TECHNICAL NOTE

Project:	**WATER MEADOWS PRIMARY SCHOOL, SHAFTESBURY AVENUE, HERSDEN, CANTERBURY, KENT, CT3 4HS**
Job No:	**3222**
Purpose of Note:	**DRAINAGE STRATEGY ADDENDUM**
Date:	**14/02/2020**

Introduction

This report has been prepared for Water Meadows Primary School to supplement the Flood Risk and Drainage Strategy Report (Considine, 07/10/2019) produced to provide guidance on the method of surface water disposal for the proposed development at Water Meadows Primary School, Shaftesbury Road, Hersden, Canterbury, Kent, CT3 4HS.

The proposal is to construct a new modular classroom block with toilet facilities, and additional parking within the existing car park area.

This document has been produced in accordance with current best practice and recommendations and guidance set out in the National Planning Policy Framework (NPPF).

Considine has no responsibility to any other parties to whom this report may be circulated, in part or in full, and any such parties rely on the contents of this report solely at their own risk.

Foul Water Drainage

The foul water drainage will be progressed as per the design issued within the original Flood Risk and Drainage Strategy Report (Considine, 07/10/2019).

Surface Water Drainage

Since the Flood Risk and Drainage Strategy Report (Considine, 07/10/2019) was issued, soakage tests have been undertaken on the site, as appended to this technical note.

The site investigation revealed negligible infiltration rates, such that the anticipated soakaway would not be an appropriate solution. We therefore anticipate that we will have to provide 2No pumps – one for foul water and one for surface water discharging to the existing drain.

The existing foul network from the hall runs to pumping chamber and then is lifted to a run which routes under the existing building and discharges into a combined network (on-site) prior to onward discharge into the public sewer (off-site).

Whilst there is potential scope to utilise this pipe-run under the school, our recommendation is to route the surface water around the outside of the building as this will be easier for future access/maintenance.

It is our proposal to locate the attenuation within the soft landscaped area for ease of construction and minimal excavation of the existing hardstanding areas.

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During the design process the determination of the potential impacts of an additional future construction on the site has been requested. Whilst still in its outline stages, the Client has opted to provide future proofing to the proposed design to minimise future works to the system thus reducing the risk of damage from alterations.

The proposed design has been appended for reference.

The current proposed system will now attenuate the surface water to a 1 l/s pumped discharge and will subsequently discharge surface water into the existing combined network on site for conveyance off-site via the existing combined gravity network.

Full calculations have been appended for reference.

Summary

Further to the Flood Risk and Drainage Strategy Report (Considine, 07/10/2019), additional site investigations have been undertaken to determine the soakage rates on the site.

The site presents poor soakage potential and therefore requires an alternative form of surface water discharge. The proposal is to provide a pumped attenuation feature (limited to 1 l/s).

This attenuation will be sized to provide future-proofing to the site in light of outline discussions for future development.

Please refer to the following Considine Drawings for the drainage design:

- 3222-CON-00-XX-DR-C-1500-P02 (Engineering Layout)
- 3222-CON-00-XX-DR-C-1510-P02 (Drainage Layout)
- 3222-CON-00-XX-DR-C-1520-P02 (Construction Areas)
- 3222-CON-00-XX-DR-C-1530-P02 (Drainage Details)

Prepared By: Mike Frazer MEng (Hons), GMICE
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CDM 2015 RESIDUAL RISKS

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3. All areas of excavation are to be scanned and marked for existing services prior to any excavation.
4. Be aware of possible live drainage flows and foul effluent during construction. The Contractor shall assess and implement a safe working system and equipment (PPE) as necessary.
5. When working with live drainage there is an increased risk from waterborne diseases such as leptospirosis and weils disease.
6. Unauthorised access to the site must be prevented at all times.
7. Support or batter back as necessary excavations in unstable ground.

The above residual risks are for non-standard hazards. It is assumed that a competent contractor familiar with the construction of this type of work will be appointed who will be aware ofthe standard hazards.

