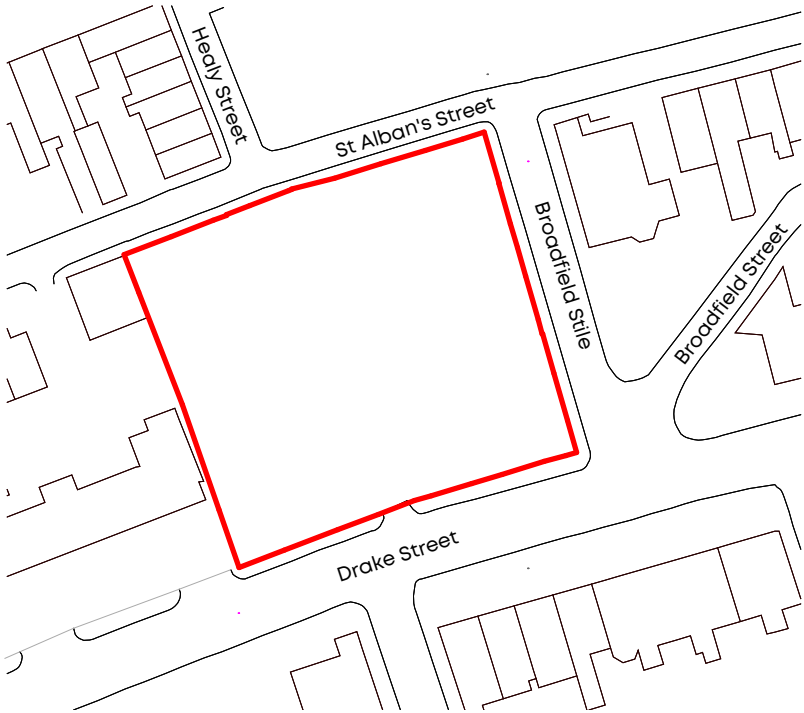

APPENDIX A – EXISTING SITE DETAILS

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REV:	DATE:	DESCRIPTION:	BY:
A	28.05.26	Planning status issue	CT



1

Site Location Plan
Scale: 1 : 1250



CLIENT:

Great Places Housing Group

PROJECT:

New Residential Development
Drake Street, Rochdale, OL16 1PJ

DRAWING TITLE:

Site Location Plan

DRAWING NUMBER:	SCALE:	DATE:
19146-PJA-00-ZZ-DR-A-1000-A	As indicated@A3	29.01.26
STATUS:	BY:	CHECKED:
PLANNING	CT	PP

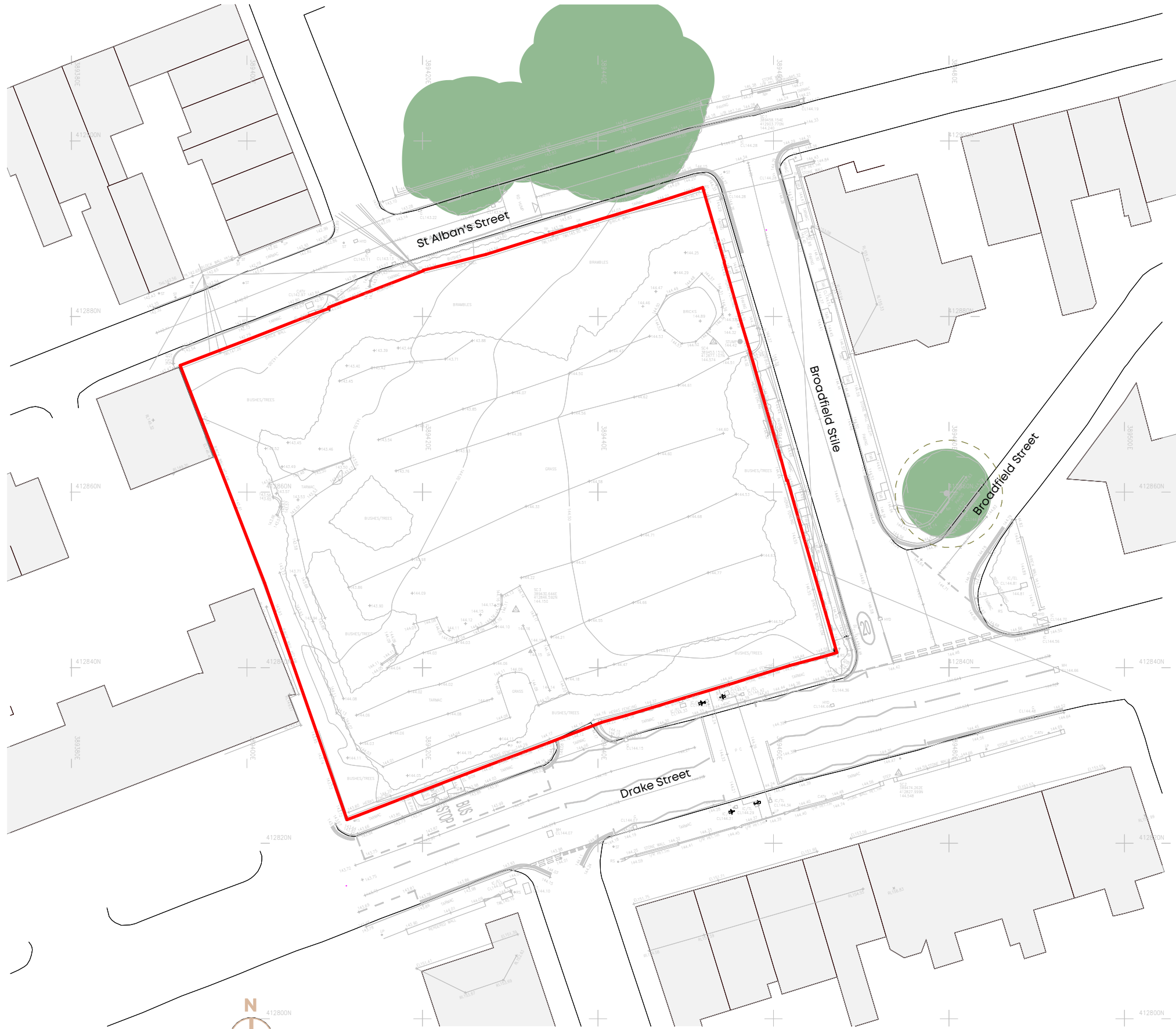
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VISUAL SCALE 1:1250 @ A3

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www.paddockjohnson.com
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Existing Site Plan

CLIENT:
Great Places Housing Group

PROJECT:
New Residential Development
Drake Street, Rochdale, OL16 1PJ

DRAWING TITLE:
Existing Site Plan

DRAWING NUMBER:
19146-PJA-00-ZZ-DR-A-1203-A

STATUS:
PLANNING

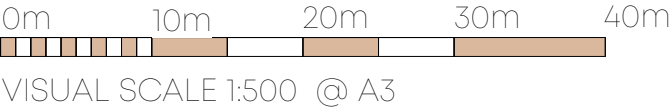
SCALE: DATE:
As 16.03.26
indicated@A3
BY: CHECKED:
CT PP



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Sheet Index

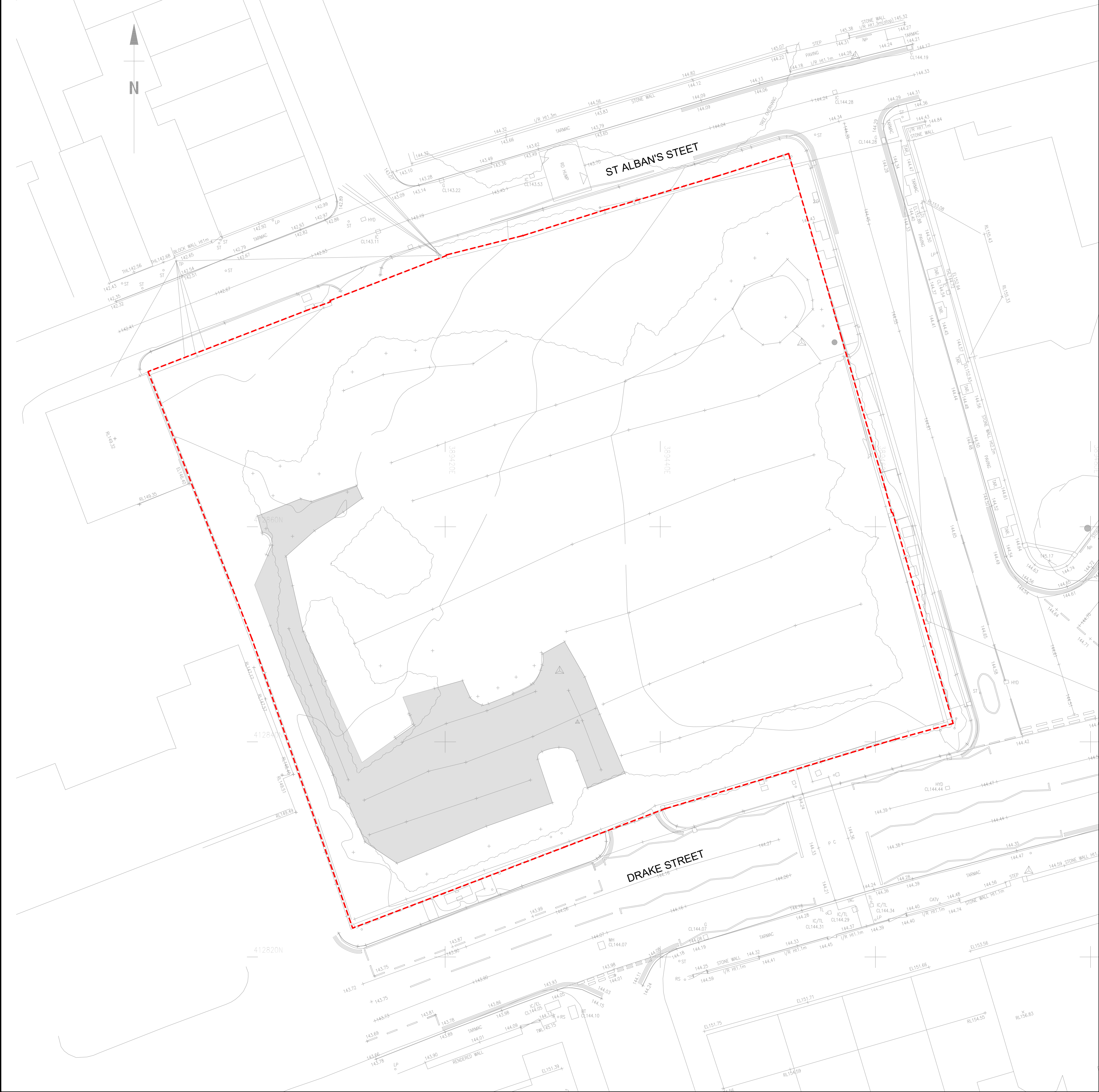
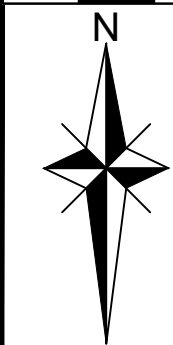
Rev.	Date	Description
A	11/03/26	Survey extended

