 hectares of open and wooded landscape located to the north of Stirling. Most of the buildings were completed during the 1960s and 1970s and are located around a serpentine loch that was created from 1787 at the heart of a parkland landscape in the manner of Capability Brown in the Airthrey Estate.

The landscape was designed by Frank Clark and Ed Hilliard. The original aim of this landscape was to create an 'instant effect' using blocks of plants with a comparatively short lifespan.

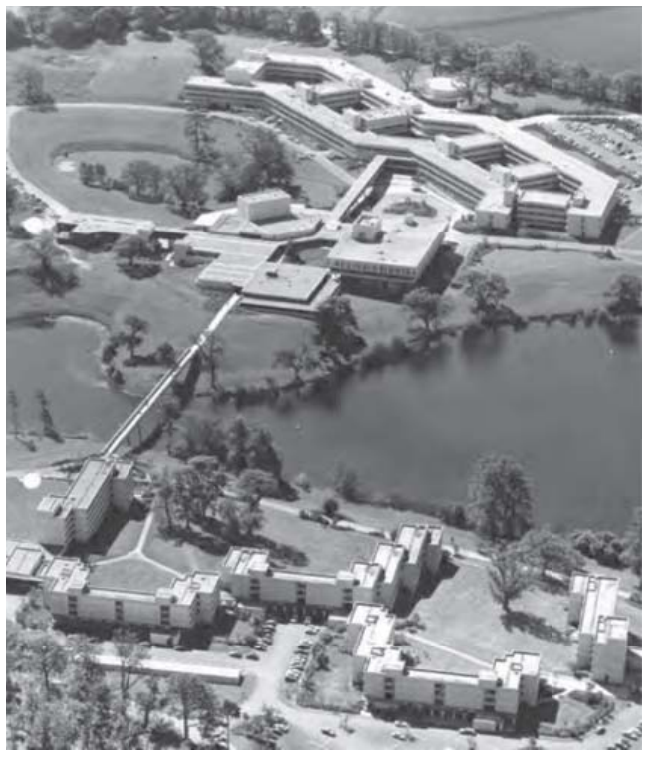
The five design principles employed by Hilliard were:

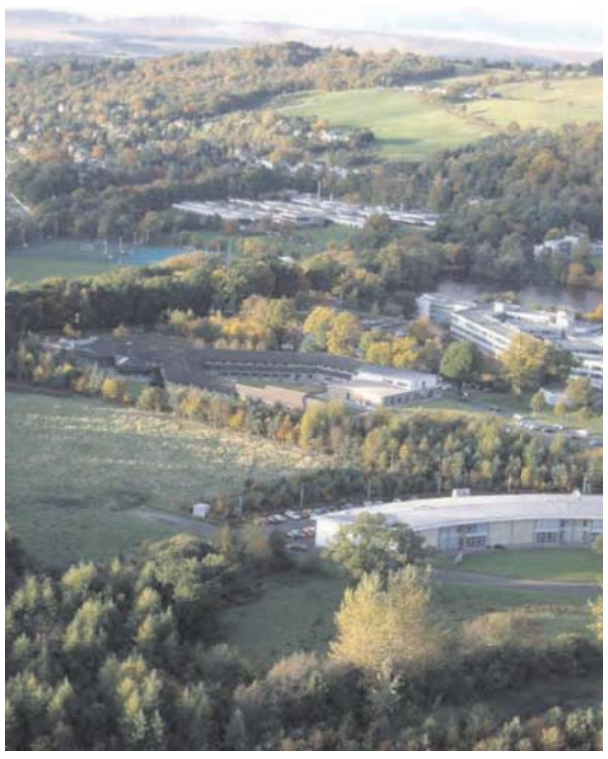
1. To use and reinforce 'the existing natural boundaries of landform, water and tree blocks as elements of continuity threading through the site.
2. Planting was to progress from west to east, coordinating with the building programme and minimizing disturbance to the existing landscape
3. Colour was to be provided throughout the year, mainly through trees with seasonal changing leaf colour. Specific emphasis was placed upon the flowering season of native cherry and hawthorn
4. To achieve a rapid, apparently mature effect through mass planting with strong blocks of colour from low level shrubs and ground-cover, mainly using white and yellow flowering species
5. To keep maintenance to a minimum…*"the overall effect was of a parkland with large areas of grass framed by buildings and bold blocks of planting."*
6. Mowing strips adjacent to buildings, with steep slopes planted with ground cover and shrubs, which required intensive short-term maintenance and the shrubs annual pruning…*"this demonstrates a frequent problem in planting design: the conflicting demands for immediate impact, low maintenance and floristic interest."*

This was very typical of landscape planting design in this period in Scotland.

The 'ecological approach' to natural planting being pioneered in Holland at that time, as taught by Alan Ruff in Manchester, was only just reaching these shores, and it was revelatory. The *Design with Nature* (1969) approach of Scottish/American landscape architect Ian McHarg, being applied to master planning in the USA, was also still new in this period and this thinking was not especially evident at Stirling.

Today this approach is very much the norm in approaching large scale landscape design.





**Stirling University - RMJM early 1970s and 2008 views**

## The Plate-Glass Campus Universities: University of York

**University of York (1963)**
Designed by RMJM, lead Architect Sir Andrew Derbyshire

The University of York opened in 1963 with 230 students and currently has a student population of some 16,000 (2013/4).

The original campus is centred around a serpentine lake (the largest plastic bottomed lake in Europe), a conscious design decision to provide both distinctive image and identity, but also to act as a drainage basin to alleviate possible flooding in this flat landscape.

The area of the campus is approximately 80 hectares, and the City of York planning conditions state that only 20% of the land area can be built upon. To accommodate more students a 117 hectare extension at Helsington East was opened in 2009 and now has three colleges, three departments and conference facilities a sports village and business start-up incubator.

It joined the Russell Group in 2012, representing the UK's most prestigious universities.

Image:

Image: york.ac.uk

Image:

## The Plate-Glass Campus Universities: University of Sussex

**University of Sussex**
Designed by Sir Basil Spence, the University of Sussex opened in 1961.

The aerial views below show the density of the expansion over the past 50 years. Spence's Corbusian vision sat in manicured lawns with existing mature trees. The buildings stepped up the hillsides in an orthogonal overall arrangement.

Over time new tree planting has prevented space leaking out from the core.

**The green spine and orthogonal arrangement of buildings and contained spaces as outdoor rooms provide a clarity to the plan**

**The University in 1965**

**The University in 2015**

## The Plate-Glass Campus Universities: University of Bath

Biodiverse rain gardens, maturing after a

The University of Bath was built on a greenfield site on Claverton Down overlooking the city of Bath, and construction began in 1964. In 2014 it was awarded the Sunday Times Best Campus University in Britain. It has a population of some 16, 000 students. Starting about 15 years ago, moves have been made to put in place sustainable drainage for new car parks and biodiverse rain gardens (see above) - a major contrast from the rather stark deck at the heart of the main buildings. Like so many universities of this era it was planned in the grounds of a large house and follows the parkland style of wider landscape design.

## The Plate-Glass Campus Universities: University of East Anglia

Denys Lasdun's masterplan (first shown in 1963) placed the teaching and research functions in the 460m long 'teaching wall' block, following the con- tours of the site. The iconic brutalist ziggurat accommodation blocks overlook an open grassy expanse, dipping towards the Broad, a 7 hectare lake constructed in 1973 by the removal of gravel and fed by the river Yare. The main square, designed by Bernard Feilden in 1972, is the main social space. The teaching wall, walkways and ziggurats are now grade II listed. The Sainsbury Centre (1978) is one of the first major works of Norman Foster. UEA is a major centre for climate change research and is home to the Tyndall Centre.

The lake is not really apparent from the top of the parkland due to a dense line of trees on its northern shore - this is in contrast to the lakes at York, Stirling and the more recent Nottingham campus.

As with all universities from this time, the planting aimed to get a mature look early on. Here, pines and birch were used to do this, but of course as fast growing species they are now nearing the end phase of life and the age structure as seen in the photos above is potentially problematical. There is still strong shrub planting in evidence and this certainly creates a softer side to the architecture. Where new development has occurred, it appears to address the main spine road rather than being set back from it or turning its back on it as the original buildings do.

The Skywalk through the tree canopies to the Sainsbury Centre is a fun feature. Perhaps not surprising for a University that hosts the Tyndall Centre on climate research, the recently completed innovation centre has thatched walls. The art of doing this is limited to workers from Hungary who were building a similar structure at the Dutch ecovillage of Culemburg a few years ago, as there was a lack of skills in this regard in Holland. The particularly interesting thing here is the use of local landscape-produced materials for a well-insulated building that avoids the use of polyurethane foam.

**The Plate-Glass Campus Universities: University of East Anglia**

## The Plate-Glass Campus Universities: University of Essex

Essex University was established in 1963 after Essex County Council had received a proposal from Alderman Charles Leatherland in 1959, and it received its Royal Charter in 1965 having opening in the autumn of 1964 with 122 students. It is located in the grounds of Wivenhoe Park near Colchester that had been painted by John Constable. It plans to expand to 15,000 students.

The architect Kenneth Capon took the Tuscan hilltop town of San Giminiano with its squares and towers as his inspiration - a strange choice in this lowland landscape. Originally 29 towers were planned to house the undergraduates but only six were built. There are two small lakes on campus and the former farmed landscape is largely put down to amenity grassland with parkland trees.

The recent Essex Business School building opened in 2015; this is the UK's first zero carbon Business School in which a winter garden provides its own microclimate, and a pond recycles rain water to provide cooling for the building.

source:

source: www.bac.edu.my/univerisity-of-

source:

Innovation Centre

source:

Albert Sloman Library

Essex business School

source: Thomasmatthews.com

## The Plate-Glass Campus Universities: University of Lancaster

Located in farmland to the south of Lancaster city centre and adjacent to the M6 motorway, the campus for the University of Lancaster covers 120 hectares. It was designed by Sheppard Epstein Hunter in 1963.

The original site was a barren wind-swept hilltop, so the masterplan concept was to have a covered walkway spine running north-south linking a series of courtyards and interconnected buildings, with Alexandra Square as the main space. Cars were kept to the periphery and the campus is surrounded by a main perimeter road.

This was another development of the time that was inspired by hill top Italian towns (Cumbernauld New Town and the University of Essex were others), with a close packed arrangement of connected buildings. Over time, later development pressures resulted in a more unstructured campus. John McAslan & Partners are currently aiming to reconstitute the original structure with a central pedestrian spine.

The original site is surrounded by a wooded shelterbelt and interior spaces are either predominantly paved or put down to lawn. The tightness of the plan is clearly a means to mitigate the severe microclimate, but as with other Italian hilltop town inspirations of the time there was a lack of understanding of why those towns had evolved in that way as opposed to the urban form in this country.

## The Plate-Glass Campus Universities: University of Keele

**Keele University**
Keele University has an archetypal self-contained campus, located in 240 hectares of 'landscaped' grounds to the west of the potteries conurbation. It is situated on a hill that overlooks the town of Newcastle-under-Lyme. All aspects of student life, from teaching and accommodation to shops, leisure and health-care are provided for and some staff also live on campus which, as a whole, gains from a vibrant and cosmopolitan community.

The Keele Estate, on which the university was originally located, was once owned by the Order of Knights Templars from 1180, and whose possessions were annexed by Henry VIII after the Reformation. The estate was later purchased from the Crown by the Sneyd family, and eventually bought by the Stoke-on-Trent Corporation in 1948. It was founded as a university college in 1949 in the grounds of Keele Hall which still stands and became a university in 1962.

The immediate grounds to Keele Hall are maintained, with the Lodge House providing an entrance feature along with an avenue of mature trees. The main concourse is more typical of New World campuses with expanses of lawn crisscrossed by paths

Trees are a major feature of this landscape, and this resource has been established as an arboretum in order to make them available to visitors from the wider public. The core theme of the tree collection is Japanese flowering cherries of which there are over 150 varieties, making it one of the largest collections of its kind in the United Kingdom, and mentioned in the visit Britain website.

source:

source: Wikipedia

source: Wikipedia

source: Wikipedia

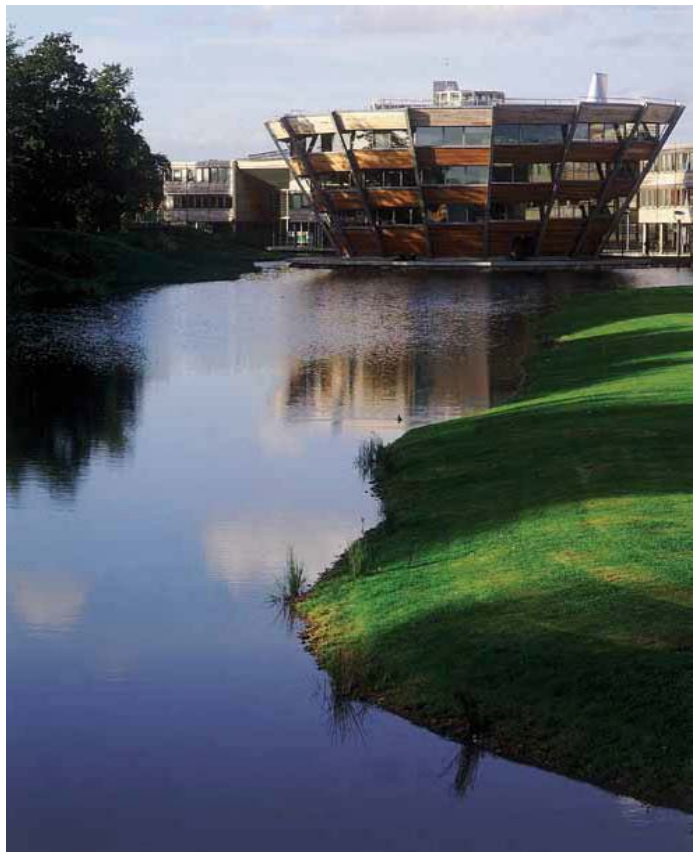
source: visit britain.com

## Examples of Newer Sustainable Campuses: University of Nottingham

The University of Nottingham, originally built on an initial gift of 35 acres of land by the family who founded Boots the chemists, is now one of the largest (and widely recognised as one of the greenest) university campuses in the UK.

The university campus now extends to some 300 acres and has consistently won the Green Flag Award for its green and environmentally friendly spaces. The landscaped setting consists of contemporary gardens, trees and shrubbery, including various plant species from around the world, and water features that provide a focal point.

In 1998 Michael Hopkins and Partners prepared a masterplan for a 6-hectare expansion of the university on the redundant Raleigh bicycle factory site from polluted brownfield land almost 2 kilometres from the main campus. Prominence was given to green principles which Hopkins described as 'eco-functionalism' in which a lake was installed, the far side being a series of barkan (boomerang-shaped) mounds that extend the edge condition with the water whilst maximising south facing basking slopes for reptiles and sheltered conditions for invertebrates.



## A selection of the '100 Most Beautiful College Campuses in America'

**Pacific Union College, Angwin, California**
Although Pacific Union College (PUC) was set up in Healdsburg, California in 1882, its sylvan campus – which stretches to around 1,900 acres – now lies on Howell Mountain in Angwin. As a result, it affords lovely vistas of the Golden State's verdant Napa Valley wine country. The school relocated there in 1909 and it was an understandable choice, given the abundance of raw beauty in and around the grounds. PUC's students can bask in the glory of nature by cycling or trekking their way across no less than 30 miles of trails. Budding scholars can also worship in the sleek, white PUC Church, which has hosted congregations since 1968 and boasts a magnificent 4,000-pipe organ fashioned in Austria that towers some 50 feet overhead.

**University of Richmond, Richmond, Virginia**
The University of Richmond's 350-acre grounds were judged to be the most beautiful in the country by The Princeton Review in 2000. The school was originally established in 1830 as an institute for aspiring ministers and was chartered as Richmond College in 1840. The campus' wealth of green spaces, picturesque location and inspiring red brick Collegiate Gothic-style buildings amidst the undulating hills of Richmond, Virginia make it a splendid sight. Warren H. Manning was the prominent American landscape designer behind the look of the grounds, which also feature the serene waters of Westhampton Lake, after the school relocated here from central Richmond in 1914. Architect Ralph Adams Cram conceived various of the magnificent buildings, including Jeter Hall, completed in 1913, which provided accommodation for nurses stationed at the campus' base hospital in WWI.

**Whitman College, Walla Walla, Washington**
As well as possessing expanses of appealing greenery and some architecturally outstanding buildings, Washington's Whitman College boasts two notable and beautiful areas of water. College Creek runs through the 117acre grounds, while the splendid (and splendidly named) geothermal spring Lakum Duckum provides a haven for both human and avian life. On the architectural front, the Richardson Romanesque-style Whitman Memorial Building has the honour of being the first edifice still standing to have been erected on Whitman's grounds; it was designed by George Washington Babcock and completed at the turn of the 20th century. The structure – the administrative heart of the college – was awarded a slot on the National Register of Historic Places in 1974. Whitman itself traces its origins back to 1859, when it was established as Whitman Seminary, eventually becoming a four-year college in 1883.

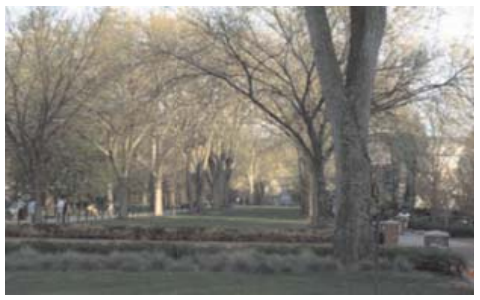
**University of Chicago, Chicago, Illinois**
This campus environment is rich in natural splendour and attractive architecture. Elegant Collegiate Gothic structures are dotted across the school's 211-acre grounds, with a number of them having been based on those at the University of Oxford. The university boasts a botanic garden, which (according to its official website) *"provides a campus environment rich in horticultural diversity and beauty."* The garden also boasts a pond that's home to ducks, dragonflies and turtles. The University of Chicago itself was established in 1890, and its grounds were built around a donation of land from American businessman Marshall Field.

## A selection of the '100 Most Beautiful College Campuses in America'

**Colgate University, Hamilton Village, New York**
Given the abundance of stunning greenery, attractive architecture and lovely natural features, it is fitting that Colgate University's 575-acre campus in Hamilton Village, New York was hailed as the most beautiful in the U.S. for 2010 by The Princeton Review. The grounds are home to around 2,300 trees such as magnificent maples and oaks; the grand Taylor Lake, graced by a pair of swans named Adam and Eve; and an abundance of eye-catching stone buildings. The impressive edifices include the Old Biology Hall, completed in a Romanesque style by C.B. Butler in 1885 and Hascall Hall, playing host to the philosophy and religion department. Colgate University was originally set up in 1819 as the Baptist Education Society of the State of New York, in the town of Hamilton. The current campus was bought in 1826, and the institution was renamed Madison University in 1846 before settling upon its present name in 1890.

**Amherst College, Amherst, Massachusetts**
Massachusetts-based Amherst College was founded in 1821, and during the mid-1830s it lay claim to be the second biggest institution of its kind in the country. Today, its 1,000-acre campus has expanded to encompass over 100 buildings, including exceptional architecture. The President's House, featuring Greek and Georgian Revival elements, was designed by Warren Slade Howland and completed in its first form in 1835. Amherst's campus boasts around 500 acres of natural beauty in its wildlife sanctuary, which incorporates woodlands, fields, wetlands, ponds and the Fort River – all ideal for both student research and relaxation.

**Gettysburg College, Gettysburg, Pennsylvania**
Gettysburg College was instituted in 1832 as Pennsylvania College and moved to its present-day campus in 1837. Trees flourish on campus (almost 2,000 by 2012) in 200 the acre grounds of the Gettysburg, Pennsylvania-based school. A haven for avian life, Quarry Pond is a highlight of the campus green areas. Architectural treasures include the Pennsylvania Hall, conceived in the American Greek Revival style by John Cresson Trautwine, which opened its doors in 1837. Elsewhere, the Glatfelter Hall is a Victorian Romanesque construction, building work on which was concluded in 1889 to a design by John A. Dempwolf. Pennsylvania Hall acted as a field hospital in 1863 when the Battle of Gettysburg took place.



**Pennsylvania State University, State College, Pennsylvania** Pennsylvania State University has an amazing 24 campuses in total, but the institution's biggest – and perhaps most beautiful – is its University Park location in State College. This 5,448acre area includes the campus' famed Mall, through which students can amble to class from Pattee Library, down a walkway lined with elms that have earned their own spot in the U.S. National Register of Historic Places. In the words of a Penn State Press university guide, during the summer and autumn months *"the elms' branches overhead create a dap- pled and leafy tunnel"*. Pennsylvania State was established in 1855 as the Farmers' High School of Pennsylvania, becoming the Agricultural College of Pennsylvania seven years later and Pennsylvania State College from 1874 until 1953.

## Seattle University: a 'Biophilic' Campus

Seattle University is a Jesuit Catholic university located in the city with over 7,500 students. The campus covers some 20 hectares. It has rain gardens and widespread use of native planting that lends a verdant quality. There is a central walkway through the campus linking the main spaces and buildings.

The campus is noted for its commitment to sustainability, which includes a commitment to pesticide-free grounds, a food compost waste facility and an energy and water conservation programme.

Seattle University received an innovation award in 2007 from the US Sustainable Endowments Institute and other green ratings. The move towards a pesticide-free campus began in the 1980s, replacing sprays with beneficial insects like lacewings to eat aphid-infested trees.

Certified
WILDLIFE
Habitat

SEATTLE UNIVERSITY
Native shade
garden

## Shengyang Architectural University: an 'Edible Landscape'

**The Rice Campus**
This campus was commissioned in 2002 by Shenyang City in North China's Liaoning Province and was designed by Kongjian Yu, the founder of Turenscape.
There were severe financial limitations to developing this new campus on agricultural land, and the budget for the landscape was only $1/m$^2$. There was also a short timeline for the construction of 320 000 m$^2$ of new buildings.

The region is known for its high-quality rice, as the cooler climate provides a longer growing season. A single crop will last from May until October, whereas in southern China this cycle is around 100 days.

The Chinese landscape architects had to consider food production and sustain- able land use due to rapid urbanisation, which is encroaching on arable land. The design concept was to retain the existing rice paddies and to demonstrate that an inexpensive productive landscape could become a usable space.

The design has small open platforms across the landscape, and paths respect the paddies and their irrigation system. The rice is grown in rotation with buckwheat.

The site covers 21 hectares and was completed in September 2003.

**Concept Sketch**

**Shengyang Architectural University: an 'Edible Landscape'**

**Warsaw University Library: Building Integrated Vegetation**

The new Library building at Warsaw University was designed by Marek Budzyński and Zbigniew Badowski, and it was opened in 1999. It has one of the largest roof gardens in Europe covering over a hectare. The building includes a botanical garden located on the roof, designed by landscape architect Irena Bajerska, which is freely accessible to the public.

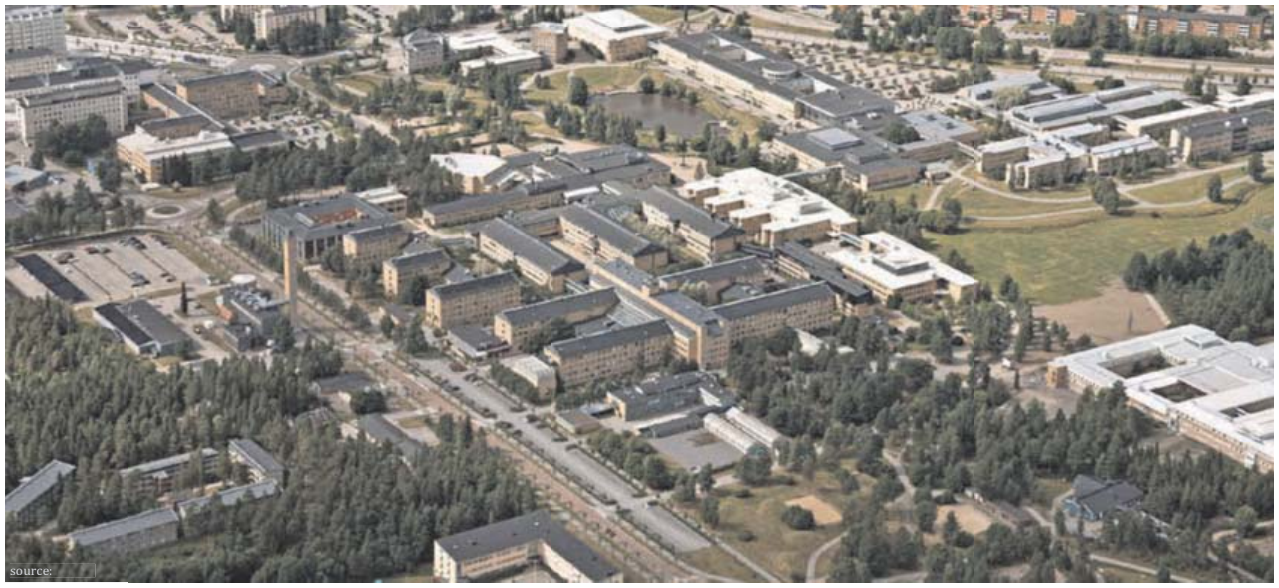
**Warsaw University Library: Building Integrated Vegetation**

## Umea University, Sweden

Umea university was founded in 1965 and located in the north of Sweden.

The campus buildings are tightly arranged in an orthogonal arrangement to resist the area's harsh winter conditions. Student housing is within a 15-minute walk of the campus. However, come the long summer days, the many outdoor spaces become important and active social hubs.

A social space has to be attractive and, on this campus, water is the attractor. A small lake, created from a natural stream, is a case in point with a 'socialising' bridge that allows for pausing next to the water and even stepping down to it. Jetties are provided for sunbathing - a feature seen elsewhere in places such as in Malmo in the south.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**Ho Chi Minh City University, Vietnam**

Vo Trong Nghia Architects are proposing the greenest university in the world in Ho Chi Minh City. The project is currently under construction and covers an area of just under 2.5 hectares

The university buildings have been conceived as a 'mountain range' covered in trees using bamboo and building integrated vegetation. This concept is consistent with work done by these architects before, such as their spectacular Vietnam Pavilion at the Milan Expo in 2015.

This concept echoes other examples of *building integrated vegetation*, such as the pine forested inner courtyards at the Biblioteque Nationale in Paris by Dominique Perrault; the wooded facades on the Bosco Verticale by Stefano Boeri in Milan; and of native planting mixed with level changes and courtyards in Seattle University.

As well as providing a dramatic aesthetic and sense of place, the vegetation at Ho Chi Minh University is also designed to cut the cost of air conditioning,

## Wageningen University, Holland

Recently voted the 'Best University in the Netherlands', Wageningen is located in the centre of the country. It evolved from an agricultural research institute and became a university in 1986. It has an emphasis on Life Sciences and Natural Resources with over 10,000 students and it is to become the base of Unilever's Research and Development Department.

The campus is open, car-free and comprises meadows and hedgerows with some woodland that form part of the ecological corridors of the wider area. The large water bodies collect and store surface water. A natural garden was created in 1998 with biodiverse fluvial vegetation and meadows. A winter garden in the Lumen Building brings the vegetation to the inside environment, as part of the University's research into nature's role in the human quality of life.

source:

source:

source: wageningen university

## The Orange Eco-Campus at Chatillon, France

The recent 'eco-campus' developed at Chatillon opened in 2015 in the Hauts-de-Seine. It provides 72,000m$^2$ of office accommodation in five buildings for 4,900 people, centred around a lake on a three hectare site. The architects were Bridot & Willerval, who also designed the Microsoft campus at Issy-les-Moulineaux in France.

The central landscape is a small lake, and there are bio-porous gabion walls and living walls and roofs for the buildings. All the buildings are designed to BREEAM 'very good' standard and all vehicular movement is kept outside the campus heart.

**“In an era of multiple unprecedented challenges imposed by the processes of industrialisation, and urbanisation, landscape architecture is now on the verge of change in the world...(it) must define itself in terms of the art of survival, not just the descendent of gardening.”**

Kongjian Yu
The Art of Survival - recovering landscape architecture 2006

## Drawing Conclusions & Learning from other University & Campus Landscapes

As we can see from this study, there have been numerous and varied influences upon the development of university campus landscapes, both in the UK and around the world. How we continue to interpret and develop the landscape of the University campus depends upon a great deal, however, upon its role and context in the 21st century.

It is interesting to note how many of the UK's *'Plate-Glass Universities'* created in the 19060's were located in the grounds of former stately or grand homes (such as the Universities of East Anglia, Keele, York, Stirling and Bath) and, as a direct consequence, they now comprise low maintenance parkland landscapes consisting of trees and grass but without livestock. This is the essence of the garden village/city design ethic passed down to us since the 1920s, and this suburban model presents a sanitised vision of town and country that has infected our collective view of landscape as something to be kept tidy.

However, nature tends to be more unruly, and there is growing and significant global interest in 're-wilding' our landscapes. In any case, the driving concerns today are different and include wider global issues such as climate change, resource depletion and food security in a global economy.

In examining more contemporary university and campus landscapes, we can certainly conclude from this study that green issues are to the fore today:

- They have informed the landscape design at the campuses of Nottingham and Seattle, as well as retrofitting of SUD's at the University of Bath
- In Wageningen University, Holland, they look to the potential for nature to improve quality of life and even put this statement on the front of their brochure
- In the business world the same 'biophilic' approach informs campus designs for IBM, Microsoft, Apple and Orange
- At Shenyang University, an existing productive landscape (ie: rice-growing) was retained as a pragmatic measure
- In Seattle native woodland planting and rain gardens provide a biodiverse and lush campus
- In Warsaw and Ho Chi Minh City the buildings are colonised by plants
- In Seattle, the management of amenity areas has been transformed by eradicating the use of pesticides (this has also been done across the City of Lyon)

Somewhere amongst these solutions is the sustainable and resilient path we should consider for the Framework Masterplan for Kent University.

The Concept masterplan produced by Farrells in 2015 for example, suggested that the University of Kent might become the "*…best Garden Campus in the UK*", whilst the university currently markets itself as the "UK's European University". Both are great ideas; the historic city and the surrounding landscape is also clearly a major draw for students and staff.

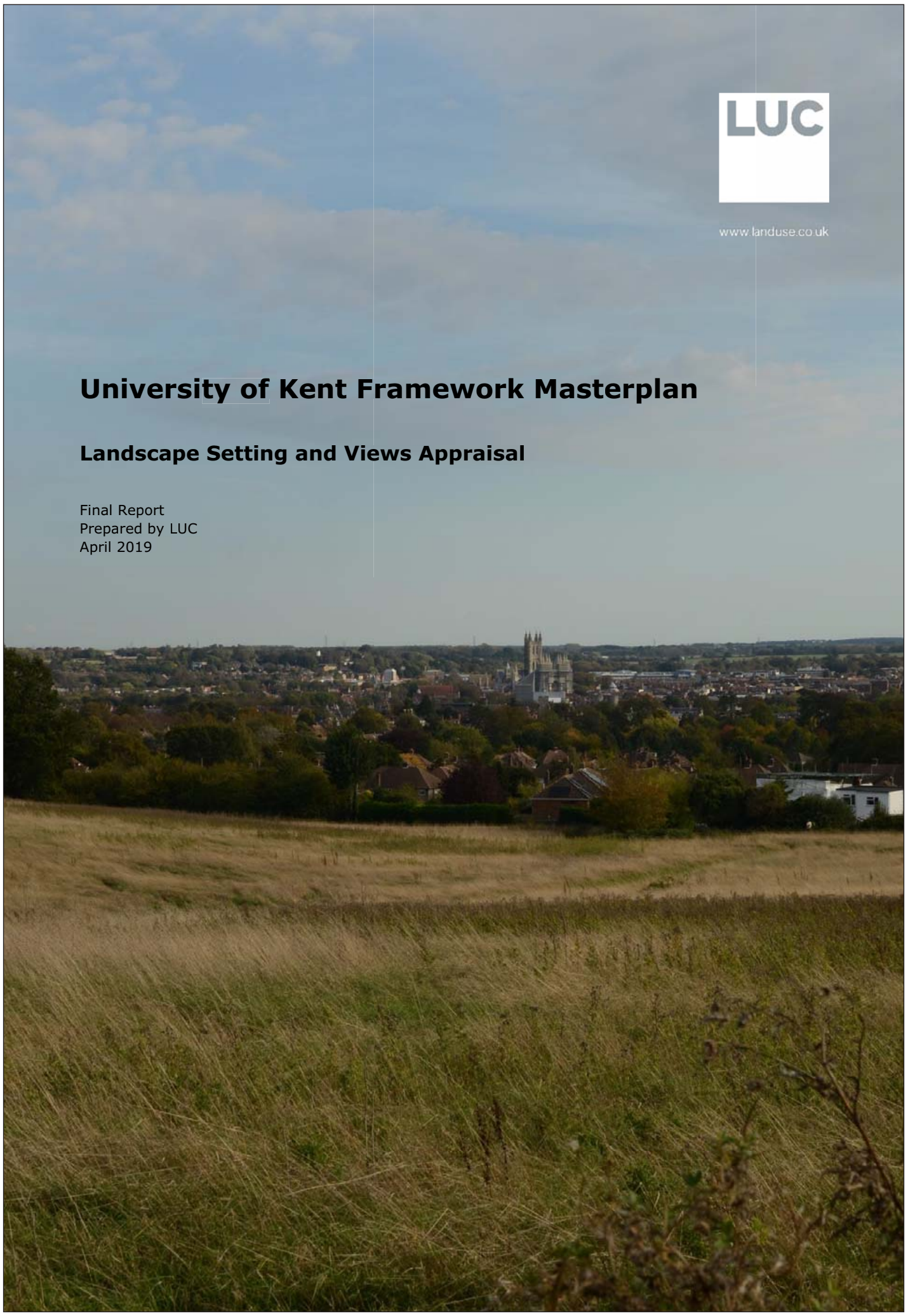
Perhaps the biggest clue lies in finding continuity with the history of the landscape itself; the University of Kent was derived substantially from three productive farms and woodland. This is significantly different to other universities of the time where universities were 'imposed' upon a somewhat alien landscape and where tree planting for shelter from fast growing species was needed (e.g. the University of East Anglia and Lancaster University). Forcing a university campus into an inappropriate landscape setting is neither a sustainable nor a resilient path, and as we have noted, the original pine and birch planting at UEA is already in need of rejuvenation.

At Canterbury the context is different; it is the former woodland that has been eroded and in need of rejuvenation and the productive landscape taken away and replaced by the civic 'garden-esque'. This is a good time therefore to reconsider the University of Kent's approach to land management, and by re-imagining the landscape as 'natural capital' that can provide a range of ecosystem services. We should move away from hidden, carbon intense, traditionally engineered infrastructure to a lower tech approach, which can also help improve the wellbeing and productivity of students and staff. We need to examine the landscape of layers that already exists at the Canterbury campus, learn from them and adapt them to the present and future needs of the University of Kent.

Today our landscape setting should also be an enjoyable part of education that celebrates both history and place whilst beating a path to the future. There is no doubt that Landscape Architecture must play a significant role in framing the way ahead for the University of Kent. Today there is a much deeper understanding of the complexities of the environment and its effects on people, and the university has a responsibility for careful and considered stewardship of the whole university estate as a legacy for future generations. This approach should enable and embrace a closer and more integrated response to the natural world appropriate to the managed sylvan setting of the University.

In other words, the future campus landscape setting should also be an enjoyable part of education that celebrates both history and place, whilst beating a path to the future. We need to seize the opportunity to move away from the traditionally-engineered, carbon-intense landscape infrastructure of the past towards a more low-tech, 'biophilic' approach, which should in turn contribute to the wellbeing and productivity of students and staff.

# Appendix L
# Landscape Setting and Views Appraisal


LUC
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University of Kent Framework Masterplan
Landscape Setting and Views Appraisal
Final Report
Prepared by LUC
April 2019

**Project Title**: University of Kent Framework Masterplan: Landscape Setting and Views Appraisal

**Client**: University of Kent

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| V3 | April 2019 | Final Appraisal | B Gurney | B Gurney | R Knight |

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# University of Kent Framework Masterplan

## Landscape Setting and Views Appraisal

Prepared by LUC
April 2019

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# 1 Introduction

### Context and purposes of the study

1.1 LUC was commissioned in June 2018 to produce a Landscape Setting and Views Appraisal as part of the preparation of the University of Kent Framework Masterplan. The aim of this work is to ensure that the Framework Masterplan respects the setting of the site in the wider countryside in accordance with Policy EMP7 of the Canterbury Local Plan.

1.2 The University campus is located to the north of Canterbury, set within a wooded parkland landscape while Canterbury is positioned in the centre of East Kent, at the foot of the North Downs in the Stour Valley and between Ashford, Dover and Thanet.

1.3 The landscape has been occupied since prehistoric times and has evolved through the interaction of physical, biological and cultural influences. A wealth of heritage can still be found within Canterbury including listed buildings, conservation areas, scheduled monuments and a world heritage site which all contribute to the cultural heritage and identity of Canterbury.

1.4 The landscape setting to Canterbury is characterised by the Stour Valley slopes that rise up to the North Downs in the south. The Kent Downs with its dramatic and diverse landform offers expansive views across the wider countryside and sea. The hills also form an attractive backdrop in views out from the city and other nearby settlements.

1.5 In light of this context, there is potential for new development to threaten the character of the city, its setting and views between the two. This in turn could affect designated landscapes.

1.6 This report sets out relevant background information to better understand the underlying principles of key landscape and heritage designations, identifies a selection of viewpoints for assessment, and provides an analysis of each view.

1.7 The report structure comprises:

- **Section 1** (this section) sets out the context and purposes of the study;
- **Section 2** provides an analysis of relevant planning policy;
- **Section 3** provides a review of landscape and heritage designations;
- **Section 4** provides a review of the landscape character;
- **Section 5** provides a descriptive list of key views;
- **Section 6** presents the visual analyses from each selected viewpoint.

# 2 Planning Policy

2.1 This section provides an analysis of relevant planning policy with regard to the landscape and heritage in Canterbury and the development at University of Kent.

### Canterbury District Local Plan, July 2017 (adopted)

2.2 The Canterbury Local Plan sets out plans to develop Canterbury and the surrounding areas until 2031 and is primarily used to guide planning decisions within the district.

2.3 The reason for undertaking this study is **Policy EMP7 University of Kent** which seeks to support the improvement of educational facilities at the University of Kent and facilitate the development of long term strategies that **fit with the character of the city and surrounding countryside** [our emphasis].

*2.4 "Within the campus of the University of Kent, identified on the proposals map, the City Council will support development of educational buildings for teaching and office space; student accommodation; business accommodation (compatible with the University's role in research and development and business innovation); sports facilities and other facilities directly related to the University's core business.*

*2.5 The City Council will expect a masterplan to be prepared for the whole identified campus site, prior to any significant development within the site. Such a masterplan should maintain the campus character of the university; respect the setting of the site in the wider countryside; identify the key uses and their disposition within the site and any relocation of uses within the wider campus area. It should also set out a landscape and biodiversity strategy for the whole site."*

2.6 Chapter 10 of the Local Plan is concerned with Canterbury's Landscape and Biodiversity policy, a key objective of which is to:

2.7 *'…protect and enhance the countryside, acknowledging its own intrinsic value, the diversity of its landscape, heritage and wildlife and recognising that a high quality of rural environment contributes to the economic, social and cultural wellbeing of the District.'*

2.8 **Policy LB1 Kent Downs Area of Outstanding Natural Beauty** affirms the importance of managing the most important landscapes for the conservation and enhancement of their natural beauty. It notes that development should also have regard to the AONB setting although no definition on what constitutes the setting is provided in the policy wording. Reference is made to the advice set out in the Kent Downs AONB Management Plan.

2.9 *"Proposals will be encouraged where they facilitate the delivery of the statutory Kent Downs AONB Management Plan and are desirable for the understanding and enjoyment of the area."*

2.10 Due to the proximity of the Kent Downs to Canterbury, views across the city from the hilltops are also likely to have some historical qualities, with distinctive landmarks providing a strong settlement identity. Key viewing opportunities referred to within the AONB management plan as well as the guidance on the special qualities are considered in Section 3.

2.11 **Policy LB2 Areas of High Landscape Value** highlights five areas in and around Canterbury of 'greater than local' importance. Of particular note is the Canterbury AHLV which is identified as important to protect the historic and landscape setting of the City and the World Heritage Site.

2.12 **"***Development proposals that support the landscape character (including settlement character), and have no significant impact upon historic setting, archaeological or nature conservation interests, where relevant, will be permitted.*

2.13 *Within the Canterbury AHLV, development proposals should have particular regard to the historic setting of the City and World Heritage Site."*

2.14 The relevant areas within the Canterbury District Landscape and Biodiversity Appraisal as well as the Kent Landscape Assessment are reviewed within Section 4 to provide a deeper understanding of the qualities that make these AHLV landscapes important and to ensure development does not have any significant impacts on them.

2.15 **Policy LB4 Landscape Character Areas** aims to protect the landscape character and local distinctiveness recognising how particular qualities of the landscape contribute to the sense of place.

2.16 *"Development, or associated land use change or land management, which does not significantly should have regard to the Canterbury Landscape Character and Biodiversity Appraisal to identify the character areas and features affected."*

2.17 A review of the Canterbury Landscape Character and Biodiversity Appraisal is set out in Section 4 to identify the key landscape sensitivities of the relevant character areas. Any important visual relationships between the city and the countryside have also been considered.

2.18 **Policy OS6 Green Gaps** seeks to retain separate settlement identities by preventing their coalescence through built development. The policy has identified specific gaps between towns and villages where development pressure are evident through ribbon development, which includes Canterbury and a small number of neighbouring villages.

2.19 *"Within the Green Gaps identified on the Proposals Map development will be permitted where it does not:*

*a. significantly affect the open character of the Green Gap, or lead to coalescence between existing settlements;*

*b. result in new isolated and obtrusive development within the Green Gap"*

2.20 The openness of these areas is considered critical to the objective of retaining separate identities of the settlement. Where these areas are discernible in views, they have been annotated along with other sensitivities important to the settlement's distinctiveness.

2.21 **Policy HE2 World Heritage Site and Buffer Zone** sets out the Councils commitment to protecting the Outstanding Universal Value of the Canterbury World Heritage Site and its setting. The setting is clearly marked as the Buffer Zone on the Proposals Map and includes the streets and spaces immediately surrounding the three constituent parts of the World Heritage Site; the Cathedral, St Augustine's Abbey and St Martin's Church.

2.22 *"Developers, planning authorities and others envisaging change should have thorough understanding of the physical, historical, social and economic context of the World Heritage Site and the contribution that the site's setting makes to an appreciation of Outstanding Universal Value, including its integrity, authenticity and significance."*

2.23 A thorough review of the Canterbury World Heritage Site Management Plan including the statement of Outstanding Universal Value is provided in Section 3 to understand the special qualities that warrant protection. The plan also provides guidance for development and conservation in the World Heritage Site and its buffer zone and these are noted where they are appropriate.

2.24 **Policy HE3 Significant Views of the City and World Heritage Site** notes that a key element of the World Heritage Site Management Plan is to prevent development that would damage the World Heritage Site by introducing intrusive elements or blocking a key view. It does this by setting out criteria by which proposals should be assessed against.

2.25 *"Where buildings are proposed that are substantially taller than their neighbours, affect one of the identified long distance views, close viewing places, locations and/or significantly change the skyline, they should be assessed against the following criteria:*

- *The relationship to context (topography, urban grain, built form, views, prospects and vistas and effect on the skyline);*
- *The effect on the historic environment including the need to preserve and enhance historic buildings and sites;*
- *The effect on the World Heritage Site and its buffer zone;*

- *The architectural quality of the proposed building including its materials, scale form, massing and silhouette."*

2.26 The City Council has identified nine views based on their advantage of providing the best views to illustrate the historic significance of the city and the World Heritage Site. These are described in detail within the Canterbury Conservation Area Appraisal and have formed a starting point for the views considered within this study. The criteria have also informed the iterative design process.

2.27 **Policy HE6 Conservation Area** seeks to protect areas of special architectural or historic interest and their setting. It recognises how the sense of history and the type and quality of buildings, spaces, trees and other features contributes to the special character of these areas and also the views into and out of the area.

2.28 *"Development within, affecting the setting of, or views into and out of, a conservation area, as shown on the Proposals Map and all insets, should preserve or enhance all features that contribute positively to the area's character, appearance or setting."*

2.29 The relevant Conservation Area Appraisals including that which covers Canterbury are examined in Section 3 to understand the key elements that contribute to the special architectural, landscape and historic character of each of the area, and provide a firm basis upon which development proposals can be assessed. Key views are noted also in keeping with Policy HE3.

2.30 Other published studies and documents that will be considered include the following:

- Heritage Archaeology and Conservation SPD, October 2007
- Canterbury Conservation Area Appraisal, October 2010
- World Heritage Site Management Strategy
- Kent Downs AONB Management Plan (2014-2019)
- Draft Canterbury Landscape Character and Biodiversity Appraisal, 2012
- The Landscape Character of Kent, October 2004

# 3 Landscape and Heritage Designations

3.1 This section provides a review of relevant designations and management plans to understand the special qualities that are fundamental to their designation. These areas can be clearly seen mapped on **Figure 1: Landscape & Heritage Designations.**

### Kent Downs Area of Outstanding Natural Beauty Management Plan 2014-2019

3.2 To the south, approximately 4km from the City centre, is the boundary of the Kent Downs AONB. The Kent Downs AONB Management Plan sets out the special characteristics and qualities of the AONB with associated objectives and policies to conserve and enhance the distinctive character and natural beauty.

3.3 The special characteristics are identified as the following:

3.4 **Landform and landscape character**

3.5 The diverse topography is influenced by the underlying geology of the Kent Downs. Features that contribute to the dramatic landform comprise south-facing steep slopes of chalk and greensand; scalloped and hidden dry valleys; expansive open plateaux; broad, steep-sided river valleys, and the iconic white cliffs and foreshore. Expansive panoramas can be obtained across open countryside, estuaries, towns and sea from the scarp, cliffs and plateaux, while the dip slope dry valleys and river valleys provide more intimate and enclosed vistas.

3.6 **Biodiversity**

3.7 The Kent Downs supports a rich mosaic of habitats, plant and animal communities of national and local importance. These include semi-natural chalk grassland and chalk scrub; ancient semi-natural woodland; traditional orchards, including cobnut plats; chalk cliffs, foreshore and sea platform; chalk rivers and wet pasture; ponds and spring lines; heath and acid grassland; woodland pasture and ancient trees and networks of linear features of species-rich hedgerows, flower-rich field margins and road verges.

3.8 **Farmed landscape**

3.9 The Kent Downs AONB is predominantly a farmed landscape, with around 64% of its land classed as agricultural. Expansive arable fields can be typically found on the lower slopes, valley bottoms and plateaux tops, with fragmented pasture on the steep scarp and valley sides often grazed by livestock.

3.10 **Woodland and trees**

3.11 Woodland covers around 23% of the AONB and is the second largest land use after farming. Broadleaf and mixed woodland frame the upper slopes of the scarp and dry valleys and plateaux tops, over half of which is ancient.

3.12 **Historic and cultural heritage**

3.13 Fields of varying shapes and sizes and ancient wood banks and hedges, set within networks of droveways and sunken lanes have produced a rich historic mosaic. Architectural distinctiveness is evident in the scattered villages and farmsteads and oasthouses, barns, and other agricultural buildings, churches and country houses. The diverse range of local materials used, which includes flint, chalk, Ragstone, timber and tile, also contributes to the character of the countryside.

3.14 **The Heritage Coasts**

3.15 The chalk cliffs between Folkestone and Kingsdown form one of Britain's most evocative and best known landmarks. The clifftops are characterised by windswept coastal chalk downs, with areas of salt-wind sculpted scrub, open downland, and arable farming. The Heritage Coasts are one of the few places in south east England which offer a feeling of wilderness.

3.16 **Geology and natural resources**

3.17 The AONB comprises a complex band of geological layers, all of which are of glacial origins emanating from the northern ice sheets and outwash torrents. The geology of the landscape has attracted mineral workings for some years, particularly on the northern edge of the Greensand which has left some exposures uncovered revealing strata of important rocks, minerals and fossils.

3.18 **Vibrant communities**

3.19 The Kent Downs AONB is a landscape where people live and work. There are estimated to be 93,000 people living in communities within the Kent Downs.

3.20 **Access, enjoyment and understanding**

3.21 The Kent Downs AONB offers some of the south east England's most accessible countryside, with over one million people living within a kilometre of the AONB boundary. The landscape has a Public Rights of Way network which is four times the density of the national average, accommodating 40% of Kent's bridleways and 50% of Kent's byways on 23% of the county land areas.

3.22 As well as the qualities that make the Kent Downs AONB special, the management plan also provides greater detail on its setting. The setting is not formally defined on a map but is generally considered to be the land outside the designated area which is visible from the AONB.

3.23 The plan recognises that proposals within the setting of the AONB are not afforded the same level of constraint as those within the AONB but would ultimately depend on the significance of the impact. Where the special qualities listed above are likely to be affected then the impacts would be given more weight. The views to and from the scarp of the North Downs are highlighted in the plan as being particularly relevant.

### Area of High Landscape Value

3.24 The University of Kent campus falls within Canterbury Area of High Landscape Value which has been identified to protect the historic and landscape setting of the City and the World Heritage Site. The boundary of the AHLV largely follows the LCA boundaries defined within the Canterbury Landscape and Biodiversity Appraisal and in this area covers **LCA 28: Stour Valley Slopes**.

3.25 The Appraisal sets out the sensitivities that are important to the landscape distinctiveness as well as specific guidelines for the conservation and restoration of the area. The key sensitivities include:

a. *striking views over Canterbury, the remnant parkland features and elements of the former enclosure pattern*

b. *the dominant south-facing grassed slopes combined with the filtered tree cover from small blocks of woodland and other trees gives a highly visible landscape overall.*

c. *The ridgeline plays an important role for viewing the City. It is also particularly important as a backdrop to views out from the City and from the landscape to the east.*

d. *Where the gradient is less steep the enclosure from woodlands and buildings restricts all but local views in and out. This occurs to the north of Rough Common and above the University beyond the steepest part of the slopes as the landform starts to level and form the Blean.*

3.26 The condition is described as being poor, and the management strategy is to 'restore and improve'. Specific guidance for the management of the Stour Valley Slopes character, include:

- *Encourage the restoration of the historic parkland planting*
- *Strengthen the boundary on the edge of Hales Place housing estate in a manner that reflects the historic connections*
- *Strengthen and recreate the traditional field pattern*
- *Conserve and restore open grass slopes overlooking the City*
- *Resist further fragmentation and seek to create new woodland or woodland corridors where significant opportunity exists between the University and Broad Oak village.*
- *Strengthen the structure of the field pattern on the slopes beneath the University resisting the further introduction of scattered ornamental planting*
- *Resist the introduction of dominant features on the visually sensitive ridgeline.*

### World Heritage Site and the Outstanding Universal Value

3.27 Canterbury Cathedral, St Augustine's Abbey and St Martin's Church together form the Canterbury World Heritage Site, some 2km to the south of the University campus. The associated management plan aims to guide conservation efforts on the integral assets that together make up the World Heritage Site. It sets out the cultural significance and values, the key management issues as well the proposals for furthering the protection, conservation and improvements of the Site.

3.28 The Statement of Outstanding Universal Value provides a summary of the Site's importance with further details on its integrity and authenticity as well as information relating to its protection and management. The key points from the summary are stated below:

3.29 *St Martin's Church, the ruins of St Augustine's Abbey and Christ Church Cathedral together reflect milestones in the history of Christianity in Britain. They reflect in tangible form:*

- *The reintroduction of Christianity to south Britain by St Augustine, commencing at St Martin's Church where Queen Bertha already worshiped, and leading to the conversion of King Ethelbert.*
- *The successive architectural responses to Canterbury's developing role as focus of the Church in England – adaption of Roman buildings, the development of Anglo-Saxon building in mortared brick and stone, and the flowering of Romanesque and Gothic styles.*
- *The development under St Augustine and the monks from Rome, of early Benedictine monasticism, which spread from its cradle in Canterbury throughout Britain has a profound impact on English society.*
- *The Abbey scriptorium, which was one of the great centres of insular book production of Kent and Northumbria. The development of literacy, education and scholarship at the Abbey meant that Canterbury became the most important centre of learning in the country.*
- *Canterbury's importance as a pilgrimage centre, based on Augustine and its other early saints, was transformed by the murder and canonisation of Archbishop Thomas Becket, whose Cathedral shrine attracted pilgrims from all over Europe.*
- *The wealth and power of the Cathedral in the 12$^{th}$ century – when the offerings of large numbers of pilgrims helped the building of the magnificent enlargement of the east end, with its exceptional stained glass windows and the rebuilding of the choir and transepts following the fire of 1174. These features form one of the finest examples of Early Gothic art.*
- *The Cathedral's rich panorama of Romanesque, early Gothic and late Gothic art and architecture is exceptional.*
- *The establishment of Canterbury as the seat of the spiritual leader of the Church of England*

3.30 Further to this, the Statement highlights how the Cathedral, more specifically the Bell Harry Tower continues to dominate the city skyline rising out of the valley floor. Being the tallest building in the city, it forms a readily identifiable landmark from the neighbouring hills and surrounding landscape.

3.31 The view analysis undertaken as part of the Canterbury Conservation Area Appraisal is recognised within the Statement as a key document in the protection and management of the World Heritage Site. This is set out in greater detail below.

### Canterbury Conservation Area Appraisal

3.32 The Canterbury Conservation Area Appraisal details the fundamental elements that contribute to the special architectural and historic interest of the City. This encompasses all of the urban Canterbury conservation areas, except for Canterbury and Whitstable Railway conservation areas.

3.33 The Cathedral is again identified as the dominant element of the townscape, with views of the Bell Harry Tower seen protruding from a roofscape characterised by small pitched Kent peg tiled roofs and against the backdrop of the Stour Valley.

3.34 The city wall is of historical importance forming an intact relic of the medieval city together with the gateway, Westgate Towers. The wall has also helped to preserve the historic street pattern which is made up of gently curving streets, staggered junctions, market squares, narrow lanes

and alleyways, interwoven with landscaped spaces such as Westgate Gardens, Dane John Gardens and the Cathedral Precincts.

3.35 The streetscape owes much of its character to the medieval times, with narrow piecemeal plots resulting in a distinctive street scene. It was not until the Victorian and Edwardian period when residential terraces were introduced which created more regular proportions and a homogenous character.

3.36 The built vernacular contains a diverse mix of styles and materials which have been influenced by changes in architectural trends. The jettied timber-framed building with steeply pitched tiled roofs is the most characteristic of the city although 18th century alterations such as hung tiles are not uncommon and often conceal earlier structures.

3.37 Local red bricks, timber, stucco and clay tiles are abundant throughout the city as it was not until the late 19th century, when building materials such as welsh slate were able to be imported along the recently developed railways. The Victorian period also saw the building of rows of shops in the city, many of which still remain intact and form attractive frontages to the streets.

3.38 Other elements that make an important contribution to the townscape character include boundary walls, trees, stone and brick paving together with street furniture items such as bollards, railings, street lighting brackets and lampposts.

3.39 The Appraisal also provides a view analysis, which identifies nine public viewing opportunities that best illustrate the heritage significance of the city and the World Heritage Site. These are listed below:

a. **View from Tonford / Stour Meadows;** These views from the Stour valley to the west of the city have been depicted in paintings by William Delamotte (1844 and 1847), and in engravings such as The Stour at Whitehall, (1841), and a Southwest Prospect by J Hinton, (1751).

b. **View from Harbledown;** Depicted in paintings of Canterbury from Summer Hill and Golden Hill by William Delamotte (18444 and 1847), and in engravings by G Shepherd (1828), W Boot and A Knasser (1850), Goodridge (1790), Mould and Tod (1850) and LL Raze (1850).

c. **St Thomas's Hill;** Depicted in painting by William Delamotte (1844) and engravings by LL Raze (1850), and C&E Layton (1850).

d. **St Martin's Hill;** Depicted in painting by William Delamotte (1844) and engravings by LL Raze (circa 1850), J&F Harwood (Circa 1850), and T Hastings (1816).

e. **King George's Field;** Important open space off St Martin's Hill with good views across the city.

f. **New House Lane, Thanington;** A distant viewing place to the west of the city. Well known location for views along the Stour valley.

g. **Neal's Place;** An open area of unimproved chalk downland above Harbledown.

h. **University Road / University slopes;** Major area of open space providing the setting of the University. Extensive views to the south across the city.

i. **Beaconsfield Road / St Stephen's playing fields;** Area of open space between the city and the historic settlement of St Stephen's.

3.40 Guidance is provided within the appraisal to maintain and enhance these views. Development proposals should be assessed against the following points:

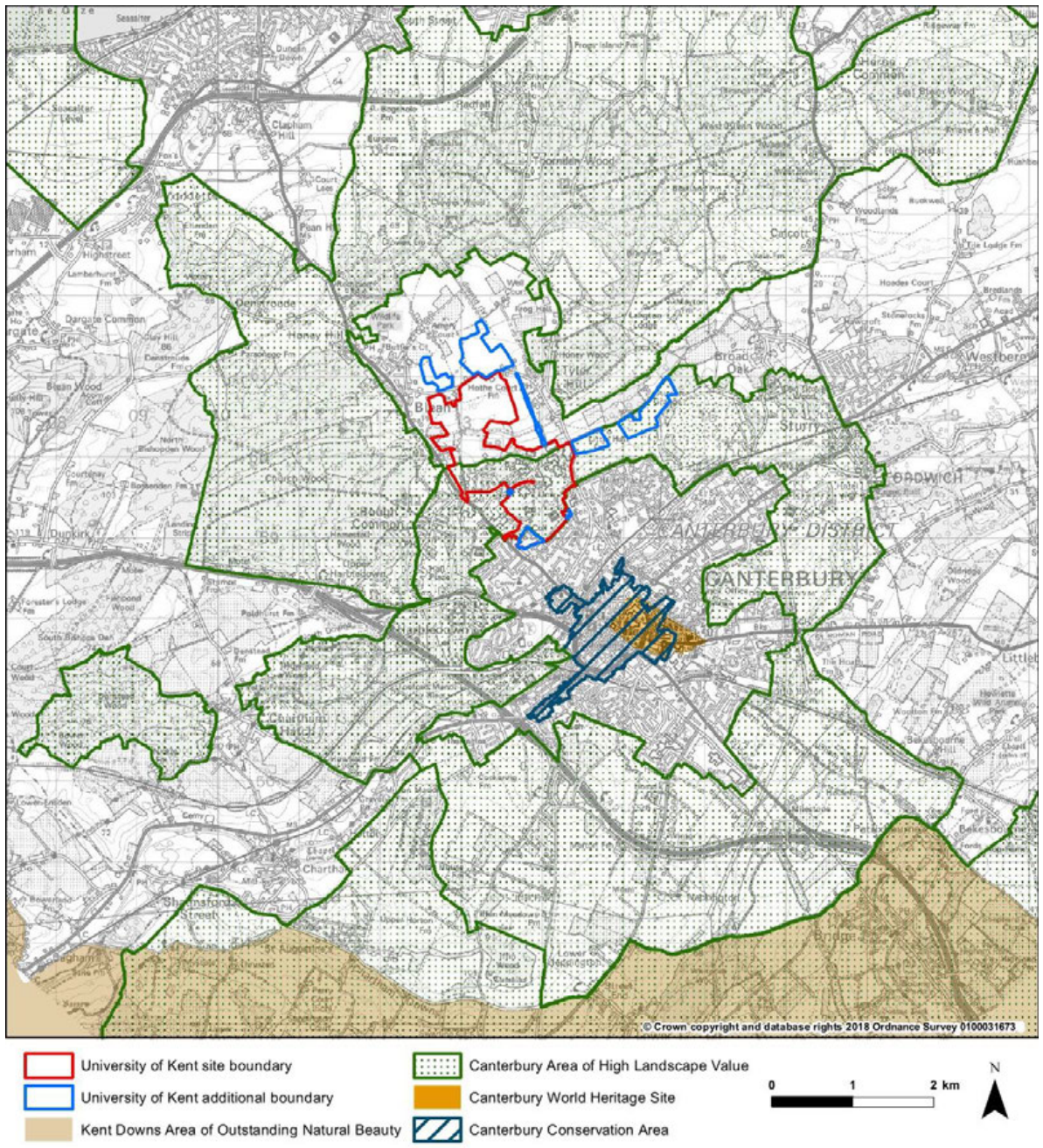
*a. Development in the front and middle ground of a view can affect the ability of the viewer to appreciate the landmarks in the view. The aim of the appraisal is to identify important views and to prevent unsightly and overly prominent developments adversely affecting the view.*

*b. The landscape management of the foreground of many views will need to ensure that the view can continue to be appreciated. This may, as is the case for the view from St Martin's Churchyard, involve the management of trees that would grow and obscure the view.*

*c. Development proposals in the background of designated views should seek to preserve or enhance the setting of landmarks, and of roofscape. Those seeking to develop in the background of an identified view should carefully analyse the characteristics of the view.*

*d. The effect on the landmarks of the city. The main landmark in the city is the Bell Harry tower of the cathedral and it is the major element contributing to the enjoyment of many views.*

**Figure 1: Landscape & Heritage Designations**



# 4 Landscape Character

4.1 This section provides a review of relevant character assessments and appraisals to understand the physical and visual relationship between the City and the surrounding countryside. The relevant landscape character areas can be seen on **Figure 2: Landscape Character Areas.**

### Canterbury Landscape Character and Biodiversity Appraisal

4.2 The Canterbury Landscape Character and Biodiversity Appraisal[1] divides the district into 48 Landscape Character Areas (LCAs), and the University's land holding straddles two of these. The core campus is located within the Stour Valley Slopes LCA, as is the Little Hall Farm area. The northern land holding falls within the Blean Farmlands LCA.

4.3 **LCA 28: Stour Valley Slopes**

4.4 The Stour Valley slopes is an area of south facing slopes to the north of the City containing grassland, small blocks of semi-natural broadleaved woodland and remnants of former parkland. There are extensive views over the City from the south facing slopes with the Cathedral as a notable focal point. The slopes beneath the University, Neal's Place and across the grazed pastures of St Stephen's Hill all provide vantage points from this area.

4.5 Traditionally the Stour Valley Slopes would have been characterised by pasture fields defined by hedgerows and blocks of woodland. This is still evident today but exists in a more fragmented form due to recent land use changes such as landfill and quarrying. This is acknowledged as the overall condition being rated as poor.

4.6 Landscape guidelines are focussed on restoring and improving the landscape character. The following actions are of particular note:

- *Conserve and restore open grass slopes overlooking the city*
- *Resist the introduction of dominant features on the visually sensitive ridgeline.*

4.7 **LCA 36: Blean Farmlands**

4.8 The Blean Farmlands comprises an area of gently undulating farmland and includes the village of Blean and the network of arable and fruit fields which are enclosed to the north by the Blean Woodlands. The woodland, settlement and hedgerows together with the unremarkable landform means that long views out are generally limited.

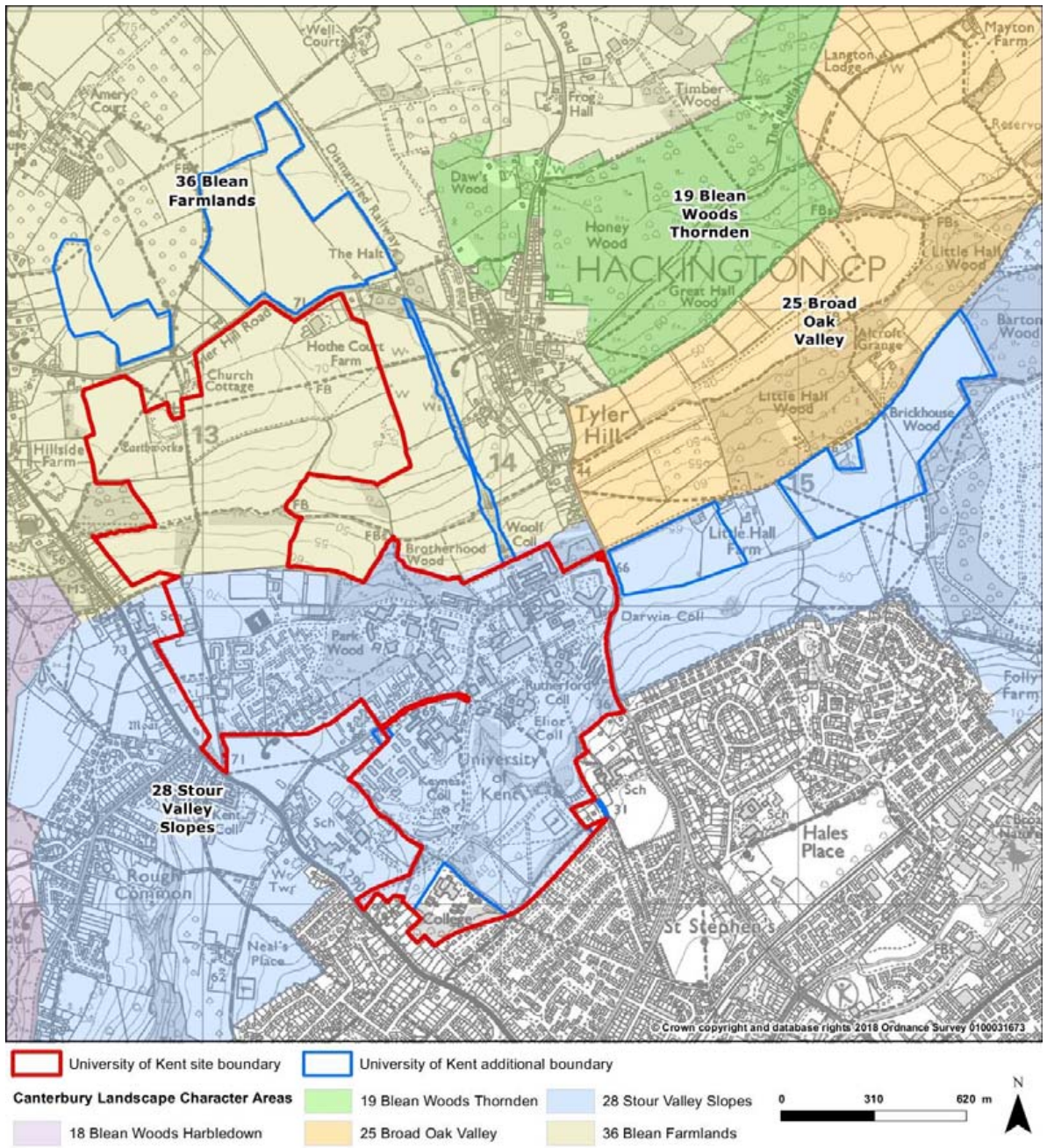
4.9 The majority of the land is managed for arable and fruit production with the tree-defined Sarre Penn flowing through a small valley and providing a particular sensitivity. The strong tree cover and network of hedgerows creates an intact landscape in a moderate condition, only interrupted by insensitive housing developments.

4.10 The management strategy for the Blean Farmlands is to 'Conserve and Improve', recognising the pressures of expanded villages as a key force for change in the area. The guidelines include:

- *Conserve grazed pasture*
- *Maintain and improve the traditional character of hedgerow planting along lanes and roads*
- *Reinforce and conserve the hedgerow and shelterbelt networks*
- *Encourage suitable planting around visually prominent farm buildings (particularly large, modern sheds) to soften the visual impact*
- *New development should be of local scale and character, and relate to existing settlements.*

[1] Canterbury Landscape Character and Biodiversity Appraisal (August 2012) Jacobs, Canterbury City Council

**Figure 2: Landscape Character Areas**



# 5 Key Views

5.1 This section identifies important views and viewing opportunities which represent the relationship between the city and its setting and which will be considered as part of the iterative design process.

5.2 Views were firstly identified where they are likely to provide a particularly good vantage point to demonstrate the interaction of the city and its setting (including views that reveal key sensitivities highlighted in published documents). This included all of the existing protected views noted within the Canterbury Conservation Area Appraisal as well as viewing opportunities cited in the Canterbury Landscape and Biodiversity Appraisal and Kent Downs AONB Management Plan. A viewshed from a 15m high point located on the most elevated part of the site was then created in Google Earth to provide an approximate zone of theoretical visibility (ZTV) as shown on **Figure 3: Google Earth Viewshed** and this was used to refine the viewpoint selection. As a result of this exercise, Viewpoint 1, Viewpoint 2 and Viewpoint 9 from the Canterbury Conservation Area Appraisal were excluded from the final list because they were orientated away from the University and/or were not included within the ZTV.

