

The Seam, Barnsley

Drainage Strategy & FRA

November 2024



FAIRHURST

CONTROL SHEET

CLIENT: Willmott Dixon

PROJECT TITLE: The Seam, Barnsley

REPORT TITLE: Drainage Strategy & FRA

PROJECT REFERENCE: 159592

DOCUMENT NUMBER: D/I/D/159592/17

STATUS: FINAL

Issue & Approval Schedule		Name	Signature	Date
	Prepared by	Frank Moore		30/10/24
	Checked by	Sujay Kumar		31/10/24
	Approved by	Jason McArdle		1/11/24

Revision Record	Rev.	Date	Status	Description	Signature	
	3	21/03/2025	Final	Proposed Drainage Section updated to suit new drainage strategy	FM	On File
					MC	On File
					MC	On File
	4	21/03/2025	Final	Updated to suit new Appendix D	FM	On File
					MC	On File
					MC	On File

*This document has been prepared in accordance with the Fairhurst Quality and Environmental Management System and in accordance with the instructions of the client, **Willmott Dixon** for the client's sole and specific use. Any other persons who use any information contained herein do so at their own risk. Any information provided by third parties and referred to herein has not been checked or verified by Fairhurst unless otherwise expressly stated within this report.*

Unless otherwise agreed in writing, all intellectual property rights in, or arising out of, or in connection with this report, are owned by Fairhurst. The client named above has a licence to copy and use this report only for the purposes for which it was provided. The licence to use and copy this report is subject to other terms and conditions agreed between Fairhurst and the client.

Fairhurst is the trading name of Fairhurst Group LLP, a limited liability partnership registered in Scotland with the registered number SO307306 and registered office at 43 George Street, Edinburgh EH2 2HT.

CONTENTS

1. INTRODUCTION	3
2. SURFACE WATER DRAINAGE ASSESSMENT	4
3. PROPOSED DRAINAGE STRATEGY	5
4. REPORT CONDITIONS	7

APPENDICES

Appendix A	Proposed Site Plans
Appendix B	Utility Survey
Appendix C	Yorkshire Water Asset Map
Appendix D	Proposed Drainage Strategy
Appendix E	Causeway Flow Model Results

1. Introduction

1.1 Background

- 1.1.1 Fairhurst have been appointed to produce a drainage strategy, on behalf of Willmott Dixon to support the planning application for the development of the existing carpark at Barnsley.
- 1.1.2 The proposed development involves the redevelopment of the existing car park. The northern part of the site will be retained as car park and resurfaced, while the southern part of the site will be developed into a public realm space. The proposed site plans are located in **Appendix A**.



Satellite image of the site

2. Surface Water Drainage Assessment

2.1 Hierarchy of Discharge

2.1.1 Following the hierarchy of discharge, in accordance with Paragraph 56 in Flood Risk and Coastal Change section of the PPG and Building Regulations, surface water flows should be discharged in the following order:

1. Discharge via infiltration, as the first priority where achievable. If this is not feasible move to step 2.
2. Discharge via watercourse / water feature, as the second priority. If this is not feasible, move to step 3.
3. Discharge to public surface water sewer, as the third priority. Where this is not feasible, move to step 4.
4. Discharge to the public combined / foul sewer.

2.1.2 The aim of this approach is to try mimic the existing natural drainage regime as a priority.

Method 1 – Infiltration

An Intrusive ground investigation was carried out to confirm infiltration rates across the site. The residual soil is Pennine Middle Coal formation which is a good infiltration media, however across the site there are cohesive deposits with very poor infiltration. This along with the presence of contamination within the groundwater and soils has meant discharging via infiltration would not be appropriate and method 2 discharging via a watercourse has been reviewed.

Method 2 – Via Watercourse

The nearest watercourse is the River Dearne, located over 600m to the northeast of the site. To discharge into this river, a drainage network would need to be constructed beneath existing buildings and through land owned by third parties, or diverted around these obstacles. Both options would be prohibitively expensive, making this discharge method unfeasible. Therefore, Method 3 has been reviewed.

Method 3 – Via Surface Water Sewer

Two existing surface water sewers run beneath the pavement on Old Mill Lane Road to the north and Eldon Street North to the south of the site. The existing drainage network currently discharges from the site using both of these existing sewers. It is therefore proposed to continue to utilise these sewers, for the discharge of surface water flows from the site once the development is complete. See **Appendix B** for the utility survey.

3. Proposed Drainage Strategy

The proposed drainage strategy is divided into two networks. The drainage from the carpark area will discharge into an existing Yorkshire Water asset to the north, and the public realm area will discharge to the south, also into an existing Yorkshire Water asset. See Appendix C for Yorkshire Water Asset Map.

3.1 Flood Risk Assessment

- 3.1.1 The EA Flood Maps for planning shows that the site is entirely located in Flood Zone 1 (low risk) and is therefore at low risk from flooding including surface water flooding.

3.2 Northern Network

- 3.2.1 The northern section of the site involves the redevelopment of an existing carpark, with the majority of the existing levels retained, except for a middle section where levels are being raised by 300mm. The proposed levels have been raised to allow for the installation of a geocell system to protect existing tree roots from damage.
- 3.2.2 The proposed drainage to the north is to the Yorkshire Water surface water culvert located beneath the footpath on Old Mill Lane. The proposed network connects via a backdrop onto the existing 150mm pipe that saddle connects onto this culvert. See **Appendix D** for the proposed drainage strategy.
- 3.2.3 The flow rate to the north is restricted via the orifice provided by the 150mm pipe, this leads to a maximum discharge rate of 80.0l/s. The rest of the northern network is made of majority 600mm diameter pipes that provide attenuation during large storm events.
- 3.2.4 As this network drains more than 50 car parking spaces, an oil separator has been provided with all surface water from the parking areas passing through before discharging into the Yorkshire Water culvert beneath the footpath on Old Mill Lane.
- 3.2.5 The flow results shown in **Appendix E**, show the connection into the existing 150mm pipe as surcharging during a 1 in 1 storm event. There is no flooding apparent on the model for storm events up to 1 in 100 year with 40% climate change.

3.3 Southern Network

- 3.3.1 The southern section of the site provides positive drainage for the proposed public realm and part of the remediated carpark.
- 3.3.2 The southern network discharges into the existing 225mm diameter pipe which discharges downstream into an existing back drop along the retaining wall to the

south, which then connects to the Yorkshire Water network beneath Eldon Street North. See **Appendix D** for the proposed drainage strategy.

3.3.3 As this network drains more than 50 car parking spaces, an oil separator has been provided with all surface water from the parking areas passing through before discharging into the Yorkshire Water network beneath Eldon Street North

3.3.4 The southern network is restricted via a hydro brake to discharge into the existing backdrop at 80l/s.

3.4 Discharge Rates

3.4.1 Yorkshire water stipulated that the site must achieve a minimum 30% reduction in the discharge rate across the entire site. Please see below table 1 for the calculated existing discharge rates to the North and South, the reduced discharge rates and the proposed maximum discharge rates (See Appendix E for full discharge rates).

Catchment	Existing	30% Reduction	Proposed	Actual Reduction
Northern	207.92 l/s	145.54 l/s	80 l/s	62 %
Southern	115.92 l/s	81.14 l/s	80 l/s	31 %

Table 1 – Discharge Rate Comparisons

3.4.2 As shown in table 1 both networks discharge into their associated Yorkshire Water assets with a greater than 30% reduction of what the existing arrangement is discharging at.

4. Report Conditions

- 4.1 The report is based upon the information that has been acquired and/or made available to Fairhurst via the various searches and consultations completed as part of this assessment. In some cases, anecdotal information has been relied upon, where documented evidence has been absent.
- 4.2 The conclusions drawn in the above report are considered correct, although any subsequent additional information may allow refinement of the conclusions.
- 4.3 All work carried out in preparing this report has utilised Fairhursts' professional knowledge and understanding of the current UK standard and codes, terminology and legislation. Changes in this guidance may occur at any time in the future, and therefore cause any conclusions to become inappropriate or incorrect. Should this be the case then an updated assessment will be required based upon the latest released guidance.
- 4.4 This report has been produced using information contained within online mapping and documents prepared by others. Fairhurst can accept no liability or responsibility for the accuracy of the information provided.

Appendix A
Proposed Site Plan



NOTES

LEGEND

- Existing Soft Landscape Area to be retained
- Proposed Wildflower Turf
- Proposed Grass Turf
- Proposed Ornamental Planting
- Proposed Hedge
- Proposed Tree Planting
- Existing Trees/ Vegetation to be retained
- Existing Trees to be removed
- Existing Area Retained - No Work
- Proposed Paving - Type 1 / Concrete Block Paving Vehicular (100x200mm)
- Proposed Paving - Type 2 / Sandstone Occasional Vehicular Use
- Proposed Paving - Type 3 / Granite Occasional Vehicular
- Proposed Paving - Type 4 / Sandstone Occasional Vehicular Use
- Proposed Paving - Type 5 / Sandstone Occasional Vehicular Use
- Asphalt Vehicular Grade
- Concrete Hard-standing
- Existing Asphalt Surface to be Renewed
- Permeable Block Paving
- Free-draining Gravel
- Tactile Blister Paving
- Perforated Metal Featured Texts
- Proposed Raised Planter Edge
- Proposed Focal Point Sculpture
- Proposed Louvred Fencing [with matching gates (manually lockable)]
- Proposed 1.2m High Railing [with matching gates (manually lockable)]
- Proposed Knee Rail
- Palisade Fence to be Renewed [with existing posts & foundations retained]
- Designed CorTen Fence
- Free-standing Metal Benches
- Gabion Seating with Timber Top
- Automatic Bollards
- Fixed Bollards
- Totem Signs
- Litter Bins
- Metal Tree Grill [weathering steel]
- Space Allowance for Ticket Machine [to be supplied by BMBC]
- Lighting Columns refer to drawing SEAM-AGL-ZZ-XX-DR-E-24002
- Rumble Strip
- EV Charger
- EV Bays [infrastructure provided for Phase 1]
- EV Bays [infrastructure provided for Phase 2]

REVISION | P28 DATE | 14.02.25 BY | YL CHECKED | PA
Rumble strip added to car park entrance; granite strips in front of DMC updated; Quadrants kerb added; red line boundary updated

REVISION | P27 DATE | 11.02.25 BY | YL CHECKED | PA
Tree removed from south entrance to avoid underground structure; bollards to south entrance moved

REVISION | P26 DATE | 06.02.25 BY | YL CHECKED | PA
Tactile paving updated accordingly to comments received

REVISION | P25 DATE | 04.02.25 BY | YL CHECKED | PA
Gravel added to existing wall; Hedge and fence removed to west boundary; paving updated to southern entrance; line hatch added to NWR bay; bollards to service route exit moved; mottard removed from northern EV parking; rumble strip added

