

Project Title: Oak Park, Havant

Project No/ Document Reference: A048 – R04

Date: 24 August 2018

SERVICE YARD AREA DRAINAGE STRATEGY

1. Drainage Strategy

- 1.1. This technical note outlines the amendments to the pre-approved drainage strategy 'Havant Health and Wellbeing Campus - Drainage Strategy Report A048-03', to provide the construction of the 'Service Yard' area on the western boundary of the proposed development,
- 1.2. The Drainage Strategy outlined the service yard as having a granular layer providing at source attenuation for development runoff.
- 1.3. The revised proposed strategy for the service yard utilises an impermeable surface and subbase; thus, removing the ability for the overall scheme to utilise the area for attenuation.

2. Service Yard Strategy,

- 2.1. The service yard will utilise a system of trapped gullies at low points of the road connected to an infiltration soakaway, the layout of the gullies and soakaway system has been shown in appendix 1, the proposed system contains a 2 stage treatment process providing a comprehensive SuDS scheme.
- 2.2. The proposed soakaway is a 2m deep 2.4m ring lined soakaway with porous rings at the lower 1.2m and impervious rings making up the remainder, the infiltration rates in Site investigation 'Enzygo - CRM.1112.005.GE.R.001.A' were measured in the area to be 0.2m/hr, with a topsoil layer 0.3m deep overlaying a band of clay extending to 0.8m below ground level. Below this is a predominantly gravel layer extending at least 3m deep.
- 2.3. The soakaway has been sized to accommodate for the attenuation volumes required for the service yard area consisting of a measured 130m² catering for the design storm of 1:100 year return period with a 30% allowance for climate change, Microdrainage calculations are available in appendix 2 of the report.
- 2.4. The location of the soakaway has been placed at least 5m from the proposed location of any adopted highway or occupied structure.
- 2.5. The proposed soakaway is in the location of the previously approved porous draining aggregate structure. The provision of a soakaway will provide no additional risk to nearby sewer assets or watercourses.



3. Overall Scheme Revised Drainage Strategy

- 3.1. The service area provided attenuation for the scheme overall as part of the previous drainage strategy; with the removal of the attenuation features alternative provisions will be required to mitigate the potential for flooding.
- 3.2. The proposal is to provide the additional attenuation within the overall site boundary near the service yard by one of two potential methods, these available methods are to be refined during the detailed design of the overall scheme. The proposed layout is in appendix 3 of this note.
 - Proposal A – Provide an additional 2.4m diameter ring soakaway allowing additional storage and the potential for a small amount of infiltration, site limitations may exclude the possibility for additional attenuation in this area of the site. Plans and Micro Drainage calculations are available in appendix 4 of this note.
 - Proposal B – Provide an 8m² 1m deep subsurface impervious lined attenuation crate system to capture high intensity rain prior to discharging to the pond in the South East corner of the development. Plans and Micro Drainage calculations are available in Appendix 5 of this note.
- 3.3. The calculations show that with the removal of the service yard area and the minor provision of supplementary attenuation features there is no additional negative impact on the overall drainage scheme for the development.

