



Drainage Maintenance Plan

Proposed Commercial Units

Land Adjacent Kirkby Bank Road & Acornfield Road

Kirkby | Knowsley | Liverpool | L33 7BJ

April 2025

Document Control Sheet

Document Title: Drainage Maintenance Plan

Document Reference: 021B42-DMP/01

Project Name: Proposed Commercial Units,
Land Adjacent Kirkby Bank Road & Acornfield Road
Kirkby, Knowsley, Liverpool, L33 7BJ

Project Number: 021B42

Client: Acornfield Properties Limited

Issue Record

Revision	Date	Status	Comment
0	08.04.2025	First Issue	First Issue

Contents

1.0	Introduction	4
2.0	Ground Conditions	4
3.0	Hierarchy of SW Disposal Methods.....	6
4.0	SW Drainage Strategy	7
5.0	FW Drainage Strategy	7
6.0	Operation & Maintenance	8
	Appendix A – GIR extract - borehole and trial pit logs	10
	Appendix B – Runoff Area Plans	11
	Appendix C – Drainage Layout.....	12
	Appendix D – Drainage Calculations.....	13
	Appendix E – Drainage Details.....	14

MADE GROUND – The majority of Made Ground identified across the site was a gravelly sand that consisted of brick, asphalt and concrete, also localised reworked clay was identified in a number of locations to a maximum proven depth of 1.50m bgl.
DRIFT – Drift deposits were fairly varied across the site, comprising of a dark brown slightly gravelly clayey fine to medium SAND overlaying a; stiff, high-strength, brown mottled grey, slightly gravelly CLAY with sandstone and mudstone gravel at 3.00m bgl. A firm light grey sandy CLAY was identified in a small number of exploratory holes above 2.00 m bgl. PEAT was identified in several location mainly within the north east of the site with a maximum depth of 1.4 m bgl. Stiff boulder CLAY was identified within Cable Percussive location at a maximum depth of 8.5 m bgl. Occasional fine to course gravel of Sandstone and Mudstone was identified within the cohesive deposits.
SOLID – Reddish brown weathered SANDSTONE was encountered within CP103 and CP104 at 6.0 m bgl and inferred in CP101 and CP102 at 7.50m bgl, this sandstone is found underlying stiff bolder CLAY identified within cable percussive holes.
GROUNDWATER – Groundwater was encountered between 2 m bgl and 4 m bgl across the site.

Section 10.8 of E3P's report advises that: *'The site is underlain by permeable SAND and low permeability CLAY forming a barrier between the SAND and underlying BEDROCK. If soakaway drainage is to be considered, full BRE 365 testing must be completed to inform the detailed design'.*

The following plan shows the investigation holes that are relevant to the development area that is the subject of this Drainage Maintenance Plan:

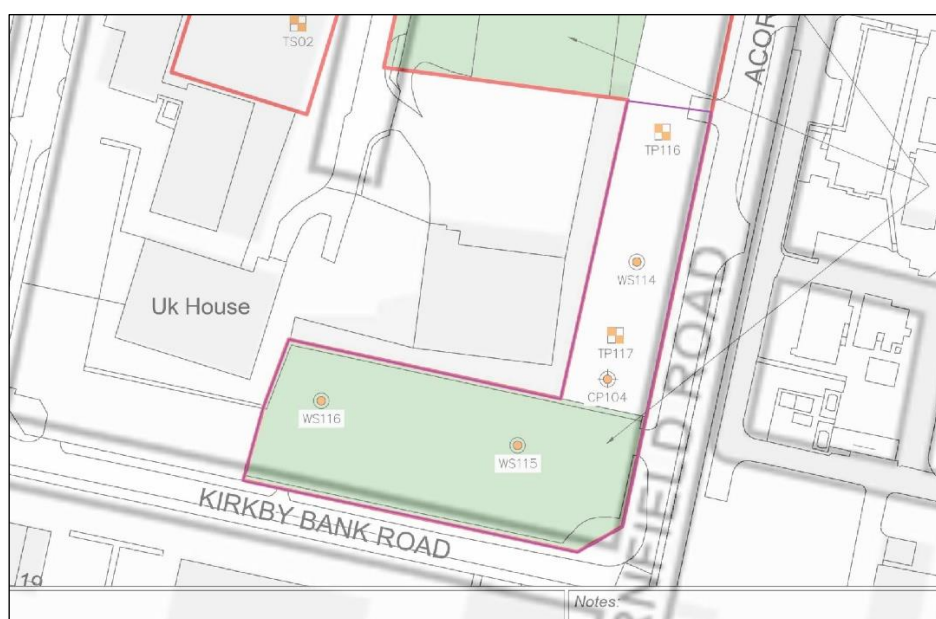


FIGURE 2 EXTRACT E3P EXPLORATORY HOLE LOCATION PLAN²

² E3P drawing 12-969-004, rev R1, 04.07.2019

The relevant borehole and trial pit logs are appended and show that the depth of made ground across the development area varies between 0.5m (CP104) and 2.2m (WS114) from ground level. A thin band of PEAT is recorded below the made ground in WS115 from 0.6m to 1.0m bgl. Subsequently slightly clayey and clayey fine to medium SAND is recorded in all holes to depths between 2.6m to 3.9m bgl (terminating at the base of the trial pits at 2.0m and 2.1m depth. The three boreholes terminate in sandy CLAY at 5.45m depth with a band of clayey SAND present between sandy CLAY stratum between 4.0m and 4.7m bgl. CP104 extended through the sandy CLAY below which weathered SANDSTONE is recorded from 6.0m to the base of borehole at 7.5m bgl. A water strike was encountered at 4.00m bgl in WS116. It is noted that a strong strong sulphur odour is attributed to the sand recorded in TP116 and WS116, whilst a strong organic odour is attributed to sand recorded in WS115.

Given that a water strike was only recorded at one borehole location within the development area, this is not considered to be representative of the groundwater table which is likely to occur within the solid sandstone geology at depth. The low permeability nature of the superficial boulder sandy CLAY deposits will act as an aquitard limiting the movement of groundwater from rising and issuing at the surface. This aquitard will also effectively prevent the vertical movement of groundwater arising from infiltrated surface water and so it is expected that groundwater in the superficial SAND deposits will flow laterally following the surface of the CLAY layer assumed to be at a consistent depth and therefore mirroring the natural fall of the local terrain.

Based on the above information, it is not considered that infiltration drainage such as soakaways will be an appropriate method for surface water disposal for runoff from the roof areas of the proposed buildings or associated paved areas.

3.0 Hierarchy of SW Disposal Methods

Paragraph 056 of Planning Practice Guidance for Flood Risk and Coastal Change (PPG-FRCC)³ advises a hierarchy which reflects the guidance of the Building Regulations Approved Document H:

'Where possible, preference should be given to multi-functional sustainable drainage systems, and to solutions that allow surface water to be discharged according to the following hierarchy of drainage options:

- 1. into the ground (infiltration);*
- 2. to a surface water body;*
- 3. to a surface water sewer, highway drain, or another drainage system;*
- 4. to a combined sewer'.*

Based on the ground information described in section 2, it is considered that the use of direct infiltration to the ground will not be effective as a primary means of surface water disposal at the site due to high groundwater levels. Instead, a positive outfall will be required, and United Utilities were therefore

³ Planning Practice Guidance – Flood Risk and Coastal Change (<https://www.gov.uk/guidance/flood-risk-and-coastal-change>)

contacted to agree a point of connection to the public surface water sewer which crosses through the site.

4.0 SW Drainage Strategy

Pre-development runoff rates for the development area were assessed as described in the Flood Risk Assessment and Drainage Strategy that was prepared in support of the planning application for the development proposals. These have then been used as design discharge rates for the proposed development with the limiting rate for runoff from the northern building (unit D) and hardstanding set at 3.2l/s, whilst the limiting rate for runoff from the southern building (units E, F and G) and hardstanding areas is set at = 3.9l/s. The two drainage systems are to be connected in series and so the final flow from the overall development is $3.2+3.9 = 7.1\text{l/s}$. Flow rates are to be controlled by vortex flow controls (Hydrobrake Optimum units).

A surface water drainage network has been modelled in Causeway Flow with attenuation tanks to provide attenuation storage capacity and flow controls to limit discharge rates. The drainage model is detailed on the Causeway Flow output provided at appendix D. The pipe references and manhole labels in the drainage model correspond to those shown on the drainage plan at appendix C (also annotated on the drainage areas plan at appendix B).

Causeway Flow pages 7, 8 and 9 at appendix D show the summary of results for simulations of 1in1year, 1in30year+40% and 1in100yr+45% rainfall events and demonstrate that the development discharge rate of 7.1l/s is not exceeded.

Each drainage network also has a separator to manage and mitigate pollutants in surface water runoff. The mitigation indices of the specified SPEL units exceed the pollution hazard indices for the category of usage (medium hazard).

5.0 FW Drainage Strategy

The provision of foul water drainage serving the units is basic and it is proposed that discharge will be to the main public sewer system via connection at foul water sewer chamber 6503. This is in line with development enquiry discussion with United Utilities but is subject to formal agreement via a Section 106 (Water Industry Act) application.

6.0 Operation & Maintenance

The developer will initially be responsible for the inspection, operation and maintenance of the proposed drainage system shown on the plan at Appendix C until works are complete and the development is occupied. Subsequently a private management company will be responsible for the inspection, operation and maintenance of the proposed drainage system.

It is important that all drainage systems are adequately maintained. An important part of this is regular inspection to monitor where action will be required (eg silt accumulation). This may occur at drainage inlet points (ie linear drainage channels and road gullies) which will require regular inspection and silt removal.

Where silts pass downstream a secondary facility is available via catchpits and the separator units. This will similarly require silt removal at longer time intervals and as informed by regular inspection.

The separator units will also accumulate sludge that will require removal periodically and disposal to an appropriate facility.

The flow control units have sumps which also require occasional cleansing, whilst the controls must also be inspected regularly and after significant rainfall events with the by-pass facilities checked for operability.

The following tables provide details of inspection and maintenance operations and frequencies for the key elements of the proposed drainage system:

	Cellular (Crated) Tank Construction
<i>Regular</i>	Inspect upstream inlets (catch pit chambers) and downstream outlet (flow control chambers) monthly for signs of silt build up. Check for signs of settlement over the footprint of the tank annually.
<i>Occasional</i>	Remove silts from connecting chambers, annually or as determined by inspection.
<i>Remedial</i>	If settlement occurs, monitor and consider trial pit excavation to verify structural adequacy of tank.

	Linear Drainage Channels & Road Gullies
<i>Regular</i>	Inspect grating for signs of damage annually. Inspect sumps for signs of silt build up annually.
<i>Occasional</i>	Adjust / re-secure grating as necessary if dislodged. Remove silts from sumps as necessary.
<i>Remedial</i>	Replace grating if damaged.

	Flow Controls – Hydrobrake Optimum Units
<i>Regular</i>	Inspect monthly and after every significant rainfall event.
<i>Occasional</i>	Check functionality of pivoting by-pass door facility and ensure steel operating rope is adequately secured within reach of chamber cover opening.
<i>Remedial</i>	Cleansing of the chamber sump will be required possibly annually, but this can be assessed when the by-pass door facility is inspected.

	Proprietary Treatment Units – SPEL Separators
<i>Regular</i>	Inspect regularly in line with manufacturer's guidance, initially monthly and then bi-annually after 1 year. Record the level of oil/light liquid and level of silt present in the separator unit.
<i>Occasional</i>	When required (before full), oil and sediments are to be removed by a waste management contractor and disposed in accordance with EA and LA guidelines. Allow annual emptying, actual frequency to be determined via regular inspection. Alarm probes where fitted, should be removed and cleaned with water whenever waste material is removed from the stormwater treatment device. After emptying, check the float/closure device and raise if it has self-seated.
<i>Remedial</i>	Replace coalescer media as required.

	General Drainage System
<i>Regular</i>	Inspect and identify any areas that are not operating correctly. If required, take remedial action. Monthly for 3 months then annually. Maintain vegetation to designed limits within the vicinity of below ground drainage pipes to avoid damage to system. Monthly or as required. Inspect rainwater gutters and down pipes, removing obstructions and silt as necessary. Check there is no physical damage. Monthly
<i>Occasional</i>	Remove silt and leaf build up from manholes, gutters etc. Annually (or as required). Remove inspection covers and inspect, ensuring that the water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Annually. Survey inside of pipe runs for sediment build up and remove if necessary. Every 5 years or as required.
<i>Remedial</i>	Replacement of malfunctioning parts. As required. Repair physical damage if necessary. As required.

Appendix A – GIR extract - borehole and trial pit logs

Project Name: Draw Well Road

Project No.
12969

Co-ords:

Hole Type
CP

Location: Knowsley

Level:

Scale
1:50

Client: Prime Property Consultancy Ltd

Dates: 29/06/2019

Logged By
A.AHMED

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10			MADE GROUND: Asphalt.	
		0.50	B		0.50			MADE GROUND: Dark brown gravelly fine to medium sand. Gravel is sub-rounded to angular brick concrete and ash.	
								Medium dense brown slightly clayey SAND.	
		1.00	B						1
		1.00	D						
		1.00	SPT	N=20 (3,4/5,5,5,5)					
		2.00	D		2.00			Loose brown slightly clayey SAND.	2
		2.00	SPT	N=4 (1,0/1,1,1,1)					
		3.00	D		3.20			Firm medium strength grey silty CLAY.	3
		3.00	SPT	N=6 (1,1/1,2,1,2)					
		4.00	U		4.00			Stiff high strength brown sandy CLAY.	4
		5.00	D						5
		5.00	SPT	N=14 (1,3/3,3,4,4)					
		6.00	D		6.00			Dense reddish brown weathered SANDSTONE.	6
		6.00	SPT	50 (3,7/50 for 235mm)					
		7.50	D		7.50			End of Borehole at 7.50m	8
		7.50	SPT	50 (20,5/50 for 105mm)					9
									10

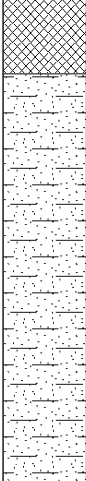
Remarks

1.Chiseling from 6.00m to 7.50m bgl for 1 hour. 2. Monitoring well installed.

Trial Pit Log

TrialPit No
TP116
Sheet 1 of 1

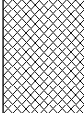
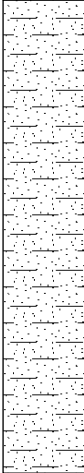
Project Name: Draw Well Road	Project No. 12969	Co-ords: - Level:	Date 27/06/2019
Location: Knowsley		Dimensions (m): 2.00	Scale 1:24
Client: Prime Property Consultancy Ltd		Depth 2.00	Logged A.AHMED

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.40	ES		0.20			MADE GROUND: Asphalt.	
				0.70			MADE GROUND: Dark brown gravelly fine to medium sand with frequent cobbles. Gravel is fine to coarse sub-angular to angular asphalt concrete and brick cobbles are angular brick.	
				2.00			Dark brown fine to medium clayey SAND. (Strong sulphur odour).	1
							End of Pit at 2.00m	2
								3
								4
								5

Remarks: 1. Complete

Stability: Stable.

Project Name: Draw Well Road	Project No. 12969	Co-ords: - Level:	Date 27/06/2019
Location: Knowsley		Dimensions (m): 1.80 0.60	Scale 1:24
Client: Prime Property Consultancy Ltd		Depth 2.10	Logged A.AHMED

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.30	ES		0.20			MADE GROUND: Asphalt.	
				0.60			MADE GROUND: Dark brown gravelly fine to medium sand with frequent cobbles. Gravel is fine to coarse sub-angular to angular asphalt concrete and brick cobbles are angular brick.	
	1.00	ES					Orangish brown slightly clayey fine to medium SAND.	1
				2.10			End of Pit at 2.10m	2
								3
								4
								5

Remarks: 1. Complete	
Stability: Stable.	

