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Be.EV – Reliance Street, Manchester

Surface Water Drainage Strategy

Ref: 220698-CON-ZZ-XX-RP-C-0001
Author: A.Smith
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Date: 14 June 2024
Version: 2.2

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1.0 INTRODUCTION

Conisbee have been appointed to prepare a Drainage Strategy for the proposed Be.EV electric car charging station at Reliance Street, Manchester, M40 3AG.

The site is located in Flood Zone 1 of the Environment Agency maps. As the site is less than 1ha, and not in a critical drainage area, a Flood Risk Assessment is not required. However, a summary of flood risk from various sources is included in Section 4 to demonstrate that flood risk is low.

The purpose of document is to demonstrate compliance with relevant national and local planning requirements.

Reference has been made to the following policy documents in the production of this Drainage Strategy report:

- National Planning Policy Framework (TSO, July 2018) & Planning Practice Guidance - Flood Risk and Coastal Change (CLG, March 2014);
- Technical Guidance to the National Planning Policy Framework (TGNPPF, March 2012);
- Flood and Water Management Act (2010);

The following documents should be referred to as part of this report:

- **Appendix A:** Topographic Survey
- **Appendix B:** Architectural Proposal
- **Appendix C:** United Utilities Sewer Assets Plan
- **Appendix D:** Proposed Drainage Strategy Plans
- **Appendix E:** Microdrainage Results
- **Appendix F:** SuDS Maintenance Strategy

2.0 EXISTING SITE

2.1 Site Location

The site is located at OS grid reference 388070, 400732. The overall area is 1369m² / 0.137ha. The site is bounded by:

- North: Car parking for retail unit (Pound Stretchers)
- East: Reliance Street
- South: Oldham Road (A62)
- West: Medium rise residential block

A site location plan is shown in the figure below.



Figure 2.1 Site location plan

2.2 Existing Site and Topography

The site is a former fuel filling station that has previously been demolished (2009/2010)

The site is paved with a combination of concrete slab and asphalt left behind following the demolition works. It has a gradual fall from north-east (high point of 88.18) to south-west (low point of 86.81).

2.3 Geology & Hydrogeology

British Geological Survey (BGS) mapping indicates that the bedrock geology is Collyhurst Sandstone Formation - Sandstone, and the superficial deposits are recorded as Till, Devensian - Diamicton

There are no BGS recorded boreholes on the Site, however the nearest borehole, (170m to the east) exhibits the following ground conditions:

Table 2.1 – Summary of Ground Conditions

General Description	Recorded Depth (m bgl)	Recorded Thickness (m)
Made Ground	0.00 to 0.50m	0.50 m
Soft to firm sandy CLAY	0.50 to 1.20m	0.70 m
Soft/firm brown silty & sandy CLAY	1.20 to 2.00m	0.80 m
Very stiff brown silty and sandy CLAY	2.00 to 4.40m	2.40 m
Brown clayey fine/medium grained SAND	4.40 to 4.65m	0.25 m
Stiff to very stiff brown silty & sandy CLAY	4.65 to 6.00m	-

Aquifer designation mapping published by the EA indicates that the underlying Sandstone bedrock formation is classified as a Principal Aquifer, and the Superficial Deposits are designated as Secondary (Undifferentiated) Aquifers.

Principal Aquifers are: *'rocks that provide significant quantities of water and can support water supply and/or baseflow to rivers, lakes and wetlands on a strategic scale'*

Secondary Aquifers are: *'rocks that provide modest amounts of water, but the nature of the rock or the aquifer's structure limits their use. They support water supplies at a local rather than strategic scale (such as for private supplies) and remain important for rivers, wetlands and lakes'*

EA groundwater vulnerability mapping (Environment Agency, 2019) indicates that the site is located within an area of Medium-Low risk. This is defined as '*areas that provide the greatest protection to groundwater from pollution. They are likely to be characterised by low-leaching soils and/or the presence of low-permeability superficial deposits*'

The site is not located within a Source Protection Zone. The nearest surface water features are the Rochdale Canal located approximately 165m south of the site, and Moston Brook located approximately 420m north of the site.

2.4 Existing Site Drainage

United Utilities record drawings have been received for the development, and are included in **Appendix C**. They show that there is a 225mm diameter and a 300mm diameter combined sewer in Reliance Street, as well as a 525x750mm combined sewer in Oldham Road.

There are no separate foul & surface water sewers within the vicinity of the site

A GPR utilities survey has identified there is existing onsite drainage which served the former fuel filling station. This confirms that there is an existing 150mm diameter drain that leaves the site on the southern boundary. It is assumed that this connects to the 525x750mm combined sewer in Oldham Road.

2.5 Existing Watercourses

There are no existing watercourses in the vicinity of the site.

2.6 Existing Site Characteristics

The existing hydrological characteristics for the site are as follows:

- M5_60min=20
- Ratio $r=0.4$
- IH 124 Soil Type: 4
- Total Site Area = 1369 m²
- Total Existing Impermeable Area = 1061 m²
- Percentage Impermeable (PIMP) = 77.50 %
- Peak Foul Flow = 0.00 l/s

3.0 DEFINITION OF THE FLOOD HAZARD

3.1 Sources of Flooding

The following sources of flooding should be considered:

- Fluvial
- Tidal
- Surface Water / Overland Flow
- Sewers
- Groundwater
- Artificial Sources

These sources of flooding, and how they relate to the site, are discussed below:

3.1.1 Fluvial Flooding

The EA flood maps confirmed that the site is located within Flood Zone 1. The nearest watercourses are the Rochdale Canal located approximately 165m south of the site, and Moston Brook located approximately 420m north of the site.

It is concluded that the site is not at risk of flooding from fluvial sources.

3.1.2 Tidal Flooding

The site is remote from any tidal watercourses and therefore this source of flooding is not relevant.

It is concluded that the site is not at risk of flooding from tidal sources.

3.1.3 Surface Water and Overland Flooding

Surface Water flooding occurs when high intensity rainfall overwhelms man made drainage systems or cannot soak into the ground. Man-made drainage systems / sewers can fail for a number of reasons, such as when the rainfall event exceeds the capacity of the sewer system / drainage system, the drainage system (including surface level drainage) becomes blocked by debris or sediment, or because the system surcharges due to high water levels in receiving (downstream) watercourses.

This results in surface water falling on impermeable areas being unable to enter the drainage system through surface drainage features such as road gullies. This is known as surface water or overland flooding and discussed in this section.

The Environment Agency publishes and maintains the national Risk of Flooding from Surface Water (RoFSW). This aims to represent flooding caused by surface runoff from precipitation and is based on a high resolution ground model and simulated rainfall for return periods up to the 1 in 1000 year event. The model picks up depressions in the surface where flooding would occur and identifies the overland flood flow paths.

The RoFSW relevant to the site with the site location and boundary is shown in the figures below. This shows that the site is in an area of very low risk of surface water flooding. There is an area of low risk along Oldham Road, which may experience surface water flooding up to a depth of 300mm.

