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PROPOSED DEVELOPMENT
ASPERTON ROAD
WIGTOFT,
BOSTON, LINCOLNSHIRE

DRAINAGE STRATEGY REPORT

Client: Giant Homes Limited

Prepared By: Garry Dunnett

Date: 20th October 2022

Reference: 22/48789

Revision: P1

VAT Registration No.: 670 8636 12
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CONTENTS

1 INTRODUCTION

1.1 Purpose of Report

David Smith Associates have been instructed on behalf of Giant Homes Limited to prepare a Drainage Strategy report to accompany a Flood Risk Assessment for a residential development site at Asperton Road, Wigtoft, near Boston, Lincolnshire.

1.2 Existing Site and Proposed Development

Situated off Asperton Road, within the village of Wigtoft (grid ref: TF 26540 36520), the site is a greenfield site with existing residential dwellings adjacent to the western boundary, fields to the east, a Welland and Deeping Internal Drainage Board watercourse along the northern boundary and Asperton Road along the southern boundary.

The site is approximately 1.0 hectares with the highest level covered by the topographical survey being 3.47m AOD at the southern end of the site, and the lowest level located at the north corner with a level of 2.71m AOD.

The proposed development consists of 20No. residential dwellings, together with associated access roads, footways and off-road car parking/shared driveways.

1.3 Ground Conditions

At the time of writing the report, no ground investigation had been undertaken, therefore reference has been made to the British Geological Surveys (BGS) on-line mapping.

The BGS on-line mapping confirmed the area is located within the West Walton formation Mudstone and Siltstone.

Based on the BGS finding, the site in question is considered unsuitable for any surface water infiltration techniques.

In the absence of a ground investigation, we would recommend one is undertaken, including undertaking infiltration tests in accordance with the BRE 365 Soakaway document to confirm the suitability of the site for any infiltration.

2 DRAINAGE

2.1 Existing Drainage

As the development is located within a Greenfield site it would be assumed that there is no existing drainage within the site.

Anglian Water (AW) sewer records indicate a foul sewer located within Asperton Road near the southern corner of the site. The topographical survey having picked up a manhole cover within the carriageway appears to confirm AW records, although no invert level of the manhole has been recorded by either the survey or AW records.

2.2 Proposed Drainage

2.2.1 Surface Water Strategy

Given the size of the size and the density of the development, there is insufficient space to consider the use of swales, basins or ponds.

Therefore, the proposed surface water drainage will be of a traditional gravity drainage system which will discharge in to the existing Welland and Deeping IDB watercourse located at the northern end of the site.

It is proposed to restrict the surface water discharge rate to a 1 in 1-year Greenfield Runoff rate which equates to 1.4l/s (refer to Appendix B).

Initial consultation has been undertaken with the Welland and Deeping IDB which confirmed that they would accept a Greenfield Runoff rate of 1.4l/s (refer to Appendix C).

As mentioned within the accompanying Flood Risk Assessment, the surface water drainage has been designed to cater for the 1 in 100-year storm event, plus a 40% allowance for climate change.

The excess surface water will be attenuated by means of oversized pipes and manholes, together with on-line crate attenuation system.

As previously mentioned within the report, there is insufficient space within the development to provide any SuDS such as swales, basins or ponds. Therefore, to provide a treatment train for the surface water, it is proposed (where possible) to provide a permeable pavement (non-infiltration) system which will be located within the private parking areas of the development.

In addition to the above to minimise any silts entering the watercourse from the development, it is proposed to provide catchpit manholes at the upstream end of the crate attenuation units, together with trapped road gullies.

2.2.2 Foul Water Strategy

As previously mentioned within the report, there is an Anglian Water foul sewer located within the carriageway of Asperton Road.

It is proposed to have a gravity foul drainage system located within the access carriageway and discharge to AW manhole.

The above proposal is subject to further investigation works in establishing the invert level of the existing manhole and subject to a Section 106 Sewer connection application approval from AW.

2.2.3 Exceedance Events

An exceedance plan has been produced to indicate the general flow of the surface water for the proposed works beyond the designed 1 in 100-year storm event, plus the 40% allowance for climate change.

The proposed levels for the development allow most of the excess surface water to remain within the carriageway of the development and within the confines of the site. In providing sufficient cover to the proposed drainage, a small length of the carriageway does fall towards the existing highway, although road gullies are located at the entrance to allow the collection of the surface water.

2.3 Drainage Maintenance

2.3.1 Responsibilities

Any existing and new on-site foul or surface water drainage will be the responsibility of the building owner.

2.3.2 Pipe drainage systems

<u>6 monthly, when extreme rainfall is forecast, and after significant storm events</u>

- Clear leaves litter and debris from all areas of the site and from visible surface features of the drainage system. This shall include above ground roof gutters and downpipes, and gullies.
- Inspect all manholes, road gullies, threshold drains, roof gutters, and downpipes. Collect and dispose of any silt present. Monitor the speed of silt build up and increase frequency of maintenance if required.
- Inspect the hydro-brake control chamber. Collect and dispose of any silt present. Monitor the speed of silt build up and increase frequency of maintenance if required.
- Inspect the hydro-brake and ensure it is fully operational. Repair or replace any faulty parts.

<u>At 5-10-year intervals</u>

- CCTV survey of piped drainage system on site, through to the outfall to the third-party system within the site. Removal of silt and debris as required. Replace or repair any areas of failure.

2.3.3 Permeable Concrete Block Paving

<u>12-weekly</u>

- For the first 12 months following regular use, an additional 2-4mm quartzite/gritstone to BS EN 1097-2: 1998 to be brushed into joints at 12-week intervals to accommodate the initial settlement of the block paving.

<u>12 monthly, when extreme rainfall is forecast, and after significant storm events</u>

- Brush silt and organic matter from all joints with stiff brush and vacuum.

At 5-year intervals

- Shallow trial holes to be carried out at a low point of the pavement to assess silt and organic matter build up in the joints between paviours and the laying course
- If the silt build up is significant and forms a seal which prevents water flowing into the sub-base layer easily, localised areas shall be taken up and the paviours re-laid with new layer course and jointing grit.