Borehole Log

Borehole No.

WS114

Sheet 1 of 1

Project Name: Draw Well Road

Project No.
12969

Co-ords:

Hole Type
WS

Location: Knowsley

Level:

Scale
1:50

Client: Prime Property Consultancy Ltd

Dates: 28/06/2019

Logged By
A.AHMED

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.30			MADE GROUND: Asphalt.	
		0.50	ES		0.70			MADE GROUND: Dark brown gravelly fine to medium sand. Gravel is fine to coarse sub-angular to angular asphalt concrete and brick.	1
		1.00	SPT	N=2 (1,0/0,1,0,1)				MADE GROUND: Dark brown clayey slightly gravelly fine to medium SAND. Gravel is fine to coarse asphalt and brick.	
		1.70	ES						2
		2.00	SPT	N=11 (2,3/3,3,3,2)	2.20				
		3.00	SPT	N=4 (2,2/1,1,1,1)				Loose light brown slightly clayey fine to medium SAND.	3
					3.70				
		4.00	D		4.00			Very stiff extremely high strength greyish brown slightly sandy CLAY.	4
		4.00	SPT	N=50 (4,4/12,12,13,13)				Dense light brown very clayey SAND.	
					4.70				
		5.00	D					Very stiff very high strength greyish brown sandy CLAY.	5
		5.00	SPT	N=49 (6,9/10,11,14,14)	5.45				
								End of Borehole at 5.45m	6
									7
									8
									9
									10

Remarks

1. Complete

				Borehole Log				Borehole No. WS115 Sheet 1 of 1		
Project Name: Draw Well Road				Project No. 12969		Co-ords:		Hole Type WS		
Location: Knowsley				Level:		Scale 1:50				
Client: Prime Property Consultancy Ltd				Dates: 28/06/2019		Logged By A.AHMED				
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.30	ES	N=14 (3,2/3,3,4,4)	0.20			MADE GROUND: Asphalt.	1 2 3 4 5 6 7 8 9 10	
					0.60			MADE GROUND: Dark brown gravelly fine to medium sand. Gravel is fine to coarse sub-angular to angular asphalt concrete and brick.		
		1.00	SPT	N=12 (4,4/3,3,3,3)	1.00			Dark brown amorphous spongy PEAT.		
		1.20	ES		1.80			Dark brown clayey fine to medium SAND. (Strong Organic odour).		
		2.00	SPT	N=11 (1,2/2,3,3,3)	2.60			Medium dense light yellow slightly clayey fine to medium SAND.		
		3.00	D		3.40			Stiff high strength light grey slightly sandy slightly gravelly CLAY. Gravel is fine sub-rounded to round mudstone.		
		3.00	SPT	N=38 (5,6/7,8,12,11)				Stiff high strength brown slightly sandy CLAY.		
		4.00	D							
		4.00	SPT	N=48 (8,7/12,12,12,12)						
		5.00	D							
5.00	SPT		5.45			End of Borehole at 5.45m				
Remarks 1. Complete										

Project Name: Draw Well Road

Project No.
12969

Co-ords:

Hole Type
WS

Location: Knowsley

Level:

Scale
1:50

Client: Prime Property Consultancy Ltd

Dates: 28/06/2019

Logged By
A.AHMED

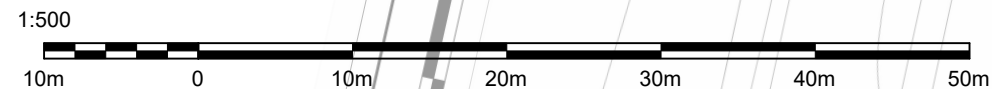
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40	ES		0.20			MADE GROUND: Asphalt.	
		1.00	SPT	N=25 (6,5/5,7,7,6)	1.20			MADE GROUND: Black gravelly fine to medium sand. Gravel is fine to coarse sub-angular to angular asphalt concrete and brick.	1
		1.50	ES					Medium dense light brown clayey fine to medium SAND. (Strong sulphur odour).	
		2.00	SPT	N=15 (3,4/5,3,4,3)					2
		3.00	D SPT	N=9 (2,3/2,2,2,3)					3
		4.00	D SPT	N=15 (2,3/3,3,4,5)	3.90			Very stiff high strength dark brown sandy CLAY.	4
		5.00	D SPT	50 (9,9/50 for 255mm)	5.45			End of Borehole at 5.45m	5
									6
									7
									8
									9
									10

Remarks

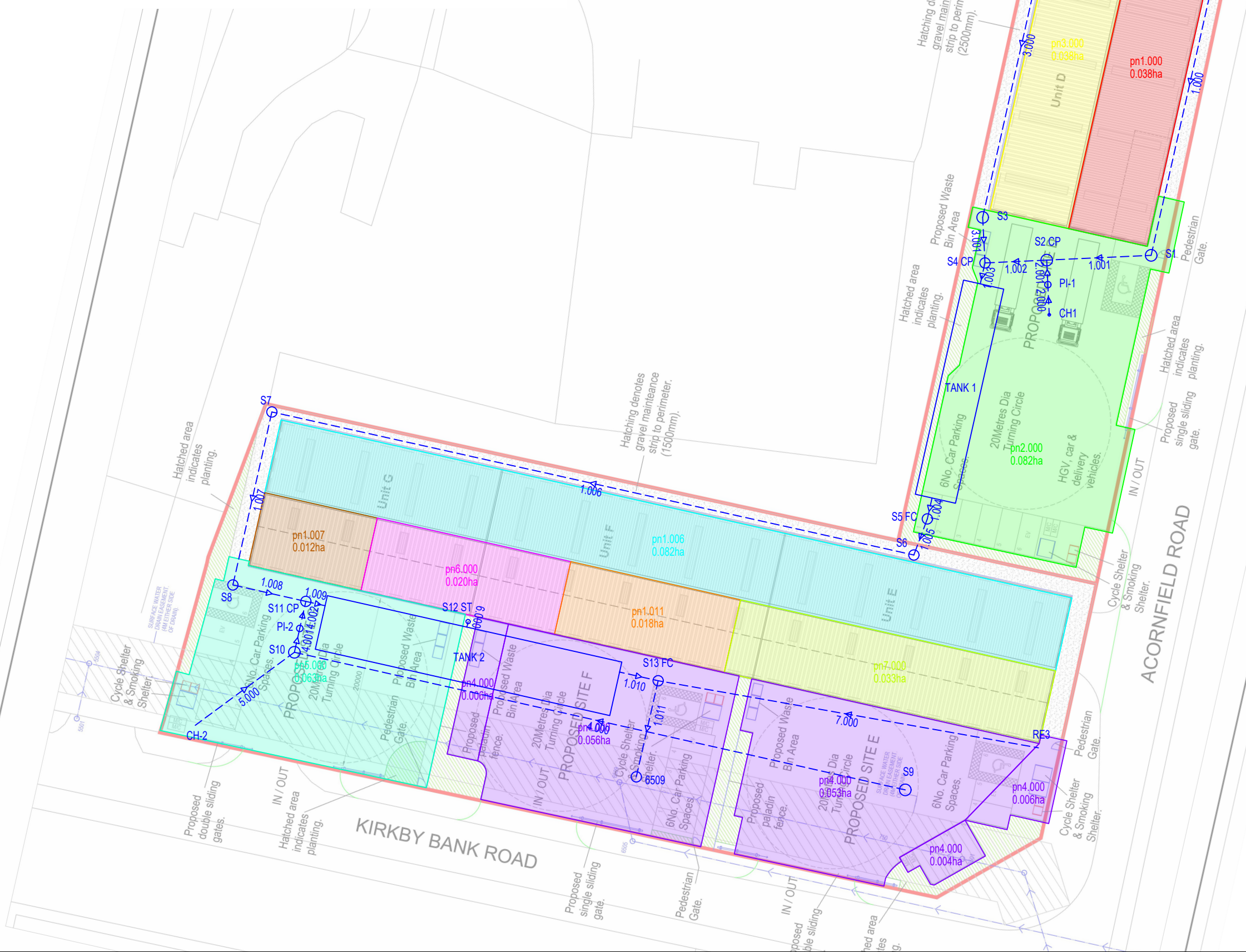
1. Complete 2. Water strike encountered at 4.00m bgl.



Appendix B – Runoff Area Plans

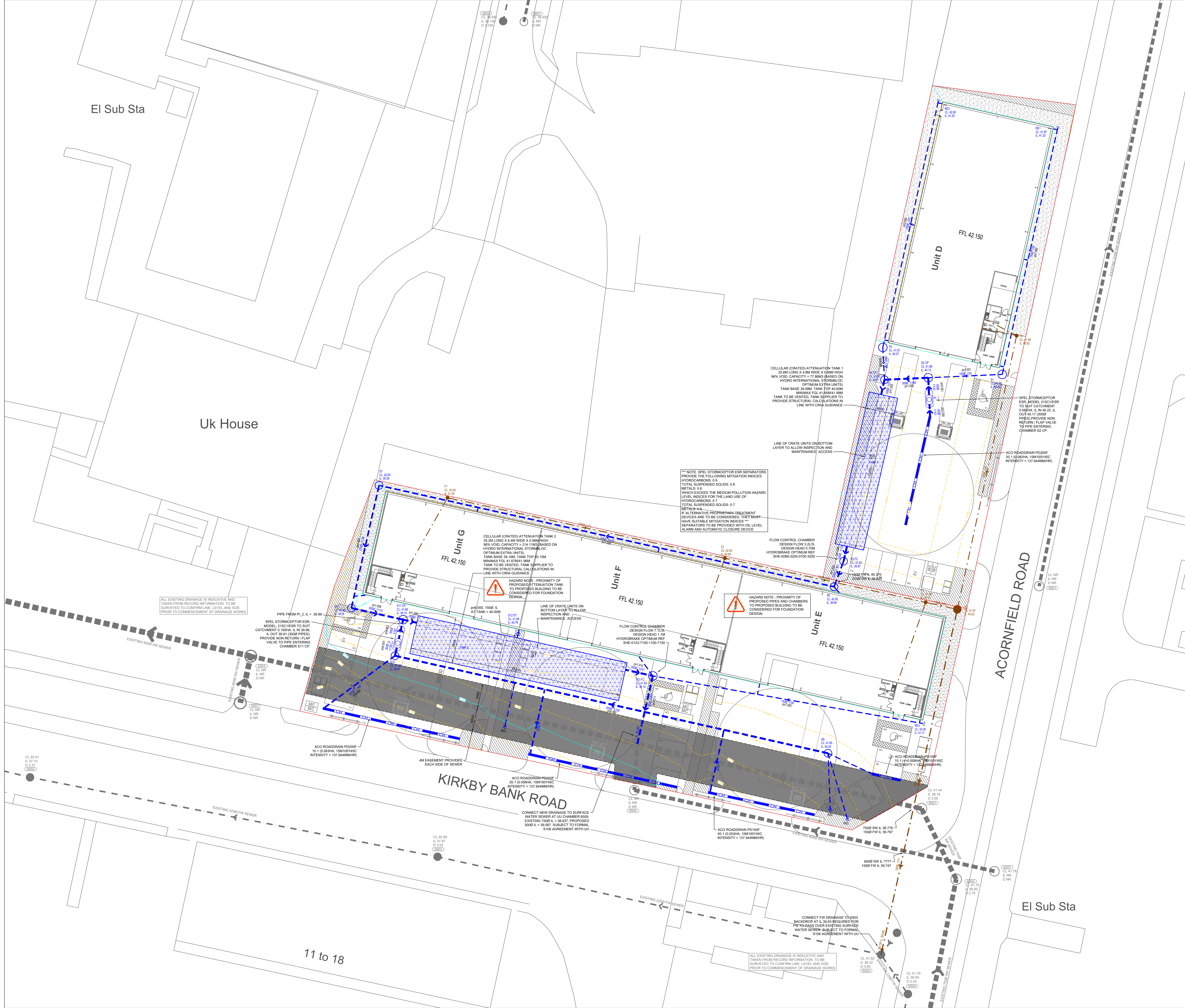


PROPOSED DRAINAGE AREAS PLAN





Appendix C – Drainage Layout



GENERAL NOTES:

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT DRAWINGS (ARCHITECTURAL, M&E ETC).
- ALL BELOW GROUND DRAINAGE WORKMANSHIP IS TO BE CARRIED OUT IN STRICT ACCORDANCE WITH BS 8000 'WORKMANSHIP OF BUILDING SITES, PART 14: CODE OF PRACTICE FOR BELOW GROUND DRAINAGE'.
- EXACT LOCATIONS AND CURRENT USAGE OF ALL EXISTING DRAINAGE TO BE ESTABLISHED PRIOR TO OR ON COMMENCEMENT OF ANY WORKS.
- ALL NEW BELOW GROUND DRAINAGE WORKS TO BE INSPECTED AND APPROVED BY BUILDING CONTROL PRIOR TO BACKFILLING.
- ALL DRAINAGE WITHIN THE SITE BOUNDARY IS TO BE PRIVATE. COVERS TO BE ADJUSTED TO SUIT FINAL FINISHED GROUND LEVELS.
- BUILDING FFL'S AND DRAIN POINTS (IE RWPS, SVPS, ETC) ARE SUBJECT TO CONFIRMATION OF THE BUILDING DESIGNER.