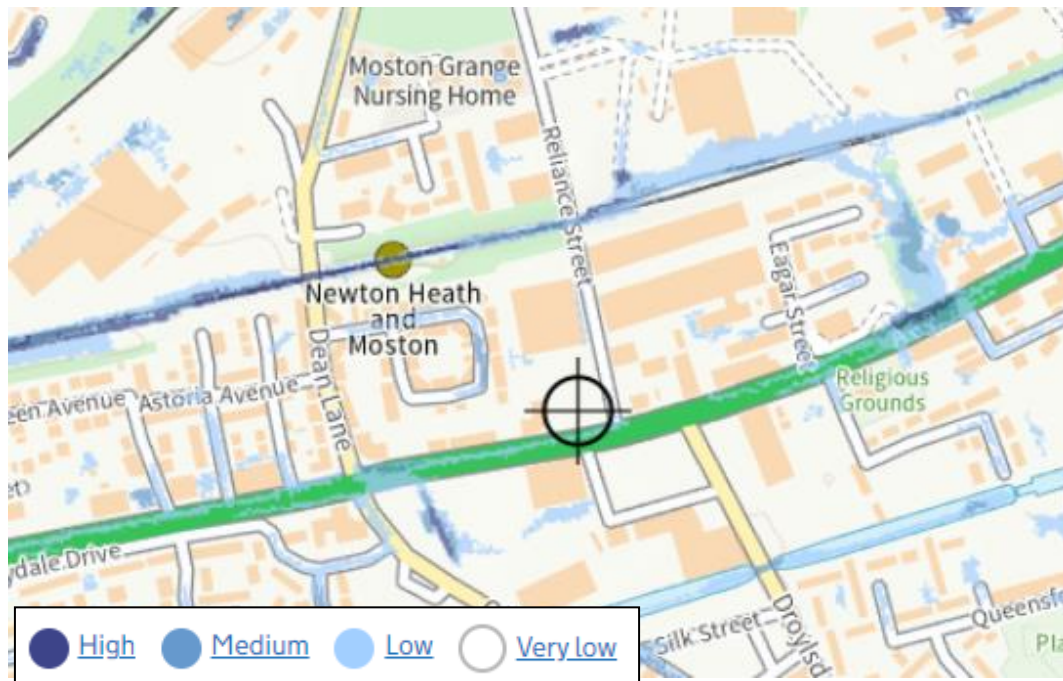


Figure 6.2 - EA RoFSW “Extent of Flooding” Map

The site is considered to be at a very low risk of flooding from surface water or overland flows.

3.1.4 Sewer Flooding

Since the late 1970s, and with the publication of Sewers for Adoption in 1980, sewer networks are designed to cope with storm events up to and including the 1 in 30-year storm event. If this storm event is exceeded, then surface water flooding is likely to occur.

However, the finished levels of the site will be higher than the ground level where public sewers are located so a failure of the system at any point is not likely to lead to flooding of the site.

The new drainage system seeks to intercept as much runoff as possible and reduce the peak flow from the site through the use of Sustainable Drainage Systems (SuDS). This should reduce the risk of the external drainage system being overloaded and therefore reduces flood risk elsewhere.

The site is considered to be at a low risk from sewer flooding, and the proposed development reduces flood risk elsewhere.

3.1.5 Groundwater Flooding

Groundwater flooding occurs when the water table rises above ground level and flows over land. It can also occur where building floors, such as basements, are lower than the surrounding ground.

There are no basements proposed and the site investigation indicates that there is no risk of elevated ground water levels at the site.

The site is considered to be at a very low risk of flooding from groundwater.

3.1.6 Flooding from Artificial Sources

Artificial water bodies, such as reservoirs, canals, etc. could pose a flood risk in the event of a structural failure such as a breached reservoir dam.

The Environment Agency Maps show that the site is not located in the vicinity of any areas at risk of reservoir flooding.

The site is not considered to be at risk of flooding from artificial sources.

3.2 Probability of Flooding

Overall, the probability of the site flooding from the sources described above is very low.

4.0 FLOOD ZONE, SEQUENTIAL AND EXCEPTION TEST

4.1 Flood Zone

The EA has derived flood maps of England, from which it is possible to initially identify whether a site is located within an area that is at risk of fluvial/tidal flooding. The maps show that the site is located within Flood Zone 1.

4.2 Vulnerability Classification

The Vulnerability Classification of the development is determined from 'Annex 3: Flood Risk Vulnerability Classification' in the National Planning Policy Framework (NPPF).

The intended use as an Electric Vehicle charging station is not listed in Annex 3 however it is deemed to have the same vulnerability as a car park.

The intended use as 'car park' has a Vulnerability Classification of 'Less Vulnerable'

4.3 Sequential and Exception Test

As the site is located in Flood Zone 1, according to Table 3 of the NPPF Practice Guidance, the proposed use of the site is acceptable. The exception test is not required.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

5.0 CLIMATE CHANGE

5.1 Background

The nature of climate change at a regional level will vary. For the UK, more frequent short duration, high intensity rainfall and more frequent periods of long-duration rainfall could be expected. It is expected that sea levels will also continue to rise.

5.2 Development Lifespan

The EA Flood Risk Assessments: Climate Change Allowances 2022 dataset indicates that climate change is expected to result in increased rainfall and rising sea levels. Tables 5.1 and 5.2 below shows anticipated changes in extreme rainfall intensity in small urban catchments for the 3.3% and 1% AEP events.

3.3% AEP	Central allowance	Upper-end allowance
2050s	25%	35%
2070s	30%	40%

Table 5.1: Peak rainfall intensity allowance, 3.3% AEP

1% AEP	Central allowance	Upper-end allowance
2050s	25%	40%
2070s	30%	45%

Table 5.2: Peak rainfall intensity allowance, 1% AEP

5.3 Impact of Climate Change on the Development

The entire site is located well outside of the fluvial floodplain, within Flood Zone 1, in an area where the probability of fluvial flooding is lower than 0.1% in any year. Fluvial flooding is therefore not expected to become an issue at the site even when the impacts of climate change are considered.

The surface water drainage strategy outlined in Section 7 will be designed to accommodate run-off during all events up to and including the 100-year return period plus 45% to allow for increases in rainfall intensity due to climate change for the expected 100-year lifespan of the development; this is in line with the recommendations of the NPPF Technical Guidance.

The site levels will be designed to ensure that, so far as is reasonably practicable, flows resulting from rainfall that exceeds a 1 in 100-year rainfall event are managed in exceedance routes that minimise the risks to people and property.

6.0 PROPOSED DEVELOPMENT

6.1 Description

The development proposals comprise the construction of a new Electric Vehicle charging station, and associated hardstanding.

Refer to the proposed scheme drawings produced by Architect That attached in **Appendix B**.

6.2 Development lifespan

A typical lifespan for the development is 100 years. As discussed in Section 5, the climate change allowances for the increase in peak rainfall intensity are 30% (central) and 45% (upper end).

7.0 DRAINAGE STRATEGY

This section of the report sets out the proposed strategy for the sustainable management of the surface water runoff at the site.