5.3 The final set of suggested views is set out below and can also be seen on **Figure 4: Viewpoint Locations.**

| Viewpoint location | Reason for selection |
|---|---|
| 1. Tyler Hill Road | Demonstrates views across the city from the Blean Woods towards the North Downs. This ridge is identified in the Canterbury Landscape and Biodiversity Appraisal for its role in viewing the city and the backdrop in views out from the city. |
| 2. University Road / University slopes | Recognised as a key view within the Canterbury Conservation Appraisal protected by Policy HE3 Significant Views of the City and World Heritage Site<br>Demonstrates extensive views across the city from the open space providing the setting of the university |
| 3. St Thomas's Hill | Recognised as a key view within the Canterbury Conservation Appraisal protected by Policy HE3 Significant Views of the City and World Heritage Site<br>Demonstrates an extensive view of the city which is framed by several large mature trees between which the cathedral and roofscape of the city is seen. |
| 4. Neal's Place | Recognised as a key view within the Canterbury Conservation Appraisal protected by Policy HE3 Significant Views of the City and World Heritage Site<br>Demonstrates the view across open farmland over the eastern part of the city. |
| 5. Lady Wooton's Green and Church Street, St Pauls | Noted within the WHS management plan as providing the historical link between the Cathedral and St Augustine's through the city walls. |

| Viewpoint location | Reason for selection |
|---|---|
| | Demonstrates views from the centre of Canterbury and the immediate setting of the World Heritage Site |
| 6. St Martin's Hill | Recognised as a key view within the Canterbury Conservation Appraisal protected by Policy HE3 Significant Views of the City and World Heritage Site<br>Demonstrates the view of the cathedral from St Martin's Church which is part of the World Heritage Site. |
| 7. King George's Field | Recognised as a key view within the Canterbury Conservation Appraisal protected by Policy HE3 Significant Views of the City and World Heritage Site<br>Demonstrates the view over the western part of the city. |
| 8. North Downs Way, Barton Business Park | Demonstrates views across the city from the east towards the Blean Woods. The ridgeline is identified in the Canterbury Landscape and Biodiversity Appraisal for its role in viewing the city and the backdrop in views out from the city. |
| 9. North Downs Way, Barham Downs | Demonstrates long distance views across the city from the scarp of the North Downs to the east. These views are highlighted as important to the setting of the Kent Downs AONB within the associated management plan. |
| 10. Nackington Road, Street End | Demonstrates long distance views across the city from the scarp of the North Downs to the south. These views are highlighted as important to the setting of the Kent Downs AONB within the associated management plan. |
| 11. New House Lane, Thanington | Recognised as a key view within the Canterbury Conservation Appraisal protected by Policy HE3 Significant Views of the City and World Heritage Site<br>Demonstrates a distant view of the cathedral across open land that shows the importance of the valley slopes in providing the backdrop. |

**Figure 3: Google Earth Viewshed**

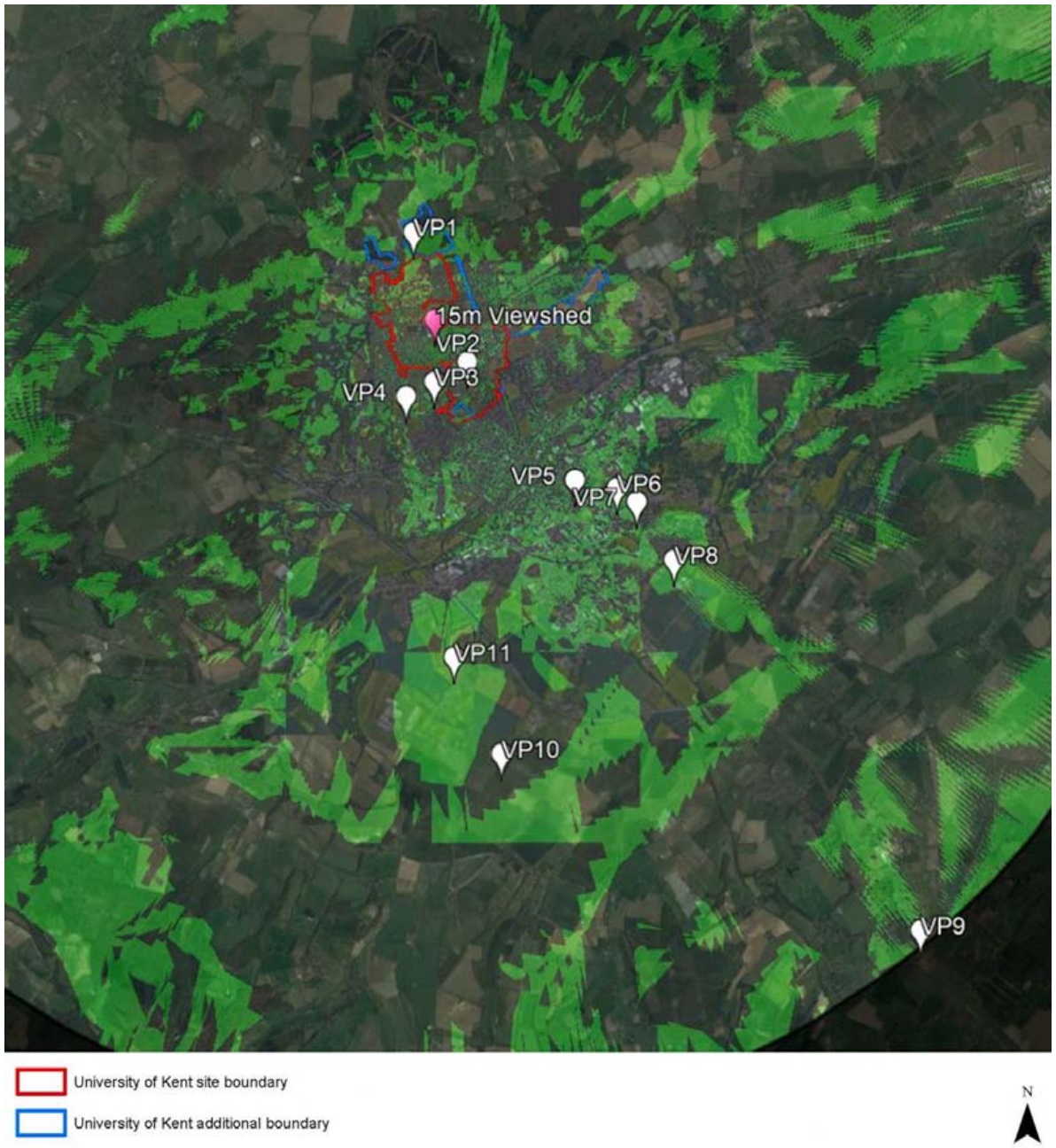
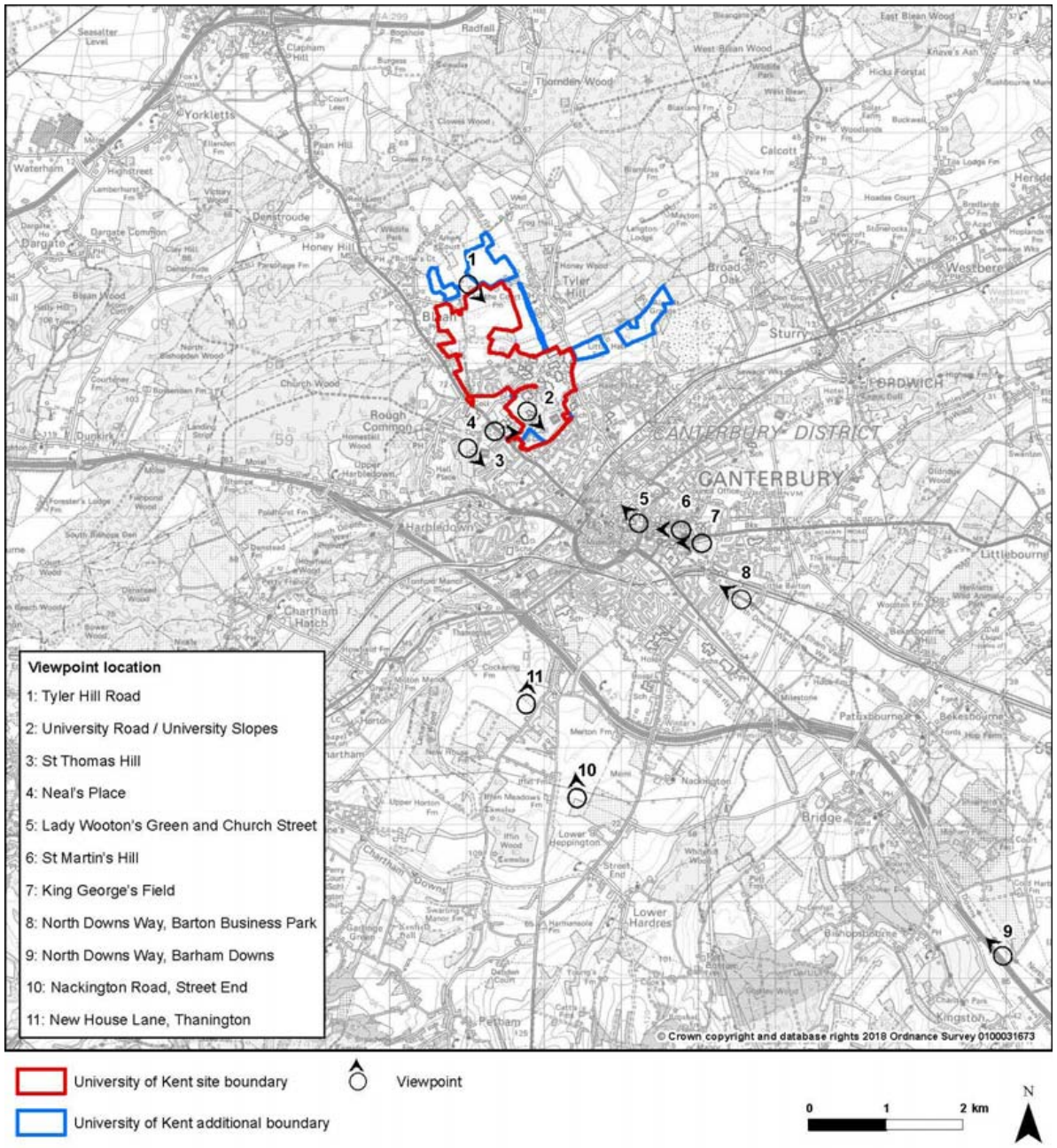


**Figure 4: Viewpoint Locations**



# 6 Visual Analyses

6.1 Photographs were taken on 11th October 2018 using a Nikon D7000 camera with Nikon AF 35mm fixed lens. Zoomed in versions were taken on 9th November using the same Nikon D7000 camera with a Sigma DC 18-200mm varifocal lens.

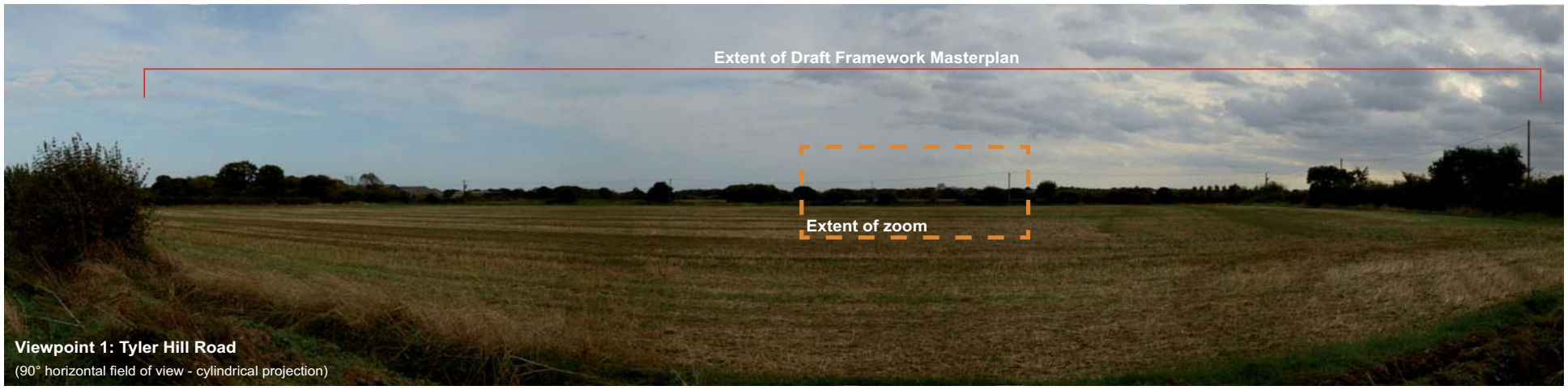
6.2 A draft framework masterplan was provided by JLL in dwg format on 28th November 2018. This was imported into Google Earth using AutoCAD to extrude the buildings at specified heights. Google Earth was used to provide an indication of the visibility of the proposed masterplan buildings in the views. Oblique aerial views similar to the examples below were examined to assess the levels of visibility in comparison to existing buildings in the University and suggestions to reduce building heights were incorporated as part of the iterative design process.

6.3 Each view analysis is set out on an A3 sheet. The first page of each view analysis includes:

- a viewpoint location plan;
- a panoramic photograph at a 90 degree field of view;
- a zoomed section of the view which is of most interest to the analysis.

6.4 The second page of each view analysis includes:

- key aims for the view, setting out the sensitivities of the view in relation to the masterplan and what the masterplan should respond to;
- a plan of the relevant section of the draft framework masterplan including the viewpoint location in relation to the masterplan;
- images taken from Google Earth showing the view with the draft framework masterplan model embedded;
- an assessment of how the draft framework masterplan affects the view, drawing on the Google Earth images.

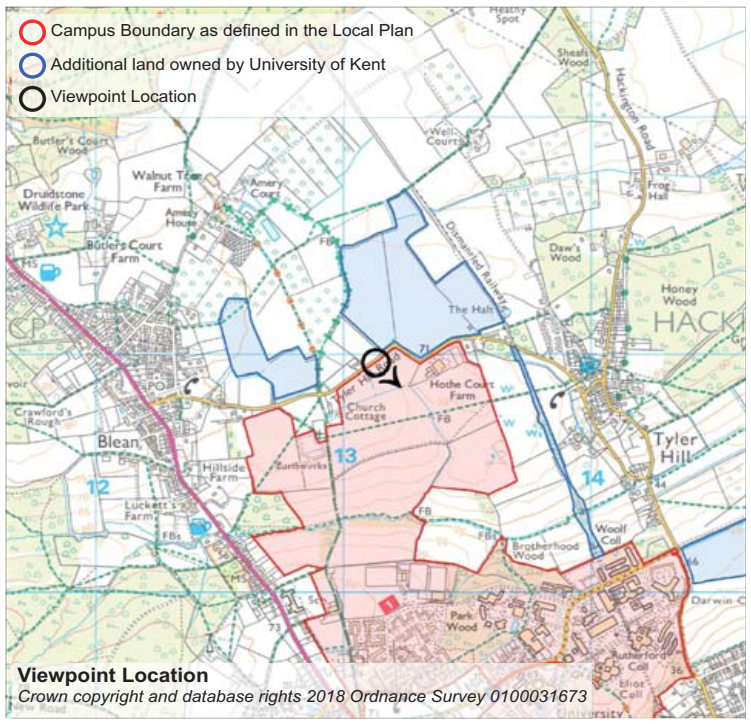



**Viewpoint 1: Tyler Hill Road**
(90° horizontal field of view - cylindrical projection)

**Zoom view**
(not to scale)

**Reason for selection:**

Demonstrates views across the city from the Blean Woods towards the North Downs. This ridge is identified in the Canterbury Landscape and Biodiversity Appraisal for its role in viewing the city and providing a backdrop in views out from the city.




**Viewpoint Location**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

**University of Kent Framework Masterplan - Visual Analysis**

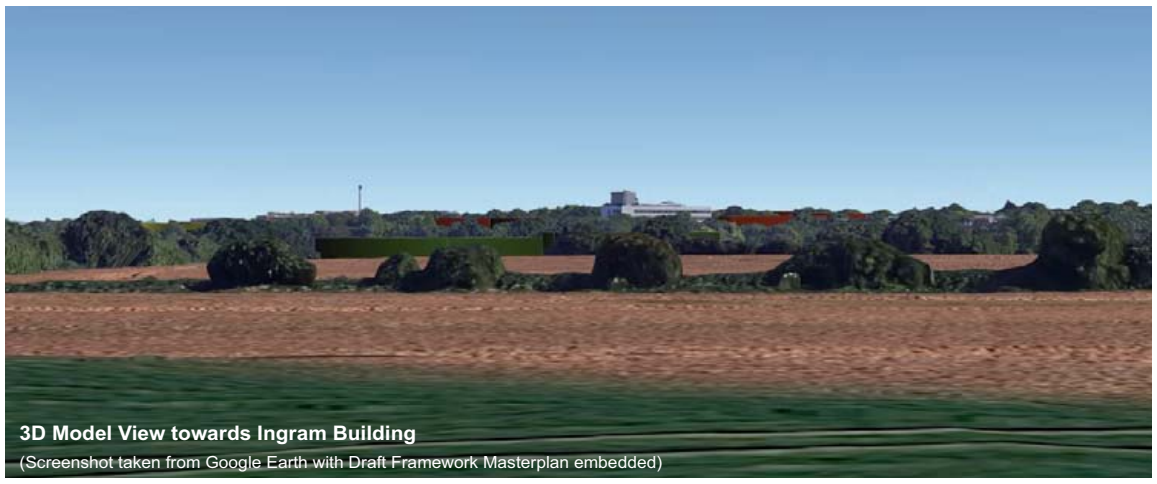
**Keys aims for this view are to:**

- Maintain a predominantly wooded horizon.

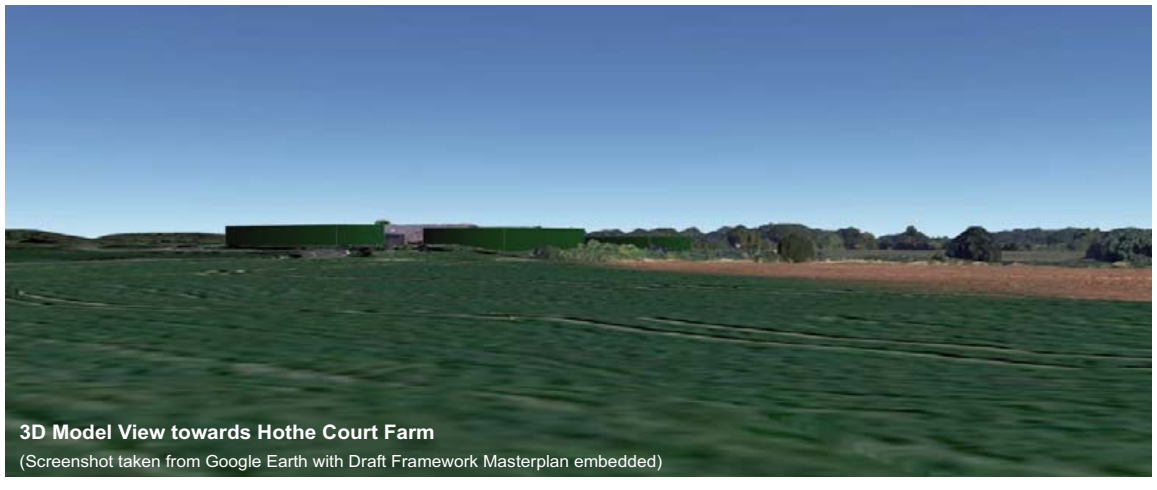
- Keep new development below the skyline where possible and ensure new development is no more prominent than the Ingram Building.

- Where development is visible aim for a varied skyline, rather than large blocks of development.

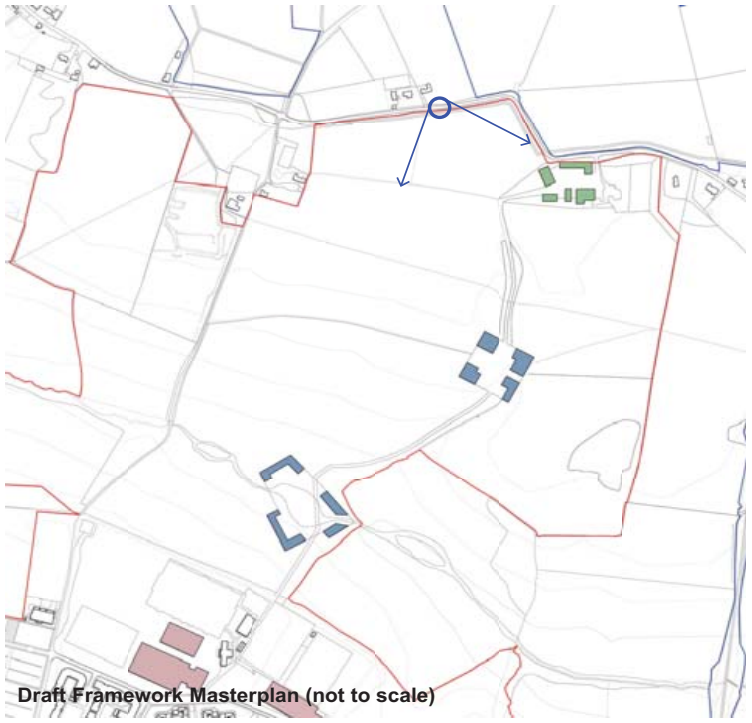
- Use subdued colours on facades to ensure they site within their wooded context, and avoid large areas of glazing on visible faces.



**3D Model View towards Ingram Building**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)



**3D Model View towards Hothe Court Farm**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)



**Draft Framework Masterplan (not to scale)**

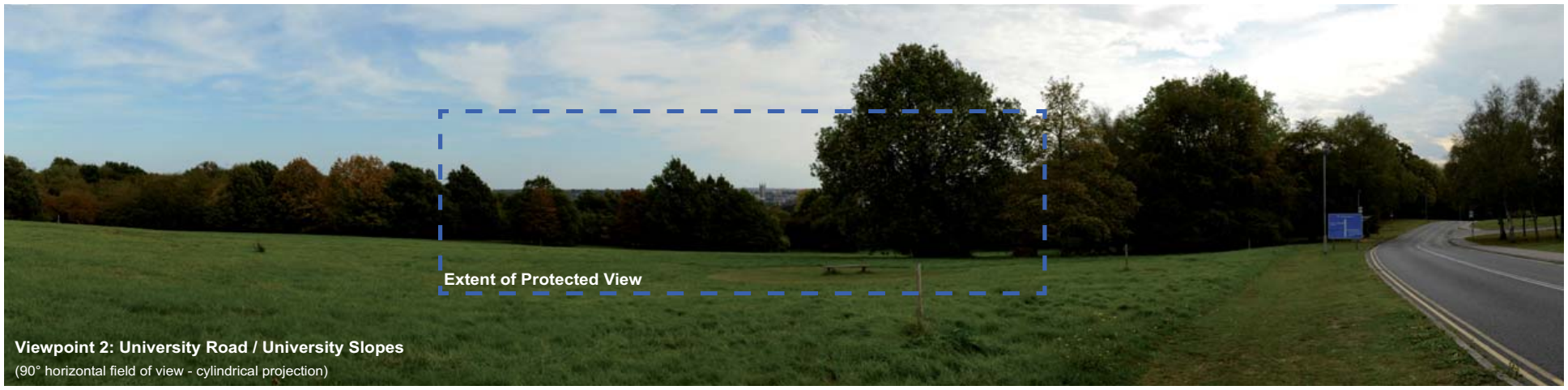
**Assessment of Draft Framework Masterplan:**

New development in and around the existing campus is likely to sit below the wooded skyline and be largely screened by woodland. The Ingram Building would still be the most prominent feature on the skyline in the distance.

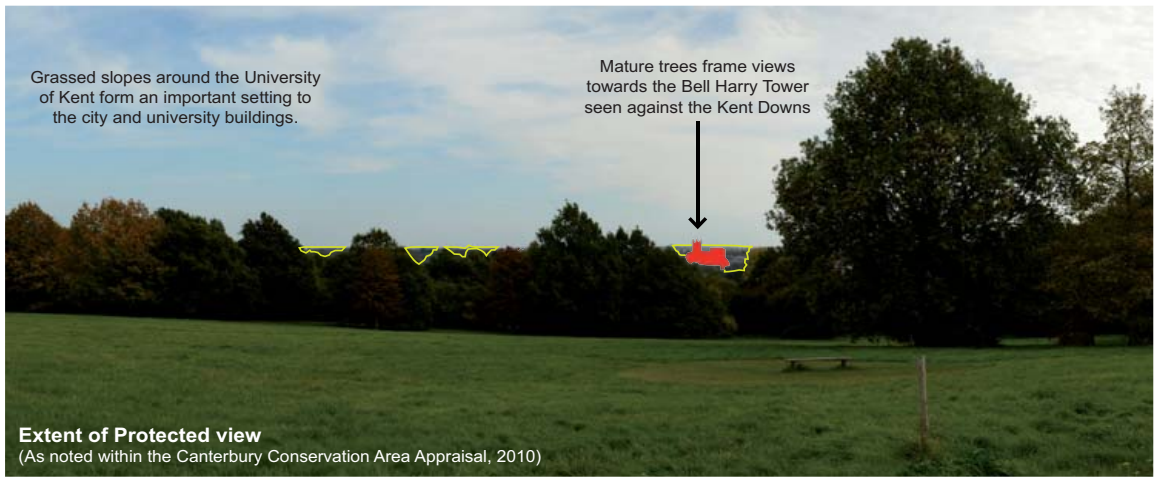
New buildings north of the university campus would be prominent in this view due to the more open character of the agricultural fields in which they are situated. In particular, the proposed development at Hothe Court Farm would be most visible due to the limited tree cover nearby.

Appropriate use of building materials and styles for the development which extends beyond the main campus would minimise impact on this view.

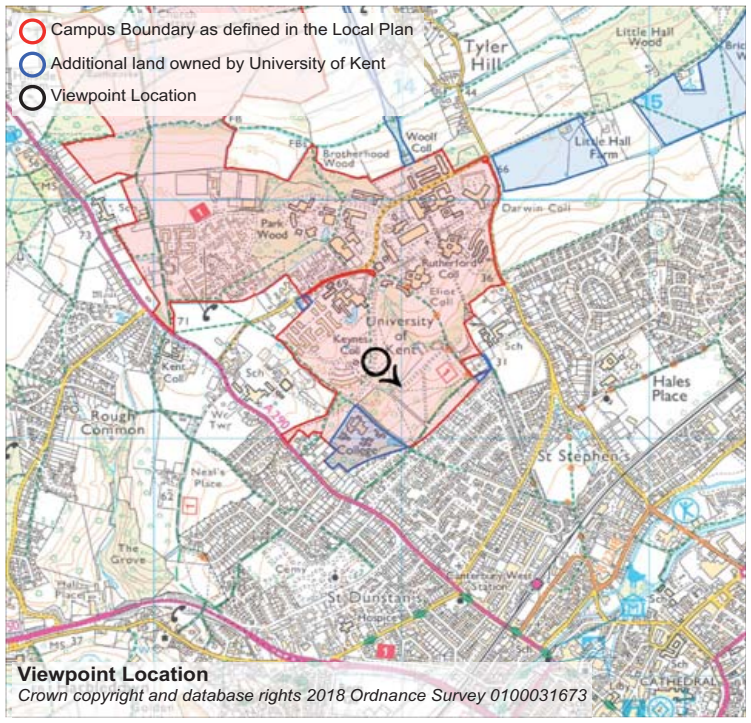
## University of Kent Framework Masterplan - Visual Analysis




**Viewpoint 2: University Road / University Slopes**
(90° horizontal field of view - cylindrical projection)




**Extent of Protected view**
(As noted within the Canterbury Conservation Area Appraisal, 2010)




**Viewpoint Location**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

**Reason for selection:**

Recognised as a key view within the Canterbury Conservation Area Appraisal protected by Policy HE3 Significant Views of the City and World Heritage Site.

Demonstrates extensive views across the city from the open space providing the setting of the university.

**University of Kent Framework Masterplan - Visual Analysis**

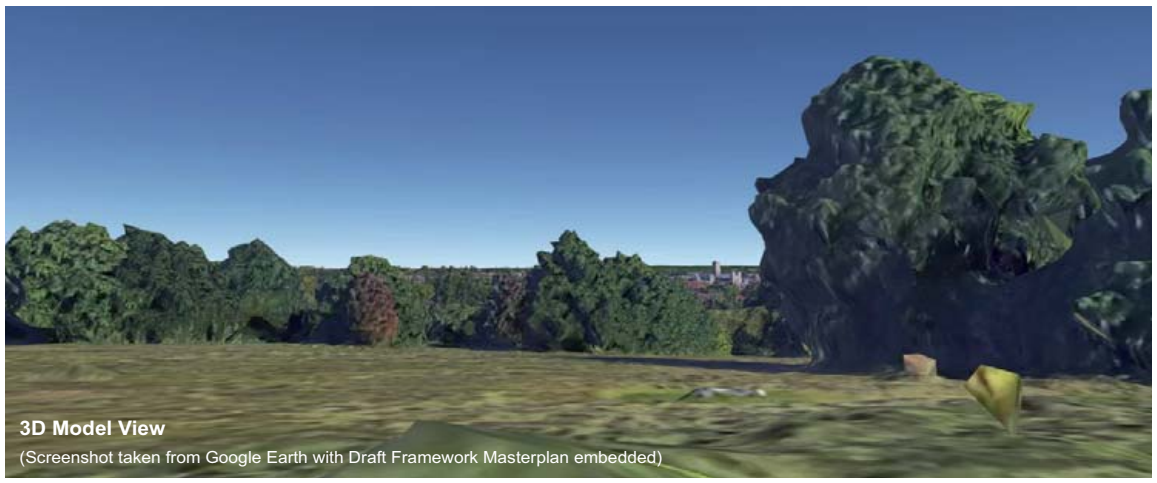
LUC

**Keys aims for this view are to:**

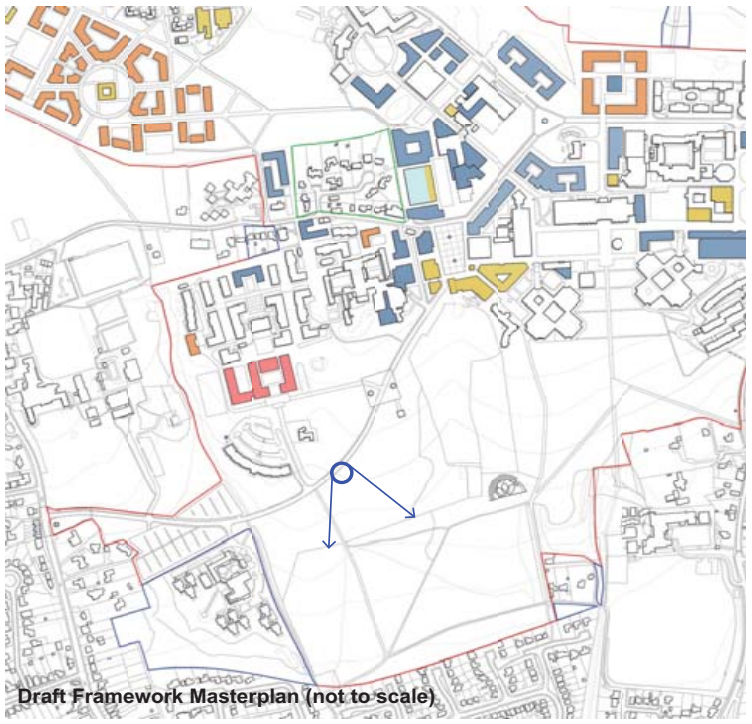
- Maintain open character of the foreground to preserve views to the city centre, particularly the extent of the protected view highlighted in the Conservation Area Appraisal (marked on the photograph).

- Manage tree heights to maintain views to the city centre, and particularly the Cathedral.

- Ensure buildings on University land do not block or detract from this view of the Cathedral.



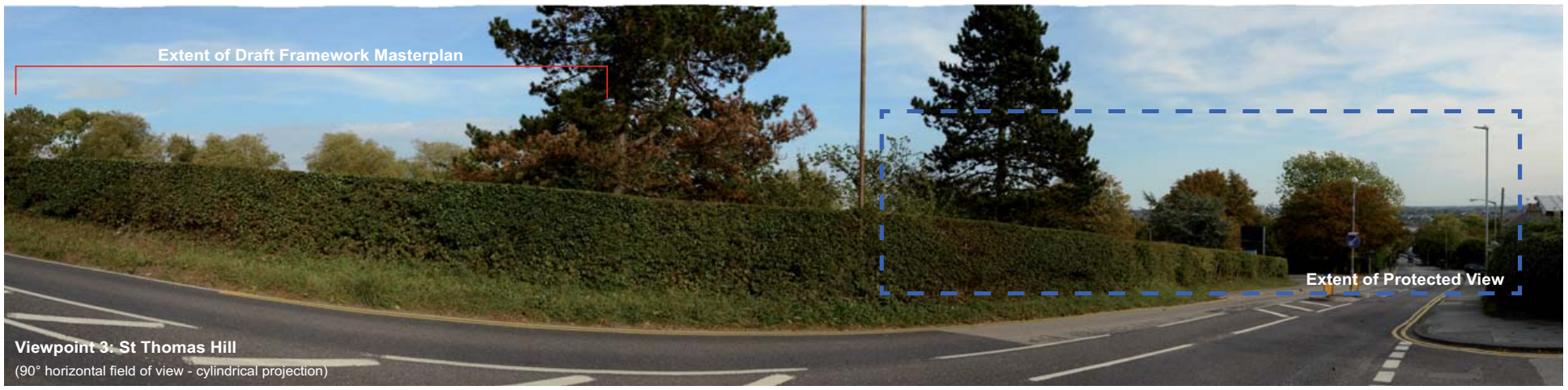
**3D Model View**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)



**Draft Framework Masterplan (not to scale)**

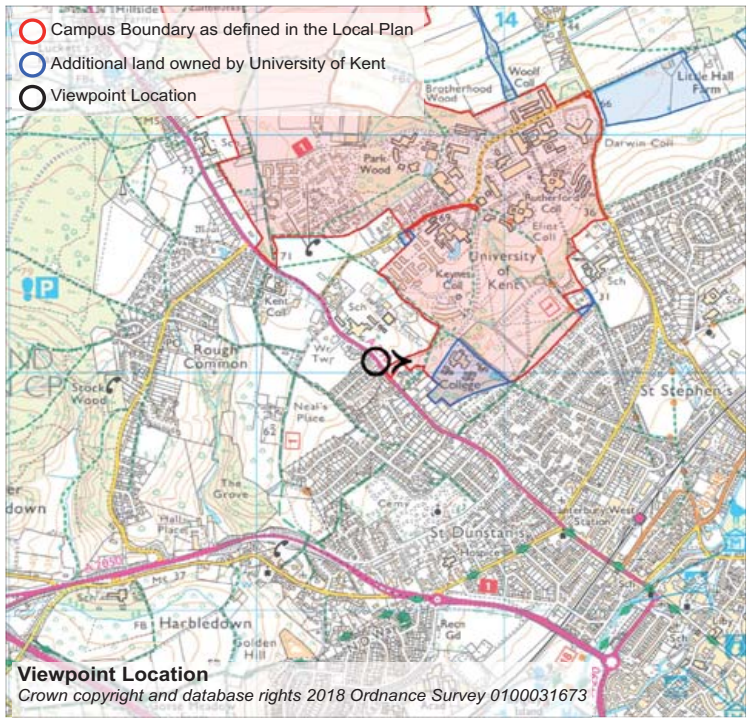
**Assessment of Draft Framework Masterplan:**

New development is located in the opposite direction of this view and so would not have any effect on the viewers experience.




**Viewpoint 3: St Thomas Hill**
(90° horizontal field of view - cylindrical projection)

**Extent of Protected view**
(As noted within the Canterbury Conservation Area Appraisal, 2010)




**Viewpoint Location**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

**Reason for selection:**

Recognised as a key view within the Canterbury Conservation Area Appraisal protected by Policy HE3 Significant Views of the City and World Heritage Site.

Demonstrates an extensive view of the city which is framed by several large mature trees between which the cathedral and roofscape of the city is seen.

**University of Kent Framework Masterplan - Visual Analysis**

LUC

**Keys aims for this view are to:**

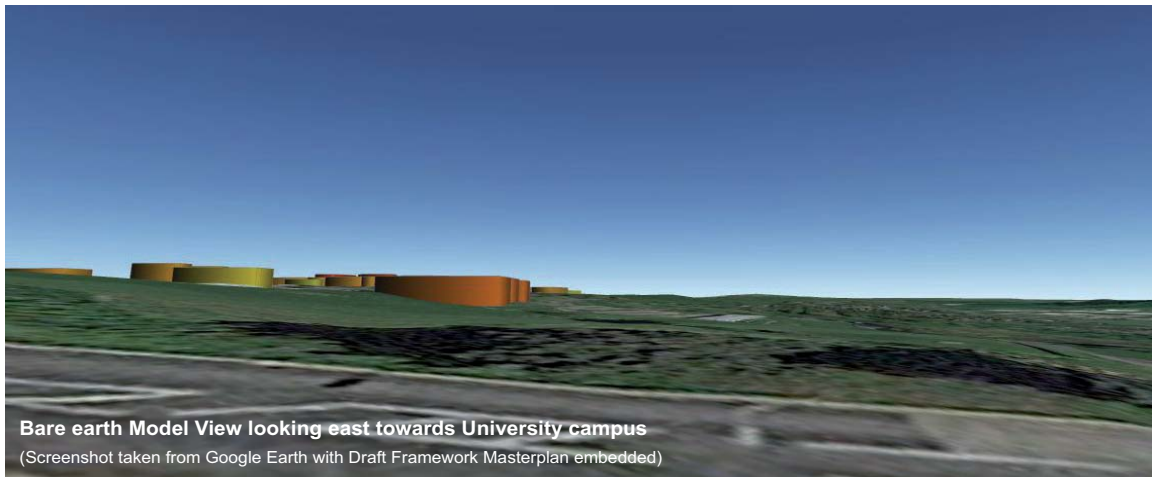
- Maintain views to the Bell Harry Tower, Canterbury Christ Church University and the city roofscape.

- Ensure that the cathedral remains the focal point.

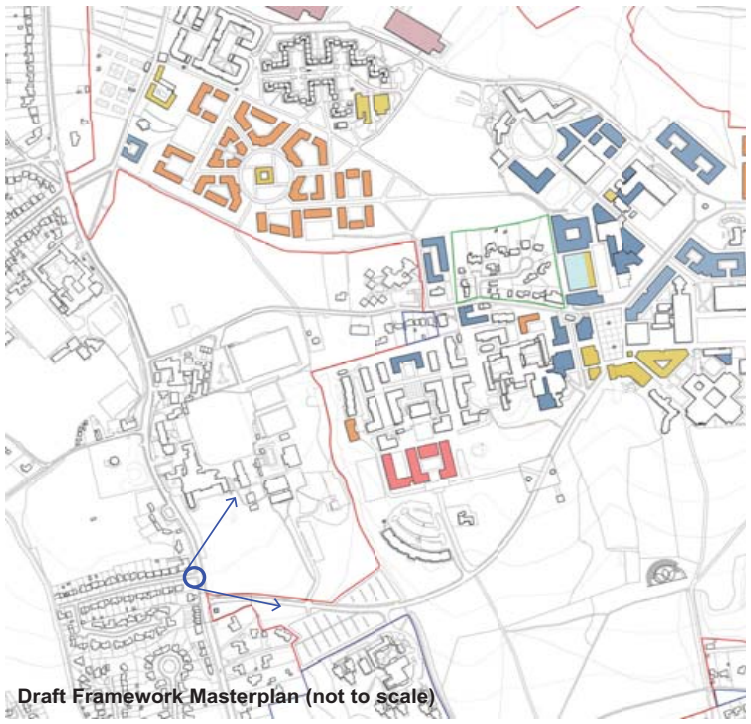
- Maintain the parkland character on the edge of the university campus to retain an attractive edge to the residential area.

- Maintain a wooded backdrop to the city (the North Kent Downs).

**3D Model View looking east towards University campus**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)



**Bare earth Model View looking east towards University campus**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)



**Draft Framework Masterplan (not to scale)**

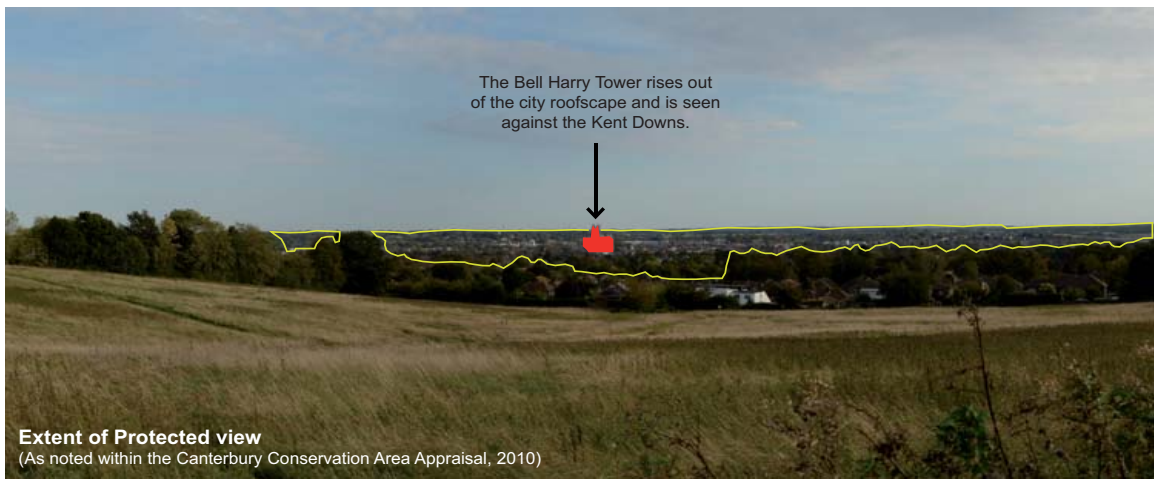
**Assessment of Draft Framework Masterplan:**

Proposed new development at the university will not be visible from this location in summer or winter and will not impact on the protected view highlighted in the Conservation Area Appraisal or the wooded edge to the university.

The retention of the trees around St Edmund's School is key to screening views of development..

## University of Kent Framework Masterplan - Visual Analysis

**Viewpoint 4: Neal's Place**
(90° horizontal field of view - cylindrical projection)

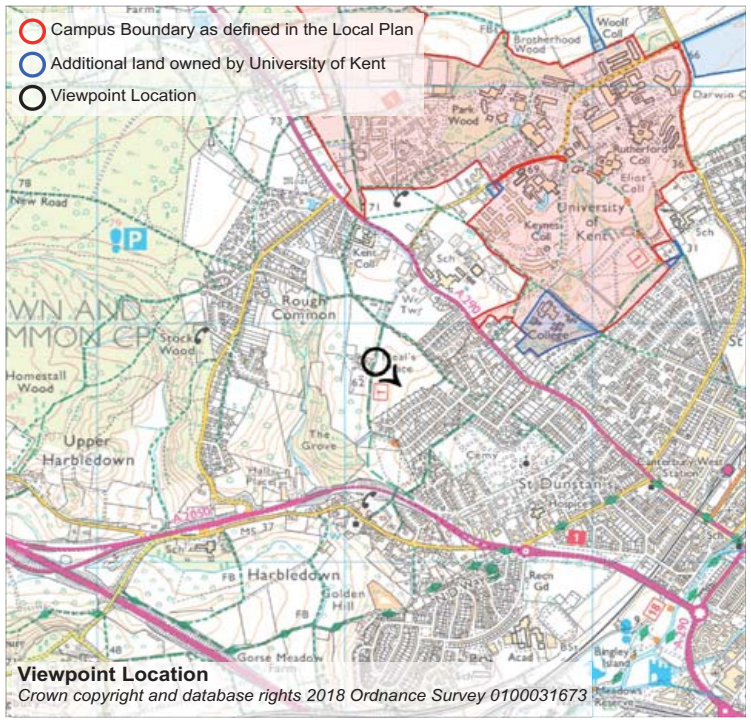



**Extent of Protected view**
(As noted within the Canterbury Conservation Area Appraisal, 2010)

**Reason for selection:**

Recognised as a key view within the Canterbury Conservation Area Appraisal protected by Policy HE3 Significant Views of the City and World Heritage Site.

Demonstrates the view across open farmland over the eastern part of the city.




**Viewpoint Location**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

**University of Kent Framework Masterplan - Visual Analysis**

LUC

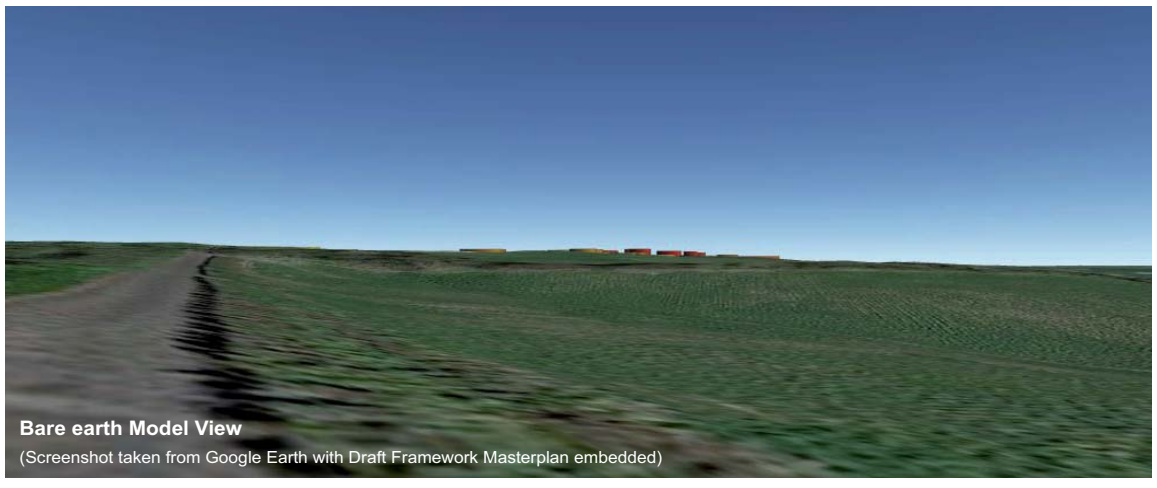
**Keys aims for this view are to:**

- Maintain the open character of the foreground allowing for uninterrupted views over the city.

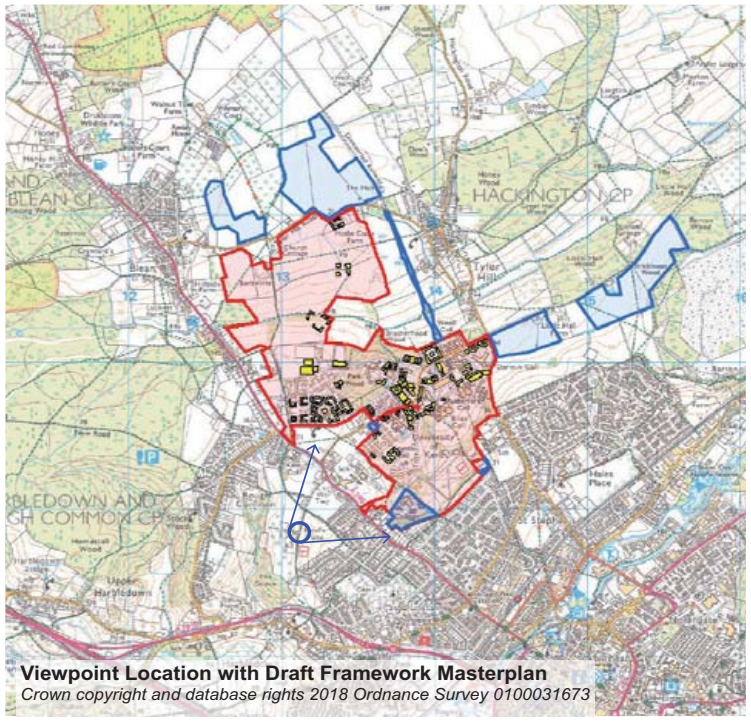
- Ensure the cathedral remains the focal point in this wide panoramic view.

- Retain a wooded backdrop.

**3D Model View**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)



**Bare earth Model View**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)




**Viewpoint Location with Draft Framework Masterplan**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

**Assessment of Draft Framework Masterplan:**

Proposed new development at the university will be screened by trees in the foreground both in summer and winter, and will not impact on the protected view highlighted in the Conservation Area Appraisal.

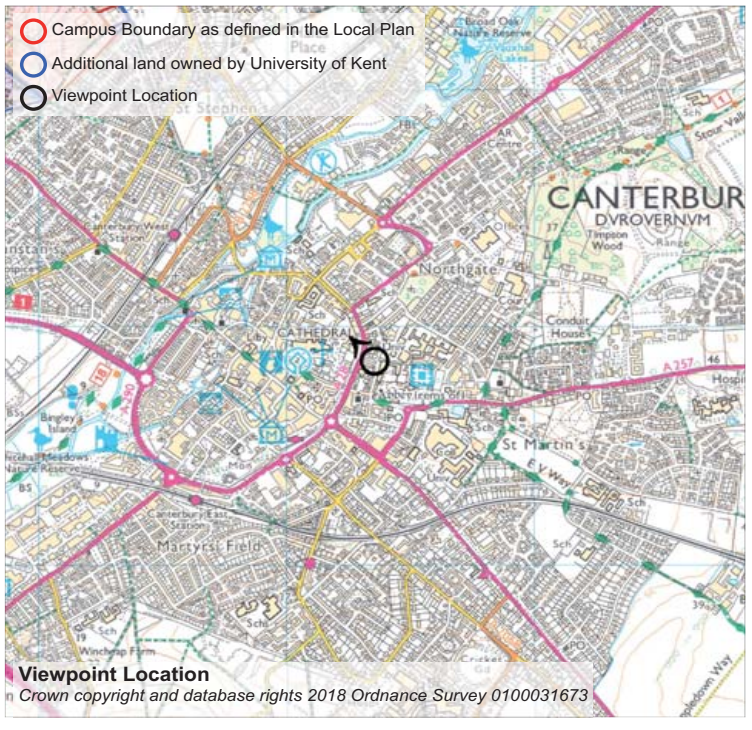
**University of Kent Framework Masterplan - Visual Analysis**

**Viewpoint 5: Lady Wooton's Green and Church Street, St Pauls**
(90° horizontal field of view - cylindrical projection)

**Reason for selection:**

Noted within the WHS management plan as providing the historical link between the Cathedral and St Augustine's through the city walls.

Demonstrates views from the centre of Canterbury and the immediate setting of the World Heritage Site




**Viewpoint Location**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

**University of Kent Framework Masterplan - Visual Analysis**

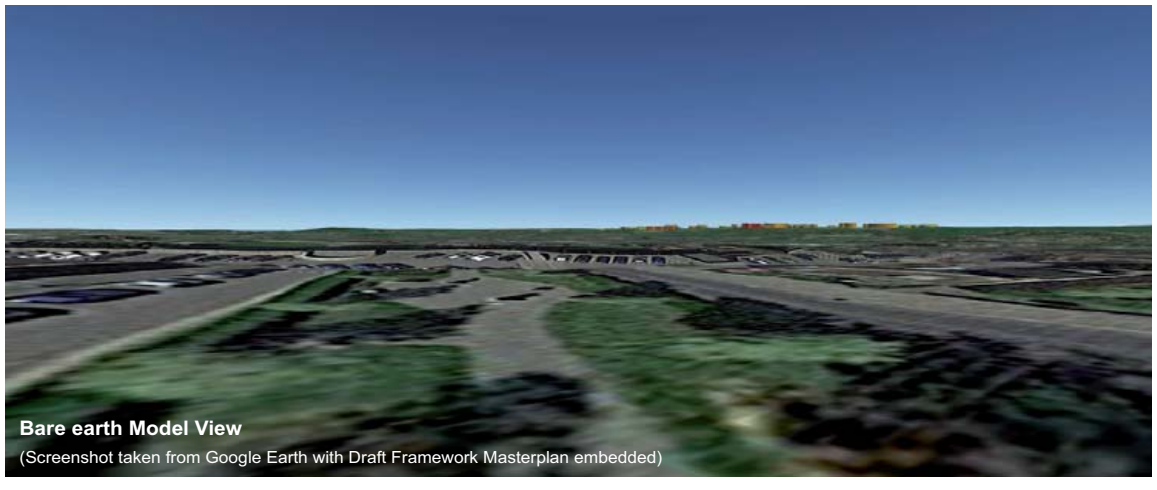
LUC

**Keys aims for this view are to:**

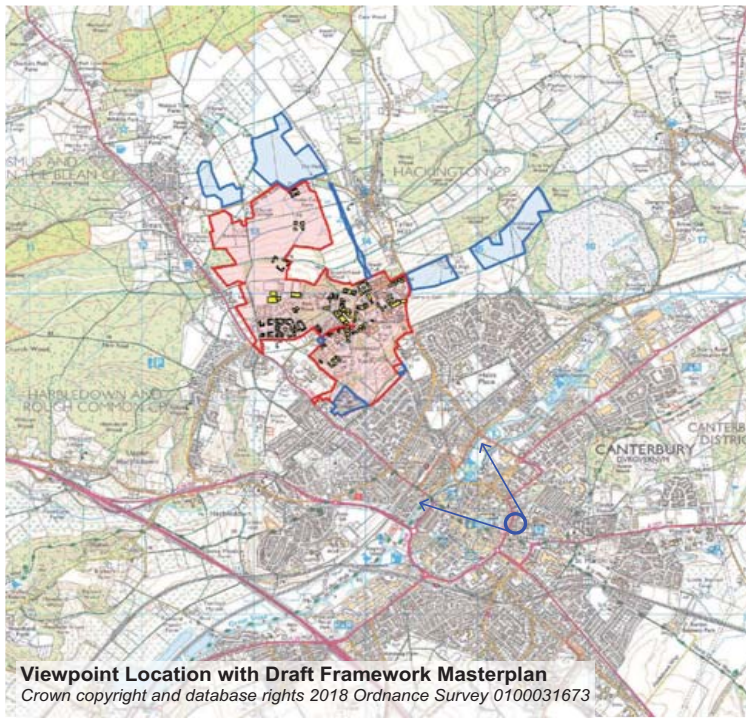
- Maintain a clear visual link between the Fyndon Gate of St Augustine's Abbey and the Cathedral

- Ensure the Cathedral is visible and new buildings do not intrude into the view or compete with the Cathedral for prominence.

**3D Model View**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)



**Bare earth Model View**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)




**Viewpoint Location with Draft Framework Masterplan**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

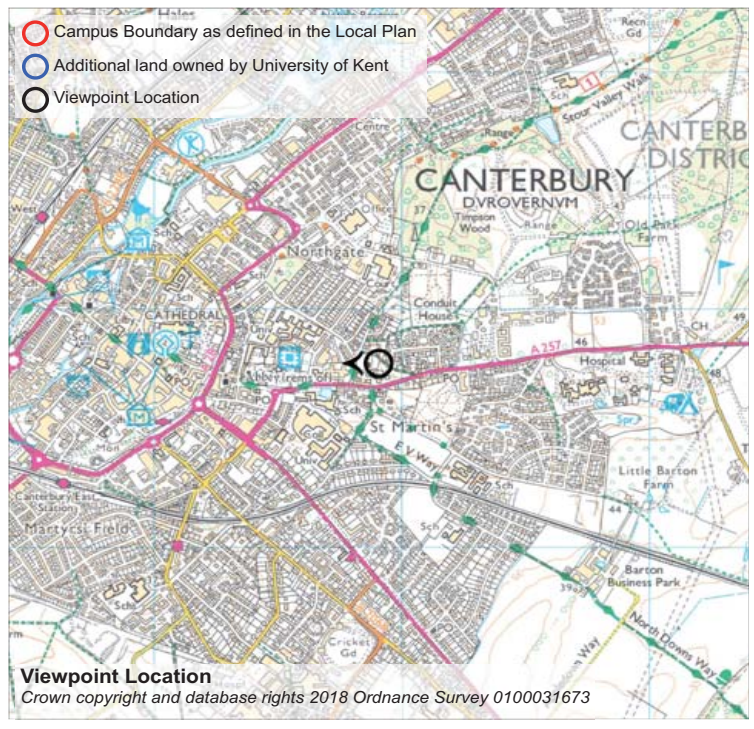
**Assessment of Draft Framework Masterplan:**

Proposed new development at the university will not be visible from this location.

**University of Kent Framework Masterplan - Visual Analysis**

**Viewpoint 6: St Martin's Hill**
(90° horizontal field of view - cylindrical projection)

**Extent of Protected view**
(As noted within the Canterbury Conservation Area Appraisal, 2010)




**Viewpoint Location**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

**Reason for selection:**

Recognised as a key view within the Canterbury Conservation Area Appraisal protected by Policy HE3 Significant Views of the City and World Heritage Site.

Demonstrates the view of the cathedral from St Martin's Church which is part of the World Heritage Site

**University of Kent Framework Masterplan - Visual Analysis**

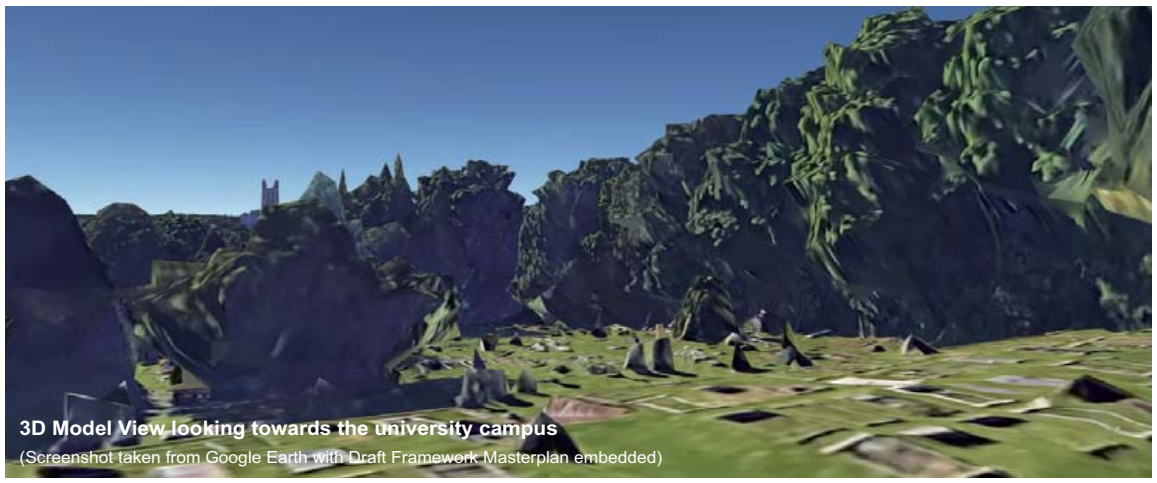
LUC

**Keys aims for this view are to:**

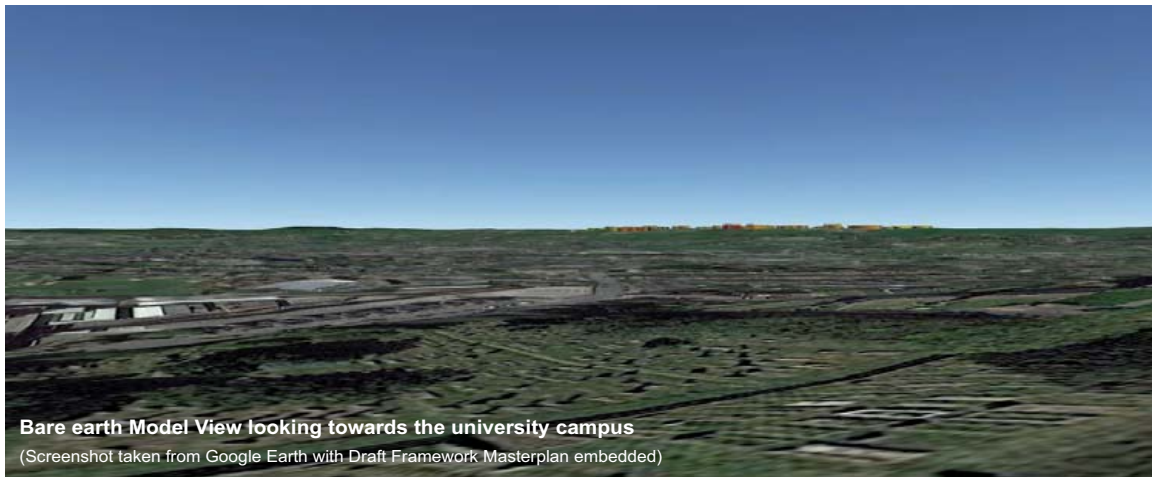
- Ensure Bell Harry Tower remains visible and the key features are the key focus of the view

- Ensure new buildings do not compete with the Bell Harry Tower for prominence

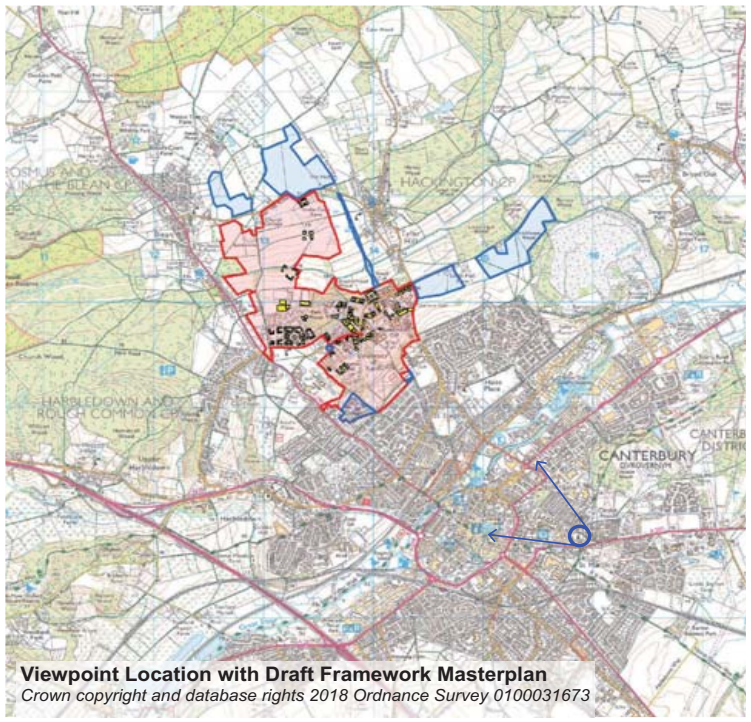
- Maintain the wooded skyline provided by the Blean Woods in the backdrop.



**3D Model View looking towards the university campus**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)



**Bare earth Model View looking towards the university campus**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)



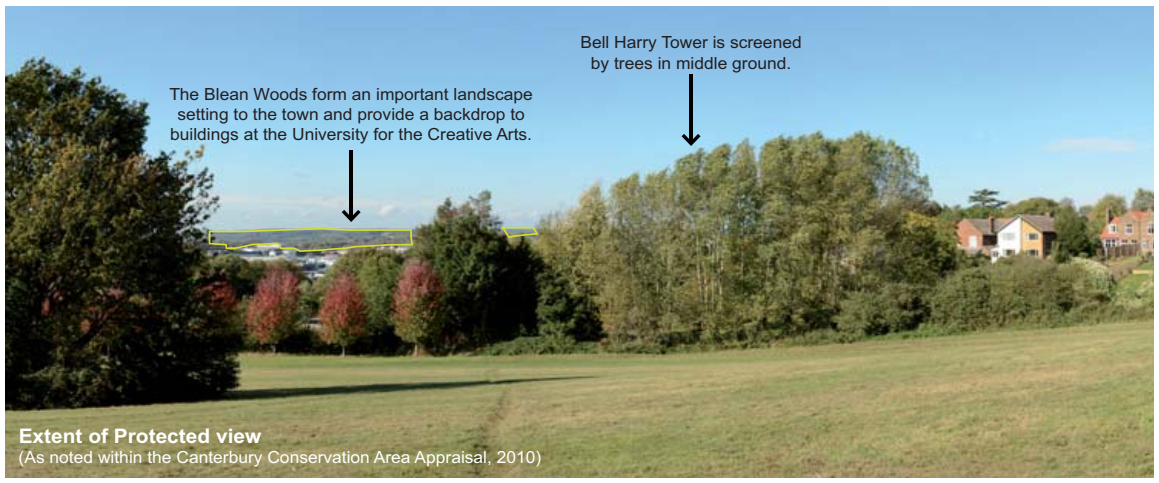

**Viewpoint Location with Draft Framework Masterplan**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

**Assessment of Draft Framework Masterplan:**

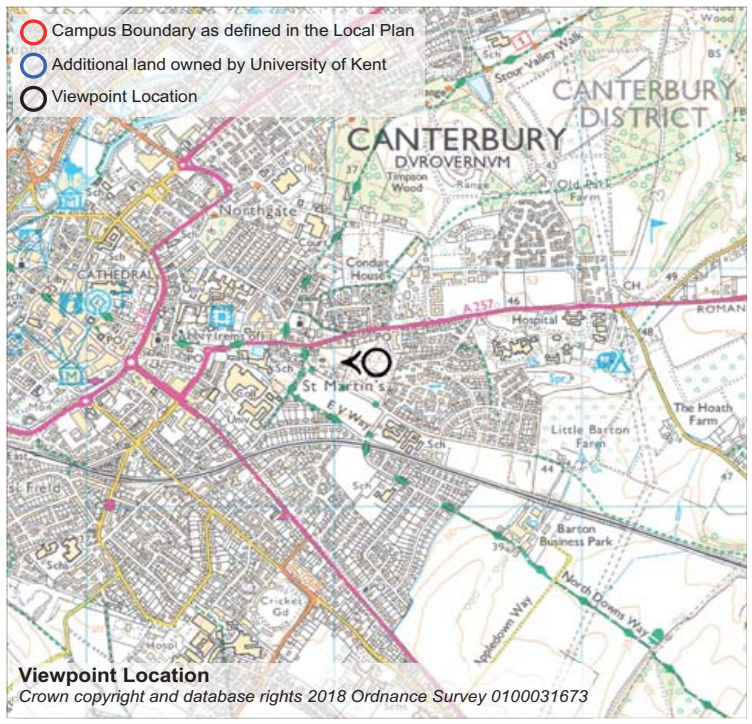
Proposed new development at the university will not be visible from this location in summer and winter, and will not impact on the protected view highlighted in the Conservation Area Appraisal or the Bell Harry Tower.

**University of Kent Framework Masterplan - Visual Analysis**

**Viewpoint 7: King George's Field**
(90° horizontal field of view - cylindrical projection)




**Extent of Protected view**
(As noted within the Canterbury Conservation Area Appraisal, 2010)




**Viewpoint Location**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

**Reason for selection:**

Recognised as a key view within the Canterbury Conservation Area Appraisal protected by Policy HE3 Significant Views of the City and World Heritage Site.

Demonstrates the view over the western part of the city. When the Conservation Area Appraisal was undertaken the Cathedral was visible - trees have subsequently grown up to obscure views of it.

**University of Kent Framework Masterplan - Visual Analysis**

LUC

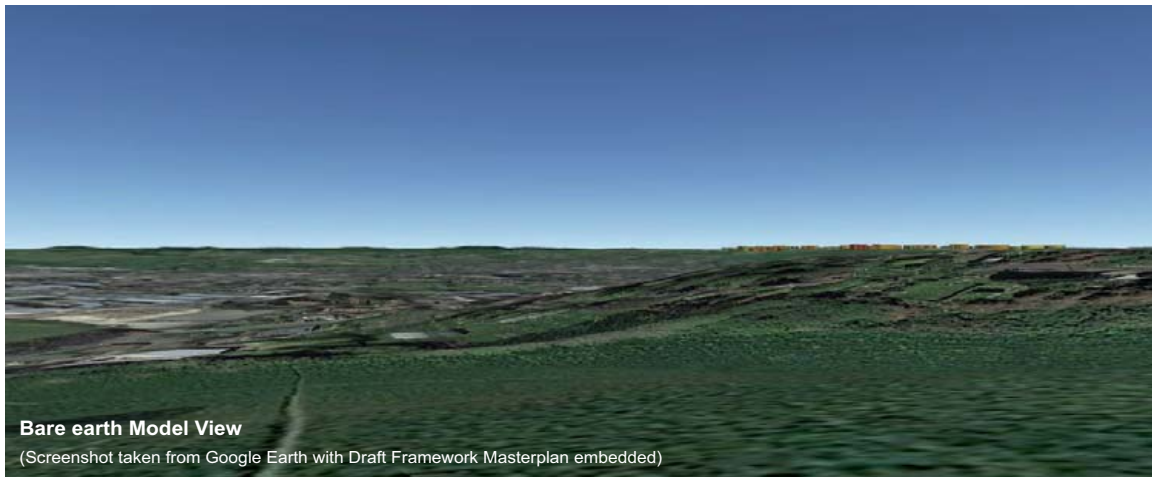
**Keys aims for this view are to:**

- Maintain the character of the roofscape, ensuring new buildings do not dominate the existing scale and grain of the city in the view.

