



RIDGE

GOULDEN STREET, MANCHESTER

REPORT TO DISCHARGE DRAINAGE
RELATED PLANNING CONDITION

NOVEMBER 2021

Document Control Sheet

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Project Title: Goulden Street, Manchester

Report Title: Report to Discharge Proposed Drainage Related Planning Condition

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Date: 03.11.21

Record of Issue

Issue	Status	Author	Approved	Date
1	Final	Eleanor Dale	Kris Clark	03.11.21

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1.0 Introduction

In 2019 a planning application (Ref: 125678/FO/2019) was submitted to Manchester City Council for the construction of an 8-storey residential building (Use Class C3) comprising 73 residential units, with ground floor commercial use (Classes A1, A2, A3, B1 and D1 (excluding Places of Worship)) (205 sqm); alterations to the retained perimeter wall and chimney including the introduction of a light box; disabled car parking, highways, landscaping and other associated works.

The application was approved in December 2020 with planning conditions, including one related to drainage. This report has been prepared to discharge the pre-commencement condition.

2.0 Drainage Strategy

2.1 Surface Water Strategy

The site is currently occupied by an industrial building which has been demolished except for its chimney and external walls. Therefore the site should be classified as brownfield.

Site investigations confirmed that the site is underlain by Made Ground to depths of between 1.20 and 4.60mbgl. Beneath the Made Ground was firm low strength to very stiff very high strength red brown gravelly clay with gravel of sandstone to depths of 26.40mbgl. Groundwater was also recorded at depths of between 0.78mbgl and 4.20mbgl.

There are no watercourses in close proximity to the site. There has been the suggestion that the River Tib, a potentially hidden historic watercourse, may flow beneath sites in this area. However, there is no evidence of its existence from the drainage CCTV survey or any intrusive site investigations completed to date. Therefore, the proposal is to follow the same approach as agreed with Manchester City Council on adjacent schemes, which is to notify the Council should any evidence be found once construction works start.

There are no surface water sewers in close proximity to the site. There is a 420mm x 820mm brick combined water sewer running along Marshall Street from the south east to the north west, a combined sewer of unknown diameter running along Chadderton Street from the north east to the south west, a combined sewer of unknown diameter running along Goulden Street from the south east to the north west and a 900mm x 570mm brick combined sewer running along Cross Keys Street from the north east to the south west.

In accordance with the Manchester City Council Strategic Flood Risk Assessment, a 50% reduction in surface water runoff rates is recommended for brownfield sites up to a 1 in 100-year storm event, considering climate change. Table 1 below details these rates.

Table 1: Existing Brownfield Runoff Rate

	Impermeable Area (m ²)	Existing Discharge Rate - (Imp Area x 50mm/hr) ÷ 3600	Allowable Discharge Rate (50% Reduction from Existing)
Goulden Street	1200	16.6l/s	8.3/s

Based on the above, surface water from the development site will discharge into the combined sewer in Goulden Street to the southwest. United Utilities have requested a maximum discharge rate of **6l/s** which equates to a greater than 50% reduction on existing runoff rates. 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 Goulden 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 4

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;*

The building covers the majority of the site and the existing chimney is to be retained in the only external area. There is limited scope to use green SuDS however rain gardens and permeable paving have been incorporated in the courtyard. Other than the courtyard area, all external areas are all Manchester City Council adopted footpaths so they will be drained into the highway as per the existing scenario. There are too many existing services in the footway for tree pits to be suitable.

- *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.*

United Utilities have requested the runoff rate be restricted to **6l/s**. This is a greater than 50% reduction in existing runoff rates. Correspondence of this request has been provided in Appendix C.

- *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 site investigation recorded groundwater at depths of between 0.78mbgl and 4.20mbgl. Therefore, there is no scope to use infiltration SuDS to reduce volumes. The existing site is also brownfield and in the redevelopment scenario there is a greater than 50% reduction on existing flow rates. 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 and existing chimney cover the majority of the 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 external courtyard area until water levels recede. No habitable areas of the proposed development will be impacted. The FFL of the building is elevated in relation to the surrounding footway – no surface water from the footway is diverted towards the building.

- *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 5015327-RDG-00-XX-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.

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 – Ridge Design Drawings

CONTENTS	
Identifier	Name
5015327-RDG-00-XX-DR-C -0101	Proposed Drainage GA
5015327-RDG-00-XX-DR-C-0102 & 0103	Drainage Details
5015327-RDG-00-XX-DR-C -0104	Manhole Schedule
5015327-RDG-00-XX-DR-C -0105	Flood Route Plan

DRAINAGE NOTES

- 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.
- 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.
- ALL PRIVATE DRAINAGE WITHIN THE SITE IS TO COMPLY WITH THE REQUIREMENTS OF BS EN 752 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.
- 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 2 BEDDING). CLASS 'S' BED AND SURROUND MAY BE REQUIRED FOR SEWERS TO BE ADOPTED. REFER TO SPECIFIC DRAWINGS FOR FURTHER INFORMATION.
- 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

COMPACTION TESTS. SUFFICIENT TESTING SHALL BE CARRIED OUT, BY THE CONTRACTOR, TO DEMONSTRATE THIS IS ACHIEVED (NUMBER AND FREQUENCY OF TESTING TO BE AGREED WITH RCU). WHERE THE MOISTURE CONTENT OF THE MATERIAL PROHIBITS COMPLIANCE WITH THE ABOVE 6F1 OR SIMILAR IMPORTED MATERIAL SHALL BE USED.

- CONCRETE PROTECTION TO PIPEWORK IS TO BE PROVIDED AS FOLLOWS:
 - ALL PIPEWORK WITHIN PEDESTRIAN/SOFT AREAS WITH LESS THAN 600mm COVER.
 - ALL PIPEWORK SUBJECT TO VEHICULAR OVERRUN WITH LESS THAN 1.2m COVER.
- 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.
- ALL DRAINS TO BE LAID ACCURATELY TO LINE AND LEVEL IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
- 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.
- CO-ORDINATE SETTING OUT INFORMATION FOR MANHOLES IS TO THE INTERSECTION THE DRAINS AND NOT THE CENTRE OF THE MANHOLE.
- 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.

- MANHOLE COVERS AND FRAMES ARE TO BE IN ACCORDANCE WITH BS EN 124 AND THE FOLLOWING:
 - 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.
 - PEDESTRIAN AREAS: CLASS B125, 100mm DEEP, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.
- 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.
- GULLY GRATINGS AND STEEL CHANNEL COVERS ARE TO BE IN ACCORDANCE WITH BS EN 124 AS FOLLOWS:
 - AREAS SUBJECT TO VEHICULAR OVERRUN: CLASS D400 MINIMUM.
 - AREAS NOT SUBJECT TO REGULAR VEHICLE OVERRUN (ADJACENT TO KERBS ETC): CLASS C250.
 - GULLY GRATES ADJACENT TO KERBS SHALL BE HINGED ON THE SIDE OF THE TRAFFIC DIRECTION (LEFT HAND SIDE).
- ALL BRICKWORK IN CONNECTION WITH DRAINAGE IS TO BE SOLID CLASS B ENGINEERING BRICK TO BS3921.
- ALL PRECAST CONCRETE PIPES, CHAMBER PRODUCTS AND ROAD GULLIES SHALL BE TO BS5911 AND BE KITEMARKED.
- ALL DRAINAGE INSITU CONCRETE SHALL BE GEN3 (U.N.O).
- 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.

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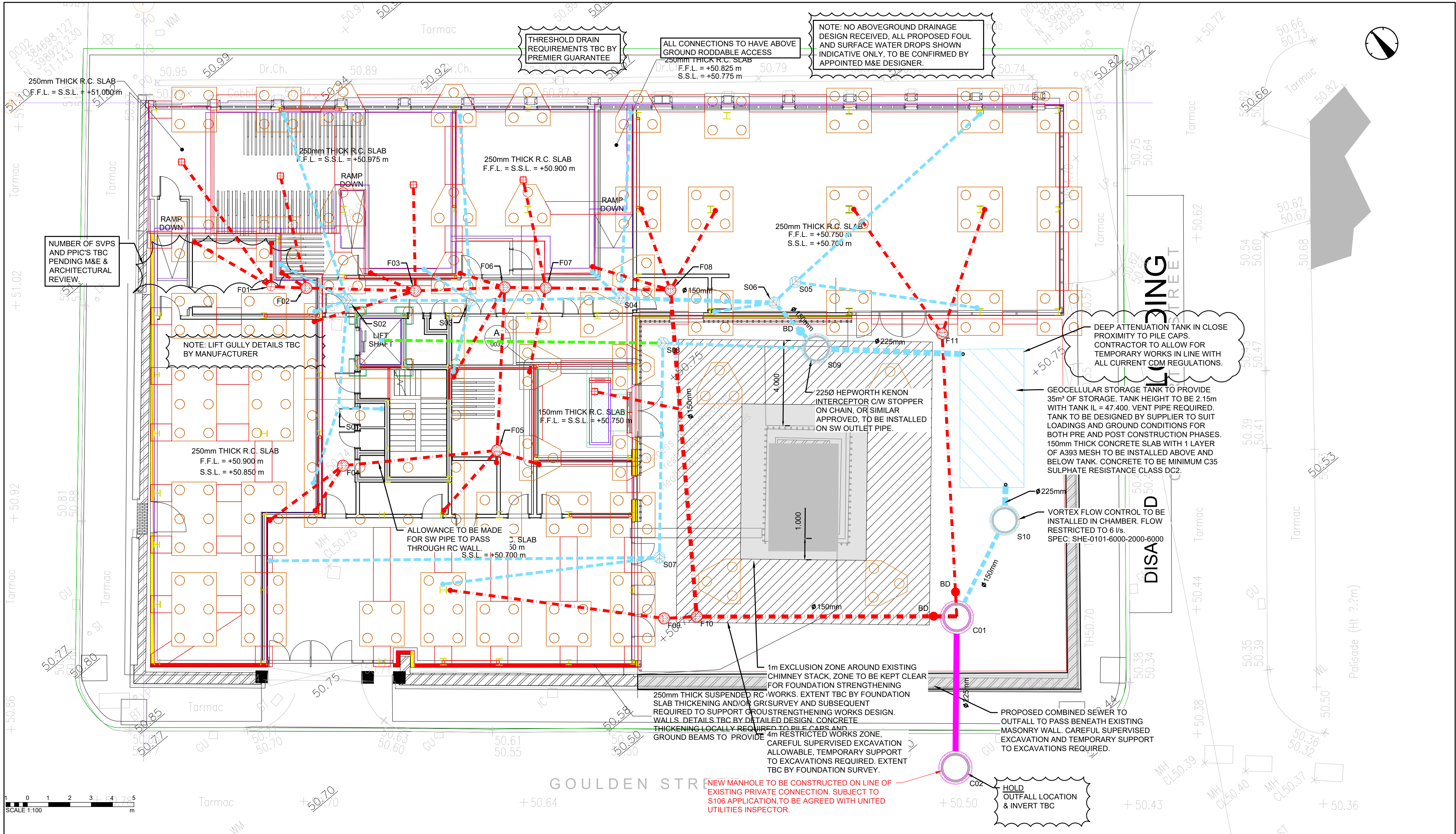
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DRAINAGE KEY

