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PLOT 9A FIRST STREET, MANCHESTER
SUDS OPERATION AND MAINTENANCE PLAN

RAMBOLL Bright ideas. Sustainable change.

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PLOT 9A FIRST STREET, MANCHESTER
SUDS OPERATION AND MAINTENANCE PLAN

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1. INTRODUCTION

1.1 Project Background

Ramboll UK Ltd (Ramboll) were appointed by BAM as the Civil and Structural Engineer for the Plot 9a First Street project. The project was constructed on a former brownfield site and comprises a 9-storey building with basement comprising office accommodation (Use Class E(c)), 26 car parking spaces, 130 cycle spaces and associated facilities, landscaping, and associated works.

1.2 Scope and Objectives

The report is intended to give an overview of the operational and maintenance plan for the range of drainage and external works features included within the drainage network. Where proprietary products are specified, the manufacturer's instructions and recommendations have been consulted and should be followed, unless specifically stated otherwise.

The recommended operations and frequencies are typical only and should be more frequent initially to ensure that there are no unforeseen issues with the operation. Thereafter, they should be adjusted to suit the site requirements.

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2. SURFACE WATER DRAINAGE

2.1 Performance Objectives

The operational maintenance need of the installed below ground drainage system is to provide a system that will continue to perform in accordance with the design. In addition, it will ensure the operation of the system is safe, environmentally acceptable, economically efficient and provide the client with a functional and easily operated asset.

2.2 Maintenance Requirements

Effective maintenance includes a combination of planned and reactive tasks and looks to ensure that the system is kept in a condition that it can function as required.

The tasks may include:

- Localised repair or replacement of damaged pipework or other structures,
- Removal of naturally occurring sediments, abnormal obstructions, etc. to restore hydraulic capacity,
- Maintenance of mechanical plant, and
- Rodent and insect control

2.3 Maintenance Schedule

The maintenance of the drainage network will be the responsibility of the on-site facilities management team. A strategy for the maintenance of the underground drainage elements has been developed, incorporating normal regular maintenance requirements, any potential long-term maintenance work and any monitoring required.

Any parties involved with the disposal of any waste materials from the underground drainage system should hold appropriate management licenses to undertake any such activities. Disposal of any site materials is required to be made in accordance with current legislation and guidance.

2.4 Drainage and SuDS Components

The drainage and SuDS components are summarised in Table 2.1. A detailed plan for the operational and maintenance requirements for each is provided in the forthcoming sections.

Table 2.1 –Surface water drainage and SuDS features specification.

Feature	Manufacturer	Model/Product type	Relevant Section
Manholes and Catchpits	FP McCann	Twin Wall Rings	Section 3
Pipes	Polypipe	Ridgidrain	Section 4
Drainage Channel Systems	ACO	MultiDrain	Section 5
Flow Control Devices	ACO	Q-Brake Vortex	Section 6
Attenuation tanks	Hydro WMS	Attenuation Tank	Section 7
Permeable Paving	Hardscape	C3/C4	Section 8
Pump Stations	Packaged Pumping Stations Ltd	1800x3.0	Section 9
Proprietary Treatment Systems	SPEL	Stormceptor Class1 Bypass	Section 9

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3. MANHOLES AND CATCHPITS

3.1 General

Manhole and catchpit chambers are proprietary products, and the materials can vary across the site and as such where used, the manufacturer's recommendations should be followed.

Access points have been located at the head of each run, at a change in direction and at a change of pipe size in accordance with Building Regulations Part H.

Locations of manholes & catchpits can be found on Ramboll drawings:

- MN2A-RAM-ZZ-XX-DR-C-000100 & MN2A-RAM-ZZ-XX-DR-C-000101

For typical manhole details refer to:

- MN2A-RAM-ZZ-XX-DR-C-000400 to 000404

For as built locations & information, refer to contractor's drawings.

The appropriate health and safety equipment must be used when accessing inspection and manholes chambers. Confined space certificates must be held by any personnel entering a manhole and the appropriate permits should be obtained from the maintenance manager prior to any access.

3.2 Operation and Maintenance Requirements

Regular inspection and maintenance are important to identify areas which may have been obstructed/clogged and may not drain correctly thus exposing the development to a greater level of flood risk. Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols.

Table 3.1: Manholes and catchpit maintenance summary.

Action	Details	Frequency
Monitoring and Inspection /Testing	Check condition of inlets, outlets, vents, overflows, flow controls, covers and chambers	Monthly for the first three months following commission; Six-monthly thereafter or 48 hours after major storm event
	Inspect all manholes and catch-pit sumps for any sediment, trash, debris, and any other pollutants	Monthly for the first three months following commission; Six-monthly thereafter or 48 hours after major storm event
Regular Maintenance	Repair inlets, outlets, vents, overflows, flow controls, covers and chambers	Monthly for the first three months following commission; Six-monthly thereafter or 48 hours after major storm event
	Remove sediment, trash, debris and any other pollutants from manholes and catchpit sumps to ensure correct performance	Monthly for the first three months following commission; Six-monthly thereafter or 48 hours after major storm event
Occasional Maintenance	Replace covers and frames as necessary	As required
	Repair exposed concrete and surfacing as necessary	As required
Remediation	Replace malfunctioning parts or structures	As required

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4. PIPES

4.1 General

Pipes are proprietary products and the materials can vary across the site and as such where used the manufacturer's recommendations should be followed.

Pipes are intended to be the main conveyance across the development. The surface water pipes are intended to be dry except for during rainfall events. These have been designed to be self-cleansing where possible. Access for maintenance is provided through access chambers, manholes, rodding plates, and rodding eyes.

Location of pipework can be found on Ramboll drawings:

- MN2A-RAM-ZZ-XX-DR-C-000100 & MN2A-RAM-ZZ-XX-DR-C-000101

For pipe bedding notes, see Ramboll drawings:

- MN2A-RAM-ZZ-XX-DR-C-000400 to 000404

For as built locations, refer to contractors drawings.

4.2 Operation and Maintenance Requirements

Regular inspection and maintenance are important to identify areas which may have been obstructed or clogged and may not drain correctly thus exposing the development to a greater level of flood risk.

Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols.

If continued poor performance, jet the system as required. A CCTV survey of poorly performing runs should be undertaken as required.

If above does not improve performance, seek advice for remediation techniques suitable for the type of performance issue and location.

Table 4.1: Pipes maintenance summary.

Action	Details	Frequency
Monitoring and Inspection /Testing	Initial water test to be done prior to CCTV survey	Once, upon completion of development
	Initial inspection should be provided as post construction CCTV survey	Once, upon completion of development
	Inspect for evidence of poor operation via water level in chambers. If required, take remedial action	Monthly for the first three months following commission; Three-monthly thereafter or 48 hours after major storm event
Occasional Maintenance	Check and remove large vegetation growth near pipe runs	Six-monthly
Remediation	Rod through poorly performing runs as initial remediation	As required
	If continued poor performance, jet and CCTV survey poorly performing runs	As required
	Seek advice as to remediation techniques suitable for the type of performance issue and location	As required, if above does not improve performance

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5. DRAINAGE CHANNELS

5.1 General

Drainage channels are proprietary products and the materials can vary across the site and as such where used the manufacturer's recommendations should be followed.

Channel drains can get clogged up by dirt and debris over time which can lead to them becoming ineffective and not performing as efficiently as they should. Drainage channels require regular maintenance to ensure continual performance to as built standards. Litter, leaf-litter, and debris removal should be undertaken as part of the general landscape maintenance for the site before any other SuDS management task is undertaken. All litter should be regularly removed from the site.

Locations of drainage channels can be found on Ramboll drawings:

- MN2A-RAM-ZZ-XX-DR-C-000100 & MN2A-RAM-ZZ-XX-DR-C-000101

For drainage channel details refer to

- MN2A-RAM-ZZ-XX-DR-C-000400 to 000404

For as built locations & information, refer to contractor's drawings.

5.2 Operation and Maintenance Requirements

Regular inspection and maintenance are important to identify areas which may have been obstructed or clogged and may not drain correctly thus exposing the development to a greater level of flood risk.

Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols.

Table 5.1: Drainage channels maintenance summary.

Action	Details	Frequency
Monitoring and Inspection /Testing	Initial inspection including channel outlet boxes and locking parts	Monthly for the first three months following commission; Six-monthly thereafter or 48 hours after major storm event
	Inspect for evidence of poor operation and/or weed growth and sediment accumulation. If required, take remedial action.	Three-monthly or 48 hours after major storm event
Regular Maintenance	Remove litter, leaf-litter, large vegetation and debris	Monthly or as required
	Clean channels as per manufacturers recommendations	Monthly for the first three months following commission; Six-monthly thereafter (in spring and after the summer) or 48 hours after major storm event
	Check and repair channel surfaces, joints; tighten locking parts that the bolt heads do not stand above the top surface of the cover or grate	Monthly for the first three months following commission; Six-monthly thereafter or 48 hours after major storm event
	Remove sediment	Six-monthly until required frequency is established
Occasional Maintenance	Remove and replace surface gratings and quick cleaning buckets	Every five years or as required (refer to manufacturer's recommendations)
	Clear perforated pipework	As required
Remediation	Inspect access and outlet boxes and rod through, replace if required	As required

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6. FLOW CONTROL DEVICES

6.1 General

Flow controls are proprietary products and the materials can vary across the site and as such where used the manufacturer's recommendations should be followed.

The flow control units are intended for flood control and flow restriction as approved by the local authorities. Therefore, their maintenance is essential to ensure long-term performance as intended. Although, with no power source or moving parts, hydro-breaks require minimal and predictable maintenance. Access for maintenance is provided through the manhole chambers.

Locations of flow control devices can be found on Ramboll drawings:

- MN2A-RAM-ZZ-XX-DR-C-000100 & MN2A-RAM-ZZ-XX-DR-C-000101

Hydrobrake and pump details can be found on Ramboll drawing:

- MN2A-RAM-ZZ-XX-DR-C-000400 to 000404

For as built locations & information, refer to contractor's drawings.

6.2 Operation and Maintenance Requirements

Regular inspection and maintenance are important to identify areas which may have been obstructed or clogged and may not drain correctly thus exposing the development to a greater level of flood risk.

Table 6.1: Flow control device maintenance summary.

Action	Details	Frequency
Monitoring and Inspection /Testing	Inspect for evidence of poor operation	Six-monthly
	Inspect inlet for blockages and clogging. Jetting and CCTV survey may be required	Monthly for the first three months following commission; Six-monthly thereafter or 48 hours after major storm event
	Inspect for accumulation of sediment	Monthly for the first three months following commission; Six-monthly thereafter or 48 hours after major storm event
Regular Maintenance	Remove debris and sediment	Monthly or as required
	Clean out of unit as per the manufacturer's recommendations	Annually or as required
Remediation	Repair or replace malfunctioning parts	As required

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7. ATTENUATION TANKS

7.1 General

Below ground geocellular attenuation tanks are proprietary products and the materials can vary across the site and as such where used the manufacturer's recommendations should be followed.

The attenuation tanks are intended to be the surface water storage feature to attenuate the discharge from the site up to and including the 1 in 100 year plus 40% climate change event. The tanks are intended to be empty between rainfall events.

Access for maintenance has been provided from the manhole chambers upstream.

Location of attenuation tanks can be found on Ramboll drawings:

- MN2A-RAM-ZZ-XX-DR-C-000100 & MN2A-RAM-ZZ-XX-DR-C-000101

For attenuation tank details refer to:

- MN2A-RAM-ZZ-XX-DR-C-000400 to 000404

For as built locations & information, refer to contractor's drawings.

7.2 Operation and Maintenance Requirements

Regular inspection and maintenance are important to identify areas which may have been obstructed or clogged and may not drain correctly thus exposing the development to a greater level of flood risk.

Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols.

Table 7.1: Attenuation tanks maintenance summary.

Action	Details	Frequency
Monitoring and Inspection /Testing	Inspect inlets, outlets, and overflows for blockages and sediment, and clear if required. If faults persist jetting and CCTV survey may be required	Monthly for the first three months following commission; Six-monthly thereafter or 48 hours after major storm event
	Inspect the tank structure and other mechanical devices	As per manufacturer's recommendations Monthly for the first three months following commission; Six-monthly thereafter or 48 hours after major storm event
Regular Maintenance	Maintain pre-treatment structures, manholes, catchpits, drainage channels	Monthly for the first three months following commission; Six-monthly thereafter or 48 hours after major storm event
	Remove debris from catchment surface	Monthly or as required
	Remove sediment and debris from pretreatment structures, manholes, catchpits, drainage channels	Monthly for the first three months following commission; Six-monthly thereafter or 48 hours after major storm event
Remediation	Repair and/or of inlets, outlet, overflows and vents	As required

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8. PERMEABLE PAVING

8.1 General

Permeable paving are proprietary products and the materials can vary across the site and as such where used, the manufacturer's recommendations should be followed in priority.

Permeable paving is intended to provide a pavement suitable for pedestrians and vehicular traffic, while allowing rainwater to infiltrate through the surface and into the below ground drainage system. Overall, permeable paving needs to be able to effectively capture the design storm water event and discharge it in a controlled manner to the subgrade or drainage system, while maintaining resistance to withstand the loadings imposed. Thus, it is important to ensure the permeable paving is maintained and inspected regularly to ensure it fulfils both functions.

The external surface and kerbing layout can be found on Ramboll drawing:

- MN2A-RAM-LA-XX-DR-C-000700

Surface works details can be found on:

- MN2A-RAM-LA-XX-DR-C-000710

For as built locations & information, refer to contractor's drawings.

8.2 Operation and Maintenance Requirements

Regular inspection and maintenance are important to identify areas which may have been obstructed or clogged and may not drain correctly thus exposing the development to a greater level of flood risk.

Permeable paving ought to be swept frequently (minimum of once annually), to maintain sufficient infiltration, however, this is to be adjusted to suit site-specific circumstances. A brush and suction cleaner or lightweight rotating brush cleaners combined with power spraying with hot water should be used for regular sweeping. Care should be taken to avoid removal of jointing material. Any loss in material should be replaced. Specialist sweepers with water jetting and oscillating and rotating brushes may be required for clogged surfaces.

Generally, permeable paving requires less frequent gritting in the winter months, however, a slight frost may occur and this can be delt with by the application of salt.

Further details can be found on the following table.

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Table 8.1: Permeable paving maintenance summary.

Action	Details	Frequency
Monitoring and Inspection /Testing	Initial inspection	Monthly for the first three months following commission;
	Inspect for evidence of poor operation and/or weed growth- if required, take remedial action	Three-monthly or 48 hours after major storm event
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over entire surface)	Once a year after autumn leaf fall, or reduced frequency as required, based on site specific observations of clogging. Attention to be paid to areas where water runs onto permeable surface from adjacent impermeable areas as this area is the most likely to collect the most sediment.
Occasional Maintenance	Stabilise and mow contributary adjacent areas	As required
	Removal or management of weeds using glyphosate applied directly onto weeds	Annually or as required
Remediation	Remediate any landscaping, which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users. Replace lost jointing material.	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years, or as required (if infiltration is reduced due to clogging)

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9. PUMP STATIONS

9.1 General

Flow controls are proprietary products and as such the manufacturer's recommendations should be followed.

The pump stations are intended for the flow restriction to the on-site swale as approved by the local authorities in the outline scheme. Therefore, their maintenance is essential to ensure long-term performance as intended to provide discharge from the site.

There are multiple components to the pumping station & these components will be bespoke per manufacturer. Thus, the manufacturers guidance & recommendations with regards to the operation & maintenance of the pump station should be followed. Access for maintenance of the pumping units is provided through the manhole chambers.

Locations of flow control devices can be found on Ramboll drawing:

- MN2A-RAM-ZZ-XX-DR-C-000100 & MN2A-RAM-ZZ-XX-DR-C-000101

Typical pump details can be found on Ramboll drawing:

- MN2A-RAM-ZZ-XX-DR-C-000400 to 000404

For as built locations & information, refer to contractor's drawings.

9.2 Operation and Maintenance Requirements

Regular inspection and maintenance are important to identify areas which may have been obstructed or clogged and may not drain correctly thus exposing the development to a greater level of flood risk.

Refer to Packaged Pumping Stations Limited's operation & maintenance schedule for detailed instructions for the operation & maintenance.

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10. PROPRIETARY TREATMENT SYSTEMS

10.1 General

Oil Separators are proprietary products and the materials can vary and as such where used the manufacturer's recommendations should be followed.

The oil separators are intended to be remove pollutants from vehicles within the basement car park & will not be utilised for rainwater flows. Access for maintenance is provided as part of the system.