7.1 Proposed Method of Surface Water Disposal

The Building Regulations (H3) and the NPPG set out the following hierarchy for discharging surface water runoff from a development in order of preference:

- Collection for reuse in the development;
- Infiltration into the ground;
- Discharge into a watercourse;
- Discharge into a surface water sewer;
- Discharge into a combined water sewer

The proposed development intends to integrate a rainwater harvesting system into the development and reuse some of the captured runoff within the site. The rainwater harvesting will not capture all runoff from all storm scenarios and therefore an outfall for surface water will still be required.

As described in Section 2, the site is underlain by Made Ground and Clay subsoils which are not suitable for using infiltration systems. Therefore, this method of disposal is not suitable.

As described in Section 2 there are no watercourses within the vicinity of the site. Therefore, this method of disposal is not suitable.

As described in Section 2 there are no surface water sewers within the vicinity of the site. Therefore, this method of disposal is not suitable.

There are combined water sewers within the vicinity of the site. This will be the targeted form of disposing runoff from the development.

7.2 SuDS Strategy

In accordance with the NPPF, and local guidance, the development will incorporate a Sustainable Drainage System (SuDS) to manage rainfall on site and ensure that runoff is not increased elsewhere.

It is proposed that the vehicular parking bays and circulation areas will be constructed using a non-permeable coloured asphalt, with a granular Type 3 tanked subbase and collector filter drains. Runoff will be collected in channel drains with discharge direct to the permeable subbase.

It is proposed that the roof of the development will discharge direct to the filter drains.

Discharge from the porous subbase and below ground network will be attenuated to 1.0 l/s by an orifice plate chamber. The restricted flows will then combine with foul water flows generated by the site and discharge via the existing lateral to the combined sewer in Oldham Road.

Refer to Proposed Drainage Strategy drawing 220698-CON-XX-00-SK-C-1010 attached at **Appendix D**.

7.3 Water Quality

Water quality prior to discharge has been considered as part of the proposed drainage arrangement. In line with the CIRIA SuDS Manual C753, the treatment requirements have been established using the 'Simple Index Approach' (Tbl 4.3 – SuDS Manual. Using this approach, a system is considered acceptable if:

Total SuDS Mitigation Index $\geq$ Pollution Hazard Index (for each contaminant type)

Where two (or more) SuDS components are arranged in series the total SuDS Mitigation Index is:

$$\text{Total SuDS Mitigation Index} = \text{Mitigation Index}_1 + 0.5(\text{Mitigation Index}_2)$$

(Where: Mitigation Index_n = Mitigation Index for Component n)

In line with the CIRIA SuDS Manual C753, non-residential car parking with frequent change are considered a medium pollution hazard level. The Pollution Hazard Indices for the site are as follows (Tb.26.2 – SuDS Manual)

- Total Suspended Solids 0.7
- Metals 0.6
- Hydrocarbons 0.7

The SuDS Mitigation Indices for Permeable Pavement are as follows (Tbl.26.3 – SuDS Manual)

- Total Suspended Solids 0.7
- Metals 0.6
- Hydrocarbons 0.7

The Mitigation Indices are greater or equal to that of the Pollution Hazard Indices for each contaminant type, and therefore the proposed treatment system is considered suitable

7.4 Design and Modelling Criteria

The proposed SW drainage system has been analysed using MicroDrainage SourceControl software, in conjunction with FSR rainfall parameters, for storms up to the 1 in 100 year return period event, with an additional 45% allowance for climate change. The model output files are attached in **Appendix E**.

The model results demonstrate that the proposed strategy can accommodate rainfall events up to and including the 100 year return period event, with an additional 45% allowance for climate change.

7.5 Exceedance Flows

In an event where the capacity of the surface water system is exceeded, water will leave the site via overland flow. As noted in section 2.2, levels around the site generally fall to the south-west.

7.6 Maintenance Strategy

All proposed SuDS and drainage are to be maintained for the duration of the development by the client

A proposed maintenance strategy, in line with the CIRIA SuDS Manual, is included in **Appendix F**.

7.7 Proposed Foul Drainage

Foul water generated from the development will drain via a below ground drainage network to the existing lateral on the southern boundary. Prior to discharge it will combine with the attenuated surface water discharge, as discussed in Section 7.2.

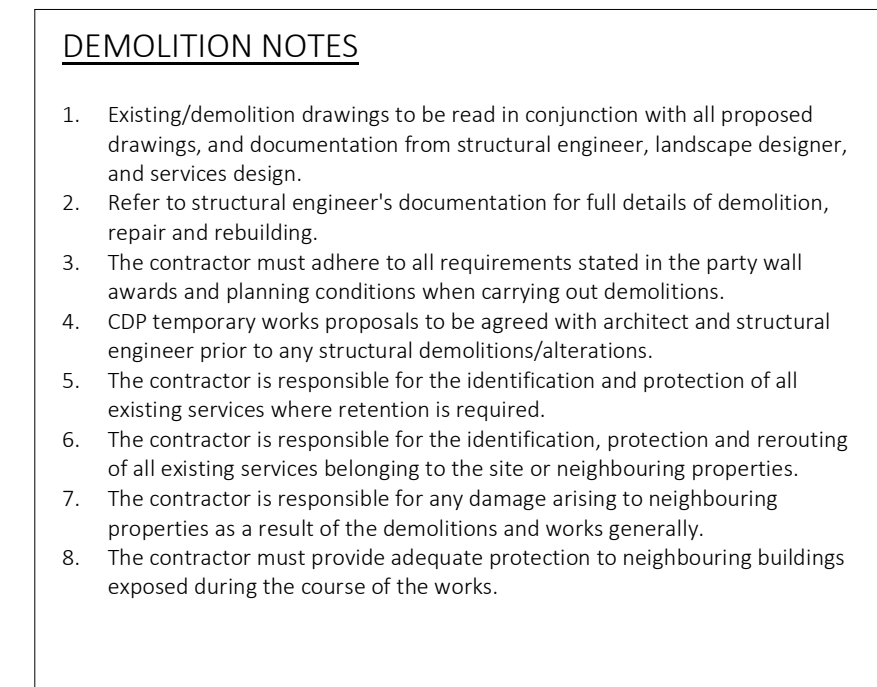
8.0 CONCLUSIONS

The site is located in Flood Zone 1 and there is a low risk of flooding from other sources such as ground water, sewers and overland flows.

Surface water runoff from the development is managed through the use of sustainable drainage systems (SuDS) to ensure there is a significant reduction in flows leaving the site. The design accounts for an increase in rainfall volumes due to climate change.

It is considered that the development will reduce flood risk elsewhere because of the proposed SuDS system.