2.4 Permeable Concrete Block Paving

12-weekly

For the first 12 months following regular use, an additional 2-4mm quartzite/gritstone to BS EN 1097-2:1998 to be brushed into joints at 12-week intervals to accommodate the initial settlement of the block paving.

12 monthly, when extreme rainfall is forecast, and after significant storm events

Brush silt and organic matter from all joints with stiff brush and vacuum.

Additional 2-4mm quartzite/gritstone to BS EN 1097-2:1998 to be brushed into joints.

At 5 year intervals

Shallow trial holes to be carried out at a low point of the paving to assess silt and organic matter build up in the joints between paviours and the laying course.

If the silt build-up is significant and forms a seal which prevents water flowing into the sub-base layers easily, localised areas shall be taken up and the paviours relaid with new laying course and jointing grit.

2.5 Cellular Storage Systems

At 5-10-year intervals

CCTV survey of the inlet/outlet pipework and the access tunnels of the cellular storage units, accessed by catchpits at the upstream and downstream sides of the storage system.

Depending on the results of the survey, the system shall be isolated to prevent downstream flow, and a jetting and suction pump operation carried out to remove as much silt as possible.

If silt build up remains over 20% of the overall depth and cannot be cleared satisfactorily, the system shall be excavated and replaced with a like-for-like system

At 20-year intervals

- Deep trial holes to be carried out at a low point of the paving to assess silt and organic matter build up in the joints between paviours, the laying course, the sub-base and the surfaces of the geotextiles.
- If the silt build-up is significant and affects the ability of the system to satisfactorily hold and dispose of surface water, the affected parts shall be taken up and replaced.

For the first 12 months following regular use, additional 2-4mm quartzite/gritstone to BS EN 1097-2: 1998 to be brushed into joints at 12 weekly intervals to accommodate the initial settlement of the block paving.

3 CONCLUSION

The proposed drainage is desigmed to accommodate a 1 in 100-year storm event, plus a 40% allowance for climate change.

The on-line surface water crate attenuation units and flow control device are designed to allow for the main surface water drainage to be adopted by Anglian Water.

Although due to limitations of space within the site, a treatment train in the use of permeable pavements has been proposed to improve the quality of the surface water prior to discharge to the existing watercourse.

In addition to the permeable pavement catchpit manholes are proposed upstream of the attenuation crates, together with trapped road gullies, all to assist in the removal of silts and improve water quality.

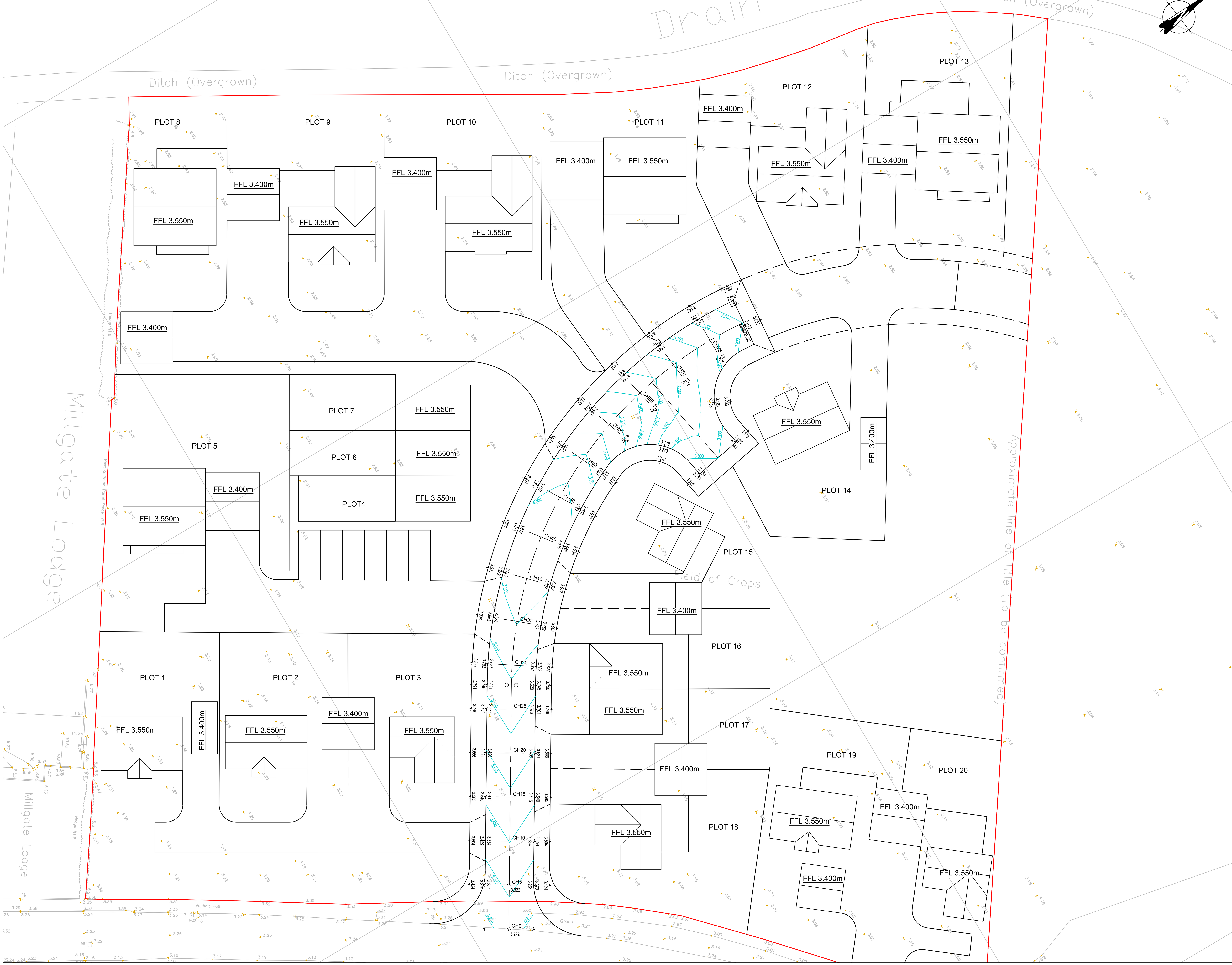
In the absence of a ground investigation at the time of writing the report, it is recommended in undertaking such an investigation, including undertaking infiltration tests (in accordance with BRE 365), to prove or disprove the viability of infiltration within the site..