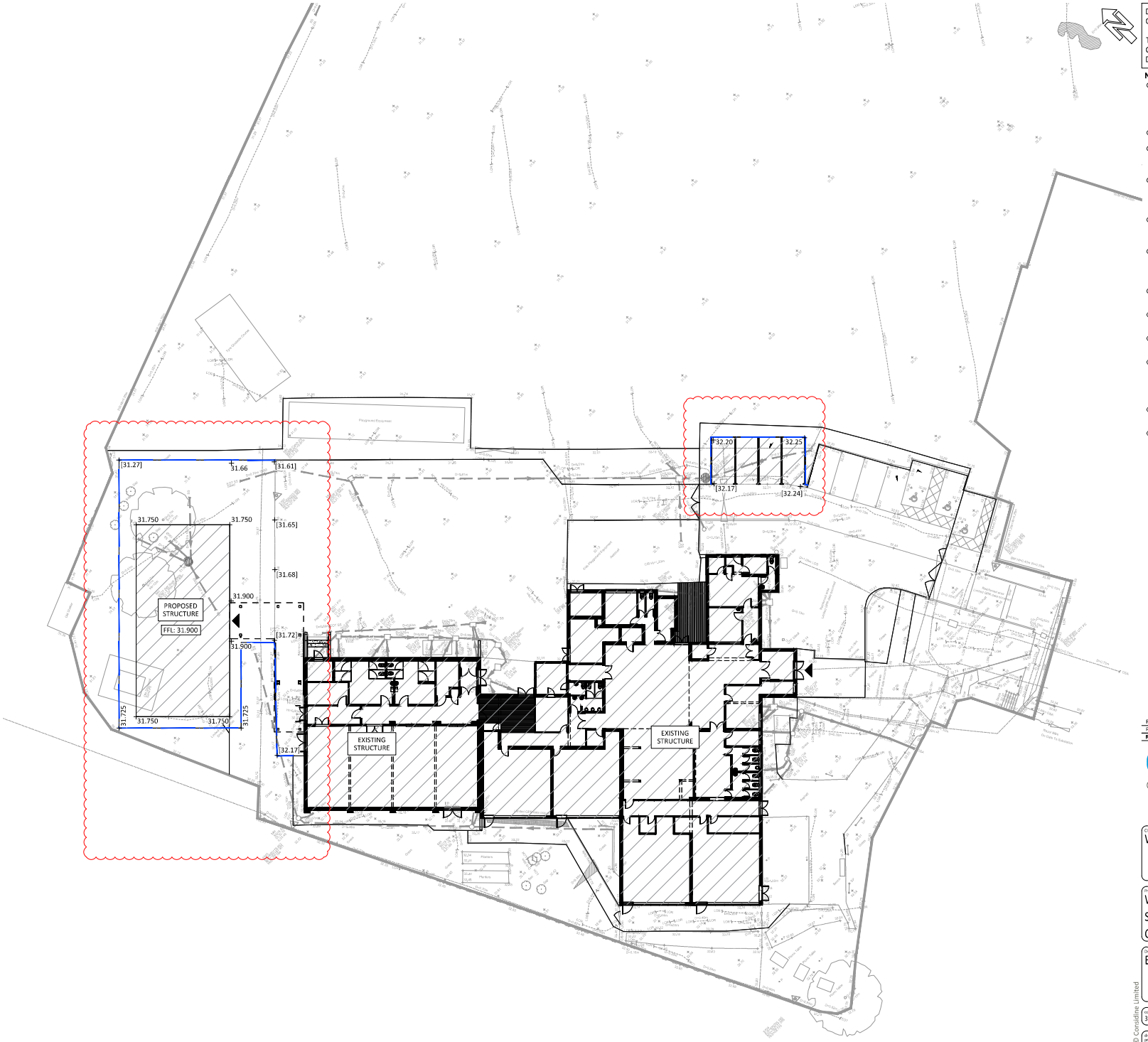
KEY

Proposed PC Edging

+12.345 Proposed Level

+[12.345] Proposed Level to Match Existing

1/40 Proposed Gradient



1m 2m 3m 4m 5m 10m 15m 20m
SCALE 1-200

DO NOT SCALE THIS DRAWING. ALL SETTING OUT TO ARCHITECTS DETAILS AND DRAWINGS

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWING ISSUES AND THE SPECIFICATION.

Notes:

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G11. Gradient of under floor branch pipes to be 1:40 and no flatter than 1:80 (minimum of 1 WC connected).

G12. All RWP, SVP and SS positions are subject to confirmation from the architect.

Rev	Amendment	Drn	Chk	Date
P02	REVISED TO NEW PROPOSED FFL	MJF	JEM	14.02.20
P01	PRELIMINARY ISSUE	MJF	RSC	16.12.19

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Project:
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SHAFTESBURY ROAD, HERSDEN
CANTERBURY, CT3 4HS

Drawing Title:
ENGINEERING LAYOUT

considine ref	drawn by	date	drawing scales	original paper size
3222	MJF	OCT'19	1:200@A1, 1:400@A3	A1

drawing reference : project - originator - volume - level - type - role - number
3222 - CON - 00 - XX - DR - C - 1500

status : S0
status description : SUITABLE FOR INFORMATION
revision : P02
revision status : PRELIMINARY

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KEY

- Proposed Surface Water Pipe Ø and gradient TBC
- Proposed Surface Water Rising Main
- Proposed Foul Water Pipe Ø and gradient TBC
- Proposed Foul Water Rising Main
- Existing Surface Water Pipe Ø and gradient TBC
- Existing Foul Water Pipe Ø and gradient TBC
- Existing Combined Water Pipe Ø and gradient TBC
- Proposed Surface Water PPIC size TBC
- Proposed Foul Water PPIC size TBC
- Proposed Surface Water Manhole Pre Cast Concrete - Circular Size TBC
- Proposed Foul Water Pump Refer to specialist design
- Proposed Surface Water Pump Refer to specialist design
- ACO — Proposed ACO Drain
- TH — Proposed Threshold Drain to Architect Specification
- CP — Proposed Catchpit
- RWP — Proposed Rainwater Pipe
- SVP — Proposed Soil and Vent Pipe
- SS — Proposed Stub Stack
- NRV — Proposed Non Return Valve Refer to Details for Specification
- AT — Access Turret

Private Foul Water Manhole Schedule

Manhole Ref	Cover Level	Depth to invert (m)	Depth to soffit (m)	Pipe Out IL	Pipe Out Dia (mm)	Pipe In IL	Pipe In Dia (mm)	MH Type	Dimensions (mm)	Cover Class	Bedding class	MH / IC	RAC?	Comments
F1	31.900	0.575	0.475	31.325	100	31.375	100	PPIC	450mmØ	B125	Z	IC	-	
						31.375	100							
F2	32.090	1.165	1.065	30.925	100	30.975	100	PPIC	450mmØ	B125	Z	IC	-	
F3	32.090	1.425	1.375	30.665	50	30.665	100	PUMP	TBC	B125	S	IC	RAC	PUMP TO SPECIALIST DESIGN
						30.665	100							
EF1	32.130	1.300	1.200	30.830	100	30.830	100	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	EXISTING PUMP CHAMBER TO CONVERTED TO STANDARD CHAMBER
EF2	31.590	0.600	0.500	30.990	100	30.990	100	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	