4. Temporary Surface Water Management Measures

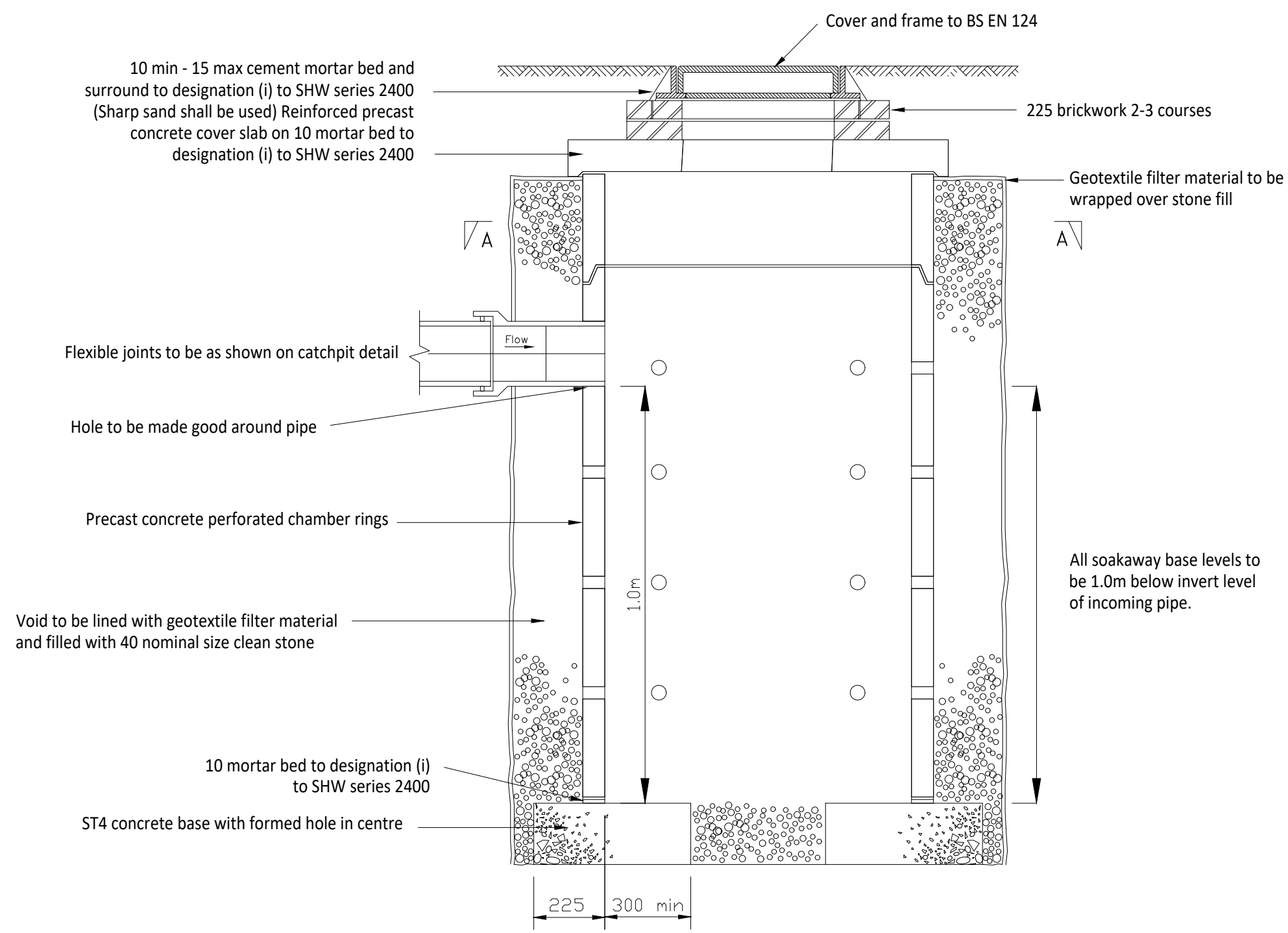
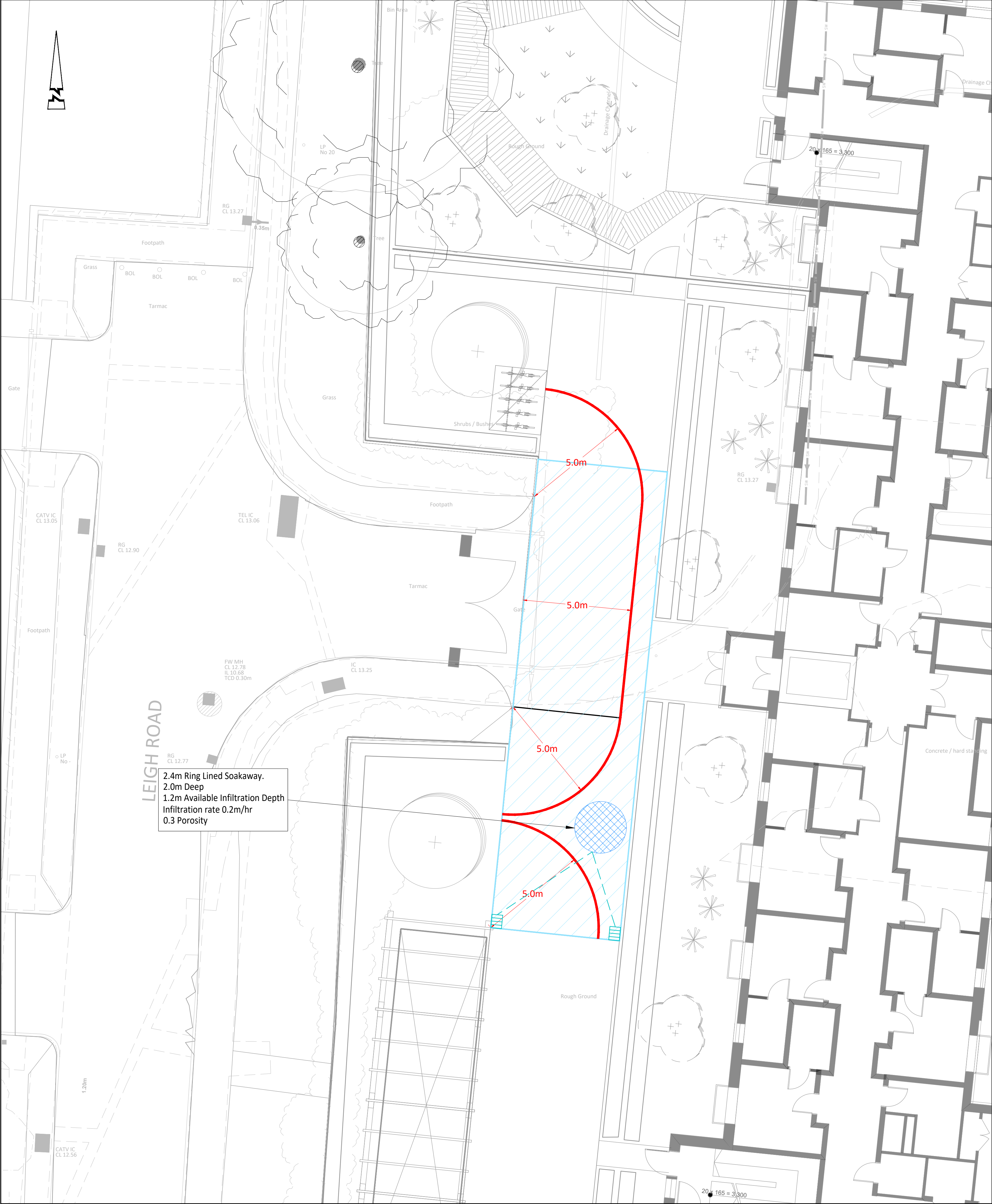
- 4.1. The site is not located within an area that is susceptible to flooding and therefore no special considerations are needed in terms of storage of materials within a designated floodplain.
- 4.2. The site topography is such that the land drains naturally towards an open watercourse forming part of the River Lavant, located along the eastern boundary of the site, as well as through infiltration means.
- 4.3. The Contractor will therefore employ appropriate measures when undertaking construction activities close to any existing watercourses to ensure that any silty water that is caused by activities such as wheel washing facilities or run off from exposed ground, does not enter such watercourses.
- 4.4. Where possible, water is to be prevented from entering excavations or on site drainage systems through the use of cut-off ditches as appropriate. Any silty water that is caused by excavation work, and other activities such as wheel washing facilities or run off from exposed ground, is not to be pumped directly into watercourses.
- 4.5. As part of the construction phase the contractor on site will ensure the maintenance regime for the soakaway system is followed, and the condition is frequently monitored during the construction. The process includes
 - Removal of debris from the floor of chambers and sediment traps;



