

This cover note is provided on behalf of Ventry Construction Ltd. to amend the approved drainage strategy and seek approval from the LLFA. We refer the LLFA officer to document '24-011-I&L Response to LLFA Consultation (2)' dated April 9th 2025, submitted during planning consultation ruling out infiltration based on a 1m unsaturated zone not being achieved. The strategy has since been amended to lift the base of tank to achieve a 1m unsaturated zone beneath. The proposal is to now discharge surface water runoff via infiltration.

The amended strategy drawing has been included as Appendix A with supporting calculations included as Appendix B.

- The worst case recorded infiltration rate has been used.
- ½ drain time meets with current guidance
- A groundwater level of 16.01m AOD has been used. This is based on the highest recorded level taken during the wet season stated in the latest TRC site investigation report. Further detail has been provided in our previous response stated above.
- The drainage network has been amended to lift the base of the proposed soakaway to 17.01m AOD, thereby achieving a 1m unsaturated zone between base of tank and groundwater level.
- A water quality assessment has been included as Appendix C.
- A revised maintenance report has been included as Appendix D.

Should the officer wish to discuss anything please use the contact details provided below.

Ismail Laher



24-011-CAN Downley Road, HAVANT

APP/24/00606 I&L proposal to amend drainage strategy (1)



APPENDIX A

DRAINAGE

- REFER TO CIVIL AND STRUCTURAL SPECIFICATION REPORT - PART R.
- CONTRACTOR SHOULD ENSURE THE LOCAL PLANNING AUTHORITY HAVE APPROVED THE DRAINAGE PROPOSALS PRIOR TO ORDERING MATERIAL OR INSTALLATION.

HYDRAULIC DESIGN:

- THE SURFACE WATER NETWORK, FLOW CONTROL AND ATTENUATION HAS BEEN DESIGNED USING DRAINAGE SOFTWARE WITH FSR RAINFALL DATA.

STRATEGY:

- NEW DEVELOPMENT SHALL BE DISCHARGED INTO SOAKAWAY.
- TOTAL ATTENUATION FOR 100YR+45% CLIMATE CHANGE BELOW GROUND = 964m³.

FINAL DRAINAGE CONNECTIONS:

- WHERE THIRD PARTY APPROVAL IS REQUIRED THESE ARE NOTED AGAINST EACH DISCHARGE POINT ON THE DRAWING.
- NO CONNECTION OR DISCHARGE SHOULD BE MADE UNTIL APPROVAL HAS BEEN RECEIVED. CHECK STATUS OF APPLICATION WITH ENGINEER.
- CONTRACTOR SHOULD INVESTIGATE AND INSTALL FINAL DRAINAGE CONNECTIONS PRIOR TO INSTALLING ANY UPSTREAM DRAINAGE TO AVOID POTENTIAL LEVEL ISSUES.
- EVERY EFFORT HAS BEEN MADE TO PROVIDE ACCURATE INFORMATION. HOWEVER, THE CONTRACTOR IS ADVISED TO CHECK ACTUAL CONDITIONS, I.E. THE LOCATION, ACCESSIBILITY, UNDERGROUND ROUTE, LEVELS, SIZES, CONDITION OF EXISTING SEWERS TO BE RE-USED AND/OR CONNECTED INTO.

GENERALLY:

- DO NOT SCALE FROM THIS DRAWING. WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED.
- REPORT CONFLICTS TO ENGINEER IMMEDIATELY.
- EVERY EFFORT HAS BEEN MADE TO ASCERTAIN TYPE, LOCATION AND DEPTH OF BURIED SERVICES AND/OR OBSTRUCTIONS. HOWEVER, THE CONTRACTOR IS ADVISED TO CARRY OUT OWN INVESTIGATIONS TO ENSURE THERE ARE NO CLASHES WITH THE PROPOSED WORKS.
- CONTRACTOR IS RESPONSIBLE FOR PROTECTING RETAINED SERVICES AND MAKING CONTACT WITH OWNERS OF APPARATUS TO OBTAIN NECESSARY CONSENT FOR EXCAVATION, PROTECTION AND/OR DIVERTING.
- BURIED OBSTRUCTIONS ENCOUNTERED DURING EXCAVATION THAT CONFLICT WITH PROPOSED WORKS SHOULD BE BROKEN OUT AND REMOVED. RESIDUAL VOIDS TO BE BACKFILLED AND COMPACTED AS PER SPECIFICATION.