Client

Great Places Housing Group
2a Derwent Avenue, West Didsbury
Manchester M21 7QP

Project
206-208 Drake Street
Rochdale
OL16 1PJ

Drawing Title Topographical Survey	
Drawn By IC	Survey Date August 2024
Checked by DJ	Scale A0@1:200
Drawing No 62032/2	
Revision A	



- KEY:
- APPLICATION SITE BOUNDARY AREA - 3345m² (0.335ha)
 - GREENFIELD/LANDSCAPED AREAS - 2985m² (0.299ha)
 - IMPERMEABLE AREAS - 360m² (0.036ha)
 - EXISTING PERCENTAGE OF IMPERMEABLE AREAS (PIMP) 11.0%

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 - SOURCE INFORMATION USED:
 - TOPOGRAPHICAL SURVEY
 - Malcolm Hughes 62032/1 August 2024.

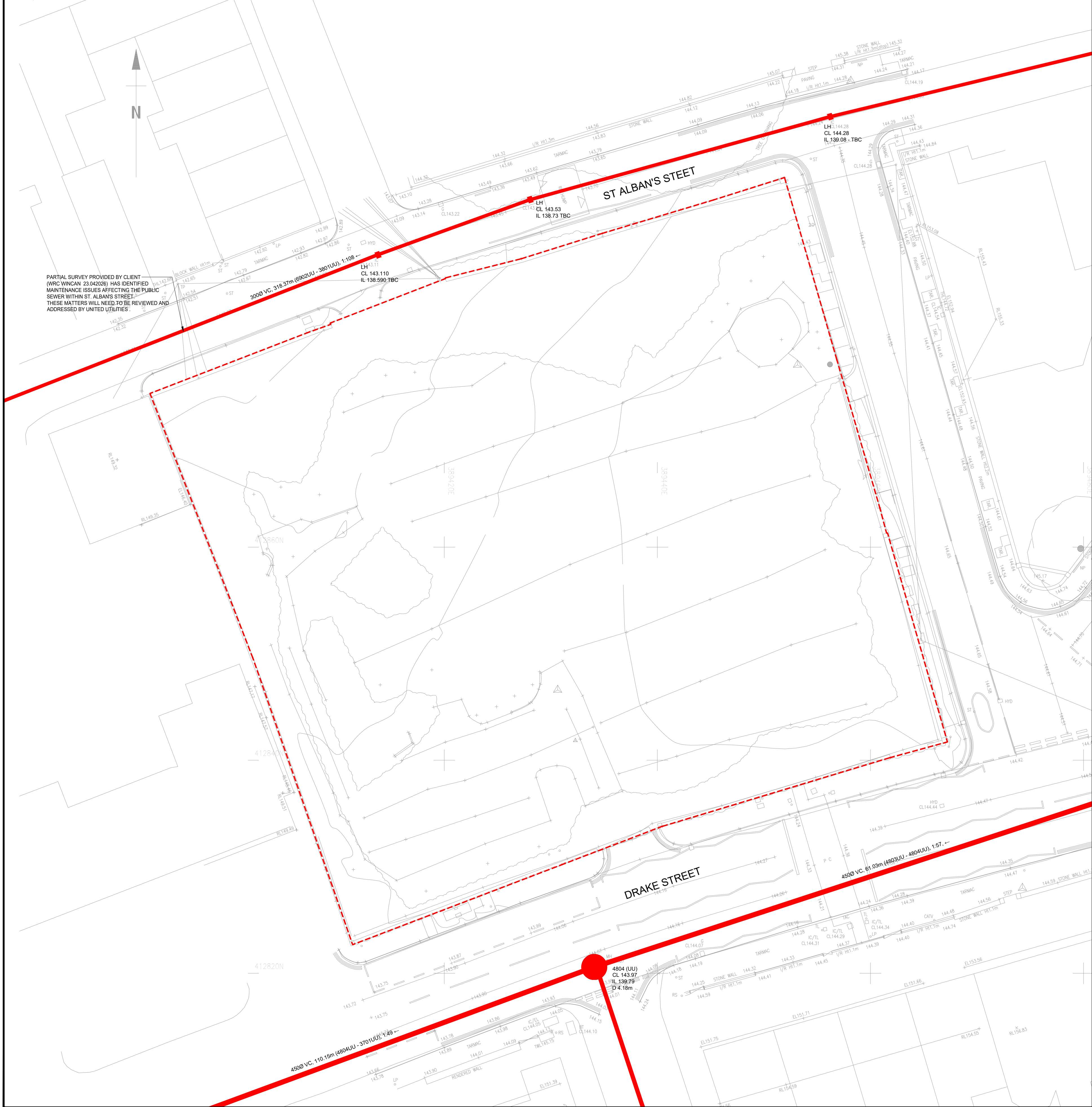
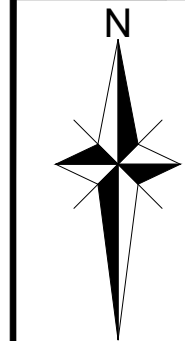
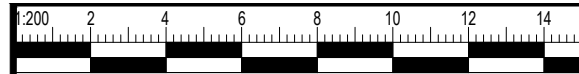
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P03	29.05.26	ES	PLANNING ISSUE	MS	MS
P02	21.05.2026	ES	PLANNING ISSUE FOR COMMENTS	ES	RJ
P01	20.02.2026	SP	INITIAL ISSUE	ES	RJ
REV.	DATE	DRAWN	DESCRIPTION	CHKD	APPRD
STATUS DESCRIPTION				STATUS	
FOR INFORMATION				S2	



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Consulting Civil & Structural Engineers

PROJECT			
LAND ON DRAKE STREET ROCHDALE			
DRAWING TITLE			
EXISTING CONTRIBUTING AREAS PLAN			
CLIENT			
GREAT PLACES HOUSING GROUP			
HBL REF.	DATE	SCALE(S)	A1
11524	16.02.26	1:200	
DRAWN	CHECKED	APPROVED	
ES	MS	MS	
DRAWING No.			REV.
11524-HBL-XX-XX-DR-C-5100			P04



PARTIAL SURVEY PROVIDED BY CLIENT (WRC WINCAN 23.042026) HAS IDENTIFIED MAINTENANCE ISSUES AFFECTING THE PUBLIC SEWER WITHIN ST. ALBANS STREET. THESE MATTERS WILL NEED TO BE REVIEWED AND ADDRESSED BY UNITED UTILITIES.

KEY

3000 100m 1:85

EXISTING COMBINED WATER PUBLIC SEWER

EXISTING COMBINED WATER ACCESS CHAMBER

EXISTING COMBINED WATER LAMP HOLE

ALL EXISTING PUBLIC SEWERS AND PRIVATE DRAINS ARE SHOWN INDICATIVE ONLY. ALL LOCATIONS AND LEVELS TO BE CHECKED PRIOR TO ANY DETAILED DRAINAGE DESIGN OR ON-SITE WORKS. ANY DIFFERENCES BETWEEN ACTUAL AND DRAWN DETAILS ARE TO BE REPORTED IMMEDIATELY.

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- ENVIRONMENT AGENCY
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3. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, IN WRITING, SHOULD ANY ERRORS OR DISCREPANCIES BE FOUND PRIOR TO THE COMMENCEMENT OR CONTINUATION OF ANY WORKS.

4. ALL WORK IS TO BE CARRIED OUT IN ACCORDANCE WITH CURRENT BRITISH STANDARDS, BUILDING REGULATIONS AND NHBC STANDARDS.

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7. BEFORE WORK COMMENCES CONTRACTOR SHOULD CONSULT THE ENGINEER AND THE SJ REPORT REGARDING ANY CONTAMINATION ISSUES. ALL NECESSARY HEALTH AND SAFETY MEASURES TO BE TAKEN

8. SOURCE INFORMATION USED:

8.1. TOPOGRAPHICAL SURVEY

8.1.1. Malcolm Hughes 62032/1 August 2024.

8.2. SEWER RECORDS

8.2.1. UUPS-ORD-708519 (16-02-26)

8.2.2. Partial CCTV survey provided by client WRC WINCAN 23.042026

PLEASE NOTE HBL ASSOCIATES ARE USING NEW AND UPDATED TITLE BOX TEMPLATES. THEREFORE, PRESENTATION MAY DIFFER BETWEEN TECHNICAL DRAWINGS.