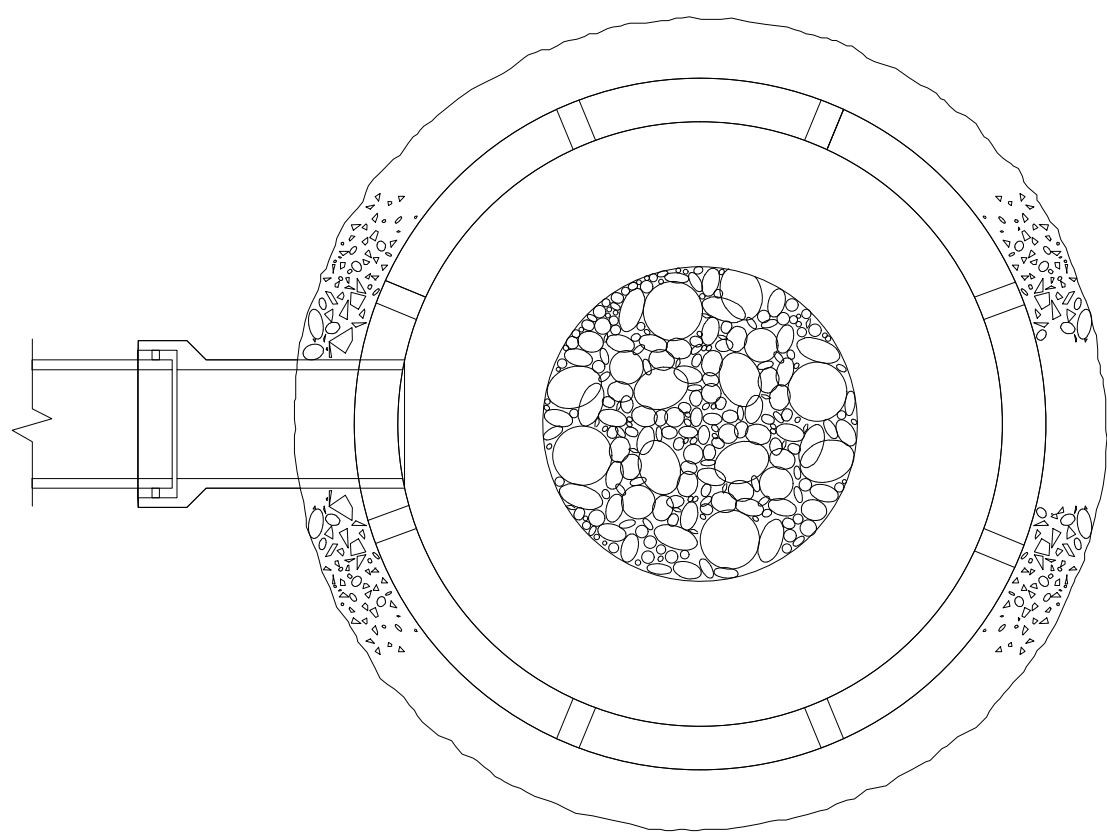
- Check inspection tubes for clogging to ensure the soakaway is emptying
 - Removal and washing of exposed stones
- 4.6. By following this process, the contractor will ensure that silts and sediments will be contained on the surface and will not have a negative impact on the watercourse
- 4.7. When necessary a number of control procedures will be implemented in order to reduce the potential for dust emission as far as practicable. Such measures include:
- Wheel washing facilities will be located at the construction accesses to ensure the local road network is kept clear from mud and dust.
 - All HGVs removing loose materials from the site will be fully sheeted to minimise the risk of any spillage of mud or dusty material.
 - In dry weather, haul routes and stockpiles will be dampened down to help prevent dust migrating from the site.
 - Ensure speed limits along haul routes are adhered to.
 - Use dust suppression techniques such as water sprays when undertaking cutting, grinding and demolition activities.
 - Load demolished material into appropriate waste / recycling skips as soon as possible.
- 4.8. Bowsers will be used on site to damp down the excavation works and roads as required to help suppress dust. Also, wherever possible, topsoil stripping during the summer months will be undertaken at the beginning of the day to limit the amount of dust produced.
- 4.9. The wheel washing will be undertaken by a site operative using a jet wash at the entrances to the site. A run off area with polythene filled with shingle will be placed to trap any silt run off. This will be removed when it becomes silted up.



