

DRAINAGE CONDITION DISCHARGE

Document Reference. 21458-CCL-LS-002

Revision. A

Date. 23.04.2024

Planning Application No	137467/JO/2023
Site Location	32-34 Laystall Street, Manchester.
Description	Erection of 9 storey residential building (Use Class C3) comprising 89 residential units (28 x 1 bed and 61 x 2 bed) and conversion of and 3 storey extension to 32-34 Laystall Street for use as offices (Class E) with associated external works following demolition of outrigger and associated structures along with other associated works including access, servicing, landscaping and secure cycle parking.
Applicant Name	Great Places Housing Group

Planning Application	FULL
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LLFA Drainage comments.

Condition 23: No above ground works shall commence until surface water drainage works have been submitted in accordance with Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) or any subsequent replacements national standards and details that have been submitted to and approved in writing by the Local Planning Authority.

In order to discharge the above drainage condition the following additional information has to be requested:

1. Full justification on why green SuDS solutions (such as blue/green roof systems) have not been included within the drainage layout where practicable.
2. The drainage layout should show all drainage elements including systems used to control surface water run-off on site at ground level and should also include the drainage for the refurbished listed building and the northern areas of the site.
3. Evidence that groundwater monitoring has taken place on site to identify the average groundwater level and where required mitigation measures must be put in place to ensure that the proposed basement level is not at risk of ground water flooding.
4. Evidence that the drainage system has been designed (unless an area is designated to hold and/or convey water as part of the design) so that flooding does not occur during a 1 in 100 year rainfall event with allowance for 40% climate change and a maximum pass flow of 5 l/s.

5. Assessment of overland flow routes for extreme events that is diverted away from buildings (including basements). Overland flow routes need to be designed to convey the flood water in a safe manner in the event of a blockage or exceedance of the proposed drainage system capacity including inlet structures. A layout with overland flow routes needs to be presented with appreciation of these overland flow routes with regards to the properties on site and adjacent properties off site.
6. Where surface water is connected to the public sewer, agreement in principle from United Utilities is required that there is adequate spare capacity in the existing system taking future development requirements into account. An email of acceptance of proposed flows and/or new connection will suffice.
7. Hydraulic calculations of the proposed drainage system; construction details of flow control, attenuation features and SuDS elements.

CCL Response

Condition

1. Full justification on why green SuDS solutions (such as blue/green roof systems) have not been included within the drainage layout where practicable.

Refer to Architect justification appended to the back of this document, Section 6.

2. The drainage layout should show all drainage elements including systems used to control surface water run-off on site at ground level and should also include the drainage for the refurbished listed building and the northern areas of the site.

Refer to Drainage Layout appended to the back of this document for drainage elements to control surface water run-off. Refer to separate Drainage scheme (1902-LS-DP2-A180-RP-XX-9033 rev P02 Drainage Strategy) and planning condition 7 discharge document for the refurbished listed building and northern areas, by others.

3. Evidence that groundwater monitoring has taken place on site to identify the average groundwater level and where required mitigation measures must be put in place to ensure that the proposed basement level is not at risk of ground water flooding.

See below statement from CCL Geo-environmental Engineer.

Several phases of investigation have been carried out at this site between March 2022 and October 2022. The works included both a Phase 1 Desk Based Study and Phase 2 Site Investigation.

The desk based study highlighted the ground conditions beneath the site to include predominantly low permeability cohesive strata (Devensian Till) to significant depths, underlain by sandstone of the Chester Formation. Hydrogeological data provided as part of the assessment categorised the drift soils as an Undifferentiated Aquifer – these are not typically formations which yield significant groundwater bodies and were previously referred to as minor or non-aquifers.

The intrusive ground investigations comprises the drilling of 9 no. boreholes across the site to depth ranging from 2.4m to 24.0m bgl along with the excavation of 4 no. trial pits to depths up to 4.1m bgl. During drilling groundwater was recorded in 2 no. locations only as "seepage" within the shallow soils and is representative of a small, discontinuous perched groundwater body. No evidence of true groundwater levels was observed during the fieldwork.

Groundwater monitoring wells were installed in 6 no. boreholes. Post fieldwork monitoring was subsequently undertaken on 3 occasions during winter between 1st February and 28th February 2022. Three boreholes were found to be completely dry during all monitoring visits with the remaining boreholes recording groundwater between 0.9m and 1.9m bgl.

In conclusion, there is evidence of some discrete pockets of perched groundwater located within the near surface soils, though there is no indication of a continuous groundwater body within the drift strata which could cause flooding to the basement area.

4. Evidence that the drainage system has been designed (unless an area is designated to hold and/or convey water as part of the design) so that flooding does not occur during a 1 in 100 year rainfall event with allowance for 40% climate change and a maximum pass flow of 5 l/s.

Refer to Hydraulic Calculations appended to the back of this document. The surface water drainage system has been designed not to flood up to the 1 in 100 year including 45% for climate change.

5. Assessment of overland flow routes for extreme events that is diverted away from buildings (including basements). Overland flow routes need to be designed to convey the flood water in a safe manner in the event of a blockage or exceedance of the proposed drainage system capacity including inlet structures. A layout with overland flow routes needs to be presented with appreciation of these overland flow routes with regards to the properties on site and adjacent properties off site.

Refer to Overland Flow Path drawing appended to the back of this document.

With regards to the courtyard area, given that the basement level is c.1.5m below road level (Brock Street), should a blockage occur preventing surface water discharge, the basement could potentially receive flood water. Given the impermeable catchment size of this area (94m²), this has been considered as low risk. Providing maintenance of on-site drainage is carried out in accordance with the drainage maintenance strategy, and United Utilities maintain their public sewer assets, the risk to flooding due to blockage has been considered as low risk.

6. Where surface water is connected to the public sewer, agreement in principle from United Utilities is required that there is adequate spare capacity in the existing system taking future development requirements into account. An email of acceptance of proposed flows and/or new connection will suffice.

Refer to correspondence appended to the back of this report containing United Utilities approval of the connection to the Public Sewer in Pigeon Street for surface water and foul water discharge.

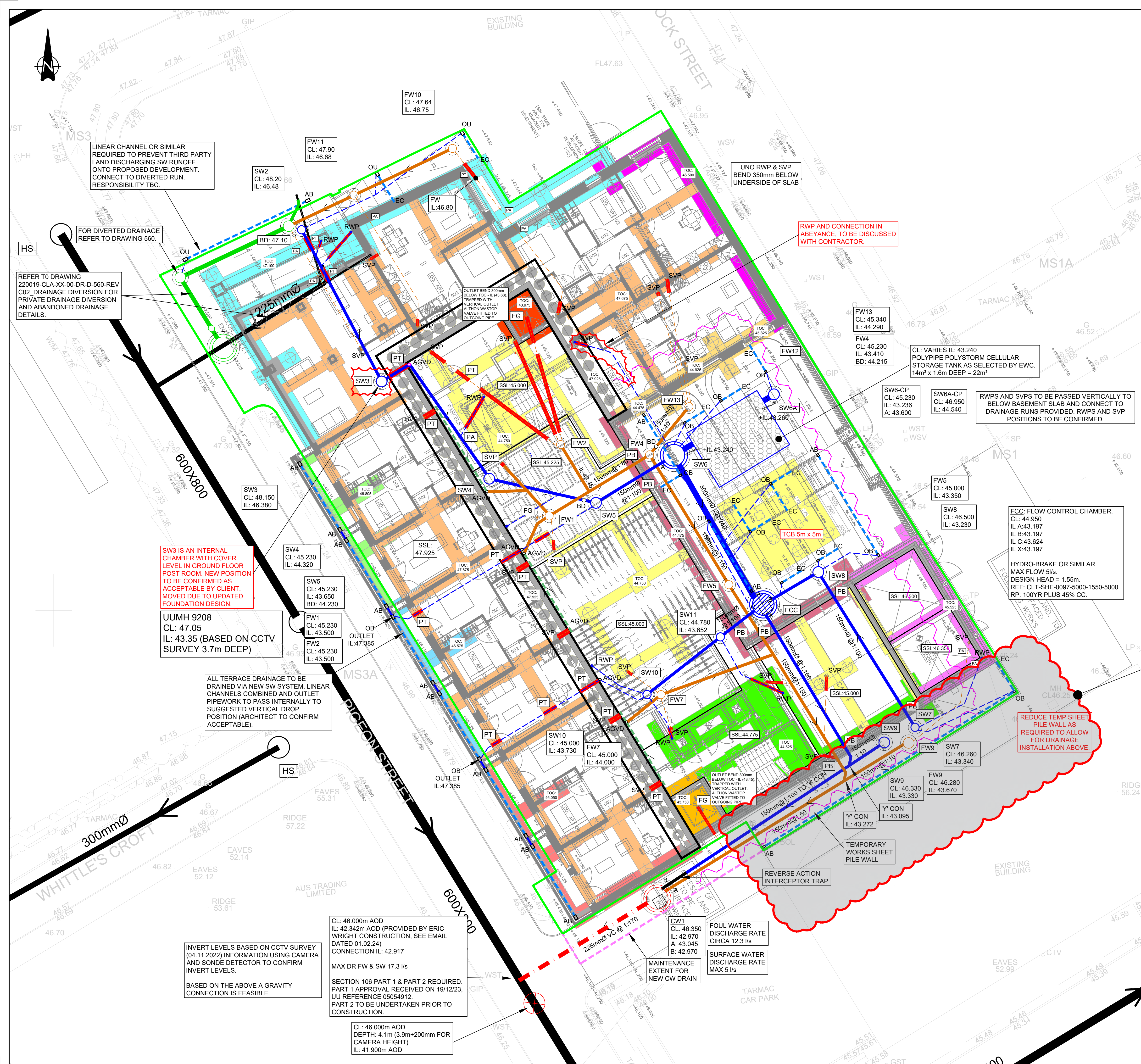
7. Hydraulic calculations of the proposed drainage system; construction details of flow control, attenuation features and SuDS elements.

Refer to calculations and details appended to the back of this document.

CCL Documents/Drawings Included

1. Drainage Strategy Layout.
2. Surface Water Hydraulic Calculations
3. Overland Flow Plan
4. United Utilities approval
5. Drainage Construction Details
6. Architect Correspondence Regarding Green Roof Justification

1. Drainage Strategy Layout



KEY:

- SITE BOUNDARY
- PUBLIC COMBINED SEWER
- EX PRIVATE COMBINED DRAIN
- PROPOSED FW DRAIN 150mmØ UNO
- PROPOSED SW DRAIN 150mmØ UNO
- PROPOSED CW DRAIN 225mmØ UNO
- PROPOSED CELLULAR STORAGE. SDS OR SIMILAR.
- PROPOSED FLOW CONTROL CHAMBER
- PROPOSED RAIN WATER PIPE AND 150mm CONNECTION (TBC)
- PROPOSED SOIL VENT PIPE AND 150mm CONNECTION (TBC). *SVP TO BE MOVED OFF WALL.
- WASHDOWN GULLY, VERTICAL OUTLET, TRAPPED TYPE. SPECIFICATION BY ARCHITECT.
- ABOVE GROUND VERTICAL DROP POSITION TO PASS DOWN TO BELOW GROUND DRAINAGE SYSTEM. ARCHITECT TO CONFIRM ACCEPTABLE.
- GATIC SLOT DRAIN OR SIMILAR APPROVED. CASTSLOT TREADSAFE TYPE. OUTLET AND ACCESS BOXES TO BE PROVIDED. OUTLET PIPE TO MATCH CHANNEL OR 150mm MINIMUM. SIZE TBC.
- EXISTING DRAINAGE TO BE ABANDONED
- FOUNDATIONS. SEE FOUNDATION KEY
- PASS THROUGH, PASS ABOVE, PASS BELOW WALL OR FOUNDATION
- ABOVE GROUND DRAINAGE TO BE CO-ORDINATED WITH MEP AND ARCHITECT
- DIVERTED EXISTING DRAINAGE INVERT LEVELS TBC
- BASEMENT AREA (LG). SLAB LEVELS VARY, SEE PLAN.
- AREA IN ABEYANCE.
- CAST IN OR PASSING THROUGH FOUNDATION.

GENERAL NOTE:

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRAWING 1-21458/CLA/XX/00/D/504.

DRAWING BASED ON THE FOLLOWING:

- EXISTING SURVEY INFORMATION
 - UNITED UTILITIES SEWER RECORDS
 - TEAM DRAINAGE CCTV SURVEY INFORMATION 09.11.2022
 - TOPOGRAPHICAL SURVEY (L&M SURVEY SERVICES) - 18.01.21 17E111_2D
- ARCHITECTURAL INFORMATION (04.11.2022)
 - 1383-OMI-XX-LG-DR-A-L110-P04
 - 1383-OMI-XX-00-DR-A-L1109-P05
 - 1383-OMI-XX-RL-DR-A-L1109-P04
 - 1383-OMI-XX-RL-DR-A-L1120-P05
- FOUNDATION INFORMATION
 - 220019-CLA-XX-FN-DR-S-007
 - 220019-CLA-XX-FN-DR-S-008
 - 220019-CLA-XX-FN-DR-S-009

PROPOSED DRAINAGE SUBJECT TO APPROVAL WITH RELEVANT AUTHORITIES.

Rev	Date	Description	By	Check	App.
P1	04.11.22	FIRST ISSUE			
P2	11.11.22	STAGE 3			
P3	26.01.23	ATTENUATION REPOSITIONED DRAINAGE UPDATED TO SUIT			
P4	26.05.23	DRAINAGE UPDATED TO SUIT REVISED BASEMENT PLAN			
P5	30.06.23	UPDATED TO SUIT COMMENTS			
P6	21.07.23	PRIVATE COMBINED DRAIN ROUTE UPDATED			
P7	17.08.23	DRAINAGE WITHIN RIGHT OF ACCESS UPDATED			
P8	08.12.23	DRAINAGE UPDATED TO SUIT NEW FOUNDATIONS AND RELOCATED TANK			
C01	10.01.24	CLOUDED AREA FOR CONSTRUCTION ONLY			
C02	13.01.24	REVISED SHEET PILE WALL ADDED AND COMMENTS FROM EWC INCORPORATED WHERE POSSIBLE			

FOUNDATIONS KEY

TOC =	GB3 = 800mm DEEP GB4 = 600mm DEEP
44.750	
44.475	
44.525	
45.525	
47.675	
47.100	

Client: GREAT PLACES HOUSING GROUP

Project: LAYSTALL STREET DEVELOPMENT MANCHESTER

Office: MANCHESTER

Discipline: CIVIL AND STRUCTURAL

Title: DRAINAGE LAYOUT

Scale @ A1: 1-100

Status: STAGE 5

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Job Number	Originator	Building/Zone	Level
220019	CLA	XX	00

Type	Discipline	Drawing No.	Revision
DR	C	500	C02

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.

2. ALL ADOPTABLE DRAINAGE WORKS INCLUDING WORKS TO EXISTING PUBLIC SEWERS TO BE UNDERTAKEN IN ACCORDANCE WITH 'SEWERS FOR ADOPTION 7th EDITION' AND "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY 7th EDITION" AND CONSTRUCTED TO THE RELEVANT STATUTORY UNDERTAKERS DETAILS.

3. ALL PRIVATE DRAINAGE WORKS TO BE IN ACCORDANCE WITH CURTINS DRAINAGE SPECIFICATION, "CIVIL ENGINEERING SPECIFICATION FOR THE WATER INDUSTRY 7th EDITION", BS EN 752 2017 'DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS' AND THE BUILDING REGULATIONS APPROVED 'DOCUMENT H'.

4. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.

5. DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF THE DESIGN.

6. OUTFALL CONNECTION(S) SUBJECT TO AGREEMENT WITH THE APPROVING AUTHORITY.

7. ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.

8. COVER LEVELS, GULLY POSITIONS, AND BUILDINGS LOCATION ARE APPROXIMATE AND SHALL BE CONFIRMED BY ARCHITECT/ LANDSCAPE ARCHITECT. CONTRACTOR TO ALLOW FOR ADJUSTMENT TO SUIT AGREED POSITIONS AND FINISHED LEVELS, AND CONFIRM ALL COVER LEVELS ON SITE.

9. ALL INTERNAL DRAINAGE CONNECTIONS ARE PROVIDED TO THE PENETRATION POSITIONS SHOWN ON ARCHITECT AND M&E DRAWINGS. REFER TO DIMENSIONED LOCATIONS AND DIAMETERS ON ARCHITECT'S GROUND FLOOR SETTING-OUT PLANS.

10. ALL UNDERGROUND FOUL DRAINAGE SHOULD BE SUITABLY VENTED AT OR NEAR TO THE HEAD OF RUNS.

11. ALL ACCESS FITTINGS, STACKS, RWP'S AND GULLIES TO BE RODDABLE. ALL TO HAVE LOW LEVEL RODDING ACCESS PLATES UNLESS AN ALTERNATIVE MEANS OF ACCESS IS AGREED. ACCESS POINT TO BE ABOVE ANY GROUND FLOOR CONNECTED APPLIANCE SPILL LEVEL.

12. LARGE ACCESS FITTING REQUIRED ABOVE GROUND WHERE GREATER THAN 12M UP TO 22M TO A JUNCTION. SMALL ACCESS FITTING REQUIRED UP TO 12M TO A JUNCTION.

13. ALL GULLY AND CHANNEL DRAIN OUTLETS AND TERMINATION POINTS TO BE TRAPPED AND RODDABLE. INTERNAL GULLIES AND CHANNEL DRAINS TO BE SPECIFIED BY OTHERS.

14. WHERE NO WC'S ARE CONNECTED UPSTREAM, UNDERSLAB FW DRAINAGE TO BE LAID AT 1:40 MIN. AFTER THE CONNECTION OF AT LEAST 1NO WC, A MIN. FALL OF 1:80 APPLIES.

15. ALL CONNECTIONS FROM POP-UPS TO BE LAID AT A CONSTANT GRADIENT TO JUNCTION/ INSPECTION CHAMBER/ MANHOLE UNLESS NOTED OTHERWISE. ANY ISSUES RELATING TO CLASHES WITH FOUNDATIONS ARE TO BE FORWARDED TO THE ENGINEER, ALLOWING SUFFICIENT TIME FOR AN ALTERNATIVE SOLUTION TO BE PROPOSED.

16. INVERT LEVELS AT MANHOLES/ INSPECTION CHAMBERS TO BE USED TO SET OUT PIPEWORK. PIPE GRADIENTS ARE SHOWN INDICATIVELY ONLY.

17. ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS.

18. ALL PIPWORK, UNLESS AGREED OTHERWISE STATED, SHALL BE:
 - 100mm to 300mm DIA TO BE VITRIFIED CLAY.
 - 375mm DIA AND GREATER TO BE CLASS 120 CONCRETE PIPES.

19. AS AN ALTERNATIVE THE CONTRACTOR MAY USE AN APPROVED UNPLASTICISED POLYVINYL CHLORIDE (PVCU) WITH APPROVAL FROM THE ENGINEER.

20. SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS.

21. THE FIRST PIPE OUT OF MANHOLES TO BE AS SHORT AS PRACTICABLE SO AS TO PROVIDE A FLEXIBLE JOINT AS CLOSE AS POSSIBLE TO THE OUTSIDE FACE OF THE CONCRETE SURROUND AND CONNECTED TO A LENGTH OF ROCKER PIPE.

22. ALL NEW CONNECTIONS INTO EXISTING MANHOLES (OR INTO EXISTING SEWERS) TO BE 'SOFFITS LEVEL' UNLESS OTHERWISE NOTED.
23. ALL ADOPTABLE DRAINAGE PIPES WILL REQUIRE A MINIMUM OF 1200mm COVER, IN ACCORDANCE WITH SEWERAGE UNDERTAKERS REQUIREMENTS. WHERE THIS IS NOT ACHIEVED, IT WILL BE NECESSARY TO AGREE THE BED AND SURROUND DETAIL.