Private Surface Water Manhole Schedule

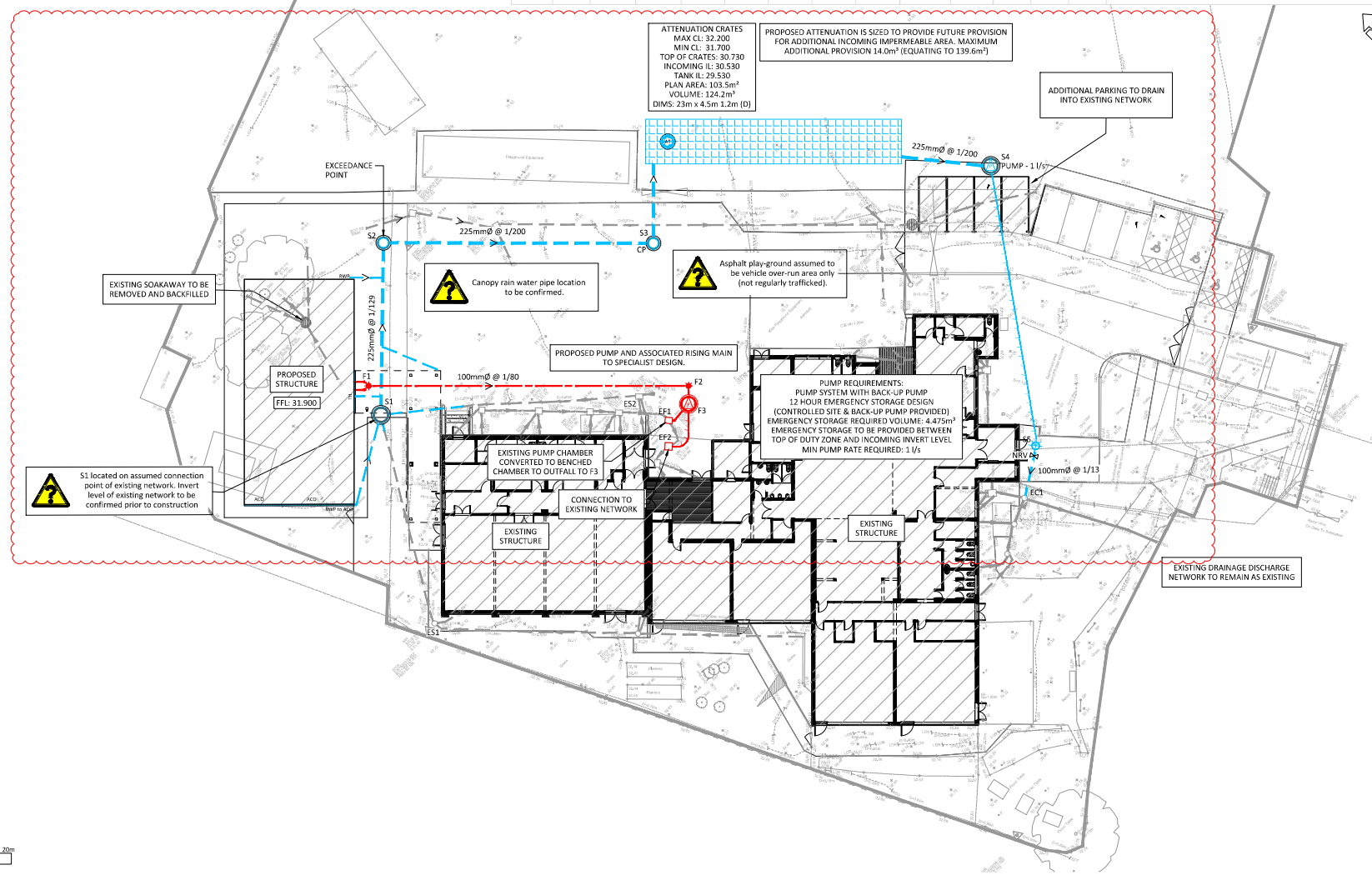
Manhole Ref	Cover Level	Depth to invert (m)	Depth to soffit (m)	Pipe Out IL	Pipe Out Dia (mm)	Pipe In IL	Pipe In Dia (mm)	MH Type	Dimensions (mm)	Cover Class	Bedding class	MH / IC	RAC?	Comments
S1	31.803	0.828	0.603	30.975	225	31.100	100	CONC	1200mmØ	A15	Z	IC	-	
						31.100	100							
						31.100	100							
S2	31.680	0.825	0.600	30.855	225	30.855	225	CONC	900mmØ	A15	Z	IC	-	
S3	31.900	1.170	0.945	30.730	225	30.730	225	CONC	900mmØ	A15	Z	IC	-	CATCHPIT
S4	32.240	2.840	TBC	29.400	TBC	29.400	225	PUMP	TBC	A15	S	IC	RAC	PUMP TO SPECIALIST DESIGN - 1 l/s
S5	32.200	1.100	1.000	31.100	100	31.100	50	PPIC	450mmØ	A15	Z	IC	-	BREAK CHAMBER

Private Combined Water Manhole Schedule

Manhole Ref	Cover Level	Depth to invert (m)	Depth to soffit (m)	Pipe Out IL	Pipe Out Dia (mm)	Pipe In IL	Pipe In Dia (mm)	MH Type	Dimensions (mm)	Cover Class	Bedding class	MH / IC	RAC?	Comments
EC1	32.060	1.260	1.160	30.800	100	30.800	100	EXIST	EXIST	EXIST	EXIST	EXIST	EXIST	
						30.800	100							
						30.800	100							NEW CONNECTION FROM S5

NOTES:

MH/IC Chambers denoted as MH are designed to accommodate manned entry. Chambers denoted as IC are designed to be accessed from ground level only.
RAC Reduced Access Chamber
Amendments from previous issue