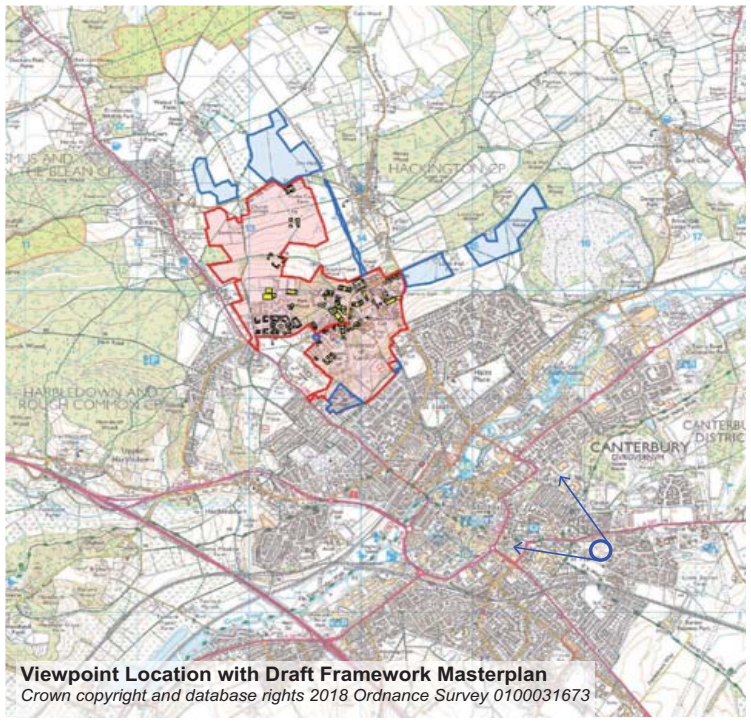
- Maintain a wooded skyline as the backdrop.

- Ensure that, if the trees in the foreground are cut, the Cathedral remains the focal point and new buildings do not compete with it for prominence.

**3D Model View**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)



**Bare earth Model View**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)




**Viewpoint Location with Draft Framework Masterplan**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

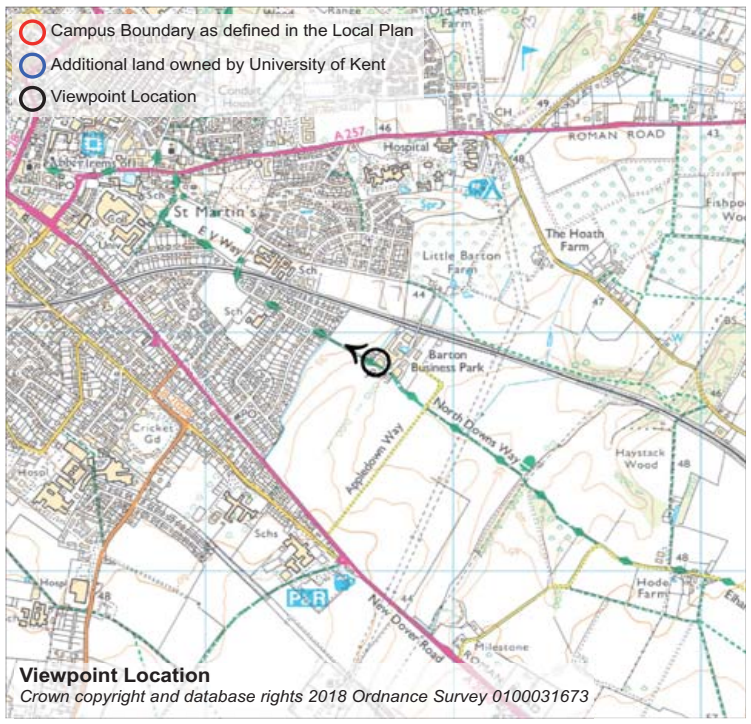
**Assessment of Draft Framework Masterplan:**

Proposed new development at the university will not be visible from this location and will not impact on the protected view highlighted in the Conservation Area Appraisal.

**University of Kent Framework Masterplan - Visual Analysis**

**Viewpoint 8: North Downs Way, Barton Business Park**
(90° horizontal field of view - cylindrical projection)

**Zoom view**
(not to scale)




**Viewpoint Location**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

**Reason for selection:**

Demonstrates views across the city from the east towards the Blean Woods. The distance ridgeline is identified in the Canterbury Landscape and Biodiversity Appraisal for its role in viewing the city and forming a backdrop in views out from the city.

**University of Kent Framework Masterplan - Visual Analysis**

LUC

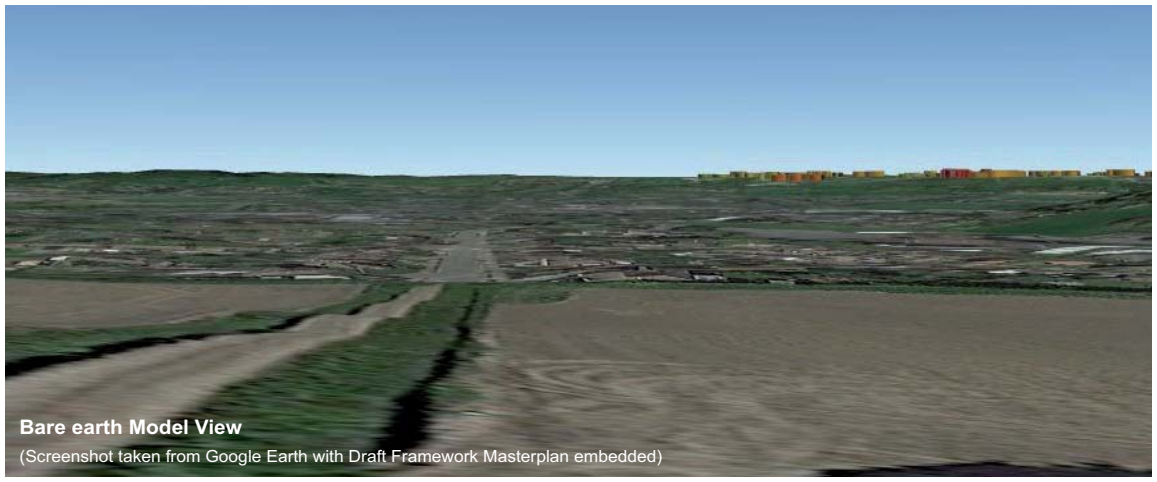
**Keys aims for this view are to:**

- Maintain views of the Cathedral and ensure new buildings do not compete with it for prominence.

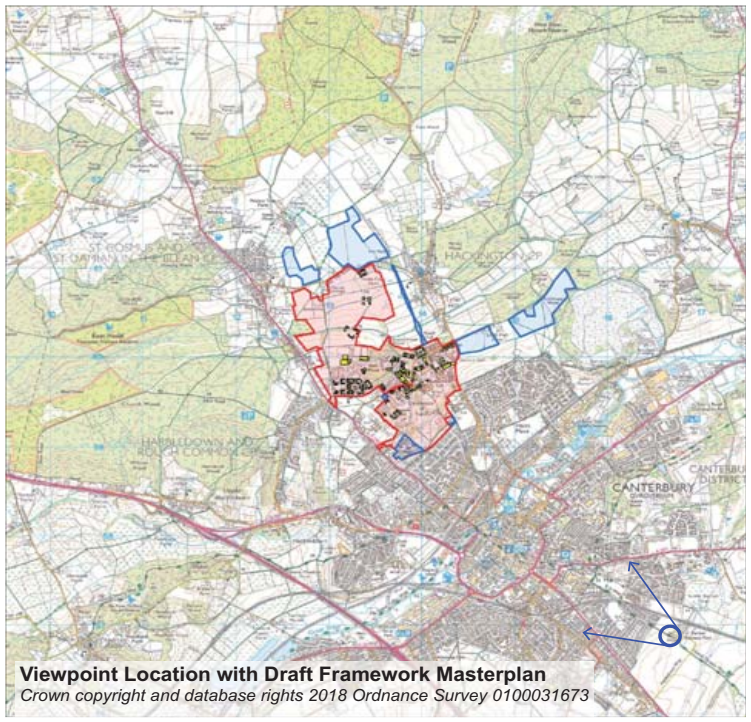
- Maintain a wooded skyline and ensure new buildings are kept below the skyline where possible.

- Where development is visible, aim for a varied skyline rather than large blocks of development.

**3D Model View**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)



**Bare earth Model View**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)




**Viewpoint Location with Draft Framework Masterplan**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

**Assessment of Draft Framework Masterplan:**

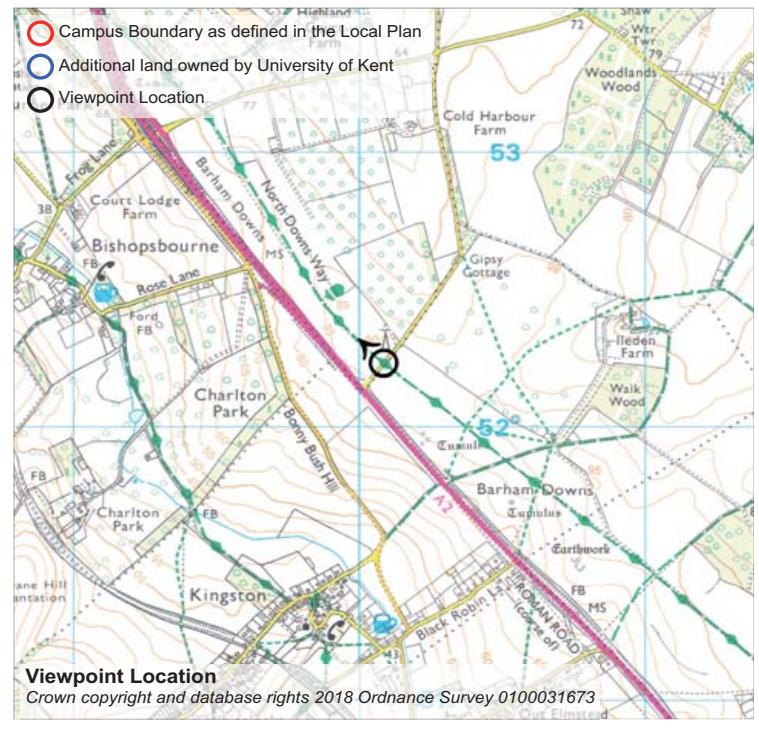
Proposed new development at the university will not be visible from the public footpath, which is restricted to a narrow view through a farm gate. The striking building at St Edmund's School is seen on the skyline but tall hedgerows and buildings in the foreground prevent views towards the development proposed as part of the Draft Framework Masterplan.

Where filtered views are achieved through hedgerows in the winter, proposed buildings would be seen set within the wooded skyline and would not form prominent features on the skyline.

**University of Kent Framework Masterplan - Visual Analysis**

**Viewpoint 9: North Downs Way, Barham Downs**
(90° horizontal field of view - cylindrical projection)

**Zoom view**
(not to scale)




**Viewpoint Location**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

**Reason for selection:**

Demonstrates long distance views across the city from the scarp of the North Downs to the east. These views are highlighted as important to the setting of the Kent Downs AONB within the associated management plan.

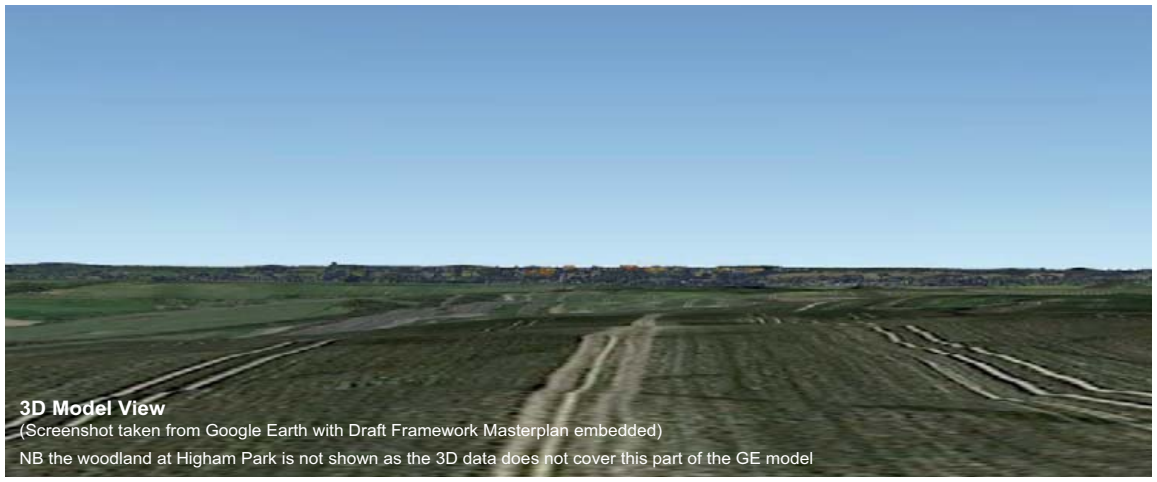
**University of Kent Framework Masterplan - Visual Analysis**

LUC

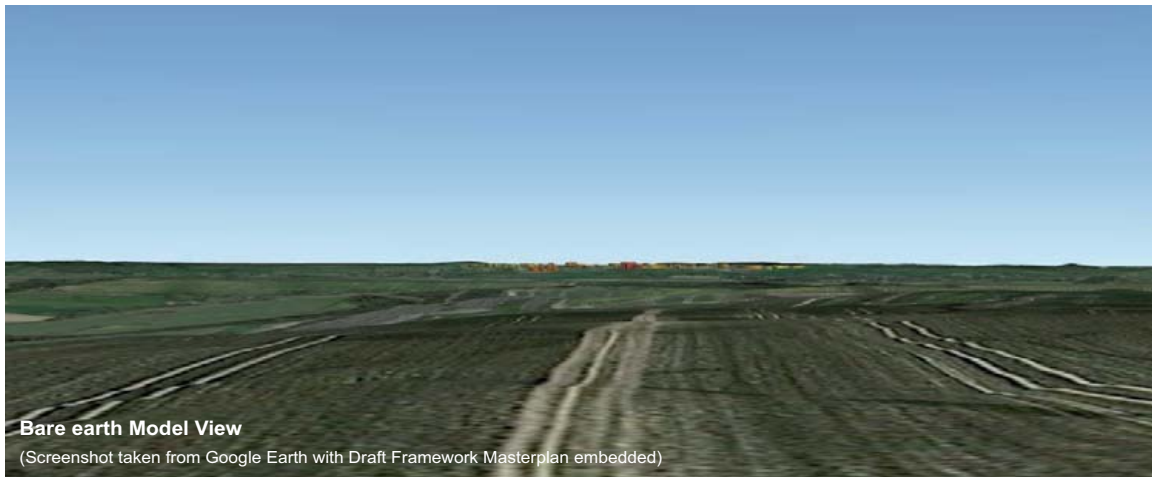
**Keys aims for this view are to:**

- Maintain a wooded skyline and ensure new buildings are kept below the skyline where possible.

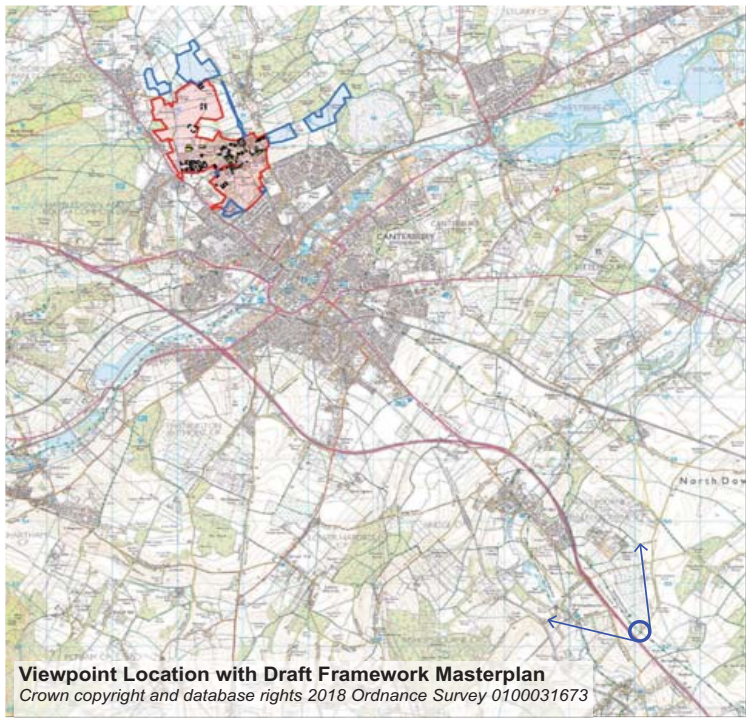
- Where development is visible, aim for a varied skyline rather than large blocks of development.



**3D Model View**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)
NB the woodland at Higham Park is not shown as the 3D data does not cover this part of the GE model



**Bare earth Model View**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)



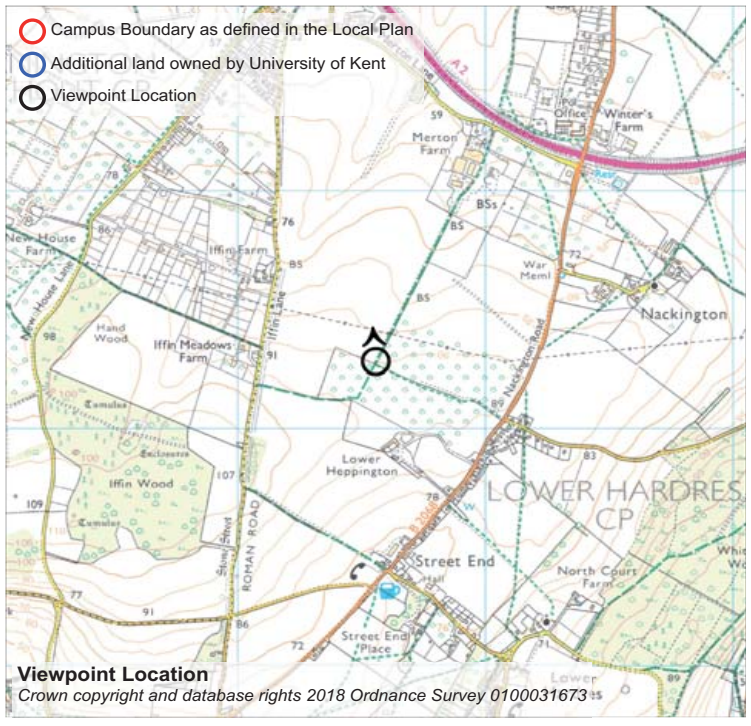
**Viewpoint Location with Draft Framework Masterplan**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

**Assessment of Draft Framework Masterplan:**

Proposed new development at the university will not be visible from this location. Despite development showing in the 3D model view, intervening woodland along the A2 and on undulating landform at Higham Park in the middle distance will screen direct views of development both in summer and winter.

**Viewpoint 10: Nackington Road, Street End**
(90° horizontal field of view - cylindrical projection)

**Zoom view**
(not to scale)




**Viewpoint Location**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

**Reason for selection:**

Demonstrates long distance views across the city from the scarp of the North Downs to the south. These views are highlighted as important to the setting of Kent Downs AONB within the associated management plan.

**University of Kent Framework Masterplan - Visual Analysis**

LUC

**Keys aims for this view are to:**

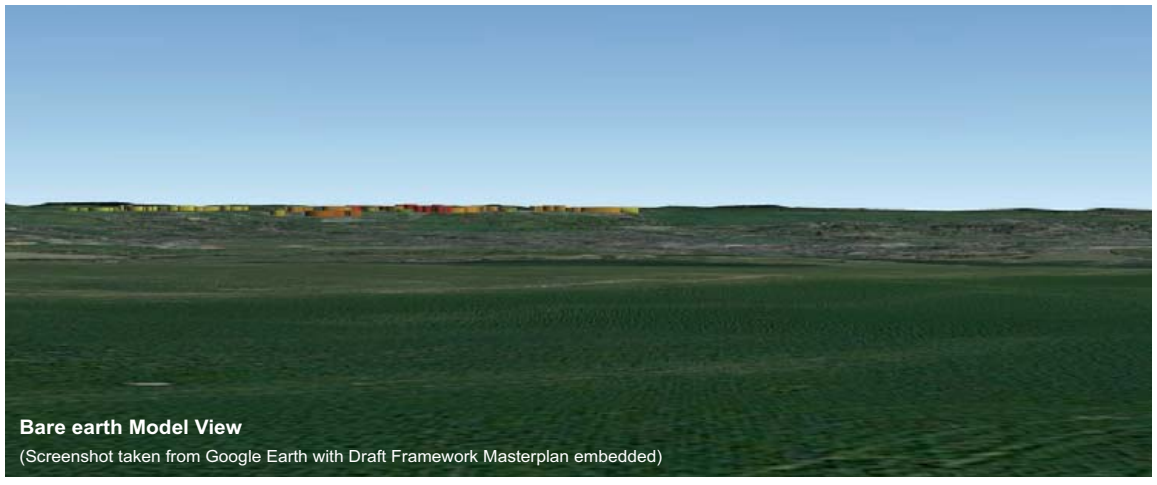
- Maintain views of the Cathedral and ensure new buildings do not compete with it for prominence.

- Maintain a wooded skyline and ensure new buildings are kept below the skyline where possible.

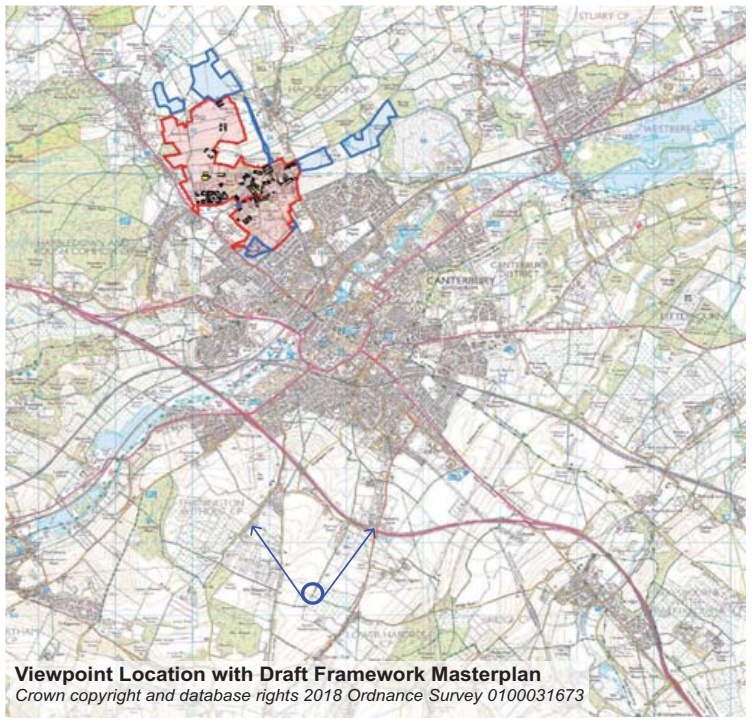
- Where development is visible, aim for a varied skyline rather than large blocks of development.

- Visible facades should be in subdued colours to blend with their wooded context and large areas of glazing should be avoided on highly visible faces.

**3D Model View**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)



**Bare earth Model View**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)

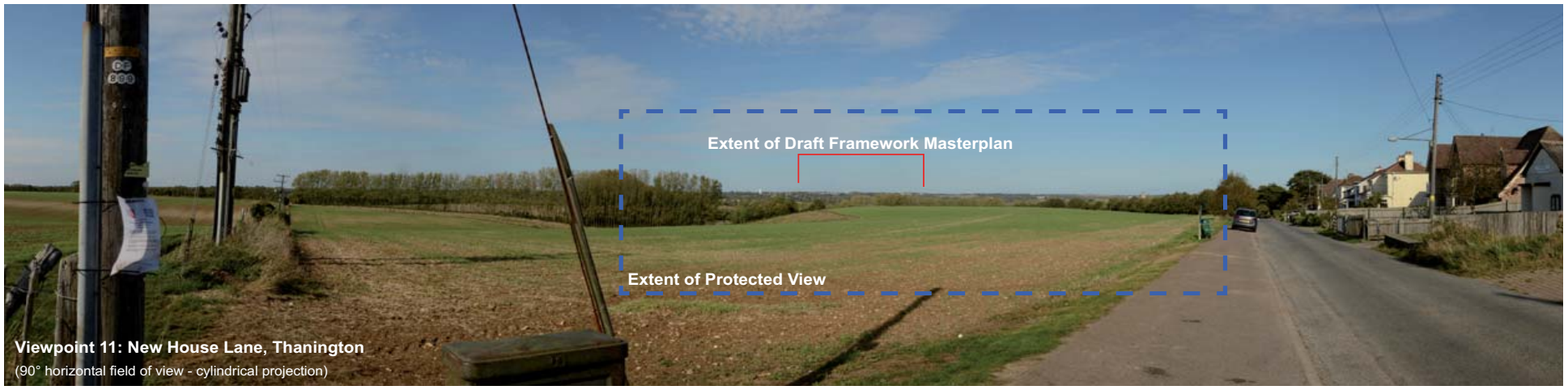


**Viewpoint Location with Draft Framework Masterplan**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

**Assessment of Draft Framework Masterplan:**

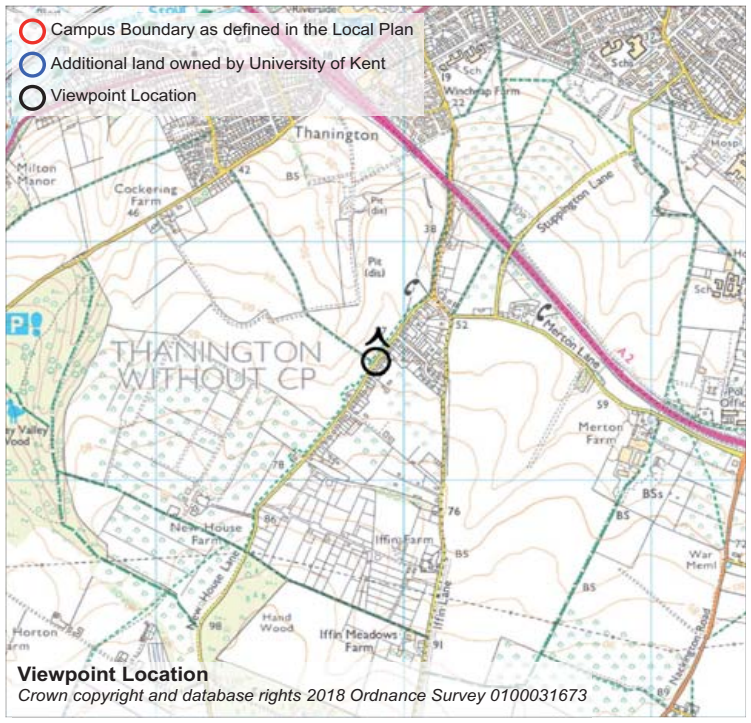
New development is situated within the wooded university slopes and does not form a prominent feature on the skyline. The proposed buildings do not impose on the backdrop to views of the Cathedral or compete for prominence of the Bell Harry Tower.

## University of Kent Framework Masterplan - Visual Analysis




**Viewpoint 11: New House Lane, Thanington**
(90° horizontal field of view - cylindrical projection)

**Extent of Protected view**
(As noted within the Canterbury Conservation Area Appraisal, 2010)




**Viewpoint Location**
*Crown copyright and database rights 2018 Ordnance Survey 0100031673*

**Reason for selection:**

Recognised as a key view within the Canterbury Conservation Area Appraisal protected by Policy HE3 Significant Views of the City and World Heritage Site.

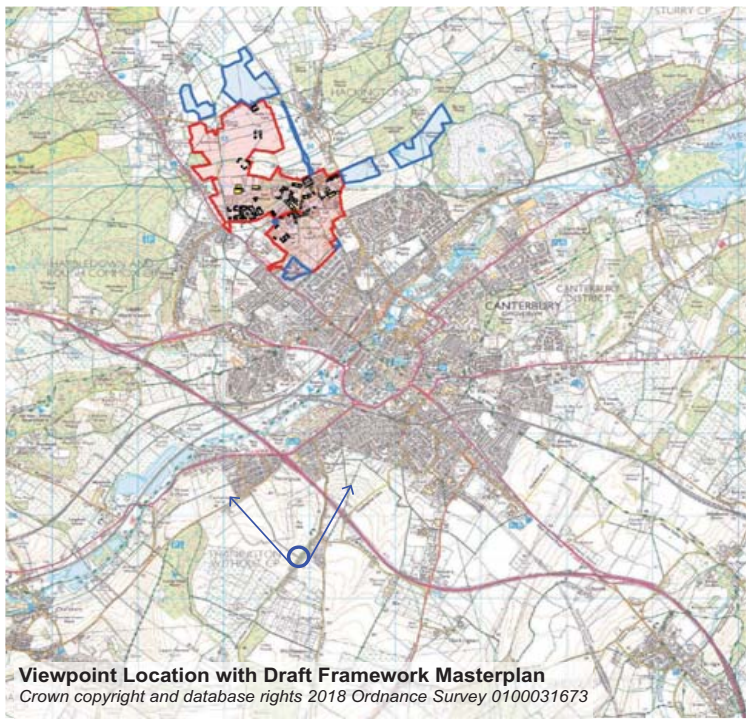
Demonstrates a distant view of the cathedral across open land that shows the importance of the valley slopes in providing the backdrop.

## University of Kent Framework Masterplan - Visual Analysis

LUC

**Zoom View**
(not to scale)

**3D Model View**
(Screenshot taken from Google Earth with Draft Framework Masterplan embedded)



**Viewpoint Location with Draft Framework Masterplan**
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**Keys aims for this view are to:**

- Maintain a wooded horizon and ensure new buildings are kept below the skyline where possible.

- Where development is visible, aim for a varied skyline, rather than large blocks of development.

- Visible facades should be in subdued colours to blend with their wooded context and large areas of glazing should be avoided on highly visible faces.

**Assessment of Draft Framework Masterplan:**

Proposed buildings are set within the wooded skyline and do not form prominent features on the skyline. They do not compete with the Cathedral for prominence and woodland retained as part of the Draft Framework Masterplan will continue to contribute to the wooded backdrop.

**University of Kent Framework Masterplan - Visual Analysis**

# Appendix M
# Preliminary Ecological Appraisal

# University of Kent Canterbury Campus Framework Masterplan

## Preliminary Ecology Appraisal and Guidance

February 2018

University of Kent

CMA PLANNING

BIODIVERSITY BY DESIGN

SAVIA NUEVA

studioengleback

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# Preliminary Ecology Appraisal and Guidance

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Grey Squirrel
taken near Kent Business School

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**“Nature holds the key to our aesthetic, intellectual, cognitive, and even spiritual satisfaction.”**

**E.O.Wilson**

# 1.0 Introduction

# Introduction

**1.1 Background**

In 2015 the University of Kent (UoK) commissioned Farrells to produce a Concept Master Plan for its campus in Canterbury (also referred to here as *'the Campus'*), setting out a vision for the University's ongoing development over the next 50 years. This study concluded that the priorities for the growth should be to:

- Sympathetic growth through intensification of the heart of the campus, and
- A focus on Placemaking' through the process of consolidation and reorganisation

With respect to the second point, the University recognises that enhancing sense of place will play a major part in attracting new students and staff to the campus, as well as differentiating the UoK from competing universities, and that the soft estate of any campus can and should be major part of its sense of place. The strategy seeks to promote a wider diversity of landscape spaces within the core area of the Campus which *'will be the public* "living rooms" *where all members of the University community can gather to exchange ideas, where formal events take place and informal encounters are made possible.'*

The UoK now intends to develop the masterplan concept into a more detailed *'Framework Masterplan'*. The Framework Masterplan process is being undertaken in collaboration with Canterbury City Council with the intention that it is in due course adopted by the Council as planning guidance. In order to achieve these goals, the UoK has appointed a masterplan team to explore *'new opportunities to enhance the landscape, ecology, movement, environmental and economic infrastructure.'* The UoK therefore commissioned Studio Engleback and Biodiversity by Design to work together (under the banner joint company label *'Savia Nueva'*) to produce a Landscape and Biodiversity Appraisal which will in turn inform the wider Framework Masterplan; the present document has been produced in support of this.

| Task reference / name | Description |
|---|---|
| 1 | Agree Memorandum of Understanding with Canterbury City Council (CCC); status, purpose, scope, process & resourcing. |
| 2 | Appoint Core Consultant Team. |
| 3 | Compile Baseline Data. |
| 4 | Review and agree the Client Brief & Objectives for the Framework Masterplan (including the University's development strategy). |
| 5 | Review Concept Masterplan in context of Public Consultation Statement (Round 1). |
| 6 | Prepare a detailed Project Plan, Programme & Fee Projection for the next stages of Framework Masterplan. |
| 7 | Set the Strategic Direction for the Core Disciplines: Urban Design; Town Planning; Transport & Movement; Landscape & Biodiversity; Consultation / Communications / PR (see below for further explanation). |
| 8 | Undertake gap analysis to identify need for further studies and identify study briefs. |
| 9 | Review and agree implementation of some *'Early Wins'*. |
| 10 | Review & agree all of the above before proceeding to Step 2. |
| Outputs | Client Brief & Objectives<br>• Digital Database.<br>• Digital & Physical Model.<br>• Strategic Planning Report (contents to summarise all of the above). |

**Table 1.1:**
**Stage 1 requirements as set out in the University of Kent: Introduction to a Framework Masterplan document**

**1.1 Terms of Reference**

In keeping with the project brief set out in the document University of Kent: Introduction to a Framework Masterplan, the UoK envisages the Framework Masterplan being produced over five stages which are:

1. Strategic Spatial Vision
2. Option Studies
3. Option Review
4. Framework Masterplan
5. Publication

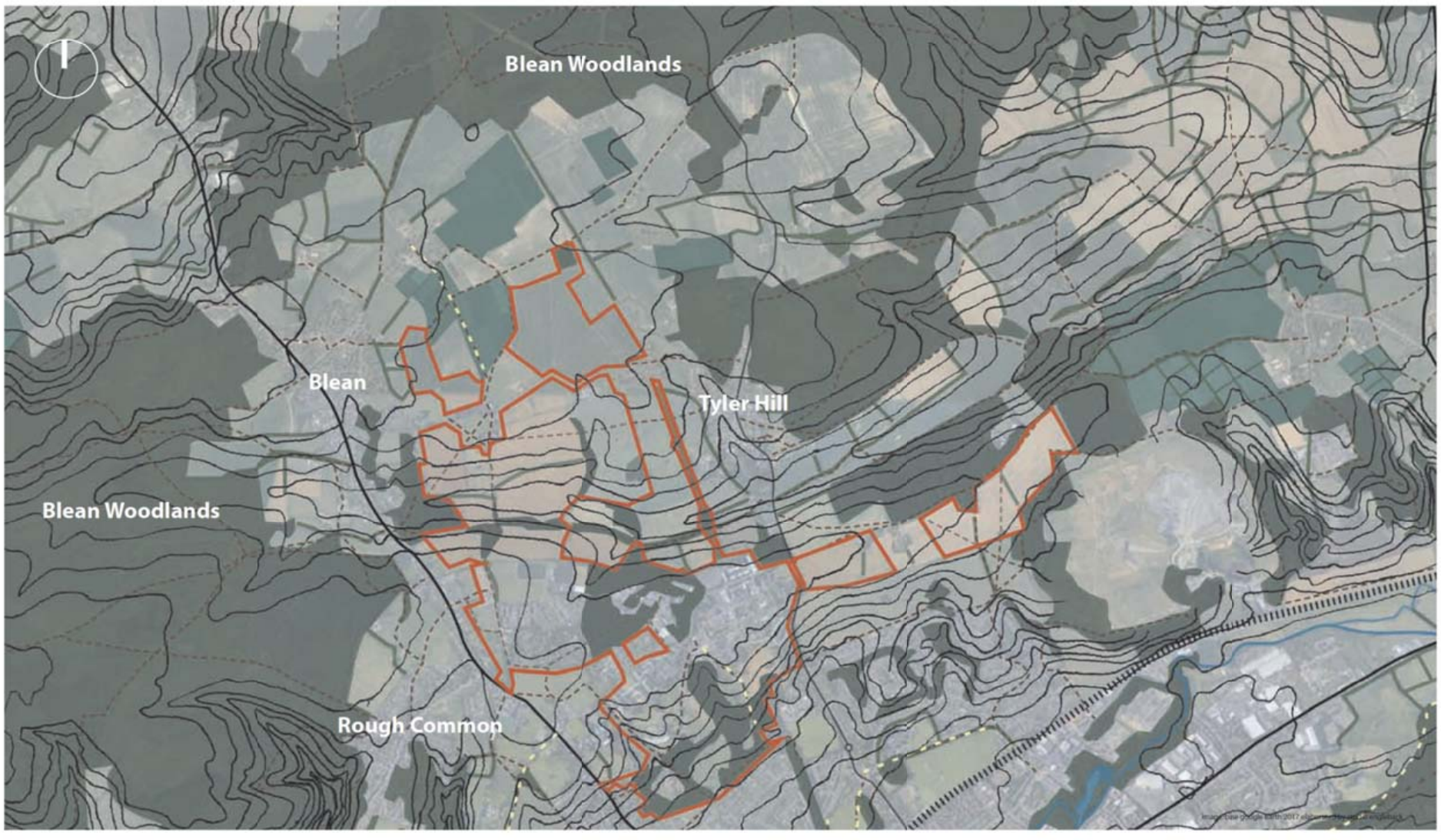
This Landscape and Biodiversity Appraisal document relates to Stage 1 (Project Planning), the requirements for which are set out verbatim in Table 1.1.

With respect to Task 7 – 'Set the Strategic Direction'– the project brief provides further clarity; specifically, regarding the Landscape and Biodiversity the strategy should include the following elements:

- *Define the strategy for the public realm in the Campus Core: hard/ soft/ character /levels /uses /commercial/ seasonal/ productive/enhancement of eco habitats/continuity with past.*
- *Define the strategy for the public realm in the Parklands: character/ continuity with past/planting/landscape elements & structures/enhancement of eco habitats.*
- *Define the strategy for the public realm in north of the campus: ditto, plus landscape setting for business clusters.*

The project brief clearly requires that all tasks listed above apply to the entire UoK estate and not just the Campus Heart (see Figure 1.1).

The present document has been produced to provide more detail on the ecological baseline as a basis for the Framework Masterplan and to set out a preliminary strategic approach to green infrastructure provision from an ecological point of view.


Blean Woodlands
Blean
Tyler Hill
Blean Woodlands
Rough Common

# 2.0 Survey Protocols

Meadow Brown Butterfly
taken in the lower parklands

# 2.0 Survey Protocols

**2.1 Desk Study**
The collation and review of desk information was carried out through June and July 2017. The aim was to collate local records of protected or notable species and habitats.

Desk records and comments were requested from Kent and Medway Biological Records Centre (KMBRC). The search area was a 10km radius for sites designated for nature conservation at the European level (Natura 2000 sites) and Annex II bat roost records and 2km for all other ecological data. KMBRC subsequently provided data including records from Kent Bat Group and Kent Ornithological Group.

Kent Wildlife Trust was contacted specifically with respect to the Blean Living Landscape Area, although no response has been received to date.

As discussed below, various biodiversity planning policy documents and biodiversity strategies and initiatives have also been reviewed.

**2.2 Field Survey**
Fieldwork followed standard Phase 1 Habitat Survey protocol (JNCC 2010), extended in accordance with the Institute of Environmental Assessment (1995) to include an assessment of the potential presence of legally protected flora and fauna.

All accessible land within the Site was walked and habitat types were classified and mapped as fully as possible using standard codes. Survey was undertaken by experienced ecologist Dr Lincoln Garland MCIEEM between the 13th and 16th July 2017 inclusive.

A map of habitats was drawn up and target notes were used to describe features of particular ecological interest. Land adjacent to the university estate was mapped at a more basic level of detail from the ownership boundary where visible to provide context. No detailed Phase 2 surveys (e.g. for protected species) were undertaken as part of these initial investigations.

**2.3 Assessment of Ecological Importance**
The approach to the assessment of ecological importance and impact assessment has followed guidance prescribed by the Chartered Institute for Ecology and Environmental Management (2016). The ecological importance of areas of land, and assemblages/populations of species and taxa has been categorised as follows:

- International (Special Areas of Conservation, Special Protection Areas, Ramsar sites)
- National (e.g. Sites of Special Scientific Interest and National Nature Reserves)
- Regional
- County
- Local (District) – Canterbury City Council
- Local (Parish) - Blean Forest Ward and Blean Parish
- Within the Immediate Zone of Influence of the Site only

# 3.0 Legislation Policy and Strategies

# 3.0 Biodiversity Legislation, Policy and Strategies

### 3.1 Biodiversity legislation

Key wildlife legislation covering protected sites and species relevant to the present project is summarised as follows:

- **Conservation of Habitats and Species Regulations 2010 (HR 2010)**. Provides protection for European Protected Species (EPS)/Schedule 2 (Sch. 2) listed species and their places of shelter and protection.

- **Wildlife and Countryside Act 1981 (as amended) (WCA 1981)**. Provides protection for – Schedule V (Sch. V) listed species and their places of shelter and protection; Schedule I (Sch. I) birds, their young, their eggs and their nests.

- **Natural Environment and Rural Communities Act 2006 (NERC 2006).** Provides protection via the 'Biodiversity Duty' of habitats, flora and fauna listed on Section 41 (S. 41) of the Act as being of 'Principal Importance' in England for the purpose of conserving biodiversity. A key purpose of this duty is to embed consideration of biodiversity as an integral part of policy and decision making throughout the public sector, which should be seeking to make a significant contribution to the achievement of the commitments made by Government in *Biodiversity 2020: A strategy for England's Wildlife and Ecosystem Services.* The framework demonstrates how the UK and its component countries are to work to achieve the 'Aichi targets' set out in the Convention on Biological Diversity report - *'Strategic Plan for Biodiversity 2011–2020'.*

- **Hedgerow Regulations 1997.** These are the main regulations aimed at protecting 'Important' countryside hedges from removal and apply in England and Wales; hedgerows are exempt from protection where planning permission has been obtained for removal.

- **Protection of Badgers Act 1992 (PBA 1992**). Provides protection for Badgers and their setts.

The relevant protective status of each protected species (e.g. S. 41) is only given on the first occasion the species in question is mentioned.

### 3.1 National and Local Biodiversity Planning Policy

#### 3.1.1 National Biodiversity Planning Policy

The National Planning Policy Framework (NPPF) 2012 establishes a presumption in favour of *'sustainable'* development except in case of Natura 2000 sites. For development to be sustainable there should be at least no-net loss of ecological resources. It prescribes that developments should seek to minimise impacts on biodiversity and provide net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.

In summary the NPPF stipulates that:

- All developments should consider climate change and biodiversity.

- If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused.

- Development proposals, where the primary objective is to conserve or enhance biodiversity, should be permitted. (N.B. as will be discussed, achieving a significant net gain for biodiversity is a key aim of the present proposals.)

- Opportunities to incorporate biodiversity in and around developments should be encouraged.

- Planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including Ancient Woodland and the loss of aged or veteran trees found outside Ancient Woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss.

#### 3.1.2 Biodiversity 2020: A Strategy for England's Wildlife & Ecosystem Services

In October 2010, over 190 countries signed an historic global agreement in Nagoya, Japan to take urgent and effective action to halt the alarming global declines in biodiversity. In June 2011, the Government published a Natural Environment White Paper entitled *The Natural Choice - Securing the Value of Nature*, responding to the global commitments made at Nagoya. It outlines the Government's vision for the natural environment, shifting the emphasis from piecemeal conservation action towards a more integrated landscape-scale approach and focus on provision of ecosystem services. Also, in June 2011, EU Member States endorsed the European Commission's *European Union Biodiversity Strategy,* which along with the global Nagoya agreement is being used to inform national plans.

The biodiversity strategy for England builds on the Natural Environment White Paper and these international strategies and agreements, setting out the strategic direction for biodiversity policy. The mission for this strategy, for the next decade, is to halt overall biodiversity loss, support healthy well-functioning ecosystems and the very valuable services that they provide, and to establish coherent ecological networks with more and better places for nature for the benefit of wildlife and people.

Biodiversity 2020 is being implemented in Kent via *Kent Biodiversity 2020 and Beyond – a Strategy for the Natural Environment 2015-2025* (Kent Nature Partnership, undated), which is discussed below.

**3.02.3 Canterbury District Local Plan Publication Draft 2014 - Landscape and Biodiversity**

The Canterbury District Local Plan 2017 (CDLP) has been adopted. Consultation on Main Modifications (following an Examination in Public) took place in February and March 2017 and the Plan is expected to be adopted by the end of 2017. Given this advanced stage of preparation, the emerging Plan (as proposed to be modified) is taken as being the 'development plan'. Relevant policies are set out below

In summary the plan:

1. Broadly commits to the Royal Town Planning Institute's (1999) five- point approach to decision-making which is: (i) basing decisions on up-to-date ecological information; (ii) avoidance of ecological impacts where possible; (iii) mitigation of significant impacts; (iv) compensation for losses of important biodiversity; and (iv) new benefits or enhancement.

2. Identifies notable ecological features as designated sites, protected habitats and species, and the requirement for these to be protected and enhanced.

3. Recognises the importance of biodiversity networks (linear and continuous landscape features that provide links or stepping stones from one habitat to another) and the importance of landscape scale conservation measures.

4. Recognises the importance Areas of High Landscape Value and Landscape Character Areas, and in this regard emphasises that new development should address the findings of the Landscape Character and Biodiversity Appraisal (see next section).

5. Provides particular support for projects that restore, enhance and connect the valued woodland habitat complex of the Blean (see below for further discussion).

**Policy LB2 Areas of High Landscape Value**

Within these areas, development will be considered in relation to the extent to which its location, scale, design and materials would protect the local landscape character and enhance the future appearance of the designated landscape and its nature conservation interest. Development proposals which run contrary to landscape character (including settlement character), or impact directly upon historic setting, archaeological or nature conservation interests, where relevant, will not be permitted.

[N.B. The Canterbury (the valley of the River Stour around Canterbury) Areas of High Landscape Value overlaps with the southern edge of the Site and thus is of most relevance to the present proposals.]

**Policy LB4 Landscape Character Areas**

Proposals for development, and associated land use change or land management, must demonstrate that they are informed by, and sympathetic to, the landscape character of the locality. In considering development proposals, the Council will take every opportunity to reinforce, restore, conserve or improve, as appropriate, the landscape character of the area in which development is proposed.

Development will only be permitted if the following criteria can be satisfied:

1. Development would be appropriate to the economic and social wellbeing of the area;
2. The site selection can be adequately justified, with the siting of development minimising the impact;
3. Development would safeguard or strengthen tranquillity, features and patterns that contribute to the landscape character and local distinctiveness of the area;
4. The scale, design, materials and landscaping measures are appropriate and would lead to an enhancement of the character of the landscape; and Development will promote maintenance, enhancement, and restoration of biodiversity as appropriate in accordance with policy LB9.

All development must take into account the sensitivity of the particular landscape to accommodate change. Development, or associated land use change or land management, which would adversely affect the landscape character of an area, will not normally be allowed. The development should appropriately address the findings of the Landscape Character and Biodiversity Appraisal condition and sensitivity guidelines of the particular landscape policy character areas affected.

**Policy LB5 Sites of International Conservation Importance**

Sites of international nature conservation importance must receive the highest levels of protection. No development will be permitted which may have an adverse impact on the integrity of a Special Area of Conservation, Special Protection Area for birds or Ramsar site, alone or in combination with other plans or projects, as it would not be in accordance with the aims and objectives of this local plan. Where a likely significant effect of a plan or project on European sites cannot be excluded, during Habitat Regulations Assessment Screening, an Appropriate Assessment in line with the Habitats Directive and associated regulations will be required. In the event that the Council is unable to conclude that there will be no adverse effect on the integrity of any European sites, the plan or project will be refused.

**Policy LB6 Sites of Special Scientific Interest**

Planning permission will not be granted for development which would materially harm the scientific or nature conservation interest, either directly, indirectly or cumulatively, of sites designated as a site of Special Scientific Interest (SSSI) or National Nature Reserve (NNR) for their nature conservation, geological, or geomorphological value.

**Policy LB7 Locally Designated Sites**

Development or land-use changes likely to have an adverse effect, either directly or indirectly, on:

1. Local Wildlife Sites;
2. Local Nature Reserves; or
3. Regionally Important Geological / Geomorphological Sites

will only be permitted if the justification for the proposals clearly outweighs any harm to the intrinsic nature conservation and/or scientific value of the site. Where development is permitted on such sites, careful site design should be used to avoid any negative impact. Where negative impact is unavoidable, measures must be taken to ensure that the impacts of the development on valued natural features and wildlife have been mitigated to their fullest practical extent. Where mitigation alone is not sufficient, adequate compensatory habitat enhancement or creation schemes will be required. Any application affecting locally important sites will be expected to demonstrate enhancement measures to benefit biodiversity.

**Policy LB8 Landscape Scale Biodiversity Networks**

New development will need to:

1. Avoid the fragmentation of existing habitats and support the creation of coherent ecological networks through both urban and rural areas, and

2. Retain, protect and enhance notable ecological features of conservation value such as ancient woodland, neutral grassland, hedgerows, trees, wetlands, river corridors and other water bodies, and habitats that offer breeding or feeding sites of local importance to populations of protected or targeted species. Only lighting that has been sensitively designed to minimise disturbance to protected species and their food sources (e.g. low level, directed, warm, tinted lighting) will be permitted.

Strategic opportunities for biodiversity improvement will be actively pursued within the Biodiversity Opportunity Areas. Development which significantly damages opportunities for improving connectivity of habitats in these strategically important areas will be refused.

**Policy LB9 Protection, Mitigation, Enhancement and Increased Connectivity for Species and Habitats of Principal Importance**

All development should avoid a net loss of biodiversity/nature conservation value and actively pursue opportunities to achieve a net gain, particularly where:

1. There are wildlife habitats/species identified as Species or Habitats of Principal Importance;
2. There are habitats/species that are protected under wildlife legislation;
3. The site forms a link between or buffer to designated wildlife sit

This will be secured by:

1. Ensuring that site evaluation is undertaken to establish the nature conservation value of proposed development sites. Developers will be expected to carry out appropriate ecological survey/s and present proposals for mitigation and enhancement prior to determination of a planning application. Planning permission will only be granted where the City Council is satisfied that mitigation measures proposed represent an appropriate response to the habitat or species interest of the site. Where on-site mitigation is not possible, adequate compensatory habitat enhancement, creation schemes or other measures will be required to ensure that the impacts of the development on valued natural features and wildlife have been offset to their fullest practical extent.

2. In some cases, where wildlife impacts are significant, it may be necessary to find an alternative location for the development. For European protected species, planning permission will only be granted where the three tests set out in the Habitats Regulations are satisfied.

3. Delivering positive opportunities for habitat restoration and creation through the development process: identifying, safeguarding and managing existing and potential land (or landscape features of major importance for wild flora and fauna) for nature conservation as part of development proposals, particularly where a connected series of sites can be achieved.

Development which may harm (either directly or indirectly) Habitats or Species of Principal Importance will only be permitted if *"there are no reasonable alternatives and there are clear demonstrable social or economic benefits of the development which clearly outweigh the need to safeguard the site or species; and adequate mitigation and compensation measures are provided when damage to bio diversity interests are unavoidable."*

Any mitigation measures must be within the control of the developer. The developer must take responsibility for ensuring mitigation measures are fully implemented.

**Policy LB10 Trees, Hedgerows and Woodland**
Development should be designed to retain trees, hedgerows and woodland that make an important contribution to the amenity of the site and the surrounding area and which are important to wild flora and fauna. New development should incorporate trees, in areas of appropriate landscape character, help restore and enhance degraded landscapes, screen noise and pollution, provide recreational opportunities, help mitigate climate change and contribute to floodplain management. The value and character of woodland and hedgerow networks should be maintained and enhanced, particularly where this would improve the landscape, biodiversity or link existing woodland habitats.

This will be achieved by:

- Incorporating tree planting as an integral element of landscaping schemes where this is in keeping with the landscape character of the area;
- Protecting ancient woodland, ancient trees and 'important' hedgerows from damaging development and land uses;
- Promoting the retention and effective management, and where appropriate, extension and creation of new woodland areas and hedgerows;
- Promoting and encouraging the economic use of woodlands and wood resources, including wood fuel as a renewable energy source;
- Promoting the growth and procurement of sustainable timber products; and
- Promoting the retention, enhancement and extension of existing hedges.

The Council will refuse planning permission for proposals that would threaten the future retention of trees, hedgerows, woodland or other landscape features of importance to the site's character, an area's amenity or the movement of wildlife.

**Policy LB11 The Blean Complex**
The Council will support projects that restore, enhance and connect the valued woodland habitat complex of The Blean Complex. The Council will give particular support to projects that benefit the landscape through sensitive and traditional woodland practices and which support the timber market and wider local economy.

The Council will refuse proposals for development that damages the character and integrity of The Blean Complex or which will prevent important opportunities for biodiversity improvement within the Biodiversity Improvement Areas.

**Policy LB13 River Corridors**
The environment within river corridors and river catchments, including the landscape, water environment and wildlife habitats, will be conserved and enhanced.

Supply of water, treatment and disposal of waste water and flood risk management should be sustainable and deliver environmental benefits.

**3.02.4 Canterbury Landscape Character and Biodiversity Appraisal**
CCC has produced a Draft Supplementary Planning Document (SPD), titled the *Draft Canterbury Landscape Character and Biodiversity Appraisal* (Jacobs & Canterbury City Council 2012). This report is intended to be a useful tool for development management, land managers, developers and conservation bodies. It is also being used to inform the preparation of the Local Plan. Summary recommendations from this document are set out below in section 3.02.5.

**3.02.5.** More specific recommendations are provided in the document for the various Landscape Character Areas found within the local authority. The two Landscape Character Areas covering the UoK site are the *Stour Valley Slopes* and *Blean Farmlands*.

Recommendations for these two areas from the Appraisal document are summarised below in 3.02.06. Habitat Network Potential figures extracted from the document are shown in Section 3.02.3. Note that within the UoK boundary two areas are highlighted as having potential for woodland establishment in the Blean Farmlands Landscape Character Area; one just to the north of Sarre Penn Valley and the other to the north of Tyler Hill Road.

**Summary Recommendations from the Draft Canterbury Landscape Character and Biodiversity Appraisal Document**

**Task: Overview**

- For biodiversity, the conservation of the existing resource must be done in concert with the creation of new areas of habitat, where such creation can provide district and county-wide linkage.
- As an adaptation to climate change and to rectify past losses, the development of well-connected habitat networks at the landscape scale should be given a clear priority.
- The active involvement of local landowners, farmers, national and local government, special interest groups and all those who live in, work in and visit the countryside will be vital to secure these measures to protect and enhance the countryside around Canterbury.

**Task: Farmland Landscapes**

- Where these landscapes [farmland] are in poor condition opportunities should be sought to enhance natural features such as the enclosure pattern.
- Where grazing of grasslands is prevalent, consideration should be given to managing grazing for enhanced biodiversity.
- Mechanisms for the enhancement of the [farmland] landscape include the application of appropriate design through the normal planning process and land management initiatives such as woodland and environmental stewardship grant schemes.

**Task: Valley and Wetland Landscapes**

- The improvement of the condition of these areas should be encouraged through the appropriate retention and management of areas of woodland, heath and pasture.
- The long term aim for The Blean is to bring the different parts of The Blean together. This will be achieved through The Blean Initiative, which is a partnership of landowners, local authorities, conservation bodies and community groups working together to look after this unique landscape for both wildlife and people.
- Particular objectives include improving access and enabling people to explore the landscape on both foot and by bike.

**3.02.5 Habitat Network Opportunities**

The Summary recommendations in the Draft Canterbury Landscape Character and Biodiversity Appraisal covering the two landscape character areas falling within the University's landholding (Stour Valley Slopes and Blean Farmlands Landscape Character Areas) are as follows:

**Stour Valley Slopes**

- There is significant opportunity in this area to extend and buffer the woodlands of The Blean southwards into the Stour valley, towards Canterbury. This would also link the small blocks of woodland scattered throughout this area between the University of Kent and Broad Oak.
- Encourage the restoration of the historic parkland planting.
- Strengthen and recreate the traditional field pattern.
- Conserve and restore open grass slopes overlooking the City.
- Promote active coppice management of designated woodland habitat where appropriate.
- Resist further fragmentation and seek to create new woodland or woodland corridors where significant opportunity exists between the University and Broad Oak village.
- Strengthen the structure of the field pattern on the slopes beneath the University resisting the further introduction of scattered ornamental planting.
- Resist the introduction of dominant features on the visually sensitive ridgeline.

**Blean Farmlands**

- There is great woodland habitat network opportunity in this area, mainly around the periphery, as shown on the graphic showing detailed habitat network potential (see Figure 3.1).
- In addition, to the north east, there is a significant zone highlighted as having acid grassland and heath network potential
- Conserve grazed pasture.
- Maintain and improve the traditional character of hedgerow planting along lanes and roads.
- Reinforce and conserve the hedgerow and shelterbelt networks.
- Encourage suitable planting around visually prominent farm buildings (particularly large, modern sheds) to soften the visual impact.
- New development should be of local scale and character and relate to existing settlements.

**3.02.6 Blean Living Landscape Area**

Nature conservation in the UK has traditionally focused on the preservation of specific sites. But outside these limited areas, natural habitats have been lost on an unprecedented scale and many species, both common and rare, are in long-term decline. It is therefore generally agreed that:

- Small, isolated areas of habitat are likely to hold proportionately fewer species than larger areas, and the populations of these species are likely to be more vulnerable to local extinction.
- Functional connectivity between areas of wildlife habitat is likely to make it easier for populations of species to shift in response to climate change.
- The small and isolated nature of most areas of wildlife habitat in the UK poses a significant risk to biodiversity, particularly in the face of likely climate change.

In response to these challenges The Wildlife Trusts has since 2006 championed the *Living Landscape Recovery Plan*; a new way of thinking about how land is managed for wildlife, people and the economy. To achieve a vision for Living Landscapes, where wildlife is flourishing and recovering from past decline, the goal is to 'think bigger and longer-term'. Each Living Landscape scheme therefore covers a large area of land; a naturally functioning landscape (such as a river catchment). Each Living Landscape aims to protect and enhance: core areas of high quality; connections between core areas; and to make land between the core areas and connecting habitats more permeable for wildlife.

The northern part of the University estate is within Blean Living Landscape Area. The Blean Living Landscape includes one of the biggest complexes of Ancient semi-natural woodland in England, covering ca. 1,000ha. Most of the woodlands are designated under various tiers of protection including Special Area of Conservation (SAC), National Nature Reserve (NNR), Site of Special Scientific Interest (SSSI) and Local Wildlife Site (LWS). The Blean Woodland Complex is of particular importance for birds and several threatened butterfly species, and harbours Kent's last few colonies of the rare Heath Fritillary Butterfly *Melitaea athalia* (Sch. V; S. 41). The Blean Living Landscape aims to expand and reconnect nature reserves within the area, preserving and enhancing the area's rich biodiversity.

Key actions include:

- Natural ecological processes such as grazing are being restored, in order to re-create a diverse mixture of habitats including broadleaved woodland, wooded heath, grassland and wetland.
- Wildlife corridors are being established to encourage the dispersal of some of the UK's rarest species.
- Habitat will be enhanced for species such as the Nightjar *Caprimulgus europaeus* (S. 41; Amber list), Nightingale *Luscinia megarhynchos* (Red list) and the rare Honey Buzzard *Pernis apivorus*, and one of the largest colonies of the Heath Fritillary Butterfly in Britain will be established.
- More than 1,000 hectares of woodland have been brought into conservation management and a programme has been started to restore native deciduous woodland from pine plantation.

Further information on specific proposals for the Blean Living Landscape Area has been requested from Kent Wildlife Trust although a response has not been received to date.

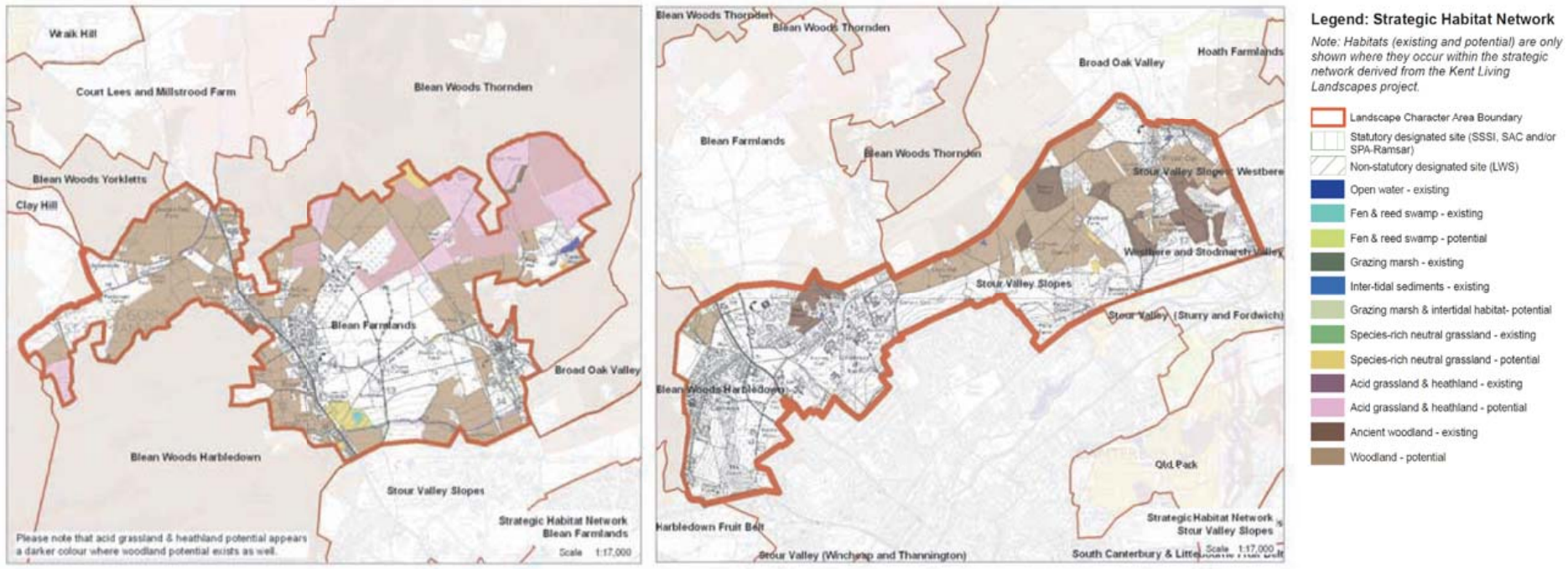



**Figure 3.1: Stour Valley Slopes and Blean Farmlands Landscape Character Areas Habitat Network Potential (reproduced from Draft Canterbury Landscape Character and Biodiversity Appraisal). N.B. Within the UoK boundary two areas are highlighted as having potential for woodland establishment in the Blean Farmlands Landscape Character Area (see dashed black line)**

**3.02.8 Blean Biodiversity Opportunity Area**
The northern part of the University estate is also within the Blean Biodiversity Opportunity Area (BOA). Biodiversity Opportunity Areas are areas where conservation action, such as habitat creation, restoration or expansion, is likely to have the greatest benefit for biodiversity. They are centred on existing areas of biodiversity interest but have a key role as areas which offer strategic opportunities for biodiversity enhancement and are expected to contribute towards the UKBAP priority habitat targets identified in regional and local Biodiversity Strategies and Action Plans. As discussed, The Blean is one of the biggest complexes of Ancient semi-natural woodland in England. Much of this interest has been created and maintained by a long history of coppice management. Biodiversity targets for the Blean BOA are set out below.

It should be noted that the Biodiversity Opportunity Area concept is integral element of the Canterbury Landscape Character and Biodiversity Appraisal document and hence is considered a material consideration in planning policy.

**Biodiversity Targets for The Blean BOA**

1. No loss of ancient semi-natural woodland and its mosaic of associated habitats.

2. Enhance and reconnect woodland to create a very extensive block of habitat, particularly through the maintenance and restoration of coppice management.

3. Restore conifer plantations on ancient woodland sites to suitable, wooded habitat including up to 25% early successional stages.

4. By 2020, at least 50ha of heath and acid grassland (including grazed wooded heath) should be restored or enhanced as part of the wood land matrix, in blocks of at least 2ha in extent. Additional opportunities should be pursued for creation of acid grassland and heathland where this would contribute to the county-wide target of creating up to 37ha.

5. Pursue opportunities for creation of species-rich neutral grassland where this would contribute to the county-wide target of creating 37ha of new lowland meadow in blocks of at least 2ha by 2020. Enhance at least 13ha of species-rich neutral grassland to bring it to UK BAP priority habitat Lowland Meadow quality.

6. Action for naturally widely dispersed habitats and species will need to focus across the whole of the area and not just within the Biodiversity Opportunity Area boundary.

**3.03 UoK Policy and Strategy Documents**

**3.03.1 UoK Environment Policy**
The UoK adopted its first Environment Policy in 1996 and the latest version was approved by the Vice-Chancellor and Chair of Council in October 2016. This Environment Policy commits the University to being a responsible corporate citizen that leads by example with regard to environmental sustainability. The University is committed to following good environmental practice, meeting or exceeding all compliance obligations, and continual improvement.

The main objectives and commitments are to:

- 'Reduce carbon emissions in accordance with the University's Carbon Management Plan.
- Improve energy and water efficiency and reduce reliance on fossil fuels.
- Protect the environment and prevent pollution.
- Optimise reduction, reuse, recycling and disposal of waste.
- Reduce the impacts of transport and travel and encourage sustainable alternatives.
- Manage the use, storage and disposal of materials to reduce environ mental impact.
- Manage our campuses to protect and enhance biodiversity.
- Promote sustainable procurement, both internally and through the University's supply chains.
- Communicate with staff, students and relevant interested parties and promote sustainable behaviours.'

Of particular relevance to this document is the commitment to protect and enhance biodiversity.

**3.03.2 University of Kent, Canterbury: Concept Master Plan**
In 2015 the UoK has published a Concept Masterplan which set out a new vision for future growth and development (Farrells, 2015). Key messages with respect to sustainability and environmental protection are set out in Table 3.5. In summary the UoK has great ambitions to create a safe and sustainable landscape environment that is visually appealing, and which encourages leisure activities and social interaction. The strategy sees the creation of a high quality public realm linked to local landscape character as critical in establishing a unique selling point for the University. This is founded upon establishing a network of high quality green landscapes set within the framework of a consolidated pedestrian friendly campus *'heart.'* This landscape-based approach also ties in neatly in with the wider reputation of the county as the *'Garden of England.'*

The strategy commits to creating *'eco-spaces where a diversity of flora and fauna could thrive.'* The broad commitment to enhance and create new recreational greenspaces will also provide opportunities for the creation of rich biodiverse landscapes i.e. greenspaces should be multifunctional.

The strategy goals respond to the fact that many of the *'green spaces within the campus are rather homogenous and repetitious, and this lack of variety means that the university under-achieves in terms of its campus character and personality.' Furthermore, the report notes that 'access to green space is available but their use is not encouraged …. paths that connect the core with the outer campus are long, lack animation or passive surveillance.'*

Much of the University landscape is valuable woodland and protected from development or adaptation. The University of Kent should embrace the value of woodlands within the Campus and should not see them as a constraint. Woodlands on campus should be viewed as major natural assets that should be enhanced to provide much greater ecological, visual and amenity interest, as is discussed in more detail below.

**Other Environmental Guidance for the Framework Masterplan**
The masterplan team are in the process of preparing Baseline Mapping data, which will identify the relevant planning designations, that will need to be taken into account during the Framework Masterplan process, including relevant open space, TPO's, ancient woodland and biodiversity designations.

The masterplan team are also in the process of preparing a Planning Baseline section of an emerging Planning and Environment Strategy, which will refer to key relevant planning designations and additional relevant guidance/evidence documents. The emerging strategy document will include links to the relevant documents as making reference to the following documents:

**Trees and development SPG (September 2003)**
The aim of this guidance is to provide advice and examples of best practice, and to assist applicants in the identification and successful retention of appropriate trees within development sites.

**The Landscape Assessment of Kent (October 2004)**
The Landscape Assessment of Kent is a landscape character-based study that draws together existing assessments and updates them. Additional work on the condition and sensitivity of the Kent landscape was used to formulate character-based strategies to ensure the continued distinctiveness of the Kent landscape.

The Character Area Report for the Stour Valley (p216) describes the Valley's condition as "Poor" (within a range of "Poor", "Moderate" and "Good") and its sensitivity as "Moderate" (within a range of "Low", "Moderate" and "High"). The identified 'Landscape Actions' comprise:

- Conserve ditches and the pattern of sinuous pastures.
- Conserve the strong ecological corridor of the river, wetlands and ditch network, and enhance it with sensitive management.
- Conserve areas of non-intensive use within farmland.
- Restore managed tree cover in and around areas of settlement.
- Conserve and restore tree lines along water courses.

**Woodland Inventory for Canterbury District, Kent:**
**Report & Inventory Maps (August 2012)**
This document sets out a revised Ancient Woodland Inventory for the Canterbury District. It identifies part of the Campus as comprising Ancient semi-natural woodland (ASNW). ASNW stands are those that are composed predominantly of trees and shrubs native to the site that do not obviously originate from planting. They include stands that may have been managed by coppicing or pollarding in the past, as well as those where the tree and shrub layer has grown up by natural regeneration.

The draft Planning & Environment Strategy also has a section on hedgerows which seeks to summarise their protection. It would be good to get comments on this to make sure it is correct.

**Draft Open Space Strategy for the Canterbury District (2014 to 2019)**
This is a comprehensive strategy for open space provision in the District. The most relevant part is Appendix 13 -Public open space in new housing developments best practice paper – which can be accessed vi the second link.