REVISION | P24 DATE | 04.02.25 BY | YL CHECKED | PA
EV chargers added; rumble strips added; accessible EV bay size revised; tactile paving on cell web removed; service bay added; knee rail to northern entrance removed; pedestrian path width reduced to 2m; Trief reduced to 2m; paving to service route updated

REVISION | P23 DATE | 10.01.25 BY | YL CHECKED | PA
Grass in raised planter changed to ornamental planting; key updated; Light column added

REVISION | P22 DATE | 20.12.24 BY | YL CHECKED | PA
Bollards around substation removed; pathway and tactile paving added to car park; road marking updated; existing no-work area updated; bollards spacing revised to 1.2m maximum; bollards symbols changed to match specification

REVISION | P21 DATE | 12.12.24 BY | YL CHECKED | PA
Updated phase 1 and 2 EV bays; Speed table removed; east planting area updated accordingly to comments; planting type keys updated

REVISION | P20 DATE | 12.11.24 BY | YL CHECKED | PA
EV charging points removed; key updated to show phase 1 and 2 EV bays; ticket machine added

REVISION | P19 DATE | 16.10.24 BY | YL CHECKED | PA
Existing cycle parking area revised to be retained

CLIENT Willmott Dixon

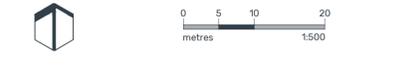
PROJECT The Seam, Barnsley

TITLE Landscape Site Plan

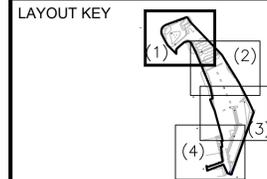
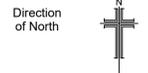
DWG No. SEAM-ONE-ZZ-XX-DR-L-00001 REV P28

STATUS PRELIMINARY

SCALE 1:500 @ A1 DATE 20.02.24 DRN BY TL



Appendix B
Utilities Survey



Background topographical information used for this drawing is from drawing P24-00416-MET-EXT-XX-TOP-M2-G' dated 23/05/24.
Datum: OS Level Datum.
Using the OS GPS Network and applying OSGM15 National Geoid Model to obtain local area corrections

This drawing and information contained within is issued in confidence and is the copyright of Met Geo Environmental Ltd. If the topographical information or base mapping has been supplied by a Third Party, Met Geo Environmental Ltd is not liable for any inaccuracies contained therein. If inaccuracies to supplied mapping have been identified (and Met Geo Environmental Ltd have not been commissioned to rectify these inaccuracies) these will be highlighted in the accompanying report. Disclosure of this information to Third Parties and unauthorised copying or replication of this data without approval is forbidden.

The data presented in this drawing have been collected using a combination of the following: consultation of utility asset information, visual survey & inspection of manholes and inspection chambers; electromagnetic location techniques; ground penetrating radar, and, where applicable, trial hole excavations. These techniques have been deployed in accordance with the BS1 PAS128 Specification for the Detection, Verification and Location of Underground Utilities using the search methodologies indicated on sheet PAS1 and described in the accompanying report. This drawing should be used in conjunction with the accompanying report which details the limitations of these techniques and any hindering factors encountered during this survey.

Unless otherwise stated, all services shown on this plan have been surveyed using approved detectors and the connections between inspection chambers, if unable to be detected, are generally assumed to be direct unless there are indications to the contrary. The detection confidence for each utility segment is depicted in line with the PAS128 scheme outlined below. Information depicted as QL-C or QL-D cannot be guaranteed as it is based on utility record information which can be inaccurate and incomplete.

The service routes depicted may reflect the routes of multiple cables or pipes. It is not always possible to differentiate between buried construction features, utilities and other subsurface linear features due to the inherent limitations of the techniques employed. It is therefore possible that some features shown are not utility related. Due to the limitations of electromagnetic techniques all utility identifications should be treated with caution and verified prior to use during design or building works.

If the location or depth of services or features is of particular importance to a project then it is recommended that discussions are held with Met Geo Environmental Ltd. regarding any further considerations that may have arisen due to the nature and methods employed to ascertain the location data presented as part of this survey.

Please note that not all buried pipes, cables and ducts can be detected and mapped in consideration of their depth, location, material type, geology and proximity to other utilities. Even an appropriate and professionally executed survey may not be able to achieve a 100% detection rate. Where an area of utilities is likely to affect client project requirements, it is strongly recommended that PAS128 Type A verification surveys are carried out to confirm the position or absence of utilities where this is critical to the scheme.

No utility mapping survey can be considered a 100% accurate depiction of the sub-surface environment, and the use of these drawings does not remove the requirement for the use of safe digging techniques at all times, in line with the requirements of HSG47 and current CDM regulations.

Rev	Date	Drawn	Description	Check
-	-	-	-	-

Southgate House
Pontefrac Road T: +44 [0] 1132 008 900
Stourton F: +44 [0] 1132 008 901
Leeds E: admin@metgeoenvironmental.com
West Yorkshire W: www.metgeoenvironmental.com
LS10 1SW

Client
WILLMOTT DIXON CONSTRUCTION LIMITED

Site
**County Way,
Barnsley, S70 2EQ**

Title
**UTILITY MAPPING
SURVEY**

Surveyed	JA EM AP HB	Drawn	EM
Chk.	JPR	Date	28/05/2024 - 05/06/24
Scale	1:200	Job No	P24-00416
		Sheet Size	A1
		Revision	01
DWG Ref	P24 00416 MET EXT UMS M2 GU 001		



SUB-SURFACE KEY

DRAINAGE

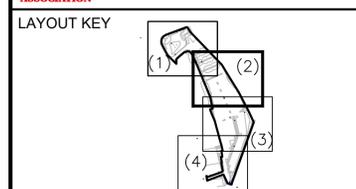
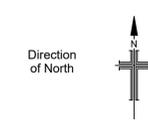
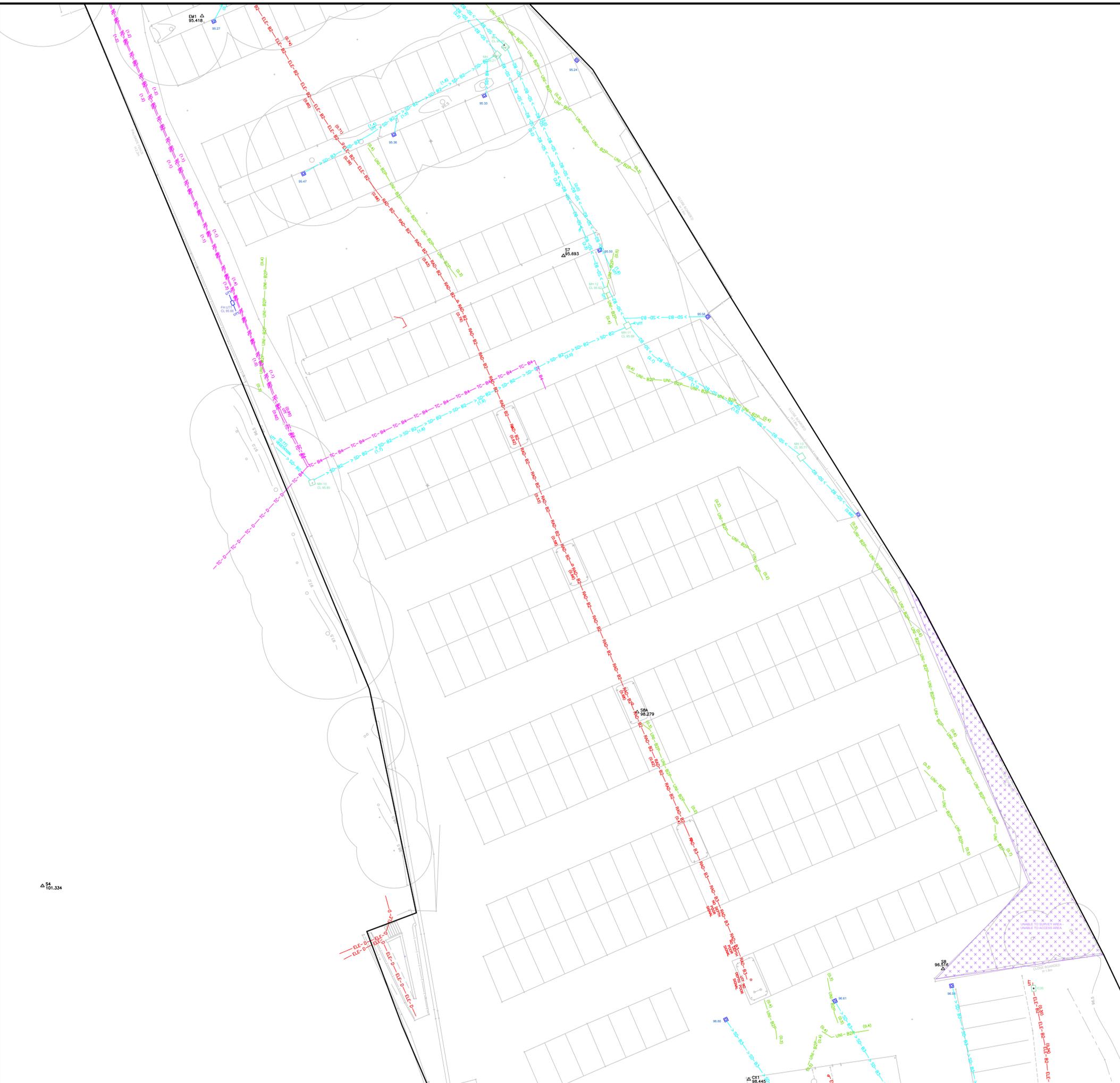
- FD-B1P FOULED
- SD-B3 SURFACE
- RM-B2 RISING MAIN
- GAS-B2P GAS (UNSPECIFIED)
- GAS-MP-M MEDIUM PRESSURE
- ELECTRICITY
- ELEC-B1 ELECTRICITY CABLE(S) (UNSPECIFIED)
- HV-B1 HIGH VOLTAGE
- TL-B3 TRAFFIC LIGHT/CONTROL CABLE(S)
- PIPES, DUCTS & PIPELINES
- HEAT-B2 DISTRICT HEATING/STEAM PIPE(S)
- FL-B1 FUEL PIPELINE
- PIPE-B3 UNIDENTIFIED PIPEWORK
- TELECOMMUNICATIONS
- WATER
- WAT-B1 WATER SERVICE (UNSPECIFIED)
- WAT-MP-B3P MEDIUM PRESSURE
- WAT-RAW-C RAW WATER
- UNIDENTIFIED
- UN-B1 UNIDENTIFIED POTENTIAL UTILITY
- PWR-B2 POWER (LINEAR RESPONSE DETECTED USING 'POWER' MODE OF EM LOCATOR - INDUCED 50 HZ GROUND CURRENTS)
- RAO-B3 RADIO (LINEAR RESPONSE DETECTED USING 'RADIO' MODE OF EM LOCATOR - RE-RADIATED VLF RADIO WAVES)
- ELE-B2 APPROXIMATE DEPTH BELOW GROUND LEVEL OF APPARATUS IN METRES