KEY:

- 101.500 - PROPOSED GROUND LEVEL CONTOURS AT 0.5M INTERVALS
- 103.300 - PROPOSED GROUND LEVEL CONTOURS AT 0.1M INTERVALS
- EXISTING SURFACE WATER DRAINAGE
- EXISTING FOUL WATER DRAINAGE
- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED FOUL WATER DRAINAGE

CHAMBER SCHEDULE:

REF	CHAMBER DIAMETER (mm)	CHAMBER TYPE	COVER LEVEL (m)	INVERT LEVEL (m)	DEPTH TO SOFFIT (m)	DEPTH TO INVERT (m)	COVER GRADE
F1	450	TYPE C	41.980	41.300	0.680	0.700	8/15
F2	450	RANGE	42.000	40.840	1.280	1.380	8/15
F3	450	RANGE	41.980	40.150	1.730	1.830	8/15
F4	450	TYPE C	41.980	40.830	1.050	1.150	8/15
F5	1200	TYPE B	41.970	40.020	1.950	1.950	D400
S1	1350	TYPE C	41.950	40.520	1.280	1.430	D400
S2 CP	1350	CATCHPIT	41.880	40.150	1.430	1.730	D400
S3	1350	TYPE C	41.970	40.370	1.450	1.600	D400
S4 CP	1200	CATCHPIT	41.930	40.110	1.520	1.820	D400
S5 FC	1200	FLOW CTRL	41.930	39.970	1.735	1.960	D400
S6	1200	TYPE B	42.000	39.940	1.535	2.060	8/15
S7	1200	TYPE B	42.000	39.930	2.385	2.610	8/15
S8	1200	TYPE B	41.930	39.240	2.380	2.680	D400
S9	1350	TYPE C	41.850	40.350	1.200	1.500	D400
S10	1350	TYPE C	41.930	39.970	1.360	1.660	D400
S11 CP	1200	CATCHPIT	41.880	39.100	2.360	2.660	D400
S12	500	SILT TRAP	41.980	40.780	1.050	1.200	D400
S13 FC	1200	FLOW CTRL	41.930	39.140	2.490	2.790	D400

PPCC - POLYPROPYLENE INSPECTION CHAMBER, DEPTH UP TO 1.2M
RANGE - WAIN NON-ACCESS CHAMBER (RESTRICTED OPENING 350MM DIA), DEPTH UP TO 3.0M
SILT TRAP - 5000 WAIN CHAMBER REF 6L8000 OR SIMILAR
CATCHPIT - PCC CHAMBER WITH MIN 300MM SUMP BELOW OUTGOING PIPE
TYPE B - STANDARD ACCESSIBLE CHAMBER (DEPTH TO SOFFIT LESS THAN 3M) TO WATER LK DESIGN AND CONSTRUCTION GUIDANCE DETAIL
TYPE C - SHALLOW ACCESSIBLE CHAMBER (DEPTH TO SOFFIT LESS THAN 1.5M) TO WATER LK DESIGN AND CONSTRUCTION GUIDANCE DETAIL
FLOW CTRL - FLOW CONTROL CHAMBER, EACH TO HAVE SUMP, BENCHING AND MOUNTING BLOCK TO SUIT INSTALLATION OF THE HYDROBRAKE OPTIMUM UNIT SPECIFIED ON THE PLAN

Tanks

ESS

El Sub Sta



07 470 955548
www.cjemm.co.uk

REV	DESCRIPTION	DATE
1	PRIME POINT KNOWSLEY	02/18/24
2	PROPOSED DRAINAGE LAYOUT	

DRAWING NO.	REVISION	INITIALS	SHEET SIZE
021B42-100	-	CJE	A0
		DATE	SCALE
		17/01/2025	1:200



Appendix D – Drainage Calculations



Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	19.500	Minimum Backdrop Height (m)	1.000
Ratio-R	0.390	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
RE1	0.038	5.00	41.970	150	343670.976	398681.845	0.720
S1			41.950	1350	343661.848	398641.329	1.430
CH1	0.082	5.00	41.700	300	343649.965	398634.399	1.460
PI-1			41.790	750	343649.804	398637.912	1.620
S2 CP			41.880	1350	343649.673	398640.773	1.730
RE2	0.038	5.00	42.000	150	343651.328	398686.271	0.750
S3			41.970	1350	343642.201	398645.756	1.600
S4 CP			41.930	1200	343642.476	398640.444	1.820
TANK 1			41.850		343636.300	398613.031	1.860
S5 FC			41.930	1200	343635.751	398610.592	1.960
S6	0.082	5.00	42.000	1200	343634.180	398606.380	2.060
S7	0.012	5.00	42.000	1200	343559.318	398623.062	2.610
S8			41.930	1200	343554.773	398602.887	2.690
S9	0.125	5.00	41.850	1350	343633.179	398578.986	1.500
CH-2	0.063	5.00	41.120	225	343550.381	398586.518	0.975
S10			41.630	1350	343561.943	398595.035	1.660
PI-2			41.750	750	343562.570	398597.817	1.840
S11 CP			41.880	1200	343563.280	398600.970	2.690
S12 ST	0.020	5.00	41.980	500	343582.200	398598.614	1.200
TANK 2			41.770		343599.863	398592.728	2.610
RE3	0.033	5.00	41.990	150	343648.708	398583.893	0.900
S13 FC	0.018	5.00	41.930	1200	343604.362	398591.715	2.790
6509			41.610	1200	343601.814	398580.505	2.523

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	RE1	S1	41.531	0.600	41.250	40.520	0.730	56.9	150	5.52	50.0
1.001	S1	S2 CP	12.188	0.600	40.520	40.300	0.220	55.4	150	5.67	49.8
2.000	CH1	PI-1	2.021	0.600	40.240	40.220	0.020	101.1	300	5.02	50.0
2.001	PI-1	S2 CP	2.863	0.600	40.170	40.150	0.020	143.2	300	5.06	50.0

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	1.336	23.6	5.2	0.570	1.280	0.038	0.0	48	1.074
1.001	1.354	23.9	5.2	1.280	1.430	0.038	0.0	47	1.082
2.000	1.564	110.5	11.1	1.160	1.270	0.082	0.0	64	1.009
2.001	1.312	92.7	11.1	1.320	1.430	0.082	0.0	70	0.894



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)
1.002	S2 CP	S4 CP	7.205	0.600	40.150	40.110	0.040	180.1	300	5.77	49.4
3.000	RE2	S3	41.531	0.600	41.250	40.370	0.880	47.2	150	5.47	50.0
3.001	S3	S4 CP	5.319	0.600	40.370	40.260	0.110	48.4	150	5.53	50.0
1.003	S4 CP	TANK 1	2.500	0.600	40.110	39.990	0.120	20.8	300	5.78	49.4
1.004	TANK 1	S5 FC	2.500	0.600	39.990	39.970	0.020	125.0	300	5.81	49.3
1.005	S5 FC	S6	4.495	0.600	39.970	39.940	0.030	149.8	225	5.88	49.0
1.006	S6	S7	76.698	0.600	39.940	39.390	0.550	139.5	225	7.04	45.0
1.007	S7	S8	20.681	0.600	39.390	39.240	0.150	137.9	225	7.35	44.0
1.008	S8	S11 CP	8.720	0.600	39.240	39.190	0.050	174.4	300	7.47	43.6
4.000	S9	S10	73.021	0.600	40.350	39.970	0.380	192.2	300	6.08	48.3
5.000	CH-2	S10	14.360	0.600	40.145	40.045	0.100	143.6	225	5.22	50.0
4.001	S10	PI-2	1.356	0.600	39.970	39.960	0.010	135.6	300	6.09	48.2
4.002	PI-2	S11 CP	3.232	0.600	39.910	39.890	0.020	161.6	300	6.14	48.0
1.009	S11 CP	TANK 2	2.300	0.600	39.190	39.160	0.030	76.7	300	7.49	43.6
6.000	S12 ST	TANK 2	18.618	0.600	40.780	40.000	0.780	23.9	150	5.15	50.0
1.010	TANK 2	S13 FC	4.611	0.600	39.160	39.140	0.020	230.6	300	7.57	43.4
7.000	RE3	S13 FC	45.031	0.600	41.090	39.290	1.800	25.0	150	5.37	50.0
1.011	S13 FC	6509	11.496	0.600	39.140	39.087	0.053	216.9	300	7.75	42.8

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)
1.002	1.168	82.6	16.1	1.430	1.520	0.120	0.0	89	0.911
3.000	1.468	25.9	5.2	0.600	1.450	0.038	0.0	45	1.149
3.001	1.450	25.6	5.2	1.450	1.520	0.038	0.0	45	1.135
1.003	3.459	244.5	21.2	1.520	1.560	0.159	0.0	59	2.154
1.004	1.405	99.3	21.2	1.560	1.660	0.159	0.0	93	1.122
1.005	1.066	42.4	21.1	1.735	1.835	0.159	0.0	112	1.064
1.006	1.105	43.9	29.4	1.835	2.385	0.241	0.0	135	1.182
1.007	1.111	44.2	30.1	2.385	2.465	0.253	0.0	137	1.194
1.008	1.187	83.9	29.9	2.390	2.390	0.253	0.0	123	1.089
4.000	1.130	79.9	16.4	1.200	1.360	0.125	0.0	92	0.894
5.000	1.089	43.3	8.5	0.750	1.360	0.063	0.0	67	0.849
4.001	1.348	95.3	24.6	1.360	1.490	0.188	0.0	103	1.135
4.002	1.234	87.2	24.5	1.540	1.690	0.188	0.0	109	1.065
1.009	1.797	127.0	52.0	2.390	2.310	0.441	0.0	133	1.709
6.000	2.069	36.6	2.7	1.050	1.620	0.020	0.0	28	1.223
1.010	1.031	72.9	54.2	2.310	2.490	0.461	0.0	193	1.126
7.000	2.021	35.7	4.4	0.750	2.490	0.033	0.0	35	1.378
1.011	1.063	75.2	59.4	2.490	2.223	0.511	0.0	202	1.175



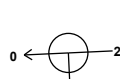
Pipeline Schedule

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	41.531	56.9	150	Circular	41.970	41.250	0.570	41.950	40.520	1.280
1.001	12.188	55.4	150	Circular	41.950	40.520	1.280	41.880	40.300	1.430
2.000	2.021	101.1	300	Circular	41.700	40.240	1.160	41.790	40.220	1.270
2.001	2.863	143.2	300	Circular	41.790	40.170	1.320	41.880	40.150	1.430
1.002	7.205	180.1	300	Circular	41.880	40.150	1.430	41.930	40.110	1.520
3.000	41.531	47.2	150	Circular	42.000	41.250	0.600	41.970	40.370	1.450
3.001	5.319	48.4	150	Circular	41.970	40.370	1.450	41.930	40.260	1.520
1.003	2.500	20.8	300	Circular	41.930	40.110	1.520	41.850	39.990	1.560
1.004	2.500	125.0	300	Circular	41.850	39.990	1.560	41.930	39.970	1.660
1.005	4.495	149.8	225	Circular	41.930	39.970	1.735	42.000	39.940	1.835
1.006	76.698	139.5	225	Circular	42.000	39.940	1.835	42.000	39.390	2.385
1.007	20.681	137.9	225	Circular	42.000	39.390	2.385	41.930	39.240	2.465
1.008	8.720	174.4	300	Circular	41.930	39.240	2.390	41.880	39.190	2.390
4.000	73.021	192.2	300	Circular	41.850	40.350	1.200	41.630	39.970	1.360
5.000	14.360	143.6	225	Circular	41.120	40.145	0.750	41.630	40.045	1.360
4.001	1.356	135.6	300	Circular	41.630	39.970	1.360	41.750	39.960	1.490
4.002	3.232	161.6	300	Circular	41.750	39.910	1.540	41.880	39.890	1.690
1.009	2.300	76.7	300	Circular	41.880	39.190	2.390	41.770	39.160	2.310
6.000	18.618	23.9	150	Circular	41.980	40.780	1.050	41.770	40.000	1.620
1.010	4.611	230.6	300	Circular	41.770	39.160	2.310	41.930	39.140	2.490
7.000	45.031	25.0	150	Circular	41.990	41.090	0.750	41.930	39.290	2.490
1.011	11.496	216.9	300	Circular	41.930	39.140	2.490	41.610	39.087	2.223

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	Node Type
1.000	RE1	150	Manhole	S1	1350	Manhole
1.001	S1	1350	Manhole	S2 CP	1350	Manhole
2.000	CH1	300	Manhole	PI-1	750	Manhole
2.001	PI-1	750	Manhole	S2 CP	1350	Manhole
1.002	S2 CP	1350	Manhole	S4 CP	1200	Manhole
3.000	RE2	150	Manhole	S3	1350	Manhole
3.001	S3	1350	Manhole	S4 CP	1200	Manhole
1.003	S4 CP	1200	Manhole	TANK 1		Junction
1.004	TANK 1		Junction	S5 FC	1200	Manhole
1.005	S5 FC	1200	Manhole	S6	1200	Manhole
1.006	S6	1200	Manhole	S7	1200	Manhole
1.007	S7	1200	Manhole	S8	1200	Manhole
1.008	S8	1200	Manhole	S11 CP	1200	Manhole
4.000	S9	1350	Manhole	S10	1350	Manhole
5.000	CH-2	225	Manhole	S10	1350	Manhole
4.001	S10	1350	Manhole	PI-2	750	Manhole
4.002	PI-2	750	Manhole	S11 CP	1200	Manhole
1.009	S11 CP	1200	Manhole	TANK 2		Junction
6.000	S12 ST	500	Manhole	TANK 2		Junction
1.010	TANK 2		Junction	S13 FC	1200	Manhole
7.000	RE3	150	Manhole	S13 FC	1200	Manhole
1.011	S13 FC	1200	Manhole	6509	1200	Manhole

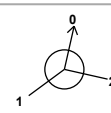
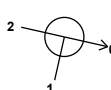
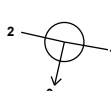


Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
RE1	343670.976	398681.845	41.970	0.720	150		0	1.000	41.250	150
S1	343661.848	398641.329	41.950	1.430	1350		1	1.000	40.520	150
							0	1.001	40.520	150
CH1	343649.965	398634.399	41.700	1.460	300		0	2.000	40.240	300
PI-1	343649.804	398637.912	41.790	1.620	750		1	2.000	40.220	300
							0	2.001	40.170	300
S2 CP	343649.673	398640.773	41.880	1.730	1350		1	2.001	40.150	300
							2	1.001	40.300	150
							0	1.002	40.150	300
RE2	343651.328	398686.271	42.000	0.750	150		0	3.000	41.250	150
S3	343642.201	398645.756	41.970	1.600	1350		1	3.000	40.370	150
							0	3.001	40.370	150
S4 CP	343642.476	398640.444	41.930	1.820	1200		1	3.001	40.260	150
							2	1.002	40.110	300
							0	1.003	40.110	300
TANK 1	343636.300	398613.031	41.850	1.860			1	1.003	39.990	300
							0	1.004	39.990	300
S5 FC	343635.751	398610.592	41.930	1.960	1200		1	1.004	39.970	300
							0	1.005	39.970	225
S6	343634.180	398606.380	42.000	2.060	1200		1	1.005	39.940	225
							0	1.006	39.940	225
S7	343559.318	398623.062	42.000	2.610	1200		1	1.006	39.390	225
							0	1.007	39.390	225
S8	343554.773	398602.887	41.930	2.690	1200		1	1.007	39.240	225
							0	1.008	39.240	300



Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S9	343633.179	398578.986	41.850	1.500	1350		0	4.000	40.350	300
CH-2	343550.381	398586.518	41.120	0.975	225		0	5.000	40.145	225
S10	343561.943	398595.035	41.630	1.660	1350		1 2	5.000 4.000	40.045 39.970	225 300
PI-2	343562.570	398597.817	41.750	1.840	750		1 0	4.001 4.002	39.960 39.910	300 300
S11 CP	343563.280	398600.970	41.880	2.690	1200		1 2 0	4.002 1.008 1.009	39.890 39.190 39.190	300 300 300
S12 ST	343582.200	398598.614	41.980	1.200	500		0	6.000	40.780	150
TANK 2	343599.863	398592.728	41.770	2.610			1 2 0	6.000 1.009 1.010	40.000 39.160 39.160	150 300 300
RE3	343648.708	398583.893	41.990	0.900	150		0	7.000	41.090	150
S13 FC	343604.362	398591.715	41.930	2.790	1200		1 2 0	7.000 1.010 1.011	39.290 39.140 39.140	150 300 300
6509	343601.814	398580.505	41.610	2.523	1200		1	1.011	39.087	300

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	19.500	Additional Storage (m³/ha)	0.0
Ratio-R	0.390	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440



Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	40	0	0
100	45	0	0

Node S5 FC Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.005	Sump Available	✓
Replaces Downstream Link	x	Product Number	CTL-SHE-0089-3200-0700-3200
Invert Level (m)	39.970	Min Outlet Diameter (m)	0.150
Design Depth (m)	0.700	Min Node Diameter (mm)	0
Design Flow (l/s)	3.2		

Node S13 FC Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.011	Sump Available	✓
Replaces Downstream Link	x	Product Number	CTL-SHE-0123-7100-1100-7100
Invert Level (m)	39.140	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.100	Min Node Diameter (mm)	0
Design Flow (l/s)	7.1		

Node TANK 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	39.990
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.96	Time to half empty (mins)	224

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	122.9	122.9	0.660	122.9	148.8	0.661	0.0	148.8

Node TANK 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	39.160
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.96	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	225.3	225.3	0.990	225.3	278.0	0.991	0.0	278.0