- 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



P02	PRELIMINARY ISSUE	03.11.21	AS	ED
P01	PRELIMINARY ISSUE	09.07.21	AS	ED
REV	DESCRIPTION	DATE	BY	CHKD



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CLIENT:
MULBURY CITY

IN ASSOCIATION WITH:

PROJECT:
GOULDEN STREET

TITLE:
DRAINAGE GA

ENG/TECH:	CSE:	ICSE:	SCALE:	1:100	@ A1
AS	ED	ED	STATUS ISSUE:	09.07.21	

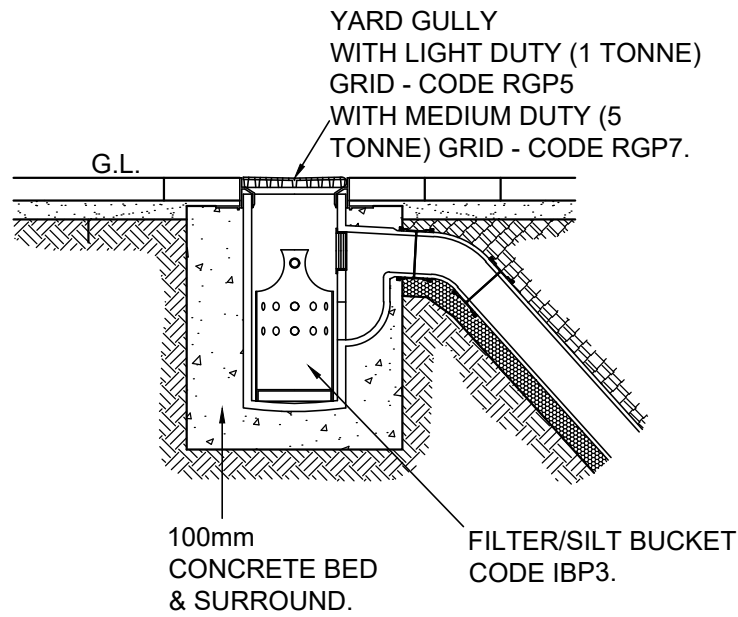
STATUS:
PRELIMINARY

"UNLESS ISSUED FOR CONSTRUCTION - WORKS AT CLIENT/CONTRACTORS RISK"

SUITABILITY:
S0 - Initial Status or WIP

PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
5015327	RDG	XX	XX	DR	C	0101	P02

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.



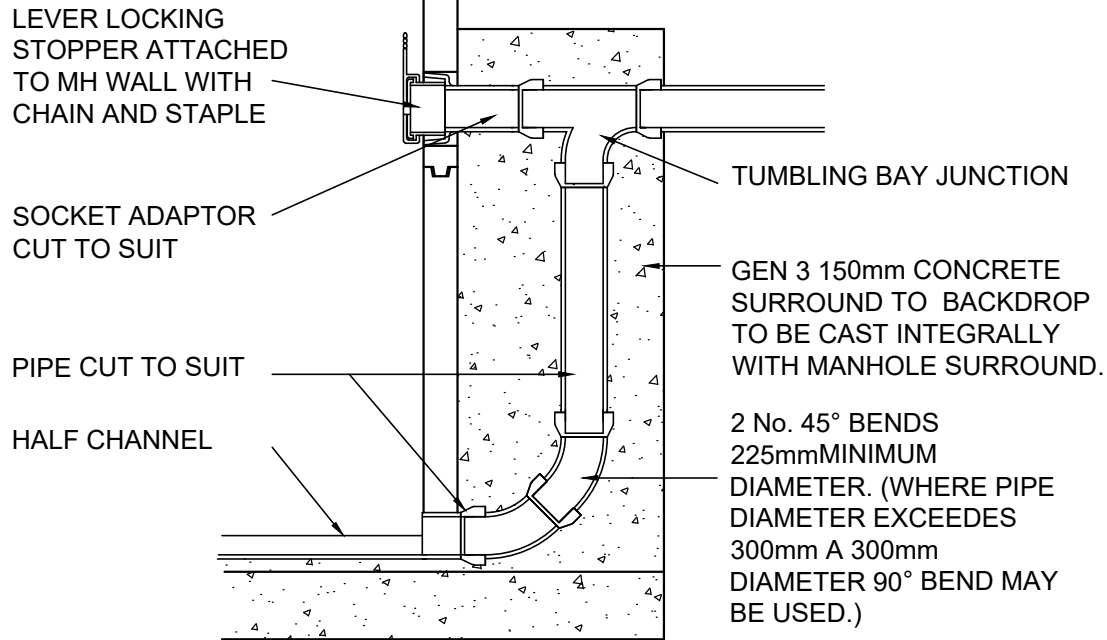
YARD GULLY

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

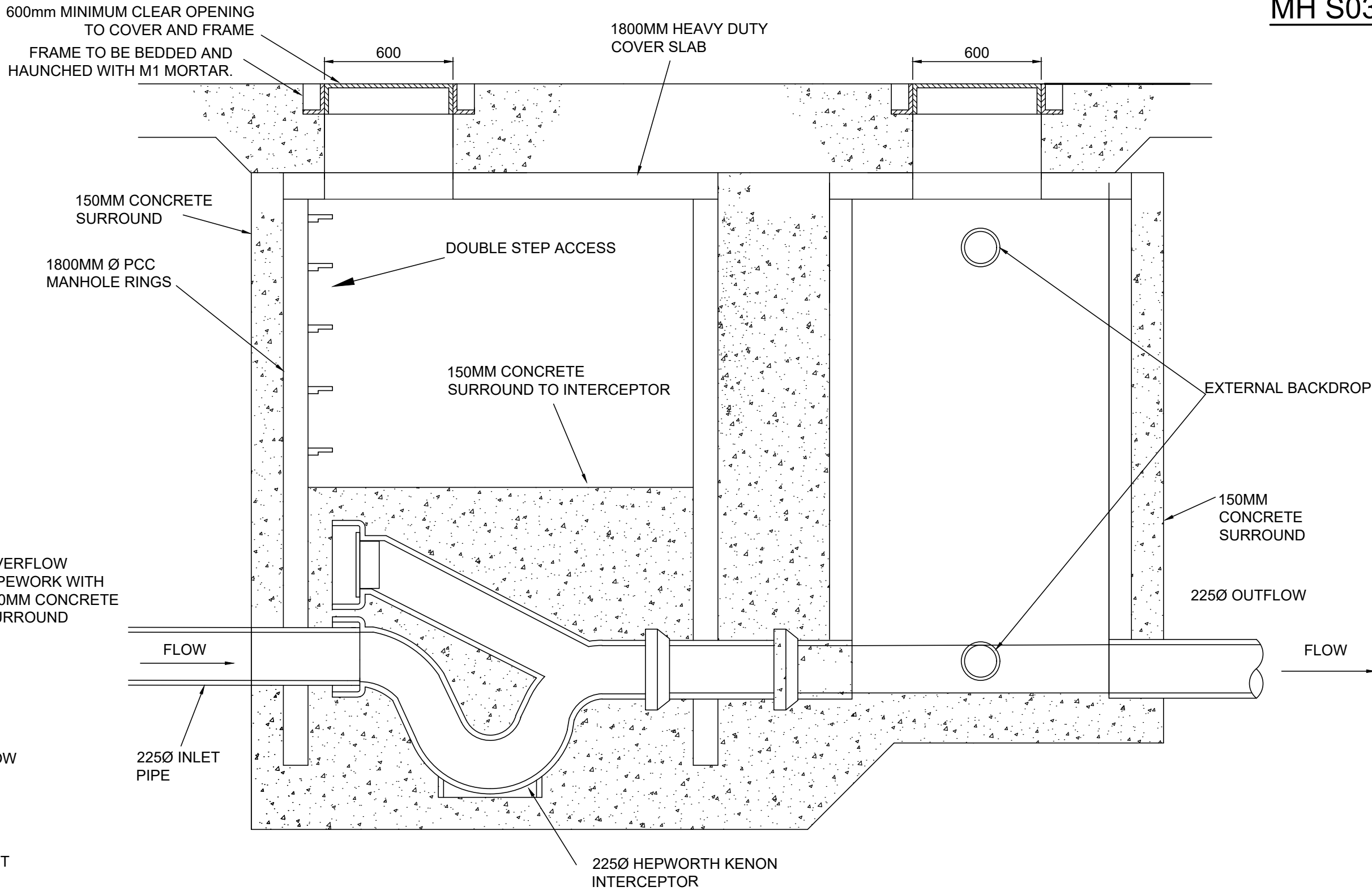
NOTES

- 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.

