

Foul and Surface Water Drainage Strategy Report

Menzies Wood Farm, Okehurst Lane, Billingshurst, West Sussex RH14 9HR

For

Mark Betts

Rev – **P1**

Reference **C3130**

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P	31.07.2024	Initial Issue	LH	CS
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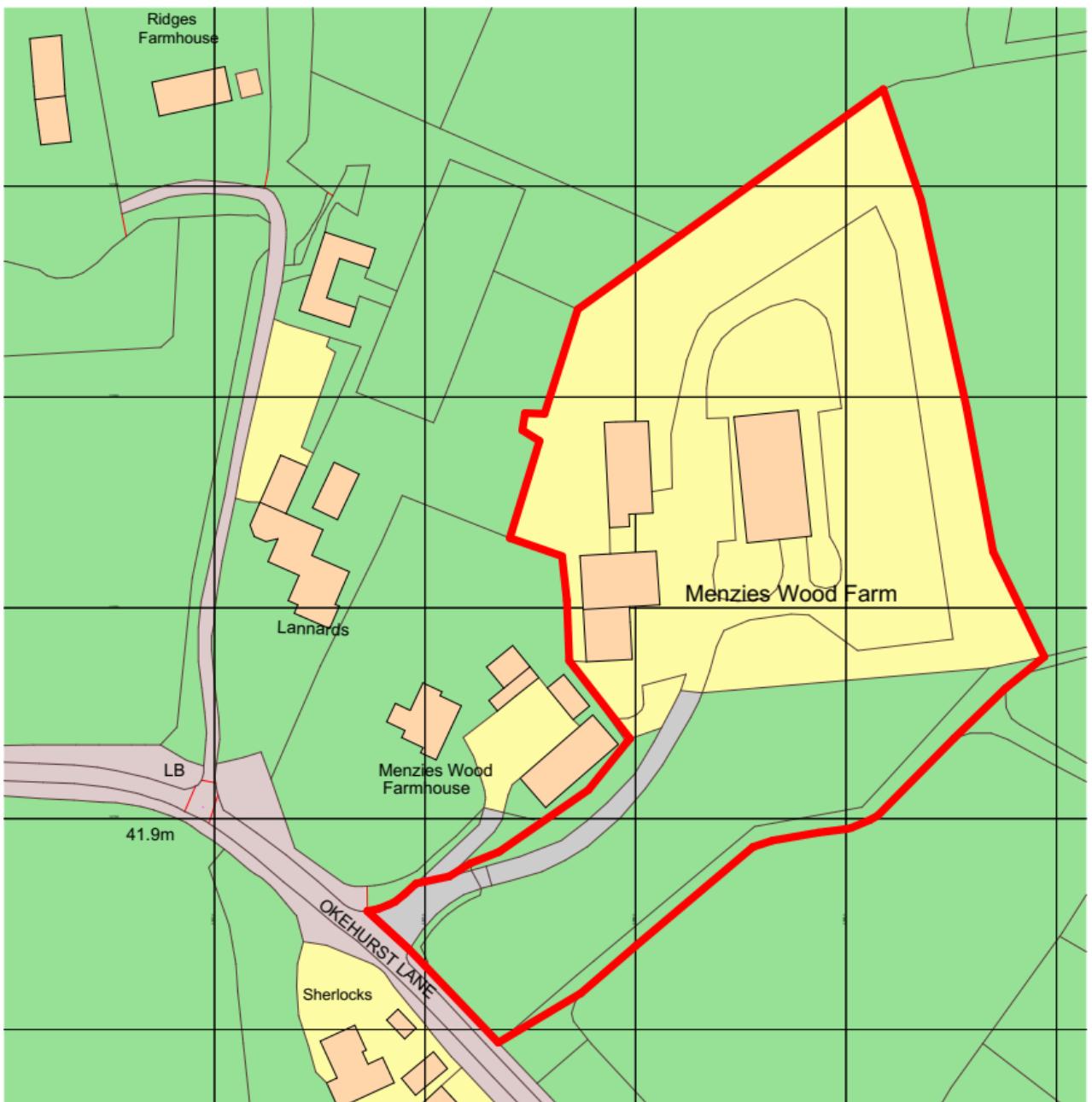
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1 Introduction

1.1.1 CGS Civils Ltd has been appointed to undertake a drainage strategy report for a proposed development at Menzies Wood Farm in Billingshurst.