Appendix 1 - Drainage Layout



TYPICAL SOAKAWAY DETAIL
(SIZE AND DEPTH VARIES
PLEASE REFER TO
DRAINAGE LAYOUT)



Section A-A

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KEY

- Extent of impermeable Carriageway
- 2.4m Soakaway
- Trapped Gully & Connection
- 5.0m Structural Easement

P1	08/18	First Issue	DS	RW
Rev	Date	Description	Drawn	Checked

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HAMPSHIRE LIVING SPACE

Project

HAVANT HEALTH AND WELLBEING CAMPUS

Title

SERVICE YARD DRAINAGE SCHEME

Status

Scale	Date	Drawn	Checked	RW
1:100 @ A1	AUG 18	DS		RW

Drawing No	Revision	P1
A048-12		



Appendix 2 - Micro Drainage Source Control Calculations

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<u>Summary of Results for 100 year Return Period (+30%)</u> Half Drain Time : 120 minutes. <table><thead><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr></thead><tbody><tr><td>15 min Summer</td><td>30.524</td><td>0.524</td><td>0.3</td><td>2.6</td><td>0 K</td></tr><tr><td>30 min Summer</td><td>30.681</td><td>0.681</td><td>0.3</td><td>3.3</td><td>0 K</td></tr><tr><td>60 min Summer</td><td>30.807</td><td>0.807</td><td>0.4</td><td>3.9</td><td>0 K</td></tr><tr><td>120 min Summer</td><td>30.864</td><td>0.864</td><td>0.4</td><td>4.2</td><td>0 K</td></tr><tr><td>180 min Summer</td><td>30.864</td><td>0.864</td><td>0.4</td><td>4.2</td><td>0 K</td></tr><tr><td>240 min Summer</td><td>30.846</td><td>0.846</td><td>0.4</td><td>4.1</td><td>0 K</td></tr><tr><td>360 min Summer</td><td>30.798</td><td>0.798</td><td>0.4</td><td>3.9</td><td>0 K</td></tr><tr><td>480 min Summer</td><td>30.751</td><td>0.751</td><td>0.4</td><td>3.7</td><td>0 K</td></tr></tbody></table> <table><thead><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr></thead><tbody><tr><td>15 min Summer</td><td>117.069</td><td>0.0</td><td>24</td></tr><tr><td>30 min Summer</td><td>78.692</td><td>0.0</td><td>37</td></tr><tr><td>60 min Summer</td><td>50.485</td><td>0.0</td><td>64</td></tr><tr><td>120 min Summer</td><td>31.269</td><td>0.0</td><td>102</td></tr><tr><td>180 min Summer</td><td>23.274</td><td>0.0</td><td>134</td></tr><tr><td>240 min Summer</td><td>18.738</td><td>0.0</td><td>170</td></tr><tr><td>360 min Summer</td><td>13.779</td><td>0.0</td><td>238</td></tr><tr><td>480 min Summer</td><td>11.072</td><td>0.0</td><td>308</td></tr></tbody></table>							Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	15 min Summer	30.524	0.524	0.3	2.6	0 K	30 min Summer	30.681	0.681	0.3	3.3	0 K	60 min Summer	30.807	0.807	0.4	3.9	0 K	120 min Summer	30.864	0.864	0.4	4.2	0 K	180 min Summer	30.864	0.864	0.4	4.2	0 K	240 min Summer	30.846	0.846	0.4	4.1	0 K	360 min Summer	30.798	0.798	0.4	3.9	0 K	480 min Summer	30.751	0.751	0.4	3.7	0 K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	15 min Summer	117.069	0.0	24	30 min Summer	78.692	0.0	37	60 min Summer	50.485	0.0	64	120 min Summer	31.269	0.0	102	180 min Summer	23.274	0.0	134	240 min Summer	18.738	0.0	170	360 min Summer	13.779	0.0	238	480 min Summer	11.072	0.0	308
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15 min Winter	117.069	0.0	24																																																																																																							
30 min Winter	78.692	0.0	37																																																																																																							
60 min Winter	50.485	0.0	64																																																																																																							
120 min Winter	31.269	0.0	110																																																																																																							
180 min Winter	23.274	0.0	142																																																																																																							
240 min Winter	18.738	0.0	182																																																																																																							
360 min Winter	13.779	0.0	256																																																																																																							
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Abley Letchford Partnership Ltd				Page 4																																																																																																					
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Date 24/08/2018 File SOAKAWAY OP 1.SRCX		Designed by RW Checked by RW																																											
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Summary of Results for 100 year Return Period (+30%) <table><thead><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr></thead><tbody><tr><td>7200 min Winter</td><td>30.030</td><td>0.030</td><td>0.1</td><td>0.1</td><td>0 K</td></tr><tr><td>8640 min Winter</td><td>30.026</td><td>0.026</td><td>0.1</td><td>0.1</td><td>0 K</td></tr><tr><td>10080 min Winter</td><td>30.023</td><td>0.023</td><td>0.1</td><td>0.1</td><td>0 K</td></tr></tbody></table> <table><thead><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr></thead><tbody><tr><td>7200 min Winter</td><td>1.335</td><td>0.0</td><td>3656</td></tr><tr><td>8640 min Winter</td><td>1.156</td><td>0.0</td><td>4288</td></tr><tr><td>10080 min Winter</td><td>1.023</td><td>0.0</td><td>4968</td></tr></tbody></table>						Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	7200 min Winter	30.030	0.030	0.1	0.1	0 K	8640 min Winter	30.026	0.026	0.1	0.1	0 K	10080 min Winter	30.023	0.023	0.1	0.1	0 K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	7200 min Winter	1.335	0.0	3656	8640 min Winter	1.156	0.0	4288	10080 min Winter	1.023	0.0	4968
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Search House Charnham Lane Hungerford RG17 0EY	A048 - Oak Park, Havant Source Control Results	
Date 24/08/2018 File SOAKAWAY OP 1.SRCX	Designed by RW Checked by RW	
XP Solutions		
Source Control 2018.1		
Model Details Storage is Online Cover Level (m) 32.000 Lined Soakaway Structure Infiltration Coefficient Base (m/hr) 0.20000 Infiltration Coefficient Side (m/hr) 0.20000 Safety Factor 2.0 Porosity 0.30 Invert Level (m) 30.000 Ring Diameter (m) 2.40 Pit Multiplier 1.0 Number Required 1 Cap Volume Depth (m) 1.800 Cap Infiltration Depth (m) 1.200		
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Appendix 3 - Overall Site Drainage Layout



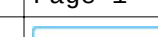
Legend:

- Existing Storm Water Sewer
- Existing Foul Water Sewer
- Existing Sewer Easement
- Proposed Storm Water Sewer (IL=invert)
- Proposed Foul Water Sewer (IL=invert)
- Proposed Porous Paving / Infiltration Trench.
- Proposed Location of Attenuation feature

P2		08.18	Updated to suit amended strategy		RW	SL
Rev	Date	Description			Drawn	Checked
 AL P ABLEY LETCHFORD PARTNERSHIP Consulting Engineers Avebury 2, Elcot Park, Elcot Lane Marlborough, Wiltshire SN8 2BG www.alpce.co.uk Tel: 01672 519196						
Client						
HAMPSHIRE LIVING SPACE						
Project						
HAVANT HEALTH AND WELLBEING CAMPUS						
Title						
DRAINAGE STRATEGY						
Status						
FOR PLANNING						
Scale	Date	Drawn	Checked			
1:500 @ A1	FEB 2015	LPA	SL			
Drawing No	A048-010			Revision	P2	



