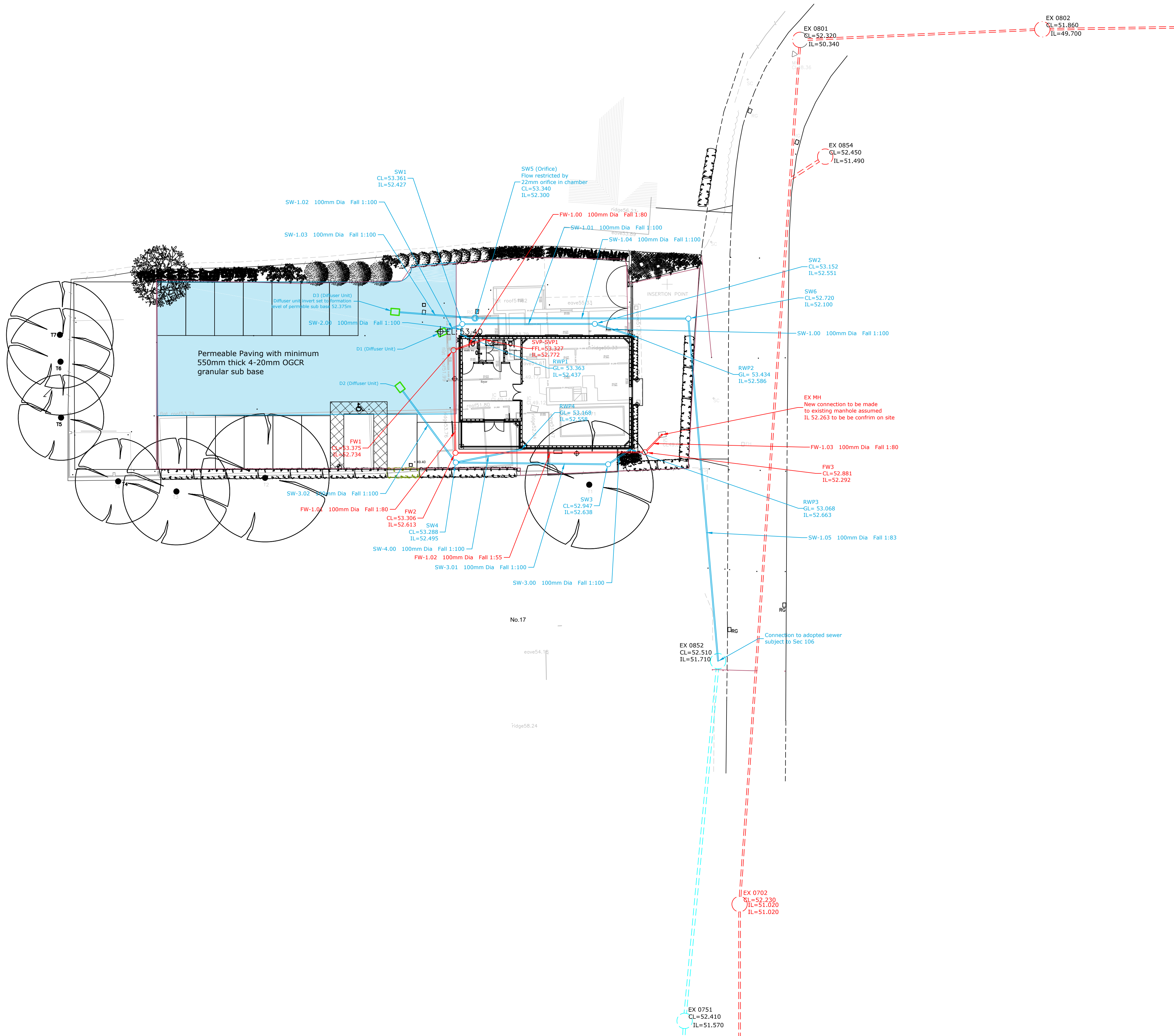


DWG No. 262152/500/01

Key:

- ===== Existing Adopted sewer
Proposed surface water sewer
Proposed foul sewer



Drainage inverts levels have been converted from survey local datum to OS datum, Levels to be checked on site and any discrepancies notified.

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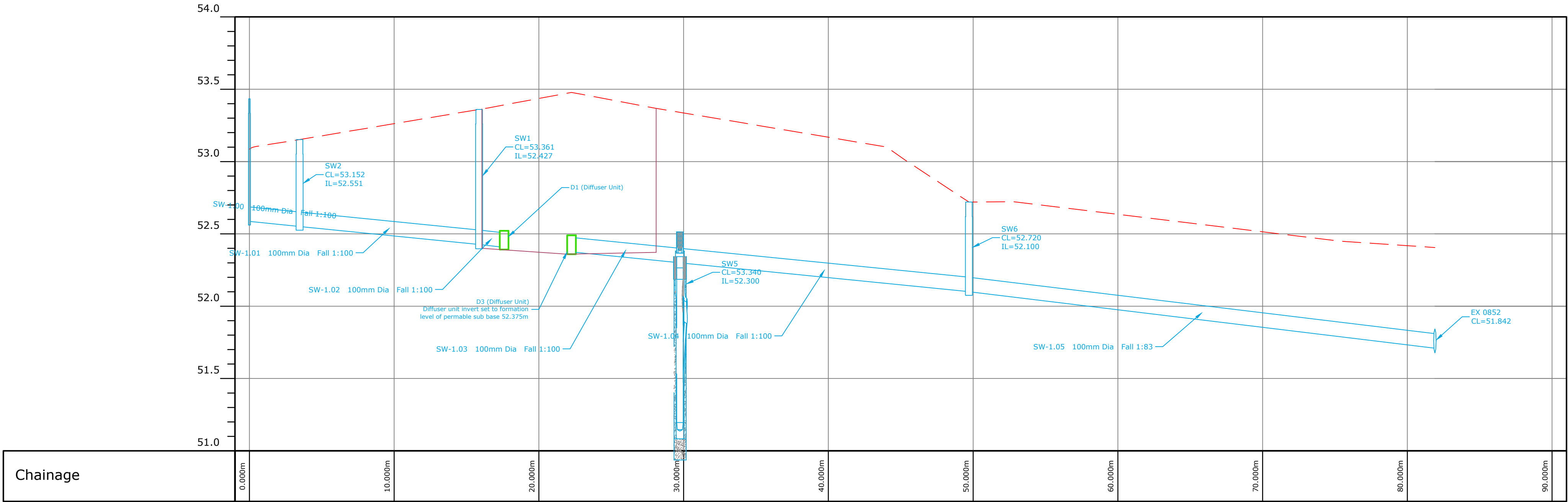
LANMOR Consulting
Civil Engineers & Transport Planning