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P02	REVISED TO NEW PROPOSED FFL AND FUTURE-PROOFING ATTENUATION	MJF	JEM	14.02.20
P01	PRELIMINARY ISSUE	MJF	RSC	16.12.19

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Drawing Title:
PROPOSED DRAINAGE LAYOUT

considine ref	drawn by	date	drawing scales	original paper size
3222	MJF	OCT'19	1:200@A1, 1:400@A3	A1

drawing reference: project - originator - volume - level - type - role - number
3222 - CON - 00 - XX - DR - C - 1510

status	status description
S0	SUITABLE FOR INFORMATION
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P02	PRELIMINARY

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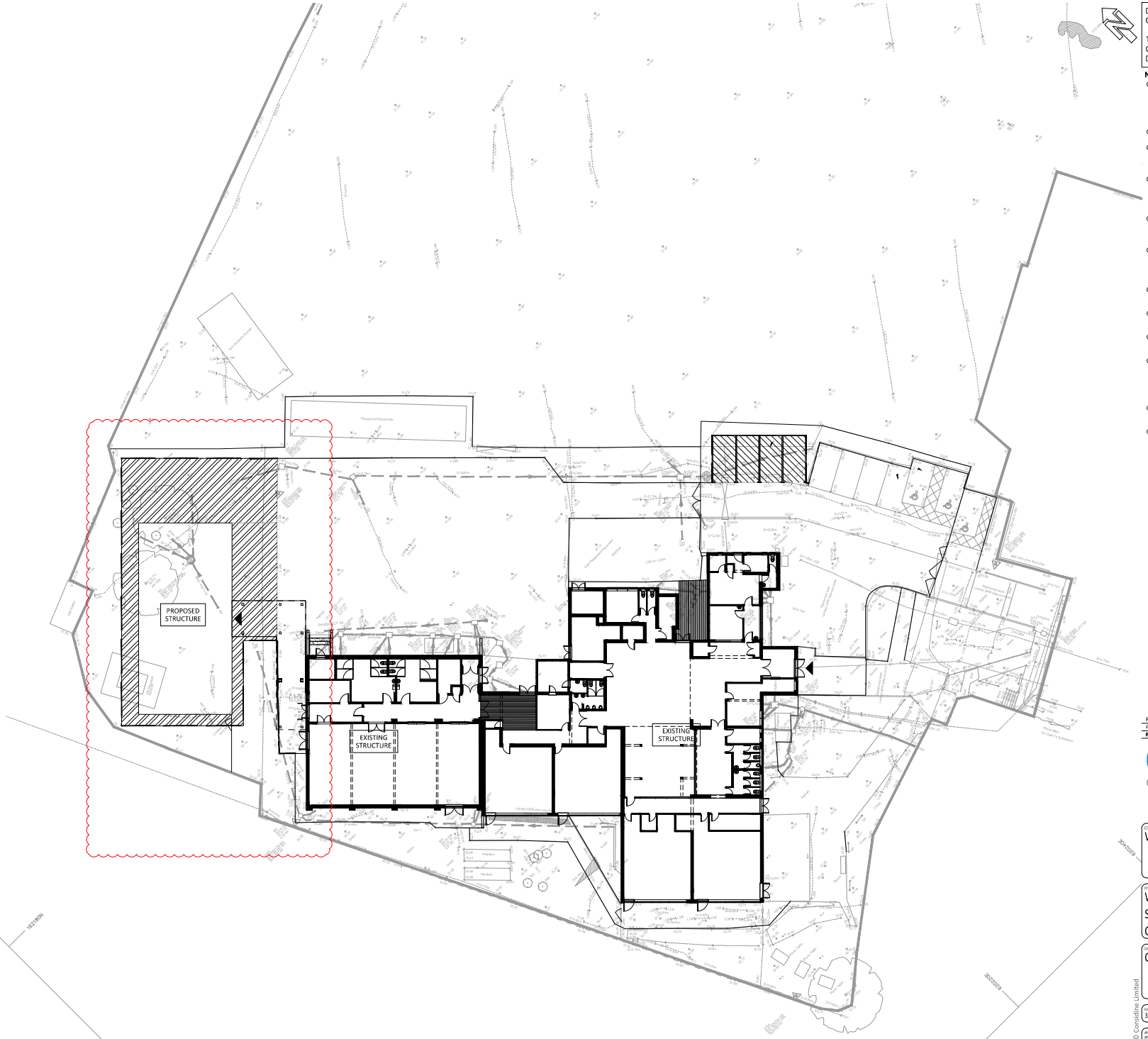
KEY

Refer to Drawing 3222-1540 for Typical Construction Details

Full Depth Carriageway Construction Asphalt Surfacing (A)

Full Depth Footway Construction Asphalt Surfacing (B)

Existing surface construction unknown. Proposed surface design to tie into existing - assumed construction based on current standards.