**3.04. Kent Biodiversity Strategy and Action Plan Documents**

**3.04.1 Kent Biodiversity 2020 and Beyond Strategy**
The Kent Nature Partnership has produced the *Kent Biodiversity 2020 and Beyond – A Strategy for the Natural Environment 2015-2025* to:

- Halt overall biodiversity loss in Kent and Medway.
- Contribute to the conservation of national and global biodiversity.
- Support healthy well-functioning ecosystems.
- Establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people.
- Support work that contributes to the objectives of the Strategic Frame work for the Natural Environment and ensures that this work is reported to capture the contribution that is being made in Kent and Medway to the England Biodiversity Strategy.

The Strategy provides a spatial plan for the delivery of these objectives, indicating where targets should be focused in order to secure the maximum biodiversity benefits. In this regard Kent's terrestrial landscape has been divided into Biodiversity Opportunity Areas. Objectives for the Blean Biodiversity Opportunity Area have been, as discussed, integrated into CCC planning policy through the Canterbury Landscape Character and Biodiversity Appraisal.

Targets aspired to in the Strategy for habitats that are potentially relevant to UoK are set out in Table 3.1.

**3.04.2 Kent Biodiversity Action Plan**
The Kent Biodiversity Action Plan (BAP) has been considered pivotal in ensuring delivery of the local nature conservation goals described for the National Character Areas set in a national context (Kent Biodiversity Action Plan Steering Group, 1997). While the Kent BAP has now been largely superseded by Kent Biodiversity 2020 and Beyond strategy in terms policy and approach, the BAP is still referenced here as much of the background information still has relevance with respect to nature conservation practice; note though it is recognised that the current approach has a much greater focus on landscape-scale habitat restoration and management.

As discussed, the UoK is within the North Kent Plain National Character Area. Relevant objectives for Priority Habitats and Priority Species as set out in the Kent (BAP) are set out in Tables 3.2 and 3.3 respectively.

| Priority Habitats | Objectives |
|---|---|
| Lowland Mixed Deciduous Woodland | • Restore 23ha by 2020 & 11ha by 2025.<br>• Create 12ha by 2020 & 6ha by 2025. |
| Wet Woodland | • Restore 99ha by 2020 & 49ha by 2025.<br>• Create 53ha by 2020 & 26ha by 2025. |
| Wood Pasture and Parkland | • Restore 476ha by 2020 & 238ha by 2025.<br>• Create 254ha by 2020 & 127ha by 2025. |
| Traditional Orchard | • Restore 1500ha by 2020 & 750ha by 2025.<br>• Create 1500ha by 2020 & 750ha by 2025. |
| Hedgerows | • Restore 16km by 2020 & 8km by 2025.<br>• Create 134km by 2020 & 67km by 2025. |
| Arable Field Margins | • Restore x ha by 2020 & x ha by 2025.<br>• Create x ha by 2020 & x ha by 2025. |
| Lowland meadow | • Restore 69ha by 2020 & 34ha by 2025.<br>• Create 37ha by 2020 & 18ha by 2025. |
| Rivers, including chalk rivers | • Improve condition 21ha by 2020 & 10ha by 2025.<br>• Restore No net loss by 2020 & No net loss by 2025. |
| Ponds | • Restore 350 by 2020 & 170 by 2025.<br>• Create 300 by 2020 & 150 by 2025. |

| Priority Habitats | Objectives |
|---|---|
| Woodland | To retain all ancient semi-natural woodland, to restore positive conservation management and enhance to a more semi-natural character woodlands on ancient replanted sites (e.g. diversify Sweet Chestnut plantations, retain some standard trees, allow some neglected coppice to develop into high forest), with a priority given to SSSI/SNCI woodlands.<br>Creation of new native woodland on greenfield sites of no current wildlife or archaeological value.<br>Implement best practice in woodlands, with increasing biodiversity as a key aim.<br>Establish a small number of large, minimal intervention woodlands.<br>To manage some areas of scrub, in the long term, alone or in association with other habitats. |
| Lowland Wood-Pasture And Historic Parkland | Retain the best examples of wood-pasture in the county.<br>Reinstate positive management of key areas of wood-pasture and parkland to ensure the survival of the old trees and their associated micro-habitats. |
| Hedgerows | Prevent further hedgerow losses.<br>Reinstate positive management and restoration of existing hedges, with a priority given to ancient and species-rich hedges.<br>Extend the hedgerow cover to create links between isolated woodland and hedge fragments.<br>All planting to use plants of native stock where possible of local provenance.<br>Maintain current stock of hedgerow trees and establish new ones where absent. |
| Lowland Farmland | Maintain the existing areas of semi-natural habitat within the farmland matrix and create new areas increase where possible (e.g. field margins, number of ponds, woodland shaws [A shaw is a strip of woodland usually between 5 and 15 metres (15 and 50 feet) wide) commonly forming a boundary between fields or between a field and a road], hedges, wet grassland) and connect fragmented habitats and populations where appropriate.<br>Increase the number of farms operating under nature conservation schemes.<br>Reduce agricultural pollution, especially entering waterways. |
| Neutral Grassland | To prevent the further loss of species-rich neutral grassland.<br>To secure positive, traditional management of species-rich semi-improved sites.<br>To create and restore habitats by promoting appropriate management of those improved grasslands in proximity to valuable neutral grassland areas, enlarging areas and creating links between existing fragments. |
| Rivers and Streams | To manage all catchments and maintain in a condition which supports the full potential range of flora and fauna, through improved water quantity and quality, and physically respecting and conserving the dynamic nature of rivers, their micro-habitats and their associated floodplains. |
| Standing Water | Retain the current area of standing open water in Kent.<br>Enhance the conservation interest of existing water bodies by appropriate management, particularly those which support important species or communities.<br>Increase the number of ponds and ditches with open water.<br>To maintain ground water supplies and increase to historic levels. |

**Table 3.2 Relevant Kent BAP Priority Habitats and Species**

| Priority Species | Objectives |
|---|---|
| Otter<br>*Lutra lutra*<br>(Sch. 2; Sch. V; S. 41) | Survey to assess and monitor populations.<br>Protect existing populations and encourage natural expansion through good habitat management.<br>Assess and alleviate physical threats.<br>Maintain and raise the profile of the Otter.<br>Determine historical distribution. |
| Dormouse *Muscardinus avellanarius*<br>(Sch. 2; Sch. V; S. 41) | To maintain and enhance the current Dormouse populations and increase the number of self-sustaining populations.<br>To ensure known sites are managed with appropriate scale and frequency of coppicing cycles.<br>To ensure commercial viability of coppicing by stimulating the wood products market.<br>As a stronghold Kent could possibly act as a donor for translocation to other counties. |
| Serotine Bat *Eptesicus serotinus*<br>(Sch. 2; Sch. V) | To maintain this building-dependent bat as a widespread species in Kent.<br>To maintain and enhance, and where possible extend, the available feeding habitat.<br>To maintain and increase opportunity for roosting in buildings. |
| Nightingale<br>*Luscinia megarhynchos*<br>(RSPB Red List) | To maintain the current population numbers (at least 1,000 pairs) in the short-term and increase in the longer-term within Kent.<br>To ensure appropriate coppicing and scrub management is carried out on and adjacent to known sites, and in other areas identified as being potential expansion sites (N.B. to conflict with management for dormice, heath or pearl-bordered fritillary if known to be present). |
| Great Crested Newt<br>*Triturus cristatus*<br>(Sch. 2; Sch. V; S. 41) | Maintain the range, distribution and viability of existing Great Crested Newt populations, in the county.<br>Increase the area of suitable terrestrial habitat and number of ponds available to GCN (aim to create, or restore from a derelict state, 20 ponds/year in areas with suitable terrestrial habitat). |
| Heath Fritillary<br>*Melitaea athalia*<br>(Sch. V; S. 41) | Ensure positive management of all known Heath Fritillary sites in Kent.<br>To increase the population and range within Kent. |

**Table 3.3 Relevant Kent BAP Priority Habitats and Species**

**Table 3.4 Summary of Management Plan Objectives**

| Habitat | Management objectives |
|---|---|
| **Biodiversity Management Plan & Woodland Management Strategy** | |
| Woodland | Brotherhood Wood and Park Wood:<br>Rotational coppicing of Brotherhood Wood, Park Wood and Bluebell Wood.<br>Maintain ongoing presence of oak standards through recruitment of natural regeneration and planting.<br>Control invasive species such as sycamore.<br>Bluebell Wood<br>Selective thinning with Norway maple and Hornbeam to encourage establishment of woodland ground flora. |
| Mature trees | A number of Tree Preservation Orders exist across campus and all proposed works take into account the requirements set by these Orders.<br>Fell dangerous or diseased trees where necessary.<br>When planting new trees the majority will be selected from British native species and where possible of local provenance. This is with the exception of trees selected for the Arboretum. |
| Grassland | Amenity – monthly cuts April to October.<br>Meadows in the Parklands zone (also known as the Southern Slopes – annual cut in August.<br>Wildflower meadows between Beverly Farm House and Keynes College - annual cut in September. |
| Ponds | Remove dead vegetation<br>Remove excess detritus from pond surface<br>Check tree canopy and cut back where required |
| Invasive species | The types and locations of invasive species will be recorded and a detailed management plan produced.<br>Where necessary a specialised contractor will be employed to deal with invasive species around the campus. |
| **Estates Environmental Plan** | |
| Soft estate management - general | The Canterbury campus is host to number of protected species including, but not limited to: Bats, Great Crested Newts, Badgers *Meles meles*, Dormice, Reptiles and Birds. Where construction, maintenance or grounds work has the potential to disturb these species ecologist surveys, mitigation plans and in some cases licences are required.<br>Prevent pollution.<br>Manage the use, storage and disposal of materials to reduce environmental impact.<br>Manage green spaces to promote biodiversity (N.B. prescriptions for management of woodlands, grasslands and ponds as set out in Biodiversity Management Plan are reiterated).<br>Work with staff, students and other contacts to understand their own environmental impacts and assist them to make improvements where possible. |
| Short term goals | Improve communication between Projects team and Grounds Maintenance to ensure protection of existing landscapes. |
| Medium term goals | Develop campus-wide tree survey programme.<br>Develop campus-wide biodiversity forum to discuss issues, share best practice and ensure a joined-up approach to biodiversity management. |
| Long term goals | Investigate campus GIS mapping to include trees, wetlands, greenspace, protected and biodiversity important species.<br>Formalise practical conservation through academic curriculum. |

**3.05 University of Kent Landuse Management Plan**

The University of Kent has produced the following land management plans:

- *University of Kent Biodiversity Management Plan (UoK, 2016).*
- *Woodland Management Strategy (LUC, 2016).*
- *University of Kent Estates Environmental Plan (UoK, 2015).*
- *Woodland Mitigation and Enhancement (LUC, 2014).*
- *Canterbury Campus: Ponds and Recommended Management Actions (2012)*

These documents outline the University's commitment to environmental sustainability with respect soft estate management. As stated in the Biodiversity Management Plan, a key aim is to ensure that *'biodiversity becomes an integral part of the day to day running of the University's outdoor spaces through identification of the status of its habitats and the species present, and key objectives are identified for maintaining and enhancing biodiversity.'*

Management objectives and prescriptions are not reproduced in detail here, although a summary is provided in Table 3.4 (all habitats referenced are described in detail in the following section).

Management is primarily being implemented by the University's Estates Department although voluntary management of select areas is being carried out by a number of groups including:

- Durrell Institute of Conservation and Ecology (DICE) – GCN Experimental Ponds and adjoining plot of land (western edge of Site near Estates Management yard).
- Allotment Group / Oasis Garden Society – allotment area (western edge of Site near Estates Management yard).
- School of Anthropology and Conservation - Dr Ian Bride and students undertaking traditional woodland management activities in Billhook Nook, along the south-western margins of Brotherhood Wood.
- The University of Kent Conservation Society – worked on a Birdbox project, erecting 40 bird boxes around the Campus for National Birdbox Week.

# 4.0 Existing Conditions

# 4.0 Existing Conditions

**4.01 Context**

The UoK is located in Kent, England's south-easternmost county. Kent is bordered to the north by the River Thames and the North Sea, and to the south by the Straits of Dover and the English Channel. The major geographical features of the county are a series of ridges and intervening valleys and lowlands that extend broadly from west to east. These include (from north to south) the marshlands along the Thames/Medway estuaries and North Kent coast, the Kent Downs, Vale of Holmesdale, the Greensand Ridge, the Low Weald and the High Weald.

A third of Kent is covered by Areas of Outstanding Natural Beauty, including the Kent Downs in the north of the county and the High Weald to the south. The Kent Downs are based on a huge east-west aligned arc of chalk extending from the White Cliffs of Dover to the edge of London, which includes extensive Ancient woodlands and chalk grasslands. The High Weald landscape still displays many medieval characteristics including wooded rolling hills studded with sandstone outcrops and flower-rich meadows.

The University of Kent is located in the north-east of the county just to the north of the city of Canterbury. The National Character Area (NCA) is The North Kent Plain, which covers the strip of land between the Thames Estuary to the north and the chalk of the Kent Downs to the south; the latter forming a particularly distinctive backdrop. The North Kent Plain is mostly open, low and gently undulating including much productive arable land, although tradition- al orchards, soft fruits and other horticultural crops are prevalent in central and eastern areas, giving rise to the County's *'Garden of England'* appellation. There are also extensive areas of Ancient woodland in the North Kent Plain, most notable of which is the Blean Woodland Complex which broadly encompasses the University to the west, east and north. The Blean Woodlands, at 11 square miles in area, are probably the largest area of contiguous/semi-contiguous Ancient woodland in England. These woodlands have developed on heavy, acidic soil that is generally unsuitable for arable production.

**4.02 University of Kent - an overview**

The UoK Canterbury Campus and adjoining University-owned land' is located on the northern edge of Canterbury, approximately two miles from the centre of the city. In broad terms the Campus is enclosed by St Stephen's Hill Road to the east; Tyler Hill Road to the north (although the UoK also owns a few fields north of this road); Whitstable Road (A290) to the west; and the north-western edge of the City of Canterbury to the south.

The UoK's total landholding (excluding campuses in Medway and Tonbridge) is 230 hectares. This area can be divided into three zones – the Campus Heart, Parklands and the Northern Land Holding. The University's various departments and student accommodation are relatively densely concentrated in the Campus Heart, which is separated from northern edge of Canterbury by a green buffer known as the Parklands. The Campus Heart and Parklands zones together cover 121 hectares. The University has also acquired agricultural land to the north – the Northern Land Holding - which covers a further 109 hectares.

The University sits in an elevated position near the top and at the western end of the Stour Valley Slopes, which rise above the Stour Valley forming a distinct ridge; the Stour Valley is a level floodplain associated with the River Stour which flows south-west to north-east through Canterbury. The Campus generally rises from the Stour Valley south to north. The southern edge of the Campus is approximately at 28m AOD, while the Campus Heart is approximately at 75m AOD. North of the Campus Heart the land descends into the west-east aligned Sarre Penne Valley, which at its base along the Sarre Penn Stream, is approximately 55m AOD. From the valley bottom the land rises again to the north to approximately 75m AOD at the northern edge of the landholding near Tyler Hill Road.

Within the UoK's three zones there are five broad landuse/habitat types:

- Amenity grassland with scattered tree and ornamental planting; dominant between the buildings of the Campus Heart.
- Woodland; mostly encompassing the Campus Heart but also present in the parklands and the land to the north.
- Meadow and parkland; prevailing in the parklands
- Arable farmland; the dominant landuse in the land to the north.
- Waterbodies; most significant of which is the Sarre Penne Stream, although there are also a number of ponds, ditches/rivulets.

These landuse/habitat types are shown on Figure 4.1 and described in more detail below.

In terms of geology, an extensive area of London Clay covers the area to the north of Canterbury known as The Blean. Soils underlying the Campus Heart and Parklands are predominantly loam but include a number bands of loam/clay. Clay soils predominate across the land to the north, at least north of the Sarre Penn Stream. London Clay normally gives rise to acidic conditions although many of the semi-natural plant communities present appeared generally neutral in their soil pH affinities.

| Designated site, area and distance from Site boundary | Total area | Distance from Site | Summary description based on citation |
|---|---|---|---|
| Blean Woodland Complex SAC | 522.89 ha | ca. 0.2km to the west at closest point | Annex I habitat: Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli.<br><br>Hornbeam *Carpinus betulus* coppice occurs interspersed with Pedunculate Oak *Quercus robur* stands and introduced Sweet Chestnut *Castanea sativa*. Great Wood-rush *Luzula sylvatica* is locally dominant in the woodland, and the characteristic Greater Stitchwort *Stellaria holostea* is found in more open patches. The stands have traditionally been managed as coppice, and are one of the British strongholds for the Heath Fritillary Butterfly. |
| Stodmarsh SAC | 563.27 ha | ca. 3km to the east | A large area of open water and marsh.<br><br>Annex II species that is a primary reason for selection of this site - Desmoulin`s Whorl Snail *Vertigo moulinsiana*. |
| The Swale SPA and Ramsar Site | 6514.71 ha | ca. 4.5km to the north-west | The Swale is located on the south side of the outer part of the Thames Estuary in south-eastern England. The Swale is an estuarine area that separates the Isle of Sheppey from the Kent mainland. To the west it adjoins the Medway Estuary. It is a complex of brackish and freshwater, floodplain grazing marsh with ditches, and intertidal saltmarshes and mud-flats.<br><br>This site qualifies for supporting notable waterfowl populations. |
| Stodmarsh SPA and Ramsar Site | 481.33 ha | ca. 4.5km to the north-west | Stodmarsh is a wetland site in the Great Stour valley and supports a number of uncommon wetland invertebrates and plants, and provides wintering habitats for wetland bird species and Hen Harrier *Circus cyaneus*. |
| Thanet Coast & Sandwich Bay SPA and Ramsar Site | 1,870.16 ha | ca. 5.8km to the north | Thanet Coast and Sandwich Bay SPA is located at the north-eastern tip of Kent. It is a coastal site consisting of a long stretch of rocky shore, adjoining areas of estuary, sand dune, maritime grassland, saltmarsh and grazing marsh. The site holds important numbers of Turnstone *Arenaria interpres* and is also used by large numbers of migratory birds. |
| Tankerton Slopes And Swalecliffe SAC | 13.01 ha | ca. 5.8km to the north | Primary reason for selection of this site is Fisher's Estuarine Moth *Gortyna borelii lunata*. The site's north facing slopes are composed of London Clay and support a tall herb community dominated by its food plant Hog's Fennel *Peucedanum officinale*, together with areas of neutral grassland also required by the species for egg laying. |

**Table 4.1:**
**Natura 2000 and Nationally Designated sites for Nature Conservation within 10 km of the UoK Campus**

**Designated Sites**

The UoK includes no European or nationally designated sites. The Blean Woodland Complex SAC is, however, only 0.2km to the west of the UoK campus at its closest point (Table 4.1). This SAC is designated for its special oak-hornbeam forest. The SAC consists of a number of Sites of Special Scientific Interest (SSSIs) including Church Woods, Blean SSSI and Ellenden Wood SSSI, designated in part for their noteworthy faunal interest including rare mammals, birds and invertebrates (Table 4.2). European and SSSI designated sites are shown on Figure 4.2

As regards non-statutory designated sites, Blean Pastures Local Wildlife Site directly abuts and overlaps the UoK's western edge. This Local Wildlife Site includes a mosaic of woodland (both wet and dry components) interspersed with glades consisting of tall herb and riparian vegetation. It also includes a section of the Sarre Penn Stream and the Crab and Winkle Link cycleway (see below). The components of this site that are within the UoK landholding include:

- The West Triangle Wood.
- A ca. 140m section of Sarre Penn Stream.
- A ca. 150m section of Crab and Winkle Link.

Figure 4.1: Extended Phase 1 Habitat Survey Map

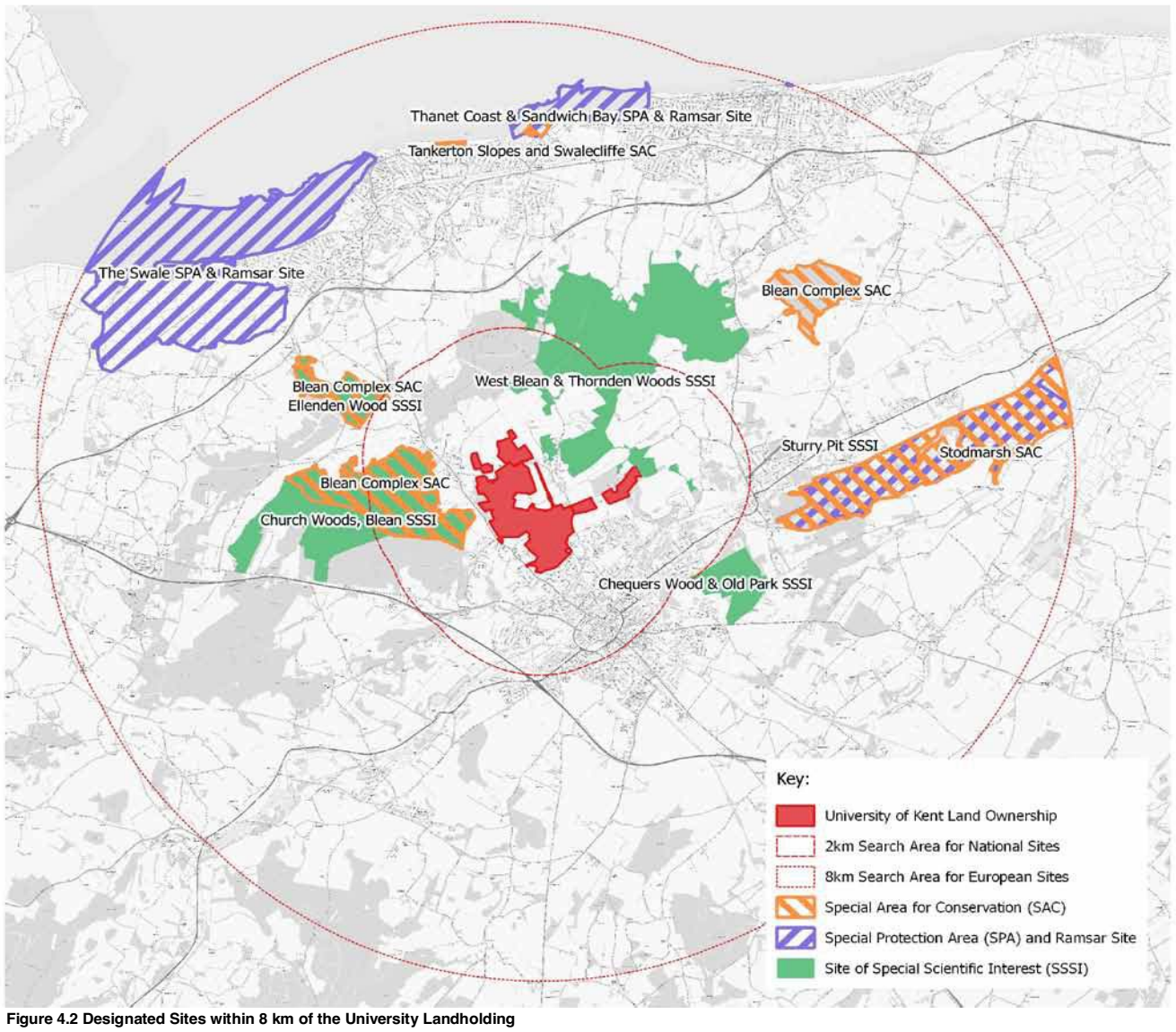



**Figure 4.2 Designated Sites within 8 km of the University Landholding**

**4.03.1 Canterbury World Heritage Site**

Canterbury Area of High Landscape Value (AHLV) (the Valley of the River Stour around Canterbury) has been identified to protect the historic and landscape setting of the City and the Canterbury World Heritage Site (the latter consisting of Canterbury Cathedral, St Augustine's Abbey and St Martin's Church). Although the designation is based on cultural / architectural criteria (Canterbury Cathedral, St Augustine's Abbey and St Martin's Church), the picturesque rural setting, is considered inextricably linked to the protective conservation status of this special city. Note that the UoK's Parklands and Campus Heart zones are covered under the AHLV.

**4.04 Habitats and Flora**

The tree main types of habitats outlined below are Woodlands, hedgerows and grasslands

| Designated site, area and distance from Site boundary | Total area | Distance from Site | Summary description based on citation |
|---|---|---|---|
| Church Woods - Blean SSSI (boundary corresponds with Blean Wood National Nature Reserve) | 297.07 ha | ca. 0.2km to the west | One of the most extensive areas of broadleaved woodland remaining in the Forest of Blean. A good range of woodland birds is present, including three woodpecker species, eight warblers, and six tits. Several species which regularly breed here are elsewhere rather scarce in East Kent; these include Woodcock *Scolopax rusticola* (RSPB Red List - see RSPB, 2015), Nightjar, Redstart *Phoenicurus phoenicurus* (RSPB Amber List) and Wood Warbler *Phylloscopus sibilatrix* (RSPB Red List). The area has especially good numbers of Nightingales.<br><br>[N.B. Recent research indicates that Redstart and Wood Warbler no longer breed in the Blean (Walter, undated)] |
| West Blean and Thornden Woods SSSI | 762.5 ha | Adjacent to the UoK Eastern Extension | West Blean and Thornden Woods, lying to the north of Canterbury, comprise a mosaic of Ancient semi-natural woodland and conifer plantation within the Ancient Blean Forest complex and include several rare woodland types. The site is a particularly important locality for the nationally rare and specially protected Heath Fritillary Butterfly. The wide range of woodland habitat types present within the site supports an exceptional diversity of birds. This site also supports an important local population of Dormouse. |
| Ellenden Wood SSSI | 90.8 ha | 1.9km to the north-west | Ancient woodland containing several uncommon woodland types. Large numbers of insects including three nationally rare species have been recorded. Birds breeding regularly include Nightingale. Mammals include Dormouse. |

**Table 4.2 SSSIs and National Nature Reserves designated site within 2km of the Site**

| Local sites | Total area | Description & distance from Site |
|---|---|---|
| Tyler Hill Meadows Local Nature Reserve | 4.3 ha | Adjacent to the north-eastern edge of Site.<br><br>One of the few remaining unimproved neutral grasslands in Kent.<br>In summer the grassland supports colourful wild flowers such as St John's wort *Hypericum* sp. and Black Knapweed *Centaurea nigra*. Although the grassland is important the surrounding scrub and woodland also provides undisturbed habitat for birds. Eleven species of butterfly have been recorded on the site as have reptiles such as Slow-worms *Anguis fragilis* and Viviparous Lizards *Zootoca vivipara* which shows that even small sites support a wealth of wildlife. |
| Blean Pastures Local Wildlife Site | 13.51 ha | Partly within UoK (western boundary)<br>Mosaic of woodland (both wet and dry components) interspersed with glades consisting of tall herb and riparian vegetation.<br>UoK components within the Local Wildlife Site include West Triangle Wood and a section of the Sarre Penn Stream and the Crab and Winkle Link cycleway (see below). |
| Little Hall and Kemberland Woods and Pasture Local Wildlife Site | Not known | Adjacent to the un-surveyed UoK Eastern Extension.<br>Comprises three predominantly broad-leaved woodlands with a good diversity of ground flora indicative of Ancient woodland (e.g. Moschatel *Adoxa moschatellina* and Bluebell *Hyacinthoides non-scripta*) and a series of unimproved and species-rich semi-improved neutral pastures to the north-west of Kemberland Woods, which lie in the Sarre Penn valley. Plants recorded in the grassland include Pepper Saxifrage *Silaum silaus*, Spiny Restharrow *Ononis spinosa* and Meadow Vetchling *Lathyrus pratensis*, while the stream sides support Branched Bur-reed *Sparganium erectum* and Water Mint *Mentha citrata*. Kingfisher *Alcedo atthis* (Sch. I) present. |
| Blean Woods RSPB Reserve | Not known | 320m west of Site.<br>Ancient woodland including Lesser Spotted Woodpecker *Dryobates minor* (S. 41; RSPB Red List), Nightingale (RSPB Red List)., Nightjar (RSPB Amber List)., Sparrowhawk *Accipiter nisus* and Woodcock (RSPB Red List). |

**Table 4.3 Local Nature Reserves and Local Wildlife Sites and nature reserves within 2km of the Site**

## 4.04.1 Woodlands

**4.04.1 Woodlands**

Our Ancient woodlands represent one of our longest-standing land uses and are one of our most diverse habitats. Many have taken hundreds, if not thousands of years to develop, and are essentially irreplaceable. Ancient woodlands are classified as those woodlands which have existed in some form for at least 400 years in the UK (i.e. from the time of the earliest reliable maps). The South East region of England covers 14.5% of the country yet has approximately 40% of the Nation's Ancient woodland. While Ancient woodland covers only ca. 2.5% of England, Ancient woodland coverage in the Canterbury District is nearly 14%, the third highest percentage cover for a local authority in the region (Sansum et al., 2012). The Blean Woodland Complex represents most of the CCC's Ancient woodland. As already stated, it is believed to be the largest contiguous / semi-contiguous area of Ancient woodland in England. Given this context, and the large size of the University's landholding and its semi-rural location, it is perhaps not surprising that the Campus also incorporates areas of Ancient woodland. From the present study it is provisionally estimated that Ancient woodland coverage of the UoK land holding amounts to around 16ha, representing 7% of the Campus area; which again is a disproportionately high coverage compared with England as a whole.

Woodland within the UoK's landholding can be found throughout the University estate. These woodlands are also described below and in Appendix A (Table A.1) and key features are summarised here. The larger woodlands include:

- Brotherhood Wood (northern edge of Central Heart)
- Park Wood (centre/west of Campus Heart)
- Hospital (Bluebell) Wood (southern edge of Campus Heart)
- Giles Lane Wood (centre of Campus Heart)
- West Triangle Wood (western edge of the land to the north)
- The Long Thin Wood (extending the length of Sarre Penn Stream)

All of these woodlands are classified as Ancient. Note that West Triangle Wood, as well as a section of the adjoining Long Thin Wood, are components of Blean Pastures Local Wildlife Site, the only Local Wildlife Site within/overlapping the University's landholding.

The canopies of the two largest woodlands, Brotherhood Wood and Park Wood, are dominated by oaks standards and old Sweet Chestnut *Castanea sativa* coppice. Most oaks appeared to be Pedunculate Oak rather than Sessile Oak *Quercus petraea*, although according to Shire & Martin (undated) many of the oaks of the nearby Blean woodlands have a hybrid quality. Coppiced Hornbeam is also present and is particularly frequent in parts of Brotherhood Wood. All three species are characteristic of woodland in the wider Blean Woodland Complex. The south-western corner of Brotherhood Wood and the northern edge of Park Wood are only separated by Park Wood Road and reference to historic mapping from the 19th Century reveals far greater connectivity prior to the development of the University. Giles Lane Wood also appears to have been part of Brotherhood Wood.

Coppicing of Hornbeam in local woodlands dates back at least 700 years, while coppicing of Sweet Chestnut was introduced in the 18th century (Shire & Mar- tin, undated b). It is interesting to note from OS mapping from 1898 that oaks were also historically pollarded in Brotherhood Wood. While small scale coppicing has been carried out in the past by both the Estate Management and by UoK Conservation Society volunteers, coppicing effort has been inconsistent; and most coppiced areas within the University's woodlands now appear over- grown. Neglect of coppice management will ultimately will be detrimental to the retention of low flowering woodland herbs, including notable species such as Bluebell *Hyacinthoides non-scripta*, Wood Anemone *Anemone nemorosa* and Common Cow-wheat *Melampyrum pratense* (the latter was only recorded in Brotherhood Wood), and also to certain local wildlife adapted to more open woodland conditions. Neglected Hornbeam coppice in particular casts very dense shade. Coppicing has, however, recently been introduced within the eastern-most component of Brotherhood Wood, possibly in response to woodland management recommendations from LUC (2016). In addition to neglect of traditional coppice management, the woodlands are also threatened by the spread of Rhododendron, although at present the limited coverage would seem at a manageable level. One small patch of Japanese Knotweed *Fallopia japonica* is present in Eliot Footpath Woodland (Area 111); this appears to have been recently treated with herbicide and no fresh growth was evident.

While Sweet Chestnut is a non-native species and has been widely planted in many woodlands in Kent, it has also naturalised and therefore woodlands including this species should not necessarily be considered as being plantation in origin (Sansun et al., 2012). Furthermore, many Sweet Chestnut coppices in the Canterbury District provide important habitat for various woodland species of conservation concern, including Nightingale, Nightjars and Tree pipits *Anthus trivialis* (NERC Act S. 41; RSPB Red List), as well as certain rare lepidoptera including the Heath Fritillary Butterfly in Blean Woods.

Woodland 'shaws' are not large-scale hedgerows, but are effectively narrow woodland strips of mature trees, which commonly form boundaries between fields or line a road and are often remnants of larger woods in the Weald that had been cleared for agriculture. They are a particularly characteristic feature of the Kent countryside. The UoK includes a several of these, including Long Thin Wood described above, the Northern Lands Linear Wood (Area 63), and also Areas 100 and 115 that form the south-western boundary of the campus.

It is important to view the Campus woodlands and other semi-natural habitats as forming part of the wider Blean Woodland Complex, and as key *'stepping stones'* for woodland wildlife moving between Church Woods - Blean (to the west) and West Blean / Thornden Woods and Ellenden Wood (to the east / north-east).

## Woodlands

**Area 5 - Brotherhood Wood**
This 4ha Ancient woodland is located on the northern edge of Campus Heart. The upper canopy is dominated by Pedunculate Oak standards, while overgrown Hornbeam and Sweet Chestnut coppice is also prevalent.

Survey in mid-June prohibited a thorough assessment of woodland ground flora, although Bluebells and Wood Anemones were still evident. Common Cow-wheat *Melampyrum pratense* was also present along the northern mar- gins. Note that Common Cow-wheat is the larval food plant of the rare Heath Fritillary Butterfly, one of the flagship species of the wider Blean Woodland Complex. This woodland herb also has a special relationship with the South- ern Wood Ant *Formica rufa*, the large nest mounds of which were found in a number of locations.

Habitat complexity is enhanced by the Sarre Penn Stream, which bounds the woodland's north-western edge, and by several shaded seasonal streams/rivulets which join the Sarre Penn from both sides. The eastern-most compartment of this woodland (Area 6) has been subjected to recent coppice management, while the University's Dr Ian Bride has also been leading traditional wood- land management activities along the south-western margins of Brotherhood Wood. Other evidence of management within the University's woodlands include log piles, tree mounted bird boxes, and supplementary tree planting. According to LUC (2016) this woodland accords to National Vegetation Com- munity (NVC) W10a *Quercus robur-Pteridium aquilinum-Rubus fruticosus.*

A 15-20m wide band of plantation woodland (Area 7), ca. 10-15 years of age, links Brotherhood Wood with the southern end of the Dismantled Crab and Winkle Railway woodland (Area 20; see below).

KMBRC also references presence of Common Cow-wheat as well as Bitter-vetch, both of which are vascular plant Red List species (Stroh et al. 2014).

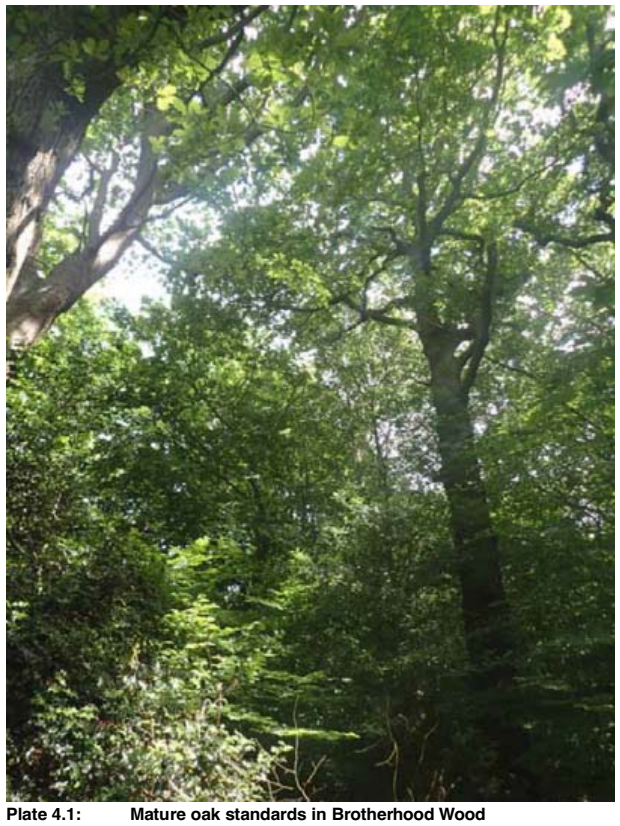


**Plate 4.1: Mature oak standards in Brotherhood Wood**

**Plate 4.2: Coppiced Sweet Chestnut and Hornbeam in Brotherhood Wood; note oak standards have been retained uncoppiced**

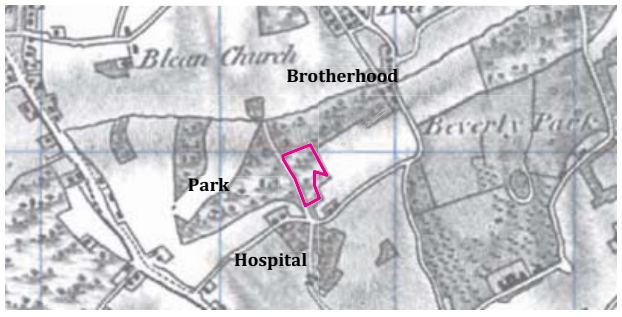



**Plate 4.2.1 : Extract from 1816 OS map showing fuller extent of Brotherhood Wood extending north to the Sarre Penn and to Tyler Hill Road. Note that Giles Lane (east) was moved north in 1963. Approx. 1960 ex- tent of Brotherhood Wood shown in red. (Ed.)**

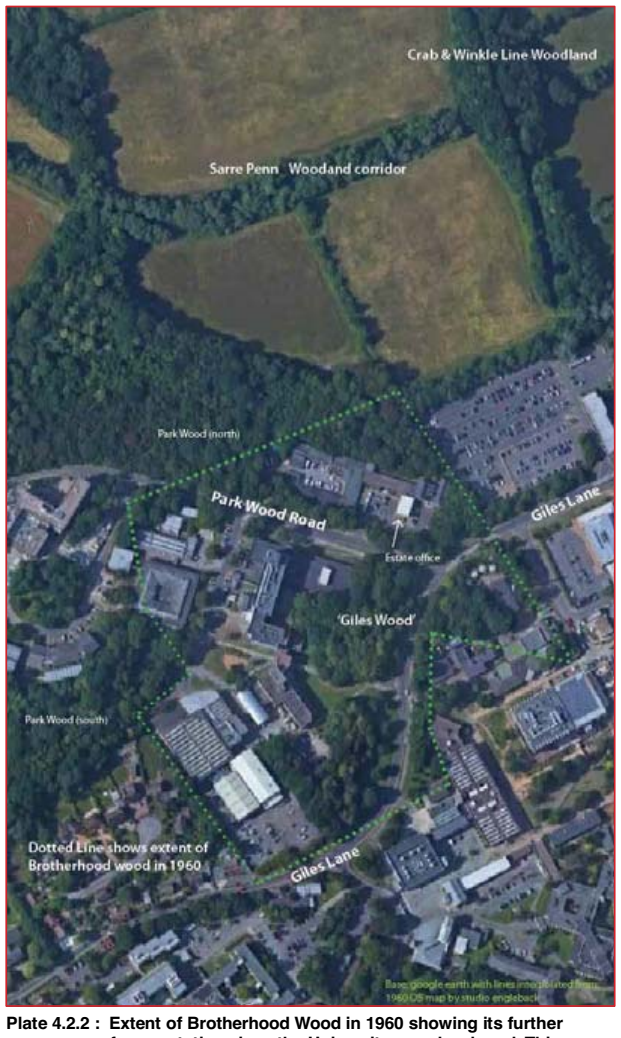



**Plate 4.2.2 : Extent of Brotherhood Wood in 1960 showing its further fragmentation since the University was developed. This was already a fraction of its original size (Ed.)**

**Areas 12 & 13 - Giles Lane Wood**

Giles Lane Wood covers ca. 1ha and consists of two small Ancient woodland copses between the Sports Centre / Ingram buildings and Giles Lane. These woodland blocks had been part of Brotherhood Wood (see extend in plates 4.4.1 & 4.4.2), which has become fragmented by the expansion of the University. Giles Wood includes a number of mature Pedunculate Oak standards and Bluebells are locally dominant in the ground flora. Bramble is also frequent and may be becoming increasingly prevalent to due lack of management. Sweet Chestnut is abundant in both woodland blocks. Small patches of Rhododendron are present.

**Plate 4.3: Giles Wood, separated from Giles Lane by amenity grassland**

**Plate 4.4: Giles Wood**

## Woodlands

**Area 17 - Woolf College Wood**
Along the northern side of Woolf College is a ca. 0.6ha woodland block that links the Canterbury and Whitstable Dismantled Railway woodland (Area 20) to the west with a block of Ancient woodland to east, the latter being just be- yond the University's boundary. Although Ancient Woodland Inventory map- ping does not show Woolf College Wood as being Ancient woodland, there are a few standard oaks and Bluebells are locally frequent in the ground flora. However, a dense shrub layer and stands of Common Nettle *Urtica dioica* are indicative of ground disturbance and limiting the development of a more no- table ground flora.

**Plate 4.5: Deadwood in Woof College Wood providing good opportunities for bats, hole nesting birds and saproxylic invertebrates**

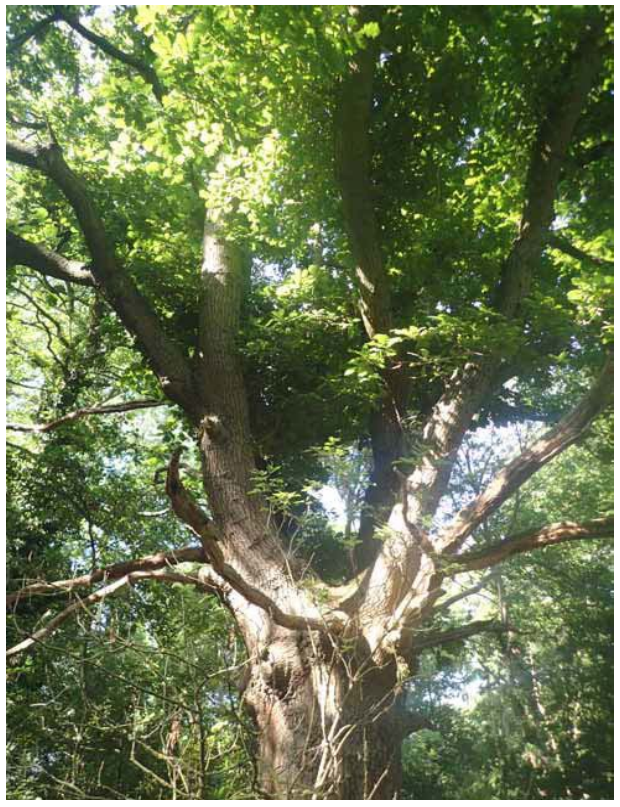


**Plate 4.6: Occasional oak standards and patches of Bluebell are remnants of former Ancient woodland in Woolf College Wood. (In 1816 it was part of Brotherhood Wood, but by 1870 only trees around the pond remained)**

**Area 14 - Park Wood**
This shaded 5.2ha woodland abuts the western side of the Campus Heart and is similar in composition and structure to Brotherhood Wood, although shrub layer species such as Hazel *Corylus avellana* and Holly *Ilex aquifolium* appear more prevalent. Bluebells are frequent and locally dominant in spite of neglected coppice management. The southern half of the woodland has been fragmented by a relatively newly constructed cycle/footpath, although this has also created a woodland ride effect which may be benefitting certain woodland edge species. Small patches of Rhododendron are present, which in time this could proliferate and reduce the site's conservation importance. According to the Woodland Management Strategy (LUC, 2016) the National Vegetation Community (NVC) accords to W10a *Quercus robur-Pteridium aquilinum-Rubus fruticosus.*

**Area 20 - The Crab and Winkle Dismantled Railway**
This narrow, wooded embankment, 15-30m wide, extends along the dismantled Crab and Winkle Railway Line. The section within the University's land- holding extends ca. 1km from Woolf College/Tyler Hill Tunnel to the village of Tyler's Hill. Canopy species include oak, Ash *Fraxinus excelsior* and Sweet Chestnut, while understorey species include Hazel, Elder *Sambucus nigra*, Hawthorn *Crataegus monogyna*, Field Maple *Acer campestre*, Garden Privet *Ligustrum ovalifolium* and Bramble *Rubus fruticosus*. A relatively well-used footpath extends 175m from Tyler Hill Tunnel to the Sarre Penn Stream crossing but after this point access becomes increasingly restricted by encroaching scrub.

**Plate 4.9: Tyler Hill Tunnel at southern end of the woodland along the Crab and Winkle Dismantled Railway**

**Plate 4.10: Footpath along the Crab and Winkle Dismantled Railway becoming increasingly overgrown north of Sarre Penn crossing**

## Woodlands

**Area 51 - West Triangle Wood**
West Triangle Wood is ca. 0.5ha in area and is located on the western edge of Northern Land Holdings. The upper canopy is dominated by mature Pedunculate Oaks while Hazel coppice dominates the shrub layer. The abundance of Hazel coppice is unusual compared with other woodlands within the campus. Sweet Chestnut and Hornbeam were not recorded although may be present in small numbers. Bluebells dominated much of the ground layer while Wood Anemone was frequently recorded. West Triangle Wood forms one component of Blean Pastures Local Wildlife Site. Further ecological complexity is provided by Sarre Penn Stream which bounds the woodland's northern edge. The Crab and Winkle Link cycleway bounds the woodland to the east. LUC (2012) NVC categorises this woodland as W10b Quercus robur – *Pteridium aquilinum* – *Rubus fruticose* subcommunity *Anemone nemorosa.*

**Plate 4.11: Rot and woodpecker holes in tree trunk in West Triangle Wood providing opportunities for bats and hole nesting birds**

**Plate 4.12: Sarre Penn Stream extending along the northern edge of West Triangle Wood**

**Area 58 - Long Thin Wood**
The Long Thin Wood, as referred to by LUC (2016), is an east-west aligned woodland shaw extending along the Sarre Penn Stream. The canopy is dominated mature Pedunculate Oaks and Ash, while Hazel, Hawthorn, Blackthorn, Dogwood, Field Maple and Grey Willow *Salix cinerea* are all frequent in the understory. This woodland is noteworthy for providing connectivity between Brotherhood Wood, West Triangle Wood and the woodland of Blean Pastures Local Wildlife Site; note that the western section is within the Local Wildlife Site. Blean Walk Public Right of Way extends the length of the woodland. LUC (2012) NVC categorises this woodland as W8b *Fraxinus excelsior – Acer campes– Mercurialis perennis* subcommunity *Anemone nemorosa.*

**Plate 4.13: Blean Walk along the northern edge**

**Plate 4.14: Sarre Penn Stream extending the length of woodland**

**Area 63 - North Linear Wood**
A north-south aligned woodland shaw, ca. 0.5km long and 10-35m wide, extends from Court Farm near the top of the Northern Land Holdings down to the Sarre Penn valley bottom, connecting with the Long Thin Wood. Pedunculate Oak dominates much of the canopy while Hawthorn, Blackthorn and Elder are frequent in the understorey. Two large Black Poplars are also present. A narrow stream/rivulet (dry in part) extends the length of the woodland feeding into Sarre Penn Stream at the valley bottom.

**Plate 4.15a: Shaw (linear woodland) between Court Farm and Sarre Penn valley bottom**

**Plate 4.15b: Shaw (linear woodland) between Court Farm and Sarre Penn valley bottom**

## Woodlands

**Area 83 - Bluebell Wood**
This ca. 4ha hillside woodland (formally known as Hospital Wood according to 1898 OS mapping) descends from north (edge of Campus Heart) to south, bisecting the Parklands' zone. Bluebell Wood is more complex than the other woods, both botanically and in terms of historic management. As with Brotherhood Wood and Park Wood, large oak standards are present and there is frequent Hornbeam and occasional Sweet Chestnut. However, Silver Birch *Betula pendula* appears to be the dominant canopy species, allowing higher light levels to penetrate to the ground flora. Towards the base of the hillside, however, compartments are dominated by pollarded Hornbeam and Norway Maple *Acer platanoides*, which both cast more shade, thereby inhibiting development of a shrub layer and varied ground flora. In addition to these areas and the open Silver Birch-dominated woodland, there are also compartments including dense understorey, frequent species being Holly, Field Maple and Bramble.

As the name suggests, much of the woodland's ground flora is dominated by Bluebells with Wood Anemone being more occasional.

Remnant hedgerow, ditch and bank features are present; a gnarly Hornbeam coppice-lined embankment being a one particularly striking feature. Further ecological interest is provided by ponds at both the top and base of the hill- side, and from seasonal wet rivulets and ditches. Multiple footpaths criss-cross the woodland. LUC (2012) NVC categorises this woodland as W10a *Quercus robur-Pteridium aquilinum-Rubus fruticosus.*

**Area 103 - Chaucer College Woodland**
A ca. 1ha Norway Maple-dominated woodland is present in the south-western corner of the Parklands zone. The dense shade cast by this woodland appears to have inhibited development of a shrub understorey while ground flora species are also limited. A few mature oaks and Sycamore *Acer pseudoplatanus* are present along the northern edge adjoining University Road.

**Plate 4.18 Occasional mature oaks and Sycamore on edge of the Norway Maple-dominated woodland of Chaucer College**

**Area 111 - Eliot Footpath Woodland**

In the south-eastern corner of the Parklands zone is an area of secondary woodland abutting the lower section of the Eliot Path. Sycamore dominates the canopy while oak, Norway Maple, Ash, Wild Cherry *Prunus avium*, Horn- beam, Field Maple and Grey Willow are all frequent to occasional. While some patches of Bluebells are present, Ivy and Common Nettle dominate much of the ground flora. A large steep-side hollow (probably a former sand pit according to historical OS mapping from 1898) is present at the woodland's southern extremity. A small stand of Japanese Knotweed *Fallopia japonica*, an invasive alien Schedule 9 listed species, is present.

**Plate 4.19a: Secondary woodland established in a hollow feature at southern end of Eliot Footpath woodland**

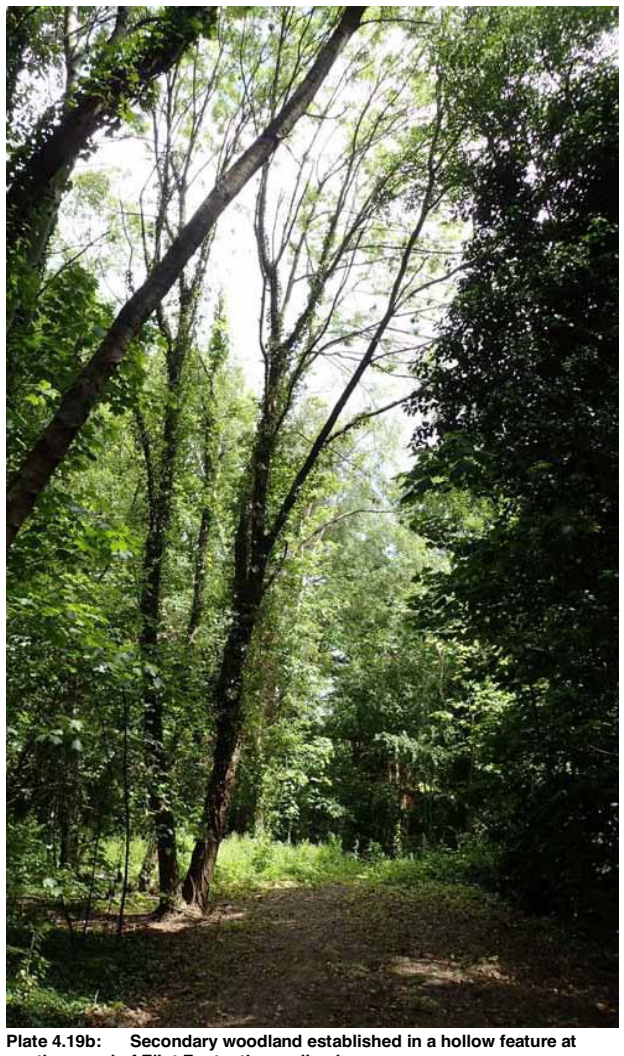


**Plate 4.19b: Secondary woodland established in a hollow feature at southern end of Eliot Footpath woodland**

## Woodlands

**Area 113 - St Stephen's Hill Woodland**
This area of secondary woodland extends between the eastern side of the Parklands zone and St Stephen's Hill Road. Ash, Sycamore and Silver Birch are most frequent in the upper canopy although a there are also some oak standards present, particularly along the western margins. Ivy and Common Nettle dominate much of the ground flora.

**Plate 4.20: Occasional oak standards present along woodland margins in St Stephen's Hill Woodland**

**Plate 4.21: Secondary woodland of St Stephen's Hill Woodland abutting Tyler Court**

## 4.04.2 Hedgerows

**4.04.2 Hedgerows**
Hedgerow species lists are provided in Appendix A, Table A.2. A few examples are shown in Plates 4.22-4.25. The most species-rich hedgerows bound farmland within the Northern Land Holdings. These are dominated by Hawthorn and Blackthorn *Prunus spinosa*. Other relatively commonly occurring species include Field Maple, Elder, Dogwood *Cornus sanguinea*, Goat Willow *Salix caprea*, Hazel, Rose Rosa spp. and Bramble. Most of these hedgerows were intact although a number in the north-eastern corner include quite large gaps. Hedgerows within the campus are mostly species-poor and some include non-native species such as Leyland Cypress *Cupressus x leylandii, and Elaeagnus x ebbingei*. A number of hedgerows are also present within the Parklands Zone, although these consist mostly of Garden Privet and native thorn species. A double Garden Privet *Ligustrum ovalifolium* hedge encloses a track extending through the Chaucer Fields. The track is considered an historic landscape feature that once provided access to Beverley Farm (next to the Innovation Centre).

**Plate 4.24: A double privet hedge encloses historic track extending through the Parklands**

**Plate 4.25: Low cut Hornbeam hedge opposite Woolf College**

## 4.04.3 Grasslands

**4.04.3 Grasslands**
The UoK campus includes four key grassland habitats:

- Species-poor semi-improved meadow in the Parklands.
- Recently sown wildflower meadow in the vicinity of Turing College/Keynes College/Innovation Centre.
- Amenity grassland (including sports pitches) throughout the Campus Heart.
- Improved pasture and hay meadow in the north.

The key characteristics of these grasslands are summarised here and also described below and Appendix A, Table A.3.

Perhaps of most interest from an ecological perspective are the species-poor semi-improved meadows within the 'Parklands' character area, and the meadows in the south-western corner east of Chaucer College. The Parklands are dominated by relatively coarse neutral grassland with a low proportion of wildflowers, which probably reflects the fact that they were mostly intensively managed as amenity grassland up until 2008 (LUC, 2011). It is also understood from reference to OS mapping dating back to 1938 that much of the meadow area of the Parklands was planted with orchards, which were probably cleared sometime in 1970s. Given this history, more time and ecologically informed management is required before the meadows develop a more notable sward. It has been indicated that cut arisings are not being removed following mowing. If this is the case this will be enriching soils and inhibiting colonisation by low flowering herbs and fine grasses.

Nevertheless, the meadow area between the Eliot Footpath and Bluebell Wood (Area 115) includes a much higher proportion of fine grasses (Common Bent being dominant) and a higher percentage of wildflowers. This particular meadow area along with adjoining Silver Birch-dominated woodland, shares some superficial similarities with the heathland type environment found in parts of the Blean Complex, although no heather species are present. The meadows of the Parklands also include scattered mature trees, creating a Parkland like effect to varying degrees, and hence the name of this particular zone.

Although the Parklands are not botanically rich, as a single coherent feature (and including adjoining woodlands) they are ecologically noteworthy. They also have considerable landscape interest, being important both to the setting of the University, and to the context of the nearby World Heritage Site. Indeed, the Parklands are included within a wider designated AHLV. The Parklands are also valued by the local community in providing a green buffer that is preventing the coalescence of the Campus and the north- ern fringe of Canterbury.

Although the meadows south of Turing College (Areas 93 & 97) and the Innovation Centre (Area 99) are much more herb-rich than those in the Parklands, these appear to have been recently sown with a wildflower mix, which currently limits their nature conservation value compared with longer-standing grassland communities.

The majority of grassland within the Campus Heart is intensively managed as amenity grassland, including large sports pitches on the north-western side. Most grassland within the Northern Land Holdings is improved pasture and hay meadow. None of the farmland is apparently managed under any agri-environment schemes, although ca. 8m wide uncultivated strips (potential conservation headlands) have been left along the margins of two arable fields abutting the Sarre Penn Stream.

**Species-poor semi-improved meadow (Areas 86, 87, 104, 106, 114 & 115)**
Large species-poor semi-improved meadow, neutral in character, cover much of the Parklands zone of the campus. This area is also referred to as the South- ern Slopes and Chaucer Fields. Yorkshire Fog and False-oat grass are generally dominant, while Meadow Barley, Red Fescue, Cock's-foot, Sweet Vernal Grass and Common Bent are all frequent. Most areas are not rich in flowers, only including occasional buttercup species, Bird's-foot Trefoil, Field Bindweed, Common Sorrel, Red Clover, White Clover and Meadow Vetchling.

The most flower-rich meadow (Area 115) is located towards the top of the Parklands between Eliot Path and Bluebell Wood. Here finer grasses, most notably Common Bent, are dominant and Bird's-foot Trefoil and butter- cups are much more prevalent. The ecological value of these meadows is enhanced by the fact that they form one component of a wider habitat mosaic including woodlands and scattered trees. The latter creates, to varying degrees, a Parkland habitat effect, hence the name of this particular zone. Adjoining woodlands are described in Table 4.1. Free-standing trees within the meadows include Ash, oak species, Norway Maple, Hornbeam, Sycamore, False Acacia Robinia pseudoacacia and a fir species. Area 106 includes more trees than the other meadows within the Parklands zone, and indeed the north-eastern component of this area is described by the University as the Arboretum. It is understood that meadows are mown for hay once or twice annually.

There is also a closely Rabbit-cropped flower-rich sward in a glade within the Eliot Footpath Woodland in the south-eastern corner of the Parklands Zone (Area 112). Frequent species include Bird's-foot Trefoil, Creeping Cinquefoil, Daisy, Selfheal, Creeping Buttercup and White Clover.

**Plate 4.26: Mown footpath through species-poor semi-improved grassland (Area 87)**

**Plate 4.27: Tussocky species-poor semi-improved grassland dominated by False Oat-grass (Area 86)**

Plates 4.28a: Greater abundance of fine grasses (primarily Common Bent) and flowers in meadow between Eliot Path & Bluebell

Plate 4.29: Area 112, Rabbit-cropped flower-rich glade within the Eliot Footpath Woodland

Plates 4.28b: Greater abundance of fine grasses (primarily Common Bent) and flowers in meadow between Eliot Path Bluebell Wood

Plate 4.30: Area 114, meadow below Rutherford College

## Grasslands

**Recently sown wildflower meadow (Areas 93, 97 & 99)**
A wildflower meadow has been recently created to the south-west of the Campus Heart on the southern side of Turing College (Areas 93 & 97) and Innovation Centre (Area 99). The former has established less well than the latter, including more weed species characteristic of disturbed ground, although both were attractive including an abundance of Oxeye Daisy. The Innovation Centre meadow included a variety of grass species including abundant York- shire Fog, and frequent Meadow Barley, Crested Dog's-tail, False-oat grass and Quaking Grass. Herbs included abundant Oxeye Daisy and frequent Bird's-foot Trefoil, Black Knapweed and Selfheal, and occasional Meadow Buttercup, Ragged Robin and Red Clover. The Turing College grassland included many similar species, although ruderals such as Creeping Thistle, Spear Thistle, dock, Weld and crucifers were much more prevalent.

**Plate 4.31: Existing wildflower meadow south Turing College (Area 97); note the contrast between long-standing relatively flower- poor meadow (left) and newly created flower-rich meadow (right)**

**Plate 4.32: Existing wildflower meadow south-west of Innovation Centre (Area 99)**

**Amenity grassland / scattered trees / ornamental planting mosaic** Amenity Grassland predominates between the Campus Heart's buildings, car- parks and roads. This is mostly species-poor and regularly tightly mown. Of more interest are the associated trees and ornamental planting discussed below.

**Plate 4.33: Amenity grassland and scattered trees alongside University Road**

**Plate 4.34: Darwin College - amenity grassland and scattered trees**

**Amenity grassland, species-rich**
While the Campus Heart includes a vast area of tightly mown species-poor amenity grassland, there are also a few species-rich lawn areas. These are found mostly on roadside embankments where thinner poorer soils have enabled a greater diversity of herbs to establish including Bird's-foot Trefoil, Daisy, Creeping Buttercup, Field Bindweed, Creeping Cinquefoil, Black Medick, hawkweed, crane's-bill species, Selfheal and White Clover.

**Plate 4.35: Flower-rich lawn between Giles Lane and Woolf College**

**Plate 4.36: Flower-rich lawn bounding carpark near Registry**

**Improved grassland**
The northern part of the campus consists mostly of arable land, although there is also some cattle-grazed improved grassland and hay meadow.

**Plate 4.37: Cattle grazed Improved grassland in the Northern Lands**

**Plate 4.38: Improved hay meadow (possibly species-poor semi-improved grassland)**

## 4.04.4 Watercourses

**4.04.4 Sarre Penn Valley**

The Sarre Penn Stream, a section of which flows through the UoK landholding, is a 13km long tributary of the River Stour which is joins ca. 12km to the north-east (*'as the crow flies')* at Plucks Gutter. The stream is also known locally as the Fishbourne. While the lower section of the Sarre Penn is defined as a heavily modified watercourse that mainly serves a drainage and water resources (agricultural abstraction) function, in its upper reaches above Calcott (which includes the UoK section) much of the channel has re-naturalised and shows many features of an un-modified (natural) waterbody (Jacobs, 2015).

Flowing west to east across the centre of Northern Land Holding the Sarre Penn has formed a shallow sided 'V' shaped valley. The stream gently meanders in a sequence of glides and riffles, the latter formed over gravels and small cobbles. Silt is mostly confined to the margins and pools. The stream is typically 2-3m wide and only 5-20cm deep, although it is understood that certain sections regularly flood. Banksides are mostly low, typically less than 0.3m in height, and various drainage ditches and rivulets feed into the stream.

Jacobs (2015) also reports Biological Monitoring Working Party data designed to detect the impacts of organic pollution, which show good quality habitat conditions but with some evidence of slight anthropogenic impacts.

For virtually its entire length across the UoK's landholding the Sarre Penn is densely shaded by mature trees and shrubs, and thus there is little in the way of riparian herbaceous vegetation. Woody debris (fine, coarse and large) is a key feature within the channel, generating organic matter that contributes to the overall productivity of the river system; this material is the main source of detritus for benthic invertebrates and other detritivores. Woody debris, as well as submerged roots and limbs, and overhanging canopies, provides refuge areas for fish and invertebrates, and diversifies flow and the range of species that can inhabit the varied current velocities. Tree roots also stabilise the banks that may otherwise be vulnerable to collapse under the spate conditions, which in turn might smother the valuable gravel/riffle habitat. Woody material also *'slows the flow,'* attenuating flood risk downstream. For all these reasons South East Water generally recommends retention and restoration of the stream's wooded character (Jacobs, 2015). They do though qualify this, advising that *'full tunnel vegetation'* should be avoided. In this regard it is interesting to note that on the adjoining Oakwell Estate, scalloped woodland margins have been created intermittently along the Sarre Penn, presumably to allow more light to reach the stream to diversify riverine conditions and perhaps also to maximise woodland edge ecotone.

The westernmost section of the stream within the UoK landholding forms part of the Blean Pastures Local Wildlife Site, while upstream of Blean Pastures the stream passes through Blean Woods. The stream and adjoining habitat is likely therefore to function as an important conduit for wildlife moving between these important habitats and the Campus. A short distance downstream of the Campus the steam is again designated, forming one component of the Little Hall and Kemberland Woods and Pasture Local Wildlife Site.

## 4.04.5 Ponds

**4.04.5 Ponds**

The Campus includes eight ponds while there are at least another six ponds outside the boundary but within 300m (see below). Note that for consistency UoK's historic pond numbering regime has been followed here. The most attractive and ecologically rich ponds within the Campus are Ponds 1, 2 and 10 although all of the ponds are generally in a neglected state, being (to varying degrees) relatively inaccessible, silted, polluted, overgrown by trees/shrubs, and in some cases inhabited by non-native invasive species. All these pressures inhibit their ecological potential and detracts from their amenity interest. There is therefore considerable opportunity for enhancing their ecological value, visual interest, accessibility, signage and visual appearance. In spite of the various pressures the Campus's ponds do support Great Crested Newts and various other amphibian species (see below).

The UoK's many drainage features have been sown with amenity grassland and are tightly mown, and hence have very little wildlife or aesthetic interest.

**Pond 1, Lower Eliot (Bluebell Wood)**

- Attractive shaded pond towards the southern end of wood.
- Circular shaped ca. 10m x 10m, ca. 30cm deep and turbid.
- Woodland setting although overhanging trees and shrubs appear to have been cut back.
- Aquatic/riparian vegetation including Yellow Iris (abundant), water lily, Water Starwort and Soft Rush.
- Fish present.
- Medium population of Great Crested Newts identified from 2014 survey.

Proposed management :

- Selectively remove trees and shrubs from southern edge and continue to manage overhanging branches elsewhere.
- Provide sitting area. Pond 2, Upper Eliot (Bluebell Wood)

**Pond 2, Upper Eliot (Bluebell Wood)**

- Attractive shaded pond located on north-western edge of Bluebell Wood.
- Circular shaped ca. 10m x 10m, ca. 30cm deep.
- Aquatic/riparian vegetation including Yellow Iris (abundant), and occasional Gypsywort Lycopus europaeus and Soft Rush Juncus effusus.
- Seemingly young Giant Hogweed Heracleum mantegazzianum.
- Favourable location from an amenity perspective being adjacent to Becket Court hall of residence.
- Small population of Great Crested Newts identified from 2014 GCN survey; fish and Alpine Newt Ichthyosaura alpestris present.

Proposed management :

- Provide sitting area.
- Remove small number of trees/shrubs from western bank and prevent further encroachment by trees and shrubs.
- Re-check for Giant Hogweed and treat if necessary.

**Plate 4.39: Pond 1, Lower Eliot (Bluebell Wood)**

**Plate 4.40: Pond 2, Upper Eliot (Bluebell Wood)**

## Ponds

**Pond 3, Beverley Farm**

- Shaded pond at southern end of copse to the south of Turing College.
- Rectangular shaped ca. 10m x 5m; only ca. 5cm deep although according to the UoK Biodiversity Management Plan this pond has been recently dredged.
- Stagnant and turbid with many mosquitos.
- No aquatic/riparian vegetation.
- No GCNs from 2014 survey but survey relating to development of Turing College did identify newts (species not known at this time).

Proposed management :

- De-silt, selectively remove a few trees and shrubs from margins, and expand outwards if possible.
- Improve runoff water quality if possible, potentially through establishing marginal, emergent and aquatic planting from local source pond that lacks alien invasive plants.
- Improve access for students.

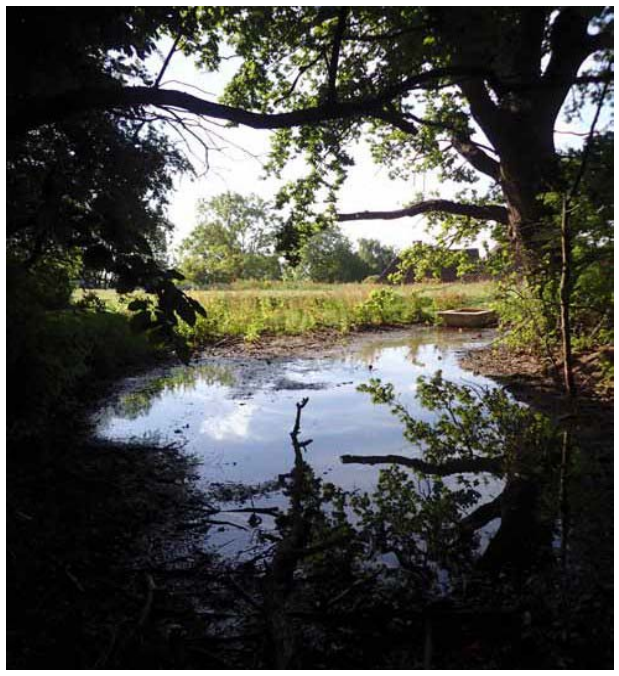


**Plate 4.41: Pond 3, Beverley Farm**

**Pond 4, Keynes**

- Located on southern edge of Keynes College.
- 'S' shaped ca. 25m x 8m, ca. 20-30cm deep.
- Eutrophic/polluted, large amount of leaf litter and also plastic litter.
- Trees and Bramble on southern margins; trees including Grey Willow, Crack Willow and Sycamore. Large Oak on north-western bank.
- Aquatic/riparian vegetation limited but includes large stand of Yellow Iris. Schedule 9 listed invasive alien species, New Zealand Pygmyweed Crassula helmsii also present according to UoK Biodiversity Management Plan.
- Favourable location from an amenity perspective being adjacent to a café and hall of residence.
- No Great Crested Newts according to 2014 survey.