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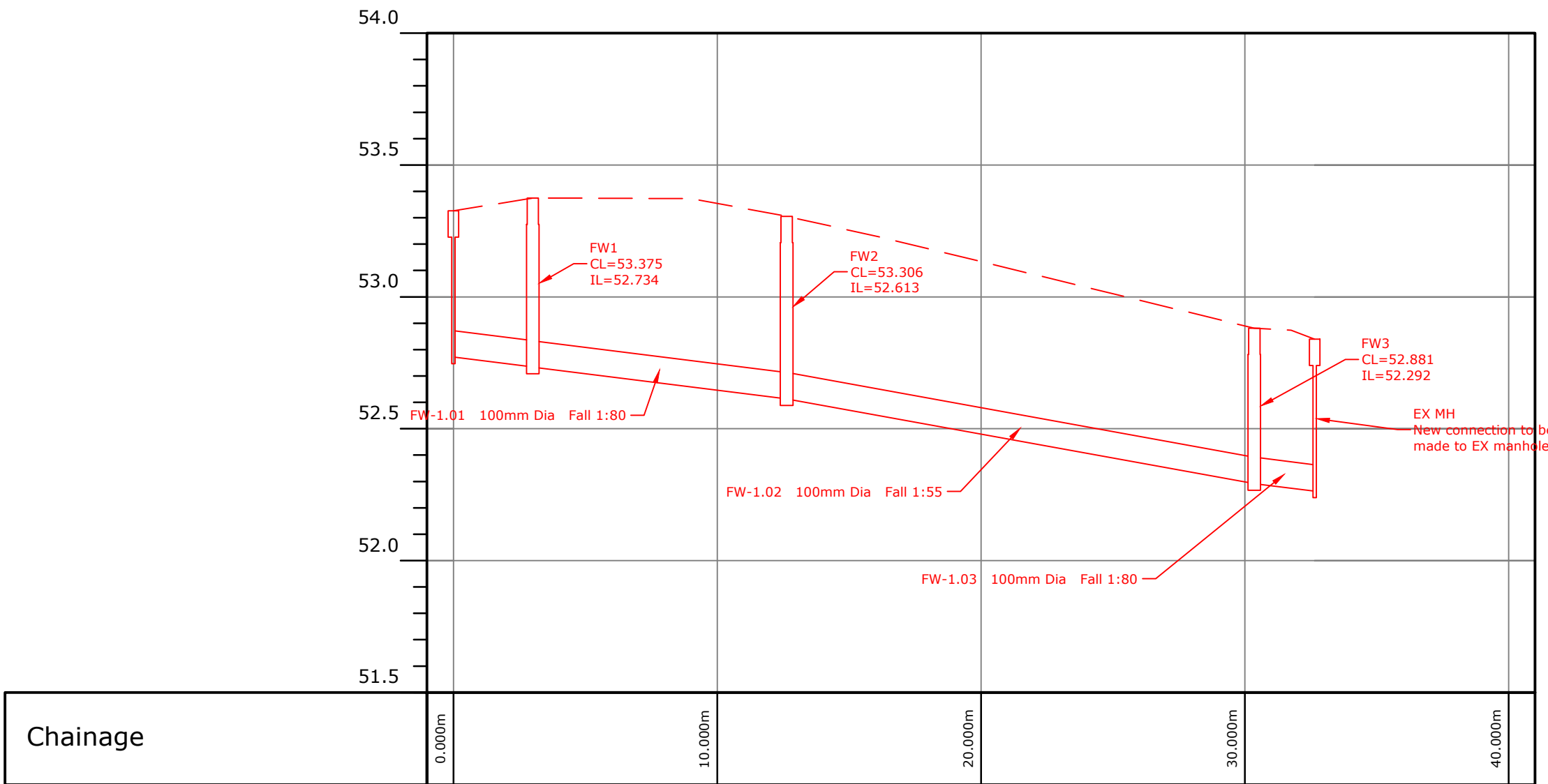
19 Groveland Road
Spencers Wood, Reading
Drainage Layout
Site Plan

DRAWN	RS	CHECKED	KBL	APPROVED	KBL
DATE	Jul 26	DATE	Jul 26	DATE	Jul 26
SCALE	1:200	PRJ No.	262153	SIZE	REV
DWG No.	262152/500/01			A1	

SW Branch 1



Foul Branch 1



SURFACE WATER MANHOLE SCHEDULE								
MH Ref	MH Internal Diameter	Cover Level	Depth of MH	Sump Depth	MH Type	MH Cover	Pipe Connections	Comments
SW1	450 mm	53.361 m	0.939 m	0.005 m	PVC	Max Opening 430 x 430 Grade D400	SW-1.01 100 mm Dia IL=52.427 m SW-2.00 100 mm Dia IL=52.427 m SW-1.02 100 mm Dia IL=52.427 m	
SW2	450 mm	53.152 m	0.601 m	0.000 m	PVC	Max Opening 430 x 430 Grade D400	No of pipe connections 2 SW-1.00 100 mm Dia IL=52.551 m SW-1.01 100 mm Dia IL=52.551 m	
SW3	450 mm	52.947 m	0.310 m	0.000 m	PVC	Max Opening 430 x 430 Grade D400	No of pipe connections 2 SW-3.00 100 mm Dia IL=52.638 m SW-3.01 100 mm Dia IL=52.638 m	
SW4	450 mm	53.288 m	0.794 m	0.000 m	PVC	Max Opening 430 x 430 Grade B125	No of pipe connections 3 SW-3.01 100 mm Dia IL=52.495 m SW-4.00 100 mm Dia IL=52.495 m SW-3.02 100 mm Dia IL=52.495 m	
SW5	300 mm	53.340 m	1.340 m	0.300 m	PVC	Min Opening 430 x 430 Grade D400	No of pipe connections 2 SW-1.03 100 mm Dia IL=52.300 m SW-1.04 100 mm Dia IL=52.300 m	Flow Control Manhole Flow restricted by 22mm orifice in chamber
SW6	450 mm	52.720 m	0.620 m	0.000 m	PVC	Max Opening 430 x 430 Grade B125	No of pipe connections 2 SW-1.04 100 mm Dia IL=52.100 m SW-1.05 100 mm Dia IL=52.100 m	