CONFIDENCE LEVELS

(D)	UNDETECTED	FROM SERVICE RECORDS ONLY
(C)	UNDETECTED	FROM SERVICE RECORDS ONLY - SUPPORTING EVIDENCE FROM VISUAL INSPECTION (UTILITY COVERS, SCARS, ETC.)
(B4)	ASSUMED	UNDETECTED BY REMOTE LOCATION METHODS
(B3)(B3P)	DETECTED	HORIZONTAL POSITION ONLY ±500mm
(B2)(B2P)	DETECTED	HORIZONTAL POSITION ±250mm
(B1)(B1P)	DETECTED	VERTICAL POSITION ±40% OF DEPTH
(A)	VERIFIED	SERVICE HAS BEEN VISUALLY VERIFIED AND SURVEYED USING APPROPRIATE METHODS ±50mm IN POSITION & DEPTH
(P)	SEE REPORT FOR FULL DISCUSSION OF MAXIMUM ACHIEVABLE ACCURACY	SUFFIX DENOTES DATA HAS BEEN PROCESSED POST COLLECTION

OTHER POTENTIAL BURIED FEATURES

- AREA OF ELEVATED GPR AMPLITUDE RESPONSE CAUSED BY SUB-SURFACE FEATURE OR DISTURBED GROUND. MAY POSSIBLY BE RELATED TO UTILITY APPARATUS OR SERVICE TRENCH.
- AREA STRONG, REGULARLY SPACED GPR RESPONSES - LIKELY RELATED TO REINFORCED CONCRETE BUT SOMETIMES BURIED STONE SETTS (OR SIMILAR) MAY GIVE ANALOGOUS RESPONSE.
- AREA OF MULTIPLE HYPERBOLA RESPONSES CAUSED BY SUB-SURFACE FEATURES. MAY POSSIBLY BE RELATED TO DISTURBED GROUND WITH CONCENTRATION OF DISCRETE REFLECTORS, AREAS OF TREE ROOTS, ANIMAL BURROWING OR SIMILAR.



Background topographical information used for this drawing is from drawing P24-00416-MET-EXT-XX-TOP-M2-G' dated 23/05/24.
 Datum: OS Level Datum.
 Using the OS GPS Network and applying OSGM15 National Geoid Model to obtain local area corrections

This drawing and information contained within is issued in confidence and is the copyright of Met Geo Environmental Ltd. If the topographical information or base mapping has been supplied by a Third Party, Met Geo Environmental Ltd is not liable for any inaccuracies contained therein. If inaccuracies to supplied mapping have been identified (and Met Geo Environmental Ltd have not been commissioned to rectify these inaccuracies) these will be highlighted in the accompanying report. Disclosure of this information to Third Parties and unauthorised copying or replication of this data without approval is forbidden.

The data presented in this drawing have been collected using a combination of the following: consultation of utility asset information, visual survey & inspection of manholes and inspection chambers; electromagnetic location techniques; ground penetrating radar, and, where applicable, trial hole excavations. These techniques have been employed in accordance with the BS1 PAS128 Specification for the Detection, Verification and Location of Underground Utilities using the search methodologies indicated on sheet PAS1 and described in the accompanying report. This drawing should be used in conjunction with the accompanying report which details the limitations of these techniques and any hindering factors encountered during this survey.

Unless otherwise stated, all services shown on this plan have been surveyed using approved detectors and the connections between inspection chambers, if unable to be detected, are generally assumed to be direct unless there are indications to the contrary. The detection confidence for each utility segment is depicted in line with the PAS128 scheme outlined below. Information depicted as QL-C or QL-D cannot be guaranteed as it is based on utility record information which can be inaccurate and incomplete.

The service routes depicted may reflect the routes of multiple cables or pipes. It is not always possible to differentiate between buried construction features, utilities and other subsurface linear features due to the inherent limitations of the techniques employed. It is therefore possible that some features shown are not utility related. Due to the limitations of electromagnetic techniques all utility identifications should be treated with caution and verified prior to use during design or building works.

If the location or depth of services or features is of particular importance to a project then it is recommended that discussions are held with Met Geo Environmental Ltd. regarding any further considerations that may have arisen due to the nature and methods employed to ascertain the location data presented as part of this survey.

Please note that not all buried pipes, cables and ducts can be detected and mapped in consideration of their depth, location, material type, geology and proximity to other utilities. Even an appropriate and professionally executed survey may not be able to achieve a 100% detection rate. Where an area of utilities is likely to affect client project requirements, it is strongly recommended that PAS128 Type A verification surveys are carried out to confirm the position or absence of utilities where this is critical to the scheme.

No utility mapping survey can be considered a 100% accurate depiction of the sub-surface environment, and the use of these drawings does not remove the requirement for the use of safe digging techniques at all times, in line with the requirements of HSG47 and current CDM regulations.

SUB-SURFACE KEY

DRAINAGE	> FD-B1P - FOUL	> CD-B2P - COMBINED
	> SD-B3 - SURFACE	> D-B3P - UNIDENTIFIED
	> RM-B2 - RISING MAIN	> OF-B4 - OVERFLOW
GAS	GAS-B2P - GAS (UNSPECIFIED)	GAS-LP-B2 - LOW PRESSURE
	GAS-MP-D - MEDIUM PRESSURE	GAS-IP-B4 - INTERMEDIATE PRESSURE
	GAS-HP-B1P - HIGH PRESSURE	
ELECTRICITY	ELE-B1 - ELECTRICITY CABLE(S) (UNSPECIFIED)	LV-B2P - LOW VOLTAGE (UNSPECIFIED)
	HV-B1P - HIGH VOLTAGE	CCTV-B2 - CCTV CABLE(S)
	TL-B3 - TRAFFIC LIGHT/CONTROL CABLE(S)	
PIPES, DUCTS & PIPELINES	HEAT-B2 - DISTRICT HEATING/STEAM PIPE(S)	ROUTE CONTAINING HEATING PIPE(S) & CABLE(S)
	FL-B1 - FUEL PIPELINE	OIL-B2 - OIL PIPELINE
	PIPE-B3 - UNIDENTIFIED PIPEWORK	X-B1P - EMPTY DUCT
	TC-B1 - TELECOMMUNICATIONS CABLE(S)	TC-B1P - TELECOMMUNICATIONS CABLE(S)
WATER	WAT-B1 - WATER SERVICE (UNSPECIFIED)	WAT-LP-B1P - LOW PRESSURE
	WAT-MP-B2P - MEDIUM PRESSURE	WAT-HP-B2 - HIGH PRESSURE
	WAT-RAW-C - RAW WATER	WAT-PVT-A - PRIVATE
UNIDENTIFIED	UNI-B1 - UNIDENTIFIED POTENTIAL UTILITY	CAB-B2P - UNIDENTIFIED CABLE
	PWR-B2 - POWER (LINEAR RESPONSE DETECTED USING 'POWER' MODE OF EM LOCATOR - INDUCED 50 Hz GROUND CURRENTS)	
	RAD-B3 - RADIO (LINEAR RESPONSE DETECTED USING 'RADIO' MODE OF EM LOCATOR - RE-RADIATED VLF RADIO WAVES)	
	ELC-B2 - APPROXIMATE DEPTH BELOW GROUND LEVEL OF APPARATUS IN METRES	

CONFIDENCE LEVELS	
(D)	UNDETECTED FROM SERVICE RECORDS ONLY
(C)	UNDETECTED FROM SERVICE RECORDS ONLY - SUPPORTING EVIDENCE FROM VISUAL INSPECTION (UTILITY COVERS, SCARS, ETC.)
(B4)	ASSUMED UNDETECTED BY REMOTE LOCATION METHODS
(B3)/(B3P)	DETECTED HORIZONTAL POSITION ONLY ±500mm
(B3)/(B3P)	DETECTED HORIZONTAL POSITION ±250mm
(B3)/(B3P)	DETECTED VERTICAL POSITION 40% OF DEPTH HORIZONTAL POSITION ±150mm
(B1)/(B1P)	DETECTED VERTICAL POSITION ±15% OF DEPTH
(A)	VERIFIED SERVICE HAS BEEN VISUALLY VERIFIED AND SURVEYED USING APPROPRIATE METHODS ±50mm IN POSITION & DEPTH
(P)	SEE REPORT FOR FULL DISCUSSION OF MAXIMUM ACHIEVABLE ACCURACY
	SUFFIX DENOTES DATA HAS BEEN PROCESSED - POST COLLECTION

UTR	UNABLE TO TRACE	CL	METRES BELOW GROUND LEVEL COVER LEVEL
UTM	UNABLE TO MEASURE	ME	MEASUREMENT ESTIMATED
OS	SERVICE EXTENDS OFF SITE	SP	SCOFFIT LEVEL OF PIPE/DUCT
Ø	DIAMETER OF PIPE OR DUCT	IL	INVERT LEVEL OF PIPE/DUCT

[Hatched]	APPROXIMATE CHAMBER EXTENTS	[Dashed]	EXTENTS OF UTILITY MAPPING SURVEY
[Diagonal Lines]	TRENCH SCAR / SURFACE SCAR	[Stippled]	UNABLE TO SURVEY AREA DUE TO DENSE VEGETATION
[Dotted]	UNABLE TO SURVEY AREA DUE TO INABILITY TO ACCESS AREA	[Cross-hatched]	UNABLE TO SURVEY AREA DUE TO OBSTRUCTIONS
[Red Line]	CABLE DUCT SHOWING NUMBER OF CABLES	[Blue Line]	UNABLE TO SURVEY AREA DUE TO TERRAIN/TOPOGRAPHY
[Blue Arrow]	WINSOR TRAP/INTERCEPTOR ON CHAMBER OUTFLOW	[Blue Arrow]	BACKDROP (INTERNAL/EXTERNAL ON CHAMBER INFLOW)

[Red Circle]	AREA OF ELEVATED GPR AMPLITUDE RESPONSE CAUSED BY SUB-SURFACE FEATURE OR DISTURBED GROUND. MAY POSSIBLY BE RELATED TO UTILITY APPARATUS OR SERVICE TRENCH.
[Green Circle]	AREA STRONG, REGULARLY SPACED GPR RESPONSES - LIKELY RELATED TO REINFORCED CONCRETE BUT SOMETIMES BURIED STONE SETTS (OR SIMILAR) MAY GIVE ANALOGOUS RESPONSE
[Blue Circle]	AREA OF MULTIPLE HYPERBOLA RESPONSES CAUSED BY SUB-SURFACE FEATURES. MAY POSSIBLY BE RELATED TO DISTURBED GROUND WITH CONCENTRATION OF DISCRETE REFLECTORS, AREAS OF TREE ROOTS, ANIMAL BURROWING OR SIMILAR.