Proposed management :

- Control invasive alien species.
- Address pollution.
- Selectively coppice / fell trees around southern, margins to allow more light to penetrate and reduce leaf litter.
- De-silt to deepen and undertake riparian planting.
- Regularly remove litter.
- Provide additional seating and create bankside access at select location on southern bank.

**Pond 5 – within St Edmunds School and so not visited**
No Image

**Pond 6 – within St Edmunds School and so not visited.**
No Image

**Pond 7 – within St Edmunds School and so not visited.**
No Image

**Pond 8 – within St Edmunds School and so not visited.**
No Image

**Plates 4.42a to c: Pond 4, Keynes**

**Pond 9, Woolf**

- Located in north-eastern corner of woodland.
- Circular shaped with 15m diameter ca. 20-30cm deep.
- Heavily shaded, turbid and large amount of leaf litter.
- No aquatic or riparian vegetation.
- No Great Crested Newts according to 2014 survey.
- Palmate Newts Lissotriton helveticus present according to DICE (Andrew Buxton, personal communication).

Proposed management :

- Selectively coppice / fell trees around southern, eastern and western margins to allow more light to penetrate and reduce leaf litter.
- De-silt to deepen and undertake riparian planting.
- Improve access for students from Woolf College – footpath and sitting area.

Plate 4.43: Pond 9, Woolf

**Pond 10, Jennison**

- Rectangular shaped ca. 30m x 15m, ca. 50cm deep.
- Heavily wooded fringe but large size of pond allows light to penetrate to centre.
- Relatively clean water; waterlily covering 15% of pond, Yellow Iris frequent.
- Fish observed but no GCNs present based on 2014 survey.

Proposed management :

- Control trees and shrubs around margins to maintain direct sunlight.
- Monitor for New Zealand Pygmyweed.
- Create safe access to water's edge.

Plate 4.44: Pond 10, Jennison

**Pond 11, Park Wood**

- Located in north-western corner of woodland.
- Rectangular shaped 20m x 5m and ca. 20cm deep.
- Heavily shaded, turbid and large amount of leaf litter.
- No aquatic or riparian vegetation.
- No information on amphibian presence/absence.

Proposed management :

- Selectively coppice / fell trees around southern, eastern and western margins to allow more light to penetrate and reduce leaf litter.
- Potentially enlarge pond to the east and west, and de-silt to deepen.
- Undertake herbaceous bankside and emergent planting from local source pond that lacks alien invasive plants.
- Improve access for students from Park Wood Courts – footpath and sitting area.

Plate 4.45: Pond 11, Park Wood

## Ponds

**Pond 12, GCN Experimental Ponds**

- GCN Experimental Ponds – long term study being led by Professor Richard Griffith and Andrew Buxton, Durrell Institute of Conservation and Ecology (DICE).
- Located on western edge of Campus.
- Ca. eight small plastic sheet lined ponds, each 2m x 1m in size.
- Surrounded by tussocky grassland and Bramble, wider area a mosaic of hedgerows, scrub, and amenity grassland.
- Great Crested Newt pond experimentation area. Small population of Great Crested Newts identified from 2014 survey, although peak of 68 adults in 2017 now indicates a Medium population (Andrew Buxton, personal communication). Palmate Newts, Alpine Newts, Common Toads Bufo bufo (S. 41) and Grass Snakes Cornella austriaca
- (Sch. V; S. 41) also present.

Proposed management:

- Leave as is under control of DICE.

Plate 4.46: Pond 12, GCN Experimental Ponds

**Pond 13 Blean Pastures Local Wildlife Site**

- Blean Pastures Local Wildlife Site overlaps the western edge of the Northern Lands.
- Circular 8m x 8m with very little standing water as heavily choked by tall herbs; Reed Sweet-grass Glyceria maxima is dominant while Agrimony, Great Willowherb, and Common Fleabane are all frequent.
- No information available on amphibian presence/absence.

Proposed management :

- None as outside UoK boundary.

Plate 4.47: Pond 13 Blean Pastures Local Wildlife Site

**Pond 14, North of Blean Pastures Local Wildlife Site ponds**

- Very attractive pond, 15m west of UoK's western boundary.
- 10m x10m and up to 40cm deep.
- Species include Pondweed Potamogeton natans, Waterlily, Yellow Iris, Hemlock Water-dropwort, Water Mint and Great Willowherb.
- No information available on amphibian presence/absence.
- Proposed management - None as outside UoK boundary

Plate 4.48: Pond 14, North of Blean Pastures Local Wildlife Site

## 4.04.6 Building integrated vegetation

**4.04.6 Green Roofs and Façades**
Examples of vegetated architecture can be seen in a few of locations within the Campus (see Plates 4.49 to 4.56). Most notable of which is the sedum roof covering the Turing College restaurant. A modular green wall has also been installed on UELT Building including, which includes a mix of different herbs, grasses and ferns. Arguably most impressive was the Ivy-clad walls of Rutherford College, covering what otherwise is a fairly stark concrete façade.

**Plate 4.49 , 50 Ivy to Rutherford College Wall**

**Plate 4.51 Sedum roof to Turing College Cafe**

**Plate 4.52 Sedum roof to Turing College Store**

**Plate 4.53 Living wall to Aphra Lumley Building**

**Plate 4.54 Clematis covering basement façade in Keynes College**

**Plate 4.55 Clematis vines on the stairs to the Jarman Building**

**Plate 4.56 Vines on Cornwallis storage building**

## 4.04.7 Ornamental Planting

**4.04.7 Ornamental Planting**
While the landscape of the Campus Heart is predominantly tightly-mown amenity grassland, there is also a reasonable area of ornamental planting. While species have mostly been selected to provide good ground coverage and year-round colour, some non-native species are favoured by pollinating insects. Such species include lavender species, *Verbena bonariensis* and Elephant Ears *Bergenia cordifolia*. A selection of ornamental plants are shown in Plates 4.57 to 4.60.

The Campus Heart also includes many free-standing tree species. Many of these have been relatively recently planted although there are a good number of mature oaks which may be remnants of the former more widespread Ancient woodland that was present prior to the University's development and expansion. A selection of free-standing trees are shown in Plates 4.61 to 4.64.

**Plate 4.57 Existing ornamental planting; Yellow Loosetrife and Elephant Ears are beneficial for pollinators**

**Plate 4.58 Existing ornamental planting; Lavender and Verbena are beneficial for pollinators**

**Plate 4.59 Ornamental grassland providing good ground cover and year-round colour, but of limited ecological interest**

**Plate 4.60 Euonymus fortunei 'Emerald 'n' Gold' - popular, bushy, variegated, evergreen shrub provides excellent groundcover and year-round colour but has limited wildlife value**

**Plate 4.61 Mature. former hedgerow oaks retained between the Turing and Keynes colleges**

**Plate 4.62 Mature Black Poplar along University Road**

**Plate 4.63 Mature Giant Redwood along University Road**

**Plate 4.64 Young birch, Turing College**

## 4.04.8 Allotments and Test Beds

**4.04.8 Allotment Area**
There is a small allotment area on the western edge of the Campus Heart which is run by the Allotment Group/Oasis Garden Society, an enthusiastic group of students and local residents. The allotments complement adjoining landuses which include the GCN Experimental Ponds and an apiary (see Plates 4.65 and 4.66).

**Plate 4.65 Passionate members of the UoK's Allotment Group/Oasis Garden Society.**

**Plate 4.66 Beehives next to the allotment area**

## 4.05 Fauna

**4.05.1 Badger *Meles meles***
The Estates Management Estates Environmental Plan states that Badgers (PBA) are present within the Campus although gives no information on the distribution of setts. Badgers are fully protected and when in their setts the protection includes protection against disturbance. Al- though various mammal runs were observed not definitive evidence of Badger was noted during the Phase 1 Habitat survey.

**4.05.2 Otter *Lutra lutra***
An Environment Agency survey of Kent's waterways in 2010 found no evidence of Otter (Sch. 2; Sch. V; S. 41), although more recently evidence has been found along the Medway in west Kent. Further to this National Grid (2016) has reported Otter on the Nethergong Penn, which is a tributary of the River Great Stour and is in close proximity to Sarre Penn. As Otters continue to expand their range in Kent there is potential for Otters to also start inhabiting the Sarre Penn.

**4.05.3 Water Vole *Arvicola amphibius***
Although the Water Vole (Sch. V; S. 41) is declining in Kent, according to the Kent BAP the county represents a stronghold for the species, with the species still present in the Stour valley. Furthermore, KMBRC pro- vide seven Water Vole records for the Great Stour in and around Canter- bury, just over 1km to south of the UoK. However, the relevance of the Stour records from Canterbury are questionable, as the Sarre Penn joins with the Great Stour, via the River Wantsum, ca. 12km to the north-east *('as the crow flies')* at Plucks Gutter. While the River Wantsum is also an important stronghold for Water Voles (Kentish Stour Countryside Partnership, 2009), no definitive Water Vole records from the upper reaches of the Sarre Penn were found in the research for the present report. Conditions along the UoK section of the Sarre Penn were assessed by the present authors as sub-optimal for Water Voles, primarily due to the heavily wooded riverine environment which inhibits development of meaningful bankside herbaceous vegetation which the species de- pends on for food and cover.

**4.05.4 Dormouse**
According to *The Dormouse Conservation Handbook* Dormice (Sch. 2; Sch. V; S. 41) are more abundant in southern England with the Kent being particularly densely populated relative to most other counties (Bright et al., 2016). Even in the south, however, Dormice are no longer present at 70% of sites where they were known to be 120 years ago (Kent Biodiversity Action Plan Steering Group, 1997).

The nearby Blean Woodland Complex would seem particularly suited to Dormice, and indeed presence of the species is referenced in the SSSI citations for West Blean and Thornden Woods and Ellenden Wood. KMBRC also report Dormice from a number of sites within and around the UoK, including two records from the vicinity of Brotherhood Wood (Table 4.4), while the UoK's Estates Environmental Plan document also highlights the presence of Dormice within the Campus (although the basis for this assertion is not made clear). Other KHBRC records come from countryside to the north-east, east, south, and south-west of UoK, all between 0.08km and 1.8km of the boundary.

The most optimal Dormouse habitat is within Brotherhood Wood and Park Wood and smaller connecting woodlands and hedgerows to the north. Given the mature woodland overhanging Sarre Penn, the stream is unlikely to function as a barrier to Dormouse movement within the Northern Land Holdings.

Bluebell Wood and other copses and hedgerows within the Parklands zone also offer potential habitat for Dormice. While a detailed Dormouse survey undertaken by LUC for the Chaucer Fields Development Environmental Statement found no evidence of Dormouse presence, it should be noted that this survey excluded the majority of Bluebell Wood, as well as Eliot Footpath Wood and St Stephen's Hill Wood.

| Grid reference | Notes | Date of record |
|---|---|---|
| **Within Site in vicinity of Brotherhood Wood** | | |
| TR1460 | Within Site in vicinity of Brotherhood Wood | 11/08/1978 |
| TR16K | Within Site in vicinity of Brotherhood Wood | 26/02/1992 |
| **Woodland/hedgerows in & near to Canterbury** | | |
| TR157593 | 4 records from Broad oak (Canterbury) Nature Reserve, Canterbury; 1km to the south of UoK Eastern Extension | 2005 |
| TR15875929 | Vauxhall Lakes Nature Reserve, Canterbury; 1.2km to the south of UoK Eastern Extension | 22/06/2008 |
| TR157593 | 4 records from Broad oak (Canterbury) Nature Reserve, Canterbury; 1km to the south of UoK Eastern Extension | 2005 |
| TR15875929 | Vauxhall Lakes Nature Reserve, Canterbury; 1.2km to the south of UoK Eastern Extension | 22/06/2008 |
| TR132580 | Near Harbledown; 1km to south-east | 01/08/2002 |
| **South-east of UoK** | | |
| TR15J | 2 records from near A2/A2050 interchange; 1.8km to the south-east of UoK | 07/01/1984 |
| **Tyler Hill Village, north-east of UoK** | | |
| TR137611 | 2 records from near Tyler Hill Village; 80m to north-east of Canterbury to Whistable Dismantled Railway Line | 2005 |
| **North of UoK Eastern Extension** | | |
| TR150613 | Great Hall Wood 0.6km to the north of UoK Eastern Extension | 23/09/2011 |
| TR151609 | Little Hall Wood 0.3km to the north of UoK Eastern Extension | 23/09/2011 |
| TR159603 | Viridor Quarry 0.5km to the south-east of UoK Eastern Extension | 2001 |

**Table 4.4 Dormouse Records Provided by KMBRC from in and around the UK**

**4.05.5 Bats**

All UK bats (Sch. 2, Sch. V) have been recorded in Kent, although Greater Horseshoe, Lesser Horseshoe and Barbastelle are all thought to be locally extinct. The general wooded character of the landscape north of Canterbury provides good habitat for bats, particularly given the proximity to the Blean Woodland Complex.

The UoK landholding itself includes various habitats of value for foraging and commuting bats, including woodland, hedgerows, hay meadows, and water features (principally the wooded Sarre Penn Stream corridor). The Site's many mature trees provide potential roosting locations as do some of the buildings. With respect to the latter, older buildings probably provide the greatest opportunity, e.g. Beverley Farm House and some of the older buildings along Giles Lane. Tyler Hill Tunnel, the entrance to which is just to the north of Woolf College, might also support roosting bats.

Table 4.5 summarises bat records within 5km of the UoK that have been provided by Kent Bat Group / KMBRC. Table 4.6 summarises the 150 bat roost records from within or immediately adjacent to the UoK boundary. These roost records are concentrated in the following six locations:

**4.0** Eliot Path Wood / Archbishop's School.
**5.0** Eliot College.
**6.0** Giles Lane / Turing College.
**7.0** Park Wood / Park Wood College.
**8.0** Rutherford College / Darwin College / St Stephen's Hill.
**9.0** UoK eastern extension near Little Hall Farm

From the records it is not clear whether roosts are from buildings or trees, although with respect to the Eliot Path Wood/ Archbishop's School hibernation roost records, given the number of records (137) and the variety of species recorded, it is strongly suspected that the roosts are located in the Archbishop's Tunnel and/or buildings (or a single building) connected to the Archbishop's School. Note that the Archbishop's School adjoins UoK's south-eastern boundary. A hibernation roost (or roosts) was also identified somewhere in the vicinity of Eliot College.

With respect to the other four locations, roost types are unknown. Having said this, the presence of 40 pipistrelle bats from one roost near Rutherford College would suggest a potential maternity roost, although note though that this particular record is from 1990.

KMBRC has also provided 25 records of bats in flight from within the Campus, most of which were Common Pipistrelle with smaller numbers of Brown Long-eared and myotid bats. Bat emergence surveys of mature trees in the vicinity of the Chaucer Fields, undertaken by LUC (2011) for the Chaucer Fields Development Environmental Statement, recorded no bats, although small numbers of Common Pipistrelle and Soprano Pipistrelle were recorded from associated activity surveys.

| | | | | | |
|---|---|---|---|---|---|
| Serotine Bat | *Eptesicus serotinus* | 15 | 3 | TR1459 | 12/07/2008 |
| Daubenton's Bat | *Myotis daubentonii* | 80 | 18 | TR143595 | 28/01/2015 |
| Whiskered Bat | *Myotis mystacinus* | 6 | 1 | TR143599 | 12/08/1992 |
| Natterer's Bat | *Myotis nattereri* | 12 | 68 | TR143595 | 20/02/2015 |
| Noctule Bat | *Nyctalus noctula* | 54 | 1 | TR143595 | 07/10/2005 |
| Nathusius' Pipistrelle | *Pipistrellus nathusii* | 5 | 0 | TR143576 | 14/07/2004 |
| Common Pipistrelle | *Pipistrellus pipistrellus* | 312 | 50 | TR141597 | 03/02/1999 |
| Soprano Pipistrelle | *Pipistrellus pygmaeus* | 181 | 36 | TR143595 | 08/10/2006 |
| Brown Long-eared bat | *Plecotus auritus* | 40 | 82 | TR143600 | 02/06/2016 |

**Table 4.5 Summary of Bat Records from within 5km of the UoK**

| Location | Species | Comments |
|---|---|---|
| **In vicinity of Eliot Path Wood & adjoining Archbishop's School (TR143595)** | | |
| Hibernacula | Unidentified bat species | 7 separate records 1994-2013; 1-2 bats each |
| Hibernacula | Daubenton's bat | 20 separate records 1985-2016; 1-4 bats each visit |
| Hibernacula | Brown Long-eared Bat | 31 separate records 1987-2013; 1-3 bats each visit |
| Hibernacula | Myotid species | 5 separate records 1991-2013; 1-5 bats each visit |
| Hibernacula | Common Pipistrelle | Single visit 2005; 6 bats |
| Hibernacula | Whiskered / Brandt's / Alcathoe | 4 separate records 1991-2015; 1-2 bats each visit |
| Hibernacula | Natterer's Bat *Myotis nattereri* | 69 separate records; 1-13 bats each visit |
| **Near Eliot College TR141597** | | |
| Hibernacula | Common Pipistrelle | Single record 1998; 2 bats |
| Hibernacula | Pipistrelle species | Single record 1999; 1 bat |
| **Between Giles Lane & Turing College** | | |
| Roost type unknown (TR136595) | Long-eared bat | 2010 record; droppings only |
| Roost type unknown (TR136596) | Long-eared bat | 2010 record; droppings only |
| Roost type unknown (TR135595) | Pipistrelle species | 1989 record; observed from roost inspection |
| Roost type unknown (TR135595) | Bat species | 1989 record; droppings only |
| Roost type unknown (TR136595) | Common Pipistrelle | 2010 record; detector survey |
| **In vicinity of Park Wood & Park Wood College (TR134597)** | | |
| Roost type unknown | Bat species | 1987 record; droppings only |
| **Rutherford College / Darwin College / St Stephen's Hill** | | |
| Roost type unknown (TR142598) | Bat species | 1990 record; 40 bats observed from roost inspection |
| Roost type unknown (TR143599) | Whiskered Bat | 1990 record; 1 bat observed from roost inspection |
| Roost type unknown (TR144601) | Bat species | 1998 record; 1 bat |
| **Eastern extension near Little Hall Farm** | | |
| Roost type unknown (TR146603) | Bat species | 1987 record; droppings only |
| Roost type unknow n (TR147603) | Brown Long-eared Bat | 2005 record; bat observed from roost inspection |
| Roost type unknown (TR147603) | Brown Long-eared Bat | 2006 record; bat observed from roost inspection |

**Table 4.6 Bat Roost Records from within or Immediately Adjacent to the UoK Boundary**

**4.05.6 Other Mammals**

Although KMBRC hold 56 Hedgehog *Erinaceus europaeus* (S.41) records from within 2km of the UoK, there are only eight records from the last 10 years and only two from the last five years. The paucity of recent data probably reflects the nationwide downward trend in the population of this species. Nonetheless, the mix of habitats within the Campus including woodland, hedgerow, meadow, amenity grassland and wetland would seem suited to the species.

In Kent, numbers of Brown Hare (S.41) have declined dramatically and the species is now sparsely distributed in the county. Brown Hares are recorded most commonly from the north Kent and Romney Marshes (Kent Biodiversity Action Plan Steering Group, 1997). KMBRC hold no Brown Hare *Lepus europaeus* records from the Campus and only two from within 2km, the most recent of which was from 2001.

During survey the only mammals observed were Rabbits *Oryctolagus cuniculus* and Grey Squirrels *Sciurus carolinensis*, both of which were numerous.

**4.5.5 Amphibians**

According to the Kent Reptile and Amphibian Group (undated), Kent has a good population of GCNs (Sch. 2; Sch. V; S. 41) with The Blean Woodland Complex being a particular hotspot. As discussed, the UoK has eight ponds. A further four ponds have been identified just to the south-west of the Site in the grounds of St Edmunds School and two ponds within/near to the Blean Pastures Local Wildlife Site. Given the large size of the Site there are likely to be other ponds within 0.5km. Complementing the ponds the Campus has good terrestrial habitat for amphibians, including woodland, hedgerow, and meadow.

GCN records provided by KMBRC from within and adjacent to the Site are summarised in Table 4.7. All records from within the Campus are from the southern half, mostly in the vicinity of Ponds 1 and 2. Adjacent to the Site there are GCN records to the south-west (St Edmunds School), north-west (Tyler Hill Road, Blean), north-east (Tyler Hill village) and to the east (Little Hall Wood near to UoK's Eastern Extension).

In 2013 LUC undertook GCN surveys covering all ponds on the Campus as well as four ponds on adjoining land within the grounds of St. Edmunds School (Ponds 1-11). DICE is also monitoring GCNs from their Experimental GCN Pond (Pond 12). A summary of the results is provided in Table 4.11. Medium sized populations were recorded from Ponds 1 and 12, while Small populations were recorded from Ponds 2, 6, 7 and 11. Note though that two of the ponds (6 and 7) are within the grounds of St. Edmunds School.

According to the Estates Environmental Plan (Estates Department, 2014) there are also GCNs in Woody's Culvert, although it is currently assumed that Woody's Culvert is an alternative name for Pond 11 in Park Wood.

Common Toad (S.41) has also been recorded from Pond 12.

| Species | Location | Date of record | Comments |
|---|---|---|---|
| **UoK records** | | | |
| GCN | TR141594 | 14/05/2015 | Near to Pond 1 |
| GCN | TR141594 | 28/04/2015 | Near to Pond 1 |
| GCN | TR1406359383 | 02/03/2013 - 13/03/2014 | 3 records between Ponds 1 or 2 |
| GCN | TR1378059387 | 2004 | Between Fonds 3 or 4 |
| GCN | TR140593 | 25/05/2002 | 2 records near to Pond 1 |
| Common Toad | TR136601 | 02/04/1996 | Brotherhood Wood |
| Common Toad | TR137610 | 25/02/1998 | Northern end of Canterbury & Whitstable Dismantled Rail Line, Tyler Hill village |
| Common Toad | TR1406359383 | 1994 | Near to Pond 1 |
| Common Toad | TR151605 | 02/10/1996 | UoK Eastern Extension |
| | | | |
| **Adjacent to Site** | | | |
| GCN | TR132595 | 2015 | Near to Pond 8, St Edmunds School |
| GCN | TR150607 | 06/11/1996 - 06/07/2000 | 9 records Little Hall Wood near to UoK Eastern Extension |
| GCN | TR13936096 | 1988-1998 | 4 records near village of Tyler Hill |
| GCN | TR124607 | 10-03-1997 | Near Tyler Hill Road, Blean |
| GCN | TR136591 | 1995 | Near to Ponds 5 & 6, St Edmunds School |

**Table 4.7 Amphibian Records from Within or Immediately adjacent to the UoK Boundary**

| Pond | GCN population[a] from 2014 survey | Other amphibians | Factors inhibiting GCN occupation |
|---|---|---|---|
| **Ponds within UoK boundary** | | | |
| Pond 1, Lower Eliot (Bluebell Wood) | Medium; 25 | Smooth Newt, Palmate Newt *Lissotriton helveticus* | Shading; fish |
| Pond 2, Upper Eliot (Bluebell Wood) | Small; 2 | Smooth Newt, Palmate Newt, Alpine Newt | Shading; fish; Giant Hogweed |
| Pond 3, Beverley Farm | Not present | Later survey undertaken for Turing College development identified newts but species not known | Shading; siltation; small & shallow |
| Pond 4, Keynes | Not present | Not present | Pollution; shading; siltation |
| Pond 5, St Edmund's School (outside of UoK) | Not present | Smooth Newt, Palmate Newt, Alpine Newt | Small; densely vegetated |
| Pond 6, St Edmund's School (outside of UoK) | Small; 4 | Smooth Newt, Palmate Newt, Alpine Newt | Small |
| Pond 7, St Edmund's School (outside of UoK) | Small; 7 | Smooth Newt, Palmate Newt, Alpine Newt | Excessive Reedmace; shallow |
| Pond 8, St Edmund's School (outside of UoK) | Not present | Palmate Newt | Limited aquatic vegetation |
| Pond 9, Woolf | Not present | Palmate Newt, Alpine Newt | Shading; siltation; limited aquatic vegetation |
| Pond 10, Jennison | Not present | Smooth Newt, Alpine Newt | Shading; fish; New Zealand Pygmyweed |
| Pond 11, Park Wood | Small; 1 | Smooth Newt, Palmate Newt, Alpine Newt | Shading; siltation; limited aquatic vegetation |
| Pond 12, GCN Experimental Pond | Medium; 68 (2017 count by DICE, Andrew Buxton, pers. comm.). | Palmate Newt, Alpine Newt, Common Toad | Alpine Newt (non-native Schedule 9; potentially carrying chytrid fungus *Batrachochytrium dendrobatidis*) |
| **Ponds outside UoK boundary** | | | |
| Pond 13, Blean Pastures | Not known | Not known | Siltation; 100% riparian vegetative cover |
| Pond 14, North of Blean Pastures | Not known | Not known | - |

**Small - maximum counts up to 10; Medium - maximum counts between 11 and 100; Large - maximum counts over 100**

**Table 4.8 GCN Records from Ponds Within and Directly adjacent to the UoK**

**4.05.8 Reptiles**

According to DICE, Grass Snakes (Sch. V; S.41) are present on the western side of the Campus near to the GCN Experimentation Pond (Pond 12), although no other reptile species have been recorded in this area (Andrew Buxton, pers. comm). The Estates Environmental Plan also states that reptiles are present within the Campus although gives no information on species or their distribution. KMBRC, however, hold two old Slow-worm records from between Giles Lane and Sports Centre and one from the Archbishop's School (south-east of Parklands). There are also multiple Grass Snake, Common Lizard (Sch. V; S.41) and Slow-worm (Sch. V; S. 41) records from Tyler Hill Pastures and Little Hall Woods, just to the north-east and east of the UoK respectively. Adders are also present within 2km of the Site. During survey a Grass Snake was observed along a hedgerow north of Tyler Hill Road.

**4.05.9 Birds**

All birds are protected under the Wildlife and Countryside Act 1981 against killing or injury along with their active nests. Table 4.12 lists birds of conservation concern (see RSPB, 2015) recorded within the Site boundary, all of which were recorded in the Parklands zone of the Campus. These species included Redstart, Spotted Flycatcher, Marsh Tit, Common Crossbill and Hawfinch. These are all typically woodland species, which potentially might utilise Blue- bell Wood and other smaller woodlands in the local area. No information is held, however, on the breeding status of any of these species within the Site.

Kingfishers (Sch. I) were regularly recorded along the Sarre Penn downstream of the Site (between Tyler Hill and Broad Oak) during a recent survey by Jacobs (2015) and so may also be present along the UoK section. Note though that, unlike conditions downstream, no substantial vertical banksides, which King-fishers favour for nesting, were identified along the Campus section of the Sarre Penn.

During the present survey Blackcaps, Chiffchaffs, Whitethroat, Song Thrush (S. 41; Red List) and common tit species were widespread in hedgerows and woodlands. Great Spotted Woodpecker *Dendrocopos major*, Green Wood- pecker *Picus viridis* and Mistle Thrush *Turdus viscivorus* (Red List), all relatively charismatic species, were regularly recorded in and around the Campus Heart, making use of surrounding woodland and free-standing mature trees.

In terms of farmland birds, four singing Skylarks *Alauda arvensis* (S. 41; Red List) and two Yellowhammers *Emberiza citrinella* (S. 41; Red List) were recorded, while Kestrel *Falco tinnunculus* (Amber List) was also observed on one occasion.

| Common English Name | Scientific Name | Protection / conservation status | No. records | Nearest record to UoK | Date of nearest record |
|---|---|---|---|---|---|
| Redstart | *Phoenicurus phoenicurus* | Amber List | 7 | UoK Parklands; TR1459 | 24-09-93 |
| Spotted Flycatcher | *Muscicapa striata* | Red List; S. 41 | 20 | UoK Parklands; TR1459 | 21-09-92 |
| Marsh Tit | *Parus palustris* | Red List; S. 41 | 6 | UoK Parklands; TR1459 | 24-11-93 |
| Common Crossbill | *Loxia curvirostra* | Sch. I | 6 | UoK Parklands; TR1459 | 01-04-2012 |
| Hawfinch | *Coccothraustes coccothraustes* | Red List; S. 41 | 31 | UoK Parklands; TR1459 | 12-09-1997 |
| Yellowhammer | *Emberiza citrinella* | Red List; S. 41 | 32 | UoK Parklands; TR1459 | 28-03-1991 |

**Table 4.9 Birds of Conservation Concern Recorded Within the UoK**

| | | Protection / conservation status |
|---|---|---|
| Hobby | *Falco subbuteo* | S. 41 |
| Nightjar | *Caprimulgus europaeus* | S. 41; Amber List |
| Common Crossbill | *Loxia curvirostra* | Sch. I |
| Nightingale | *Luscinia megarhynchos* | Red List |
| Lesser Spotted Woodpecker | *Dendrocopus minor* | Red List; S. 41 |
| Woodcock | *Scolopax rusticola* | Red List |
| Marsh Tit | *Parus palustris* | Red List; S. 41 |
| Tree Pipit | *Anthus trivialis* | Red List; S. 41 |
| Cuckoo | *Cuculus canorus* | Red List; S. 41 |
| Turtle Dove | *Streptopelia turtur* | Red List; S. 41 |

**Table 4.10 Birds of Conservation Concern Recorded within The Blean According to Kent Wildlife Trust & Canterbury City Council**

(These species could potentially occur on campus now or return with appropriate habitat management and enhancement.)

**4.05.10 Fish**

A study by Jacobs (2015) references EA fish monitoring data from the upper reaches of the Sarre Penn and concluded that the stream provides *'valuable habitat for salmonid populations in the area'.* Presence of Brown Trout *Salmo trutta* (S. 41) smolts indicate that some are undergoing metamorphosis to Sea Trout that will then migrate to sea for a year or more before returning to spawn in freshwater; providing that is that downstream barriers inhibiting passage can be circumnavigated. EA monitoring has also shown Eels *Anguilla anguilla* and Bullhead *Cottus gobio* to be present along the upper reaches of the Sarre Penn. All these species are good indicators of watercourse health. Atlantic Salmon *Salmo salar* (S. 41) have been recorded migrating within the wider Stour catchment, although there are no records from the Sarre Penn to the author's knowledge. The Sarre Penn also has a healthy range of coarse fish species including Roach *Rutilus rutilus*, Rudd *Scardinius erythrophthalmus* and Bream *Abramis brama*.

The coarse gravel substrate found along the UoK section of the Sarre Penn may be important spawning habitat Brown Trout and Bullhead. Shallow, stony riffles are also utilised by juvenile Bullhead, whereas sheltered sections created by woody debris, tree roots, leaf litter are preferred by adult fish, at least during daylight. Adult Brown Trout might also utilise the larger shaded pools as cool refuges and also during low flow conditions.

During the present survey a shoal of fish was observed near the Crab and Winkle Dismantled Railway crossing, although the species was not confirmed.

**4.05.11 Invertebrates**

Overview

The UoK includes various habitats important for supporting healthy invertebrate populations including woodlands, hedgerows, free-standing trees (with- in hedgerows, the Campus Heart and Parklands), meadows, the Sarre Penn Stream and ponds. The nearby Blean Woodland Complex includes many invertebrate rarities, some of which might also utilise the Site's various woodlands. Here we briefly discuss the Southern Wood Ant, the aquatic invertebrates of Sarre Penn Stream, and the potential presence of Heath Fritillary Butterfly.

**Southern Wood Ant**

The Blean Woodland Complex woods are famed for colonies of the iconic Southern Wood Ant Formica rufa (also known as Red Ant) which constructs towering and impressively engineered nest mounds from the woody materials of the forest floor. These nests were also found during the present survey in Brotherhood Wood and Park Wood. Common Cow-wheat (present in Brother-hood Wood) is not only the larval food plant of the rare Heath Fritillary Butterfly, but also has a special relationship with wood ants. The flowers produce a sugary liquid from tiny glands below the petals that the ants are attracted to and feed on. The seeds of the plant are very similar in appearance to the cocoons of the ant and are transported back to the nest where they can then germinate, helping the species disperse.

**Aquatic invertebrates**

Within Kent, the White-clawed Crayfish *Austropotamobius pallipes* (S. 41) has been recorded from the River Stour and indeed KMBRC report five records from the Canterbury section. The most recent of these records, however, is from 1987 and it is now believed populations are largely limited to the river's head-waters (Kent Biodiversity Action Plan Steering Group, 1997). As White-clawed Crayfish prefer watercourses with relatively hard mineral-rich waters, they are unlikely to be present along the Sarre Penn, the upper reaches of which flow over London Clay that give rise acidic conditions. Consultation with the Environment Agency should be undertaken however in the next phase of the project to verify this assertion.

Jacobs (2015) reference EA data for upper sections of the Sarre Penn that classify the Sarre stream as being of 'High' value for invertebrates (according to Water Framework Directive classification tables), reflecting the relatively good water and habitat quality. The diverse range of invertebrate fauna includes a large number of specimens from the family *Glossosomatidae*, or cased caddis. The *Glossosomatidae* family contains two genera, *Glossosoma* and *Agapetus* which are generally encountered in clean fast-flowing rivers and are absent from still and polluted waters. The most notable invertebrate sampling station was at Tyler Hill which is just downstream of the UoK landholding. Down- stream of Tyler Hill aquatic invertebrate assessments indicate declining habitat quality, which is likely due to channel straightening / deepening and agro- chemical runoff.

**Heath Fritillary**

The Heath Fritillary is one of Britain's most threatened butterfly species. The Blean Woodland Complex is a major stronghold for the species and contains approximately 60% of all UK colonies (Butterfly Conservation, undated). In the Blean Woodlands the Heath Fritillary uses sunny clearings such as coppice coupes or recently clear-felled woodland where its larval food plant, Common Cow-wheat, is abundant.

While there are no recent records of Heath Fritillary from the woodlands within the Campus, there is potential given the mix of Ancient woodland, presence of Common Cow-wheat (in Brotherhood Wood at least) and the recent re-introduction of coppice management (again in Brotherhood Wood).

## 4.06 Invasive Species

**4.06 Invasive species**
Alien invasive Schedule 9 listed species recorded during the Phase 1 Habitat survey include:

**10.0** Japanese Knotweed - Eliot Footpath Woodland (Area 111); this appears to have been recently treated with herbicide and no fresh growth was evident (see Plate 4.67).

**11.0** Rhododendron - Giles Lane Wood (Areas 12 & 13); Park Wood (Area 14); and St Stephen's Hill Woodland (Area 113).

**12.0** Giant Hogweed - Upper Eliot (Bluebell Wood) Pond (Pond 5) (see Plate 4.68).

The recent amphibian surveys have also revealed the presence of Schedule 9 listed Alpine Newt in Ponds 9, 10, 11 and 12. According to Andrew Buxton of DICE (pers. comm.) the local Alpine Newt population is known to carry the chytrid *Batrachochytrium dendrobatidis* fungus which can be transmitted to native UK amphibians. According to the UoK Biodiversity Management Plan, the chytrid fungus has been identified from two ponds. Schedule 9 listed New Zealand Pygmyweed *Crassula helmsii* has also been identified from Pond 10 according to the UoK Biodiversity Management Plan.

# 5.0 Assessing the importance of ecological features

# 5.0 Assessing the Importance of Ecological Features

**5.01 Ecological Importance**
A preliminary assessment of the ecological importance of individual habitat types and notable species/taxa is presented in Table 5.1.

The Campus' Heart, farmland and parkland includes a variety of habitat types and plant communities, most notable of which are the Ancient woodlands, the Sarre Penn Stream and the meadows of the Parklands. Blean Pastures County Wildlife Site overlaps with the western edge of the Campus, incorporating West Triangle Wood and sections of the Sarre Penn Stream and the Crab and Winkle Link cycleway.

These habitats in turn support a potentially rich faunal assemblage. The Campus includes populations of breeding Great Crested Newts and reptiles, and Dormice are also believed to be present. There are historic records of bats roosting within the Campus, although precise locations and roost types are unknown. A recent survey of the Sarre Penn just downstream of the Campus by the EA reveals that spawning Brown/Sea Trout are present, as well as Eel and Bulhead. Presence of these fish species, combined with a notable aquatic invertebrate community, is indicative of a healthy riverine environment. The Campus is also likely to support notable breeding bird and woodland invertebrate populations, although no detailed surveys for these taxa have been undertaken.

In assessing the ecological importance of features on the Campus it is equally important highlight its context. The UoK is broadly encompassed by the Blean Woodland Complex to the east, west and north; it is probably the largest area of contiguous/semi-contiguous Ancient woodland in England. Most of the woodlands are designated under various tiers of protection including SAC, NNR, SSSI and LWS, and support multiple protected species. Given that it sits within the **Blean Living Landscape** and also because of its considerable size and habitat mosaic, **the Campus should be seen as being integral to the wider landscape-scale habitat protection and restoration proposals.**

On the basis of the above summary and the further detail provided in Table 5.1, the Campus is considered to be of at least 'County' importance for nature conservation, and potentially of 'Regional' importance.

| Resource | Summary description | Importance for Biodiversity |
|---|---|---|
| Context- Blean Woodland Complex | The UoK is broadly encompassed by the Blean Woodland Complex - probably the largest area of contiguous/semi-contiguous Ancient woodland in England - to the east, west and north. Most of the woodlands are designated under various tiers of protection including SAC, NNR, SSSI and LWS). Includes multiple protected species. In terms of landscape-scale habitat restoration, the Campus is seen as integral, being within the Blean Living Landscape Area. | International |
| The Site in its entirety | See summary above | At least County and perhaps Regional |
| Tyler Hill Meadows Local Nature Reserve | • Adjacent to the north-eastern corner of Campus.<br>• One of the few remaining unimproved neutral grasslands in Kent. | County |
| Blean Pastures Local Wildlife Site | • Partly overlaps Campus.<br>• Mosaic of habitats including woodland, tall herb/riparian vegetation, a section of the Sarre Penn Stream, and the Crab and Winkle Link cycleway (see below).<br>• Local sites are typically categorised as being of 'County' value which, despite lack of recent management, would also seem appropriate in this case. | County |
| Little Hall and Kemberland Woods and Pasture Local Wildlife Site | • Adjacent to the UoK Eastern Extension<br>• Broad-leaved woodlands, a series of unimproved and species-rich semi-improved neutral pastures and a section of the Sarre Penn Stream. | County |
| Sarre Penn Stream | The Sarre Penn Stream and associated bankside habitat is one of the most noteworthy feature of the Site. The stream shows many features of an un-modified (natural) watercourse. Although only a small part of the stream is within the Site, this section is integral to the ecological functioning of the upper catchment, and potentially support Bullhead, Eel and spawning Brown/Sea Trout. The stream is also ecologically important because it has fluvial and thus ecological connectivity to the Stour. The stream is also fringed by woodland, some of which is Ancient, and is partly designated under Blean Pastures Local Wildlife Site. Upstream of the Site is the Blean Woodland Complex. | County |
| Woodlands | UoK includes six areas of Ancient woodland covering ca. 16ha, plus areas of secondary woodland. West Triangle Wood, as well as a section of the adjoining Long Thin Wood, are components of Blean Pastures Local Wildlife Site. Their restoration and enlargement are seen as important elements in the Blean Living Landscape project. GCNs present and Dormice potentially widespread. Ecological importance of the woodlands potentially Regional but provisionally classified as County because: value for birds and invertebrates currently unquantified; neglected state of coppice management; fragmentation due to piecemeal development of UoK; and because of relative abundance of Ancient woodland locally and in the wider region. | At least County |
| Meadows (Southern Slopes) | Although not botanically rich, as a single coherent feature (and because of linkages with adjoining woodlands) they are of some ecological interest. They also have considerable landscape interest, being important both to the setting of the University, and to the context of the nearby World Heritage Site. GCNs present. Potential to be enhanced through introduction of grazing. | Local –(District) |

| Resource | Summary description | Importance for Biodiversity |
|---|---|---|
| Recently sown wildflower meadow (Turing College and Innovation Centre) | Much more herb-rich than those on the Southern Slopes, these appear to have been recently sown with a wildflower mix, which currently limits their ecological value compared with longer-standing grassland communities. | Local (Parish) |
| Campus Heart (excluding woodlands) | The majority of this area is intensively managed as amenity grassland, including large sports pitches, of low ecological value. However, when combined with the many scattered trees (including many mature oaks, potential remnants of former Ancient woodland) and ornamental planting, the landscape is certainly not without ecological interest. Given the abundance of mature Oaks and other trees a case could potentially be made for raising the value to Local - District. | Local (Parish) |
| Hedgerows | The Campus (primarily the Northern Land Holdings) includes a number of hedgerows, some of which may be categorised as Important in accordance with the Hedgerow Regulations. The hedgerow network may also be important in supporting protected species such as Dormice, GCNs and reptiles, and is also a foraging / commuting resource for bats. The hedgerow network is also important in achieving the Blean Living Landscape objective to reconnect woodlands and other semi-natural habitats. If the gap-ridden hedgerows could be restored the importance could potentially be at the Local-District level. | Local (Parish) |
| Ponds | The Campus's ponds are in a neglected state, being (to varying degrees) silted, polluted, overgrown by trees/shrubs, and in some cases inhabited by non-native invasive species. All these pressures inhibits their ecological potential and amenity interest. Nevertheless, the ponds do support a diverse amphibian population including GCNs. Potentially of Local (District) value if ecologically restored. | Local (Parish) |
| Arable and improved pasture (majority of the Northern Land Holdings) | These pasture was of limited botanical interest, although in terms of fauna they had some value e.g. for foraging Badgers and bats (attracted to insects associated with cattle dung). | Within the Immediate Zone of Influence of Site only |
| Dormouse | The Dormouse is a European Protected Species. Their abundance and distribution across the Site is unknown. It is provisionally assumed, given the number of woodlands and proximity to the Blean Woodland Complex that they are widespread although the valuation could be downgraded if subsequent survey work reveals them to be far less prevalent. | Possibly Local (District) |
| Bats | All bats are European Protected Species. The general wooded character of the landscape north of Canterbury appears generally good for bats, particularly given the proximity to the Blean Woodland Complex. The UoK landholding itself includes various habitats of value for foraging and commuting bats, including woodland, hedgerows, hay meadows, and water features (principally the wooded Sarre Penn Stream corridor). The Site's many mature trees provide potential roosting locations as do some of the buildings, and indeed there are 150 bat roost records from within or immediately adjacent to the UoK boundary (although most of these are believed to be from the Archbishop's Tunnel and/or School adjacent to the Campus). The status and precise location of roost records from within the Site are not known. | Local (District) |

| Resource | Summary description | Importance for Biodiversity |
|---|---|---|
| GCNs (and other amphibians) | GCN is a European Protected Species. While widespread throughout much of England and Wales, it is nonetheless scarce on a European scale. Ponds 1 and 12 support 'Medium' GCN populations while Ponds 2 and 11 support' Small' populations. GCNs also present in ponds within the neighbouring St Edmunds School site. The S. 41-listed Common Toad also present. Through creating new ponds and restoring existing ponds there is considerable potential for significantly enhancing the status of the Campus's amphibian population. | Local (District) |
| Reptiles | Mosaic of woodland edge, meadow, hedgerow and pond habitat provides reasonably good habitat for reptiles. Grass Snakes recorded on the western and northern sides of the Campus. Slow-worm and Common Lizard also potentially present. | Local (District) |
| Breeding birds | The Site's rich habitat mosaic provides potentially good breeding bird habitat, although no detailed surveys have been undertaken to our knowledge. Notable farmland species were recorded including Skylark, Yellowhammer and Kestrel, and Kingfisher has been recorded locally along the Sarre Penn. The woodlands in particular are likely to support good breeding bird numbers but whether they support rarities is unknown. The Campus certainly has good potential to attract a rich assemblage of species with good habitat management, given proximity to the Blean Woodland Complex. | Local (District) |
| Invertebrates | The Site's rich habitat mosaic provides potentially good invertebrate habitat, although no detailed surveys have been undertaken to our knowledge. Survey of aquatic invertebrates along a neighbouring (downstream) section of the Sarre Penn scored the stream as 'Good'. The Ancient woodlands in particular are likely to support a good assemblage of invertebrates. | Unkown at present but probably at least Local (Parish) |
| Fish | Bullhead, Eel and spawning Brown/Sea Trout have been recorded just downstream of the Campus. Sarre Penn is also believed to support of good coarse fish population. | Local (District) |

**High-level Overview of Ecosystem Service Provision**
The key ecosystem services being provided by the various habitats within the Site are summarised as follows:

**Food production**
The Northern Land Holdings are primarily under agricultural production which provide food. The University also has a small allotment area (see also below). Woodlands, meadows (see Plate 5.1), hedgerows and even some areas of ornamental planting provide extensive and high-quality foraging opportunities for pollinators which in turn help pollinate various crop species.

**Flood water attenuation and water quality**
The Campus's various woodlands are particularly effective in attenuating runoff entering the Sarre Penn Stream and ultimately the River Stour, both of which are susceptible to flooding. Meadow habitat on the Parklands will also contribute but to a lesser extent, and both habitats also reduce diffuse pollution entering watercourses. The greatest benefits come from the riparian and floodplain woodland which abuts both banks of the Sarre Penn Stream the length of its Campus section. Submerged roots and boughs combined with deadwood all serve to slow the flow of stream further reducing flood risk downstream. By stabilising banksides, riverine woodland also reduces sedimentation which in turn protects trout spawning areas and fish stocks (Plate 5.2).

**Ameliorating climatic extremes**
In addition to sequestering carbon from the atmosphere woodland and free-standing trees also provide substantial local cooling (see Plate 5.3). Heat gain in direct sun would be more significant were the Campus Heart to consist of a greater area of hardstanding.

**Recreation and Health and wellbeing**
A range of bodies, including Government agencies, have promoted the physical and psychological health benefits of access to greenspace. The Campus includes an abundance of greenspace, although quality and access could be improved in various areas. A network of footpaths extends across the Parklands zone, while the land to the north includes a number of Public Rights of Way, and most notably, the very popular Crab and Winkle Link. The Crab and Winkle Link is a 7-mile cycle path linking Canterbury with the harbour in Whit- stable (Plates 5.4 and 5.5). Given the activities of DICE, the Allotment Group/Oasis Garden Society, School of Anthropology and Conservation and The University of Kent Conservation Society, the Campus's wildlife would specifically seem to be providing much enjoyment to some students and staff. As the Concept Master Plan highlights, however, greenspaces within and around the Campus Heart are fairly homogenous and are not reaching their full potential in terms of biodiversity value and associated and landscape and recreational value. The key ecosystem service benefits of the allotment are amenity value and associated improvements in health and wellbeing benefits as food output is negligible (Plate 5.6).

**Plate 5.1: Newly created meadow opposite Turing College benefitting pollinators**

**Plate 5.2: Sarre Penn wooded corridor; woodland attenuates run off, improves water quality and stabilises banksides**

**Plate 5.4: Crab and Winkle Link signage**

**Plate 5.5: The Campus Heart includes many Mature Oaks which provide shade and an evaporative cooling effect**

**Plate 5.3:** **Cycling on the Crab and Winkle Link – a very popular cycle way**

**Plate 5.6:** **University Community Garden managed by the Allotment Group / Oasis Garden Society**

# 6.0 Gap Analysis

# 6.0 Gap Analysis

**6.01 Protective Species Surveys**
Whether further ecological survey work is required depends in large part on the nature and arrangement of specific development proposals and the habitats that would be potentially affected. Having said this, further survey work should also be carried out to better understand the ecology of the Campus, thereby informing green infrastructure restoration, enhancement and management proposals.

Detailed surveys of the following protected species is likely to be required at some time during future development:

**Bats**
If potential roost sites are destroyed, e.g. buildings are mature trees. Bat activity surveys may also be required if there are major proposals to change the landscape which might impact on foraging and commuting corridors.

**Dormice**
Survey would particularly be required if woodland and hedgerow habitat is potentially being lost or fragmented. Even if woodland areas are not being directly affected we recommend consideration is given to carrying out a site-wide Dormouse survey to assess indirect impacts (such as recreational attrition) and inform management proposals.

**Badgers**
No signs of Badger were noted during the present surveys, although precautionary checks for their presence should be made in relation to all new development.

**Great Crested Newts**
If ponds are affected or if there is potential significant loss of associated terrestrial habitat. Note that although a detailed survey was undertaken in 2014, data are likely to be considered out of date for Natural England licensing purposes.

**Reptiles**
If significant areas of suitable habitat are affected, e.g. meadow, hedgerow, scrub, and woodland edge.

**Breeding birds**
A breeding bird survey is proposed given the large area of Ancient woodland within the Campus and in the wider landscape, and because the noteworthy species associated with this habitat type. Note also that UoK also includes scarce farmland bird species. Even where there is no direct threat to the Ancient woodland we suggest survey to inform management and potential indirect disturbance impacts.

**Fish**
Survey is proposed to assess which fish species are present in the Sarre Penn, and in particular whether Brown/Sea Trout are spawning along the Campus section.

**Invertebrates**
Invertebrate survey of the Campus's woodlands and Sarre Penn is proposed for similar reasons.

Surveys for all these species are seasonally constrained and would need to be scheduled the moment reasonably specific development proposals have been formulated to avoid delay to the programme.

For some species such as Hedgehog, their presence in all suitable habitat should be assumed when developing mitigation or enhancement proposals.

**6.02 Habitats Regulations Assessment**
The emerging Planning and Environmental Strategy notes that the northern part of the University estate is within the Thanet Coast and Sandwich Bay 7.2km Zone of Influence and Thames Medway & Swale Estuaries 6km Zone of Influence (Special Policy Areas – European Sites).

The Canterbury District Local Plan (CDLP) was subject to a Habitats Regulations Assessment (HRA), which resulted in a number of modifications to policies during the plan preparation period. This concludes that the adopted policies along with the avoidance, monitoring and mitigation measures to be put in place will ensure that the development proposals outlined in the CDLP will not have a likely significant effect on a European site or Ramsar site.

It should be noted that any proposals for areas outside of the University Campus would not have been subject to Sustainability Assessment (SA) or Habitats Regulations Assessment (HRA). Subject to appropriate mitigation being embedded into proposals and any necessary additional off-site/financial mitigation being identified, the Framework Masterplan proposals are unlikely to have significant environmental effects such as to require Sustainability and Environmental Appraisal (SEA) or have significant effects on European habitats or species in the surrounding area such as to require an Appropriate Assessment (AA). Such mitigation is likely to include implementing strategies that ensure that there are no significant adverse effects on air quality or recreational use of the Blean Complex (Policy SP11) and making financial contributions pursuant to Policy SP6 (Strategic Access Management and Monitoring Mitigation Measures for the coastal Special Protection Areas and Ramsar sites).

The emerging Planning Strategy also refers to the Strategic Access Management and Monitoring Plan (2014). Following significant decline for important bird species in Kent, Canterbury City Council (CCC) has worked with Natural England to develop Strategic Access Management and Monitoring Strategies (SAMMS) for protected sites. This assesses likely visitor numbers and costs to mitigate the adverse effects of visitors on the Special Protection Area's (SPA's) in the District (including the Swale SPA). According to CCC's Constraints Map, the northern part of the Campus and University-owned to the north of Tyler Hill Road is within the Thanet Coast and Sandwich Bay 7.2km Zone of Influence.

Guidance on CCC's website sets out the required financial contributions for new housing in this Zone.

**6.03 Consultation**
The views and advice of the various UoK organisations will be integrated as the Framework Masterplan is developed including:

- Estates Management
- The Environmental Sustainability Team
- DICE and School of Anthropology and Conservation
- Farm Management
- Allotment Group / Oasis Garden Society – allotment area (western edge of Site near Estates Management yard).
- The University of Kent Conservation Society

Please note that Natural England, Environment Agency and the Kent Wildlife Trust have already been consulted on the Framework Masterplan to date. The draft Consultation Statement (which has been circulated) includes comments received from the Environment Agency and Kent Wildlife Trust.

Liaison with all of the relevant nature conservation organisations will continue throughout the Framework Masterplan process.

| | January | February | March | April | May | June | July | August | Sept | October | November | December |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHASE 1 HABITAT SURVEY | | | | | | | | | | | | |
| BATS - Summer roost & activity survey | | | | | | | | | | | | |
| BATS - Tree survey for bats | | | | | | | | | | | | |
| BATS - Hibernation roost survey | | | | | | | | | | | | |
| BIRDS - Winter birds surveys | | | | | | | | | | | | |
| BIRDS - Breeding birds surveys | | | | | | | | | | | | |
| BIRDS - Migratory birds surveys | | | | | | | | | | | | |
| REPTILES | | | | | | | | | | | | |
| BADGER | | | | | | | | | | | | |
| BREEDING SURVEY (Nest Tubes) - Dormice | | | | | | | | | | | | |
| INVERTEBRATES | | | | | | | | | | | | |
| BREEDING POND SURVEYS - Great Crested Newts | | | | | | | | | | | | |
| WATER VOLE | | | | | | | | | | | | |
| OTTER | | | | | | | | | | | | |
| WHITE CLAWED CRAYFISH | | | | | | | | | | | | |

**Table 6.1 - Possible and Optimal Survey Seasons**

graphic: bsg-ecology

**"Science can only ascertain what is, but not what should be, and outside of its domain, value judgements of all kinds remain necessary."**

**Albert Einstein**

# 7.0 Summary

STEP INTO NATURE

## 7.0 Summary

The University of Kent is located just to the north of the City of Canterbury at the western end of the Stour Valley Slopes. The Campus and adjoining University-owned land sits in a strategically important location from an ecological perspective, being encompassed by extensive areas of Ancient woodland to the east, west and north. In combination, these woods form the Blean Woodland Complex, which is probably the largest area of contiguous / semi-contiguous Ancient Woodland in England.

The Campus itself also includes a number of Ancient woodlands, which together with other semi-natural habitat, should be viewed as integral to the wider woodland complex. Woodland cover on the University estate had been more extensive in the recent past as maps from 1816 attest, and certainly the on-site ancient woodland has been greatly fragmented since 1963. The Campus also includes many free-standing mature trees, hedgerows, meadows, ponds and the Sarre Penn stream. A section of the Sarre Penn Stream and adjoining woodland forms part of Blean Pastures County Wildlife Site. The Campus' faunal assemblage includes Badgers, Dormice, bats, amphibians (including GCNs), reptiles, various fish species (including Brown/Sea Trout, Bullhead and Eel) and invertebrates.

In spite of these various ecological assets the environment is suffering from various pressures, which includes recent development. For example, coppice management of the woodlands has been neglected; many of the ponds are heavily silted, polluted, overgrown by tree/shrubs and colonised by alien invasive species; and many hedgerows in the north of the estate have developed substantial gaps, fragmenting the farmland landscape corridors.

In addition, other components of the Site are not realising their full ecological potential. Large areas of the Campus Heart (including drainage features) for example are managed as low-cut amenity grassland, while the annual biannual mowing regime being undertaken on the Parklands will probably take many years to achieve a botanically rich sward, not least because arisings are often left in place.

The UK as a whole has a low woodland cover compared to most countries in Europe (it ranks number 36 out of 48 states); Kent is one of the most wooded counties in the UK, with the Blean being perhaps the largest Ancient woodland in the UK, which suggests that this special sylvan asset should be prominent in the Framework Masterplan thinking.

# 8.0 References

Jackdaw - the smallest crow - a sociable creature that can be acrobatic in flight seen near the Estates OfficeLE 6/17

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# 9.0 Appendices

## Appendix A: Target Notes Descriptions (see Figure 4.1 for locations)

- TN1 - Church to St Cosmas and St Damian; and attractive feature along the Crab and Winkle Link cycle path.
- TN2 - Four singing Skylarks and two Yellowhammers recorded in surrounding fields and hedgerows respectively
- TN3 - Tyler Hill Tunnel entrance, Canterbury and Whitstable dismantled railway line
- TN4 - Un-surveyed pond in woodland outside Campus boundary
- TN5 - Location of recently coppiced woodland
- TN6 - Flower-rich closely mown amenity grassland
- TN 7 - Modular green wall has also been installed on UELT Building
- TN8 - Greater abundance of fine grasses and flowers in meadow between Eliot Path and Bluebell Wood
- TN9 - Archbishop's Tunnel entrance, Canterbury and Whitstable dismantled railway line; potential bat roost location for multiple species
- TN10 - Un-surveyed pond in residential garden outside Campus boundary
- TN11 - Community garden / allotment
- TN12 - Apiary
- TN13 - Clematis intertwined into mesh façade of Jarman Building fire escape
- TN14 - Ivy-clad walls, Rutherford College
- TN15 - Rabbit-cropped flower-rich glade within the Eliot Footpath Woodland
- TN16 - Recently sprayed Japanese Knotweed in the Eliot Footpath Woodland
- TN 17 - Sedum roof on Turing College Restaurant
- TN18 - Beverly Farm House
- TN19 - SuDS lagoons; one lagoon has a closely mown amenity sward while the other is planted with riparian herbs and grasses
- TN20 - A double privet hedge encloses historic track extending through the Chaucer Fields
- TN21 - Mature Black Poplar

Figure 4.1 Locating Target Notes

## Appendix B: Plant Species List - Woodlands

| Common English Name | Scientific Name | 5 | 6 | 7 | 10 | 12 | 13 | 14 | 15 | 17 | 20 | 31 | 50 | 51 | 58 | 63 | 83 | 89 | 90 | 94 | 10 | 10 | 10 | 11 | 11 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alder | *Alnus glutinosa* | | | | | | | | | R | | | | | | | O | | | | F | | | | | |
| Apple | *Malus domestica* | | | | | | | | | | | | | | | | | | | | | | | R | | |
| Ash | *Fraxinus excelsior* | F | | A | | | | | | F | A | O | A | | F | | | | | | F | | R | F | F | O |
| Aspen | *Populus tremula* | | | | O | | | | | | R | | F | O | | | | | | O | | | | | | |
| Beech | *Fagus sylvatica* | R | O | | | R | | R | | | | | | | | | | | | | | | | | | |
| Bittersweet | *Solanum dulcamara* | | | | | | | | | | | | | | | R | | | | | | | | | | |
| Black Bryony | *Dioscorea communis* | | | | | | | | | | F | | | | | | | | | | | | | | | |
| Black Knapweed | *Centauria nigra* | | | | | | | | | | R | | | | | | | | | | | | | | | |
| Black Poplar | *Populus nigra* | | | | | | | | | | | | | | | R | | | | | | | | | | |
| Blackthorn | *Prunus spinosa* | | | | | | | | F | | | | F | | | A | | | | | 0 | | | | O | |
| Bluebell | *Hyacinthoides non-scripta* | A | F | R | O | O | A | F (ID) | | F | | | | A | | | D | | | | | | | O | | |
| Bracken | *Pteridium aquilinum* | | | | | | | A | | | | | | | | | | | | O | | | | | | |
| Bramble | *Rubus fruticosus* agg. | | | A | | A | D | | | | A | | A | | A | | F | | F | | 0 | | O | F | A | O |
| Buttercup | *Ranunculus* sp. | | | | | | | R | | R | | | O | | | | | | | | | | | | | |
| Cherry | *Prunus avium* | R | | | | | | | O | O | | | | | | | R | | | | | | | R | | O |
| Cleavers | *Galium aparine* | | | | | | | | | | R | | R | | | | | | | | | | | | | |
| Common Cow-wheat | *Melampyrum pratense* | R | | | | | | | | | | | | | | | | | | | | | | | | |
| Cow Parsley | *Anthriscus sylvestris* | | | | | | | | | | | | | | | | | | | | | | O | | | |
| Common Nettle | *Urtica dioca* | | | | | | | | | F | | | | | | F | | | A | F | F | | | F | A | |
| Crack Willow | *Salix fragilis* | | | | | | | | | | | | | | | | R | R | D | | | | | | | |
| Dogwood | *Cornus sanguinea* | | | | | | | | | | | | F | O | | | | | | | 0 | | | | | |
| Elder | *Sambucus nigra* | | | | | | | | | O | O | | | | | F | | | O | | R | | | | | |
| An elm | *Ulmus* sp. | | | | | | R | | | | | | | R | | | | | | | | | | | | |
| Enchanter's Nightshade | *Circaea alpina* | R | | | | | | | | | O | | | O | | | | | | | | | | | O | |
| Field Maple | *Acer campestre* | F | | A | | | | R | F | | F | | F | | | O | O | | | O | 0 | O | | O | | |
| Garden Privet | *Ligustrum ovalifolium* | | | 0 | | | | | O | | O | R | | | | | | | | | | | | | | F |
| Goat Willow | *Salix caprea* | O | | | | | | | | | | | A | | | O | O | O | | | | | | | | |
| Gorse | *Ulex europaeus* | | | | | | | | | | | | | | | | | R | | | | | | | | |
| Grey Willow | *Salix cinerea* | | | | | | | | | | | | | | | O | | | | | | | | O | | |
| Ground Ivy | *Glechoma hederacea* | | | | | | | | | R | | | | | | | | | | | | | | | | |
| Guelder-Rose | *Viburnum opulus* | R | | | | | | R | | | | | | | | | | | | | | | | | | |
| Hairy Woodrush | *Luzula pilosa* | R | | | | | | | | | | | | | | | | | | | | | | | | |
| Hart's-Tongue | *Phyllitis scolopendrium* | | | | | | | | | O | | | | R | | | | | | | | | | | | |
| Hawthorn | *Crataegus monogyna* | R | | A | | | | | F | O | F | O | | | O | A | O | | | | 0 | F | R | O | O | F |

| Common English Name | Scientific Name | 5 | 6 | 7 | 10 | 12 | 13 | 14 | 15 | 17 | 20 | 31 | 50 | 51 | 58 | 63 | 83 | 89 | 90 | 94 | 10 | 10 | 10 | 11 | 11 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hazel | *Corylus avellana* | | | | | | | F | | O | F | | O | D | F | | O | | | | D | | | | O | F |
| Hogweed | *Heracleum sphondylium* | | | | | | | | | | R | | O | | | | | | | | | | | | | |
| Holly | *Ilex aquifolium* | O | O | | | O | F | F | | | | O | R | | | | O | | | | D | | | | R | O |
| Holm Oak | *Quercus ilex* | | | | | | | | | | R | | | | | | | | | | | | | | | |
| Honeysuckle | *Lonicera periclymenum* | O | | | | | | O | | | | R | | | | | F | | | | | | | | | |
| Hornbeam | *Carpinus betulus* | F | F | | | | | | | | O | | O | | | | | | | | R | R | | O | O | |
| Ivy | *Hedera helix* | A | | D | | | | | F | O | F | D | | | | | | | | | A | | F | D | D | O |
| Lords and Ladies | *Arum maculatum* | | | | | | | | | | O | | | | | | | | | | | | | | | |
| Male-fern | *Dryopteris felix-mas* | O | | | | | | O | | O | O | | | | | | | | | | | | | | O | |
| Norway Maple | *Acer platanoides* | R | | A | | | | | | | | | | | | | | | | | | | D | F | | F |
| Pedunculate Oak | *Quercus robur* | D | F | R | D | F | A | F | O | D | F | D | F | D | D | A | F | A | O | O | F | | R | O | O | O |
| Pendulous Sedge | *Carex pendula* | | | | | | | | | R | O | | R | R | | | | | | | | | | | | |
| Red Campion | *Silene dioica* | R | | | | | | | | | | | O | | | | O | | | | | | | | | O |
| Rhododendron | *Rhododendron* sp. | | | | | R | O | R | | | | R | | | | | | | | | | | | | R | |
| A rose | *Rosa* sp. | R | | R | | | R | | R | | R | | O | O | R | R | | | | | | O | | | | |
| Rowan | *Sorbus aucuparia* | R | R | | O | O | | R | | | | | | | | | | | | O | R | | | | | |
| Silver Birch | *Betula pendula* | O | | | O | | | F | | | | | | | | | D | | | | | | | | F | |
| Snowberry | *Symphoricarpos albus* | R | | F | | | | | | | | | | | | | | | | | | | | | | |
| Spear Thistle | *Cirsium vulgare* | | | | | | | | | | | | | | | | R | | | | | | | | | |
| Spindle | *Euonymus europaeus* | | | | | | | | | | | R | | | R | | | | | | | | | | | |
| Sweet Chestnut | *Castanea sativa* | A | F | O | O | D | A | D | | | O | | | | | | R | | | | | O | | | R | |
| Sycamore | *Acer pseudoplatanus* | R | | | R | | | O | | F | | O | | | | R | | F | R | | D | D | O | D | F | F |
| Weeping Willow | *Salix babylonica* | | | | | | | | | | | | | | | | R | | | | | | | | | |
| Wood Anemone | *Anemone nemorosa* | | O | | | | | | | | | | | F | | | F | | | | | | | | | |
| Wood Avens | *Geum urbanum* | | | | | | | | | | | | | | | | | | | | | | O | | | |
| A dock | *Rumex* spp. | | | O | | | | R | | O | | | O | | | | O | | | | | | O | | O | |
| Wood False-brome | *Brachypodium sylvaticum,* | | | | | | | R | | | O | | | | | | | | | | | | | | | |
| Wood Melick | *Melica uniflora* | O | | | | | | | | | | | | | | | | | | | | | | | | |
| Wood-sedge | *Carex sylvatica* | O | | | | | | | | | | | O | | | | | | | | | | | | | O |
| Yew | *Taxus baccata* | | | | | | | | | | | | | | | | | | | | R | | | | | |

**Table A.1: University of Kent Campus botanical species list - woodlands**

## Appendix B: Plant Species List - Hedgerows

| Common English Name | Scientific Name | 54 | 56 | 57 | 59 | 60 | 62 | 64 | 65 | 66 | 67 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ash | *Fraxinus excelsior* | | | O | | O | | | | O | |
| Black Bryony | *Dioscorea communis* | | | O | | | | | | | O |
| Blackthorn | *Prunus spinosa* | | | F | F | D | D | | A | F | F |
| Bracken | *Pteridium aquilinum* | | O | | | | | | | | |
| Bramble | *Rubus fruticosus* agg. | F | | O | D | O | A | A | F | O | F |
| Cleavers | *Galium aparine* | | | | | | | A | | | |
| Common Nettle | *Urtica dioca* | | | | | | | D | | | |
| Dog's-Mercury | *Mercurialis perennis* | | | O | | | | | | | |
| Dogwood | *Cornus sanguinea* | | | O | | | | | O | R | A |
| Elder | *Sambucus nigra* | | | | O | O | | O | | | O |
| Elm | *Ulmus* sp. | | | | | O | | | | | O |
| Field Maple | *Acer campestre* | A | | | | O | | | O | O | O |
| Grey Poplar | *Populus x canescens* | A | O | | | | | | | | |
| Grey Willow | *Salix cinerea* | | | | | O | | O | | O | |
| Hawthorn | *Crataegus monogyna* | | | F | A | O | F | D | F | F | O |
| Hazel | *Corylus avellana* | | | O | | | | | | | A |
| Holly | *Ilex aquifolium* | | | O | R | | | | | | |
| Holm Oak | *Quercus ilex* | | F | | | | | | | | |
| Horse-chestnut | *Aesculus hippocastanum* | R | | | | | | | | | |
| Hornbeam | *Carpinus betulus* | | F | O | | | | | | | |
| Ivy | *Hedera helix* | | | | | | | | F | | |
| Leyland Cypress | *Cupressus × leylandii* | | F | | | | | | | | |
| Lombardy Poplar | *Populus nigra* | F | | | | | | | | | |
| Pedunculate Oak | *Quercus robur* | | | D | O | R | | | O | O | |
| A rose | *Rosa* sp. | O | R | O | | R | R | | | | O |
| Spindle | *Euonymus europaeus* | | | O | | | | | | R | |

| Common English Name | Scientific Name | 22 | 24 | 27 | 28 | 30 | 32 | 33 | 34 | 35 | 36 | 39 | 40 | 41 | 42 | 45 | 46 | 47 | 48 | 52 | 53 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ash | *Fraxinus excelsior* | | R | | | | O | | R | | | | | | R | | F | F | O | | O |
| Beech | *Fagus sylvatica* | | | | D | | | | | | | | | D | | | | | | | |
| Blackthorn | *Prunus spinosa* | D | A | O | | | A | D | | | | A | A | | F | F | F | F | O | | F |
| Bramble | *Rubus fruticosus* agg. | O | F | | | | | F | R | | F | F | F | F | F | O | | | F | | A |
| Buckthorn | *Frangula alnus* | | | | | | | | | | | | | | | | | | R | | |
| Cherry | *Prunus avium* | | | | | | | | | | | | | | | | F | | R | | |
| Cotoneaster | *Cotoneaster* sp. | | | | | | | | | | | | | F | | | | | | | |
| Crack Willow | *Salix fragilis* | | | | | | | | | | | | | | | | | R | | | |
| Dogwood | *Cornus sanguinea* | | O | | | O | | | | | | | | | | | | | | | |
| Elder | *Sambucus nigra* | O | | | | | | | | | F | O | | | O | O | | | O | | O |
| An elm | *Ulmus* sp. | | R | | | | O | O | | | | | | | | | | | | | |
| Field Maple | *Acer campestre* | | O | | | F | | | | | | | | | R | | F | F | O | | |
| Goat Willow | *Salix caprea* | | | | | | | | | | | | | | | | | O | F | F | |
| Grey Poplar | *Populus x canescens* | | | | | R | | | | | | | | | | | | | | | |
| Grey Willow | *Salix cinerea* | | | | | | | | | | | | | | | | | | D | D | |
| Hawthorn | *Crataegus monogyna* | F | A | O | | F | A | F | | | D | A | A | | D | D | F | F | O | | F |
| Hazel | *Corylus avellana* | | | | | F | R | | | | | | | | | | | F | | | O |
| Holly | *Ilex aquifolium* | | | | O | | | | | | | | | | | | | F | | | |
| Holm Oak | *Quercus ilex* | | | | | | | | O | | | | | | | | | | | | |
| Horse-chestnut | *Aesculus hippocastanum* | | | | | R | | | | | | | | | | | | | | | |
| Honeysuckle | *Lonicera periclymenum* | | | | | | O | | | | | | | | | | | | | | |
| Hornbeam | *Carpinus betulus* | O | | | | | | | | | | | | | | | | | | | |
| Ivy | *Hedera helix* | F | | | | | F | O | | | | | | | | | | | | | |
| Laurel | *Prunus laurocerasus* | | | | | | | | D | | | | | | | | | | | | |
| Leyland Cypress | *Cupressus × leylandii* | | | | | | | | | D | | | | | | | | | | | |
| Lombardy Poplar | *Populus nigra* | | | | | | | | | | | | | | | | | R | | | |
| Ornamental shrub | | | | D | | | | | | | | | | | | | | | | | |
| Pedunculate Oak | *Quercus robur* | O | | | | | | | F | | | | | | | | F | O | | O | |
| Rose | *Rosa* sp. | | | R | | | R | | | | | O | | | | | | R | R | | O |
| Silver Birch | *Betula pendula* | | O | | | R | | | | | | | | | | | | | | | |
| Sycamore | *Acer pseudoplatanus* | | | R | | | O | O | F | | O | | | | | | | O | | | |

**Table A.2: University of Kent Campus Botanical Species List - Hedgerows**

## Appendix B: Plant Species List - Grasslands

| Common English Name | Scientific Name | 21 | 27 | 75 | 86 | 87 | 93 | 97 | 99 | 104 | 106 | 112 | 114 | 115 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bird's-foot Trefoil | *Lotus corniculatus* | O | F | R | | O | O | O | F | | | F | O | F |
| Black Knapweed | *Centaurea nigra* | | | | | | R | O | F | | | | | |
| Black Medick | *Medicago lupulina* | O | | | | | D | F | | | | | | |
| Black Mustard | *Brassica nigra* | | | | | | O | | | | | | | |
| Bristly Oxtongue | *Picris echioides* | R | | | | | F | R | | | | R | | |
| Broad Buckler Fern | *Dryopteris dilatata* | | | | | | | | | | | | | |
| Broad-leaved Dock | *Rumex obtusifolius* | | | O | | | F | F | O | O | | | | |
| Broad-leaved Willowherb | *Epilobium montanum* | | | | | | | | | | | | O | |
| A buttercup | *Ranunculus* sp. | | | O | | | | | | | | | | |
| Cock's-foot | *Dactylis glomerata* | | | A | F | O | | O | F | R | F | | O | R |
| Colt's-foot | *Tussilago farfara* | | | | | | | | | | | | | |
| Common Bent | *Agrostis capillaris* | | | R | O | O | | R | | F | O | | O | D |
| Common Chickweed | *Stellaria media* | | | | | | | | | | | | | F |
| Common Mouse-Ear | *Cerastium fontanum* | | | | | R | | | | | | | O | |
| Common Nettle | *Urtica dioica* | | | R | | | | | | | R | | | |
| Common Sorrel | *Rumex acetosa* | | | | O | R | | | | R | R | O | F | R |
| Common Spotted Orchid | *Dactylorhiza fuchsii* | | | R | | | | | | | | | | |
| Common Vetch | *Vicia sativa* | | | | O | | | | | | | | | |
| Corncockle | *Grostemma githago* | | | | | | | R | | | | | | |
| Creeping Buttercup | *Ranunculus repens* | O | | | | | | | | | | F | | O |
| Creeping Cinquefoil | *Potentilla reptans* | O | | | | R | | O | | | | F | | |
| Creeping Thistle | *Cirsium arvense* | | | | | | | | O | R | | | | |
| Crested Dog's-tail | *Cynosurus cristatus* | | | | | | D | F | F | | | | F | |
| Cut-Leaved Crane's-bill | *Geranium dissectum* | R | R | | | R | | R | | | R | R | R | |
| Daisy | *Bellis perennis* | F | F | | | | | | | | | F | | |
| Dandelion | *Taraxacum officinale agg.* | O | | | | | | | | | | | R | |
| Dove's-Foot Crane's-bill | *Geranium molle* | R | | | | | | | | | | | | |
| False Oat-grass | *Arrhenatherum elatius* | | | D | D | A | | O | F | F | A | | O | |
| Field Bindweed | *Convolvulus arvensis* | | O | | O | | | | | F | | | O | |
| Goat's-beard | *Tragopogon pratensis* | | | | | R | | | | | | | | |
| Hairy Tare | *Vicia hirsuta* | | | | | | R | | | R | | | | |
| Hard Rush | *Juncus inflexus* | | | R | | | | | | | | | | |
| Hawkweed Species | *Hieracium* sp. | F | | | | | | | | | | | | |
| Hogweed | *Heracleum sphondylium* | | | O | R | R | | | | | O | | | |
| Mallow | *Malva sylvestris* | R | R | | | R | | R | | | | | R | |
| Meadow Barley | *Hordeum brachyantherum* | | | | | A | R | F | F | | | | F | |
| Meadow Buttercup | *Ranunculus acris* | | | | O | O | R | O | O | R | O | | O | O |
| Meadow Foxtail | *Alopecurus pratensis* | | | | | R | O | | O | R | R | | | |

| Common English Name | Scientific Name | 21 | 27 | 75 | 86 | 87 | 93 | 97 | 99 | 104 | 106 | 112 | 114 | 115 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Meadow Vetchling | *Lathyrus pratensis* | | | | O | O | | O | | O | O | | | |
| Oxeye Daisy | *Leucanthemum vulgare* | R | | | | | A | F(ID) | A | | | | | |
| Perennial Rye-grass | *Lolium perenne* | | | | | | | O | O | R | | | O | |
| Red Campion | *Silene dioica* | | | | | | | R | | | | | | |
| Red Clover | *Trifolium pratense* | | | | | R | | R | O | | | | F | |
| Red Fescue | *Festuca rubra* | | | | O | F | | | | F | O | | F | O |
| Ribwort Plantain | *Plantago lanceolata* | O | O | | R | | F | O | | | | O | R | |
| Rough Meadow-grass | *Poa trivialis* | | | | | | | | O | | | | O | |
| Selfheal | *Prunella vulgaris* | F | | | | | F | | F | | | F | | |
| Smaller Cat's-tail | *Phleum pratense* spp. *bertolonii* | | | | | | | | | | | | O | |
| Soft-rush | *Juncus effusus* | | | R | | | | | | | | | | |
| Spear Thistle | *Cirsium vulgare* | | | | | | O | R | | | | | | |
| Sweet Vernal-Grass | *Anthoxanthum odoratum* | | | | F | F | | | | O | O | | R | O |
| Tall Fescue | *Festuca arundinacea* | | | | | R | | | | | | | | |
| Weld | *Reseda luteola* | | | | | | R | | | | | | | |
| White Campion | *Silene latifolia* | | | | | | R | | | | | | | |
| White Clover | *Trifolium repens* | D | | | R | R | F | F | O | | | F | | |
| Yarrow | *Achillea millefolium* | R | R | | | | | | | | | O | | |
| Yorkshire-fog | *Holcus lanatus* | | | A | A | A | F | D | A | A | A | | A | O |

**Table A.3: University of Kent Campus Botanical Species List - Grasslands**

Appendix C: Habitat suitability index assessment of ponds (reproduced from LUC [2011] report)

| Pond | HSI Score (value) | Key issues reducing habitat quality for GCN |
|---|---|---|
| 1 | 0.65 (average) | • Historical records of a small numbers of goldfish present which may prey upon young GCN. Not seen in the current survey.<br>• Overtime may become choked with growth of reedmace *Thypha latifolia* (not currently a problem).<br>• Covered in duckweed. |
| 2 | 0.32 (poor) | • Heavily polluted with grey/blue sheen and bad smell.<br>• Large fish population which may prey upon GCN. |
| 3 | 0.55 (below average) | • Pond fairly small and dries out frequently.<br>• Lacking aquatic plants for GCN egg laying. |
| 4 | 0.43 (poor) | • Poor water quality – water very turbid.<br>• Large waterfowl population which may prey on GCN and damage aquatic vegetation used for GCN egg laying.<br>• Poor cover of aquatic vegetation. |
| 5 | 0.53 (below average) | • Fairly small.<br>• Dries out frequently.<br>• Dense vegetation. |
| 6 | 0.59 (below average) | • Fairly small.<br>• Poor surrounding terrestrial habitat comprised of amenity grassland which offers low quality foraging and shelter for GCN.<br>• Tennis balls in water |
| 7 | 0.76 (good) | • Reedmace was noted to be over dominant and may increase risk of drying out as observed in 2011.<br>• Pond shallow and may need localised deepening to prevent drying out.<br>• Dense vegetation of duckweed.<br>• Many fallen branches around pond shore. |
| 8 | 0.47 (below average) | • Lack of aquatic vegetation.<br>• Lacking connectivity to other nearby ponds.<br>• Rabbit warren on north shore.<br>• 2 chairs in pond |
| 9 | 0.58 (below average) | • Heavily over shaded and lacking of aquatic vegetation.<br>• Poor water quality perhaps resulting from decomposing leaves. |
| 10 | 0.68 (average) | • Poor connectivity to other nearby ponds.<br>• Relatively poor surrounding terrestrial habitat (amenity grassland and built-up areas). |
| 11 | 0.69 (average) | • Poor connectivity to other nearby ponds.<br>• Low cover of aquatic vegetation needed for GCN egg laying. |

# Appendix N
# Title Plans

Land Registry

7 June 2018

Your ref
K903818

Our ref
K903818 /OC/042

# Official copy/copies

The official copy/copies of the document(s) you applied for is/are enclosed.