24. ALL PRIVATE DRAINAGE PIPES WITH A COVER OF LESS THAN 600mm IN NON-TRAFFICKED AREAS AND LESS THAN 1200mm IN TRAFFICKED AREAS TO BE BEDDED AND SURROUNDED IN CONCRETE (CLASS Z). COMPRESSIBLE MATERIAL SHALL BE PROVIDED AT EVERY PIPE JOINT. WHERE COVER EXCEEDS THIS DEPTH, PIPES ARE TYPICALLY BEDDED AND SURROUNDED IN CLASS S. REFER TO PIPE EMBEDMENT DETAILS DRAWING FOR SPECIFIC TYPES.

25. WHERE DRAINAGE PIPES ARE LESS THAN 300mm BELOW THE UNDERSIDE OF THE GROUND FLOOR SLAB, CONCRETE ENCASEMENT IS REQUIRED (CLASS Z). COMPRESSIBLE JOINTS ARE TO BE PROVIDED AT EVERY PIPE JOINT WITHIN THE CONCRETE.

26. WHERE PIPES ARE MORE THAN 300mm BELOW THE UNDERSIDE OF THE SLAB, CLASS S BEDDING IS ACCEPTABLE.

27. SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED TO PROVE THAT SUCH PRECAUTIONS ARE NOT REQUIRED.

28. WHERE FOUL SEWERS RUN ABOVE SURFACE SEWERS, CONCRETE PROTECTION MAY BE REQUIRED AT CROSSOVERS TO PREVENT ANY POTENTIAL CONTAMINATION.

29. ALL CONNECTIONS PASSING THROUGH BASES OR EDGE BEAMS TO BE IN SEALED SLEEVES. ALTERNATIVELY CONNECTIONS MAY BE CAST-IN WITH FLEXIBLE JOINTS NOT GREATER THAN 150MM FROM FACE OF CONCRETE.

30. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION MAY NEED TO BE INCREASED TO ACCOMMODATE THE CONNECTIONS AND BENDS.

31. ALL MANHOLE COVERS IN BLOCK/SLAB AND EXTERNAL PAVING AREAS TO HAVE RECESSED COVERS OF THE APPROPRIATE GRADE TO ACCEPT ARCHITECT'S PAVING PROPOSAL.

32. ALL INTERNAL COVERS TO HAVE MECHANICALLY JOINTED CORNERS AND DOUBLE SEALED WITH RECESSED TRAY TO ALLOW FOR FINISHES.

33. UNLESS NOTED OTHERWISE IN THE MANHOLE SCHEDULE, ALL MANHOLE, GULLY AND CHANNEL COVERS (IRONWORK) SHOULD BE THE FOLLOWING SPECIFICATION:
 - B125 LOAD CLASS IN PEDESTRIAN AREAS
 - D400 LOAD CLASS IN VEHICULAR AREAS.

34. ALL PROPRIETARY PRODUCTS TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS, INSTRUCTIONS AND RECOMMENDATIONS.

35. PRIOR TO ANY DRAINAGE WORKS, CONTRACTOR TO CONFIRM INVERT LEVELS FOR CONNECTION POINTS AND PROVIDE THIS INFORMATION TO THE ENGINEER.

36. CONTRACTOR TO MAKE ALLOWANCE FOR REMEDIATION WORKS TO EXISTING DRAINAGE (I.E. DAMAGED PIPEWORK ETC) TO REMAIN.

37. DRAINAGE LAYOUT SUBJECT TO FORMAL RECEIPT OF ACCEPTANCE OF DRAINAGE STRATEGY BY THE LLFA AND UNITED UTILITIES.

38. WHERE DRAINAGE IS TO BE PASSED THROUGH WALLS OR FOUNDATION, APPROPRIATE WATER PROOFING REQUIRED I.E. WATER BARS AND/OR PUDDLE FLANGE.

39. BELOW GROUND DRAINAGE THAT PASSES INTERNAL TO ABOVE GROUND DRAINAGE TO BE CO-ORDINATED WITH MEP ENGINEER.

40. FOUNDATION AND DRAINAGE CLASH DETECTION REQUIRED AT STAGE 4, TO CONFIRM PIPEWORK REQUIRED TO PASS ABOVE, THROUGH OR BELOW FOUNDATIONS.

41. ARCHITECT OR LANDSCAPE ARCHITECT TO CONFIRM MANHOLE COVER TYPES WITHIN BASEMENT AND EXTERNAL AREAS. ALLOW FOR RECESSED TYPE IN EXTERNAL AREAS TO RECEIVE PAVING FINISHES. ALL INTERNAL MANHOLES TO BE DOUBLE SEALED AND LOCKING TYPE.

MANHOLE SCHEDULE															
MH REF	CL (mAOD)	IL (mAOD)	DEPTH TO SOFFIT (m)	DS PIPE DIA (m)	MH DIA (mm)	MH TYPE	COVER SIZE (mm)	COVER CLASS	RECESSED	RESTRICTED ACCESS	BACK DROP	COMMENTS	EASTING	NORTHING	
SURFACE WATER															
SW1 - OMITTED													TBC AT STAGE 5		
SW2	48.200	46.480	1.570	0.150	600	PPIC	600X600	B125	Y	Y		NON ENTRY			
SW3	48.150	46.380	1.620	0.150	600	PPIC	600X600	B125	Y	Y		INTERNAL. DOUBLE SEALED AND LOCKING TYPE.			
SW4	45.230	44.320	0.760	0.150	600	PPIC	600X600	C250	N	N		NON ENTRY			
SW5	45.230	43.650	1.430	0.150	600	PPIC	600X600	C250	N	Y	BD: 44.23	NON ENTRY			
SW6A	46.950	44.540	2.110	0.300	1200	PCC	600X600	C250	Y	Y		CATCHPIT			
SW6	45.230	43.236	1.694	0.300	1200	PCC	600X600	C250	Y	N		CATCHPIT			
SW7	46.260	43.340	2.770	0.150	600	PPIC	600X600	D400	N	Y		NON ENTRY	384997.621	398243.533	
SW8	46.500	43.230	3.120	0.150	600	PPIC	600X600	B125	Y	Y		NON ENTRY			
SW10	45.000	43.730	1.120	0.150	600	PPIC	600X600	B125	Y	Y		NON ENTRY			
SW11	44.780	43.652	0.978	0.150	600	PPIC	600X600	B125	Y	N		NON ENTRY			
FCC	44.950	43.197	1.603	0.150	1200	PCC	600X600	B125	Y	N		FLOW CONTROL CHAMBER			
SW9	46.330	43.330	2.850	0.150	600	PPIC	600X600	D400	N	Y		NON ENTRY	384995.924	398242.697	
FOUL WATER DIVERSION															
FW1	45.230	43.500	1.580	0.150	450	PPIC	450X450	C250	N	Y		NON ENTRY			
FW2	45.230	43.500	1.580	0.150	450	PPIC	450X450	C250	N	Y		NON ENTRY			
FW3 - OMITTED													TBC AT STAGE 5		
FW4	45.230	43.410	1.670	0.150	450	PPIC	450X450	C250	Y	Y	BD: 44.215	NON ENTRY			
FW5	45.000	43.350	1.500	0.150	450	PPIC	450X450	B125	Y	Y		NON ENTRY			
FW6 - OMITTED															
FW7	45.000	44.000	0.850	0.150	450	PPIC	450X450	B125	N	N		NON ENTRY			
FW8 - OMITTED													TBC AT STAGE 5		
FW9	46.280	43.670	2.460	0.150	600	PPIC	600X600	D400	N	Y		NON ENTRY		384997.272	398242.667
FW10 - OMITTED															
FW11 - OMITTED															
FW12 - OMITTED															
FW13	45.340	44.290	0.900	0.150	450	PPIC	450X450	C250	Y	N		NON ENTRY			
COMBINED WATER															
CW1	46.350	42.970	3.155	0.225	1200	PCC	600X600	D400	N	N		DS IL TBC.	384983.374	398234.071	
NON ENTRY - REDUCER CAP REQUIRED AND FITTED TO SHAFT, PPIC - POLYPROPYLENE INSPECTION CHAMBER, PCC - PRECAST CONCRETE.															

SW7, SW9, FW9 AND CW1 HIGHLIGHTED YELLOW ISSUED FOR CONSTRUCTION ONLY.

C01	15.02.24	SW7, SW9, FW9 AND CW1 ISSUED FOR CONSTRUCTION ONLY	AA	CD	CD
P3	08.12.23	STAGE 4	CD	SW	DS
P2	30.06.23	UPDATED TO SUIT COMMENTS	CD	SW	DS
P1	26.05.23	FIRST ISSUE	CD	SW	DS
Rev	Date	Description	By	Check	App.

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Client	GREAT PLACES HOUSING GROUP		
Project	LAYSTALL STREET DEVELOPMENT MANCHESTER		
Office	ALTRINCHAM		
Discipline	CIVIL AND STRUCTURAL		
Title	DRAINAGE NOTES AND MANAHOLE SCHEDULE		
Scale @ A1	NTS	Status	CONSTRUCTION



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Job Number	Originator	Building/Zone	Level
220019	CLA	XX	00
Type	Discipline	Drawing No.	Revision
DR	C	504	C01

2. Surface Water Hydraulic 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)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	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)
SW2	0.006	5.00	48.200	600	384963.712	398271.042	1.350
SW3	0.000	5.00	48.150	600	384968.628	398262.956	1.765
VDROP	0.029	5.00	48.150		384969.658	398263.592	3.750
SW4	0.000	5.00	45.225	600	384974.082	398257.278	0.905
SW5	0.002	5.00	45.225	600	384979.980	398255.946	1.575
SW6A		5.00	46.950	600	384991.435	398262.911	2.410
TANK	0.000	5.00	46.500		384987.449	398260.496	3.260
SW6	0.023	5.00	45.225	600	384984.294	398258.573	1.989
SW7	0.004	5.00	46.260	600	385000.981	398245.605	2.920
SW8	0.005	5.00	46.500	600	384995.575	398254.496	3.270
SW10	0.032	5.00	45.000	600	384982.806	398245.350	1.270
SW11	0.009	5.00	44.780	600	384986.862	398248.533	1.128
FCC Junction	0.000	5.00	44.950 46.340	1200	384988.993 384994.253	398250.195 398241.598	1.754 3.245
CW1			46.200	1200	384983.374	398234.071	3.230
OF	0.000	5.00	46.000	1800	384977.048	398227.517	3.658
EX Buried MH			45.500	1800	384982.329	398218.927	3.920
SW9		5.00	46.330	1200	384996.301	398242.932	3.000

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)
1.001	SW2	SW3	9.463	0.600	46.850	46.755	0.095	100.0	150	5.16	46.0
1.002	SW3	VDROP	1.211	0.600	46.385	46.373	0.012	100.0	150	5.18	46.0
1.003	VDROP	SW4	7.710	0.600	44.400	44.320	0.080	96.4	150	5.30	45.5
1.004	SW4	SW5	6.047	0.600	44.320	44.260	0.060	100.8	150	5.40	45.1
1.005	SW5	SW6	5.051	0.600	43.650	43.599	0.051	100.0	150	5.49	44.8
2.000	SW6A	TANK	5.100	0.600	44.540	43.240	1.300	3.9	300	5.01	46.6
2.001	TANK	SW6	1.100	0.600	43.240	43.236	0.004	275.0	300	5.03	46.6
1.006	SW6	FCC	9.606	0.600	43.236	43.196	0.040	240.0	300	5.65	44.2
3.000	SW7	SW8	10.406	0.600	43.340	43.230	0.110	94.6	150	5.17	46.0
3.001	SW8	FCC	7.863	0.600	43.230	43.197	0.033	238.3	150	5.37	45.2
4.000	SW10	SW11	5.156	0.600	43.730	43.652	0.078	66.1	150	5.07	46.4
4.001	SW11	FCC	2.702	0.600	43.652	43.625	0.027	100.0	150	5.11	46.2
1.007	FCC	Junction	10.078	0.600	43.197	43.096	0.101	100.0	150	5.81	43.6
1.008	Junction	CW1	13.229	0.600	43.095	42.970	0.125	105.8	150	6.04	42.9
1.009	CW1	OF	9.109	0.600	42.970	42.917	0.053	171.9	225	6.19	42.4
EX SEWER	OF	EX Buried MH	10.084	0.600	42.342	41.580	0.762	13.2	800	6.21	42.3
5.000	SW9	Junction	2.444	0.600	43.330	43.096	0.234	10.4	100	5.02	46.6

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)
1.001	1.005	17.8	0.7	1.200	1.245	0.006	0.0	21	0.492
1.002	1.005	17.8	0.7	1.615	1.627	0.006	0.0	21	0.492
1.003	1.024	18.1	4.3	3.600	0.755	0.035	0.0	50	0.839
1.004	1.001	17.7	4.3	0.755	0.815	0.035	0.0	50	0.825
1.005	1.005	17.8	4.5	1.425	1.476	0.037	0.0	51	0.838
2.000	7.989	564.7	0.0	2.110	2.960	0.000	0.0	0	0.000
2.001	0.943	66.7	0.0	2.960	1.689	0.000	0.0	0	0.000
1.006	1.010	71.4	7.2	1.689	1.454	0.060	0.0	64	0.654
3.000	1.033	18.3	0.5	2.770	3.120	0.004	0.0	17	0.449
3.001	0.647	11.4	1.1	3.120	1.603	0.009	0.0	31	0.407
4.000	1.239	21.9	4.0	1.120	0.978	0.032	0.0	44	0.948
4.001	1.005	17.8	5.1	0.978	1.175	0.041	0.0	55	0.872
1.007	1.005	17.8	13.0	1.603	3.094	0.110	0.0	95	1.095
1.008	0.976	17.3	12.8	3.095	3.080	0.110	0.0	96	1.068
1.009	0.994	39.5	12.6	3.005	2.858	0.110	0.0	87	0.887
EX SEWER	8.030	4036.1	12.6	2.858	3.120	0.110	0.0	32	1.884
5.000	2.405	18.9	0.0	2.900	3.144	0.000	0.0	0	0.000

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)
1.001	9.463	100.0	150	Circular	48.200	46.850	1.200	48.150	46.755	1.245
1.002	1.211	100.0	150	Circular	48.150	46.385	1.615	48.150	46.373	1.627
1.003	7.710	96.4	150	Circular	48.150	44.400	3.600	45.225	44.320	0.755
1.004	6.047	100.8	150	Circular	45.225	44.320	0.755	45.225	44.260	0.815
1.005	5.051	100.0	150	Circular	45.225	43.650	1.425	45.225	43.599	1.476
2.000	5.100	3.9	300	Circular	46.950	44.540	2.110	46.500	43.240	2.960
2.001	1.100	275.0	300	Circular	46.500	43.240	2.960	45.225	43.236	1.689
1.006	9.606	240.0	300	Circular	45.225	43.236	1.689	44.950	43.196	1.454
3.000	10.406	94.6	150	Circular	46.260	43.340	2.770	46.500	43.230	3.120
3.001	7.863	238.3	150	Circular	46.500	43.230	3.120	44.950	43.197	1.603
4.000	5.156	66.1	150	Circular	45.000	43.730	1.120	44.780	43.652	0.978
4.001	2.702	100.0	150	Circular	44.780	43.652	0.978	44.950	43.625	1.175
1.007	10.078	100.0	150	Circular	44.950	43.197	1.603	46.340	43.096	3.094
1.008	13.229	105.8	150	Circular	46.340	43.095	3.095	46.200	42.970	3.080
1.009	9.109	171.9	225	Circular	46.200	42.970	3.005	46.000	42.917	2.858
EX SEWER	10.084	13.2	800	Circular	46.000	42.342	2.858	45.500	41.580	3.120
5.000	2.444	10.4	100	Circular	46.330	43.330	2.900	46.340	43.096	3.144

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.001	SW2	600	Manhole	Adoptable	SW3	600	Manhole	Adoptable
1.002	SW3	600	Manhole	Adoptable	VDROP		Junction	
1.003	VDROP		Junction		SW4	600	Manhole	Adoptable
1.004	SW4	600	Manhole	Adoptable	SW5	600	Manhole	Adoptable
1.005	SW5	600	Manhole	Adoptable	SW6	600	Manhole	Adoptable
2.000	SW6A	600	Manhole	Adoptable	TANK		Junction	
2.001	TANK		Junction		SW6	600	Manhole	Adoptable
1.006	SW6	600	Manhole	Adoptable	FCC	1200	Manhole	Adoptable
3.000	SW7	600	Manhole	Adoptable	SW8	600	Manhole	Adoptable
3.001	SW8	600	Manhole	Adoptable	FCC	1200	Manhole	Adoptable
4.000	SW10	600	Manhole	Adoptable	SW11	600	Manhole	Adoptable
4.001	SW11	600	Manhole	Adoptable	FCC	1200	Manhole	Adoptable
1.007	FCC	1200	Manhole	Adoptable	Junction		Junction	
1.008	Junction		Junction		CW1	1200	Manhole	Adoptable
1.009	CW1	1200	Manhole	Adoptable	OF	1800	Manhole	Adoptable
EX SEWER	OF	1800	Manhole	Adoptable	EX Buried MH	1800	Manhole	Adoptable
5.000	SW9	1200	Manhole	Adoptable	Junction		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW2	384963.712	398271.042	48.200	1.350	600		0	1.001	46.850	150
SW3	384968.628	398262.956	48.150	1.765	600		1	1.001	46.755	150
							0	1.002	46.385	150
VDROP	384969.658	398263.592	48.150	3.750			1	1.002	46.373	150
							0	1.003	44.400	150
SW4	384974.082	398257.278	45.225	0.905	600		1	1.003	44.320	150
							0	1.004	44.320	150
SW5	384979.980	398255.946	45.225	1.575	600		1	1.004	44.260	150
							0	1.005	43.650	150
SW6A	384991.435	398262.911	46.950	2.410	600		0	2.000	44.540	300
TANK	384987.449	398260.496	46.500	3.260			1	2.000	43.240	300
							0	2.001	43.240	300
SW6	384984.294	398258.573	45.225	1.989	600		1	2.001	43.236	300
							2	1.005	43.599	150
							0	1.006	43.236	300
SW7	385000.981	398245.605	46.260	2.920	600		0	3.000	43.340	150
SW8	384995.575	398254.496	46.500	3.270	600		1	3.000	43.230	150
							0	3.001	43.230	150
SW10	384982.806	398245.350	45.000	1.270	600		0	4.000	43.730	150
SW11	384986.862	398248.533	44.780	1.128	600		1	4.000	43.652	150
							0	4.001	43.652	150
FCC	384988.993	398250.195	44.950	1.754	1200		1	4.001	43.625	150
							2	3.001	43.197	150
							3	1.006	43.196	300
							0	1.007	43.197	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Junction	384994.253	398241.598	46.340	3.245			1 5.000 2 1.007 0 1.008	43.096 43.096 43.095	100 150 150
CW1	384983.374	398234.071	46.200	3.230	1200		1 1.008	42.970	150
OF	384977.048	398227.517	46.000	3.658	1800		1 1.009	42.917	225
EX Buried MH	384982.329	398218.927	45.500	3.920	1800		0 EX SEWER 1 EX SEWER	42.342 41.580	800 800
SW9	384996.301	398242.932	46.330	3.000	1200		0 5.000	43.330	100

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	20.0
M5-60 (mm)	17.000	Check Discharge Rate(s)	✓
Ratio-R	0.400	1 year (l/s)	10.1
Summer CV	0.750	30 year (l/s)	23.6
Winter CV	0.840	100 year (l/s)	29.8
Analysis Speed	Detailed	Check Discharge Volume	✓
Skip Steady State	x	100 year 360 minute (m³)	65