Rev	Date	Drawn	Description	Check
-	06/06/2024	EM	--	--

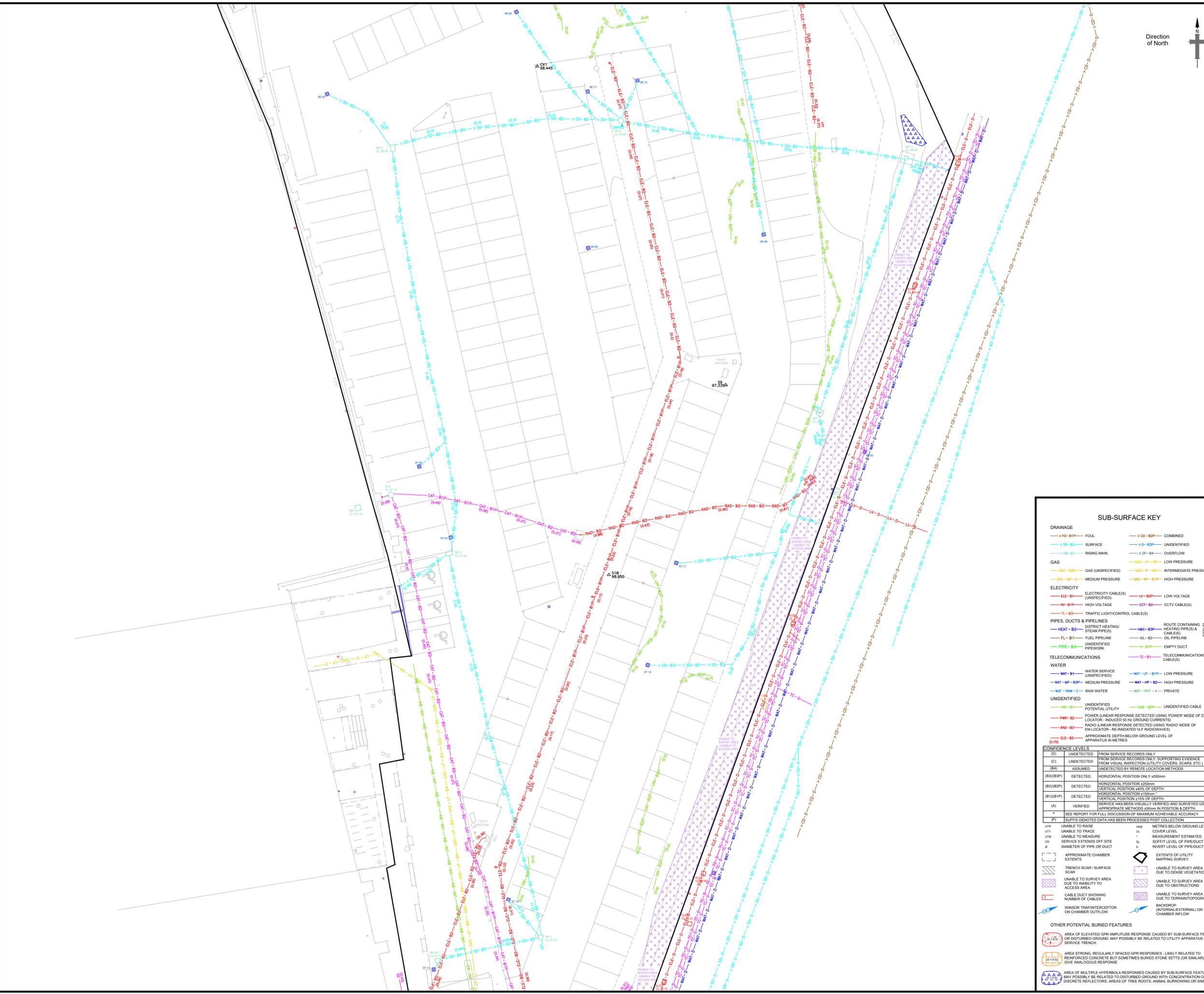
Southgate House
 Pontefract Road T: +44 [0] 1132 008 900
 Stourton F: +44 [0] 1132 008 901
 Leeds E: admin@metgeoenvironmental.com
 West Yorkshire W: www.metgeoenvironmental.com
 LS10 1SW

Client
WILLMOTT DIXON CONSTRUCTION LIMITED

Site
 County Way,
 Barnsley, S70 2EQ

Title
UTILITY MAPPING SURVEY

Surveyed	JA EM AP HB	Drawn	EM
Chk.	JPR	Date	05/06/24
Scale	1:200	Job No	P24-00416
		Sheet Size	A1
		Revision	01
DWG Ref	P24 00416 MET EXT UMS M2 GU 002		



LAYOUT KEY

Background topographical information used for this drawing is from drawing P24-00416-MET-EXT-XX-TOP-M2-G' dated 23/05/24.
 Datum: OS Level Datum.
 Using the OS GPS Network and applying OSGM15 National Geoid Model to obtain local area corrections

This drawing and information contained within is issued in confidence and is the copyright of Met Geo Environmental Ltd. If the topographical information or base mapping has been supplied by a Third Party, Met Geo Environmental Ltd is not liable for any inaccuracies contained therein. If inaccuracies to supplied mapping have been identified (and Met Geo Environmental Ltd have not been commissioned to rectify these inaccuracies) these will be highlighted in the accompanying report. Disclosure of this information to Third Parties and unauthorised copying or replication of this data without approval is forbidden.

The data presented in this drawing have been collected using a combination of the following: consultation of utility asset information, visual survey & inspection of manholes and inspection chambers; electromagnetic location techniques; ground penetrating radar, and, where applicable, trial hole excavations. These techniques have been deployed in accordance with the BS PAS128 Specification for the Detection, Verification and Location of Underground Utilities using the search methodologies indicated on sheet PAS1 and described in the accompanying report. This drawing should be used in conjunction with the accompanying report which details the limitations of these techniques and any hindering factors encountered during this survey.

Unless otherwise stated, all services shown on this plan have been surveyed using approved detectors and the connections between inspection chambers, if unable to be detected, are generally assumed to be direct unless there are indications to the contrary. The detection confidence for each utility segment is depicted in line with the PAS128 scheme outlined below. Information depicted as QL-C or QL-D cannot be guaranteed as it is based on utility record information which can be inaccurate and incomplete.

The service routes depicted may reflect the routes of multiple cables or pipes. It is not always possible to differentiate between buried construction features, utilities and other subsurface linear features due to the inherent limitations of the techniques employed. It is therefore possible that some features shown are not utility related. Due to the limitations of electromagnetic techniques all utility identifications should be treated with caution and verified prior to use during design or building works.

If the location or depth of services or features is of particular importance to a project then it is recommended that discussions are held with Met Geo Environmental Ltd, regarding any further considerations that may have arisen due to the nature and methods employed to ascertain the location data presented as part of this survey.

Please note that not all buried pipes, cables and ducts can be detected and mapped in consideration of their depth, location, material type, geology and proximity to other utilities. Even an appropriate and professionally executed survey may not be able to achieve a 100% detection rate. Where an area of utilities is likely to affect client project requirements, it is strongly recommended that PAS128 Type A verification surveys are carried out to confirm the position or absence of utilities where this is critical to the scheme.

No utility mapping survey can be considered a 100% accurate depiction of the sub-surface environment, and the use of these drawings does not remove the requirement for the use of safe digging techniques at all times, in line with the requirements of HSG47 and current CDM regulations.

SUB-SURFACE KEY

DRAINAGE	> FD-B1P - FOUL	> CD-B2P - COMBINED
	> SD-B3 - SURFACE	> D-B3P - UNIDENTIFIED
	> RW-B2 - RISING MAIN	> OF-B4 - OVERFLOW
GAS	GAS-B2P - GAS (UNSPECIFIED)	GAS-LP-B2 - LOW PRESSURE
	GAS-MP-D - MEDIUM PRESSURE	GAS-IP-B4 - INTERMEDIATE PRESSURE
	GAS-HP-D - HIGH PRESSURE	GAS-HP-B1P - HIGH PRESSURE
ELECTRICITY	ELE-B1 - ELECTRICITY CABLE(S) (UNSPECIFIED)	LV-B2P - LOW VOLTAGE
	HW-B1P - HIGH VOLTAGE	CCTV-B2 - CCTV CABLE(S)
	TL-B3 - TRAFFIC LIGHT/CONTROL CABLE(S)	
PIPES, DUCTS & PIPELINES	HEAT-B2 - DISTRICT HEATING/STEAM PIPE(S)	HAC-B2P - ROUTE CONTAINING HEATING PIPE(S) & CABLE(S)
	FL-B1 - FUEL PIPELINE	OIL-B2 - OIL PIPELINE
	UNID-B3 - UNIDENTIFIED PIPEWORK	X-B1P - EMPTY DUCT
TELECOMMUNICATIONS		TC-B1 - TELECOMMUNICATION CABLE(S)
WATER	WAT-B1 - WATER SERVICE (UNSPECIFIED)	WAT-LP-B1P - LOW PRESSURE
	WAT-MP-B2P - MEDIUM PRESSURE	WAT-HP-B2 - HIGH PRESSURE
	WAT-RAW-C - RAW WATER	WAT-PVT-A - PRIVATE
UNIDENTIFIED	UNI-B1 - UNIDENTIFIED POTENTIAL UTILITY	CAB-B2P - UNIDENTIFIED CABLE
	PWR-B2 - POWER (LINEAR RESPONSE DETECTED USING 'POWER' MODE OF EM LOCATOR - INDICED 50 Mm GROUND CURRENTS)	
	RAD-B3 - RADIO (LINEAR RESPONSE DETECTED USING 'RADIO' MODE OF EM LOCATOR - RE-RADIATED VLF RADIO WAVES)	
	(0.70) ELE-B2 - APPROXIMATE DEPTH BELOW GROUND LEVEL OF APPARATUS IN METRES	