Results for 1 year Critical Storm Duration. Lowest mass balance: 99.49%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE1	10	41.298	0.048	5.2	0.0009	0.0000	OK
15 minute winter	S1	11	40.569	0.049	5.1	0.0697	0.0000	OK
15 minute winter	CH1	10	40.315	0.075	11.2	0.0053	0.0000	OK
15 minute winter	PI-1	10	40.259	0.088	11.1	0.0391	0.0000	OK
15 minute winter	S2 CP	10	40.242	0.092	15.9	0.1320	0.0000	OK
15 minute winter	RE2	10	41.295	0.045	5.2	0.0008	0.0000	OK
15 minute winter	S3	11	40.419	0.049	5.1	0.0699	0.0000	OK
15 minute winter	S4 CP	10	40.176	0.066	20.9	0.0749	0.0000	OK
120 minute winter	TANK 1	90	40.098	0.108	7.1	12.7458	0.0000	OK
120 minute winter	S5 FC	90	40.098	0.128	2.5	0.1448	0.0000	OK
15 minute winter	S6	11	40.016	0.076	11.2	0.0857	0.0000	OK
15 minute winter	S7	11	39.473	0.083	12.4	0.0943	0.0000	OK
240 minute winter	S8	176	39.327	0.087	4.5	0.0980	0.0000	OK
15 minute winter	S9	11	40.441	0.091	17.0	0.1303	0.0000	OK
15 minute winter	CH-2	10	40.215	0.070	8.6	0.0028	0.0000	OK
15 minute winter	S10	11	40.092	0.122	24.7	0.1753	0.0000	OK
15 minute winter	PI-2	11	40.033	0.123	24.6	0.0546	0.0000	OK
240 minute winter	S11 CP	164	39.343	0.153	12.2	0.1727	0.0000	OK
15 minute winter	S12 ST	10	40.808	0.028	2.7	0.0054	0.0000	OK
240 minute winter	TANK 2	176	39.326	0.166	17.3	35.8732	0.0000	OK
15 minute winter	RE3	10	41.126	0.036	4.5	0.0006	0.0000	OK
240 minute winter	S13 FC	176	39.326	0.186	5.8	0.2099	0.0000	OK
240 minute winter	6509	176	39.143	0.056	5.8	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 winter	RE1	1.000	S1	5.1	1.057	0.217	0.2011	
15 minute winter	S1	1.001	S2 CP	5.1	1.052	0.212	0.0588	
15 minute winter	CH1	2.000	PI-1	11.1	0.907	0.101	0.0249	
15 minute winter	PI-1	2.001	S2 CP	11.1	0.619	0.119	0.0511	
15 minute winter	S2 CP	1.002	S4 CP	15.8	1.070	0.192	0.1076	
15 minute winter	RE2	3.000	S3	5.1	1.096	0.198	0.1943	
15 minute winter	S3	3.001	S4 CP	5.1	1.073	0.197	0.0251	
15 minute winter	S4 CP	1.003	TANK 1	20.9	3.045	0.086	0.0236	
120 minute winter	TANK 1	1.004	S5 FC	2.5	0.270	0.025	0.0644	
120 minute winter	S5 FC	1.005	S6	2.5	0.538	0.058	0.0244	
15 minute winter	S6	1.006	S7	10.9	0.880	0.248	0.9625	
15 minute winter	S7	1.007	S8	12.1	0.902	0.275	0.2783	
240 minute winter	S8	1.008	S11 CP	5.6	0.421	0.067	0.2245	
15 minute winter	S9	4.000	S10	16.3	0.744	0.205	1.6450	
15 minute winter	CH-2	5.000	S10	8.5	0.827	0.195	0.1468	
15 minute winter	S10	4.001	PI-2	24.6	1.017	0.258	0.0328	
15 minute winter	PI-2	4.002	S11 CP	24.5	0.982	0.281	0.0808	
240 minute winter	S11 CP	1.009	TANK 2	16.8	1.226	0.133	0.0865	
15 minute winter	S12 ST	6.000	TANK 2	2.7	1.203	0.073	0.0413	
240 minute winter	TANK 2	1.010	S13 FC	5.4	0.137	0.074	0.1976	
15 minute winter	RE3	7.000	S13 FC	4.3	1.363	0.121	0.1433	
240 minute winter	S13 FC	1.011	6509	5.8	0.622	0.077	0.1065	72.7



Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.49%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE1	10	41.349	0.099	17.9	0.0018	0.0000	OK
15 minute winter	S1	11	40.624	0.104	17.6	0.1481	0.0000	OK
120 minute winter	CH1	114	40.409	0.169	12.2	0.0120	0.0000	OK
120 minute winter	PI-1	114	40.409	0.239	12.2	0.1057	0.0000	OK
120 minute winter	S2 CP	116	40.409	0.259	22.2	0.3707	0.0000	OK
15 minute winter	RE2	10	41.341	0.091	17.9	0.0016	0.0000	OK
15 minute winter	S3	11	40.475	0.105	17.7	0.1507	0.0000	OK
120 minute winter	S4 CP	116	40.409	0.299	31.2	0.3384	0.0000	OK
120 minute winter	TANK 1	118	40.409	0.419	54.6	49.4893	0.0000	SURCHARGED
120 minute winter	S5 FC	118	40.409	0.439	4.1	0.4969	0.0000	SURCHARGED
15 minute winter	S6	10	40.099	0.159	38.6	0.1798	0.0000	OK
240 minute winter	S7	236	39.782	0.392	11.5	0.4433	0.0000	SURCHARGED
240 minute winter	S8	236	39.781	0.541	11.0	0.6114	0.0000	SURCHARGED
15 minute winter	S9	10	40.534	0.184	58.5	0.2634	0.0000	OK
15 minute winter	CH-2	11	40.299	0.154	29.5	0.0061	0.0000	OK
15 minute winter	S10	11	40.254	0.284	85.9	0.4070	0.0000	OK
15 minute winter	PI-2	11	40.190	0.280	84.1	0.1239	0.0000	OK
240 minute winter	S11 CP	236	39.780	0.590	26.3	0.6677	0.0000	SURCHARGED
15 minute winter	S12 ST	10	40.833	0.053	9.4	0.0103	0.0000	OK
240 minute winter	TANK 2	236	39.780	0.620	28.0	134.1519	0.0000	SURCHARGED
15 minute winter	RE3	10	41.159	0.069	15.3	0.0012	0.0000	OK
240 minute winter	S13 FC	236	39.780	0.640	7.4	0.7238	0.0000	SURCHARGED
60 minute summer	6509	131	39.149	0.062	7.1	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 winter	RE1	1.000	S1	17.6	1.407	0.747	0.5210	
15 minute winter	S1	1.001	S2 CP	17.5	1.413	0.730	0.1506	
120 minute winter	CH1	2.000	PI-1	12.2	0.930	0.110	0.0886	
120 minute winter	PI-1	2.001	S2 CP	17.4	0.625	0.188	0.1788	
120 minute winter	S2 CP	1.002	S4 CP	21.3	1.104	0.259	0.4864	
15 minute winter	RE2	3.000	S3	17.7	1.451	0.681	0.5053	
15 minute winter	S3	3.001	S4 CP	17.4	1.427	0.678	0.0646	
120 minute winter	S4 CP	1.003	TANK 1	54.6	2.122	0.223	0.1760	
120 minute winter	TANK 1	1.004	S5 FC	4.1	0.275	0.041	0.1760	
120 minute winter	S5 FC	1.005	S6	3.2	0.614	0.076	0.0544	
15 minute winter	S6	1.006	S7	37.6	1.151	0.856	2.5684	
240 minute winter	S7	1.007	S8	11.0	0.784	0.249	0.8225	
240 minute winter	S8	1.008	S11 CP	10.5	0.434	0.125	0.6141	
15 minute winter	S9	4.000	S10	56.8	1.020	0.711	4.1600	
15 minute winter	CH-2	5.000	S10	29.1	1.016	0.671	0.4840	
15 minute winter	S10	4.001	PI-2	84.1	1.338	0.883	0.0862	
15 minute winter	PI-2	4.002	S11 CP	84.1	1.325	0.964	0.2028	
240 minute winter	S11 CP	1.009	TANK 2	26.2	1.579	0.206	0.1620	
15 minute winter	S12 ST	6.000	TANK 2	9.3	1.715	0.255	0.1011	
240 minute winter	TANK 2	1.010	S13 FC	7.0	-0.156	0.097	0.3247	
15 minute winter	RE3	7.000	S13 FC	15.0	1.914	0.419	0.4707	
240 minute winter	S13 FC	1.011	6509	7.1	0.660	0.094	0.1237	168.2



Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.49%

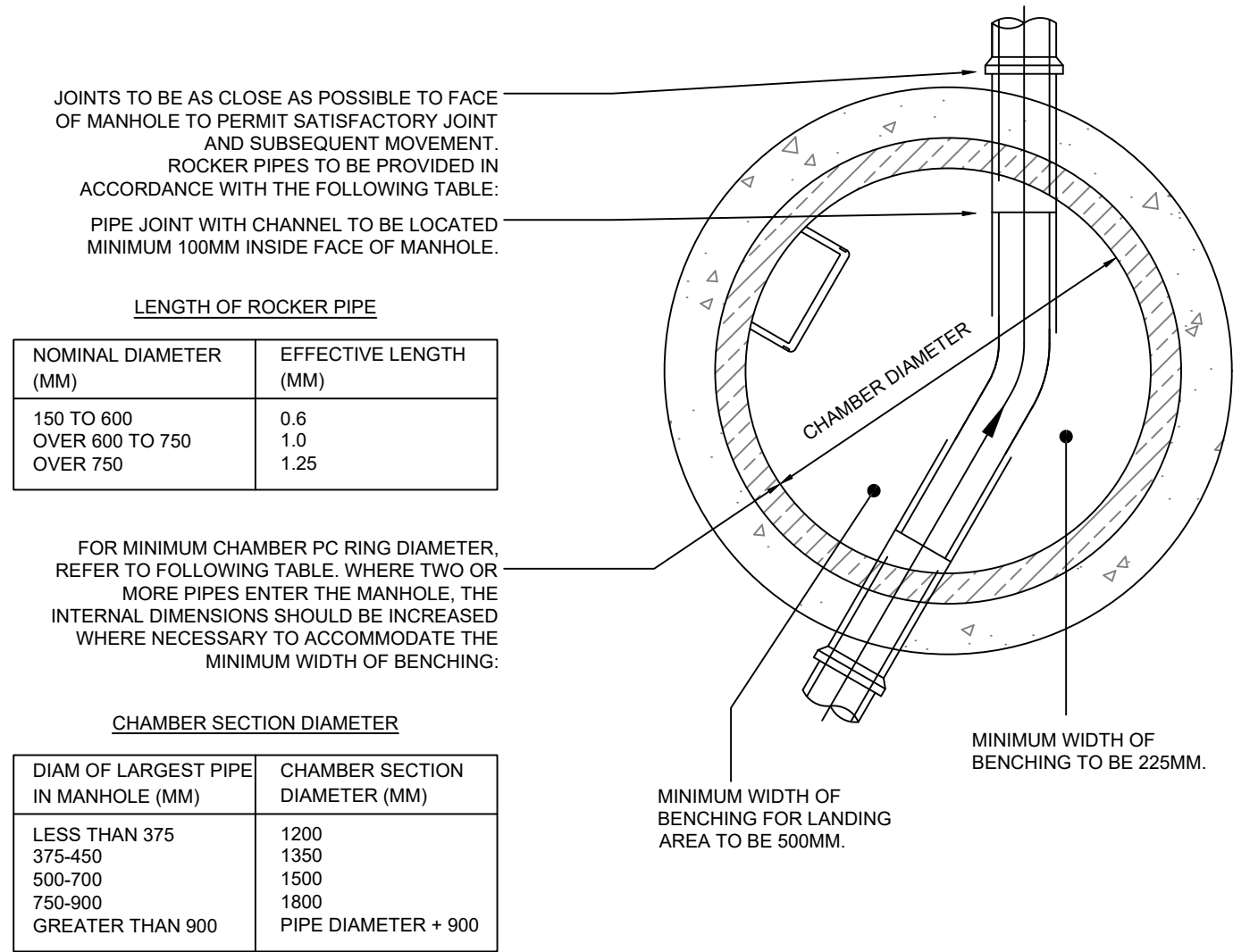
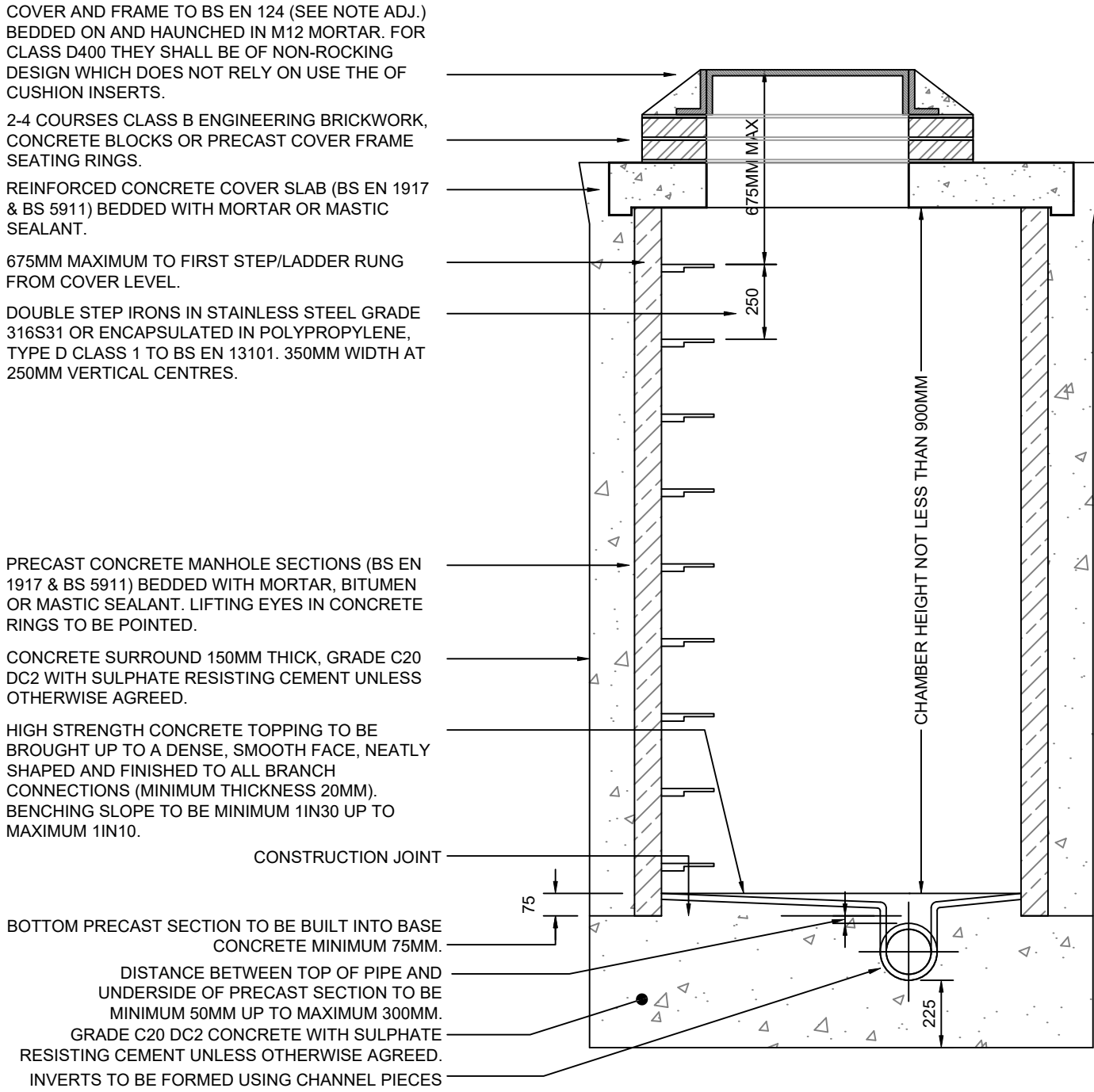
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE1	10	41.378	0.128	24.0	0.0023	0.0000	OK
15 minute winter	S1	11	40.661	0.141	23.5	0.2017	0.0000	OK
180 minute winter	CH1	176	40.606	0.366	12.2	0.0260	0.0000	SURCHARGED
180 minute winter	PI-1	176	40.606	0.436	15.5	0.1928	0.0000	SURCHARGED
180 minute winter	S2 CP	176	40.606	0.456	24.9	0.6529	0.0000	SURCHARGED
15 minute winter	RE2	10	41.364	0.114	24.0	0.0020	0.0000	OK
180 minute winter	S3	176	40.606	0.236	5.7	0.3383	0.0000	SURCHARGED
180 minute winter	S4 CP	176	40.606	0.496	22.8	0.5613	0.0000	SURCHARGED
180 minute winter	TANK 1	176	40.606	0.616	55.4	72.7053	0.0000	SURCHARGED
180 minute winter	S5 FC	176	40.606	0.636	3.9	0.7195	0.0000	SURCHARGED
15 minute winter	S6	11	40.368	0.428	51.6	0.4841	0.0000	SURCHARGED
360 minute winter	S7	352	40.062	0.672	11.3	0.7601	0.0000	SURCHARGED
360 minute winter	S8	352	40.061	0.821	10.7	0.9284	0.0000	SURCHARGED
15 minute winter	S9	11	40.692	0.342	78.5	0.4887	0.0000	SURCHARGED
15 minute winter	CH-2	10	40.445	0.300	39.6	0.0120	0.0000	SURCHARGED
15 minute winter	S10	10	40.333	0.363	110.5	0.5197	0.0000	SURCHARGED
15 minute winter	PI-2	10	40.258	0.348	109.5	0.1538	0.0000	SURCHARGED
360 minute winter	S11 CP	352	40.061	0.871	27.0	0.9848	0.0000	SURCHARGED
15 minute winter	S12 ST	10	40.842	0.062	12.6	0.0121	0.0000	OK
360 minute winter	TANK 2	352	40.061	0.901	28.7	194.7854	0.0000	SURCHARGED
15 minute winter	RE3	10	41.173	0.083	20.5	0.0015	0.0000	OK
360 minute winter	S13 FC	352	40.060	0.920	7.4	1.0409	0.0000	SURCHARGED
30 minute summer	6509	155	39.149	0.062	7.1	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 winter	RE1	1.000	S1	23.5	1.462	0.997	0.6764	
15 minute winter	S1	1.001	S2 CP	23.1	1.461	0.964	0.2068	
180 minute winter	CH1	2.000	PI-1	15.5	0.927	0.140	0.1423	
180 minute winter	PI-1	2.001	S2 CP	19.2	0.598	0.207	0.2016	
180 minute winter	S2 CP	1.002	S4 CP	17.6	1.081	0.213	0.5074	
15 minute winter	RE2	3.000	S3	23.7	1.518	0.913	0.6458	
180 minute winter	S3	3.001	S4 CP	6.1	1.094	0.239	0.0936	
180 minute winter	S4 CP	1.003	TANK 1	55.4	2.000	0.226	0.1760	
180 minute winter	TANK 1	1.004	S5 FC	3.9	0.232	0.040	0.1760	
180 minute winter	S5 FC	1.005	S6	3.2	0.612	0.075	0.0582	
15 minute winter	S6	1.006	S7	44.1	1.187	1.003	3.0504	
360 minute winter	S7	1.007	S8	10.7	0.710	0.242	0.8225	
360 minute winter	S8	1.008	S11 CP	10.6	0.404	0.126	0.6141	
15 minute winter	S9	4.000	S10	71.8	1.050	0.898	5.1421	
15 minute winter	CH-2	5.000	S10	39.1	1.024	0.904	0.5711	
15 minute winter	S10	4.001	PI-2	109.5	1.556	1.149	0.0954	
15 minute winter	PI-2	4.002	S11 CP	109.3	1.563	1.254	0.2168	
360 minute winter	S11 CP	1.009	TANK 2	26.9	1.457	0.212	0.1620	
15 minute winter	S12 ST	6.000	TANK 2	12.5	1.855	0.341	0.1253	
360 minute winter	TANK 2	1.010	S13 FC	6.2	-0.140	0.086	0.3247	
15 minute winter	RE3	7.000	S13 FC	20.1	2.055	0.562	0.5612	
360 minute winter	S13 FC	1.011	6509	7.1	0.660	0.094	0.1237	192.1