Appendix 4 - Option 1 Micro Drainage Calculations

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Search House Charnham Lane Hungerford RG17 0EY	OAK PARK, HAVANT SURFACE WATER DRAINAGE	
Date 24/08/2018 13:42 File Strategy V3 Soakaway.mdx	Designed by SL Checked by LPA	
XP Solutions	Network 2018.1	

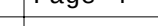
STORM SEWER DESIGN by the Modified Rational Method

Pipe Sizes STANDARD Manhole Sizes STANDARD

Designed with Level Soffits

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section	Type	Auto Design
S1.000	9.998	0.060	166.6	0.035	5.00	0.0	0.600	o	225	Pipe/Conduit		👤
S1.001	36.020	0.216	167.0	0.152	0.00	0.0	0.600	o	225	Pipe/Conduit		👤
S1.002	34.602	0.150	230.7	0.042	0.00	0.0	0.600	o	300	Pipe/Conduit		👤
S1.003	34.602	0.149	231.8	0.095	0.00	0.0	0.600	o	300	Pipe/Conduit		👤
S1.004	37.658	0.161	234.1	0.056	0.00	0.0	0.600	o	300	Pipe/Conduit		👤
S1.005	37.658	0.161	234.1	0.065	0.00	0.0	0.600	o	300	Pipe/Conduit		👤
S1.006	38.048	0.179	212.6	0.023	0.00	0.0	0.600	o	300	Pipe/Conduit		👤
S1.007	20.464	0.288	71.1	0.024	0.00	0.0	0.600	o	300	Pipe/Conduit		👤
S2.000	28.292	0.169	167.4	0.149	5.00	0.0	0.600	o	225	Pipe/Conduit		👤
S2.001	45.221	0.271	166.9	0.175	0.00	0.0	0.600	o	300	Pipe/Conduit		👤

Network Results Table

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Search House Charnham Lane Hungerford RG17 0EY	OAK PARK, HAVANT SURFACE WATER DRAINAGE	
Date 24/08/2018 13:42 File Strategy V3 Soakaway.mdx	Designed by SL Checked by LPA	
XP Solutions	Network 2018.1	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Number of Input Hydrographs	0	Number of Storage Structures	6
Number of Online Controls	0	Number of Time/Area Diagrams	2
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	30

Water Level Forecast Summary - Q4 2023										Water
PN	US/MH		Return Period	Climate Change	First (X)		First (Y)	First (Z)	Overflow Act.	Level (m)
	Name	Storm			Surcharge	Flood	Overflow			
S1.000	S1	15	Winter	100	+30%	100/15	Summer			13.183
S1.001	S2	15	Winter	100	+30%	100/15	Summer			13.186
S1.002	S3	15	Winter	100	+30%	100/15	Summer			12.924
S1.003	S4	15	Winter	100	+30%	100/15	Summer			12.852
S1.004	S5	15	Winter	100	+30%	100/15	Summer			12.621
S1.005	S6	15	Winter	100	+30%	100/15	Summer			12.262
S1.006	S7	15	Winter	100	+30%	100/15	Summer			11.723
S1.007	S8	120	Winter	100	+30%	100/15	Summer			11.334
S2.000	S9	15	Winter	100	+30%	100/15	Summer			12.598
S2.001	S10	15	Winter	100	+30%	100/15	Summer			12.840
S3.000	S11	15	Winter	100	+30%	100/15	Summer			12.892
S4.000	S12	15	Winter	100	+30%	100/15	Summer			12.791
S2.002	S13	15	Winter	100	+30%	100/15	Summer			12.794
S2.003	S14	15	Winter	100	+30%	100/15	Summer			12.571
S2.004	S15	15	Winter	100	+30%	100/15	Summer			12.240
S5.000	S16	15	Winter	100	+30%	100/15	Summer			12.034
S2.005	S17	15	Winter	100	+30%	100/15	Summer			11.995
S6.000	S18	15	Winter	100	+30%					11.967

