



RIDGE

OLDHAM ROAD, MANCHESTER

REPORT TO DISCHARGE DRAINAGE
RELATED PLANNING CONDITIONS

MARCH 2021

Document Control Sheet

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Issue	Status	Author	Approved	Date
1	Final	Eleanor Dale	Paul Graveney	01.03.21



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1.0 Introduction

In 2019 a planning application (Ref: 125686/FO/2019) was submitted to Manchester City Council for the construction of a 12-storey residential building (Use Class C3) comprising 144 residential units, with ground floor commercial use (Use Class A1, A2, A3, B1, and/or D1 (excluding Places of Workshop)) (144 sqm), disabled car parking, with highways, landscaping and other associated works following demolition of existing buildings.

The application was approved in December 2020 with planning conditions, including a number related to drainage. This report has been prepared to discharge these conditions.

2.0 Drainage Strategy

2.1 Surface Water Strategy

The site is currently occupied by retail and commercial buildings and a small car park. Therefore, the site is classified as brownfield.

Site investigations confirmed that the site is underlain by Made Ground to depths of between 1.00m and 2.50mbgl. Beneath the Made Ground lies clay with gravel of sandstone and mudstone to depths of approximately 26.00mbgl. Groundwater monitoring has identified groundwater between 0.60m and 1.13mbgl. The presence of shallow groundwater, deep Made Ground deposits, cohesive underlying clay and the proposed new building covering the whole site mean soakaways are not viable for use on the site.

There are no watercourses in close proximity to the site.

There are no surface water sewers in close proximity to the site. There is a 300mm diameter combined sewer within Chadderton Street to the northwest.

Based on the above, surface water from the development site will discharge into the combined sewer in Chadderton Street to the northwest at a rate of **11.7l/s**, as agreed with United Utilities. This discharge rate equates to a 50% reduction on existing runoff rates and is in accordance with the recommendations of the Manchester, Trafford and Salford Strategic Flood Risk Assessment. Surface water will be attenuated within below ground geo-cellular storage crates prior to controlled release.

In the case of this development, all surface water flows up to the 1 in 100 year event including an allowance for climate change will be retained below ground.

The proposed drainage layout for the new development site will be designed in accordance with Building Regulations Part H guidance, i.e. up to the 30-year storm return period criterion and tested for the extreme 100-year event to confirm no flood risk to the building.

2.2 Foul Water Strategy

A new foul water drainage network will collect foul flows from the new development and outfall unrestricted into the United Utilities Combined Water Sewer within Chadderton Street.

3.0 Drainage Related Planning Condition and Ridge Response

3.1 Detailed below is each planning condition text in Blue with the Ridge response in Black beneath.

Planning Condition 5

Notwithstanding the details submitted on the Drainage report prepared by Scott Hughes stamped as received by the City Council, as Local Planning Authority, on the 23 December 2019, (a) the development shall not commence, other than demolition and enabling works, until a scheme for the drainage of surface water from that phase of the new development shall be submitted for approval in writing by the City Council as the Local Planning Authority. This shall include:

Consideration of alternative green SuDS solutions if practicable;

- *Details of surface water attenuation that offers a reduction in surface water runoff rate in line with the Manchester, Trafford and Salford Strategic Flood Risk Assessment i.e. at least a 50% reduction in runoff rate compared to the existing rates, as the site is located within a critical drainage area.*

The design follows the requirements of the Manchester City, Salford City and Trafford Council's Level 2 Hybrid Strategic Flood Risk Assessment, ensuring a 50% reduction in runoff rate compared to existing. A vortex flow control device will be used to limit the surface water outflow to a 50% reduction on existing rates (11.7l/s).

- *Runoff volume in the 1 in 100-year, 6-hour rainfall shall be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but never to exceed the runoff volume from the development site prior to redevelopment.*

The building covers the whole site and therefore there is no scope to use infiltration SuDS to reduce volumes. The existing site is brownfield and in the redevelopment scenario there is a 50% reduction on existing flow rates. Therefore it is not achievable to reduce the volume of runoff any further.

- *Evidence that the drainage system has been designed (unless an area is designed 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 climate change in any part of a building.*

The proposed drainage layout has been designed in accordance with BS EN 752: 2008 and Building Regulations Part H guidance. All surface water flows up to the 1 in 100-year event including an allowance for climate change will be retained below ground.

- *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.*

The proposed building covers the whole site, as such the surface water drainage has been designed with no exceedance flooding. In the event of a blockage, flood waters will be contained within the bin store which encompasses the majority of the below ground drainage networks. No habitable areas of the proposed development will be impacted.

- *Hydraulic calculation of the proposed drainage system.*

Hydraulic calculations have been provided in Appendix B.

- *Construction details of flow control and SuDS elements*

For construction details refer to drawings D464-RDG-00-ZZ-DR-C-0102 & 0103 in Appendix A.

(b) The phase shall then be constructed in accordance with the approved details, within an agreed timescale.

The regular management and maintenance of surface water and foul water drainage systems is essential to ensure that the system always operates at its maximum efficiency. The maintenance schedules below taken from CIRIA document C753 outlines the required programme of maintenance for the geocellular storage.

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks			
	Maintenance schedule	Required action	Typical frequency
	Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
		Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
		For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
		Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
	Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
	Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
		Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Appendix A – Scott Hughes Design Drawings

CONTENTS	
Identifier	Name
D464-RDG-00-ZZ-DR-C-0101	Proposed Drainage GA
D464-RDG-00-ZZ-DR-C-0102 & 0103	Drainage Details
D464-RDG-00-ZZ-DR-C-0105	Flood Route Plan

DRAINAGE NOTES

1. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS AS NECESSARY, TO ALL EXISTING SERVICES TO THE SATISFACTION OF THE PUBLIC UTILITIES.
2. THE CONTRACTOR SHALL ALLOW FOR DEALING WITH SURFACE WATER RUN-OFF INTO EXCAVATIONS AND FROM GROUNDWATER BY MEANS OF SUMPS, PUMPING AND DE-WATERING AS APPROPRIATE, IN ORDER TO KEEP THE EXCAVATION AS REASONABLY DRY AS POSSIBLE DURING THE CONSTRUCTION OF THE WORKS.
3. ALL PRIVATE DRAINAGE WITHIN THE SITE IS TO COMPLY WITH THE REQUIREMENTS OF BSEN752 AND BUILDING REGULATIONS PART H. WHERE APPROPRIATE, ALL ADOPTED DRAINAGE SHALL BE DESIGN AND CONSTRUCTED IN ACCORDANCE WITH SEWERS FOR ADOPTION 8th EDITION AND THE ADOPTING AUTHORITIES STANDARD REQUIREMENTS.
4. ALL PRIVATE DRAINAGE PIPES TO BE LAID IN TRENCHES BEDDED CLASS 'B' ON SINGLE SIZED AGGREGATE AND BACKFILLED WITH APPROVED SELECTED FILL (40mm DOWN) REUSED FROM EXCAVATED MATERIAL, UNDER BUILDINGS AND WHERE COVER TO INVERT IS LESS THAN 1200mm UNDER TRAFFICKED AREAS PIPES TO BE CAST IN CONCRETE (CLASS Z BEDDING). CLASS 'S' BED AND SURROUND MAY BE REQUIRED FOR SEWERS TO BE ADOPTED. REFER TO SPECIFIC DRAWINGS FOR FURTHER INFORMATION.
5. SELECTED BACKFILL MATERIAL SHALL CONSIST OF UNIFORM EXCAVATED MATERIAL, FREE FROM STONES LARGER THAN 40mm, CLAY LUMPS LARGER THAN 75mm, TREE ROOTS, CONTAMINATED MATERIAL. SELECTED BACKFILL MATERIAL IS TO BE PLACED IN LAYERS NOT EXCEEDING 150mm THICKNESS. THE MATERIAL SHALL BE COMPACTED TO ACHIEVE NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED IN LABORATORY
6. CONCRETE PROTECTION TO PIPEWORK IS TO BE PROVIDED AS FOLLOWS:
 - a) ALL PIPEWORK WITHIN PEDESTRIAN/SOFT AREAS WITH LESS THAN 600mm COVER.
 - b) ALL PIPEWORK SUBJECT TO VEHICULAR OVERRUN WITH LESS THAN 1.2m COVER.
7. ALL PIPEWORK WITHIN MANHOLES ARE TO BE LAID SOFFIT TO SOFFIT (U.N.O). ALL CHAMBER INVERT LEVELS ARE FOR THE OUTGOING PIPE LEVELS. BACKDROP PIPEWORK SHALL BE CONNECTED AT SOFFIT TO SOFFIT WITH THE RODDING ACCESS LEVEL SPECIFIED.
8. ALL DRAINS TO BE LAID ACCURATELY TO LINE AND LEVEL IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
9. ANY GRADIENTS OF DRAINS INDICATED ARE INDICATIVE ONLY AND THE CONTRACTOR SHALL INSTALL THE DRAINS TO THE SPECIFIED LEVELS SHOWN FOR EACH MANHOLE (U.N.O). CATCHPIT INVERT LEVELS ARE FOR THE OUTGOING PIPE WITH THE SUMP LEVEL SPECIFIED SEPARATELY.
10. CO-ORDINATE SETTING OUT INFORMATION FOR MANHOLES IS TO THE INTERSECTION THE DRAINS AND NOT THE CENTRE OF THE MANHOLE.
11. COVER LEVELS OF THE MANHOLES ARE PROVISIONAL AND SUBJECT TO ADJUSTMENT ON SITE TO SUIT THE FINISHED GROUND LEVELS. ALL EXTERNAL WORKS CONSTRUCTION AREAS

TO BE AS LOCATED BY THE ARCHITECT.