FOUL MANHOLE SCHEDULE							
MH Ref	MH Internal Diameter	Cover Level	Depth of MH	MH Type	MH Cover	Pipe Connections	Comments
FW1	450 mm	53.375 m	0.641 m	PVC	Min Opening 430 x 430 Grade D400	No of pipe connections 2 FW-1.00 100 mm Dia IL=52.734 m FW-1.01 100 mm Dia IL=52.734 m	
FW2	450 mm	53.306 m	0.692 m	PVC	Min Opening 430 x 430 Grade B125	No of pipe connections 2 FW-1.01 100 mm Dia IL=52.613 m FW-1.02 100 mm Dia IL=52.613 m	
FW3	450 mm	52.881 m	0.590 m	PVC	Min Opening 430 x 430 Grade B125	No of pipe connections 2 FW-1.02 100 mm Dia IL=52.292 m FW-1.03 100 mm Dia IL=52.292 m	

SURFACE WATER PIPE SCHEDULE									
Pipe Name	Diameter	Length	Slope	Material	Pipe Bed	Upstream Manhole	Upstream Invert	Downstream Manhole	Downstream Invert
SW-1.00	100 mm	3.466 m	1:100	PVC	S or Z	RWP2	52.586 m	SW2	52.551 m
SW-1.01	100 mm	12.403 m	1:100	PVC	S or Z	SW2	52.551 m	SW1	52.427 m
SW-1.02	100 mm	2.044 m	1:100	PVC	S or Z	SW1	52.427 m	D1	52.407 m
SW-1.03	100 mm	7.502 m	1:100	PVC	S or Z	D3	52.375 m	SW5	52.300 m
SW-1.04	100 mm	19.959 m	1:100	PVC	S or Z	SW5	52.300 m	SW6	52.100 m
SW-1.05	100 mm	32.193 m	1:83	Vitrified Clay to SSG E2.18	B, N, F Or Z to SSG E2.25	SW6	52.100 m	EX 0852	51.710 m
SW-2.00	100 mm	1.008 m	1:100	PVC	S or Z	RWP1	52.437 m	SW1	52.427 m
SW-3.00	100 mm	2.488 m	1:100	PVC	S or Z	RWP3	52.663 m	SW3	52.638 m
SW-3.01	100 mm	14.260 m	1:100	PVC	S or Z	SW3	52.638 m	SW4	52.495 m
SW-3.02	100 mm	8.757 m	1:100	PVC	S or Z	SW4	52.495 m	D2	52.407 m
SW-4.00	100 mm	6.243 m	1:100	PVC	S or Z	RWP4	52.558 m	SW4	52.495 m

FOUL PIPE SCHEDULE									
Pipe Name	Diameter	Length	Slope	Material	Pipe Bed	Upstream Manhole	Upstream Invert	Downstream Manhole	Downstream Invert
FW-1.00	100 mm	3.010 m	1:80	PVC	S or Z	SVP1	52.772 m	FW1	52.734 m
FW-1.01	100 mm	9.620 m	1:80	PVC	S or Z	FW1	52.734 m	FW2	52.613 m
FW-1.02	100 mm	17.727 m	1:55	PVC	S or Z	FW2	52.613 m	FW3	52.292 m
FW-1.03	100 mm	2.286 m	1:80	PVC	S or Z	FW3	52.292 m	EX MH	52.263 m

NOTES

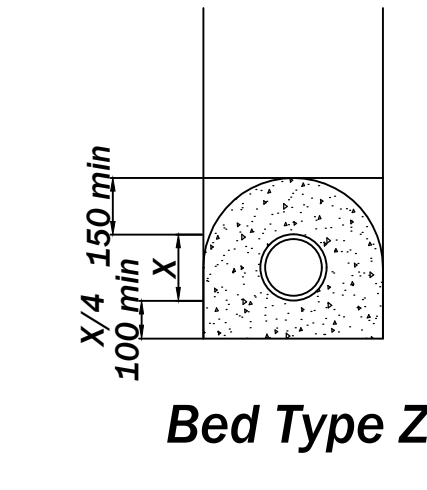
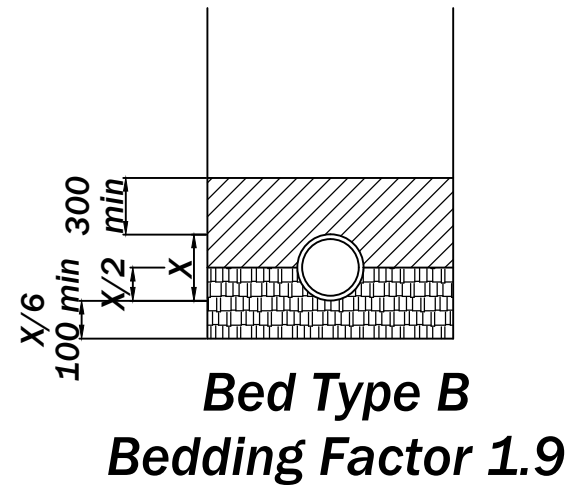
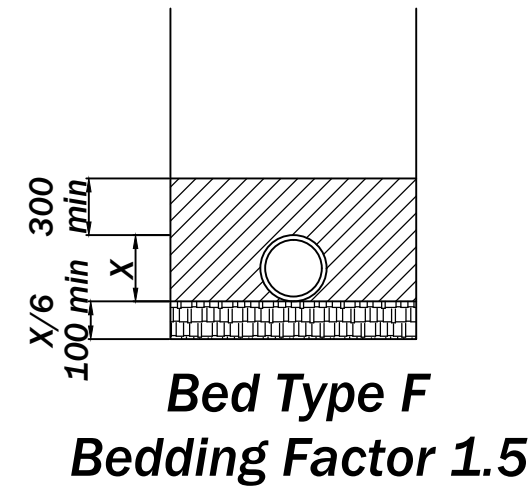
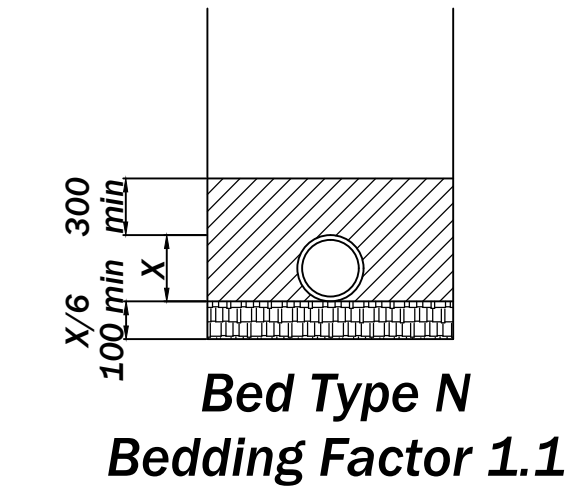
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19 Groveland Road
Spencers Wood, Reading
Drainage Profiles &
Schedules