Location of oil seperators can be found on Ramboll drawings:

- MN2A-RAM-ZZ-XX-DR-C-000100 & MN2A-RAM-ZZ-XX-DR-C-000101

For oil separator details refer to:

- MN2A-RAM-ZZ-XX-DR-C-000400 to 000404

For as built locations & information, refer to contractor's drawings.

10.2 Operation and Maintenance Requirements

Regular inspection and maintenance are important to identify areas which may have been obstructed or clogged and may not drain correctly thus exposing the development to a greater level of flood risk.

Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols.

Table 10.1: Proprietary treatment system maintenance summary.

Action	Details	Frequency
Routine Maintencance	Remove litter and debris and inspect for sediment, oil and grease accmulation	Six-monthly
	Change filter media	As per manufacturer's recommendations
	Remove sediment, oil, grease and floatables.	As necessary – indicated by system inspections or immediately following significant spill
Monitoring	Inspect for evidence of porr operation	Six-monthly
	Inspect filter media and establish appropriate replacement frequencies	Six-monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly for the first six months of operation; Six-monthly thereafter
Remediation	Replace malfunctioning parts or structures	As required

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APPENDIX A
FINAL CONSTRUCTION ISSUE DRAWINGS

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GENERAL PROJECT NOTES

- THIS DRAWING HAS BEEN DEVELOPED USING INFORMATION PROVIDED TO RAMBOLL BY A NUMBER OF THIRD PARTIES. RAMBOLL CAN ACCEPT NO RESPONSIBILITY FOR THE ACCURACY OF THE INFORMATION SHOWN AND DERIVED FROM THIRD-PARTY INFORMATION
- PHASING INFORMATION FOR CONSTRUCTION WORKS IS UNKNOWN AT THIS STAGE AND THE BELOW GROUND DRAINAGE DESIGN IS SUBJECT TO CHANGE SUBJECT TO RECEIPT OF THIS INFORMATION
- PLANNING CONDITIONS ARE IMPOSED ON THIS SCHEME IN ACCORDANCE WITH RAMBOLL DRAINAGE STRATEGY DOCUMENT 1620002943-RAM-05-XX-RP-D-00010.
- EXISTING DRAINAGE INFORMATION HAS BEEN TAKEN FROM PREVIOUS SURVEY INFORMATION. THIS INFORMATION HAS BEEN COLLABORATED ACROSS MULTIPLE SURVEYS AND THEREFORE ALLOWANCE WILL NEED TO BE MADE FOR SURVEY OF CONNECTION POINTS AND POSSIBLE REMEDIAL WORKS TO THE EXISTING MANHOLES FOR NEW CONNECTIONS.
- NO ALLOWANCE HAS BEEN MADE FOR DIVERSION OF ANY EXISTING DRAINAGE WHICH IS UNKNOWN AND MAY PASS THROUGH OUR SITE.
- GROUNDWATER IS EXPECTED TO BE ENCOUNTERED DURING EXCAVATION WORKS FOR DRAINAGE, SERVICES AND FOUNDATIONS WITHIN THE BASEMENT. THE DRAINAGE STRATEGY THEREFORE ASSUMES INFILTRATION IS NOT POSSIBLE AS A VIABLE SURFACE WATER DRAINAGE METHOD.

DESIGN LIMITATIONS AND ASSUMPTIONS

- NO ALLOWANCE HAS BEEN MADE FOR POSITIVELY DRAINING FIREFIGHTING LIFT SHAFTS OR COLLECTION OF FIRE FIGHTING WATER. IT IS ASSUMED THAT ANY SHAFT PROTECTION MEASURES WILL BE PROVIDED ABOVE GROUND (I.E. RAISED THRESHOLDS/CHANNELS ACROSS ENTRANCES)

PROPOSED DRAINAGE DESIGN NOTES

GENERAL:

- ALL DRAINAGE WORKS CARRIED OUT IN ACCORDANCE WITH SEWER SECTOR GUIDANCE (SSG-FORMALLY SFA) BS EN 752: 2017, BUILDING REGULATIONS PART H, RELEVANT WATER AUTHORITY STANDARDS, LOCAL COUNCIL STANDARDS AND HEALTH AND SAFETY POLICIES
- CONCRETE FOR GENERAL DRAINAGE WORKS DESIGNATED MIX GEN 3 TO BS 8500 - 1:2006, BS EN 206 - 1:2013 AND ENGINEERS' SPECIFICATION
- WHERE BELOW GROUND PIPE JUNCTIONS CONNECT AT AN OBLIQUE ANGLE, CONNECTIONS ARE TO BE INSTALLED AS PER THE OBLIQUE JUNCTION ARRANGEMENT DETAIL TO PREVENT FUTURE BLOCKAGES
- PIPES ARE NOT DESIGNED FOR CONSTRUCTION TRAFFIC; CONTRACTOR WILL TAKE NECESSARY PRECAUTIONS TO PROTECT PIPES DURING CONSTRUCTION. EXISTING DRAINAGE WHICH IS TO REMAIN IN THE PROPOSED WORKS TO BE PROTECTED AT ALL TIMES.
- IT IS ASSUMED THAT ALL ABOVE GROUND DRAINAGE CONNECTIONS ARE RODDABLE AND VENTED FROM ABOVE GROUND. PUBLIC HEALTH ENGINEER TO CONFIRM ABOVE GROUND VENTING
- NO REQUIREMENT FOR A POSITIVE DRAINAGE CONNECTION HAS BEEN MADE FROM ANY FIREFIGHTING LIFT SHAFT INTO THE BELOW GROUND DRAINAGE NETWORK. IT IS ASSUMED WATER WILL BE PREVENTED FROM ENTERING THE LIFT SHAFT BY ABOVE GROUND MEANS I.E. RAISED THRESHOLDS.
- ON SITE SURFACE WATER DRAINAGE HAS BEEN DESIGNED UP TO AND INCLUDING THE 1 IN 100 YEAR STORM EVENT PLUS 40% CLIMATE CHANGE. EXCEEDANCE FLOWS ARE DIRECTED AWAY FROM THE BUILDING WITHIN THE PROPOSED LEVELS DESIGN.

MANHOLES & INSPECTION CHAMBERS:

- ALL MANHOLES TO BE TRADITIONAL PRECAST CONCRETE CHAMBERS IN ACCORDANCE WITH BS 5911 - 3:2002, BS EN 1917:2002 AND TO BE KITEMARKED OR CE MARKED
- POLYPROPYLENE INSPECTION CHAMBERS TO BE IN ACCORDANCE WITH BS7158 OR BS EN 13598-1 OR AGREEMENT CERTIFIED
- ALL MANHOLE COVERS TO BE RECESSED IN PAVED AREAS AND SET SQUARE TO THE BUILDING OR KERB LINE. REFER TO SCHEDULES FOR LOAD CLASS AND SIZING
- ALL FOUL MANHOLE COVERS TO BE DOUBLE SEALED, LOCKABLE AND RECESSED TO ALLOW INFILL OF INTERNAL OR EXTERNAL FINISHES TO SUIT ARCHITECTURAL REQUIREMENTS.
- BOTH THE COMBINED OUTFALL AND THE SURFACE WATER CONNECTION TO THE COMBINED SYSTEM ARE TO BE FITTED WITH NON-RETURN VALVES TO PREVENT SURCHARGE INTO THE ONSITE DRAINAGE SYSTEMS.

PIPE BEDDING:

- FOR PIPES WITH MORE THAN 1200mm COVER BELOW EXTERNAL GROUND LEVEL TO HAVE CLASS S SURROUND U.N.O. IN ACCORDANCE WITH BUILDING REGULATIONS DOCUMENT H
- FOR PIPES WITH LESS THAN 1200mm COVER TO CROWN PIPE BEDDING TO BE CLASS Z SURROUND OR PROTECTIVE COVER SLAB U.N.O. IN ACCORDANCE WITH BUILDING REGULATIONS DOCUMENT H
- PIPES LOCATED BENEATH GROUND FLOOR BUILDING SLAB WITH LESS THAN 300mm COVER FROM THE UNDERSIDE OF THE SLAB TO CROWN OF PIPE TO HAVE CLASS Y CONCRETE SURROUND

PIPEWORK:

- ALL SURFACE WATER PIPES TO BE HDPE STRUCTURED WALL TO BS EN 1401-1, KITEMARKED, AGREMENT CERTIFIED OR CE MARKED U.N.O.
- ALL DOMESTIC FOUL WATER PIPES TO BE VITRIFIED CLAY TO BS EN 295-1:1991/BS 65 AS APPROPRIATE, KITEMARKED, AGREMENT CERTIFIED OR CE MARKED U.N.O.
- ALL PERFORATED PIPES TO BE PVC-U WRAPPED IN GEOTEXTILE TO BS 4962
- RISING MAIN TO BE DESIGNED BY PUMP SPECIALIST AND MEP CONTRACTOR
- ANY DRAIN WHICH IS TO BE CAST INTO, OR THROUGH, A FOUNDATION OR RETAINING WALL IS TO BE DUCTILE CAST IRON OR TO BE SLEEVED THROUGH STRUCTURE USING A LARGER DIAMETER HDPE SLEEVE PROVIDING AT LEAST 50mm CLEARANCE AROUND THE PIPES.
- LOCATIONS OF CAST IN DRAINAGE ARE INDICATED BY A * ON THE GENERAL ARRANGEMENT DRAWINGS & LEVELS PROVIDED ARE THE IL THROUGH THE BASEMENT WALL.
- ALL FOUL BRANCH CONNECTIONS TO BE DN100 AT 1:40 MINIMUM GRADIENT U.N.O.
- ALL SURFACE WATER BRANCHES TO BE DN150 AT 1:80 MINIMUM GRADIENT U.N.O.
- ROOT PROTECTION BARRIERS TO BE INSTALLED WHERE DRAINAGE TRENCHES ARE WITHIN 5m OF EXISTING OR PROPOSED TREES. DETAIL TO LANDSCAPE ARCHITECTS SPECIFICATION.
- ALL SURFACE WATER FROM ROOFS TO BE STORED WITHIN BLUE ROOF SYSTEM. REFER TO MEP DESIGN INFORMATION FOR BLUE ROOF DESIGN. MAXIMUM DISCHARGE INTO THE BELOW GROUND SYSTEM FROM THE BLUE ROOF IS TO BE 7.5 l/s.
- SURFACE WATER FROM THE BASEMENT SHALL BE DISCHARGED VIA TRAPPED GULLIES AND PASS THROUGH AN OIL SEPARATOR PRIOR TO DISCHARGE.

CONSULTATIONS / APPROVALS

- FOUL / STORM CONNECTION TO EXISTING PUBLIC SEWERS HAVE BEEN AGREED IN PRINCIPLE WITH THE LEAD LOCAL FLOOD AUTHORITY & UNITED UTILITIES. A SECTION 106 AGREEMENT WITH UNITED UTILITIES IS REQUIRED FOR FORMAL CONNECTION.
- BELOW GROUND DRAINAGE ATTENUATION SYSTEMS ARE DESIGNED FOR 1 IN 100 YEAR STORM EVENT PLUS 40% CLIMATE CHANGE.
- MAXIMUM SURFACE DISCHARGE TO EXISTING SEWER OUTSIDE OF SITE BOUNDARY AT 7.5 l/s.
- FOUL WATER DISCHARGE FROM SITE INTO THE FOUL PUBLIC SEWER SHALL BE UNRESTRICTED AS PER AGREEMENT WITH UNITED UTILITIES.

REFERENCE DRAWINGS AND DOCUMENTS

- ANY DISCREPANCIES IN DIMENSIONS OR DETAILS ON OR BETWEEN DRAWINGS SHOULD BE DRAWN TO THE ATTENTION OF THE ENGINEER FOR CLARIFICATION.
- THE INFORMATION USED TO PRODUCE THE DRAINAGE DRAWINGS ARE AS FOLLOWS. IF ANY INFORMATION WITHIN THESE DRAWINGS CHANGES THE BELOW GROUND DRAINAGE IS ALSO SUBJECT TO CHANGE:
  - LANDSCAPE ARCHITECTS LAYOUT BY PLANIT PL1471.1-PLA-XX-00-DR-L-0004
  - BASEMENT LAYOUT BY JMA MN2A-JMA-MB-B1-DR-A-022199
  - ABOVE GROUND DRAINAGE BY CUNDALL MN2A-CDL-ZZ-B1-DR-P-10990
  - BASEMENT FOUNDATION PLAN BY RAMBOLL MN2A-RAM-MB-B1-DR-S-000980
- FOR PROPOSED DRAINAGE LAYOUT REFER TO DRAWING SERIES MN2A-RAM-ZZ-XX-DR-C-000100
- FOR DRAINAGE SCHEDULES REFER TO DRAWING MN2A-RAM-ZZ-XX-DR-C-000200
- FOR DRAINAGE DETAILS REFER TO DRAWING SERIES MN2A-RAM-ZZ-XX-DR-C-000400

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THE FINAL CONSTRUCTION ISSUE OF THIS DRAWING INCORPORATES REVISIONS AND CHANGES MADE TO THE CONSTRUCTION ISSUE DRAWING BASED ON INFORMATION RECEIVED BY OTHERS.

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SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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OPERATIONS, MAINTENANCE

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- D3 ACCESS TO OIL SEPARATOR REQUIRED FOR MAINTENANCE.
- D4 ACCESS TO PUMP STATIONS REQUIRED FOR MAINTENANCE.

DISMANTLING / DEMOLITION (FUTURE)

NO SIGNIFICANT RESIDUAL RISK IDENTIFIED

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Rev	Description	Date	By	Chk	App
CR1	FINAL CONSTRUCTION ISSUE	08/11 2024	CO	JI	CK
C01	CONSTRUCTION ISSUE	08/12 2022	CO	LF	CK
P02	STAGE 4 ISSUE	31/05 2022	CO	LF	CK
P01	STAGE 3 ISSUE	01/04 2022	CO	LS	CK

FINAL CONSTRUCTION ISSUE

PLOT 9a
FIRST STREET
MANCHESTER

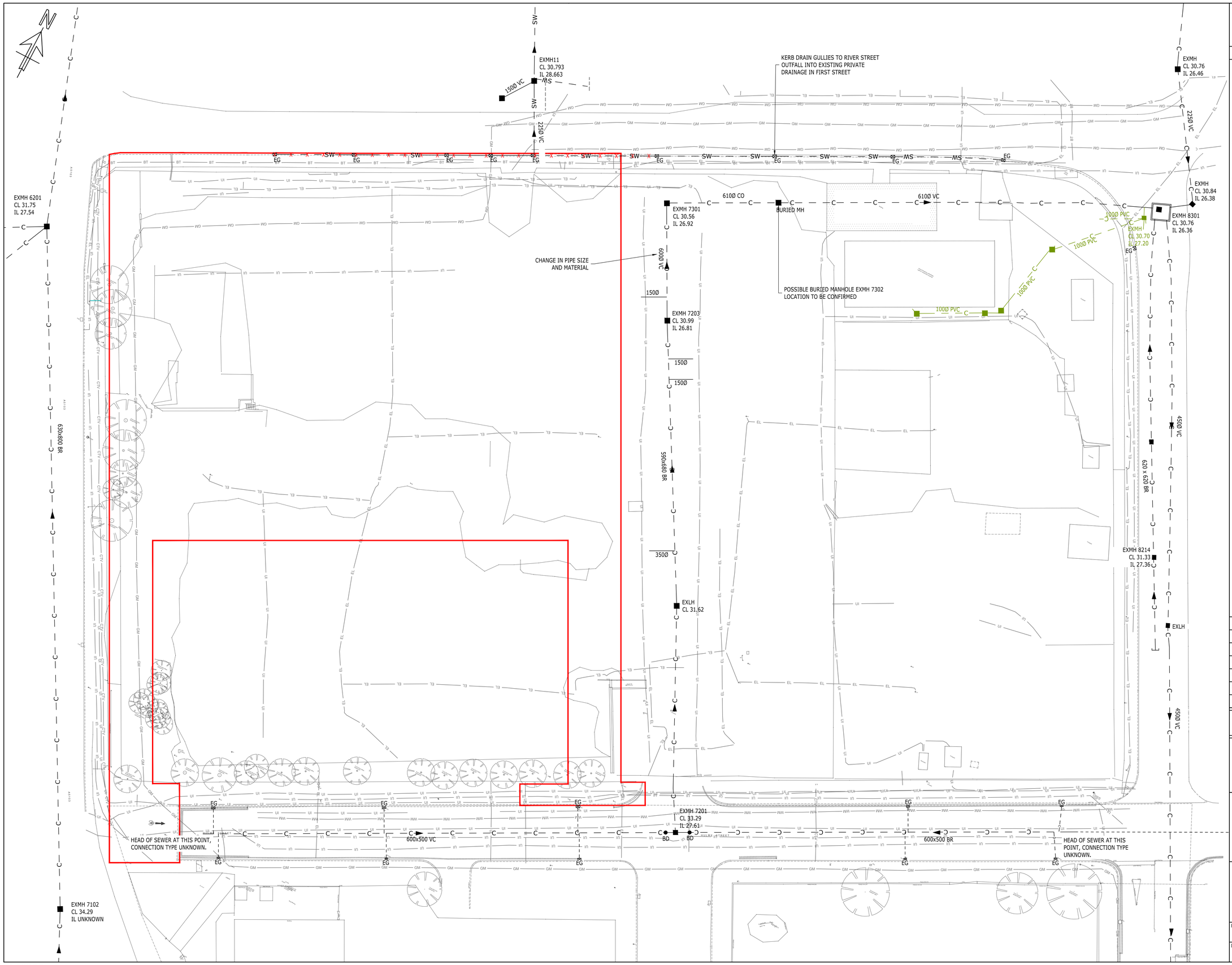
RAMBOLL

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www.ramboll.co.uk

PROPOSED DRAINAGE GENERAL NOTES

Project No:	Scale (@A1):	Drawn:	Date:
1620002943	N/A	CO	03/2022

Drawing No: MN2A-RAM-ZZ-XX-DR-C-000001 Rev: CR1



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KEY

- EXMH CL ----- IL ----- — EXISTING MANHOLE
- EG — EXISTING GULLY
- —— — —C— —— — EXISTING COMBINED UNITED UTILITIES SEWER
- —— — —C— —— — EXISTING COMBINED PRIVATE DRAIN
- —— — —SW— —— — EXISTING PRIVATE SURFACE WATER DRAIN
- — — — — — — — ASSUMED EXISTING DRAIN
- UTL — BD — C — UNABLE TO LIFT BACKDROP INTO MANHOLE
- RED LINE - PLOT 9a BOUNDARY
- EG — EXISTING GULLY TO BE REMOVED
- SW — EXISTING PRIVATE SURFACE WATER DRAIN TO BE REMOVED