12. MANHOLE COVERS AND FRAMES ARE TO BE IN ACCORDANCE WITH BSEN124 AND THE FOLLOWING:
 - a) VEHICULAR AREAS: CLASS D400 (E600 IN VULNERABLE SERVICE YARD LOCATIONS), DOUBLE TRIANGULAR, 150mm DEEP DUCTILE IRON COVER AND FRAME WITH THREE POINT COVER SEATING, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.
 - b) PEDESTRIAN AREAS: CLASS B125, 100mm DEEP, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.
13. POSITIONS AND SIZES OF ABOVE GROUND FOUL AND SURFACE WATER DRAINAGE CONNECTIONS ARE TO BE CONFIRMED PRIOR TO CONSTRUCTION WITH THE ARCHITECT & M&E ENGINEER.
14. GULLY GRATINGS AND STEEL CHANNEL COVERS ARE TO BE IN ACCORDANCE WITH BSEN124 AS FOLLOWS:
 - a) AREAS SUBJECT TO VEHICULAR OVERRUN: CLASS D400 MINIMUM.
 - b) AREAS NOT SUBJECT TO REGULAR VEHICLE OVERRUN (ADJACENT TO KERBS ETC): CLASS C250.
 - c) GULLY GRATES ADJACENT TO KERBS SHALL BE HINGED ON THE SIDE OF THE TRAFFIC DIRECTION (LEFT HAND SIDE).
15. ALL BRICKWORK IN CONNECTION WITH DRAINAGE IS TO BE SOLID CLASS B ENGINEERING BRICK TO BS3921.
16. ALL PRECAST CONCRETE PIPES, CHAMBER PRODUCTS AND ROAD GULLIES SHALL BE TO BS5911 AND BE KITEMARKED.
17. ALL DRAINAGE INSITU CONCRETE SHALL BE GEN3 (U.N.O).
18. ALL INSITU AND CONCRETE PRODUCTS SHALL COMPLY WITH THE REQUIREMENTS FOR SULPHATE EXPOSURE IN ACCORDANCE WITH BRE SPECIAL DIGEST 1, CONCRETE IN AGGRESSIVE GROUND (2001) PART 1: TABLE 2.

19. UPON COMPLETION OF THE WORKS THE CONTRACTOR SHALL CLEAN ALL DRAINAGE BY JETTING, REMOVING ALL DEBRIS FROM SITE. NO DEBRIS SHALL BE PERMITTED TO ENTER THE EXISTING DRAINAGE SYSTEM.
20. CONSTRUCTION JOINTS IN CONCRETE SURROUND MUST NOT BE WITHIN 150MM OF CHAMBER/SHAFT RING JOINTS.
21. ROCKER PIPES TO BE SURROUNDED WITH CONCRETE LOCATED 150mm MINIMUM 200mm MAXIMUM FROM THE FIRST FLEXIBLE JOINT TO THE MANHOLE WALL.
22. SOFT SPOTS IN THE TRENCH FORMATION SHALL BE REMOVED AND REPLACED WITH GRANULAR BEDDING UNLESS INSTRUCTED OTHERWISE.
23. LATERAL CONNECTIONS IN BETWEEN MANHOLE RUNS SHALL BE FORMED BY USING PURPOSE MADE JUNCTION FITTINGS. BEND FITTINGS SHALL BE PROVIDED WHERE APPROPRIATE TO DIRECT THE FLOW INTO MAIN RUNS.
24. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO LIAISE WITH BUILDING CONTROL FOR APPROVALS, INTERIM INSPECTION, SNAGGING AND FINAL INSPECTIONS OF THEIR WORK.
25. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING STATUTORY UNDERTAKERS APPARATUS AND SERVICE CONNECTIONS ADJACENT TO AND CROSSING THE WORKS BY TRIAL PITS PRIOR TO COMMENCING MACHINE DIG.
26. AT THE CONCLUSION OF THE WORKS THE CONTRACTOR SHALL PROVIDE A MARKED UP DRAWING TO RECORD ANY AS BUILT VARIATIONS NOT SHOWN ON THE DRAWINGS.
27. THE DRAINAGE SYSTEM IS NOT DESIGNED TO ACCEPT UNTREATED EFFLUENT FROM A COMMERCIAL KITCHEN

CONTAINING GREASE AND OILS. REMOVAL OF GREASE AND OIL SHOULD BE MADE AT SOURCE USING A FLOOR MOUNTED ABOVE GROUND GREASE REMOVAL SYSTEM. IT IS RECOMMENDED THAT A MECHANICAL GREASE REMOVAL SYSTEM BE EMPLOYED FOR THIS PURPOSE NOT A PASSIVE SYSTEM.

28. PIPEWORK TO BE OF THE FOLLOWING MANUFACTURER: 100 / 150 / 225MM DIAMETER HEPWORTH SUPERSLEEVE VITRIFIED CLAY PIPES (40kN/mm CRUSHING STRENGTH), 300mm + TO BE CONCRETE CLASS M, ALTERNATIVELY 'POLYSEWER' UPVC DRAINAGE SYSTEM BY POLYPIPE WHEN INSTALLED IN LINE WITH THE MANUFACTURERS RECOMMENDATIONS. FILTER DRAINAGE TO BE PERFORMED HDPE.

29. ALL RWP, WPC & GULLY CONNECTIONS TO BE 100mm DIA UNO & ARE RODDABLE AT LOCATIONS ABOVE GROUND LEVEL.

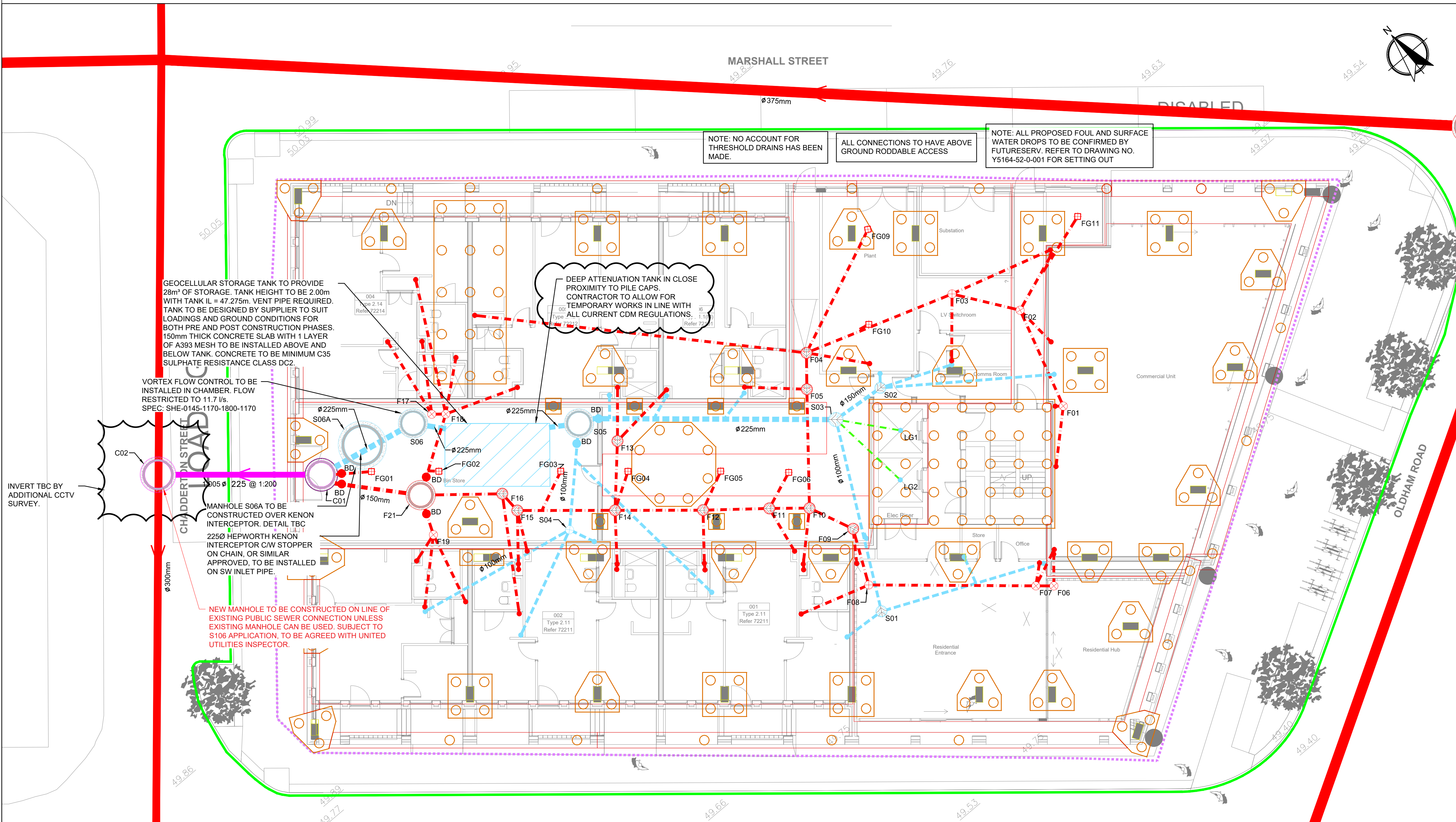
30. ALL INSPECTION CHAMBERS WITH A DEPTH GREATER THAN 1.2m TO HAVE A 350mm DIAMETER REDUCING PLATE LOCATED BENEATH COVER AND FRAME TO PREVENT ACCESS.

GENERAL NOTES

1. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, ENGINEERS, ARCHITECTS & SERVICES DRAWINGS, INCLUDING APPROVED BUILDERS WORK DRAWINGS. CONTRACTOR TO NOTIFY ENGINEER OF DISCREPANCIES BETWEEN STRUCTURAL DRAWINGS AND SPECIFICATIONS OR OTHER DRAWINGS.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM THIS DRAWING, WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED. ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS, SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY.
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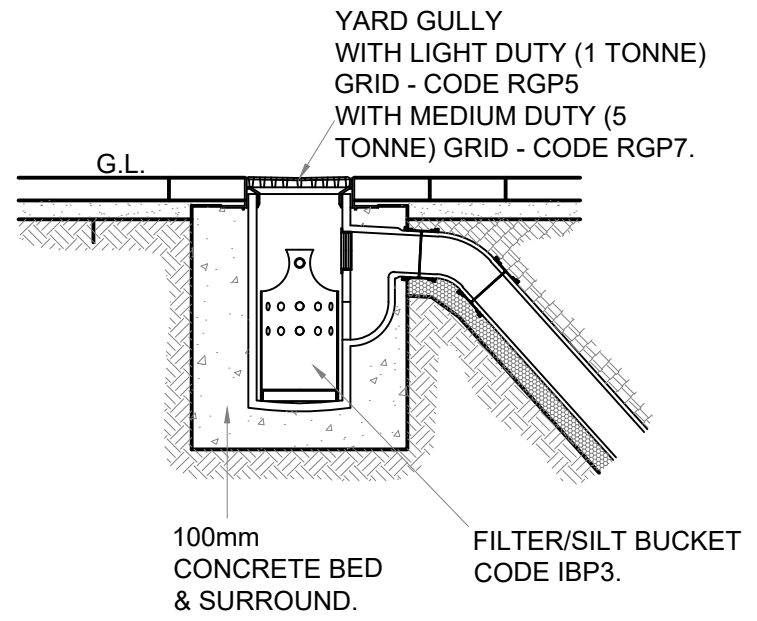
DRAINAGE KEY

- EXISTING CW DRAIN
- EXISTING CW MANHOLE
- PROPOSED CW DRAIN
- PROPOSED CW MANHOLE
- PROPOSED FW DRAIN
- PROPOSED FW MANHOLE
- PROPOSED SW DRAIN
- PROPOSED SW MANHOLE
- SITE BOUNDARY