NEW DRAINAGE:

- INTERNAL FOUL POINTS ARE LOCATED AND SET OUT BY THE ARCHITECT.
- TRADITIONAL RAINWATER DOWNPIPES ARE PROVIDED BY THE CLADDING CONTRACTOR AND COORDINATED WITH THE ARCHITECT.
- DESIGN ASSUMES THAT ALL WORKS ARE NOT TO BE ADOPTED.
- GRADIENTS OF PIPES ARE AVERAGED. PIPE CONNECTIONS SHOULD BE INSTALLED TO THE STATED INVERT LEVELS.
- COVER LEVELS OF THE MANHOLES ARE AVERAGED. COVER AND FRAME SHOULD BE SET TO SUIT FINISHED GROUND LEVELS.
- ALL PIPEWORK WITHIN MANHOLES ARE TO BE LAID SOFFIT TO SOFFIT (U.N.O.) INCLUDING BACKDROP PIPEWORK, WHERE THE ROODING ACCESS LEVEL IS SPECIFIED.
- FLAT LATERAL CONNECTION TO BE 135° "J" JUNCTIONS (IE 45° OBLIQUE JUNCTIONS) RELATIVE TO MAIN RUN. TO BE USED ON FOUL OR SURFACE WATER RUNS. 90° OR 87½° SQUARE JUNCTIONS SUITABLE FOR SURFACE WATER CONNECTIONS ONLY.
- SADDLE CONNECTIONS TO LARGER PIPES SHOULD BE MADE SO THAT THE INVERT LEVEL OF THE SMALLER PIPE DOES NOT ADJOIN BELOW MID HEIGHT OF THE LARGER PIPE.
- PIPES CROSSING WITHIN 200MM OF EACH OTHER ARE TO BE ISOLATED BY CONCRETE FOR A MINIMUM DISTANCE OF 1M BEYOND CROSSING POINT IN ALL DIRECTIONS.
- A CCTV DRAINAGE SURVEY TO BE CARRIED OUT ON COMPLETION TO PROVE THE INTEGRITY OF THE AS-BUILT DRAINAGE SYSTEMS.

ANCILLARY ITEMS:

- WHERE PROPOSED CONTRACTOR MUST PROVIDE PROPOSALS FOR SUPPLY OF LINEAR DRAINAGE CHANNELS, KERB DRAINS, INTERCEPTORS, ATTENUATION, PUMPS, HYDROBRAKE, FILTER UNITS.
- WHERE PROPOSED ALLOWANCE SHOULD BE MADE FOR POWER SUPPLY TO INTERCEPTORS AND PUMPS AND FOR INSTALLING CONTROL PANELS.

LEGEND

	EXISTING PUBLIC FOUL WATER PIPE
	EXISTING PRIVATE FOUL WATER PIPE
	NEW FOUL WATER PIPE
	NEW FOUL WATER INSPECTION CHAMBER
	NEW FOUL WATER MANHOLE
	EXISTING PUBLIC STORM WATER PIPE
	EXISTING PRIVATE STORM WATER PIPE
	NEW STORM WATER PIPE
	NEW STORM WATER INSPECTION CHAMBER
	NEW STORM WATER MANHOLE
	NEW STORM WATER CATCHPIT MANHOLE
	NEW STORM WATER VENTED MANHOLE
	SYDPHONIC DOWN PIPE
	PETROL INTERCEPTOR
	GULLY
	LINEAR DRAINAGE CHANNEL (ACCESS BOX/ OUTLET BOX)
	KERB DRAIN
	SOAKAWAY
	SITE BOUNDARY
	CONCRETE ENCASUREMENT

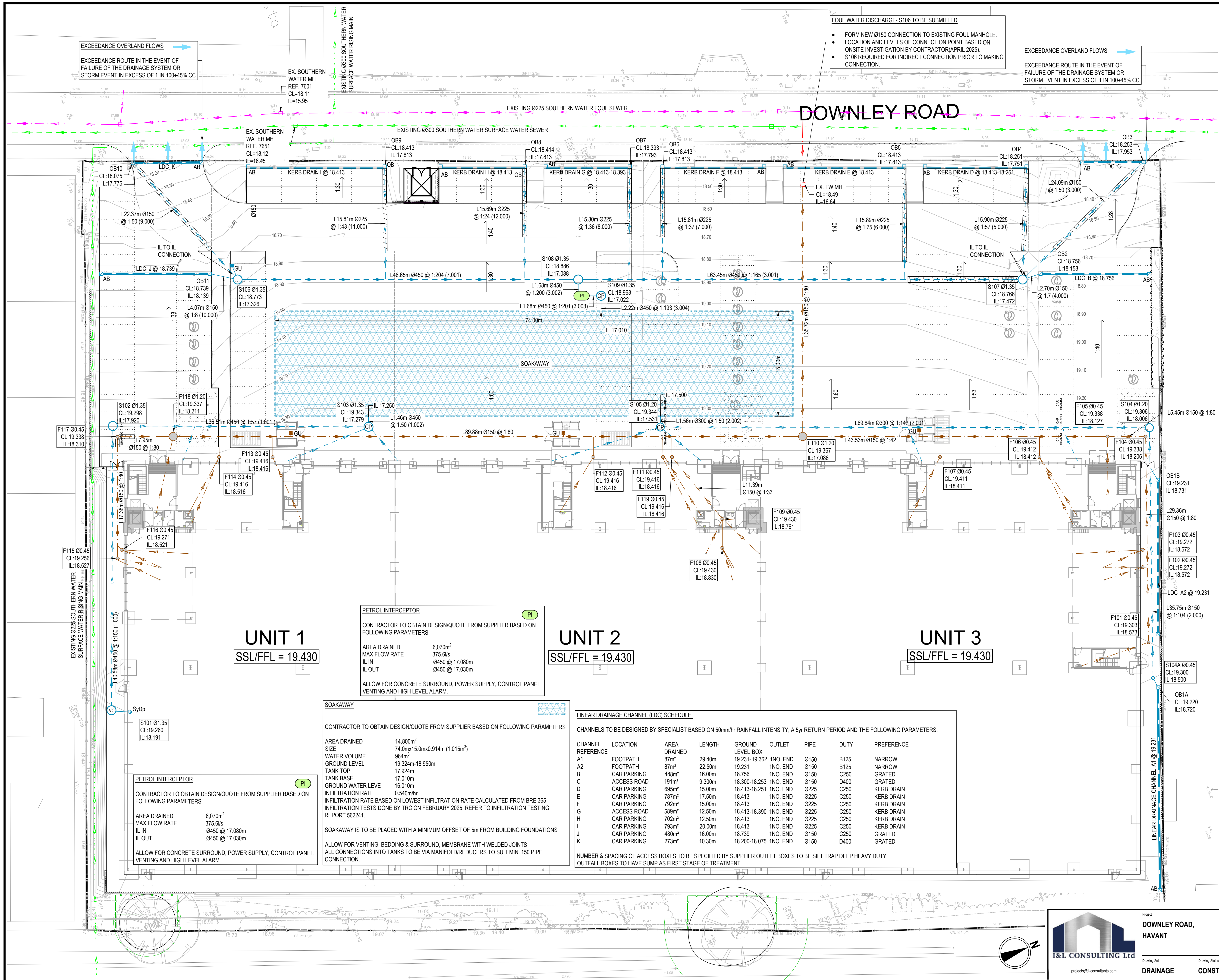
Rev.	Date	Description	Technician	Reviewer
P5	23.05.25	REVISED WITH SOAKAWAY	SH	IL
P4	05.05.25	DOWNSTREAM DEFENDER ADDED	SH	IL
P3	09.04.25	ISSUED FOR PLANNING	MS	IL
P2	12.03.25	REVISED WITH INFILTRATION TEST	RM	IL
P1	03.06.24	PRELIMINARY ISSUE	SH	IL