P03	02.06.2026	ES	CCTV NOTE ADDED TO 3000P SEWER IN ST. ALBAN'S Rd.	MS	MS
P02	29.05.2026	ES	PLANNING ISSUE - CCTV SURVEY INFORMATION ADDED.	MS	MS
P01	20.02.2026	ES	FIRST ISSUE - FOR COMMENTS	RJ	RJ
REV.	DATE	DRAWN	DESCRIPTION	CHKD	APPRD
STATUS DESCRIPTION				STATUS	
FOR INFORMATION				S2	

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PROJECT

LAND ON DRAKE STREET
ROCHDALE

DRAWING TITLE

EXISTING DRAINAGE PLAN

CLIENT

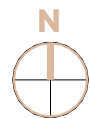
GREAT PLACES HOUSING GROUP

HBL REF.	DATE	SCALE(S)	A1
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DRAWN	CHECKED	APPROVED	
ES	RJ	RJ	
DRAWING No.	11524-HBL-XX-XX-DR-C-5101		REV.
			P03

APPENDIX B – PROPOSED DEVELOPMENT DETAILS



Proposed Site Plan



CLIENT:
Great Places Housing Group

PROJECT:
New Residential Development
Drake Street, Rochdale, OL16 1PJ

DRAWING TITLE:
Proposed Site Plan

DRAWING NUMBER:
19146-PJA-00-ZZ-DR-A-1200-K

STATUS:
PLANNING

SCALE: DATE:
As 22.12.25
indicated@A3
BY: CHECKED:
CT MK

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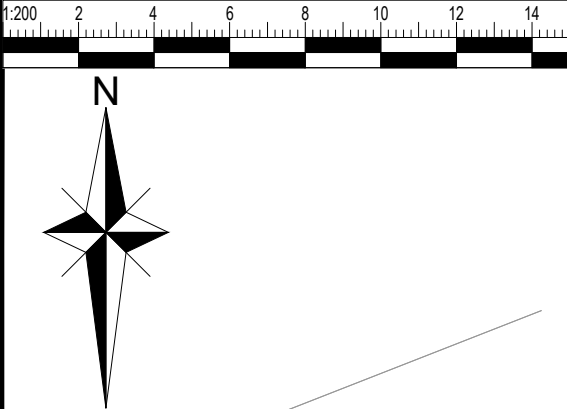
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REV:	DATE:	DESCRIPTION:	BY:
A	15.01.26	Constraints indicated	CT
B	28.01.26	Issued for Comment	CT
C	02.02.26	Pre Application Status Issue	CT
D	11.03.26	Amendments following PreApp meeting	CT
E	13.03.26	Revised following client comments	CT
F	16.03.26	Revised following updated topographic survey	CT
G	18.03.26	Revised following Client comments	CT
H	14.05.26	Revised bin store, apartments flipped, footpaths rationalised, defensible space increased around apartments.	CT
J	15.05.26	Rear access to plot 1 and 4 provided. Plot 4 boundary amended. Amendments to bin store.	
K	28.05.26	Planning status issue	CT

- EVCP
- Houses Cycle Store Location
- Houses Bin Collection Point
- Indicative Planting

Accommodation Schedule	
Type	No.
1B2P_52m2	8
1B2P_52m2 M4(2)	3
2B3P 63m2	4
2B3P 63m2 M4(2)	2
2B3P 75m2 M4(3)	2
2B3P_75m2	4
4B7P 124m2	4
TOTAL	27

0m 10m 20m 30m 40m
VISUAL SCALE 1:500 @ A3



KEY:

----- SITE BOUNDARY - 3345m² (0.335ha)

ROOF AREAS (APARTMENT BLOCK) - 709m² (0.071ha)
ROOF AREA (HOUSES) - 223m² (0.0223ha)
ROOF AREA (HOUSES) WITH 10% URBAN CREEP- 245.3m² (0.0245ha)
BIN STORE AREA ROOF - 33m² (0.0033ha)

HARDSTANDINGS - 1180m² (0.118ha)

TOTAL IMPERMEABLE AREAS - 2145m² (0.215)
PROPOSED PERCENTAGE OF IMPERMEABLE AREA (PIMP) 64%

TOTAL PROPOSED CONTRIBUTING AREAS TO BE POSITIVELY DRAINED INCLUDING 10% URBAN CREEP (HOUSES) - 2167.3m² (0.217ha)

GREENFIELD/LANDSCAPED AREA - 1200m² (0.120ha)

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- SOURCE INFORMATION USED:
 - TOPOGRAPHICAL SURVEY
 - Malcolm Hughes 62032/1 August 2024.
 - SEWER RECORDS
 - UUPS-ORD-708519 (16-02-26)
 - Partial CCTV survey provided by client WRC WINCAN 23.042026
 - LAYOUT INFORMATION
 - 19146-PJA-00-ZZ-DR-A-1200-K - Proposed Site Plan

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P05	02.06.26	ES	PLANNING ISSUE (REVISED TO SITE PLAN 1200_K)	ES	MS
P04	29.05.2026	ES	PLANNING ISSUE	ES	MS
P03	21.05.2026	ES	PLANNING ISSUE (SITE PLAN 1200_I)	ES	RJ
P02	14.05.2026	ES	REVISED TO UPDATED SITE PLAN (1200_G)	ES	RJ
P01	20.02.2026	SP	FIRST ISSUE - FOR COMMENTS	ES	RJ

STATUS	DESCRIPTION	STATUS
	FOR INFORMATION	S2



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PROJECT

LAND ON DRAKE STREET
ROCHDALE

DRAWING TITLE

PROPOSED CONTRIBUTING AREAS PLAN

CLIENT

GREAT PLACES HOUSING GROUP

HBL REF.	11524	DATE	16.02.26	SCALE(S)	1:200	A1
DRAWN	ES	CHECKED	MS	APPROVED	MS	

DRAWING No.	11524-HBL-XX-XX-DR-C-5102	REV.	P05
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- LA HIGHWAYS DEPARTMENT
- SEWERAGE UNDERTAKER

APPENDIX C – SITE INVESTIGATION AND CONSTRAINTS

3931-04A/NR

15th May 2026

Great Places Housing Group
2A Derwent Avenue
West Didsbury
Manchester
M21 7QP

15 Oxford Court
Manchester
M2 3WQ

Tel: 0161 914 9171
Email: contact@igeconsulting.co.uk
Web: www.igeconsulting.co.uk

206-208 DRAKE STREET, ROCHDALE – SOIL INFILTRATION TEST LETTER REPORT

Introduction

IGE Consulting were instructed in March 2026 to undertake soil infiltration tests at Drake Street, Rochdale for Great Places Housing Group.

The site is c. 0.33 Ha, located to the north of Drake Street, Rochdale, c. 0.5km south of Rochdale Town centre, at the approximate postcode OL16 1PJ. The National Ordnance Survey Grid Reference for the centre of the site is 389439E, 412859N. The approximate site boundary is shown on the below aerial photograph, highlighted in magenta. A site location plan is contained in Appendix 2.



Figure 1: Aerial image of the site. The approximate site boundary is highlighted in magenta.

The ground investigation works were undertaken on 19th March 2026 and comprised 4 No. trial pits, SA01 to SA03 (including SA02 and SA02a), 3 No. of which were utilised to perform soil infiltration tests. As groundwater was encountered in SA02, it was backfilled and a shallower trial pit, SA02a, was

constructed c. 2m to the east to undertake the soil infiltration test. Laboratory testing of the site soils was outside of the scope of this report. A factual report was to be provided to summarise the findings of this investigation. The limitations of the investigation work and report are included in Appendix 1.

Proposed Development

It is the client's intention to develop the site into a low-rise residential development comprising 26 No. dwellings consisting of 4 No. semi-detached dwellings and an apartment block with associated private gardens, soft landscaping and car parking.

A proposed development plan is contained in Appendix 2 with an extract below.



Figure 2: Extract of the Proposed Development Plan ('19146-PJA-00-ZZ-DR-A-1200-F - Proposed Site Plan'), dated December 2025.

Previous ground investigation works were undertaken between 13th August and 4th September 2024 and comprised 10 No. dynamic sample boreholes constructed to depths of 5.45m bgl (138.06m – 139.30m AOD). Information regarding this ground investigation can be found in the IGE Consulting *Phase 2 Geo-Environmental Investigation Report* (3931-02B, dated February 2026), however, the ground conditions encountered were noted to be Made Ground underlain by Glaciofluvial Deposits comprising sand and gravel.

Based on the findings of this ground investigation and proposed development plan, 3 No. soil infiltration test pits in-line with BRE 365 were undertaken on 19th March 2026, within areas where Sustainable Drainage Systems (SuDS) may be feasible.

Soil infiltration test depths were determined based on the depth that natural deposits were encountered, with tests undertaken at least 1m into the natural deposits, in this instance between 1.40m and 2.80m bgl (142.10m to 141.36m AOD). A factual report was to be provided to summarise the findings of this investigation. The limitations of the investigation work and report are included in Appendix 1.

Findings

The shallow ground conditions, though noted to vary across site, are generalised below:

- **Made Ground** comprising greyish brown, gravelly to very gravelly, slightly clayey to clayey, fine to coarse SAND to a depth of between 1.40m and 1.60m bgl (142.10 to 142.56m AOD), underlain by:
- **Glaciofluvial Deposits** comprising greyish brown and brown, gravelly to very gravelly, silty to very silty, fine to coarse SAND to a depth of between 2.60m and 2.80m bgl (141.27m to 141.36m AOD).