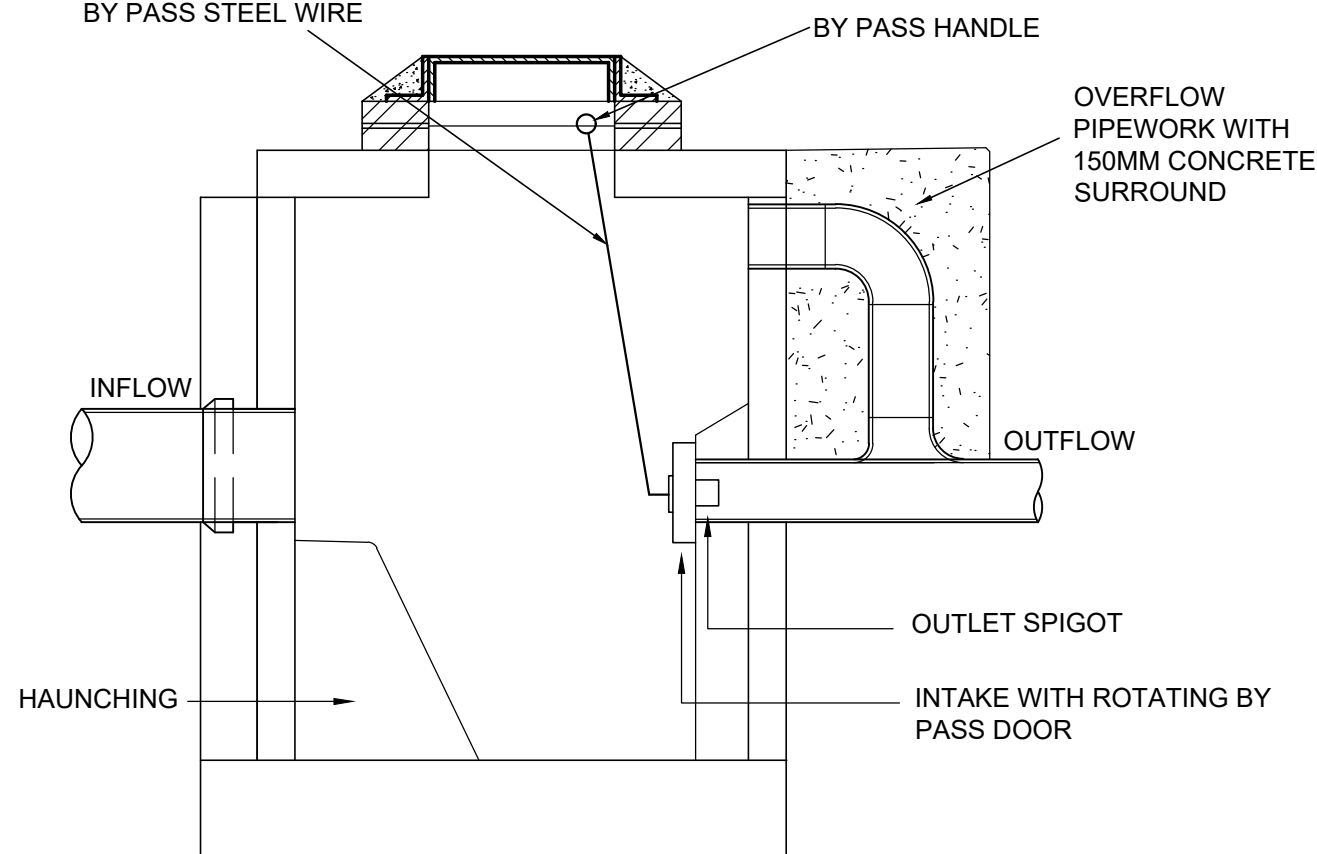
INVERT OF RODDING EYE TO BE NOT GREATER THAN 1.5m ABOVE TOP OF BENCHING. (UNLESS SPECIFIC MAN ACCESS REQUIREMENTS ARE PROVIDED.)



EXTERNAL VERTICAL BACKDROP

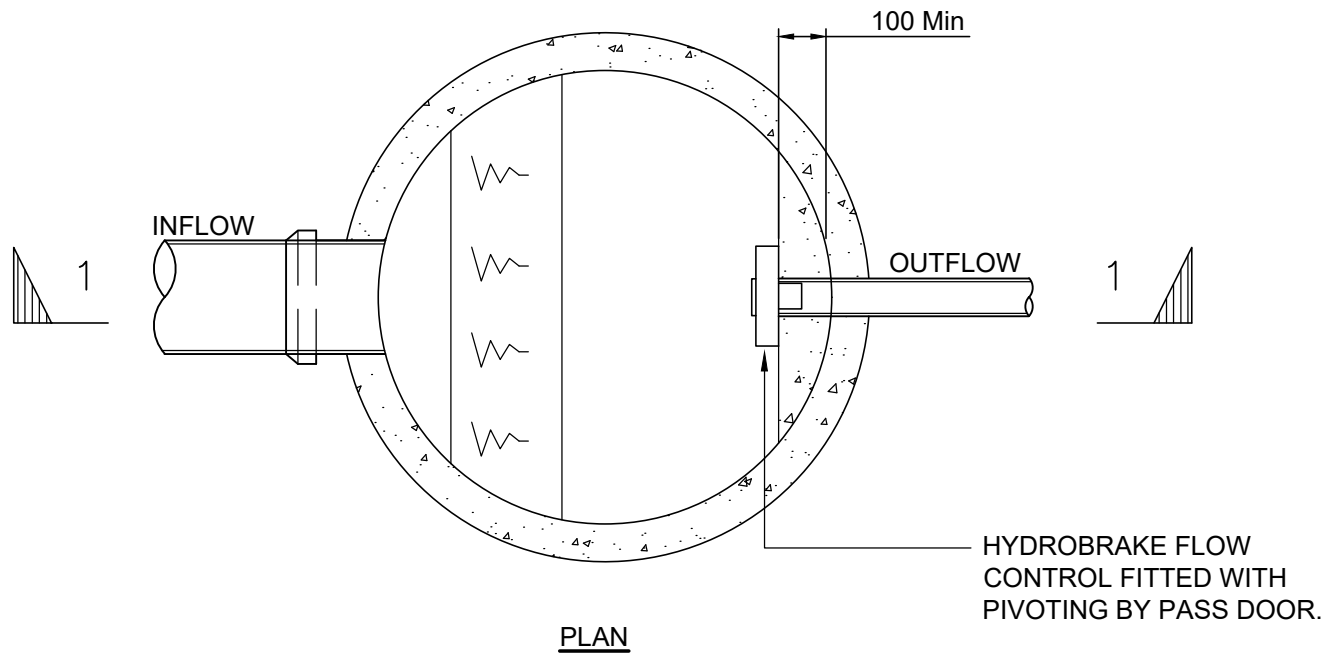


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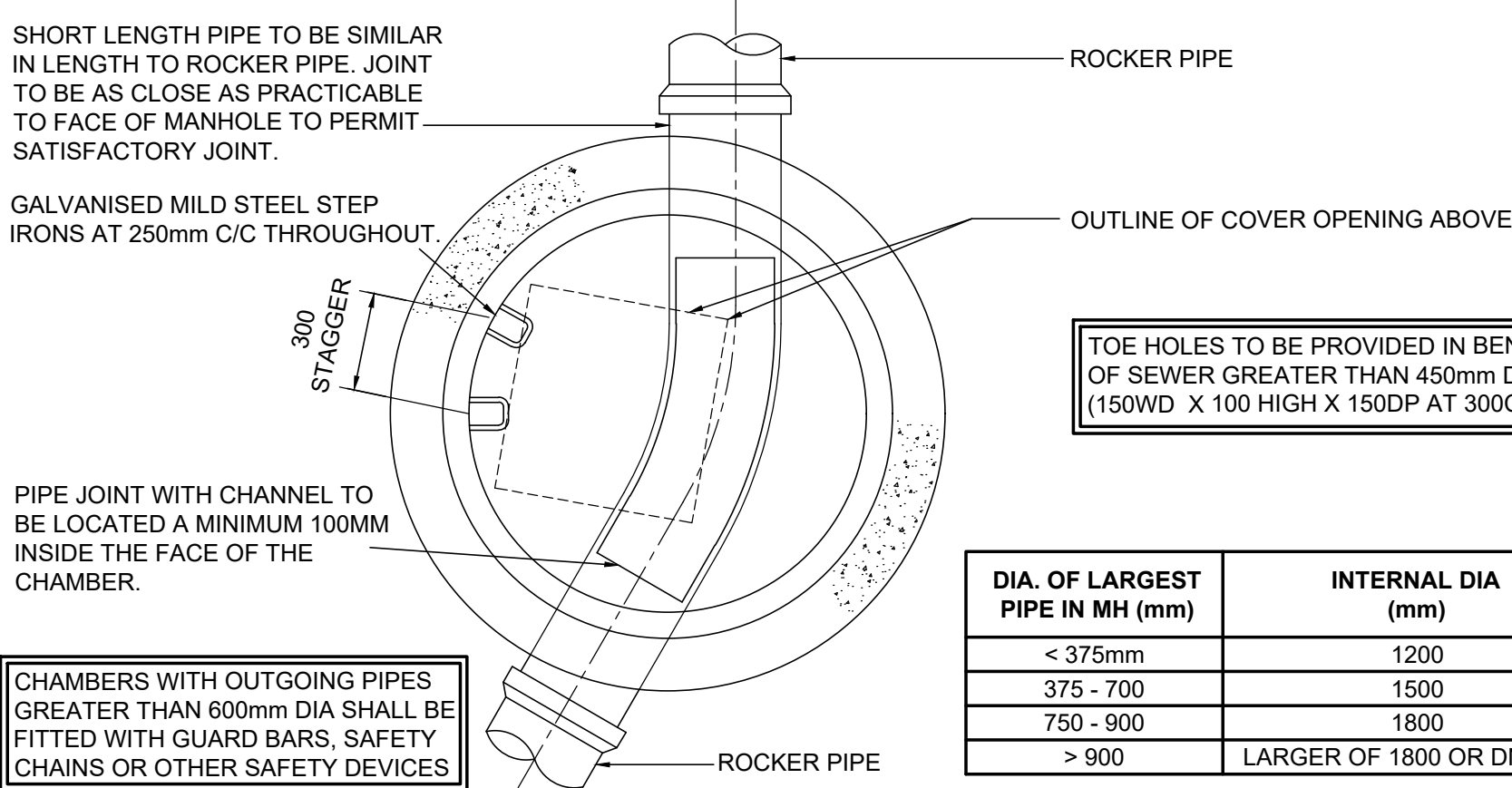
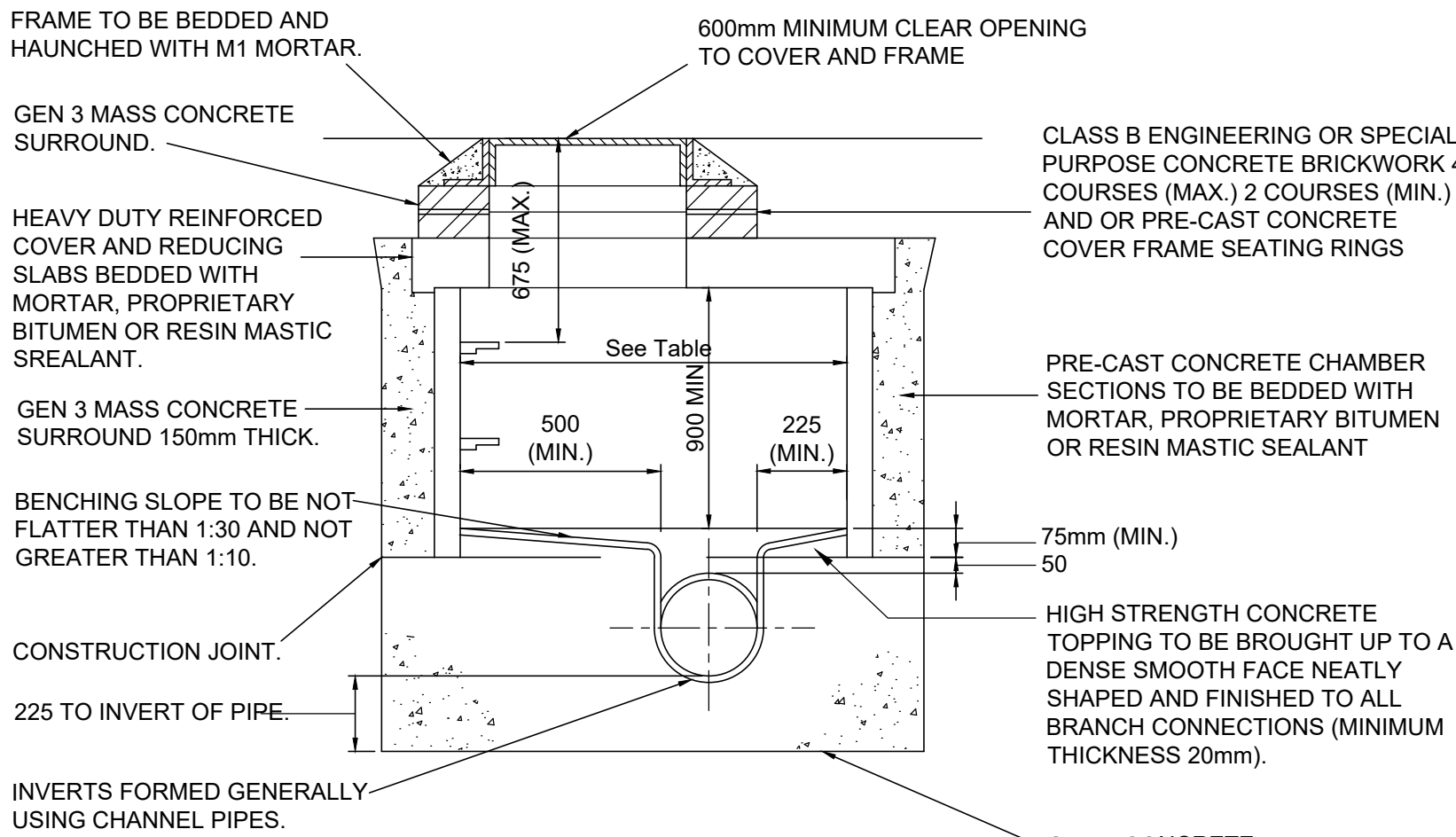