CONFIDENCE LEVELS	
(D)	UNDETECTED FROM SERVICE RECORDS ONLY
(C)	UNDETECTED FROM VISUAL INSPECTION (UTILITY COVERS, SCARS, ETC.)
(B4)	ASSUMED UNDETECTED BY REMOTE LOCATION METHODS
(B3)(B3P)	DETECTED HORIZONTAL POSITION ONLY ±500mm
(B2)(B2P)	DETECTED HORIZONTAL POSITION ±250mm
(B1)(B1P)	DETECTED VERTICAL POSITION ±10% OF DEPTH
(A)	VERIFIED HORIZONTAL POSITION ±150mm
(P)	VERIFIED VERTICAL POSITION ±10% OF DEPTH
(P)	SEE REPORT FOR FULL DISCUSSION OF MAXIMUM ACHIEVABLE ACCURACY
(P)	SUFFIX DENOTES DATA HAS BEEN PROCESSED POST COLLECTION

UTR	UNABLE TO TRACE	ML	METRES BELOW GROUND LEVEL
UT	UNABLE TO MEASURE	CL	COVER LEVEL
UTW	UNABLE TO SURVEY AREA DUE TO OBSTRUCTIONS	ME	MEASUREMENT ESTIMATED
OS	SERVICE EXTENDS OFF SITE	SL	SOFFIT LEVEL OF PIPE/DUCT
Ø	DIAMETER OF PIPE OR DUCT	IL	INVERT LEVEL OF PIPE/DUCT

[Symbol]	APPROXIMATE CHAMBER EXTENTS	[Symbol]	EXTENTS OF UTILITY MAPPING SURVEY
[Symbol]	TRENCH SCAR / SURFACE	[Symbol]	UNABLE TO SURVEY AREA DUE TO GENE VEGETATION
[Symbol]	UNABLE TO SURVEY AREA DUE TO INABILITY TO ACCESS AREA	[Symbol]	UNABLE TO SURVEY AREA DUE TO OBSTRUCTIONS
[Symbol]	CABLE DUCT SHOWING NUMBER OF CABLES	[Symbol]	UNABLE TO SURVEY AREA DUE TO TERRAIN/TOPOGRAPHY
[Symbol]	WINSOR TRAP/INTERCEPTOR ON CHAMBER OUTFLOW	[Symbol]	BACKDROP (INTERNAL/EXTERNAL) ON CHAMBER INFLOW

OTHER POTENTIAL BURIED FEATURES

[Symbol]	AREA OF ELEVATED GPR AMPLITUDE RESPONSE CAUSED BY SUB-SURFACE FEATURE OR DISTURBED GROUND. MAY POSSIBLY BE RELATED TO UTILITY APPARATUS OR SERVICE TRENCH.
[Symbol]	AREA STRONG, REGULARLY SPACED GPR RESPONSES - LIKELY RELATED TO REINFORCED CONCRETE BUT SOMETIMES BURIED STONE SETTS (OR SIMILAR) MAY GIVE ANALOGOUS RESPONSE
[Symbol]	AREA OF MULTIPLE HYPERBOLA RESPONSES CAUSED BY SUB-SURFACE FEATURES. MAY POSSIBLY BE RELATED TO DISTURBED GROUND WITH CONCENTRATION OF DISCRETE REFLECTORS. AREAS OF TREE ROOTS, ANIMAL BURROWINGS OR SIMILAR.

Rev	Date	Drawn	Description	Check
-	06/06/2024	EM	--	--

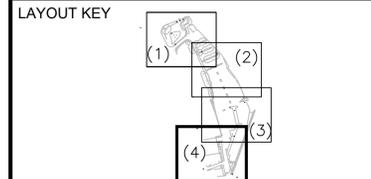
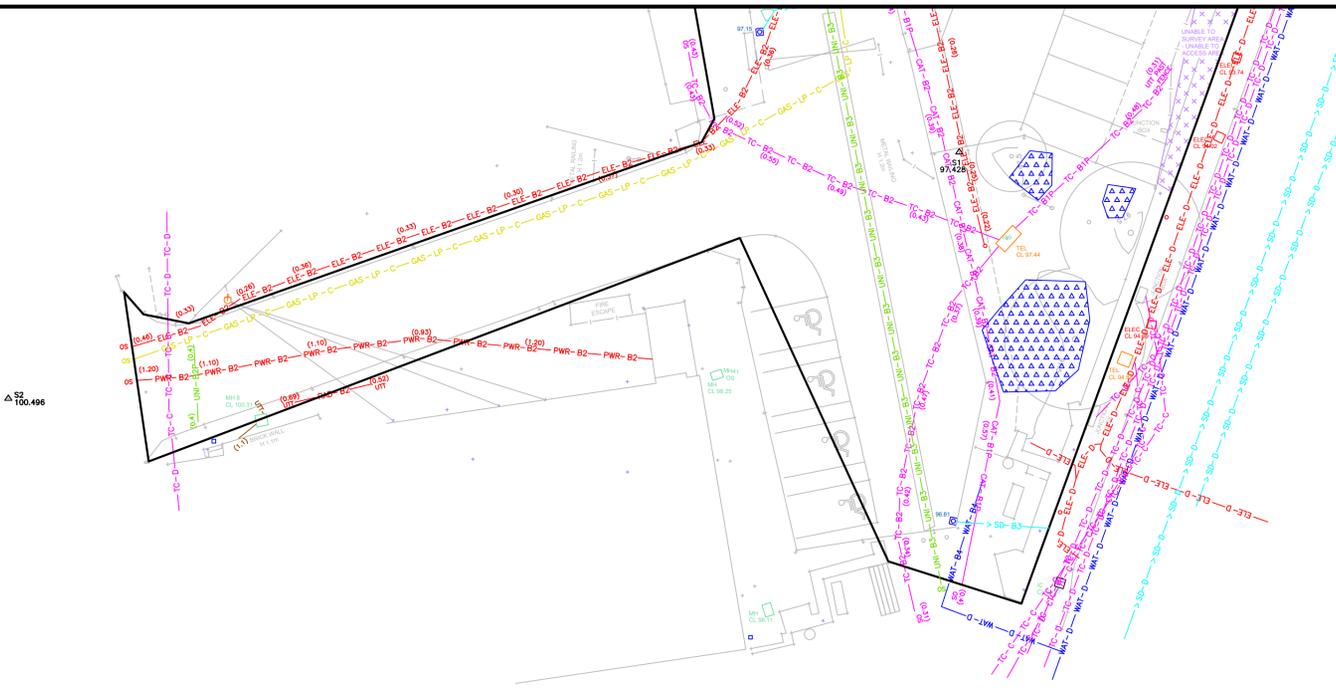
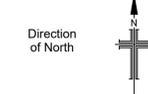
Southgate House
 Pontefract Road T: +44 [0] 1132 008 900
 Stourton F: +44 [0] 1132 008 901
 Leeds E: admin@metgeoenvironmental.com
 West Yorkshire W: www.metgeoenvironmental.com
 LS10 1SW

Client
 WILLMOTT DIXON CONSTRUCTION LIMITED

Site
 County Way,
 Barnsley, S70 2EQ

Title
 UTILITY MAPPING SURVEY

Surveyed	JA EM AP HB	Drawn	EM
Chk.	JPR	Date	28/05/2024 - 05/06/24
Scale	1:200	Job No	P24-00416
		Sheet Size	A1
		Revision	01
DWG Ref			
Year	Number	Originator	Zone
P24	00416	MET	EXT UMS
		ID	Type
		Role	Sheet
			003



Background topographical information used for this drawing is from drawing P24-00416-MET-EXT-XX-TOP-M2-G' dated 23/05/24.
Datum: OS Level Datum.
Using the OS GPS Network and applying OSGM15 National Geoid Model to obtain local area corrections

This drawing and information contained within is issued in confidence and is the copyright of Met Geo Environmental Ltd. If the topographical information or base mapping has been supplied by a Third Party, Met Geo Environmental Ltd is not liable for any inaccuracies contained therein. If inaccuracies to supplied mapping have been identified (and Met Geo Environmental Ltd have not been commissioned to rectify these inaccuracies) these will be highlighted in the accompanying report. Disclosure of this information to Third Parties and unauthorised copying or replication of this data without approval is forbidden.

The data presented in this drawing have been collected using a combination of the following: consultation of utility asset information, visual survey & inspection of manholes and inspection chambers; electromagnetic location techniques; ground penetrating radar, and, where applicable, trial hole excavations. These techniques have been deployed in accordance with the BS1 PAS128 Specification for the Detection, Verification and Location of Underground Utilities using the search methodologies indicated on sheet PAS1 and described in the accompanying report. This drawing should be used in conjunction with the accompanying report which details the limitations of these techniques and any hindering factors encountered during this survey.

Unless otherwise stated, all services shown on this plan have been surveyed using approved detectors and the connections between inspection chambers, if unable to be detected, are generally assumed to be direct unless there are indications to the contrary. The detection confidence for each utility segment is depicted in line with the PAS128 scheme outlined below. Information depicted as CL-C or CL-D cannot be guaranteed as it is based on utility record information which can be inaccurate and incomplete.

The service routes depicted may reflect the routes of multiple cables or pipes. It is not always possible to differentiate between buried construction features, utilities and other subsurface linear features due to the inherent limitations of the techniques employed. It is therefore possible that some features shown are not utility related. Due to the limitations of electromagnetic techniques all utility identifications should be treated with caution and verified prior to use during design or building works.

If the location or depth of services or features is of particular importance to a project then it is recommended that discussions are held with Met Geo Environmental Ltd. regarding any further considerations that may have arisen due to the nature and methods employed to ascertain the location data presented as part of this survey.

Please note that not all buried pipes, cables and ducts can be detected and mapped in consideration of their depth, location, material type, geology and proximity to other utilities. Even an appropriate and professionally executed survey may not be able to achieve a 100% detection rate. Where an area of utilities is likely to affect client project requirements, it is strongly recommended that PAS128 Type A verification surveys are carried out to confirm the position or absence of utilities where this is critical to the scheme.

No utility mapping survey can be considered a 100% accurate depiction of the sub-surface environment, and the use of these drawings does not remove the requirement for the use of safe digging techniques at all times, in line with the requirements of HSG47 and current CDM regulations.