Please contact the HM Land Registry Office named if you have any questions about the enclosed official copy/copies.

HM Land Registry
Durham Office
PO Box 75
Gloucester
GL14 9BD

DX 321601 Gloucester 33
Tel 0300 006 0010
Fax NA
Email durham.office@
landregistry.gov.uk
www.gov.uk/land-registry

K903818

ESTATES DEPARTMENT
UNIVERSITY OF KENT
CANTERBURY
KENT
CT2 7NN

Land Registry

# Official copy of register of title

Title number K903818 Edition date 19.12.2012

- This official copy shows the entries in the register of title on 1 June 2018 at 10:17:33.
- This date must be quoted as the "search from date" in any official search application based on this copy.
- The date at the beginning of an entry is the date on which the entry was made in the register.
- Issued on 7 June 2018.
- Under s.67 of the Land Registration Act 2002, this copy is admissible in evidence to the same extent as the original.
- For information about the register of title, see www.gov.uk/land-registry.
- This title is dealt with by HM Land Registry Durham Office.

## A: Property register

This register describes the land and estate comprised in the title.

KENT : CANTERBURY

1 (13.06.2006) The Freehold land shown edged with red on the plan of the above title filed at the Registry and being three parcels of land on the north and south sides of Tyler Hill Road, Blean, Canterbury.

2 (13.06.2006) The land has the benefit of the rights granted by but is subject to the rights reserved by the Transfer dated 28 April 2006 referred to in the Charges Register.

3 (16.06.2009) By the Deed dated 27 May 2009 referred to in the Charges register the rights reserved by the Transfer dated 28 April 2006 referred to above were rectified.

## B: Proprietorship register

This register specifies the class of title and identifies the owner. It contains any entries that affect the right of disposal.

### Title absolute

1 (13.06.2006) PROPRIETOR: UNIVERSITY OF KENT AT CANTERBURY of The Registry, Canterbury, Kent CT2 7NN.

2 (13.06.2006) The price stated to have been paid on 28 April 2006 was £1,000,000.

# C: Charges register

## This register contains any charges and other matters that affect the land.

1 (13.06.2006) A Transfer of the land in this title dated 28 April 2006 made between (1) The Master Brothers And Sisters Of The Hospital Of St. Thomas The Maytre Eastbridge (Otherwise Eastbridge Hospital) (Transferor) and (2) University Of Kent At Canterbury (Transferee) contains restrictive covenants.

*NOTE: Copy filed.*

2 (16.06.2009) The land is subject to the rights granted by a Deed dated 27 May 2009 made between (1) The Master Brothers And Sisters Of The Hospital Of St Thomas The Martyr Eastbridge (2) The University Of Kent At Canterbury and (3) Alan David Martin.

*NOTE: Copy filed.*

3 (19.12.2012) The land is subject to the rights granted by a Deed dated 12 December 2012 made between (1) The University of London and (2) John Colin Caverhill.

*NOTE: Copy filed under K823154.*

# End of register

HM Land Registry
Official copy of title plan

Title number **K903818**
Ordnance Survey map reference **TR1360NW**
Scale **1:2500**
Administrative area **Kent: Canterbury**

© Crown Copyright. Produced by HM Land Registry. Reproduction in whole or in part is prohibited without the prior written permission of Ordnance Survey. Licence Number 100026316.

**This official copy issued on 7 June 2018 shows the state of this title plan on 1 June 2018 at 10:17:33.**
It is admissible in evidence to the same extent as the original (s.67 Land Registration Act 2002).
This title plan shows the general position, not the exact line, of the boundaries. It may be subject to distortions in scale. Measurements scaled from this plan may not match measurements between the same points on the ground.
**This title is dealt with by HM Land Registry, Durham Office.**

# HM Land Registry

**Title Number : K844020**

Edition Date : 28 August 2002

---

## A: Property Register

*This register describes the land and estate comprised in the title.*

| COUNTY | DISTRICT |
|---|---|
| KENT | CANTERBURY |

1. (4 February 1982) The **Freehold** land shown edged with red on the plan of the above Title filed at the Registry and being land adjoining Eastingdown, Alcroft Grange, Tyler Hill, Canterbury, (CT2 9NN).

2. The Conveyance dated 7 January 1982 referred to in the Charges Register contains the following provision:-

   "IT IS HEREBY AGREED AND DECLARED that the Purchaser and his successors in title shall not by virtue of the Conveyance acquire any right of light or air which would prejudice the free use and enjoyment of the adjoining land now or formerly of the Vendors for building or other purposes and any enjoyment of light or air had by the Purchaser or his successors in title from or over the adjoining land now or formerly of the Vendors shall be deemed to be had by the consent hereby given of the Vendors."

3. Notice entered in pursuance of rule 254 of the Land Registration Rules 1925 on 4 February 1982 that the registered proprietor claims that the land in this title has the benefit of a right of way over the land tinted brown on the filed plan.

---

## B: Proprietorship Register

*This register specifies the class of title and identifies the owner. It contains any entries that affect the right of disposal.*

### Title Absolute

1. (1 August 1990) **PROPRIETOR:** THE UNIVERSITY OF KENT AT CANTERBURY of The Registry, The University, Canterbury, Kent.

---

**Continued overleaf**

## C: Charges Register

*This register contains any charges and other matters that affect the land*

1. By a Conveyance dated 24 December 1946 made between (1) George Frank Whiteman (Vendor) (2) Winifred Harriett Stevens and others (Purchasers) and (3) Winifred Harriett Stevens and others the land in this title and other land was conveyed subject as follows:-

   "Subject as regards the lands affected thereby to the free farm rent of Eleven shillings and sixpence payable in the year 1884 to Messrs. Hedges so far as this liability still exists and is enforceable."

2. The land is subject to the following rights reserved by a Conveyance of the land in this title and other land dated 7 January 1982 made between (1) Gerald Stevens and Ralph Stevens (Vendors) and (2) Frank Ernest Whitington (Purchaser):-

   "EXCEPT AND RESERVING unto the Vendors and their successors in title

   .....

   (d) a right of passage and running of gas electricity drainage and water from and to the adjoining and neighbouring land of the Vendors through the pipes wires cables in under upon or over the property hereby conveyed

   (e) the right of the Vendors and their successors in title to enter upon the property hereby conveyed so far only as may be necessary for the inspection repair and maintenance of the pipes wires and cables before referred to the Vendors making good any damage to the property hereby conveyed by the exercise of such right

   AND EXCEPT AND RESERVING unto the Vendors and their successors in title the Registered Proprietors at H.M. Land Registry under Title Number K83980 of the further adjoining land of the Vendors known as Eastingdon Alcroft Grange Road Tyler Hill in Hackington Parish in the District of Canterbury a right to receive supplies of water through the water pipe laid under Lots 1, 2, and 3 aforesaid between the points marked A, B, C and D on the said plan the Vendors or their successors in title paying to the Purchaser or his successors in title one quarter of the cost of maintaining repairing and renewing the section of the said pipe between the points marked A and B on the said plan one third of such cost between points B and C and one half of such cost between points C and D marked on the said plan and a right to enter upon Lots 1, 2 and 3 aforesaid for the purpose of inspecting repairing renewing and maintaining the said water pipes AND in respect of Lots 1 and 2 EXCEPTING UNTO the Vendors and their successors in title a right of passage and running of electricity from and to the adjoining land of the Vendors through the wire in under upon or over Lots 1 and 2 to the said adjoining and neighbouring land of the Vendors to the Rediffusion Station erected thereon."

   NOTE:- The land in this title forms part of Lot 3. Lots 1 and 2 fall outside the land in this title. The waterpipe is shown by a blue broken line on the filed plan so far as it affects the land in this title. Points C and D are reproduced on the filed plan. Points A and B do not affect the land in this title.

3. The land is subject to the rights granted by a Deed dated 30 July 1991 made between (1) The University of Kent at Canterbury and (2) Seeboard Plc.

Continued on next page

## C: Charges Register continued

The said Deed also contains restrictive covenants by the grantor.

*NOTE: Copy Deed filed.*

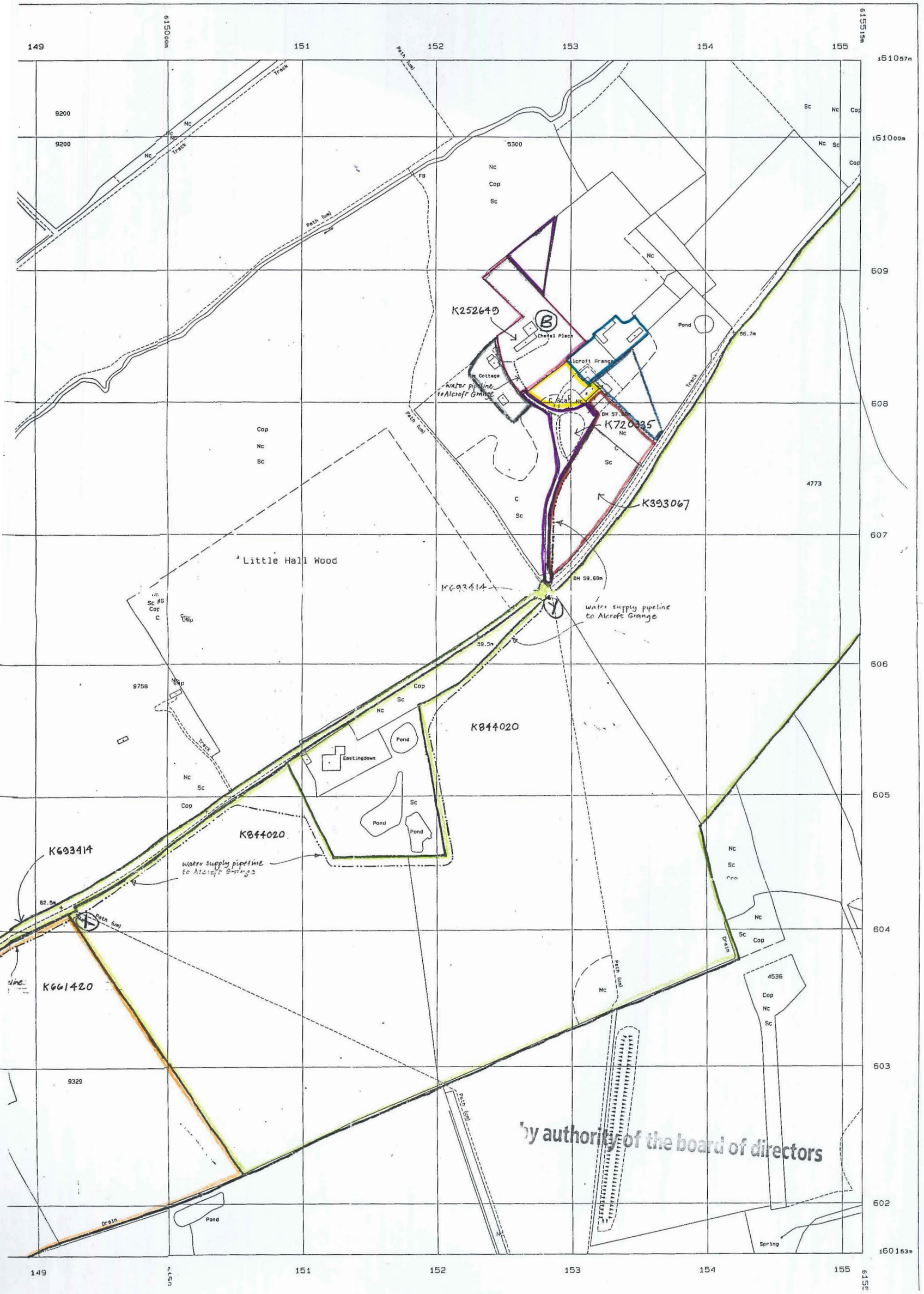
---

END OF REGISTER

*NOTE A: A date at the beginning of an entry is the date on which the entry was made in the Register.*
*NOTE B: This is a copy of the register on* ***28 August 2002 at 11:09:00.***

Option 1

Site-centred



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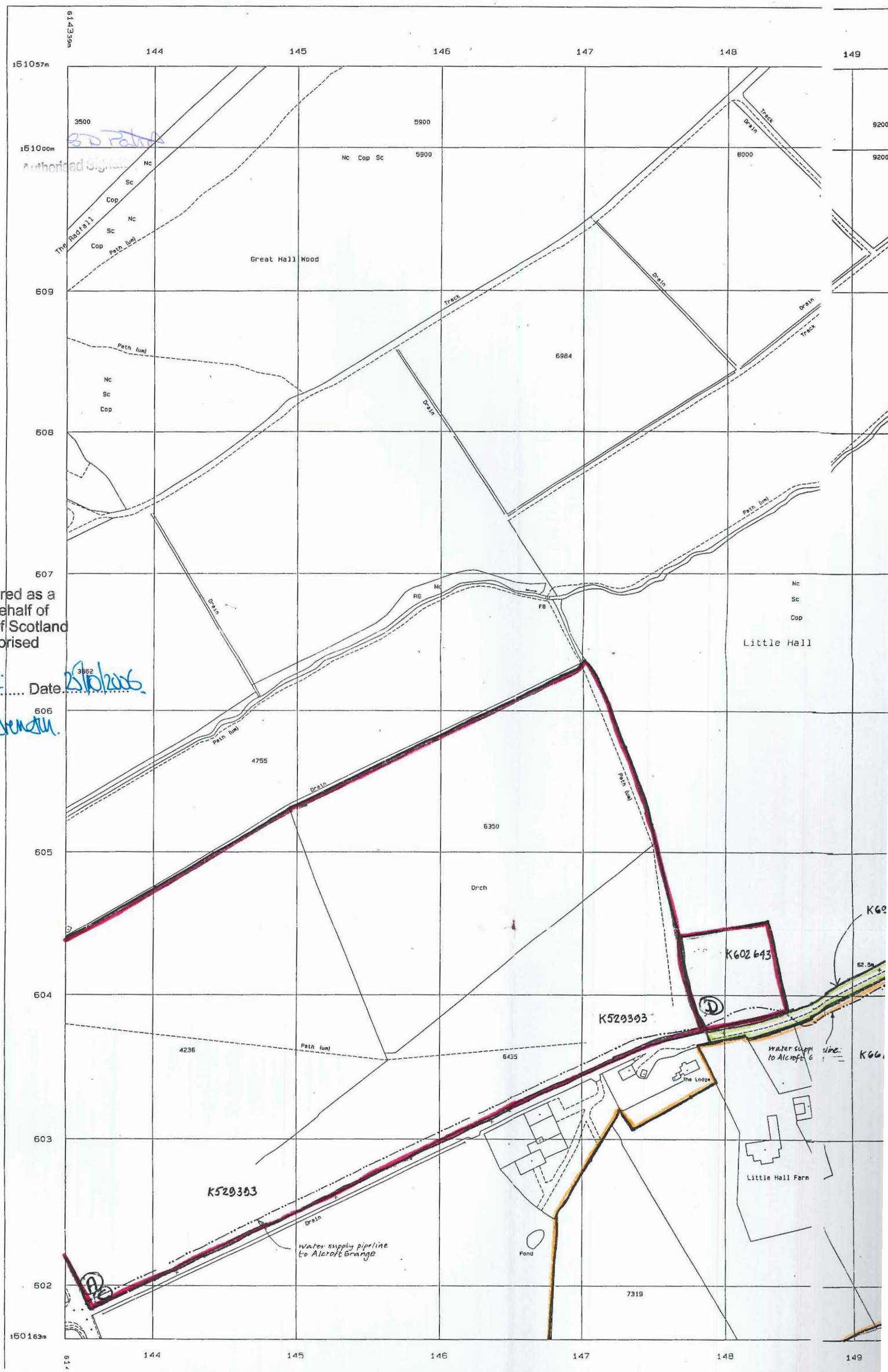
# Superplan®

SCALE ~ 1: 2500




Authorised Signatory

Signed and delivered as a deed for and on behalf of The Royal Bank of Scotland plc by a duly authorised attorney

Signature..... Date 25/10/2006

The One Account

Paul Stevenson

University of Kent

Peter Czarnomski, Director of Estates

The common seal of the University of Kent at Canterbury was here-unto affixed in the presence of:—

Land Registry

UNIVERSITY OF KENT
12 FEB 2015
ESTATES DEPARTMENT

11 February 2015

Your ref
NONE GIVEN

Our ref
K660178 /OC/219

# Official copy/copies

The official copy/copies of the document(s) you applied for is/are enclosed.

Please contact the Land Registry office named if you have any questions about the enclosed official copy/copies.

Land Registry
Nottingham Office
Castle Wharf House
2 Canal Street
Nottingham
NG1 7AU

DX 10298 Nottingham 3
Tel 0300 006 0008
Fax 0300 006 0028
Email nottingham.office@
landregistry.gsi.gov.uk
www.landregistry.gov.uk

NONE GIVEN

UNIVERSITY OF KENT
ESTATES DEPARTMENT
CANTERBURY
KENT
CT2 7NN

0186017004

Land Registry

# Official copy of register of title

Title number K660178 Edition date 02.02.2015

- This official copy shows the entries in the register of title on 11 February 2015 at 13:07:54.
- This date must be quoted as the "search from date" in any official search application based on this copy.
- The date at the beginning of an entry is the date on which the entry was made in the register.
- Issued on 11 February 2015.
- Under s.67 of the Land Registration Act 2002, this copy is admissible in evidence to the same extent as the original.
- For information about the register of title see Land Registry website www.landregistry.gov.uk or Land Registry Public Guide *1 - A guide to the information we keep and how you can obtain it.*
- This title is dealt with by Land Registry Nottingham Office.

## A: Property register

This register describes the land and estate comprised in the title.

KENT : CANTERBURY

1 (04.02.1982) The Freehold land shown edged with red on the plan of the above Title filed at the Registry and being land on the east side of St Stephens Hill, Canterbury.

2 The Conveyance dated 7 January 1982 referred to in the Charges Register contains the following provision:-

"IT IS HEREBY AGREED AND DECLARED that the Purchaser and his successors in title shall not by virtue of the Conveyance acquire any right of light or air which would prejudice the free use and enjoyment of the adjoining land now or formerly of the Vendors for building or other purposes and any enjoyment of light or air had by the Purchaser or his successors in title from or over the adjoining land now or formerly of the Vendors shall be deemed to be had by the consent hereby given of the Vendors"

3 Notice entered in pursuance of rule 254 of the Land Registration Rules 1925 on 4 February 1982 that the registered proprietor claims that the land in this title has the benefit of a right of way over the land tinted brown on the filed plan.

4 (24.06.2011) A new title plan based on the latest revision of the Ordnance Survey Map has been prepared.



0186017004

# B: Proprietorship register

This register specifies the class of title and identifies the owner. It contains any entries that affect the right of disposal.

## Title absolute

1 (02.02.2015) PROPRIETOR: UNIVERSITY OF KENT of The Registry, Canterbury CT2 7NZ a higher education corporation.

2 (02.02.2015) The price stated to have been paid on 30 January 2015 for the land in this title and in K709599 was £737,500.

3 (02.02.2015) RESTRICTION: No disposition of the registered estate by the proprietor of the registered estate is to be registered without a certificate signed by the applicant for registration or their conveyancer that the provisions of clauses 13 and 15 of a Transfer dated 30 January 2015 made between (1) Jill Celia Jenkins and others and (2)University of Kent have been complied with.

NOTE: Copy filed.

4 (02.02.2015) A Transfer of the land in this title and other land dated 30 January 2015 made between (1) Jill Celia Jenkins, Pamela Grace Gadenne and Roy Spencer Harding and (2) The University of Kent contains purchaser's personal covenants.

*NOTE: Copy filed.*

# C: Charges register

This register contains any charges and other matters that affect the land.

1 By a Conveyance dated 24 December 1946 made between (1) George Frank Whiteman (Vendor) (2) Winifred Harriett Stevens and others (Purchasers) and (3) Winifred Harriett Stevens and others (Trustees) the land in this title and other land was conveyed subject as follows:-

"Subject as regards the lands affected thereby to the fee farm rent of Eleven shillings and sixpence payable in the year 1884 to Messrs Hedges so far as this liability still exists and is enforceable"

2 The land is subject to the following rights granted by a Deed of Grant dated 21 February 1969 made between (1) Frank Stevens and others (Grantor) and (2) South Eastern Gas Board:-

"The easements to lay construct inspect maintain use replace remove or render unusable a main or pipe for the transmission or storage of gas or other materials connected with the exercise and performance of the functions of the Board and all necessary apparatus ancillary thereto (all hereinafter together called "the said works") in upon and over a strip of land twenty feet in width drawn on the plan annexed hereto and thereon coloured pink (hereinafter called "the said strip of land") and to pass over the said strip of land and over strips of land ten feet wide adjoining the said strip of land for the purposes of the said works and of any works of the Board continuous therewith and over the said land for the purposes of access to the said strip of land at all reasonable times and in an emergency at any time whether or not with workmen vehicles machinery and apparatus".

The said Deed also contains the following restrictive covenant:-

# C: Charges register continued

"The Grantor (to the intent and so as to bind the said land and every part thereof into whosesoever hands the same may come and to benefit and protect the easements hereby granted) HEREBY COVENANTS with the Board as follows:-

(i) The Grantor shall not do or cause or permit to be done on the said land anything calculated or likely to cause damage or injury to the said works and will take all reasonable precautions to prevent such damage or injury.

(ii) The Grantor shall not without the prior consent in writing of the Board make or cause or permit to be made any material alteration to or any deposit of any thing upon any part of the said strip of land or any part of the said land being a part nearer than ten feet measured in any direction from the said strip of land so as to interfere with or obstruct the access thereto or to the said works by the Board or so as to lessen or in any way interfere with the support afforded to the said works by the surrounding soil including minerals or so as materially to reduce the depth of soil above the said works

(iii) The Grantor shall not erect or install or cause or permit to be erected or installed any building or structure or permanent apparatus in through upon or over the said strip of land nor save with the consent in writing of the Board (which consent shall not be unreasonably withheld) any part of the said land being a part nearer than ten feet measured in any direction from the said strip of land".

NOTE: The land coloured pink referred to is hatched blue on the filed plan so far as it affects the land in this title.

3 The land is subject to the following rights reserved by a Conveyance of the land in this title and other land dated 7 January 1982 made between (1) Gerald Stevens and Ralph Stevens (Vendors) and (2) Frank Ernest Whitington (Purchaser):-

"EXCEPT AND RESERVING Unto the Vendors and their successors in title.

(d) a right of passage and running of gas electricity drainage and water from and to the adjoining and neighbouring land of the Vendors through the pipes wires cables in under upon or over the property hereby conveyed.

(e) the right of the Vendors and their successors in title to enter upon the property hereby conveyed so far only as may be necessary for the inspection repair and maintenance of the pipes wires and cables before referred to the Vendors making good any damage to the property hereby conveyed by the exercise of such right

AND EXCEPT AND RESERVING unto the Vendors and their successors in title the Registered Proprietors at Land Registry under Title Number K83980 of the further adjoining land of the Vendors known as Eastingdown Alcroft Grange Road Tyler Hill in Hackington Parish in the District of Canterbury a right to receive supplies of water through the water pipe laid under Lots 1, 2 and 3 aforesaid between the points marked A, B, C and D on the said plan the Vendors or their successors in title paying to the Purchaser or his successors in title one quarter of the cost of maintaining repairing and renewing the section of the said pipe between the points marked A and B on the said plan one third of such cost between points B and C and one half of such cost between points C and D marked on the said plan and a right to enter upon Lots 1, 2 and 3 aforesaid for the purpose of inspecting repairing renewing and maintaining the said water pipe AND in respect of Lots 1 and 2 EXCEPTING UNTO the Vendors and their successors in title a right of passage and running of electricity from and to the adjoining land

# C: Charges register continued

of the Vendors through the wire in under upon or over Lots 1 and 2 to the said adjoining and neighbouring land of the Vendors to the Rediffusion Station erected thereon".

NOTE: The land in this title forms part of Lot 1 referred to. The water pipe is shown by broken blue line on the filed plan so far as it affects the land in this title. Point B is marked B on the filed plan. Points A, C and D do not affect.

4 (24.06.2011) Option to purchase the land tinted pink on the title plan in favour of Mercia Crematoria Developments Limited contained in an Option Agreement dated 3 May 2011 made between (1) Florence Lilian Harding and (2) Mercia Crematoria Developments Limited upon the terms therein mentioned.

*NOTE:-Copy filed.*

# End of register

# Land Registry
# Official copy of title plan

Title number **K660178**
Ordnance Survey map reference **TR1460SE**
Scale **1:2500** enlarged from 1:10000
Administrative area **Kent: Canterbury**

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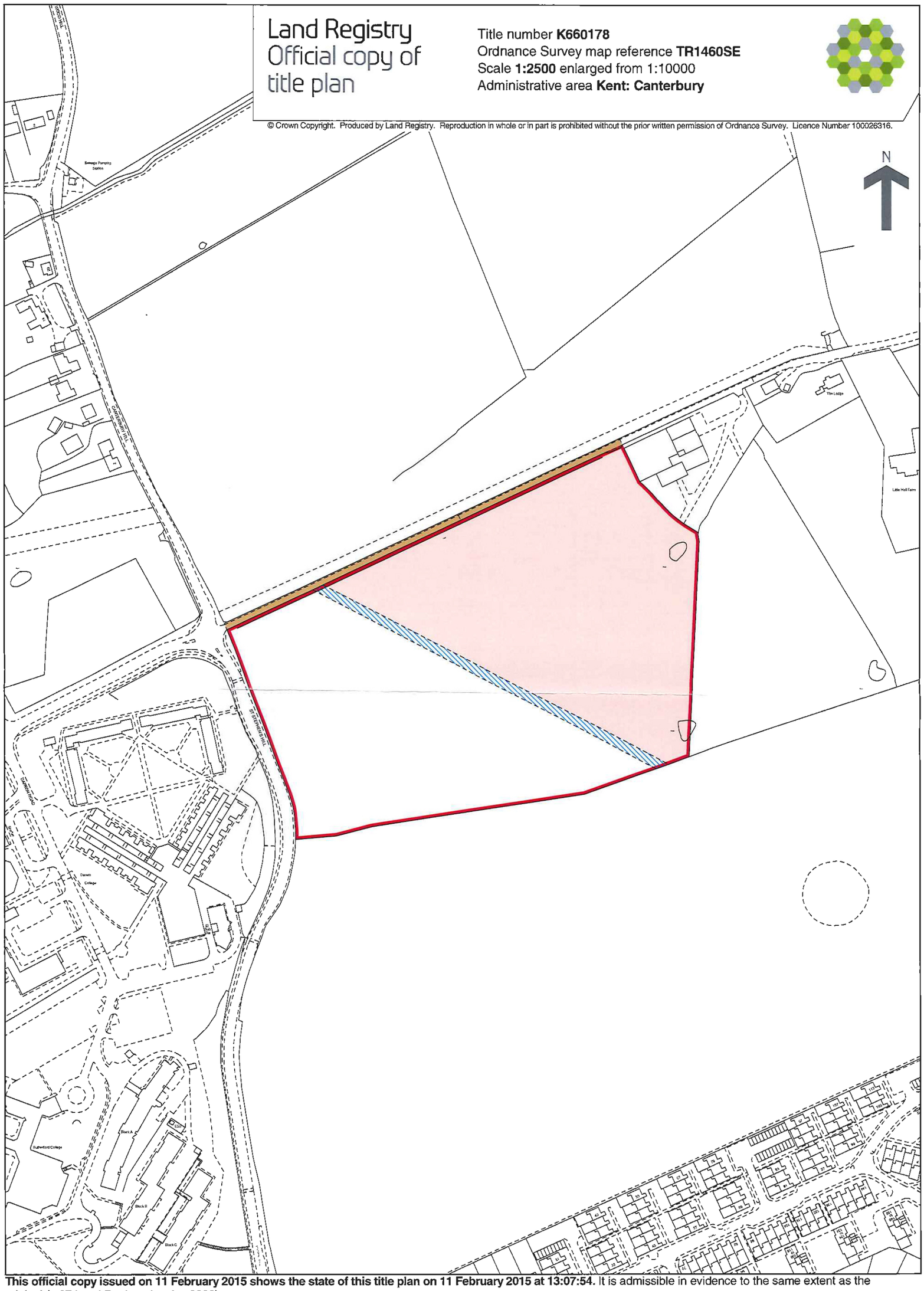



**This official copy issued on 11 February 2015 shows the state of this title plan on 11 February 2015 at 13:07:54.** It is admissible in evidence to the same extent as the original (s.67 Land Registration Act 2002).

This title plan shows the general position, not the exact line, of the boundaries. It may be subject to distortions in scale. Measurements scaled from this plan may not match measurements between the same points on the ground.

**This title is dealt with by Land Registry, Nottingham Office.**

0186017004

Land Registry

UNIVERSITY OF KENT
13 FEB 2015
ESTATES DEPARTMENT

12 February 2015

Your ref
NONE GIVEN

Our ref
K709599 /OC/219

Land Registry
Nottingham Office
Castle Wharf House
2 Canal Street
Nottingham
NG1 7AU

DX 10298 Nottingham 3
Tel 0300 006 0008
Fax 0300 006 0028
Email nottingham.office@
landregistry.gsi.gov.uk
www.landregistry.gov.uk

# Official copy/copies

The official copy/copies of the document(s) you applied for is/are enclosed.

Please contact the Land Registry office named if you have any questions about the enclosed official copy/copies.

NONE GIVEN

ESTATES DEPARTMENT
UNIVERSITY OF KENT
UNIVERSITY OF KENT
CANTERBURY
KENT
CT2 7NN

Land Registry

# Official copy of register of title

Title number K709599 Edition date 02.02.2015

- This official copy shows the entries in the register of title on 11 February 2015 at 13:05:37.
- This date must be quoted as the "search from date" in any official search application based on this copy.
- The date at the beginning of an entry is the date on which the entry was made in the register.
- Issued on 12 February 2015.
- Under s.67 of the Land Registration Act 2002, this copy is admissible in evidence to the same extent as the original.
- For information about the register of title see Land Registry website www.landregistry.gov.uk or Land Registry Public Guide *1 - A guide to the information we keep and how you can obtain it.*
- This title is dealt with by Land Registry Nottingham Office.

## A: Property register

This register describes the land and estate comprised in the title.

KENT : CANTERBURY

1 The Freehold land shown edged with red on the plan of the above Title filed at the Registry and being land lying to the east of St Stephens Hill, Canterbury.

2 The Conveyance dated 7 January 1982 referred to in the Charges Register contains the following provision:-

"IT IS HEREBY AGREED AND DECLARED that the Purchaser and his successors in title shall not by virtue of the Conveyance acquire any right of light or air which would prejudice the free use and enjoyment of the adjoining land now or formerly of the Vendors for building or other purposes and any enjoyment of light or air had by the Purchaser or his successors in title from or over the adjoining land now or formerly of the Vendors shall be deemed to be had by the consent hereby given of the Vendors."

3 Notice entered in pursuance of rule 254 of the Land Registration Rules 1925 on 4 February 1982 that a former registered proprietor claims that the land in this title has the benefit of a right of way over the land tinted brown on the filed plan.

## B: Proprietorship register

This register specifies the class of title and identifies the owner. It contains any entries that affect the right of disposal.

### Title absolute

1 (02.02.2015) PROPRIETOR: UNIVERSITY OF KENT of The Registry, Canterbury CT2 7NZ a higher education corporation.

# B: Proprietorship register continued

2 (02.02.2015) The price stated to have been paid on 30 January 2015 for the land in this title and in K660178 was £737,500.

3 (02.02.2015) RESTRICTION: No disposition of the registered estate by the proprietor of the registered estate is to be registered without a certificate signed by the applicant for registration or their conveyancer that the provisions of clauses 13 and 15 of a Transfer dated 30 January 2015 made between (1) Jill Celia Jenkins and others and (2)University of Kent have been complied with .

*NOTE:- Copy filed under K660178.*

4 (02.02.2015) A Transfer of the land in this title and other land dated 30 January 2015 made between (1) Jill Celia Jenkins, Pamela Grace Gadenne and Roy Spencer Harding and (2) The University of Kent contains purchaser's personal covenants.

*NOTE: Copy filed under K660178.*

# C: Charges register

## This register contains any charges and other matters that affect the land.

1 By a Conveyance dated 24 December 1946 made between (1) George Frank Whiteman (Vendor) (2) Winifred Harriett Stevens and others (Purchasers) and (3) Winifred Harriett Stevens and others (Trustees) the land was conveyed subject as follows:-

"Subject as regards the lands affected thereby to the fee farm rent of Eleven shillings and sixpence payable in the year 1884 to Messrs. Hedges so far as this liability still exists and is enforceable.

2 The land is subject to the following rights reserved by a Conveyance of the land in this title and other land dated 7 January 1982 made between (1) Gerald Stevens and Ralph Stevens (Vendors) and (2) Frank Ernest Whitington (Purchaser):-

"EXCEPT AND RESERVING unto the Vendors and their successors in title

(d) a right of passage and running of gas electricity drainage and water from and to the adjoining and neighbouring land of the Vendors through the pipes wires cables in under upon or over the property hereby conveyed

(e) the right of the Vendors and their successors in title to enter upon the property hereby conveyed so far only as may be necessary for the inspection repair and maintenance of the pipes wires and cables before referred to the Vendors making good any damage to the property hereby conveyed by the exercise of such right

AND EXCEPT AND RESERVING unto the Vendors and their successors in title the Registered proprietors at Land Registry under Title Number K83980 of the further adjoining land of the Vendors known as Eastingdown Alcroft Grange Road Tyler Hill in Hackington Parish in the District of Canterbury a right to receive supplies of water through the water pipe laid under Lots 1, 2 and 3 aforesaid between the points marked A, B, C and D on the said plan the Vendors or their successors in title paying to the Purchaser or his successors in title one quarter of the cost of maintaining repairing and renewing the section of the said pipe between the points marked A and B on the said plan one third of such cost between points B and C and one half of such cost between points C and D marked on the said plan and a right to enter upon Lots 1, 2 and 3 aforesaid for the purpose of inspecting

# C: Charges register continued

repairing renewing and maintaining the said water pipe AND in respect of Lots 1 and 2 EXCEPTING UNTO the Vendors and their successors in title a right of passage and running of electricity from and to the adjoining land of the Vendors through the wire in under upon or over Lots 1 and 2 to the said adjoining land neighbouring land of the Vendors to the Rediffusion Station erected thereon."

NOTE: The land in this title forms part of Lot 1. Lots 2 and 3 falls outside the land in this title. The waterpipe is shown by a blue broken line on the filed plan so far as it affects the land in this title. Point B is reproduced on the filed plan. Points A, C and D do not affect the land in this title.

3 The land is subject to the following rights granted by a Transfer of The Lodge, Little Hall Farm dated 13 July 1987 made between (1) Pamela Grace Gadenne (Transferor) and (2) Philip James Faithfull and Jacqueline Nora Faithfull (Transferees):-

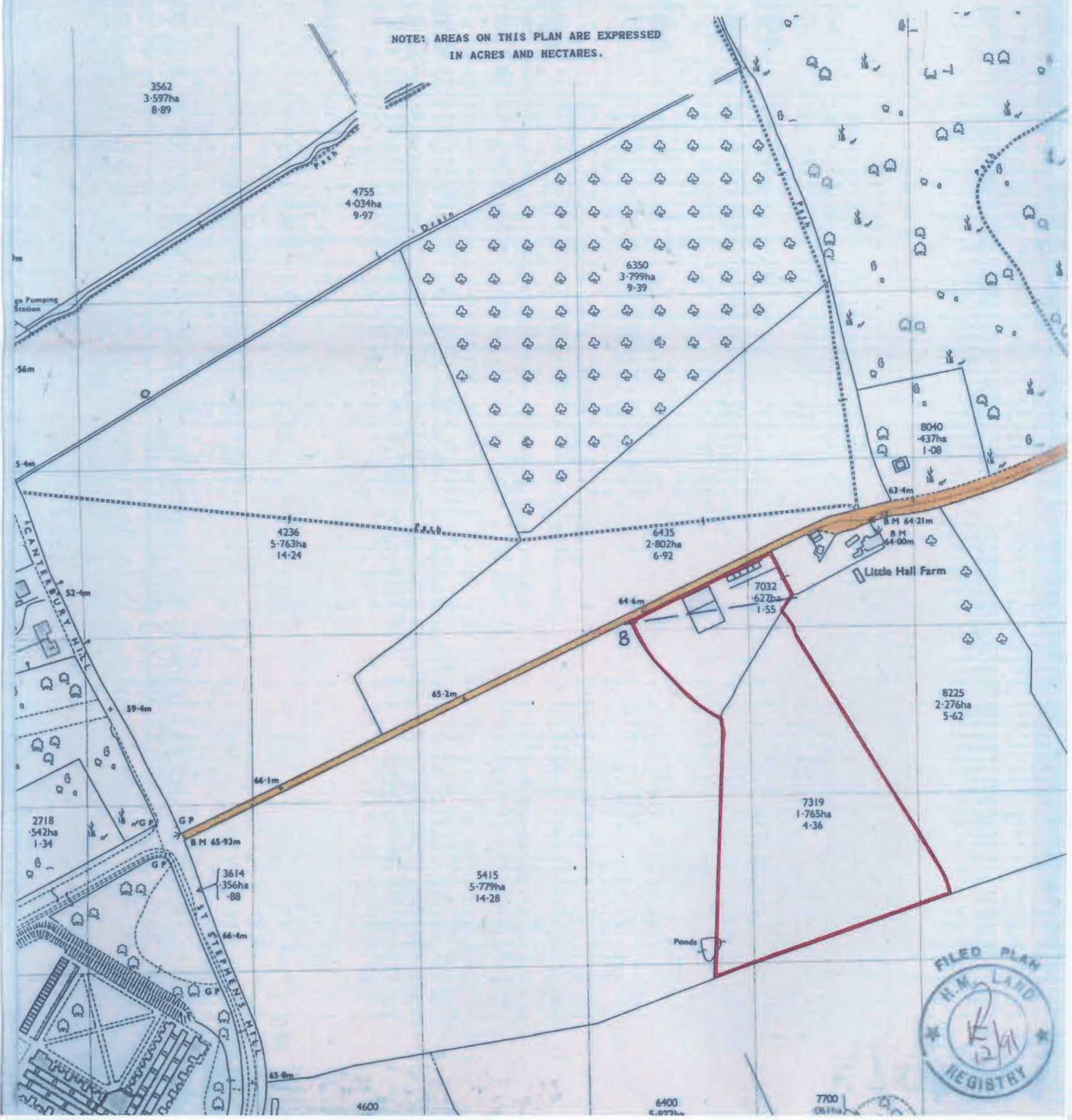
"To connect and to use and receive as the case may be a supply of electricity and a supply of water and gas (as and when available) through the wires cables pipes and drains existing at the date hereof or constructed for the benefit of the land hereby agreed to be sold within a period of seventy-nine years from the date hereof on the remainder of the Transferor's adjoining land SUBJECT TO the Transferees paying a fair proportion of the expense of repairing and maintaining and rebuilding and cleansing the same whenever the same shall be used in common with others with the right for the Transferees to enter upon the Transferor's adjoining land for the purpose of such repairing and cleansing as aforesaid making good all damage occasioned by the exercise of such right."

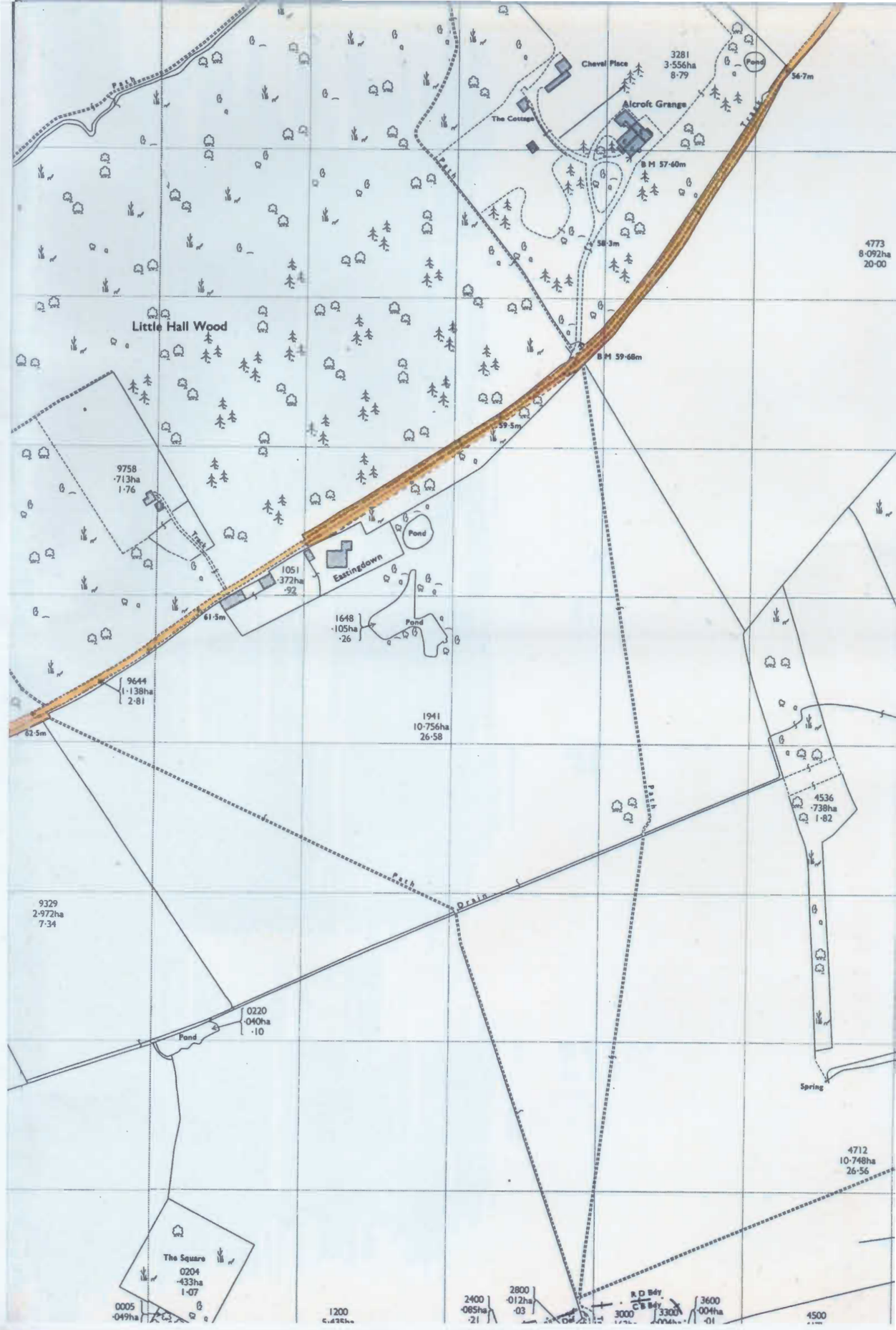
# End of register

# H.M. LAND REGISTRY

| | |
|---|---|
| TITLE NUMBER | K709599 |
| ORDNANCE SURVEY PLAN REFERENCE | TR1460 |
| Scale | 1/2500 |
| COUNTY KENT | DISTRICT CANTERBURY |
| | ©Crown Copyright |

NOTE: AREAS ON THIS PLAN ARE EXPRESSED IN ACRES AND HECTARES.




**This official copy is issued, and shows the state of this title plan, on 12 February 2015 at 11:50:34.**
It is admissible in evidence to the same extent as the original (s.67 Land Registration Act 2002).
This title plan shows the general position, not the exact line, of the boundaries. It may be subject to distortions in scale. Measurements scaled from this plan may not match measurements between the same points on the ground.
**This title is dealt with by Land Registry, Nottingham Office.**

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**Dated 2020**

**THE CITY OF LONDON LAW SOCIETY**
**LAND LAW COMMITTEE**
**CERTIFICATE OF TITLE**
**(Seventh Edition 2016 update)**

Property: Freehold land adjoining the University of Kent, Canterbury within titles K903818; K660178; K709599; K844020 and K693414

Transaction: The transaction confirmed by an override agreement dated 24 January 2020 and made between, amongst others, NatWest, SW and EIB and the Company under which the Charge was granted in favour of the Chargee

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**THE CITY OF LONDON LAW SOCIETY**
**LAND LAW COMMITTEE**
**CERTIFICATE OF TITLE**
**(Seventh Edition 2016 update)**

To:

Glas Trust Corporation Limited as Security Agent

("Addressees" and in this Certificate "you" and Addressees have the same meaning).

Freehold land adjoining the University of Kent, Canterbury, CT2 1NZ within HM Land Registry Title numbers K903818; K660178; K709599; K844020 and K693414

1. **RELIANCE ON THIS CERTIFICATE**

1.1 This Certificate is addressed to and is intended solely for the benefit of the Addressees for the purpose of the Transaction. It may not be relied on by any other person or used for any other purpose.

1.2 The giving of this Certificate does not create any retainer with the Addressees.

1.3 This Certificate may be disclosed to a third party but it cannot be relied on by that party.

1.4 Only an Addressee may bring a claim under this Certificate (whether as principal or agent).

1.5 If a claim would properly lie against any other party involved in the Transaction or this Certificate's preparation or approval, and that party has limited or excluded its liability in respect of such claim, then our liability will not be increased by that limitation or exclusion. Our liability will be calculated as if there were no such limitation or exclusion.

1.6 Where the Addressees constitute more than one person, the Addressees acknowledge that our aggregate liability to all the Addressees is no greater than the liability we would have had if the Addressees were a single person.

1.7 We acknowledge that you are entitled to rely on the statements contained in this Certificate even if any document or matter contained or referred to in a statement:

1.7.1 is in the public domain; or

1.7.2 has been disclosed by or on behalf of the Company to the Valuers; or

1.7.3 is contained in any specialist report made available by or on behalf of the Company to you or your professional team; or

1.7.4 is contained or referred to in any data room to which you or your professional team have access.

1.8 You agree that no individual member, partner, shareholder, consultant or employee of this firm owes you any personal duty of care and that you will not bring any claim whether in contract, tort, under statute or otherwise against any such individual.

## 2. CERTIFICATION

On the basis of and insofar as the same is discoverable from our investigations mentioned in this Certificate, we certify that:

### 2.1 Title

2.1.1 We have investigated the title of the Company to the Property in the knowledge that you are relying on this Certificate for the purpose of the Transaction.

2.1.2 We have:

(a) examined and considered the documents of title and other documents and papers relating to the Property produced to or obtained by us; and

(b) undertaken those of the searches and enquiries referred to in Schedule 6 which we consider appropriate or necessary in the circumstances of the Transaction and having regard to the location and nature of the Property and considered the results of the searches and replies to the enquiries

and this Certificate is given solely on the basis of:

(i) that examination and consideration and the results of those searches and enquiries; and

(ii) material provided to us by the Company;

which, so far as we are aware, is the documentation and information which we need in order to give this Certificate.

2.1.3 Subject to any Disclosures:

(a) in our opinion, the Company has a good and marketable title to the Property and is solely legally and beneficially entitled to the Property and neither we nor the Company know of any reason why the Chargee should not be registered as registered proprietor of the Charge;

(b) the details of the Property set out in Schedule 2 Part 1 are complete and accurate in all respects;

(c) if the Company holds the Property under the terms of a lease, the terms of the lease are fairly summarised in Schedule 4 Part 1 and the statements set out in Schedule 4 Part 2 are complete and accurate in all respects;

(d) no consents are required from any third parties before the Property can be effectively charged to the Chargee by way of legal mortgage or fixed charge and any consents referred to in a Disclosure have been obtained and are not subject to onerous or unusual conditions;

(e) if the Property is freehold, the Property is not registered as a freehold estate in commonhold under Part I of the Commonhold and Leasehold Reform Act 2002;

(f) if the title to the Property is registered at Land Registry, the quality of the title is title absolute; and

(g) if the title to the Property is not registered at Land Registry, then:

(i) where the Property is freehold, it commences with a good root of title at least 15 years old; or

(ii) where the Property is leasehold, it commences with the Lease and has a good root of title at least 15 years old.

2.2 **Matters affecting the Property**

Subject to any Disclosures:

2.2.1 the statements set out in Schedule 3 are complete and accurate in all respects; and

2.2.2 there are no other matters disclosed by our investigations referred to in this Certificate which, in our opinion, should be brought to your attention.

2.3 **Letting Documents**

The Letting Documents are fairly summarised in Schedule 5 Part 1 and, save as stated in any Disclosures, the statements set out in Schedule 5 Part 2 are complete and accurate in all respects.

2.4 **Searches and enquiries**

Except as stated in any Disclosures and subject to any general and usual caveats or disclaimers on results of searches or replies to enquiries undertaken, the results of such searches and enquiries do not disclose matters which, in our opinion, should be brought to your attention.

3. **CONFIRMATION OF STATEMENTS**

3.1 Where this Certificate states that the Company has “told us” or “confirmed” something (or uses words with similar meaning) (“provided information”), the Company provided information to us in writing.

3.2 A copy of the final draft of this Certificate has been sent to the Company. The Company has confirmed to us within the five working days before the date of this Certificate that to the best of its knowledge, information and belief the information contained in this Certificate is complete and accurate in all respects.

## 4. FORM OF CERTIFICATE

This Certificate is in the form of the City of London Law Society Land Law Committee Certificate of Title (Seventh Edition 2016 update) and in particular there has been no amendment to the main text of this Certificate or to the statements in paragraphs 2 to 4 of Schedule 1 and the statements in Schedule 3 and Part 2 of Schedules 4 and 5 respectively to this Certificate.

## 5. STATUS OF SCHEDULES

The Schedules form part of this Certificate.

***Disclosures***

***All Disclosures made to the Schedules to this Certificate***

## 6. LIABILITY

6.1 The liability of Mills & Reeve LLP, its or their partners, members, agents and employees or any of them (together referred to in this and subsequent clauses as Mills & Reeve) for Loss in respect of the Transaction shall be limited to an amount equal to the aggregate of the following, in each case as at the date of this Certificate: (a) the amounts outstanding under the Existing Finance Documents (as such term is defined in the Override Agreement); and (b) the Total Commitments (as such term is defined in the New Revolving Facilities Agreement (as defined in the Override Agreement)) ("Liability Cap"). For the purposes of this Transaction, Loss shall mean the aggregate of all losses or damages (including interest thereon if any) and costs suffered or incurred directly or indirectly, by the Addressees arising from or in connection with the Certificate or its subject matter and all written and oral responses by Mills & Reeve to questions raised by the Addressees and/or its legal advisers in relation to the Certificate or its subject matter, including as a result of breach of contract, breach of statutory duty, tort (including negligence), fault or other act or omission by Mills & Reeve but excluding any such losses, damages or costs arising from the fraud or dishonesty of Mills & Reeve or in respect of liabilities which cannot lawfully be limited or excluded.

## SCHEDULE 1

### Definitions, interpretation, assumptions, qualifications and applicable law

1. **DEFINITIONS AND INTERPRETATION**

1.1 In this Certificate the following expressions have the following meanings:

**Benefit** means (in each case whether or not registered):

(i) any right or easement (including any acquired through prescription); and

(ii) any restriction, stipulation, restrictive covenant, mining or mineral right, franchise or other interest;

(but not including any reserved under the terms of any Letting Document);

**Charges** means the legal charges granted on 24 January 2020 in favour of the Security Agent over the Property

**Chargee** means the Security Agent;

**Company** means The University of Kent;

**Disclosure** means:

(i) any disclosure made against a statement in this Certificate; or

(ii) any information in Part 2, 3 or 4 of Schedule 2, or in Part 1A or 1B of Schedule 4, or in Part 1A or 1B of Schedule 5, or in Schedule 5 - Supplement; or

(iii) any disclosure in Schedule 6;

**EIB** means The European Investment Bank;

**Existing Use** means the actual use to which the Property is presently put as referred to in Schedule 2 Part 4;

**Incumbrance** means:

(i) any covenant, restriction, stipulation, easement, customary or public right, local land charge, mining or mineral right, franchise, manorial right and any other right or interest in or over land in each case whether or not registered; and

(ii) any interest not included in paragraph (i) above that will override any registrable disposition or where appropriate first registration;

(but not including any granted to a tenant under the terms of any Letting Document);

**Letting Document** means any lease, underlease, tenancy, licence or other agreement or arrangement giving rise to rights of occupation and enjoyment to which the Property is

subject (in each case as amended or supplemented) including any tenancy which is being continued after the contractual expiry date under the Landlord and Tenant Act 1954 or otherwise;

**Override Agreement** means the override agreement dated 24 January 2020 and made between, amongst others, NatWest, SW, EIB, the Security Agent and the Company;

**Premises** means the premises demised by any Lease or Letting Document as the case may be;

**Property** means the property described in Schedule 2 Part 1, a brief description of which is given at the start of this Certificate;

**Town and Country Planning Legislation** means any statute relating to town and country planning, which is in force at the date of this Certificate;

**Transaction** means the transaction governed by the Override Agreement under which the Charges have been granted in favour of the Chargee; and

**1995 Act** means the Landlord and Tenant (Covenants) Act 1995.

1.2 Unless the context otherwise requires, any reference to the Property or the Premises includes each and every part of it or them and all buildings and structures on it or them.

1.3 Any reference, express or implied, to a statute includes references to:

1.3.1 that statute as amended, extended or applied by or under any other statute or subordinate legislation at the date of this Certificate;

1.3.2 any statute at the date of this Certificate which re-enacts that statute (with or without modification); and

1.3.3 any subordinate legislation made at the date of this Certificate under that statute, as amended, extended or applied as described in paragraph 1.3.1 or under any statute referred to in paragraph 1.3.2.

1.4 The expressions “authorised guarantee agreement”, “excluded assignment”, “fixed charge”, “new tenancy”, “overriding lease”, “tenant covenant”, “former tenant”, “guarantor” and “landlord covenant” shall have the meanings given to them in the 1995 Act.

1.5 In Schedule 5 “rent” includes licence fee, “tenancy” includes licence and “tenant” includes licensee.

1.6 The headings in this Certificate do not affect its interpretation.

1.7 Unless the context otherwise requires, the singular includes the plural and vice versa.

1.8 Any Disclosure in this Certificate in relation to any particular clause or paragraph is to be treated as being disclosed in relation to any other relevant clause or paragraph.

## 2. ASSUMPTIONS

2.1 We have assumed that all documents relating to the Property have been validly executed and delivered by the parties to them and that such documents are within the capacity and powers of, and have been validly authorised by, each party. There is nothing on the face of those documents which we have seen which indicates otherwise.

2.2 We have assumed, and the Company has confirmed to us in writing, that:

2.2.1 the Company has provided us with all documents of title relating to the Property of which it has knowledge together with any other information in its possession as is material for the purpose of giving this Certificate; and

2.2.2 each copy document produced to us is a true copy of the original.

## 3. QUALIFICATIONS

3.1 We have not inspected the Property nor have we made any enquiries of the occupiers of the Property (other than the Company) nor, where the Property is leasehold, have we made any enquiries of any landlord or superior landlord.

3.2 We give no opinion as to the capital or rental value of the Property.

3.3 Except as disclosed by the results of the searches listed in Schedule 6, this Certificate does not consider:

3.3.1 any environmental or flood assessments, audits, surveys or other reports on the environmental condition of the Property; or

3.3.2 other technical reports or surveys relating to the Property's condition;

and the recipient of this Certificate should consider what investigations it wishes to make in relation to those matters.

3.4 Where information has been provided to us by the Company, our investigations have given us no reason to doubt the accuracy of that information but we do not accept responsibility for it.

3.5 Whilst we express no opinion on whether any transaction affecting the Company’s title to the Property may have been at an undervalue or otherwise liable to be set aside under the provisions of the Insolvency Act 1986, the Company has told us that it is not aware of any circumstances which could render any such transaction liable to be set aside under the provisions of that Act.

3.6 We have not investigated whether there is an intention that the terms of any relevant document should be enforceable by third parties. Save as stated in any Disclosures, none of the documents relating to the Property expressly provides that a third party can enforce any of its terms in accordance with the Contracts (Rights of Third Parties) Act 1999.

3.7 We have not investigated whether any consents which may have been required under any mortgages or other documents which are no longer subsisting were obtained.

3.8 Except to the extent of any Disclosure against paragraph 9 of Schedule 3 we have not investigated what insurance may be in force (or the particular details of any policy) in respect of the Property.

3.9 We have not considered:

3.9.1 whether any right including a right to light or a right to air is in the process of being acquired through prescription; nor

3.9.2 whether any right including a right to light or a right to air has been acquired through prescription, except where a right is set out in Schedule 2 Part 2 as having been acquired through prescription.

## 4. APPLICABLE LAW

This Certificate is limited to English law as applied by the English courts as at the date of this Certificate and is given on the basis that it will be governed by and construed in accordance with English law.

## SCHEDULE 2

## Property Details

### Part 1

### The Property

Brief description: Land known as three parcels of land on the north and south sides of Tyler Hill Road, Blean, Canterbury ( "**Parcels B, C and D**") shown edged red on the attached plan 1.

Land known as land on the east side of St Stephens Hill, Canterbury shown edged red on the attached plan 7 and land lying to the east of St Stephens Hill, Canterbury shown edged red on the attached plan 8 (together known as "**Parcel E**").

Land known as land adjoining Eastingdown, Alcroft Grange, Tyler Hill, Canterbury CT2 9NN shown edged red on the attached plan 10 ("**Parcel F**").

Land known as Track, Alcroft Grange, Tyler Hill, Canterbury shown edged red on the attached plan 14 ("**Track**").

The attached plan 39 shows the relative location of each of the Parcels. The Track is situated to the north of Parcel F.

Tenure: freehold

| | | |
|---|---|---|
| Registered title number: | Parcels B, C and D | K903818 |
| | Parcel E | K660178 and K709599 |
| | Parcel F | K844020 |
| | Track | K693414 |
| Root of title, if unregistered: | N/A | |

### Part 2

### Benefits

**1 In this part of the Certificate, references to the "Property" means Parcels B, C and D registered under title number K903818.**

1.1 A transfer of the Property dated 28 April 2006 and made between (1) The Master Brothers and Sisters of the Hospital of St Thomas the Martyr Eastbridge (otherwise Eastbridge Hospital) and (2) the Company (the "**2006 Transfer**") granted the following rights:

1.1.1 A right of way in common with Eastbridge Hospital and all others entitled with and without vehicles at all times and all purposes over and along the land

coloured yellow on the attached plan 3 between the points marked "A" and "B" "D" E-F" and "AA – BB". The right of way between points "E – F" is not less than 10 metres in width.

1.1.2 A right of entry upon the Transferee's retained land adjacent to Hothe Court Farmhouse in order to maintain and repair the boundary fence between the Property and Hothe Court Farmhouse. The Company believes that the reference to "Transferee" here is incorrect and should refer to "Transferor".

1.1.3 The exceptions and reservations contained in a Transfer dated 26 January 2000 made between (1) the Transferor and (2) Jacqueline Elizabeth Pearce. No copy of this document is available for review so the Company cannot comment further on its terms.