Obstructions were also noted during the construction of the trial pits, namely a suspected foundation encountered between 0.20m and 1.00m bgl (144.01m to 143.21m AOD) in SA01.

Water Strikes

No water strikes were recorded in any of the pits in which soil infiltration tests were undertaken. A slight ingress of water was recorded at the base of SA02 to a depth of 2.80m bgl, and so this pit was backfilled, relocated c. 2m to the east and re-excavated to a depth of 2.60m bgl (SA02a), where water was not encountered. Trial pit logs and photographs are contained in Appendix 3.

An exploratory hole location plan is contained within Appendix 2 and an extract is included below.

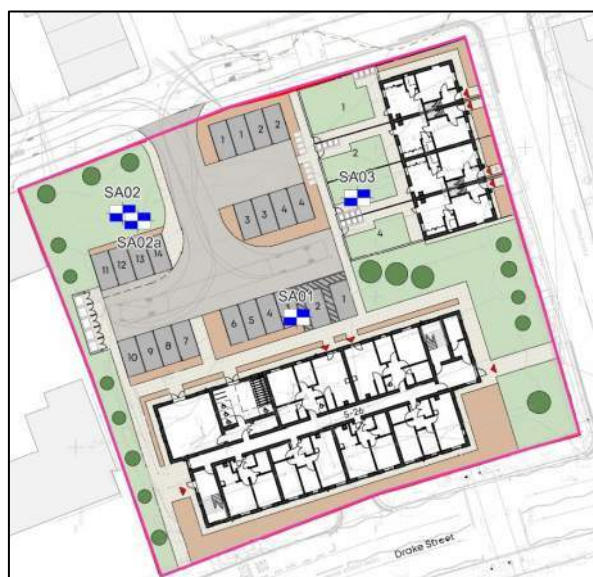


Figure 3: Extract of the exploratory hole location plan (SI-07).

Infiltration Testing

Soil infiltration tests in accordance with BRE 365 were undertaken in SA01, SA02a and SA03, located in the central and northern site sections, respectively. A singular run was successfully undertaken in SA01 and SA03 due to slow infiltration rates and 2 No. runs were achieved in SA02a. It should be noted that the soil infiltration rates for 3 No. of the tests highlighted in red below have been calculated by extrapolation. The following infiltration rates were recorded:

Exploratory Hole	Test Depth (m bgl)	Test No.	Soil Infiltration Rate (m/sec ²)
SA01	1.53 – 2.70	Test 1	2.074 x 10 ⁻⁵
SA02a	1.43 – 2.60	Test 1	8.592 x 10 ⁻⁵
	1.45 – 2.60	Test 2	1.173 x 10 ⁻⁴
SA03	1.70 – 1.90	Test 1	3.647 x 10 ⁻⁵

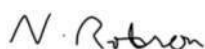
Following discussions with the client and drainage engineer, the use of soakaways is not deemed a suitable approach based on the proposed site levels and groundwater levels.

The soil infiltration test calculations are contained within Appendix 4.

If additional information is needed, do not hesitate to ask.

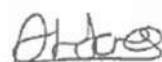
Yours sincerely,

Written By:



Noah Robson BSc (Hons)
Graduate Geo-Environmental Engineer

Checked and authorised by:



Angharad Jones BSc, FGS, MIEnvSoc, CEnv
Associate Director

Enc

Appendix 1 – Limitations of Report and Investigation Works

Appendix 2 – Figures & Drawings

Appendix 3 – Trial Pit Logs and Photographs

Appendix 4 – Soil Infiltration Test Calculation

APPENDIX 1

LIMITATIONS OF REPORT AND INVESTIGATION WORKS

LIMITATIONS OF REPORT

This consultancy report was compiled and carried out by IGE Consulting Limited ('IGE') for the client, as defined in the main report (the 'client'), on the basis of a defined programme and scope of works and the terms of a contract between IGE and the client. IGE undertook this with all reasonable skill and care, taking into account the limits of the scope of works required by the client, the prevailing site conditions, the time scale involved and the resources, including financial and manpower resources, agreed between IGE and the client. IGE cannot accept responsibility to any parties whatsoever, following the issue of this report, for any matters arising which may be considered outwith the agreed scope of works.

Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted consulting practices. This report may not be relied upon, or transferred to, by any other party without the written agreement of its author. If a third party relies on this report, it does so wholly at its own and sole risk and IGE disclaims any liability to such parties.

It is IGE's understanding that this report is to be used for the purpose described in the 'Brief' section of this report. That purpose was a significant factor in determining the scope and the services to be provided. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of, or reliance upon the report in those circumstances by the client without IGE's review and advice shall be at the client's sole and own risk.

The information contained in this report is protected by disclosure under Part 3 of the Environmental Information Regulations 2004 pursuant to the provisions of Regulation 12(5) without the consent in writing of a Director of IGE.

This report is a function of the date it was written and should be read in light of any subsequent changes in legislation, statutory requirements and industry practices. Ground conditions can also change over time and further investigations or assessment should be made if there is any significant delay in acting on the findings of this report. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of IGE. In the absence of such written advice of IGE, reliance on the report in the future shall be at the client's own and sole risk. Should IGE be requested to review the report in the future, IGE shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between IGE and the client.

The observations and conclusions described in this report are based solely upon the scope of works agreed between the client and IGE. IGE has not performed any observations, investigations, studies or testing not specifically set out or mentioned within this report. IGE is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the agreed scope of works. For the avoidance of doubt, this report is strictly limited to the nature of contamination contained within the ground and groundwater at the site. The report does not cover environmental aspects such as air or noise pollution and ground vibrations and the like. In addition, ecological matters relating to wildlife, flora and fauna have not been investigated as part of this report. In particular, the site has not been inspected for the presence or otherwise of invasive species (e.g. Japanese Knotweed). It is recommended that the client appoints a specialist in this subject to carry out a detailed inspection / survey of the site if its presence is suspected. Where mention has been made to the identification of asbestos or asbestos-containing materials this is for indicative purposes only and does not constitute or replace full and proper surveys.

LIMITATIONS OF INVESTIGATION WORK

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable and as investigation excavations only allow examination of the ground at discrete locations, the potential exists for ground conditions to be encountered which are different to those considered in this report. The explored extent of the site area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition, chemical analysis was carried

out for a limited number of parameters, based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The normal speed of investigation usually does not permit the recording of an equilibrium water level for any one water strike. Moreover, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Exploratory Holes

Where exploratory holes have been carried out as part of this investigation, the spacing has been determined to provide a reasonable indication of the general ground conditions across the site, but the number has ultimately been limited by commercial constraints. The findings of the exploratory holes relate specifically to the exploratory hole locations and are no absolute guarantee of the ground conditions between such locations. Due allowance should be made for the possibility of variation in conditions between exploratory hole locations.

Extent of Contamination Testing

The extent of contaminated land testing carried out on samples obtained from the site has been determined in accordance with the latest legal guidance issued by the government to provide, with reasonable certainty, the probable general levels of contamination present on site that could pose a significant hazard to human health or waters. The extent of site investigation works including chemical testing has also been limited by reasonable commercial constraints. Although extensive testing of samples has been carried out, the volume of samples taken for testing are a minute fraction of the total volume of soils and groundwater present on site. Therefore, there is a residual risk that undetected pockets of contamination may be present on site, situated between testing locations.

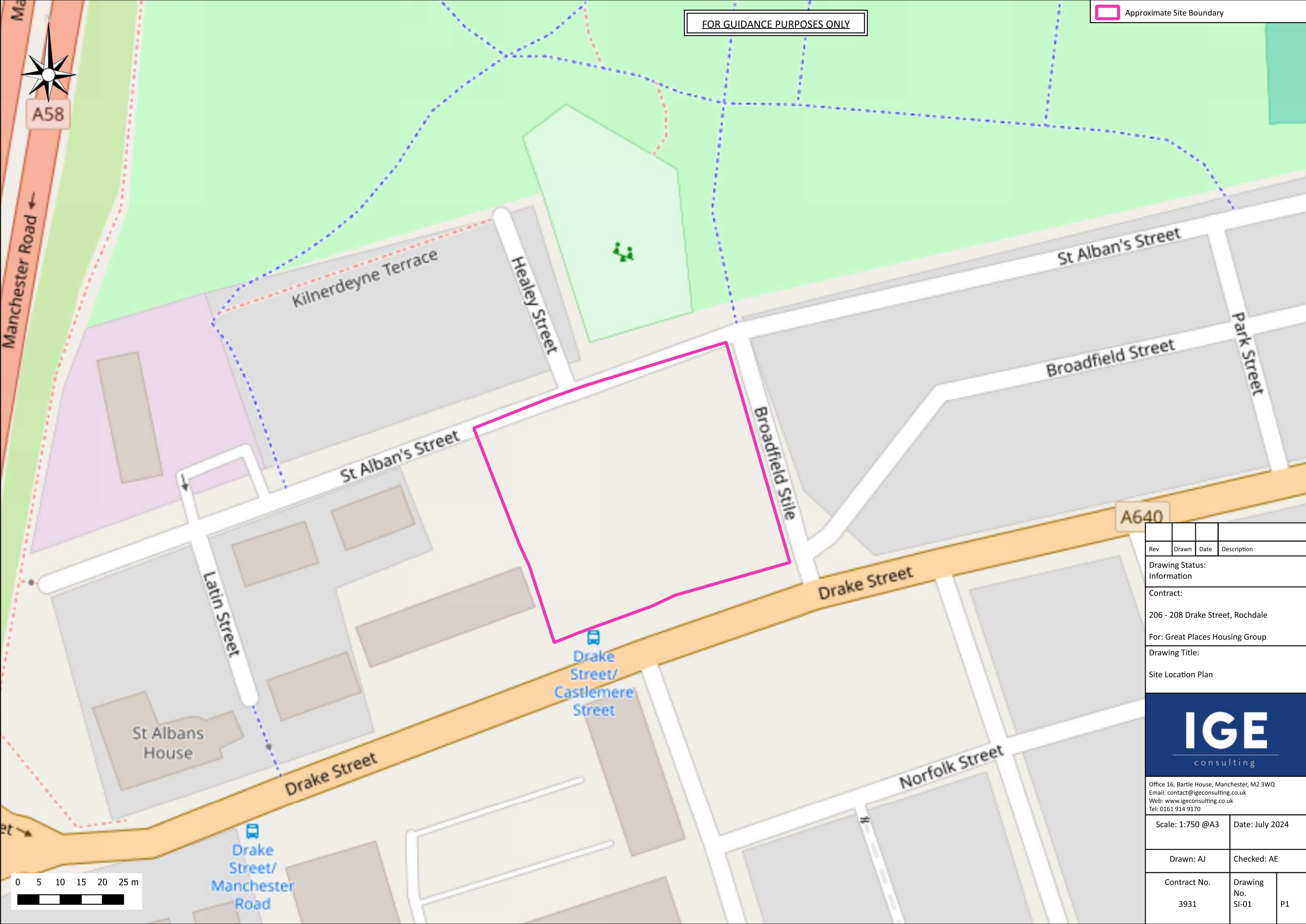
When investigating or developing potentially contaminated land it is important to recognise that sub-surface conditions may vary spatially and temporally. The absence of certain ground, ground gas, contamination or groundwater conditions at the positions tested is not a guarantee that such conditions do not exist anywhere across the site. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities. The conclusions resulting from this study are not necessarily indicative of future conditions or operating practices at or adjacent to the site.