SECTION 1-1

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



VORTEX CONTROL CHAMBER



CHAMBERS WITH OUTGOING PIPES GREATER THAN 600mm DIA SHALL BE FITTED WITH GUARD BARS, SAFETY CHAINS OR OTHER SAFETY DEVICES

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

MANHOLE TYPE B

MH S03A

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P01	PRELIMINARY ISSUE	09.07.21	AS	ED
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REV	DESCRIPTION	DATE	BY	CHKD
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CLIENT:

MULBURY CITY

IN ASSOCIATION WITH:

PROJECT:
GOULDEN STREET

TITLE:
DRAINAGE DETAILS
SHEET 1

ENG/TECH:	CSE:	ICSE:	SCALE:	1:100	@	A1
AS	ED	ED	STATUS ISSUE:	09.07.21		

STATUS: PRELIMINARY

"UNLESS ISSUED FOR CONSTRUCTION - WORKS AT CLIENT/CONTRACTORS RISK"

SUITABILITY: S0 - Initial Status or WIP

PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
5015327	RDG	XX	XX	DR	C	0102	P01

COMPRESSIBLE BOARD OR PREFORMED JOINT FILLER FOR FULL THICKNESS OF CONCRETE BED OR SURROUND

JOINTS REQUIRED AT 5m INTERVALS MAX.

COMPRESSIBLE FILLER IS TO BE USED AT PIPE JOINTS IN CONCRETE PROTECTION TO PIPES. FILLER TO BE USED CAN BE HYDROCELL BY FOSROC, OR APPROVED BITUMEN IMPREGNATED INSULATING BOARD TO B.S. 1142 PART 3. THE COMPRESSIBLE MATERIAL SHALL BE CUT TO MATCH THE PIPELINE SHAPE AND MUST EXTEND THROUGH THE FULL HEIGHT OF THE CONCRETE.

FLEXIBLE PIPE JOINT @ MAXIMUM 3 PIPE LENGTHS & IN ACCORDANCE WITH PIPE MANUFACTURERS INSTRUCTIONS.

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

BS EN 1610:1997 Annex B Table B.15 Coarse Aggregate - Pipe Bedding									
Sieve Size (mm)	Percentage by mass passing BS sieves for nominal sizes				Single-sized Aggregate (mm)				
	40 to 5	20 to 5	14 to 5	40	20	14	10		
50.0	100	-----	-----	100	-----	-----	-----		
37.5	90 - 100	100	-----	85 - 100	100	-----	-----		
20.0	35 - 70	90 - 100	100	0 - 25	85 - 100	100	-----		
14.0	-----	-----	90 - 100	-----	-----	85 - 100	100		
10.0	10 - 40	30 - 60	50 - 85	0 - 5	0 - 25	0 - 50	85 - 100		
5.0	0 - 5	0 - 10	0 - 10	-----	0 - 5	0 - 10	0 - 25		
2.36	-----	-----	-----	-----	-----	-----	0 - 5		

RIGID PIPES BEDDING GRADING

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

SELECTED AS DUG MATERIAL IN NON TRAFFICKED AREAS, M.O.T. TYPE 1 IN HIGHWAYS.

SELECTED AS DUG MATERIAL. REFER TO STANDARD NOTES DRAWING FOR CLASSIFICATION OF 'AS DUG' MATERIAL

FOR GRANULAR BEDDING REFER TO TABLE

Y VALUE (BELOW PIPE):
HARD SPOTS/IRREGULAR TRENCH BOTTOM BC/4 (200mm MIN)
EVEN TRENCH BOTTOM BC/6 (100mm MIN)

BC = OUTSIDE DIAMETER

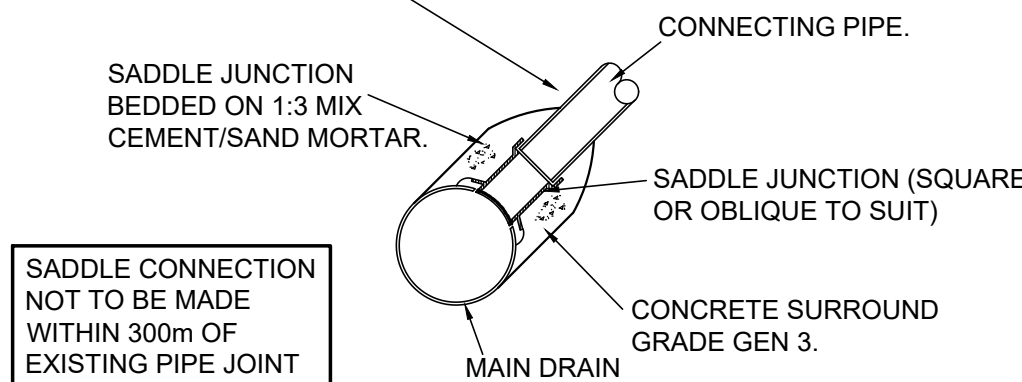
PIPE BEDDING CLASS B

BEDDING FACTOR 1.9

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

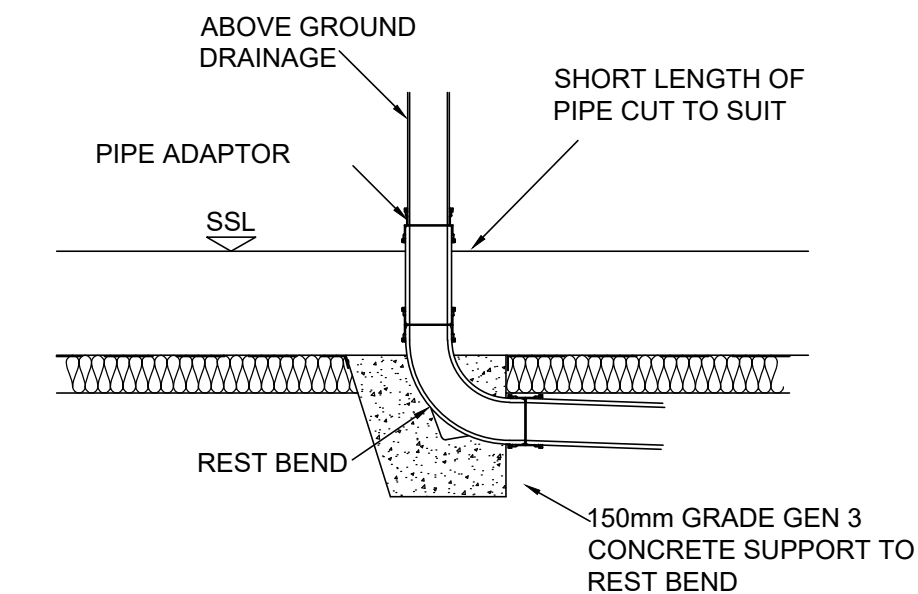
CLASS 'Z' PIPE BEDDING

15mm THICK 'AEROFIL 2' FILLER BOARD WITH 15 WIDE X 12 DEEP 'PARASEAL' SEALANT



SADDLE CONNECTION DETAIL

(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.)



TYPICAL DETAIL OF CONNECTION OF INTERNAL DRAINAGE TO BELOW GROUND DRAINAGE

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.