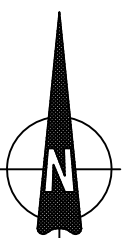
APPENDIX A: TOPOGRAPHIC SURVEY



 Demolished



P1	18.08.2023	Draft Issue to Consultant Team					LL	EL		
rev	date	description					revised by	audited by		
stage		drawing title						suitability code		
PRE-CONSTRUCTION		EXISTING SITE TOPOGRAPHY						S2		
<div>ARCHITECT</div> <div>that</div>		CONTRACTORS ARE NOT TO SCALE DIMENSIONS FROM THIS DRAWING								
		68-80 Hanbury Street London E1 5JL					+44 207 081 4316 info@architectctthat.com www.architectctthat.com			
		client Be.EV					project Reliance Street, Manchester, M40 1EZ			
		THIS DRAWING IS COPYRIGHT								
scale	drawn by	audited by	job no	originator	zone	level	type	role	dwg no	revision
As indicated @ A1	LL	EL	612	AT	ZZ	XX	DR	A	3.5.0001	P1



LEGEND	
	Foul Drainage
	Surface Drainage
	Combined Drainage
	Electricity
	Electricity High Voltage
	Electricity Low Voltage
	Gas
	Water
	Cable Television
	Close Circuit Television
	Communication
	British Telecom
	Compressed Air
	Offset Fill-Line
	Oil Pipe
	Pipe
	Ventilation
	Fuel Line
	Vapour Recovery
	Gauge Line
	Telemetry
	Fibre Optics
	Unknown
	Fence
	Edge of Canopy
	Gully Run
	End Of Trace
	Do Not Drill / Banded Pipes
	Borehole
	Trial Pit Location
	Excavated Area
	Window Sample
	Soil Vapour Sample
	W=Water
	F=Foam
	P=Product
	C=Concrete
	U=Unknown

ABBREVIATIONS	
AR	Assumed Route
BO	Bollard
BOILL	Illuminated Bollard
BH	Borehole
BTB	British Telecom Box
BTIC	British Telecom Cover
C/BOX	Control Box
C/B FENCE	Closeboard Fence
CR	Cable Riser
CATV	Cable TV
CP	Catch Pit
Co	Concrete
CON	Conifer
CL	Cover Level
d	Depth (in metres)
D/CHAN	Drainage Channel
DP	Down Pipe
ER	Earth Rod
EIC	Electricity IC
EP	Electricity Pole
EOC	Edge of Canopy
EOT	End of Trace
FIBED	Flower Bed
FH	Fire Hydrant
FS	Fire Switch
GV	Gas Valve
G	Gully
GPR	Ground Probing Radar
GRUN	Gully Run
HT	Height
H/CHESTNUT	Horse Chestnut
H/HORN	Hawthorn
IC	Inspection Cover
IL	Invert Level
INT	Interceptor
KO	Kerb Outlet
LP	Lamp Post
LC	Lighting Column
LH	Lamp Hole
MH	Manhole Cover
MW	Monitoring Well
NPV	No Pipes Visible
OH	Overhead Service
OSA	Off Survey Area
OSBM	Ordnance Survey Bench Mark
PR	Pipe Riser
P	Post
P&R FENCE	Post & Rail Fence
RET WALL	Retaining Wall
RWP	Rain Water Pipe
RS	Road Sign
RE	Rodding Eye
S/A	Soakaway
S/BIRCH	Silver Birch
SAP	Sapling
SEC FENCE	Security Fence
SL	Spot Light
SP	Soil Pipe
ST	Stop Tap
SV	Sluice Valve
SVP	Soil Vent Pipe
SVS	Soil Vapour Sample
TBM	Temporary Bench Mark
TFR	Taken From Records
TL	Traffic Light
TP	Telegraph Pole
TS	Traffic Sensor
UTL	Unable to Locate
UTR	Unable to Raise
UTS	Unable to Survey
UTT	Unable to Trace
VR	Vapour Recovery
VP	Vent Pipe
WM	Water Meter
WFC	Water Filled Chamber
WP	Waste Pipe
WR	Water Riser
WS	Window Sample
US	Underside
Ø	Pipe Diameter

General Notes:

Demolished site - No connections possible due to redundant services.

All Tank IC's sand filled UTS.

EML & GPR scans carried out within survey boundary.

No connections available to trace Gas, TFR only.



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Client

DSI

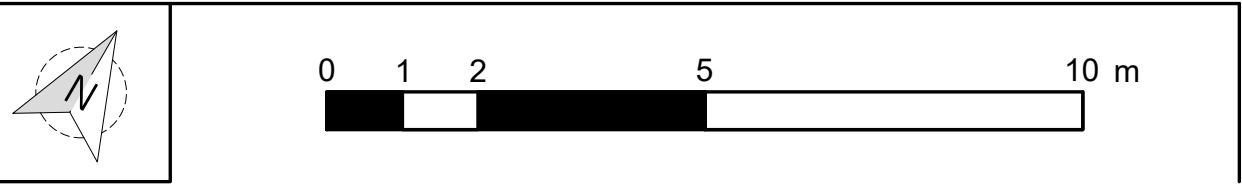
Site Location

Reliance Street
Former PFS
Manchester, M40 1EZ

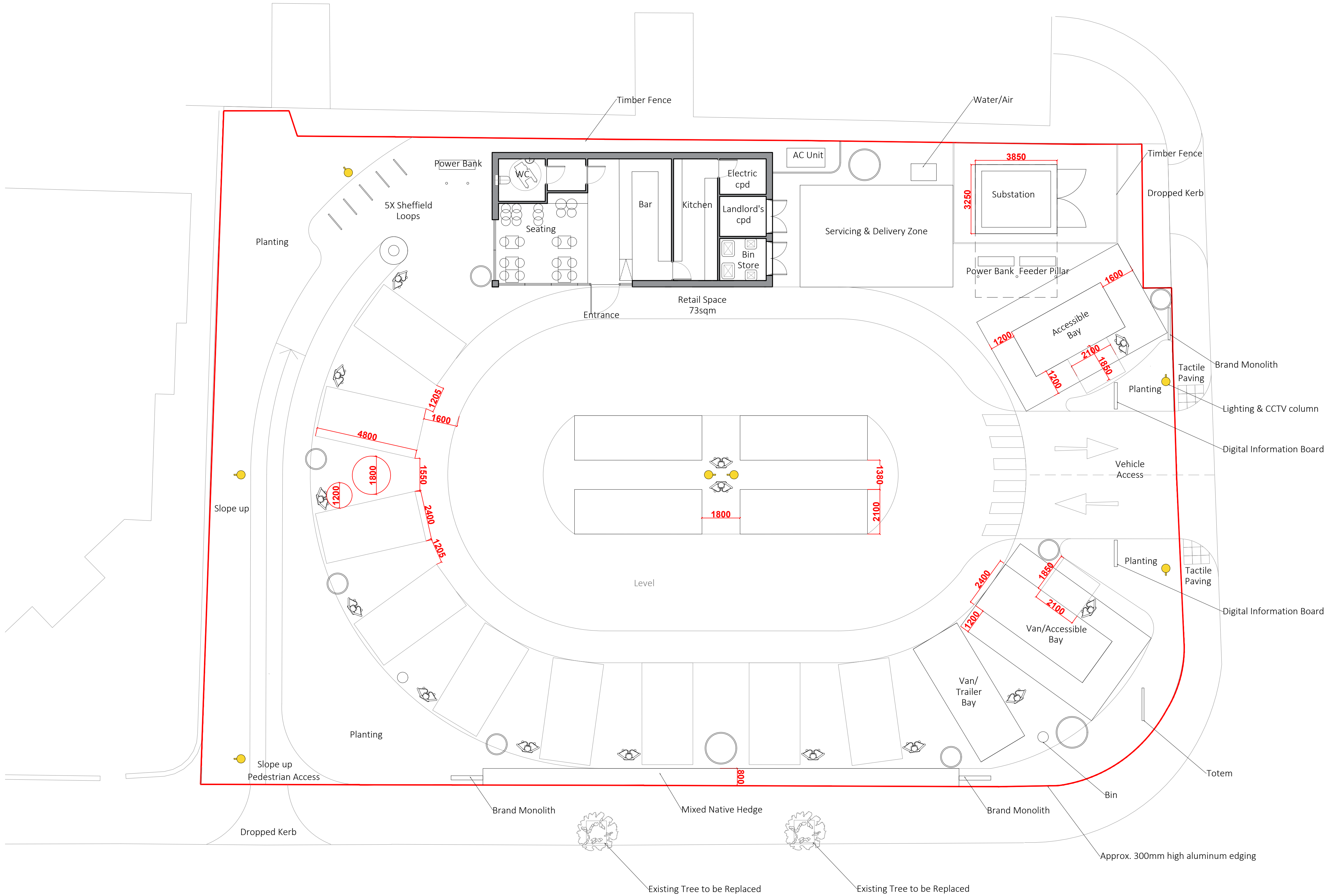
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Drawing No.	1122/DSI/9924	Revision			
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APPENDIX B: ARCHITECTURAL PROPOSAL