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	0	0	0
100	45	0	0

Pre-development Discharge Rate

Site Makeup	Brownfield	Time of Concentration (mins)	5.00
Brownfield Method	MRM	Betterment (%)	0
Contributing Area (ha)	0.120	Q 1 year (l/s)	20.2
PIMP (%)	100	Q 30 year (l/s)	47.2
CV	1.000	Q 100 year (l/s)	59.5



Pre-development Discharge Volume

Site Makeup	Brownfield	CV	1.000	Betterment (%)	0
Brownfield Method	MRM	Return Period (years)	100	PR	1.000
Contributing Area (ha)	0.120	Climate Change (%)	0	Runoff Volume (m³)	65
PIMP (%)	100	Storm Duration (mins)	360		

Node FCC Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.007	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0097-5000-1550-5000
Invert Level (m)	43.197	Min Outlet Diameter (m)	0.150
Design Depth (m)	1.550	Min Node Diameter (mm)	1200
Design Flow (l/s)	5.0		

Node TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	43.240
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	82

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	15.0	0.0	1.500	15.0	0.0	1.501	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 93.59%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW2	11	46.871	0.021	0.7	0.0077	0.0000	OK
15 minute winter	SW3	11	46.406	0.021	0.7	0.0060	0.0000	OK
15 minute winter	VDROP	10	44.450	0.050	4.2	0.0078	0.0000	OK
15 minute winter	SW4	10	44.372	0.052	4.1	0.0148	0.0000	OK
15 minute winter	SW5	11	43.704	0.054	4.3	0.0167	0.0000	OK
15 minute summer	SW6A	1	44.540	0.000	0.0	0.0000	0.0000	OK
30 minute winter	TANK	24	43.385	0.145	4.1	2.0651	0.0000	OK
30 minute winter	SW6	24	43.385	0.149	5.4	0.0765	0.0000	OK
15 minute winter	SW7	15	43.385	0.045	0.5	0.0139	0.0000	OK
30 minute winter	SW8	24	43.385	0.155	0.9	0.0486	0.0000	SURCHARGED
15 minute winter	SW10	10	43.775	0.045	3.8	0.0356	0.0000	OK
15 minute winter	SW11	10	43.712	0.060	4.9	0.0265	0.0000	OK
30 minute winter	FCC	24	43.385	0.189	4.8	0.2138	0.0000	SURCHARGED
30 minute winter	Junction	24	43.147	0.052	4.3	0.0000	0.0000	OK
30 minute winter	CW1	25	43.022	0.052	4.3	0.0591	0.0000	OK
30 minute winter	OF	25	42.363	0.021	4.3	0.0525	0.0000	OK
30 minute winter	EX Buried MH	25	41.600	0.020	4.3	0.0000	0.0000	OK
15 minute summer	SW9	1	43.330	0.000	0.0	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	SW2	1.001	SW3	0.7	0.486	0.039	0.0136	
15 minute winter	SW3	1.002	VDROP	0.7	0.473	0.039	0.0018	
15 minute winter	VDROP	1.003	SW4	4.1	0.780	0.229	0.0410	
15 minute winter	SW4	1.004	SW5	4.1	0.783	0.231	0.0316	
15 minute winter	SW5	1.005	SW6	4.3	0.793	0.243	0.0275	
15 minute summer	SW6A	2.000	TANK	0.0	0.000	0.000	0.0698	
30 minute winter	TANK	2.001	SW6	-4.1	-0.615	-0.062	0.0377	
30 minute winter	SW6	1.006	FCC	3.0	0.273	0.041	0.3922	
15 minute winter	SW7	3.000	SW8	0.5	0.206	0.025	0.1145	
30 minute winter	SW8	3.001	FCC	0.6	0.072	0.052	0.1384	
15 minute winter	SW10	4.000	SW11	3.8	0.685	0.172	0.0285	
15 minute winter	SW11	4.001	FCC	4.8	0.791	0.271	0.0164	
30 minute winter	FCC	Hydro-Brake®	Junction	4.3				
30 minute winter	Junction	1.008	CW1	4.3	0.795	0.250	0.0717	
30 minute winter	CW1	1.009	OF	4.3	0.639	0.109	0.0614	
30 minute winter	OF	EX SEWER	EX Buried MH	4.3	1.351	0.001	0.0322	7.8
15 minute summer	SW9	5.000	Junction	0.0	0.000	0.000	0.0048	

Results for 30 year Critical Storm Duration. Lowest mass balance: 93.59%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW2	10	46.882	0.032	1.7	0.0119	0.0000	OK
15 minute winter	SW3	11	46.418	0.033	1.7	0.0093	0.0000	OK
15 minute winter	VDROP	10	44.484	0.084	10.0	0.0130	0.0000	OK
15 minute winter	SW4	10	44.408	0.088	10.0	0.0250	0.0000	OK
30 minute winter	SW5	29	43.818	0.168	8.2	0.0519	0.0000	SURCHARGED
15 minute summer	SW6A	1	44.540	0.000	0.0	0.0000	0.0000	OK
30 minute winter	TANK	29	43.818	0.578	15.1	8.2331	0.0000	SURCHARGED
30 minute winter	SW6	29	43.818	0.582	16.8	0.2990	0.0000	SURCHARGED
30 minute winter	SW7	29	43.819	0.479	1.5	0.1485	0.0000	SURCHARGED
30 minute winter	SW8	29	43.817	0.587	1.8	0.1839	0.0000	SURCHARGED
30 minute winter	SW10	29	43.818	0.088	7.2	0.0696	0.0000	OK
30 minute winter	SW11	29	43.818	0.166	9.2	0.0734	0.0000	SURCHARGED
30 minute winter	FCC	29	43.818	0.622	9.7	0.7030	0.0000	SURCHARGED
15 minute winter	Junction	12	43.150	0.055	4.8	0.0000	0.0000	OK
120 minute summer	CW1	88	43.025	0.055	4.8	0.0625	0.0000	OK
120 minute summer	OF	88	42.364	0.022	4.8	0.0551	0.0000	OK
120 minute summer	EX Buried MH	88	41.601	0.021	4.8	0.0000	0.0000	OK
15 minute summer	SW9	1	43.330	0.000	0.0	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	SW2	1.001	SW3	1.7	0.622	0.094	0.0253	
15 minute winter	SW3	1.002	VDROP	1.6	0.604	0.093	0.0033	
15 minute winter	VDROP	1.003	SW4	10.0	0.950	0.550	0.0807	
15 minute winter	SW4	1.004	SW5	9.8	0.970	0.554	0.0612	
30 minute winter	SW5	1.005	SW6	8.2	0.930	0.462	0.0889	
15 minute summer	SW6A	2.000	TANK	0.0	0.000	0.000	0.1796	
30 minute winter	TANK	2.001	SW6	-15.1	-0.695	-0.226	0.0775	
30 minute winter	SW6	1.006	FCC	4.0	0.256	0.056	0.6764	
30 minute winter	SW7	3.000	SW8	-0.7	0.207	-0.040	0.1832	
30 minute winter	SW8	3.001	FCC	-0.9	-0.069	-0.076	0.1384	
30 minute winter	SW10	4.000	SW11	7.2	0.777	0.329	0.0733	
30 minute winter	SW11	4.001	FCC	9.2	0.930	0.518	0.0476	
30 minute winter	FCC	Hydro-Brake®	Junction	4.8				
15 minute winter	Junction	1.008	CW1	4.8	0.819	0.279	0.0776	
120 minute summer	CW1	1.009	OF	4.8	0.659	0.122	0.0665	
120 minute summer	OF	EX SEWER	EX Buried MH	4.8	1.398	0.001	0.0347	26.1
15 minute summer	SW9	5.000	Junction	0.0	0.000	0.000	0.0053	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 93.59%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW2	10	46.895	0.045	3.3	0.0168	0.0000	OK
15 minute winter	SW3	10	46.432	0.047	3.2	0.0132	0.0000	OK
120 minute winter	VDROP	96	44.684	0.284	6.2	0.0440	0.0000	SURCHARGED
120 minute winter	SW4	96	44.683	0.363	6.2	0.1027	0.0000	SURCHARGED
120 minute winter	SW5	96	44.683	1.033	6.6	0.3180	0.0000	SURCHARGED
120 minute winter	SW6A	96	44.682	0.142	0.4	0.0402	0.0000	OK
120 minute winter	TANK	96	44.682	1.442	9.9	20.5496	0.0000	SURCHARGED
120 minute winter	SW6	96	44.682	1.446	10.6	0.7433	0.0000	SURCHARGED
120 minute winter	SW7	96	44.682	1.342	0.9	0.4160	0.0000	SURCHARGED
120 minute winter	SW8	96	44.682	1.452	1.1	0.4545	0.0000	SURCHARGED
120 minute winter	SW10	96	44.683	0.953	5.6	0.7498	0.0000	SURCHARGED
120 minute winter	SW11	96	44.682	1.030	6.5	0.4554	0.0000	FLOOD RISK
120 minute winter	FCC	96	44.682	1.486	6.3	1.6807	0.0000	FLOOD RISK
30 minute summer	Junction	39	43.719	0.624	4.9	0.0000	0.0000	SURCHARGED
30 minute summer	CW1	39	43.704	0.734	5.2	0.8299	0.0000	SURCHARGED
15 minute winter	OF	36	43.702	1.360	4.9	3.4607	0.0000	SURCHARGED
15 minute summer	EX Buried MH	1	43.700	2.120	5.2	0.0000	0.0000	OK
15 minute summer	SW9	37	43.720	0.390	1.1	0.4410	0.0000	SURCHARGED

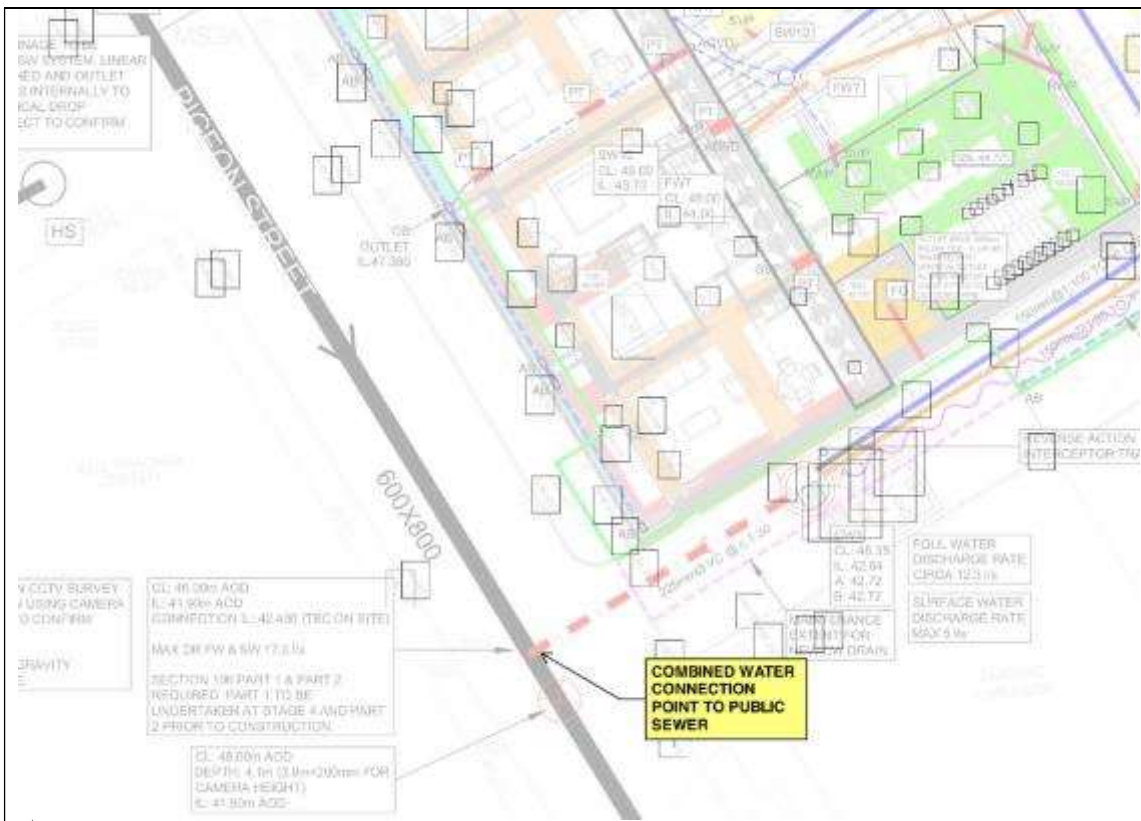
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW2	1.001	SW3	3.2	0.748	0.183	0.0410	
15 minute winter	SW3	1.002	VDROP	3.2	0.725	0.181	0.0054	
120 minute winter	VDROP	1.003	SW4	6.2	0.855	0.343	0.1357	
120 minute winter	SW4	1.004	SW5	6.2	0.869	0.351	0.1065	
120 minute winter	SW5	1.005	SW6	5.9	0.815	0.334	0.0889	
120 minute winter	SW6A	2.000	TANK	-0.4	-0.009	-0.001	0.2633	
120 minute winter	TANK	2.001	SW6	-9.9	-0.502	-0.149	0.0775	
120 minute winter	SW6	1.006	FCC	3.7	0.146	0.051	0.6764	
120 minute winter	SW7	3.000	SW8	0.3	0.195	0.015	0.1832	
120 minute winter	SW8	3.001	FCC	0.6	0.055	0.048	0.1384	
120 minute winter	SW10	4.000	SW11	5.0	0.704	0.228	0.0908	
120 minute winter	SW11	4.001	FCC	5.9	0.816	0.331	0.0476	
120 minute winter	FCC	Hydro-Brake®	Junction	4.8				
30 minute summer	Junction	1.008	CW1	5.2	0.820	0.299	0.2329	
30 minute summer	CW1	1.009	OF	5.7	0.659	0.143	0.3623	
15 minute winter	OF	EX SEWER	EX Buried MH	6.0	0.012	0.001	5.0497	9.3
15 minute summer	SW9	5.000	Junction	-1.1	-0.156	-0.058	0.0191	

3. UU Connection Approval

S106 Part 1 'Application to connect to a public sewer' Approval Notice



United Utilities Reference Number:		05054912				
Applicant details						
Applicant name	Sam Godfrey					
Applicant address (including postcode)	Sceptre House Sceptre Way Bamber Bridge Preston PR5 6AW					
Applicant email	sgodfrey@ericwright.co.uk					
Site details: The site / property which is proposed for connection to the public sewer						
Site address (including postcode)	Laystall Street, Manchester, M1 2JZ					
<h2>APPROVED</h2> <p>Your application for connection to the public sewer has been approved, to be made via a new connection:</p>						
To a private drain	☐	You may appoint your contractor and advise your appointed building control body (who should inspect the work). United Utilities should be advised when this work is complete.				
Direct to the public sewer	☒	Further action required You may now appoint an appropriately qualified contractor. Your appointed contractor is responsible for obtaining authorisation to work on a public sewer. (The S106 Part 2 application form 'Request for permission to work on a public sewer' is available on our website; unitedutilities.com).				
Mode of connection approved	Saddle					
Sewer connection type	Foul	☐	Surface water	☐	Combined	☒
<p>This approval is valid for 12 months from the date below.</p> <p>This approval does not grant access to third party land, permission should be sought if required between applicant and land owner If the new connection renders access unsafe or is otherwise detrimental to the manhole or sewer, a new/upgraded manhole will be requested.</p>						
Comments						
<p>Approval granted for a 225mm combined connection to the 520mm combined brick sewer located in Pigeon street with surface water restricted to 5l/s as per drainage plan below.</p> <p>Saddle connections should be core drilled with care taken to ensure the core does not fall into the public sewer. Please see details included in the Sewer Connection Pack.</p> <p>Please note, if you are proposing to connect to an existing, unchartered drain or sewer then it is the developers responsibility to confirm that it communicates with the Public Sewer</p>						



Developer Services Inspector	Wesley Odell
Contact number	07789924735
Date	19/12/2023

4. Overland Flow Plan



KEY:

 LEVELS FALL DIRECTION

 OVERLAND FLOW DIRECTION

PROPOSED DRAINAGE SUBJECT TO APPROVAL WITH RELEVANT AUTHORITIES.

P1	22.02.24	FIRST ISSUE	AA	CD	SW
Rev	Date	Description	By	Check	App.

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Client	GREAT PLACES HOUSING GROUP
Project	LAYSTALL STREET MANCHESTER
Office	MANCHESTER
Discipline	CIVIL AND STRUCTURAL
Title	OVERLAND FLOW PLAN