1.1.2 The purpose of this drainage strategy is to demonstrate how the development area can be satisfactorily drained without increasing flood risk onsite and elsewhere. The proposed development will consist of demolition of an existing barn, office and workshop followed by the erection of a new barn/workshop that is to match size with the existing barn. There is also to be the construction of a new office unit. The external areas are to be reduced following the demolition of the existing buildings on site. The proposed development is located as OS Grid Reference TQ 08841 27827 and has the post code RH14 9HR.

Fig 1. Site Location



2 Executive Summary:

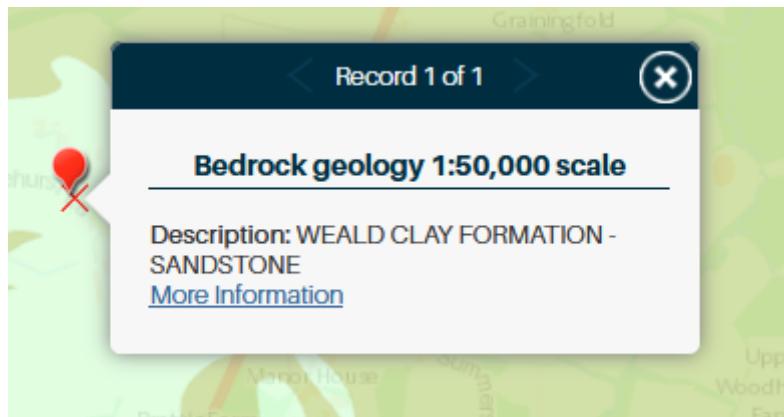
- 2.1.1 The Surface Water will discharge to a culverted watercourse via a connection in an existing drainage network on site. The surface water discharge is to be restricted to 2.0l/s and the network will make use of a geocellular attenuation tank in order to cater for the 1 in 100-year +45% storm.
- 2.1.2 The Foul water is to be treated on site prior to discharging into the culverted watercourse via a new connection into an existing drainage system on site.

3 Site Geology

3.1 British Geological Survey information

- 3.1.1 The British Geological Survey confirms the bedrock geology to be made up Weald Clay Formation. At the time of writing the British Geological Survey website does not have any recorded information of the Superficial deposits on site.

Fig 2. British Geological Survey



3.2 Geological Assessment

- 3.2.1 An infiltration test to BRE365 was carried out on site by CGS Civils Ltd. A trial pit was excavated to a depth of 0.9mbgl and rapidly filled with water. It was recorded that after an hour and 40 minutes, the water level failed to drain and therefore the test was considered a failure.

Fig 3. Soakaway test photographs



4 Existing Drainage

4.1.1 A CCTV Drainage survey was undertaken on site which recorded the existing drainage arrangements on site. This survey confirmed that the foul water is treated on site via a treatment plant prior to discharging to an existing culvert on the adjacent side of Okehurst Lane alongside the surface water runoff. It is noted that the existing drainage has sufficient capacity to cater for the proposed buildings.

5 Proposed Drainage Strategy

5.1 SuDS Hierarchy

5.1.1 All options for the destination of run-off generated on site have been assessed in line with the SuDS hierarchy as set out in Building Regulations Part H document and DEFRA's Draft National Standards for SuDS.

Table 1. SuDS Hierarchy

Discharge Destination	
Rainwater Harvesting	Yes – Rainwater harvesting will be utilised within the proposed office block.
Discharge to Ground	No - Discharge to ground via infiltration is not viable on site.
Discharge to Watercourse	Yes – The surface water will be discharged into the existing drainage network on site which discharges into a culverted watercourse. The discharge rate is to be restricted to 2.0l/s.
Discharge to Surface Water Sewer	N/A due to above
Discharge to Other Sewer	N/A due to above

5.2 Proposed Hydraulic Calculation Specifications:

Table 2. SuDS Hierarchy

Hydraulic Calculations Settings:	
Rainfall Methodology	FEH22
Volumetric Run-off Coefficient Cv	1
CV Winter and Summer	1
Additional Storage (m ³ / ha)	0.0
Flow Control	1.71m Head @ 2l/s discharge
Attenuation Tank Design	Factor of Safety: 2 Porosity: 95% Time to Half Empty (mins): 222

5.3 Surface Water Drainage

- 5.3.1 In order to follow the SuDS hierarchy, an infiltration test to BRE365 was conducted on site which resulted in a failure. It is therefore determined that an alternative means of disposal should be sought. It was recorded during the CCTV drainage survey that the existing drainage network on site discharges into a culverted watercourse on the adjacent side of Okehurst Lane.
- 5.3.2 It is proposed that all surface water runoff from the proposed roof areas is to be discharged into the existing drainage network at a restricted rate of 2.0l/s. The proposed network is to make use of a geocellular attenuation tank in order to cater for the 1 in 100-year +45% storm. The proposed development will only result in the reduction of hard paved areas on site, therefore, it is proposed that the hard paved areas are to drain as per existing.
- 5.3.3 Hydraulic calculations have been carried out which can be found at Appendix C.