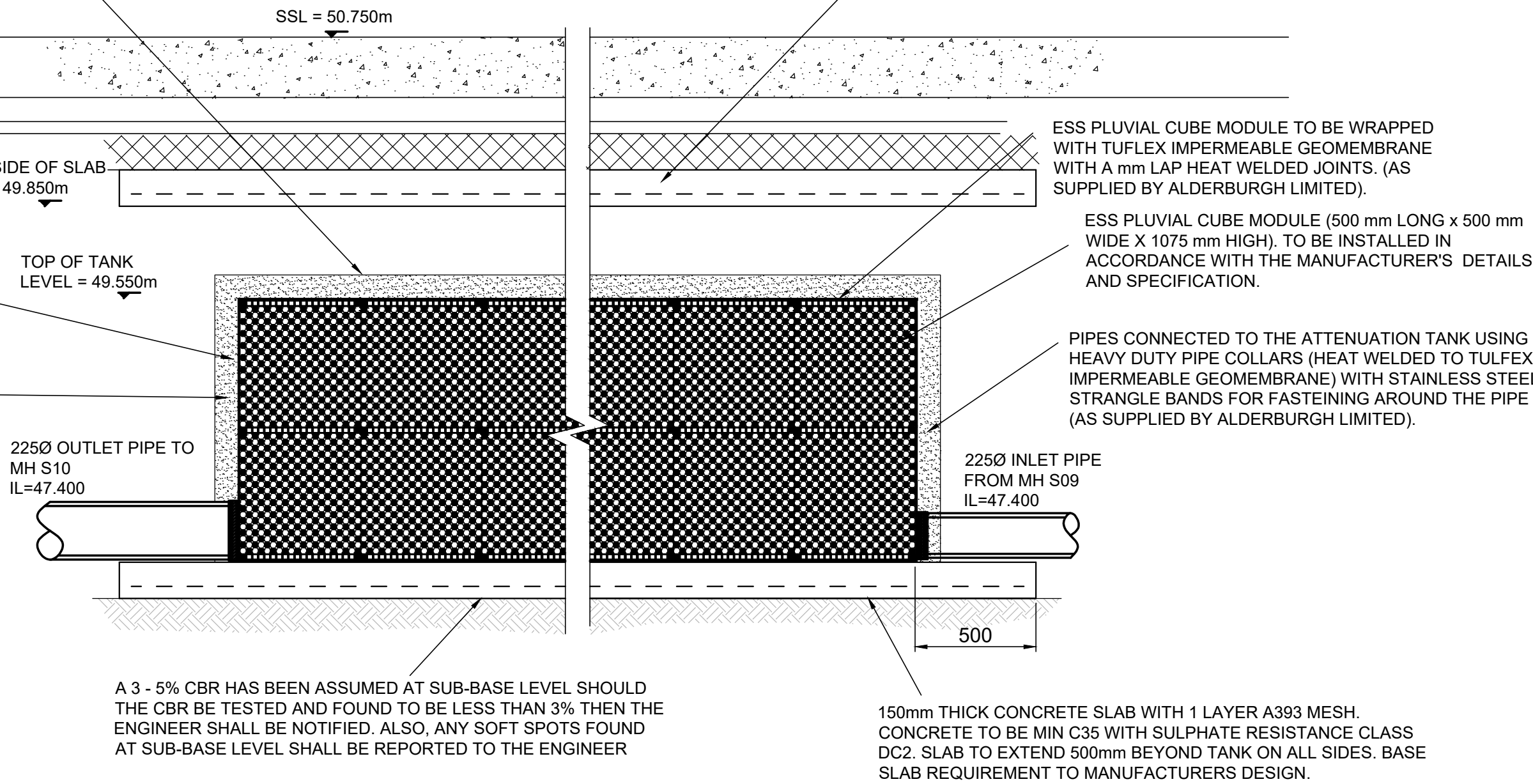
TO PROTECT THE WATERPROOF TUFLEX GEOMEMBRANE DURING BACKFILLING OPERATION, OVERLAY THE TOP AND SIDES WITH GEOTEX 300 PP NEEDLE PUNCHED NON-WOVEN PROTECTION GEOTEXTILE WITH A LAPPED JOINTS (AS SUPPLIED BY ALDERBURGH LIMITED).

WHERE SURCHARGING IN THE TEMPORARY CASE IS LIKELY TO OCCUR TEMPORARY WORKS DESIGNER MAY OPT TO SUBSTITUTE BACKFILL MATERIAL FOR 300mm THK ST1 LEAN MIX CONCRETE.

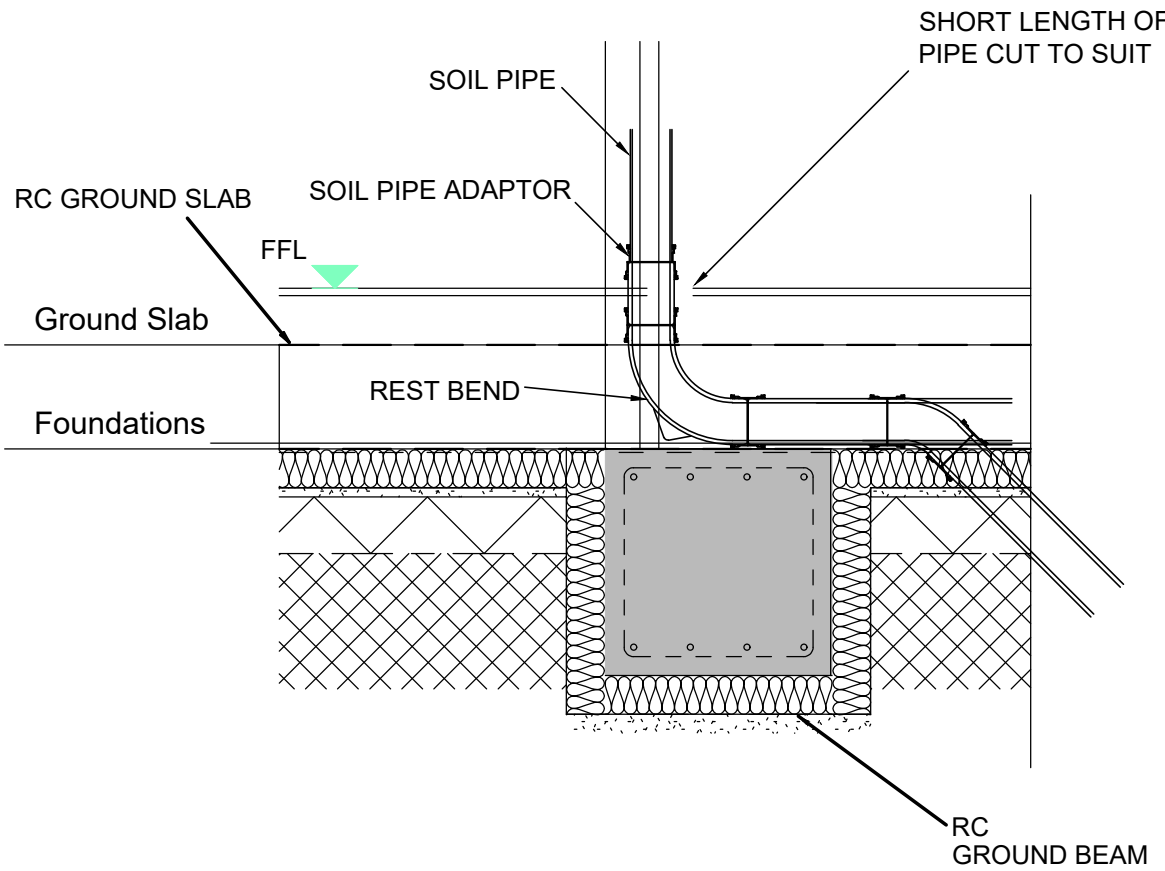
OTHERWISE BACKFILL OPTIONS AROUND THE SIDES OF MODULAR UNIT MAY BE:

- 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

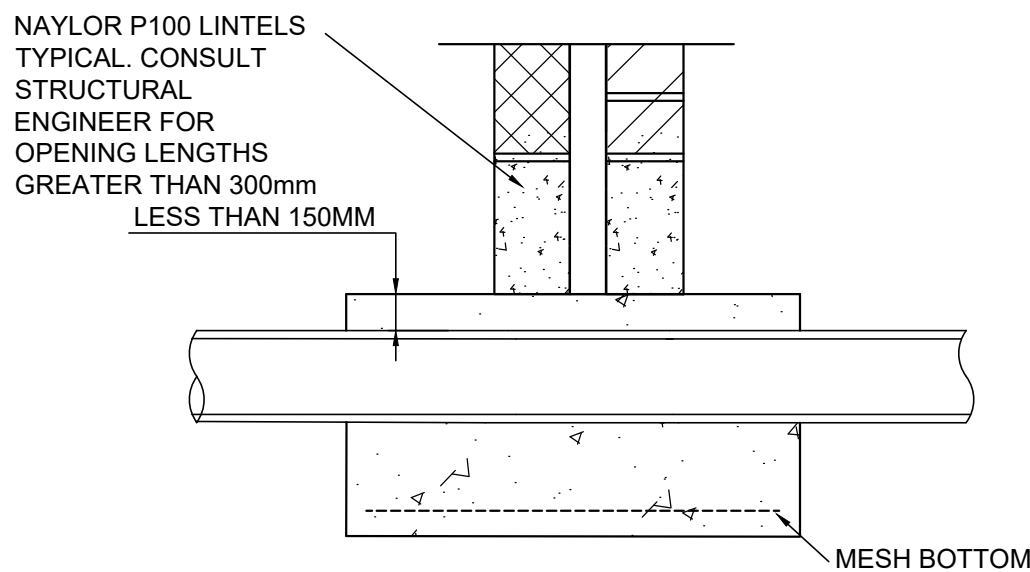


TYPICAL DETAILS OF ATTENUATION TANK BASED ON ALDERBURGH PLUVIAL CUBE MODULE UNITS



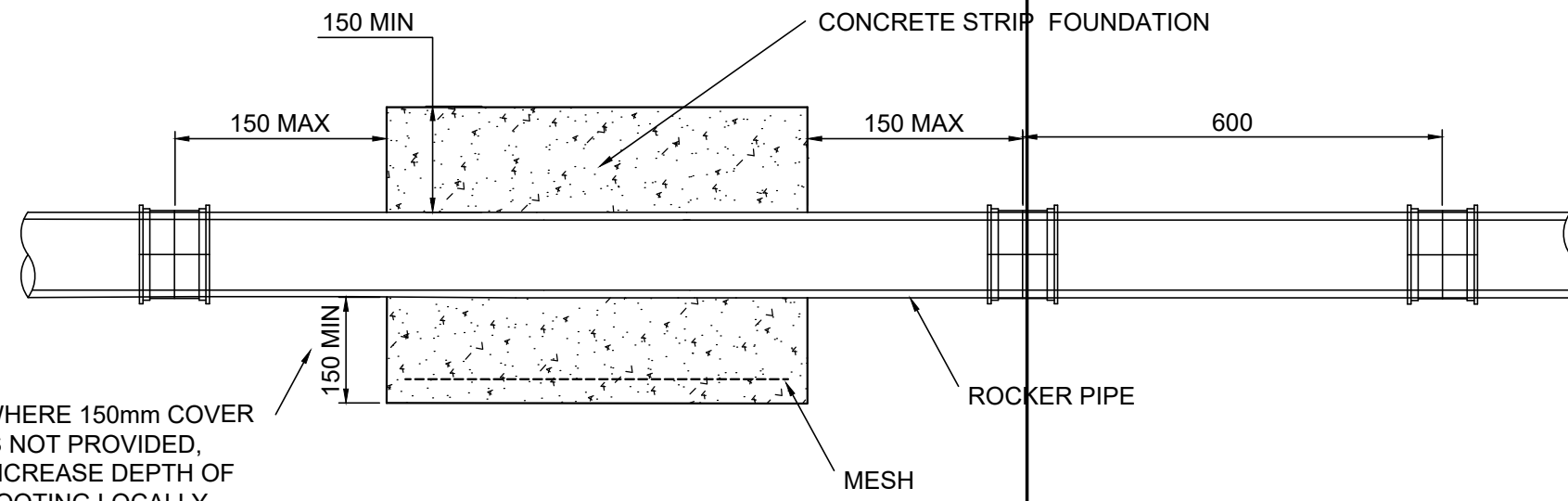
TYPICAL FOUNDATION PENETRATION DETAIL WITH INSUFFICIENT TOP COVER

1:10



TYPICAL FOUNDATION PENETRATION DETAIL

1:10



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P02	UPDATED TANK INFORMATION	03.11.21	AS	ED
P01	PRELIMINARY ISSUE	09.07.21	AS	ED
REV	DESCRIPTION	DATE	BY	CHKD