<p>MH1 SURFACE CL 97.26 CHAMBER: 0.60m x 0.85m PIPE X: IL 95.95 PIPE A: IL 96.34 PIPE B: IL 96.28 PIPE C: IL 96.43</p>	<p>MH2 SURFACE CL 97.13 CHAMBER: 0.65m x 1.02m PIPE X: IL 95.17 PIPE A: IL 95.35 PIPE B: IL 95.59</p>	<p>MH3 SURFACE CL 96.69 CHAMBER: 0.95m x 0.97m PIPE X: IL 93.44 PIPE A: IL 93.92 PIPE B: IL 93.85</p>	<p>MH4 SURFACE CL 96.89 CHAMBER: 1.40m x 1.31m PIPE X: IL 94.08 PIPE A: IL 95.43 CAPPED PIPE B: IL 94.17</p>
<p>MH5 SURFACE CL 97.05 CHAMBER: 1050mmø PIPE X: 225ø IL 95.61 PIPE A: 225ø IL 95.67 PIPE B: 150ø IL 95.83</p>	<p>MH7 SURFACE CL 96.80 CHAMBER: 1.20m x 1.20m PIPE X: 225ø IL 94.69 PIPE A: 225ø IL 94.74 PIPE B: 150ø IL 95.00</p>	<p>MH8 FOUL CL 100.31 CHAMBER: 0.90m x 0.60m PIPE X: UTMø IL 98.81 PIPE A: 150ø IL 99.31</p>	<p>MH10 SURFACE CL 95.80 CHAMBER: 0.90m x 0.90m PIPE X: 150ø IL 94.24 PIPE A: 150ø IL 94.31</p>
<p>MH11 SURFACE CL 95.69 CHAMBER: 0.80m x 1.10m PIPE X: IL 93.51 PIPE A: IL 93.51 PIPE B: IL 93.51 PIPE C: IL 93.61</p>	<p>MH12 SURFACE CL 95.62 CHAMBER: 900mmø PIPE X: IL 93.15 PIPE A: IL 93.45 PIPE B: IL 93.70</p>	<p>MH13 SURFACE CL 95.71 CHAMBER: 0.90m x 0.90m PIPE X: 150ø IL 94.35 PIPE A: 150ø IL 94.41</p>	<p>MH14 SURFACE CL 95.21 CHAMBER: 1.20m x 0.90m PIPE X: IL 93.00 PIPE A: IL 93.03 PIPE B: IL 93.01</p>
<p>MH15 SURFACE CL 95.20 CHAMBER: 0.90m x 1.20m PIPE X: 150ø IL 93.16 PIPE A: 150ø IL 93.18</p>	<p>MH16 SURFACE CL 95.14 CHAMBER: 1.20m x 0.90m PIPE X: IL 92.55 PIPE A: IL 92.57 PIPE B: IL 92.61</p>	<p>MH17 SURFACE CL 95.14 CHAMBER: 0.90m x 1.20m PIPE X: 150ø IL 92.71 PIPE A: 150ø IL 92.73</p>	<p>MH18 SURFACE CL 95.50 CHAMBER: 0.90m x 1.20m PIPE X: 150ø IL 92.08 PIPE A: 150ø IL 92.10</p>
<p>MH19 SURFACE CL 95.52 CHAMBER: 1.20m x 0.90m PIPE X: IL 92.06 PIPE A: IL 92.07 PIPE B: IL 92.12</p>	<p>MH20 SURFACE CL 96.46 CHAMBER: 0.65m x 0.65m PIPE X: 100ø IL 95.82 PIPE A: 150ø IL 95.78</p>	<p>MH21 SURFACE CL 98.33 CHAMBER: 0.60m x 0.60m PIPE X: 150ø IL 97.80</p>	<p>MH22 SURFACE CL 92.21 CHAMBER: 1.00m* x 0.70m PIPE X: 450ø IL 91.01 PIPE A: 150ø IL 91.05</p>
<p>MH23 SURFACE CL 91.88 CHAMBER: 0.45m x 0.60m PIPE X: 150ø IL 91.25 PIPE A: 150ø IL 91.18</p>	<p>MH24 SURFACE CL 92.01 CHAMBER: 0.45m x 0.60m PIPE X: 150ø IL 91.43 PIPE A: 150ø IL 91.30</p>	<p>MH25 SURFACE CL 91.15 UTR</p>	<p>MH26 SURFACE CL 91.15 COVER BROKEN</p>
<p>MH40 SURFACE CL 97.19 CHAMBER: 0.80m x 0.80m PIPE X: 150ø IL 96.44 PIPE A: 150ø IL 96.57</p>	<p>MH41 FOUL CL 98.25 CHAMBER: 0.90m x 0.45m PIPE X: 275ø IL 97.81 PIPE A: 100ø PIPE B: 225ø</p>	<p>MH42 SURFACE CL 95.52 CHAMBER: 1.20m x 0.90m PIPE X: IL 92.06 PIPE A: IL 92.07 PIPE B: IL 92.12</p>	<p>MH43 SURFACE CL 95.52 CHAMBER: 1.20m x 0.90m PIPE X: IL 92.06 PIPE A: IL 92.07 PIPE B: IL 92.12</p>

SUB-SURFACE KEY

DRAINAGE	FD-B1P - FOUL	CD-B2P - COMBINED
	SD-B3 - SURFACE	D-UB - UNIDENTIFIED
	RM-B2 - RISING MAIN	OF-B4 - OVERFLOW
	RM-B2 - RISING MAIN	OF-B4 - OVERFLOW
GAS	GAS-B2P - GAS (UNSPECIFIED)	GAS-LP-B2 - LOW PRESSURE
	GAS-MP-B2 - MEDIUM PRESSURE	GAS-HP-B2 - HIGH PRESSURE
ELECTRICITY	ELE-B1 - ELECTRICITY CABLE(S)	LV-B2P - LOW VOLTAGE
	HW-B1P - HIGH VOLTAGE	CT-C2 - CCTV CABLE(S)
	TL-B3 - TRAFFIC LIGHT/CONTROL CABLE(S)	
PIPES, DUCTS & PIPELINES	HEAT-B2 - DISTRICT HEATING/STEAM PIPE(S)	MHC-B2P - ROUTE CONTAINING HEATING PIPE(S)
	FL-B1 - FUEL PIPELINE	OL-B2 - OIL PIPELINE
	PIPE-B3 - UNIDENTIFIED PIPEWORK	X-B1P - EMPTY DUCT
		TC-B1 - TELECOMMUNICATION CABLE(S)
TELECOMMUNICATIONS		
WATER	WAT-B1 - WATER SERVICE (UNSPECIFIED)	WAT-LP-B1P - LOW PRESSURE
	WAT-MP-B2P - MEDIUM PRESSURE	WAT-HP-B2 - HIGH PRESSURE
	WAT-RAW-C - RAW WATER	WAT-PVT-A - PRIVATE
UNIDENTIFIED	UNI-B1 - UNIDENTIFIED POTENTIAL UTILITY	CAB-B2P - UNIDENTIFIED CABLE
	PWR-B2 - POWER (LINEAR RESPONSE DETECTED USING 'POWER' MODE OF EM LOCATOR - INDUCED 50 Hz GROUND CURRENTS)	
	RAO-B3 - RADIO (LINEAR RESPONSE DETECTED USING 'RADIO' MODE OF EM LOCATOR - RE-RADIATED VLF RADIO WAVES)	
	APPROXIMATE DEPTH BELOW GROUND LEVEL OF APPARATUS IN METRES	

Rev	Date	Drawn	Description	Check



Southgate House
Pontefract Road T: +44 [0] 1132 008 900
Stourton F: +44 [0] 1132 008 901
Leeds E: admin@metgeoenvironmental.com
West Yorkshire W: www.metgeoenvironmental.com
LS10 1SW

Client
WILLMOTT DIXON CONSTRUCTION LIMITED

Site
County Way,
Barnsley, S70 2EQ

Title
UTILITY MAPPING SURVEY

Surveyed	JA EM AP HB	Drawn	EM
Chk.	JPR	Date	28/05/2024 - 05/06/24
Scale	1:200	Job No	P24-00416
		Sheet Size	A1
		Revision	01
DWG Ref	Year	Number	Originator
P24	2024	00416	MET EXT UMS M2 GU 004

CONFIDENCE LEVELS

(D)	UNDETECTED	FROM SERVICE RECORDS ONLY
(C)	UNDETECTED	FROM SERVICE RECORDS ONLY SUPPORTING EVIDENCE FROM VISUAL INSPECTION (UTILITY COVERS, SCARS, ETC.)
(B4)	ASSUMED	UNDETECTED BY REMOTE LOCATION METHODS
(B3)(B3P)	DETECTED	HORIZONTAL POSITION ONLY ±500mm
(B2)(B2P)	DETECTED	HORIZONTAL POSITION ±250mm
(B1)(B1P)	DETECTED	VERTICAL POSITION ±10% OF DEPTH
(A)	VERIFIED	HORIZONTAL POSITION ±150mm
(P)	VERIFIED	VERTICAL POSITION ±10% OF DEPTH
		APPROXIMATE DEPTH BELOW GROUND LEVEL AND SURVEYED USING APPROPRIATE METHODS ±50mm IN POSITION & DEPTH
		SEE REPORT FOR FULL DISCUSSION OF MAXIMUM ACHIEVABLE ACCURACY
		SUFFIX DENOTES DATA HAS BEEN PROCESSED POST COLLECTION

METRES BELOW GROUND LEVEL

UTR	UNABLE TO RAISE	CL	COVER LEVEL
UTM	UNABLE TO TRACE	ME	MEASUREMENT ESTIMATED
OR	UNABLE TO MEASURE	SL	SURFACE LEVEL OF PIPEDUCT
DI	SERVICE EXTENDS OFF SITE	IL	INVERT LEVEL OF PIPEDUCT
Ø	DIAMETER OF PIPE OR DUCT		

APPROXIMATE CHAMBER EXTENTS

SCAR	TRENCH SCAR / SURFACE	UNABLE TO SURVEY AREA DUE TO DENSE VEGETATION
UNABLE TO SURVEY AREA DUE TO INABILITY TO ACCESS AREA		UNABLE TO SURVEY AREA DUE TO OBSTRUCTIONS
UNABLE TO SURVEY AREA DUE TO TERRAIN TOPOGRAPHY		UNABLE TO SURVEY AREA DUE TO TERRAIN TOPOGRAPHY

WINSOR TRAP/INTERCEPTOR ON CHAMBER OUTFLOW

OTHER POTENTIAL BURIED FEATURES

AREA OF ELEVATED GPR AMPLITUDE RESPONSE CAUSED BY SUB-SURFACE FEATURE OR DISTURBED GROUND. MAY POSSIBLY BE RELATED TO UTILITY APPARATUS OR SERVICE TRENCH.	
AREA STRONG, REGULARLY SPACED GPR RESPONSES - LIKELY RELATED TO REINFORCED CONCRETE BUT SOMETIMES BURIED STONE SETTS (OR SIMILAR) MAY GIVE ANALOGOUS RESPONSE	
AREA OF MULTIPLE HYPERBOLA RESPONSES CAUSED BY SUB-SURFACE FEATURES. MAY POSSIBLY BE RELATED TO DISTURBED GROUND WITH CONCENTRATION OF DISCRETE REFLECTORS. AREAS OF TREE ROOTS, ANIMAL BURROWINGS OR SIMILAR.	