5.4 Foul water drainage

- 5.4.1 The foul water is to be treated on site via a new package treatment plant. The treated effluent runoff from the treatment plant is to be discharged into the existing combined water sewer system on site which ultimately discharges into the culverted watercourse. The proposed discharge is to be less than 5m³ a day and therefore does not require EA approval.

6 Summary and Conclusions

- 6.1.1 CGS Civils has been instructed to produce a Drainage statement under National Planning Policy Framework (NPPF) to support the Planning Application for the proposed development which will consist of demolition of an existing barn, office and workshop followed by the erection of a new barn/workshop that is to match size with the existing barn. There is also to be the construction of a new office unit. The external areas are to be reduced following the demolition of the existing buildings on site.
- 6.1.2 The Surface Water will discharge to a culverted watercourse via a connection in an existing drainage network on site. The surface water discharge is to be restricted to 2.0l/s and the network will make use of a geocellular attenuation tank in order to cater for the 1 in 100-year +45% storm.
- 6.1.3 The Foul water is to be treated on site prior to discharging into the culverted watercourse via a new connection into an existing drainage system on site.
- 6.1.4 The report has demonstrated that the proposed drainage measures ensure that suitable means of surface water and foul drainage can be achieved for the proposed development.

7 Appendices

7.1 Appendix A – Site Plan



7.2 **Appendix B – Drainage Layout**



DRAINAGE LEGEND

EXISTING FEATURES

 Ex CWS	Existing combined water sewer/drain and manhole
 Ex SWD	Existing surface water sewer/drain and manhole
	Existing foul/surface water sewer/drain and manhole to be abandoned

PROPOSED FEATURES

 FWD

 SWD

 Storm water inspection chamber (450Ø)

 Storm water manhole (1200Ø)

 Storm water catchpit (1200Ø)

 Storm water vortex flow control chamber

 Foul water inspection chamber (450Ø)

 Foul water manhole (1200Ø)

00.000

100Ø 4.5m 1:100
Z BED Pipe info - diameter, length, gradient,
bedding type

ABBREVIATION

IC	- INSPECTION CHAMBER
AC	- ACCESS CHAMBER
CP	- CATCHPIT
BC	- BRAKE CHAMBER
RE	- RODDING EYE
IL	- INVERT LEVEL
SL	- SUMP LEVEL
RA	- RESTRICTED ACCESS COVER
CL	- COVER LEVEL
TL	- TOP OF CELLULAR SA
BL	- BASE OF CELLULAR SA
FL	- FORMATION LEVEL

A horizontal scale bar with tick marks at 0m, 2m, 4m, 6m, 8m, 10m, and 20m. The segments between 0m and 4m, and between 4m and 20m, are shaded dark gray.