A P P E N D I X ‘A’

Drawings

Proposed Levels, Drainage Strategy Drainage Plan, Catchment Plan, Exceedance Plan

ALL DIMENSIONS TO BE CONFIRMED ON SITE PRIOR TO ORDERING / FABRICATION OF MATERIALS AND COMMENCEMENT OF WORKS



Notes

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CDM 2015 DESIGNER NOTES

IN ADDITION TO THE HAZARDS, AND RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RISKS AND INFORMATION.

CONSTRUCTION:

1. N/A

FOR INFORMATION RELATING TO END USE, MAINTENANCE, DEMOLITION, SEE THE HEALTH AND SAFETY FILE.

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BOSTON, LINCOLNSHIRE

TITLE
PROPOSED LEVELS PLAN

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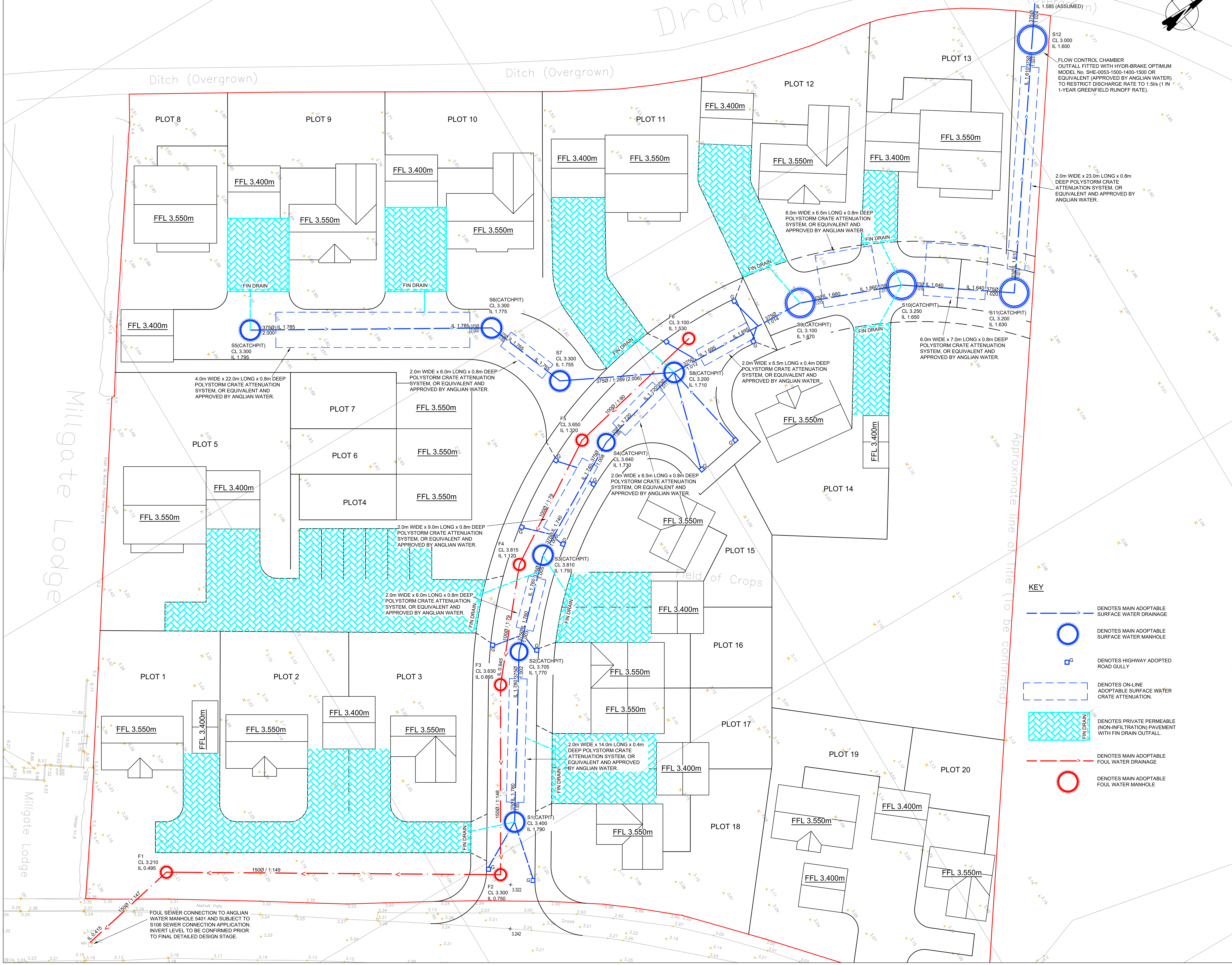

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DRAINAGE NOTES

1. ALL PIPEWORK TO BE VITRIFIED CLAY TO BS EN 295-1:2013 OR PLASTIC TO BS4660:2000 AND B SEN 1401-1:2019 UNLESS DETAILED OTHERWISE. ONLY CLAY PIPES TO BE USED WHERE HAZARDOUS WASTE IS PERCEIVED.
2. BACK FILL TO PIPE TRENCHES SHALL BE PLACED AND COMPACTED TO SHW CLAUSE 505.
3. MANHOLE COVER LEVELS SHALL BE ADJUSTED WHERE NECESSARY TO SUIT FINISHED LEVELS.
4. SQUARE DUCTILE IRON COVER AND FRAME TO BS EN124:- TRAFFICKED AREAS: CLASS D400, AND PEDESTRIAN AREAS: CLASS B125 DOUBLE SEAL.
5. MANHOLE TYPE 1 ACCESS SIZE: DEPTH UPTO 1.2m = 430x430 MIN. DEPTH OVER 1.2m = 300x300 MAX.
6. BRICKWORK SHALL BE IN CLASS 'B' ENGINEERING BRICK TO BS 3921 IN ENGLISH BOND SET IN 1:4 MORTAR
7. ALL PRECAST CONCRETE COMPONENTS SHALL BE IN ACCORDANCE WITH BS 5911 PART 200:1994
8. CEMENT - SULPHATE RESISTING CEMENT TO BS4027:1991 SHALL BE USED IN ALL CASES (INCLUDING PRECAST CONCRETE PRODUCTS) UNLESS AGREED OTHERWISE WITH LOCAL AUTHORITY
9. CONCRETE - CONCRETE MIX GEN3 SHALL HAVE A MINIMUM CEMENT CONTENT OF 330KG/m3, A MAXIMUM FREE WATER/CEMENT RATIO OF 0.50 AND 20mm NOMINAL MAXIMUM SIZE AGGREGATE
10. ALL MANHOLES TO BE MARKED WITH FW or SW AS APPROPRIATE.