ORIGINATOR:

RIDGE

5TH FLOOR
BELVEDERE HOUSE
12 BOOTH STREET
MANCHESTER, M2 4AW

TEL: 0161 833 9579
WWW.RIDGE.CO.UK

CLIENT:

MULBURY CITY

IN ASSOCIATION WITH:

PROJECT:

GOULDEN STREET

TITLE:

DRAINAGE DETAILS
SHEET 2

ENG/TECH:	CSE:	ICSE:	SCALE:	1:100	@	A1
AS	ED	ED	STATUS ISSUE:	09.07.21		

STATUS:

PRELIMINARY

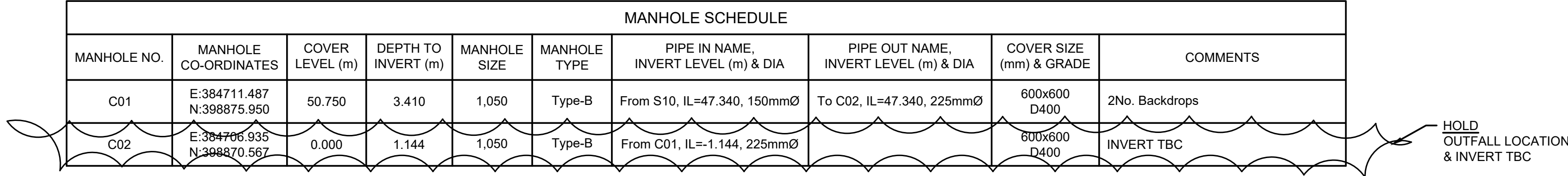
"UNLESS ISSUED FOR CONSTRUCTION - WORKS AT CLIENT/CONTRACTORS RISK"

SUITABILITY: S0 - Initial Status or WIP

PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
5015327	RDG	XX	XX	DR	C	0101	P02

MANHOLE SCHEDULE									
MANHOLE NO.	MANHOLE CO-ORDINATES	COVER LEVEL (m)	DEPTH TO INVERT (m)	MANHOLE SIZE	MANHOLE TYPE	PIPE IN NAME, INVERT LEVEL (m) & DIA	PIPE OUT NAME, INVERT LEVEL (m) & DIA	COVER SIZE (mm) & GRADE	COMMENTS
S01	E:384695.429 N:398902.024	50.750	0.565	300	Mini IC	From RWP, IL=50.185, 100mmØ From RWP, IL=50.185, 100mmØ	To S02, IL=50.185, 100mmØ	450x450 A15	RECESSED COVER
S02	E:384698.972 N:398905.646	50.750	0.645	450	IC	From RWP, IL=50.105, 100mmØ From RWP, IL=50.105, 100mmØ From RWP, IL=50.105, 100mmØ From S01, IL=50.105, 100mmØ	To S03, IL=50.105, 100mmØ	450x450 A15	RECESSED COVER
S03	E:384703.418 N:398901.941	50.750	0.925	450	IC	From S02, IL=49.825, 100mmØ From RWP, IL=49.825, 100mmØ From RWP, IL=49.825, 100mmØ From RWP, IL=49.825, 100mmØ	To S04, IL=49.825, 100mmØ	450x450 A15	RECESSED COVER
S04	E:384708.895 N:398897.548	50.750	1.020	450	IC	From RWP, IL=49.730, 100mmØ From S03, IL=49.730, 100mmØ From RWP, IL=49.730, 100mmØ	To S06, IL=49.730, 150mmØ	450x450 A15	RECESSED COVER
S05	E:384715.690 N:398892.884	50.750	0.970	450	IC	From RWP, IL=49.780, 100mmØ From RWP, IL=49.780, 100mmØ	To S06, IL=49.780, 100mmØ	450x450 A15	RECESSED COVER
S06	E:384714.316 N:398892.782	50.750	1.110	450	IC	From S04, IL=49.640, 150mmØ From RWP, IL=49.640, 100mmØ From S05, IL=49.640, 100mmØ	To S09, IL=49.640, 150mmØ	450x450 A15	RECESSED COVER
S07	E:384702.538 N:398887.015	50.750	0.750	450	IC	From RWP, IL=50.000, 100mmØ From RWP, IL=50.000, 100mmØ	To S08, IL=50.000, 100mmØ	450 B125	
S08	E:384709.082 N:398894.652	50.750	1.750	450	IC	From S07, IL=49.000, 100mmØ From RWP, IL=49.000, 100mmØ	To S09, IL=49.000, 100mmØ	450 B125	
S09	E:384714.468 N:398889.854	50.750	2.450	900	Type-B	From S08, IL=48.300, 100mmØ From S06, IL=49.600, 150mmØ	To ATT, IL=48.300, 225mmØ	600x600 D400	1No BACKDROP
S10	E:384716.119 N:398878.020	50.750	0.744	900	Type-B	From ATT (1), IL=47.375, 225mmØ	To C01, IL=47.375, 150mmØ	600x600 D400	FLOW CONTROL

MANHOLE SCHEDULE									
MANHOLE NO.	MANHOLE CO-ORDINATES	COVER LEVEL (m)	DEPTH TO INVERT (m)	MANHOLE SIZE	MANHOLE TYPE	PIPE IN NAME, INVERT LEVEL (m) & DIA	PIPE OUT NAME, INVERT LEVEL (m) & DIA	COVER SIZE (mm) & GRADE	COMMENTS
F01	E:384696.625 N:398908.418	50.900	0.600	300	Mini IC	From SVP, IL=50.300, 100mmØ From SVP, IL=50.300, 100mmØ From SVP, IL=50.300, 100mmØ	To F02, IL=50.300, 100mmØ	450x450 A15	RECESSED COVER
F02	E:384697.856 N:398907.307	50.900	0.625	450	IC	From SVP, IL=50.275, 100mmØ From F01, IL=50.275, 100mmØ From SVP, IL=50.275, 100mmØ	To F03, IL=50.275, 100mmØ	450x450 A15	RECESSED COVER
F03	E:384701.708 N:398903.945	50.750	0.540	450	IC	From F02, IL=50.210, 100mmØ From SVP, IL=50.210, 100mmØ From SVP, IL=50.210, 100mmØ From SVP, IL=50.210, 100mmØ	To F06, IL=50.210, 100mmØ	450x450 A15	RECESSED COVER
F04	E:384693.862 N:398899.801	50.750	0.570	450	IC	From SVP, IL=50.180, 100mmØ From SVP, IL=50.180, 100mmØ	To F05, IL=50.180, 100mmØ	450x450 A15	RECESSED COVER
F05	E:384699.881 N:398895.739	50.750	0.665	450	IC	From SVP, IL=50.085, 100mmØ From F04, IL=50.085, 100mmØ From SVP, IL=50.085, 100mmØ From SVP, IL=50.085, 100mmØ	To F06, IL=50.085, 100mmØ	450x450 A15	RECESSED COVER
F06	E:384705.038 N:398901.399	50.750	0.760	450	IC	From F03, IL=49.990, 100mmØ From SVP, IL=49.990, 100mmØ From F05, IL=49.990, 100mmØ From SVP, IL=49.990, 100mmØ	To F07, IL=49.990, 100mmØ	450x450 A15	RECESSED COVER
F07	E:384706.503 N:398900.151	50.750	0.785	450	IC	From F06, IL=49.965, 100mmØ From SVP, IL=49.965, 100mmØ From SVP, IL=49.965, 100mmØ	To F08, IL=49.965, 100mmØ	450x450 A15	RECESSED COVER
F08	E:384710.940 N:398896.342	50.750	0.860	450	IC	From SVP, IL=49.890, 100mmØ From F07, IL=49.890, 100mmØ From SVP, IL=49.890, 100mmØ From SVP, IL=49.890, 100mmØ	To F10, IL=49.890, 150mmØ	450x450 A15	RECESSED COVER
F09	E:384700.883 N:398884.676	50.750	0.700	450	IC	From SVP, IL=50.050, 100mmØ	To F10, IL=50.050, 100mmØ	450 B125	
F10	E:384702.116 N:398883.761	50.750	0.965	450	IC	From F09, IL=49.785, 100mmØ From F08, IL=49.785, 150mmØ	To C01, IL=49.785, 150mmØ	450 B125	
F11	E:384719.445 N:398886.630	50.750	0.605	450	IC	From SVP, IL=50.145, 100mmØ From SVP, IL=50.145, 100mmØ	To C01, IL=50.145, 100mmØ	450 B125	