DRAWN	RS	CHECKED	KBL	APPROVED	KBL
DATE	Jul 26	DATE	Jul 26	DATE	Jul 26
SCALE	H-1:200 V-1:20	PRJ No.	262152	SIZE	REV
DWG No.	262152/510/01			A1	

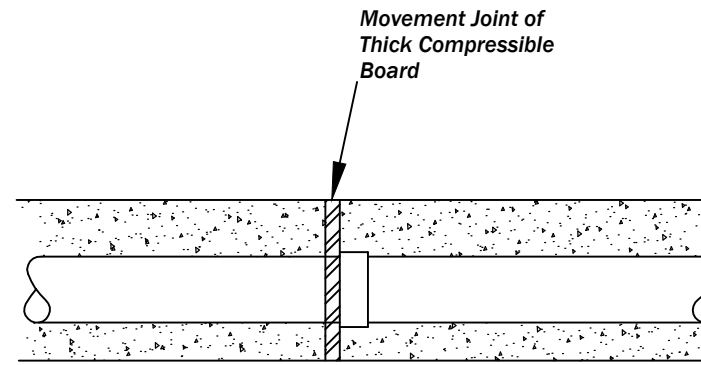


Notes:
1. Movements joints shall be formed in Bed Type Z at each socket or sleeve joint

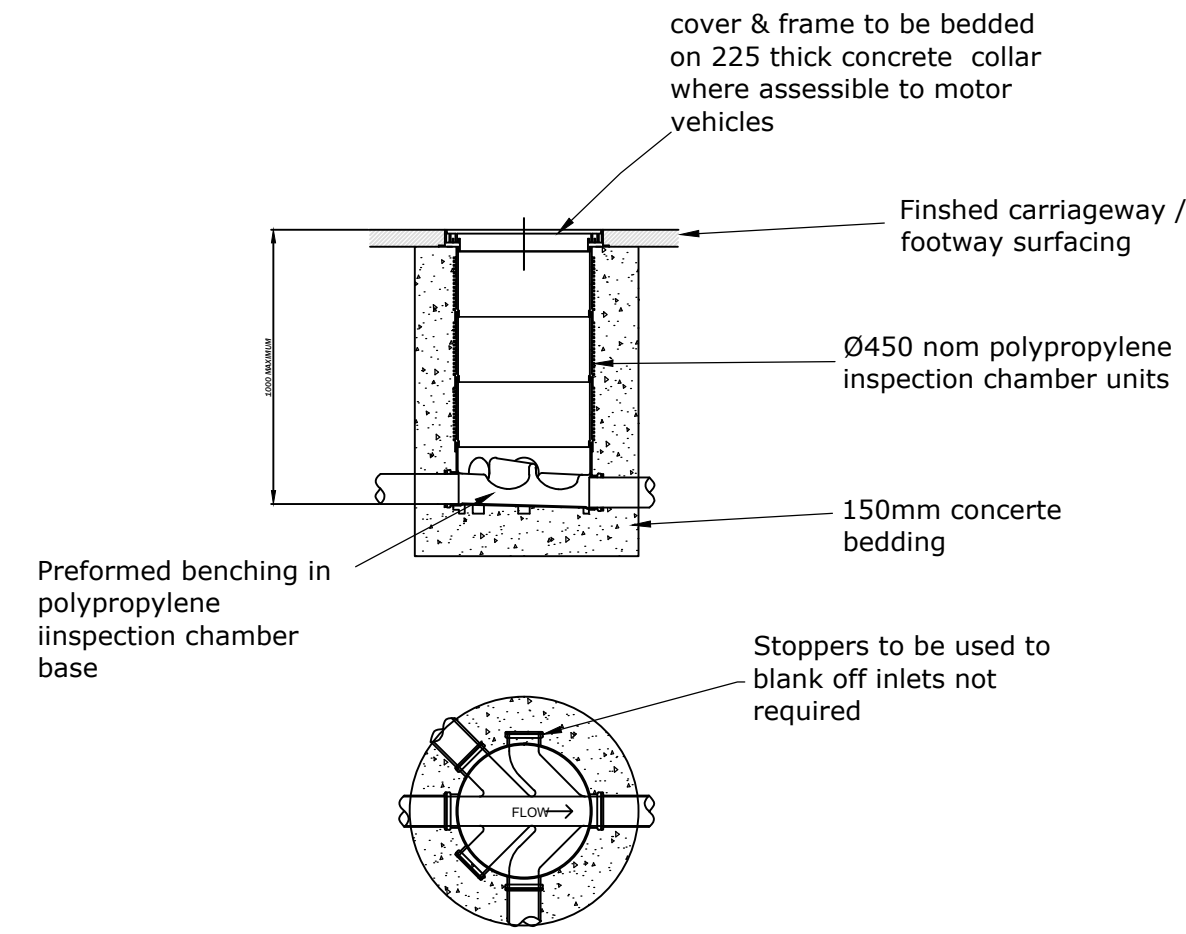
Selected Fill: free from stones larger than 40mm lumps of clay over 100mm, timber, frozen material, vegetable matter.

Granular Material: should conform to BS EN 1619 Annex B Table B15 and should be single size material from 5mm up to a max of 10mm for 100mm pipes 14mm for 150mm pipes, 20mm for pipes upto 600mm and 40mm for pipes greater than 600mm diameter. Compaction fraction maximum 0.3 for Bed Type N or B and 0.15 for Bed Type F