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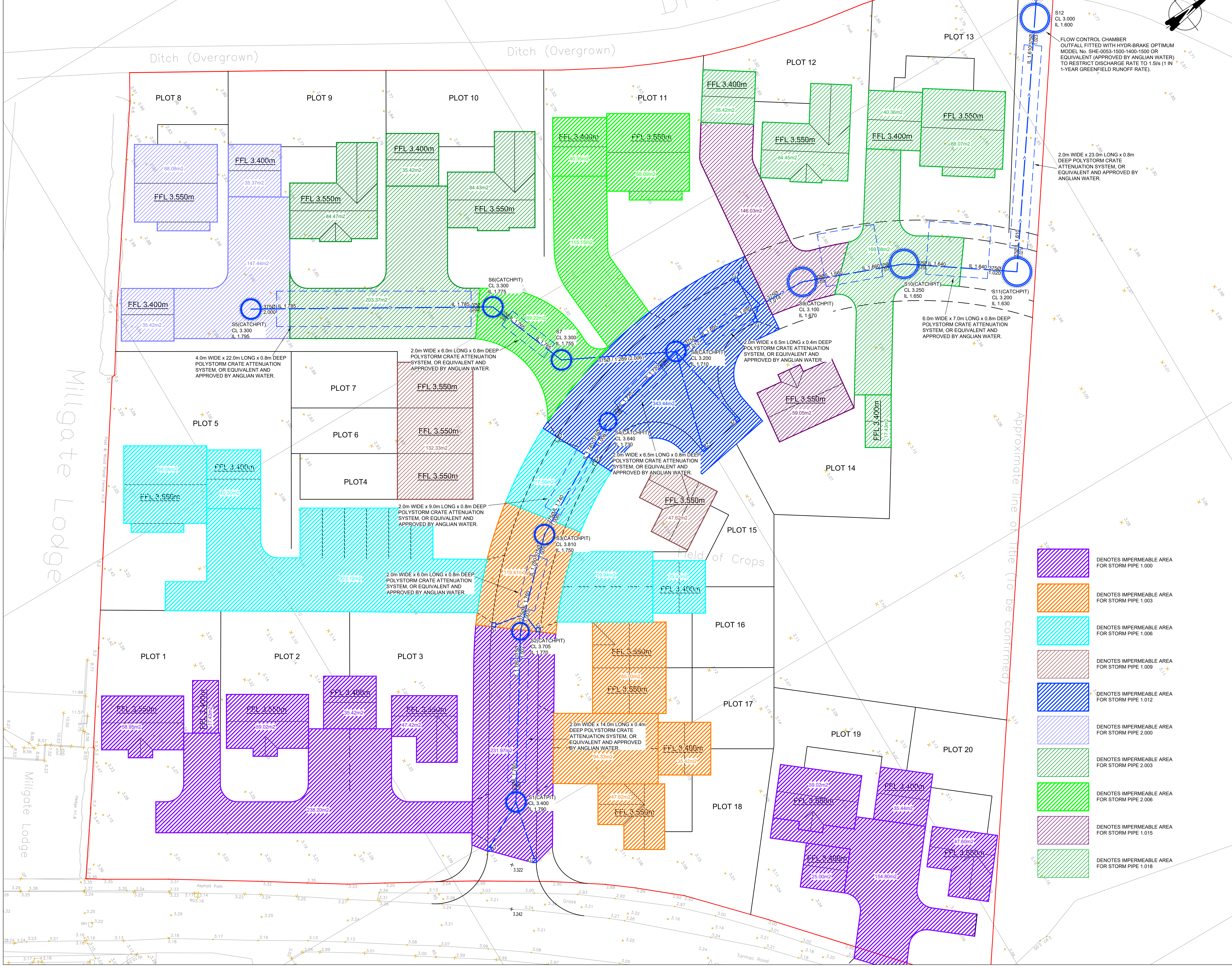

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PROPOSED SURFACE WATER EXCEEDANCE PLAN

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A P P E N D I X 'B'

SURFACE WATER DRAINAGE CALCULATIONS & SIMULATION RESULTS

ICP SUDS Mean Annual Flood

Input

Return Period (years)	1	SAAR (mm)	600	Urban	0.000
Area (ha)	1.000	Soil	0.300	Region Number	Region 5

Results	**l/s**
QBAR Rural	1.5
QBAR Urban	1.5
Q1 year	1.3
Q1 year	1.3
Q30 years	3.7
Q100 years	5.4

Time Area Diagram for Existing

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.228	4-8	0.134	8-12	0.020	12-16	0.020	16-20	0.020	20-24	0.010