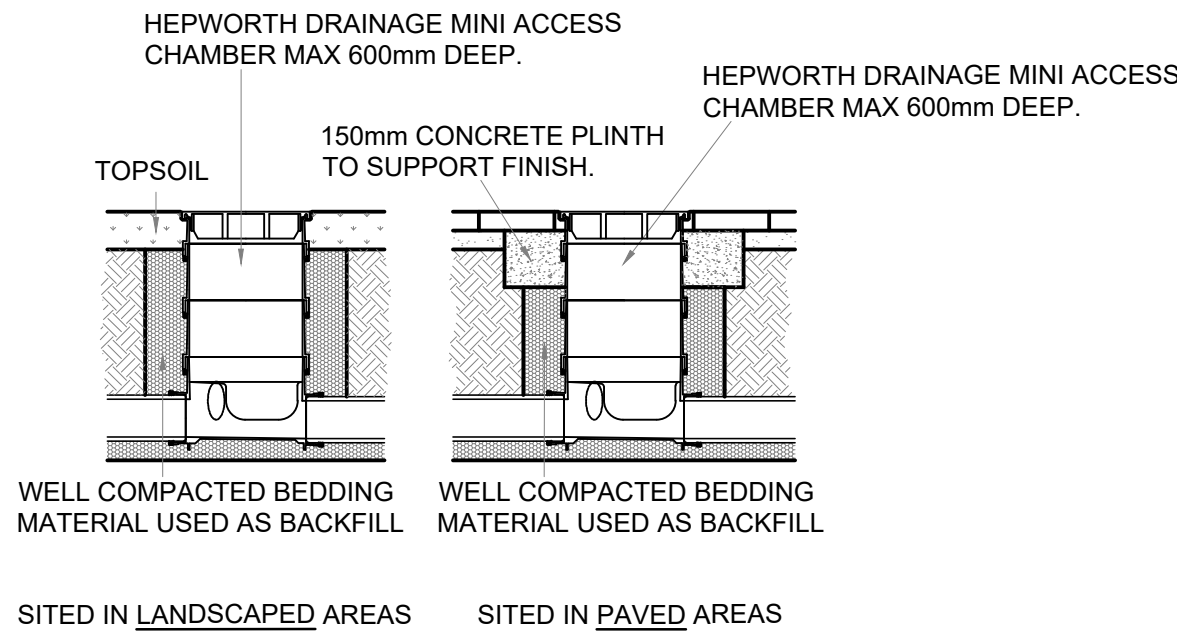
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P1	12.10.20	AS	PG	ISSUED FOR TENDER
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STATUS		PURPOSE OF ISSUE		
D2		TENDER		
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RIDGE				
CLIENT GMI CONSTRUCTION				
PROJECT OLDHAM ROAD, NEW CROSS,MANCHESTER				
DRAFTER AS		ENGINEER PG		
TITLE DRAINAGE GA		PROJECT REFERENCE:		
SCALE 1:100	SHEET A1	DRAWING No D464-RDG-00-ZZ-DR-C-0101		REV P2

THE DEPTH OF THE GULLY CAN BE INCREASED BY UPTO 300mm BY FITTING A 225mm COUPLING CODE VC1/3 AND A 300mm HIGH RAISING PIECE CODE SIC3/1 BETWEEN THE FRAME AND THE GULLY BODY.

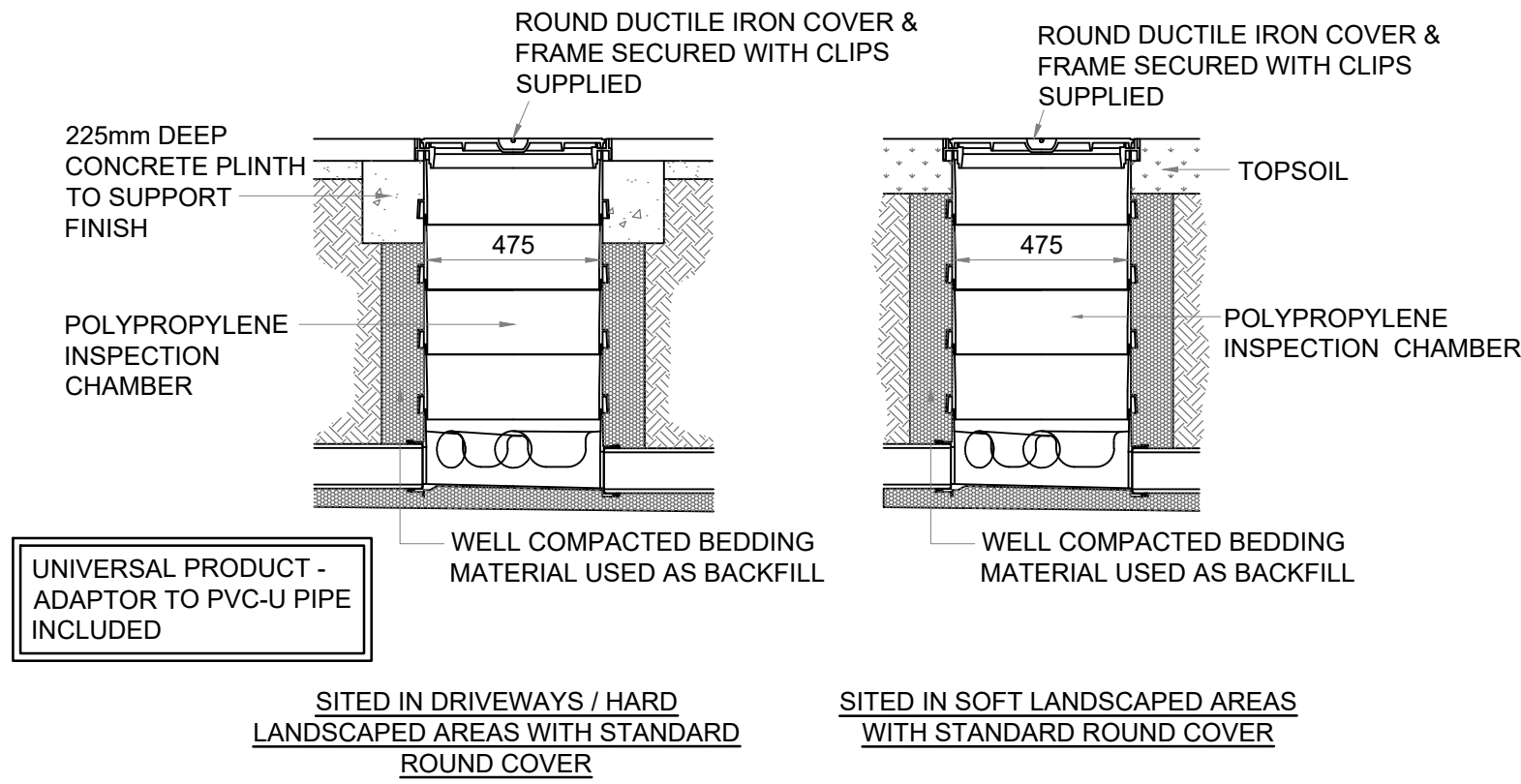
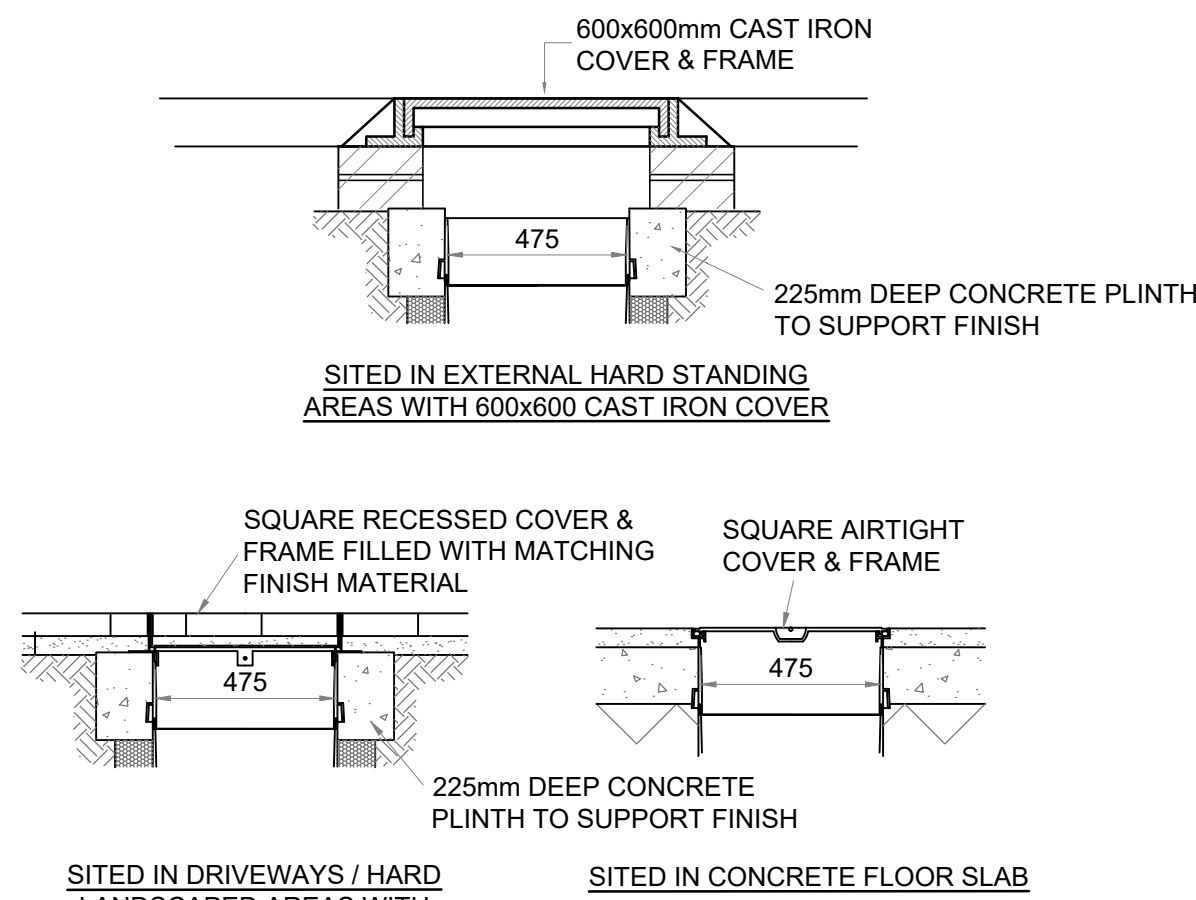