Project
**DOWNLEY ROAD,
HAVANT**

DRAINAGE PLANNING STRATEGY

Drawing Set	Drawing Status	Scale	Project Number	Drawing Number	Revision
DRAINAGE	CONSTRUCTION	1:250 @ A1 1:500 @ A3	24-011-I&L	D00	P5



24-011-CAN Downley Road, HAVANT

APP/24/00606 I&L proposal to amend drainage strategy (1)



APPENDIX B

**Nodes**

Name	Area (ha)	Cover Level (m)	Node Type	Diameter (mm)	Width (mm)	Depth (m)
S104A	0.018	19.300	Manhole	450		0.800
S104	0.080	19.306	Manhole	1200		1.300
S105	0.079	19.344	Manhole	1200		1.804
OB3	0.019	18.251	Manhole	500	500	0.298
OB4	0.069	18.251	Manhole	500	500	0.400
OB5	0.079	18.413	Manhole	500	500	0.600
OB6	0.079	18.413	Manhole	500	500	0.600
OB2	0.049	18.756	Manhole	500	500	0.599
S107		18.766	Manhole	1350		1.294
OB10	0.027	18.075	Manhole	500	500	0.300
OB8	0.070	18.414	Manhole	500	500	0.601
OB9	0.079	18.413	Manhole	500	500	0.600
OB11	0.048	18.739	Manhole	500	500	0.601
S106	0.027	18.773	Manhole	1350		1.447
OB7	0.059	18.393	Manhole	500	500	0.600
S108		18.782	Manhole	1350		1.694
PI		18.968	Junction			1.938
S109		19.040	Manhole	1350		2.018
S101	0.613	19.260	Manhole	1350		1.069
S102	0.042	19.298	Manhole	1350		1.378
S103	0.043	19.343	Manhole	1350		2.064
TANK		18.950	Junction			1.940
Dummy		18.950	Manhole	1200		1.970

**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)
2.000	35.745	103.9	150	Circular	19.300	18.500	0.650	19.306	18.156	1.000
2.001	69.839	149.9	300	Circular	19.306	18.006	1.000	19.344	17.540	1.504
2.002	3.130	78.3	300	Circular	19.344	17.540	1.504	18.950	17.500	1.150
3.000	24.088	50.1	150	Circular	18.251	17.953	0.148	18.766	17.472	1.144
5.000	15.898	41.9	225	Circular	18.251	17.851	0.175	18.766	17.472	1.069
6.000	15.893	165.6	225	Circular	18.413	17.813	0.375	18.766	17.717	0.824
7.000	15.811	164.7	225	Circular	18.413	17.813	0.375	18.766	17.717	0.824
4.000	2.701	7.4	150	Circular	18.756	18.157	0.449	18.766	17.791	0.825
3.001	63.452	165.2	450	Circular	18.766	17.472	0.844	18.782	17.088	1.244
9.000	22.372	49.8	150	Circular	18.075	17.775	0.150	18.773	17.326	1.297
12.000	15.692	59.9	225	Circular	18.414	17.813	0.376	18.773	17.551	0.997
11.000	15.119	57.7	225	Circular	18.413	17.813	0.375	18.773	17.551	0.997
10.000	4.066	7.9	150	Circular	18.739	18.138	0.451	18.773	17.625	0.998
7.001	48.650	204.4	450	Circular	18.773	17.326	0.997	18.782	17.088	1.244
8.000	15.803	25.1	225	Circular	18.393	17.793	0.375	18.782	17.163	1.394