Scale @ A1	1-100	Status	PRELIMINARY
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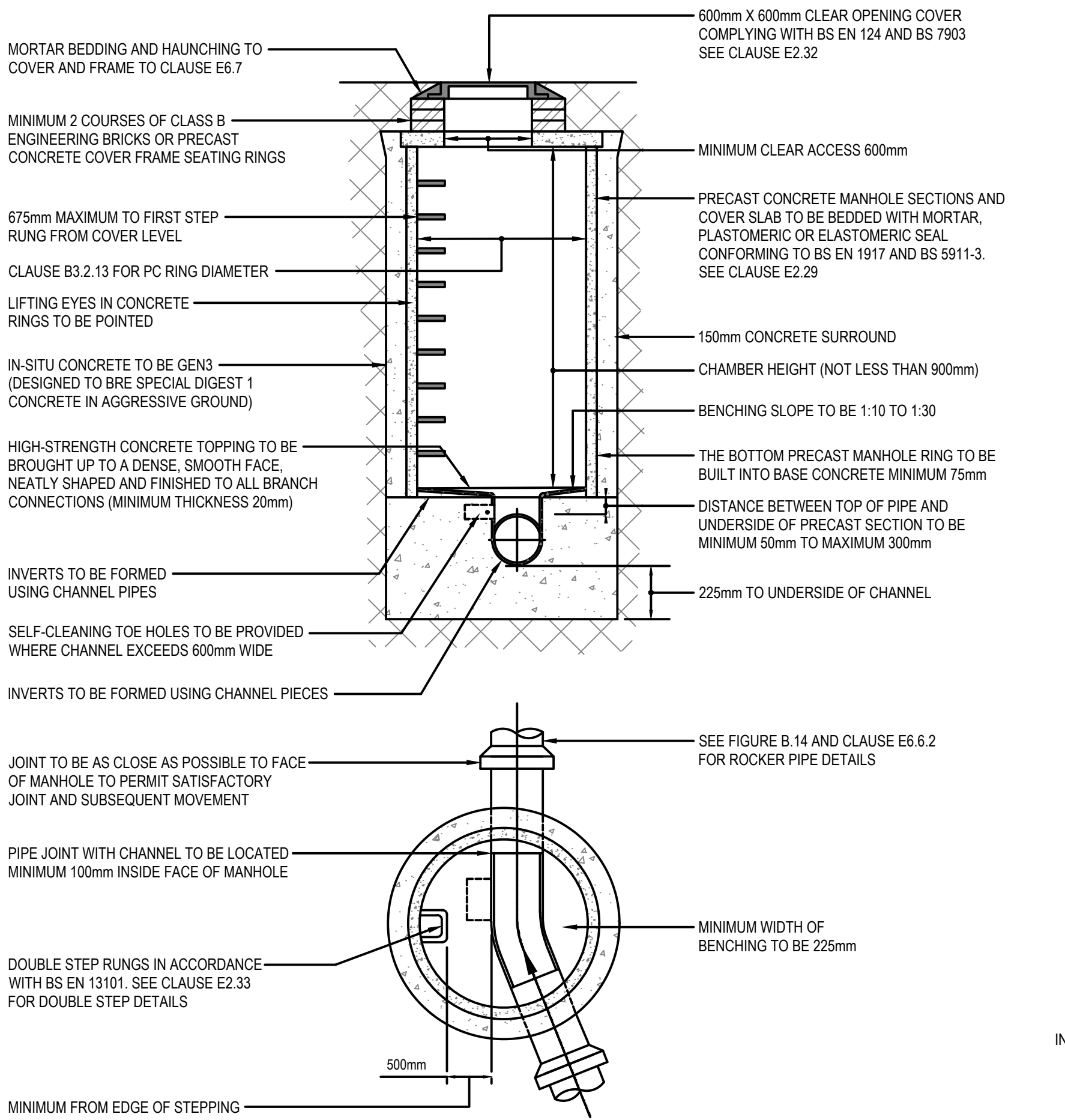
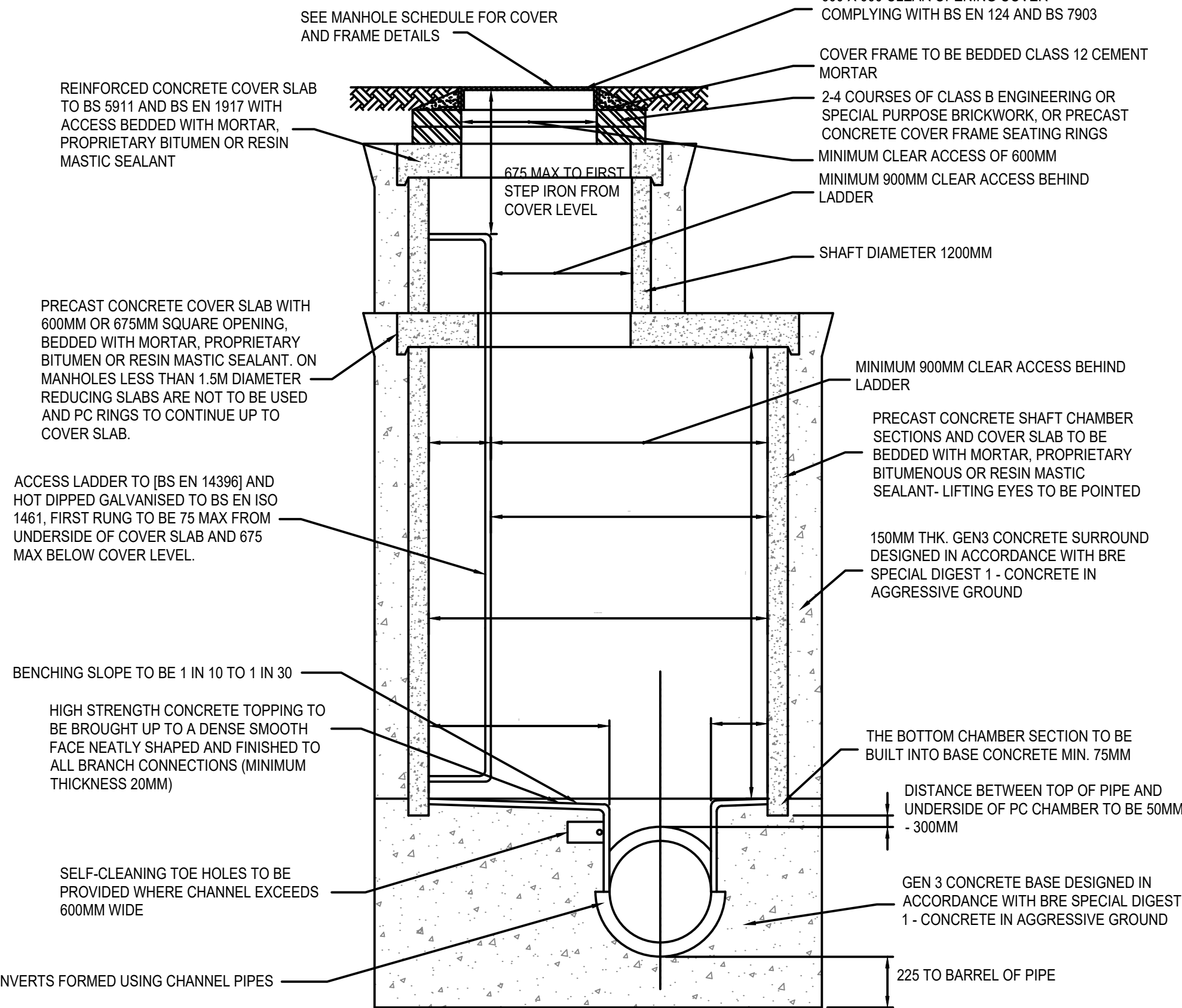
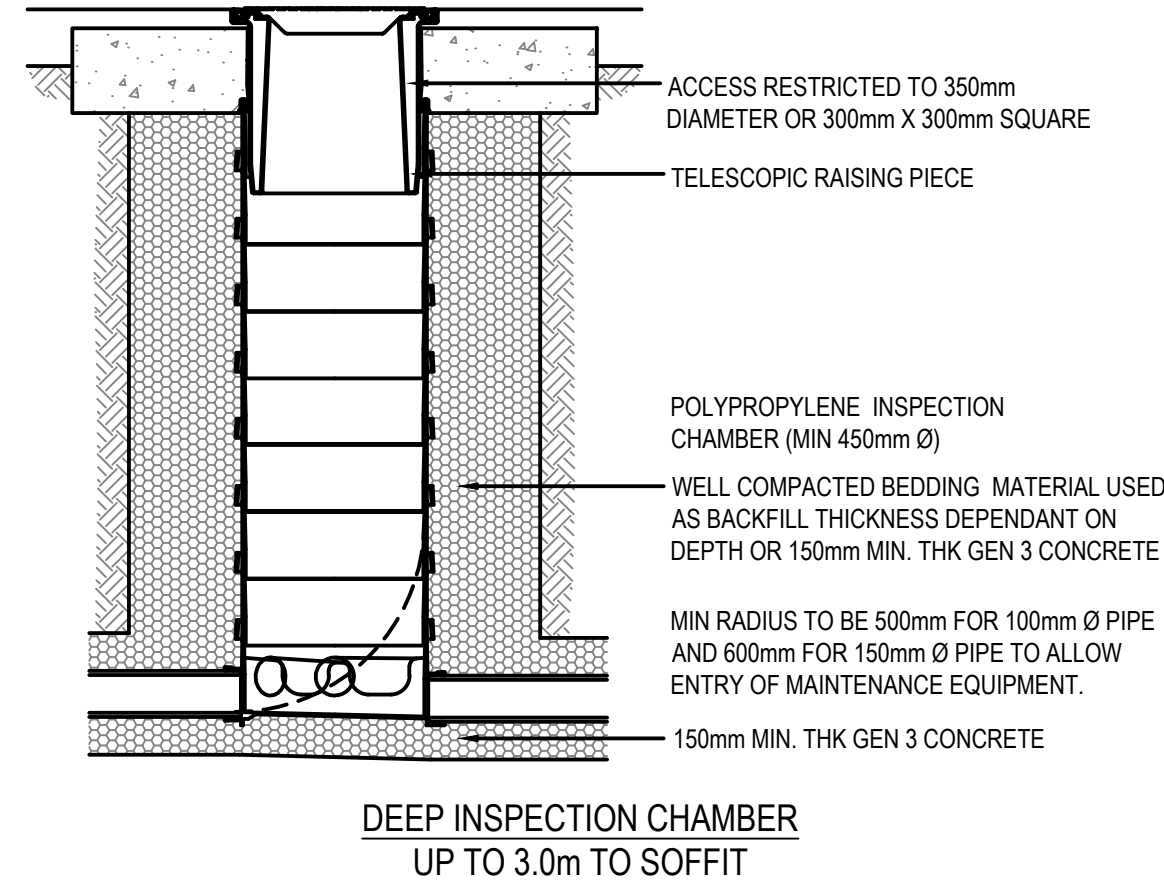
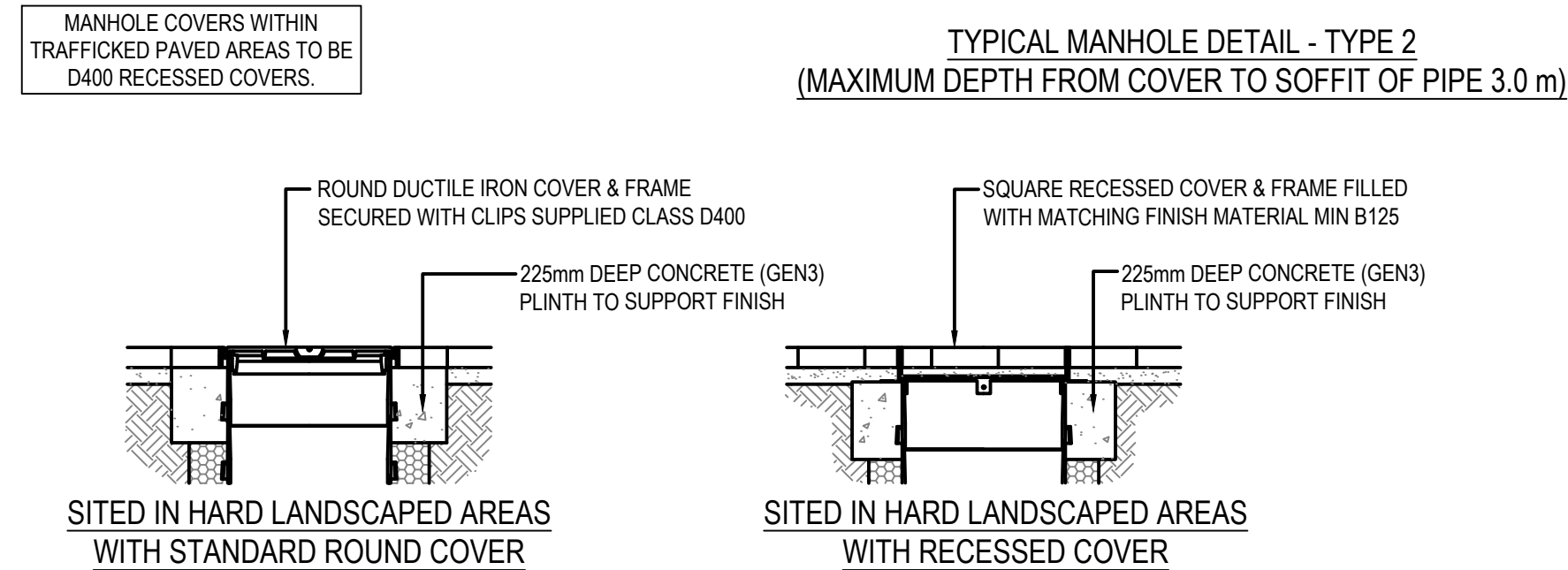
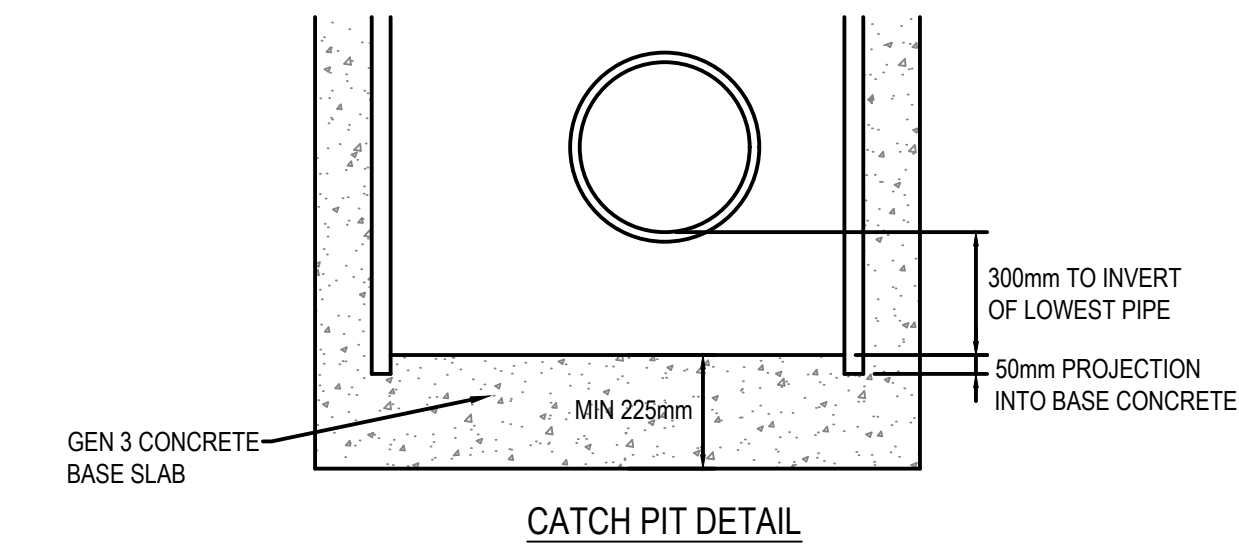
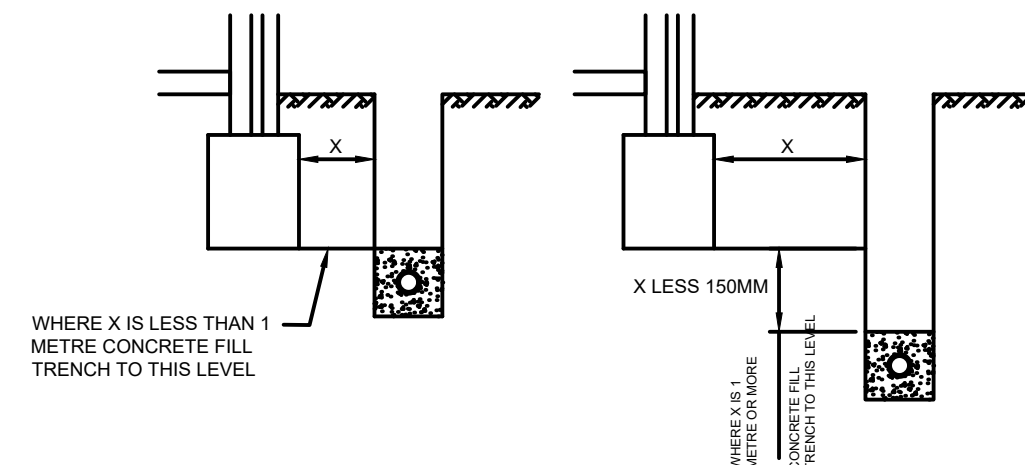
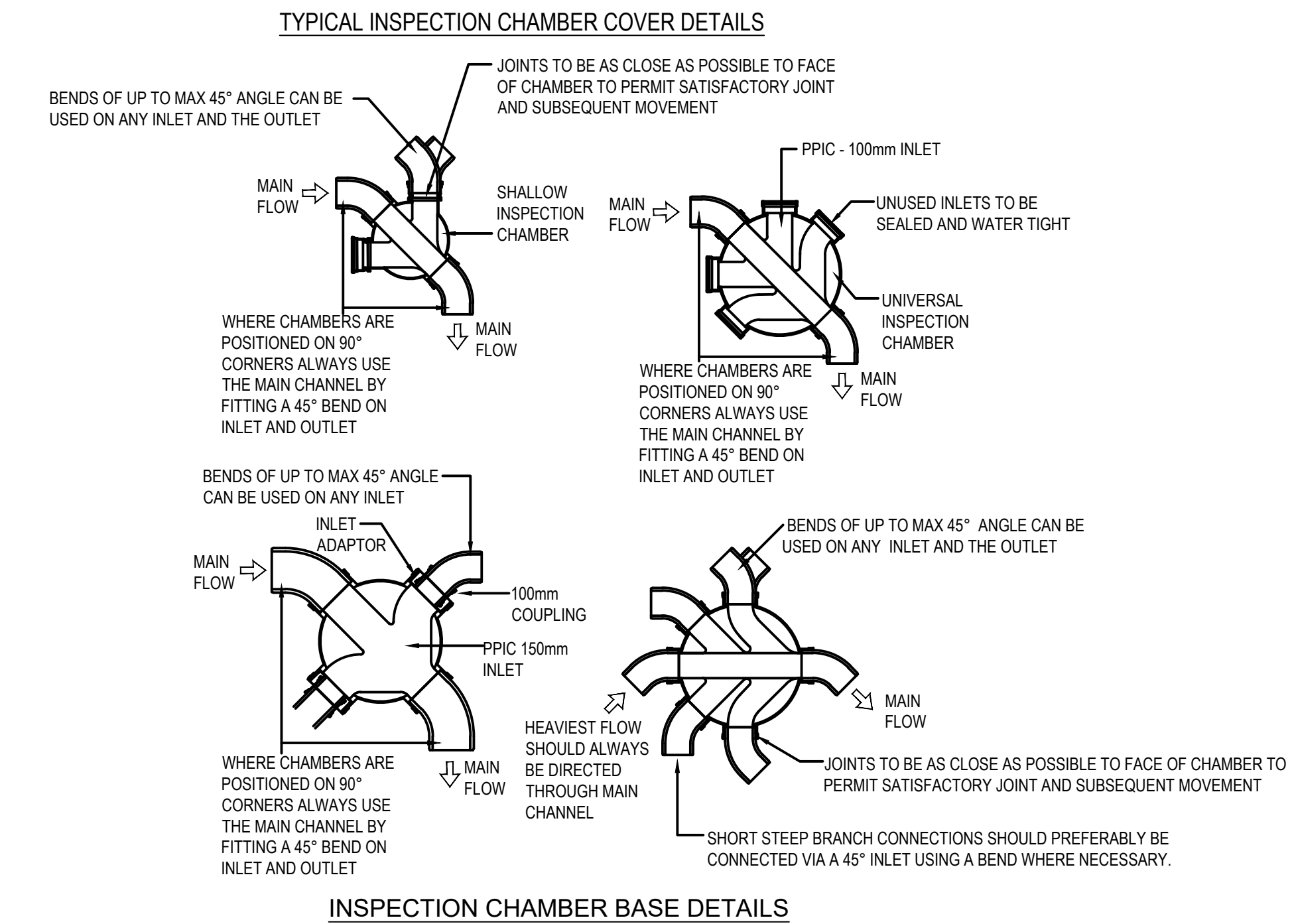
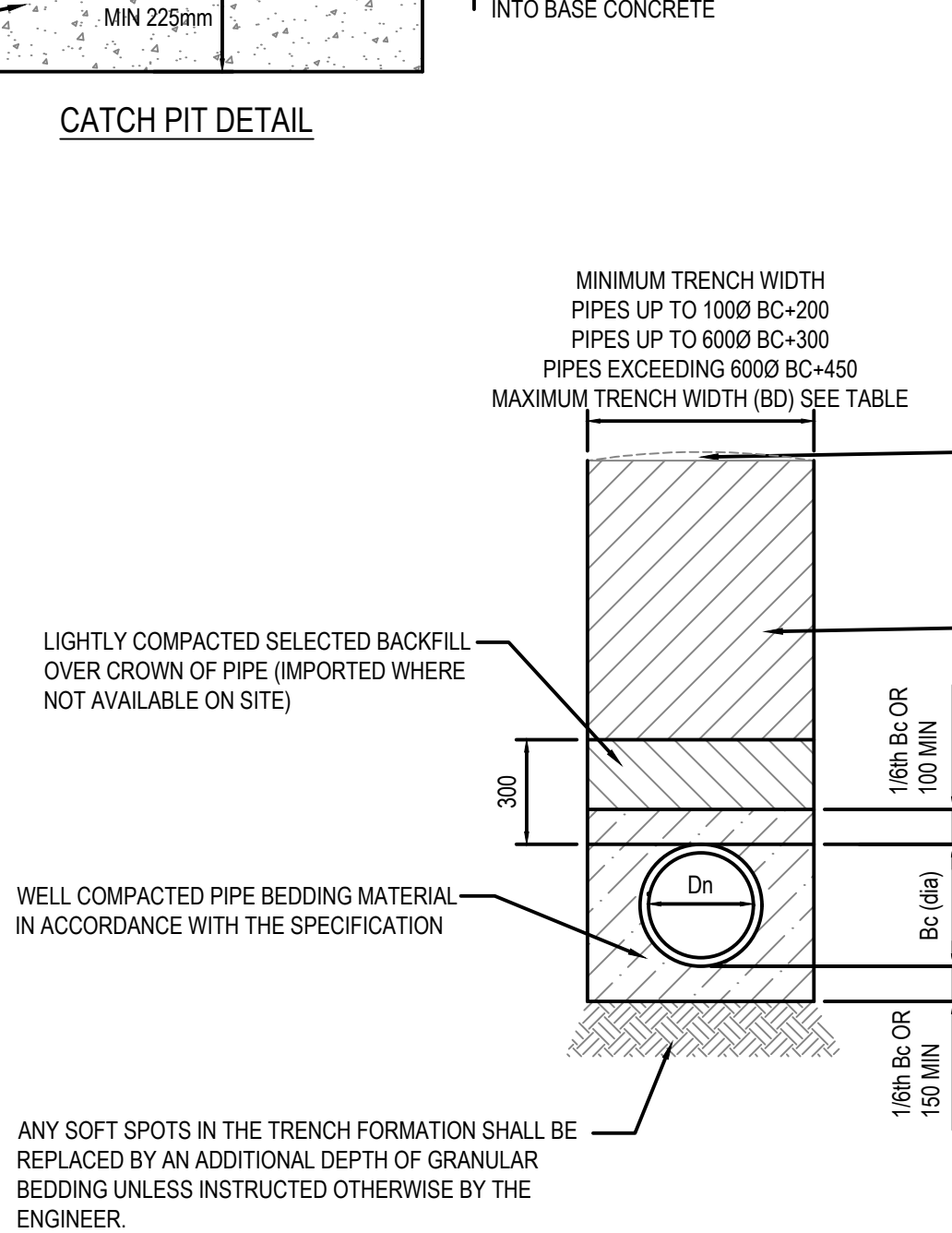
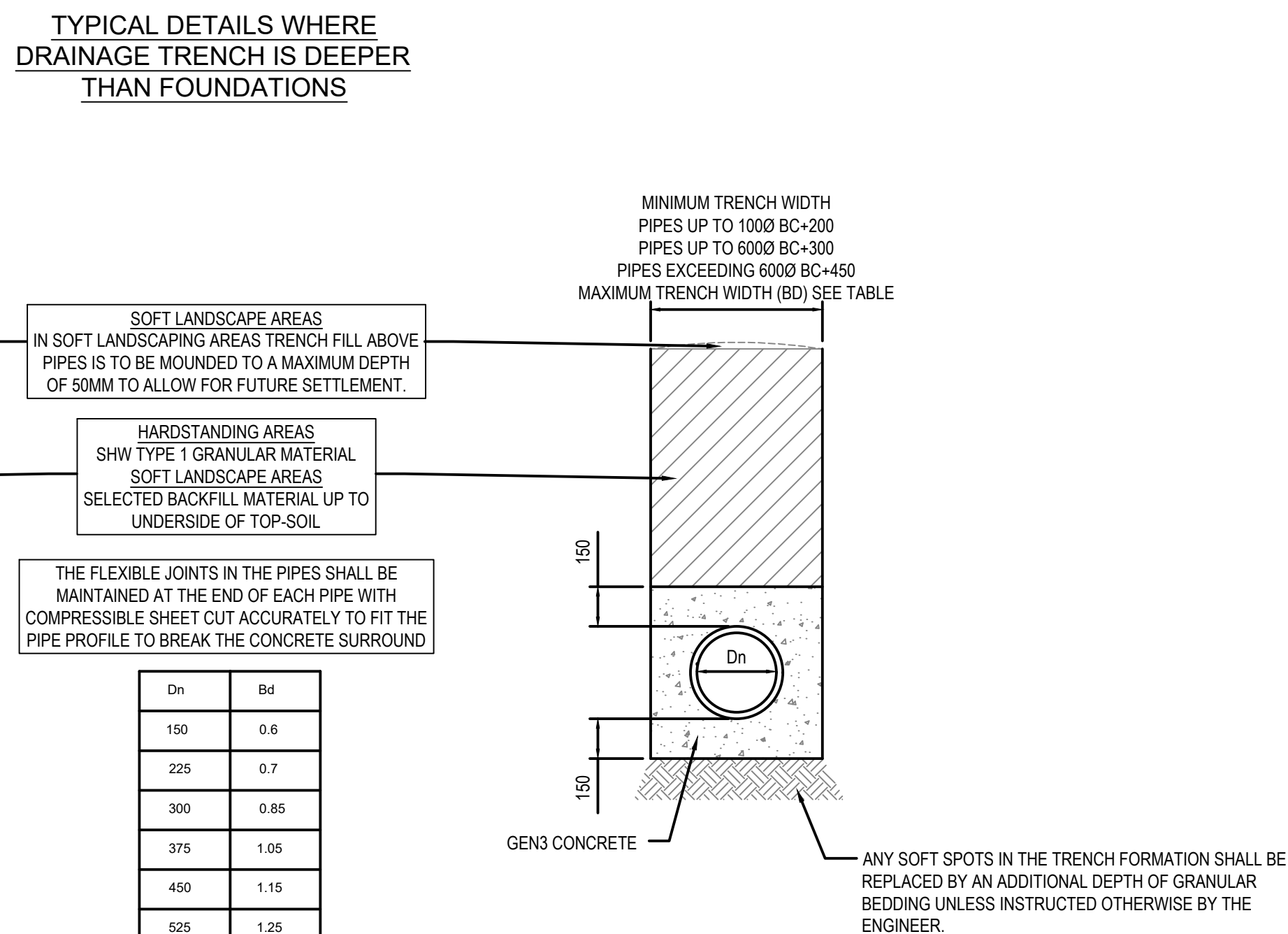