Total Area Contributing (ha) = 0.433

Total Pipe Volume (m^3) = 19.556

Existing Network Details for Existing

- Indicates pipe length does not match coordinates

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
1.000	2.245	0.010	224.5	0.101	20.00	0.0	0.600	o	375	Pipe/Conduit
1.001	14.000	0.000	0.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
1.002	3.061	0.010	306.1	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
1.003	2.622	0.010	262.2	0.038	10.00	0.0	0.600	o	375	Pipe/Conduit
1.004	6.000	0.000	0.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
1.005	2.648	0.010	264.8	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
1.006	2.787	0.010	278.7	0.064	10.00	0.0	0.600	o	375	Pipe/Conduit
1.007	9.000	0.000	0.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
1.008	2.870	0.010	287.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
1.009	2.058	0.010	205.8	0.018	10.00	0.0	0.600	o	375	Pipe/Conduit
1.010	6.500	0.000	0.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
1.011	2.486	0.010	248.6	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
2.000	2.903	0.010	290.3	0.031	5.00	0.0	0.600	o	375	Pipe/Conduit
2.001	22.000	0.000	0.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
2.002	2.460	0.010	246.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
2.003	2.050	0.010	205.0	0.041	5.00	0.0	0.600	o	375	Pipe/Conduit
2.004	6.000	0.000	0.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
2.005	1.748	0.010	174.8	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
2.006	12.986	0.045	288.6	0.034	5.00	0.0	0.600	o	375	Pipe/Conduit
1.012	3.386	0.015	225.7	0.034	20.00	0.0	0.600	o	375	Pipe/Conduit
1.013	6.500	0.000	0.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
1.014	6.416	0.025	256.6	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	1.790	0.101	0.0	1.21	133.1
1.001	1.780	0.101	0.0	0.00	0.0
1.002	1.780	0.101	0.0	1.03	113.8
1.003	1.770	0.139	0.0	1.11	123.1
1.004	1.760	0.139	0.0	0.00	0.0
1.005	1.760	0.139	0.0	1.11	122.4
1.006	1.750	0.203	0.0	1.08	119.3
1.007	1.740	0.203	0.0	0.00	0.0
1.008	1.740	0.203	0.0	1.06	117.6
1.009	1.730	0.221	0.0	1.26	139.1
1.010	1.720	0.221	0.0	0.00	0.0
1.011	1.720	0.221	0.0	1.14	126.4
2.000	1.795	0.031	0.0	1.06	116.9
2.001	1.785	0.031	0.0	0.00	0.0
2.002	1.785	0.031	0.0	1.15	127.1
2.003	1.775	0.072	0.0	1.26	139.4
2.004	1.765	0.072	0.0	0.00	0.0
2.005	1.765	0.072	0.0	1.37	151.0
2.006	1.755	0.106	0.0	1.06	117.2
1.012	1.710	0.361	0.0	1.20	132.7
1.013	1.695	0.361	0.0	0.00	0.0
1.014	1.695	0.361	0.0	1.13	124.4

Existing Network Details for Existing

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
1.015	2.597	0.010	259.7	0.029	10.00	0.0	0.600	o	375	Pipe/Conduit
1.016	6.500	0.000	0.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
1.017	2.593	0.010	259.3	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
1.018	2.532	0.010	253.2	0.043	10.00	0.0	0.600	o	375	Pipe/Conduit
1.019	7.000	0.000	0.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
1.020	3.272	0.010	327.2	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
1.021	2.653#	0.020	132.7	0.000	10.00	0.0	0.600	o	375	Pipe/Conduit
1.022	20.000#	0.000	0.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
1.023	3.096#	0.010	309.6	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
1.024	4.093	0.015	272.9	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.015	1.670	0.390	0.0	1.12	123.7
1.016	1.660	0.390	0.0	0.00	0.0
1.017	1.660	0.390	0.0	1.12	123.8
1.018	1.650	0.433	0.0	1.13	125.3
1.019	1.640	0.433	0.0	0.00	0.0
1.020	1.640	0.433	0.0	1.00	110.0
1.021	1.630	0.433	0.0	1.57	173.6
1.022	1.610	0.433	0.0	0.00	0.0
1.023	1.610	0.433	0.0	1.02	113.1
1.024	1.600	0.433	0.0	1.09	120.6

Manhole Schedules for Existing

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	3.400	1.610	Open Manhole	2100	1.000	1.790	375				
CRATE	3.475	1.695	Junction		1.001	1.780	375	1.000	1.780	375	
CRATE OUTFALL	3.700	1.920	Junction		1.002	1.780	375	1.001	1.780	375	
S2	3.705	1.935	Open Manhole	1800	1.003	1.770	375	1.002	1.770	375	
CRATE	3.800	2.040	Junction		1.004	1.760	375	1.003	1.760	375	
CRATE OUTFALL	3.805	2.045	Junction		1.005	1.760	375	1.004	1.760	375	
S3	3.810	2.060	Open Manhole	2100	1.006	1.750	375	1.005	1.750	375	
CRATE	3.805	2.065	Junction		1.007	1.740	375	1.006	1.740	375	
CRATE OUTFALL	3.700	1.960	Junction		1.008	1.740	375	1.007	1.740	375	
S4	3.640	1.910	Open Manhole	1800	1.009	1.730	375	1.008	1.730	375	
CRATE	3.400	1.680	Junction		1.010	1.720	375	1.009	1.720	375	
CRATE OUTFALL	3.300	1.580	Junction		1.011	1.720	375	1.010	1.720	375	
S5	3.300	1.505	Open Manhole	2100	2.000	1.795	375				
CRATE	3.300	1.515	Junction		2.001	1.785	375	2.000	1.785	375	
CRATE OUTFALL	3.300	1.515	Junction		2.002	1.785	375	2.001	1.785	375	
S6	3.300	1.525	Open Manhole	2100	2.003	1.775	375	2.002	1.775	375	
CRATE	3.300	1.535	Junction		2.004	1.765	375	2.003	1.765	375	
CRATE OUTFALL	3.300	1.535	Junction		2.005	1.765	375	2.004	1.765	375	
S7	3.300	1.545	Open Manhole	2100	2.006	1.755	375	2.005	1.755	375	
S8	3.200	1.490	Open Manhole	2100	1.012	1.710	375	1.011	1.710	375	
								2.006	1.710	375	
CRATE	3.100	1.405	Junction		1.013	1.695	375	1.012	1.695	375	
CRATE OUTFALL	2.900	1.205	Junction		1.014	1.695	375	1.013	1.695	375	
S9	3.100	1.430	Open Manhole	3000	1.015	1.670	375	1.014	1.670	375	
CRATE	3.150	1.490	Junction		1.016	1.660	375	1.015	1.660	375	
CRATE OUTFALL	3.200	1.540	Junction		1.017	1.660	375	1.016	1.660	375	
S10	3.250	1.600	Open Manhole	3000	1.018	1.650	375	1.017	1.650	375	
CRATE	3.225	1.585	Junction		1.019	1.640	375	1.018	1.640	375	
CRATE OUTFALL	3.225	1.585	Junction		1.020	1.640	375	1.019	1.640	375	
S11	3.200	1.570	Open Manhole	3000	1.021	1.630	375	1.020	1.630	375	
CRATE	3.400	1.790	Junction		1.022	1.610	375	1.021	1.610	375	
CRATE OUTFALL	3.400	1.790	Junction		1.023	1.610	375	1.022	1.610	375	
S12	3.000	1.400	Open Manhole	3000	1.024	1.600	375	1.023	1.600	375	
Outfall	2.700	1.115	Open Manhole	1200		OUTFALL		1.024	1.585	375	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	526547.585	336460.611	526547.585	336460.611	Required	
S2	526531.243	336470.889	526531.243	336470.889	Required	