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.000	S104A	450		Manhole	Adoptable	S104	1200	Manhole	Adoptable
2.001	S104	1200		Manhole	Adoptable	S105	1200	Manhole	Adoptable
2.002	S105	1200		Manhole	Adoptable	TANK		Junction	
3.000	OB3	500	500	Manhole	Adoptable	S107	1350	Manhole	Adoptable
5.000	OB4	500	500	Manhole	Adoptable	S107	1350	Manhole	Adoptable
6.000	OB5	500	500	Manhole	Adoptable	S107	1350	Manhole	Adoptable
7.000	OB6	500	500	Manhole	Adoptable	S107	1350	Manhole	Adoptable
4.000	OB2	500	500	Manhole	Adoptable	S107	1350	Manhole	Adoptable
3.001	S107	1350		Manhole	Adoptable	S108	1350	Manhole	Adoptable
9.000	OB10	500	500	Manhole	Adoptable	S106	1350	Manhole	Adoptable
12.000	OB8	500	500	Manhole	Adoptable	S106	1350	Manhole	Adoptable
11.000	OB9	500	500	Manhole	Adoptable	S106	1350	Manhole	Adoptable
10.000	OB11	500	500	Manhole	Adoptable	S106	1350	Manhole	Adoptable
7.001	S106	1350		Manhole	Adoptable	S108	1350	Manhole	Adoptable
8.000	OB7	500	500	Manhole	Adoptable	S108	1350	Manhole	Adoptable

**Pipeline Schedule**

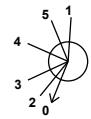
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
3.002	1.675	209.4	450	Circular	18.782	17.088	1.244	18.968	17.080	1.438
3.003	1.680	210.0	450	Circular	18.968	17.030	1.488	19.040	17.022	1.568
3.004	2.220	185.0	450	Circular	19.040	17.022	1.568	18.950	17.010	1.490
1.000	32.611	120.3	450	Circular	19.260	18.191	0.619	19.298	17.920	0.928
1.001	36.145	56.4	450	Circular	19.298	17.920	0.928	19.343	17.279	1.614
1.002	1.462	50.4	450	Circular	19.343	17.279	1.614	18.950	17.250	1.250
1.003	4.528	150.9	150	Circular	18.950	17.010	1.790	18.950	16.980	1.820

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.002	S108	1350		Manhole	Adoptable	PI		Junction	
3.003	PI			Junction		S109	1350	Manhole	Adoptable
3.004	S109	1350		Manhole	Adoptable	TANK		Junction	
1.000	S101	1350		Manhole	Adoptable	S102	1350	Manhole	Adoptable
1.001	S102	1350		Manhole	Adoptable	S103	1350	Manhole	Adoptable
1.002	S103	1350		Manhole	Adoptable	TANK		Junction	
1.003	TANK			Junction		Dummy	1200	Manhole	Adoptable

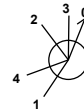
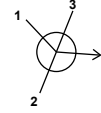
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type	
S104A	472860.527	107693.466	19.300	0.800	450		Manhole	Adoptable		0	2.000	18.500	150	Circular
S104	472827.174	107706.321	19.306	1.300	1200		Manhole	Adoptable		1	2.000	18.156	150	Circular
										0	2.001	18.006	300	Circular

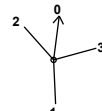
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type	
S105	472801.035	107641.557	19.344	1.804	1200		Manhole	Adoptable		1	2.001	17.540	300	Circular
										0	2.002	17.540	300	Circular
OB3	472791.661	107719.704	18.251	0.298	500	500	Manhole	Adoptable		0	3.000	17.953	150	Circular
OB4	472786.259	107703.860	18.251	0.400	500	500	Manhole	Adoptable		0	5.000	17.851	225	Circular
OB5	472779.735	107687.637	18.413	0.600	500	500	Manhole	Adoptable		0	6.000	17.813	225	Circular
OB6	472766.861	107655.624	18.413	0.600	500	500	Manhole	Adoptable		0	7.000	17.813	225	Circular
OB2	472800.972	107700.108	18.756	0.599	500	500	Manhole	Adoptable		0	4.000	18.157	150	Circular
S107	472800.792	107697.413	18.766	1.294	1350		Manhole	Adoptable		1	4.000	17.791	150	Circular
										2	7.000	17.717	225	Circular
										3	6.000	17.717	225	Circular
										4	5.000	17.472	225	Circular
										5	3.000	17.472	150	Circular
										0	3.001	17.472	450	Circular