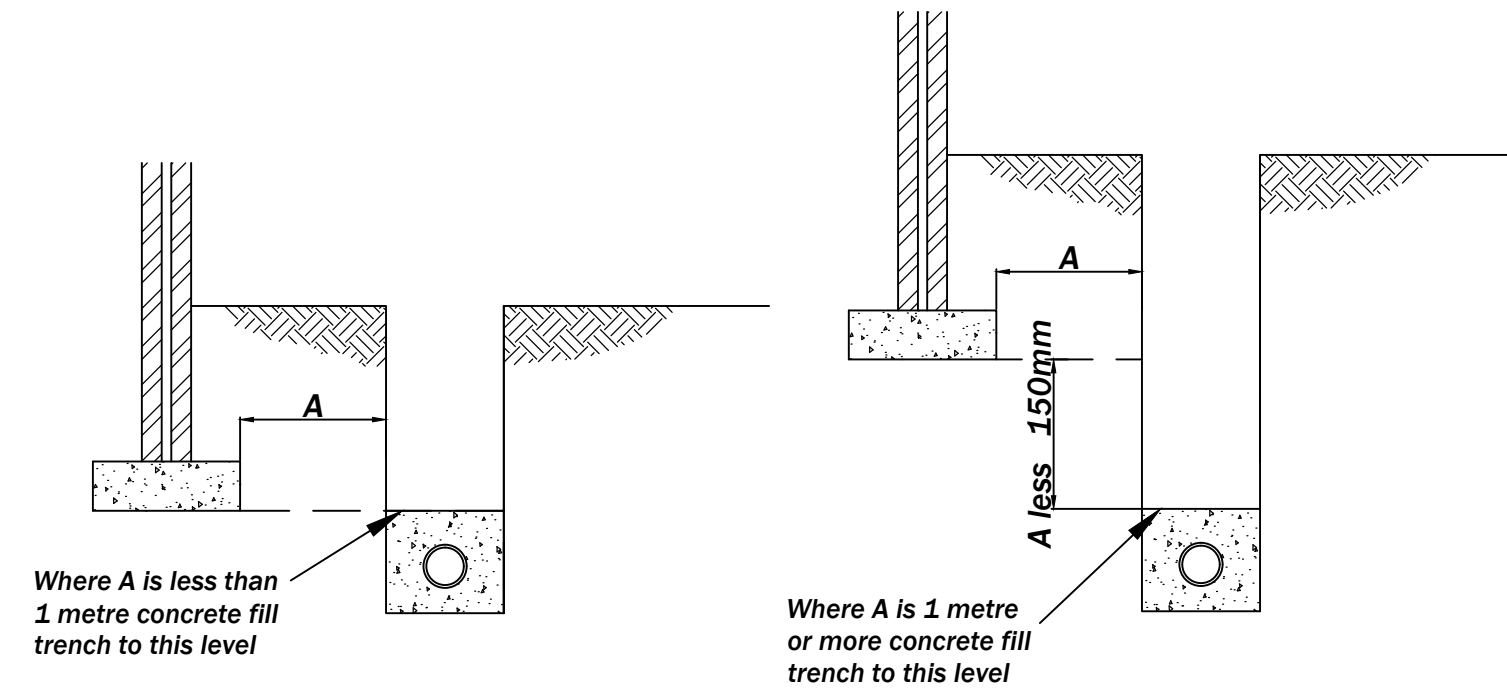
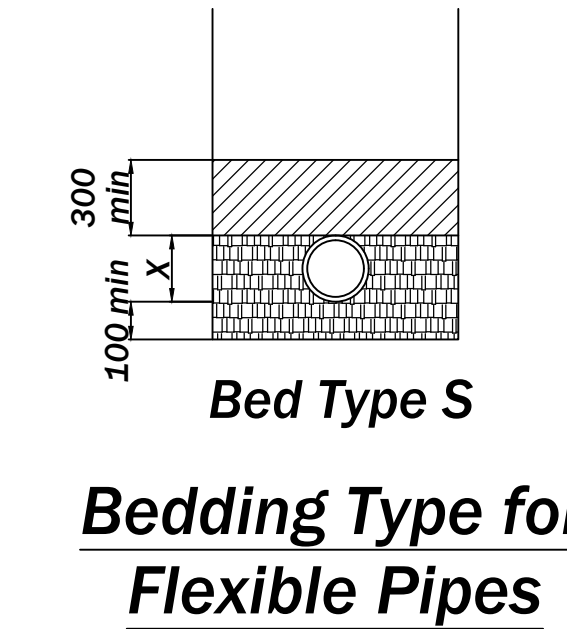
Concrete bed nad surround