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P01	PRELIMINARY ISSUE	MJF	RSC	16.12.19

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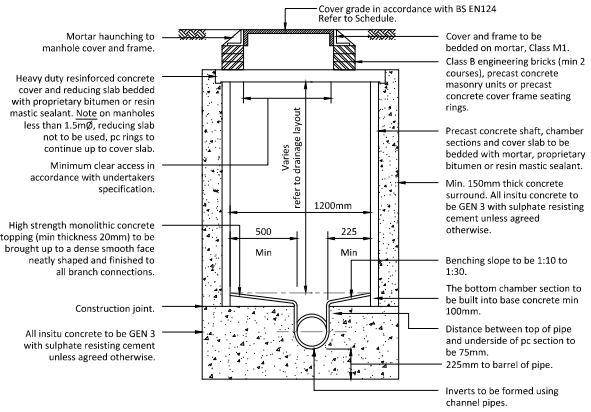
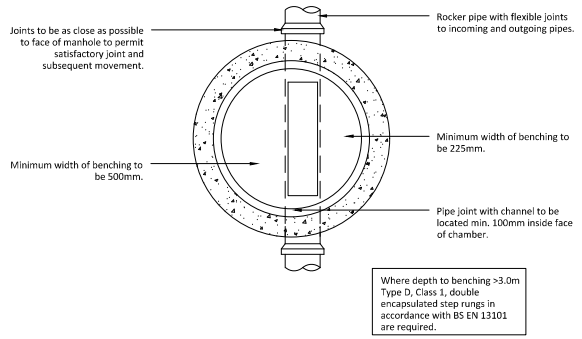
Drawing Title:
CONSTRUCTION AREAS

considine ref	drawn by	date	drawing scales	original paper size
3222	MJF	OCT'19	1:200@A1, 1:400@A3	A1

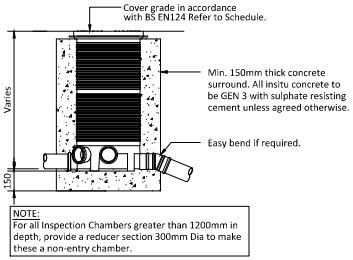
drawing reference : project : originator : volume : level : type : role : number
3222 - CON - 00 - XX - DR - C - 1520

status : S0
status description : SUITABLE FOR INFORMATION
revision : P02
revision status : PRELIMINARY

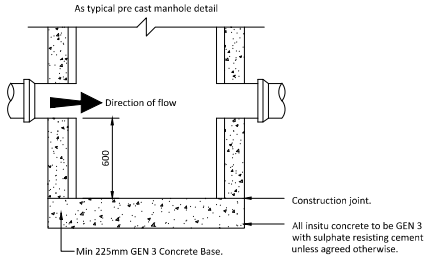




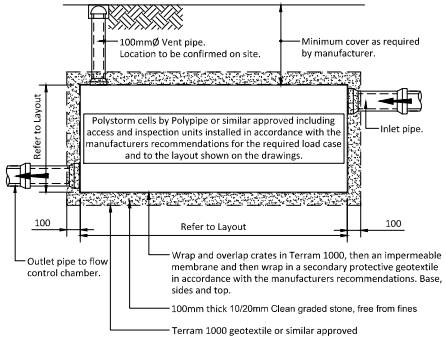
Typical Pre Cast Manhole Detail
Max Depth from Ground Level to Soffit of 3.0m
Scale 1-20



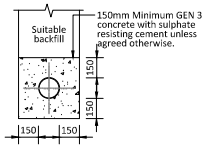
Typical Inspection Chamber
450mmØ Polypropylene (SFA type 3)
Scale 1-20



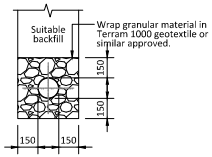
Typical Catchpit Detail
Min 225mmØ Pipework
Scale 1-20



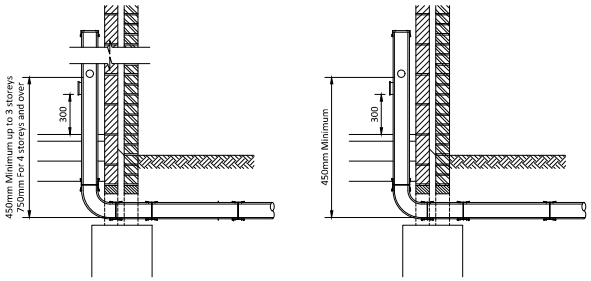
Typical Attenuation Tank Detail
Sealed Geo-Cellular System
Refer to Plan for Required Layout
Scale 1-20



Type Z Bedding
Concrete Bed and Surround
(Depth to soffit<1.2m)
Scale 1-20

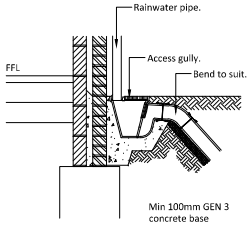


Type S Bedding
Granular Bed and Surround
(Depth to soffit >1.2m)
Scale 1-20

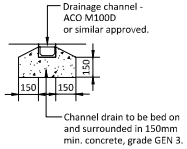


Typical Soil and Vent Pipe Arrangement
To Architects Specification
Scale 1-20

Typical Stub Stack Arrangement
To Architects Specification
Scale 1-20



Typical Rainwater Pipe Arrangement
To Architects Specification
Scale 1-20



Typical Channel Drain
ACO M100D - Pedestrian Areas
Scale 1-20

0.5m 1m 2m
SCALE 1-20

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Drawing Title:
CONSTRUCTION DETAILS

considine ref	drawn by	date	drawing scale	original paper size
3222	MJF	OCT'19	AS SHOWN	A1

drawing reference : project - originator - volume - level - type - role - number
3222 - CON - 00 - XX - DR - C - 1530

status :	status description :
S0	SUITABLE FOR INFORMATION
revision :	revision status :
P02	PRELIMINARY

Summary of Results for 2 year Return Period (+40%)