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type	
OB10	472738.079	107585.753	18.075	0.300	500	500	Manhole	Adoptable		0	9.000	17.775	150	Circular
OB8	472759.521	107637.376	18.414	0.601	500	500	Manhole	Adoptable		0	12.000	17.813	225	Circular
OB9	472747.774	107608.164	18.413	0.600	500	500	Manhole	Adoptable		0	11.000	17.813	225	Circular
OB11	472756.703	107590.029	18.739	0.601	500	500	Manhole	Adoptable		0	10.000	18.138	150	Circular
S106	472758.965	107593.407	18.773	1.447	1350		Manhole	Adoptable		1 2 3 4 0	10.000 11.000 12.000 9.000 7.001	17.625 17.551 17.551 17.326 17.326	150 225 225 150 450	Circular Circular Circular Circular Circular
OB7	472765.119	107651.292	18.393	0.600	500	500	Manhole	Adoptable		0	8.000	17.793	225	Circular
S108	472777.117	107638.543	18.782	1.694	1350		Manhole	Adoptable		1 2 3 0	8.000 7.001 3.001 3.002	17.163 17.088 17.088 17.088	225 450 450 450	Circular Circular Circular Circular
PI	472780.215	107638.320	18.968	1.938			Junction			1 0	3.002 3.003	17.080 17.030	450 450	Circular Circular

**Manhole Schedule**

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type	
S109	472780.486	107640.713	19.040	2.018	1350		Manhole	Adoptable		1	3.003	17.022	450	Circular
										0	3.004	17.022	450	Circular
S101	472809.315	107553.756	19.260	1.069	1350		Manhole	Adoptable		0	1.000	18.191	450	Circular
										1	1.000	17.920	450	Circular
S102	472771.722	107569.067	19.298	1.378	1350		Manhole	Adoptable		1	1.000	17.920	450	Circular
										0	1.001	17.920	450	Circular
S103	472785.448	107602.903	19.343	2.064	1350		Manhole	Adoptable		1	1.001	17.279	450	Circular
										0	1.002	17.279	450	Circular
TANK	472783.905	107636.873	18.950	1.940			Junction			1	1.002	17.250	450	Circular
										2	3.004	17.010	450	Circular
										3	2.002	17.500	300	Circular
										0	1.003	17.010	150	Circular
Dummy	472784.477	107641.320	18.950	1.970	1200		Manhole	Adoptable		1	1.003	16.980	150	Circular

Simulation Settings

Rainfall Methodology	FSR	Summer CV	0.750	Additional Storage (m ³ /ha)	0.0
Rainfall Events	Singular	Winter CV	0.840	Starting Level (m)	
FSR Region	England and Wales	Analysis Speed	Detailed	Check Discharge Rate(s)	x
M5-60 (mm)	20.000	Skip Steady State	✓	Check Discharge Volume	x
Ratio-R	0.400	Drain Down Time (mins)	10080		

	I&L Consulting Limited	File: Network C1.pfd Network: SW MS 23/05/2025	Page 7 24-011-CAN Downley Road, Havant Rev. P5
Storm Durations 1530601201802403604806007209601440216028804320 Return Period (years) Climate Change (CC %) Additional Area (A %) Additional Flow (Q %) Return Period (years) Climate Change (CC %) Additional Area (A %) Additional Flow (Q %) 1 0 0 0 30 0 0 0 100 45 0 0			
Node TANK Depth/Area Storage Structure Base Inf Coefficient (m/hr) Side Inf Coefficient (m/hr) 0.00000 0.54000 Safety Factor Porosity 2.0 0.97 Invert Level (m) Time to half empty (mins) 17.010 1095 Depth (m) Area (m²) Inf Area (m²) 0.000 1110.0 0.0 Depth (m) Area (m²) Inf Area (m²) 0.914 1110.0 162.7 Depth (m) Area (m²) Inf Area (m²) 0.915 0.0 162.7			
Flow+ v14.0 Copyright © 1988-2025 Causeway Technologies Ltd			

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S104A	11	18.538	0.038	2.5	0.0061	0.0000	OK
15 minute winter	S104	11	18.083	0.077	13.7	0.0868	0.0000	OK
15 minute winter	S105	11	17.637	0.097	24.1	0.1092	0.0000	OK
15 minute winter	OB3	10	17.986	0.033	2.7	0.0082	0.0000	OK
15 minute winter	OB4	10	17.903	0.052	9.7	0.0131	0.0000	OK
15 minute winter	OB5	10	17.897	0.084	11.1	0.0209	0.0000	OK
15 minute winter	OB6	10	17.897	0.084	11.1	0.0209	0.0000	OK
15 minute winter	OB2	10	18.194	0.037	6.9	0.0092	0.0000	OK
15 minute winter	S107	11	17.592	0.120	41.0	0.1716	0.0000	OK
15 minute winter	OB10	10	17.814	0.039	3.8	0.0098	0.0000	OK
15 minute winter	OB8	10	17.873	0.060	9.9	0.0150	0.0000	OK
15 minute winter	OB9	10	17.876	0.063	11.1	0.0159	0.0000	OK
15 minute winter	OB11	10	18.174	0.036	6.8	0.0090	0.0000	OK
15 minute winter	S106	11	17.443	0.117	35.1	0.1669	0.0000	OK
15 minute winter	OB7	10	17.836	0.043	8.3	0.0107	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S104A	2.000	S104	2.4	0.694	0.139	0.1249	
15 minute winter	S104	2.001	S105	13.2	0.787	0.146	1.1788	
15 minute winter	S105	2.002	TANK	23.9	1.304	0.190	0.0575	
15 minute winter	OB3	3.000	S107	2.6	0.297	0.105	0.2152	
15 minute winter	OB4	5.000	S107	9.6	0.708	0.120	0.2249	
15 minute winter	OB5	6.000	S107	10.9	0.843	0.271	0.2059	
15 minute winter	OB6	7.000	S107	10.9	0.844	0.270	0.2045	
15 minute winter	OB2	4.000	S107	6.9	2.229	0.104	0.0083	
15 minute winter	S107	3.001	S108	40.3	0.816	0.161	3.2410	
15 minute winter	OB10	9.000	S106	3.8	0.408	0.149	0.2048	
15 minute winter	OB8	12.000	S106	9.8	1.183	0.145	0.1296	
15 minute winter	OB9	11.000	S106	11.0	1.236	0.160	0.1342	
15 minute winter	OB11	10.000	S106	6.8	2.220	0.106	0.0124	
15 minute winter	S106	7.001	S108	34.3	0.717	0.152	2.4534	
15 minute winter	OB7	8.000	S108	8.2	1.182	0.079	0.2199	