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P04	STAGE 4 ISSUE	31/05/2022	CO	LF	CK
P03	STAGE 3 ISSUE	01/04/2022	CO	LS	CK
P02	UPDATED PLANNING ISSUE	20/12/2021	CO	LS	LS
P01	PLANNING ISSUE	29/09/2021	CO	LS	LS

FINAL CONSTRUCTION ISSUE

PLOT 9A
FIRST STREET
MANCHESTER

RAMBOLL

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EXISTING BELOW GROUND DRAINAGE

Project No:	Scale (@A1):	Drawn:	Date:
1620002943	1:250	CO	09/2021

Drawing No: MN2A-RAM-ZZ-XX-DR-C-000010 Rev: CR1

07/11/2024 10:48:52

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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RIVER STREET

MEDLOCK STREET

7m EASEMENT OF EXISTING GAS MAIN. DISCUSSIONS TO BE HELD WITH CADENT REGARDING HIGH LEVEL DRAINAGE WORKS WITHIN EASEMENT AREA.

AREA OF HARD LANDSCAPING TO BE PERMEABLE PAVING UP TO EXISTING PAVEMENT LINE

FLUSH KERB DRAIN UNIT REQUIRED ACROSS PROPOSED LAYBY IF REQUIRED

NEW KERB DRAIN REQUIRED TO DRAIN PROPOSED LAYBY & REPLACE EXISTING GULLIES IF REQUIRED

NEW ALIGNMENT OF PUBLIC SEWER FOLLOWING S185 DIVERSION WORKS UNDERTAKEN AS A SEPARATE WORKS PACKAGE

NEW MANHOLE LOCATION FOLLOWING S185 WORKS AS PER SEPARATE WORKS PACKAGE

STUB FOR FUTURE CONNECTION INTO DIVERTED PUBLIC SEWER FOLLOWING S185 DIVERSION WORKS TO BE CONSTRUCTED UP TO SITE BOUNDARY AS PART OF PLOT 9A WORKS

NON RETURN VALVE TO BE INSTALLED TO PREVENT SURCHARGE OF PUBLIC SEWER. TWO OUTFALL LOCATIONS REQUIRED TO ACCOMMODATE FUTURE S185 WORKS ON PUBLIC SEWER. FORMAL CONNECTION TO BE UNDERTAKEN UNDER A S106 WITH UNITED UTILITIES.

HIGH LEVEL CONNECTION REQUIRED TO VENT ATTENUATION TANK

FLOW CONTROL MANHOLE TO RESTRICT FLOW TO 7.5 l/s.

ATTENUATION TANK REQUIRED FOR EXTERNAL WORKS SURROUNDING PLOT 9a (EXCLUDING THE SOUTH SIDE), THE RESTRICTED FLOW FROM ATTEN-1 AND RESTRICTED FLOW FROM PLOT 9a BLUE ROOF. TANK SIZE: 80.64m² X 1.44m (TOP OF TANK LEVEL 29.580 VOLUME CALCULATED TO INCLUDE REDLINE BOUNDARY AREA ONLY AT THIS STAGE. TOTAL STORAGE VOLUME REQUIRED: 105m³

ATTENUATION TANK REQUIRED FOR EXTERNAL WORKS SOUTH OF PLOT 9a. TANK SIZE: 56m² X 1.09m (TOP OF TANK LEVEL 30.790), VOLUME CALCULATED TO INCLUDE REDLINE BOUNDARY AREA ONLY. DISCHARGE OF 4 l/s FROM FLOW CONTROL WITHIN SW04. TOTAL STORAGE VOLUME REQUIRED: 55m³

HIGH LEVEL CONNECTION REQUIRED ABOVE OUTLET PIPEWORK TO VENT ATTENUATION TANK

PERFORATED PIPE IN BASE OF PLANTERS & PERMEABLE PAVING

EXISTING PUBLIC SEWER TO BE REMOVED IN FUTURE PHASES

PERFORATED PIPE IN BASE OF PLANTERS

TO AVOID GAS EASEMENT PIPEWORK TO DRAIN EXTERNAL WORKS TO BE LOCATED AT ROOF LEVEL WITHIN THE BASEMENT. ACCESS POINTS REQUIRED AT LEVEL CHANGES WITHIN BASEMENT STRUCTURE. REFER TO CUNDALL DRAWING MN2A-CDL-ZZ-B1-DR-P-10990 FOR FURTHER DETAILS.

NO MAIN DRAINAGE SYSTEMS CAN BE CONSTRUCTED IN THE AREA ADJACENT TO PLOT 9B DUE TO GAS EASEMENT. LEVELS NEED TO FALL TOWARDS PLOT 9A TO BE PICKED UP IN DRAINAGE SYSTEM BETWEEN PLOTS.

ROAD GULLIES TO CATCH ANY POSSIBLE RAINWATER THAT ENTERS BASEMENT LEVEL FROM VEHICLES OR ANY OIL SPILLS THAT MAY OCCUR

ROUTING OF ABOVE GROUND SURFACE WATER ROUTING IS INDICATIVE. REFER TO CUNDALL DRAWINGS FOR DETAILS INCLUDING RODDING POINTS.

PUMPING STATION TO PUMP BASEMENT CAR PARK DRAINAGE TO EXTERNAL WORKS LEVEL DUTY/STANDBY PUMP CONFIGURATION: DUTY @ 2.5 L/S STANDBY @ 2.5 L/S ASSUMED 65mm Ø RISING MAIN LEVEL CONTROLLED PUMPS WITH LINK TO BMS BY MEP ENGINEER. CONTROL PANEL AND VENT TO SUIT ARCHITECTS POSITIONING (WITHIN 5m OF THE PUMP). ANCILLARY REQUIREMENTS TO BE CONFIRMED BY SPECIALIST PUMP MANUFACTURER. NOTE: FINAL PUMP SELECTION, RISING MAIN AND WET WELL DESIGN TO BE FINALISED BY CONTRACTOR AND PUMP SPECIALIST.

BLUE ROOF DOWNPIPE, FLOW LIMITED TO 2.5 l/s. DESIGN BY OTHERS, REFER TO CUNDALL DRAWINGS FOR MORE DETAILS. NOTE, ANY CHANGE IN PROPOSALS WILL AFFECT BELOW GROUND DRAINAGE PROPOSALS.

BLUE ROOF DOWNPIPE, FLOW LIMITED TO 2.5 l/s. DESIGN BY OTHERS, REFER TO CUNDALL DRAWINGS FOR MORE DETAILS. NOTE, ANY CHANGE IN PROPOSALS WILL AFFECT BELOW GROUND DRAINAGE PROPOSALS.

NO POSITIVE CONNECTION FROM LIFT SHAFTS REQUIRED

DC-1 TO BE LOCATED AT BASE OF ENTRANCE RAMP TO CAPTURE RAINWATER FROM EXTERNAL WORKS

BYPASS SEPARATOR WITH HIGH LEVEL ALARM SYSTEM LINKED TO BMS.

SURFACE WATER DRAINAGE TO PASS THROUGH TOWER CRANE BASE, REFER TO STRUCTURAL DRAWINGS FOR DETAILS

DRAINAGE CHANNEL TO EXTEND FULL LENGTH OF PLOT 9b. REFER TO RAM-XX-ZZ-DR-D-10101 FOR FURTHER DETAILS.

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CONTINUATION ON MN2A-RAM-ZZ-XX-DR-C-000101

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KEY

- PROPOSED SURFACE WATER MANHOLE
- PROPOSED FOUL WATER MANHOLE
- PROPOSED COMBINED MANHOLE
- PROPOSED PUMP CHAMBER
- PROPOSED CATCH PIT CHAMBER
- PROPOSED FLOW CONTROL CHAMBER
- PROPOSED FOUL WATER DRAIN
- PROPOSED SURFACE WATER DRAIN
- PROPOSED PERFORATED PIPEWORK
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- BELOW GROUND ATTENUATION TANK
- PROPOSED PERMEABLE PAVING
- SU SUMP UNIT IN DRAINAGE CHANNEL
- AU ACCESS COVER FOR RODDING
- FG PROPOSED FLOOR GULLY
- RG PROPOSED ROAD GULLY
- SVP FOUL DISCHARGE PIPE
- RWP RAINWATER PIPE
- REDLINE BOUNDARY

Rev	Description	Date	By Chk	App
CR1	FINAL CONSTRUCTION ISSUE	08/11 2024	CO JJ	CK
C05	CONSTRUCTION ISSUE	30/05 2024	CO CO	CK
C04	UPDATED SLOT DRAIN LOCATIONS	03/05 2024	CO CO	CK
C03	CONSTRUCTION ISSUE	19/04 2023	CO CO	CK
C02	CONSTRUCTION ISSUE	08/12 2022	CO LF	CK
C01	CONSTRUCTION ISSUE HATCHED AREAS AT STAGE 4 AND ARE NOT FOR CONSTRUCTION	13/09 2022	CO CO	CK
P04	STAGE 4 ISSUE	31/05 2022	CO LF	CK

FINAL CONSTRUCTION ISSUE

PLOT 9a
FIRST STREET
MANCHESTER

RAMBOLL
tel 01244 311855 chester@ramboll.co.uk
www.ramboll.co.uk

PROPOSED DRAINAGE STRATEGY

SHEET 1 OF 2

Project No:	Scale (@A1):	Drawn:	Date:
1620002943	1:150	CO	SEPT 21

Drawing No: MN2A-RAM-ZZ-XX-DR-C-000100 Rev: CR1

07/11/2024 10:49:13

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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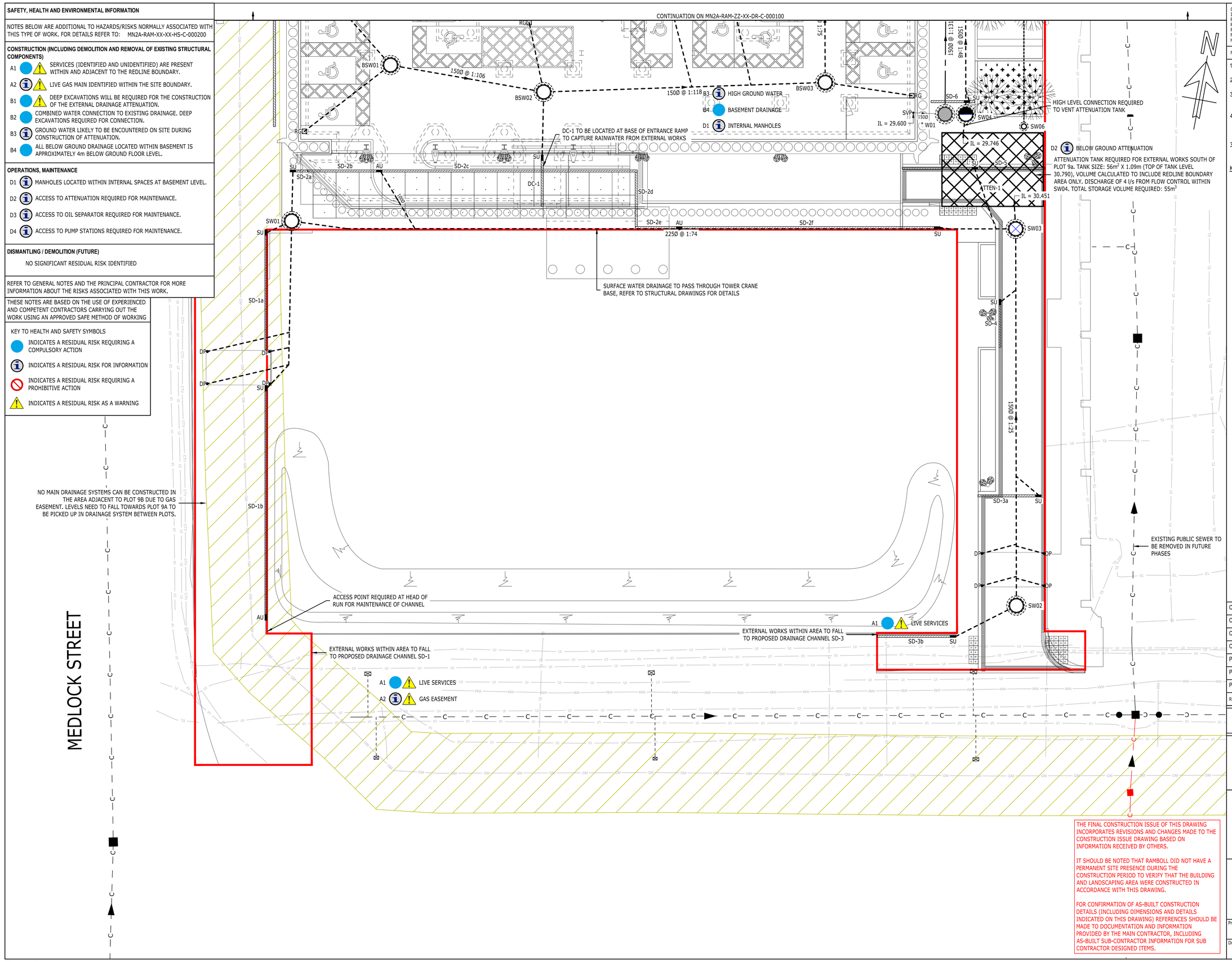
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C03	CONSTRUCTION	30/05 2024	CO	CO	CK
C02	UPDATED SLOT DRAIN LOCATIONS	03/05 2024	CO	CO	CK
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P03	STAGE 4 ISSUE	31/05 2022	CO	LF	CK
P02	STAGE 3 ISSUE	01/04 2022	CO	LS	CK
P01	PLANNING ISSUE	20/12 2021	CO	LS	CK

FINAL CONSTRUCTION ISSUE

PLOT 9a
FIRST STREET
MANCHESTER

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RAMBOLL
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www.ramboll.co.uk

PROPOSED DRAINAGE STRATEGY

SHEET 2 OF 2

Project No:	Scale (@A1):	Drawn:	Date:
1620002943	1:150	CO	DEC 21

Drawing No: MN2A-RAM-ZZ-XX-DR-C-000101 Rev: CR1

07/11/2024 10:49:18

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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- INDICATES A RESIDUAL RISK FOR INFORMATION
- INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION
- INDICATES A RESIDUAL RISK AS A WARNING

STUB CONNECTION TO BE PROVIDED TO PLOT 10A BOUNDARY FOR FUTURE PLOT 9B FOUL WATER CONNECTION. CONNECTION TO BE RESTRICTED TO A MAXIMUM FLOW RATE OF 11 L/S. EXISTING RIVER STREET DRAINAGE DIVERSION CANNOT ACCOMMODATE A HIGHER FLOW RATE.