Extent of Geo-Environmental Studies

This report is strictly limited to the nature of contamination contained within the ground and groundwater at the site. The report does not cover environmental aspects such as air or noise pollution and ground vibrations and the like. In addition, ecological matters relating to wildlife, flora and fauna have not been investigated as part of this report. In particular, the site has not been inspected for the presence or otherwise of invasive species e.g. Japanese Knotweed. It is recommended that the Client appoints a specialist in this subject to carry out a detailed inspection / survey of the site if its presence is suspected. Where mention has been made to the identification asbestos or asbestos-containing materials this is for indicative purposes only and does not constitute or replace a full and proper survey. If an Unexploded Ordnance (UXO) report has been obtained within the report, it has been so on the basis of Health and Safety concerns and no assessment has been made other than transcribing the recommendations of the sub-contractor contained within the report. In terms of a potential contaminative source, unless ordnance has been manufactured / stored on site, UXOs will only be determined as a contaminative source following a positive identification on site.

APPENDIX 2

FIGURES AND DRAWINGS



FOR GUIDANCE PURPOSES ONLY

Approximate Site Boundary

Rev	Drawn	Date	Description
-----	-------	------	-------------

Drawing Status:
Information

Contract:

206 - 208 Drake Street, Rochdale

For: Great Places Housing Group

Drawing Title:

Site Location Plan



Office 16, Bartle House, Manchester, M2 3WQ
Email: contact@igeconsulting.co.uk
Web: www.igeconsulting.co.uk
Tel: 0161 914 9170

Scale: 1:750 @A3	Date: July 2024
------------------	-----------------

Drawn: AJ	Checked: AE
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Contract No. 3931	Drawing No. SI-01	P1
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Notes: This drawing is the copyright Paddock Johnson Partnership Limited and may not be used without their prior written consent.
Written dimensions to be taken in preference to scaled dimensions.
Due to the inaccuracies of scanning, scanned images should not be scaled.

REV:	DATE:	DESCRIPTION:	BY:
A	15.01.26	Constraints indicated	CT
B	28.01.26	Issued for Comment	CT
C	02.02.26	Pre Application Status Issue	CT
D	11.03.26	Amendments following PreApp meeting	CT
E	13.03.26	Revised following client comments	CT
F	16.03.26	Revised following updated topographic survey	CT

Indicative Planting



VISUAL SCALE 1:500 @ A3

1 Proposed Site Plan
Scale: 1: 500

CLIENT:
Great Places Housing Group

PROJECT:
New Residential Development
Drake Street, Rochdale, OL16 1PJ

DRAWING TITLE:
Proposed Site Plan

DRAWING NUMBER:
19146-PJA-00-ZZ-DR-A-1200-F

STATUS:
PRE APPLICATION

\\pjdco1\Cubefiles\Generated Docs\1897\Drawings\PJA-00-ZZ-M3-A-9000\19146-PJA-00-ZZ-M3-A-9000-B.rvt

SCALE: DATE:
As 22.12.25
indicated@A3
BY: CHECKED:
CT MK

PADDOCK
JOHNSON

Studio 2, The Lyceum,
Bath Street, Port Sunlight,
Merseyside, CH62 4UJ
0151 643 1234
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Paddock Johnson Partnership
Limited. Registered in England
and Wales. No. 06684275



FOR GUIDANCE PURPOSES ONLY

- Approximate Site Boundary
- Soil Infiltration Test Pits



Rev	Drawn	Date	Description
Drawing Status: Information			
Contract: 206 - 208 Drake Street, Rochdale			
For: Great Places Housing Group			
Drawing Title: Soil Infiltration Test Location Plan			
			
1st Floor, 15 Oxford Court, Manchester, M2 3WQ Email: contact@igeconsulting.co.uk Web: www.igeconsulting.co.uk Tel: 0161 914 9170			
Scale: 1:300 @A3		Date: March 2026	
Drawn: NR		Checked: AJ	
Contract No. 3931	Drawing No. SI-07	P1	



APPENDIX 3

TRIAL PIT LOGS AND PHOTOGRAPHS

Hole Type SOAK	Easting 389429.48	Northing 412857.31	Ground Level (m) 144.21	Scale 1:20
Project Name Drake Street	Project No. 3931	Start Date 2026-03-19	End Date 2026-03-19	

Client
Great Places Housing Group Ltd.

Consultant
IGE Consulting Ltd.

Contractor



Remarks

Terminated at target depth to undertake BRE 365 soil infiltration test.

Method, Plant, Stability, Dimensions

0.00 - 2.70m SOAK JCB-3CX
Stable during excavation.
Orientation: 270°

L = 1.90m



W = 0.60m

Logger

NR

Checked By: LM

IGE consulting					Soakaway SA02 Sheet 1 of 1					
Hole Type SOAK		Easting 389408.26		Northing 412870.17		Ground Level (m) 143.50		Scale 1:20		
Project Name Drake Street				Project No. 3931		Start Date 2026-03-19		End Date 2026-03-19		
Client Great Places Housing Group Ltd.					Consultant IGE Consulting Ltd.			Contractor		
Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m)	Strata			
		Depth (m)	Type/ Ref	Results			Legend	Description		
						(0.80)		Dark greyish brown very gravelly clayey fine to coarse SAND with high cobble content. Gravel is angular to subangular fine to coarse of red brick, concrete, plastic, asphalt and ceramic. Cobbles are angular to subangular of red brick, concrete and asphalt. [MADE GROUND]		
					142.70	0.80		Brownish grey gravelly clayey fine to coarse SAND with low cobble content. Gravel is angular to rounded fine to coarse of red brick, concrete, sandstone and mudstone. Cobbles are angular to subangular of red brick and concrete. [MADE GROUND]		
					142.10	1.40		Greyish brown mottled light brown very gravelly silty fine to coarse SAND. Gravel is subangular to well rounded fine to coarse of sandstone and mudstone. [GLACIOFLUVIAL DEPOSITS]		
					141.50	2.00		Brown very gravelly very silty fine to coarse SAND. Gravel is rounded to well rounded fine to coarse of sandstone and mudstone. [GLACIOFLUVIAL DEPOSITS]		
					140.70	2.80	End of Borehole at 2.80m			
Remarks Terminated due to water strike.					Method, Plant, Stability, Dimensions 0.00 - 2.80m SOAK JCB-3CX Stable during excavation. Orientation: 280° L = 2.00m W = 0.60m					Logger NR
Checked By: LM										

Created using Pebble Geo

Hole Type SOAK	Easting 389408.26	Northing 412870.17	Ground Level (m) 143.50	Scale 1:20
Project Name Drake Street	Project No. 3931	Start Date 2026-03-19	End Date 2026-03-19	

Client
Great Places Housing Group Ltd.

Consultant
IGE Consulting Ltd.

Contractor



Remarks
Terminated due to water strike.

Method, Plant, Stability, Dimensions

0.00 - 2.80m SOAK JCB-3CX

Stable during excavation.