Appendix C

Yorkshire Water Asset Map

YORKSHIRE WATER PROTECTION OF MAINS AND SERVICES

1. The position of Yorkshire Water Services Ltd (YWS) apparatus shown on the existing mains record drawing(s) indicates the **general** position and nature of our apparatus and the accuracy of this information cannot be guaranteed. Any damage to YWS apparatus as a result of your works may have serious consequences and you will be held responsible for all costs incurred. Prior to commencing major works, the exact location of apparatus must be determined on site, if necessary by excavating trial holes. The actual position of such apparatus and that of service pipes which have not been indicated must be established on site by contacting the Customer Helpline on 0845 124 24 24 for both water and sewerage.
2. The public sewer and water network is lawfully retained in its existing position and the sewerage and water undertaker is entitled to have it remain so without any disturbance. The provisions of section 159 of the Water Industry Act 1991 provides that the undertaker may "inspect, maintain, adjust, repair or alter" the network. Those rights are given to enable the undertaker to perform its statutory duties. Any development of the land or any other action that unacceptably hindered the exercise of those rights would be unlawful. The provisions contained in Section 185 of the Water Industry Act 1991 state that where it is reasonable to do so, a person may require the water supply undertaker to alter or remove a pipe where it is necessary to enable that person to carry out a proposed change of use of the land. The provisions contained in Section 185 also require the person making the request to pay the full cost of carrying out the necessary works.
3. Ground levels over existing YWS apparatus are to be maintained. Sewers in highways will **generally** be laid to give 1200mm of cover from finished ground level working to kerb races, other permanent identification of the limits of the road or to an agreed line and level. Substantial increases or decreases to this 1200mm depth of cover will result in the sewer being re-laid at your expense. Water mains and services will **generally** be laid with a minimum of 750mm depth of cover however some mains and services usually those installed over 50 years ago may have less ground cover.
4. If surface levels are to be decreased / increased significantly the effects on existing water supply apparatus will be carefully considered and if any alterations are necessary, the costs of the alterations will be recharged to you in full. Outlets on fire hydrants must be no more than 300mm below the new levels and all surface boxes must be adjusted as part of the scheme.
5. To enable future repair works to be carried out without hindrance; any pipe, cable, duct, etc. installed parallel to a water main or service pipe should not be installed directly over or within 300mm of a water main or service pipe or 1000mm of a waste water asset. Where a pipe, cable, duct, etc. crosses a main or service it should preferably cross perpendicular or at an angle of no less than 45° and with a minimum clearance of 150mm. These requirements apply to activities within an existing highway and are relevant to the installation of pipes, cables, ducts, etc. up to and including 250mm in diameter (*see illustration below*). Necessary protection measures for installations greater than 250mm in diameter and/or in private land will need to be agreed on an individual basis. Installations within a new development site must comply with the National Joint Utilities Group publication Volume 2: NJUG Guidelines On The Positioning Of Underground Utilities Apparatus For New Development Sites.
6. All excavation works near to YW apparatus should be by hand digging only.
7. Backfilling with a suitable material to a minimum 300mm above YW apparatus is required.
8. Adequate support must be provided where any works pass under YW apparatus.
9. Jointing chambers, lighting columns and other structures must be installed in such a way that future repair or maintenance works to YW apparatus will not be hindered.
10. Apparatus such as; railings, sign posts, etc. must not be placed in such a way that they prevent access to or full operation of controlling valves, hydrants or similar apparatus. YWS surface boxes must not be covered or buried. Any adjustment, alteration or replacement of manhole covers must be agreed on site prior to the commencement of the works with a YWS Inspector who may be contacted via our Call Centre on 0845 124 24 24.
11. Explosives shall not be used within 100 metres of any Yorkshire Water Services apparatus or installations.
12. Vibrating plant should not be used directly over any apparatus. Movement or operation by vehicles or heavy plant is not to be permitted in the immediate vicinity of YWS plant or apparatus unless there has been prior consultation and, if necessary, adequate protection provided without cost to YWS.
13. **Under no circumstances** should thrust boring or similar trenchless techniques commence until the actual position of the Company's mains/services along the proposed route have been confirmed by trial holes.
14. Any alterations to the highway should be notified following the procedures outlined in the New Road and Street Works Act 1991 Code of Practice; Measures Necessary Where Apparatus Is Affected By Major Works (Diversionary Works).
15. You will be held responsible for any damage or loss to YWS apparatus during and after completion of work, caused by yourselves, your servant or agent. Any damage caused or observed to YWS plant or apparatus should be immediately reported to YWS. Should YW incur any costs as a result of non-compliance with the above, all costs will be rechargeable in full.
16. You should ensure that nothing is done on the site to prejudice the safety or operation of YWS employees, plant or apparatus.
17. In accordance with the New Roads and Street Works Act 1991, Chapter 22, Part 3, Section 80. The location of any identified YW asset "*which is not marked, or is wrongly marked, on the records made available*" should be communicated back to Yorkshire Water. The location of the apparatus should be identified on copies of the supplied plans which should be returned to Yorkshire Water (Asset Records Team) with photographic supporting evidence where possible.
18. The Government has decided that responsibility for private sewers serving two or more properties and lateral drains (the section of pipe beyond the boundary of a single property, connecting it to the public sewer) will be transferred to the water companies on Oct 1 2011.

Private pumping stations will also transfer during the period 1 October 2011 – 1 Oct 2016. Records of these assets may not yet be shown on the existing mains record drawing(s). If you encounter any of these assets you must inform Yorkshire Water Services Ltd (YWS).

19. Please note that the information supplied on the enclosed plans is reproduced from Ordnance Survey material with the permission of the Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. Licence Number 1000019559.
20. This information is for guidance only and the position and depth of any YW apparatus is approximate only. Likewise, the nature and condition of any YW apparatus cannot be guaranteed. YW has no responsibility for recording the locations of privately owned apparatus. As of 1 October 2011, there may be some lateral drains and/or public sewers which are not documented on YW records but may still be present. For the avoidance of doubt, this information is not a substitute for appropriate professional and/or legal advice. YW accepts no responsibility for any inaccuracy or omissions in this information. The actual position of YW apparatus must be determined on site by excavating trial holes by hand. YW requires a minimum of two working days' written notice of the intention to excavate any trial holes before any excavation can be undertaken. If there are any queries in this respect please contact Yorkshire Water on 0845 124 24 24.

Property Identifier



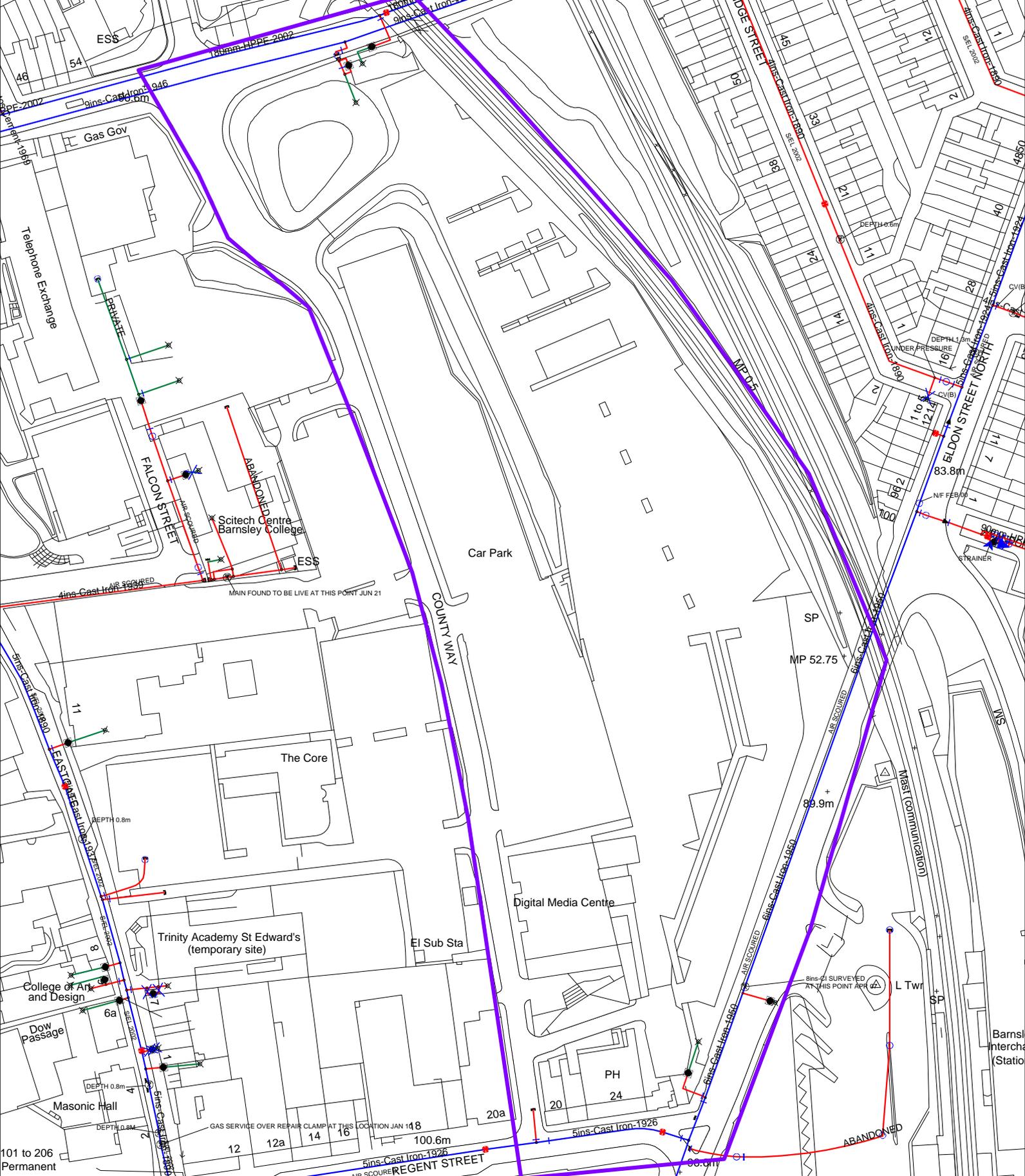
Sewer Legend

	Combined Sewer		S24 Combined Sewer
	Surface Water Sewer		S24 Surface Water Sewer
	Foul Sewer		S24 Foul Sewer
	Section 104 Sewer		Rising Main
	Overflow Sewer		Abandoned Sewer
	Syphone Sewer & Vacuum Sewer		
	Pumping Station		Public Sewer Treatment Works