YARD GULLY

(SHOWN AS HEPWORTH PRODUCT BUT OTHER SIMILAR CAN BE USED)



MINI ACCESS CHAMBERS (600mm DEEP)

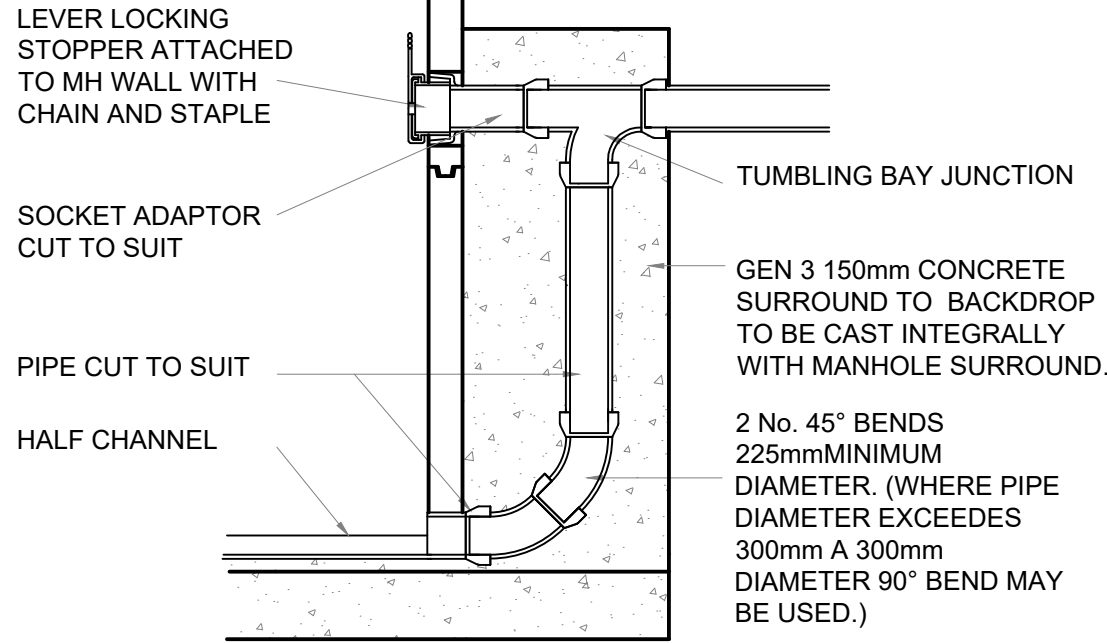


POLYPROPYLENE INSPECTION CHAMBER INSTALLATION DETAIL

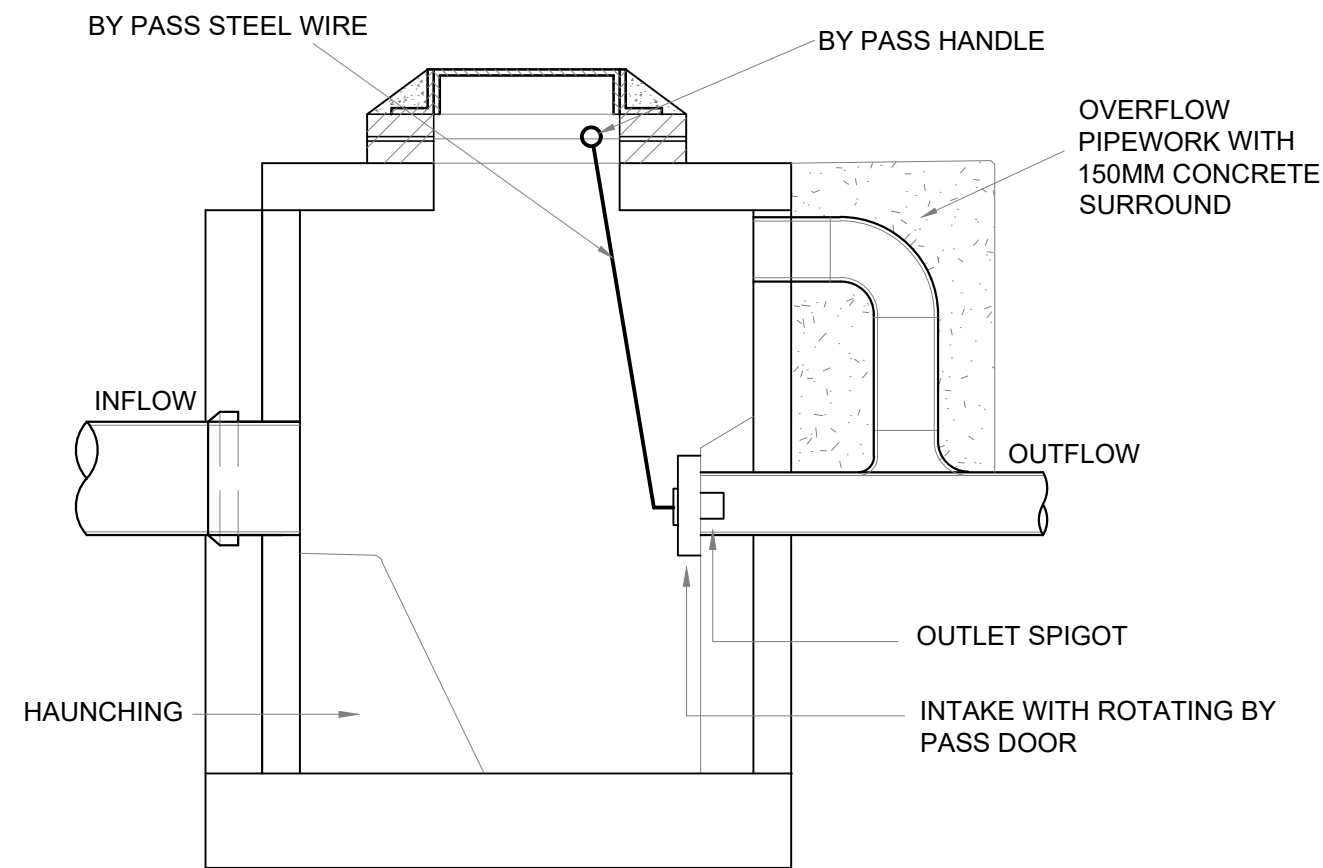
NOTES

- GULLY POTS:
HIGHWAY GULLIES P.C.C. TO B.S. 5911
GULLY POT TO BE OF 100 LITRES CAPACITY.
- MAXIMUM TRENCH WIDTH FOR 150mm GULLY LEAD IS 600mm.
- NUMBER OF BENDS MAY VARY DUE TO SITE DIFFERENCES - SEE DRAINAGE SCHEDULE.
- CONCRETE SURROUND TO PIPES SHALL ALWAYS FINISH AT A JOINT.
- HEAVY DUTY, CAST IRON, LAMPHOLE TYPE COVER IN HARDSTANDING AND AREAS ACCESSIBLE TO VEHICULAR TRAFFIC, TO B.S. EN 124. 1994 CLASS D400, C250, OR B125 DEPENDANT ON LOCATION.
- COVER SLAB TO BE 200MM THICK GRADE C20 CONCRETE.

INVERT OF RODDING EYE TO BE NOT GREATER THAN 1.5m ABOVE TOP OF BENCHING. (UNLESS SPECIFIC MAN ACCESS REQUIREMENTS ARE PROVIDED.)