**Results for 1 year Critical Storm Duration. Lowest mass balance: 99.94%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S108	11	17.289	0.201	82.4	0.2871	0.0000	OK
2160 minute winter	PI	1560	17.272	0.242	3.6	0.0000	0.0000	OK
2160 minute winter	S109	1560	17.272	0.250	3.6	0.3582	0.0000	OK
15 minute winter	S101	10	18.367	0.176	86.4	0.2520	0.0000	OK
15 minute winter	S102	10	18.062	0.142	91.4	0.2033	0.0000	OK
15 minute winter	S103	10	17.445	0.166	96.6	0.2381	0.0000	OK
2160 minute winter	TANK	1560	17.272	0.262	8.5	282.3982	0.0000	SURCHARGED
2160 minute winter	Dummy	1560	17.272	0.292	0.0	0.3305	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S108	3.002	PI	81.3	1.256	0.365	0.1084	
15 minute winter	PI	3.003	S109	81.2	1.294	0.365	0.1054	
15 minute winter	S109	3.004	TANK	81.1	2.813	0.342	0.0752	
15 minute winter	S101	1.000	S102	85.5	1.708	0.290	1.6359	
15 minute winter	S102	1.001	S103	90.5	1.885	0.210	1.7366	
15 minute winter	S103	1.002	TANK	96.0	2.038	0.210	0.0690	
15 minute winter	TANK	1.003	Dummy	1.4	0.389	0.094	0.0585	
2160 minute winter	TANK	Infiltration		3.0				
15 minute summer	Dummy	Pump		0.0				0.0

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S104A	11	18.562	0.062	6.2	0.0098	0.0000	OK
15 minute winter	S104	10	18.129	0.123	33.6	0.1393	0.0000	OK
15 minute winter	S105	11	17.701	0.161	60.0	0.1825	0.0000	OK
15 minute winter	OB3	10	18.005	0.052	6.6	0.0130	0.0000	OK
15 minute winter	OB4	10	17.934	0.083	23.9	0.0208	0.0000	OK
15 minute winter	OB5	10	17.957	0.144	27.3	0.0361	0.0000	OK
15 minute winter	OB6	10	17.957	0.144	27.3	0.0360	0.0000	OK
15 minute winter	OB2	10	18.220	0.063	17.0	0.0157	0.0000	OK
15 minute winter	S107	11	17.664	0.192	101.0	0.2753	0.0000	OK
15 minute winter	OB10	10	17.838	0.063	9.3	0.0157	0.0000	OK
15 minute winter	OB8	10	17.912	0.099	24.2	0.0247	0.0000	OK
15 minute winter	OB9	10	17.918	0.105	27.3	0.0264	0.0000	OK
15 minute winter	OB11	10	18.198	0.060	16.6	0.0149	0.0000	OK
960 minute winter	S106	765	17.520	0.194	5.5	0.2775	0.0000	OK
15 minute winter	OB7	10	17.860	0.067	20.4	0.0168	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S104A	2.000	S104	6.0	0.892	0.346	0.2414	
15 minute winter	S104	2.001	S105	32.7	0.997	0.361	2.2976	
15 minute winter	S105	2.002	TANK	59.1	1.647	0.470	0.1123	
15 minute winter	OB3	3.000	S107	6.5	0.478	0.259	0.2774	
15 minute winter	OB4	5.000	S107	23.8	0.934	0.295	0.3935	
15 minute winter	OB5	6.000	S107	26.9	1.048	0.667	0.4074	
15 minute winter	OB6	7.000	S107	26.9	1.050	0.665	0.4045	
15 minute winter	OB2	4.000	S107	16.9	2.738	0.257	0.0167	
15 minute winter	S107	3.001	S108	98.8	1.012	0.394	6.2759	
15 minute winter	OB10	9.000	S106	9.2	0.643	0.365	0.2749	
15 minute winter	OB8	12.000	S106	23.9	1.493	0.356	0.2517	
15 minute winter	OB9	11.000	S106	27.0	1.557	0.394	0.2625	
15 minute winter	OB11	10.000	S106	16.5	2.761	0.260	0.0244	
15 minute winter	S106	7.001	S108	84.6	0.889	0.375	4.7427	
15 minute winter	OB7	8.000	S108	20.3	1.234	0.195	0.3925	