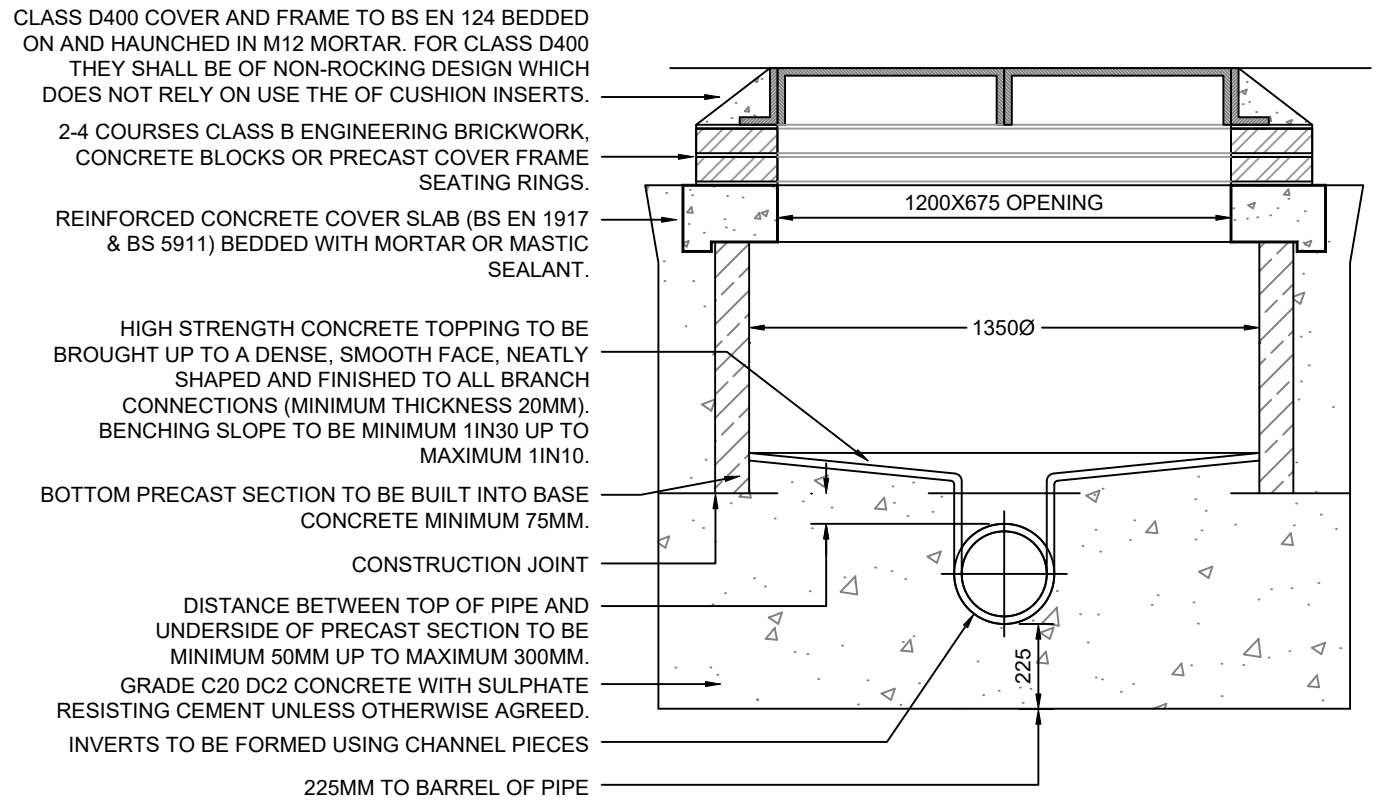


Appendix E – Drainage Details

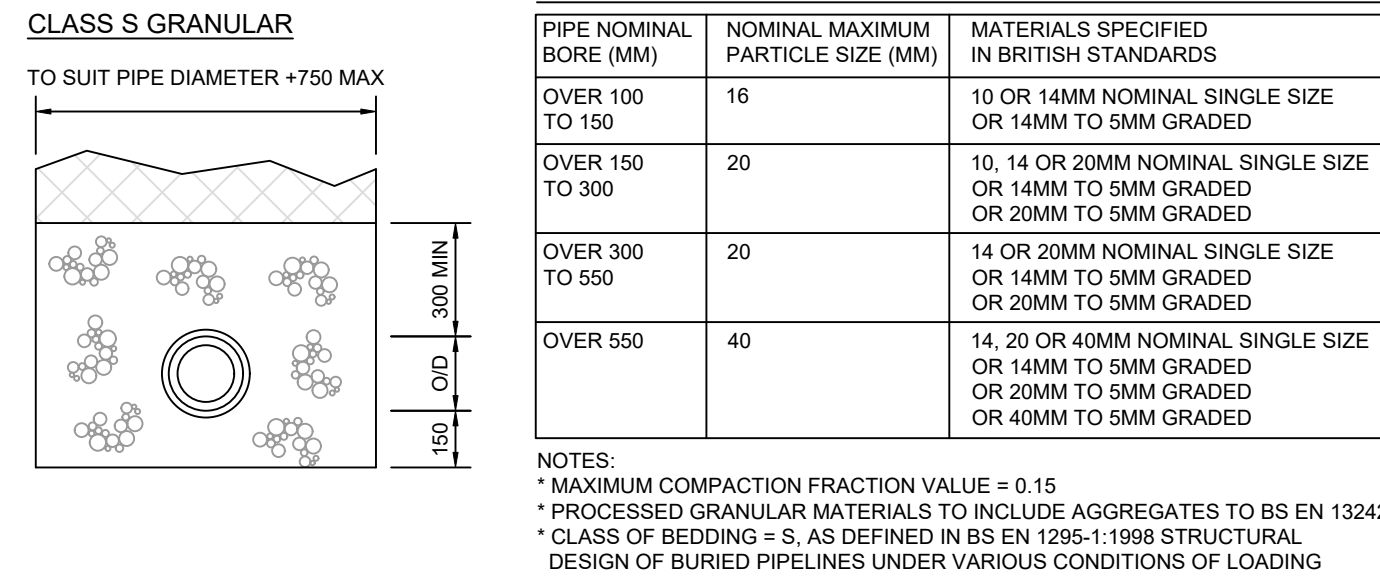
TYPE B - ACCESSIBLE PRECAST CONCRETE CHAMBER
[DEPTH FROM GROUND LEVEL TO SOFFIT OF PIPE 1.50M TO 3.00M]



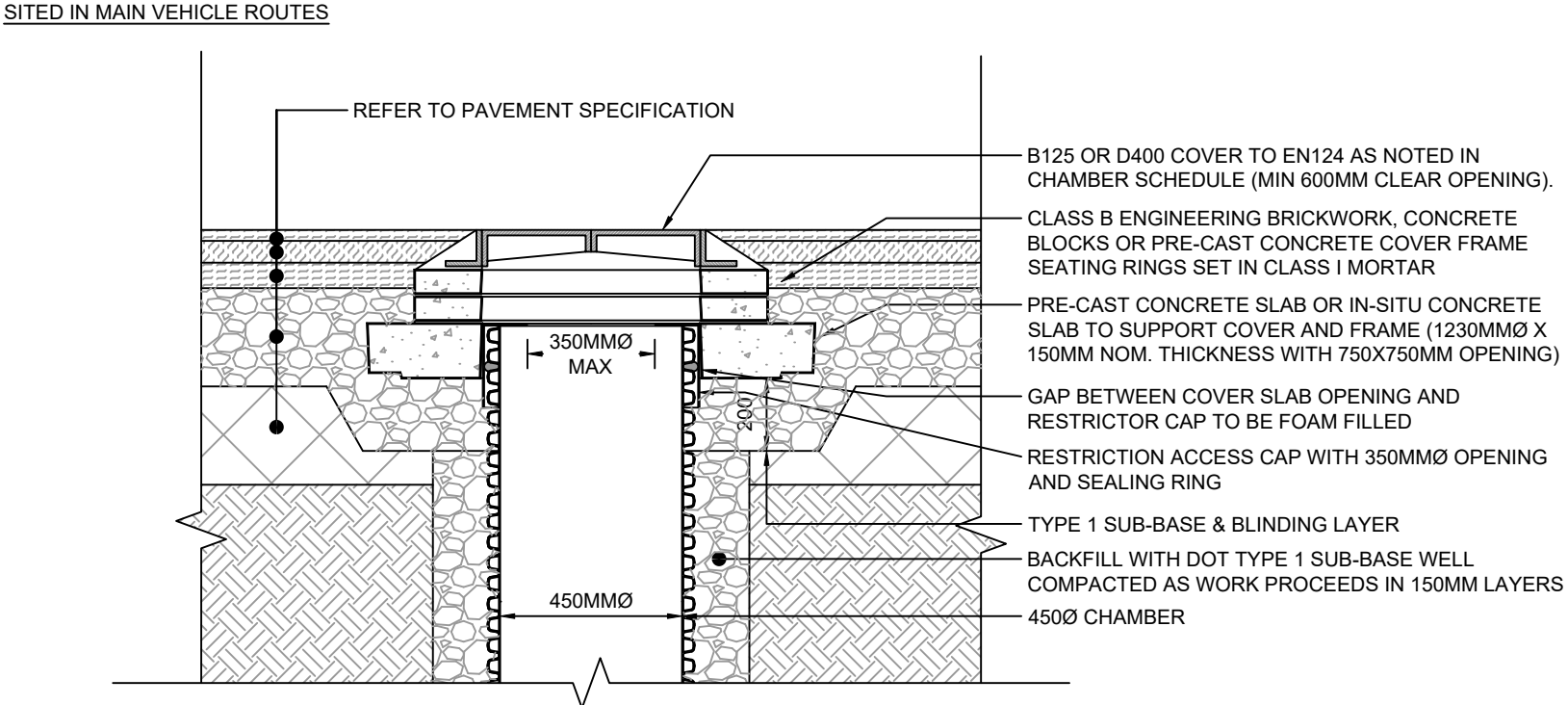
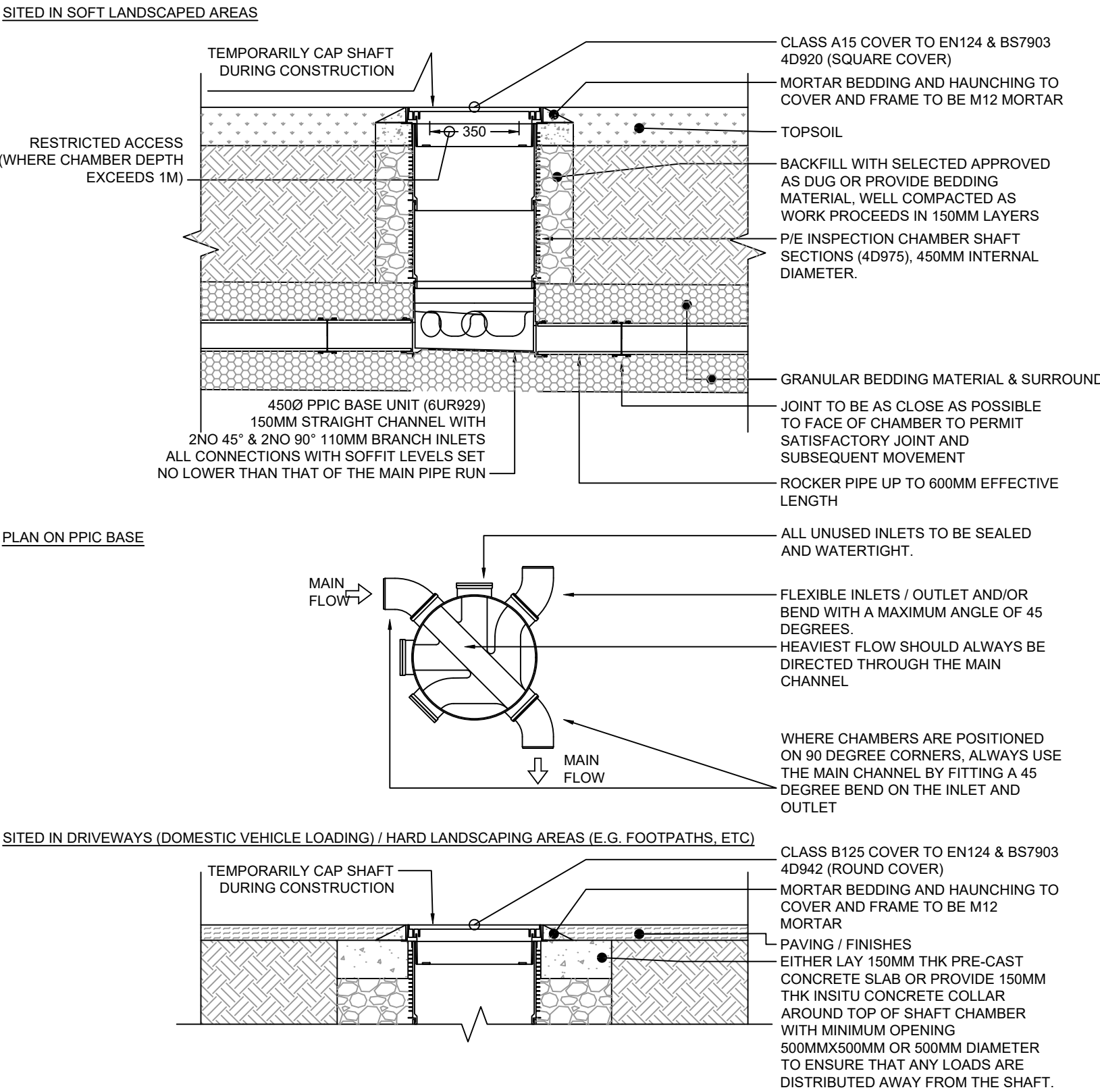
TYPE C - ACCESSIBLE PRECAST CONCRETE CHAMBER
[DEPTH FROM GROUND LEVEL TO SOFFIT OF PIPE LESS THAN 1.50M, MAXIMUM SEWER DIAMETER 450Ø]