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Search House Charnham Lane Hungerford RG17 0EY	OAK PARK, HAVANT SURFACE WATER DRAINAGE	
Date 24/08/2018 13:42 File Strategy V3 Soakaway.mdx	Designed by SL Checked by LPA	
XP Solutions	Network 2018.1	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)					
S1.000	S1	1.069	0.000	0.19		6.3	FLOOD RISK	
S1.001	S2	1.132	0.000	1.24		47.0	FLOOD RISK	
S1.002	S3	1.085	0.000	0.85		57.0	FLOOD RISK	
S1.003	S4	1.164	0.000	1.24		82.6	FLOOD RISK	
S1.004	S5	1.081	0.000	1.53		102.4	FLOOD RISK	
S1.005	S6	0.884	0.000	1.85		123.6	SURCHARGED	
S1.006	S7	0.506	0.000	1.83		128.4	SURCHARGED	
S1.007	S8	0.295	0.000	0.64		74.1	SURCHARGED	
S2.000	S9	0.573	0.000	1.07		40.0	SURCHARGED	
S2.001	S10	0.984	0.000	1.10		88.5	SURCHARGED	
S3.000	S11	1.060	0.000	0.59		22.6	FLOOD RISK	
S4.000	S12	1.091	0.000	0.27		11.8	FLOOD RISK	
S2.002	S13	1.209	0.000	1.58		102.9	FLOOD RISK	
S2.003	S14	1.121	0.000	1.57		102.4	SURCHARGED	
S2.004	S15	0.925	0.000	1.93		115.9	SURCHARGED	
S5.000	S16	0.508	0.000	0.38		18.4	SURCHARGED	
S2.005	S17	0.745	0.000	2.36		140.4	FLOOD RISK	
S6.000	S18	-0.033	0.000	0.39		14.5	OK	

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Search House Charnham Lane Hungerford RG17 0EY	OAK PARK, HAVANT SURFACE WATER DRAINAGE	
Date 24/08/2018 13:42 File Strategy V3 Soakaway.mdx	Designed by SL Checked by LPA	
XP Solutions	Network 2018.1	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S6.001	S19	15 Winter	100	+30%	100/15 Winter			
S6.002	S20	15 Winter	100	+30%	100/15 Summer			
S6.003	S21	15 Winter	100	+30%	100/15 Summer			
S2.006	S22	15 Winter	100	+30%	100/15 Summer			
S2.007	S23	15 Winter	100	+30%	100/15 Summer			
S2.008	S24	120 Winter	100	+30%	100/15 Summer			
S2.009	S25	120 Winter	100	+30%	100/15 Winter			
S7.000	S26	120 Winter	100	+30%	100/120 Winter			
S8.000	S27	120 Winter	100	+30%	100/15 Summer			
S7.001	S28	120 Winter	100	+30%	100/30 Summer			
S7.002	S29	120 Winter	100	+30%	100/15 Summer			
S1.008	S30	120 Winter	100	+30%	100/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S6.001	S19	11.942	0.092	0.000	0.82		30.7	SURCHARGED	
S6.002	S20	11.878	0.221	0.000	0.85		32.4	SURCHARGED	
S6.003	S21	11.769	0.333	0.000	0.71		32.6	SURCHARGED	
S2.006	S22	11.653	0.462	0.000	1.80		175.6	SURCHARGED	
S2.007	S23	11.448	0.304	0.000	1.72		177.7	SURCHARGED	
S2.008	S24	11.349	0.269	0.000	1.17		116.9	SURCHARGED	
S2.009	S25	11.328	0.300	0.000	0.68		119.1	SURCHARGED	
S7.000	S26	11.320	0.057	0.000	0.09		3.6	SURCHARGED	
S8.000	S27	11.322	0.262	0.000	0.48		16.0	SURCHARGED	
S7.001	S28	11.318	0.318	0.000	0.18		24.5	SURCHARGED	
S7.002	S29	11.316	0.379	0.000	0.31		29.6	SURCHARGED	
S1.008	S30	11.314	0.714	0.000	3.45		55.6	SURCHARGED	



Appendix 5 - Option 2 Micro Drainage Calculations

Abley Letchford Partnership Ltd		Page 1
Search House Charnham Lane Hungerford RG17 0EY	OAK PARK, HAVANT SURFACE WATER DRAINAGE	
Date 24/08/2018 13:46 File Strategy V3 Crate.mdx	Designed by SL Checked by LPA	
XP Solutions Network 2018.1		

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	5	PIMP (%)	100	
M5-60 (mm)	19.100	Add Flow / Climate Change (%)	0	
Ratio R	0.350	Minimum Backdrop Height (m)	0.000	
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000	
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200	
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00	
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500	

Designed with Level Soffits

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Search House Charnham Lane Hungerford RG17 0EY	OAK PARK, HAVANT SURFACE WATER DRAINAGE	
Date 24/08/2018 13:46 File Strategy V3 Crate.mdx	Designed by SL Checked by LPA	
XP Solutions	Network 2018.1	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 6
Number of Online Controls 0 Number of Time/Area Diagrams 2
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.350
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.100 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status OFF
Inertia Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 100
Climate Change (%) 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	100	+30%	100/15 Summer				13.144
S1.001	S2	15 Winter	100	+30%	100/15 Summer				13.147
S1.002	S3	15 Winter	100	+30%	100/15 Summer				12.843
S1.003	S4	15 Winter	100	+30%	100/15 Summer				12.766
S1.004	S5	15 Winter	100	+30%	100/15 Summer				12.563
S1.005	S6	15 Winter	100	+30%	100/15 Summer				12.208
S1.006	S7	15 Winter	100	+30%	100/15 Summer				11.696
S1.007	S8	120 Winter	100	+30%	100/15 Summer				11.335
S2.000	S9	15 Winter	100	+30%	100/15 Summer				12.598
S2.001	S10	15 Winter	100	+30%	100/15 Summer				12.840
S3.000	S11	15 Winter	100	+30%	100/15 Summer				12.892
S4.000	S12	15 Winter	100	+30%	100/15 Summer				12.791
S2.002	S13	15 Winter	100	+30%	100/15 Summer				12.794
S2.003	S14	15 Winter	100	+30%	100/15 Summer				12.571
S2.004	S15	15 Winter	100	+30%	100/15 Summer				12.240
S5.000	S16	15 Winter	100	+30%	100/15 Summer				12.034
S2.005	S17	15 Winter	100	+30%	100/15 Summer				11.995
S6.000	S18	15 Winter	100	+30%					11.967