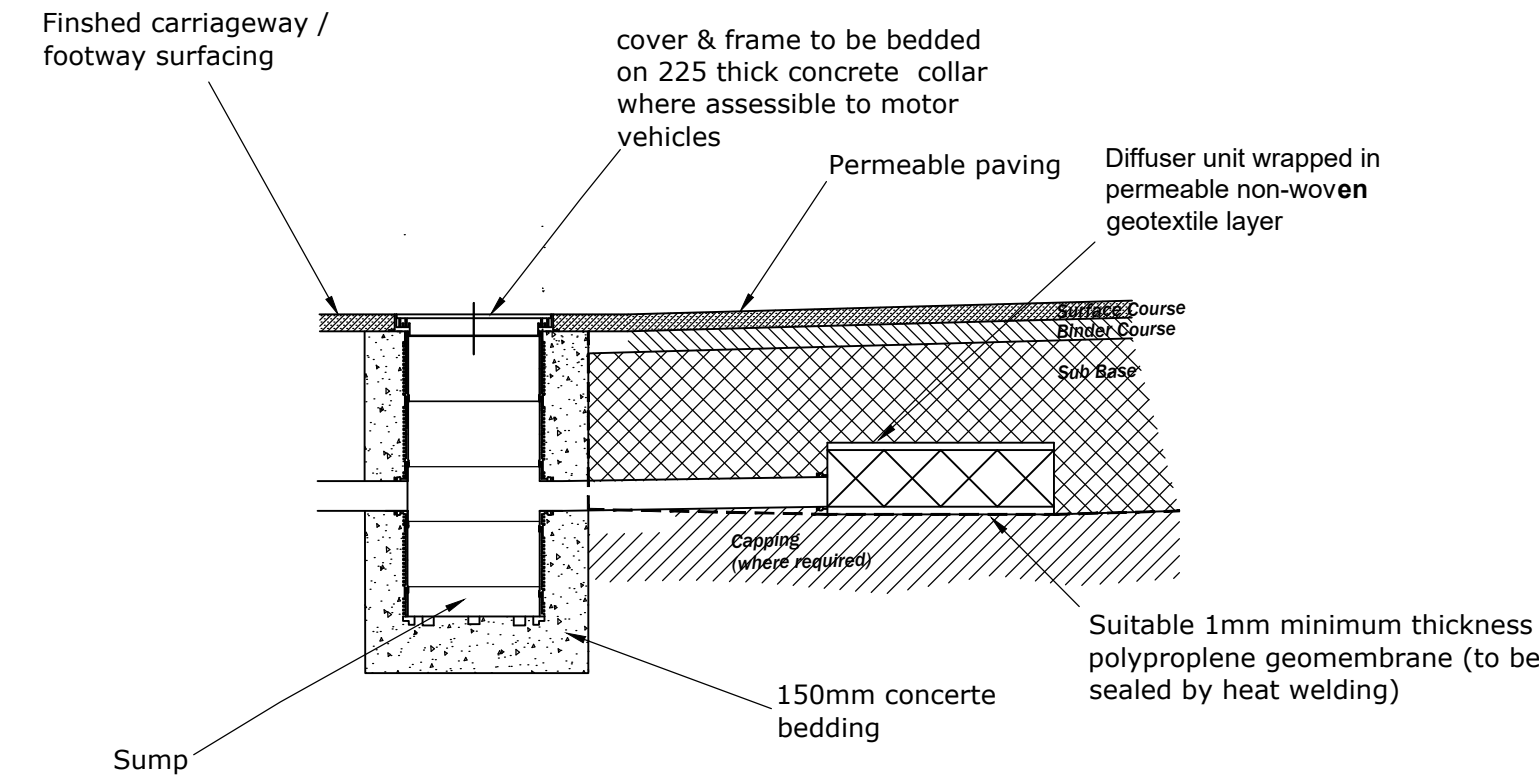
Joints in Bed Type Z



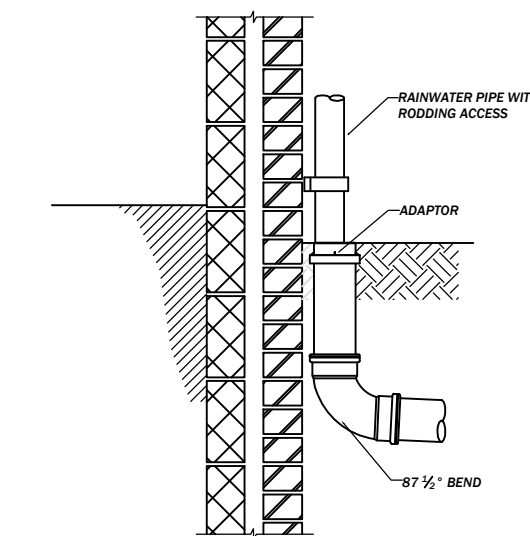
Inspection chamber.



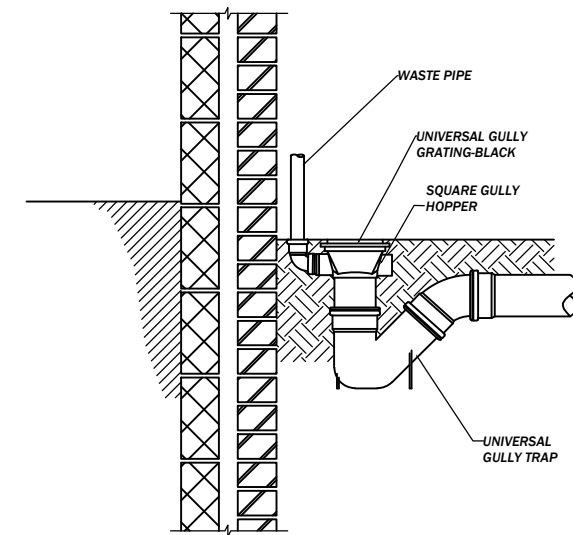
Pipe runs near buildings



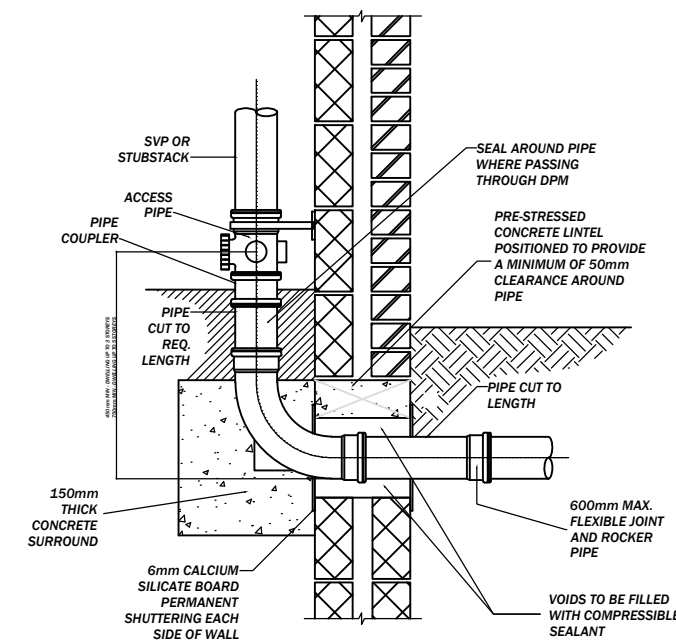
Diffuser Unit Outlet



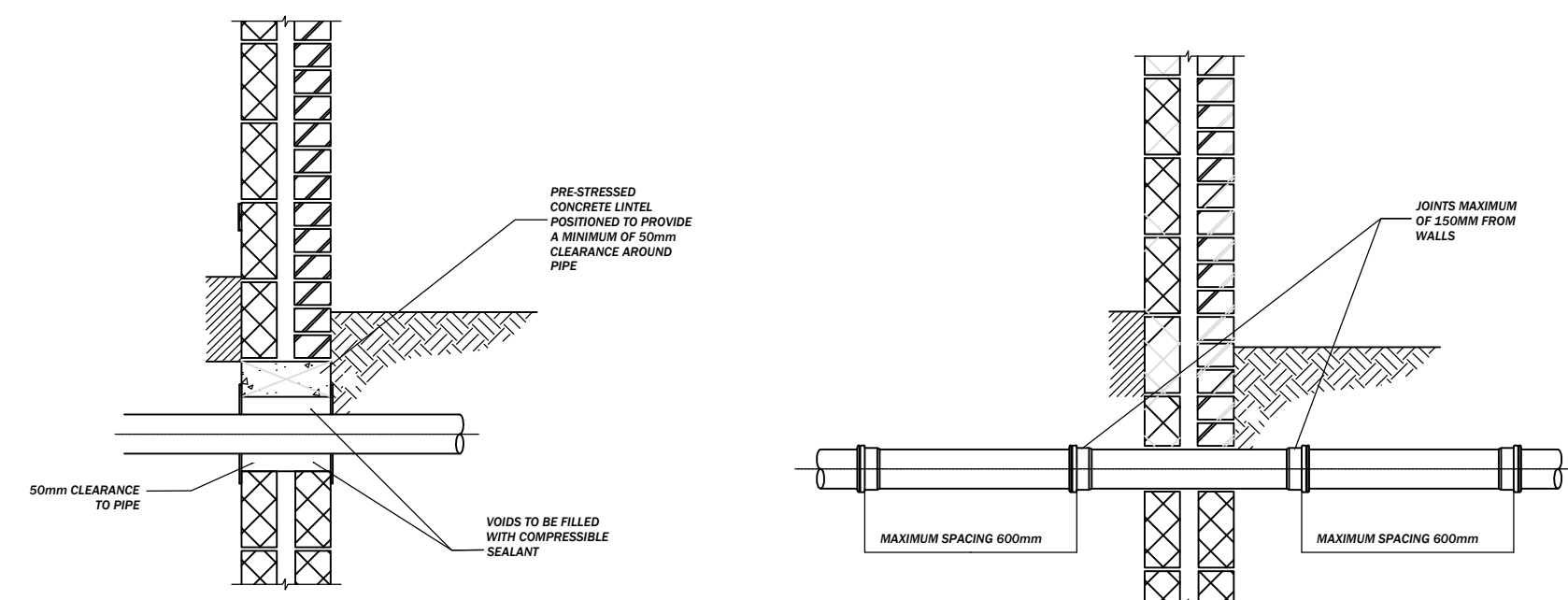
Rainwater down pipe detail



External gully and rainwater pipe detail



Internal SVP detail



Pipe penetration through wall

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19 Groveland Road
Spencers Wood, Reading
Drainage Construction
Details