Orientation: 280°

L = 2.00m

W = 0.60m

Logger

NR

Checked By: LM

IGE consulting		Soakaway SA02a Sheet 1 of 1			
Hole TypeSOAK		Easting412870.17	Northing389408.26	Ground Level (m)143.87	Scale1:20
Project NameDrake Street		Project No.3931		Start Date2026-03-19	End Date2026-03-19
ClientGreat Places Housing Group Ltd.			ConsultantIGE Consulting Ltd.		Contractor
Inst/Backfill	Water Levels	Samples and Tests Depth (m)Type/RefResults		Level (m)	Depth (thickness) (m)LegendDescription
					(0.80) 143.07 0.80 (0.60) 142.47 1.40 (1.20) 141.27 2.60 Dark greyish brown very gravelly clayey fine to coarse SAND with high cobble content. Gravel is angular to subangular fine to coarse of red brick, concrete, plastic, asphalt and ceramic. Cobbles are angular to subangular of red brick, concrete and asphalt. [MADE GROUND] Brownish grey gravelly clayey fine to coarse SAND with low cobble content. Gravel is angular to rounded fine to coarse of red brick, concrete, sandstone and mudstone. Cobbles are angular to subangular of red brick and concrete. [MADE GROUND] Greyish brown mottled light brown very gravelly very silty fine to coarse SAND. Gravel is subangular to well rounded fine to coarse of sandstone and mudstone. [GLACIOFLUVIAL DEPOSITS] Becoming brown. (2.00m) End of Borehole at 2.60m
Remarks Terminated at target depth to undertake BRE 365 soil infiltration test.					Method, Plant, Stability, Dimensions 0.00 - 2.60m SOAK JCB-3CX Stable during excavation. Orientation: 280° L = 2.00m W = 0.60m
Checked By: LM					Logger NR

IGEconsulting Soakaway					SA03 Sheet 1 of 1																																																																																																																																																																																											
Hole Type SOAK		Easting 389437.56		Northing 412873.24		Ground Level (m) 144.16		Scale 1:20																																																																																																																																																																																								
Project Name Drake Street				Project No. 3931		Start Date 2026-03-19		End Date 2026-03-19																																																																																																																																																																																								
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[MADE GROUND]</td><td rowspan="3">0.5</td></tr><tr><td></td><td></td><td></td><td></td><td>(0.30)</td></tr><tr><td></td><td></td><td></td><td></td><td>(0.50)</td></tr><tr><td rowspan="3"></td><td rowspan="3"></td><td></td><td></td><td></td><td></td><td>143.66</td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3">Greyish brown very gravelly clayey angular to subangular COBBLES of red brick and concrete. Gravel is angular to subangular of red brick, concrete, asphalt, plastic and ceramic. [MADE GROUND]</td><td rowspan="3">1.0</td></tr><tr><td></td><td></td><td></td><td></td><td>(1.10)</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="3"></td><td rowspan="3"></td><td></td><td></td><td></td><td></td><td>142.56</td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3">Brown very gravelly silty fine to coarse SAND with moderate cobble content. Gravel is angular to subangular of red brick, concrete, asphalt, plastic and ceramic. Cobbles are angular to subangular of red brick and concrete. [MADE GROUND]</td><td rowspan="3">1.5</td></tr><tr><td></td><td></td><td></td><td></td><td>(1.60)</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="3"></td><td rowspan="3"></td><td></td><td></td><td></td><td></td><td>142.06</td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3">Greyish brown mottled light brown very gravelly silty fine to coarse SAND. Gravel is angular to rounded fine to coarse of sandstone and mudstone. [GLACIOFLUVIAL DEPOSITS]</td><td rowspan="3">2.0</td></tr><tr><td></td><td></td><td></td><td></td><td>(0.50)</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="3"></td><td rowspan="3"></td><td></td><td></td><td></td><td></td><td>141.36</td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3">Light brown very gravelly very silty fine to coarse SAND with occasional cobble-sized inclusions of gravelly very sandy SILT. Gravel is angular to well rounded fine to coarse of sandstone and mudstone. [GLACIOFLUVIAL DEPOSITS]</td><td rowspan="3">2.5</td></tr><tr><td></td><td></td><td></td><td></td><td>(2.10)</td></tr><tr><td></td><td></td><td></td><td></td><td>(0.70)</td></tr><tr><td rowspan="3"></td><td rowspan="3"></td><td></td><td></td><td></td><td></td><td></td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3">End of Borehole at 2.80m</td><td rowspan="3">3.0</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="3"></td><td rowspan="3"></td><td></td><td></td><td></td><td></td><td></td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3">3.5</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td rowspan="3"></td><td rowspan="3"></td><td></td><td></td><td></td><td></td><td></td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3">4.0</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>										Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m)	Strata			Depth (m)	Type/ Ref	Results	Legend	Description							(0.20)			Dark brown very gravelly clayey fine to coarse SAND with high cobble content and frequent roots. 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Checked By: LM																																																																																																																																																																																																

Hole Type SOAK	Easting 389437.56	Northing 412873.24	Ground Level (m) 144.16	Scale 1:20
Project Name Drake Street	Project No. 3931		Start Date 2026-03-19	End Date 2026-03-19

Client
Great Places Housing Group Ltd.

Consultant
IGE Consulting Ltd.

Contractor



Remarks

Terminated at target depth to undertake BRE 365 soil infiltration test.

Method, Plant, Stability, Dimensions

0.00 - 2.80m SOAK JCB-3CX

Stable during excavation.

Orientation: 90°

L = 1.90m



W = 0.60m

Logger

NR

Checked By: LM

APPENDIX 4

SOIL INFILTRATION TEST CALCULATIONS

DETERMINATION OF SOIL INFILTRATION RATE (f)

Site Name: Drake Street
 Job Number: 3931
 Date: 19/03/2026
 Exploratory Hole: SA01

15 Oxford Court
 Manchester
 M2 3WQ

Tel: 0161 914 9171
 Email: contact@igeconsulting.co.uk
 Web: www.igeconsulting.co.uk

Effective depth (m)	100% Full	75% Full	50% Full	25% Full
1.17	1.53	1.82	2.12	2.41

Time (mins)	Depth (m bgl)
0	1.53
1	1.54
2	1.54
3	1.55
4	1.56
5	1.56
6	1.56
8	1.57
10	1.58
16	1.61
37	1.66
86	1.73
112	1.76
128	1.77
180	1.83
233	1.92
612	2.41

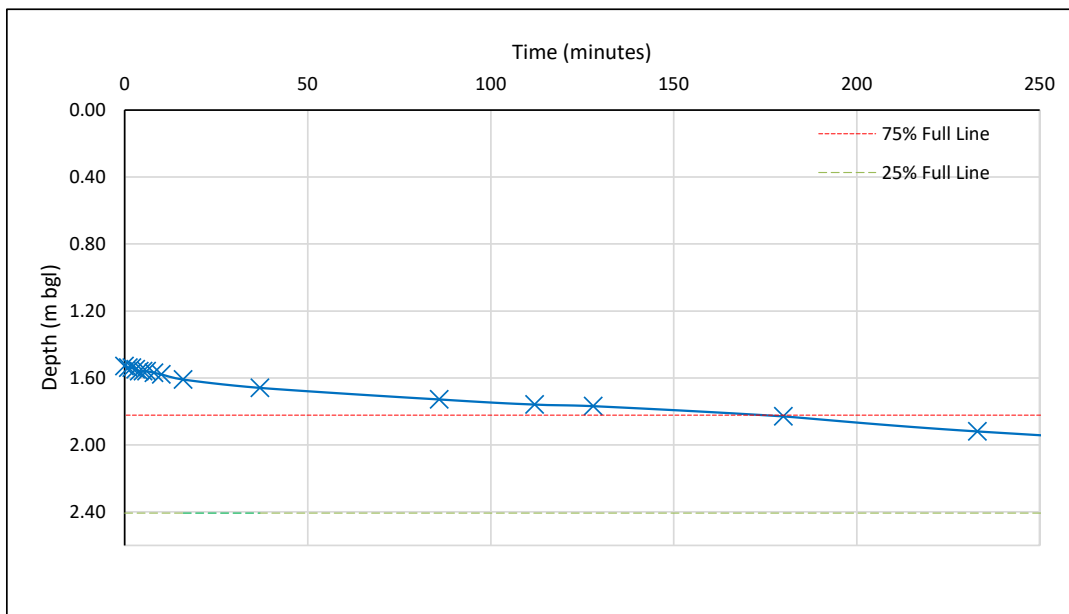
Pit dimensions (m):	
Length:	1.90
Width:	0.60
Depth:	2.70

Gravel used?	Yes
Void ratio of gravel fill =	0.3

Vp75-25 (m ³) =	0.67
ap50 (m ²) =	1.2195
tp75-25 (secs) =	26370
f (m/s) =	2.074E-05

Calculations carried out in accordance with
BRE 365

100 - calculated using extrapolation



IGE Consulting Ltd
 Registered in England No 10780128



DETERMINATION OF SOIL INFILTRATION RATE (f)

Site Name: Drake Street

Job Number: 3931

Date: 19/03/2026

Exploratory Hole: SA02 - Run 1

 15 Oxford Court
 Manchester
 M2 3WQ

 Tel: 0161 914 9171
 Email: contact@igeconsulting.co.uk
 Web: www.igeconsulting.co.uk

Effective depth (m)	100% Full	75% Full	50% Full	25% Full
1.17	1.43	1.72	2.02	2.31

Time (mins)	Depth (m bgl)
0	1.43
1	1.44
2	1.45
3	1.47
4	1.48
5	1.49
6	1.50
8	1.52
10	1.57
18	1.63
27	1.68
39	1.77
75	2.09
102	2.20
120	2.25
139	2.31