Half Drain Time : 200 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	97.140	0.140	0.0	1.0	1.0	11.8	O K
30 min Summer	97.173	0.173	0.0	1.0	1.0	14.6	O K
60 min Summer	97.200	0.200	0.0	1.0	1.0	16.9	O K
120 min Summer	97.247	0.247	0.0	1.0	1.0	20.9	O K
180 min Summer	97.262	0.262	0.0	1.0	1.0	22.2	O K
240 min Summer	97.266	0.266	0.0	1.0	1.0	22.5	O K
360 min Summer	97.265	0.265	0.0	1.0	1.0	22.4	O K
480 min Summer	97.258	0.258	0.0	1.0	1.0	21.8	O K
600 min Summer	97.249	0.249	0.0	1.0	1.0	21.0	O K
720 min Summer	97.238	0.238	0.0	1.0	1.0	20.1	O K
960 min Summer	97.215	0.215	0.0	1.0	1.0	18.2	O K
1440 min Summer	97.170	0.170	0.0	1.0	1.0	14.4	O K
2160 min Summer	97.113	0.113	0.0	1.0	1.0	9.6	O K
2880 min Summer	97.070	0.070	0.0	1.0	1.0	5.9	O K
4320 min Summer	97.019	0.019	0.0	1.0	1.0	1.6	O K
5760 min Summer	97.002	0.002	0.0	1.0	1.0	0.2	O K
7200 min Summer	97.002	0.002	0.0	1.0	1.0	0.1	O K
8640 min Summer	97.001	0.001	0.0	1.0	1.0	0.1	O K
10080 min Summer	97.001	0.001	0.0	1.0	1.0	0.1	O K
15 min Winter	97.140	0.140	0.0	1.0	1.0	11.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	47.576	0.0	12.8	18
30 min Summer	30.631	0.0	16.5	33
60 min Summer	19.047	0.0	20.5	62
120 min Summer	13.001	0.0	28.1	120
180 min Summer	10.146	0.0	32.9	178
240 min Summer	8.422	0.0	36.3	208
360 min Summer	6.378	0.0	41.3	274
480 min Summer	5.183	0.0	44.7	340
600 min Summer	4.394	0.0	47.4	410
720 min Summer	3.831	0.0	49.6	478
960 min Summer	3.077	0.0	53.1	614
1440 min Summer	2.257	0.0	58.5	880
2160 min Summer	1.662	0.0	64.8	1252
2880 min Summer	1.345	0.0	70.0	1612
4320 min Summer	1.015	0.0	79.2	2252
5760 min Summer	0.842	0.0	87.4	2912
7200 min Summer	0.735	0.0	94.9	3928
8640 min Summer	0.662	0.0	101.5	4592
10080 min Summer	0.609	0.0	109.3	4808
15 min Winter	47.576	0.0	12.8	18

Summary of Results for 2 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	97.174	0.174	0.0	1.0	1.0	14.7	O K
60 min Winter	97.201	0.201	0.0	1.0	1.0	17.0	O K
120 min Winter	97.250	0.250	0.0	1.0	1.0	21.2	O K
180 min Winter	97.267	0.267	0.0	1.0	1.0	22.6	O K
240 min Winter	97.270	0.270	0.0	1.0	1.0	22.8	O K
360 min Winter	97.264	0.264	0.0	1.0	1.0	22.3	O K
480 min Winter	97.252	0.252	0.0	1.0	1.0	21.3	O K
600 min Winter	97.237	0.237	0.0	1.0	1.0	20.0	O K
720 min Winter	97.220	0.220	0.0	1.0	1.0	18.6	O K
960 min Winter	97.184	0.184	0.0	1.0	1.0	15.5	O K
1440 min Winter	97.117	0.117	0.0	1.0	1.0	9.9	O K
2160 min Winter	97.041	0.041	0.0	1.0	1.0	3.4	O K
2880 min Winter	97.002	0.002	0.0	1.0	1.0	0.2	O K
4320 min Winter	97.001	0.001	0.0	1.0	1.0	0.1	O K
5760 min Winter	97.001	0.001	0.0	1.0	1.0	0.1	O K
7200 min Winter	97.001	0.001	0.0	0.8	0.8	0.1	O K
8640 min Winter	97.001	0.001	0.0	0.8	0.8	0.1	O K
10080 min Winter	97.001	0.001	0.0	0.8	0.8	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	30.631	0.0	16.5	32
60 min Winter	19.047	0.0	20.5	60
120 min Winter	13.001	0.0	28.0	118
180 min Winter	10.146	0.0	32.9	174
240 min Winter	8.422	0.0	36.4	226
360 min Winter	6.378	0.0	41.3	282
480 min Winter	5.183	0.0	44.7	360
600 min Winter	4.394	0.0	47.4	436
720 min Winter	3.831	0.0	49.6	512
960 min Winter	3.077	0.0	53.1	654
1440 min Winter	2.257	0.0	58.5	922
2160 min Winter	1.662	0.0	64.8	1256
2880 min Winter	1.345	0.0	70.1	1500
4320 min Winter	1.015	0.0	79.3	2368
5760 min Winter	0.842	0.0	86.7	3032
7200 min Winter	0.735	0.0	93.6	3712
8640 min Winter	0.662	0.0	103.1	5072
10080 min Winter	0.609	0.0	110.6	3816

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	2	Cv (Summer)	1.000
FEH Rainfall Version	2013	Cv (Winter)	1.000
Site Location	GB 620224 162139	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.108

Time (mins) From:	To:	Area (ha)
0	4	0.108

Model Details

Storage is Online Cover Level (m) 100.000

Cellular Storage Structure

Invert Level (m) 97.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	89.0	89.0	1.201	0.0	134.3
1.200	89.0	134.3			

Pump Outflow Control

Invert Level (m) 97.000

Depth (m)	Flow (l/s)
0.001	1.0000

Summary of Results for 30 year Return Period (+40%)