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Job Number	Originator	Building/Zone	Level
220019	CLA	XX	00
Type	Discipline	Drawing No.	Revision
DR	C	570	P01

Birmingham 0121 350 7600, Glasgow 0141 227 5300, London 020 3077 0700, Manchester 0161 610 0000, Newcastle 0191 221 0102, Norwich 01603 300 000, Plymouth 01202 632070, Reading 01185 841 7008

5. Drainage Details



- DRAINAGE NOTES**
1. DO NOT SCALE THIS DRAWING.
 2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
 3. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS AND ARCHITECTS DRAWINGS AND SPECIFICATIONS.
 5. ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ENGINEERS ATTENTION PRIOR TO COMMENCING ANY WORKS SHOWN.
 6. ALL DETAILS TO BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL COUNCILS BUILDING CONTROL, OR ANY OTHER RELEVANT STANDARDS BODY.
 7. ALL PROPRIETARY PRODUCT TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS, INSTRUCTIONS AND RECOMMENDATIONS.
- 1. NO WORK SHOULD COMMENCE ON SITE UNTIL WRITTEN APPROVAL IS RECEIVED FROM THE ADOPTING HIGHWAY AUTHORITY, ADOPTING SEWERAGE UNDERTAKERS, ENVIRONMENT AGENCY AND/OR ANY OTHER RELEVANT AUTHORITY. WORKS UNDERTAKEN PRIOR TO APPROVAL ARE AT THE DEVELOPERS RISK AND CLANCY CONSULTING LIMITED WILL NOT BE HELD RESPONSIBLE FOR SUBSEQUENT DELAYS IN APPROVALS, REMEDIAL OR CORRECTIVE ACTIONS.**
2. ALL INVERT LEVELS OF EXISTING FOLI AND SURFACE WATER SYSTEMS ARE TO BE CONFIRMED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF ANY ON SITE DRAINAGE WORKS. ANY DISCREPANCY IN LEVELS IS TO BE REPORTED IMMEDIATELY TO CLANCY CONSULTING LIMITED.
 3. ALL SEWERS, UNLESS AGREED OTHERWISE STATED, SHALL BE:
150mm DIA TO BE VITRIFIED CLAY.
225mm DIA TO BE VITRIFIED CLAY.
300mm DIA TO BE VITRIFIED CLAY.
375mm DIA AND GREATER TO BE CLASS 120 CONCRETE PIPES.
 4. ALL VITRIFIED CLAY PIPES TO BS EN 295-1.
ALL CONCRETE PIPES TO BE TO BS EN 1916.
 5. LATERAL CONNECTIONS FROM MAIN SEWERS TO DEMARCATION CHAMBER TO BE 150mm DIA MINIMUM AND CONSTRUCTED TO ADAPTABLE STANDARDS.
 6. FIRST PIPE OUT OF MANHOLES TO BE AS SHORT AS PRACTICABLE SO AS TO PROVIDE A FLEXIBLE JOINT AS CLOSE AS POSSIBLE TO THE OUTSIDE FACE OF THE CONCRETE SURROUND AND CONNECTED TO A LENGTH OF ROCKER PIPE.
 7. ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS.
 8. ALL SEWER WORKS TO COMPLY WITH HRC SEWERS FOR ADOPTION, 6TH EDITION, STVS REQUIREMENTS AND KITE-MARKED (OR SIMILAR APPROVED) WHERE PRACTICABLE. WHERE CONFLICTING DETAILS OCCUR, STVS DETAILS SHALL TAKE PRECEDENCE IN ALL CASES.
 9. MANHOLE COVERS SHALL HAVE A CLEAR OPENING IN ACCORDANCE WITH SFA 6TH EDITION AND SHALL BE CLASS D400 TO BS EN 124 WITH 150mm DEEP FRAMES IN VEHICULAR TRAFFICED AREAS. CLASS B125 COVERS AND FRAMES TO BE PROVIDED ON ALL OTHER MANHOLES IN LANDSCAPING.
 10. FILLED GROUND MUST BE FILLED AND CONSOLIDATED BEFORE ANY SEWER WORKS ARE CARRIED OUT.
 11. WATER AUTHORITIES ARE NOT OBLIGED TO ACCEPT FILTER DRAIN / LAND DRAINAGE RUN OFF INTO THE PUBLIC SEWER NETWORK OR ADAPTABLE DRAINAGE SYSTEM (DIRECTLY OR INDIRECTLY). AN ALTERNATIVE METHOD OF DISPOSAL OF LAND DRAINAGE RUN OFF MUST THEREFORE BE REQUIRED AND ANY PROPOSALS MUST BE AGREED WITH THE LOCAL AUTHORITY LAND DRAINAGE SECTION.
 12. COVER SLABS MUST CARRY THE BS1 KITEMARK AND SHALL COMPLY WITH BS 5911 PART3 / BS EN 1917 : 2000. WHERE THE CLEAR OPENING OF THE KITE-MARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A LOAD BEARING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN AS SPECIFIED ABOVE. PLEASE REFER TO CONCRETE PIPELINE SYSTEMS ASSOCIATION (CPSA) 'TECHNICAL BULLETIN' ISSUED AUTUMN 2004 FOR KITE-MARKED COVER SLAB OPENING SIZES.
 13. SULPHATE RESISTANT CEMENT (C20-0C2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED TO PROVE THAT SUCH PRECAUTIONS ARE NOT REQUIRED.
 14. ADAPTABLE SEWERS SHOULD BE A MINIMUM OF 1M AND MANHOLES 0.5M FROM KERB FACES AND SERVICE MARGINS.
 15. SEWERS MUST HAVE 9M CLEARANCE FROM TREES AND HEDGES OR TO HAVE SUITABLE ROOT PROTECTION IN ACCORDANCE WITH THE SFA 6TH REQUIREMENTS.
 16. ALL PIPES TO HAVE CLASS 'S' GRANULAR BED AND SURROUND UNLESS OTHERWISE STATED. BEDDING AND BACKFILL MATERIALS TO CONFORM TO THE REQUIREMENTS OF BS 4005 (TABLE A2). WHERE DEPTH OF COVER TO TOP OF SEWER IS LESS THAN 1.2M IN HIGHWAYS AND VERGES (OR LESS THAN 0.9M IN NON-VEHICULAR ACCESSED AREAS), THEN A CLASS 'Z' BEDDING TO BE USED.
 17. ALL SEWER TRENCHES AND BRANCH CONNECTIONS TO BE BACKFILLED WITH SUITABLE MATERIAL IN LAYERS NOT EXCEEDING 225mm UNCONSOLIDATED THICKNESS THEN FULLY COMPACTED.
 18. ADAPTABLE SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO ANY LONGER LENGTHS.
 19. PLASTIC CHANNEL SECTIONS WILL NOT BE PERMITTED WITHIN MANHOLE CHAMBERS. CLAYWARE CHANNELS SHALL BE USED WITHIN MANHOLES FOR PIPE SIZES UP TO AND INCLUDING 300mm DIAMETER.
 20. THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTION AND BENDS.
 21. SECTION 163 OF THE HIGHWAYS ACT 1980 REQUIRES PROVISION TO BE MADE TO PREVENT WATER FALLING ON OR FLOWING ONTO THE HIGHWAY FROM PRIVATE DRIVEWAYS OR PROPERTIES. ANY DRAINAGE REQUIREMENTS MUST BE CONNECTED INTO THE PRIVATE SURFACE WATER DRAINAGE SYSTEM.
 22. THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING:-
(i) ALL OPERATIONS SHOULD BE CARRIED OUT IN ACCORDANCE WITH THE GENERAL HEALTH AND SAFETY POLICY OF THE DEVELOPER AS REQUIRED BY SECTIONS 2 OF THE HEALTH AND SAFETY AT WORK ACT 1974 AND IN PARTICULAR THE CONSTRUCTION (GENERAL PROVISIONS) REGULATIONS.
(ii) THE LOCAL AUTHORITY AND UTILITIES COMPANIES ARE TO BE NOTIFIED PRIOR TO COMMENCEMENT OF WORK ON SITE.
(iii) PRIOR TO CONSTRUCTION THE ACTUAL POSITIONS AND DEPTHS OF SERVICES LIKELY TO BE AFFECTED BY THE WORKS SHOULD BE ESTABLISHED BY MEANS OF HAND DIG. CLOSE LIAISON WITH THE UTILITY COMPANIES. THE CONTRACTOR SHALL IMMEDIATELY ADVISE THE ENGINEER OF ANY SERVICES EXPOSED WHICH MAY AFFECT THE DESIGN.
(iv) ALL OPERATIVES WORKING ON THE HIGHWAY WORKS MUST HAVE STREET WORKS ACCREDITATION.
 23. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH CURTINS SPECIFICATION FOR DRAINAGE WORKS AND ANY OTHER SUBSEQUENT ADDITIONS TO THIS LIST.
 24. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT, AND TEMPORARY AND PERMANENT DIVERSION WORKS, AS NECESSARY TO ALL EXISTING SERVICES.
 25. THE CONTRACTOR SHALL ALLOW FOR KEEPING TRENCHES AND EXCAVATIONS AS DRY AS PRACTICABLE BY PUMPING FROM TEMPORARY SUMPS AND DE-WATERING AS APPROPRIATE. THE POINT AND METHOD OF DISCHARGE TO BE AGREED WITH THE DRAINAGE AUTHORITY & LPA AND ENVIRONMENT AGENCY.
 26. ALL DRAINAGE WORKS ARE TO BE CONSTRUCTED FROM THE OUTFALL TOWARDS THE HEAD OF RUN TO ENSURE THE OUTFALL CAN BE ACHIEVED.

P3	22.02.24	UPDATED TO SUIT COMMENTS	AA	CD	CD
P2	08.12.23	STAGE 4	CD	SW	CB
P1	11.11.22	FIRST ISSUE	CD	DS	DS
Rev	Date	Description	By	Check	App.

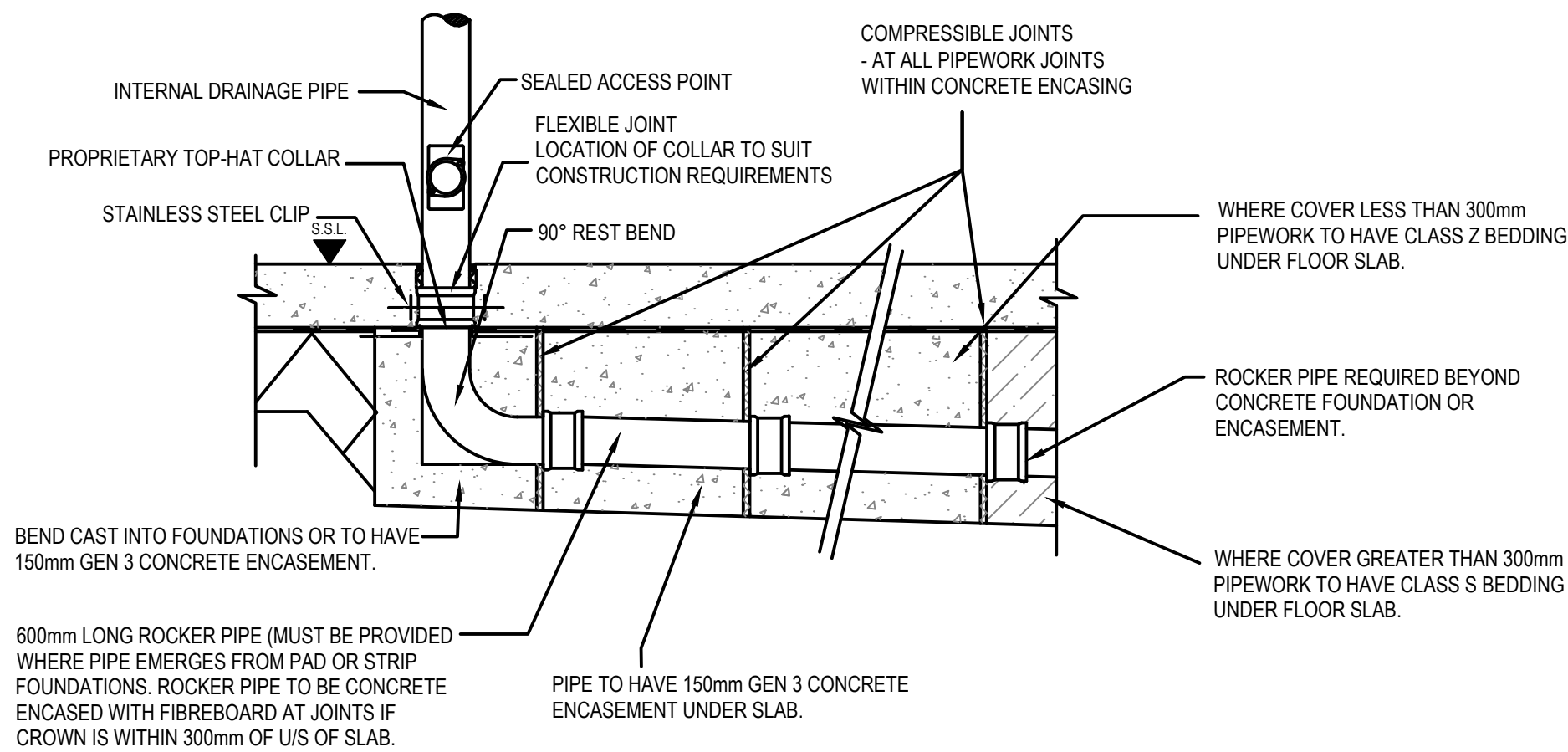
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Client	GREAT PLACES HOUSING GROUP				
Project	LAYSTALL STREET DEVELOPMENT MANCHESTER				
Office	ALTRINCHAM				
Discipline	CIVIL AND STRUCTURAL				
Title	DRAINAGE DETAILS SHEET 1				
Scale @ A1	NTS	Status	STAGE 4		