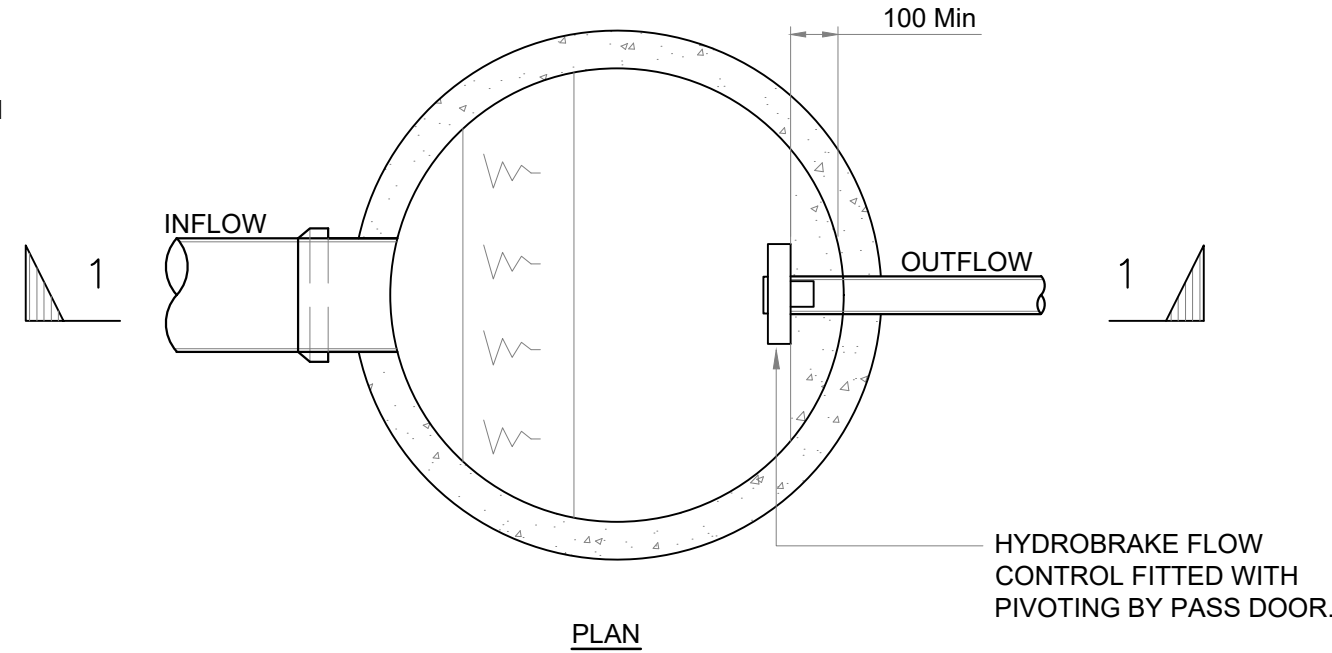


EXTERNAL VERTICAL BACKDROP

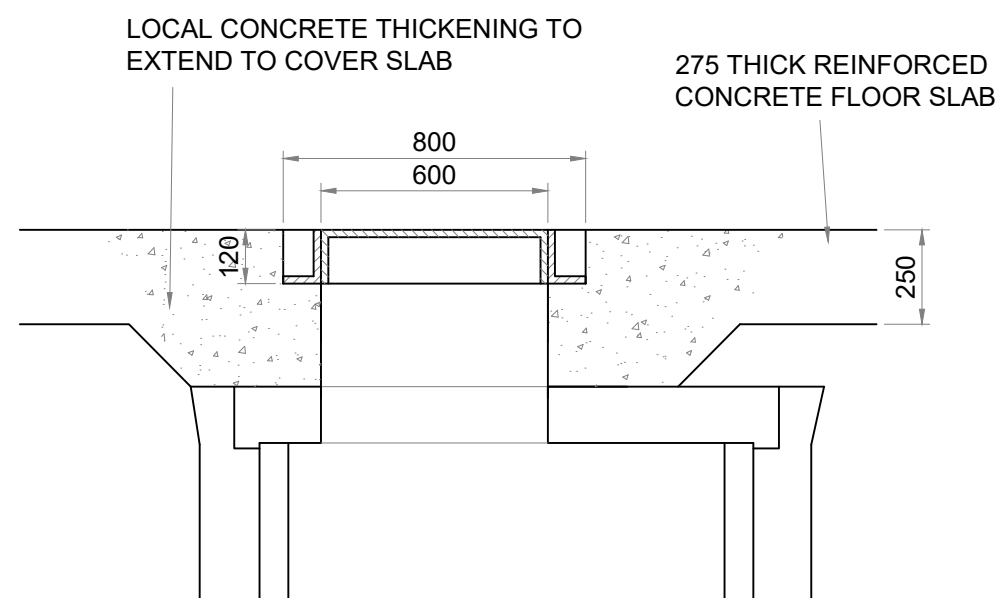


SECTION 1-1

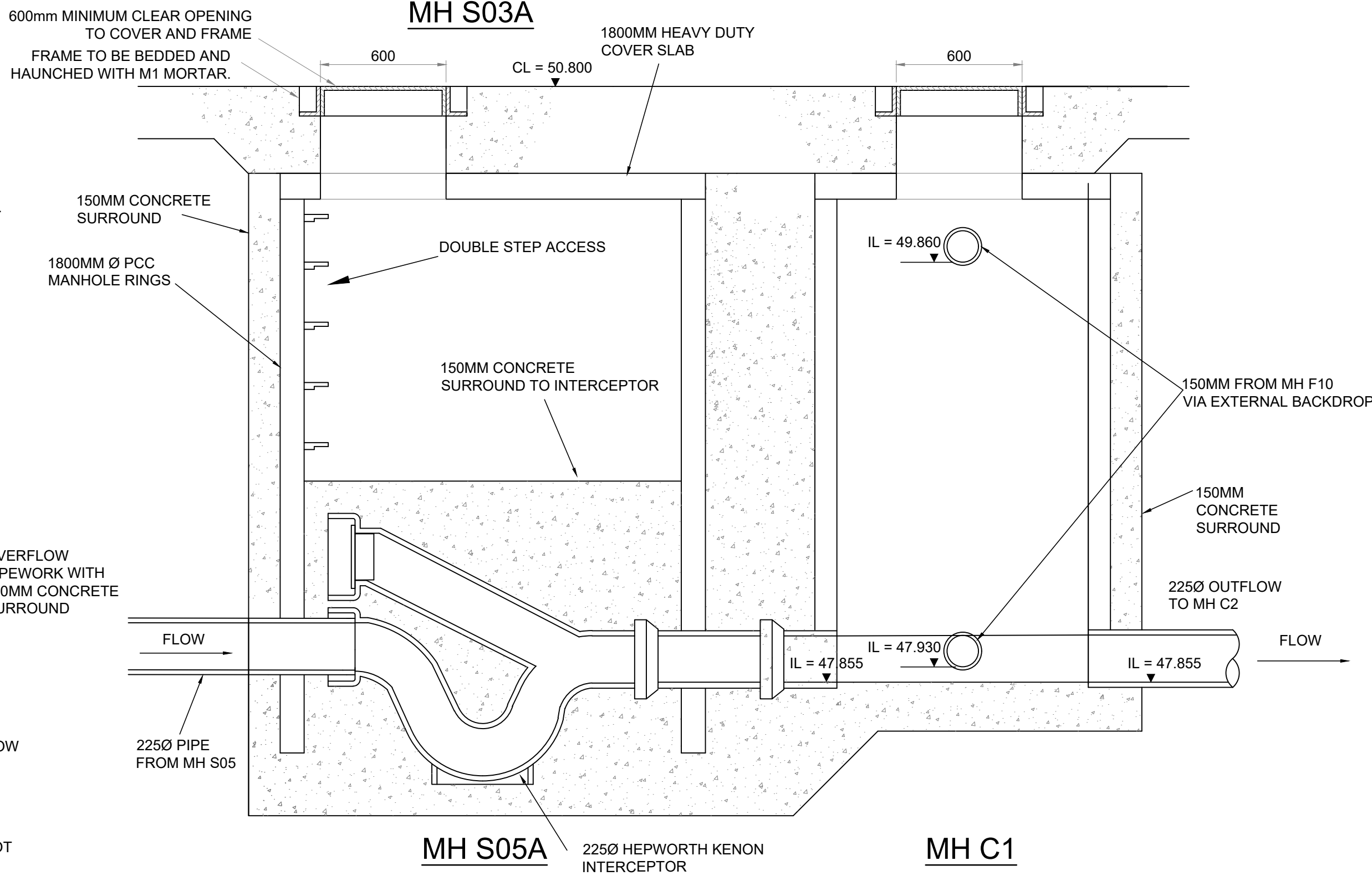
NOTE:
THIS DRAWING IS INDICATIVE ONLY. SEE MANUFACTURERS DRAWINGS AND SPECIFICATION FOR CONSTRUCTION DETAILS.



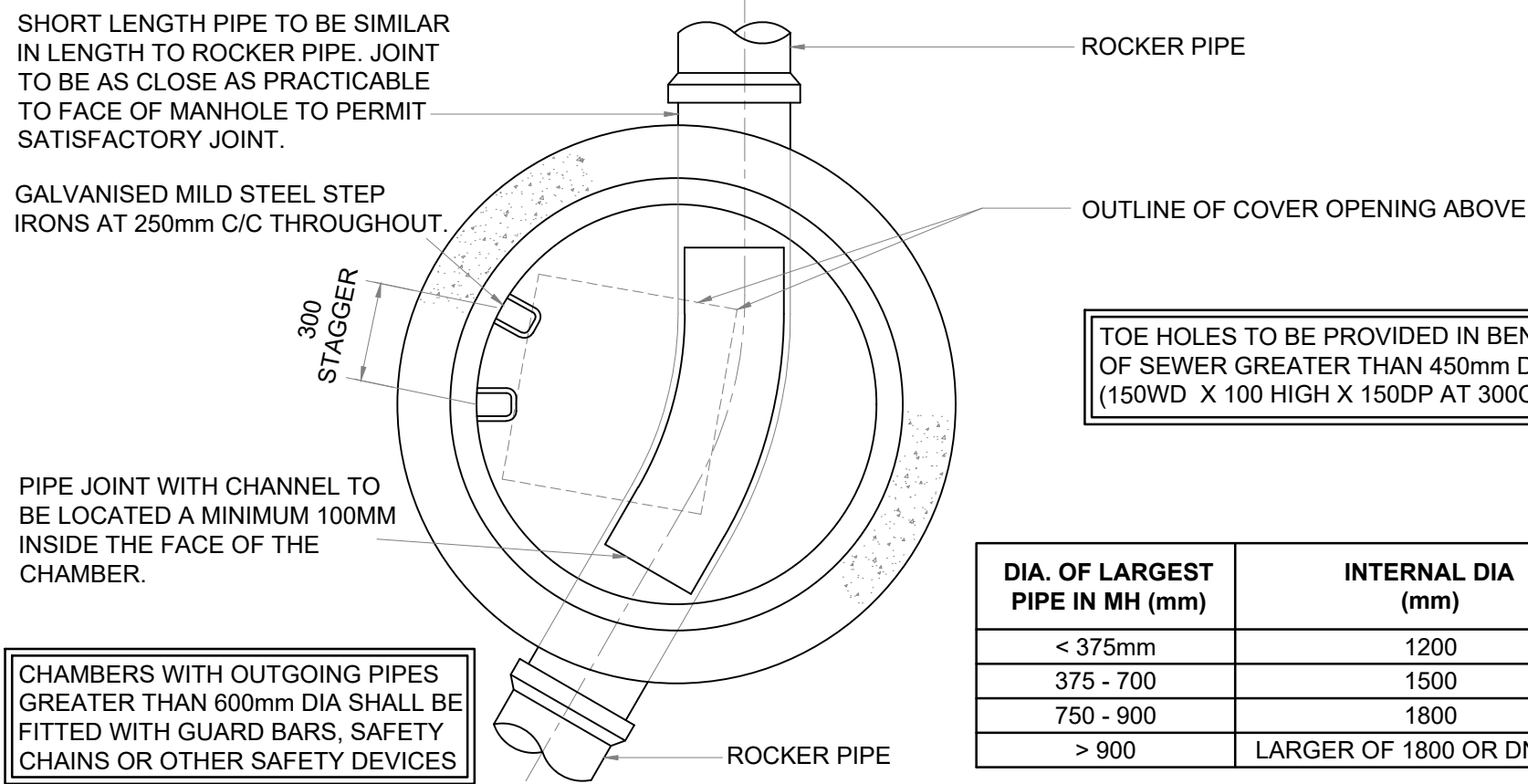
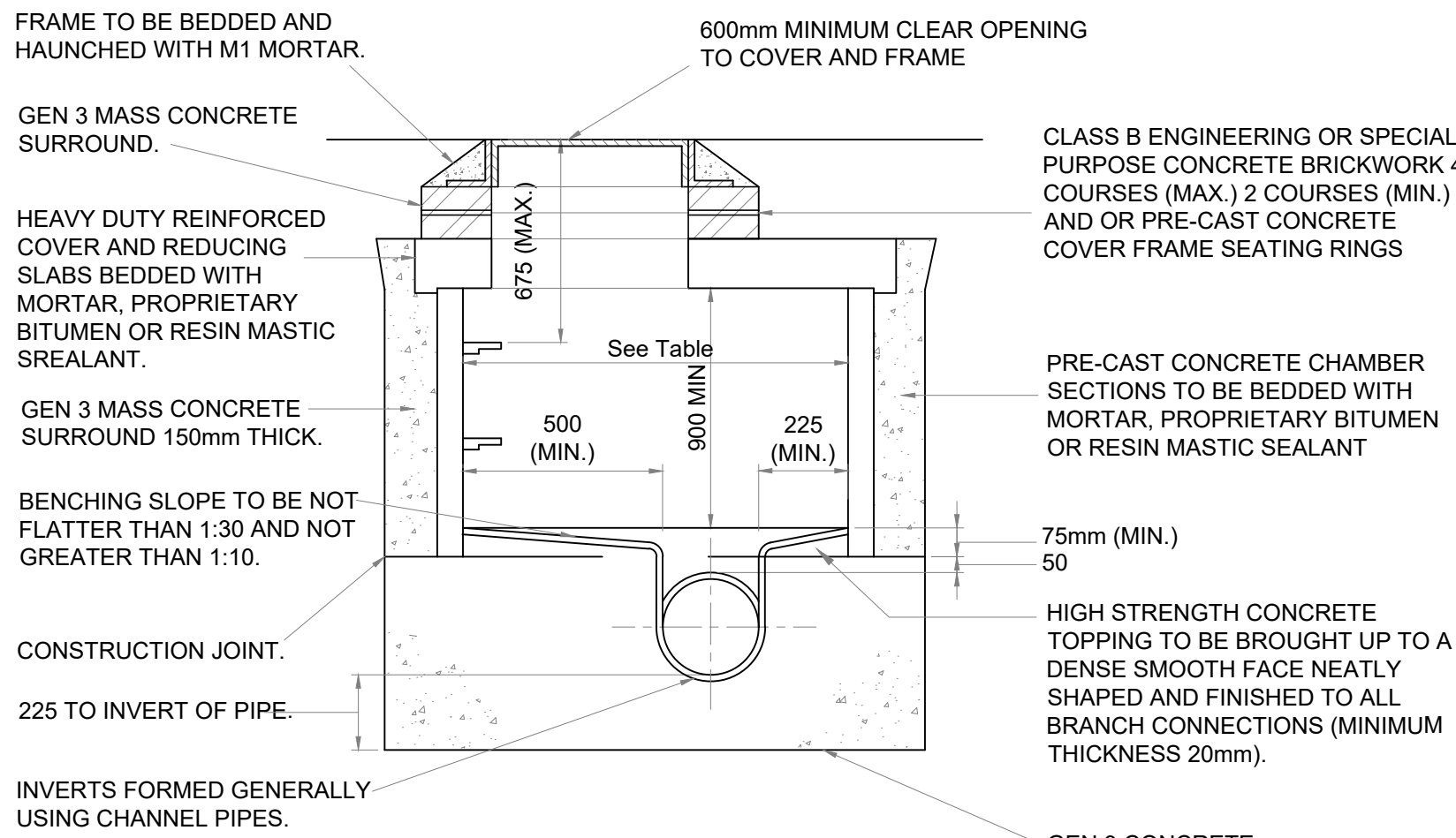
VORTEX CONTROL CHAMBER