Manhole Schedules for Existing

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S3	526523.222	336478.807	526523.222	336478.807	Required	
S4	526515.887	336491.496	526515.887	336491.496	Required	
S5	526484.352	336463.267	526484.352	336463.267	Required	
S6	526498.100	336486.926	526498.100	336486.926	Required	
S7	526507.213	336490.526	526507.213	336490.526	Required	
S8	526512.994	336502.154	526512.994	336502.154	Required	
S9	526513.511	336518.448	526513.511	336518.448	Required	
S10	526517.634	336529.388	526517.634	336529.388	Required	
S11	526524.912	336539.922	526524.912	336539.922	Required	
S12	526501.286	336556.301	526501.286	336556.301	Required	
Outfall	526497.922	336558.633			No Entry	

PIPELINE SCHEDULES for Existing

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	375	S1	3.400	1.790	1.235	Open Manhole	2100
1.001	o	375	CRATE	3.475	1.780	1.320	Junction	
1.002	o	375	CRATE OUTFALL	3.700	1.780	1.545	Junction	
1.003	o	375	S2	3.705	1.770	1.560	Open Manhole	1800
1.004	o	375	CRATE	3.800	1.760	1.665	Junction	
1.005	o	375	CRATE OUTFALL	3.805	1.760	1.670	Junction	
1.006	o	375	S3	3.810	1.750	1.685	Open Manhole	2100
1.007	o	375	CRATE	3.805	1.740	1.690	Junction	
1.008	o	375	CRATE OUTFALL	3.700	1.740	1.585	Junction	
1.009	o	375	S4	3.640	1.730	1.535	Open Manhole	1800
1.010	o	375	CRATE	3.400	1.720	1.305	Junction	
1.011	o	375	CRATE OUTFALL	3.300	1.720	1.205	Junction	
2.000	o	375	S5	3.300	1.795	1.130	Open Manhole	2100
2.001	o	375	CRATE	3.300	1.785	1.140	Junction	
2.002	o	375	CRATE OUTFALL	3.300	1.785	1.140	Junction	
2.003	o	375	S6	3.300	1.775	1.150	Open Manhole	2100
2.004	o	375	CRATE	3.300	1.765	1.160	Junction	
2.005	o	375	CRATE OUTFALL	3.300	1.765	1.160	Junction	
2.006	o	375	S7	3.300	1.755	1.170	Open Manhole	2100
1.012	o	375	S8	3.200	1.710	1.115	Open Manhole	2100
1.013	o	375	CRATE	3.100	1.695	1.030	Junction	
1.014	o	375	CRATE OUTFALL	2.900	1.695	0.830	Junction	

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	2.245	224.5	CRATE	3.475	1.780	1.320	Junction	
1.001	14.000	0.0	CRATE OUTFALL	3.700	1.780	1.545	Junction	
1.002	3.061	306.1	S2	3.705	1.770	1.560	Open Manhole	1800
1.003	2.622	262.2	CRATE	3.800	1.760	1.665	Junction	
1.004	6.000	0.0	CRATE OUTFALL	3.805	1.760	1.670	Junction	
1.005	2.648	264.8	S3	3.810	1.750	1.685	Open Manhole	2100
1.006	2.787	278.7	CRATE	3.805	1.740	1.690	Junction	
1.007	9.000	0.0	CRATE OUTFALL	3.700	1.740	1.585	Junction	
1.008	2.870	287.0	S4	3.640	1.730	1.535	Open Manhole	1800
1.009	2.058	205.8	CRATE	3.400	1.720	1.305	Junction	
1.010	6.500	0.0	CRATE OUTFALL	3.300	1.720	1.205	Junction	
1.011	2.486	248.6	S8	3.200	1.710	1.115	Open Manhole	2100
2.000	2.903	290.3	CRATE	3.300	1.785	1.140	Junction	
2.001	22.000	0.0	CRATE OUTFALL	3.300	1.785	1.140	Junction	
2.002	2.460	246.0	S6	3.300	1.775	1.150	Open Manhole	2100
2.003	2.050	205.0	CRATE	3.300	1.765	1.160	Junction	
2.004	6.000	0.0	CRATE OUTFALL	3.300	1.765	1.160	Junction	
2.005	1.748	174.8	S7	3.300	1.755	1.170	Open Manhole	2100
2.006	12.986	288.6	S8	3.200	1.710	1.115	Open Manhole	2100
1.012	3.386	225.7	CRATE	3.100	1.695	1.030	Junction	
1.013	6.500	0.0	CRATE OUTFALL	2.900	1.695	0.830	Junction	
1.014	6.416	256.6	S9	3.100	1.670	1.055	Open Manhole	3000

PIPELINE SCHEDULES for Existing

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.015	o	375	S9	3.100	1.670	1.055	Open Manhole	3000
1.016	o	375	CRATE	3.150	1.660	1.115	Junction	
1.017	o	375	CRATE OUTFALL	3.200	1.660	1.165	Junction	
1.018	o	375	S10	3.250	1.650	1.225	Open Manhole	3000
1.019	o	375	CRATE	3.225	1.640	1.210	Junction	
1.020	o	375	CRATE OUTFALL	3.225	1.640	1.210	Junction	
1.021	o	375	S11	3.200	1.630	1.195	Open Manhole	3000
1.022	o	375	CRATE	3.400	1.610	1.415	Junction	
1.023	o	375	CRATE OUTFALL	3.400	1.610	1.415	Junction	
1.024	o	375	S12	3.000	1.600	1.025	Open Manhole	3000