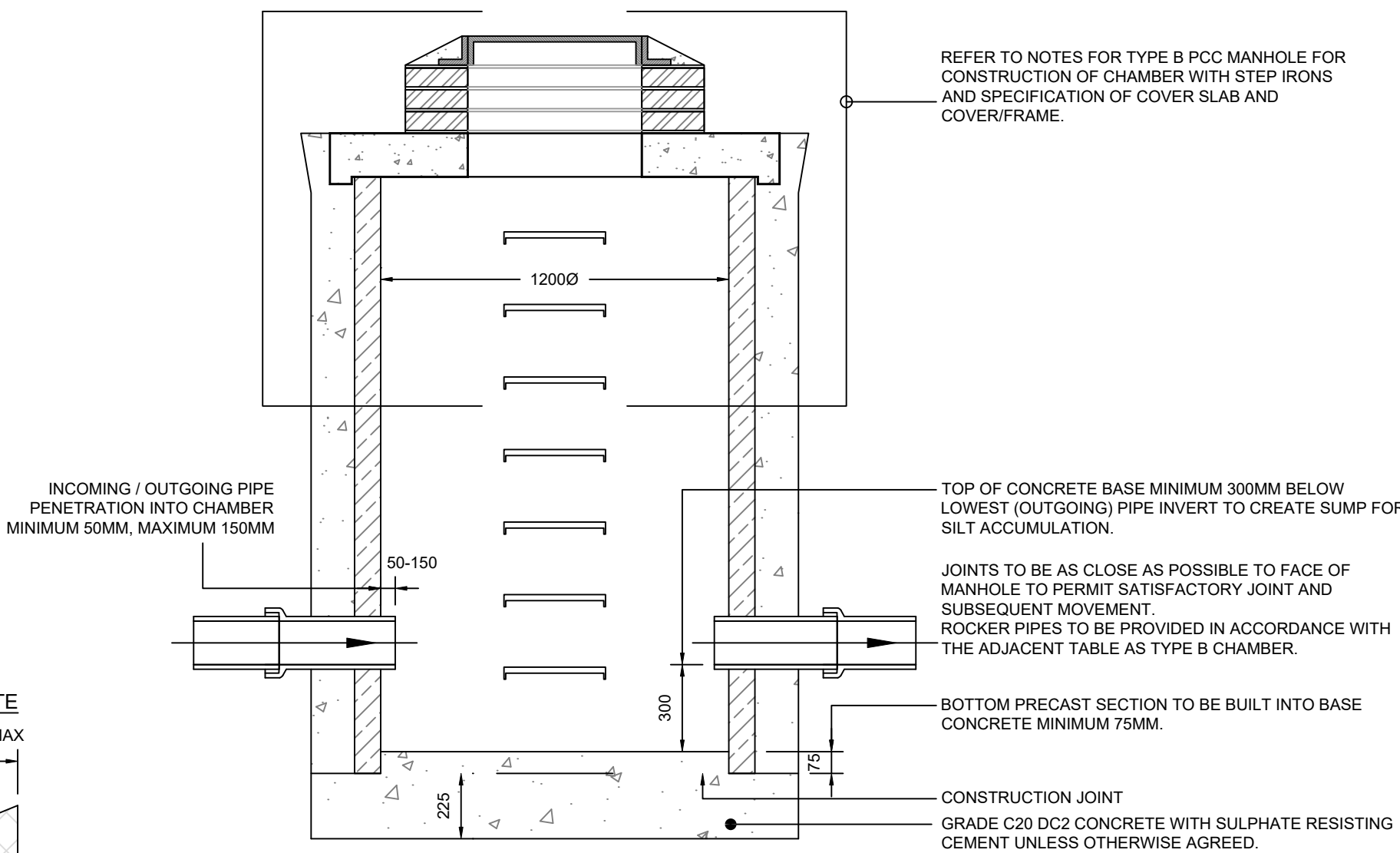
PIPE BEDDING



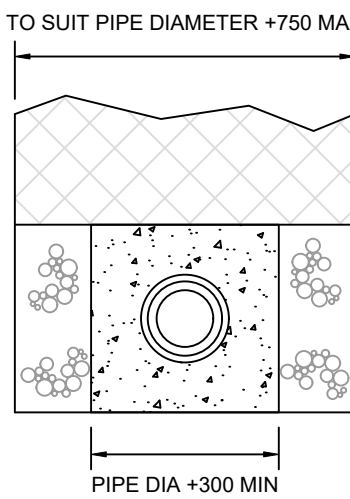
NON-ENTRY INSPECTION CHAMBER - OSMA/WAVIN 450Ø PPIC
[DEPTHS UP TO 1.2M, 100Ø/150Ø PIPES]



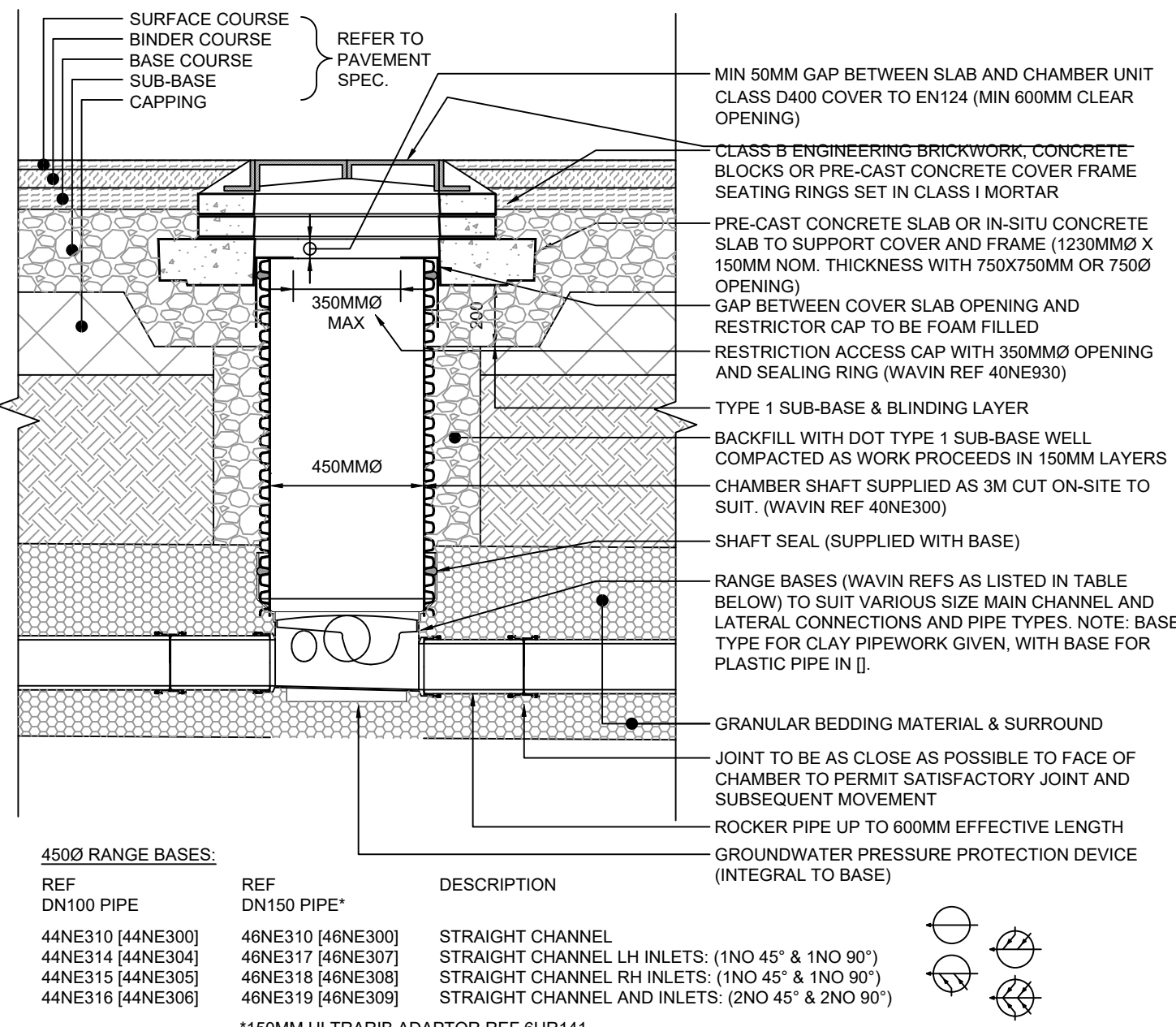
PRECAST CONCRETE CATCHPIT CHAMBER
[DEPTH FROM GROUND LEVEL TO SOFFIT OF PIPE UP TO 2.00M, PIPE DIAMETER UP TO 375MM]



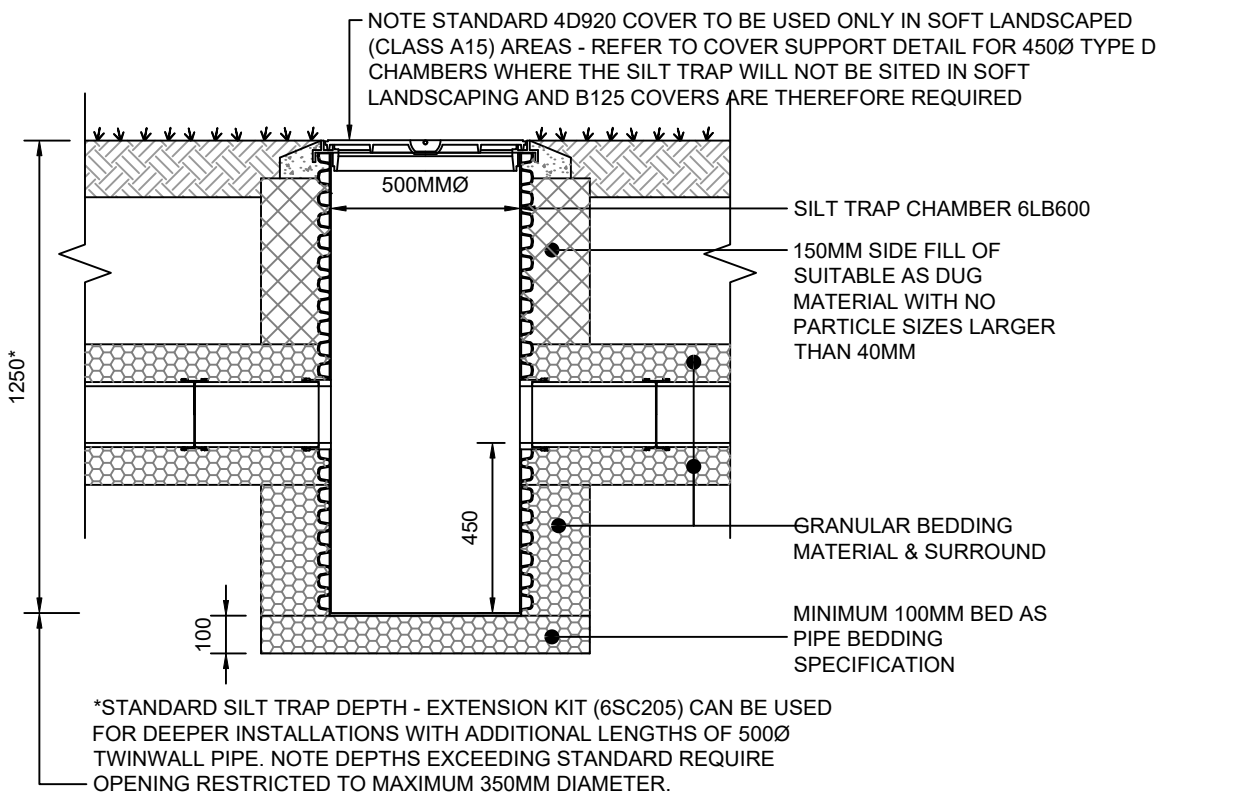
CLASS Z PLAIN CONCRETE



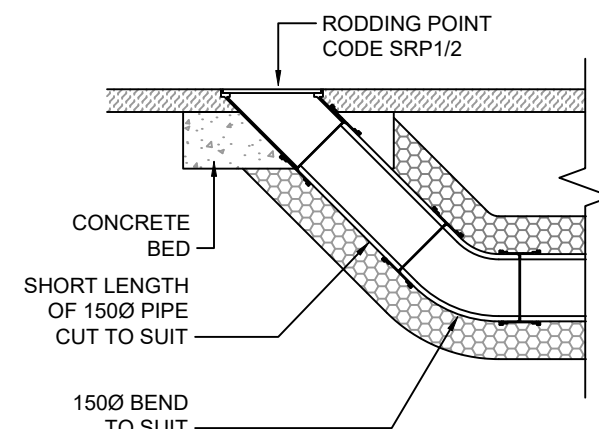
NON-ENTRY INSPECTION CHAMBER - RANGE 450Ø (WAVIN)
[DEPTHS GREATER THAN 1.0M AND UP TO 3.0M, 100Ø/150Ø PIPES]



500Ø SILT TRAP
[WAVIN 6LB600, 150Ø PIPES]



RODDING EYE



GENERAL NOTES:

- ALL DIMENSIONS IN MILLIMETRES
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT DRAWINGS (ARCHITECTURAL, M&E ETC).
- ALL BELOW GROUND DRAINAGE WORKMANSHIP TO BE CARRIED OUT IN STRICT ACCORDANCE WITH BS 8000 'WORKMANSHIP OF BUILDING SITES, PART 14: CODE OF PRACTICE FOR BELOW GROUND DRAINAGE'.
- EXACT LOCATIONS AND CURRENT USAGE OF ALL EXISTING DRAINAGE TO BE ESTABLISHED ON COMMENCEMENT OF ANY WORKS.
- ALL NEW BELOW GROUND DRAINAGE WORKS TO BE INSPECTED AND APPROVED BY BUILDING CONTROL PRIOR TO BACKFILLING.