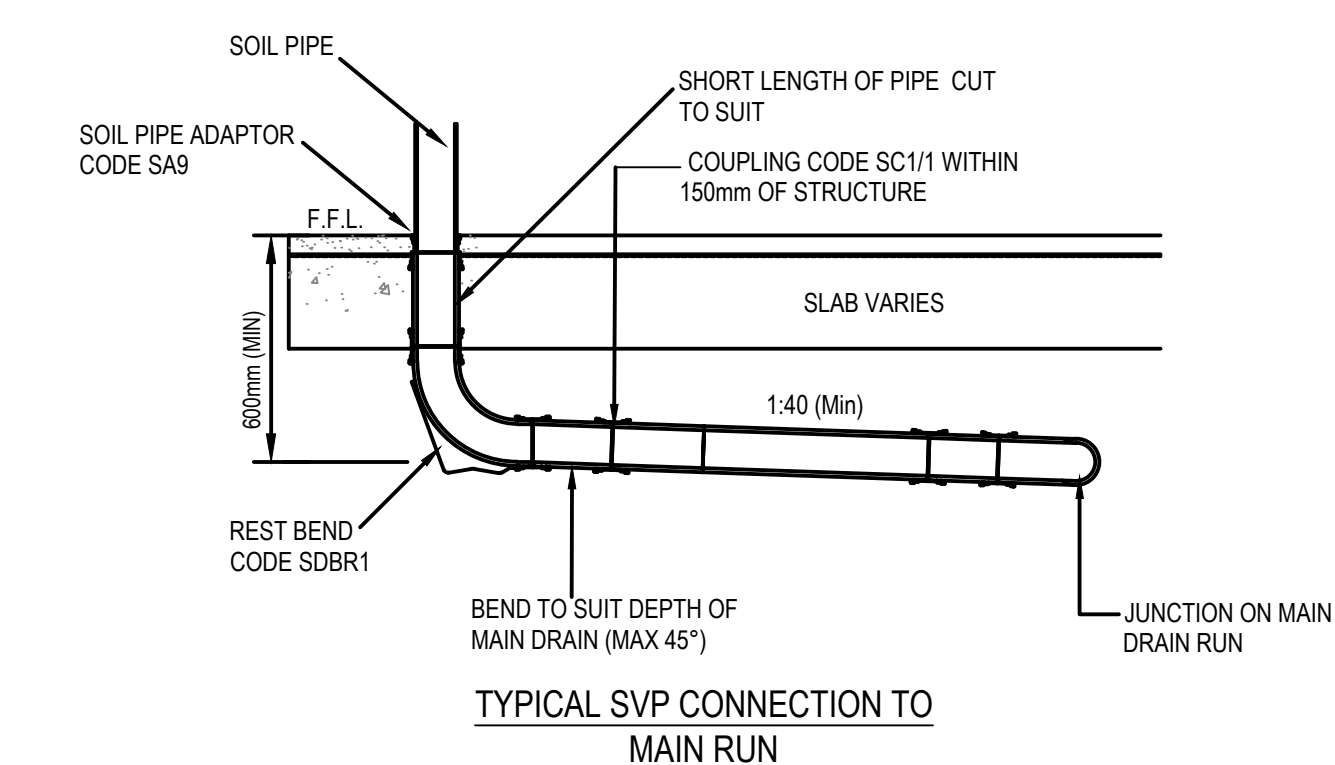


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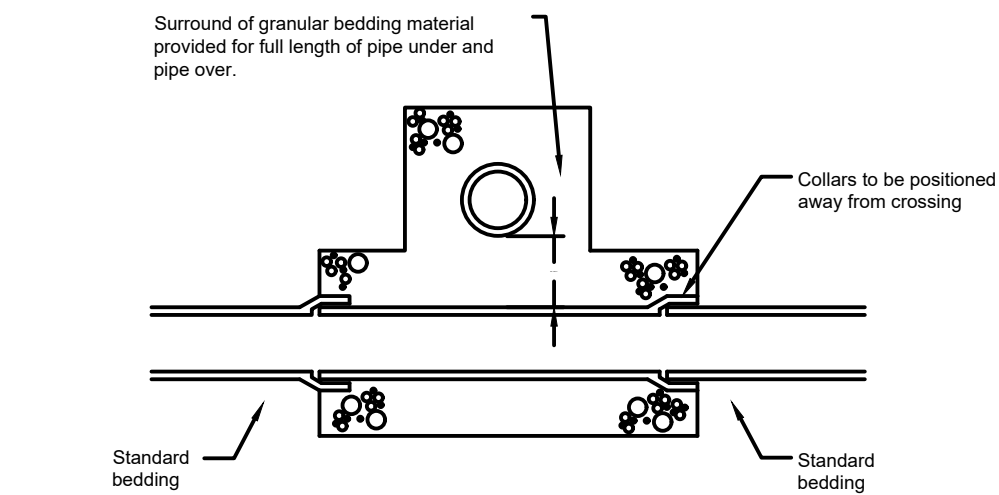
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Type	Discipline	Drawing No.	Revision
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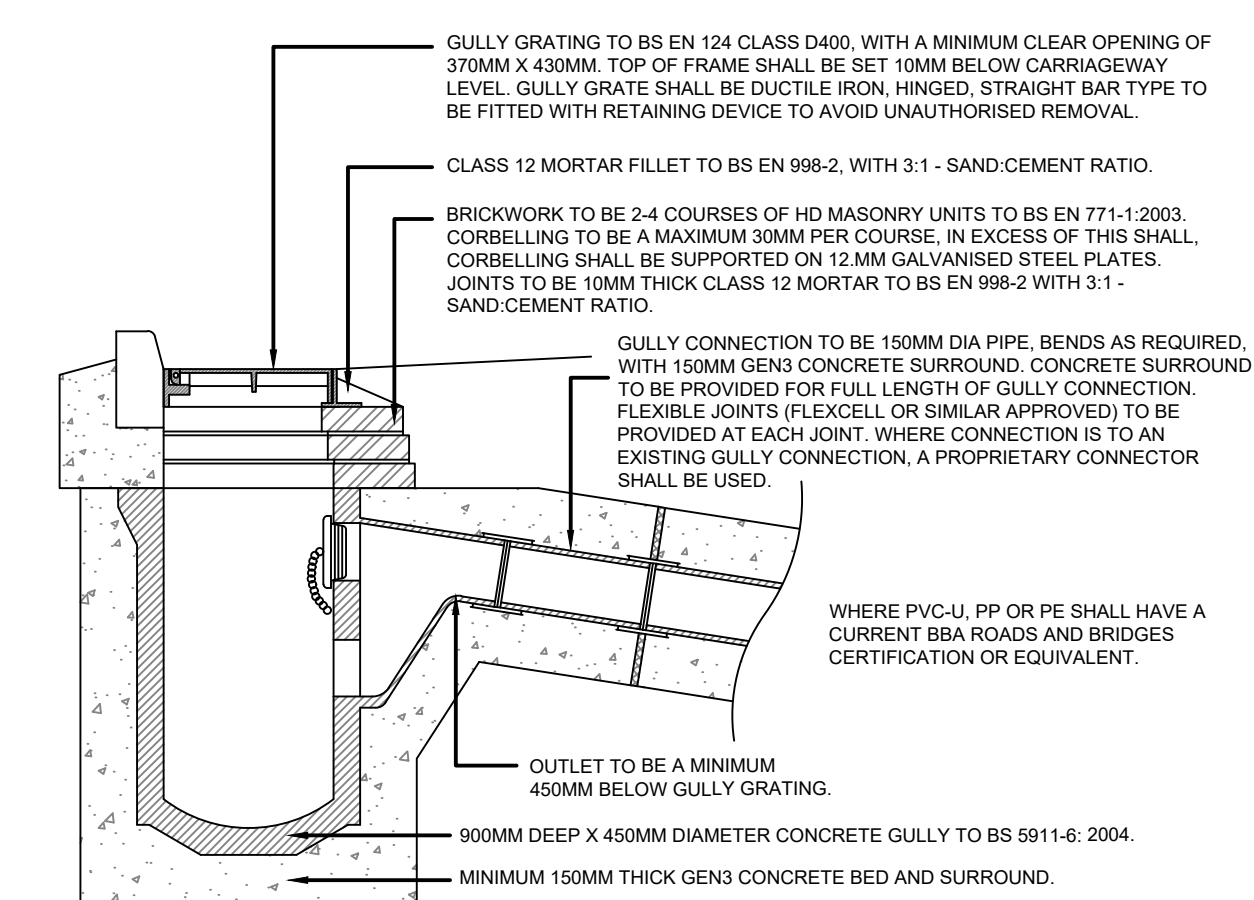
DRAINAGE UNDER BUILDINGS



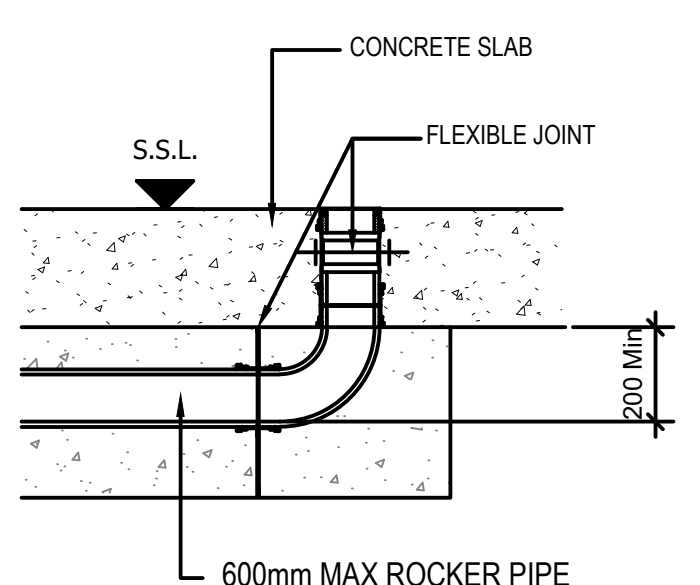
TYPICAL SVP CONNECTION TO MAIN RUN



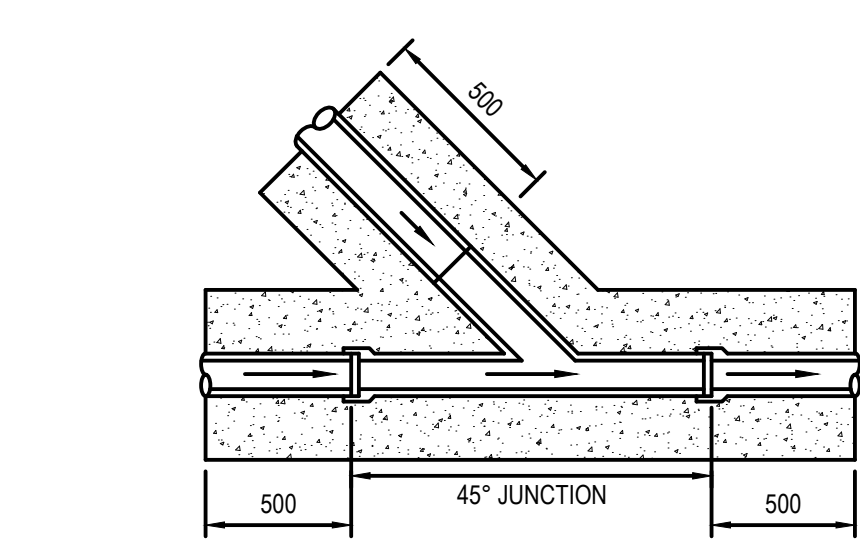
PIPE CROSSINGS DETAIL



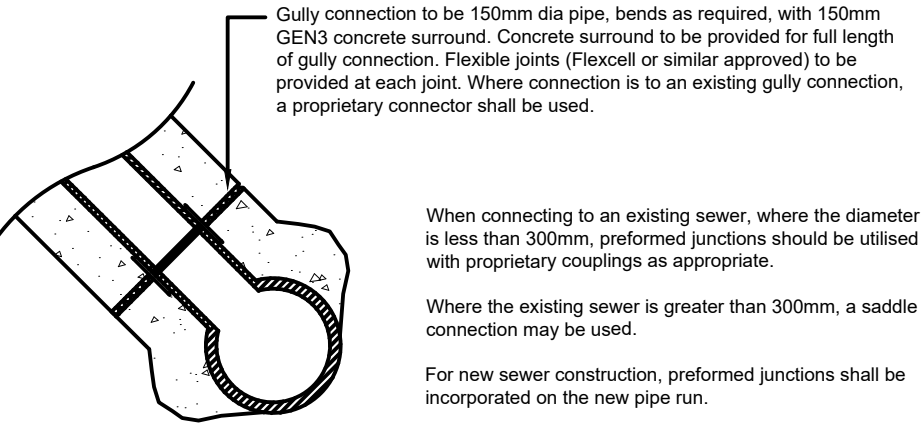
ROAD GULLY (G) DETAIL - TYPE 1



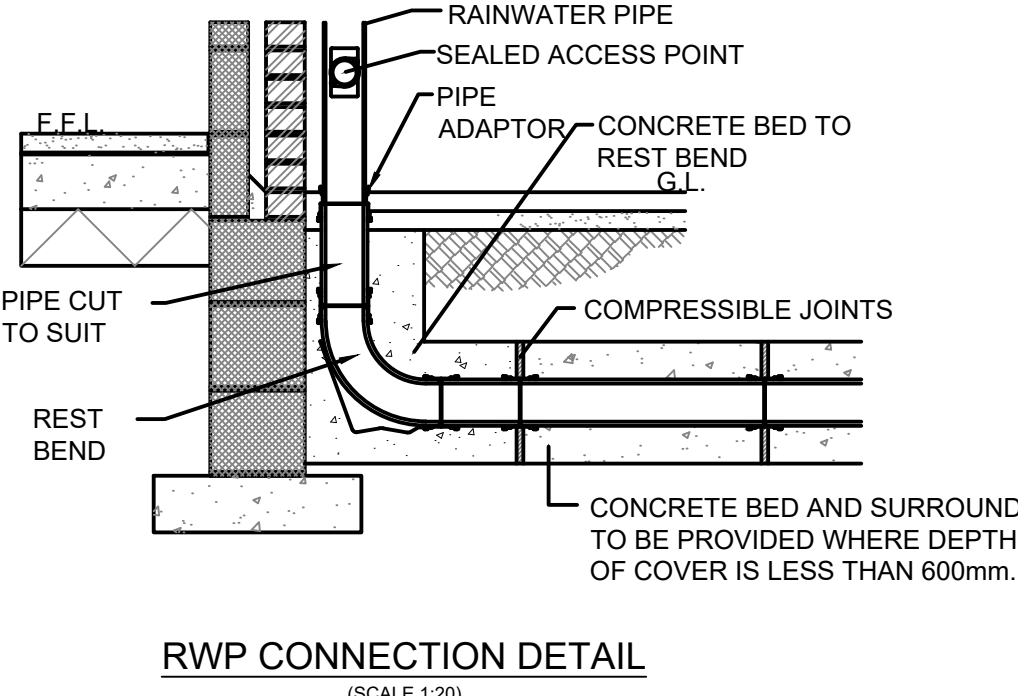
TYPICAL SECTION THROUGH SLAB (100mmØ downpipe)



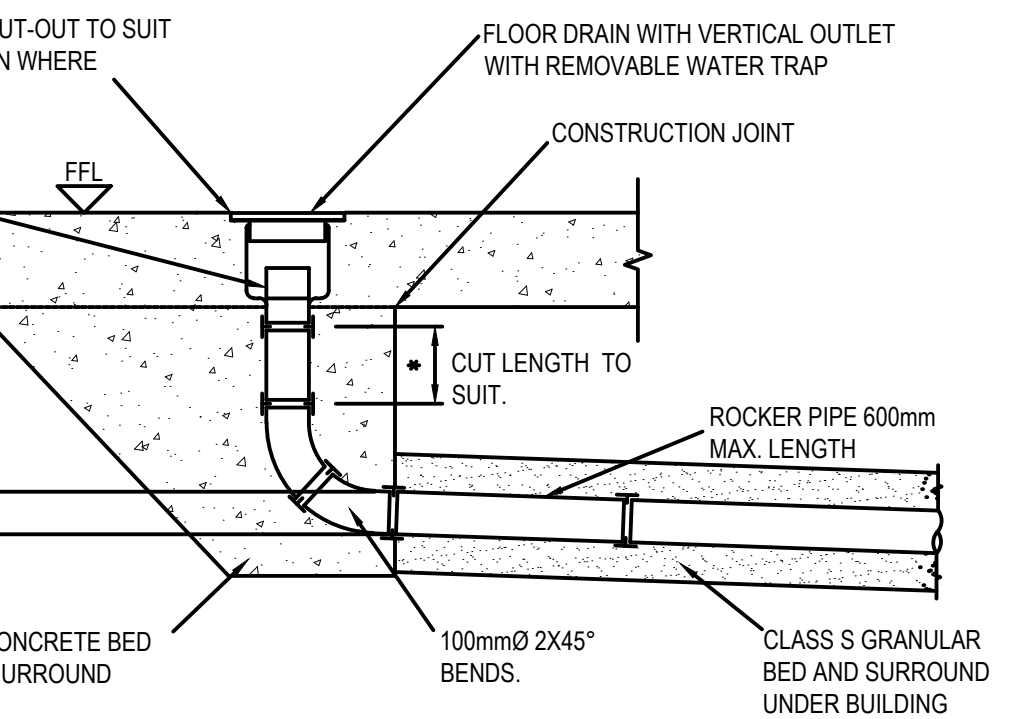
TYPICAL SADDLE CONNECTION



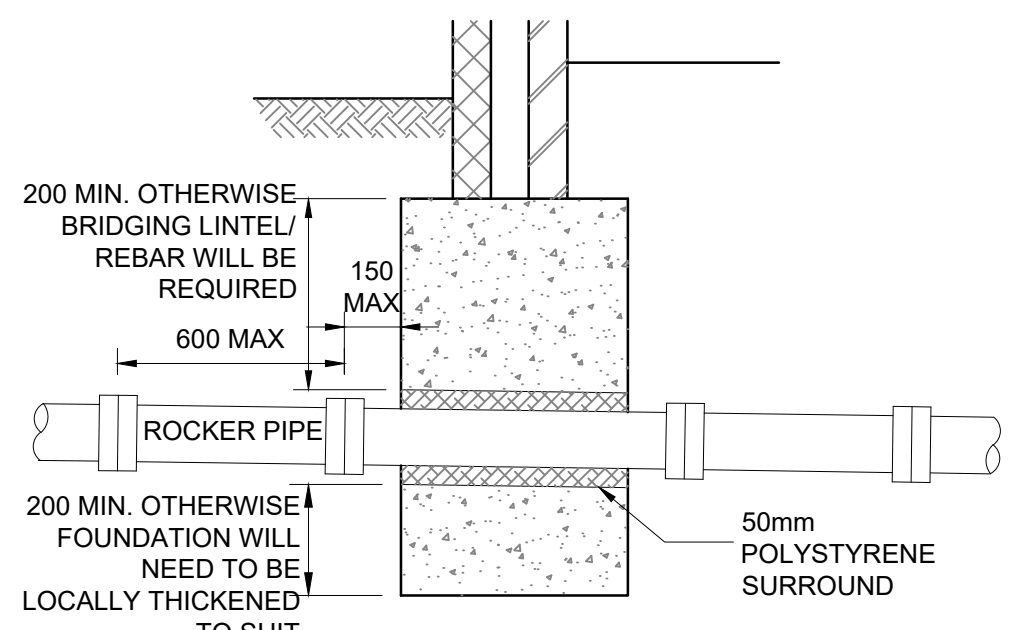
SADDLE CONNECTION TO EXISTING SEWER



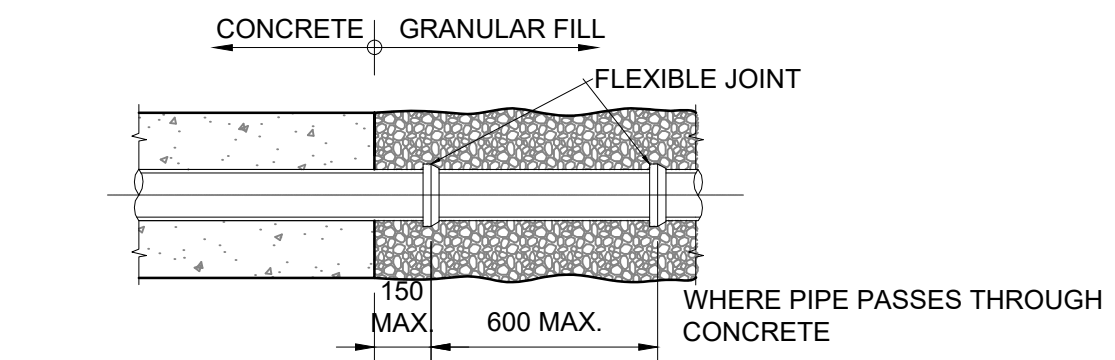
RWP CONNECTION DETAIL (SCALE 1:20)