**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.94%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	S108	765	17.520	0.432	13.2	0.6181	0.0000	OK
960 minute winter	PI	765	17.520	0.490	12.5	0.0000	0.0000	SURCHARGED
960 minute winter	S109	765	17.520	0.498	12.4	0.7125	0.0000	SURCHARGED
15 minute winter	S101	10	18.496	0.305	212.1	0.4365	0.0000	OK
15 minute winter	S102	10	18.164	0.244	224.7	0.3493	0.0000	OK
15 minute winter	S103	10	17.558	0.279	237.1	0.3997	0.0000	OK
960 minute winter	TANK	765	17.520	0.510	43.7	549.0437	0.0000	SURCHARGED

960 minute winter	Dummy	780	17.520	0.540	0.3	0.6106	0.0000	OK
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Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S108	3.002	PI	203.2	1.605	0.912	0.2118	
15 minute winter	PI	3.003	S109	203.3	1.625	0.914	0.2098	
15 minute winter	S109	3.004	TANK	203.3	3.127	0.857	0.1687	
15 minute winter	S101	1.000	S102	210.2	2.076	0.714	3.2963	
15 minute winter	S102	1.001	S103	222.2	2.324	0.515	3.4544	
15 minute winter	S103	1.002	TANK	235.8	2.579	0.517	0.1336	
15 minute summer	TANK	1.003	Dummy	2.4	0.402	0.165	0.0797	
960 minute winter	TANK	Infiltration		6.5				
15 minute summer	Dummy	Pump		0.0				0.0

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S104A	10	18.590	0.090	11.7	0.0144	0.0000	OK
15 minute winter	S104	10	18.185	0.179	63.3	0.2027	0.0000	OK
960 minute winter	S105	765	18.059	0.519	11.2	0.5865	0.0000	SURCHARGED
960 minute winter	OB3	765	18.058	0.105	0.8	0.0263	0.0000	OK
960 minute winter	OB4	765	18.059	0.208	2.8	0.0519	0.0000	OK
15 minute winter	OB5	10	18.099	0.286	51.4	0.0715	0.0000	SURCHARGED
15 minute winter	OB6	10	18.098	0.285	51.4	0.0714	0.0000	SURCHARGED
15 minute winter	OB2	10	18.254	0.097	31.9	0.0243	0.0000	OK
960 minute winter	S107	765	18.059	0.587	12.0	0.8395	0.0000	SURCHARGED
960 minute winter	OB10	765	18.058	0.283	1.1	0.0707	0.0000	FLOOD RISK
960 minute winter	OB8	765	18.058	0.245	2.8	0.0613	0.0000	SURCHARGED
960 minute winter	OB9	765	18.058	0.245	3.2	0.0613	0.0000	SURCHARGED
15 minute winter	OB11	9	18.225	0.087	31.3	0.0217	0.0000	OK
960 minute winter	S106	765	18.058	0.732	10.2	1.0479	0.0000	SURCHARGED
960 minute winter	OB7	765	18.059	0.266	2.4	0.0665	0.0000	SURCHARGED

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S104A	2.000	S104	11.3	1.040	0.649	0.3887	
15 minute winter	S104	2.001	S105	61.8	1.154	0.682	3.7009	
15 minute winter	S105	2.002	TANK	111.2	1.903	0.884	0.1823	
15 minute winter	OB3	3.000	S107	12.3	0.817	0.488	0.3160	
15 minute winter	OB4	5.000	S107	44.1	1.239	0.547	0.5114	
15 minute winter	OB5	6.000	S107	50.7	1.289	1.259	0.5967	
15 minute winter	OB6	7.000	S107	50.7	1.289	1.256	0.5937	
15 minute winter	OB2	4.000	S107	31.8	3.076	0.482	0.0279	
15 minute winter	S107	3.001	S108	182.2	1.182	0.726	9.3629	
15 minute winter	OB10	9.000	S106	16.9	0.972	0.670	0.3939	
15 minute winter	OB8	12.000	S106	46.1	1.687	0.684	0.5341	
15 minute winter	OB9	11.000	S106	51.3	1.750	0.748	0.5377	
15 minute winter	OB11	10.000	S106	31.3	3.102	0.491	0.0559	
15 minute winter	S106	7.001	S108	155.1	0.979	0.688	7.7076	
15 minute winter	OB7	8.000	S108	37.9	1.272	0.364	0.4437	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	S108	765	18.059	0.971	23.4	1.3890	0.0000	SURCHARGED
960 minute winter	PI	765	18.059	1.029	22.8	0.0000	0.0000	SURCHARGED
960 minute winter	S109	765	18.059	1.037	22.7	1.4834	0.0000	SURCHARGED
15 minute winter	S101	10	19.065	0.874	399.0	1.2509	0.0000	FLOOD RISK
15 minute winter	S102	10	18.447	0.527	411.8	0.7535	0.0000	SURCHARGED
960 minute winter	S103	765	18.059	0.780	28.5	1.1156	0.0000	SURCHARGED
960 minute winter	TANK	765	18.059	1.049	64.3	984.6422	0.0000	SURCHARGED