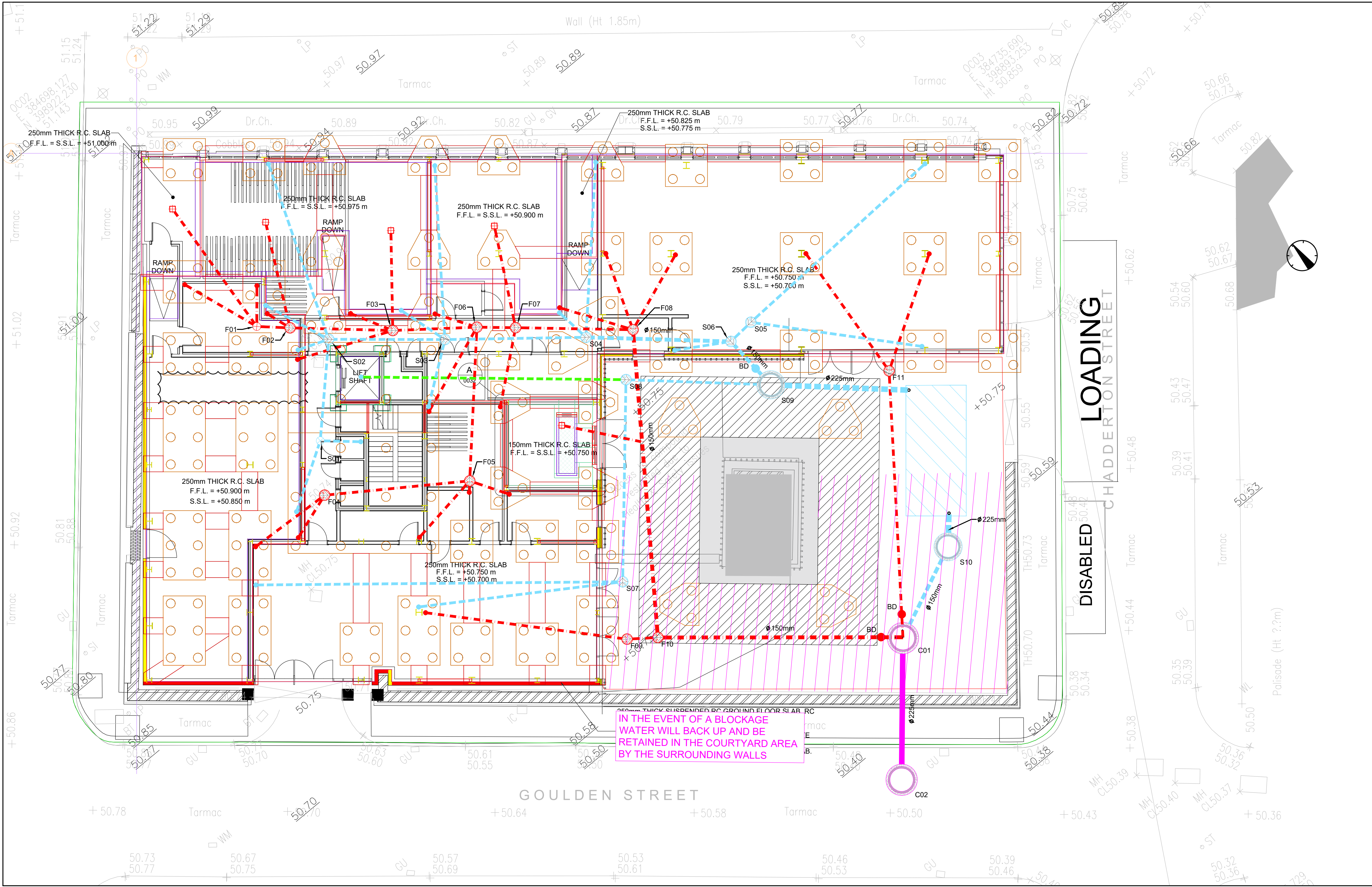


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P01	PRELIMINARY ISSUE	03.11.21	AS	ED
REV	DESCRIPTION	DATE	BY	CHKD
ORIGINATOR:				
RIDGE				
5TH FLOOR BELVEDERE HOUSE 12 BOOTH STREET MANCHESTER, M2 4AW		TEL: 0161 833 9579		
		WWW.RIDGE.CO.UK		
CLIENT:				
MULBURY CITY				
IN ASSOCIATION WITH:				
PROJECT:				
GOULDEN STREET				
TITLE:				
DRAINAGE MANHOLE SCHEDULE				
ENG/TECH:	CSE:	ICSE:	SCALE:	@ A1
AS	ED	ED	STATUS ISSUE:	09.07.21
STATUS:				
PRELIMINARY				
UNLESS ISSUED FOR CONSTRUCTION - WORKS AT CLIENT/CONTRACTORS RISK				
SUITABILITY:				
S0 - Initial Status or WIP				
PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:
5015327	RDG	XX	XX	DR
			ROLE:	NUMBER:
			C	0104
				REV:
				P01



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RIDGE				
5TH FLOOR BELVEDERE HOUSE 12 BOOTH STREET MANCHESTER, M2 4AW			TEL: 0161 833 9579 WWW.RIDGE.CO.UK	
CLIENT: MULBURY CITY				
IN ASSOCIATION WITH:				
PROJECT: GOULDEN STREET				
TITLE: FLOOD ROUTE PLAN				
ENG/TECH:	CSE:	ICSE:	SCALE:	1:100 @ A1
AS	ED	ED	STATUS ISSUE:	03.11.21
STATUS: PRELIMINARY				
UNLESS ISSUED FOR CONSTRUCTION - WORKS AT CLIENT/CONTRACTORS RISK				
SUITABILITY:				
S0 - Initial Status or WIP				
PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:
ROLE:	NUMBER:	REV:		
5015327	RDG	XX	XX	DR
				C
				0105
				P01

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	Full SW Calcs Goulden Street	
Date 03/11/2021	Designed by EJD	
File Full Surface Water Drainage Calculations 03.11...	Checked by	
Micro Drainage		Network 2018.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Foul Sewage (l/s/ha)	0.000	Maximum Backdrop Height (m)	1.500
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)	0.200		

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

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	5.067	0.080	63.3	0.009	5.00	0.0	0.600	o	100	Pipe/Conduit	🟢
1.001	5.787	0.280	20.7	0.013	0.00	0.0	0.600	o	100	Pipe/Conduit	🟢
1.002	7.021	0.095	73.9	0.018	0.00	0.0	0.600	o	100	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	5.09	50.185	0.009	0.0	0.0	0.0	0.97	7.6	1.2
1.001	50.00	5.14	50.105	0.022	0.0	0.0	0.0	1.71	13.4	3.0
1.002	50.00	5.27	49.825	0.040	0.0	0.0	0.0	0.90	7.0	5.4

Scott Hughes Design Ltd		Page 2
The Flint Glass Works 64 Jersey Street Manchester M4 6JW	Full SW Calcs Goulden Street	
Date 03/11/2021	Designed by EJD	
File Full Surface Water Drainage Calculations 03.11...	Checked by	
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
1.003	7.218	0.090	80.2	0.008	0.00	0.0	0.600	o	100	Pipe/Conduit	
2.000	1.378	0.140	9.8	0.016	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.004	2.933	0.060	48.9	0.005	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	10.057	1.000	10.1	0.018	5.00	0.0	0.600	o	100	Pipe/Conduit	
3.001	7.213	0.123	58.6	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.005	6.874	0.900	7.6	0.036	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	3.000	0.025	120.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.007	5.073	0.035	144.9	0.000	0.00	0.0	0.600	o	150	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)
1.003	50.00	5.41	49.730	0.048	0.0	0.0	0.0	0.86	6.8	6.5
2.000	50.00	5.01	49.780	0.016	0.0	0.0	0.0	2.48	19.5	2.2
1.004	50.00	5.45	49.640	0.069	0.0	0.0	0.0	1.44	25.5	9.3
3.000	50.00	5.07	50.000	0.018	0.0	0.0	0.0	2.45	19.3	2.4
3.001	50.00	5.19	49.000	0.018	0.0	0.0	0.0	1.01	7.9	2.4
1.005	50.00	5.47	48.300	0.123	0.0	0.0	0.0	4.76	189.4	16.7
1.006	50.00	5.51	47.400	0.123	0.0	0.0	0.0	1.19	47.4	16.7
1.007	50.00	5.62	47.375	0.123	0.0	0.0	0.0	0.83	14.7	16.7

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The Flint Glass Works 64 Jersey Street Manchester M4 6JW	Full SW Calcs Goulden Street	
Date 03/11/2021	Designed by EJD	
File Full Surface Water Drainage Calculations 03.11...	Checked by	
Micro Drainage	Network 2018.1	
Simulation Criteria for Storm Volumetric Runoff Coeff 0.750 Manhole Headloss Coeff (Global) 0.500 Inlet Coeffiecient 0.800 Areal Reduction Factor 1.000 Foul Sewage per hectare (l/s) 0.000 Flow per Person per Day (l/per/day) 0.000 Hot Start (mins) 0 Additional Flow - % of Total Flow 0.000 Run Time (mins) 60 Hot Start Level (mm) 0 MADD Factor * 10m³/ha Storage 2.000 Output Interval (mins) 1 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 Return Period (years) 2 Ratio R 0.361 Cv (Winter) 0.840 Region England and Wales Profile Type Summer Storm Duration (mins) 30		
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Online Controls for Storm

Hydro-Brake® Optimum Manhole: FLOW CONTROL, DS/PN: 1.007, Volume (m³): 2.2

Unit Reference	MD-SHE-0101-6000-2000-6000	Sump Available	Yes
Design Head (m)	2.000	Diameter (mm)	101
Design Flow (l/s)	6.0	Invert Level (m)	47.375
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	150
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points			Control Points		
	Head (m)	Flow (l/s)		Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	6.0	Kick-Flo®	0.900	4.1
Flush-Flo™	0.438	5.2	Mean Flow over Head Range	-	4.8

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	3.3	0.600	5.1	1.600	5.4	2.600	6.8	5.000	9.2	7.500	11.2
0.200	4.7	0.800	4.7	1.800	5.7	3.000	7.3	5.500	9.7	8.000	11.5
0.300	5.1	1.000	4.3	2.000	6.0	3.500	7.8	6.000	10.1	8.500	11.9
0.400	5.2	1.200	4.7	2.200	6.3	4.000	8.3	6.500	10.5	9.000	12.2
0.500	5.2	1.400	5.1	2.400	6.5	4.500	8.8	7.000	10.8	9.500	12.5

Scott Hughes Design Ltd		Page 5																		
The Flint Glass Works 64 Jersey Street Manchester M4 6JW	Full SW Calcs Goulden Street																			
Date 03/11/2021	Designed by EJD																			
File Full Surface Water Drainage Calculations 03.11...	Checked by																			
Micro Drainage	Network 2018.1																			
<u>Storage Structures for Storm</u> <u>Cellular Storage Manhole: TANK, DS/PN: 1.006</u> Invert Level (m) 47.400 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>18.0</td><td>18.0</td><td>2.000</td><td>18.0</td><td>51.9</td><td>2.001</td><td>0.0</td><td>51.9</td></tr></tbody></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	18.0	18.0	2.000	18.0	51.9	2.001	0.0	51.9
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)												
0.000	18.0	18.0	2.000	18.0	51.9	2.001	0.0	51.9												
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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

PN	US/MH		Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Surcharged Flooded			Flow / Overflow (l/s)	Pipe		Level Exceeded
	Name	Storm							Level (m)	Depth (m)	Volume (m³)	Cap.	Flow (l/s)	Status	
1.000	S01	15 Winter	1	+0%	30/15	Summer			50.212	-0.073	0.000	0.16	1.1	OK	
1.001	S02	15 Winter	1	+0%	30/15	Summer			50.136	-0.069	0.000	0.20	2.4	OK	
1.002	S03	15 Winter	1	+0%	30/15	Summer			49.885	-0.040	0.000	0.66	4.2	OK	
1.003	S04	15 Winter	1	+0%	30/15	Summer			49.800	-0.030	0.000	0.83	5.1	OK	
2.000	S05	15 Winter	1	+0%	100/15	Summer			49.809	-0.071	0.000	0.18	1.9	OK	
1.004	S06	15 Winter	1	+0%	30/15	Summer			49.715	-0.075	0.000	0.49	7.5	OK	
3.000	S07	15 Winter	1	+0%					50.023	-0.077	0.000	0.12	2.2	OK	
3.001	S08	15 Winter	1	+0%	100/15	Summer			49.038	-0.062	0.000	0.30	2.1	OK	
1.005	S09	15 Winter	1	+0%	100/15	Summer			48.348	-0.177	0.000	0.10	13.3	OK	