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Abley Letchford Partnership Ltd		Page 3
Search House Charnham Lane Hungerford RG17 0EY	OAK PARK, HAVANT SURFACE WATER DRAINAGE	
Date 24/08/2018 13:46 File Strategy V3 Crate.mdx	Designed by SL Checked by LPA	
XP Solutions	Network 2018.1	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	1.030	0.000	0.19		6.2	FLOOD RISK	
S1.001	S2	1.093	0.000	1.24		46.8	FLOOD RISK	
S1.002	S3	1.005	0.000	0.83		55.6	SURCHARGED	
S1.003	S4	1.077	0.000	1.18		78.9	SURCHARGED	
S1.004	S5	1.024	0.000	1.48		99.1	FLOOD RISK	
S1.005	S6	0.830	0.000	1.82		121.7	SURCHARGED	
S1.006	S7	0.479	0.000	1.80		126.4	SURCHARGED	
S1.007	S8	0.296	0.000	0.64		74.2	SURCHARGED	
S2.000	S9	0.573	0.000	1.07		40.0	SURCHARGED	
S2.001	S10	0.984	0.000	1.10		88.5	SURCHARGED	
S3.000	S11	1.060	0.000	0.59		22.6	FLOOD RISK	
S4.000	S12	1.091	0.000	0.27		11.8	FLOOD RISK	
S2.002	S13	1.209	0.000	1.58		102.9	FLOOD RISK	
S2.003	S14	1.121	0.000	1.57		102.4	SURCHARGED	
S2.004	S15	0.925	0.000	1.93		115.9	SURCHARGED	
S5.000	S16	0.508	0.000	0.38		18.4	SURCHARGED	
S2.005	S17	0.745	0.000	2.36		140.4	FLOOD RISK	
S6.000	S18	-0.033	0.000	0.39		14.5	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.
S6.001	S19	15 Winter	100	+30%	100/15	Winter		
S6.002	S20	15 Winter	100	+30%	100/15	Summer		
S6.003	S21	15 Winter	100	+30%	100/15	Summer		
S2.006	S22	15 Winter	100	+30%	100/15	Summer		
S2.007	S23	15 Winter	100	+30%	100/15	Summer		
S2.008	S24	120 Winter	100	+30%	100/15	Summer		
S2.009	S25	120 Winter	100	+30%	100/15	Winter		
S7.000	S26	120 Winter	100	+30%	100/120	Winter		
S8.000	S27	120 Winter	100	+30%	100/15	Summer		
S7.001	S28	120 Winter	100	+30%	100/30	Summer		
S7.002	S29	120 Winter	100	+30%	100/15	Summer		
S1.008	S30	120 Winter	100	+30%	100/15	Summer		

PN	US/MH Name	Water	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Pipe	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)			Flow (l/s)		
S6.001	S19	11.942	0.092	0.000	0.82		30.7	SURCHARGED	
S6.002	S20	11.878	0.221	0.000	0.85		32.4	SURCHARGED	
S6.003	S21	11.769	0.333	0.000	0.71		32.6	SURCHARGED	
S2.006	S22	11.653	0.462	0.000	1.80		175.6	SURCHARGED	
S2.007	S23	11.448	0.304	0.000	1.72		177.7	SURCHARGED	
S2.008	S24	11.350	0.269	0.000	1.17		116.9	SURCHARGED	
S2.009	S25	11.329	0.301	0.000	0.68		119.1	SURCHARGED	
S7.000	S26	11.321	0.058	0.000	0.09		3.6	SURCHARGED	
S8.000	S27	11.323	0.263	0.000	0.48		16.0	SURCHARGED	
S7.001	S28	11.319	0.319	0.000	0.18		24.5	SURCHARGED	
S7.002	S29	11.317	0.380	0.000	0.31		29.6	SURCHARGED	
S1.008	S30	11.314	0.715	0.000	3.46		55.6	SURCHARGED	