9B-FW01
CL 31.980
IL 29.955

PLOT 9A SITE UNDER CONSTRUCTION. ANY WORKS OUTSIDE OF PLOT 10A BOUNDARY ASSUMED TO BE BUILT.

CONTRACTOR TO ENSURE EXISTING INFRASTRUCTURE (INCLUDING PIPES, MANHOLES & TANKS) ARE TO BE PROTECTED DURING THE WORKS.

CS01 (AS BUILT)
CL 30.690
IL 27.930

A1 LIVE SERVICES
B1 DRAINAGE CONSTRUCTION

150Ø @ 1:63

9B-FW02
CL 31.930
IL 29.810

150Ø @ 1:68

9B-FW03
CL 31.735
IL 29.696

150Ø @ 1:76

9B-FW04
CL 31.670
IL 29.130

IL = 29.100

STUB CONNECTION FOR FUTURE CONNECTION INTO RIVER STREET DIVERSION PIPEWORK.

9B-FW04 TO BE CONSTRUCTED ON PLOT 10a BOUNDARY. NO CONNECTION TO BE MADE TO BE MADE TO PUBLIC SEWER WITHOUT AGREEMENT WITH UNITED UTILITIES. NO FLOW TO TRAVEL THROUGH SYSTEM PRIOR TO FINAL OUTFALL BEING FORMED - SUBJECT TO SECTION 106 AGREEMENT.

INDICATIVE PLOT 10A TREE PIT ATTENUATION SYSTEM

PLOT 9A GEOCELLULAR ATTENUATION TANK

INDICATIVE PLOT 10A FOUL DRAINAGE PIPEWORK

A1 LIVE SERVICES

INDICATIVE PLOT 10A FOUNDATION LAYOUT

INDICATIVE PLOT 10A DRAINAGE CHANNEL

INDICATIVE PLOT 10A SURFACE WATER DRAINAGE

DRAINAGE TO BE CONSTRUCTED WITHIN PRIVATE LAND & IS TO BE SERVED BY PLOT 9b ONLY. NO EASEMENT REQUIRED AS THE DRAINAGE WOULD SERVE ONE PLOT.

A1 LIVE SERVICES
B1 DRAINAGE CONSTRUCTION

9B-FW02 DEPTH TO ENSURE PIPEWORK IS PLACED BELOW PROPOSED PLOT 10a TREE PIT ATTENUATION

PLOT 10A ITEMS ARE INDICATIVE & BASED ON DESIGN PROPOSALS. EXTENT SUBJECT TO CHANGE PRIOR TO CONSTRUCTION.

FOUL WATER MANHOLE SCHEDULE

Manhole No.	Cover Level (m)	Invert Level (m)	Depth to Invert (m)	Main Channel (mm)	Branches	Manhole Type	Chamber Size (mm)	Cover Size (mm)	Cover Loading	Comment	Co-ordinates (mm) EastingNorthing
9B-FW01	31.980	29.955	2.025	150Ø	150Ø @ IL 29.955 In 150Ø @ IL 29.955 Out	PCC	1200Ø	600x600	D400	-	383756530,397254564
9B-FW02	31.930	29.810	2.120	150Ø	150Ø @ IL 29.810 In 150Ø @ IL 29.810 Out	PCC	1200Ø	600x600	D400	-	383763423,397261180
9B-FW03	31.735	29.696	2.039	150Ø	150Ø @ IL 29.696 In 150Ø @ IL 29.696 Out	PCC	1200Ø	600x600	D400	-	383759176,397267851
9B-FW04	31.670	29.130	2.540	150Ø	150Ø @ IL 29.115 In 150Ø @ IL 29.115 Out	PCC	1200Ø	750x600	D400	-	383738318,397307079

IMPORTANT - NO POSITIVE CONNECTION TO BE MADE FROM 9B-FW03 ONTO PUBLIC SEWER WITHOUT FORMAL S106 APPLICATION BEING SUBMITTED & APPROVED. CONNECTION IS NOT PART OF THIS PROPOSAL.

29/11/2024 14:23:18

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Notes

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3. REFER TO PROPOSED DRAINAGE NOTES DRAWING MN2A-RAM-ZZ-XX-DR-C-000001 FOR FURTHER DETAILS.

KEY

- PROPOSED FOUL WATER MANHOLE
- PROPOSED FOUL WATER DRAIN
- PROPOSED PLOT 9A & 10A DRAINAGE MANHOLE CHAMBERS
- PROPOSED PLOT 9A & 10A DRAINAGE PIPEWORK
- PROPOSED PLOT 9A & 10A DRAINAGE CHANNEL WITH SUMP UNIT
- BELOW GROUND ATTENUATION TANK
- PROPOSED PERMEABLE PAVING
- PLOT 10A REDLINE BOUNDARY

THE FINAL CONSTRUCTION ISSUE OF THIS DRAWING INCORPORATES REVISIONS AND CHANGES MADE TO THE CONSTRUCTION ISSUE DRAWING BASED ON INFORMATION RECEIVED BY OTHERS.

IT SHOULD BE NOTED THAT RAMBOLL DID NOT HAVE A PERMANENT SITE PRESENCE DURING THE CONSTRUCTION PERIOD TO VERIFY THAT THE BUILDING AND LANDSCAPING AREA WERE CONSTRUCTED IN ACCORDANCE WITH THIS DRAWING.

FOR CONFIRMATION OF AS-BUILT CONSTRUCTION DETAILS (INCLUDING DIMENSIONS AND DETAILS INDICATED ON THIS DRAWING) REFERENCES SHOULD BE MADE TO DOCUMENTATION AND INFORMATION PROVIDED BY THE MAIN CONTRACTOR, INCLUDING AS-BUILT SUB-CONTRACTOR INFORMATION FOR SUB CONTRACTOR DESIGNED ITEMS.

Rev	Description	Date	By	Chk	App
CR1	FINAL CONSTRUCTION ISSUE	02/12 2024	CO	JI	CK
C01	ISSUED FOR CONSTRUCTION	03/07 2024	CO	CO	NM
P01	ISSUED FOR TENDER	18/04 2024	CO	GS	NM

FINAL CONSTRUCTION ISSUE

PLOT 9a
FIRST STREET
MANCHESTER

RAMBOLL

tel 01244 311855 chester@ramboll.co.uk
www.ramboll.co.uk

PROPOSED FOUL WATER DRAINAGE STRATEGY FOR FIRST STREET DRAIN SERVING 9b

Project No:	Scale (@A1):	Drawn:	Date:
1620002943	1:100	CO	APR 24

Drawing No:	Rev:
MN2A-RAM-ZZ-XX-DR-C-000150	CR1

SURFACE WATER MANHOLE SCHEDULE

Manhole No.	Cover Level (m)	Invert Level (m)	Depth to Invert (m)	Main Channel (mm)	Branches	Manhole Type	Chamber Size (mm)	Cover Size (mm)	Cover Loading	Comment	Co-ordinates (mm) EastingNorthing
BSW01	27.115	25.775	1.340	150Ø	150Ø @ IL 25.775 In 150Ø @ IL 25.775 In 150Ø @ IL 25.775 Out	PCC	1200Ø	750x600	D400	-	383704147,397246456
BSW02	27.115	25.648	1.467	150Ø	150Ø @ IL 25.648 In 150Ø @ IL 25.648 In 150Ø @ IL 25.648 In 150Ø @ IL 25.648 Out	PCC	1200Ø	750x600	D400	-	383717034,397250553
BSW03	27.115	25.440	1.675	150Ø	150Ø @ IL 25.440 In 150Ø @ IL 25.440 In 150Ø @ IL 25.440 Out	PCC	1200Ø	600x600	D400	-	383738333,397262629
BSW04	27.115	24.845	2.270	150Ø	150Ø @ IL 25.295 In 150Ø @ IL 25.295 In 150Ø @ IL 25.295 Out	PCC	1200Ø	600x600	D400	Catchpit	383733254,397272236
BSW05	27.115	25.752	1.363	150Ø	150Ø @ IL 25.752 Out	PCC	1200Ø	750x600	D400	-	383701532,397267139
BSW06	27.115	25.535	1.580	150Ø	150Ø @ IL 25.535 In 150Ø @ IL 25.535 In 150Ø @ IL 25.535 Out	PCC	1200Ø	750x600	D400	-	383722386,397277916
BSW07	27.115	25.140	1.975	150Ø	150Ø @ IL 25.140 In 150Ø @ IL 25.140 In 150Ø @ IL 25.140 Out	PCC	1200Ø	600x600	D400	-	383728662,397281126
BSW08-PS	27.115	REFER TO PUMP STATION SCHEDULE FOR DETAILS						600x600	D400		383727343,397283822
SW01	32.510	31.330	1.180	225Ø	150Ø @ IL 31.330 In 150Ø @ IL 31.330 In 150Ø @ IL 31.330 In 225Ø @ IL 31.330 Out	PCC	1200Ø	750x600	D400	Recessed, Single Sealed & Lockable	383702818,397230455
SW02	33.115	31.791	1.324	150Ø	150Ø @ IL 31.791 In 150Ø @ IL 31.791 Out	PCC	1200Ø	750x600	D400	Recessed, Single Sealed & Lockable	383774138,397230031
SW03	31.945	30.031	1.914	225Ø	225Ø @ IL 30.481 In 150Ø @ IL 30.481 In 225Ø @ IL 30.481 Out	PCC	1200Ø	600x600	D400	Catchpit, Recessed, Single Sealed & Lockable	383758908,397259024
SW04	31.650	29.219	2.431	150Ø	225Ø @ IL 29.669 In 150Ø @ IL 29.669 Out	PCC	1200Ø	600x600	D400	Flow Control, Recessed, Single Sealed & Lockable	383750452,397265836
SW05	31.090	28.877	2.213	150Ø	150Ø @ IL 29.327 In 150Ø @ IL 29.327 In 150Ø @ IL 29.327 Out	PCC	1200Ø	600x600	D400	Catchpit, Recessed, Single Sealed & Lockable	383742862,397280286
SW06	31.660	30.645	1.015	150Ø	150Ø @ IL 30.645 Out	PPIC	450Ø	450x450	D400	Recessed, Single Sealed & Lockable	383755409,397267246
SW07	30.890	29.620	1.270	150Ø	150Ø @ IL 29.620 In 150Ø @ IL 29.620 Out	PPIC	450Ø	450x450	D400	Recessed, Single Sealed & Lockable	383742671,397291602
SW08	30.850	28.905	1.945	150Ø	150Ø @ IL 29.355 In 150Ø @ IL 29.355 Out	PCC	1200Ø	600x600	D400	Catchpit, Recessed, Single Sealed & Lockable	383741018,397294520
SW09	30.925	28.848	2.077	225Ø	150Ø @ IL 28.848 In 65Ø @ IL 28.848 In 225Ø @ IL 28.848 Out R.M. @ IL T.B.C. In	PCC	1200Ø	600x600	D400	Recessed, Single Sealed & Lockable	383730407,397292111
SW10	30.855	29.038	1.817	150Ø	150Ø @ IL 29.488 In 150Ø @ IL 29.488 In 150Ø @ IL 29.488 In 150Ø @ IL 29.488 Out	PCC	1200Ø	600x600	D400	Catchpit, Recessed, Single Sealed & Lockable	383727285,397293623
SW11	28.448	27.720	0.728	150Ø	225Ø @ IL 28.220 In 150Ø @ IL 28.120 Out	PCC	1200Ø	600x600	D400	Flow Control, Recessed, Single Sealed & Lockable	383739199,397300375

ATTENUATION TANK SCHEDULE

REF.	MANUFACTURER & TYPE	MIN. STORAGE VOLUME (m^3)	PLAN AREA (m^2)	HEIGHT (m)	INVERT LEVEL (m)	PIPE IN INVERT (m)	PIPE OUT INVERT (m)
ATTEN-1	GRAF ECOBLOC MAXX (96% VOID RATIO)	58	56	1.090	29.670	225Ø @ 30.451	225Ø @ 29.746
ATTEN-2	GRAF ECOBLOC MAXX (96% VOID RATIO)	111.48	80.64	1.440	28.140	150Ø @ 29.272 150Ø @ 29.185 150Ø @ 29.210 225Ø @ 28.421	225Ø @ 28.199

1. TANK TO BE WRAPPED AND TAPED IN IMPERMEABLE GEOMEMBRANE AND GEOTEXTILE PROTECTION FLEECE. WELDED JOINTS REQUIRED DUE TO GROUND WATER LEVELS AND DEPTHS OF TANKS.
2. 100mm VENT PIPE FROM SOFFIT LEVEL OF TANK INTO DOWNSTREAM MANHOLE TO BE PROVIDED.
3. BEDDING AND SURROUND TO BE 150mm OF 6H SHARP SAND ON UNDISTURBED GROUND WITH 5% CBR AND FULL PERIMETER TO PROTECT GEOTEXTILE AND GEOMEMBRANE.

OIL SEPARATOR SCHEDULE

REF.	MANUFACTURER & TYPE	DESIGNATION	COVER LEVEL	OIL CAPACITY	OVERALL LENGTH (mm)	OVERALL DIAMETER (mm)	INLET INVERT/ DIA (m/ mm)	OUTLET INVERT/ DIA (m/ mm)	COVER SIZE (mm)	COVER LOADING
OS-1	SPEL STORMCEPTOR CLASS 1	NSB3	27.115	45 LITRES	1550mm	1300mm Ø	25.305 / 150	25.255 / 150	450 dia	D400

1. BESPOKE SQUARE COVER AND CONCRETE SUPPORT AROUND CIRCULAR ACCESS SHAFT
2. OIL SEPARATOR TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS. TO BE INSTALLED ON 500mm FND2 CONCRETE BASE WITH 500mm CONCRETE SURROUND.
3. OIL ALARM LINKED TO BMS REQUIRED. DN100 VENT PIPE TO ABOVE GROUND TO BE INSTALLED AND TERMINATED IN A LOCATION AGREED BY THE ARCHITECT

PUMPING STATION SCHEDULE

REF.	MANUFACTURER & TYPE	CONFIGURATION	CHAMBER SIZE (m)	PUMP DUTY (l/s)	PUMPING MAIN	GEODETIC HEAD (m)	PIPE IN INVERT (m)	MAIN OUT LEVEL (m)	SUMP LEVEL (m)
BSW08-PS	PACKED PUMPING STATIONS LTD - PACKAGED PUMP STATION	DUTY / STANDBY	1.800m Ø	DUTY @ 2.5 L/S STANDBY @ 2.5 L/S	AS PER PACKAGED PUMPING STATIONS DESIGN	AS PER PACKAGED PUMPING STATIONS DESIGN	150Ø @ 25.140m AOD	AS PER PACKAGED PUMPING STATIONS DESIGN	AS PER PACKAGED PUMPING STATIONS DESIGN

1. REFER TO M&E ENGINEERS DRAWINGS FOR CONTROL PANEL LOCATIONS, BMS LINKAGE AND POWER SUPPLY
2. DN100 VENT PIPE TO ABOVE GROUND TO BE INSTALLED AND TERMINATED IN A LOCATION AGREED BY THE ARCHITECT. APPROXIMATE LOCATIONS INDICATED ON GENERAL ARRANGEMENT.
3. ANCILLARY REQUIREMENTS TO BE CONFIRMED BY SPECIALIST PUMP MANUFACTURER.
4. ALL INFORMATION PROVIDED IN THIS SCHEDULE IS SUBJECT TO DETAILED DESIGN BY M&E CONTRACTOR AND PUMP SPECIALIST/MANUFACTURER
5. RISING MAIN & WET WELL ARE TO BE SIZED TO EMPTY DURING EACH CYCLE
6. STORAGE REQUIREMENT BEING SATISFIED WITHIN BELOW GROUND DRAINAGE SYSTEM IS TO BE SIGNED OFF BY BUILDING CONTROL PRIOR TO ANY CONSTRUCTION WORKS

FOUL WATER MANHOLE SCHEDULE

Manhole No.	Cover Level (m)	Invert Level (m)	Depth to Invert (m)	Main Channel (mm)	Branches	Manhole Type	Chamber Size (mm)	Cover Size (mm)	Cover Loading	Comment	Co-ordinates (mm) EastingNorthing
FW01	31.660	29.460	2.200	150Ø	150Ø @ IL 29.460 In 150Ø @ IL 29.460 Out	PCC	1200Ø	750x600	D400	Recessed, Double Sealed & Lockable	383748842,397265009
FW02	31.220	29.359	1.861	150Ø	150Ø @ IL 29.359 In 150Ø @ IL 29.359 In 150Ø @ IL 29.359 Out	PCC	1200Ø	750x600	D400	Recessed, Double Sealed & Lockable	383742797,397276773
FW03	30.840	28.912	1.928	150Ø	150Ø @ IL 28.912 In 150Ø @ IL 28.912 Out	PCC	1200Ø	750x600	D400	Recessed, Double Sealed & Lockable	383730945,397299232