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.015	2.597	259.7	CRATE	3.150	1.660	1.115	Junction	
1.016	6.500	0.0	CRATE OUTFALL	3.200	1.660	1.165	Junction	
1.017	2.593	259.3	S10	3.250	1.650	1.225	Open Manhole	3000
1.018	2.532	253.2	CRATE	3.225	1.640	1.210	Junction	
1.019	7.000	0.0	CRATE OUTFALL	3.225	1.640	1.210	Junction	
1.020	3.272	327.2	S11	3.200	1.630	1.195	Open Manhole	3000
1.021	2.653#	132.7	CRATE	3.400	1.610	1.415	Junction	
1.022	20.000#	0.0	CRATE OUTFALL	3.400	1.610	1.415	Junction	
1.023	3.096#	309.6	S12	3.000	1.600	1.025	Open Manhole	3000
1.024	4.093	272.9	Outfall	2.700	1.585	0.740	Open Manhole	1200

Area Summary for Existing

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.101	0.101	0.101
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.038	0.038	0.038
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.064	0.064	0.064
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.018	0.018	0.018
1.010	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.000	0.000	0.000
2.000	-	-	100	0.031	0.031	0.031
2.001	-	-	100	0.000	0.000	0.000
2.002	-	-	100	0.000	0.000	0.000
2.003	-	-	100	0.041	0.041	0.041
2.004	-	-	100	0.000	0.000	0.000
2.005	-	-	100	0.000	0.000	0.000
2.006	-	-	100	0.034	0.034	0.034
1.012	-	-	100	0.034	0.034	0.034
1.013	-	-	100	0.000	0.000	0.000
1.014	-	-	100	0.000	0.000	0.000
1.015	-	-	100	0.029	0.029	0.029
1.016	-	-	100	0.000	0.000	0.000
1.017	-	-	100	0.000	0.000	0.000
1.018	-	-	100	0.043	0.043	0.043
1.019	-	-	100	0.000	0.000	0.000
1.020	-	-	100	0.000	0.000	0.000
1.021	-	-	100	0.000	0.000	0.000
1.022	-	-	100	0.000	0.000	0.000
1.023	-	-	100	0.000	0.000	0.000
1.024	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.433	0.433	0.433

Free Flowing Outfall Details for Existing

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.024	Outfall	2.700	1.585	0.000	1200	0

Simulation Criteria for Existing

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	10	Number of Real Time Controls	0

Synthetic Rainfall Details

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	30
Ratio R	0.400		

Online Controls for Existing

Hydro-Brake® Optimum Manhole: S12, DS/PN: 1.024, Volume (m^3): 10.1

Unit Reference	MD-SHE-0053-1500-1400-1500
Design Head (m)	1.400
Design Flow (l/s)	1.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	53
Invert Level (m)	1.600
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	1.5	Kick-Flo®	0.474	0.9
Flush-Flo™	0.233	1.1	Mean Flow over Head Range	-	1.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0	0.800	1.2	2.000	1.8	4.000	2.4	7.000	3.1
0.200	1.1	1.000	1.3	2.200	1.8	4.500	2.6	7.500	3.2
0.300	1.1	1.200	1.4	2.400	1.9	5.000	2.7	8.000	3.3
0.400	1.1	1.400	1.5	2.600	2.0	5.500	2.8	8.500	3.4
0.500	0.9	1.600	1.6	3.000	2.1	6.000	2.9	9.000	3.5
0.600	1.0	1.800	1.7	3.500	2.3	6.500	3.0	9.500	3.6

Storage Structures for Existing

Cellular Storage Manhole: CRATE, DS/PN: 1.001

Invert Level (m) 1.770 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)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	28.0	28.0	0.400	28.0	40.8	0.401	0.0	40.8

Cellular Storage Manhole: CRATE, DS/PN: 1.004

Invert Level (m) 1.750 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)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	12.0	12.0	0.800	12.0	24.8	0.801	0.0	24.8

Cellular Storage Manhole: CRATE, DS/PN: 1.007

Invert Level (m) 1.730 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)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	18.0	18.0	0.800	18.0	35.6	0.801	0.0	35.6

Cellular Storage Manhole: CRATE, DS/PN: 1.010

Invert Level (m) 1.710 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)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	13.0	13.0	0.800	13.0	26.6	0.801	0.0	26.6

Cellular Storage Manhole: CRATE, DS/PN: 2.001

Invert Level (m) 1.765 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)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	88.0	88.0	0.800	88.0	129.6	0.801	0.0	129.6

Cellular Storage Manhole: CRATE, DS/PN: 2.004

Invert Level (m) 1.745 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Cellular Storage Manhole: CRATE, DS/PN: 2.004

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	12.0	12.0	0.800	12.0	24.8	0.801	0.0	24.8

Cellular Storage Manhole: CRATE, DS/PN: 1.013

Invert Level (m) 1.690 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)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	13.0	13.0	0.400	13.0	19.8	0.401	0.0	19.8

Cellular Storage Manhole: CRATE, DS/PN: 1.016

Invert Level (m) 1.660 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)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	39.0	39.0	0.800	39.0	59.0	0.801	0.0	59.0

Cellular Storage Manhole: CRATE, DS/PN: 1.019

Invert Level (m) 1.640 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)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	42.0	42.0	0.800	42.0	62.8	0.801	0.0	62.8

Cellular Storage Manhole: CRATE, DS/PN: 1.022

Invert Level (m) 1.615 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)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	46.0	46.0	0.800	46.0	86.0	0.801	0.0	86.0

A P P E N D I X ‘C’

WELLAND & DEEPING INTERNAL DRAINAGE BOARD CONSULTATION

Garry Dunnett

From: Craig Shinkin <Craig@wellandidb.org.uk>
Sent: 01 July 2022 13:56
To: Garry Dunnett
Subject: FW: 22/48789 Residential Development Asperton Road, Wigtoft, Boston Lincs
Attachments: 2020-208-02B.pdf; IDB MAP.PNG; GREENFIELD RUNOFF RATE.pdf

Good Afternoon Gary,

Thanks for your email and I can advise as follows:

In line with current recommendations, the use of SUDS (Sustainable Urban Drainage Systems) should be considered as a first approach to dealing with surface water run-off. Lincolnshire County Council as Lead Local Flood Authority will have a key input into any SUDS or surface water disposal strategy. I would advise early engagement of discussions with them.
The Board would accept flows at the accepted Greenfield run-off rate of 1.4 litres/second/hectare from the site, subject to completion of the relevant consent application form, agreement of technical details, payment of the application fee as well as the relevant development contribution. (Planning permission should be gained first though). A copy of the Board's Development Levies can be supplied upon request or retrieved from our website.