DRAWN	RS	CHECKED	KBL	APPROVED	KBL
DATE	Jul 26	DATE	Jul 26	DATE	Apr 26
SCALE	N.T.S	PRJ No.	262152	SIZE	REV
DWG No.	262152/SD/01			A1	

Lanmor Consulting Ltd							Page 1																																																																																																																																																																																																																																																																																	
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<u>Summary of Results for 100 year Return Period (+40%)</u> Half Drain Time : 603 minutes. <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Control (l/s)</th><th>Max Σ Outflow (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>52.842</td><td>0.467</td><td>0.0</td><td>0.6</td><td>0.6</td><td>20.1</td><td>O K</td></tr><tr><td>30 min Summer</td><td>52.914</td><td>0.539</td><td>0.0</td><td>0.6</td><td>0.6</td><td>26.7</td><td>O K</td></tr><tr><td>60 min Summer</td><td>52.987</td><td>0.612</td><td>0.0</td><td>0.6</td><td>0.6</td><td>33.3</td><td>O K</td></tr><tr><td>120 min Summer</td><td>53.066</td><td>0.691</td><td>0.0</td><td>0.7</td><td>0.7</td><td>39.3</td><td>Flood Risk</td></tr><tr><td>180 min Summer</td><td>53.109</td><td>0.734</td><td>0.0</td><td>0.7</td><td>0.7</td><td>42.1</td><td>Flood Risk</td></tr><tr><td>240 min Summer</td><td>53.133</td><td>0.758</td><td>0.0</td><td>0.7</td><td>0.7</td><td>43.5</td><td>Flood Risk</td></tr><tr><td>360 min Summer</td><td>53.148</td><td>0.773</td><td>0.0</td><td>0.7</td><td>0.7</td><td>44.3</td><td>Flood Risk</td></tr><tr><td>480 min Summer</td><td>53.146</td><td>0.771</td><td>0.0</td><td>0.7</td><td>0.7</td><td>44.2</td><td>Flood Risk</td></tr><tr><td>600 min Summer</td><td>53.139</td><td>0.764</td><td>0.0</td><td>0.7</td><td>0.7</td><td>43.8</td><td>Flood Risk</td></tr><tr><td>720 min Summer</td><td>53.131</td><td>0.756</td><td>0.0</td><td>0.7</td><td>0.7</td><td>43.4</td><td>Flood Risk</td></tr><tr><td>960 min Summer</td><td>53.113</td><td>0.738</td><td>0.0</td><td>0.7</td><td>0.7</td><td>42.3</td><td>Flood Risk</td></tr><tr><td>1440 min Summer</td><td>53.074</td><td>0.699</td><td>0.0</td><td>0.7</td><td>0.7</td><td>39.8</td><td>Flood Risk</td></tr><tr><td>2160 min Summer</td><td>53.021</td><td>0.646</td><td>0.0</td><td>0.7</td><td>0.7</td><td>36.0</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>52.978</td><td>0.603</td><td>0.0</td><td>0.6</td><td>0.6</td><td>32.5</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>52.911</td><td>0.536</td><td>0.0</td><td>0.6</td><td>0.6</td><td>26.5</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>52.859</td><td>0.484</td><td>0.0</td><td>0.6</td><td>0.6</td><td>21.6</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>52.813</td><td>0.438</td><td>0.0</td><td>0.5</td><td>0.5</td><td>17.7</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>52.772</td><td>0.397</td><td>0.0</td><td>0.5</td><td>0.5</td><td>14.5</td><td>O K</td></tr><tr><td>10080 min Summer</td><td>52.735</td><td>0.360</td><td>0.0</td><td>0.5</td><td>0.5</td><td>12.0</td><td>O K</td></tr><tr><td>15 min Winter</td><td>52.872</td><td>0.497</td><td>0.0</td><td>0.6</td><td>0.6</td><td>22.8</td><td>O K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Discharge Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>129.089</td><td>0.0</td><td>20.5</td><td>19</td></tr><tr><td>30 min Summer</td><td>84.848</td><td>0.0</td><td>27.5</td><td>34</td></tr><tr><td>60 min Summer</td><td>53.188</td><td>0.0</td><td>34.9</td><td>64</td></tr><tr><td>120 min Summer</td><td>32.259</td><td>0.0</td><td>42.7</td><td>122</td></tr><tr><td>180 min Summer</td><td>23.779</td><td>0.0</td><td>47.4</td><td>182</td></tr><tr><td>240 min Summer</td><td>19.047</td><td>0.0</td><td>50.7</td><td>242</td></tr><tr><td>360 min Summer</td><td>13.827</td><td>0.0</td><td>55.3</td><td>360</td></tr><tr><td>480 min Summer</td><td>11.024</td><td>0.0</td><td>58.8</td><td>452</td></tr><tr><td>600 min Summer</td><td>9.241</td><td>0.0</td><td>61.6</td><td>506</td></tr><tr><td>720 min Summer</td><td>7.997</td><td>0.0</td><td>64.0</td><td>568</td></tr><tr><td>960 min Summer</td><td>6.361</td><td>0.0</td><td>67.8</td><td>694</td></tr><tr><td>1440 min Summer</td><td>4.600</td><td>0.0</td><td>73.4</td><td>968</td></tr><tr><td>2160 min Summer</td><td>3.321</td><td>0.0</td><td>79.2</td><td>1384</td></tr><tr><td>2880 min Summer</td><td>2.633</td><td>0.0</td><td>83.4</td><td>1788</td></tr><tr><td>4320 min Summer</td><td>1.896</td><td>0.0</td><td>89.4</td><td>2592</td></tr><tr><td>5760 min Summer</td><td>1.500</td><td>0.0</td><td>93.5</td><td>3336</td></tr><tr><td>7200 min Summer</td><td>1.251</td><td>0.0</td><td>96.7</td><td>4040</td></tr><tr><td>8640 min Summer</td><td>1.077</td><td>0.0</td><td>99.1</td><td>4760</td></tr><tr><td>10080 min Summer</td><td>0.949</td><td>0.0</td><td>101.1</td><td>5456</td></tr><tr><td>15 min Winter</td><td>129.089</td><td>0.0</td><td>23.2</td><td>19</td></tr></table>								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	52.842	0.467	0.0	0.6	0.6	20.1	O K	30 min Summer	52.914	0.539	0.0	0.6	0.6	26.7	O K	60 min Summer	52.987	0.612	0.0	0.6	0.6	33.3	O K	120 min Summer	53.066	0.691	0.0	0.7	0.7	39.3	Flood Risk	180 min Summer	53.109	0.734	0.0	0.7	0.7	42.1	Flood Risk	240 min Summer	53.133	0.758	0.0	0.7	0.7	43.5	Flood Risk	360 min Summer	53.148	0.773	0.0	0.7	0.7	44.3	Flood Risk	480 min Summer	53.146	0.771	0.0	0.7	0.7	44.2	Flood Risk	600 min Summer	