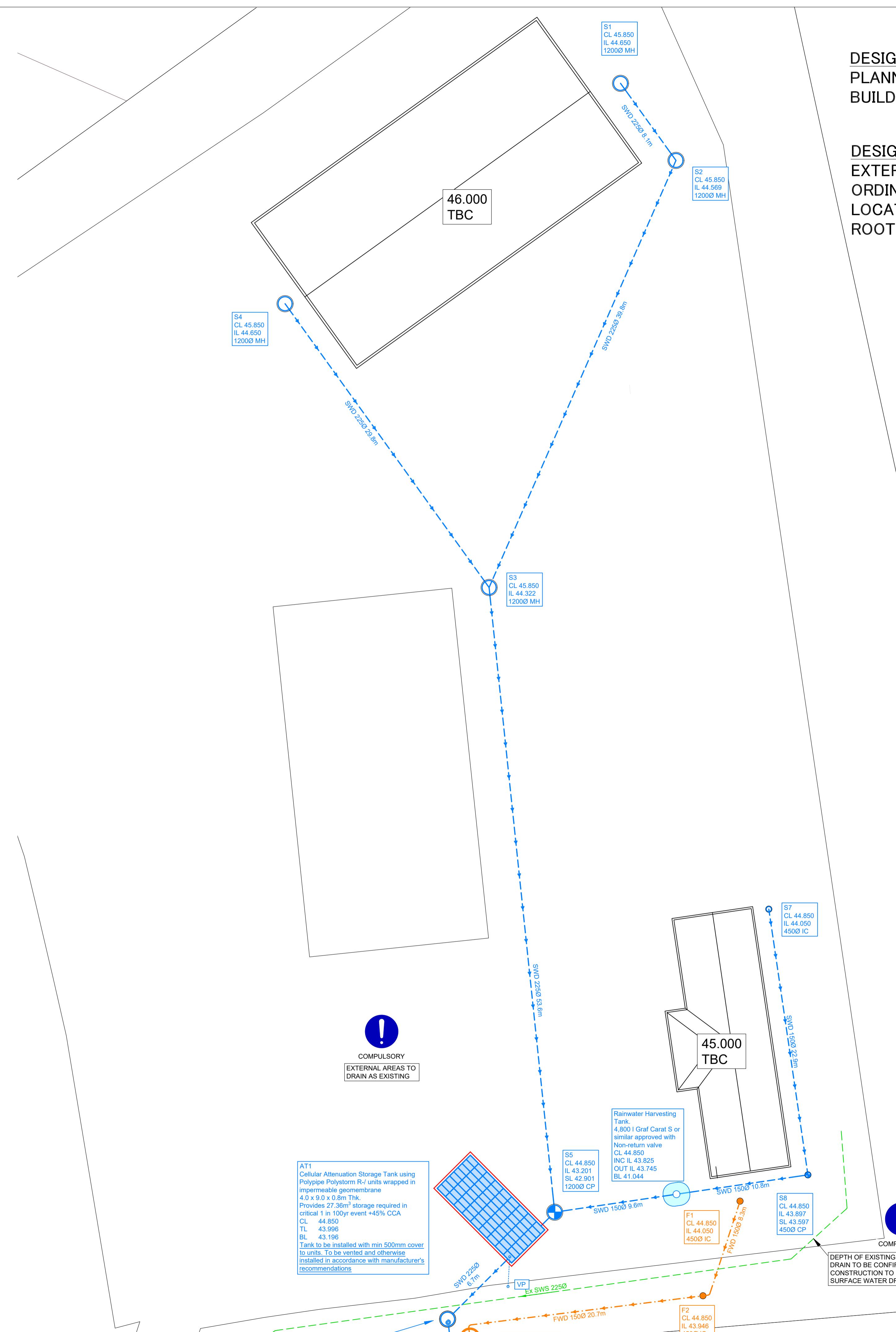
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1. The proposed scheme

barn, office and workshop. Following the demolition, a new barn/workshop and office unit is to be constructed on site. There are also alterations to the external hard paved areas on site.

2. An infiltration test to BRE365 was carried out on site by CGS Civils Ltd. The test consisted of the excavation of a trial pit to a depth of 0.9mbgl followed by the rapid introduction of water. Over the course of an hour and 40 minutes, the water level failed to change and therefore the test was considered a failure.
3. A CCTV drainage survey was conducted on site by Eyes on Drainage Solutions Ltd on behalf of CGS Civils Ltd. The CCTV survey recorded the existing drainage arrangement on site and it is noted that the existing site discharges both surface and foul water into an existing culverted watercourse located on the opposing side of Okehurst Lane.
4. It is proposed that all surface water runoff from roof areas is to be discharged into the existing drainage network on site at a restricted rate of 2.0l/s. The proposed surface water network will make use of a geocellular attenuation tank in order to cater for the 1 in 100-year +45% storm.
5. The foul water is to be treated on site via a new package treatment plant. All treated effluent runoff is to then be discharged into the culverted watercourse via a new connection into the existing drainage network.



**DESIGN SUBJECT TO THE APPROVAL OF:
PLANNING AUTHORITY
BUILDING CONTROL**

DESIGN SUBJECT TO THE CONFIRMATION OF:
EXTERNAL LEVELS DESIGN
ORDINARY WATERCOURSE APPROVAL
LOCATION AND DEPTH OF EXISTING UTILITIES
ROOT PROTECTION AREAS

NDARD DRAINAGE NOTES

DO NOT SCALE FROM THIS DRAWING, REFER TO FIGURED DIMENSIONS ONLY. THE CONTRACTOR SHOULD CHECK ALL DIMENSIONS ON SITE.

ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.

THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECT AND ENGINEERING DETAILS, DRAWINGS AND SPECIFICATIONS.

ANY DISCREPANCIES SHOULD BE REPORTED TO THE ARCHITECT AND/OR ENGINEER IMMEDIATELY, SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.