1.2 By a deed of easement dated 12 December 2012 and made between (1) the Company and (2) John Colin Caverhill the Company reserved the following rights for the benefit of the Property and K254318 (part of the Company's main campus):

1.2.1 right to enter each Accessway (being a private roadway of no more than 5 metres wide over the positions shown coloured brown on the attached plan 6) at any time to carry out any obligation of the grantee provided the Company will cause as little interference as reasonably practicable to the exercise of the grantee's rights;

1.2.2 right to enter onto each Accessway at any time to repair, maintain or replace any services, structure or facilities either serving or on any part of the Property provided the Company will cause as little interference as reasonably practicable to the exercise of the grantee's rights;

1.2.3 right to use the Property as the Company thinks fit, or to build on or develop any part of the Property or any neighbouring land, provided such use or works do not interfere with, or obstruct, the exercise of the grantee's rights;

1.2.4 right on not less than 3 months' written notice to deviate the route of any Accessway provided the alternative route is no less commodious as that previously enjoyed but such alternative access may be a longer distance.

**2 In this part of the Certificate, references to the "Property" means Parcel E registered under title numbers K660178 and K709599.**

2.1 In a conveyance dated 7 January 1982 and made between (1) Gerald Stevens and Ralph Stevens and (2) Frank Ernest Whitington (the "**1982 Conveyance**") it was agreed that the purchaser and its successors in title did not acquire any right of light or air which would prejudice the free use and enjoyment of the adjoining land now or formerly of the vendors for building or other purposes and any enjoyment of light or air by the purchaser or its successors in title from or over the adjoining land now or formerly of the vendors was deemed to be had by the consent of the vendors (the "**1982 Conveyance ROL Agreement**"). The 1982 Conveyance is noted on both title numbers K660178 and K709599 as a conveyance of land within that title number and other land. The Company has not seen a copy of the 1982 Conveyance so cannot confirm the extent of the land to which it relates but believes that it is a successor in title to the purchaser. The above declaration is noted on the Property Register to both titles.

2.2 There is a notice on title entered on 4 February 1982 that the registered proprietor claimed the land has the benefit of a right of way over the land tinted brown on the attached plan 7 and plan 8. This is the right of way along the private road to the north of the Property to the public highway and is exercised for the benefit of the Property. Please refer to paragraph 9 of Schedule 3 for details of the indemnity insurance to be taken out by the Company on the date of this Certificate.

**3 In this part of the Certificate, references to the "Property" means Parcel F registered under title number K844020.**

3.1 As for Parcel E, Parcel F is also subject to the 1982 Conveyance ROL Agreement.

3.2 There is a notice on title entered on 4 February 1982 that the registered proprietor claimed the land has the benefit of a right of way over the land tinted brown on the attached plan 10. Please refer to paragraph 9 of Schedule 3 for details of the indemnity insurance to be taken out by the Company on the date of this Certificate.

3.3 The Company entered into a deed dated 1 November 2006 (the "**2006 Deed**") and made between (1) Catherine Carmel Whitington (2) Michael Louis Wain and Rosalinde Claire Wain (3) The Company (4) Christopher Kenneth Farmer and Deborah Jayne Farmer (5) Michael George Coates and (6) The Alcroft Trust (the aforementioned parties being together the "Owners") and (7) Michael Robert Webb and Virginia Elizabeth Scott Webb (8) Richard Philip Champeney Podger and Heike Ute Podger (9) Michael Benedict Henry and Monica Clare Henry (10) David Coupe (11) Christopher Kenneth Farmer and Deborah Jayne Farmer (12) Michael George Coates (13) The Alcroft Trust and (14) the Company (the aforementioned parties (7) – (14) being together the "Grantees"). The Company is both an owner and grantee of the land shown edged light green on the attached plan 11, which comprises Parcel F and the Track. The deed was entered into to allow a supply of water to be routed from the main to property owned by the Alcroft Trust, shown edged purple on plan 11. The Property benefits from the right to lay a water pipe under the Owners' Land (which comprises the Property and land shown edged red (owned by C Whitington), orange (owned by M and R Wain), pink (owned by C and D Farmer), brown (owned by M Coates) and purple (owned by The Alcroft Trust) shown on plan 11) along the route marked with a black dotted line between the points marked "A" and "B" on plan 11 and then the right of free and uninterrupted passage and running of water in and through the pipes now laid upon through or under the Owners' Land with power at any time on at least 48 hours' notice (save in emergency) to enter the Owners' Land to inspect clean maintain or renew the pipe to at least the same specification.

**4 In this part of the Certificate, references to the "Property" means the Track registered under title number K693414.**

4.1 By a conveyance of the Property and other land dated 30 April 1884 and made between (1) George Whiteman and (2) Neville Louis Cooper the Property has the benefit of a right of way for the purchaser his heirs and assigns and his and their tenants and workmen at all times and for all purposes with or without horses carts or carriages over and along the road coloured brown on the plan leading from the main road from Canterbury to

Whitstable into the premises conveyed, the purchaser his heirs and assigns paying a proportionate part of the cost of keeping such road in repair. The Company is not aware of any sums having been demanded or paid in this regard. Note the disclosure in paragraph 24 of Schedule 3 regarding works which were carried out to the Track by the Company, for which the Company contributed 50% of the cost. There is a note on the title that the part of the land coloured brown over which the rights are granted is a continuation to the west of the road in the title to the Property. The Company does not have a plan but believes that this is the continuation of the track to St Stephen's Hill, the public highway. The right is exercised for the benefit of the Property.

4.2 As for Parcel F, the Property has the benefit of the rights granted by the 2006 Deed noted at paragraph 3.3 above.

**Part 3**

**Incumbrances**

**5 In this part of the Certificate, references to the "Property" means Parcels B, C and D registered under title number K903818.**

5.1 The Property was sold subject to the following matters in the 2006 Transfer:

5.1.1 A right of way granted by a Transfer of Hothe Court Farmhouse dated 29 April 2005 made between (1) Eastbridge Hospital and (2) David John Keir;

5.1.2 A wayleave dated 19 December 1962 in favour of the GPO;

5.1.3 An agreement dated 21 March 1969 in favour of Seeboard;

5.1.4 A deed dated 10 October 1969 in favour of South Eastern Gas Board.

5.2 The Company does not have a copy of any of the documents listed in paragraph 5.1 so cannot comment further on their terms. An agreement dated 21 March 1969 is noted on the title to Parcel E – please see below for further details. The Company cannot confirm whether this is the same document. Please refer to paragraph 9 of Schedule 3 for details of the indemnity insurance to be taken out by the Company on the date of this Certificate.

5.3 Eastbridge Hospital, in the 2006 Transfer, excepted and reserved for Eastbridge Hospital's adjoining and retained land the right to pass and repass with or without vehicles at all times for agricultural purposes and field maintenance only along the accessways marked "B-G-H" "H-I" "H-J" shown on the attached plan 3 and "X-C" shown on the attached plan 2. This right was amended by a Deed of Rectification dated 27 May 2009 and made between (1) The Master Brothers and Sisters of the Hospital of St Thomas the Martyr Eastbridge (otherwise Eastbridge Hospital) (2) The University of Kent at Canterbury and (3) Alan David Martin. In this deed it was acknowledged that, in a transfer dated 2 May 2006, Eastbridge Hospital had granted a right of way with or without vehicles at all times and for all purposes in connection with the use and enjoyment of the land transferred to Martin over the land shown coloured yellow and coloured pink on the attached plan 4. The right reserved in the 2006 Transfer was rectified to extend it to the land coloured pink on plan 4 (it being acknowledged that the right already existed over the land coloured yellow) and the Company granted Martin his successors in title and the owners and occupiers for the time being a right of way with or

without vehicles at all times and for all purposes in connection with the use and enjoyment of the land transferred to Martin (as shown edged red on plan 4) over the land coloured yellow and coloured pink on plan 4.

5.4 In the 2006 Transfer, the Company covenanted:

5.4.1 to maintain the fences shown on plan 3 at "E-R" "U-W" "L-M" "W-X" "Y-Z" and "S-T" in good and stockproof condition;

5.4.2 not to obstruct nor permit to be obstructed nor park or allowed to be parked any vehicle on any part of the right of way granted between the points marked "AA" and "BB" on plan 3.

5.5 It was agreed in the 2006 Transfer that the Company nor its successors in title would not, by virtue of the transfer, acquire any right of light or air which would prejudice the free use and enjoyment of any of Eastbridge Hospital's adjoining or retained land for building or for other purposes and that any enjoyment of light or air had by the Company or its successors in title from or over any such of Eastbridge Hospital's adjoining or retained land shall be deemed to be had by the consent of Eastbridge Hospital.

5.6 By a deed of easement dated 12 December 2012 and made between (1) the Company and (2) John Colin Caverhill the Company granted the following rights over the Property and K254318 (part of the Company's main campus) for the benefit of the property registered at the Land Registry under title number K823154 (the "Grantee's Property", as shown edged red on the attached plan 5). The deed notes that the rights granted shall only be exercisable if the rights and each accessway come into existence within 80 years from the date of this deed. The rights granted were:

5.6.1 the right for the grantee, its successors in title and those authorised by it or them in common with the Company and other persons having the same right to pass with or without agricultural vehicles or vehicles being used for agricultural purposes only (including four wheel drives being used for the carrying of stock or fodder for farm agricultural livestock or for the carriage of agricultural plant machinery tools and produce to and from the Grantee's Property) and on foot only over and along each Accessway (being a private roadway of no more than 5 metres wide over the positions shown coloured brown on the attached plan 6) to gain access to and egress from the Grantee's Property for all purposes connected with the use of the Grantee's Property. When exercising the rights over Accessway 1, the grantee shall pass as close as possible to the boundary fence line.

5.6.2 the right to use only the Accessways numbered 2 and 3 on plan 6 as a bridleway for access to and from the Grantee's Property.

5.7 The grantee covenanted in the 2012 deed of easement:

5.7.1 not to damage the Property or any property of the owners or occupiers of the Property and make good any damage caused to the Company's reasonable satisfaction and pay full compensation in respect of any damage caused and not made good and any loss caused to the Company due to such damage;

5.7.2 not to cause any nuisance, annoyance or disturbance to the Company or occupiers of the Property, or of any neighbouring land, or to any other person entitled to the rights in common with the grantee;

5.7.3 not to obstruct any Accessway or deposit any waste, rubbish, soil or other material on the Property or in any other way interfere with or disturb the exercise of the rights granted or similar rights by any other person authorised by the Company;

5.7.4 to keep each Accessway clean and free from obstruction and in suitable repair and condition for agricultural use making good any damage to the made-up surface of Accessway 1 where it passes through Hothe Court Farm where the Accessway is used for general pedestrian and vehicular use by the Company and its invitees;

5.7.5 to pay to the Company on written demand all costs incurred due to the grantee's failure to comply with these covenants within 28 days of notice of breach;

5.7.6 to keep the gate erected at point X on plan 6 in good repair and condition (once erected by the Company);

5.7.7 to use all reasonable endeavours to prevent trespass along the Accessway by anyone not authorised to exercise the rights by the grantee.

The grantee surrendered any other pedestrian and vehicular rights over the Property.

5.8 The Company covenanted in the 2012 deed of easement:

5.8.1 subject to the rights reserved by the deed, not to obstruct, interrupt or interfere with the rights granted to the grantee;

5.8.2 to erect within 28 days, at the Company's expense, double gates at the point marked X on plan 6. The Company has confirmed that gates have been erected.

**6 In this part of the Certificate, references to the "Property" means Parcel E registered under title numbers K660178 and K709599.**

6.1 By a conveyance dated 24 December 1946 and made between (1) George Frank Whiteman (2) Winifred Harriett Stevens and others (purchasers) and (3) Winifred Harriett Stevens and others (trustees) the Property was conveyed subject as regards the lands affected thereby to a fee farm rent of 11 shillings and sixpence payable in the year 1884 to Messrs Hedges so far as the liability still exists and is enforceable. The Company has confirmed that it has not paid nor received any demand to pay such sum. Please refer to paragraph 9 of Schedule 3 for details of the indemnity insurance to be taken out by the Company on the date of this Certificate.

6.2 By a Deed of Grant dated 21 February 1969 and made between (1) Frank Stevens and others and (2) South Eastern Gas Board the part of the Property registered under title number K660178 is subject to the following:

6.2.1 Easements to lay construct inspect maintain use replace remove or render unusable a main or pipe for the transmission or storage of gas or other materials connected with the exercise and performance of the functions of the Board and all necessary apparatus ancillary thereto (the "said works") over the strip of land 20ft in width shown hatched blue on plan 7 (the "Strip") and to pass over the Strip and over strips of land 10ft wide adjoining the Strip for the purposes of the said works and of any works of the Board continuous therewith and over the said land for the purposes of access to the Strip at all reasonable times and in an emergency at any time whether or not with workmen vehicles machinery and apparatus;

6.2.2 Restrictive covenants:

(i) not to do or cause or permit to be done on the said land anything calculated or likely to cause damage or injury to the said works and to take all reasonable precautions to prevent such damage or injury;

(ii) not without the Board's prior written consent to make or cause or permit to be made any material alteration to or any deposit of any thing upon any part of the Strip or any part of the said land being a part nearer than 10ft measured in any direction from the Strip so as to interfere with or obstruct the access thereto or to the said works by the Board or so as to lessen or in any way interfere with the support afforded to the said works by the surrounding soil including minerals or so as materially to reduce the depth of soil above the said works;

(iii) not to erect or install or cause or permit to be erected or installed any building or structure or permanent apparatus in through upon or over the Strip nor save with the Board's written consent (not to be unreasonably withheld) any part of the said land being a part nearer than 10ft measured in any direction from the Strip.

6.3 By the 1982 Conveyance, the Property is subject to the following rights reserved:

6.3.1 Right of passage and running of gas electricity drainage and water from and to the vendors' adjoining and neighbouring land through the pipes wires cables in under upon or over the property conveyed. The Company has not seen a copy of the 1982 Conveyance and so cannot comment on the extent of the vendors' adjoining and neighbouring land to which this right relates;

6.3.2 Right to enter the property conveyed so far only as may be necessary for the inspection repair and maintenance of the pipes wires and cables making good any damage to the property conveyed by the exercise of such right.

6.3.3 Right reserved to the vendors and their successors in title the registered proprietors of title number K83980 of the further adjoining land of the vendors known as Eastingdown Alcroft Grange Road Tyler Hill in Hackington Parish (as shown edged red on the attached plan 9 and currently owned by Roland David Evans and Belinda Evans) to receive supplies of water through the water pipe laid under Lots 1, 2 and 3 between the points marked A, B and C and D on the conveyance plan the vendors or their successors in title paying to the purchaser or his successors in title one quarter

of the cost of maintaining repairing and renewing the section of pipe between the points marked A and B on the plan one third of such cost between points B and C and one half of such cost between points C and D and a right to enter Lots 1, 2 and 3 for the purpose of inspecting repairing renewing and maintain the said water pipe and a right in respect of Lots 1 and 2 of passage and running of electricity from and to the vendors' adjoining land through the wire in under upon or over Lots 1 and 2 to the said adjoining and neighbouring land of the vendors to the Rediffusion Station erected thereon. The Company is not aware of any demands for payment for repairs or maintenance having been made. The Company is not aware of any repair activity to the water supply and so does not believe that these rights are being exercised. The title entry notes that the Property forms part of Lot 1 and the water pipe is shown by a broken blue line on plan 8 so far as it affects the Property. Point B is marked on plan 8 and points A, C and D do not affect. The Company has not seen a copy of the 1982 Conveyance and so cannot comment on the extent of the land to which this right relates.

6.4 By a transfer of The Lodge, Little Hall Farm dated 13 July 1987 and made between (1) Pamela Grace Gadenne and (2) Philip James Faithfull and Jacqueline Nora Faithfull the part of the Property registered under title number K709599 is subject to the right to connect and to use and receive a supply of electricity and a supply of water and gas (as and when available) through the wires cables pipes and drains existing at the date of the transfer or constructed for the benefit of The Lodge within 79 years from the date of the transfer on the remainder of the transferor's adjoining land subject to the transferees paying a fair proportion of the expense of repairing and maintaining and rebuilding and cleansing the same whenever used in common with others with the right for the transferees to enter the transferor's adjoining land for the purpose of such repairing and cleansing, making good all damage occasioned by the exercise of such right.

6.5 The land tinted pink on plan 7 is subject to an option to purchase in favour of Mercia Crematoria Developments Limited contained in an option agreement dated 3 May 2011 and made between (1) Florence Lilian Harding and (2) Mercia Crematoria Developments. The option period was due to expire on 2 May 2013 but was subject to an extension due to a live application for planning permission at that date (reference CA//13/00289). The agreement provides for the option period to be extended until the date of a refusal or deemed refusal of the planning application. The planning officer's report recommended a refusal and the application was withdrawn on 22 May 2013. The option has not been exercised and the Company's view is that the option period has therefore now expired and an application is being made to the Land Registry to remove the notice on the title register.

6.6 A transfer of the Property dated 30 January 2015 and made between (1) Jill Celia Jenkins, Pamela Grace Gadenne and Roy Spencer Harding and (2) the Company, the Company contained overage provisions. The overage period has now expired and an application is being made to the Land Registry to remove the restriction on title relating to these provisions.

**7 In this part of the Certificate, references to the "Property" means Parcel F registered under title number K844020.**

7.1 As for Parcel E, the Property is subject to:

7.1.1 the fee farm rent in the 24 December 1946 conveyance; and

7.1.2 the rights reserved in the 1982 Conveyance (note that in respect of the water pipe, the Property forms part of Lot 3. The water pipe is shown by a broken blue line on plan 10 in so far as it affects the Property and Points C and D are also marked on plan 10. Points A and B do not affect the Property)

each referred to above. Please refer to paragraph 9 of Schedule 3 for details of the indemnity insurance to be taken out by the Company on the date of this Certificate.

7.2 By a Deed dated 30 July 1991 and made between (1) the Company and (2) Seeboard plc, the Property is subject to the following rights granted to Seeboard and its successors in title:

7.2.1 to retain construct erect and maintain (including to use and from time to time repair alter re-construct re-erect renew supplement inspect examine test and remove) electric lines as defined in section 64(1) of the Electricity Act 1989 and communications cables (the "overhead electric lines") over the Property in the approximate positions shown by a continuous red line on the attached plan 13 together with the necessary poles and stays in the approximate positions indicated in red on the said plan (and any other means of support and apparatus as Seeboard now requires or may hereafter reasonably require) (the "poles and stays");

7.2.2 to retain lay and maintain (including to use and from time to time adjust repair alter relay renew supplement inspect examine test and remove) underground electric lines and communications cables under the land shown coloured yellow on plan 13;

7.2.3 in a proper and woodmanlike manner and at its own expense to fell or lop from time to time all timber and other trees now or hereafter on the Property within a distance of 4.3m on either side of the overhead lines which would, if not felled or lopped, obstruct or interfere with the construction erection and maintenance or operation of the overhead electric lines;

7.2.4 to break up the respective surfaces of the sites of the poles and stays and the land coloured yellow on plan 13 so far as may be necessary from time to time in connection with the exercise of the rights granted at paragraphs 1 or 2 above;

7.2.5 to enter the Property for all purposes connected with the rights granted.

7.3 Seeboard covenanted as follows with the Company:

7.3.1 to exercise the rights so as to cause no unnecessary damage injury or disturbance and to make good all damage caused thereby at Seeboard's expense to the Company's reasonable satisfaction provided if such damage

cannot be made good to the Company's reasonable satisfaction or if Seeboard prefer, Seeboard can pay compensation to the Company in lieu of making good;

7.3.2 if requested, to remove all timber and other wood felled or lopped in the exercise of the rights.

7.4 The Company covenanted with Seeboard as follows:

7.4.1 with the intent to bind the Property not without Seeboard's prior written consent to (and note references to overhead electric lines and poles and stays include intended routes and sites prior to erection):

(i) erect or extend or permit or suffer to be erected or extended any dwellinghouse building or other erection or structure within 4.3m on either side of the overhead electric lines or so as to encroach upon the foundations of any of the poles and stays or upon the ground supporting the same;

(ii) plant or permit or suffer to be planted any timber or other tree on the Property within 7.6m on either side of the overhead electric lines;

(iii) alter or permit or suffer to be altered the level of the ground within 4.3m on either side of the overhead electric lines or within an area surrounding the poles and stays of 4.3m or elsewhere on the Property so as to obstruct vehicular access to any of the poles and stays;

(iv) allow or permit or suffer to be allowed any vehicle machinery or plant of any description to approach or pass under the overhead electric lines unless a clear space of not less than 1.5m can be and is at all times maintained between any conductor forming part of the overhead electric lines and all parts of any such vehicle machinery or plant and any person riding thereon;

7.4.2 with the intent of binding the land coloured yellow on plan 13 and every part of the Property which lies within 1.5m of the land coloured yellow:

(i) not to do or permit or suffer to be done any act which would interfere with or damage any underground electric line;

(ii) not to alter or permit or suffer to be altered the existing level of nor to cover or permit or suffer to be covered the surface of the land coloured yellow in a way which renders the laying of or access to any underground electric line thereunder impracticable or more difficult than at the date of the deed provided always this does not prevent the laying and/or re-laying of appropriate surfaces on any part of the land coloured yellow forming the site of an intended or existing road or footpath or other way after the initial laying of underground electric lines;

(iii) not to erect or permit or suffer to be erected any building or structure (other than as shown on plan 13) nor to plant or permit or suffer to be planted any trees on or within 1.5m of the land coloured yellow.

7.5 A licence dated 18 March 2005 and made between (1) the Company and (2) Brett Waste Management Limited ("**BWML**") relates to the installations of boreholes. BWML required 2 boreholes in the Property in order to monitor the quality of water in the water table close to its waste management operations at Shelford and the soil gas concentrations in the adjacent subsoil. The licence provides as follows:

7.5.1 The licence grants the right for BWML, its employees, contractors and agents to go onto the land shown edged red on the attached plan 12 at all times throughout the term of 30 years from the date of the licence with vehicles, plant, machinery and other equipment for the purposes of:

(i) initially, drilling a borehole on each borehole site marked GWM 45 and GWM 46 on plan 12 to a depth of 45m or thereabouts as required to intercept the groundwater table by 5m;

(ii) thereafter:

(A) monitoring the groundwater levels and quality and the soil gas concentrations in each borehole, including taking samples of water and other materials from each borehole for analysis;

(B) surveying the boreholes from time to time as and when BWML consider necessary;

(C) carrying out repair and maintenance works to the boreholes and borehole sites and redrilling the boreholes as and when necessary;

(D) doing any other works required to comply with the water and soil gas monitoring and other requirements of the PPC Permit issued under the Pollution Prevention and Control Regulations 2004 for Shelford; and

(E) doing anything incidental to the things mentioned in paragraphs i - iv.

7.5.2 BWML must use the access route shown by the broken black line on plan 12 when exercising its rights and must not obstruct the access route. When any drilling works required in connection with the installation, maintenance, repair or redrilling of the boreholes (or anything ancillary or incidental to such works) ("**Drilling Works**") are completed, BWML must use reasonable endeavours to exercise the rights on foot only and minimise vehicular access to the borehole sites, except when reasonably necessary and minimise the area taken for turning vehicles when gaining vehicular access to the borehole sites. The Company has confirmed that the licensee do not have active keys to the gates and so take access on foot.

7.5.3 BWML shall:

(i) give not less than 7 days' written notice to the Company of its proposed start date for the Drilling Works (provided they are started in 2004) and (except in emergency) not less than 6 weeks' notice of any other works to be carried out under the licence, other than monitoring;

(ii) use reasonable endeavours to complete the Drilling Works within 10 working days. So far as the Company is aware, the Drilling

Works have been completed and the rights granted under the licence are exercised from time to time;

(iii) leave any silty water arising from the Drilling Works on the surface of the Property to evaporate or soak away and clear away any silt residues remaining on the surface of the Property in conjunction with its reinstatement works;

(iv) ensure the Drilling Works are supervised by a suitably qualified representative;

(v) ensure the Drilling Works are fenced off to minimise danger and the risk of accidents to persons and livestock;

(vi) ensure adequate warning signs are placed during the Drilling Works in a prominent position at the site access point to bring the potential hazards of the Drilling Works to the attention of any person in their vicinity;

(vii) remove all plant, equipment and debris on completion of the Drilling Works, reinstate the surface of the Property surrounding the borehole sites and leave it in a safe and satisfactory condition;

(viii) provide the Company with copies of any planning consents required for the Drilling Works and the installation and use of the borehole sites and evidence of compliance with any conditions;

(ix) exercise its monitoring and sampling rights on a weekly basis unless monitoring or sampling is required more/less frequently by the PPC Permit and not exercise those rights more frequently than as required, except in case of need;

(x) obtain at its own cost any statutory and other consents required in respect of any works or the exercise of any rights;

(xi) indemnify the Company against any costs expenses claims damages proceedings and other liability sustained as a direct consequence of anything BWML does or fails to do under this licence, except to the extent the Company or any employee, agent, contractor or invitee does or fails to do anything that causes or contributes to that liability;

(xii) effect and maintain public liability insurance of not less than £10 million any one claim throughout the term;

(xiii) repair and make good to the Company's reasonable satisfaction all damage caused by BWML to any fences, walls, hedges, gates, drains, culverts, roads (including access across the field) and the like in the exercise of any rights;

(xiv) comply with all statutory duties in the exercise of the rights;

(xv) pay any VAT due on any sums due under the lience;

(xvi) discharge direct or indemnify the Company against all outgoings, rates and other precepts in respect of the land and its use and occupation.

7.5.4 The Company may terminate the licence by one month's written notice if BWML is in breach of any material obligation which it fails to remedy within a reasonable time of being given written notice of such breach or goes into liquidation (compulsory or voluntary, save for the purpose of amalgamation or

reconstruction) or has an administration order made against it. If the licence is terminated, BWML must make good the borehole sites and reinstate them as nearly as practicably possible to their original condition to the Company's reasonable satisfaction.

7.5.5 BWML may not assign the licence other than to another company in the Robert Brett Group of companies or a person who acquires Shelford or an interest in Shelford and is obliged to comply with the PPC Permit and requires to exercise the rights for that purpose.

7.6 The Property is subject to the following covenants made in the 2006 Deed by the grantees (which include the Company):

7.6.1 To keep the water pipe in good repair and condition and make good all damage to the Owners' Land and in respect of any agricultural land, to compensate the owners for any loss of crop or grazing caused by the installation, repair, maintenance, removal, replacement and renewal of the pipe as soon as practicable. The Company is not aware of any compensation being paid in this regard.

7.6.2 To cause to be supplied and laid:

(i) a further and separate pipe for the sole use of Catherine Carmel Whitington from point "C" to point "D" on plan 11 subject to Catherine Whitington contributing £300 plus VAT;

(ii) a further and separate 25mm pipe for the sole use of the Company and locate and connect it at their own expense to the troughs marked X and Y on plan 11 such works to be carried out to the reasonable satisfaction of the Company's surveyor. The Company has confirmed that such works have been carried out so far as it is aware.

7.6.3 To pay the owners' reasonable legal fees for the Deed;

7.6.4 Not to obstruct the owners in the use of their land (subject to the owners' covenant set out in paragraph 5 below where such use is prejudicial to the grantees' rights);

7.6.5 To indemnify the owners from and against any act damage or liability suffered by the owners as a consequence of the grantees exercising their rights as set out above.

7.7 The Property is subject to the following covenants made in the 2006 Deed by the owners (which include the Company – see paragraph 3.3 above for details):

7.7.1 To permit the grantees (as set out in paragraph 3.3 above), their employees and agents to enter on to the land from time to time on 48 hours' notice (save in emergency and then at any time) in order to repair or maintain the pipe;

7.7.2 To inform the grantees or their agent of any damage to or deterioration in the pipe as soon as they become aware of it;

7.7.3 to notify the grantees of any claim made against them and not to admit any liability and to permit the grantees to defend any claim;

7.7.4 each owner is to indemnify the grantees in respect of any damage done to the pipe or associated apparatus by that owner or their employees agents or assigns wilfully negligently or accidentally;

7.7.5 not to use the land for any purpose which will be prejudicial to the pipe without the grantees' consent and if any diversion of the pipe would facilitate the owners' intended use of the land, a diversion shall be made at a total cost of the owners to the same standard as the original pipe. No diversion shall be made without the grantees' consent (not to be unreasonably withheld).

**8 In this part of the Certificate, references to the "Property" means the Track registered under title number K693414.**

8.1 By a conveyance of the Property and other land dated 30 April 1884 and made between (1) George Whiteman and (2) Neville Louis Cooper the Property is subject to a right in favour of the vendor his heirs and assigns and their agents servants and workmen at all times to a free and uninterrupted right of way over and along the road on the south side of the premises conveyed and coloured brown into other property owned by the vendor on the south side of the said road. The Land Registry title register notes that the Property forms part of that part of the brown referred to over which the rights are excepted. The Company cannot confirm where the right is granted from nor whether it is still exercised.

8.2 The Property is subject so far as may be affected thereby to a Lease of shooting and sporting rights dated 10 November 1876 and made between (1) Mary Barbara Felicity Hales and (2) George Beer. No further details of the lease were supplied on first registration and the Company does not have a copy of such lease. The Company is not aware of any such rights being exercised over the Property. Please refer to paragraph 9 of Schedule 3 for details of the indemnity insurance to be taken out by the Company on the date of this Certificate.

8.3 The Property is subject to the following rights for the purchaser their heirs and assigns and their tenants and workmen granted by a conveyance of the land tinted pink on the attached plan 14 dated 3 March 1955 made between (1) Madeline Ruth Oldham and Helen Alice Primrose Oldham and (2) Winifred Harriett Stevens:

8.3.1 right to enter upon the adjoining land of Neville Louis Cooper at all reasonable times for the purpose of cutting the undergrowth within 4ft of the fences separating the land conveyed from Cooper's adjoining land

8.3.2 right of way in common with all other persons having similar rights at all times and for all purposes with or without vehicles over and along the road coloured brown on the conveyance plan leading from the main road from Canterbury to Whitstable to the land conveyed the purchasers and their heirs and assigns paying a proportionate part of the cost of keeping such road in repair. The Company is not aware of any demand for financial contribution.

The Land Registry title register notes that the Property forms part of that once owned by Neville Louis Cooper and part of the road coloured brown referred to forms part of the Property.

8.4 By a Conveyance dated 20 August 1990 and made between (1) Neville Sydney William Fraser and Louis Vernon John Arnold and (2) the Company, the Property is subject to:

8.4.1 a right of way reserved for the benefit of the vendors' adjoining land with or without vehicles of all descriptions at all times and for all purposes over so much of the land conveyed as presently comprises the track or way. The land conveyed is shown coloured red and coloured green on the attached plan 15. The Company cannot confirm the extent of the vendors' adjoining land which benefits from this right but note that the benefit is registered on the property registered with title number K932162, as shown edged red on the attached plan 32.

8.4.2 a covenant by the Company to pay 10% of the Net Development Value when the Development Value is realised in respect of the whole or any part of the land edged blue on the attached plan 16 (which is Parcel F) during the perpetuity period of 80 years from 20 August 1990. To realise the Development Value, part or whole of the Property must be used as a means of access or part of an access to the Development Unit;

(i) Development Unit means so much of Parcel F as shall for the time being be comprised within a current planning permission the primary purpose of which is residential business or industrial development. Development for sporting or recreational purposes is specifically excluded. Note that the conveyance refers to this being the definition of "Development Value" but the Company believes that this is a mistake as Development Value is subsequently defined below and that the correct reference should be to "Development Unit".

(ii) Development Value shall be realised or deemed realised but once only in respect of the same land:

(A) in relation to a Development Unit, when work starts pursuant to a qualifying planning permission on the construction of any road or building;

(B) in relation to a Development Unit sold before such work starts, when such sale completes.

(iii) The Net Development Value is the difference between the Development Value and the Base Value when the Development Value is realised.

(iv) Development Value shall be the open market value of the land in respect of which it is realised at the date it is realised or, if realised by sale, the larger of the sale price (including any consideration paid or provided in addition to any cash consideration) and the market value. Any sale or disposition at arm's length without intention to confer a gratuitous benefit on the purchase shall be deemed to be at market value.

(v) Base Value means the market value of the land without a qualifying permission at the time the Development Value is realised plus any expenditure incurred by the Company in applying for and obtaining a qualifying permission or in relation to any agreement concluded with the planning or other statutory body as a condition precedent to

the grant of a qualifying permission, including expenditure reasonably and necessarily incurred in pursuing an appeal against the refusal of such a planning application.

(vi) If the parties cannot agree the Net Development Value, it can be referred to an independent valuer for expert determination.

There is no restriction on the title to the Property in relation to this obligation.

8.4.3 a covenant by the Company to pay 10% of any consideration (less £5,000) received by the Company upon the sale (of a freehold or leasehold interest) or on the grant (except for the benefit of Parcel F) of a right of way or other easement over the Property or any part during the perpetuity period. There is no restriction on the title to the Property in relation to this obligation. The title register notes an equitable charge arising by operation of law by reason of this provision in the conveyance.

8.5 As for Parcel F, the Property is subject to the rights granted and the restrictive covenants contained in the 2006 Deed noted at paragraph 3.3 above.

**9 Tenancies**

The Property is subject to the following Farm Business Tenancies and licence. Please refer to Schedules 5 and 5A for further information.

1. Undated tenancy for pasture land and buildings at Hothe Court Farm made between (1) the Company and (2) E H Holdstock and Son
2. Undated tenancy for arable land, north and south of Hothe Court Farm and 20 acres at Little Hall Farm for a term commencing on 25 October 2017 and expiring 29 September 2022 and made between (1) the Company and (2) A J Strand & Sons.
3. Licence over land at St Stephen's Hill, Canterbury extending to 45 acres, The Southern Slopes dated 29 May 2019 for a period commencing on 23 June 2019 and expiring on 29 September 2022 and made between (1) the Company and (2) I Machin.

**Part 4**

**Existing Use**

Parcels B, C and D, Parcel E and Parcel F - Agricultural

Track – track used for access

## SCHEDULE 3

## Matters affecting the Property

**TITLE**

1. **Title documents, stamp taxes and value added tax**

1.1 The documents of title consist of original documents or properly examined abstracts and are held by us, or will be held by us, on completion of the Transaction to the order of the Company.

1.2

1.2.1 Where necessary, all such title documents are fully stamped with ad valorem stamp duty and a particulars delivered stamp.

1.2.2 Where such title documents have not been registered at Land Registry at the date of this Certificate, we have seen a related certificate from HM Revenue & Customs evidencing submission of a land transaction return for the purposes of stamp duty land tax in relation to all circumstances in respect of which a land transaction return is required to be made.

1.3 The Company has told us that no further land transaction return or payment in relation to stamp duty land tax is required in respect of any transaction involving the Property which has an effective date prior to the date of this Certificate and there is nothing on the face of the documents to suggest otherwise.

1.4 For the purposes of paragraph 1.5, "option to tax" has the meaning given in Schedule 10 the Value Added Tax Act 1994 and includes an option to tax which has been deemed, or treated as having been, exercised.

1.5 The Company has told us that a valid option to tax has been exercised by the Company or a body corporate in relation to which the Company is either a relevant associate or a relevant group member over the whole Property and that such option has not been, or been deemed to be, disapplied or revoked so that value added tax is due in respect of any supply of the Property by it.

***Disclosures***

*1.1 The documents of title reviewed are those available as Official Copies at the Land Registry. The Company holds originals of the farm business tenancies and licence dated 29 May 2019 referred to in Part 3 of Schedule 2. Please refer to Schedule 2 for details of the documents which were not available for review. The Company does not know who holds the original deeds.*

*1.5 An option to tax has been exercised in respect of Parcels B, C and D only.*

2. **Unregistered land**

Where title to the Property is not registered at Land Registry:

2.1 there is no caution registered against first registration and no event has occurred in consequence of which registration of title should have been effected.

2.2 clear Land Charges Act searches against every estate owner who was a party to any transaction, or concerned in any event, comprised in the relevant title are held with the title deeds.

***Disclosures***

3. **Access**

3.1 The Company has told us the location of each point where access is gained to the Property.

3.2 We have reviewed the title plan for the Property and a plan from the relevant Highways Authority showing the boundaries of publicly maintainable highways and we have where appropriate consulted the Company and on that basis we confirm that the Property appears to abut a roadway maintainable at public expense at each point where access is gained or have the benefit of all necessary rights of way to and from such a roadway.

***Disclosures***

*The Highways Search for Parcels B, C and D is awaited at the date of this Certificate and expected on 4 May 2020. The local search dated 3 February 2020 confirms that Tyler Hill Road, Tile Kiln Hill and Whitstable Road are all highways maintainable at public expense.*

*The Highways Search for Parcel E dated 23 January 2020 identifies that:*

1. *Alcroft Grange, Canterbury is a private road. Please see the attached plan 18.*
2. *St. Stephens Hill, Canterbury is a public road. Please see plan 18. The Property has the benefit of a right of way to St Stephen's Hill, as shown coloured brown on plan 7 and plan 8.*
3. *A public footpath passes along the track to the north of Parcel E. Please see the attached plan 19.*

*The Highways Search for Parcel F dated 13 February 2020 identifies that:*

1. *Alcroft Grange, Canterbury is a private road. Please see the attached plan 20 and plan 21. The nearest highway maintainable at public expense is Canterbury*

*Hill, approximately 614m to the south west. The Property has the benefit of a right of way to St Stephen's Hill, as shown coloured brown on plan 10.*

2. *The Property is surrounded and crossed by public footpaths. Please see the attached plan 22 and plan 23.*

*The Highways Search for the Track dated 23 January 2020 identifies that:*

3. *Alcroft Grange, Tyler Hill is a private road. The nearest highway maintainable at public expense is Canterbury Hill, approximately 0.4km to the south west. The Property has the benefit of a right of way to St Stephen's Hill.*
4. *A public footpath passes along the Track. Please see the attached plan 17.*

4. **Benefits**

4.1 There are appurtenant to the Property the Benefits of a material nature set out in Schedule 2 Part 2. The Company has told us that, so far as it is aware, those Benefits are the only Benefits necessary for the use and enjoyment of the Property for the Existing Use or (if no Benefits are so set out) that none are required.

4.2 Such Benefits are enjoyed freely without interruption and without payment or restriction as to hours of use or otherwise and are held for the same estate or interest as the Company's estate or interest in the Property. None of those Benefits is enjoyed on terms entitling any person to terminate or curtail it.

4.3 Where any such Benefit requires protection (in order to bind all other persons) by:

4.3.1 registration or notice on the title to any registered land; or

4.3.2 a caution against first registration or land charge in respect of any unregistered land

such protection has been properly effected.

***Disclosures***

*4.3.2 Part of the land over which the rights granted by a transfer of Parcels B, C and D dated 28 April 2006 referred to in more detail in Schedule 2 Part 2 is unregistered.*

*The Part of the track to the north of Parcel E over which Parcels E & F and the Track have a right of way is unregistered.*

*The Company has not seen evidence of a caution against first registration or land charge in respect of those rights.*

5. **Incumbrances**

5.1 The only Incumbrances of a material nature to which the Property is subject are disclosed in Schedule 2 Part 3. The Company has told us that it has not received notice of any breach of and is not aware of any breach of those Incumbrances and that those Incumbrances do not materially adversely affect the Existing Use.

5.2 Where any such Incumbrance requires protection (in order to bind all other persons) by:

5.2.1 registration or notice on the title to the Property (where registered); or

5.2.2 a caution against first registration or land charge in respect of the Property (where unregistered)

such protection has been properly effected.

5.3 The Company has told us that it is not aware that any person is in the process of acquiring an Incumbrance over the Property through prescription other than rights to light or rights to air.

***Disclosures***

*5.2 Note that the covenant to pay overage on the realisation of the Development Value of Parcel F, as set out in the Conveyance of the Track dated 20 August 1990 and described in Part 3 of Schedule 2 in more detail is noted only on the title to the Track and not on the title to Parcel F.*

6. **Charges**

There are no mortgages, charges or liens (whether legal or equitable, specific or floating) affecting the Property.

***Disclosures***

*The Security Agent is aware of the Charge affecting the Property pursuant to this Transaction.*

7. **Agreements**

7.1 There are no agreements for sale, estate contracts, options, rights of pre-emption or similar matters affecting the Property the provisions of which remain to be observed or performed.

7.2 There are no obligations binding on the Property to make future payments in respect of overage, clawback, deferred consideration or other payments of a similar nature.

***Disclosures***

*The land tinted pink on plan 7 was subject to an option to purchase in favour of Mercia Crematoria Developments Limited contained in an option agreement dated 3 May 2011. It is the Company's view that this option has now expired and an application is being made to remove the notice of the option from the title to Parcel E. Please refer to paragraph 6.5 of Part 3 of Schedule 2 for more details. 6.6*

*A transfer of Parcel E dated 30 January 2015 contained overage provisions. The overage period has now expired and an application is being made to remove the notice of the transfer from the title to Parcel E. Please refer to paragraph 6.6 of Part 3 of Schedule 2 for more details.*

*The Track is subject to two covenants to pay overage or similar contained in a conveyance dated 20 August 1990. Please refer to paragraph 8.4 of Part 3 of Schedule 2 for more details.*

8. **Adverse rights**

8.1 The Company has told us that it is or is entitled to be in actual occupation on an exclusive basis of those parts of the Property as are not the subject of the Letting Documents and that, except by virtue of the Letting Documents, no person, other than the Company, has any right (actual or contingent) to possession, occupation or use of, or interest in, the Property.

8.2 The Company has told us that it has inspected the Property not more than 20 working days before the date of this Certificate and that, so far as it is aware, no one is in adverse possession of the Property or has acquired or is acquiring any rights adversely affecting the Property other than rights to light or rights to air.

***Disclosures***

9. **Title policies**

The Company has told us that there are no insurance policies relating to planning, title or covenants affecting the Property.

***Disclosures***

*The Company shall put in place a policy on the date of this Certificate as follows:*

- *Insurer: Liberty Legal Indemnities, underwritten by Liberty Mutual Insurance*

*Europe SE*

- *Premium: £895 (inclusive of Insurance Premium Tax)*
- *Insured: the current and future owner(s) of the Property, their lessees and any bank, building society or other lender holding a mortgage or charge on the Property*
- *Policy limit: £1,000,000 increasing by 10% compound interest per annum on each anniversary of the policy commencement date but not exceeding 200% of the original policy limit*
- *Policy term: indefinite from policy commencement date, subject to the terms of the policy*
- *Property: Parcels B, C & D; Parcel E, Parcel F and the Track*
- *Insured Risk: title to the Property is or may be subject to:*
    - *known or unknown freehold restrictive covenants imposed prior to the policy commencement date which may have been breached by the Insured Use;*
    - *rights of way and/or rights to lay services imposed in a deed dated at least 20 years prior to the policy commencement date which have been physically obstructed for a period of at least 12 months prior to the policy commencement date;*
    - *unknown freehold rights, easements, exceptions and/or reservations imposed prior to the policy commencement date;*
    - *rights to collect an outstanding freehold fee farm rent charge liability created prior to 20 August 1977;*
    - *shooting and sporting rights as referred to in a deed dated at least 20 years prior to the policy commencement date;*
- *Insured Use: continued use as commercial or mixed commercial and residential premises, including any extensions, additions or alterations, as in existence and which has remained unaltered for at least 12 months at the policy commencement date*
- *The insurance covers:*
    - *the cost of defending or prosecuting any legal proceedings*
    - *damages, compensation and costs awarded against the insured by a court or tribunal*
    - *the expense of complying with an injunction or an undertaking given by the insurer in the insured's name*
    - *surveyor, architect and/or planning consultant fees, and any capital monies contracted or expended, which are subsequently rendered abortive*
    - *reduction in market value of the property following enforcement of the restrictive covenants, rights and/or easements*
    - *any other costs and expenses incurred with the insurer's prior written agreement*
- *The following claims are not covered by the insurance:*
    - *claims relating to any rights physically exercised at the property on the policy commencement date;*
    - *claims relating to any restrictive covenants, rights or easements not specified on the policy schedule*

- *Restrictions on cover:*
    - *the use and/or works at the property as stated on the policy schedule*
    - *the policy limit*

10. **Complaints and disputes**

The Company has told us that:

10.1 it has not made and not had occasion to make any claim or complaint in relation to any neighbouring property or its use or occupation; and

10.2 there are no disputes, claims, actions, demands or complaints in respect of the Property which are outstanding or which are expected by it.

***Disclosures***

*10.2 From time to time, the Company has dealt with individuals who ride their motorbikes from the adjoining woodland on to Parcel F. The Company acts to remove such persons as soon as it becomes of them and there is nothing outstanding in this regard at the date of this Certificate.*

11. **Notices**

The Company has told us that no notices materially affecting the Property or any of the Benefits detailed in Schedule 2 Part 2 have been given or received by the Company.

***Disclosures***

**PLANNING**

12. **Existing Use**

12.1 The Company has told us that the Property is presently used for the Existing Use.

12.2 The Existing Use is a use permitted under a subsisting planning permission (which the Company has told us has been implemented) or otherwise permitted under the Town and Country Planning Legislation.

***Disclosures***

*12.1 – Part of Parcel B and adjoining the boundary of Parcel C form part of the 'Crab and Winkle Way', which is part of the national cycle network. This route follows public bridleway CB24A through Parcel B (where it is tarmacked) and continues adjacent to Parcel C (where the Company believes is a gravel path). The Company has confirmed that the route is maintained by the local authority.*

13. **Development**

13.1 The Company has told us that it is not aware that:

13.1.1 any development which has been carried out in relation to the Property is unlawful or has been carried out without any necessary consents or permissions being obtained;

13.1.2 any enforcement proceedings under the Town and Country Planning Legislation have been commenced or notices served; or

13.1.3 any such proceedings or notices have been proposed.

13.2 The Company has told us that it is not aware of any acts, omissions or other circumstances by reason of which a planning enforcement order may be applied for or made in relation to the Property.

***Disclosures***

14. **Validity of permissions**

The Company has told us that no planning permission affecting the Property is the subject of an existing challenge as to its validity. Our local authority search did not reveal that any planning permission has been issued within the six weeks immediately before the date of that search.

***Disclosures***

15. **Conditions**

15.1 The planning permissions affecting the Property are subject only to conditions which the Company has told us have either been satisfied so that nothing further remains to be done

under them or, in the case of continuing conditions, are being complied with and the Company knows of no reason why those conditions should not continue to be so complied with.

15.2 There are no unusual or onerous conditions attaching to any planning permission affecting the Property, and no planning permission is subject to any condition or limitation making it temporary (other than the conditions referred to in Sections 91 and 92 of the Town and Country Planning Act 1990) or personal to anyone.

***Disclosures***

*15.2 – Parcel E benefits from planning permission ref CA/04/C0499/HAC for "change of use from farm buildings to storage, drying, preparation and cutting of timber". This consent is personal to "Messrs G Thornhill and S Stankovitch of Artisan Oak Buildings Limited". However, it is no longer relied on for the Existing Use (and the Company has indicated that any reliance on it would have pre-dated its interest in the Property). These buildings are currently vacant and not used.*

16. **Pending applications**

The Company has told us that there is no application for planning permission in respect of the Property awaiting determination and no planning decision or deemed refusal which is subject to appeal.

***Disclosures***

17. **Planning agreements or obligations**

17.1 There is no agreement or planning obligation or planning contribution (together a "Planning Agreement") affecting the Property under Section 52 of the Town and Country Planning Act 1971, Section 38 and Section 278 of the Highways Act 1980, Section 33 of the Local Government (Miscellaneous Provisions) Act 1982, Section 106 of the Town and Country Planning Act 1990, Section 104 of the Water Industry Act 1991, Part 11 of the Planning Act 2008 or any provision in legislation of a similar nature and the Company has told us that it is not required to enter into any such Planning Agreement.

17.2 Where there is any Planning Agreement, the Company has told us that, so far as it is aware:

17.2.1 all of the obligations which have fallen due as at the date of this Certificate have been observed or performed and no notice of breach has been received; and

17.2.2 there are no material obligations which remain to be observed or performed.

***Disclosures***

*17.1 and 17.2.2 – Whilst it does not bind the Property, a S.106 Agreement dated 23 October 2014 which relates to the Sibson Building which forms part of the Company's main campus (phase 1) affects the Property in that it contains ongoing obligations to:*

*(a) carry out planting within one field on Parcel B (within an identified area of approximately 2.34ha) in accordance with a Woodland Creation Method Statement appended to the S.106 Agreement, and subsequently manage that new planting (again in accordance with the Woodland Creation Method Statement, which contains a schedule of maintenance obligations, some of which have no specified end date); and*

*(b) manage existing woodland planting on the existing woodland within Parcel B in accordance with the Methodology for Mitigation and Enhancement appended to the S.106 Agreement. As above, this contains a schedule of maintenance obligations with unspecified end dates for some of the management operations. .*

18. **Listed buildings etc.**

None of the buildings or other structures or erections on the Property has been listed under Section 1 of the Planning (Listed Buildings and Conservation Areas) Act 1990 nor has the relevant local authority served or authorised the service of any building preservation notice under Section 3 of the Planning (Listed Buildings and Conservation Areas) Act 1990 or any repairs notice under Section 48 of the Planning (Listed Buildings and Conservation Areas) Act 1990 in respect of the Property, nor is the Property located within a conservation area.

***Disclosures***

*The Property is within several conservation areas as follows:*

- *Parcels B, C and D fall within the Amery Court (Blean) Conservation Area, the Blean Conservation Area and the Canterbury and Whitstable Railway (Hackington & Blean) Conservation Area;*
- *Parcel E falls within the Tyler Hill Conservation Area;*
- *Parcel F and the Track fall within the Allcroft Grange (Hackington) Conservation Area.*

19. **Ancient Monuments and Assets of Community Value**

19.1 The Property is not within an area of archaeological importance nor is any building or erection on the Property a scheduled monument within the meaning set out in the Ancient Monuments and Archaeological Areas Act 1979.

19.2 The Property is neither nominated nor listed as an asset of community value.

***Disclosures***

*19.1 The local search of Parcels B, C and D identifies an Ancient Monument National Monument No 31400 dated 7 July 1999, being dispersed medieval settlement remains and a Roman building immediately south-west of St Cosmus and ha) St Damian's Church.*

*The local search of Parcel E identifies an Ancient Monument No 1426019 dated 12 December 1998, being part of the Tyler Hill medieval pottery and tile industry.*

20. **Compulsory acquisition**

The Company has told us that it is not aware of any resolution, proposal, order or act made or contemplated for the compulsory acquisition of the Property or any private access to it.

***Disclosures***

**STATUTORY MATTERS**

21. **Statutory requirements**

The Company has told us that it is not aware of any outstanding order, notice or other requirement of any local or other authority that affects the Existing Use or involves expenditure in compliance with it nor of any other circumstances which may result in any such order or notice being made or served.

***Disclosures***

22. **Statutory compliance**

The Company has told us that it has not received notice of any breach of and is not aware of any material breach of the requirements of any statute affecting the Property that are capable of enforcement at the date of this Certificate.

***Disclosures***

## ENVIRONMENT

### 23. Environmental notices and permits

23.1 The Company has told us that:

23.1.1 it holds all necessary permits, licences, consents, authorisations, registrations or any other approvals (together an "environmental permit") under any legislation relating to pollution or protection of health and the environment (together "environmental laws") in respect of the Existing Use of the Property; and

23.1.2 it has not received any written notices, notifications or orders under any environmental laws in respect of the Property or the Existing Use and it is not aware of any circumstances which may result in any such notices, notifications or orders being made or served.

23.2 Where required by the Transaction, the Company has obtained an energy performance certificate for the Property.

23.3 The Company has told us that it holds the energy performance certificates for the Property.

***Disclosures***

*The Company does not hold any energy performance certificate for the Property. It is not required for the Transaction.*

## GENERAL

### 24. Construction work and warranties

The Company has told us that:

24.1 no buildings or other structures on the Property have been erected or been subject to extension or major alteration within the six years prior to the date of this Certificate; and

24.2 there are no subsisting agreements, certificates, guarantees, warranties or insurance policies relating to the construction, repair, replacement, treatment or improvement of any building or structure on the Property.

***Disclosures***

*The Company carried out some works to repair and resurface the track in 2012. The Trustees of the Alcroft Trust contributed 50% of the cost of such works, as the nearby residential property Alcroft Grange (the administration of which is carried out by the Trust) has the benefit of a right of way along the Track. The cost of the works split between the Company and the Trust was £33,099 + VAT.*

*The Company funded some minor land drainage works carried out by the tenant of Parcels B, C and D in the past 5-6 years.*

*The Company does not believe there are any subsisting documents of which it has the benefit in respect of any of these works.*

25. **Outgoings**

The Company has told us that the Property is not subject to the payment of any outgoings other than the uniform business rate and water rates (and where the Property is leasehold sums due under the Lease) and the Company has told us that all such payments have been made to date.

***Disclosures***

*By a conveyance dated 24 December 1946 and made between (1) George Frank Whiteman (2) Winifred Harriett Stevens and others (purchasers) and (3) Winifred Harriett Stevens and others (trustees) the Property was conveyed subject as regards the lands affected thereby to a fee farm rent of 11 shillings and sixpence payable in the year 1884 to Messrs Hedges so far as the liability still exists and is enforceable. An entry is contained on the title registers for Parcels E and F. The Company has confirmed that it has not paid nor received any demand to pay such sum. Please refer to paragraph 9 of Schedule 3 for details of the indemnity insurance to be taken out by the Company on the date of this Certificate.*

26. **Fixtures and fittings**

The Company has told us that all fixtures and fixed plant at the Property, other than (where the Property is leasehold) landlord's fixtures or (where the Property is subject to a Letting Document) tenant's fixtures, are, or will on completion of the Transaction be, the Company's property free from incumbrances.

***Disclosures***

**SCHEDULE 4**

**Not Used**

**SCHEDULE 5**

**The Letting Documents**

**First Standard Letting Document - Arable land, north and south of Hothe Court Farm and 20 acres at Little Hall Farm**

**Part 1A**

**Details of Letting Document**

| | |
|---|---|
| Premises let by the Letting Document: | Arable land, north and south of Hothe Court Farm and 20 acres at Little Hall Farm as shown edged red coloured yellow and edged red coloured blue on Plan 33, edged red and numbered 1, 3, 5, 7, 8, 9, 10 and 11 on Plan 34 and edged red labelled 6799, 1025, 3628 and 5122 on Plan 35 forming part of title number K903818 |
| Date: | Not dated |
| Original parties: | (1) University of Kent<br>(2) A J Strand & Sons |
| Length of term: | 4 years 11 months 4 days (Letting Document defines the Term as 5 years) |
| Contractual term commencement date: | 25 October 2017 |
| Contractual term expiry date: | 29 September 2022 |
| Does the term expressly include any statutory continuation? | ~~Yes/~~No |
| Is the Letting Document contracted out of the Landlord and Tenant Act 1954: | ~~Yes/~~No – not applicable, Farm Business Tenancy |
| Name of present tenant and any present guarantor: | Tenant: A J Strand & Sons |
| Original annual rent including details of any premium paid: | £31,385 + VAT p/a |
| Current annual rent and (if applicable) date from which last reviewed: | £31,385 + VAT p/a |
| Remaining rent review dates: | 30 September 2020 |
| Present permitted use (and whether personal): | Agricultural cropping purposes |
| Name of every former tenant who has entered into an authorised guarantee agreement and of every former guarantor who has guaranteed the relevant former | None |

| | |
|---|---|
| tenant's obligations in that authorised guarantee agreement: | |
| Name of every former tenant and former tenant's guarantor unreleased because (1) the assignment by that tenant was an excluded assignment; or (2) the letting is not a new tenancy: | None |
| Proportion of service charge expenditure payable by the tenant and how assessed: | No service charge provisions |
| Proportion of insurance payable by the tenant and how assessed: | The tenant is responsible for insuring the Premises. The landlord is responsible for insuring any buildings other than dwellings on the basis of full reimbursement from the tenant |
| Summary of the rights granted to the tenant: | None |
| Summary of the rights reserved to the landlord: | Right of access for inspecting, carrying out works, taking samples, student educational training and to exercise other rights reserved; right to all timber and other trees (except fruit trees), underwood, pollards and saplings on the Premises, together with the right to mark, fell, cut, process, extract and remove such timber and trees; right to all mines and minerals; right to all treasures or archaeological artefacts discovered on the Premises; right to use and create any new roads, tracks or paths on the Premises reasonably required for access; right to lay or maintain across the Premises any pipes, drain, conduits, cables, wires or other conducting media reasonably required; exclusive right to grant wayleaves, easements or licences; right to all game, deer, wildfowl, woodcock, snipe and other wild birds listed in Part 1 Schedule 2 of the Wildlife and Countryside Act 1981 (including their nests and eggs) and fish, together with the right to go onto the Premises to rear, preserve, shoot or kill all such creatures and to hunt, shoot, hawk, sport or fish on or over the Premises; right to go on to the Premises to kill and take away any rabbits and other pests; right to take water from any stream or other source on or beneath the Premises (save that sufficient water is left for the tenant); and the exclusive right to erect wind turbines or solar arrays on the Premises |
| Summary of any options to determine (other than on damage or destruction) or renew or purchase or rights of first refusal: | Either part may bring the tenancy to an end by giving the other at least 12 months' notice in writing expiring on the last day of the term or on an anniversary of that date.<br>If the tenant:<br>• fails to pay the rent or any part of it for 21 |

| | |
|---|---|
| | days after it becomes payable (whether formally demanded or not);<br>• breaches any tenant obligation;<br>• has a receiving order made against him/her or if a meeting of his/her creditors is called or if he is adjudicated bankrupt or if the tenant (being a company) enters into compulsory or voluntary liquidation otherwise than for the purposes of reconstruction or amalgamation or if any distress or execution is levied on the Premises<br>then the landlord will be entitled to re-enter the Premises and bring the tenancy to an end, on giving the tenant one month written notice.<br>Additionally:<br>• The landlord may recover possession at any time of part of the Premises (not being greater than 2/10ths of the total area and not including any area the tenant has been given consent for a non-agricultural use) if the landlord requires it for any non-agricultural use by giving the tenant at least 12 months' written notice.<br>• If the tenant (or the last surviving joint tenant) dies during the term either the landlord or the executors or personal representatives of the tenant may end the lease by giving the other party at least 12 months' written notice provided that such notice is given within 3 months of the date on which the landlord is notified of the death of the tenant.<br>• The tenant may bring the tenancy to an end by giving the landlord not less than 12 months' written notice if the tenant becomes incapable of managing the Premises because of some permanent physical or mental disability or illness.<br>Any such notice given in the three circumstances above may expire at any time before the last day of the term, but any notice which is to expire while the lease continues as a periodic tenancy must expire at the end of a year of the tenancy |

Part 1B

Licences and other supplemental documents

| **Date** | **Document description** | **Parties** | **Other information – *for example, for rent deposit deed, include amount of initial and current rent deposit*** |
|---|---|---|---|
| | | | |
| | | | |

**Part 2**

**Statements**

1. **Details of the Letting Document**

Details of the Letting Document are fairly summarised in Part 1A of this Schedule and any licences granted and other supplemental documents entered into are listed in Part 1B of this Schedule.

| ***Disclosures*** |
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2. **Occupation**

The Company has told us that the Premises the subject of the Letting Document are occupied by the tenant or the person authorised pursuant to the Letting Document to be in occupation.

| ***Disclosures*** |
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3. **Payment of rent**

3.1 The annual rent is payable quarterly in advance on the usual English quarter days, without deduction or set-off.

3.2 The Company has told us that all rent and additional rent, service charges or other payments have been paid to date and no rent or other payment has been commuted, waived or paid in advance of the due date for payment.

3.3 The Company has told us that where any fixed charge was not paid on the due date and is still in arrears for more than three months, an effective notice has been served under section 17 of the 1995 Act on every relevant former tenant and on every relevant guarantor of a former tenant and the Disclosures contain full particulars of all such notices.

3.4 Interest is payable on all rent not paid on the due date at a rate of at least 3% above the prevailing base rate of a recognised clearing bank subject to a grace period of not more than 14 days for rents other than the annual rent. There is no grace period for the annual rent.

***Disclosures***

*3.1 The rent is payable half yearly on 30 September and 30 March in advance each year.*

4. **Rent review**

4.1 Where there are any provisions for rent review:

4.1.1 time is not of the essence;

4.1.2 they are upwards only;

4.1.3 the rent is to be reviewed to the open market rent at the date of review;

4.1.4 they contain a procedure for resolving disputes (either by expert determination or arbitration) and which may be initiated by either the landlord or the tenant;

4.1.5 the reviewed rent is backdated to the relevant review date and interest is payable on the back rent;

4.1.6 assumptions substantially in the following form are to be made in determining the open market rent:

(a) the hypothetical lease is to be on the same terms as the Letting Document except for the amount of the principal rent;

(b) the hypothetical lease is to be between a willing landlord and a willing tenant with vacant possession and without a premium;

(c) the hypothetical term is to begin on the review date and be equal to the residue of the contractual term at the review date (or ten years if longer);

(d) if the Premises or their means of access have been damaged or destroyed they have been reinstated;

(e) the Premises are fit for immediate occupation and use;

(f) the tenant's and the landlord's obligations in the Letting Document have been complied with; and

(g) the open market rent is the rent that would become payable after the willing tenant has received the benefit of a rent free period, rent concession or any other inducement of such length or amount as would be negotiated in the open market for the purpose of fitting out;

4.1.7 disregards substantially in the following form are to be made in determining the open market rent:

(a) the effect of the tenant's occupation or that of any undertenant and goodwill arising from such occupation;

(b) any reduction in rental value attributable to works carried out to the Premises by the tenant or any undertenant whether before or during the term; and

(c) any increase in rental value attributable to any improvements to the Premises carried out at the cost of the tenant or any undertenant in each case with the consent of the landlord where required whether before or during the term otherwise than pursuant to an obligation to the landlord;

4.1.8 there are no other material assumptions or disregards.

4.2 Where there are any provisions for rent review:

4.2.1 the Company has told us that all steps in current rent reviews have been duly taken and no rent reviews are currently under negotiation or the subject of a reference to an expert or arbitrator or the courts;

4.2.2 where the current annual rent is not the same as the annual rent originally reserved, evidence of its agreement or determination has been placed with the documents of title;

4.2.3 the Company has told us that no building, alteration or improvement has been carried out pursuant to an obligation to the landlord.

***Disclosures***

*4.1 The rent is subject to review as provided by Part II of the Agricultural Tenancies Act 1995 (the "1995 Act"). Under the statutory procedure the landlord or tenant may by notice in writing given to the other require that the rent to be payable in respect of the Premises as from the review date shall be referred to arbitration in accordance with the 1995 Act.*

*An arbitrator or other person shall be appointed by agreement to determine the question of the rent.*

*The arbitrator (or other person as appointed) shall determine the rent properly payable in respect of the holding at the review date and accordingly shall, with effect from that date, increase or reduce the rent previously payable or direct that it shall continue unchanged.*

*The rent properly payable in respect of a holding is the rent at which the holding might reasonably be expected to be let on the open market by a willing landlord to a willing tenant, taking into account all relevant factors (subject to the below), including (in every case) the terms of the tenancy.*

*The arbitrator (or other person as appointed) shall disregard any increase in the rental value of the holding which is due to tenant's improvements other than:*

- *any tenant's improvement provided under an obligation which was imposed on the tenant by the terms of his tenancy or any previous tenancy and which arose on or before the beginning of the tenancy in question;*
- *any tenant's improvement to the extent that any allowance or benefit has been made or given by the landlord in consideration of its provision; and*
- *any tenant's improvement to the extent that the tenant has received any compensation from the landlord in respect of it.*

*The arbitrator (or other person as appointed):*

- *shall disregard any effect on the rent of the fact that the tenant who is a party to the arbitration is in occupation of the holding, and*
- *shall not fix the rent at a lower amount by reason of any dilapidation or deterioration of, or damage to, buildings or land caused or permitted by the tenant.*

*The Company confirms it has not activated any rent reviews.*

5. **Repair and yielding up**

5.1 Where the whole of the Property is comprised in a single Letting Document, the tenant is responsible for keeping the whole of the Premises and (to the extent they form part of the Premises) fittings and plant and equipment in good and substantial repair and condition (damage by insured risks excepted unless and to the extent that insurance is vitiated by the act or default of the tenant), and is responsible for the decoration of the interior and exterior of the Premises not less frequently than every five and three years respectively.

5.2 Where the Premises comprised in any Letting Document form part or parts only of the Property, the tenant is responsible for keeping the whole of the interior of its Premises and fittings and plant and equipment demised to it in good and substantial repair and condition (damage by insured risks excepted unless and to the extent that insurance is vitiated by the act or default of the tenant) and is responsible for the decoration of the interior of its Premises not less frequently than every five years.

5.3 On expiry or earlier determination of the term granted by the Letting Document the tenant is to yield up the Premises in a condition consistent with the performance of its repairing obligations and with vacant possession.

***Disclosures***

5.*2 The tenant is responsible for repairing and maintaining to the condition at the time of the commencement of the tenancy the buildings, fixed equipment, external works and services on the Premises, and agrees:*

- *to put and keep those parts into a good state of repair; and*
- *where the item identified relates to the decoration or treatment of any part of the Premises, the tenant shall paint, redecorate or treat the relevant part whenever necessary and in any case at intervals of not more than 7 years in the case of internal items and at intervals of not more than 5 years in the case of external items, all such work to be carried out to a proper standard using materials of suitable quality by Company approved contractors.*

*There are no exceptions to the obligation to repair where damage is caused by an insured risk.*

*5.3 On quitting the Premises at the end of the term, the tenant if required by the landlord must leave on the Premises the whole of the unconsumed hay, straw and silage and all farmyard manure made on the Premises in the last year of the term, all to be properly protected. Vacant possession is not expressly required, but the tenant must remove any*

*waste materials including tyres, polythene, scrap metal, redundant vehicles or machinery, manure or other items not reasonably required for the future farming of the Premises.*

6. **Restrictions on use**

6.1 The uses permitted by the Letting Document are consistent with the Existing Use.

6.2 The tenant is not permitted to change the use of the Premises from the present permitted use set out in Part 1A of this Schedule, unless the landlord in its absolute discretion agrees.

***Disclosures***

7. **Alterations**

7.1 The tenant is prohibited from making structural alterations or additions to, or alterations affecting the external appearance of, the Premises.

7.2 The tenant may carry out:

7.2.1 non-structural alterations to the Premises with the prior written consent of the landlord, such consent not to be unreasonably withheld; and

7.2.2 the erection or dismantling of demountable partitioning without the prior consent of the landlord.

7.3 The tenant is required to remove all alterations and additions made during the term on yielding up the Premises at the expiration or sooner determination of the term unless the landlord requires otherwise.

***Disclosures***

*7.1 The tenant may not without the prior written consent of the landlord remove or make structural alterations or additions to any existing building or fixed equipment of the Premises or put up any new building or structure or make any other improvement to the Premises other than any act of husbandry or physical improvement to the Premises made in the normal course of farming, excluding:*

- *the provision or improvement of any building or structure or any equipment; and*
- *any act of husbandry or physical improvement contrary to the schedule of cropping agreed for the final year of the term.*

*7.2 The tenant may not remove or damage any fence, hedge, field wall or boundary on the Premises unless the landlord gives written consent in advance. See disclosures at 7.1 above for permitted alterations.*

*7.3 There are no provisions requiring the tenant to remove any alterations or additions made to the Premises on determination of the Letting Document.*

8. **Alienation**

8.1 Except as mentioned subsequently in this paragraph 8, the tenant may not:

8.1.1 share or part with possession of the Premises or any part;

8.1.2 permit another to occupy the Premises or any part;

8.1.3 share occupation of the Premises or any part; or

8.1.4 hold the Premises or any part on trust.

8.2 The tenant may not assign underlet or charge part only of the Premises.

8.3 The tenant may assign or charge the whole of the Premises with the prior written consent of the landlord, such consent not to be unreasonably withheld, and any restrictions on the tenant assigning the Premises or conditions that the landlord might impose on such assignment (including any agreement under Section 19(1A) of the Landlord and Tenant Act 1927) are fairly summarised in the Disclosures.

8.4 Where the Letting Document is a new tenancy:

8.4.1 the landlord has an express contractual right (whether or not reasonable in the circumstances) to require an authorised guarantee agreement from the tenant

and to require any guarantor of the tenant to guarantee the tenant's obligations in the authorised guarantee agreement;

8.4.2 no guarantor of the current tenant has acted as a guarantor of any previous tenant; and

8.4.3 the Letting Document is not now and has not been previously vested in any guarantor of a previous tenant.

8.5 The tenant under the Letting Document may underlet the whole of the Premises with the prior consent of the landlord, such consent not to be unreasonably withheld, but subject to conditions including those substantially in the following form:

8.5.1 the underlease is to be granted:

(a) without a fine, premium, reverse premium or other inducement;

(b) at a rent which is no less than the open market rent and is not calculated by reference to the passing rent under the Letting Document; and

(c) on the same terms as the Letting Document with rent reviews on the same dates;

8.5.2 the undertenant is to covenant directly with the landlord to comply with its covenants in the underlease;

8.5.3 the tenant agrees with the landlord to enforce the covenants by the undertenant;

8.5.4 the tenant is not to vary or waive its rights under the underlease or accept a surrender of the underlease without the prior written consent of the landlord, such consent not to be unreasonably withheld; and

8.5.5 the underlease is to be validly contracted out of the Landlord and Tenant Act 1954.

8.6 The tenant may share occupation of the Premises with another member of the same group of companies subject to such sharing of occupation not granting the group company security of tenure within the provisions of the Landlord and Tenant Act 1954, nor entitling it to occupy the Premises after it ceases to be a member of the same group of companies as the tenant.