960 minute winter Dummy 765 18.059 1.079 0.2 1.2199 0.0000 OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S108	3.002	PI	375.1	2.368	1.684	0.2654	
15 minute winter	PI	3.003	S109	375.3	2.369	1.687	0.2659	
15 minute winter	S109	3.004	TANK	376.7	3.263	1.588	0.3256	
15 minute winter	S101	1.000	S102	384.5	2.427	1.305	5.1670	
15 minute winter	S102	1.001	S103	409.0	2.590	0.949	5.7011	
15 minute winter	S103	1.002	TANK	437.1	3.000	0.958	0.2095	
15 minute summer	TANK	1.003	Dummy	2.3	0.430	0.161	0.0797	
600 minute winter	TANK	Infiltration		12.2				
15 minute summer	Dummy	Pump		0.0				0.0

24-011-CAN Downley Road, HAVANT

APP/24/00606 I&L proposal to amend drainage strategy (1)



APPENDIX C

HAZARD INDEX AND MITIGATION

Land Use	Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Service yards	Medium	0.7	0.6	0.7

SuDS Component for Mitigation	TSS	Metals	Hydrocarbons
By-pass oil separator*	0.8	0.6	0.9

Land Use	Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Car parks	Low	0.5	0.4	0.4

SuDS Component for Mitigation	TSS	Metals	Hydrocarbons
By-pass oil separator*	0.8	0.6	0.9

- Based on SPEL products data sheet and testing.

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APPENDIX D

1.0 PREAMBLE

Regular inspections and maintenance of both the foul and surface water drainage systems is important to ensure the effective and efficient operation of the system and to reduce the likelihood of blockages and flooding on and off site.

Responsibility for maintaining and managing the drainage system on completion of the 12-month maintenance period will be by the landowner, through their site management company and/or tenants occupying the units. Principle contact is the landowner:

Canmoor,
34 Dover Street,
London W1S 4NG
020 7495 4115

this plan should be read in conjunction with the drainage design drawings and an up-to-date CCTV survey report.

The Operation and Maintenance (O&M) manuals and/or Health & Safety (H&S) files must contain copies of:

- This Drainage Maintenance Plan
- Record Copy of drainage design drawings
- Manufacturers information for ancillary items
- Pump supplier contact and service agreements
- Post construction CCTV survey report

The post construction CCTV report acts as a physical record of the drainage system at handover, as installed running at full efficiency. Any further CCTV surveys should be inserted and replace previous where appropriate.

Sewers, manholes and drainage channels are unlikely to require maintenance other than periodic inspections, unless a blockage occurs.

2.0 DESIGN

Below ground drainpipes for both the surface and foul water networks have been designed to achieve self-cleansing velocity and in accordance with:

Approved Document H: Drainage and waste disposal
BS 8301: 1985 Code of practice for Building Drainage

3.0 GUIDANCE

If **sudden failure** occurs inspections should be carried out at the earliest opportunity by a specialist. Blockages must be cleared, and remediation works undertaken to ensure the effective operation of the drainage system.

The following should be carried out on an annual basis:

- Inspection chambers, manhole chambers and drainage channel outlets noted as **silt traps**, **sump pits**, or **filter units** must be inspected and cleared.
- **Drainage channels** and **gully's** must be inspected and cleared.

The following should be carried out every two years:

- The gully traps should be plunged and thoroughly flushed out with clean water.
- Covers of inspection chambers and manholes should be removed and the sides, benching and channels cleaned.
- Main and branch drains should be rodded, jetted, and then flushed with clean water.
- Note that correct ends of rods should be used to avoid damage to pipes and them becoming detached.

Reference should be made to the manufacturer's information and maintenance requirements for recommended intervals and safe methods of cleaning for the following proprietary systems which are located on the record drawings:

- storm water storage system
- drainage channels
- petrol interceptors

A full CCTV survey will also be carried out at 10 yearly intervals to assess the condition of the drainage system.

Jetting should be carried out downstream to suit the flow of effluent but should not be attempted to push through an attenuation tank, interceptor, or flow control. A vacuum tanker should be used upstream of each inlet into the tank or other ancillary item noted.

5.0 SAFETY

Petrol interceptors are designed to trap and store hydrocarbon contamination which may emanate from the yards and as such, should only be cleaned out by a suitable qualified and licensed specialist Contractors.

In all instances, inspection and cleaning is to be carried out by a suitable Specialist Contractor, following the guidelines given in BE EN 752 Part 7 1998 "Maintenance and Operations" and "Safe Working in Sewers and at Sewage Works", published by the National Joint Health and Safety Committee for the Water Services.

All underground and under-floor drains and manholes (including oil interceptors) represent confined spaces. Appropriate precautions will be taken before entering drains and manholes. Access will only be undertaken by appropriately trained personnel.

PROPRIETARY SYSTEMS		
Maintenance schedule	Required action	Typical frequency
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months

SOAKAWAYS		
Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning of gutters and any filters on downpipes	Annually, or as required
	Trimming any roots that may be causing blockages	Annually, or as required
Occasional maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required
Remedial actions	Reconstruction soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually