



GOULDEN STREET, MANCHESTER

REPORT TO DISCHARGE DRAINAGE
RELATED PLANNING CONDITION

OCTOBER 2023

RIDGE

Document Control Sheet

Project No: 5015327

Project Title: Goulden Street, Manchester

Report Title: Report to Discharge Proposed Drainage Related Planning Condition

Report Reference: 5015327-RDG-00-ZZ-RP-C-0001

Issue: 4

Status: Final

Date: 13.12.23

Record of Issue

Issue	Status	Author	Approved	Date
1	Final	Eleanor Dale	Kris Clark	03.11.21
2	Final	Eleanor Dale-Maude	Kris Clark	14.06.23
3	Final	John Speers	Kris Clark	05.10.23
4	Final	John Speers	Kris Clark	13.12.23



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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 and also the additional planning comments.

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 permeable paving has 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.

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
		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
Remedial actions		Repair/rehabilitate inlets, outlet, overflows and vents	As required
		Inspect/check all inlets, outlets, vents and overflows	Annually

- 3.2 Detailed below is each of the additional planning comments text in Blue with the Ridge response in Black beneath.

Hydraulic calculation of the proposed drainage system - Must include all parameters. The developer needs to supply the manhole schedule included within the hydraulic modelling for review.

The updated hydraulic modelling results, which include the manhole schedule are attached in Appendix B.

Construction details of flow control and SuDS elements. – Hydro-brake construction details need to be submitted (Spec: SHE-0101-6000-2000-600).

A typical detail of the hydrobrake chamber is attached within the drainage details drawing 5015327-RDG-00-XX-DR-C-0102, located in Appendix A. The hydro international specific construction detail has also been added to Appendix A.

SuDS features should be appropriately positioned away from proposed buildings. The developer will need to confirm the current attenuation tank easements from proposed dwellings and existing highway infrastructure. Good practice is typically 2.5m easement from existing boundaries, 5m from any dwellings, to enable future maintenance access.

As previously stated, the building covers the majority of the site and the existing chimney is to be retained in the only external area. As such, there is limited scope to meet the good practice requirements outlined above. Unfortunately, the proposed attenuation tank is located in the only area of the site where it is feasible to place the tank.

The surface water drainage layout must be amended to clearly demonstrate the point of outfall onto United Utilities sewer and include an invert level.

The updated proposed drainage GA drawing 5015327-RDG-00-XX-DR-C-0101, which shows the UU sewers within the highways is attached in Appendix A.

4.0 Additional Drainage Related Planning Comments and Ridge Response

- 4.1 Detailed below is each of the planning comments in Blue with the Ridge response in Black beneath.

Construction details of flow control and SuDS elements. – Hydro-brake construction details need to be submitted (Spec: SHE-0101-6000-2000-600).

The 'vortex control chamber' detail includes a 150mm overflow during the event of an emergency. To ensure discharge is always limited to the maximum rate (6l/s), can the developer please include

top water level for each return period within a specific section. Discharge rates must always be limited to a maximum of 6l/s.

The hydrobrake construction details are indicated on Ridge drawing 5015327-RDG-00-XX-DR-C-0107, which is attached in Appendix A. As can be seen the water levels within the hydrobrake chamber for the; 1 year, 30 year and 100 year + 40% CC have all been included on the drawing. The water levels indicate that the high level overflow pipeline will only be utilised during events in exceedance of the 1 in 100 year +40% climate change event. Therefore, the surface water discharge rate will be restricted to a maximum discharge rate of 6.0 L/s for all rainfall events up to and including the 1 in 100 year +40% climate change event.

SuDS features should be appropriately positioned away from proposed buildings. The developer will need to confirm the current attenuation tank easements from proposed dwellings and existing highway infrastructure. Good practice is typically 2.5m easement from existing boundaries, 5m from any dwellings, to enable future maintenance access.

In the instance this location is the only available option, and good practice cannot be achieved. The developer will need to provide a plan demonstrating proposed easements from buildings / structures and boundaries. The developer must also provide a site-specific cross-section through the attenuation tank including foundation details. This should include permeable paving to review how the components interlink.

In the instance of tank failure, or full replacement. The appointed private maintenance company will need to be made aware of the potential future risk, when adopting this structure (attenuation tank).

The proposed attenuation tank has been relocated to ensure it is further away from the proposed building. An additional chamber has also been added upstream of the tank to allow for easier access for maintenance of the tank. The Proposed Drainage GA drawing 5015327-RDG-00-XX-DR-C-0101 and all other relevant drawings have been updated to reflect this change and the updated drawings are all attached in Appendix A.

The surface water drainage layout must be amended to clearly demonstrate the point of outfall onto United Utilities sewer and include an invert level. No invert level has been provided. The developer will need to amend the submitted drawing to reflect existing invert level.

The updated drawings attached in Appendix A indicate the invert level of the outfall manhole C02. However, it should be noted that the invert level is to be confirmed on site prior to the commencement of any works.

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
5015327-RDG-00-XX-DR-C-0106	Attenuation Tank Sections
5015327-RDG-00-XX-DR-C-0107	Flow Control Chamber Details

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 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.
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

- 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 RDG), WHERE THE MOISTURE CONTENT OF THE MATERIAL PROHIBITS COMPLIANCE WITH THE ABOVE 6F1 OR SIMILAR IMPORTED MATERIAL SHALL BE USED.
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 BS EN 124 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 BS EN 124 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.

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DRAWING NOTES:

CDM REGULATIONS 2015

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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
- PROPOSED PERMEABLE PAVING
- SITE BOUNDARY

P06	ATTENUATION TANK RELOCATED TO SUIT PLANNING COMMENTS	13.12.23	AP	JRS
P05	EXISTING UU SEWERS ADDED	05.10.23	AS	JRS
P04	GENERAL UPDATES	14.06.23	AS	EDM
P03	UPDATED TO SUIT COMMENTS	28.01.22	AS	ED
P02	PRELIMINARY ISSUE	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:

CERT PROPERTY

IN ASSOCIATION WITH:

PROJECT:
GOULDEN STREET

TITLE:
DRAINAGE GA

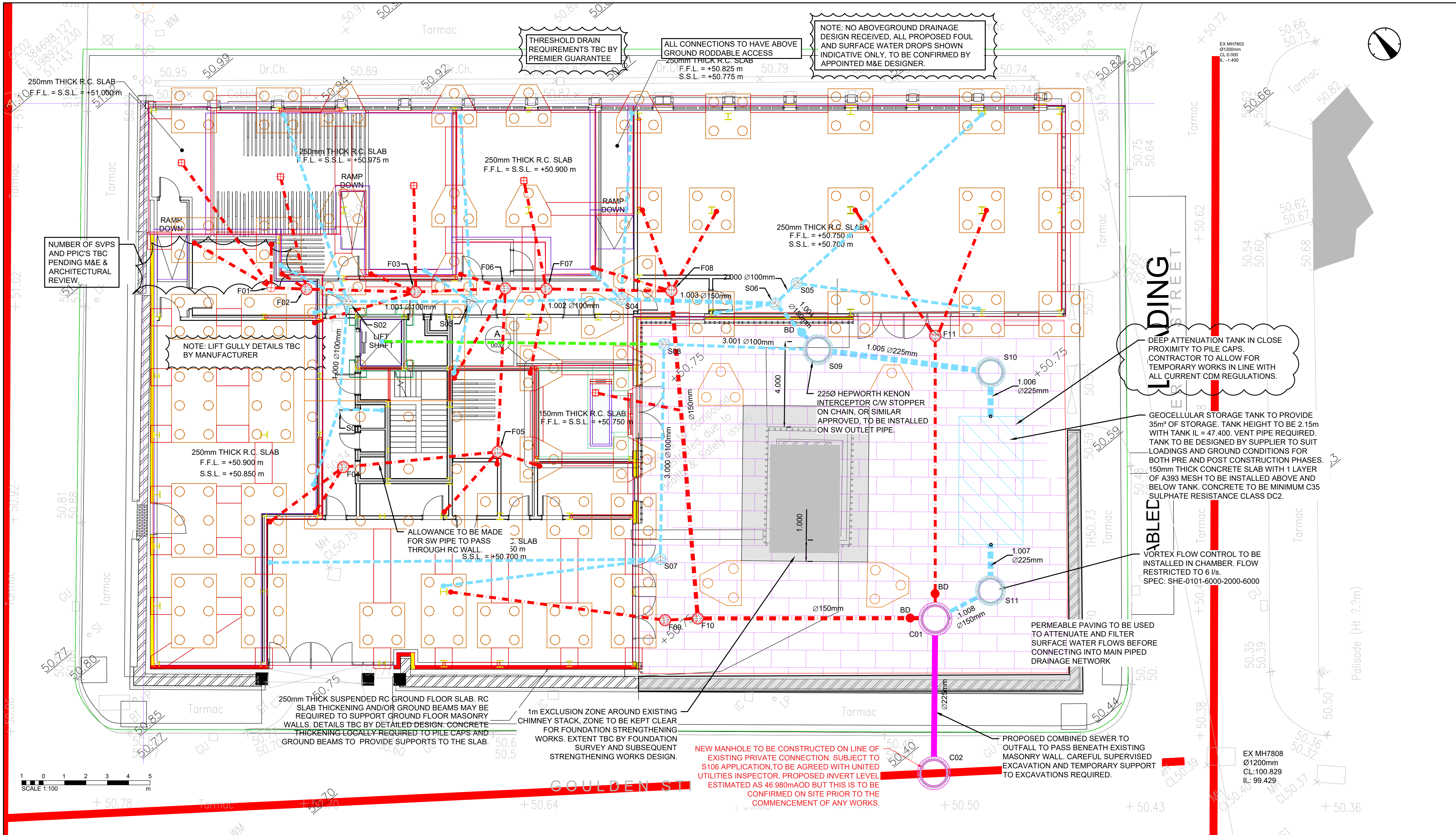
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AS	EDM	EDM	STATUS ISSUE:	09.07.21		

STATUS:
PRELIMINARY

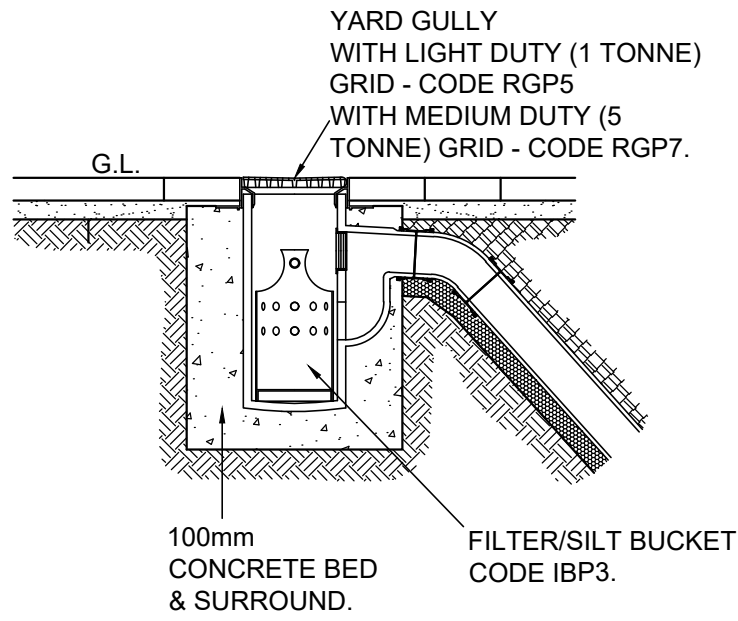
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SUITABILITY: SO - Initial Status or WIP

PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
5015327	RDG	XX	XX	DR	C	0101	P06



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.



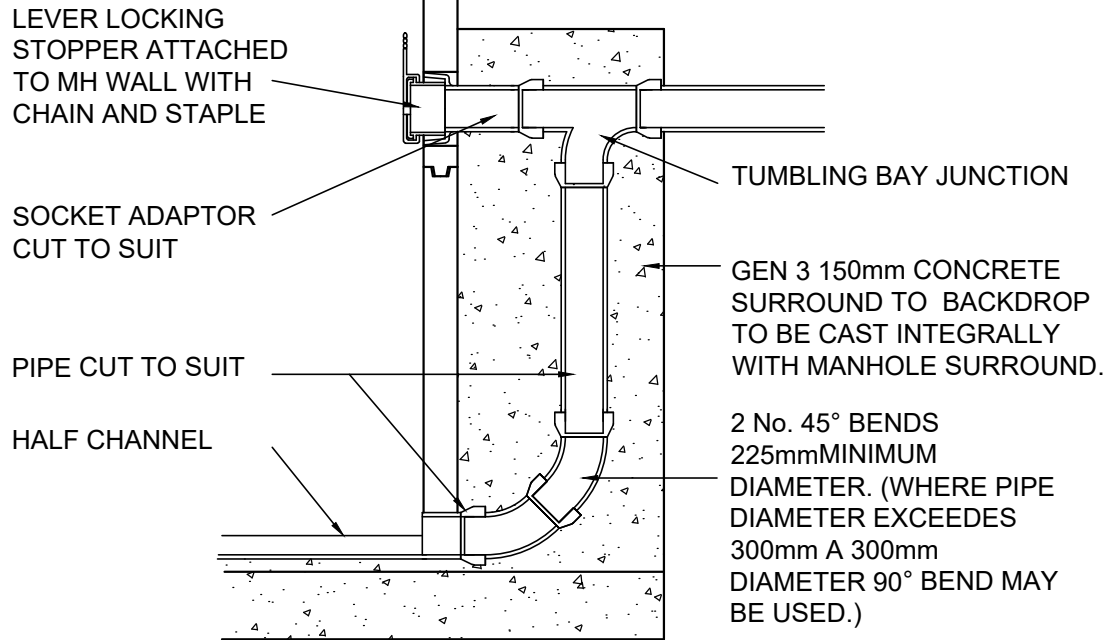
YARD GULLY

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

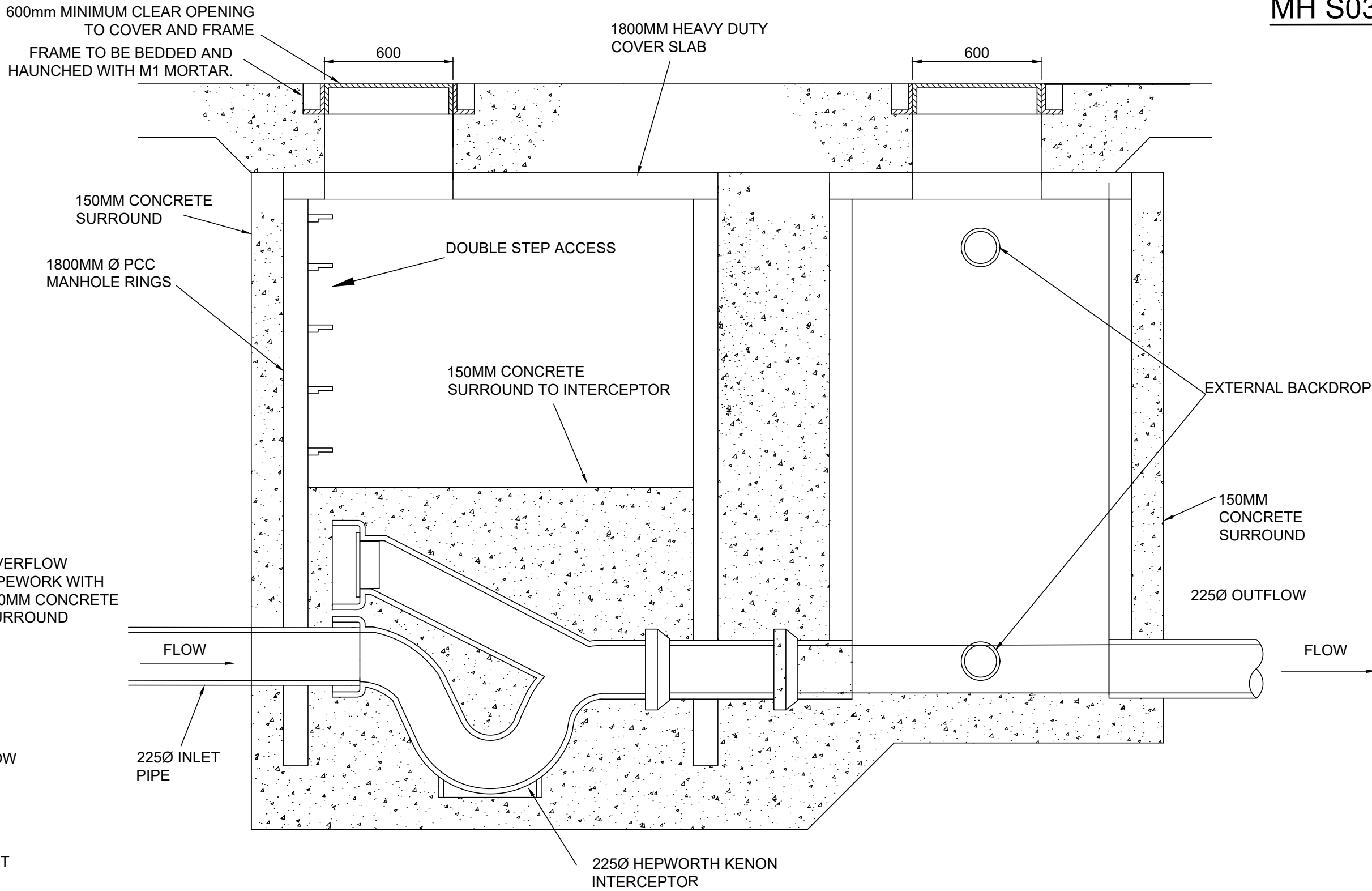
NOTES

- 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.

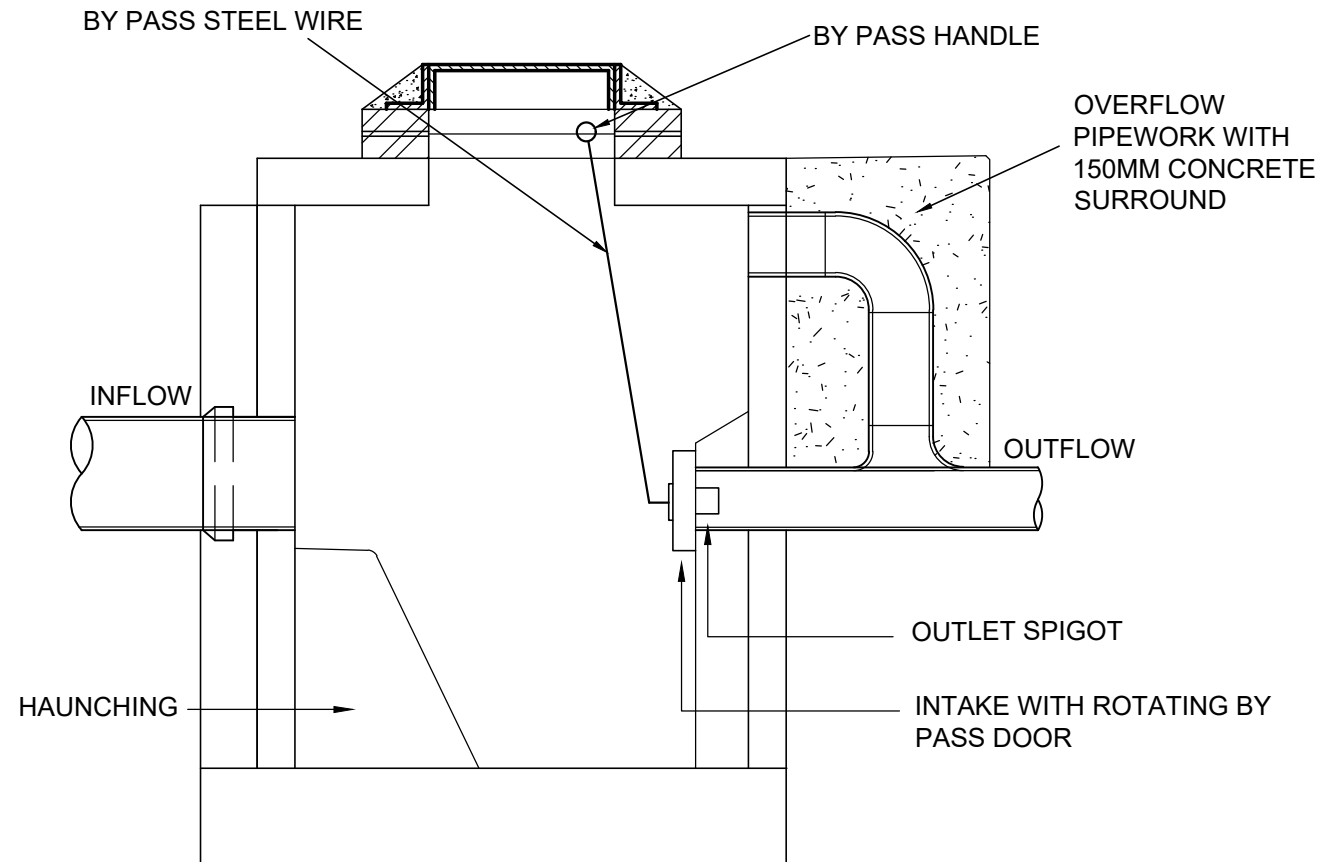
INVERT OF RODDING EYE TO BE NOT GREATER THAN 1.5m ABOVE TOP OF BENCHING. (UNLESS SPECIFIC MAN ACCESS REQUIREMENTS ARE PROVIDED.)



EXTERNAL VERTICAL BACKDROP

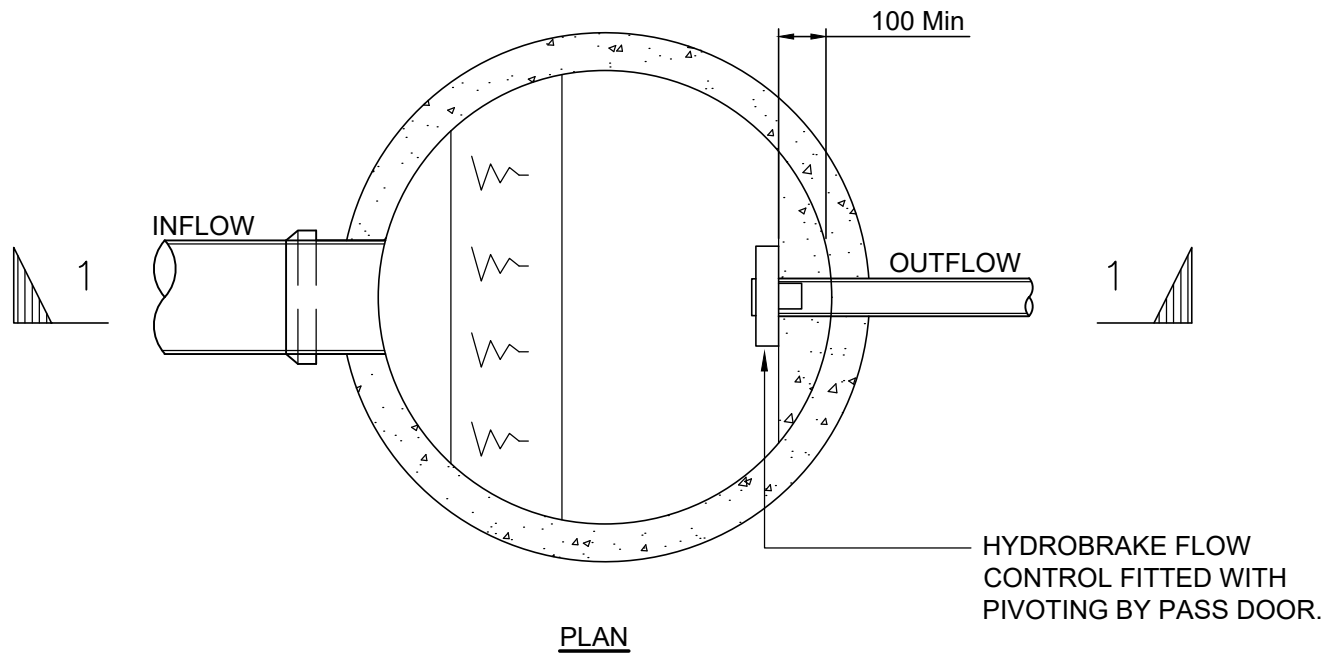


SECTION THROUGH TYPICAL INTERCEPTOR ARRANGEMENT

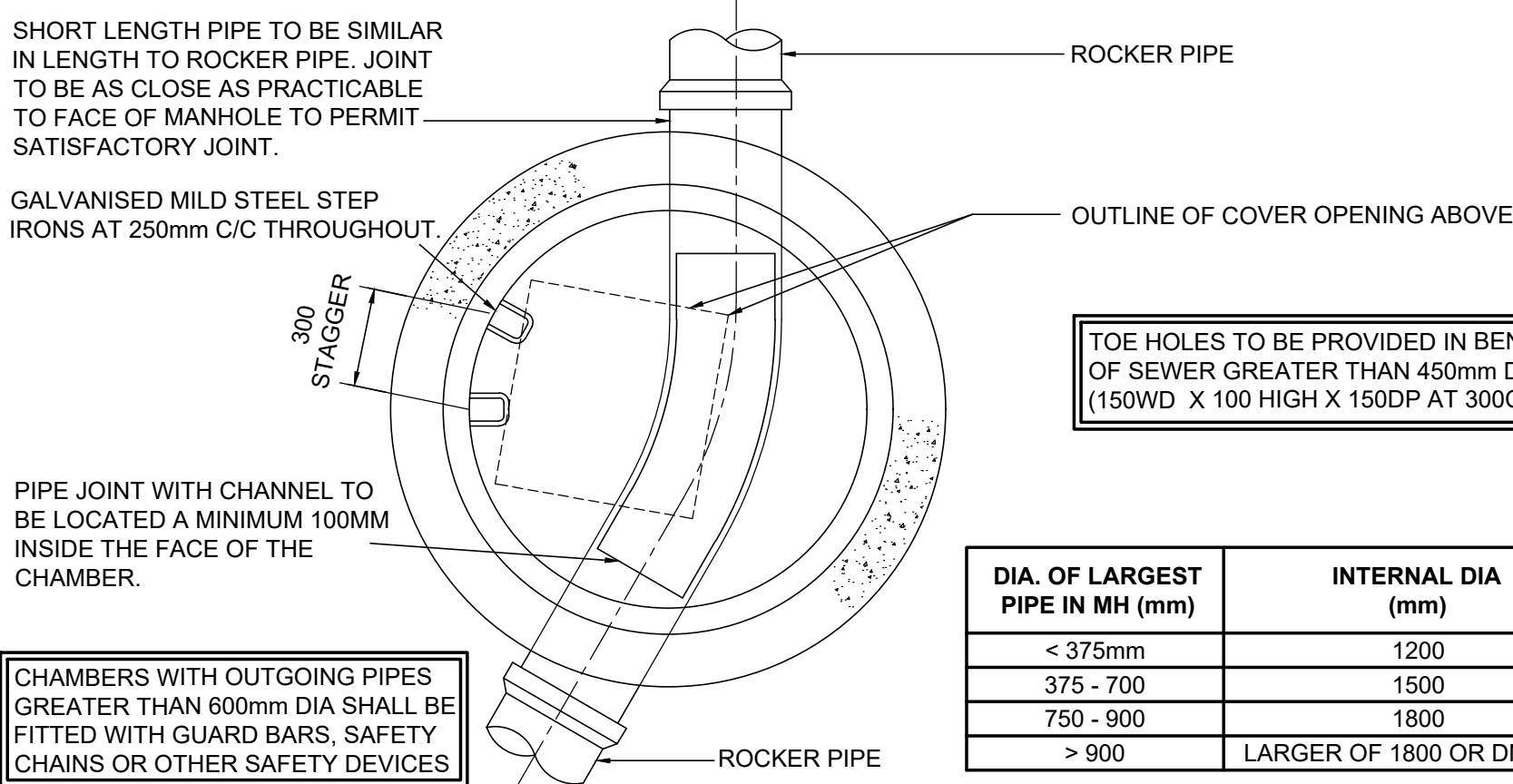
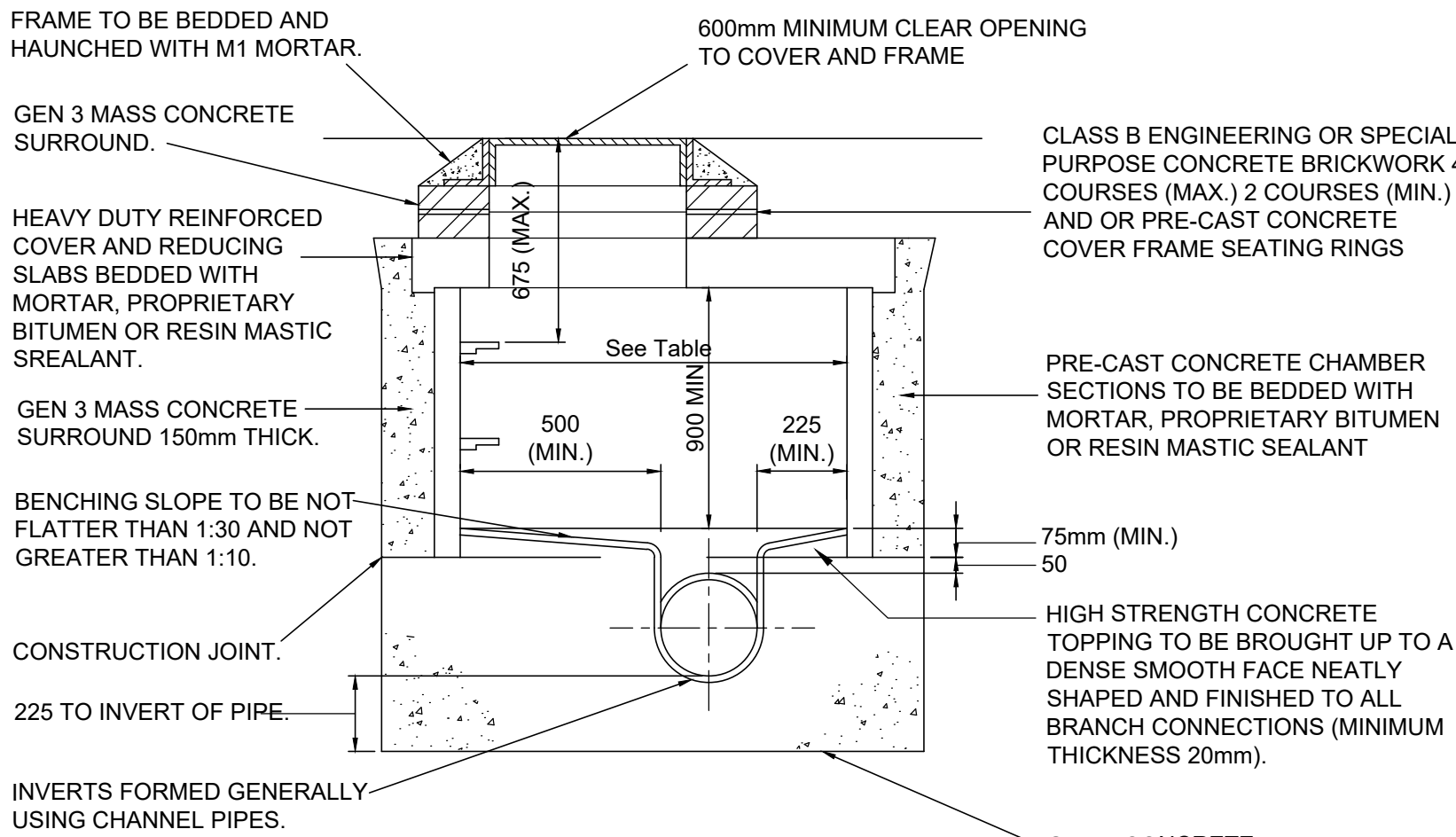


SECTION 1-1

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



VORTEX CONTROL CHAMBER



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

MH S03A

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P01	PRELIMINARY ISSUE	09.07.21	AS	ED
REV	DESCRIPTION	DATE	BY	CHKD

ORIGINATOR:

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TEL: 0161 833 9579
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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)		
	Graded Aggregate (mm)	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.

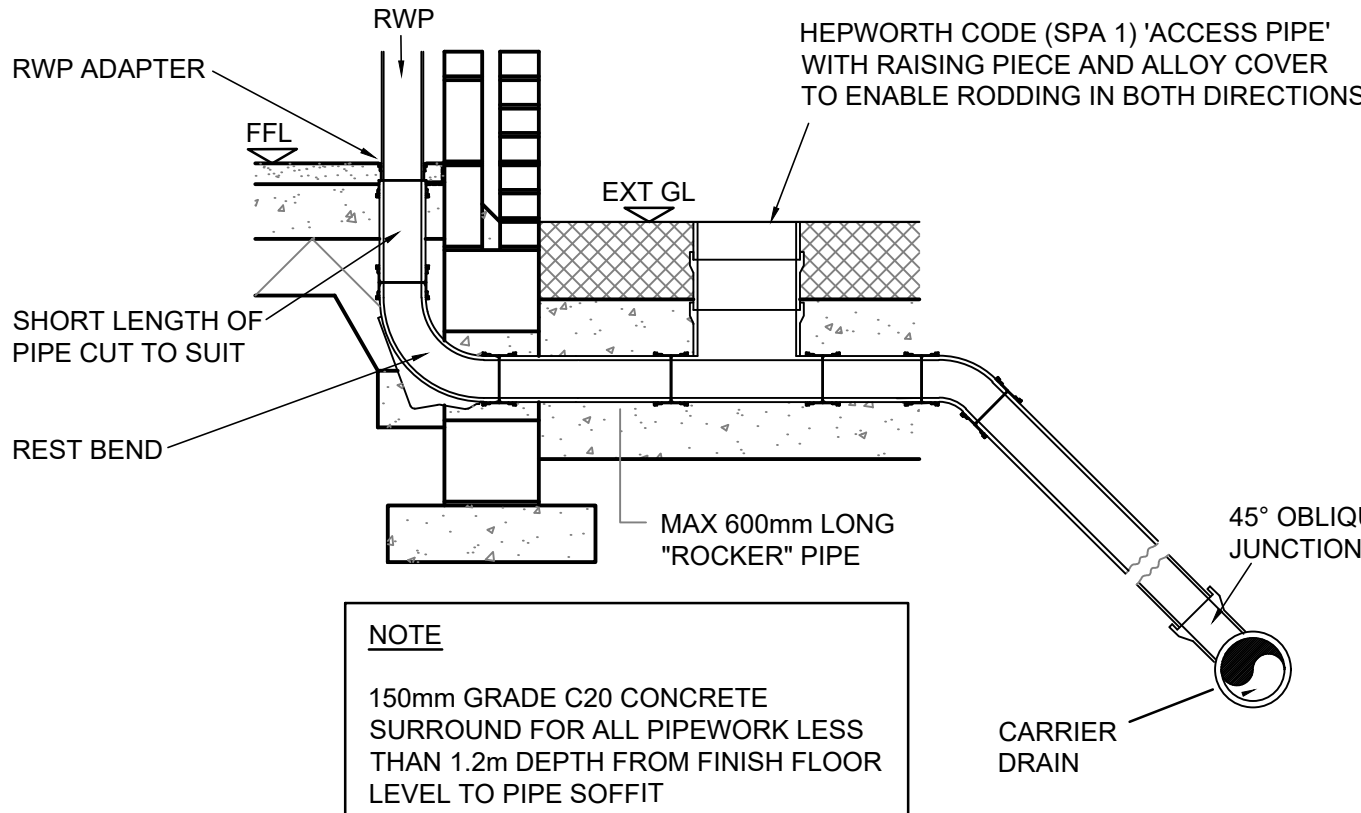
SELECTED AS DUG MATERIAL. REFER TO STANDARD NOTES DRAWING FOR CLASSIFICATION OF 'AS DUG' MATERIAL

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



RWP CONNECTION DETAIL

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 & SLAB REQUIREMENTS TO SUIT TANK MANUFACTURER'S FINAL DESIGN

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

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.

150mm THICK CONCRETE SLAB WITH 1 LAYER A393 MESH. CONCRETE TO BE MIN C35 WITH SULPHATE RESISTANCE CLASS DC2. SLAB TO EXTEND 500mm BEYOND TANK ON ALL SIDES. PROTECTION SLAB REQUIREMENT TO MANUFACTURERS DESIGN.

ESS PLUVIAL CUBE MODULE TO BE WRAPPED WITH TUFLEX IMPERMEABLE GEOMEMBRANE WITH A mm LAP HEAT WELDED JOINTS. (AS SUPPLIED BY ALDERBURGH LIMITED).

ESS PLUVIAL CUBE MODULE (500 mm LONG x 500 mm WIDE X 1075 mm HIGH). TO BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S DETAILS AND SPECIFICATION.

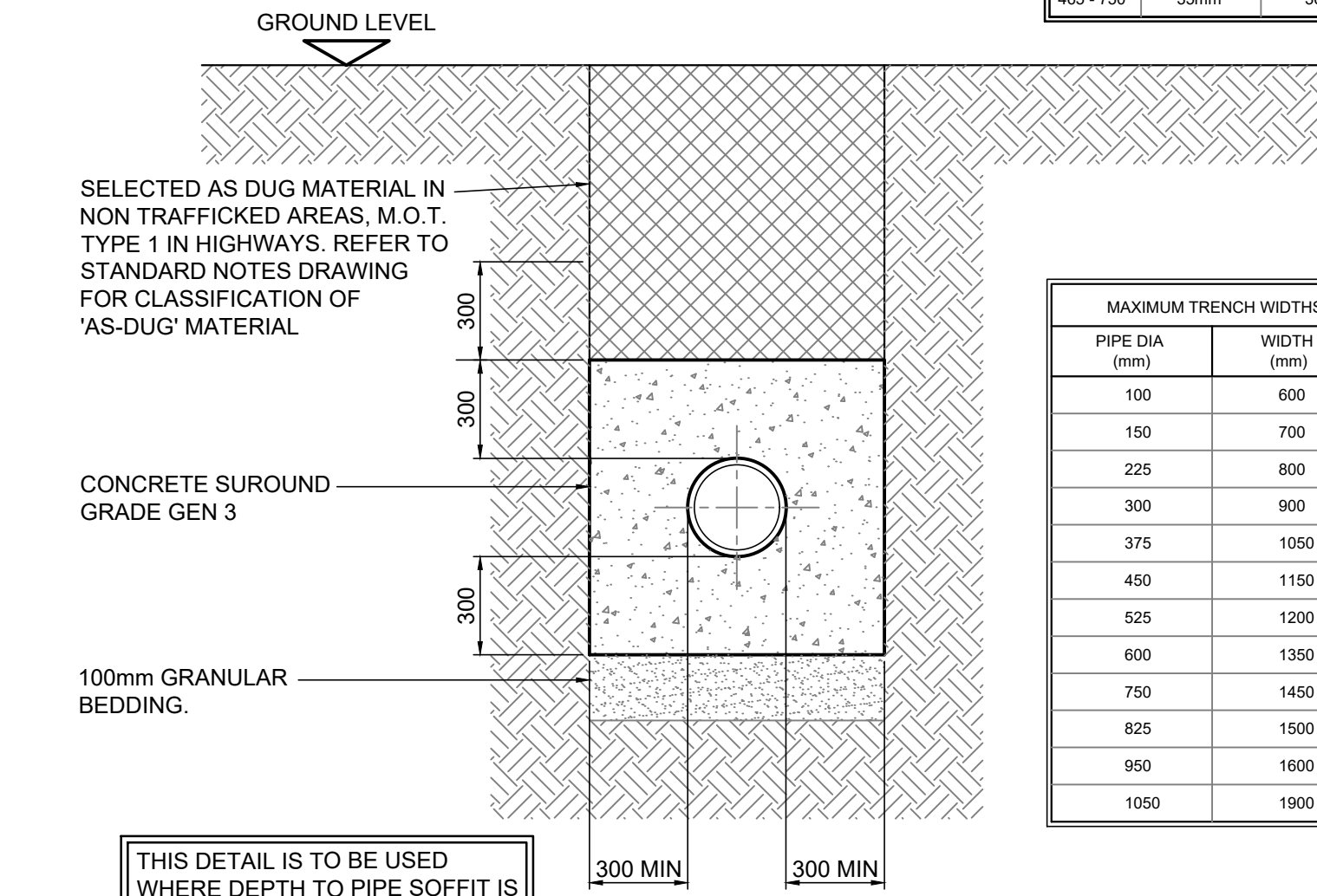
PIPES CONNECTED TO THE ATTENUATION TANK USING HEAVY DUTY PIPE COLLARS (HEAT WELDED TO TUFLEX IMPERMEABLE GEOMEMBRANE) WITH STAINLESS STEEL STRANGLE BANDS FOR FASTENING AROUND THE PIPE (AS SUPPLIED BY ALDERBURGH LIMITED).

150mm THICK CONCRETE SLAB WITH 1 LAYER A393 MESH. CONCRETE TO BE MIN C35 WITH SULPHATE RESISTANCE CLASS DC2. SLAB TO EXTEND 500mm BEYOND TANK ON ALL SIDES. BASE SLAB REQUIREMENT TO MANUFACTURERS DESIGN.

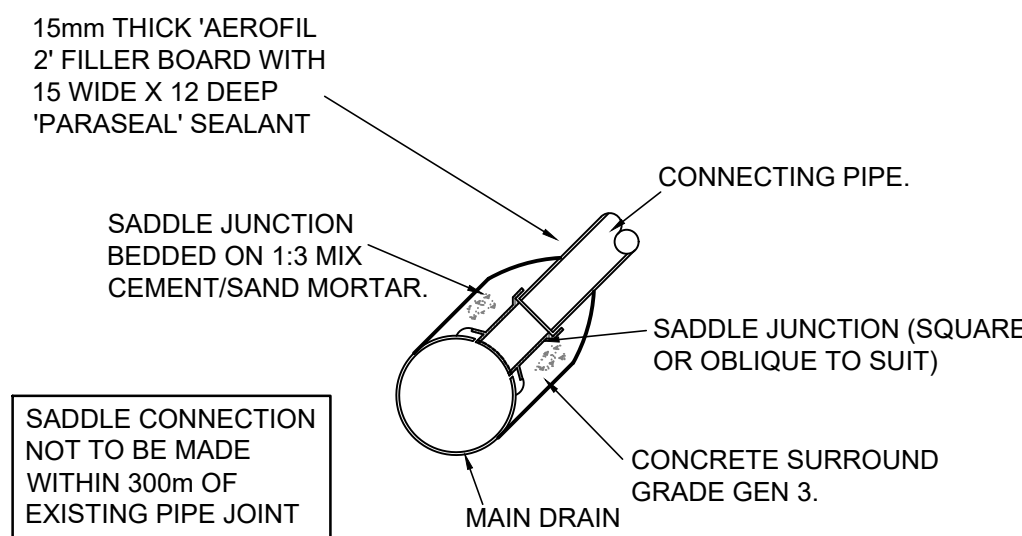
A 3 - 5% CBR HAS BEEN ASSUMED AT SUB-BASE LEVEL SHOULD THE CBR BE TESTED AND FOUND TO BE LESS THAN 3% THEN THE ENGINEER SHALL BE NOTIFIED. ALSO, ANY SOFT SPOTS FOUND AT SUB-BASE LEVEL SHALL BE REPORTED TO THE ENGINEER

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

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

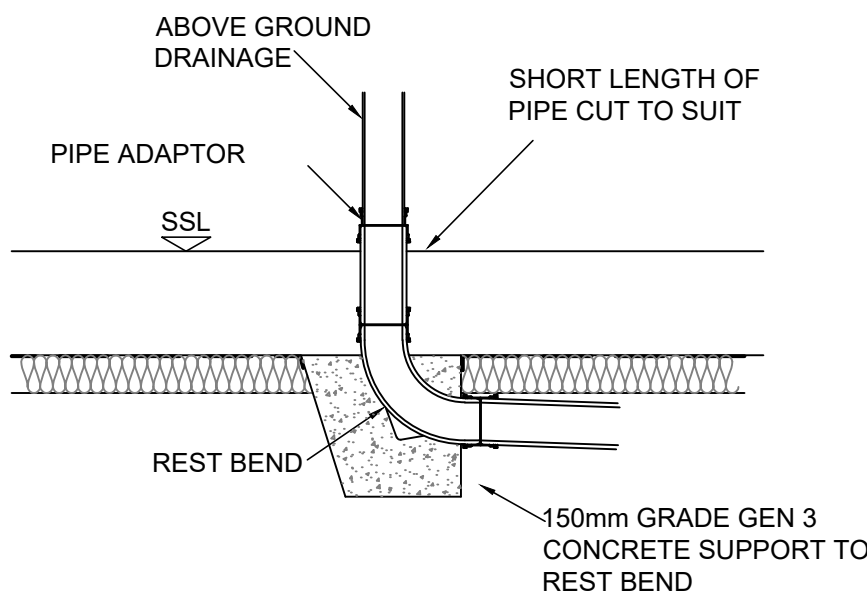


CLASS 'Z' PIPE BEDDING



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.)



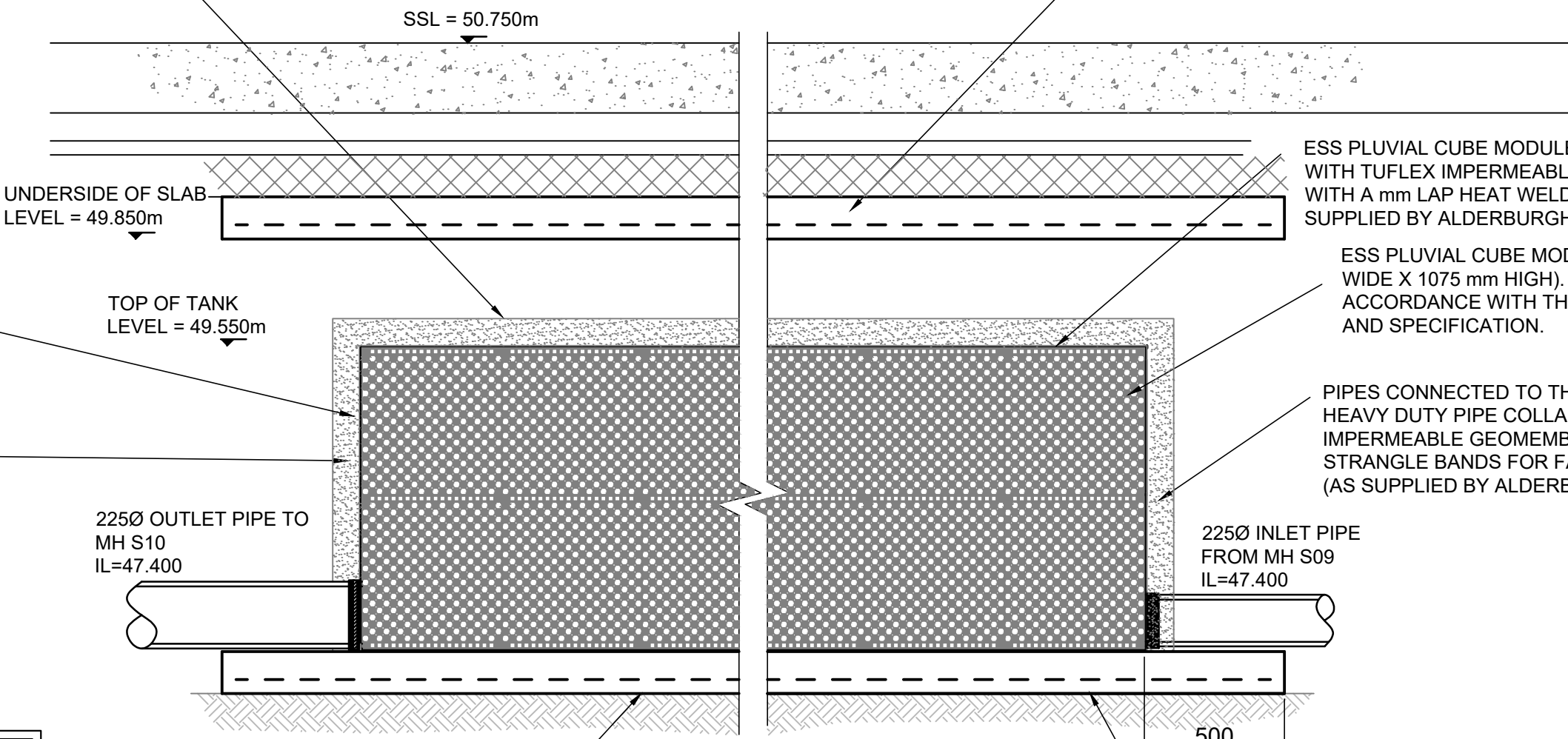
TYPICAL DETAIL OF CONNECTION OF INTERNAL DRAINAGE TO BELOW GROUND DRAINAGE

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).

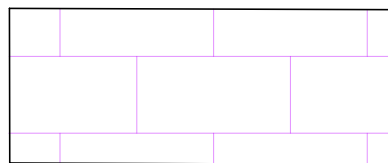
WHERE SURCHARGING IN THE TEMPORARY CASE IS LIKELY TO OCCUR TEMPORARY WORKS DESIGNER MAY OPT TO SUBSTITUTE BACKFILL MATERIAL FOR 300mm THK ST1 LEAN MIX CONCRETE.

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)



PERMEABLE BLOCK PAVING



80mm THK PERMEABLE BLOCKS (SPECIFICATION TBC BY LANDSCAPE ARCHITECT)

50mm 6-2mm COARSE GRIT LAYING COURSE BS 7533-13:2009

250mm CLEAN 4-20mm COURSE GRADED AGGREGATE TO BS13242:2002, SUBJECT TO CBR OF 5% OR GREATER.

PERMEABLE GEOTEXTILE TO BS7533-13:2009

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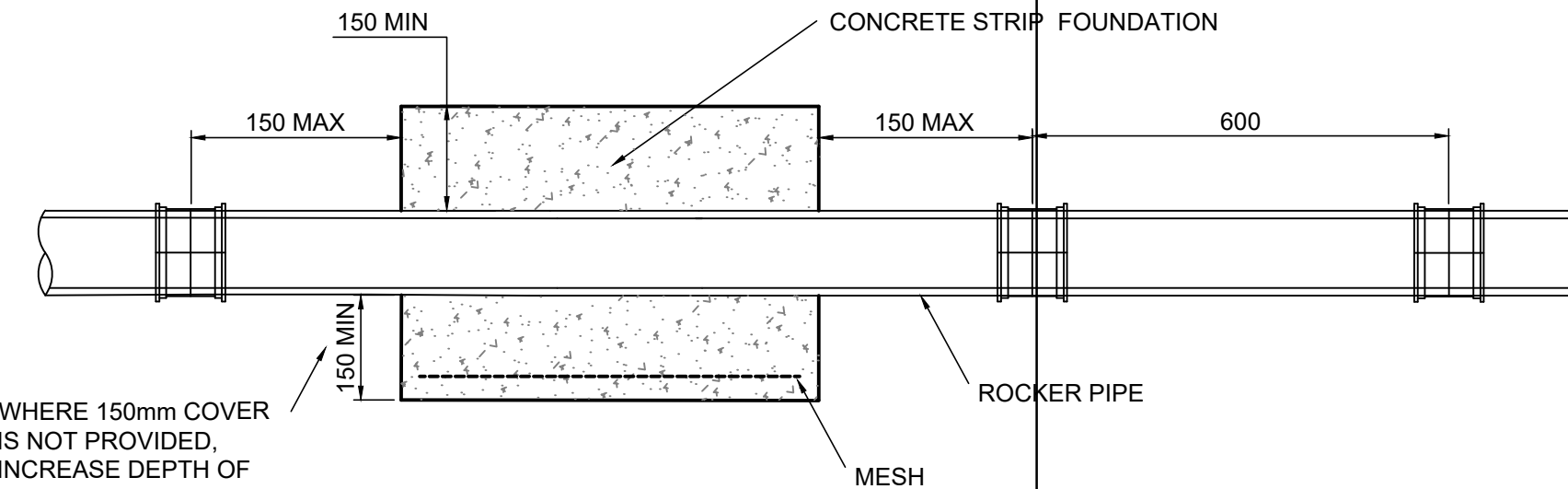
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TYPICAL FOUNDATION PENETRATION DETAIL WITH INSUFFICIENT TOP COVER

1:10



TYPICAL FOUNDATION PENETRATION DETAIL

1:10

P03	PERMEABLE PAVING ADDED	28.01.22	AS	ED
P02	UPDATED TANK INFORMATION	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 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:	ZONE:	ORIG:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
5015327	RDG	XX	XX	DR	C	0101	P03

SURFACE WATER 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	1050	Type-B	From S08, IL=48.300, 100mmØ From S06, IL=49.600, 150mmØ	To S10, IL=48.300, 225mmØ	600x600 D400	1No BACKDROP
S10	E:384720.017 N:398883.890	50.750	3.250	1050	Type-B	From S09, IL=47.500, 225mmØ	To ATT(1), IL=47.500, 225mmØ	600x600 D400	
S11	E:384713.490 N:398876.017	50.750	3.375	1200	Type-B	From ATT(1), IL=47.375, 225mmØ	To C01, IL=47.375, 150mmØ	600x600 D400	FLOW CONTROL

FOUL WATER 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:384719.109 N:398886.844	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	

COMBINED WATER 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
C01	E:384710.656 N:398876.650	50.750	3.410	1050	Type-B	From F10, IL=49.600, 150mmØ From F11, IL=49.810, 100mmØ From S11, IL=47.340, 150mmØ	To C02, IL=47.340, 225mmØ	600x600 D400	2No. Backdrops
C02	E:384705.997 N:398871.139	50.456 (TBC)	3.470	1050	Type-B	From C01, IL=46.980 (TBC), 225mmØ		600x600 D400	COVER AND INVERT LEVELS APPROX. ONLY. TO BE CONFIRMED ON SITE.

HOLD
OUTFALL LOCATION
& LEVELS TBC

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P03	UPDATED TO SUIT LATEST DRAINAGE REVISIONS	13.12.23	AP	JRS
P02	C02 INVERT LEVEL UPDATED	28.01.22	AS	ED
P01	PRELIMINARY ISSUE	03.11.21	AS	ED
REV	DESCRIPTION	DATE	BY	CHKD

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IN ASSOCIATION WITH:

PROJECT:

GOULDEN STREET

TITLE:

DRAINAGE
MANHOLE SCHEDULE

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

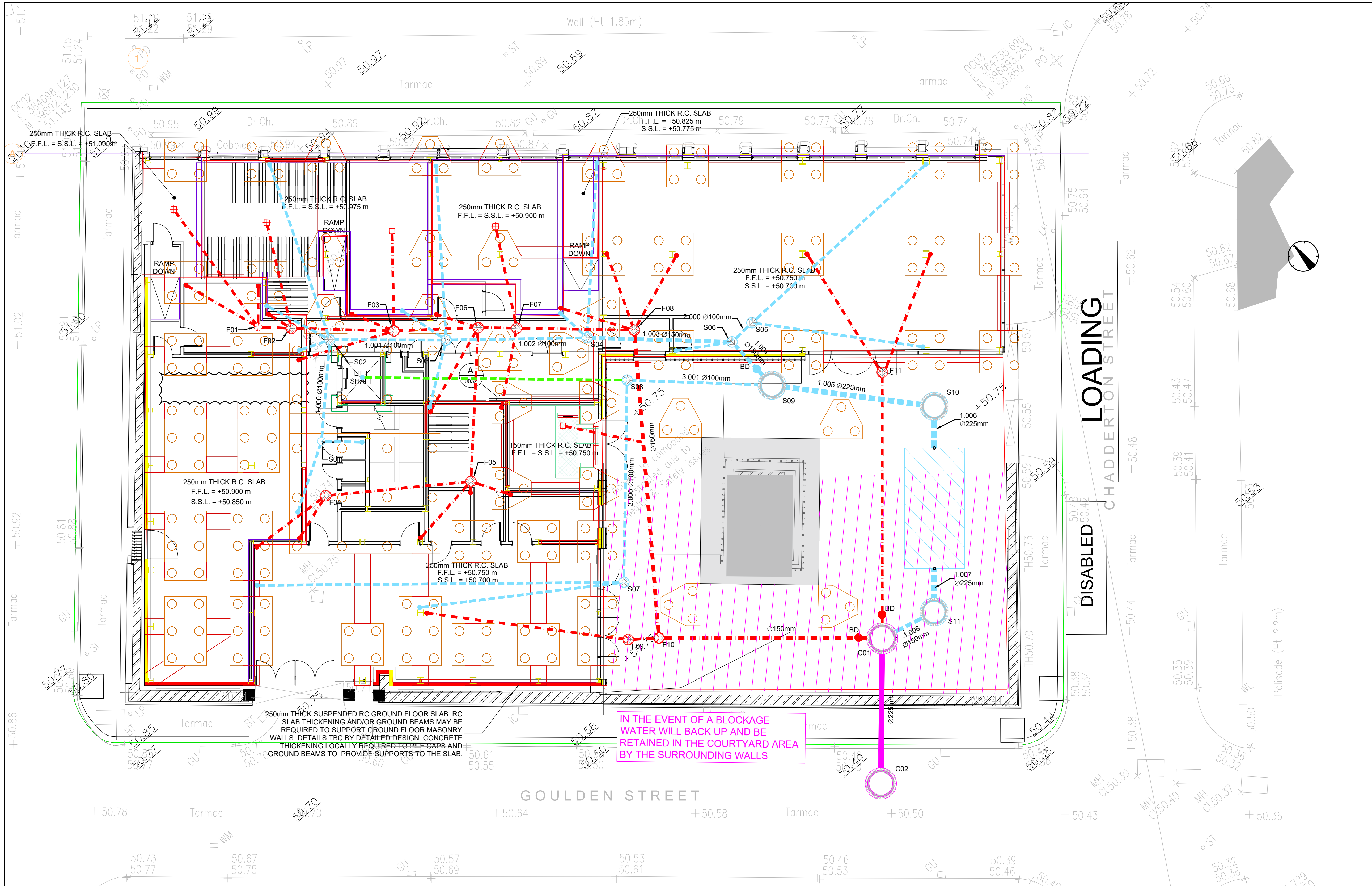
STATUS:

PRELIMINARY

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SUITABILITY: SO - Initial Status or WIP

PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
5015327	RDG	XX	XX	DR	C	0104	P03



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P01	PRELIMINARY ISSUE	03.11.21	AS	ED
REV	DESCRIPTION	DATE	BY	CHKD

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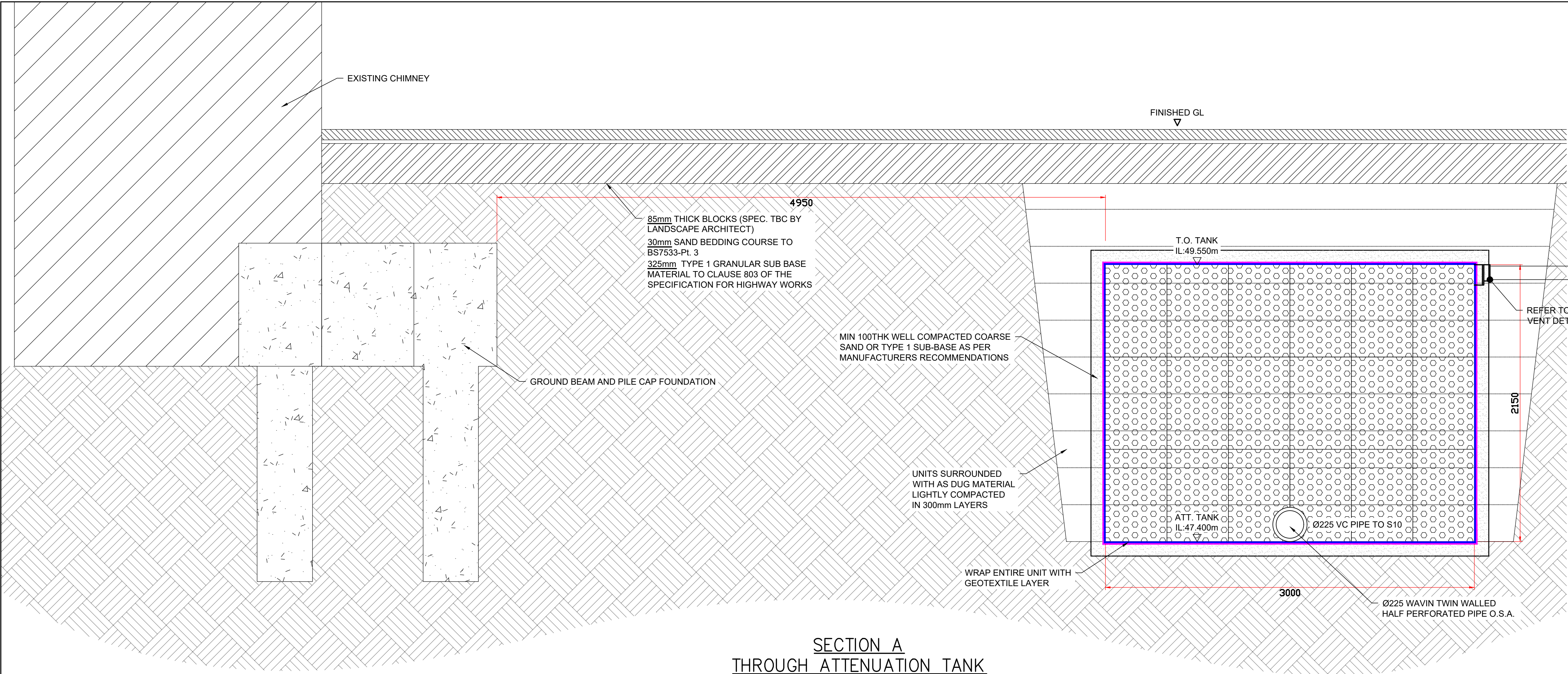
PROJECT:

GOULDEN STREET

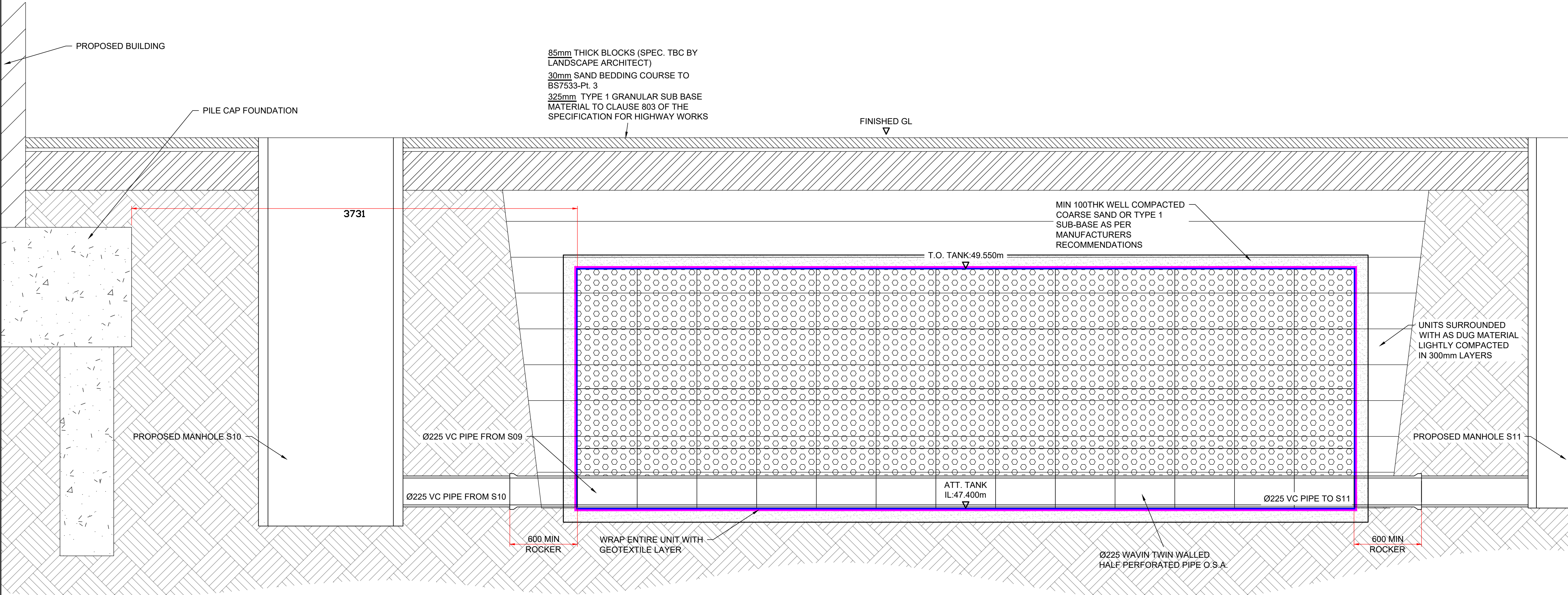
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FLOOD ROUTE PLAN

SUITABILITY:								S0 - Initial Status or WIP									
PROJECT:				ORG:		ZONE:		LEVEL:		TYPE:		ROLE:		NUMBER:		REV:	
5015327				RDG		XX		XX		DR		C		0105		P02	



SECTION A
THROUGH ATTENUATION TANK



SECTION B
THROUGH ATTENUATION TANK

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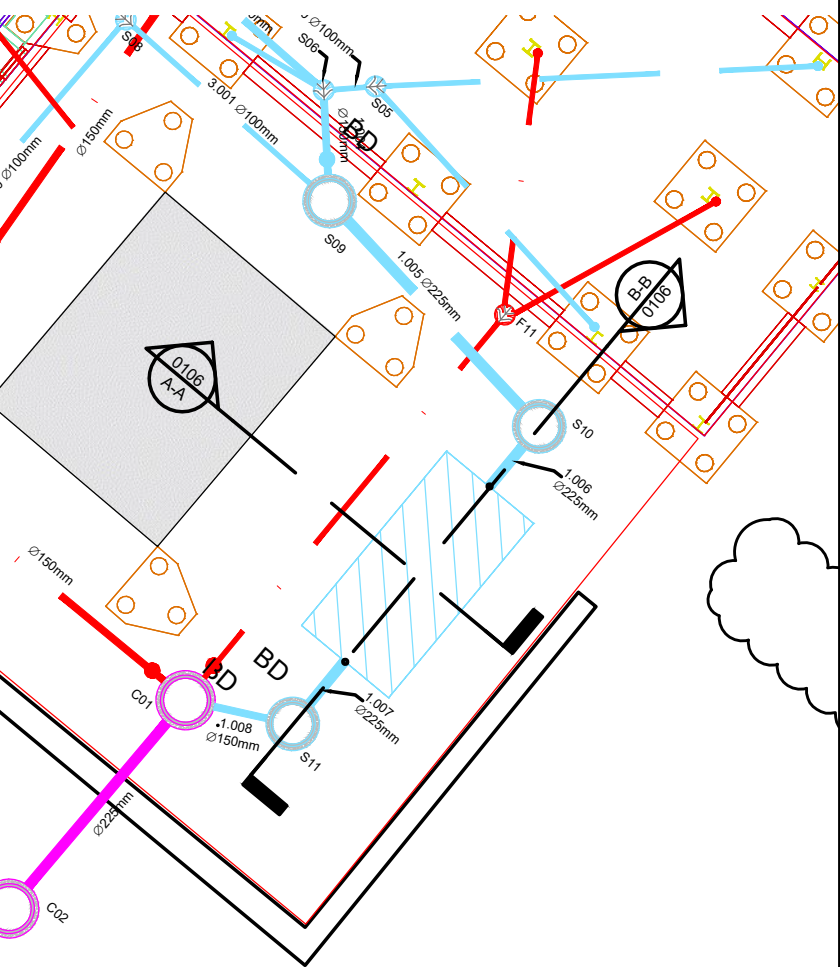
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P01	PRELIMINARY ISSUE	13.12.23	AP	JS
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IN ASSOCIATION WITH:

PROJECT:

GOULDEN STREET

TITLE:

ATTENUATION TANK SECTIONS

ENG/TECH:	CSE:	ICSE:	SCALE:		@	A1
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STATUS:		PRELIMINARY				
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SUITABILITY:		S2 - Issued for Information				
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5015327	RDG	XX	XX	DR	C	0106 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.

Ridge and Partners LLP		Page 1
The Cowyards Blenheim Park, Oxford Road Woodstock OX20 1QR	Full SW Calcs Goulden Street	
Date 13/12/2023	Designed by JRS	
File FULL SURFACE WATER DRAINAGE	Checked by KC	
Innovyze	Network 2020.1	

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	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.361	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.107	4-8	0.016

Total Area Contributing (ha) = 0.123

Total Pipe Volume (m³) = 1.009

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	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	
1.003	7.218	0.090	80.2	0.008	0.00	0.0	0.600	o	150	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	0.572	12.6	0.000	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
1.003	50.00	5.38	49.730	0.048	0.0	0.0	0.0	1.12	19.9	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	5.42	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	5.12	49.000	0.018	0.0	0.0	0.0	2.19	17.2	2.4

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Date 13/12/2023	Designed by JRS	
File FULL SURFACE WATER DRAINAGE	Checked by KC	
Innovyze	Network 2020.1	

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
1.005	8.146	0.799	10.2	0.036	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	2.065	0.100	20.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.007	2.159	0.025	86.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.008	2.903	0.035	82.9	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)
1.005	50.00	5.45	48.300	0.123	0.0	0.0	0.0	4.12	163.9	16.7
1.006	50.00	5.46	47.500	0.123	0.0	0.0	0.0	2.89	115.0	16.7
1.007	50.00	5.49	47.400	0.123	0.0	0.0	0.0	1.41	56.0	16.7
1.008	50.00	5.53	47.375	0.123	0.0	0.0	0.0	1.10	19.5	16.7

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Innovyze	Network 2020.1	

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S01	50.750	0.565	Open Manhole	300	1.000	50.185	100				
S02	50.750	0.645	Open Manhole	450	1.001	50.105	100	1.000	50.105	100	
S03	50.750	0.925	Open Manhole	450	1.002	49.825	100	1.001	49.825	100	
S04	50.750	1.020	Open Manhole	450	1.003	49.730	150	1.002	49.730	100	
S05	50.750	0.970	Open Manhole	450	2.000	49.780	100				
S06	50.750	1.110	Open Manhole	450	1.004	49.640	150	1.003	49.640	150	
								2.000	49.640	100	
S07	50.750	0.750	Open Manhole	450	3.000	50.000	100				
S08	50.750	1.750	Open Manhole	450	3.001	49.000	100	3.000	49.000	100	
S09	50.750	2.450	Open Manhole	1050	1.005	48.300	225	1.004	49.580	150	1205
								3.001	48.428	100	3
S10	50.750	3.250	Open Manhole	1050	1.006	47.500	225	1.005	47.501	225	1
TANK	50.750	3.350	Open Manhole	900	1.007	47.400	225	1.006	47.400	225	
S11	50.750	3.375	Open Manhole	1200	1.008	47.375	150	1.007	47.375	225	
C01	50.750	3.410	Open Manhole	1050		OUTFALL		1.008	47.340	150	

No coordinates have been specified, layout information cannot be produced.

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	100	S01	50.750	50.185	0.465	Open Manhole	300
1.001	o	100	S02	50.750	50.105	0.545	Open Manhole	450
1.002	o	100	S03	50.750	49.825	0.825	Open Manhole	450
1.003	o	150	S04	50.750	49.730	0.870	Open Manhole	450
2.000	o	100	S05	50.750	49.780	0.870	Open Manhole	450
1.004	o	150	S06	50.750	49.640	0.960	Open Manhole	450
3.000	o	100	S07	50.750	50.000	0.650	Open Manhole	450
3.001	o	100	S08	50.750	49.000	1.650	Open Manhole	450
1.005	o	225	S09	50.750	48.300	2.225	Open Manhole	1050
1.006	o	225	S10	50.750	47.500	3.025	Open Manhole	1050
1.007	o	225	TANK	50.750	47.400	3.125	Open Manhole	900
1.008	o	150	S11	50.750	47.375	3.225	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	5.067	63.3	S02	50.750	50.105	0.545	Open Manhole	450
1.001	5.787	20.7	S03	50.750	49.825	0.825	Open Manhole	450
1.002	7.021	73.9	S04	50.750	49.730	0.920	Open Manhole	450
1.003	7.218	80.2	S06	50.750	49.640	0.960	Open Manhole	450
2.000	1.378	9.8	S06	50.750	49.640	1.010	Open Manhole	450
1.004	2.933	48.9	S09	50.750	49.580	1.020	Open Manhole	1050
3.000	10.057	10.1	S08	50.750	49.000	1.650	Open Manhole	450
3.001	7.213	12.6	S09	50.750	48.428	2.222	Open Manhole	1050
1.005	8.146	10.2	S10	50.750	47.501	3.024	Open Manhole	1050
1.006	2.065	20.7	TANK	50.750	47.400	3.125	Open Manhole	900
1.007	2.159	86.4	S11	50.750	47.375	3.150	Open Manhole	1200
1.008	2.903	82.9	C01	50.750	47.340	3.260	Open Manhole	1050

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.009	0.009	0.009
1.001	-	-	100	0.013	0.013	0.013
1.002	-	-	100	0.018	0.018	0.018
1.003	-	-	100	0.008	0.008	0.008
2.000	-	-	100	0.016	0.016	0.016
1.004	-	-	100	0.005	0.005	0.005
3.000	-	-	100	0.018	0.018	0.018
3.001	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.036	0.036	0.036
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.123	0.123	0.123

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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1.008	C01	50.750	47.340	0.000	1050	0
-------	-----	--------	--------	-------	------	---

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	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	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.361		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S11, DS/PN: 1.008, Volume (m³): 3.9

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

Control Points	Head (m)	Flow (l/s)	Control Points	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)
0.100	3.3	0.800	4.7	2.000	6.0	4.000	8.3	7.000	10.8
0.200	4.7	1.000	4.3	2.200	6.3	4.500	8.8	7.500	11.2
0.300	5.1	1.200	4.7	2.400	6.5	5.000	9.2	8.000	11.5
0.400	5.2	1.400	5.1	2.600	6.8	5.500	9.7	8.500	11.9
0.500	5.2	1.600	5.4	3.000	7.3	6.000	10.1	9.000	12.2
0.600	5.1	1.800	5.7	3.500	7.8	6.500	10.5	9.500	12.5

Storage Structures for Storm

Cellular Storage Manhole: TANK, DS/PN: 1.007

Invert Level (m) 47.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

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	0.0	2.150	18.0	0.0	2.151	0.0	0.0

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 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
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 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) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)
1.000	S01	15 Winter	1	+0%	100/15 Summer				50.212	-0.073	0.000
1.001	S02	15 Winter	1	+0%	30/15 Summer				50.136	-0.069	0.000
1.002	S03	15 Winter	1	+0%	30/15 Summer				49.885	-0.040	0.000
1.003	S04	15 Winter	1	+0%	30/15 Winter				49.786	-0.094	0.000
2.000	S05	15 Winter	1	+0%	100/15 Summer				49.809	-0.071	0.000
1.004	S06	15 Winter	1	+0%	30/15 Summer				49.715	-0.075	0.000
3.000	S07	15 Winter	1	+0%					50.023	-0.077	0.000
3.001	S08	15 Winter	1	+0%	100/60 Winter				49.025	-0.075	0.000
1.005	S09	15 Winter	1	+0%	100/15 Summer				48.349	-0.176	0.000
1.006	S10	30 Winter	1	+0%	30/15 Summer				47.619	-0.106	0.000
1.007	TANK	30 Winter	1	+0%	30/15 Summer				47.618	-0.007	0.000
1.008	S11	30 Winter	1	+0%	1/15 Summer				47.619	0.094	0.000

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	S01	0.16			1.1	OK	
1.001	S02	0.20			2.4	OK	
1.002	S03	0.66			4.2	OK	
1.003	S04	0.30			5.1	OK	
2.000	S05	0.18			1.9	OK	
1.004	S06	0.49			7.5	OK	
3.000	S07	0.12			2.2	OK	
3.001	S08	0.14			2.1	OK	
1.005	S09	0.11			13.3	OK	
1.006	S10	0.25			11.1	OK	
1.007	TANK	0.17		14	5.1	OK	
1.008	S11	0.42			4.9	SURCHARGED	

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The Cowyards Blenheim Park, Oxford Road Woodstock OX20 1QR	Full SW Calcs Goulden Street	
Date 13/12/2023 File FULL SURFACE WATER DRAINAGE	Designed by JRS Checked by KC	
Innovyze Network 2020.1		

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 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
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 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) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)
1.000	S01	15 Winter	30	+0%	100/15 Summer				50.268	-0.017	0.000
1.001	S02	15 Winter	30	+0%	30/15 Summer				50.255	0.050	0.000
1.002	S03	15 Winter	30	+0%	30/15 Summer				50.183	0.258	0.000
1.003	S04	15 Winter	30	+0%	30/15 Winter				49.883	0.003	0.000
2.000	S05	15 Winter	30	+0%	100/15 Summer				49.853	-0.027	0.000
1.004	S06	15 Winter	30	+0%	30/15 Summer				49.824	0.034	0.000
3.000	S07	15 Winter	30	+0%					50.037	-0.063	0.000
3.001	S08	15 Winter	30	+0%	100/60 Winter				49.040	-0.060	0.000
1.005	S09	15 Winter	30	+0%	100/15 Summer				48.382	-0.143	0.000
1.006	S10	60 Winter	30	+0%	30/15 Summer				48.185	0.460	0.000
1.007	TANK	60 Winter	30	+0%	30/15 Summer				48.182	0.557	0.000
1.008	S11	30 Winter	30	+0%	1/15 Summer				48.176	0.651	0.000

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	S01	0.39			2.6	OK	
1.001	S02	0.53			6.3	SURCHARGED	
1.002	S03	1.76			11.2	SURCHARGED	
1.003	S04	0.80			13.5	SURCHARGED	
2.000	S05	0.44			4.6	OK	
1.004	S06	1.28			19.6	SURCHARGED	
3.000	S07	0.30			5.3	OK	
3.001	S08	0.34			5.3	OK	
1.005	S09	0.28			35.4	OK	
1.006	S10	0.42			18.7	SURCHARGED	
1.007	TANK	0.20		38	6.0	SURCHARGED	
1.008	S11	0.44			5.2	SURCHARGED	

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The Cowyards Blenheim Park, Oxford Road Woodstock OX20 1QR	Full SW Calcs Goulden Street	
Date 13/12/2023	Designed by JRS	
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Innovyze	Network 2020.1	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 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
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 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)
1.000	S01	15 Winter	100	+40%	100/15 Summer				50.746	0.461	0.000
1.001	S02	15 Winter	100	+40%	30/15 Summer				50.745	0.540	0.000
1.002	S03	15 Summer	100	+40%	30/15 Summer				50.700	0.775	0.000
1.003	S04	15 Winter	100	+40%	30/15 Winter				50.111	0.231	0.000
2.000	S05	15 Winter	100	+40%	100/15 Summer				50.074	0.194	0.000
1.004	S06	15 Winter	100	+40%	30/15 Summer				49.980	0.190	0.000
3.000	S07	15 Winter	100	+40%					50.052	-0.048	0.000
3.001	S08	60 Winter	100	+40%	100/60 Winter				49.184	0.084	0.000
1.005	S09	60 Winter	100	+40%	100/15 Summer				49.179	0.654	0.000
1.006	S10	60 Winter	100	+40%	30/15 Summer				49.173	1.448	0.000
1.007	TANK	60 Winter	100	+40%	30/15 Summer				49.171	1.546	0.000
1.008	S11	60 Winter	100	+40%	1/15 Summer				49.163	1.638	0.000

		Half Drain		Pipe			
PN	US/MH Name	Flow Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.000	S01	1.20			8.0	FLOOD RISK	
1.001	S02	0.89			10.6	FLOOD RISK	
1.002	S03	2.46			15.7	FLOOD RISK	
1.003	S04	1.17			19.9	SURCHARGED	
2.000	S05	0.81			8.5	SURCHARGED	
1.004	S06	2.02			31.0	SURCHARGED	
3.000	S07	0.54			9.6	OK	
3.001	S08	0.34			5.2	SURCHARGED	
1.005	S09	0.27			33.9	SURCHARGED	
1.006	S10	0.72			32.0	SURCHARGED	

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The Cowyards Blenheim Park, Oxford Road Woodstock OX20 1QR	Full SW Calcs	
	Goulden Street	
Date 13/12/2023	Designed by JRS	
File FULL SURFACE WATER DRAINAGE	Checked by KC	
Innovyze	Network 2020.1	

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

		Half Drain		Pipe			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
1.007	TANK	0.22			6.5	SURCHARGED	
1.008	S11	0.49			5.7	SURCHARGED	

Appendix C – United Utilities Correspondence

Eleanor Dale-Maude

From: seweradoptions@uuplc.co.uk
Sent: 06 April 2023 09:59
To: Eleanor Dale-Maude
Subject: Goulden Street, Manchester, M4 5EJ 03759002

Good morning Eleanor,

Thank you for your email.

In line with Grahams previous comments I have no objection to the proposed surface water connection to the public combined water sewer at 6 l/s.

Please note this is subject to section 106 application and approval, I have linked below the application form.

<https://www.unitedutilities.com/builders-developers/wastewater-services/sewer-connections/sewer-connection/>

If I can be of any further assistance please do get in touch.

Kind regards



Ashleigh Bellerby
Assistant Developer Engineer
Developer Services & Metering
Customer Services
T: 07826891650
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----- Original Message -----

From: Eleanor Dale-Maude [edale-maude@ridge.co.uk]