COMBINED WATER MANHOLE SCHEDULE

Manhole No.	Cover Level (m)	Invert Level (m)	Depth to Invert (m)	Main Channel (mm)	Branches	Manhole Type	Chamber Size (mm)	Cover Size (mm)	Cover Loading	Comment	Co-ordinates (mm) EastingNorthing
CW01	30.840	28.087	2.753	150Ø 150Ø	150Ø @ IL 28.087 In 150Ø @ IL 28.087 In 150Ø @ IL 28.087 Out 150Ø @ IL 28.087 Out	PCC	1200Ø	600x600	D400	Recessed, Double Sealed & Lockable Outlets from chamber to be fitted with non-return valves	383737686,397302809

CHANNEL DRAIN SCHEDULE

REF.	MANUFACTURER & TYPE	DESIGNATION	COVER LOADING AND MINIMUM TYPE	NUMBER OF OUTLETS	OUTLET DIA (mm)	LENGTH (m)	DRAINED AREA (m^2)
SD-1a	ACO MULTIDRAIN	M100D 30.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	10.5	85
SD-1b	ACO MULTIDRAIN	M100D 30.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	25.5	252
SD-2a	ACO MULTIDRAIN	M100D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	1.5	35
SD-2b	ACO MULTIDRAIN	M100D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	100	6.5	107
SD-2c	ACO MULTIDRAIN	M150D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	CONNECTION INTO SD-2d		22	
SD-2c	ACO MULTIDRAIN	M150D 10.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	CONNECTION INTO SD-2e		3.5	381
SD-2e	ACO MULTIDRAIN	M150D 20.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	100	3.6	
SD-2f	ACO MULTIDRAIN	M200D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	22.5	51
SD-3a	ACO MULTIDRAIN	M100D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	7.6	128
SD-3b	ACO MULTIDRAIN	M100D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	7	21
SD-4	ACO MULTIDRAIN	M100D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	4.2	88
SD-5	ACO MULTIDRAIN	M100D 20.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	12.4	242
SD-6	ACO MULTIDRAIN	M100D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	3	48
SD-7	ACO MULTIDRAIN	M100D 10.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	3	216
SD-8	REMOVED AS OF C04 UPDATE						
SD-9a	ACO MULTIDRAIN	M100D 10.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	CONNECTION INTO SD-9b		3	63
SD-9b	ACO MULTIDRAIN	M100D 20.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	5	165
SD-9c	ACO MULTIDRAIN	M100D 10.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	10	200
SD-10	ACO MULTIDRAIN	M100D 0.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	4.2	54
SD-11	ACO MULTIDRAIN	M150D 20.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	40	480
SD-12	ACO MULTIDRAIN	M100D 10.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	4.7	153
SD-13	REMOVED AS OF C03 UPDATE						
SD-14	ACO MULTIDRAIN	M100D 30.0	D400 BRICKSLOT SINGLE SLOT OFFSET GALVANISED STEEL	1	150	21	388
DC-1	ACO MULTIDRAIN	M100D 30.0	D400 HEELGAURD DUCTILE IRON	1	150	4.5	370
KD-1a	ACO ROADDRAIN	PD100 F 30.1	F900 ROADDRAIN PD100 F 30.1 CHANNEL	CONNECTION INTO KD-1b		20	250
KD-1b	ACO KERBDRAIN	KD HB480	D400 KERBDRAIN HB480 CHANNEL	1	225	42	350

ALL CHANNELS HAVE BEEN DESIGNED FOR A DESIGN RAINFALL INTENSITY OF 110mm/hr (1in5yr EVENT +40% CLIMATE CHANGE, WITH A RISK CATEGORY 3)
ALL OUTLETS TO BE DN150 WITH SUMPS AND RODDABLE TRAPS UNO

VORTEX FLOW CONTROL SCHEDULE

MANUFACTURER & UNIT: ACO Q BRAKE
MANHOLE REF: SW04
DESIGN FLOW: 4 l/s
DESIGN HEAD: 1.09m

HEADLOSS (m)	FLOW RATE (l/s)	HEADLOSS (m)	FLOW RATE (l/s)	HEADLOSS (m)	FLOW RATE (l/s)
0.1	2.7	0.4	3.8	0.8	3.5
0.2	3.8	0.5	3.1	1.0	3.9
0.3	4.0	0.6	3.0	1.09	4.0

MANUFACTURER & UNIT: ACO Q BRAKE
MANHOLE REF: SW11
DESIGN FLOW: 7.5 l/s
DESIGN HEAD: 1.44m

HEADLOSS (m)	FLOW RATE (l/s)	HEADLOSS (m)	FLOW RATE (l/s)	HEADLOSS (m)	FLOW RATE (l/s)
0.1	4.5	0.6	6.4	1.2	6.9
0.2	6.3	0.8	5.6	1.4	7.5
0.4	7.4	1.0	6.3	1.44	7.5

ALL FLOW CONTROL DEVICES HAVE BEEN SIZED TO REDUCE UPSTREAM STORAGE VOLUMES.
THE BELOW GROUND DRAINAGE SYSTEM HAS BEEN SIZED BASED ON THE HEAD/DISCHARGE RELATIONSHIP FOR THE ACO Q BRAKE AS SPECIFIED ABOVE. SHOULD ANOTHER TYPE/MANUFACTURER OF THE FLOW CONTROL DEVICE BE SPECIFIED THEN THE VOLUME OF THE BELOW GROUND ATTENUATION TANK AND ASSOCIATED PIPE SIZES WILL BE INCORRECT AND MAY REQUIRE RE-DESIGNING

NON RETURN VALVE SCHEDULE

MANHOLE REF.	DRAINAGE SYSTEM	MANUFACTURER & TYPE	TYPE
SW09	SURFACE WATER	ALTHON WASTOP	WASTOP SS225mm GRADE 304
CW01 (INLET FROM SW11)	SURFACE WATER	ALTHON WASTOP	WASTOP SS150mm GRADE 304
CW01 (BOTH OUTLETS)	COMBINED	ALTHON WASTOP	WASTOP SS150mm GRADE 304
	COMBINED	ALTHON WASTOP	WASTOP SS150mm GRADE 304

ALL NON RETURN VALVES TO BE INSTALLED AS PER MANUFACTURER'S REQUIREMENTS
ALL NON RETURN VALVES TO BE FITTED ON DOWNSTREAM PIPE U.N.O (I.E. MANHOLE OUTLET)

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

NOTES BELOW ARE ADDITIONAL TO HAZARDS/RISKS NORMALLY ASSOCIATED WITH THIS TYPE OF WORK. FOR DETAILS REFER TO: MN2A-RAM-XX-XX-HS-C-000200

CONSTRUCTION (INCLUDING DEMOLITION AND REMOVAL OF EXISTING STRUCTURAL COMPONENTS)

A1 SERVICES (IDENTIFIED AND UNIDENTIFIED) ARE PRESENT WITHIN AND ADJACENT TO THE REDLINE BOUNDARY.
A2 LIVE GAS MAIN IDENTIFIED WITHIN THE SITE BOUNDARY.
B1 DEEP EXCAVATIONS WILL BE REQUIRED FOR THE CONSTRUCTION OF THE EXTERNAL DRAINAGE ATTENUATION.
B2 COMBINED WATER CONNECTION TO EXISTING DRAINAGE. DEEP EXCAVATIONS REQUIRED FOR CONNECTION.
B3 GROUND WATER LIKELY TO BE ENCOUNTERED ON SITE DURING CONSTRUCTION OF ATTENUATION.
B4 ALL BELOW GROUND DRAINAGE LOCATED WITHIN BASEMENT IS APPROXIMATELY 4m BELOW GROUND FLOOR LEVEL. POSSIBLE UNKNOWN CONNECTIONS.

OPERATIONS, MAINTENANCE

D1 MANHOLES LOCATED WITHIN INTERNAL SPACES AT BASEMENT LEVEL.
D2 ACCESS TO ATTENUATION REQUIRED FOR MAINTENANCE.
D3 ACCESS TO OIL SEPARATOR REQUIRED FOR MAINTENANCE.
D4 ACCESS TO PUMP STATIONS REQUIRED FOR MAINTENANCE.

DISMANTLING / DEMOLITION (FUTURE)

NO SIGNIFICANT RESIDUAL RISK IDENTIFIED

REFER TO GENERAL NOTES AND THE PRINCIPAL CONTRACTOR FOR MORE INFORMATION ABOUT THE RISKS ASSOCIATED WITH THIS WORK.

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3. REFER TO PROPOSED DRAINAGE NOTES DRAWING MN2A-RAM-ZZ-XX-DR-C-000001 FOR FURTHER DETAILS.
4. REFER TO THE BELOW FOR ABBREVIATIONS USED ON THIS DRAWING:
   PCC = PRECAST CONCRETE MANHOLE
   PPIC = POLYPROPYLENE INSPECTION CHAMBER
   RM = RISING MAIN
5. BRANCH CONNECTIONS OF DN150 OR LESS TO DISCHARGE INTO MAIN CHANNEL AT HALF PIPE LEVEL.
6. BRANCH CONNECTIONS GREATER THAN DN150 TO BE SET LEVEL WITH SOFFIT OF MAIN DRAIN.

THESE NOTES ARE BASED ON THE USE OF EXPERIENCED AND COMPETENT CONTRACTORS CARRYING OUT THE WORK USING AN APPROVED SAFE METHOD OF WORKING

KEY TO HEALTH AND SAFETY SYMBOLS

- INDICATES A RESIDUAL RISK REQUIRING A COMPULSORY ACTION
- INDICATES A RESIDUAL RISK FOR INFORMATION
- INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION
- INDICATES A RESIDUAL RISK AS A WARNING

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CR1	FINAL CONSTRUCTION ISSUE	08/11 2024	CO JJ	CK	
C05	CONSTRUCTION ISSUE	30/05 2024	CO CO	CK	
C04	CONSTRUCTION ISSUE	03/05 2024	CO CO	CK	
C03	CONSTRUCTION ISSUE	19/04 2023	CO CO	CK	
C02	CONSTRUCTION ISSUE	08/12 2022	CO LF	CK	
C01	CONSTRUCTION ISSUE HATCHED AREAS AT STAGE 4 AND ARE NOT FOR CONSTRUCTION	13/09 2022	CO CO	CK	
P03	STAGE 4 ISSUE - UPDATED LEVELS	25/07 2022	CO LF	CK	
P02	STAGE 4 ISSUE	31/05 2022	CO LF	CK	
P01	STAGE 3 ISSUE	01/04 2022	CO LS	CK	

FINAL CONSTRUCTION ISSUE

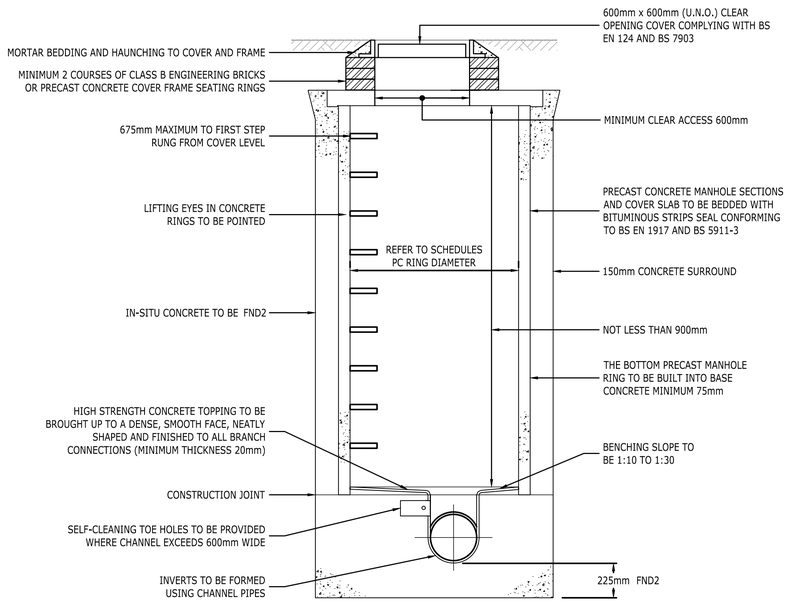
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PROPOSED MANHOLE SCHEDULE

Project No:	Scale (@A1):	Drawn:	Date:
1620002943	N/A	CO	03/2022

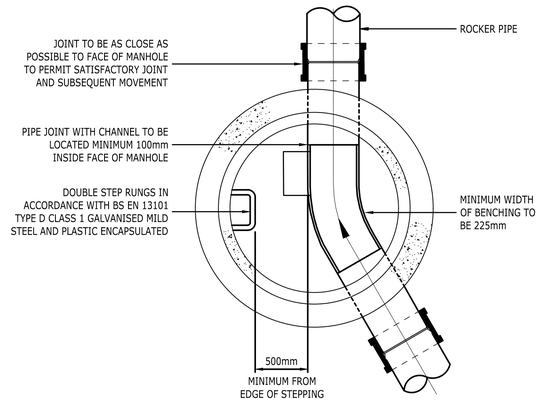
Drawing No: MN2A-RAM-ZZ-XX-DR-C-000200 Rev: CR1



TYPICAL MANHOLE DETAIL - TYPE 2

MAXIMUM DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE 3.0m

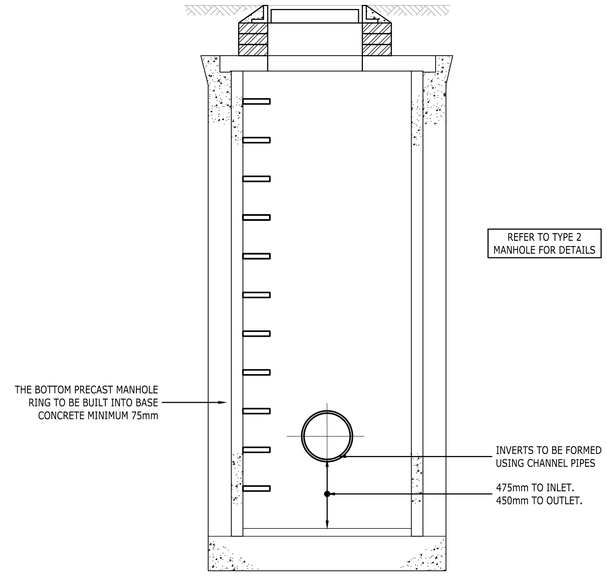
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TYPICAL MANHOLE DETAIL - TYPE 2

PLAN VIEW

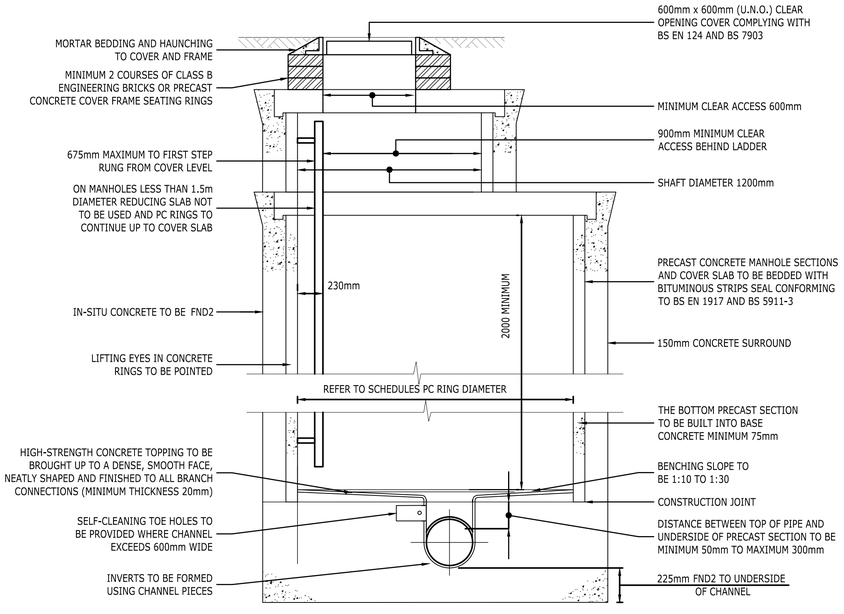
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TYPICAL CATCHPIT DETAIL - TYPE 2