COVER DETAIL FOR MANHOLE TYPE B LOCATED IN CONCRETE FLOOR SLAB



SECTION THROUGH MH S05A TO MH C1



DIA. OF LARGEST PIPE IN MH (mm)	INTERNAL DIA (mm)
< 375mm	1200
375 - 700	1500
750 - 900	1800
> 900	LARGER OF 1800 OR DN + 900

(1.5-3m DEEP, COVER LEVEL TO PIPE SOFFIT)

MANHOLE TYPE B

GENERAL NOTES

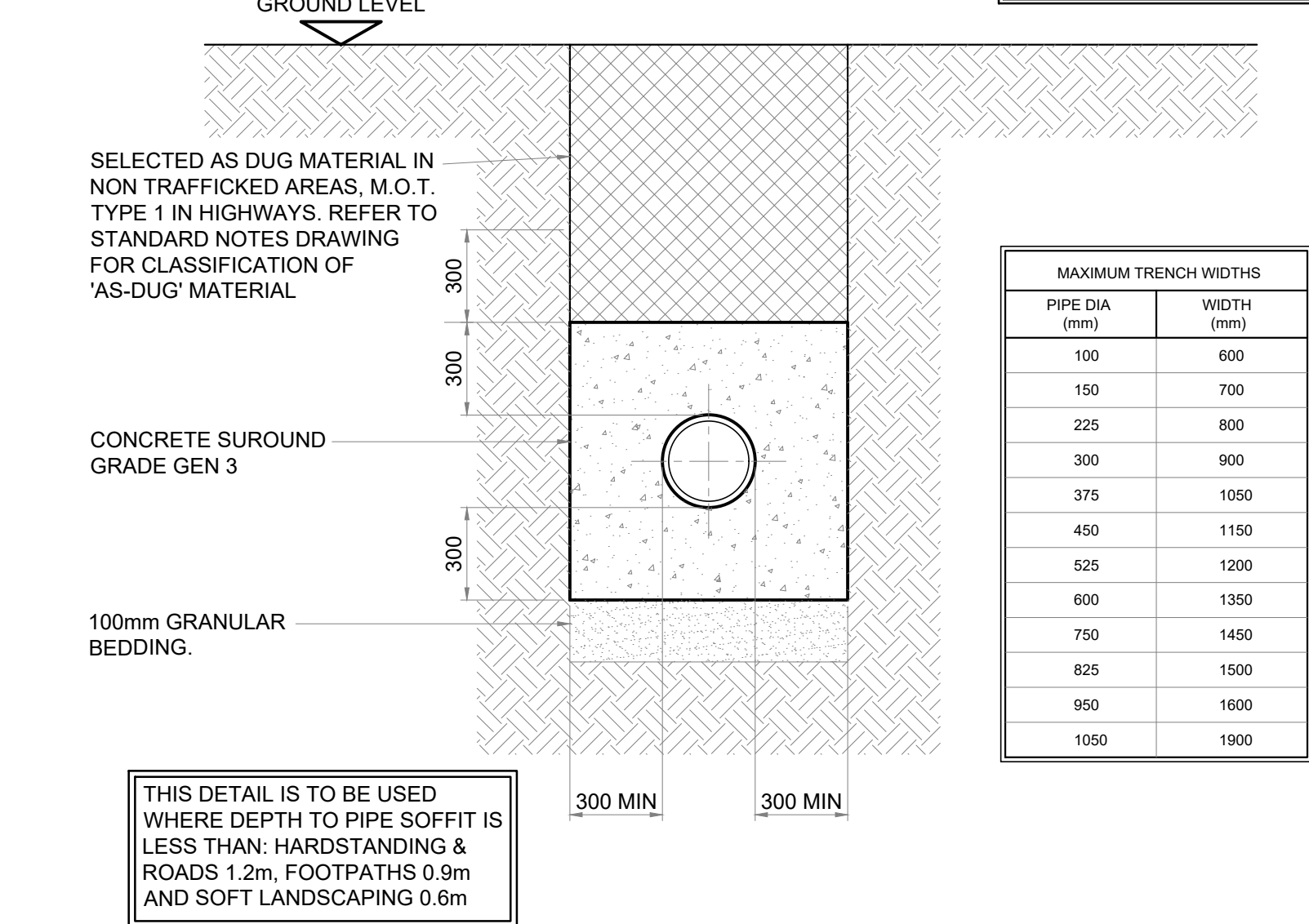
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STATUS	PURPOSE OF ISSUE
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RIDGE			
CLIENT	GMI CONSTRUCTION		
PROJECT	NEW CROSS - OLDHAM ROAD		
DRAFTER	AS	ENGINEER	PG
TITLE	DRAINAGE DETAILS SHEET 1		
SCALE	NTS	SHEET	A1
DRAWING No	D464-RDG-00-ZZ-DR-C-0102		REV
			P2



COMPRESSIBLE FILLER FOR PIPE JOINTS		
NOMINAL PIPE DIA	HYDROCELL	Bitumen Impregnated Board
100 - 300	15mm	18mm
350 - 450	20mm	24mm
465 - 750	35mm	36mm

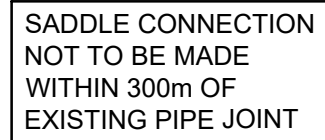
MAXIMUM TRENCH WIDTHS	
PIPE DIA (mm)	WIDTH (mm)
100	600
150	700
225	800
300	900
375	1050
450	1150
525	1200
600	1350
750	1450
825	1500
950	1600
1050	1900

[illegible]

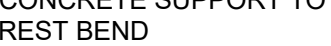
BASED ON BS EN 1610 : 1997 TABLE B.15
FOR RIGID PIPES THE BEDDING SHOULD BE SINGLE SIZE MATERIAL
OR GRADED MATERIAL FROM 5MM UP TO A MAX SIZE OF 10MM FOR
100MM PIPES; 14MM FOR 150MM PIPES; 20MM FOR 225MM TO 600MM
PIPES; 40MM FOR OVER 675MM PIPES



BEDDING FACTOR 1.9



(DIAMETER OF MAIN DRAIN TO BE A MINIMUM OF DOUBLE THE SIZE OF THE CONNECTING PIPE. IN ALL OTHER CASES A PRE-FORMED JUNCTION IS TO BE USED.)



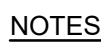
BACKFILL OPTIONS ABOVE THE MODULAR UNIT FOR FIRST 100mm :

- MIN 100mm THICK SELECTED EXCAVATED MATERIAL IF SEEN SUITABLE BY THE SITE ENGINEER.
- 100 mm THICK COARSE SAND OR CLASS 6H SELECTED GRANULAR MATERIAL.
- BACKERBOARD HD (IS A PREMOULDED BOARD FOR USE AS PROTECTION AGAINST BACKFILL)

BACKFILL MATERIAL WITHIN 300mm OF THE TANK TO BE FREE FROM PARTICLES EXCEEDING 40mm IN DIAMETER, IN ACCORDANCE WITH CLASS 8 MATERIAL TO SERIES 600, VOLUME 1, MCHW. BACKFILLING TO BE CARRIED OUT IN ACCORDANCE WITH THE MANUFACTURER'S GUIDANCE.

SETTING OUT OF TANK TO SUIT TANK MANUFACTURER'S FINAL DESIGN

THE CONTRACTOR SHALL AVOID THE MOVEMENT OF CONSTRUCTION PLANT ACROSS THE STORAGE TANK WHERE POSSIBLE . WHERE THIS IS NOT POSSIBLE,CONSTRUCTION TRAFFIC TRAVELLING ACROSS THE TANK SHOULD BE RESTRICTED TO A MAXIMUM WEIGHT OF 32 TONNES PROVIDED THAT THE CONCRETE PROTECTION SLABS ARE IN PLACE AND THERE IS A MINIMUM BACKFILL COVER OF 1.0m. THE CONTRACTOR SHALL PROHIBIT THE STOCKPILING OF MATERIALS OVER THE TANK.