BEFORE COMMENCING CONSTRUCTION THE CONTRACTOR MUST CHECK THE INVERT LEVELS OF EXISTING SEWERS TO WHICH CONNECTIONS ARE MADE. IN ADDITION THE CONTRACTOR MUST LOCATE AND DETERMINE INVERT LEVELS OF THE EXISTING SPURS TO WHICH CONNECTIONS ARE PROPOSED. ANY DISCREPANCIES ARE TO BE NOTIFIED TO THE ENGINEER IMMEDIATELY, PRIOR TO CONSTRUCTION.

ALL DRAINAGE WORKS SHOULD COMMENCE AT THE PROPOSED DOWNSTREAM CONNECTION POINT, THE WORKS CONTINUING UPSTREAM FOLLOWING CONFIRMATION OF THE TIE-IN INVERT LEVELS TO THE ENGINEER. CONNECTIONS TO MANHOLES OR LARGER SIZED PIPES ETC. SHOULD BE SOFFIT TO SOFFIT UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER, IF THIS IS NOT POSSIBLE INFORM THE ENGINEER IMMEDIATELY.

COVER LEVELS SHOWN ARE APPROXIMATE. COVERS AND FRAMES SHALL BE SET TO FINISHED GROUND LEVELS AND FALLS.

ALL UN-REFERENCED PIPES ARE TO BE 100mm DIA

ALL PIPES TO BE ADOPTED, OR CONNECTING TO ADOPTED SEWERS, TO BE VITRIFIED CLAY TO BS EN 295 AND BS65 (SWS ONLY), OR CONCRETE PIPES TO BE EN 1916 AND BS5911:PART 1.

ROAD GULLY OUTLET PIPES ARE TO BE 150mm DIA. WITH CONCRETE SURROUND AND FLEXIBLE JOINTS. ALL GULLIES SHALL BE FITTED WITH GRADE D400 GRATINGS AND FRAMES TO BS EN124, UNLESS OTHERWISE STATED.

ALL ADOPTABLE SEWERS SHALL BE CONSTRUCTED TO THE STANDARDS AND SPECIFICATION LAID DOWN IN 'SEWERS FOR ADOPTION' 6th EDITION, WITH A VIEW TO ADOPTION UPON COMPLETION OF WORKS.

ALL PRIVATE DRAINAGE TO BE IN ACCORDANCE WITH THE BUILDING REGULATIONS APPROVED DOCUMENT PART-H, AND TO THE SATISFACTION OF THE BUILDING CONTROL INSPECTOR.

THE CONTRACTOR IS TO KEEP A RECORD OF ANY VARIATIONS MADE ON SITE, INCLUDING THE RELOCATION OF SEWERS OR DRAINS, SO THAT AN AS CONSTRUCTED DRAWING CAN BE PREPARED UPON COMPLETION OF THE PROJECT.

STUB CONNECTIONS TO ADOPTABLE MANHOLES SHALL BE MADE FROM VITRIFIED CLAY AND CONSIST OF TWO ROCKER PIPES LAID AT THE SAME GRADIENT AS THE UP OR DOWNSTREAM PIPE.

IF ANY SUB SOIL DRAINAGE SYSTEMS ARE UNCOVERED DURING THE WORKS CONTACT THE ENGINEER FOR INSTRUCTIONS. SUB SOIL DRAINS ARE TO BE DIVERTED AROUND NEW WORKS AND CONNECTED INTO THE SURFACE WATER.

NO PRIVATE AREAS ARE TO DRAIN ONTO ADOPTABLE AREAS AND VICE VERSA.

ALL EXISTING MANHOLE COVER'S, GULLIES, ETC, ARE TO BE RAISED/LOWERED TO SUIT NEW LEVELS.

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CONFIRM THE LOCATION AND DEPTH OF ALL EXISTING SERVICES AND UTILITIES THAT MAY BE PRESENT