MAXIMUM DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE 3.0m

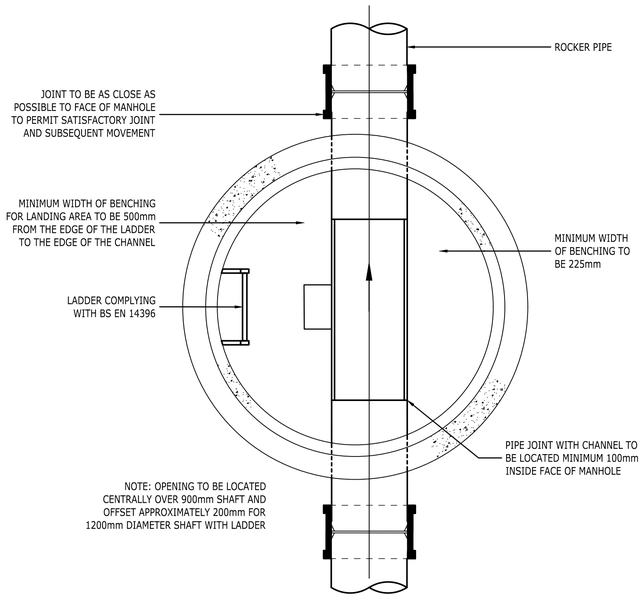
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TYPICAL MANHOLE DETAIL - TYPE 1A

DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE 3m TO 6m

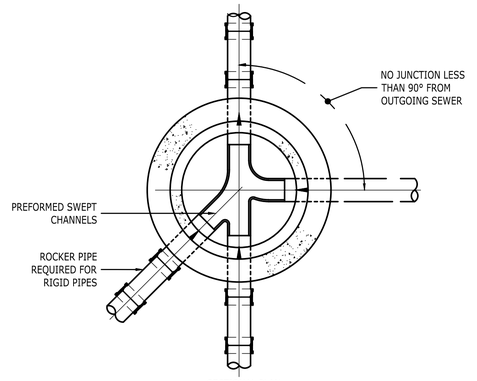
SCALE 1:20



TYPICAL MANHOLE DETAIL - TYPE 1A

PLAN VIEW

SCALE 1:20



SECTIONAL PLAN

RIGID PIPES BUILT INTO MANHOLE SHOULD HAVE A FLEXIBLE JOINT AS CLOSE AS FEASIBLE TO THE EXTERNAL FACE OF THE STRUCTURE AND THE LENGTH OF THE NEXT ROCKER PIPE SHOULD BE AS SHOWN

NOMINAL DIAMETER (mm)	MAXIMUM EFFECTIVE LENGTH (m)
150-600	0.6
601-750	1.00
OVER 750	1.25

ALL PIPES ENTERING THE BOTTOM OF THE MANHOLE TO HAVE SOFFITS LEVEL

TYPICAL ARRANGEMENT OF PIPE JUNCTIONS WITHIN MANHOLES

SCALE 1:20

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P01	STAGE 3 ISSUE	01/04/2022	CO	LS	CK

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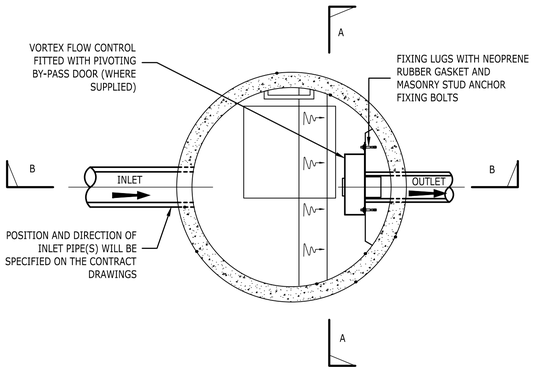
STANDARD DRAINAGE DETAILS SHEET 1

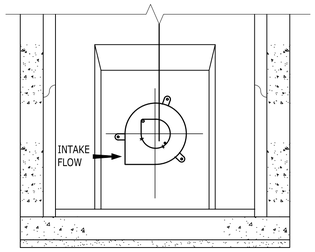
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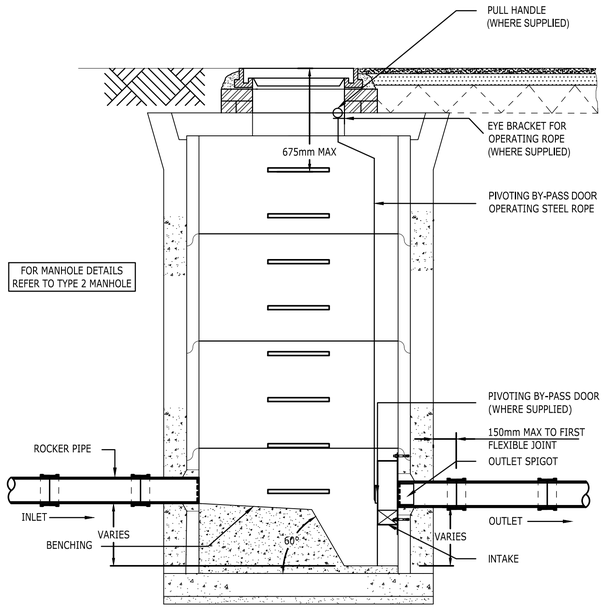
Rev: CR1

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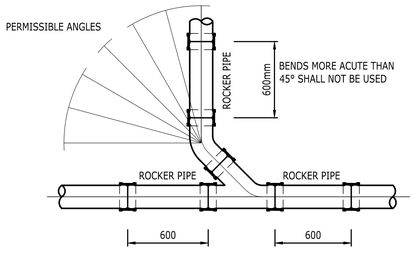
SECTION A-A



SECTION B-B

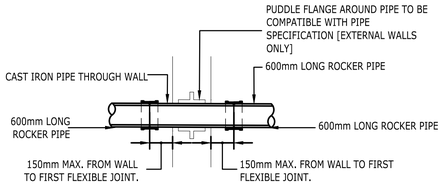
TYPICAL VORTEX FLOW CONTROL UNIT

NOT TO SCALE



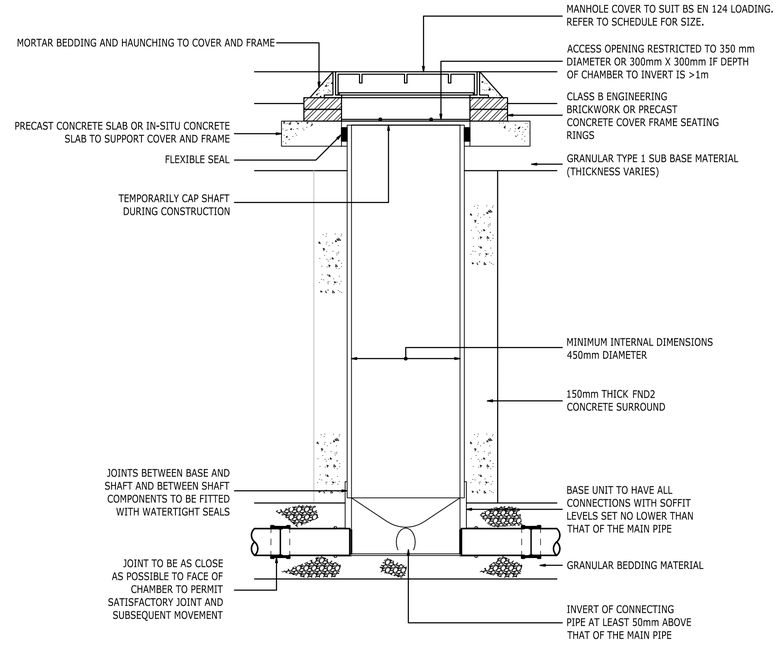
OBLIQUE JUNCTION ARRANGEMENT

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PIPE PASSING THROUGH CONCRETE WALL TYPICAL DETAIL

SCALE 1:20

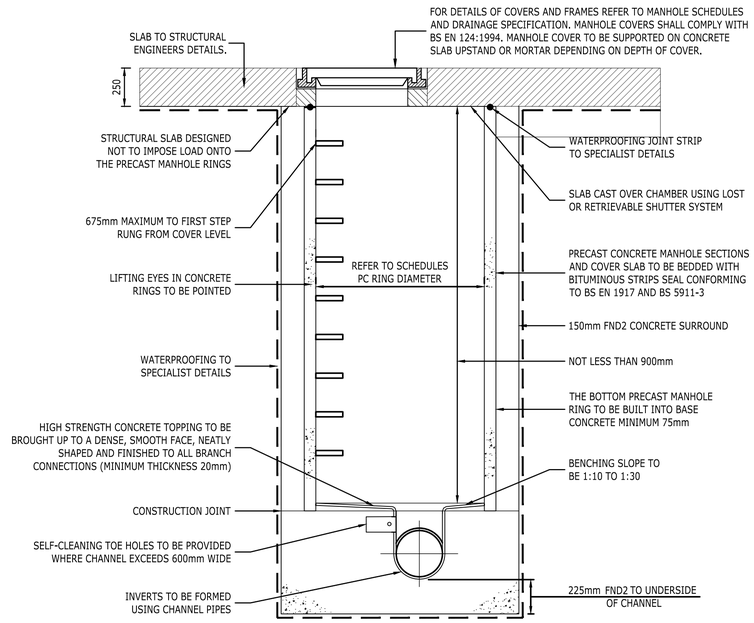


TYPICAL INSPECTION CHAMBER DETAIL - TYPE 3

MAXIMUM DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE IN AREAS SUBJECT TO VEHICLE LOADING 3m, NON-ENTRY

PLASTIC CHAMBERS AND RINGS SHALL COMPLY WITH BS EN 13598-1 AND BS EN 13598-2 OR HAVE EQUIVALENT INDEPENDENT APPROVAL

SCALE 1:20



INTERNAL MANHOLE DETAIL

MAXIMUM DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE 3.0m

SCALE 1:20

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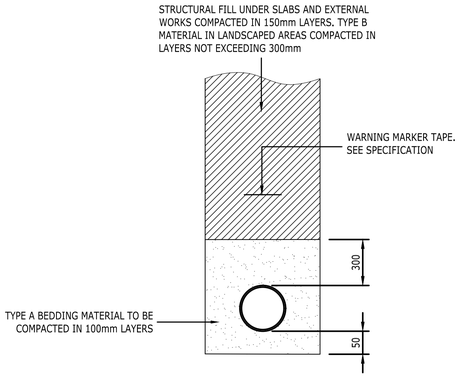
STANDARD DRAINAGE DETAILS SHEET 2

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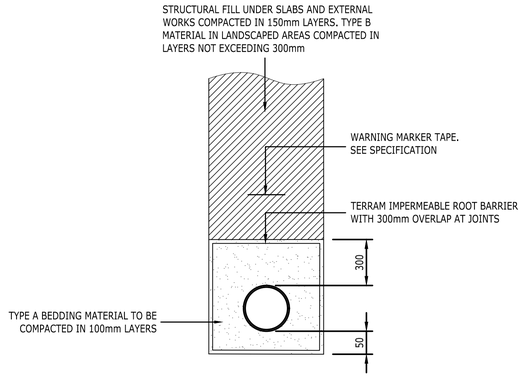
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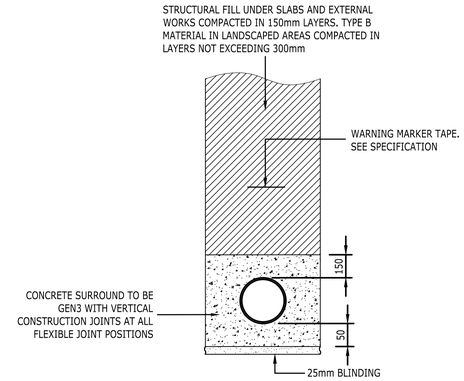
CLASS S

TO BE USED WHERE DEPTH OF COVER TO PIPE IS GREATER THAN 1200mm



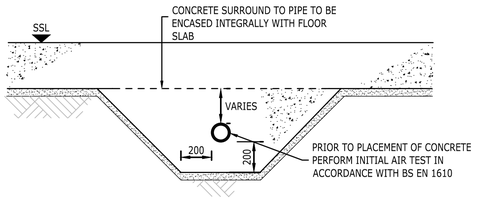
CLASS S

(WITH ROOT BARRIER)



CLASS Z

TO BE USED WHERE DEPTH OF COVER TO PIPE IS LESS THAN 1200mm



CLASS Y

(TO BE USED UNDER GROUND BEARING SLAB)

PIPE BEDDING NOTES:

1. ALL MATERIALS SHALL COMPLY WITH THE SPECIFICATION
2. TYPE A BEDDING MATERIAL TO BE:-

NOMINAL BORE OF PIPE (mm)	SIZE (mm) SINGLE SIZED	GRADED
100-150	10-15	-
225-300	10, 14 OR 20	14 TO 5 OR 20 TO 5
375-500	14 OR 20	14 TO 5 OR 20 TO 5
OVER 500	10, 20 OR 40	14 TO 5, 20 TO 5, 40 TO 5

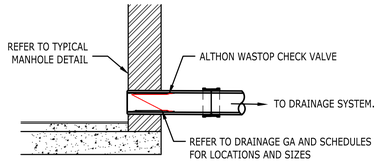
3. TRENCH WIDTHS TO BE:-

NOMINAL BORE OF PIPE (mm)	NOMINAL TRENCH WIDTH (METRES)
100	0.55
150	0.60
225	0.70
300	0.75
375	1.05
450	1.15
600	1.20

4. UNLESS AGREED OTHERWISE STRUCTURAL FILL UP TO FORMATION TO BE DfT TYPE 1
6. TYPE B FILL SHALL BE SELECTED OF READILY COMPACTABLE MATERIAL, FREE FROM TREE ROOTS, VEGETABLE MATTER, BUILDING RUBBISH, FROZEN SOIL, CLAY LUMPS OR OTHER MATTER WHICH WOULD BE RETAINED ON A 75mm SIEVE AND STONES WHICH WOULD BE RETAINED ON A 25mm SIEVE

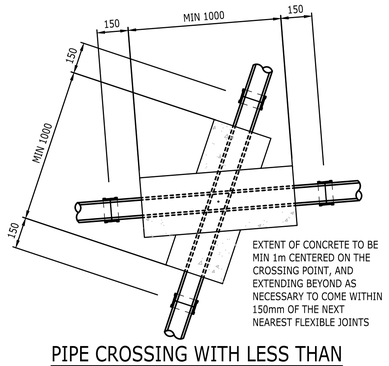
PIPE BEDDING DETAILS

SCALE 1:20



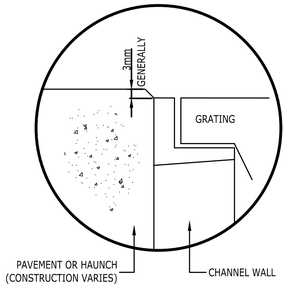
TYPICAL INLINE NON RETURN VALVE DETAIL

SCALE 1:20

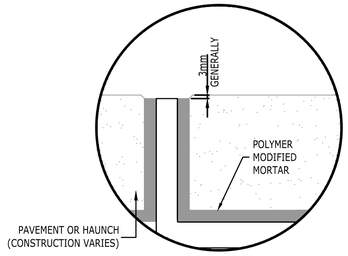


PIPE CROSSING WITH LESS THAN 300mm SEPARATION (PLAN)

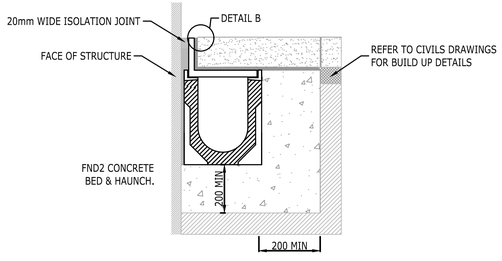
NOT TO SCALE



DETAIL A

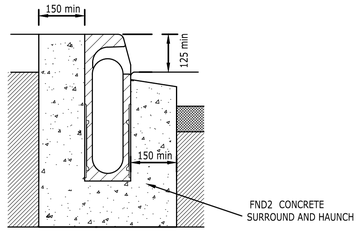


DETAIL B



TYPICAL SLOT DRAIN - ADJACENT TO STRUCTURE

SCALE 1:10



TYPICAL KERB DRAIN

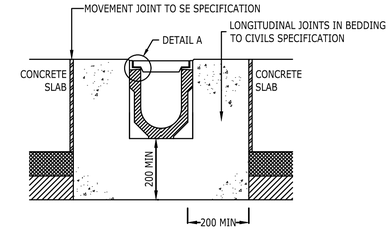
SCALE 1:10

1.0 SURFACE PROTECTION: IN ASPHALT PAVEMENTS AVOID CONTACT BETWEEN COMPACTION EQUIPMENT AND CHANNEL/GRATING. THIS MAY BE ACHIEVED BY ENSURING THAT THE FINISHED SURFACE LEVEL LIES ABOVE THE GRATING LEVEL (BY AT LEAST 3mm). STONES SHOULD BE REMOVED FROM GRATING PRIOR TO LAYING/ROLLING WEARING COURSE.