Totem and Digital Information Boards are indicative and will be subject to a separate advertisement consent application.



P18	2024.06.07	ISSUE Planning Consultant	LL	EL
P17	2024.04.18	ISSUE Planning	CW	LL
P16	2024.04.17	Issue to Planning Consultant	CW	LL
P15	2024.04.12	Updated Plan	LL	EL
P14	2024.04.11	Updated Plan	LL	EL
P13	2024.04.11	Updated Plan	LL	EL
P12	2024.04.08	Updated Plan	HF	LL
P11	2024.04.08	Updated Retail Space	HF	LL
P10	2024.03.28	Updated Plan	HF	LL
P9	2024.03.27	ISSUE Planning Consultant	HF	LL
P8	2024.03.26	ISSUE Planning Consultant	HF	LL
P7	2024.03.22	Updated EV Equipment Layout	LL	EL
P6	2024.03.20	Issue to MES for EV Equipment Layout	LL	EL
P5	2024.03.14	Updated Proposal	LL	EL
P4	2023.05.12	Updated Site Boundary	LL	EL
P3	2023.05.03	Updated Waste Storage & Tactile Paving	LL	EL
P2	2023.04.25	Updated Bicycle Location	LL	EL
P1	2022.11.29	ISSUE Planning	LL	EL

rev	date	description	revised by	audited by
stage		drawing title	suitability code	
PLANNING		PROPOSED Site Plan	S2	

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client
Be.EV

project
Reliance Street
Oldham

scale	drawn by	audited by	job no	originator	zone	level	type	role	dwg no	revision
1:100@A1 1:200@A3	HF	LL	612	AT	ZZ	GR	DR	A	3.1001	P18



APPENDIX C: UNITED UTILITIES SEWER ASSETS PLAN

How to contact us:

**United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP**

Telephone: 0370 7510101**E-mail: propertysearches@uuplc.co.uk**

**Your Ref: RELIANCE STREET
Our Ref: UUPS-ORD-422449
Date: 16/08/2022**

Location: 1069 OLDHAM ROAD, MANCHESTER, M40 2EN

I acknowledge with thanks your request dated 11/08/2022 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



Karen McCormack
Property Searches Manager

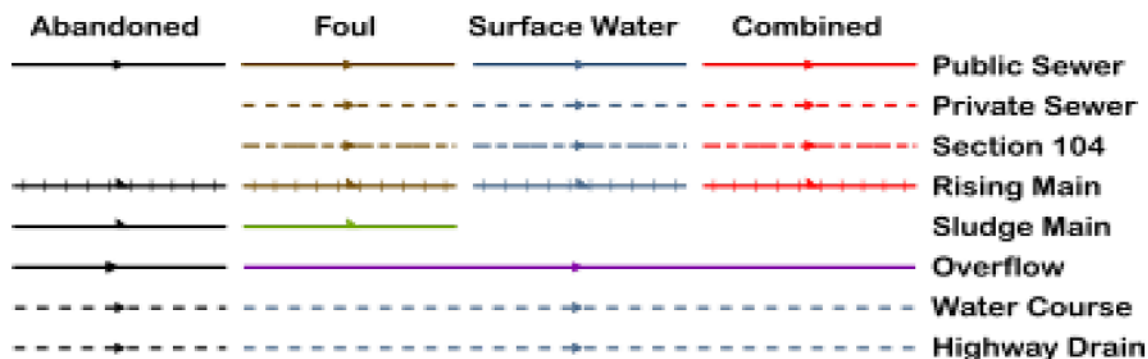
TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

Wastewater Symbolology



All point assets follow the standard colour convention: **red** – combined **brown** - foul
blue – surface water **purple** - overflow

Manhole	Side Entry Manhole
Head of System	Outfall
Extent of Survey	Screen Chamber
Rodding Eye	Inspection Chamber
Inlet	Bifurcation Chamber
Discharge Point	Lamp Hole
Vortex	T Junction / Saddle
Penstock	Catchpit
Washout Chamber	Valve Chamber
Valve	Vent Column
Air Valve	Vortex Chamber
Non Return Valve	Penstock Chamber
Soakaway	Network Storage Tank
Gully	Sewer Overflow
Cascade	Ww Treatment Works
Flow Meter	Ww Pumping Station
Hatch Box	Septic Tank
Oil Interceptor	Control Kiosk
Summit	
Drop Shaft	Change of Characteristic
Orifice Plate	



Scale: 1:1250
Date: 16/08/2022

SEWER RECORDS



Address or Site Reference: 1069 OLDHAM ROAD, MANCHESTER, M40 2EN
Printed by: Property Searches