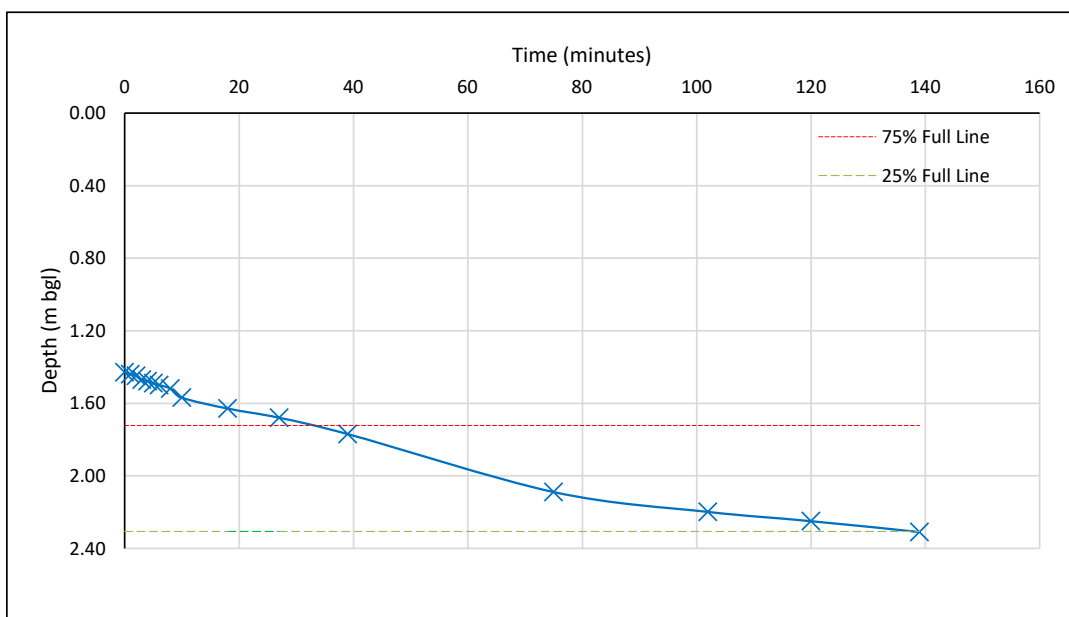
Pit dimensions (m):	
Length:	2.00
Width:	0.60
Depth:	2.60

Gravel used?	Yes
Void ratio of gravel fill =	0.3

Vp75-25 (m ³) =	0.70
ap50 (m ²) =	1.2726
tp75-25 (secs) =	6420
f (m/s) =	8.592E-05

 Calculations carried out in accordance with
 BRE 365

100 - calculated using extrapolation


 IGE Consulting Ltd
 Registered in England No 10780128


DETERMINATION OF SOIL INFILTRATION RATE (f)

Site Name: Drake Street

Job Number: 3931

Date: 19/03/2026

Exploratory Hole: SA02 - Run 2

 15 Oxford Court
 Manchester
 M2 3WQ

 Tel: 0161 914 9171
 Email: contact@igeconsulting.co.uk
 Web: www.igeconsulting.co.uk

Effective depth (m)	100% Full	75% Full	50% Full	25% Full
1.15	1.45	1.74	2.03	2.31

Time (mins)	Depth (m bgl)
0	1.45
1	1.47
2	1.48
3	1.49
4	1.50
5	1.50
6	1.51
8	1.52
10	1.53
22	1.58
78	1.98
90	2.07
113	2.25
122	2.31

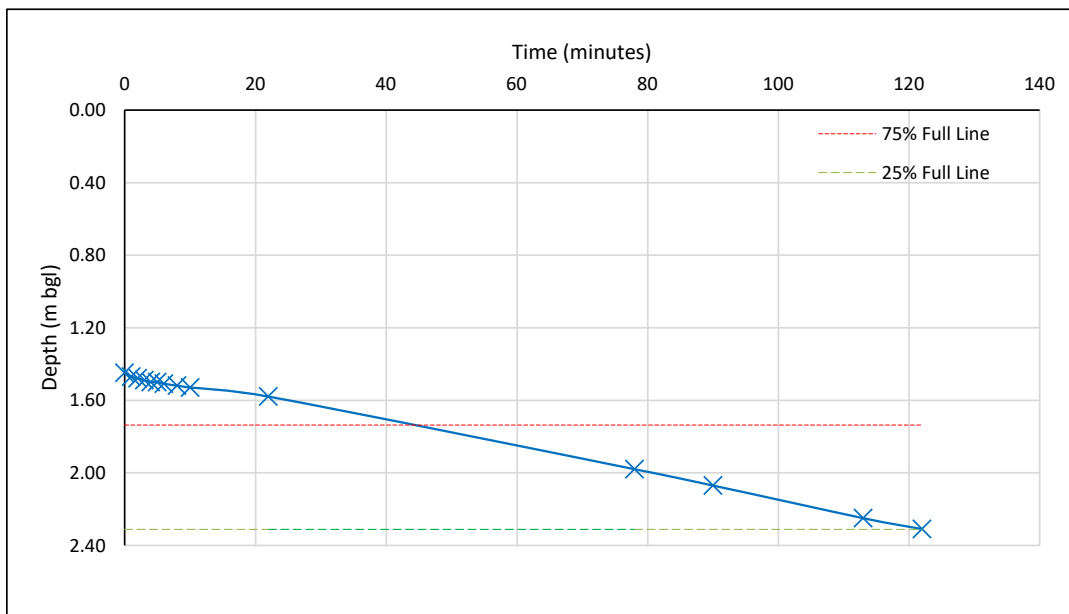
Pit dimensions (m):	
Length:	2.00
Width:	0.60
Depth:	2.60

Gravel used?	Yes
Void ratio of gravel fill =	0.3

Vp75-25 (m ³) =	0.69
ap50 (m ²) =	1.257
tp75-25 (secs) =	4680
f (m/s) =	1.173E-04

 Calculations carried out in accordance with
 BRE 365

100 - calculated using extrapolation


 IGE Consulting Ltd
 Registered in England No 10780128


DETERMINATION OF SOIL INFILTRATION RATE (f)

Site Name: Drake Street
 Job Number: 3931
 Date: 19/03/2026
 Exploratory Hole: SA03

15 Oxford Court
 Manchester
 M2 3WQ

Tel: 0161 914 9171
 Email: contact@igeconsulting.co.uk
 Web: www.igeconsulting.co.uk

Effective depth (m)	100% Full	75% Full	50% Full	25% Full
1.10	1.70	1.98	2.25	2.53

Time (mins)	Depth (m bgl)
0	1.70
1	1.71
2	1.72
3	1.72
4	1.73
5	1.74
6	1.74
8	1.74
10	1.75
24	1.78
63	1.90
109	2.00
154	2.11
210	2.22
343	2.53

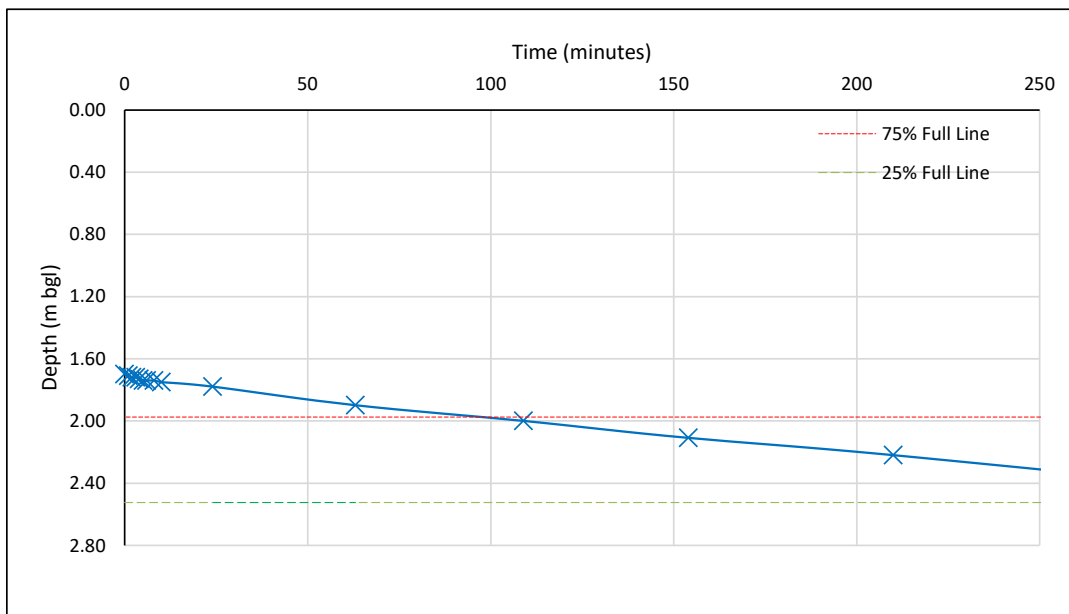
Pit dimensions (m):	
Length:	1.90
Width:	0.60
Depth:	2.80

Gravel used?	Yes
Void ratio of gravel fill =	0.3

Vp75-25 (m ³) =	0.63
ap50 (m ²) =	1.167
tp75-25 (secs) =	14730
f (m/s) =	3.647E-05

Calculations carried out in accordance with
BRE 365

100 - calculated using extrapolation



IGE Consulting Ltd
 Registered in England No 10780128



IGE

consulting

IGE Consulting Ltd, 1st Floor, 15 Oxford Court, Manchester, M2 3WQ Tel:

0161 914 9170

Email: contact@igeconsulting.co.uk

APPENDIX D – CONSULTATIONS

D.1 Environment Agency Consultation – Flood Risk

D.2 Water Company Consultation

D.3 Lead Local Flood Authority Consultation

D.1 Environment Agency Consultation – Flood Risk

Flood map for planning

Your reference
11524

Location (easting/northing)
389430/412859

Created
13 February 2026 09:40

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- in an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