2.0 A CHANNEL INSTALLATION IS NOT COMPLETE UNTIL THE FINAL SURFACING IS LAID. IN ANY TEMPORARY CONDITION, I.E WITH THE CHANNEL WALLS PROJECTING ABOVE AN ASPHALT BASE COURSE OR CONCRETE SUB-BASE, SITE TRAFFIC SHOULD NOT CROSS CHANNELS. LOOSE BOARDS; STONE FILL OR COVER PLATES WILL NOT PROTECT THE CHANNEL WALLS OR GRATING. A TEMPORARY CHANNEL CROSSING SHOULD BE FORMED BY RAISING THE ASPHALT BASE COURSE LOCALLY, TO 3 - 5mm ABOVE GRATING LEVEL, EITHER SIDE OF A CHANNEL FOR A DISTANCE OF 750 TO 1000mm SAY, TO FORM RAMPS. CONCRETE RAMPS SHOULD BE FORMED IN OTHER PAVEMENTS.

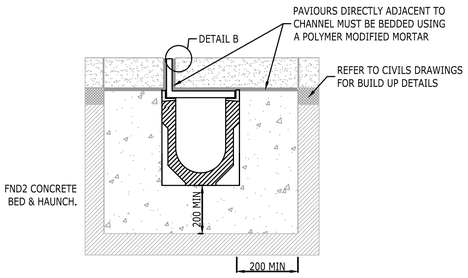
3.0 ASPHALT PAVEMENT: TOP OF CONCRETE HAUNCH
Y2 = 35mm MAXIMUM
Y3 = 70mm MAXIMUM

4.0 BOLTS: TO COMPLETE THE INSTALLATION, TIGHTEN THE GRATING FIXING BOLTS TO A TORQUE OF 40NM.



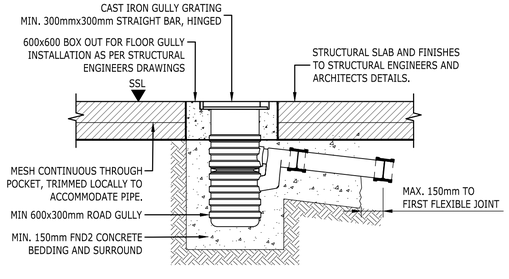
TYPICAL CHANNEL DRAIN - CONCRETE PAVEMENT

SCALE 1:10



TYPICAL SLOT DRAIN - BLOCK PAVEMENT

SCALE 1:10



ROAD GULLY - RG

SCALE 1:20

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P01	STAGE 3 ISSUE	01/04 2022	CO	LS	CK

FINAL CONSTRUCTION ISSUE

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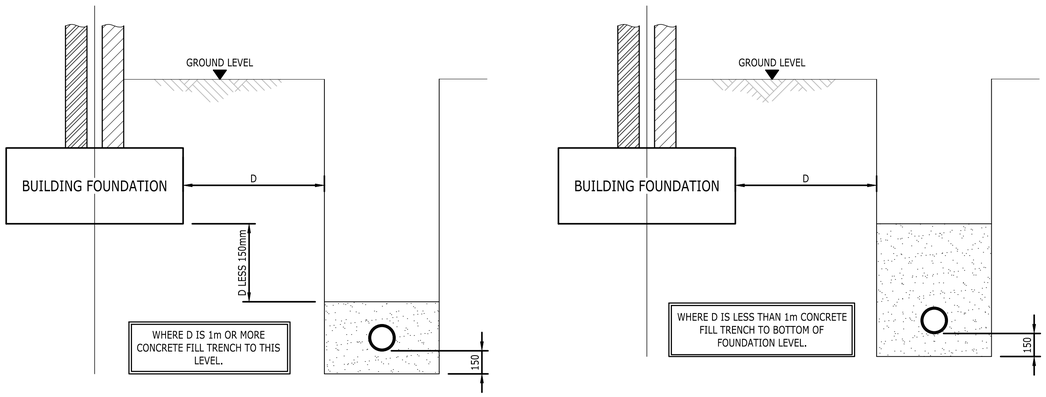
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STANDARD DRAINAGE DETAILS SHEET 3

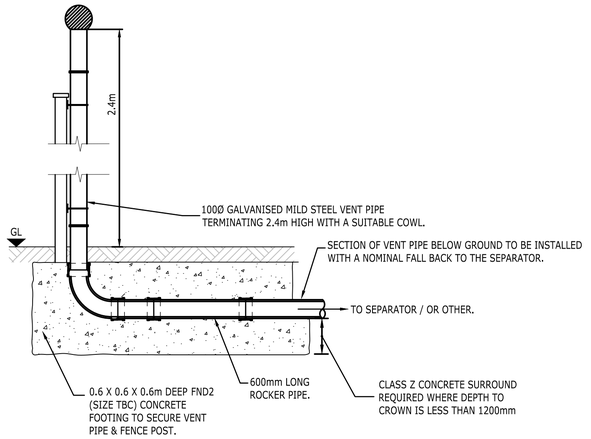
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1620002943	A/S	CO	MAR 22

Drawing No:	Rev:
MN2A-RAM-ZZ-XX-DR-C-000402	CR1



PIPE RUNS NEAR TO BUILDINGS

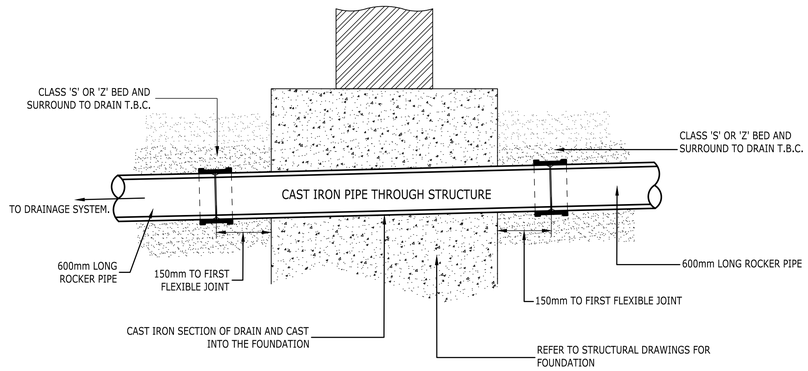
SCALE 1:20



TYPICAL SEPARATOR & PUMP STATIONS VENT PIPE DETAIL

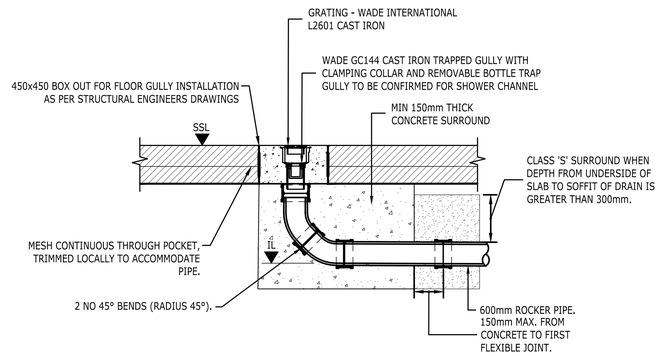
LOCATION OF ALL VENT PIPES ARE SUBJECT TO CONFIRMATION WITH THE ARCHITECT

NOT TO SCALE



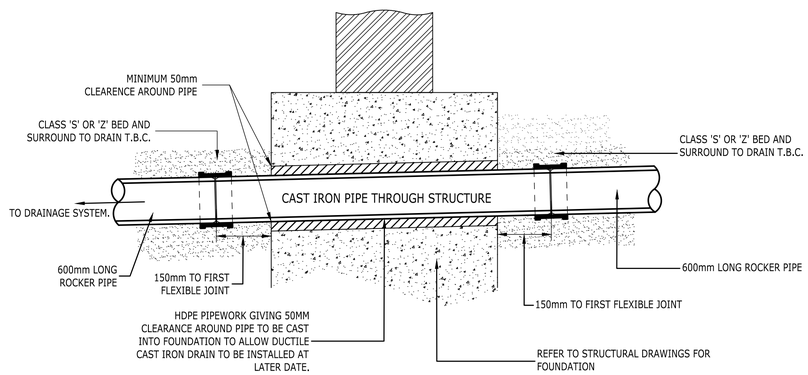
DRAIN CAST DIRECTLY THROUGH FOUNDATION

SCALE 1:10



FLOOR GULLY

SCALE 1:20



DRAIN SLEEVED THROUGH FOUNDATION

SCALE 1:10

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CR1	FINAL CONSTRUCTION ISSUE	08/11 2024	CO JI	CK	
C01	CONSTRUCTION ISSUE	08/12 2022	CO LF	CK	
P02	STAGE 4 ISSUE	31/05 2022	CO LF	CK	
P01	STAGE 3 ISSUE	01/04 2022	CO LS	CK	

FINAL CONSTRUCTION ISSUE

PLOT 9a
FIRST STREET
MANCHESTER

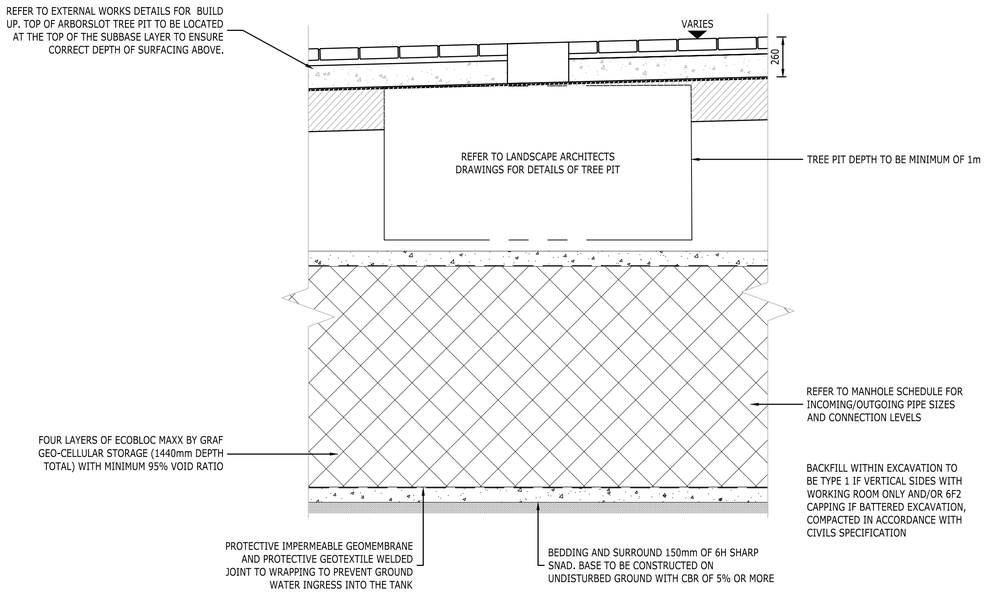
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STANDARD DRAINAGE DETAILS SHEET 4

Project No:	Scale (@A1):	Drawn:	Date:
1620002943	A/S	CO	MAR 22

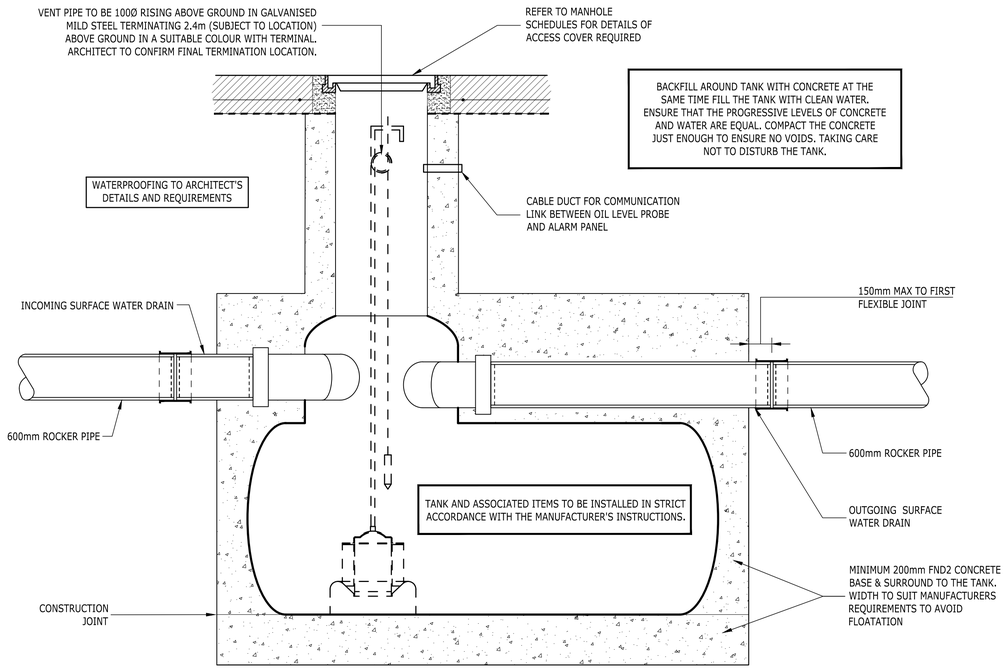
Drawing No: MN2A-RAM-ZZ-XX-DR-C-000403

Rev: CR1



ATTENUATION TANK SECTION

SCALE 1:20



TYPICAL OIL SEPARATOR DETAIL - UNDER BUILDING SLAB

SCALE 1:20

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C01	CONSTRUCTION ISSUE	08/12 2022	CO LF	CK	
P01	STAGE 4 ISSUE	31/05 2022	CO LF	CK	

FINAL CONSTRUCTION ISSUE

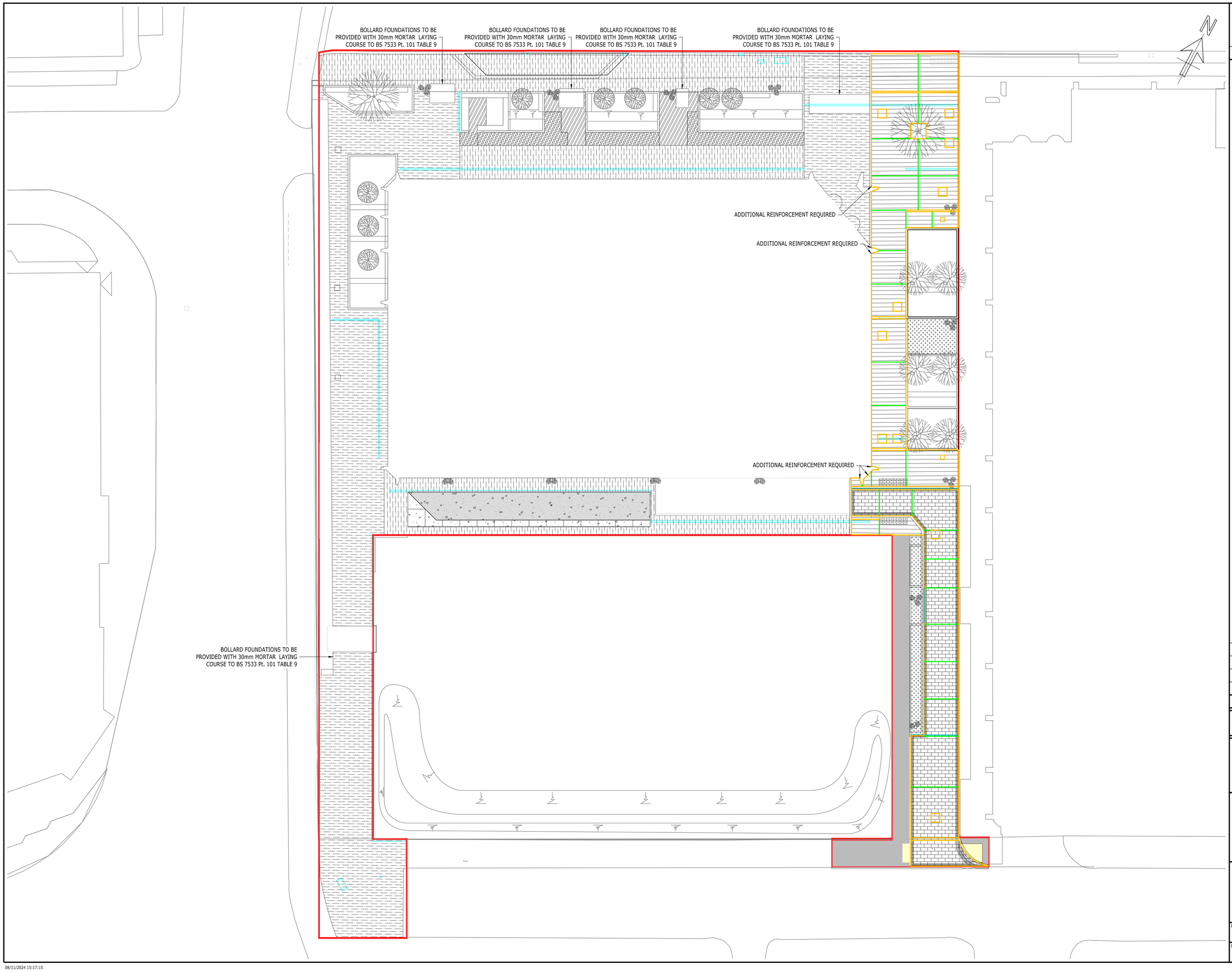
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STANDARD DRAINAGE DETAILS SHEET 5

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Drawing No:	Rev:
MN2A-RAM-ZZ-XX-DR-C-000404	CR1



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5. REFER TO DRG. No. MN2A-RAM-LA-XX-DR-C-000710 FOR HARDSTANDING BUILD-UP DETAILS.
6. FOR ANY IRREGULAR SHAPED JOINTS ADDITIONAL REINFORCEMENT REQUIRED AS PER TYPICAL DETAIL.
7. ALL MANHOLES TO INCLUDE ADDITIONAL REINFORCEMENT AS PER TYPICAL DETAIL.