Half Drain Time : 510 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	97.331	0.331	0.0	1.0	1.0	28.0	O K
30 min Summer	97.427	0.427	0.0	1.0	1.0	36.1	O K
60 min Summer	97.518	0.518	0.0	1.0	1.0	43.8	O K
120 min Summer	97.603	0.603	0.0	1.0	1.0	51.0	O K
180 min Summer	97.647	0.647	0.0	1.0	1.0	54.7	O K
240 min Summer	97.672	0.672	0.0	1.0	1.0	56.8	O K
360 min Summer	97.692	0.692	0.0	1.0	1.0	58.5	O K
480 min Summer	97.692	0.692	0.0	1.0	1.0	58.5	O K
600 min Summer	97.689	0.689	0.0	1.0	1.0	58.2	O K
720 min Summer	97.687	0.687	0.0	1.0	1.0	58.1	O K
960 min Summer	97.684	0.684	0.0	1.0	1.0	57.9	O K
1440 min Summer	97.669	0.669	0.0	1.0	1.0	56.5	O K
2160 min Summer	97.617	0.617	0.0	1.0	1.0	52.1	O K
2880 min Summer	97.550	0.550	0.0	1.0	1.0	46.5	O K
4320 min Summer	97.403	0.403	0.0	1.0	1.0	34.1	O K
5760 min Summer	97.277	0.277	0.0	1.0	1.0	23.4	O K
7200 min Summer	97.177	0.177	0.0	1.0	1.0	15.0	O K
8640 min Summer	97.103	0.103	0.0	1.0	1.0	8.7	O K
10080 min Summer	97.050	0.050	0.0	1.0	1.0	4.2	O K
15 min Winter	97.331	0.331	0.0	1.0	1.0	28.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	107.779	0.0	29.1	19
30 min Summer	70.463	0.0	38.0	33
60 min Summer	43.997	0.0	47.5	64
120 min Summer	26.976	0.0	58.3	122
180 min Summer	20.228	0.0	65.5	182
240 min Summer	16.484	0.0	71.2	242
360 min Summer	12.350	0.0	80.0	360
480 min Summer	10.091	0.0	87.1	470
600 min Summer	8.640	0.0	93.3	524
720 min Summer	7.618	0.0	98.7	592
960 min Summer	6.259	0.0	108.1	722
1440 min Summer	4.731	0.0	122.6	996
2160 min Summer	3.526	0.0	137.5	1408
2880 min Summer	2.833	0.0	147.4	1816
4320 min Summer	2.048	0.0	159.8	2592
5760 min Summer	1.621	0.0	167.5	3336
7200 min Summer	1.353	0.0	174.1	4032
8640 min Summer	1.168	0.0	180.5	4672
10080 min Summer	1.033	0.0	187.2	5344
15 min Winter	107.779	0.0	29.1	18

Summary of Results for 30 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	97.427	0.427	0.0	1.0	1.0	36.1	O K
60 min Winter	97.519	0.519	0.0	1.0	1.0	43.9	O K
120 min Winter	97.606	0.606	0.0	1.0	1.0	51.2	O K
180 min Winter	97.650	0.650	0.0	1.0	1.0	55.0	O K
240 min Winter	97.677	0.677	0.0	1.0	1.0	57.2	O K
360 min Winter	97.701	0.701	0.0	1.0	1.0	59.2	O K
480 min Winter	97.706	0.706	0.0	1.0	1.0	59.7	O K
600 min Winter	97.701	0.701	0.0	1.0	1.0	59.3	O K
720 min Winter	97.690	0.690	0.0	1.0	1.0	58.4	O K
960 min Winter	97.681	0.681	0.0	1.0	1.0	57.6	O K
1440 min Winter	97.646	0.646	0.0	1.0	1.0	54.6	O K
2160 min Winter	97.556	0.556	0.0	1.0	1.0	47.0	O K
2880 min Winter	97.449	0.449	0.0	1.0	1.0	38.0	O K
4320 min Winter	97.243	0.243	0.0	1.0	1.0	20.6	O K
5760 min Winter	97.089	0.089	0.0	1.0	1.0	7.5	O K
7200 min Winter	97.006	0.006	0.0	1.0	1.0	0.5	O K
8640 min Winter	97.002	0.002	0.0	1.0	1.0	0.1	O K
10080 min Winter	97.001	0.001	0.0	1.0	1.0	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	70.463	0.0	38.0	33
60 min Winter	43.997	0.0	47.5	62
120 min Winter	26.976	0.0	58.2	120
180 min Winter	20.228	0.0	65.5	178
240 min Winter	16.484	0.0	71.2	236
360 min Winter	12.350	0.0	80.0	350
480 min Winter	10.091	0.0	87.2	460
600 min Winter	8.640	0.0	93.3	564
720 min Winter	7.618	0.0	98.7	656
960 min Winter	6.259	0.0	108.1	748
1440 min Winter	4.731	0.0	122.6	1056
2160 min Winter	3.526	0.0	137.1	1512
2880 min Winter	2.833	0.0	147.4	1928
4320 min Winter	2.048	0.0	160.3	2680
5760 min Winter	1.621	0.0	167.1	3336
7200 min Winter	1.353	0.0	175.8	3752
8640 min Winter	1.168	0.0	182.4	5272
10080 min Winter	1.033	0.0	185.9	4168

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	30	Cv (Summer)	1.000
FEH Rainfall Version	2013	Cv (Winter)	1.000
Site Location	GB 620224 162139	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.108

Time (mins) From:	To:	Area (ha)
0	4	0.108

Model Details

Storage is Online Cover Level (m) 100.000

Cellular Storage Structure

Invert Level (m) 97.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	89.0	89.0	1.201	0.0	134.3
1.200	89.0	134.3			