The receiving private watercourse would need a prior survey to determine whether or not it is fit for purpose to take the additional flows proposed and if not it would need to brought up to standard in advance. It would also need ongoing maintenance to make sure that it remains fit for purpose to convey these additional flows in perpetuity.

I hope this helps but if you need anything further let me know.

Kind regards,

CRAIG SHINKIN
Planning & Enforcement Officer

Welland & Deepings Internal Drainage Board

Deeping House
Welland Terrace
Spalding
PE11 2TD
www.wellandidb.org.uk
Tel: 01775 725861
Fax: 01775 767689

From: Garry Dunnett <garrydunnett@dsagroup.co.uk>
Sent: 23 June 2022 12:36
To: info <info@wellandidb.org.uk>
Subject: 22/48789 Residential Development Asperton Road, Wigtoft, Boston Lincs

Dear Sirs,

We are Consulting Engineers who have been appointed to undertake a drainage strategy for a proposed residential development at the above-mentioned site. The development consists of 20 dwellings, together with associated access road and off-road car parking (see attached plan).

It is proposed to discharge the surface water into the existing ditch located along the northern site boundary, which according to the completed flood risk assessment outfalls into the Welland & Deeping IDB Drain No. 30 Wigtoft Drain (see attached map).

It is proposed to restrict the surface water discharge rate from the development (by means of a flow control device) based on the Qbar Greenfield Runoff rate of 1.5l/s (see attached Greenfield Runoff rate calculations).

Although the development does not discharge the surface water direct into an IDB watercourse, the riparian owned ditch does eventually outfall to an IDB watercourse, and therefore your comments regarding the above (and hopefully approval of the discharge rate) would be much appreciated.

I look forward to your response, and should you have any queries regarding the above, please do not hesitate to contact me.

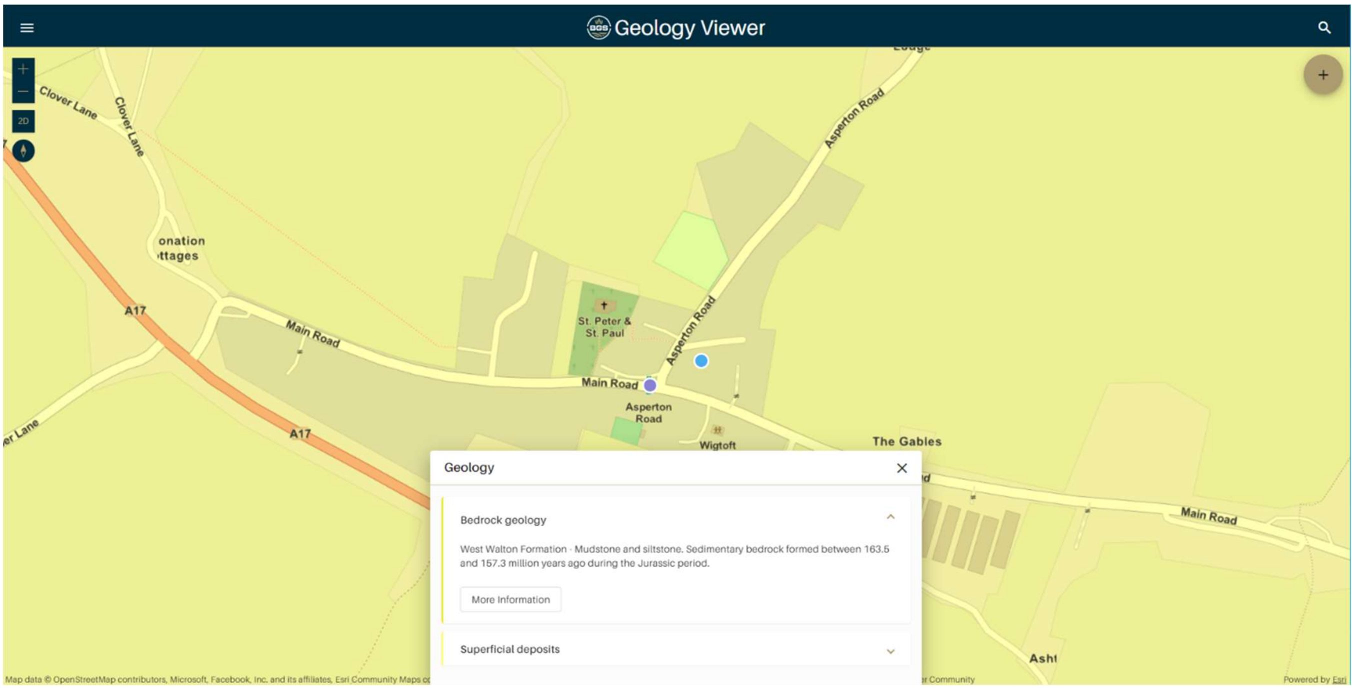
Kind regards,

Garry Dunnett
Mobile 07483 396701

Cirencester	**Northampton**	London	Birmingham
Waterloo House	**8 Duncan Close**	16 Upper Woburn Pl.	Central Boulevard
The Waterloo	**Moulton Park**	Euston	Blyth Valley Bus. Park
Cirencester	**Northampton**	London	Solihull
GL7 2PY	**NN3 6WL**	WC1H 0AF	B90 8AG
01285 657 328	**01604 782 620**	**02037 418 042**	**01564 711 008**

A P P E N D I X 'D'

BRITISH GEOLOGICAL SURVEY ON-LINE MAPPING


Geology Viewer
Clover Lane
Clover Lane
A17
A17
Main Road
Main Road
Asperton Road
Asperton Road
St. Peter &
St. Paul
Asperton
Road
Wigtoft
The Gables
Main Road
Geology
Bedrock geology
West Walton Formation - Mudstone and siltstone. Sedimentary bedrock formed between 163.5 and 157.3 million years ago during the Jurassic period.
More Information
Superficial deposits