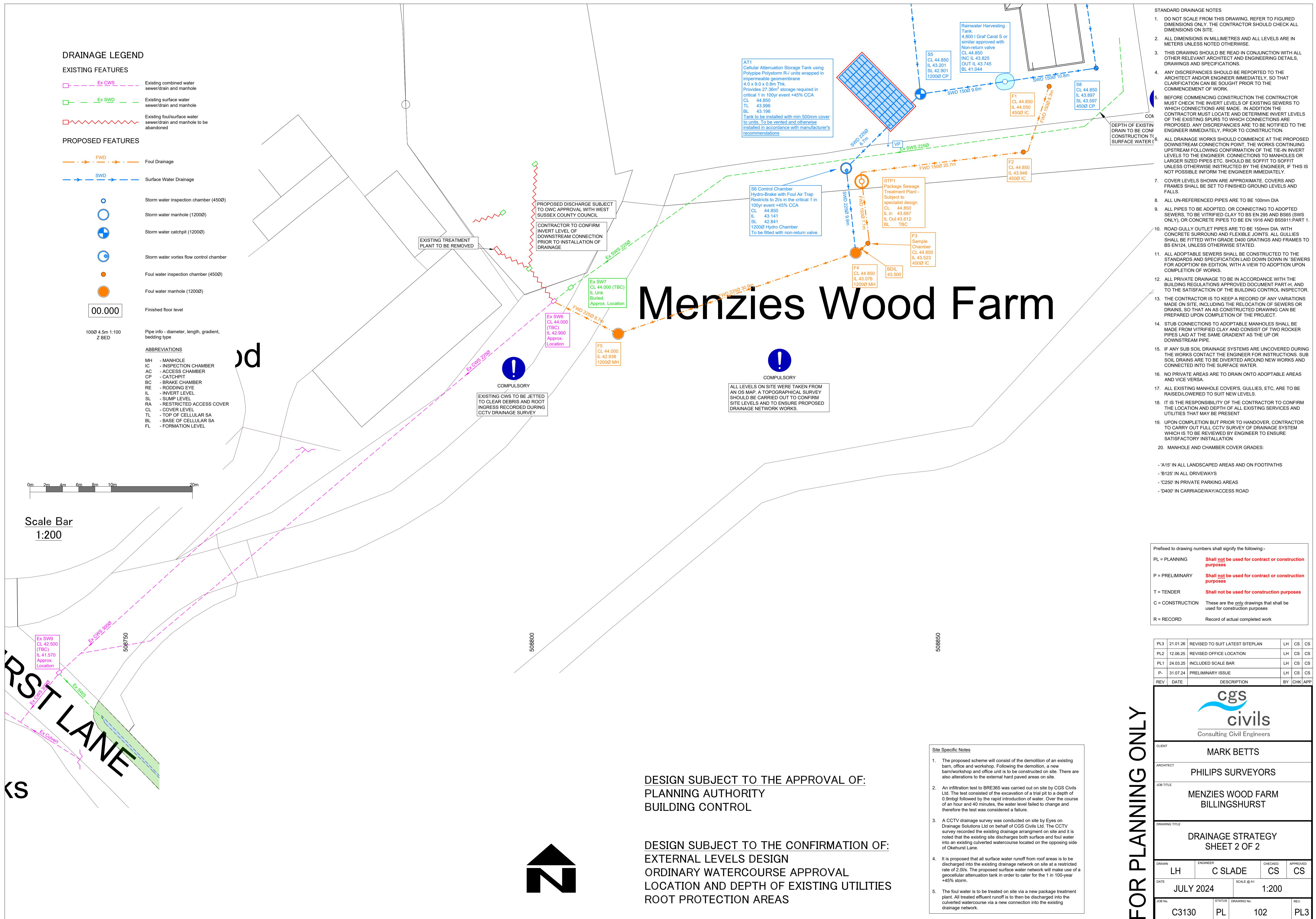
UPON COMPLETION BUT PRIOR TO HANDOVER, CONTRACTOR TO CARRY OUT FULL CCTV SURVEY OF DRAINAGE SYSTEM WHICH IS TO BE REVIEWED BY ENGINEER TO ENSURE SATISFACTORY INSTALLATION

fixed to drawing numbers shall signify the following:-	
= PLANNING	Shall <u>not</u> be used for contract or construction purposes
PRELIMINARY	Shall <u>not</u> be used for contract or construction purposes
TENDER	Shall <u>not</u> be used for construction purposes
CONSTRUCTION	These are the <u>only</u> drawings that shall be used for construction purposes
RECORD	Record of actual completed work

DATE	DESCRIPTION	BY	CHK	APP
21.01.26	REVISED TO SUIT LATEST SITEPLAN	LH	CS	CS
12.06.25	REVISED OFFICE LOCATION	LH	CS	CS
24.03.25	INCLUDED SCALE BAR	LH	CS	CS
31.07.24	PRELIMINARY ISSUE	LH	CS	CS

The logo for CGS Civils Consulting Civil Engineers. It features the letters 'cgs' in a bold, dark grey sans-serif font, with a stylized blue wavy line underneath. Below this, the word 'civils' is written in a large, bold, dark grey sans-serif font. A horizontal line separates the logo from the company name 'Consulting Civil Engineers' in a smaller, dark grey sans-serif font.