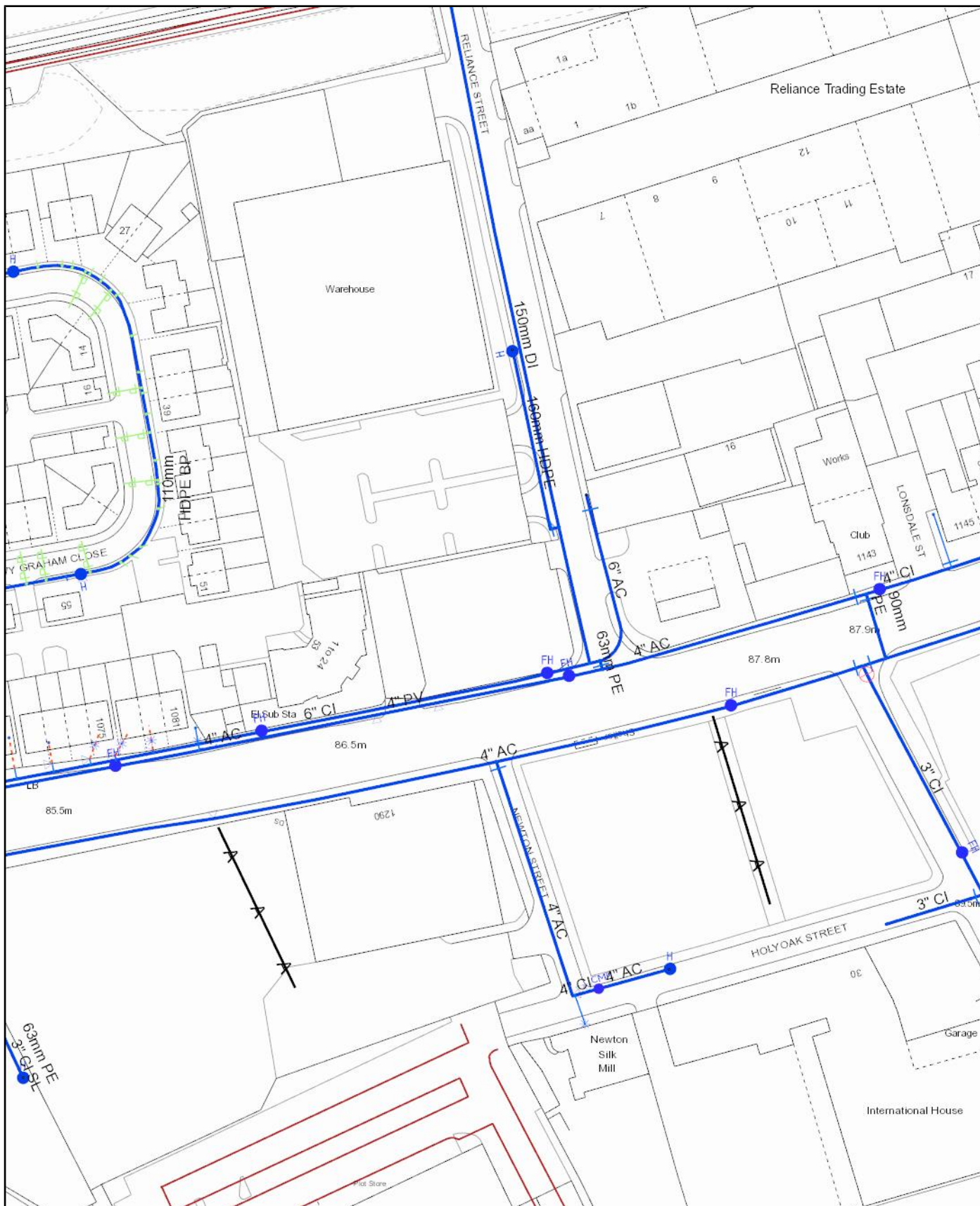
The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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Clean Water Symbolology

Proposed	Abandoned	Live	
			Distribution Main
			Trunk Main
			Comms Pipe
			Private Pipe
			Concessionary Service
			Raw Water
			LDTM Raw Water
			LDTM Treated Water
			Air Valve
			AC Valve, open
			AC Valve, closed
			CC Valve, open
			CC Valve, closed
			Non Return Valve
			Pressure Management Valve
			OMS Valve
			Stop Tap
			Flow Meter
			Domestic Meter
			Commercial Meter
			Pump
			Hydrant
			Fire Hydrant
			Anode
			Chlorination Point
			De-chlorination Point
			Strainer Point
			Access Point
			Hatch Box
			IP Point
			Sampling Station
			Logger Box
			Bore Hole
			Inlet Point
			Bulk Supply Point
			End Cap
			Site Termination
			Change of Characteristic
			Condition Report
			<u>Property Types</u>
			Water Tower
			Valve House
			Booster Pumping Station
			Intake Pumping Station
			Water Treatment Works
			Supply Reservoir
			Service Reservoir
			Impounding Reservoir
			Pipe Bridge

Symbology for proposed assets is the same as above, but shown in **green**
 Symbology for abandoned assets is the same as above, but shown in **black**



Scale: 1:1250
Date: 16/08/2022

WATER MAINS RECORDS

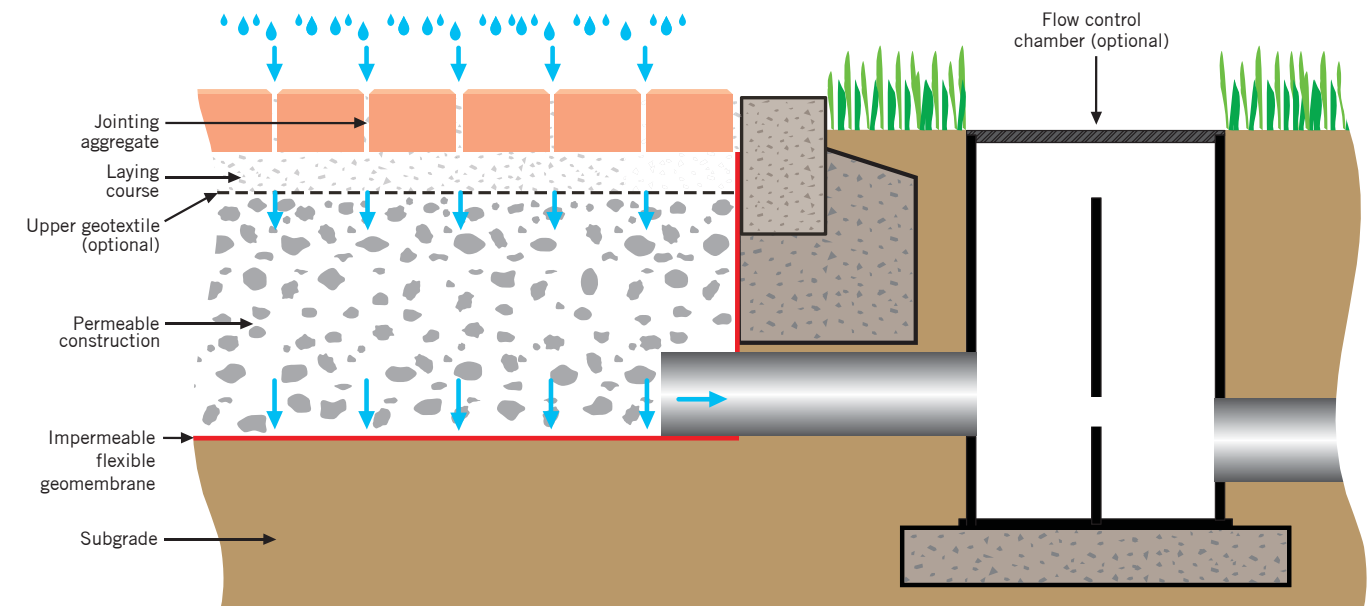
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 **United
Utilities**
Water for the North West