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The Flint Glass Works 64 Jersey Street Manchester M4 6JW	Full SW Calcs Goulden Street	
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Micro Drainage		

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Surcharged Flooded			Pipe		Status	
									Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (1/s)		Flow (1/s)
1.006	TANK	30 Winter	1	+0%	30/15 Summer				47.624	-0.001	0.000	0.17		5.2	OK
1.007	FLOW CONTROL	30 Winter	1	+0%	1/15 Summer				47.627	0.102	0.000	0.42		4.9	SURCHARGED

PN	US/MH Name	Level Exceeded
1.006	TANK	
1.007	FLOW CONTROL	

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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) Surge	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				50.466	0.181	0.000	0.38		2.5	FLOOD RISK	
1.001	S02	15 Winter	30	+0%	30/15 Summer				50.453	0.248	0.000	0.48		5.8	FLOOD RISK	
1.002	S03	15 Winter	30	+0%	30/15 Summer				50.393	0.468	0.000	1.57		10.0	SURCHARGED	
1.003	S04	15 Winter	30	+0%	30/15 Summer				50.154	0.324	0.000	1.94		11.9	SURCHARGED	
2.000	S05	15 Winter	30	+0%	100/15 Summer				49.834	-0.046	0.000	0.45		4.7	OK	
1.004	S06	15 Winter	30	+0%	30/15 Summer				49.805	0.015	0.000	1.16		17.8	SURCHARGED	
3.000	S07	15 Winter	30	+0%					50.037	-0.063	0.000	0.30		5.3	OK	
3.001	S08	15 Winter	30	+0%	100/15 Summer				49.065	-0.035	0.000	0.73		5.3	OK	
1.005	S09	15 Winter	30	+0%	100/15 Summer				48.377	-0.148	0.000	0.25		33.6	OK	

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Micro Drainage	Network 2018.1	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Surcharged Flooded			Pipe		Status	
									Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)		Flow (l/s)
1.006	TANK	60 Winter	30	+0%	30/15 Summer				48.241	0.616	0.000	0.19		5.7	SURCHARGED
1.007	FLOW CONTROL	30 Winter	30	+0%	1/15 Summer				48.230	0.705	0.000	0.44		5.2	SURCHARGED

PN	US/MH Name	Level Exceeded
1.006	TANK	
1.007	FLOW CONTROL	

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Micro Drainage	Network 2018.1	

100 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) Surge	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	100	+40%	30/15 Summer				50.747	0.462	0.000	1.38		9.2	FLOOD RISK	
1.001	S02	15 Winter	100	+40%	30/15 Summer				50.747	0.542	0.000	0.86		10.2	FLOOD RISK	
1.002	S03	15 Winter	100	+40%	30/15 Summer				50.745	0.820	0.000	1.90		12.1	FLOOD RISK	
1.003	S04	15 Winter	100	+40%	30/15 Summer				50.483	0.653	0.000	2.52		15.4	FLOOD RISK	
2.000	S05	15 Winter	100	+40%	100/15 Summer				50.005	0.125	0.000	0.81		8.5	SURCHARGED	
1.004	S06	15 Winter	100	+40%	30/15 Summer				49.907	0.117	0.000	1.72		26.4	SURCHARGED	
3.000	S07	15 Winter	100	+40%					50.052	-0.048	0.000	0.54		9.6	OK	
3.001	S08	60 Winter	100	+40%	100/15 Summer				49.298	0.198	0.000	0.73		5.2	SURCHARGED	
1.005	S09	60 Winter	100	+40%	100/15 Summer				49.291	0.766	0.000	0.25		33.3	SURCHARGED	

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Micro Drainage		

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Surcharged Flooded			Pipe		Status
									Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	
1.006	TANK	60 Winter	100	+40%	30/15 Summer				49.286	1.661	0.000	0.20	6.1	SURCHARGED
1.007	FLOW CONTROL	60 Winter	100	+40%	1/15 Summer				49.304	1.779	0.000	0.50	5.9	SURCHARGED

PN	US/MH Name	Level Exceeded
1.006	TANK	
1.007	FLOW CONTROL	

Appendix C – United Utilities Correspondence

Eleanor Dale

From: O'Brien, Neil <Neil.O'Brien@uuplc.co.uk>
Sent: 12 December 2019 14:11
To: Wastewater Developer Services; Eleanor Dale
Subject: REPEAT 1: Wastewater Pre-Development Application - 3 X Sites Manchester - 4200029171

Eleanor,

The Marshall Street site does indeed seem to be a site with buildings and there can be classed as a brownfield site. The Thompson Street site seems to be mainly an undrained car park. However, if you can provide a water bill showing that the car park is paying surface water charges then the car park can be viewed as 'brownfield'.

The picture below would indicate that the building on the Goulden Street site has been demolished.



From: Wastewater Developer Services
Sent: 09 December 2019 08:53
To: 'Eleanor Dale' <edale@scotthughesdesign.co.uk>
Subject: FW: Wastewater Pre-Development Application - 3 X Sites Manchester - 4200029171

Good Morning

Your enquiry has been logged and sent to an engineer to respond your reference is 4200029171. Our service Level agreement is to respond to you within 15 working days.

Many thanks



Sharon Hitch
Developer Services Assistant
Developer Services & Metering
Customer Services
T: 01925 679493
unitedutilities.com

If you feel you have received a good service from myself, please can you take two minutes to fill in the survey below. This will be much appreciated



Visit: <https://unitedutilities.thewowawards.co.uk/nominate>

From: Eleanor Dale [<mailto:edale@scotthughesdesign.co.uk>]
Sent: 09 December 2019 08:14
To: O'Brien, Neil ; Wastewater Developer Services
Subject: RE: Wastewater Pre-Development Application - 3 X Sites Manchester - 4200029171

Neil,

None of the sites have been demolished. They all still have buildings/car parks on them and are all still in use. Therefore we are proposing to adhere to the 50% reduction in runoff rates as agreed last year with UU. Could you please confirm this is acceptable?

Thanks,

Eleanor

Eleanor Dale

BSc (Hons), MSc

Civil Engineer

www.scotthughesdesign.co.uk

t 0161 605 0831 Ext. 224

From: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Sent: 06 December 2019 15:00

To: Eleanor Dale <edale@scotthughesdesign.co.uk>; Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Subject: RE: Wastewater Pre-Development Application - 3 X Sites Manchester - 4200029171

Eleanor,

UU consider sites that have demolished for over 12 months to be 'greenfield' and look to impose a greenfield run-off rate, which for a site of this size is 6l/s



Neil O'Brien

Wastewater rPre-Development Engineer
Great Manchester Area
Developer Services & Metering
Customer Services
T: 01925 67410
unitedutilities.com

UNISON- Health and Safety Rep

From: Eleanor Dale [<mailto:edale@scotthughesdesign.co.uk>]

Sent: 26 November 2019 09:53

To: O'Brien, Neil ; Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Cc: Edwards, Stuart <Stuart.Edwards@uuplc.co.uk>

Subject: RE: Wastewater Pre-Development Application - 3 X Sites Manchester - 4200029171

Neil,

We received a response for the pre-development enquires last year, as per the attached, stating that Manchester's Policy of a 50% reduction in existing runoff rates and discharge into the combined sewer is applicable to all sites. This was referenced in the completed forms sent with this enquiry.

These are all fully impermeable brownfield sites. The revised pre-development enquiries have only been sent as they were 12 months old in July of this year. The site has already gone in for planning last year and there are just tweaks to the layout hence the revised application.

Can you please justify why you have now halved the allowable discharge rates? As far as I am aware there is no **written** policy change that would justify this.

Regards,

Eleanor

Eleanor Dale

BSc (Hons), MSc

Civil Engineer

www.scotthughesdesign.co.uk

t 0161 605 0831 Ext. 224

From: Wastewater Developer Services

Sent: 26 November 2019 09:40

To: Eleanor Dale ; Wastewater Developer Services

Subject: RE: Wastewater Pre-Development Application - 3 X Sites Manchester - 4200029171

Dear Customer

We have carried out an assessment of your application which is based on the information provided; this pre development advice will be valid for 12 months

Foul will be allowed to drain to the public combined sewer network at an unrestricted rate. The connection(s) to the public sewer can be at a point(s) convenient to yourself

United Utilities would like to see this development drained in accordance with **the hierarchy of drainage options in the National Planning Practice Guidance for surface water which are below.**

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

In the event of surface water draining to the combined public sewer, the pass forward flow rate to the public sewer must be restricted to 6 l/s.

If you require any further guidance please follow <http://www.unitedutilities.com/builders-developers.aspx>

If you need a make further enquiry relating to this matter please send your enquiry to WastewaterDeveloperServices@uuplc.co.uk Please quote your DEXXXX/42XXXXXXX/GEXXXX reference number

Please Note:- enquiries sent to any other United Utilities e-mail address will be deleted.

Connection Application

Although we may discuss and agree discharge points & rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below

<http://www.unitedutilities.com/connecting-public-sewer.aspx>

Please be aware that on site drainage must be designed in accordance with Building Regulations, National Planning Policy, Planning Conditions and local flood authority guidelines, we would recommend that you liaise and make suitable agreements with the relevant statutory bodies.

Neil O'Brien

Developer Engineer
Developer Services & Metering
Customer Services
United Utilities
01925 679410
unitedutilities.com

UNISON- Health and Safety Rep

From: Eleanor Dale [<mailto:edale@scotthughesdesign.co.uk>]

Sent: 14 November 2019 12:21

To: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Subject: Wastewater Pre-Development Application - 3 X Sites Manchester

Good Afternoon,

Please find three pre-development enquiries for adjoining sites in northern Manchester off Goulden Street, Marshall Street and Bendix Street respectively.

Kind regards,

Eleanor

Eleanor Dale

BSc (Hons), MSc

Civil Engineer

www.scotthughesdesign.co.uk

t 0161 605 0831 Ext. 224



Manchester & Leeds Offices

Structural – Civil - & Sustainability Design Consultancy

BREEAM - HQM - LEED

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64 Jersey St Manchester M4 6JW

EMGateway3.uuplc.co.uk made the following annotations

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