***Disclosures***

*8.1 – 8.6 The tenant may not assign, sublet, part with possession or share occupation of the Premises or any part of it, unless permitted to do so as follows:*

- *the tenant may not sublet any dwelling on the Premises (except the main farmhouse) to any person employed in agriculture on the Premises, provided that such subletting is by means of and assured shorthold tenancy, notice under*

*paragraph 1 of Schedule 2A of the Housing Act 1988 having first been served, for a term which will expire before the end of the term of the Letting Document*

- *the tenant may not sublet any building on the Premises for a use other than for agriculture*
- *the tenant may not enter into any partnership, share-farming, contract-farming, management or cropping agreement or any other joint venture entitling any person to share occupation of the Premises unless the landlord has given written consent in advance*
- *the tenant may only let or sell grass keep or growing crops on the Premises or take in livestock belonging to any other person if the landlord has given written consent in advance*

*There are no express provisions with regards to the tenant charging the Premises or any part of it.*

9. **Insurance**

9.1 The landlord is required to insure:

9.1.1 the Property against damage caused by the risks of fire (including subterranean fire), lightning, explosion, storm, flood, subsidence, landslip, heave, earthquake, burst or overflowing water pipes, tanks or apparatus, impact by aircraft or other aerial devices and any articles dropped from them, impact by vehicles, terrorism, riot, civil commotion and malicious damage and any other risks against which the landlord reasonably insures from time to time, to the extent that insurance is available in the United Kingdom market with a reputable insurer, and subject to standard exclusions limitations and excesses;

9.1.2 for the full reinstatement cost of the Property (including professional fees and value added tax); and

9.1.3 for loss of at least three years' annual rent and (if applicable) service charge.

9.2 The tenant is required to pay to the landlord as rent a sum equal to the premiums (or the proportion appropriate to the Premises) paid by the landlord for insuring the Property in accordance with its obligations briefly described in paragraph 9.1.

9.3 There is provision for suspension of rent if the Premises or any part of the Property are damaged or destroyed by an insured risk so as to make the Premises incapable of use and occupation or inaccessible, such suspension being limited to a period no longer than the loss of rent period for which the landlord covenants to insure. Such suspension will not apply to the extent that the insurance has been vitiated by the act or default of the tenant.

9.4 If the Premises or any part of the Property are damaged or destroyed by an insured risk so as to make the Premises incapable of use and occupation or inaccessible:

9.4.1 the landlord is obliged to reinstate the Premises or such part of the Property once all necessary consents have been obtained and subject to the insurance not being vitiated by the act or default of the tenant. The landlord is to use at least reasonable endeavours to obtain such consents; and

9.4.2 both the landlord and the tenant are entitled to determine the Letting Document if it is not possible to reinstate the Premises or such part of the Property by the end of the period of loss of rent insurance for which the landlord covenants to insure.

9.5 If the Premises or any part of the Property are damaged or destroyed by an insured risk so as to make the Premises incapable of use and occupation or inaccessible and reinstatement is frustrated insurance monies are payable to the landlord.

9.6 There are no specific provisions in any Letting Document dealing with the effect of damage or destruction of the Premises by an uninsured risk.

***Disclosures***

*9.1 The landlord is required to insure the buildings on the Premises (other than any dwellings). Such insurance is required to be with a reputable insurance company against loss and damage by fire and other such risks as the landlord may from time to time reasonably require and to the full reinstatement cost (including all professional fees, VAT, associated costs and the cost of any work which might be required by or by virtue of any Act of Parliament). The Company has advised that there are however no buildings on the Premises.*

*9.2 The landlord's requirement to insure the buildings on the Premises is on the basis of full reimbursement from the tenant.*

*9.3 There is provision for suspension of rent where the landlord is responsible for insuring against loss of rent, and the rent payable by the tenant shall then be abated by a proportionate amount following the destruction or damage of any building or other item on the Premises by any risk against which the landlord is required to insure or has insured, and such abatement shall continue for a period of up to two years ending with the reinstatement or replacement of the building or item. There are however no provisions requiring the landlord to insure against loss of rent.*

*9.4.1 There is an obligation on the landlord to reinstate those buildings on the Premises it is responsible for insuring (being all buildings other than dwellings) where the building is destroyed or damaged by any risk against which the landlord was required*

*to insure and to cause all money received in respect of such damage or destruction to be expended in carrying out the required reinstatement. The Company has advised that there are however no buildings on the Premises.*

*9.4.2 There are no provisions allowing either party to determine the lease if it is not possible to reinstate the Premises or any part of it following damage or destruction by an insured risk. The Premises is bare land.*

*9.5 If it is impossible or impracticable to reinstate any building on the Premises, whether it is the landlord or tenant's responsibility to insure, any money received under the policy of insurance shall be divided between the landlord and the tenant in proportion to the value at the date of the damage or destruction of their respective interests in the building in question.*

10. **Service charge**

10.1 If the whole of the Property is comprised in a single Letting Document, there is no provision in the Letting Document for the payment by the tenant of a service or other similar charge.

10.2 Where the premises comprised in the Letting Document form part of the Property:

10.2.1 there are provisions for payment of a service or other similar charge which entitle the landlord to recover from the tenant the appropriate part of the cost of:

(a) keeping the Property and all landlord's plant, machinery and equipment in good and substantial repair and condition;

(b) paying outgoings;

(c) providing a range of services which the Company has told us are reasonable and appropriate for the type of buildings in the Property; and

(d) an amount for the management of the Property which either does not exceed 10% of the total service charge or is required to be reasonable;

10.2.2 the Company has told us that there are no material irrecoverable items, caps or other limitations on recovery of the costs referred to in paragraph 10.2.1 of this Part of this Schedule;

10.2.3 the Company has told us that there are no lettable areas of the Property that are currently unlet.

***Disclosures***

*10.2.1 There are no provisions for payment of a service or other similar charge. The tenant is required to pay all rates, taxes or other sums payable in respect of the Premises by the occupier (except any tax or other sum payable by the landlord in respect of rent received or in respect of any dealing with the landlord's interest in the Premises).*

*10.2.2 Not applicable – there are no service charge provisions.*

*10.2.3 There are buildings located on Parcel E that are not let.*

## 11. Rights of re-entry

The landlord is entitled to re-enter the Premises in the cases of bankruptcy, liquidation, whether compulsory or voluntary (except for the purpose of amalgamation or reconstruction of a solvent company), administrative receivership or the administration of the tenant, or appointment of a receiver of the tenant's property, as well as for non-payment of rent (whether or not formally demanded) for a period not exceeding 21 days or for any breach of the tenant's obligations.

***Disclosures***

*11.1 The landlord is entitled (after first giving the tenant one months' prior notice in writing) to re-enter the Premises if:*

- *the tenant fails to pay the rent for 21 days after it becomes payable (whether formally demanded or not)*
- *the tenant commits any breach of his/her obligations*
- *a receiving order is made against the tenant*
- *a meeting of the tenant's creditors is called*
- *the tenant is adjudicated bankrupt*
- *the tenant (being a company) enters into compulsory or voluntary liquidation otherwise than for the purposes of reconstruction or amalgamation*
- *any distress or execution is levied on the Premises*

12. **Options and rights of first refusal**

Except where specified in Part 1A of this Schedule, there are no:

12.1 options to determine (other than any in respect of damage or destruction of the Premises by an insured risk); or

12.2 options to renew the term; or

12.3 options to purchase or rights of first refusal in favour of either the landlord or the tenant.

| ***Disclosures*** |
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13. **Landlord and Tenant Act 1954**

13.1 The Company has told us that no notice has been served in respect of any Letting Document pursuant to Sections 25 or 26 of the Landlord and Tenant Act 1954.

13.2 Where a Letting Document is contracted out of the Landlord and Tenant Act 1954 notices have been served and declarations made such that any lease to be granted to a former tenant pursuant to its obligations under an authorised guarantee agreement or to a guarantor pursuant to its guarantee of a Letting Document or of an authorised guarantee agreement will be excluded from the security of tenure provisions of the Landlord and Tenant Act 1954.

| ***Disclosures*** |
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| |

14. **New tenancy**

The Letting Document is a new tenancy.

| ***Disclosures*** |
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| |

15. **Direct covenants**

If the Letting Document is not a new tenancy for the purposes of the 1995 Act, the present tenant and each of its predecessors in title and any guarantor for any of them has given a covenant to the landlord to observe and perform the obligations of the tenant throughout the term and our investigations do not disclose that any such persons have been released or are or may be entitled to be released.

***Disclosures***

16. **Overriding lease**

The Company has told us that no person has made a claim for an overriding lease under Section 19 of the 1995 Act against the Company nor, so far as it is aware, against any of its predecessors and that, so far as it is aware, no person is entitled to make such a claim and that, so far as it is aware, no notice has been served under Section 17 of the 1995 Act (other than those referred to in paragraph 3.3 of this Part of this Schedule) which would give rise to any such entitlement.

***Disclosures***

17. **Collateral assurances and undertakings**

The Company has told us that, so far as it is aware, no collateral assurances, undertakings or concessions have been made by any party to any Letting Document.

***Disclosures***

18. **Consents**

Any consents required for the grant of the Letting Document and any dealings with it have been obtained and placed with the documents of title along with evidence of the registration of the grant or dealing where requisite.

***Disclosures***

19. **Use of remainder of Property**

No Letting Document contains any restriction on the use of the remainder of the Property by the landlord other than by virtue of the covenant for quiet enjoyment.

***Disclosures***

20. **Breaches of covenant**

The Company has told us that:

20.1 it is not aware of any subsisting material breach of the covenants or conditions contained in the Letting Document, whether on the part of the landlord or the tenant, or of any other event which could give rise to forfeiture of the Letting Document;

20.2 no notice alleging any breach of the covenants or conditions contained in the Letting Document, whether on the part of the landlord or the tenant, remains outstanding; and

20.3 so far as the Company is aware, no breach of covenant has been waived or acquiesced in.

***Disclosures***

21. **Costs**

The tenant is obliged to pay the reasonable and proper costs of the landlord in connection with:

21.1 any notice under sections 146 or 147 of the Law of Property Act 1925;

21.2 the preparation and service of any schedule of dilapidations;

21.3 any breach of obligation of the tenant; and

21.4 any application for consent (unless unreasonably withheld).

***Disclosures***

*21.1.1 There are no provisions requiring the tenant to pay the landlord's costs in connection with any notice under sections 146 or 147 of the Law of Property Act 1925.*

*21.1.2 There are no provisions requiring the tenant to pay the landlord's costs in connection with the preparation and service of any schedule of dilapidations.*

*21.1.3 If the tenant fails to comply with a notice from the landlord to do any work that the letting document requires him to do then the tenant shall permit the landlord to do the work and recover the reasonable cost from the tenant. If either party suffers loss or is put to expense as a result of a breach of any of the obligations imposed on the other, he/she shall be entitled to be compensated by the other for that loss or expense.*

*21.1.4 There are no provisions requiring the tenant to pay the landlord's costs in connection with any application for consent.*

22. **VAT**

22.1 For the purposes of this paragraph, "option to tax" has the meaning given in Schedule 10 the Value Added Tax Act 1994 and includes an option to tax which has been deemed, or treated as having been, exercised.

22.2 The Company has told us that a valid option to tax has been exercised by the Company or a body corporate in relation to which the Company is either a relevant associate or a relevant group member over the whole Property and that such option has not been, or been deemed to be, disapplied or revoked so that value added tax is due in respect of any supply of the Property by it.

22.3 Whether or not an option to tax over the Property is in place, there are no provisions in any of the Letting Documents (or absence of any provisions) which prevent either the Company or a body corporate in relation to which it is either a relevant associate or a relevant group member from exercising a valid option to tax in respect of the Property or from increasing the rent or other payments under the Letting Documents by, or requiring a payment in addition of, an amount in respect of value added tax chargeable by reason of that option to tax or which oblige the Company or other person to indemnify the tenant in respect of all or any part of that amount.

22.4 The Company has told us that it is not aware of any reason why it should be prevented from charging value added tax in relation to supplies made by it under any Letting Document (nor, therefore, why its recovery of input value added tax attributable to those supplies should be restricted), in particular as a result of the operation of any of the disapplication provisions in Schedule 10 to the Value Added Tax Act 1994.

22.5 Where there are provisions in any Letting Document entitling the landlord to be paid, indemnified or reimbursed by the tenant for any amount expended or to be expended by or on behalf of the landlord, that entitlement includes an amount in respect of the value added tax to the extent that the value added tax cannot be recovered from HM Revenue & Customs by the landlord.

22.6 The Letting Document reserves value added tax as rent.

***Disclosures***

*22.2 No option to tax has been exercised over Parcel E. The Premises forms part of Parcels B (part), C, D and E. The Company has told us that the annual rent is £31,385 + VAT for the whole of the Premises. VAT has therefore been charged on the whole of the rental payment, when the proportion of the rent that relates to Parcel E should not be subject to VAT. The Company is in the process of correcting this.*

*22.4 An option to tax would need to be exercised over the Premises as to any supplies regarding it.*

*22.5 The covenants by the landlord or tenant to pay any sum which is a taxable supply, VAT is payable upon the issue of a valid VAT invoice.*

*22.6 The definition of "Rent" includes VAT.*

## 23. Compensation

There are provisions in each Letting Document where applicable excluding the right of the tenant to compensation on quitting the Premises to the extent permitted at law.

***Disclosures***

*23.1 There are provisions for the landlord to pay compensation to the tenant on quitting the Premises in respect of qualifying tenant's improvements. There are also provisions for the tenant to pay compensation to the landlord for any breach of his/her obligations contained in the Letting Document.*

24. **Notices in respect of improvements**

The Company has told us that so far as the Company is aware, no notice of intention to make improvements has been served under Section 3(1) of the Landlord and Tenant Act 1927.

***Disclosures***

25. **Statutory compliance**

The Letting Document contains an obligation on the part of the tenant to comply with the requirements of any statute which affects the Premises.

***Disclosures***

26. **Possession**

The Company has told us that it is not aware of any sub-letting, parting with possession or sharing of occupation by any tenant.

***Disclosures***

27. **Rent deposits**

27.1 The amount of any rent deposit is set out in Part 1B of this Schedule.

27.2 Where any sums are charged to the landlord by any corporate tenant by way of security for compliance with the tenant's obligations under any Letting Document, the charge has if necessary been properly registered at the Companies Registry within the prescribed time limit.

***Disclosures***

28. **Variations**

The Company has told us that, so far as it is aware, the Letting Document has not been varied in such a way as to give rise to a surrender and regrant or as to render any former tenant or the guarantor of any former tenant no longer or not fully liable to comply with any tenant covenant, whether under the 1995 Act or at common law.

***Disclosures***

29. **Guarantee provisions**

29.1 The guarantee provisions in the Letting Document or in an authorised guarantee agreement or in any other guarantee supplemental to the Letting Document include the following:

29.1.1 the guarantee is of the tenant's obligation to pay the rents and other sums reserved by the Letting Document and to perform the tenant's covenants in the Letting Document;

29.1.2 the guarantee is expressed to be a primary obligation on the part of the guarantor;

29.1.3 the guarantee contains an indemnity with regard to any loss suffered by the landlord as a result of the default of the tenant or as a result of the obligation, the subject of the guarantee, becoming unenforceable;

29.1.4 there is no financial limit on the guarantee;

29.1.5 the guarantor covenants that, in the event that the Letting Document is disclaimed, the guarantor will, if required by the landlord within a period of six months after the relevant event, enter into a new Letting Document (as tenant) on essentially the same terms as the previous Letting Document; and

29.1.6 the guarantee contains standard protective provisions, including an acknowledgement that the guarantee is not affected by any concession or indulgence granted to the tenant, any change to the terms of the underlying

Letting Document, any incapacity on the part of the tenant, or the invalidity of any of the underlying obligations.

29.2 Either the guarantee provisions provide that any consent given by the landlord and any variation to the terms of the underlying Letting Document will not release the guarantor or to the extent required to ensure that the guarantee continues to be effective, the guarantor has consented to any licences granted relating to the Letting Document and any change to the terms of the Letting Document.

***Disclosures***

*29.1 The Letting Document does not include any guarantee provisions.*

*29.2 The Letting Document does not include any guarantee provisions.*

30. **No other material matters**

There are no other material matters that we consider ought to be brought to your attention in relation to the Letting Document.

***Disclosures***

*30.1.1 The Letting Document includes provisions in relation to entitlements and quotas under the Common Agricultural Policy of the European Union. No details have been included of any existing milk quotas, but the Letting Document confirms that the landlord holds entitlements under a statutory scheme (the definition of which includes the Single Payment Scheme and Basic Payment Scheme) in relation to the Premises. The provisions in relation to entitlements include:*

- *if, because of the acquisition of further entitlements at the landlord's expense, it is reasonable to increase the rent sooner than the next rent review date. The parties may agree the new rent, or the matter will be referred to arbitration. The next review will take place at the next review date*
- *the landlord's entitlements will be made available to the tenant throughout the term. The Company confirms that the value of the landlord's entitlements is in the region of £100-£200 per entitlement. Under the Letting Document the entitlements comprise 73.29 ha*
- *the landlord and tenant will comply with any statutory or regulatory requirements in relation to the entitlements*
- *if at the end of the term the tenant is prevented for any reason from retaining any entitlements acquired by and at the expense of the tenant for the benefit of*

*the tenant, and they are acquired for the benefit of the landlord or another occupier, then the landlord shall pay compensation to the tenant. Such compensation is however limited to £1*

**SCHEDULE 5 - SUPPLEMENT**

**Details of further Letting Documents**

**Note: Disclosures of material variations between each further Letting Document and the relevant standard Letting Document are set out below the details of each further Letting Document**

| **Brief description of Premises let by the Letting Document and date of Letting Document** | **Name and address of present tenant and any present guarantor and name of any guarantor pursuant to an AGA and any sub-guarantor of an AGA** | **Term and expiry date** | **Current annual rent (including start date, if not yet payable) and future rent review dates** | **Amount of initial and current rent deposit** | **Present Permitted Use (and whether personal)** | **Summary of any options to determine (other than on damage or destruction), or renew, or purchase, or rights of first refusal** | **Is the Letting Document contracted out of the Landlord and Tenant Act 1954** | **Type of Standard Letting Document** |
|---|---|---|---|---|---|---|---|---|
| Pasture land and buildings at Hothe Court Farm as shown edged red on Plan 36 together with yard and buildings at Hothe Court Farm and other land forming part of | E H Holdstock and Son | 4 years 11 months 4 days commencing on 30 October 2017 and expiring on 29 September | £6,650 + VAT pa to be reviewed on 30 October 2020 | None | Agricultural grazing and mowing purposes | Either party may bring the tenancy to an end by giving the other at least 12 months' notice in writing expiring on the last day of the term or on an anniversary of that | No – not applicable, Farm Business Tenancy | First |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| title number K903818 | | 2022 | | | | date.<br><br>If the tenant:<br><br>• fails to pay the rent or any part of it for 21 days after it becomes payable (whether formally demanded or not);<br><br>• breaches any tenant obligation;<br><br>• has a receiving order made against him/her or if a meeting of his/her creditors is called or if he is adjudicated bankrupt or if the tenant | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | (being a company) enters into compulsory or voluntary liquidation otherwise than for the purposes of reconstruction or amalgamation or if any distress or execution is levied on the Premises<br><br>then the landlord will be entitled to re-enter the Premises and bring the tenancy to an end, on giving the tenant one month written | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | notice.<br><br>Additionally:<br><br>• The landlord may recover possession at any time of part of the Premises (not being greater than 2/10ths of the total area and not including any area the tenant has been given consent for a non-agricultural use) if the landlord requires it for any non-agricultural use by giving the tenant at least 12 months' | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | written notice.<br><br>• If the tenant (or the last surviving joint tenant) dies during the term either the landlord or the executors or personal representatives of the tenant may end the lease by giving the other party at least 12 months' written notice provided that such notice is given within 3 months of the date on which the landlord is notified of the death of the tenant. | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | • The tenant may bring the tenancy to an end by giving the landlord not less than 12 months' written notice if the tenant becomes incapable of managing the Premises because of some permanent physical or mental disability or illness.<br><br>Any such notice given in the three circumstances above may expire at any time before the last day of the term, but any notice which is | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | to expire while the lease continues as a periodic tenancy must expire at the end of a year of the tenancy. | | |

***Disclosures***

*9.1 The landlord is required to insure the buildings on the Premises (other than any dwellings). Such insurance is required to be with a reputable insurance company against loss and damage by fire and other such risks as the landlord may from time to time reasonably require and to the full reinstatement cost (including all professional fees, VAT, associated costs and the cost of any work which might be required by or by virtue of any Act of Parliament). The buildings on the Premises, which were formerly a dairy, are used by the tenant for storage and sometimes for cattle. The buildings are located on parcel B and shown on Plan 36. Please also see disclosure 30.1. The Former Workshop forms a small part of the buildings (formerly the old milk tank room).*

*22.2 No disclosures.*

*22.5 The Company has told us that the tenant has paid £6,650 in total as their annual rent, whereas the rent under the Letting Document is £6,650 + VAT. The Company is rectifying this with the land agent and the tenant.*

*30.1 Neither party is required to repair, maintain or insure the building known as the Former Workshop.*

*30.1 Under the Letting Document the entitlements comprise 12.77 ha.*

**Schedule 5B**

**The Letting Documents**

**Third Letting Document - Land at St Stephen's Hill, Canterbury**

**Part 1A**

**Details of Letting Document**

| | |
|---|---|
| Premises let by the Letting Document: | Land at St Stephen's Hill, Canterbury extending to 45 acres, The Southern Slopes as shown edged red on Plan 37 and Plan 38 forming part of title number K844020 and K254318. |
| Date: | 29 May 2019 |
| Original parties: | (1) The University of Kent<br>(2) Ian Machin |
| Length of term: | 3 years 3 months 6 days |
| Contractual term commencement date: | 23 June 2019 |
| Contractual term expiry date: | 29 September 2022 |
| Does the term expressly include any statutory continuation? | ~~Yes/~~No |
| Is the Letting Document contracted out of the Landlord and Tenant Act 1954: | ~~Yes/~~No – not applicable, licence agreement |
| Name of present tenant and any present guarantor: | Licensee: I Machin |
| Original annual rent including details of any premium paid: | £3,000 p/a (licence fee) |
| Current annual rent and (if applicable) date from which last reviewed: | £3,000 p/a (licence fee) |
| Remaining rent review dates: | None |
| Present permitted use (and whether personal): | Personal right of access to the Premises for grazing or mowing the pasture for conservation |
| Name of every former tenant who has entered into an authorised guarantee agreement and of every former guarantor who has guaranteed the relevant former tenant's obligations in that authorised guarantee agreement: | None |
| Name of every former tenant and former tenant's guarantor unreleased because (1) the | None |

| | |
|---|---|
| assignment by that tenant was an excluded assignment; or (2) the letting is not a new tenancy: | |
| Proportion of service charge expenditure payable by the tenant and how assessed: | No service charge provisions |
| Proportion of insurance payable by the tenant and how assessed: | No insurance provisions |
| Summary of the rights granted to the tenant: | Personal right of access to the Premises for grazing or mowing the pasture for conservation |
| Summary of the rights reserved to the landlord: | The licensor is free to carry out any activities on the Premises and can undertake all necessary operations to maintain, fertilise, spray and improve the pasture and to repair, maintain, alter and erect any buildings, fences, gates, boundaries, ditches and other fixed equipment and all other purposes associated with ownership of the Premises other than grazing or mowing the pasture |
| Summary of any options to determine (other than on damage or destruction) or renew or purchase or rights of first refusal: | No express rights to determine the agreement (licence) |

**Part 1B**

**Licences and other supplemental documents**

| **Date** | **Document description** | **Parties** | **Other information – *for example, for rent deposit deed, include amount of initial and current rent deposit*** |
|---|---|---|---|
| | | | |
| | | | |

**Part 2**

**Statements**

1. **Details of the Letting Document**

Details of the Letting Document are fairly summarised in Part 1A of this Schedule and any licences granted and other supplemental documents entered into are listed in Part 1B of this Schedule.

***Disclosures***

2. **Occupation**

The Company has told us that the Premises the subject of the Letting Document are occupied by the tenant or the person authorised pursuant to the Letting Document to be in occupation.

***Disclosures***

3. **Payment of rent**

3.1 The annual rent is payable quarterly in advance on the usual English quarter days, without deduction or set-off.

3.2 The Company has told us that all rent and additional rent, service charges or other payments have been paid to date and no rent or other payment has been commuted, waived or paid in advance of the due date for payment.

3.3 The Company has told us that where any fixed charge was not paid on the due date and is still in arrears for more than three months, an effective notice has been served under section 17 of the 1995 Act on every relevant former tenant and on every relevant guarantor of a former tenant and the Disclosures contain full particulars of all such notices.

3.4 Interest is payable on all rent not paid on the due date at a rate of at least 3% above the prevailing base rate of a recognised clearing bank subject to a grace period of not more than 14 days for rents other than the annual rent. There is no grace period for the annual rent.

***Disclosures***

*3.1 The licence fee is payable in two equal instalments on 23 June and 25 December each year, except that the final instalment due on 23 June 2022 shall be apportioned to the end of the term (being on 29 September 2022).*

*3.4 There are no provisions allowing the licensor to charge interest.*

4. **Rent review**

4.1 Where there are any provisions for rent review:

4.1.1 time is not of the essence;

4.1.2 they are upwards only;

4.1.3 the rent is to be reviewed to the open market rent at the date of review;

4.1.4 they contain a procedure for resolving disputes (either by expert determination or arbitration) and which may be initiated by either the landlord or the tenant;

4.1.5 the reviewed rent is backdated to the relevant review date and interest is payable on the back rent;

4.1.6 assumptions substantially in the following form are to be made in determining the open market rent:

(e) the hypothetical lease is to be on the same terms as the Letting Document except for the amount of the principal rent;

(f) the hypothetical lease is to be between a willing landlord and a willing tenant with vacant possession and without a premium;

(g) the hypothetical term is to begin on the review date and be equal to the residue of the contractual term at the review date (or ten years if longer);

(h) if the Premises or their means of access have been damaged or destroyed they have been reinstated;

(i) the Premises are fit for immediate occupation and use;

(j) the tenant's and the landlord's obligations in the Letting Document have been complied with; and

(k) the open market rent is the rent that would become payable after the willing tenant has received the benefit of a rent free period, rent concession or any other inducement of such length or amount as would be negotiated in the open market for the purpose of fitting out;

4.1.7 disregards substantially in the following form are to be made in determining the open market rent:

(l) the effect of the tenant's occupation or that of any undertenant and goodwill arising from such occupation;

(m) any reduction in rental value attributable to works carried out to the Premises by the tenant or any undertenant whether before or during the term; and

(n) any increase in rental value attributable to any improvements to the Premises carried out at the cost of the tenant or any undertenant in each case with the consent of the landlord where required whether before or during the term otherwise than pursuant to an obligation to the landlord;

4.1.8 there are no other material assumptions or disregards.

4.2 Where there are any provisions for rent review:

4.2.1 the Company has told us that all steps in current rent reviews have been duly taken and no rent reviews are currently under negotiation or the subject of a reference to an expert or arbitrator or the courts;

4.2.2 where the current annual rent is not the same as the annual rent originally reserved, evidence of its agreement or determination has been placed with the documents of title;

4.2.3 the Company has told us that no building, alteration or improvement has been carried out pursuant to an obligation to the landlord.

***Disclosures***

*4.1 The licence does not contain any rent review provisions.*

5. **Repair and yielding up**

5.1 Where the whole of the Property is comprised in a single Letting Document, the tenant is responsible for keeping the whole of the Premises and (to the extent they form part of the Premises) fittings and plant and equipment in good and substantial repair and condition (damage by insured risks excepted unless and to the extent that insurance is vitiated by the act or default of the tenant), and is responsible for the decoration of the interior and exterior of the Premises not less frequently than every five and three years respectively.

5.2 Where the Premises comprised in any Letting Document form part or parts only of the Property, the tenant is responsible for keeping the whole of the interior of its Premises and fittings and plant and equipment demised to it in good and substantial repair and condition (damage by insured risks excepted unless and to the extent that insurance is vitiated by the act or default of the tenant) and is responsible for the decoration of the interior of its Premises not less frequently than every five years.

5.3 On expiry or earlier determination of the term granted by the Letting Document the tenant is to yield up the Premises in a condition consistent with the performance of its repairing obligations and with vacant possession.

***Disclosures***

*5.2 The Premises comprises part of the Property, but it is bare land only. The tenant is required to keep the land in good agricultural and environmental condition, and clean and free from weeds, including spear thistle, creeping or field thistle, curled dock, broad-leaved dock and ragwort. There are no exceptions where damage is caused whether or not by an insured risk. There are no decoration provisions – the Premises is bare land.*

6. **Restrictions on use**

6.1 The uses permitted by the Letting Document are consistent with the Existing Use.

6.2 The tenant is not permitted to change the use of the Premises from the present permitted use set out in Part 1A of this Schedule, unless the landlord in its absolute discretion agrees.

***Disclosures***

7. **Alterations**

7.1 The tenant is prohibited from making structural alterations or additions to, or alterations affecting the external appearance of, the Premises.

7.2 The tenant may carry out:

7.2.1 non-structural alterations to the Premises with the prior written consent of the landlord, such consent not to be unreasonably withheld; and

7.2.2 the erection or dismantling of demountable partitioning without the prior consent of the landlord.

7.3 The tenant is required to remove all alterations and additions made during the term on yielding up the Premises at the expiration or sooner determination of the term unless the landlord requires otherwise.

***Disclosures***

*7.1 – 7.2 The licensee is not permitted to erect or alter any building, to make any other alteration to the land or to plough or re-seed the land.*

*7.3 There are no provisions requiring the licensee to remove any alterations or additions on yielding up the Premises.*

8. **Alienation**

8.1 Except as mentioned subsequently in this paragraph 8, the tenant may not:

8.1.1 share or part with possession of the Premises or any part;

8.1.2 permit another to occupy the Premises or any part;

8.1.3 share occupation of the Premises or any part; or

8.1.4 hold the Premises or any part on trust.

8.2 The tenant may not assign underlet or charge part only of the Premises.

8.3 The tenant may assign or charge the whole of the Premises with the prior written consent of the landlord, such consent not to be unreasonably withheld, and any restrictions on the tenant assigning the Premises or conditions that the landlord might impose on such assignment (including any agreement under Section 19(1A) of the Landlord and Tenant Act 1927) are fairly summarised in the Disclosures.

8.4 Where the Letting Document is a new tenancy:

8.4.1 the landlord has an express contractual right (whether or not reasonable in the circumstances) to require an authorised guarantee agreement from the tenant and to require any guarantor of the tenant to guarantee the tenant's obligations in the authorised guarantee agreement;

8.4.2 no guarantor of the current tenant has acted as a guarantor of any previous tenant; and

8.4.3 the Letting Document is not now and has not been previously vested in any guarantor of a previous tenant.

8.5 The tenant under the Letting Document may underlet the whole of the Premises with the prior consent of the landlord, such consent not to be unreasonably withheld, but subject to conditions including those substantially in the following form:

8.5.1 the underlease is to be granted:

(o) without a fine, premium, reverse premium or other inducement;

(p) at a rent which is no less than the open market rent and is not calculated by reference to the passing rent under the Letting Document; and

(q) on the same terms as the Letting Document with rent reviews on the same dates;

8.5.2 the undertenant is to covenant directly with the landlord to comply with its covenants in the underlease;

8.5.3 the tenant agrees with the landlord to enforce the covenants by the undertenant;

8.5.4 the tenant is not to vary or waive its rights under the underlease or accept a surrender of the underlease without the prior written consent of the landlord, such consent not to be unreasonably withheld; and

8.5.5 the underlease is to be validly contracted out of the Landlord and Tenant Act 1954.

8.6 The tenant may share occupation of the Premises with another member of the same group of companies subject to such sharing of occupation not granting the group company security of tenure within the provisions of the Landlord and Tenant Act 1954, nor entitling it to occupy the Premises after it ceases to be a member of the same group of companies as the tenant.

***Disclosures***

*8.1 – 8.6 The licensee is not permitted to assign the benefit of the licence to any person or company. The licensor grants the licensee a personal right of access for grazing or mowing the pasture for conservation only. The Third Letting Document does not expressly permit any other forms of alienation.*

9. **Insurance**

9.1 The landlord is required to insure:

9.1.1 the Property against damage caused by the risks of fire (including subterranean fire), lightning, explosion, storm, flood, subsidence, landslip, heave, earthquake, burst or overflowing water pipes, tanks or apparatus, impact by aircraft or other aerial devices and any articles dropped from them, impact by vehicles, terrorism, riot, civil commotion and malicious damage and any other risks against which the landlord reasonably insures from time to time, to the extent that insurance is available in the United Kingdom market with a reputable insurer, and subject to standard exclusions limitations and excesses;

9.1.2 for the full reinstatement cost of the Property (including professional fees and value added tax); and

9.1.3 for loss of at least three years' annual rent and (if applicable) service charge.

9.2 The tenant is required to pay to the landlord as rent a sum equal to the premiums (or the proportion appropriate to the Premises) paid by the landlord for insuring the Property in accordance with its obligations briefly described in paragraph 9.1.

9.3 There is provision for suspension of rent if the Premises or any part of the Property are damaged or destroyed by an insured risk so as to make the Premises incapable of use and occupation or inaccessible, such suspension being limited to a period no longer than the loss of rent period for which the landlord covenants to insure. Such suspension will not apply to the extent that the insurance has been vitiated by the act or default of the tenant.

9.4 If the Premises or any part of the Property are damaged or destroyed by an insured risk so as to make the Premises incapable of use and occupation or inaccessible:

9.4.1 the landlord is obliged to reinstate the Premises or such part of the Property once all necessary consents have been obtained and subject to the insurance not being vitiated by the act or default of the tenant. The landlord is to use at least reasonable endeavours to obtain such consents; and

9.4.2 both the landlord and the tenant are entitled to determine the Letting Document if it is not possible to reinstate the Premises or such part of the Property by the end of the period of loss of rent insurance for which the landlord covenants to insure.

9.5 If the Premises or any part of the Property are damaged or destroyed by an insured risk so as to make the Premises incapable of use and occupation or inaccessible and reinstatement is frustrated insurance monies are payable to the landlord.

9.6 There are no specific provisions in any Letting Document dealing with the effect of damage or destruction of the Premises by an uninsured risk.

***Disclosures***

*9.1 – 9.6 The licensee is required to indemnify the licensor in respect of any damage to the land and all liabilities and costs including legal costs and expenses incurred by or as a result of the licensee. The licensee is required to carry appropriate third party liability insurance.*

## 10. Service charge

10.1 If the whole of the Property is comprised in a single Letting Document, there is no provision in the Letting Document for the payment by the tenant of a service or other similar charge.

10.2 Where the premises comprised in the Letting Document form part of the Property:

10.2.1 there are provisions for payment of a service or other similar charge which entitle the landlord to recover from the tenant the appropriate part of the cost of:

(r) keeping the Property and all landlord's plant, machinery and equipment in good and substantial repair and condition;

(s) paying outgoings;

(t) providing a range of services which the Company has told us are reasonable and appropriate for the type of buildings in the Property; and

(u) an amount for the management of the Property which either does not exceed 10% of the total service charge or is required to be reasonable;

10.2.2 the Company has told us that there are no material irrecoverable items, caps or other limitations on recovery of the costs referred to in paragraph 10.2.1 of this Part of this Schedule;

10.2.3 the Company has told us that there are no lettable areas of the Property that are currently unlet.

***Disclosures***

*10.2 There are no service charge provisions.*

11. **Rights of re-entry**

The landlord is entitled to re-enter the Premises in the cases of bankruptcy, liquidation, whether compulsory or voluntary (except for the purpose of amalgamation or reconstruction of a solvent company), administrative receivership or the administration of the tenant, or appointment of a receiver of the tenant's property, as well as for non-payment of rent (whether or not formally demanded) for a period not exceeding 21 days or for any breach of the tenant's obligations.

***Disclosures***

*11.1 There are no provisions in relation to the circumstances in which the licensor is entitled to re-enter the Premises, but the Letting Document is expressed to be a licence.*

12. **Options and rights of first refusal**

Except where specified in Part 1A of this Schedule, there are no:

12.1 options to determine (other than any in respect of damage or destruction of the Premises by an insured risk); or

12.2 options to renew the term; or

12.3 options to purchase or rights of first refusal in favour of either the landlord or the tenant.

***Disclosures***

*12.1.1 There are no express options to determine, but under the Letting Document the licensor grants a personal right of access to the licensee, and it does not provide for exclusive possession.*

13. **Landlord and Tenant Act 1954**

13.1 The Company has told us that no notice has been served in respect of any Letting Document pursuant to Sections 25 or 26 of the Landlord and Tenant Act 1954.

13.2 Where a Letting Document is contracted out of the Landlord and Tenant Act 1954 notices have been served and declarations made such that any lease to be granted to a former tenant pursuant to its obligations under an authorised guarantee agreement or to a guarantor pursuant to its guarantee of a Letting Document or of an authorised guarantee agreement will be excluded from the security of tenure provisions of the Landlord and Tenant Act 1954.

***Disclosures***

14. **New tenancy**

The Letting Document is a new tenancy.

***Disclosures***

15. **Direct covenants**

If the Letting Document is not a new tenancy for the purposes of the 1995 Act, the present tenant and each of its predecessors in title and any guarantor for any of them has given a covenant to the landlord to observe and perform the obligations of the tenant throughout the term and our investigations do not disclose that any such persons have been released or are or may be entitled to be released.

***Disclosures***

16. **Overriding lease**

The Company has told us that no person has made a claim for an overriding lease under Section 19 of the 1995 Act against the Company nor, so far as it is aware, against any of its predecessors and that, so far as it is aware, no person is entitled to make such a claim and that, so far as it is aware, no notice has been served under Section 17 of the 1995 Act (other than those referred to in paragraph 3.3 of this Part of this Schedule) which would give rise to any such entitlement.

***Disclosures***

17. **Collateral assurances and undertakings**

The Company has told us that, so far as it is aware, no collateral assurances, undertakings or concessions have been made by any party to any Letting Document.

***Disclosures***

18. **Consents**

Any consents required for the grant of the Letting Document and any dealings with it have been obtained and placed with the documents of title along with evidence of the registration of the grant or dealing where requisite.

***Disclosures***

19. **Use of remainder of Property**

No Letting Document contains any restriction on the use of the remainder of the Property by the landlord other than by virtue of the covenant for quiet enjoyment.

***Disclosures***

20. **Breaches of covenant**

The Company has told us that:

20.1 it is not aware of any subsisting material breach of the covenants or conditions contained in the Letting Document, whether on the part of the landlord or the tenant, or of any other event which could give rise to forfeiture of the Letting Document;

20.2 no notice alleging any breach of the covenants or conditions contained in the Letting Document, whether on the part of the landlord or the tenant, remains outstanding; and

20.3 so far as the Company is aware, no breach of covenant has been waived or acquiesced in.

***Disclosures***

21. **Costs**

The tenant is obliged to pay the reasonable and proper costs of the landlord in connection with:

21.1 any notice under sections 146 or 147 of the Law of Property Act 1925;

21.2 the preparation and service of any schedule of dilapidations;

21.3 any breach of obligation of the tenant; and

21.4 any application for consent (unless unreasonably withheld).

***Disclosures***

*21.1 The licensee is obliged to indemnify the licensor in respect of any damage to the land and all liabilities and costs including legal costs and expenses incurred by or as a result of the actions of the licensee. There are no further provisions in relation to the payment of the licensor's costs.*

22. **VAT**

22.1 For the purposes of this paragraph, "option to tax" has the meaning given in Schedule 10 the Value Added Tax Act 1994 and includes an option to tax which has been deemed, or treated as having been, exercised.

22.2 The Company has told us that a valid option to tax has been exercised by the Company or a body corporate in relation to which the Company is either a relevant associate or a

relevant group member over the whole Property and that such option has not been, or been deemed to be, disapplied or revoked so that value added tax is due in respect of any supply of the Property by it.

22.3 Whether or not an option to tax over the Property is in place, there are no provisions in any of the Letting Documents (or absence of any provisions) which prevent either the Company or a body corporate in relation to which it is either a relevant associate or a relevant group member from exercising a valid option to tax in respect of the Property or from increasing the rent or other payments under the Letting Documents by, or requiring a payment in addition of, an amount in respect of value added tax chargeable by reason of that option to tax or which oblige the Company or other person to indemnify the tenant in respect of all or any part of that amount.

22.4 The Company has told us that it is not aware of any reason why it should be prevented from charging value added tax in relation to supplies made by it under any Letting Document (nor, therefore, why its recovery of input value added tax attributable to those supplies should be restricted), in particular as a result of the operation of any of the disapplication provisions in Schedule 10 to the Value Added Tax Act 1994.

22.5 Where there are provisions in any Letting Document entitling the landlord to be paid, indemnified or reimbursed by the tenant for any amount expended or to be expended by or on behalf of the landlord, that entitlement includes an amount in respect of the value added tax to the extent that the value added tax cannot be recovered from HM Revenue & Customs by the landlord.

22.6 The Letting Document reserves value added tax as rent.

***Disclosures***

*22.2 No option to tax has been exercised over Parcel F.*

*22.4 An option to tax would need to be exercised over the Premises as to any supplies regarding it.*

*22.5 The provisions requiring the licensor to be indemnified for expenses do not expressly include an amount in respect of VAT.*

*22.6 The licence fee reserved includes any VAT as may be due in respect of the fee.*

## 23. Compensation

There are provisions in each Letting Document where applicable excluding the right of the tenant to compensation on quitting the Premises to the extent permitted at law.

***Disclosures***

*23.1 There are no provisions in relation to the licensee's right to compensation.*

24. **Notices in respect of improvements**

The Company has told us that so far as the Company is aware, no notice of intention to make improvements has been served under Section 3(1) of the Landlord and Tenant Act 1927.

***Disclosures***

25. **Statutory compliance**

The Letting Document contains an obligation on the part of the tenant to comply with the requirements of any statute which affects the Premises.

***Disclosures***

*25.1 The licensee is required to comply with any limitations on stocking density, mowing, fertilising, spraying and management imposed by the inclusion of the land within an Environmentally Sensitive Area agreement, a Site of Special Scientific Interest, a Countryside Stewardship Scheme or any similar official scheme. The licensee is also required to manage any stock on the land in accordance with the Agriculture (Miscellaneous Provisions) Act 1968 and the Welfare of Livestock Regulations 1990. There are no other requirements to comply with other statutes.*

26. **Possession**

The Company has told us that it is not aware of any sub-letting, parting with possession or sharing of occupation by any tenant.

***Disclosures***

27. **Rent deposits**

27.1 The amount of any rent deposit is set out in Part 1B of this Schedule.

27.2 Where any sums are charged to the landlord by any corporate tenant by way of security for compliance with the tenant's obligations under any Letting Document, the charge has if necessary been properly registered at the Companies Registry within the prescribed time limit.

***Disclosures***

28. **Variations**

The Company has told us that, so far as it is aware, the Letting Document has not been varied in such a way as to give rise to a surrender and regrant or as to render any former tenant or the guarantor of any former tenant no longer or not fully liable to comply with any tenant covenant, whether under the 1995 Act or at common law.

***Disclosures***

29. **Guarantee provisions**

29.1 The guarantee provisions in the Letting Document or in an authorised guarantee agreement or in any other guarantee supplemental to the Letting Document include the following:

29.1.1 the guarantee is of the tenant's obligation to pay the rents and other sums reserved by the Letting Document and to perform the tenant's covenants in the Letting Document;

29.1.2 the guarantee is expressed to be a primary obligation on the part of the guarantor;

29.1.3 the guarantee contains an indemnity with regard to any loss suffered by the landlord as a result of the default of the tenant or as a result of the obligation, the subject of the guarantee, becoming unenforceable;

29.1.4 there is no financial limit on the guarantee;

29.1.5 the guarantor covenants that, in the event that the Letting Document is disclaimed, the guarantor will, if required by the landlord within a period of six months after the relevant event, enter into a new Letting Document (as tenant) on essentially the same terms as the previous Letting Document; and

29.1.6 the guarantee contains standard protective provisions, including an acknowledgement that the guarantee is not affected by any concession or indulgence granted to the tenant, any change to the terms of the underlying Letting Document, any incapacity on the part of the tenant, or the invalidity of any of the underlying obligations.

29.2 Either the guarantee provisions provide that any consent given by the landlord and any variation to the terms of the underlying Letting Document will not release the guarantor or to the extent required to ensure that the guarantee continues to be effective, the guarantor has consented to any licences granted relating to the Letting Document and any change to the terms of the Letting Document.

***Disclosures***

*29.1 The Letting Document does not include any guarantee provisions.*

*29.2 The Letting Document does not include any guarantee provisions.*

## 30. No other material matters

There are no other material matters that we consider ought to be brought to your attention in relation to the Letting Document.

***Disclosures***

**SCHEDULE 6**

**Searches and enquiries**

| **Search** | **Date of result (or state "not made")** | **Disclosures** |
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| Official search in the Index Map (SIM) | 22 January 2020 | Parcels B, C and D: K903818<br><br>Parcel E: K660178 and K709599<br><br>Parcel F: K844020<br><br>Track: K602643 and K693414. K602643 is land adjoining the Track and is not owned by the Company. |
| Local search certificate and replies to Law Society CON 29 Enquiries of the local authority (2016) and any other relevant enquiries in Law Society CON 29O Optional enquiries of local authority (2016) including enquiry 22 (common land and town or village green) | 3 February 2020 – Parcels B, C and D | **<u>Planning</u>**<br><br>Please see Schedule 3 in relation to planning disclosures.<br><br>**<u>Highways</u>**<br><br>The search confirms that:<br><br>1. Tyler Hill Road<br>2. Tile Kiln Hill<br>3. Whitstable Road<br><br>are highways maintainable at public expense.<br><br>**<u>Public Rights of Way</u>**<br><br>The search confirms that public rights of way abut on, or cross the Property, shown on the definitive map or revised definitive map.<br><br>The Property is affected by recorded PROWs CB18A, CB14, CB12A (Public Footpaths) and CB24A (Public Bridleway).<br><br>The Property abuts recorded PROWs CB27 (byway open to all traffic), CB15, CB12 (Public Footpaths) and CB24 (Public Bridleway).<br><br>Plan 26 is an extract from the definitive |

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| | | map.<br><br>**Utilities**<br><br>The Search confirms that high pressure gas pipelines and power supplies are present at the property. Further utilities searches have not been made given the nature of the Transaction.<br><br>**Mineral Consultation Area**<br><br>All or part of the Property is within a mineral consultation area or mineral safeguarding area notified by the county planning authority under Schedule 1 para 7 of the Town & Country Planning Act 1990 as follows:<br><br>• Kent County Council Mineral Safeguarding Area<br>• River Terrace deposits (3)<br>• Brickearth<br><br>**Hedgerow Notices**<br><br>Application CAB/99/00003 related to the removal of 30 metres of hedgerow (retrospective application) but this is listed as withdrawn on 18/08/1999.<br><br>**Conservation Area**<br><br>The Property is within:<br>• The Amery Court (Blean) Conservation Area.<br>• The Blean Conservation Area<br>• The Canterbury and Whitstable Railway (Hackington & Blean) Conservation Area<br><br>**Tree Preservation Orders**<br><br>There are two tree preservation orders at the Property:<br>• Tree Preservation Order No 24 of 1990 dated 21 November 1990 which covers an area of trees consisting mainly of willows, also alder, ash and oak and identified as A1 on the attached plan 40. The |

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| | | Company has also provided a copy of Tree Preservation Order No 5 of 1970 dated 10 December 1970 and which related to the following shown on the attached plan 41:<br>o T1 – alder<br>o A2 – the several alder and willow trees<br>o A3 – the several birch, chestnut, hazel, oak and sycamore trees<br>o W1 – mixed hardwoods consisting mainly of birch, elm, holy, horse chestnut and oak trees<br>o W2 – the several trees of whatever species standing in the area numbered A1 on the plan<br>• Tree Preservation Order No 4 of 1970 dated 31 March 1971. The Company does not have a copy of this order.<br><br>**Ancient Monuments and Archaeological Areas**<br><br>The search identifies an Ancient Monument National Monument No 31400 dated 7 July 1999, being dispersed medieval settlement remains and a Roman building immediately south-west of St Cosmus and St Damian's Church.<br><br>**Building Regulations**<br><br>No building regulation approvals have been recorded since 1998. The search identifies the following building regulations certificates or notices issues in respect of work carried out under a competent person self-certification scheme. However, the Company is not aware of any such works being carried out to the Property and believes they may relate to other property:<br><br>1. NIC/05/10020 NICEIC record for Special location (room containing bath or shower, swimming pool, sauna), new consumer unit, |

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| | | main/supplementary equipotential bonding, dwelling house. Notice given 09/04/05.<br>2. NIC/06/13291 NICEIC record for extension to circuit (in kitchen, special location/installation), shower (electrically heated or pumped), special location (room containing bath or shower, swimming pool, sauna). Notice given 23/05/06.<br>3. FEN/07/15257 FENSA record for 4 windows, 1 door. Notice given 02/08/07.<br>4. FEN/08/13169. FENSA record for 1 window, 1 door. Notice given 07/05/08.<br>5. OFTEC/09/17276. OFTEC record for install a domestic oil storage facility, external. Notice given 18/09/09.<br>6. FEN/10/19910. FENSA record for 7 windows, 1 door. Notice given 09/10/10. |
| | Parcel E – 31 January 2020 | **Planning**<br><br>Please see Schedule 3 in relation to planning disclosures.<br><br>**Highways** |

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| | | The search confirms that:<br><br>1. Canterbury Hill<br>2. St Stephen's Hill<br>3. Giles Lane<br><br>are all highways maintainable at public expense;<br><br>Alcroft Grange is not a highway maintainable at public expense.<br><br>**<u>Public Rights of Way</u>**<br><br>The search confirms that public rights of way abut on, or cross the Property, shown on the definitive map or revised definitive map.<br><br>The Property abuts recorded PROW CB44 (Public Footpath).<br><br>Plan 28 is an extract from the definitive map.<br><br>**<u>Utilities</u>**<br><br>The search confirms that high pressure gas pipelines are within the Property. Scotia Gas Networks have sent a letter formally objecting to any planning application until such time as a detail consultation has taken place. They also advise that no work or crossing of this high pressure pipeline is carried out until there has been a detailed consultation.<br><br>Power supplies are present at the Property. Further utilities searches have not been made given the nature of the Transaction.<br><br>**<u>Conservation Area</u>**<br><br>The Property is within The Tyler Hill Conservation Area. |

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| | | **Ancient Monuments and Archaeological Areas**<br><br>The search identifies an Ancient Monument No 1426019 dated 12 December 1998, being part of the Tyler Hill medieval pottery and tile industry.<br><br>**Common Land and Town or Village Green**<br><br>The Property is not included but abuts land which is included in the register maintained under s15B(1) of the Commons Act 2006 or under s31A of the Highways Act 1980 ref 02/12. |
| | 31 January 2020 - Parcel F | **Planning**<br><br>Please see Schedule 3 in relation to planning disclosures.<br><br>**Highways**<br><br>The search confirms that:<br><br>1. Tyler Hill is a highway maintainable at public expense;<br>2. Alcroft Grange is not a highway maintainable at public expense.<br><br>**Public Rights of Way**<br><br>The search confirms that public rights of way abut on, or cross the Property, shown on the definitive map or revised definitive map.<br><br>The Property is affected by recorded PROWs CB47 (Public Footpath) and CB37 (Public Bridleway).<br><br>The Property abuts recorded PROWs CB44 (Public Footpath) and CB48 (Public Bridleway).<br><br>Plan 27 is an extract from the definitive |

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| | | map.<br><br>**Utilities**<br><br>The search confirms that high pressure gas pipelines are within 100 feet of the site. Scotia Gas Networks have sent a letter formally objecting to any planning application until such time as a detail consultation has taken place. They also advise that no work or crossing of this high pressure pipeline is carried out until there has been a detailed consultation.<br><br>Power supplies are present at the Property. Further utilities searches have not been made given the nature of the Transaction.<br><br>**Conservation Area**<br><br>The Property is within The Allcroft Grange (Hackington) Conservation Area.<br><br>**Common Land and Town or Village Green**<br><br>The Property is not included but abuts land which is included in the register maintained under s15B(1) of the Commons Act 2006 or under s31A of the Highways Act 1980 ref 02/12. |
| | 31 January 2020 - Track | **Planning**<br><br>Please see Schedule 3 in relation to planning disclosures.<br><br>**Highways**<br><br>The search confirms that:<br><br>1. Tyler Hill is a highway maintainable at public expense;<br>2. Alcroft Grange is not a highway maintainable at |

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| | | public expense.<br><br>**<u>Public Rights of Way</u>**<br><br>The search confirms that public rights of way abut on, or cross the Property, shown on the definitive map or revised definitive map.<br><br>The Property is affected by recorded PROWs CB37 and CB44 (Public Footpaths).<br><br>The Property abuts recorded PROW CB47 (Public Footpath).<br><br>Plan 29 is an extract from the definitive map.<br><br>**<u>Utilities</u>**<br><br>The search confirms that power supplies are present at the Property. Further utilities searches have not been made given the nature of the Transaction.<br><br>**<u>Conservation Area</u>**<br><br>The Property is within The Allcroft Grange (Hackington) Conservation Area. |
| Commercial drainage and water enquiries | 29 January 2020 – Parcels B, C and D | The search indicates that neither foul water nor surface water from the Property drains to a public sewer.<br><br>There are no public sewer, disposal main, lateral drain, water mains, resource mains or discharge pipes present at the Property. Please refer to the attached plan 25 for details of the apparatus near the Property.<br><br>The Property is not connected to a mains water supply. |
| | 28 January 2020 – Parcel | The search indicates that neither foul water nor surface water from the |

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| | E | Property drains to a public sewer.<br><br>There is a public sewer, disposal main or lateral drain within the Property. Please see the attached plan 24.<br><br>There are no water mains, resource mains or discharge pipes present at the Property.<br><br>The Property is not connected to a mains water supply. |
| | 24 January 2020 – Parcel F | The search indicates that neither foul water nor surface water from the Property drains to a public sewer.<br><br>There are no public sewer, disposal main, lateral drain, water mains, resource mains or discharge pipes present at the Property.<br><br>The Property is not connected to a mains water supply. |
| | 23 January 2020 – Track | The search indicates that neither foul water nor surface water from the Property drains to a public sewer.<br><br>There are no public sewer, disposal main, lateral drain, water mains, resource mains or discharge pipes present at the Property.<br><br>The Property is not connected to a mains water supply. |
| Enquiries of The Coal Authority as to past, present and future mining operations in proximity to the Property | Not made | |
| Where title to the Property is not registered at Land Registry, Land Charges Act searches against the Company and date of | Not made | |

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| expiry of priority | | |
| Land Registry search (whether of whole or part), date of expiry of priority, confirmation that the search from date used is the search from date stated on the official copies used to complete this Certificate, name of party having benefit of priority period and basis of search (e.g. transfer) | | |
| Where title to the Property is not registered, date of search at the Companies Registry of the file of all companies disclosed by the documents of title as estate owners of the Property since the root of title | Not made | |
| Search at the Companies Registry against the Company | Not made | |
| Enquiries of the Highways Authority to ascertain the boundaries of publicly maintainable highways abutting, and any footpaths or rights of way affecting, the Property | 23 January 2020 - Track<br><br>13 February 2020 – Parcel F (split into two searches)<br><br>23 January 2020 – Parcel E | Please refer to the Disclosures to paragraph 3.2 of Schedule 3. |
| Chancel Repairs Search | Each Parcel dated 21 January 2020 | ChancelCheck certify that the Property is within a tithe district or Parish that has no record of risk of chancel repair liability. |
| Details of other searches or enquiries we considered to be appropriate | 28 January 2020 – Groundsure Review Parcels B, C and D | **<u>Groundsure Review – Parcels B, C D and D</u>**<br><br><u>Contaminated Land</u><br><br>Groundsure has identified that:<br>• it is likely that the property will |

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| | | represent acceptable banking security from a contaminated land perspective;<br>• it is unlikely that there is a risk that statutory or third party action;<br>• it is unlikely that there is a risk that the property value may be impacted due to contaminated land issues;<br>• the risk of contamination from past land use is low-moderate. A former grave yard, unspecified tank and pits and unspecified ground workings have been identified on site. The risk of contamination from waste and landfill is low. The risk of contamination from current and recent industrial use is moderate. The site has the potential to be impacted by ground contamination as a result of current land uses, with the farm on site;<br>• there are water features on site, including inland rivers;<br>• The operational environmental risk is moderate.<br><br>The Groundsure report states that the Property has a "high" environmental sensitivity, due to the underlying aquifer and surface water features. Designated Ancient Woodland has been identified on site and there is a local nature reserve 25m south east.<br><br>The report concludes that the site represents an Acceptable Environmental Risk. However, there are some liabilities which a prudent purchaser may want to consider further, particularly in relation to the farmyard on site.<br><br><u>Flooding</u><br><br>Groundsure suggests that the Property's overall risk assessment for past flooding and river, coastal, surface water and groundwater flooding is moderate-high. |

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| | | The level of risk identified is as follows:<br>• River and coastal flooding – very low<br>• Groundwater flooding – low<br>• Surface water flooding – significant. The report notes that the Property is likely to be prone to flooding following extreme rainfall, which may have an impact on insuring the Property against flood risk. Please see the attached plan 30.<br>• FloodScore – very high. Please see the attached plan 31.<br>• Past flooding – not identified<br>• Flood Storage Areas – not identified<br>• NPPF Flood Risk Assessment required if site redeveloped<br><br>The Property has not flooded to the Company's knowledge.<br><br><u>Ground Stability</u><br><br>The Property is located in an area that could be affected by natural ground subsidence, mining other than coal, infilled land.<br><br>The level of risk identified is as follows:<br>• Natural ground stability – moderate-high<br>• Non-natural ground stability – the property is located on infilled land – previous unspecified pits ground workings and a grave yard have been identified.<br><br><u>Energy</u><br><br>• Existing or proposed wind installations have been identified within 5km. Planning applications for individual wind turbines have been proposed within 5-6km.<br>• Existing or proposed solar installations (operational solar photovoltaic farms) have been identified within 5km. There are also planning applications |

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| | | relating to a solar farm or smaller installation within 5km.<br>• One or more nationally significant energy infrastructure project has been identified within 5km – the proposed 400kV electricity transmission connection between Richborough and Canterbury in Kent to connect the proposed new UK to Belgium interconnector (known as the Nemo Link) is within 2 - 3km.<br><br><u>Historical railway infrastructure</u><br><br>The property is situated within 250m of:<br>• a railway or tunnel feature identified on historical mapping, being railway sidings 27m to the north east dating from 1938;<br>• abandoned railway to the east which has been razed/abandoned.<br><br><u>Planning</u><br><br>Parcels B, C and D lie within 250m of an environmentally protected site or area and within 250m of a visually or culturally protected site or area.<br>• Church Woods, Blean and West Blean and Thorndean Woods are identified as Sites of Special Scientific Interest;<br>• Blean Complex Special Area of Conservation is 190m to the south west;<br>• Blean Woods is a National Nature Reserve;<br>• Tyler Hill Meadow is a Local Nature Reserve;<br>• There is ancient and semi-natural woodland on site.<br>• Parcels B, C and D are within the Blean, Amery Court, Blean and Canterbury and Whitstable Railway, Hackington and Blean Conservation Areas.<br>• A scheduled monument has been identified on site, being |

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| | 22 January 2020 – Groundsure Review Parcel E | the dispersed medieval settlement remains and a roman building immediately south west of St Cosmus and St Damian's Church<br><br>**<u>Groundsure Review – Parcel E</u>**<br><br><u>Contaminated Land</u><br><br>Groundsure has identified that:<br>• it is likely that the property will represent acceptable banking security from a contaminated land perspective;<br>• it is unlikely that there is a risk that statutory or third party action;<br>• it is unlikely that there is a risk that the property value may be impacted due to contaminated land issues;<br>• the risk of contamination from past land use (the search identifies unspecified pits and old gravel pits on site dating from 1957 and before) and current and recent industrial use is low-moderate. The risk of contamination from waste and landfill is low;<br>• there are water features on site, including a watercourse and ponds;<br>• The operational environmental risk is low – moderate.<br><br>The report concludes that the site represents an Acceptable Environmental Risk.<br><br><u>Flooding</u><br><br>Groundsure suggests that the Property's overall risk assessment for past flooding and river, coastal, surface water and groundwater flooding is low.<br><br>The level of risk identified is as follows:<br>• River and coastal flooding – very low<br>• Groundwater flooding – moderate |

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| | | • Surface water flooding – negligible<br>• FloodScore – very low<br>• Past flooding – not identified<br>• Flood Storage Areas – not identified<br>• NPPF Flood Risk Assessment required if site redeveloped<br><br><u>Ground Stability</u><br><br>The Property is located in an area that could be affected by natural ground subsidence, mining other than coal, infilled land.<br><br>The level of risk identified is as follows:<br>• Natural ground stability – moderate-high<br>• Non-natural ground stability – the property is located in an area that may be affected by surface or sub-surface mining. Small scale underground mining may have occurred for chalk, mine adits, shafts and tunnels may be present Potential for localised difficult ground conditions are at a level where they should be considered. Infilled land has been identified at the site.<br><br><u>Energy</u><br><br>• Existing or proposed wind installations have been identified within 10km. Planning applications for individual wind turbines have been proposed within 5-6km.<br>• Existing or proposed solar installations (operational solar photovoltaic farms) have been identified within 5km. There are also planning applications relating to a solar farm or smaller installation within 5km.<br>• One or more nationally significant energy infrastructure project has been identified within 5km – the proposed 400kV electricity |

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| | | transmission connection between Richborough and Canterbury in Kent to connect the proposed new UK to Belgium interconnector (known as the Nemo Link) is within 1 – 2km.<br><br><u>Planning</u><br><br>Parcel E lies within 250m of an environmentally protected site or area and within 250m of a visually or culturally protected site or area.<br>• A scheduled monument has been identified on site – part of the Tyler Hill medieval pottery and tile industry.<br>• There is ancient and semi-natural woodland nearby.<br>• Parcel E is within the Tyler Hill Conservation Area. |
| | 21 January 2020 – Groundsure Review Parcel F | **<u>Groundsure Review – Parcel F</u>**<br><br><u>Contaminated Land</u><br><br>Groundsure has identified that:<br>• it is likely that the property will represent acceptable banking security from a contaminated land perspective;<br>• it is unlikely that there is a risk that statutory or third party action will be taken against the site;<br>• it is unlikely that there is a risk that the property value may be impacted due to contaminated land issues; and<br>• the risk of contamination from waste and landfill is moderate. There is a formal landfill site within 50m (Shelford Sandpit) and an active or recent landfill (Shelford Landfill) within 52m. Other potential contamination risks are noted as low.<br><br>The Groundsure report states that the Property has a “high” environmental sensitivity, with surface water features (including inland rivers) on site and in close proximity, being situated above a |

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| | | Secondary A aquifer and adjacent to a Site of Special Scientific Interest in the east and ancient woodland adjacent to the north, south and east.<br><br>The report concludes that the site has the potential to be impacted by ground contamination as a result of current land uses but that the contaminated land risk is moderate and that the site represents an Acceptable Environmental Risk.<br><br><u>Flooding</u><br><br>Groundsure suggests that the Property's overall risk assessment for past flooding and river, coastal, surface water and groundwater flooding is negligible.<br><br>The level of risk identified is as follows:<br>• River and coastal flooding – very low<br>• Groundwater flooding – low<br>• Surface water flooding – negligible<br>• FloodScore – very low<br>• Past flooding – not identified<br>• Flood Storage Areas – not identified<br>• NPPF Flood Risk Assessment required if site redeveloped<br><br><u>Ground Stability</u><br><br>The Property is located in an area that may be affected by natural ground subsidence, mining other than coal, infilled land.<br><br>The level of risk identified is as follows:<br>• Natural ground stability – moderate-high<br>• Non-natural ground stability – the property is located in an area that may be affected by surface or sub-surface mining. Small scale underground mining may have occurred for chalk, mine adits, shafts and tunnels may be present Potential for localised difficult |

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| | | ground conditions are at a level where they should be considered. Past ground workings have been identified at the site.<br>• Parcel F is located within 3m of a previous pond which has been infilled.<br><br><u>Energy</u><br><br>• Existing or proposed wind installations have been identified within 10km. Planning applications for individual wind turbines have been proposed within 5km.<br>• Existing or proposed solar installations (operational solar photovoltaic farms) have been identified within 5km. There are also planning applications relating to a solar farm or smaller installation within 5km.<br>• One or more nationally significant energy infrastructure project has been identified within 5km – the proposed 400kV electricity transmission connection between Richborough and Canterbury in Kent to connect the proposed new UK to Belgium interconnector (known as the Nemo Link) is within 697m.<br><br><u>Planning</u><br><br>Parcel F lies within 250m of an environmentally protected site or area and within 250m of a visually or culturally protected site or area.<br>• West Blean and Thornden Woods are a Site of Special Scientific Interest<br>• There is ancient and semi-natural woodland on site.<br>• Parcel F is within the Tyler Hill and Allcroft Grange, Hackington Conservation Areas. |

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| | 22 January 2020 – Groundsure Review Track | **<u>Groundsure Review – Track</u>**<br><br><u>Contaminated Land</u><br><br>Groundsure has identified that:<br>• it is likely that the property will represent acceptable banking security from a contaminated land perspective;<br>• it is unlikely that there is a risk that statutory or third party action will be taken against the site;<br>• it is unlikely that there is a risk that the property value may be impacted due to contaminated land issues; and<br>• the risk of contamination from past land use, waste and landfill, current and recent industrial use is low. The operational environmental risk is low.<br><br>The Groundsure report states that the Property has a "high" environmental sensitivity, with an area of designated Ancient Woodland on site.<br><br>The report concludes that the site represents an Acceptable Environmental Risk.<br><br><u>Flooding</u><br><br>Groundsure suggests that the Property's overall risk assessment for past flooding and river, coastal, surface water and groundwater flooding is negligible.<br><br>The level of risk identified is as follows:<br>• River and coastal flooding – very low<br>• Groundwater flooding – negligible<br>• Surface water flooding – negligible<br>• FloodScore – very low<br>• Past flooding – not identified<br>• Flood Storage Areas – not identified<br>• NPPF Flood Risk Assessment |

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| | | required if site within Flood Zones 2 and 3.<br><br><u>Ground Stability</u><br><br>The Property is located in an area that may be affected by natural ground subsidence, mining other than coal, infilled land.<br><br>The level of risk identified is as follows:<br>• Natural ground stability – moderate-high<br>• the property is located in an area that may be affected by surface or sub-surface mining. Small scale underground mining may have occurred for chalk, mine adits, shafts and tunnels may be present Potential for localised difficult ground conditions are at a level where they should be considered.<br>• The Track is located within 18m of a previous pond which has been infilled.<br><br><u>Energy</u><br><br>• Existing or proposed wind installations have been identified within 10km. Planning applications for individual wind turbines have been proposed within 5km.<br>• Existing or proposed solar installations (operational solar photovoltaic farms) have been identified within 5km. There are also planning applications relating to a solar farm or smaller installation within 5km.<br>• One or more nationally significant energy infrastructure project has been identified within 5km – the proposed 400kV electricity transmission connection between Richborough and Canterbury in Kent to connect the proposed new UK to Belgium interconnector |

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| | | (known as the Nemo Link) is within 1 – 2km.<br><br><u>Planning</u><br><br>The Track lies within 250m of an environmentally protected site or area and within 250m of a visually or culturally protected site or area.<br>• West Blean and Thornden Woods are a Site of Special Scientific Interest<br>• There is ancient replanted and ancient and semi-natural woodland on site.<br>• The Track is within the Tyler Hill and Allcroft Grange, Hackington Conservation Areas.<br>• The scheduled monument being part of the Tyler Hill medieval pottery and tile industry is within 166m of the Track. |
| | Parcel E Mining Search – 3 March 2020 | **<u>Parcel E Mining Search</u>**<br><br>Mining Searches UK considers the Property to be acceptable free from chalk mining risk. They have no evidence of any chalk mining features potentially affecting the Property. They are not aware of any planned future mining activity.<br><br>Two old gravel pits are recorded to lie within the Property and the search recommends further action in the form of a site walkover for visible defects and signs of mining-related settlement or subsidence effects by a suitably qualified and experienced period. |
| | Parcel F Mining Search – 3 March 2020 | **<u>Parcel F Mining Search</u>**<br><br>Mining Searches UK considers the Property to be acceptable free from chalk mining risk. They have no evidence of any chalk mining features potentially affecting the Property. They are not aware of any planned future mining activity. No further action is recommended. |

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| | Track Mining Search – 2 March 2020 | **<u>Track Mining Search</u>**<br><br>Mining Searches UK considers the Property to be acceptable free from chalk mining risk. They have no evidence of any chalk mining features potentially affecting the Property. They are not aware of any planned future mining activity. No further action is recommended. |

Date 2020

Signed:

Name of firm: Mills & Reeve LLP

Address: Botanic House, 100 Hills Road, Cambridge CB2 1PH

Reference: CRTN/4012546-0009

# Contact Details

**Enquiries**
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