Pump Outflow Control

Invert Level (m) 97.000

Depth (m)	Flow (l/s)
0.001	1.0000

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 853 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	97.429	0.429	0.0	1.0	1.0	36.3	O K
30 min Summer	97.560	0.560	0.0	1.0	1.0	47.3	O K
60 min Summer	97.687	0.687	0.0	1.0	1.0	58.1	O K
120 min Summer	97.802	0.802	0.0	1.0	1.0	67.8	O K
180 min Summer	97.877	0.877	0.0	1.0	1.0	74.2	O K
240 min Summer	97.934	0.934	0.0	1.0	1.0	79.0	O K
360 min Summer	98.019	1.019	0.0	1.0	1.0	86.1	O K
480 min Summer	98.082	1.082	0.0	1.0	1.0	91.5	O K
600 min Summer	98.125	1.125	0.0	1.0	1.0	95.1	O K
720 min Summer	98.152	1.152	0.0	1.0	1.0	97.4	O K
960 min Summer	98.171	1.171	0.0	1.0	1.0	99.0	O K
1440 min Summer	98.168	1.168	0.0	1.0	1.0	98.7	O K
2160 min Summer	98.109	1.109	0.0	1.0	1.0	93.7	O K
2880 min Summer	98.027	1.027	0.0	1.0	1.0	86.9	O K
4320 min Summer	97.847	0.847	0.0	1.0	1.0	71.6	O K
5760 min Summer	97.677	0.677	0.0	1.0	1.0	57.2	O K
7200 min Summer	97.527	0.527	0.0	1.0	1.0	44.5	O K
8640 min Summer	97.395	0.395	0.0	1.0	1.0	33.4	O K
10080 min Summer	97.286	0.286	0.0	1.0	1.0	24.2	O K
15 min Winter	97.429	0.429	0.0	1.0	1.0	36.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	138.421	0.0	37.3	19
30 min Summer	91.330	0.0	49.3	34
60 min Summer	57.285	0.0	61.8	64
120 min Summer	34.804	0.0	75.2	122
180 min Summer	26.254	0.0	85.0	182
240 min Summer	21.621	0.0	93.4	242
360 min Summer	16.627	0.0	107.8	362
480 min Summer	13.922	0.0	120.2	482
600 min Summer	12.138	0.0	131.0	600
720 min Summer	10.843	0.0	140.5	720
960 min Summer	9.015	0.0	155.8	872
1440 min Summer	6.828	0.0	168.6	1124
2160 min Summer	5.044	0.0	196.1	1512
2880 min Summer	4.019	0.0	208.4	1928
4320 min Summer	2.875	0.0	224.5	2724
5760 min Summer	2.255	0.0	233.2	3512
7200 min Summer	1.865	0.0	241.2	4256
8640 min Summer	1.597	0.0	247.8	4936
10080 min Summer	1.400	0.0	253.5	5648
15 min Winter	138.421	0.0	37.3	19

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	97.560	0.560	0.0	1.0	1.0	47.4	O K
60 min Winter	97.689	0.689	0.0	1.0	1.0	58.2	O K
120 min Winter	97.805	0.805	0.0	1.0	1.0	68.0	O K
180 min Winter	97.881	0.881	0.0	1.0	1.0	74.4	O K
240 min Winter	97.938	0.938	0.0	1.0	1.0	79.3	O K
360 min Winter	98.026	1.026	0.0	1.0	1.0	86.7	O K
480 min Winter	98.093	1.093	0.0	1.0	1.0	92.4	O K
600 min Winter	98.140	1.140	0.0	1.0	1.0	96.4	O K
720 min Winter	98.172	1.172	0.0	1.0	1.0	99.1	O K
960 min Winter	98.195	1.195	0.0	1.0	1.0	101.0	O K
1440 min Winter	98.167	1.167	0.0	1.0	1.0	98.7	O K
2160 min Winter	98.081	1.081	0.0	1.0	1.0	91.4	O K
2880 min Winter	97.960	0.960	0.0	1.0	1.0	81.2	O K
4320 min Winter	97.699	0.699	0.0	1.0	1.0	59.1	O K
5760 min Winter	97.463	0.463	0.0	1.0	1.0	39.1	O K
7200 min Winter	97.267	0.267	0.0	1.0	1.0	22.5	O K
8640 min Winter	97.117	0.117	0.0	1.0	1.0	9.9	O K
10080 min Winter	97.022	0.022	0.0	1.0	1.0	1.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	91.330	0.0	49.3	33
60 min Winter	57.285	0.0	61.8	62
120 min Winter	34.804	0.0	75.1	120
180 min Winter	26.254	0.0	85.0	180
240 min Winter	21.621	0.0	93.3	238
360 min Winter	16.627	0.0	107.7	354
480 min Winter	13.922	0.0	120.2	468
600 min Winter	12.138	0.0	131.1	580
720 min Winter	10.843	0.0	140.5	692
960 min Winter	9.015	0.0	155.8	906
1440 min Winter	6.828	0.0	168.6	1142
2160 min Winter	5.044	0.0	196.1	1604
2880 min Winter	4.019	0.0	208.5	2048
4320 min Winter	2.875	0.0	224.3	2896
5760 min Winter	2.255	0.0	231.9	3680
7200 min Winter	1.865	0.0	239.9	4328
8640 min Winter	1.597	0.0	249.1	4936
10080 min Winter	1.400	0.0	253.0	5440

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	1.000
FEH Rainfall Version	2013	Cv (Winter)	1.000
Site Location	GB 620224 162139	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.108

Time (mins) From:	To:	Area (ha)
0	4	0.108

Model Details

Storage is Online Cover Level (m) 100.000

Cellular Storage Structure

Invert Level (m) 97.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	89.0	89.0	1.201	0.0	134.3
1.200	89.0	134.3			

Pump Outflow Control

Invert Level (m) 97.000

Depth (m)	Flow (l/s)
0.001	1.0000