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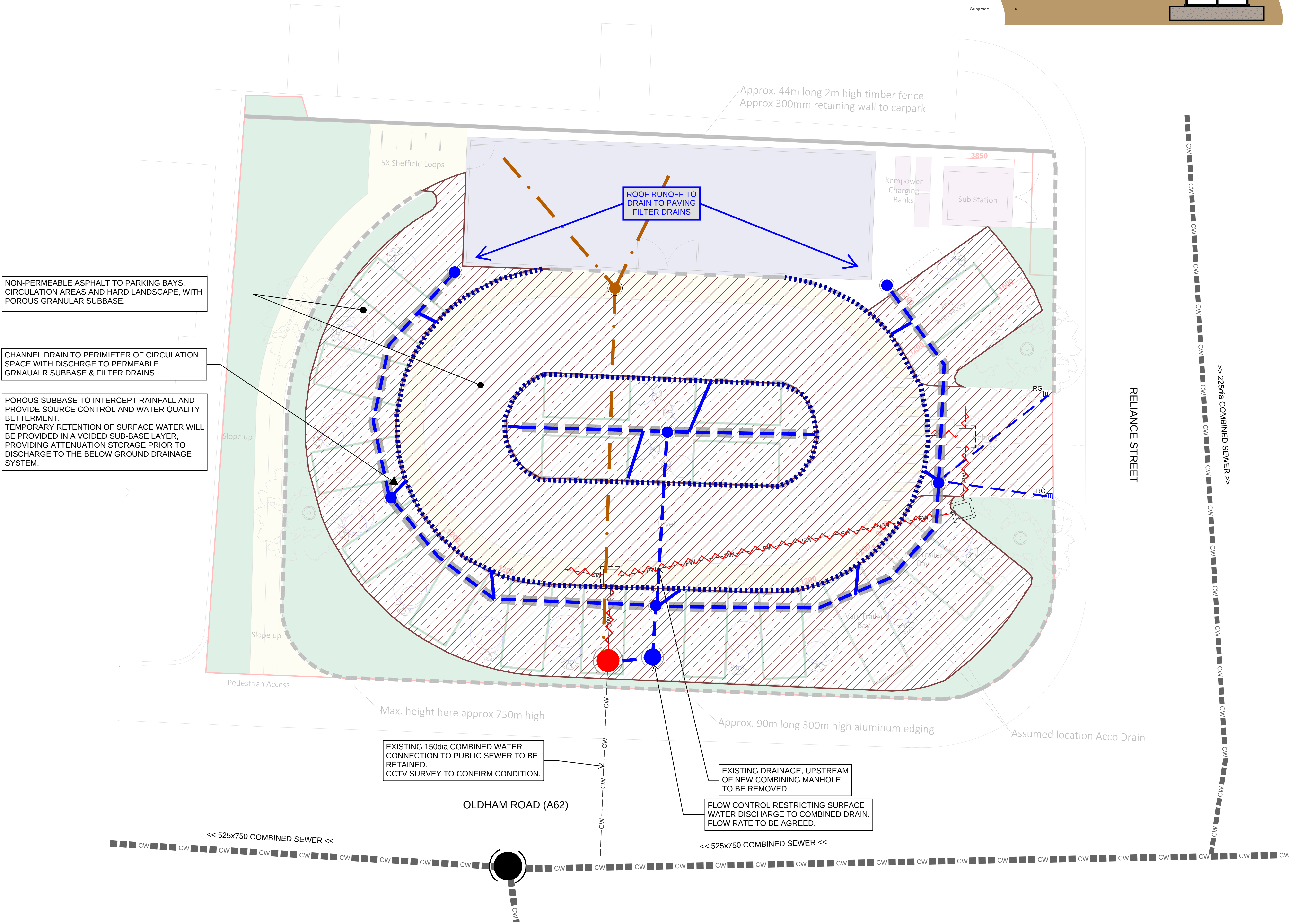
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APPENDIX D: PROPOSED DRAINAGE STRATEGY PLAN



GENERAL NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS
- DO NOT SCALE FROM THIS DRAWING IN EITHER PAPER OR DIGITAL FORM. USE WRITTEN DIMENSIONS ONLY.



NOT FOR CONSTRUCTION

P2	03.04.24	FOR COMMENT	AS	AM
P1	25.03.24	FOR COMMENT	AS	AM
Rev	Date	Description	Drawn	Check

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Drawing Status	
S2 - SUITABLE FOR INFORMATION	
Project	Date MAR 2024
BE EV RELiance STREET MANCHESTER	Scale NTS
Drawn AS	Engineer AM
Title DRAINAGE SKETCH UPDATED SCHEME	Project No 220698
Drawing No 220698-CON-XX-00-SK-C-1010	Revision P02

APPENDIX E: MICRODRAINAGE RESULTS

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.089	5.00	87.596	450	0.000	0.000	0.680
2	0.020	5.00	87.596	450	5.000	0.000	1.130
3			87.688	1200	10.000	0.000	1.518
Out_01			87.465	1200	12.000	0.000	1.315

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	2	5.000	0.600	86.916	86.616	0.300	16.7	150	5.03	50.0
1.001	2	3	5.000	0.600	86.466	86.170	0.296	16.9	150	5.07	50.0
1.002	3	Out_01	2.000	0.600	86.170	86.150	0.020	100.0	225	5.09	50.0

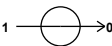
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	2.479	43.8	16.1	0.530	0.830	0.089	0.0	63	2.294
1.001	2.462	43.5	19.7	0.980	1.368	0.109	0.0	71	2.400
1.002	1.307	52.0	19.7	1.293	1.090	0.109	0.0	96	1.221

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	5.000	16.7	150	Circular	87.596	86.916	0.530	87.596	86.616	0.830
1.001	5.000	16.9	150	Circular	87.596	86.466	0.980	87.688	86.170	1.368
1.002	2.000	100.0	225	Circular	87.688	86.170	1.293	87.465	86.150	1.090

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	450	Manhole	Adoptable	2	450	Manhole	Adoptable
1.001	2	450	Manhole	Adoptable	3	1200	Manhole	Adoptable
1.002	3	1200	Manhole	Adoptable	Out_01	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	0.000	0.000	87.596	0.680	450				
						0	1.000	86.916	150
2	5.000	0.000	87.596	1.130	450		1	1.000	86.616
						0	1.001	86.466	150
3	10.000	0.000	87.688	1.518	1200		1	1.001	86.170
						0	1.002	86.170	225
Out_01	12.000	0.000	87.465	1.315	1200		1	1.002	86.150
									225

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Check Discharge Rate(s)	x
Summer CV	1.000	Check Discharge Volume	x
Analysis Speed	Normal		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	------

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
10	0	0	0
30	0	0	0
100	0	0	0
100	45	0	0

Node 3 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	86.170	Product Number	CTL-SHE-0045-1000-1200-1000
Design Depth (m)	1.200	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.0	Min Node Diameter (mm)	1200

Node 2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	86.616	Slope (1:X)	5000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	28.000	Inf Depth (m)	
Porosity	0.30	Length (m)	28.000		