PIPEWORK:

- ALL PIPEWORK TO HAVE CLASS S GRANULAR BED AND SURROUND AS FOLLOWS (UNLESS REQUIRED OTHERWISE - REFER TO NOTE 9 BELOW). BEDDING THICKNESS 150 MIN BELOW PIPE AND 100MM MIN BELOW SOCKETS TO BE LIGHTLY COMPACTED OVER FULL WIDTH OF TRENCH. WHERE TRENCH BOTTOM IS UNEVEN DUE TO HARD SPOTS OR OTHER REASONS, INCREASE DEPTH BY 100MM. SCOOP OUT LOCALLY AT COUPLINGS / SOCKETS AND LAY PIPES DIGGING INTO BED AND RESTING UNIFORMLY ON THEIR BARRELS. ADJUST TO LINE AND GRADIENT AFTER INITIAL TESTING. LAY AND COMPACT MORE GRANULAR MATERIAL IN 100MM LAYERS TO 150MM (300MM FOR ADAPTABLE SEWERS) ABOVE CROWN OF PIPE. GRANULAR MATERIAL TO WIS 4-08-01, TABLE A1 (RIGID PIPELINES) / TABLE A2 (FLEXIBLE PIPELINES), AND COMPLYING WITH WIS 4-08-02. RECYCLED MATERIALS COMPLYING WITH BS8500-2.
- CONCRETE SURROUND (CLASS Z): MIN CONCRETE GRADE GEN 3 (C20 STRENGTH) LAY CONCRETE BLINDING 25MM OVER FULL TRENCH AND ALLOW TO SET. LAY PIPES ON BLINDING ON FOLDED WEDGES OF COMPRESSIBLE BOARD NOT LESS THAN 100MM ABOVE BLINDING. FORM VERTICAL CONSTRUCTION JOINTS IN SURROUND AT FACE OF PIPE JOINT USING 18MM COMPRESSIBLE BOARD PRECUT TO PROFILE OF PIPE (PIPES LESS THAN 450MM DIA). FILL ANY GAP BETWEEN SPIGOT AND SOCKET WITH RESILIENT MATERIAL TO PREVENT ENTRY OF COCRETE. AFTER INITIAL TESTING, PLACE AND COMPACT MORE CONCRETE ACROSS FULL WIDTH OF TRENCH TO ENCASE PIPE TO 300MM ABOVE CROWN.
- SELECTED FILL MATERIAL: THIS SHOULD CONSIST OF UNIFORM READILY COMPACTABLE MATERIAL, FREE FROM TREE ROOTS, VEGETABLE MATTER, BUILDING RUBBISH AND FROZEN SOIL. WHEN USED AS FILL THE MATERIAL SHOULD NOT CONTAIN LARGE CLAY LUMPS OR COBBLES. 'AS DUG' MATERIAL MAY BE USED PROVIDED THAT IT IS READILY COMPACTABLE AND PROVIDES STABLE EMBEDMENT.
- WHERE THE FINAL DEPTH OF COVER TO THE CROWN OF PIPES IS LESS THAN 900MM IN AGRICULTURAL LAND AND PUBLIC OPEN SPACE OR LESS THAN 1200MM IN HIGHWAYS AND PARKING AREAS WITH UNRESTRICTED ACCESS FOR HGVs (VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES), THEY ARE TO HAVE A CONCRETE BED AND SURROUND AND MAY NEED ADDED PROTECTION VIA A REINFORCED CONCRETE SLAB. THE DEPTH OF COVER TO THE CROWN OF PIPES CAN BE REDUCED FOR THE FOLLOWING AREAS ONLY: DOMESTIC GARDENS AND PATHWAYS WITHOUT ANY POSSIBILITY OF VEHICULAR ACCESS - 350MM. DOMESTIC DRIVEWAYS, PARKING AREAS AND YARDS WITH HEIGHT RESTRICTIONS TO PREVENT ENTRY BY HGVs - 500MM. DOMESTIC DRIVEWAYS, PARKING AREAS AND NARROW STREETS WITHOUT FOOTWAYS (EG. MEWS DEVELOPMENTS) WITH LIMITED ACCESS FOR HGVs) - 900MM
- PIPE MATERIAL AND STRENGTH: ALL SEWER PIPES UP TO AND INCLUDING 225MM DIAMETER ARE TO BE VITRIFIED CLAY COMPLYING WITH BS 65 (STORM SEWERS) & BS EN 295 (FOUL SEWERS). ALL SEWER PIPES 300MM DIAMETER AND ABOVE TO BE CLASS M CONCRETE PIPES UNLESS NOTED OTHERWISE. UNSTABILISED PVC PIPES, JOINTS AND FITTINGS FOR GRAVITY SEWERS, WHERE AGREED AS AN ALTERNATIVE TO CLAY OR CONCRETE, SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS 4660 AND BS EN 1401-1. TO BE LAID IN MAXIMUM 3M LENGTHS. THERMOPLASTICS STRUCTURED WALL PIPES, WHERE AGREED AS AN ALTERNATIVE TO CLAY OR CONCRETE, SHALL COMPLY WITH THE RELEVANT PROVISIONS OF THE WIS 4-35-01.
- A FLEXIBLE MECHANICAL JOINT SHALL BE PROVIDED IN EACH SECTION OF THE PIPELINE AND WITHIN 150MM OF WHERE IT ENTERS A BUILDING OR CONNECTS WITH A WALL OR OTHER STRUCTURE.

ACCESS CHAMBERS:

- ALL POLYPROPYLENE INSPECTION CHAMBERS TO BE OSMA WAVIN (OR SIMILAR APPROVED) AND INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- ALL REINFORCED PRECAST CONCRETE SHAFTS, CHAMBERS, COVER SLABS, LANDING SLABS, AND SEATING RINGS TO BE BY F P MCCANN (OR SIMILAR APPROVED).
- ALL BRICKWORK SHALL BE CLASS B ENGINEERING, LAID ON CLASS (I) MORTAR IN ENGLISH BOND.
- CHAMBERS SHALL BE BACKFILLED WITH DOT TYPE 1 SUB-BASE.
- UNLESS OTHERWISE STATED, ALL MANHOLES AND CHAMBERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST VERSION OF DESIGN AND CONSTRUCTION GUIDANCE PUBLISHED BY WATER UK.
- THE FIRST MANHOLE UPSTREAM FROM THE CONNECTION TO THE PUBLIC SEWER SHOULD, WHEN CONSTRUCTED, BE FITTED WITH A SCREEN IN ORDER TO PREVENT DEBRIS ENTERING THE PUBLIC SEWER. THE SCREEN SHOULD NOT BE REMOVED UNTIL IMMEDIATELY PRIOR TO THE OCCUPATION OF PREMISES TO BE SERVED BY THE SEWER.
- MANHOLE COVER GRADES LOCATED IN: CARRIAGEWAY OF ROADS (INCL. PARKING AREAS): CLASS D400. FOOTPATHS, PAVED AREAS & DOMESTIC PARKING: CLASS B125. ALL FRAME DEPTHS TO BE 150MM MINIMUM, EXCEPT FOR RESIDENTIAL CUL-DE-SACS WHERE 100MM IS ACCEPTABLE. MINIMUM CLEAR OPENING = 600MM X 600MM FOR PRIVATE DRAINAGE.
- COVER LEVELS GIVEN TO CHAMBERS ARE TO BE ADJUSTED TO SUIT FINAL FINISHED SITE LEVELS.

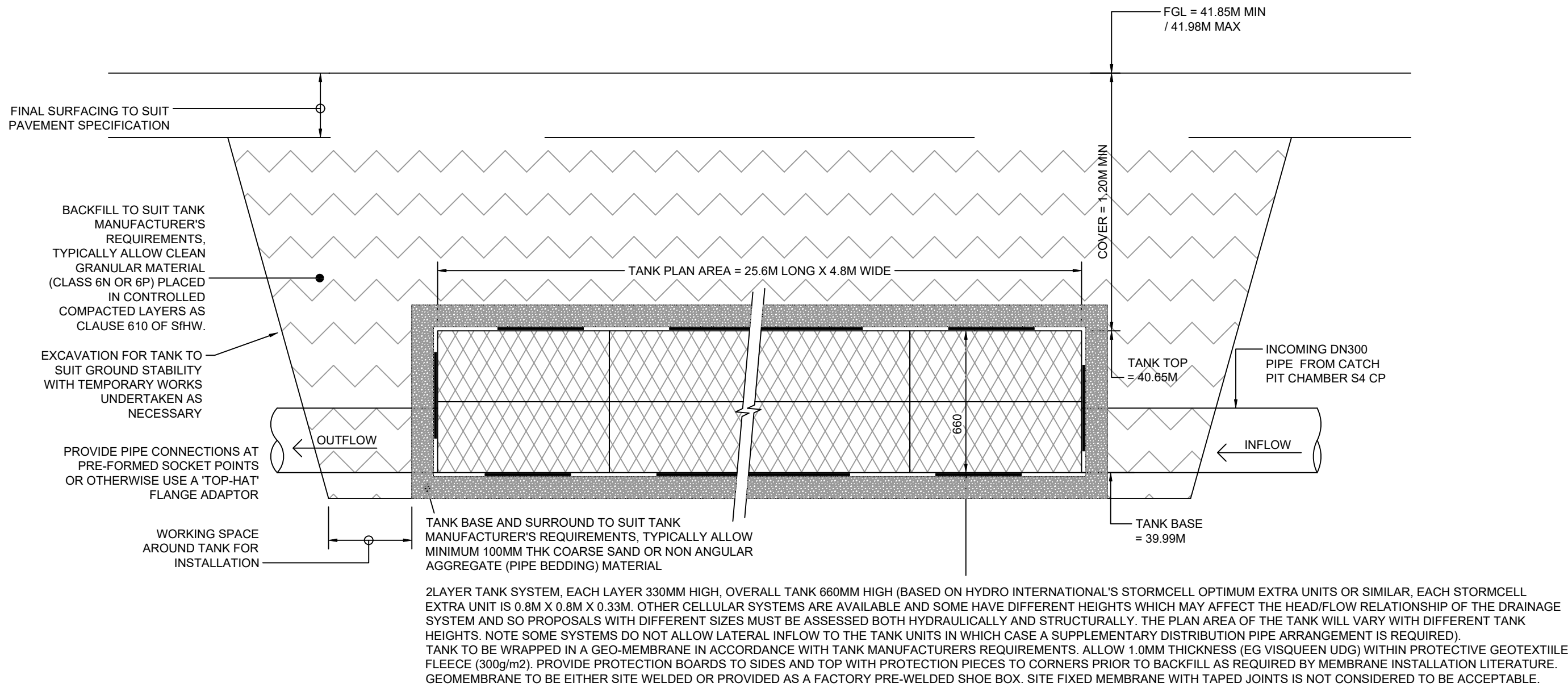


REV	DESCRIPTION	DATE
0	PROJECT TITLE PRIME POINT KNOWSLEY	JOB NO. 021B42
1	DRAWING TITLE DRAINAGE DETAILS SHEET 1	
2	DRAWING NO. 021B42-101	REVISION -
3	INITIALS CJE	SHEET SIZE A1
4	DATE 17 01 2025	SCALE NTS

PRIVATE CELLULAR/CRATED ATTENUATION TANK 1

TANK INSTALLATION AND BACKFILLING TO BE IN ACCORDANCE WITH CRATE MANUFACTURER'S REQUIREMENTS. ALL NECESSARY CLIPS AND CONNECTORS ARE TO BE PLACED WHEN THE TANK IS ASSEMBLED. THE TANK WILL REQUIRE VENTING - REFER TO TANK MANUFACTURER'S STANDARD DETAILS FOR APPROPRIATE METHOD.

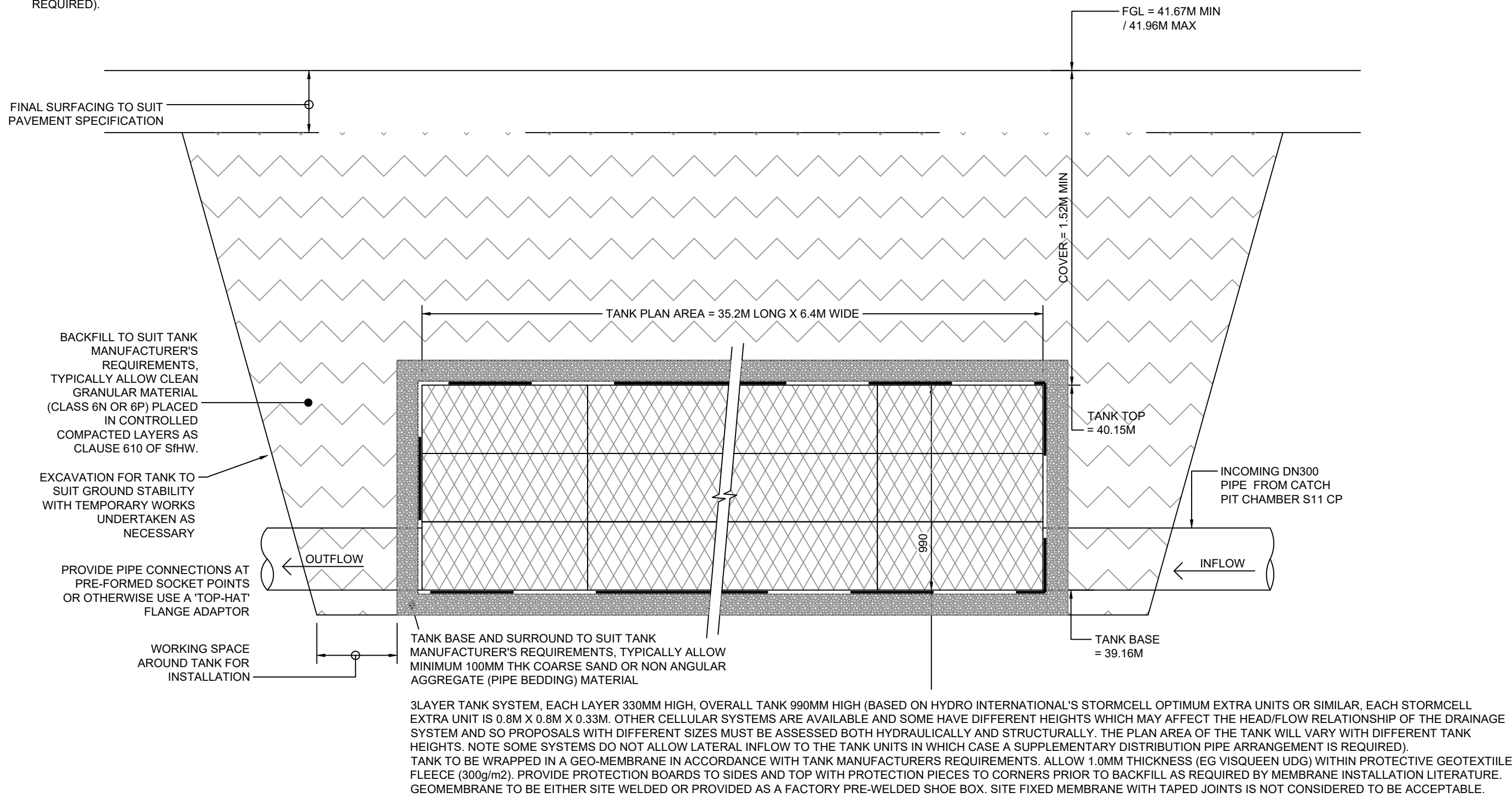
SITE SPECIFIC STRUCTURAL CALCULATIONS ARE TO BE UNDERTAKEN IN LINE WITH CIRIA C680/C737 ALLOWING FOR FINAL INSTALLED ENVIRONMENT UNDER HEAVY GOODS VEHICLE USAGE AREA. THE CONTRACTOR IS ALSO TO ASSESS USAGE OF THE AREA FOR THEIR REQUIREMENTS AND ENSURE THAT THE TANK IS NOT COMPROMISED AS A RESULT OF PLANT MOVEMENT, MATERIAL STORAGE OR ANY OTHER ONEROUS LOADING. SEQUENCE OF WORKING / TIMING OF TANK INSTALLATION TO BE CONSIDERED IN TERMS OF AVAILABLE COVER AND LOADING APPLIED PRIOR TO FINAL SURFACING BEING PLACED (IE TEMPORARY PROTECTION WORKS MAY BE REQUIRED).