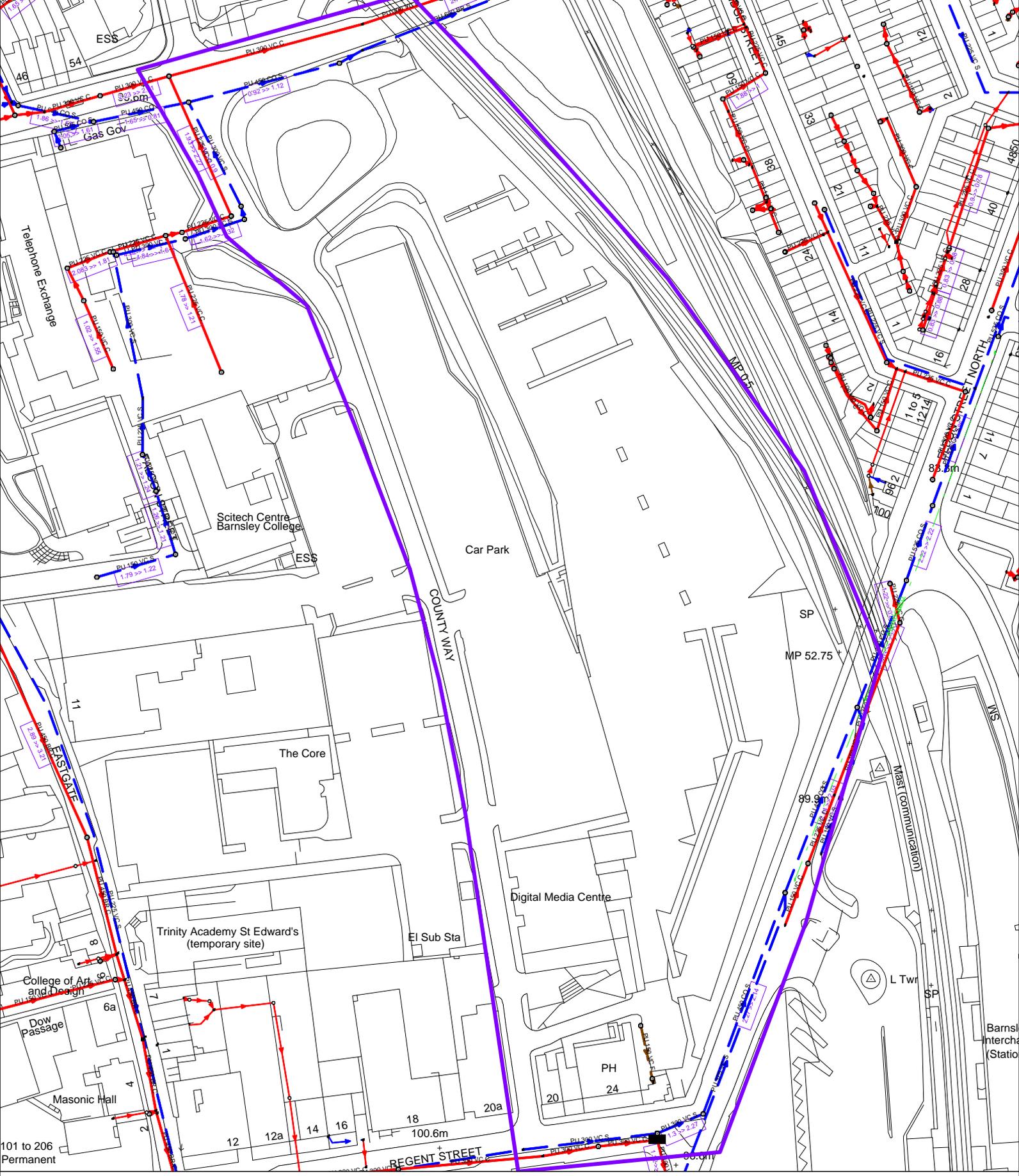
Please note that the direction of flow arrows may not always appear depending on the scale of the map.

Water Legend

	Water Main 4" and below
	Water Main 4" and above
	Raw Water Main
	Private Water Main
	Fire Hydrant
	Pumping Station
	The assets in this area are the responsibility of another Water Undertaker



Public Clean Water Network 20/05/2024 14:43:24 OS Grid Coordinates: 434435 : 406547 Map Name : SE3406NW svcGISSafeMovePD



Public Waste Water Network 20/05/2024 14:43:26 OS Grid Coordinates: 434435 : 406547 Map Name : SE3406NW svcGISSafeMovePD

Appendix D
Proposed Drainage Strategy

Appendix E
Causeway Flow Results

Design Settings

Rainfall Methodology FSR Return Period (years) 100 Additional Flow (%) 45 FSR Region England and Wales M5-60 (mm) 19.000 Ratio-R 0.350 CV 0.750 Time of Entry (mins) 5.00	Maximum Time of Concentration (mins) 30.00 Maximum Rainfall (mm/hr) 50.0 Minimum Velocity (m/s) 1.00 Connection Type Level Soffits Minimum Backdrop Height (m) 0.200 Preferred Cover Depth (m) 1.200 Include Intermediate Ground ✓ Enforce best practice design rules x
--	--

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
MH9	0.131	5.00	95.759	1800	434644.832	406781.270	2.109
MH8	0.107	5.00	95.932	1800	434604.682	406764.259	2.379
MH7	0.073	5.00	95.651	1800	434606.128	406803.461	2.170
MH6	0.066	5.00	95.815	1800	434589.269	406796.202	2.407
MH5	0.050	5.00	95.717	1800	434592.624	406818.434	2.340
MH4	0.015	5.00	95.851	1800	434581.469	406813.762	2.522
MH3	0.033	5.00	95.671	1800	434585.568	406837.239	2.373
MH2	0.068	5.00	95.803	1800	434573.154	406832.393	2.558
MH1	0.070	5.00	95.780	1800	434562.462	406856.548	2.667
MH1.1	0.020	5.00	95.846	1500	434555.255	406873.855	2.811
NEW SW 1			95.595	1500	434561.332	406878.454	3.956
EX SW 1			91.880	1350	434548.132	406889.980	0.630
MH16	0.107	5.00	97.215	1500	434653.384	406631.578	1.575
MH14	0.030	5.00	97.125	1350	434643.550	406647.045	1.350
MH15	0.021	5.00	97.143	1950	434654.756	406648.764	2.425
MH17			97.147	1950	434665.157	406650.359	2.450
MH11	0.097	5.00	96.631	1800	434621.652	406708.164	1.831
MH12	0.103	5.00	97.095	1800	434635.892	406677.345	2.445
MH10	0.132	5.00	96.589	1800	434654.683	406722.085	1.944
MH13	0.053	5.00	97.045	1800	434668.744	406691.705	2.467
MH18			96.941	1950	434678.865	406703.295	2.941
MH19	0.000		97.037	2400	434676.582	406694.906	2.576
EX SW 3			96.680	1350	434687.131	406702.025	3.413

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	MH9	MH8	43.605	0.600	93.650	93.553	0.097	450.0	600	5.64	50.0
1.001	MH8	MH6	35.467	0.600	93.553	93.408	0.145	244.6	600	6.02	50.0
2.000	MH7	MH6	18.355	0.600	93.481	93.408	0.073	250.0	600	5.20	50.0
1.002	MH6	MH4	19.214	0.600	93.408	93.329	0.079	243.2	600	6.22	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)
1.000	1.141	322.7	25.7	1.509	1.779	0.131	0.0
1.001	1.552	438.9	46.8	1.779	1.807	0.238	0.0
2.000	1.535	434.1	14.3	1.570	1.807	0.073	0.0
1.002	1.557	440.1	74.1	1.807	1.922	0.377	0.0

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)
3.000	MH5	MH4	12.094	0.600	93.377	93.329	0.048	250.0	600	5.13	50.0
1.003	MH4	MH2	20.402	0.600	93.329	93.245	0.084	242.9	600	6.44	50.0
4.000	MH3	MH2	13.326	0.600	93.298	93.245	0.053	250.0	600	5.14	50.0
1.004	MH2	MH1	26.416	0.600	93.245	93.113	0.132	200.0	600	6.70	50.0
1.005	MH1	MH1.1	18.748	0.600	93.113	93.035	0.078	240.4	375	6.97	50.0
1.006	MH1.1	NEW SW 1	7.621	0.600	93.035	92.997	0.038	200.0	375	7.07	50.0
EX1.000	NEW SW 1	EX SW 1	17.524	0.600	91.639	91.250	0.389	45.0	150	7.26	50.0
5.002	MH19	MH18	8.694	0.600	94.461	94.000	0.461	18.9	375	5.99	50.0
5.000	MH16	MH17	22.166	0.600	95.640	94.997	0.643	34.5	300	5.14	50.0
6.000	MH14	MH15	11.337	0.600	95.775	95.167	0.608	18.6	150	5.08	50.0
6.001	MH15	MH17	10.523	0.600	94.718	94.697	0.021	501.1	600	5.24	50.0
5.001	MH17	MH19	45.989	0.600	94.697	94.461	0.236	194.9	600	5.68	50.0
7.000	MH11	MH12	33.950	0.600	94.800	94.650	0.150	226.3	600	5.35	50.0
7.001	MH12	MH13	35.853	0.600	94.650	94.578	0.072	500.0	600	5.90	50.0
8.000	MH10	MH13	33.476	0.600	94.645	94.578	0.067	500.0	600	5.52	50.0
7.002	MH13	MH19	8.466	0.600	94.578	94.461	0.117	72.4	600	5.95	50.0
5.003	MH18	EX SW 3	6.270	0.600	94.000	93.267	0.733	8.6	225	6.01	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)
3.000	1.535	434.1	9.8	1.740	1.922	0.050	0.0
1.003	1.558	440.5	86.9	1.922	1.958	0.442	0.0
4.000	1.535	434.1	6.5	1.773	1.958	0.033	0.0
1.004	1.718	485.8	106.7	1.958	2.067	0.543	0.0
1.005	1.164	128.6	120.5	2.292	2.436	0.613	0.0
1.006	1.277	141.1	124.4	2.436	2.223	0.633	0.0
EX1.000	1.503	26.6	124.4	3.806	0.480	0.633	0.0
5.002	4.188	462.6	106.7	2.201	2.566	0.543	0.0
5.000	2.686	189.9	21.0	1.275	1.850	0.107	0.0
6.000	2.343	41.4	5.9	1.200	1.826	0.030	0.0
6.001	1.081	305.6	10.0	1.825	1.850	0.051	0.0
5.001	1.741	492.2	31.0	1.850	1.976	0.158	0.0
7.000	1.614	456.4	19.1	1.231	1.845	0.097	0.0
7.001	1.082	305.9	39.3	1.845	1.867	0.200	0.0
8.000	1.082	305.9	25.9	1.344	1.867	0.132	0.0
7.002	2.865	810.0	75.7	1.867	1.976	0.385	0.0
5.003	4.501	178.9	106.7	2.716	3.188	0.543	0.0