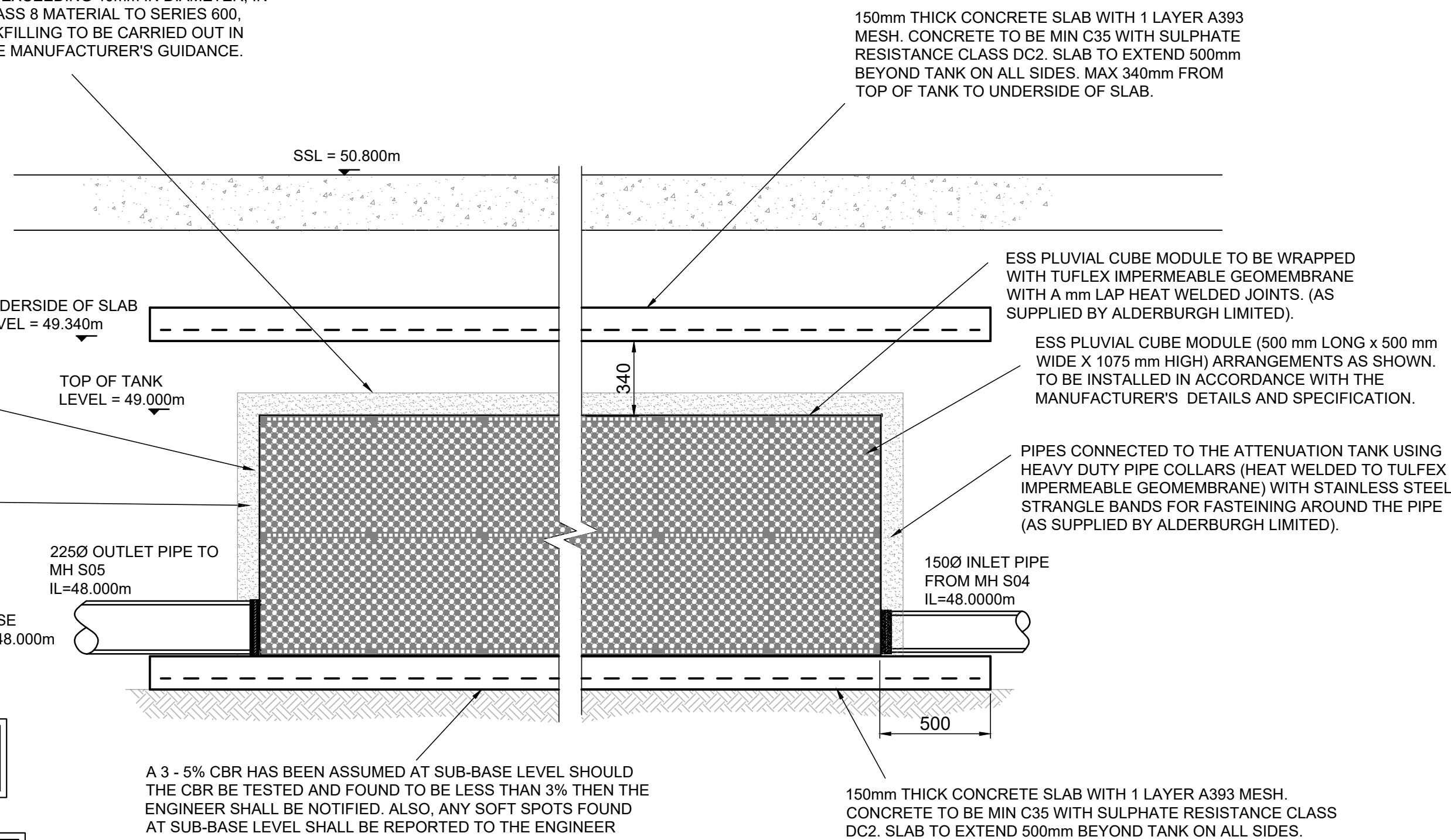
1. CONCRETE TO BE GRADE GEN 3
2. JOINTS TO BE PROVIDED IN CONCRETE SURROUND AT NOT GREATER THAN 5.0m CENTRES. BUILDING REGULATIONS PART H1 PARA A11
3. WHERE THE TRENCH IS WITHIN 1m OF THE BUILDING THE TRENCH SHALL BE FILLED WITH CONCRETE UP TO THE LOWEST LEVEL OF THE FOUNDATIONS. WHERE THE TRENCH IS FURTHER THAN 1000mm FROM THE BUILDING, THE TRENCH SHALL BE FILLED WITH CONCRETE UP TO A LEVEL BELOW THE LOWEST LEVEL OF THE FOUNDATION, EQUAL TO THE DISTANCE FROM THE BUILDING LESS 150mm.

BACKFILL OPTIONS AROUND THE SIDES
OF MODULAR UNIT:

- 100mm THICK SELECTED EXCAVATED MATERIAL IF SEEN SUITABLE BY THE SITE ENGINEER.
- BACKERBOARD HD (IS A PREMOULDED BOARD FOR USE AS PROTECTION AGAINST BACKFILL)

INLET/OUTLET PIPES MUST BE
SUPPORTED WITH CONCRETE TO
PROTECT IT DURING BACKFILLING

MODULES REQUIRE 450 mm MINIMUM
BACKFILL COVER BEFORE DRIVING
OVER WITH SMALL EXCAVATORS OR
BOBCAT



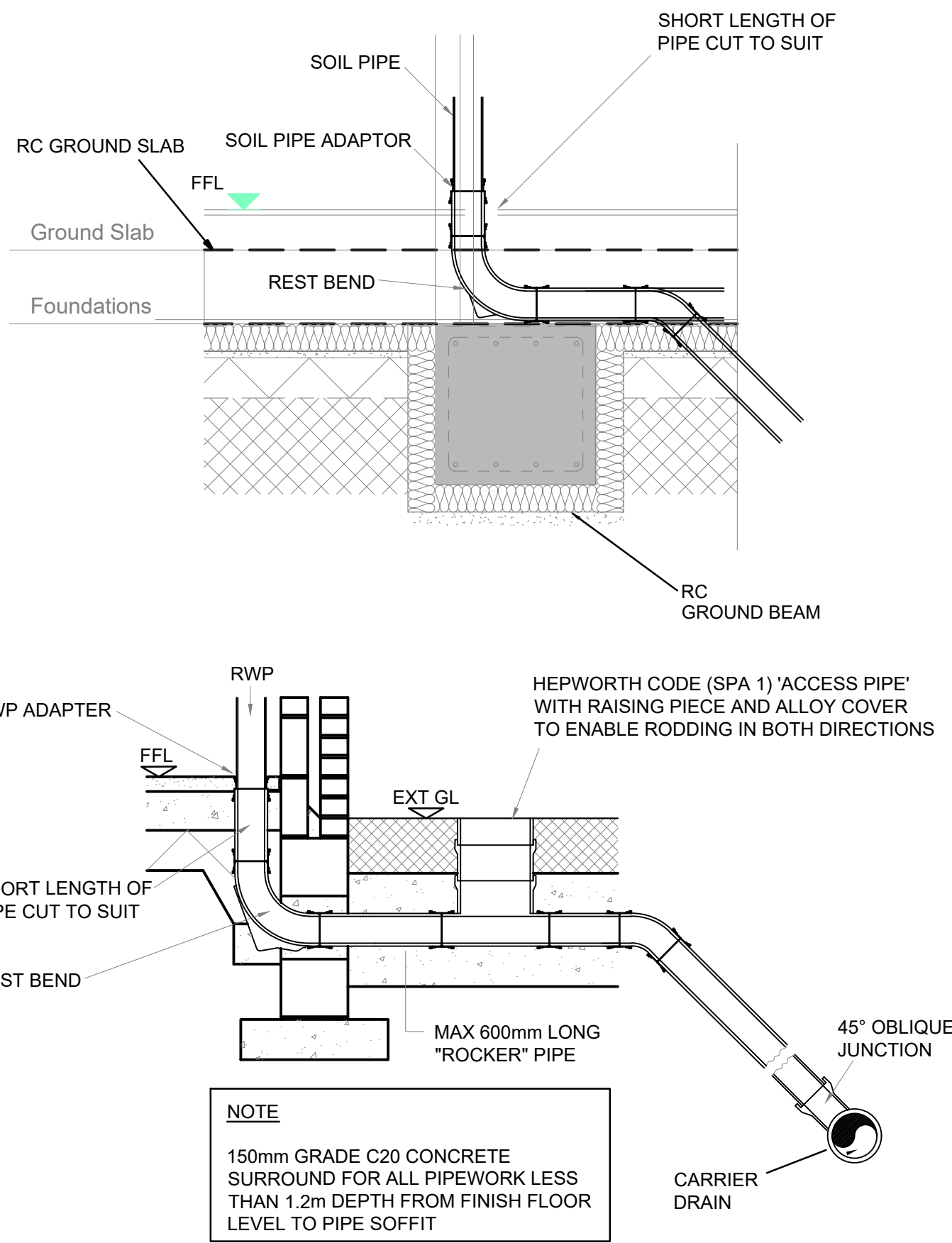
TYPICAL DETAILS OF ATTENUATION TANK BASED ON
ALDERBURGH PLUVIAL CUBE MODULE UNITS

1. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, ENGINEERS, ARCHITECTS & SERVICES DRAWINGS, INCLUDING APPROVED BUILDERS WORK DRAWINGS. CONTRACTOR TO NOTIFY ENGINEER OF DISCREPANCIES BETWEEN STRUCTURAL DRAWINGS AND SPECIFICATIONS OR OTHER DRAWINGS.

2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

3. DO NOT SCALE FROM THIS DRAWING. WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED. ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS, SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY.

4. INFORMATION CONTAINED ON THIS DRAWING IS TENDER DESIGN ONLY. FURTHER DETAILED DESIGN AND CO-ORDINATION WITH THE CONTRACTOR, DESIGN TEAM AND APPROPRIATE SUB-CONTRACTORS WILL BE REQUIRED TO FULLY DEVELOP AND DETAIL THE FINAL CONSTRUCTION DETAILS. CONTRACTOR TO USE THEIR EXPERIENCE AND JUDGEMENT TO MAKE SUFFICIENT ALLOWANCES FOR DETAILED DESIGN DEVELOPMENT.