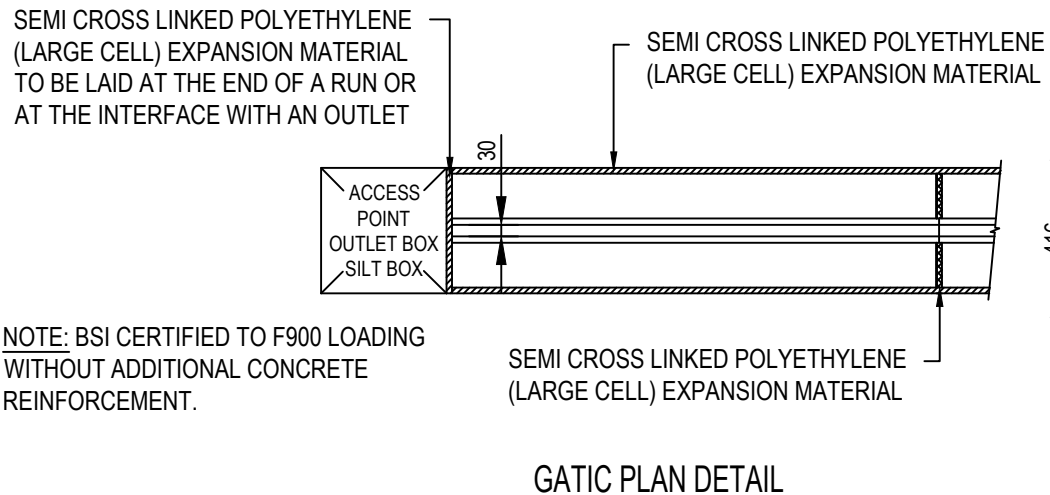
TYPICAL INTERNAL FLOOR DRAIN



TYPICAL PIPE THROUGH FOUNDATIONS DETAIL (SCALE 1:20)

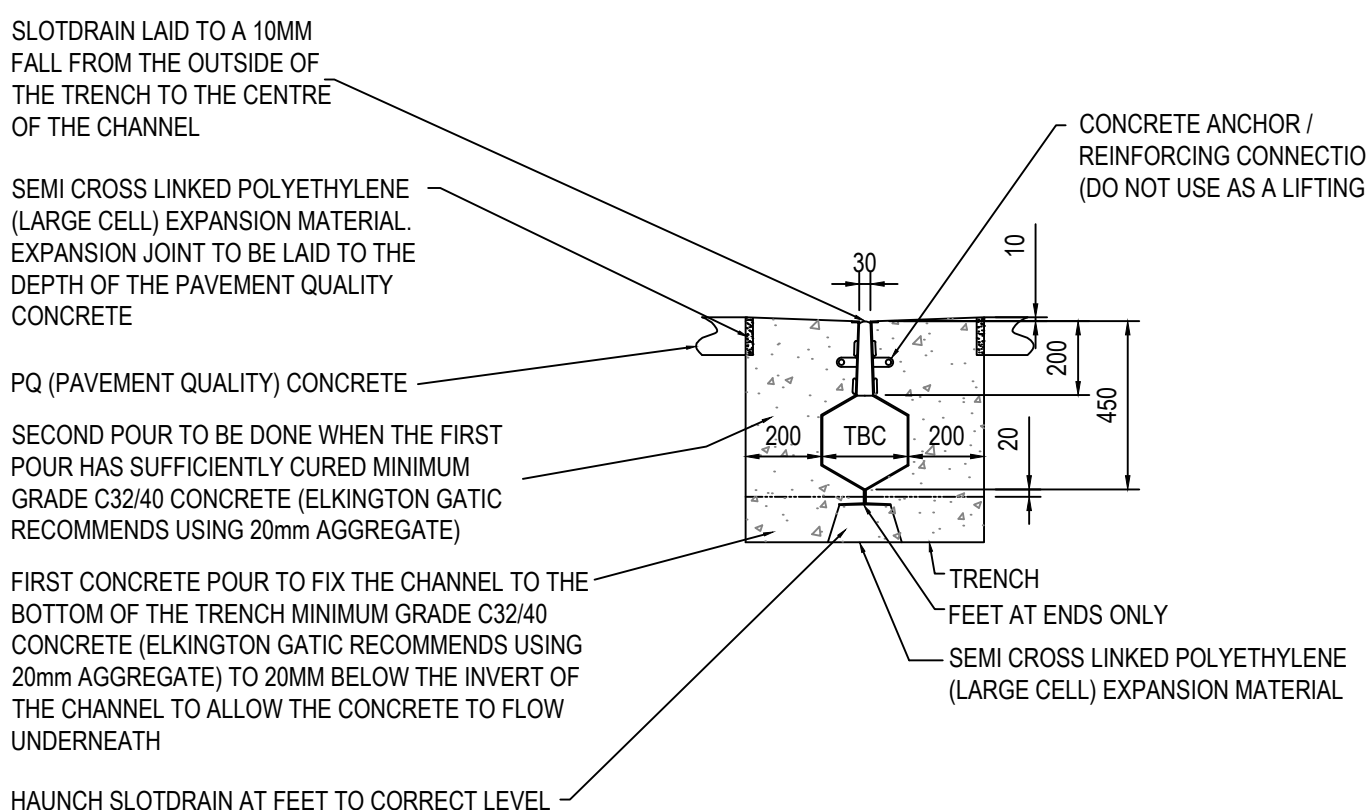


TYPICAL ROCKER PIPE DETAIL (SCALE 1:20)

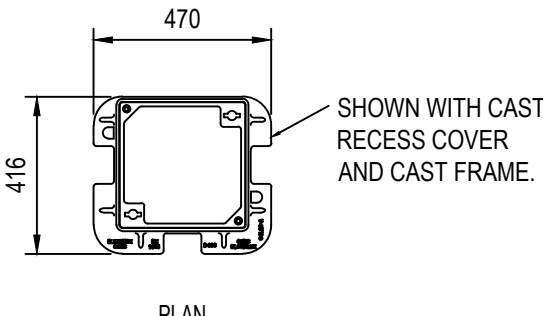


NOTE: BSI CERTIFIED TO F900 LOADING WITHOUT ADDITIONAL CONCRETE REINFORCEMENT.

GATIC PLAN DETAIL



GATIC SLOT DRAIN 350mm OUTLET UNIT SECTION AND PLAN DETAILS NTS



350 ACCESS BOX SECTION AND PLAN DETAILS NTS

NAT 133

CHANNEL CONNECTION IN MANHOLE

GULLY PLUG

ISOMETRIC VIEW

SUPPLIED AS STANDARD WITH PLASTIC GULLY PLUG.

ALSO AVAILABLE WITH OPTIONAL LEVER LOCKING STOPPER

CODE No.	A	B	C	D	E	F	G	H	J	WEIGHT (kg)
KRI3/1	100	130	153	185	580	265	270	40	530	15.35
KRI3/2	150	185	220	250	720	278	300	40	610	23.90
KRI3/3	225	270	300	340	1070	430	450	50	840	57.00

ALL DIMENSIONS IN mm

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± 5% TOLERANCE TO BE APPLIED ON ALL DIMENSIONS

WEIGHT = DRAWN: GB 26-04-10 SCALE: PROJECTION: 1:5

DO NOT SCALE ISSUE: 2 29-08-17

TITLE: REVERSE ACTION INTERCEPTOR

DRAWING No.: KRI3

A4

GENERAL NOTES

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- ALL DETAILS TO BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL COUNCILS BUILDING CONTROL, OR ANY OTHER RELEVANT STANDARDS BODY.
- ALL PROPRIETARY PRODUCT TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS, INSTRUCTIONS AND RECOMMENDATIONS.

DRAINAGE NOTES

- NO WORK SHALL COMMENCE ON SITE UNTIL WRITTEN APPROVAL IS RECEIVED FROM THE ADOPTING HIGHWAY AUTHORITY, ADOPTING SEWERAGE UNDERTAKERS, ENVIRONMENT AGENCY AND/OR ANY OTHER RELEVANT AUTHORITY. WORKS UNDERTAKEN PRIOR TO APPROVAL ARE AT THE DEVELOPERS RISK AND CARTERS CONSULTING LIMITED WILL NOT BE HELD RESPONSIBLE FOR SUBSEQUENT DELAYS IN APPROVALS, REMEDIATION OR COSTS INCURRED.
- ALL INVERT LEVELS OF EXISTING FOLLS AND SURFACE WATER SYSTEMS ARE TO BE CONFIRMED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF ANY ON SITE DRAINAGE WORKS. ANY DISCREPANCY IN LEVELS IS TO BE REPORTED IMMEDIATELY TO CURTINS CONSULTING LIMITED.
- ALL SEWERS, UNLESS AGREED OTHERWISE STATED, SHALL BE: 150MM DIA TO BE VITRIFIED CLAY. 225MM DIA TO BE VITRIFIED CLAY. 300MM DIA TO BE VITRIFIED CLAY. 375MM DIA AND GREATER TO BE CLASS 220 CONCRETE PIPES.
- ALL VITRIFIED CLAY PIPES TO BS EN 295-1. ALL CONCRETE PIPES TO BE TO BS EN 1916. ALL CONCRETE MANHOLES TO BE TO BS EN1917.
- LATERAL CONNECTIONS FROM MAIN SEWERS TO DEMARICATION CHAMBER TO BE 150MM DIA MINIMUM UNLESS OTHERWISE STATED.
- FIRST PIPE OUT OF MANHOLES TO BE AS SHORT AS PRACTICABLE SO AS TO PROVIDE A FLEXIBLE JOINT AS CLOSE AS POSSIBLE TO THE OUTSIDE FACE OF THE CONCRETE SURROUND AND CONNECTED TO A LENGTH OF ROCKER PIPE.
- ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS.
- ALL SEWER WORKS TO COMPLY WITH WRC SEWERS FOR ADOPTION, 6TH EDITION. STAYS REQUIREMENTS AND KITE-MARKED (OR SIMILAR APPROVED) WHERE PRACTICABLE. WHERE CONFLICTING DETAILS OCCUR, STAYS DETAILS SHALL TAKE PRECEDENCE IN ALL CASES.
- MANHOLE COVERS SHALL HAVE A CLEAR OPENING IN ACCORDANCE WITH SFA 6TH EDITION AND SHALL BE CLASS D400 TO BS EN 124 WITH 150MM DEEP FRAMES IN VEHICULAR TRAFFICED AREA. CLASS 8/12 COVERS AND FRAMES TO BE PROVIDED ON ALL OTHER MANHOLES IN LANDSCAPING.
- FILLED GROUND MUST BE FILLED AND CONSOLIDATED BEFORE ANY SEWER WORKS ARE CARRIED OUT.
- WATER AUTHORITIES ARE NOT OBLIGED TO ACCEPT FILTER DRAIN / LAND DRAINAGE RUN OFF INTO THE PUBLIC SEWER NETWORK OR ADAPTABLE DRAINAGE SYSTEM (DIRECTLY OR INDIRECTLY). AN ALTERNATIVE METHOD OF DISPOSAL OF LAND DRAINAGE RUN OFF WILL THEREFORE BE REQUIRED AND ANY PROPOSALS MUST BE AGREED WITH THE LOCAL AUTHORITY LAND DRAINAGE SECTION.
- COVER SLABS MUST CARRY THE BSI KITEMARK AND SHALL COMPLY WITH BS 5911 PART 1 / BS EN 1917: 2000. WHERE THE CLEAR OPENING OF THE KITE-MARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A LOAD BEARING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN AS SPECIFIED ABOVE. PLEASE REFER TO CONCRETE PIPELINE SYSTEMS ASSOCIATION (CPSA) 'TECHNICAL BULLETIN' ISSUED AUTUMN 2004 FOR KITE-MARKED COVER SLAB OPENING SIZES.
- SULPHATE RESISTANT CEMENT (C20-0C2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED TO PROVE THAT SUCH PRECAUTIONS ARE NOT REQUIRED.
- ADAPTABLE SEWERS SHOULD BE A MINIMUM OF 1M AND MANHOLES 0.5M FROM KERB FACES AND SERVICE LINES. NEED TO AVOID LONG LENGTHS.
- SEWERS MUST HAVE 5M CLEARANCE FROM TREES AND HEDGES OR TO HAVE SUITABLE ROOT PROTECTION IN ACCORDANCE WITH THE SFA 6TH REQUIREMENTS.
- ALL PIPES TO HAVE CLASS 'S' GRANULAR BED AND SURROUND UNLESS OTHERWISE STATED. BEDDING AND BACKFILL MATERIALS TO CONFORM TO THE REQUIREMENTS OF BS 4005 (TABLE A2). WHERE DEPTH OF COVER TO TOP OF SEWER IS LESS THAN 1.2M IN HIGHWAYS AND VERGES (OR LESS THAN 0.9M IN NON-VEHICULAR ACCESSED AREAS), THEN A CLASS 'Z' BEDDING TO BE USED.
- ALL SEWER TRENCHES AND BRANCH CONNECTIONS TO BE BACKFILLED WITH SUITABLE MATERIAL IN LAYERS NOT EXCEEDING 225MM UNCONSOLIDATED THICKNESS THEN FULLY COMPACTED.
- ADAPTABLE SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO AVOID LONG LENGTHS.
- PLASTIC CHANNEL SECTIONS WILL NOT BE PERMITTED WITHIN MANHOLE CHAMBERS. CLAYWARE CHANNELS SHALL BE USED WITHIN MANHOLES FOR PIPE SIZES UP TO AND INCLUDING 300MM DIAMETER.
- THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTION AND BENDS.
- SECTION 163 OF THE HIGHWAYS ACT 1980 REQUIRES PROVISION TO BE MADE TO PREVENT WATER FALLING ON OR FLOWING ONTO THE HIGHWAY FROM PRIVATE DRIVEWAYS OR PROPERTIES. ANY DRAINAGE REQUIREMENTS MUST BE CONNECTED INTO THE PRIVATE SURFACE WATER DRAINAGE SYSTEM.
- THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING:- (i) ALL OPERATIONS SHOULD BE CARRIED OUT IN ACCORDANCE WITH THE GENERAL HEALTH AND SAFETY POLICY OF THE DEVELOPER AS REQUIRED BY SECTIONS 2 OF THE HEALTH AND SAFETY AT WORK ACT 1974 AND IN PARTICULAR THE CONSTRUCTION (GENERAL PROVISIONS) REGULATIONS. (ii) THE LOCAL AUTHORITY AND UTILITIES COMPANIES ARE TO BE NOTIFIED PRIOR TO COMMENCEMENT OF WORK ON SITE. (iii) PRIOR TO CONSTRUCTION THE ACTUAL POSITIONS AND DEPTHS OF SERVICES LIKELY TO BE AFFECTED BY THE WORKS SHOULD BE ESTABLISHED BY MEANS OF HAND DIG. CLOSE LIAISON WITH THE UTILITY COMPANIES. THE CONTRACTOR SHALL IMMEDIATELY ADVISE THE ENGINEER OF ANY SERVICES EXPOSED WHICH MAY AFFECT THE DESIGN. (iv) ALL OPERATIVES WORKING ON THE HIGHWAY WORKS MUST HAVE STREET WORKS ACCREDITATION.
- THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH CURTINS SPECIFICATION FOR DRAINAGE WORKS AND ANY OTHER SUBSEQUENT ADDITIONS TO THIS LIST.
- THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT, AND TEMPORARY AND PERMANENT DIVERSION WORKS, AS NECESSARY TO ALL EXISTING SERVICES.
- THE CONTRACTOR SHALL ALLOW FOR KEEPING TRENCHES AND EXCAVATIONS AS DRY AS APPROPRIATE. THE POINT AND METHOD OF DISCHARGE TO BE AGREED WITH THE DRAINAGE AUTHORITY & LPA AND ENVIRONMENT AGENCY.
- ALL DRAINAGE WORKS ARE TO BE CONSTRUCTED FROM THE OUTFALL TOWARDS THE FEET OF RUN TO ENSURE THE OUTFALL CAN BE ACHIEVED.

P3	22.02.24	UPDATED TO SUIT COMMENTS	AA	CD	CD
P2	08.12.23	STAGE 4	CD	SW	CB
P1	11.11.22	FIRST ISSUE	CD	DS	DS
Rev	Date	Description	By	Check	App.

