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## **SURFACE & FOUL WATER DRAINAGE NOTES**

These notes are to be read in conjunction with Drawings below:

- C10101 – Pre Development Impermeable Areas Plan
- C10102 – Post Development Impermeable Areas Plan
- C10501 - Drainage Layout
- C10502 – SW Drained Areas plan
- C11001, C11002 – Drainage Details
- Pre & Post Development Runoff rates & Volumes
- MicroDrainage Simulation SW Network result files (incorporating the permeable paving sub-base storage calculations with flow control).

The notes are intended to explain the findings of the hydraulic analysis results and how these results have been incorporated within the drainage layout.

### **1.0 EXISTING SITE**

The existing site is a brownfield site. The existing concrete hardstanding area was used for car parking with the existing surface water flows discharging unrestricted to an outfall to the River Stour (via a petrol interceptor).

- Total site area = 1250 m<sup>2</sup>
- Roof/External Paved Areas = 1020 m<sup>2</sup>
- Site Impermeability Factor = 81%.

### **2.0 PROPOSED DEVELOPMENT**

The proposed residential development comprises of 12 units over 3 storeys with an associated car park. The building is within Flood Zones 2 & 3 and a separate flood risk assessment has predicted the 1 in 100 year flood level for the site at 8.63m AOD. The proposed FFL for the building has been set 600mm higher at 9.23 AOD. The development increases the existing area of landscaping.

- Total site area = 1250 m<sup>2</sup>
- Roof/External Paved Areas = 860 m<sup>2</sup>
- Site Impermeability Factor = 69%.

### **3.0 MAXIMUM RUNOFF RATES**

A restricted surface water discharge rate of 5 l/sec is proposed which can be achieved by using 0.5m deep permeable sub base storage over the entire area of the new car park with an orifice plate flow control. The existing outfall to the River Stour (with tidal flap) and on site petrol interceptor will be checked for condition prior to reuse. Storage provided is based on 1 in 100 year at 40% climate change. A new foul water connection is to be constructed from the development to the existing 450mm diameter public foul sewer located in St Stephens Rd.

#### **4.0 EXISTING RUNOFF RATES**

Surface Water:

- 1 in 1 year = 13.3 l/s
- 1 in 30 year = 36.6 l/s
- 1 in 100 year = 47.7 l/s

Foul Water:

- 12 Dwellings x 4000 l/day = 0.56 l/s (as per Sewer for Adoption 7<sup>th</sup>)

#### **5.0 SURFACE & FOUL WATER DESIGN PERFORMANCE STANDARDS**

The proposed surface water drainage serving the site has been designed to cater for runoff rates and volumes resulting from the 1 in 100 year event including an allowance of 40% for climate change.

The proposed foul water drainage serving the 12 new dwellings has been designed to convey peak flows based on 4000 litres/unit per day as required under Sewer for Adoption.

#### **6.0 SURFACE WATER MANAGEMENT**

The on-site drainage system serving the development comprises of the following key component;

- Piped network – This system conveys runoff from the roof and paved areas.
- Permeable Paving [Type C Non Infiltration] – The new car park is constructed as a no infiltration permeable pavement. Run-off from these areas percolates in to the underlying sub-base and is collected via fin drains along the pavement edge/centre.
- Flow Control – To ensure the maximum post development runoff rate does not exceed the pre-development runoff rate, flow controls are required immediately downstream of the permeable paving sub base. The flow control proposed on this project is an orifice plate.

#### **7.0 MICRO DRAINAGE ANALYSIS**

The performance of the surface water network has been analysed using the XP Solutions MicroDrainage Simulation software. The piped network, flow controls and attenuation storage have been analysed for the 100 year event + climate change. The results file provides the following information;

## **SW MD Network with Permeable Paving:**

### **Page 1**

**Design Criteria for Storm** – This shows the standard design criteria plus the contributing areas.

### **Page 3**

**Network Design Table** – This shows the piped network details such as length, slope, impermeable area and pipe diameter

### **Page 4**

**MH & Pipeline Schedules** – This shows the piped network details such as length, slope, impermeable area and pipe diameter.

### **Page 6**

**Simulation Criteria** – This provides information on the design variables used for the storm event. The information shows the storm id the 100 year event and that an additional flow of 40% has been included to allow for climate change.

### **Page 7**

**Online Controls** – Details of the 56mm Dia. flow control are provided. The data shows that the flow control has an outflow of 5 l/sec @ a water depth of 0.6m.

### **Page 8**

**Porous Car Park Storage Structure** – Details of the 0.5m deep permeable paving storage structure is shown. This volume is distributed by the permeable paving. Total storage available:

- Permeable paving storage volume =  $300 \text{ m}^2 \times 30\% \times 0.5 \text{ m} = 45 \text{ m}^3$

### **Pages 9 to 20**

This provides the results for the each storm event, showing the status for each pipe length in the network. It shows a pipe flow of 5.0 l/s. The results confirm no flooding for the 100 year event plus 40% climate change.

## **8.0 SUMMARY**

The surface water hydraulic analysis confirms that appropriate surface water management arrangements have been incorporated within the proposed development such that there will be no increase in flood risk either on or off site for a range of storm events up to the 1 in 100 year event (1% annual probability) including a 40% allowance for climate change. The proposals are consistent with the Government's National Planning Policy Framework and it has been demonstrated that the occupants and buildings will remain safe for the lifetime of the development.

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