P2	24.02.21	EJD	PG	DRG NO REVISED TO SUIT GMI PEP
P1	12.10.20	AS	PG	ISSUED FOR TENDER
No	DATE	DRAWN	REV'D ENG.	AMENDMENT

STATUS	PURPOSE OF ISSUE
D2	TENDER

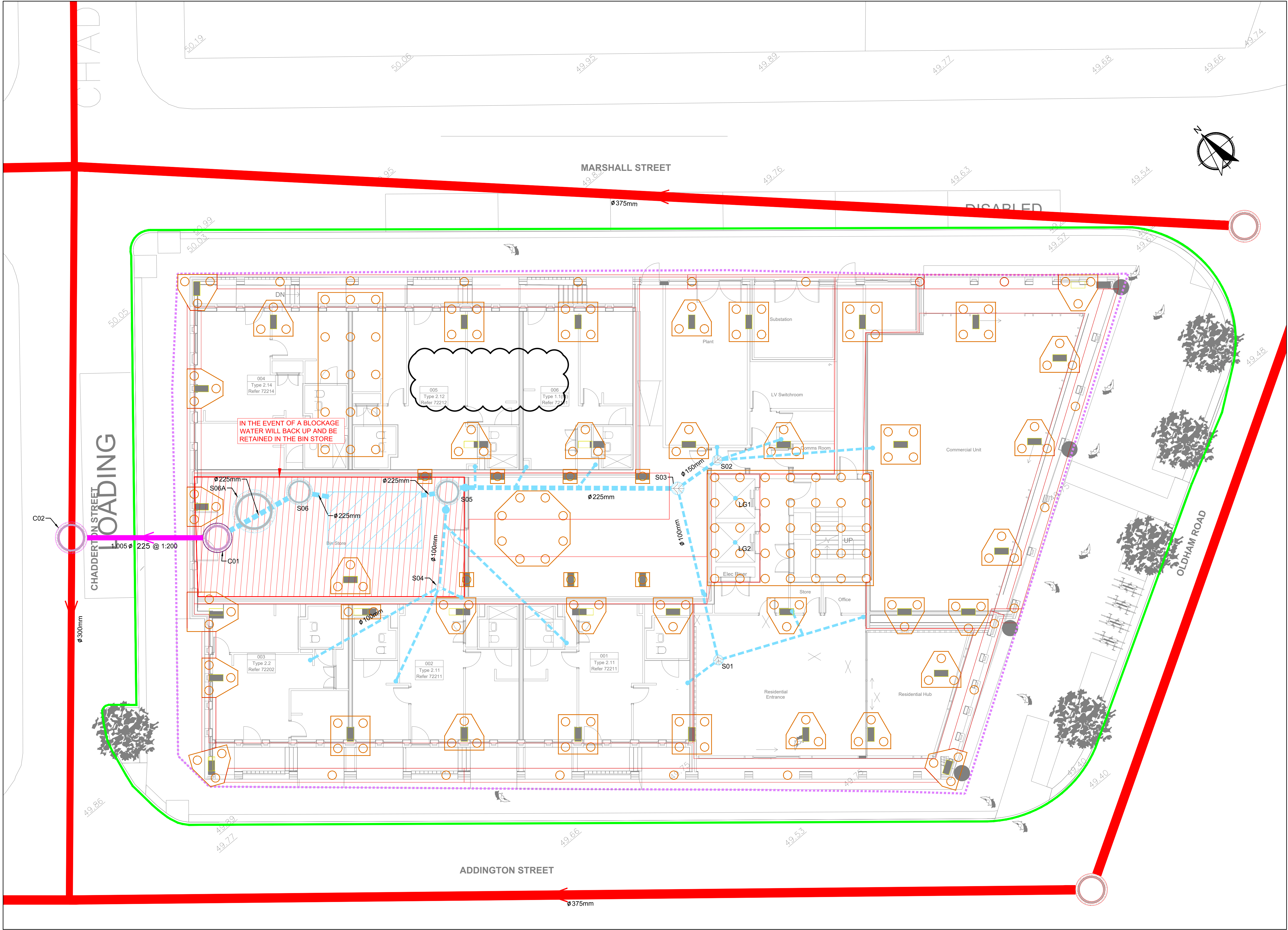
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RIDGE

CLIENT	GMI CONSTRUCTION
PROJECT	NEW CROSS - OLDHAM ROAD

DRAFTER	AS	ENGINEER	PG
TITLE		PROJECT REFERENCE:	
DRAINAGE DETAILS			
SHEET 2			

SCALE NTS	SHEET A1	DRAWING No D464-RDG-00-ZZ-DR-C-0103	REV P2
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GENERAL NOTES

1. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, ENGINEERS, ARCHITECTS & SERVICES DRAWINGS, INCLUDING APPROVED BUILDERS WORK DRAWINGS. CONTRACTOR TO NOTIFY ENGINEER OF DISCREPANCIES BETWEEN STRUCTURAL DRAWINGS AND SPECIFICATIONS OR OTHER DRAWINGS.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM THIS DRAWING, WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED. ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS, SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY.
4. INFORMATION CONTAINED ON THIS DRAWING IS SCHEME DESIGN ONLY AND REQUIRES FURTHER DETAILED DESIGN AND CO-ORDINATION WITH THE CONTRACTOR, DESIGN TEAM AND APPROPRIATE SUB-CONTRACTORS.

P1	24.02.21	AS	PG	PRELIMINARY ISSUE
No	DATE	DRAWN	REV'D ENG.	AMENDMENT

STATUS	PURPOSE OF ISSUE
S2	FOR INFORMATION

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RIDGE			
CLIENT	GMI CONSTRUCTION		
PROJECT	NEW CROSS - OLDHAM ROAD		
DRAFTER	AS	ENGINEER	EJD
TITLE	FLOOD ROUTE PLAN		
SCALE	SHEET	DRAWING No	REV
1-100	A1	D464-RDG-00-ZZ-DR-C-0105	P1

Appendix B – Hydraulic Calculations

Outputs from the Microdrainage software for the surface water drainage networks serving the development are provided. Pipe references from the hydraulic models can be located on the drainage layout plan.

Scott Hughes Design Ltd		Page 1
The Flint Glass Works 64 Jersey Street Manchester M4 6JW	Oldham Road Manchester	
Date 12/10/2020 File Full network SW.MDX	Designed by EJD Checked by PG	
Micro Drainage	Network 2018.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes Pipe Manhole Sizes Manhole

FSR Rainfall Model - England and Wales

Return Period (years)	2	Foul Sewage (l/s/ha)	0.000	Maximum Backdrop Height (m)	20.000
M5-60 (mm)	18.000	Volumetric Runoff Coeff.	0.750	Min Design Depth for Optimisation (m)	1.200
Ratio R	0.361	PIMP (%)	100	Min Vel for Auto Design only (m/s)	1.00
Maximum Rainfall (mm/hr)	50	Add Flow / Climate Change (%)	0	Min Slope for Optimisation (1:X)	500
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.001		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	9.352	0.120	77.9	0.024	5.00	0.0	0.600	o	100	Pipe/Conduit	
2.000	2.441	0.081	30.0	0.025	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	11.958	0.120	99.7	0.050	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.18	49.045	0.024	0.0	0.0	0.0	0.87	6.9	3.2
2.000	50.00	5.02	49.045	0.025	0.0	0.0	0.0	1.84	32.6	3.4
1.001	50.00	5.33	48.925	0.099	0.0	0.0	0.0	1.31	52.1	13.4

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Micro Drainage	Network 2018.1	

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
3.000	5.091	0.064	79.5	0.021	5.00	0.0	0.600	o	100	Pipe/Conduit	🔒
1.002	6.505	0.108	60.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	🔒
1.003	5.015	0.025	200.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	🔒

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
3.000	50.00	5.10	49.565	0.021	0.0	0.0	0.0	0.86	6.8	2.8
1.002	50.00	5.40	47.290	0.120	0.0	0.0	0.0	1.69	67.1	16.2
1.003	50.00	5.49	47.180	0.120	0.0	0.0	0.0	0.92	36.6	16.2

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S06, DS/PN: 1.003, Volume (m³): 2.0

Unit Reference	MD-SHE-0145-1170-1800-1170	Sump Available	Yes
Design Head (m)	1.800	Diameter (mm)	145
Design Flow (l/s)	11.7	Invert Level (m)	47.180
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	225
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1500
Application	Surface		

Control Points			Control Points		
	Head (m)	Flow (l/s)		Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	11.7	Kick-Flo®	1.104	9.3
Flush-Flo™	0.531	11.7	Mean Flow over Head Range	-	10.2

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.2	0.600	11.7	1.600	11.1	2.600	13.9	5.000	19.0	7.500	23.1
0.200	10.0	0.800	11.3	1.800	11.7	3.000	14.9	5.500	19.9	8.000	23.8
0.300	11.1	1.000	10.3	2.000	12.3	3.500	16.0	6.000	20.7	8.500	24.5
0.400	11.5	1.200	9.7	2.200	12.9	4.000	17.1	6.500	21.6	9.000	25.2
0.500	11.7	1.400	10.4	2.400	13.4	4.500	18.1	7.000	22.3	9.500	25.9

Storage Structures for Storm

Cellular Storage Manhole: S05, DS/PN: 1.002

Invert Level (m) 47.290 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

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	15.0	2.000	15.0	46.0	2.001	0.0	46.0

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Micro Drainage	Network 2018.1	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coefficient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.360 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep 2.5 Second Increment (Extended) Inertia Status ON
DTS Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

									Water	Surcharged	Flooded	Pipe				
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	Level Exceeded
1.000	S01	15 Winter	1	+0%	30/15 Summer				49.093	-0.052	0.000	0.45		2.9	OK	
2.000	S02	15 Winter	1	+0%	100/15 Summer				49.086	-0.109	0.000	0.17		3.0	OK	
1.001	S03	15 Winter	1	+0%	100/15 Summer				49.001	-0.149	0.000	0.25		10.9	OK	
3.000	S04	15 Winter	1	+0%	100/15 Summer				49.611	-0.054	0.000	0.42		2.5	OK	
1.002	S05	15 Winter	1	+0%	30/15 Summer				47.399	-0.116	0.000	0.22		10.3	OK	
1.003	S06	15 Winter	1	+0%	30/15 Summer				47.389	-0.016	0.000	0.38		10.2	OK	

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Date 12/10/2020 File Full network SW.MDX	Designed by EJD Checked by PG	
Micro Drainage	Network 2018.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
 Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coefficient 0.800
 Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.360 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
 Analysis Timestep 2.5 Second Increment (Extended) Inertia Status ON
 DTS Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S01	15 Winter	30	+0%	30/15 Summer				49.211	0.066	0.000	1.11		7.0	SURCHARGED	
2.000	S02	15 Winter	30	+0%	100/15 Summer				49.112	-0.083	0.000	0.41		7.4	OK	
1.001	S03	15 Winter	30	+0%	100/15 Summer				49.061	-0.089	0.000	0.66		29.6	OK	
3.000	S04	15 Winter	30	+0%	100/15 Summer				49.659	-0.006	0.000	1.00		5.9	OK	
1.002	S05	15 Winter	30	+0%	30/15 Summer				47.845	0.330	0.000	0.27		12.5	SURCHARGED	
1.003	S06	30 Winter	30	+0%	30/15 Summer				47.838	0.433	0.000	0.44		11.7	SURCHARGED	