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Client	GREAT PLACES HOUSING GROUP				
Project	LAYSTALL STREET DEVELOPMENT MANCHESTER				
Office	ALTRINCHAM				
Discipline	CIVIL AND STRUCTURAL				
Title	DRAINAGE DETAILS SHEET 2				

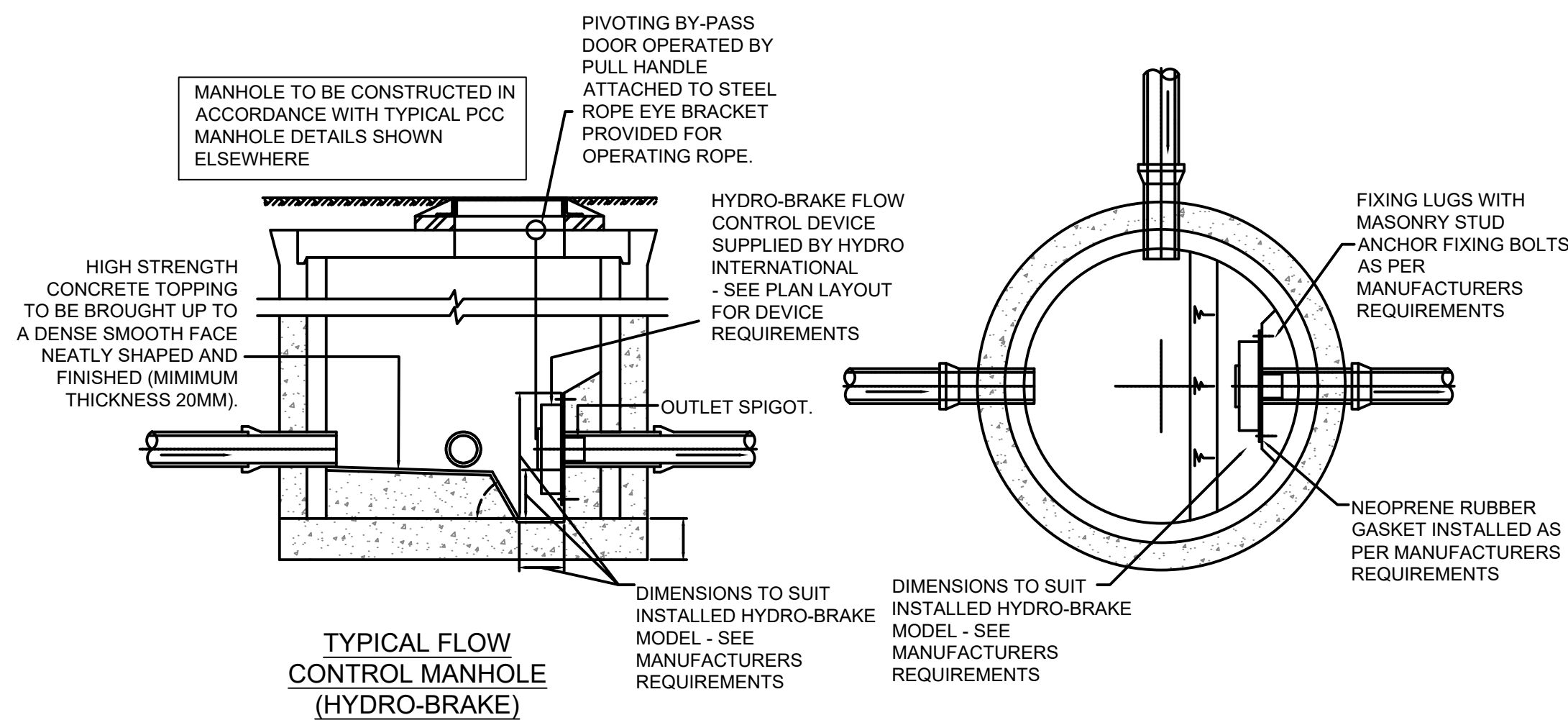
Scale @ A1	NTS	Status	STAGE 4
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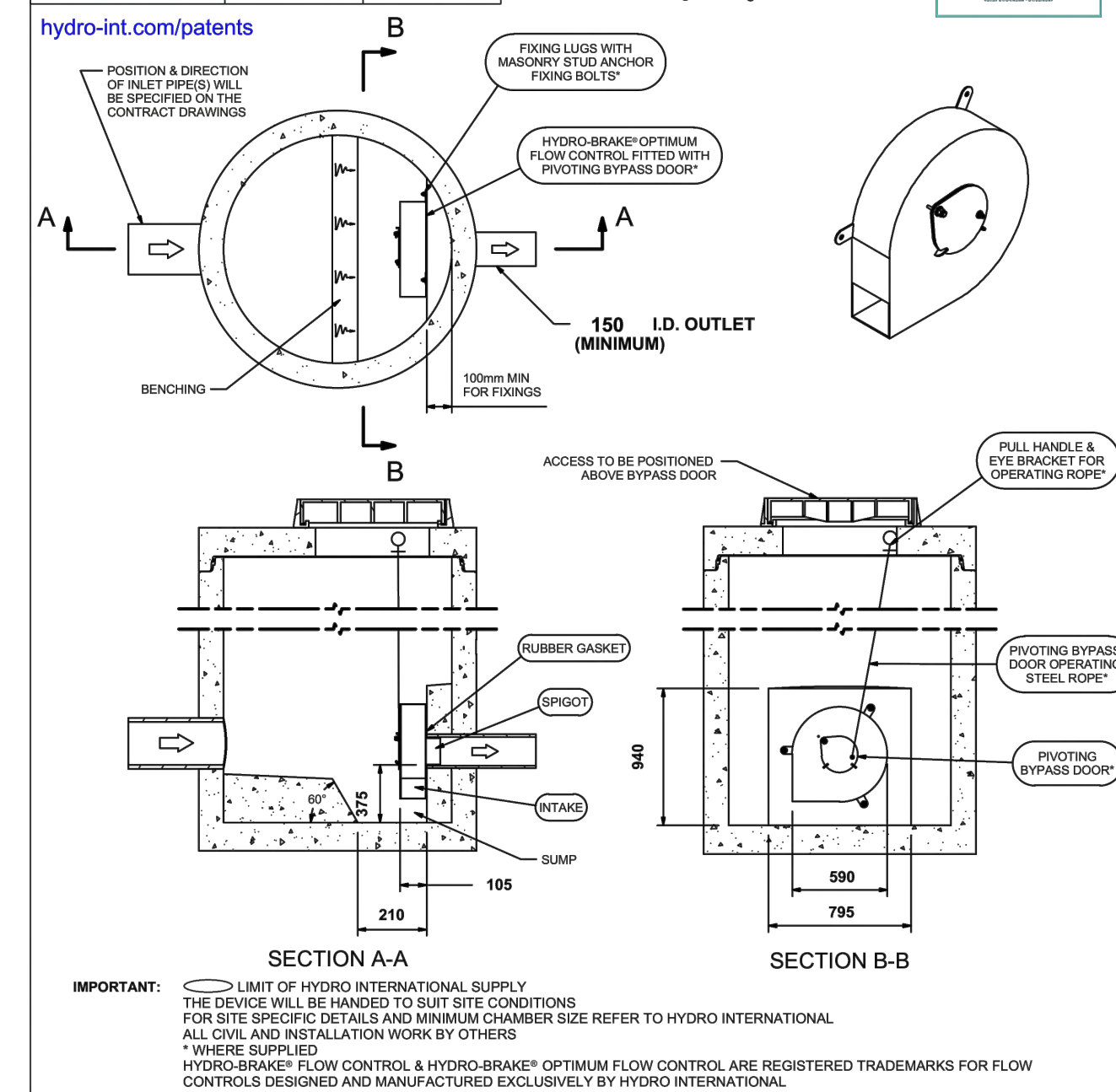
Job Number	Originator	Building/Zone	Level
220019	CLA	XX	00
Type	Discipline	Drawing No.	Revision
DR	C	502	P3

DESIGN OF TANK TO BE
CONFIRMED BY SELECTED
MANUFACTURER.
CONTRACTOR TO CONFIRM
AND ISSUE TO CLANCY
CONSULTING FOR APPROVAL.



Technical Specification		
Control Point	Head (m)	Flow (l/s)
Primary Design	1.550	5.000
Flush-Flo™	0.424	4.794
Kick-Flo®	0.868	3.820
Mean Flow		4.268

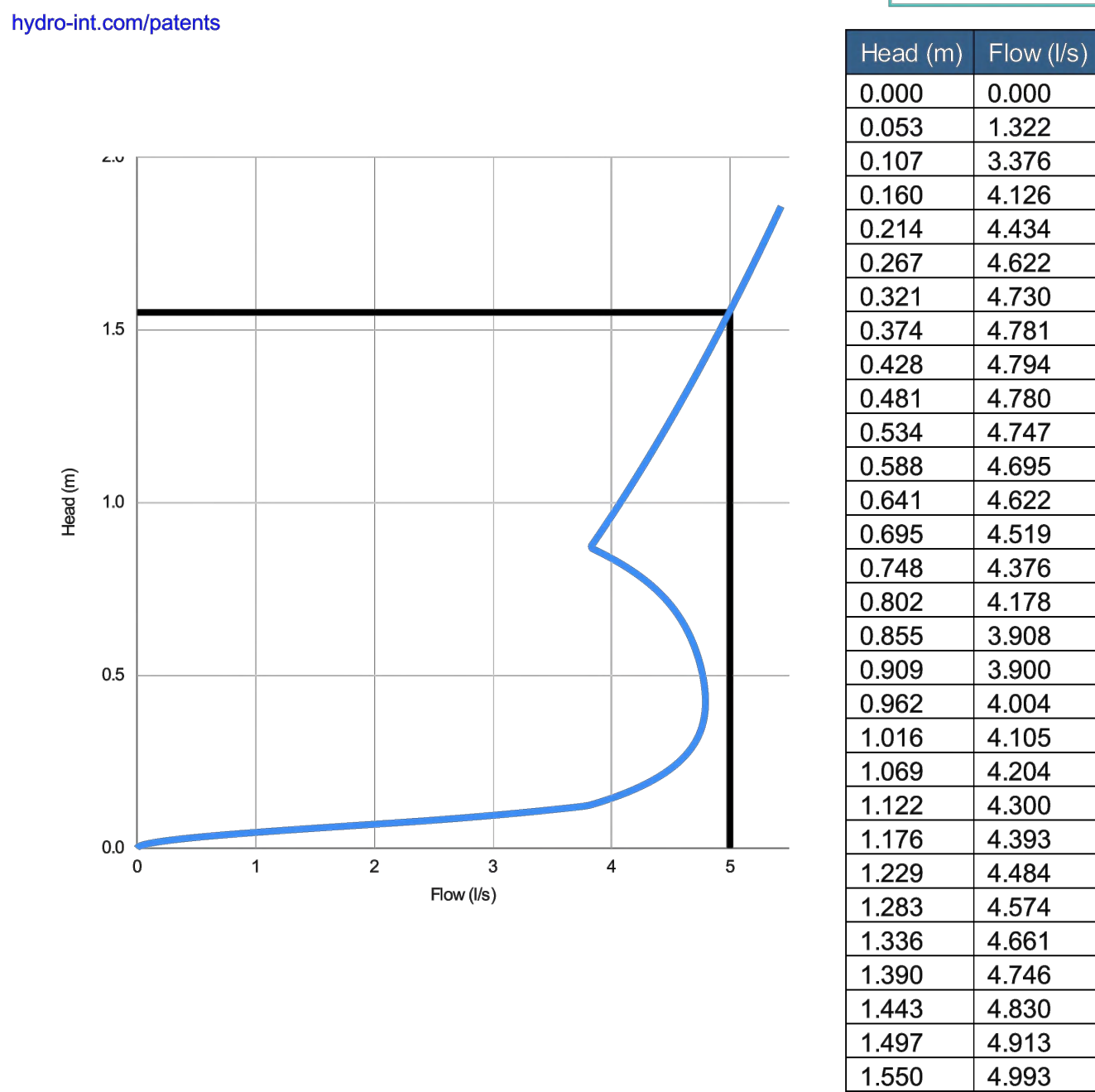
Hydro-Brake® Optimum Flow Control including:



THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

<div>DESIGN ADVICE</div>	<p>The headflow characteristics of this SHE-0097-5000-1550-5000 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full headflow characteristic curve.</p> <p>The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.</p>	<div> A CBM COMPANY</div>
	<p>DATE 08/12/2023 11:15</p> <p>SITE Laysall Street</p> <p>DESIGNER carl dawson</p> <p>REF 1-21458</p>	<p>SHE-0097-5000-1550-5000</p> <p>Hydro-Brake® Optimum</p>
	<p>© 2023 Hydro International Ltd Unit 2, Rivermead Court, Kern Business Park, Windmill Road - Kern - Clevedon - B821 6PT - Tel: 01275 878371 - www.hydro-int.com - Email: Enquiries@hydro-int.co.uk</p> <p>carl.dawson@clancy.co.uk</p>	

Control Point	Head (m)	Flow (l/s)
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DESIGN ADVICE	The head/flow characteristics of this SHE-0097-5000-1550-5000 HydroBrake Optimum® Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.	 Hydro International® <small>in close contact</small>
<p>!</p> <p>The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.</p>		
DATE	08/12/2023 11:15	SHE-0097-5000-1550-5000
SITE	Laystall Street	Hydro-Brake Optimum®
DESIGNER	carl dawson	
Ref	1-21458	
<small>© 2018 Hydro International, Ryelwood Court, Kern Business Park, Windmill Road, Kern, Cleveland, BS21 6FT. Tel 01275 678371 Fax 01275 574979 Web www.hydrointl.com Email design@hydrointl.com</small>		

P3	22.02.24	STAGE 4	CD	SW	CB
P2	08.12.23	STAGE 4	CD	SW	CB
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ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
DO NOT TURN ON LAYERS THAT HAVE BEEN TURNED OFF.
DO NOT THAW LAYERS THAT HAVE BEEN FROZEN.
DRAWING MUST BE PRINTED IN BLACK AND WHITE ONLY.

Client	GREAT PLACES HOUSING GROUP		
Project	LAYSTALL STREET DEVELOPMENT MANCHESTER		
Office	ALTRINCHAM		
Discipline	CIVIL AND STRUCTURAL		
Title	DRAWING DETAILS SHEET 3		
Scale @ A1	NTS	Status	STAGE 4

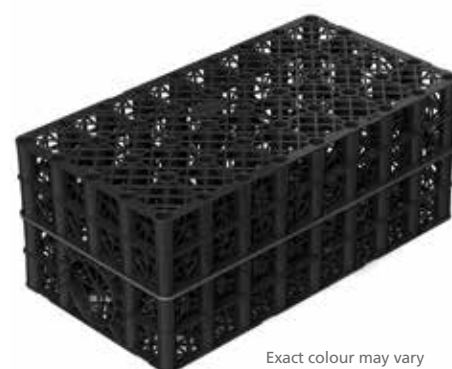


Job Number 220019	Originator CLA	Building/Zone XX	Level 00
Type DR	Discipline C	Drawing No. 503	Revision P3

Product code: PSM1A

The Polystorm-R modular cell is ideally suited for loaded applications at greater depths, such as housing, commercial and infrastructure projects and has a compressive strength of up to 61 tonnes/m². It offers all the proven performance of the Polystorm cell, with the added benefits of being manufactured from over 90% recycled material content.

Wherever performance criteria and standards allow, we will always maximise the sustainability of our products by using post consumer plastics in their manufacture. By sourcing and carefully controlling the quality of the recycled material we use our precision injection moulding. Therefore we are able to guarantee consistent quality in our recycled plastic, giving you the confidence and the performance levels you expect from the market leader.



Exact colour may vary due to recycled materials.

Key Benefits

- Made from specially selected and controlled recycled materials
- Environmentally friendly, sustainable solution
- Has undergone stringent testing to ensure product performance
- Compressive strength of 61 tonnes/m²
- Ideal for retention, attenuation and infiltration applications with a suitable geomembrane or geotextile
- BBA approved
- Allow flexibility of shape - ideal for shallow excavation systems, narrow strips or use in restricted areas
- Can be used as part of a value engineered hybrid system with Polystorm, Polystorm Lite and Polystorm Xtra
- Integrated inlet and outlet
- 3D flow throughout the structure
- 95% void ratio
- Light weight yet robust - excellent Health and Safety and installation benefits
- 60 years creep limited life expectancy

Technical Support

Detailed guidance and assistance is available.

For further information, please contact our Technical Team on **+44 (0) 1509 615100** or email civils@polypipe.com



ELEMENT	VALUE
PHYSICAL PROPERTIES	
Length	1m
Width	0.5m
Depth	0.4m
Total volume	0.2m ³
Unit weight	9kg (approx)
Unit storage volume	0.19m ³ (190 litres)
Void ratio	95%
SHORT TERM COMPRESSIVE STRENGTH	
Vertical	610 kN/m ² **
Lateral	63 kN/m ² **
SHORT TERM DEFLECTION	
Short-term vertical deflection	60 kN/m ² per mm
LONG TERM DEFLECTION	
Estimated long term vertical deflection (creep)	0.2798 Ln (design life in hrs) +0.485 [Based on an applied test load = 162 kN/m ²] Creep data limit 60 years
Estimated long term lateral deflection (creep)	1.0192 Ln (design life in hrs) -3.864 [Based on an applied test load = 30.8 kN/m ²] Creep data limit 60 years

Note: Polystorm-R is ideal for use in trafficked and pedestrian applications subject to a structural design check and suitable installation conditions

* Each unit includes 4 Clips and 2 Shear Connectors.

** Compressive strength at yield, maximum recommended value for design purposes.

RECOMMENDED MAXIMUM DEPTH OF INSTALLATION (to cell invert) [m]

TYPICAL SOIL TYPE	TYPICAL ANGLE OF SHEAR RESISTANCE	SOIL WEIGHT kN/m ³	WITHOUT GROUNDWATER (below base of cells) NORMAL CASE		WITH GROUNDWATER AT 1M BELOW GROUND LEVEL AND UNITS WRAPPED IN GEOMEMBRANE	
			Pedestrian	Trafficked (cars) <3000kg GVW	Pedestrian	Trafficked (cars) <3000kg GVW
Stiff over consolidated clay e.g. London clay	24	20.0	2.2	1.9	1.8	1.6
Normally consolidated silty sandy clay e.g. alluvium, made ground	26	19.0	2.4	2.2	1.9	1.7
Loose sand and gravel	30	18.0	3.0	2.7	2.0	1.9
Medium dense sand and gravel	33	19.0	3.2	2.9	2.0	1.9
Dense sand and gravel	38	20.0	3.7	3.5	2.1	2.0

Note:

1) Stated depths based on the calculation methodology detailed within CIRIA C680 (2008)

2) Assuming water density = 10.0kN/m³

3) Assumed ultimate limit state (ULS) partial factor of safety applied to: Material = 2.75 Lateral pressure = 1.35

Durability

The polymer material used in the manufacture of the Polystorm-R unit has an adequate resistance to attack from the type and quantities of chemicals that may be expected to naturally occur in uncontaminated soils and rainwater runoff. When installed in accordance with our recommendations, it is expected that the Polystorm-R unit will have a design life in excess of 60 years*. The installer of a proposed geocellular structure should ensure that an appropriate design check has been undertaken, in accordance with the recommended methodology and factors of safety given in CIRIA C680 (2008), Structural Design of Modular Geocellular Drainage Tanks, prior to the commencement of construction activities.

* Derived from long term extrapolated creep testing

Notes

1. Unless stated, all values are nominal and may vary within normal production tolerances.
2. The characteristic unit parameters stated have been based on Polypipe BBA certificate N° 06/4297, sheet 3.
3. Polypipe reserve the right to change product specifications without prior notice.
4. This document is uncontrolled and updates will not be issued automatically.

RECOMMENDED MINIMUM COVER LEVELS [m]

LIVE LOAD CONDITIONS	PEDESTRIAN	LIGHT TRAFFICKED	
		Car park with vehicle mass <GVW	
Minimum cover depth required (m)	0.50	<3000kg 0.50	<9000kg 0.65

Note

1) Stated depths based on the calculation methodology detailed within CIRIA C680 (2008)

2) Assumed serviceability limit state (SLS) partial factor of safety applied to: Material = 1.5 Live load = 1.0 Dead load = 1.0

3) Shallower minimum burial depths may be applicable subject to an assessment of the specific site conditions. For further details please consult our Technical Team on 01509 615100.

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www.polypipe.com/wms



6. Architect Correspondence Regarding Green Roof Justification

From: Rob Paton <rob.paton@omiarchitects.com>
Sent: 23 April 2024 10:17
To: Carl Dawson
Cc: Stuart McGrath
Subject: SuDs Strategy DoC

OMI Architects

Hi Carl,

See below.

The submitted drawings and report demonstrate how the scheme achieves the required flow rate of 5l/s. To achieve this a below ground surface water attenuation tank system has been incorporated. We note the request for justification of why a blue green roof system has not been incorporated into the scheme and can confirm this is for the following reasons:

Structural Considerations/Construction Methodology

The scheme is being delivered with a Light Gauge Steel Frame (LGSF) superstructure. LGSF is an efficient form of construction utilising cold rolled steel sections, which delivers a light weight building. The incorporation of a Blue/Green roof would increase the weight on the system, increasing the mass (and overall material use) of both the superstructure and foundations. This would add an unnecessary level of additional embodied carbon into the development when compared to the below ground attenuation solution proposed, and would contradict the Embodied carbon strategy agreed under a separate planning condition.

Maintenance/Risk of Water Ingress

Holding water at roof level is intrinsic to blue roof design. Blue roofs are installed with a waterproofing membrane but if this becomes damaged and begins to leak, the damage that could be caused by water cascading through the building could be catastrophic. Maintenance regimes can be advised however the client's view is that the risk of these not being followed to the letter, or water ingress being caused by a failure of the waterproofing system, is too great a risk. This has led to the below ground attenuation tank solution proposed.

Building Height/Massing

The overall building height approved under the planning and listed building consent was arrived at through close liaison with the planning and conservation officers, to deliver a scheme at an appropriate height to its context whilst delivering a viable quantum of housing (in this case 100% affordable tenure housing). This requires careful consideration of roof levels and parapets in order to conform to the consented design, and the additional height required to accommodate a blue green roof system cannot be accommodated.

Kind Regards

Rob Paton | Senior Architect

OMI ARCHITECTS
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0161 832 3242 | omiarchitects.com | [@omiarchitects](https://www.instagram.com/omiarchitects)

1. Drainage Strategy Layout