53.139	0.764	0.0	0.7	0.7	43.8	Flood Risk	720 min Summer	53.131	0.756	0.0	0.7	0.7	43.4	Flood Risk	960 min Summer	53.113	0.738	0.0	0.7	0.7	42.3	Flood Risk	1440 min Summer	53.074	0.699	0.0	0.7	0.7	39.8	Flood Risk	2160 min Summer	53.021	0.646	0.0	0.7	0.7	36.0	O K	2880 min Summer	52.978	0.603	0.0	0.6	0.6	32.5	O K	4320 min Summer	52.911	0.536	0.0	0.6	0.6	26.5	O K	5760 min Summer	52.859	0.484	0.0	0.6	0.6	21.6	O K	7200 min Summer	52.813	0.438	0.0	0.5	0.5	17.7	O K	8640 min Summer	52.772	0.397	0.0	0.5	0.5	14.5	O K	10080 min Summer	52.735	0.360	0.0	0.5	0.5	12.0	O K	15 min Winter	52.872	0.497	0.0	0.6	0.6	22.8	O K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	15 min Summer	129.089	0.0	20.5	19	30 min Summer	84.848	0.0	27.5	34	60 min Summer	53.188	0.0	34.9	64	120 min Summer	32.259	0.0	42.7	122	180 min Summer	23.779	0.0	47.4	182	240 min Summer	19.047	0.0	50.7	242	360 min Summer	13.827	0.0	55.3	360	480 min Summer	11.024	0.0	58.8	452	600 min Summer	9.241	0.0	61.6	506	720 min Summer	7.997	0.0	64.0	568	960 min Summer	6.361	0.0	67.8	694	1440 min Summer	4.600	0.0	73.4	968	2160 min Summer	3.321	0.0	79.2	1384	2880 min Summer	2.633	0.0	83.4	1788	4320 min Summer	1.896	0.0	89.4	2592	5760 min Summer	1.500	0.0	93.5	3336	7200 min Summer	1.251	0.0	96.7	4040	8640 min Summer	1.077	0.0	99.1	4760	10080 min Summer	0.949	0.0	101.1	5456	15 min Winter	129.089	0.0	23.2	19
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																																																																																																																																																																																																																																																																																	
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30 min Summer	84.848	0.0	27.5	34																																																																																																																																																																																																																																																																																				
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480 min Summer	11.024	0.0	58.8	452																																																																																																																																																																																																																																																																																				
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2160 min Summer	3.321	0.0	79.2	1384																																																																																																																																																																																																																																																																																				
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Thorogood House 34 Tolworth Close Surbition Surrey KT6 7EW		
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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	52.952	0.577	0.0	0.6	0.6	30.2	O K
60 min Winter	53.043	0.668	0.0	0.7	0.7	37.6	O K
120 min Winter	53.151	0.776	0.0	0.7	0.7	44.5	Flood Risk
180 min Winter	53.221	0.846	0.0	0.8	0.8	47.8	Flood Risk
240 min Winter	53.269	0.894	0.0	0.8	0.8	49.5	Flood Risk
360 min Winter	53.315	0.940	0.0	0.8	0.8	50.8	Flood Risk
480 min Winter	53.321	0.946	0.0	0.8	0.8	50.9	Flood Risk
600 min Winter	53.300	0.925	0.0	0.8	0.8	50.4	Flood Risk
720 min Winter	53.277	0.902	0.0	0.8	0.8	49.8	Flood Risk
960 min Winter	53.240	0.865	0.0	0.8	0.8	48.5	Flood Risk
1440 min Winter	53.164	0.789	0.0	0.7	0.7	45.2	Flood Risk
2160 min Winter	53.073	0.698	0.0	0.7	0.7	39.8	Flood Risk
2880 min Winter	53.005	0.630	0.0	0.7	0.7	34.7	O K
4320 min Winter	52.908	0.533	0.0	0.6	0.6	26.1	O K
5760 min Winter	52.835	0.460	0.0	0.6	0.6	19.5	O K
7200 min Winter	52.771	0.396	0.0	0.5	0.5	14.5	O K
8640 min Winter	52.716	0.341	0.0	0.5	0.5	10.8	O K
10080 min Winter	52.670	0.295	0.0	0.4	0.4	8.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	84.848	0.0	31.0	33
60 min Winter	53.188	0.0	39.3	62
120 min Winter	32.259	0.0	48.1	120
180 min Winter	23.779	0.0	53.3	178
240 min Winter	19.047	0.0	57.0	236
360 min Winter	13.827	0.0	62.1	350
480 min Winter	11.024	0.0	66.1	458
600 min Winter	9.241	0.0	69.3	560
720 min Winter	7.997	0.0	71.9	586
960 min Winter	6.361	0.0	76.2	734
1440 min Winter	4.600	0.0	82.6	1042
2160 min Winter	3.321	0.0	89.1	1492
2880 min Winter	2.633	0.0	93.9	1928
4320 min Winter	1.896	0.0	100.7	2724
5760 min Winter	1.500	0.0	105.5	3512
7200 min Winter	1.251	0.0	109.1	4184
8640 min Winter	1.077	0.0	112.0	4928
10080 min Winter	0.949	0.0	114.4	5552

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Thorogood House 34 Tolworth Close Surbition Surrey KT6 7EW		
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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.800	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.092

Time (mins)		Area
From:	To:	(ha)
0	4	0.092

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Model Details

Storage is Online Cover Level (m) 53.350

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	12.3
Membrane Percolation (mm/hr)	1000	Length (m)	28.0
Max Percolation (l/s)	95.7	Slope (1:X)	50.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	52.375	Cap Volume Depth (m)	0.500

Orifice Outflow Control

Diameter (m) 0.020 Discharge Coefficient 0.600 Invert Level (m) 52.375

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Event: 480 min Winter