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.26%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	86.987	0.071	15.9	0.1972	0.0000	OK
120 minute summer	2	122	86.669	0.203	8.7	11.7855	0.0000	SURCHARGED
120 minute summer	3	122	86.669	0.499	1.2	0.5639	0.0000	SURCHARGED
15 minute summer	Out_01	1	86.150	0.000	0.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	15.8	2.089	0.360	0.0378	
120 minute summer	2	1.001	3	1.2	0.878	0.027	0.0880	
120 minute summer	3	Hydro-Brake®	Out_01	0.7				14.3

Results for 10 year Critical Storm Duration. Lowest mass balance: 99.26%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	87.030	0.114	30.8	0.3162	0.0000	OK
240 minute summer	2	240	86.733	0.267	9.9	26.8682	0.0000	SURCHARGED
240 minute summer	3	240	86.733	0.563	1.0	0.6362	0.0000	SURCHARGED
15 minute summer	Out_01	1	86.150	0.000	0.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	30.5	2.367	0.697	0.0643	
240 minute summer	2	1.001	3	1.0	0.310	0.023	0.0880	
240 minute summer	3	Hydro-Brake®	Out_01	0.7				19.9

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.26%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	87.108	0.192	39.1	0.5322	0.0000	SURCHARGED
240 minute summer	2	244	86.775	0.309	12.6	36.7929	0.0000	SURCHARGED
240 minute summer	3	244	86.775	0.605	1.2	0.6838	0.0000	SURCHARGED
15 minute summer	Out_01	1	86.150	0.000	0.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	37.5	2.402	0.856	0.0776	
240 minute summer	2	1.001	3	1.2	0.292	0.027	0.0880	
240 minute summer	3	Hydro-Brake®	Out_01	0.7				20.3

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.26%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	11	87.340	0.424	50.7	1.1769	0.0000	FLOOD RISK
360 minute summer	2	360	86.837	0.371	12.2	51.3771	0.0000	SURCHARGED
360 minute summer	3	360	86.836	0.666	1.1	0.7538	0.0000	SURCHARGED
15 minute summer	Out_01	1	86.150	0.000	0.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	48.3	2.742	1.102	0.0879	
360 minute summer	2	1.001	3	1.1	0.121	0.025	0.0880	
360 minute summer	3	Hydro-Brake®	Out_01	0.8				26.0

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.26%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	1	256	87.596	0.680	14.5	1.8884	6.3156	FLOOD
180 minute summer	2	168	87.596	1.130	28.4	70.5520	0.0860	FLOOD
180 minute summer	3	168	87.597	1.427	2.5	1.6137	0.0000	FLOOD RISK
15 minute summer	Out_01	1	86.150	0.000	0.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute summer	1	1.000	2	14.4	1.189	0.329	0.0880	
180 minute summer	2	1.001	3	2.5	0.211	0.057	0.0880	
180 minute summer	3	Hydro-Brake®	Out_01	1.1				20.4

APPENDIX F: SUDS MAINTENANCE STRATEGY

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Be.EV – Reliance Street, Manchester

Sustainable Drainage Maintenance Plan

Ref: 220698-CON-ZZ-XX-RP-C-0002
Author: A.Smith
Approved By: A.Marshall
Date: 25 March 2024
Version: 2

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3.0 Conventional Drainage Systems 3

4.0 SuDS Features 4

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1.0 INTRODUCTION

The purpose of this document is to outline the proposed maintenance schedule for the drainage system and all SuDS features for the proposed development of a Be.EV electric vehicle charging station at Reliance Street, Manchester.

The maintenance schedule set out here complies with the CIRIA SuDS Manual (C753), which is identified as providing current best practice in the industry. The report does not replace manufacturers' requirements and these should be followed for each product in addition to the information in this document.

For the proposed extents of SuDS features on a plan drawing, please refer to the separate drainage layout plans and drainage strategy report.

2.0 ORGANISATION RESPONSIBLE

The client, BeEV, will be responsible for undertaking maintenance of the proposed drainage for the whole life of the site.

3.0 CONVENTIONAL DRAINAGE SYSTEMS

3.1 Gullies, Silt Traps, Manholes, Catchpits & Pipework

On completion of construction, the internal surfaces of the sewers and manholes shall be thoroughly cleansed to remove all deleterious matter, without such matter being passed forward into the existing sewers.

All trapped gullies, silt traps, manholes and catchpits are to be regularly inspected every three months and cleared out on a regular frequency for the first nine months. After this period, the frequency can be reduced to every six months.

All drainage runs will be inspected once a year. The system is to be jetted clear if/when necessary.

3.2 Flow controls

The manhole containing the flow control is to be regularly inspected once a year and any debris and silt are to be removed from the sump and manhole.

Orifice Plate chambers should be maintained in accordance with the manufacturer's requirements.

4.0 SUDS FEATURES

4.1 Introduction

The following SuDS measures are proposed for the Be.EV electric vehicle charging station project:-

- Permeable Paving

During the first year of the operation of all types of SuDS should be inspected at least monthly and after significant storm events to ensure that the system is functioning as designed and that no damage or faults are evident.

It is recommended that a report on the condition of the SuDS is undertaken further to an inspection at least once annually.

4.2 Permeable pavements

The pavement should be inspected regularly for clogging, litter, weeds and water ponding, preferably during and after heavy rainfall to check effective operation. Permeable pavements need to be regularly cleaned of silt and other sediments to preserve their infiltration capacity. The SuDS Manual indicates that sweeping once per year is sufficient for most sites, however the sweeping frequency should be adjusted to suit site specific conditions and should also be informed by annual inspection reports.

Care should be taken in adjusting vacuuming equipment to avoid removal of joining material. Any lost material should be replaced.

Table 1 outlines the proposed operation and maintenance regime for permeable pavements. This is adapted from The SuDS Manual (C753).

Table 1: Operation and maintenance requirements for permeable pavements

Maintenance Schedule	Required Action	Frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall or reduced frequency as required, based on site-specification observations of clogging - pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediments
Occasional maintenance	Stabilise and mow contributing and advancement areas	As required
	Removal of weeds or management using glyphosphate applied directly into the weeds by an applicator rather than spraying	As required –once per year on less frequently used pavements
Remedial actions	Remediate any landscaping which through vegetation maintenance or soil slip, has been raised to within 50 mm 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, and replace lost jointing material	As required
	Rehabilitation of surface and upper structure by remedial sweeping.	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth- if required, take remedial action	Three-monthly, 48h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

5.0 SUDS PROGRAMME

The proposed SuDS for the site will come on line approximately Summer 2024.

The contractor should ensure that during the construction phase (or in any other phasing associated with the site coming on line) that SuDS are not damaged by construction works.

6.0 OPERATION AND MAINTENANCE MANUAL RECORDS

6.1 Documents to be handed over

Conisbee will provide this document to Be.EV, who will provide the document to the construction contractor, and Be.EV will also include it in the Operation and Maintenance Manual.

The client will have copies of the drainage design drawings which show locations of the proposed SuDS and any 'as-builts' provided by the contractor.

6.2 Maintenance Records

Be.EV will be provided with the standard proforma in Appendix B of The SuDS Manual to enable them to record the outcomes of inspections.