FOR PLANNING ONLY



7.3 Appendix C – Surface Water Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	0.350
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	75.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.015	5.00	45.850	1200	3221.588	317.677	1.200
S2	0.015	5.00	45.850	1200	3226.321	311.097	1.281
S3	0.016	5.00	45.850	1200	3210.360	274.637	1.528
S4		5.00	45.850	1200	3192.932	298.864	1.200
S5	0.016	5.00	44.850	1200	3215.966	221.307	1.649
S6			44.850	1200	3206.815	201.991	1.709
F3			44.700	1200	3197.250	198.106	1.612

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	8.105	0.600	44.650	44.569	0.081	100.1	225	5.10	58.2
1.001	S2	S3	39.801	0.600	44.569	44.322	0.247	161.1	225	5.75	55.7
1.002	S3	S5	53.624	0.600	44.322	43.201	1.121	47.8	225	6.22	54.0
1.003	S4	S3	29.844	0.600	44.650	44.322	0.328	91.0	225	5.36	57.2
1.004	S5	S6	21.374	0.600	43.201	43.141	0.060	356.2	225	6.74	52.0
3.000	S6	F3	10.324	0.600	43.141	43.088	0.053	194.8	225	6.92	51.4

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.307	52.0	3.2	0.975	1.056	0.015	0.0	37	0.725
1.001	1.027	40.8	6.0	1.056	1.303	0.030	0.0	58	0.741
1.002	1.896	75.4	9.0	1.303	1.424	0.046	0.0	52	1.287
1.003	1.371	54.5	0.0	0.975	1.303	0.000	0.0	0	0.000
1.004	0.687	27.3	11.7	1.424	1.484	0.062	0.0	102	0.660
3.000	0.933	37.1	11.5	1.484	1.387	0.062	0.0	86	0.824

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	8.105	100.1	225	Circular	45.850	44.650	0.975	45.850	44.569	1.056
1.001	39.801	161.1	225	Circular	45.850	44.569	1.056	45.850	44.322	1.303
1.002	53.624	47.8	225	Circular	45.850	44.322	1.303	44.850	43.201	1.424
1.003	29.844	91.0	225	Circular	45.850	44.650	0.975	45.850	44.322	1.303
1.004	21.374	356.2	225	Circular	44.850	43.201	1.424	44.850	43.141	1.484
3.000	10.324	194.8	225	Circular	44.850	43.141	1.484	44.700	43.088	1.387

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	1200	Manhole	Adoptable	S2	1200	Manhole	Adoptable
1.001	S2	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.002	S3	1200	Manhole	Adoptable	S5	1200	Manhole	Adoptable
1.003	S4	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.004	S5	1200	Manhole	Adoptable	S6	1200	Manhole	Adoptable
3.000	S6	1200	Manhole	Adoptable	F3	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S1	3221.588	317.677	45.850	1.200	1200		0	1.000	44.650	225
S2	3226.321	311.097	45.850	1.281	1200		1	1.000	44.569	225
S3	3210.360	274.637	45.850	1.528	1200		1	1.003	44.322	225
						2	1.001	44.322	225	
						0	1.002	44.322	225	
S4	3192.932	298.864	45.850	1.200	1200		0	1.003	44.650	225
S5	3215.966	221.307	44.850	1.649	1200		1	1.002	43.201	225
						0	1.004	43.201	225	
S6	3206.815	201.991	44.850	1.709	1200		1	1.004	43.141	225
						0	3.000	43.141	225	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
F3	3197.250	198.106	44.700	1.612	1200	1	3.000	43.088	225


Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s) x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume x
Winter CV	1.000	Additional Storage (m³/ha)	20.0	

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
10	0	0	0
30	0	0	0
100	45	0	0

Node S6 Online Hydro-Brake® Control

Flap Valve	✓	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	43.141	Product Number	CTL-SHE-0059-2000-1709-2000
Design Depth (m)	1.709	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node S5 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	43.250
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	36.0	0.0	0.800	36.0	0.0	0.801	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node	Flood Vol (m³)	Status
15 minute summer	S1	10	44.679	0.029	1.9	0.0402	0.0000	OK
15 minute summer	S2	11	44.616	0.047	3.8	0.0640	0.0000	OK
15 minute summer	S3	11	44.363	0.041	5.6	0.0549	0.0000	OK
15 minute summer	S4	1	44.650	0.000	0.0	0.0000	0.0000	OK
180 minute summer	S5	116	43.301	0.100	3.4	1.8949	0.0000	OK
180 minute summer	S6	116	43.301	0.160	1.7	0.1807	0.0000	OK
15 minute summer	F3	1	43.088	0.000	1.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	1.9	0.426	0.036	0.0361	
15 minute summer	S2	1.001	S3	3.7	0.687	0.091	0.2168	
15 minute summer	S3	1.002	S5	5.5	0.824	0.073	0.4380	
15 minute summer	S4	1.003	S3	0.0	0.000	0.000	0.0735	
180 minute summer	S5	1.004	S6	1.7	0.225	0.062	0.5044	
180 minute summer	S6	Hydro-Brake®	F3	1.4				10.2