KEY:

- PAVING TYPE A - SANDSTONE
- PAVING TYPE B - CONCRETE LINEAR
- PAVING TYPE C1 - LARGE CONCRETE STRUCTURE ABOVE BASEMENT
- PAVING TYPE C2 - LARGE CONCRETE
- PAVING TYPE D - WITH GRAVEL INFILL
- PAVING TYPE D - WITH GRASS INFILL
- PAVING TYPE E - GRANITE SETTS
- PAVING TYPE F - RESIN BOUND
- PAVING TYPE G - ASPHALT FOOTWAY

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C01	CONSTRUCTION ISSUE	05/04 2024	CO CN		CN
P01	STAGE 3 ISSUE	04/04 2022	BC CN		CN

FINAL CONSTRUCTION ISSUE

PLOT 9a
FIRST STREET
MANCHESTER

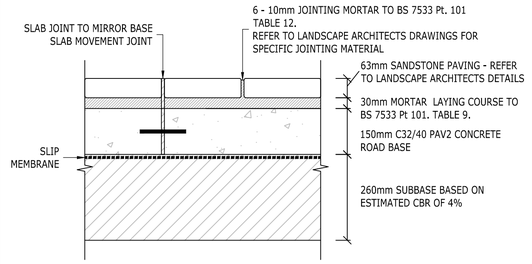
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HARDSTANDING LAYOUT

Project No:	Scale (@A1):	Drawn:	Date:
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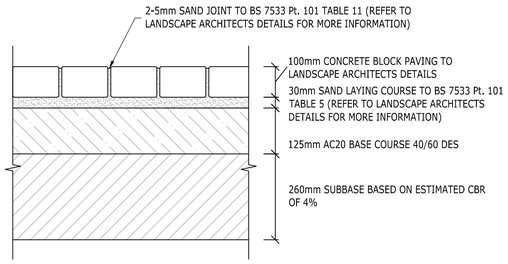
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MN2A-RAM-LA-XX-DR-C-000700	CR1

08/11/2024 15:17:15



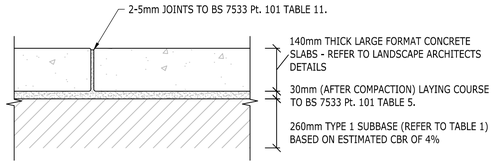
DETAIL TYPE A 0710
1:10

TYPE A - SANDSTONE PAVING TO MATCH SPECIFICATION OF EXISTING FIRST STREET SURFACING. ASSUME TRAFFIC CATEGORY 5 ≤7 STANDARD AXLES/DAY (BS 7533 Pt. 101)



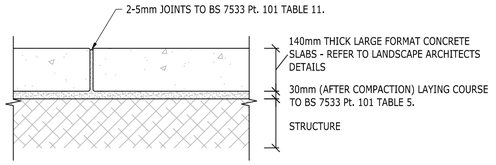
DETAIL TYPE B 0710
1:10

TYPE B - LINEAR CONCRETE IMPERMEABLE BLOCK PAVING. ASSUME TRAFFIC CATEGORY 6, ≤0.5msa (BS 7533 Pt. 101)



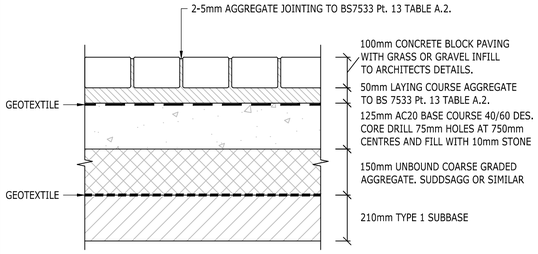
DETAIL TYPE C1 0710
1:10

TYPE C1 (AWAY FROM BASEMENT) - LARGE FORMAT CONCRETE SLABS DOUBLE XL REINFORCED CONCRETE UNITS



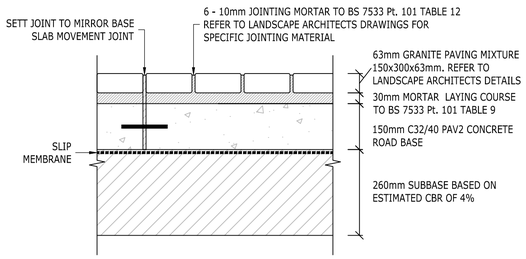
DETAIL TYPE C2 0710
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TYPE C2 (ABOVE BASEMENT) - LARGE FORMAT CONCRETE SLABS DOUBLE XL REINFORCED CONCRETE UNITS



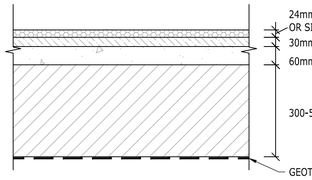
DETAIL TYPE D 0710
1:10

TYPE D- LINEAR CONCRETE BLOCK PAVING WITH GRASS INFILL OR GRAVEL INFILL. ASSUME SITE CATEGORY C (1 LARGE HGV/WEEK (BS 7533 Pt. 13)



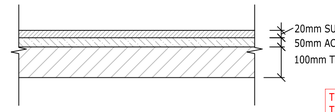
DETAIL TYPE E 0710
1:10

TYPE E - GRANITE PAVING MIXTURE. ASSUME TRAFFIC CATEGORY 6 ≤70 STANDARD AXLES/DAY (BS 7533 Pt. 101)



DETAIL TYPE F 0710
1:10

TYPE F - RESIN BOUND GRAVEL



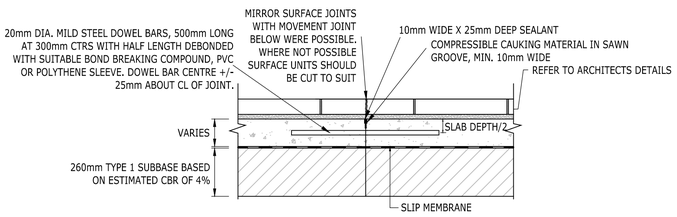
DETAIL TYPE G 0710
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TYPE G - FOOTWAY DETAIL

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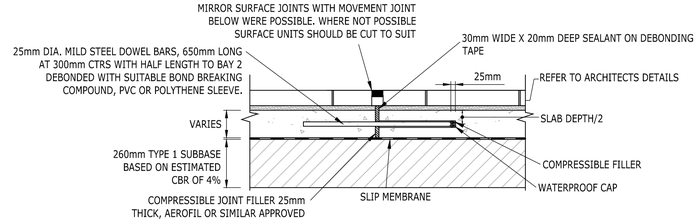
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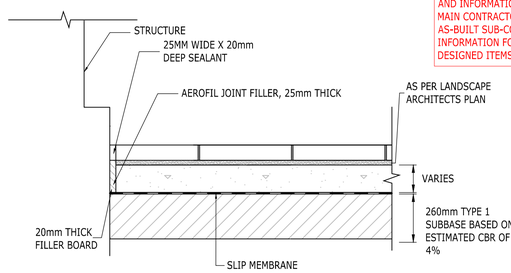
DETAIL 0710
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FREE MOVEMENT CONTRACTION JOINT DOWELLED IN AREAS OF SLABS AND SETTS (RIGID, BOUND CONSTRUCTION) - TRAFFICKED



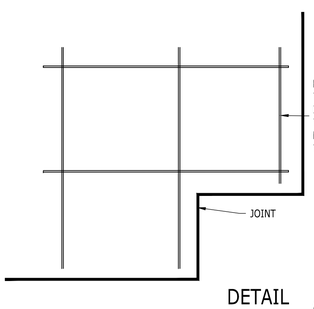
DETAIL 0710
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EXPANSION JOINT IN AREAS OF SLABS AND SETTS (RIGID, BOUND CONSTRUCTION)



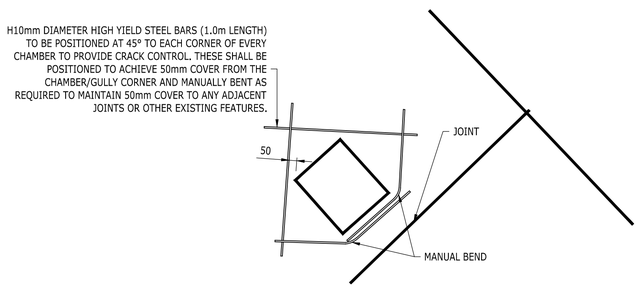
DETAIL 0710
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ISOLATION JOINT IN AREAS OF SLABS AND SETTS (RIGID, BOUND CONSTRUCTION)



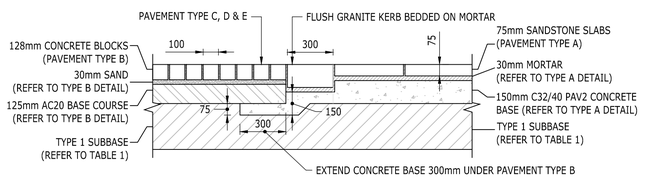
DETAIL 0710
1:20

TYPICAL DETAIL SHOWING ADDITIONAL REINFORCEMENT AROUND IRREGULAR SHAPED BAYS



DETAIL 0710
1:20

TYPICAL MANHOLE SURROUND DETAIL SHOWING ADDITIONAL REINFORCEMENT AROUND EVERY CHAMBER AND GULLY



DETAIL 0710
1:20

TRANSITION DETAIL BETWEEN PAVEMENT TYPE A AND PAVEMENT TYPE B

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4. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
5. IT HAS BEEN ASSUMED THAT PERMEABLE PAVING AND AN UNBOUND FLEXIBLE BUILD-UP IS ACCEPTABLE FOR PAVEMENT TYPE D.
6. IT HAS BEEN ASSUMED THAT PAVEMENT TYPE C1/C2 (LARGE FORMAT CONCRETE SLAB) CAN BE LAID FLEXIBLY ON AN UNBOUND SURFACE COURSE (IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS).
7. WHERE RIGID PAVING SHOWN, CONCRETE BASE SLAB MOVEMENT JOINTS TO REFLECT UP INTO SURFACE PAVING JOINTS.
8. FOR UNREINFORCED CONCRETE BASE SLABS, JOINTS SHOULD BE PROVIDED IF THE PAVED AREA EXCEEDS 6 METRES IN ANY ONE DIMENSION. ISOLATION JOINTS SHOULD BE PROVIDED AROUND FIXED POINTS OF RESTRAINT, SUCH AS MANHOLES, COLUMNS AND UPSTANDS. WHERE THERE IS A JOINT IN THE CONCRETE BASE, IT SHOULD BE CARRIED THROUGH TO THE SURFACE. CONTRACTION JOINTS TO BE GENERALLY 4x4m SPACING. EXPANSION JOINTS 90x90m MAX. SPACING.
9. AREAS OF CHAMBERS IN CLOSE PROXIMITY TO EACH OTHER MAY REQUIRE REINFORCEMENT IN THE SURROUNDING CONCRETE BASE SLAB TO PREVENT CRACKING.
10. SURFACING, BEDDING AND JOINTING MATERIAL SHOULD ALL BE IN ACCORDANCE WITH LANDSCAPE ARCHITECTS DETAILS. FOR THE PURPOSE OF COSTING, ALLOW FOR THE DETAIL OF THE FINISHES, BEDDING AND JOINTING OUTLINED ON THESE DETAILS.
11. PAVEMENT FOUNDATIONS TO BE IN ACCORDANCE WITH TABLE 1 UPON RECEIPT OF IN SITU CBR TESTS.
15. REFER TO DRG. No.MN2A-RAM-LA-XX-DR -C-000700 FOR HARDSTANDING LAYOUT.

	CLASS 2 FOUNDATION TO IAN 73/06 (RESTRICTED DESIGN)	
SUBGRADE CBR	SUB-BASE AND CAPPING	SUB-BASE ONLY
2.5%	350mm SUB BASE 250mm CAPPING	450mm SUB BASE ONLY
4%	270mm SUB BASE 230mm CAPPING	360mm SUB BASE ONLY
5%	240mm SUB BASE 210mm CAPPING	320mm SUB BASE ONLY
7.5%	200mm SUB BASE 190mm CAPPING	280mm SUB BASE ONLY
10%	180mm SUB BASE 170mm CAPPING	250mm SUB BASE ONLY
15%	150mm SUB BASE 150mm CAPPING	200mm SUB BASE ONLY

TABLE 1
Subbase - Type 1 to D20/617 (MCHW)
Capping - 6F1 to D20/620 (MCHW) (non-frost susceptible)

Rev	Description	Date	By	Chk	App
CR1	FINAL CONSTRUCTION ISSUE	08/11 2024	CO JI		CK
C02	UPDATED TO SUIT PAVING DEPTHS	03/05 2024	CO CO		CK
C01	CONSTRUCTION ISSUE	05/04 2024	CO CN		CN

FINAL CONSTRUCTION ISSUE

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HARDSTANDING BUILD-UPS

Project No:	Scale (@A1):	Drawn:	Date:
1620002943	AS SHOWN	BC	APR 22

Drawing No: MN2A-RAM-LA-XX-DR-C-000710
Rev: CR1

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APPENDIX B
MAINTENANCE INSPECTION CHECKLIST

Confidential

C753 The SuDS Manual

Maintenance Inspection Checklist

Table B.25 SuDS maintenance inspection checklist			
General information			
Site ID			
Site location and co-ordinates (GIS if appropriate)			
Elements forming the SuDS scheme		Approved drawing reference(s)	
Inspection frequency		Approved specification reference	
Type of development		Specific purpose of any parts of the scheme (eg biodiversity, wildlife and visual aspects)	

Inspection date								
	Details	**Y/N**	**Action required**	**Date completed**	**Details**	**Y/N**	**Action required**	**Date Completed**
General inspection items								
Is there any evidence of erosion, channelling, ponding (where not desirable) or other poor hydraulic performance?								
Is there any evidence of accidental spillages, oils, poor water quality, odours or nuisance insects?								
Have any health and safety risks been identified to either the public or maintenance operatives?								
Is there any deterioration in the surface of permeable or porous surfaces (eg rutting, spreading of blocks or signs of ponding water)?								

Silt/sediment accumulation								
Is there any sediment accumulation at inlets (or other defined accumulation zones such as the surface of filter drains or infiltration basins and within proprietary devices)? If yes, state depth (mm) and extent. Is removal required? If yes, state waste disposal requirements and confirm that all waste management requirements have been complied with (consult environmental regulator)								
Is surface clogging visible (potentially problematic where water has to soak into the underlying construction or ground (eg underdrained swale or infiltration basin)?								
Does permeable or porous surfacing require sweeping to remove silt?								
System blockages and litter build-up								
Is there evidence of litter accumulation in the system? If yes, is this a blockage risk?								
Is there any evidence of any other clogging or blockage of outlets or drainage paths?								
Vegetation								
Is the vegetation condition satisfactory (density, weed growth, coverage etc)? (Check against approved planting regime.)								
Does any part of the system require weeding, pruning or mowing? (Check against maintenance frequency stated in approved design.)								
Is there any evidence of invasive species becoming established? If yes, state action required								
Infrastructure								
Are any check dams or weirs in good condition?								
Is there evidence of any accidental damage to the system (eg wheel ruts?)								

Is there any evidence of cross connections or other unauthorised inflows?								
Is there any evidence of tampering with the flow controls?								
Are there any other matters that could affect the performance of the system in relation to the design objectives for hydraulic, water quality, biodiversity and visual aspects? (Specify.)								
Other observations								
Information appended (eg photos)								
Suitability of current maintenance regime								
Continue as current Increase maintenance Decrease maintenance								
Next inspection								
Proposed date for next inspection								