PRIVATE CELLULAR/CRATED ATTENUATION TANK 2

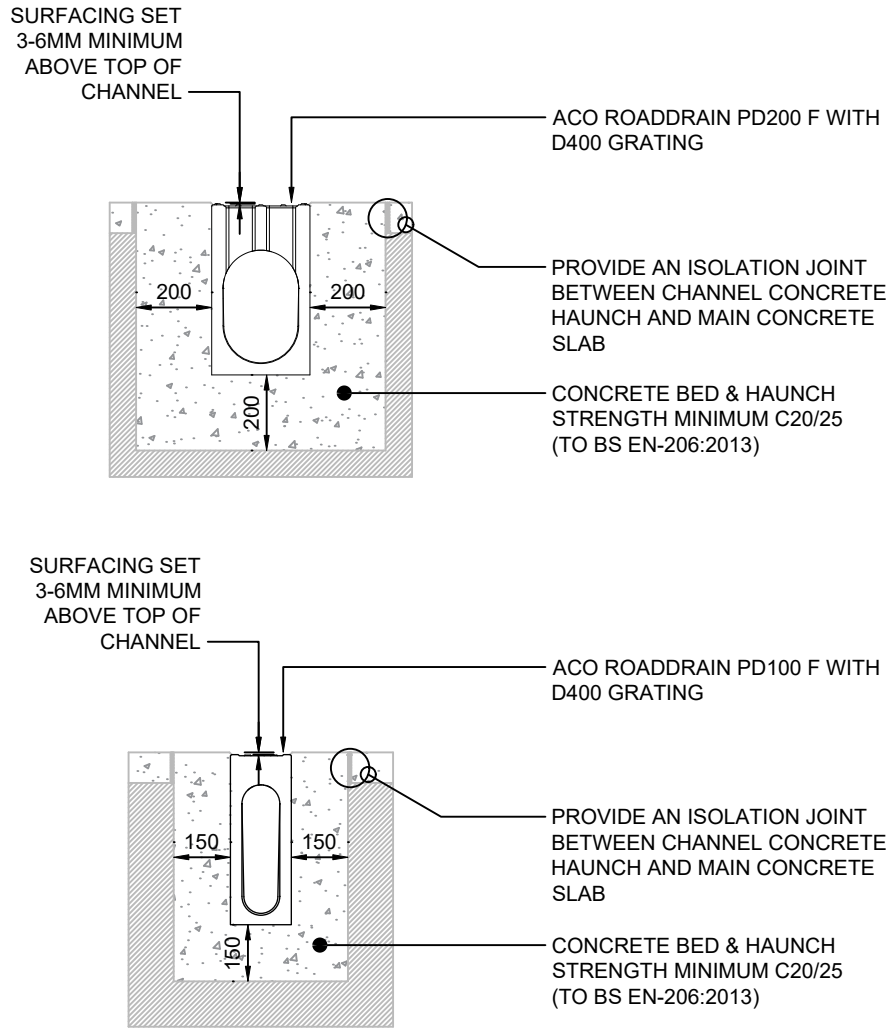
TANK INSTALLATION AND BACKFILLING TO BE IN ACCORDANCE WITH CRATE MANUFACTURER'S REQUIREMENTS. ALL NECESSARY CLIPS AND CONNECTORS ARE TO BE PLACED WHEN THE TANK IS ASSEMBLED. THE TANK WILL REQUIRE VENTING - REFER TO TANK MANUFACTURER'S STANDARD DETAILS FOR APPROPRIATE METHOD.

SITE SPECIFIC STRUCTURAL CALCULATIONS ARE TO BE UNDERTAKEN IN LINE WITH CIRIA C680/C737 ALLOWING FOR FINAL INSTALLED ENVIRONMENT UNDER HEAVY GOODS VEHICLE USAGE AREA. THE CONTRACTOR IS ALSO TO ASSESS USAGE OF THE AREA FOR THEIR REQUIREMENTS AND ENSURE THAT THE TANK IS NOT COMPROMISED AS A RESULT OF PLANT MOVEMENT, MATERIAL STORAGE OR ANY OTHER ONEROUS LOADING. SEQUENCE OF WORKING / TIMING OF TANK INSTALLATION TO BE CONSIDERED IN TERMS OF AVAILABLE COVER AND LOADING APPLIED PRIOR TO FINAL SURFACING BEING PLACED (IE TEMPORARY PROTECTION WORKS MAY BE REQUIRED).



ACO DRAINAGE CHANNELS

REFER TO PLAN FOR SPECIFICATION OF EACH CHANNEL:
PD200 F 10.1 (400MM OVERALL DEEP, 370MM TO INVERT)
PD200 F 20.1 (450MM OVERALL DEEP, 420MM TO INVERT)
PD100 F 50.0 (450MM OVERALL DEEP, 425MM TO INVERT)



GENERAL NOTES:

- ALL DIMENSIONS IN MILLIMETRES
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT DRAWINGS (ARCHITECTURAL, M&E ETC).
- ALL BELOW GROUND DRAINAGE WORKMANSHIP TO BE CARRIED OUT IN STRICT ACCORDANCE WITH BS 8000 'WORKMANSHIP OF BUILDING SITES, PART 14: CODE OF PRACTICE FOR BELOW GROUND DRAINAGE'.
- EXACT LOCATIONS AND CURRENT USAGE OF ALL EXISTING DRAINAGE TO BE ESTABLISHED ON COMMENCEMENT OF ANY WORKS.
- ALL NEW BELOW GROUND DRAINAGE WORKS TO BE INSPECTED AND APPROVED BY BUILDING CONTROL PRIOR TO BACKFILLING.

PIPEWORK:

- ALL PIPEWORK TO HAVE CLASS S GRANULAR BED AND SURROUND AS FOLLOWS (UNLESS REQUIRED OTHERWISE - REFER TO NOTE 9 BELOW).
 - BEDDING THICKNESS 150 MIN BELOW PIPE AND 100MM MIN BELOW SOCKETS TO BE LIGHTLY COMPACTED OVER FULL WIDTH OF TRENCH.
 - WHERE TRENCH BOTTOM IS UNEVEN DUE TO HARD SPOTS OR OTHER REASONS, INCREASE DEPTH BY 100MM. SCOOP OUT LOCALLY AT COUPLINGS / SOCKETS AND LAY PIPES DIGGING INTO BED AND RESTING UNIFORMLY ON THEIR BARRELS. ADJUST TO LINE AND GRADIENT
 - AFTER INITIAL TESTING, LAY AND COMPACT MORE GRANULAR MATERIAL IN 100MM LAYERS TO 150MM (300MM FOR ADOPTABLE SEWERS) ABOVE CROWN OF PIPE.
- GRANULAR MATERIAL TO WIS 4-08-01, TABLE A1 (RIGID PIPELINES) / TABLE A2 (FLEXIBLE PIPELINES), AND COMPLYING WITH WIS 4-08-02. RECYCLED MATERIALS COMPLYING WITH BS8500-2.
- CONCRETE SURROUND (CLASS Z2):
 - MIN CONCRETE GRADE GEN 3 (C20 STRENGTH)
 - LAY CONCRETE BLINDING 25MM OVER FULL TRENCH AND ALLOW TO SET.
 - LAY PIPES ON BLINDING ON FOLDED WEDGES OF COMPRESSIBLE BOARD NOT LESS THAN 100MM ABOVE BLINDING.
 - FORM VERTICAL CONSTRUCTION JOINTS IN SURROUND AT FACE OF PIPE JOINT USING 18MM COMPRESSIBLE BOARD PRECUT TO PROFILE OF PIPE (PIPES LESS THAN 450MM DIA). FILL ANY GAP BETWEEN SPIGOT AND SOCKET WITH RESILIENT MATERIAL TO PREVENT ENTRY OF CONCRETE.
 - AFTER INITIAL TESTING, PLACE AND COMPACT MORE CONCRETE ACROSS FULL WIDTH OF TRENCH TO ENCASE PIPE TO 300MM ABOVE CROWN.
- SELECTED FILL MATERIAL:
 - THIS SHOULD CONSIST OF UNIFORM READILY COMPACTIBLE MATERIAL, FREE FROM TREE ROOTS, VEGETABLE MATTER, BUILDING RUBBISH AND FROZEN SOIL.
 - WHEN USED AS FILL THE MATERIAL SHOULD NOT CONTAIN LARGE CLAY LUMPS OR COBBLES.
 - 'AS DUG' MATERIAL MAY BE USED PROVIDED THAT IT IS READILY COMPACTIBLE AND PROVIDES STABLE EMBEDMENT.
- WHERE THE FINAL DEPTH OF COVER TO THE CROWN OF PIPES IS LESS THAN 900MM IN AGRICULTURAL LAND AND PUBLIC OPEN SPACE OR LESS THAN 1200MM IN HIGHWAYS AND PARKING AREAS WITH UNRESTRICTED ACCESS FOR HGV's (VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES), THEY ARE TO HAVE A CONCRETE BED AND SURROUND AND MAY NEED ADDED PROTECTION VIA A REINFORCED CONCRETE SLAB. THE DEPTH OF COVER TO THE CROWN OF PIPES CAN BE REDUCED FOR THE FOLLOWING AREAS ONLY:
 - DOMESTIC GARDENS AND PATHWAYS WITHOUT ANY POSSIBILITY OF VEHICULAR ACCESS - 350MM.
 - DOMESTIC DRIVEWAYS, PARKING AREAS AND YARDS WITH HEIGHT RESTRICTIONS TO PREVENT ENTRY BY HGV's - 500MM
 - DOMESTIC DRIVEWAYS, PARKING AREAS AND NARROW STREETS WITHOUT FOOTWAYS (EG. MEWS DEVELOPMENTS) WITH LIMITED ACCESS FOR HGV's) - 900MM
- PIPE MATERIAL AND STRENGTH:
 - ALL SEWER PIPES UP TO AND INCLUDING 225MM DIAMETER ARE TO BE VITRIFIED CLAY COMPLYING WITH BS 65 (STORM SEWERS) & BS EN 295 (FOUL SEWERS).
 - ALL SEWER PIPES 300MM DIAMETER AND ABOVE TO BE CLASS M CONCRETE PIPES UNLESS NOTED OTHERWISE
 - UNPLASTICISED PVC PIPES, JOINTS AND FITTINGS FOR GRAVITY SEWERS, WHERE AGREED AS AN ALTERNATIVE TO CLAY OR CONCRETE, SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS 4660 AND BS EN 1401-1. TO BE LAID IN MAXIMUM 3M LENGTHS
 - THERMOPLASTICS STRUCTURED WALL PIPES, WHERE AGREED AS AN ALTERNATIVE TO CLAY OR CONCRETE, SHALL COMPLY WITH THE RELEVANT PROVISIONS OF THE W.I.S 4-35-01.
- A FLEXIBLE MECHANICAL JOINT SHALL BE PROVIDED IN EACH SECTION OF THE PIPELINE AND WITHIN 150MM OF WHERE IT ENTERS A BUILDING OR CONNECTS WITH A WALL OR OTHER STRUCTURE.

ACCESS CHAMBERS:

- ALL POLYPROPYLENE INSPECTION CHAMBERS TO BE OSMA WAVIN (OR SIMILAR APPROVED) AND INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- ALL REINFORCED PRECAST CONCRETE SHAFTS, CHAMBERS, COVER SLABS, LANDING SLABS, AND SEATING RINGS TO BE BY F P MCCANN (OR SIMILAR APPROVED).
- ALL BRICKWORK SHALL BE CLASS B ENGINEERING, LAID ON CLASS (i) MORTAR IN ENGLISH BOND.
- CHAMBERS SHALL BE BACKFILLED WITH DOT TYPE 1 SUB-BASE.
- UNLESS OTHERWISE STATED, ALL MANHOLES AND CHAMBERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST VERSION OF DESIGN AND CONSTRUCTION GUIDANCE PUBLISHED BY WATER UK.
- THE FIRST MANHOLE UPSTREAM FROM THE CONNECTION TO THE PUBLIC SEWER SHOULD, WHEN CONSTRUCTED, BE FITTED WITH A SCREEN IN ORDER TO PREVENT DEBRIS ENTERING THE PUBLIC SEWER. THE SCREEN SHOULD NOT BE REMOVED UNTIL IMMEDIATELY PRIOR TO THE OCCUPATION OF PREMISES TO BE SERVED BY THE SEWER.
- MANHOLE COVER GRADES LOCATED IN:
 - CARRIAGEWAY OF ROADS (INCL. PARKING AREAS): CLASS D400
 - FOOTPATHS, PAVED AREAS & DOMESTIC PARKING: CLASS B125
 - ALL FRAME DEPTHS TO BE 150MM MINIMUM, EXCEPT FOR RESIDENTIAL CUL-DE-SACS WHERE 100MM IS ACCEPTABLE. MINIMUM CLEAR OPENING = 600MM X 600MM FOR PRIVATE DRAINAGE.
- COVER LEVELS GIVEN TO CHAMBERS ARE TO BE ADJUSTED TO SUIT FINAL FINISHED SITE LEVELS.

REV		DESCRIPTION	DATE
PROJECT TITLE		PRIME POINT KNOWSLEY	JOB NO. 021B42
DRAWING TITLE		DRAINAGE DETAILS SHEET 2	
DRAWING NO.	REVISION	INITIALS	SHEET SIZE
021B42-102	-	CJE	A1
		DATE	SCALE
		17/01/2025	NTS



07470 955548
www.cjemm.co.uk