Results for 10 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	44.701	0.051	5.9	0.0700	0.0000	OK
15 minute summer	S2	10	44.653	0.084	11.7	0.1150	0.0000	OK
15 minute summer	S3	11	44.396	0.074	17.6	0.0986	0.0000	OK
15 minute summer	S4	1	44.650	0.000	0.0	0.0000	0.0000	OK
120 minute summer	S5	100	43.539	0.338	11.0	10.3630	0.0000	SURCHARGED
120 minute summer	S6	100	43.539	0.398	1.9	0.4504	0.0000	SURCHARGED
15 minute summer	F3	1	43.088	0.000	1.4	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	5.8	0.584	0.112	0.0820	
15 minute summer	S2	1.001	S3	11.6	0.939	0.283	0.4919	
15 minute summer	S3	1.002	S5	17.6	1.169	0.234	1.2146	
15 minute summer	S4	1.003	S3	0.0	0.000	0.000	0.1682	
120 minute summer	S5	1.004	S6	1.9	0.290	0.071	0.8501	
120 minute summer	S6	Hydro-Brake®	F3	1.4				22.0

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.83%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	44.708	0.058	7.6	0.0805	0.0000	OK
15 minute summer	S2	10	44.666	0.097	15.1	0.1328	0.0000	OK
15 minute summer	S3	11	44.407	0.085	23.1	0.1134	0.0000	OK
15 minute summer	S4	1	44.650	0.000	0.0	0.0000	0.0000	OK
120 minute winter	S5	118	43.699	0.498	9.8	16.0449	0.0000	SURCHARGED
120 minute winter	S6	120	43.699	0.558	1.8	0.6313	0.0000	SURCHARGED
15 minute summer	F3	1	43.088	0.000	1.4	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	7.5	0.620	0.145	0.0995	
15 minute summer	S2	1.001	S3	15.0	1.005	0.366	0.5952	
15 minute summer	S3	1.002	S5	22.9	1.246	0.304	1.3910	
15 minute summer	S4	1.003	S3	0.0	0.000	0.000	0.2034	
120 minute winter	S5	1.004	S6	1.8	0.294	0.067	0.8501	
120 minute winter	S6	Hydro-Brake®	F3	1.4				27.9

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 98.63%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	44.736	0.086	14.0	0.1191	0.0000	OK
180 minute winter	S2	172	44.725	0.156	6.2	0.2128	0.0000	OK
180 minute winter	S3	172	44.725	0.403	9.6	0.5402	0.0000	SURCHARGED
180 minute winter	S4	172	44.725	0.075	0.7	0.0849	0.0000	OK
180 minute winter	S5	172	44.724	1.523	13.0	29.4128	0.0000	FLOOD RISK
180 minute winter	S6	172	44.724	1.583	2.8	1.7904	0.0000	FLOOD RISK
15 minute summer	F3	1	43.088	0.000	1.4	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	13.9	0.692	0.267	0.1623	
180 minute winter	S2	1.001	S3	6.2	0.781	0.152	1.3755	
180 minute winter	S3	1.002	S5	9.6	0.450	0.127	2.1327	
180 minute winter	S4	1.003	S3	-0.7	-0.027	-0.013	0.7664	
180 minute winter	S5	1.004	S6	2.8	0.275	0.104	0.8501	
180 minute winter	S6	Hydro-Brake®	F3	1.9				37.0

Node Name		S1	S2	S3	S5	S6	F3
A4 drawing							
Hor Scale 1500							
Ver Scale 100							
Datum (m) 39.000							
Link Name		1.00	1.001	1.002	1.004	3.00	
Section Type		225	225mm	225mm	225mm	225m	
Slope (1:X)		100	161.1	47.8	356.2	194.8	
Cover Level (m)		45.850	45.850	45.850	44.850	44.850	44.700
Invert Level (m)		44.569	44.569	44.322	43.201	43.141	43.088
Length (m)		8.10	39.801	53.624	21.374	10.37	

Node Name		S4	S3
A4 drawing			
Hor Scale 1500			
Ver Scale 100			
Datum (m) 39.000			
Link Name		1.003	
Section Type		225mm	
Slope (1:X)		91.0	
Cover Level (m)		45.850	45.850
Invert Level (m)		44.650	44.322
Length (m)		29.844	