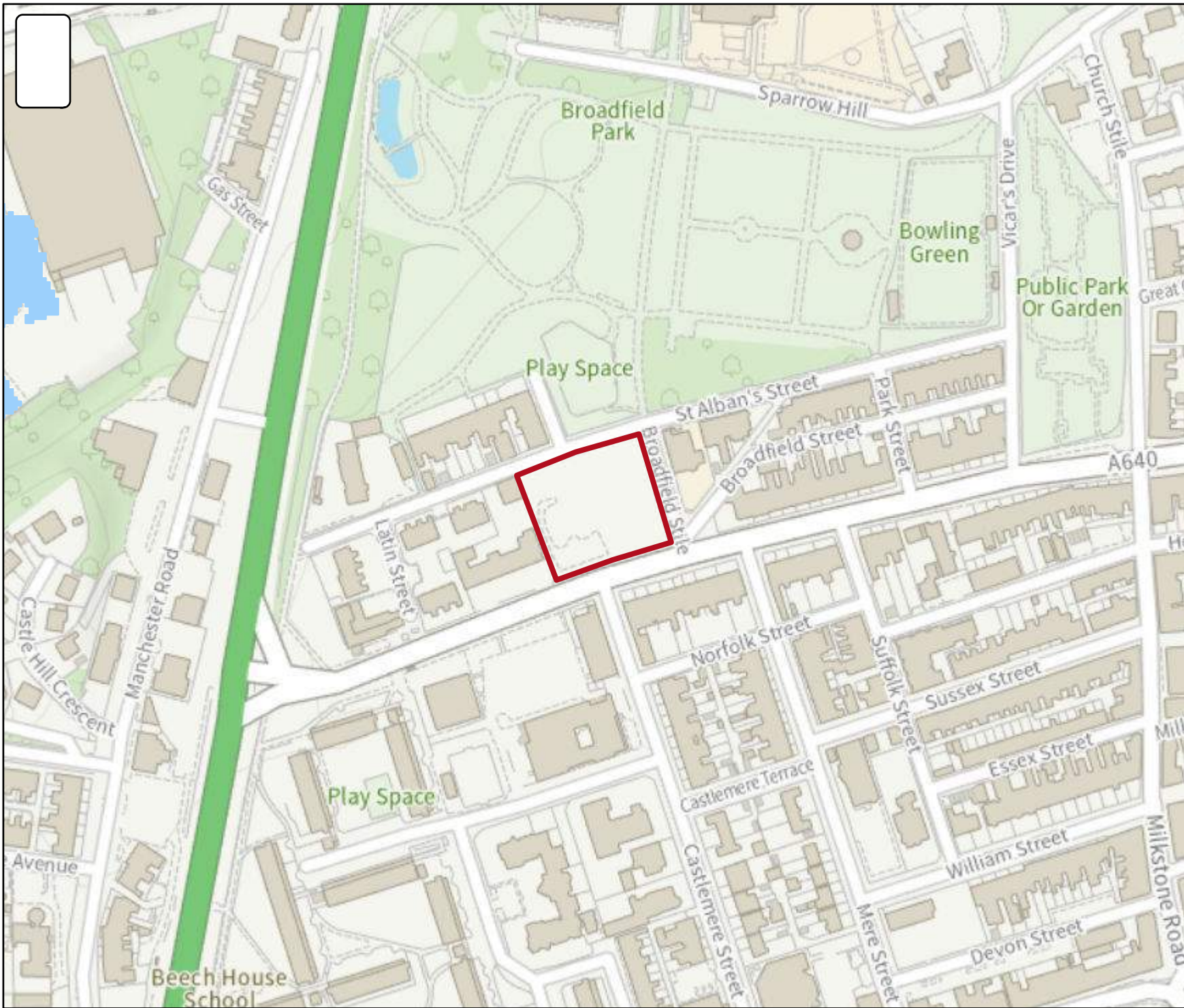
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2026 AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>



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<RXU UHIHUHQFH

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6FDOH

&UHDWHG
)HE

6HOHFWHG DU

)ORRG JRQH

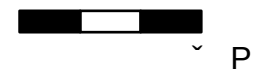
)ORRG JRQH

)ORRG JRQH

)ORRG GHIHQFH

0DLQ ULYHU

:DWHU VWRUDJ



3DJH RI

Edyta Savage

From: Get flood risk information for planning
<get.flood.risk.information.for.planning@notifications.service.gov.uk>
Sent: 03 February 2026 11:03
To: Edyta Savage
Subject: Ordered flood risk data not available. Your reference number F3RBMUVNKGB2

Warning: This email was sent from outside the organisation.



Dear Edyta Savage,

Thank you for ordering flood risk data.

Location data requested for: 341429,391814 easting and northing coordinates.

We do not have any flood risk data for this location.

However, flooding may have happened here in the past, as our records are not comprehensive.

Why do we not have data for this location?

We do not hold any detailed flood modelling data for your site, as it is not within 150 metres of an area at risk of flooding from rivers or the sea.

We do not hold records of historical flood events from rivers or the sea affecting the area local to this site.

Help with flood risk assessments

If you have requested this information to help inform a development proposal, you can find out more about the use of

Environment Agency information for flood risk assessments on GOV.UK:

- flood risk assessments for planning applications:
<https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications>
- pre-planning application enquiry form:
<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

Surface water and other sources of flooding

View surface water flood maps online at:

<https://www.gov.uk/check-long-term-flood-risk>

When using the surface water map on the check your long term flood risk service the following considerations apply:

- surface water extents are suitable for use in planning
- surface water climate change scenarios may help to inform risk assessments, but the available data fall short of what is required to assess planned development
- surface water depth information should not be used for planning purposes

To find out about other factors that might affect the flood risk of this location, you should also check:

Reservoir flood risk: <https://www.gov.uk/check-long-term-flood-risk>

Groundwater flood risk:

- the British Geological Survey groundwater flooding data:
<https://www.bgs.ac.uk/datasets/groundwater-flooding/>

- groundwater: current status and flood risk:
<https://www.gov.uk/government/collections/groundwater-current-status-and-flood-risk>
- the guide on mining and groundwater constraints for development: <https://www.gov.uk/guidance/mining-and-groundwater-constraints-for-development>
- further information may be available from the lead local flood authority (LLFA)

Your local planning authority's strategic flood risk assessment (SFRA), which includes future flood risk.

View information on climate change allowances:

<https://www.gov.uk/government/publications/peak-river-flow-climate-change-allowances-by-management-catchment>

This information is provided subject to the Open Government Licence:

<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

We respond to requests for recorded information that we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR). If you need information for insurance purposes, you should send an insurance related request by email to enquiries@environment-agency.gov.uk

Data available online

Many of our flood datasets are available online.

You can view and download flood risk maps on flooding from surface water, reservoirs, and rivers and the sea (accounting for existing defences) from our website at:

<https://www.gov.uk/check-long-term-flood-risk>

Flood map for planning:

- flood zone 2: <https://data.gov.uk/dataset/cf494c44-05cd-4060-a029-35937970c9c6/flood-map-for-planning-rivers-and-sea-flood-zone-2>
- flood zone 3: <https://data.gov.uk/dataset/bed63fc1-dd26-4685-b143-2941088923b3/flood-map-for-planning-rivers-and-sea-flood-zone-3>
- water storage areas: <https://data.gov.uk/dataset/cae4e24c-0342-48aa-8a93-d727ce582b3c/flood-map-for-planning-rivers-and-sea-flood-storage-areas>
- flood defences: <https://data.gov.uk/dataset/76828b72-3c9c-4700-83c7-d7c36047d322/flood-map-for-planning-rivers-and-sea-spatial-flood-defences-without-standardised-attributes>
- areas benefiting from defences: <https://data.gov.uk/dataset/eea328e7-2eea-4cbf-bd6b-c66121981ba1/flood-map-for-planning-rivers-and-sea-areas-benefiting-from-defences>

Other online data:

- historic flood map: <https://data.gov.uk/dataset/76292bec-7d8b-43e8-9c98-02734fd89c81/historic-flood-map>
- assets and defences: <https://environment.data.gov.uk/asset-management/index.html>
- current flood warnings: <https://check-for-flooding.service.gov.uk/>
- open data: <https://data.gov.uk/>

Contact us

Do not reply to this email. This inbox is not checked regularly.

If you have any questions about your request, contact the Cumbria and Lancashire area team at inforequests.cmblnc@environment-agency.gov.uk. Make sure you include your reference number.

Regards,

Flood map for planning service
Environment Agency

<https://flood-map-for-planning-service.gov.uk/>

D.2 Water Company Consultation

United Utilities Grasmere House, 2nd Floor
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

04/03/26

Dear **Edyta Savage- HBL Associates Ltd,**

Pre-Development Enquiry for **New Residential development, Drake street, Rochdale, OL16 1PJ.**

UU Reference Number: **08992657.**

We have assessed your application based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your strategy will need review by other authorities as part of the planning process. We advise conducting necessary site investigations to confirm viability of your proposals.

Modelled Flood Risk

I can confirm that we do not have modelled flood risk within the vicinity of the proposed development.

Please note that our modelling data is indicative, and only representative of the 1:100year storm event.

[Please see **comment 2** of the attached guidance sheet](#)

Asset Protection

We have reviewed our records and can confirm that there does not appear to be any charted public sewers located within the boundary of the proposed development.

[Please see **comment 3** of the attached guidance sheet and **Working Near Our Pipelines Guidance document**](#)

Foul Water

Foul flow from this site will be allowed to drain into the public combined sewer system.

Our preferred point of discharge would be to the 300mm diameter public combined sewer within St Alban's street located North of your proposed development at an unrestricted rate.

Manhole reference: this would be to the new manhole, we have no objection of, onto the 300mm combined sewer.

[Please see the images at the end of this letter for clarification](#)

Surface Water

Follow the National Planning Policy Guidance drainage hierarchy and Provide evidence for discounting higher options before considering public sewer discharge. Consult the Lead Local Flood Authority regarding surface water concerns.

[Please see comment 4 within the guidance sheet](#)

Infiltration

[Please see comment 4 within the guidance sheet](#)

Public Sewer

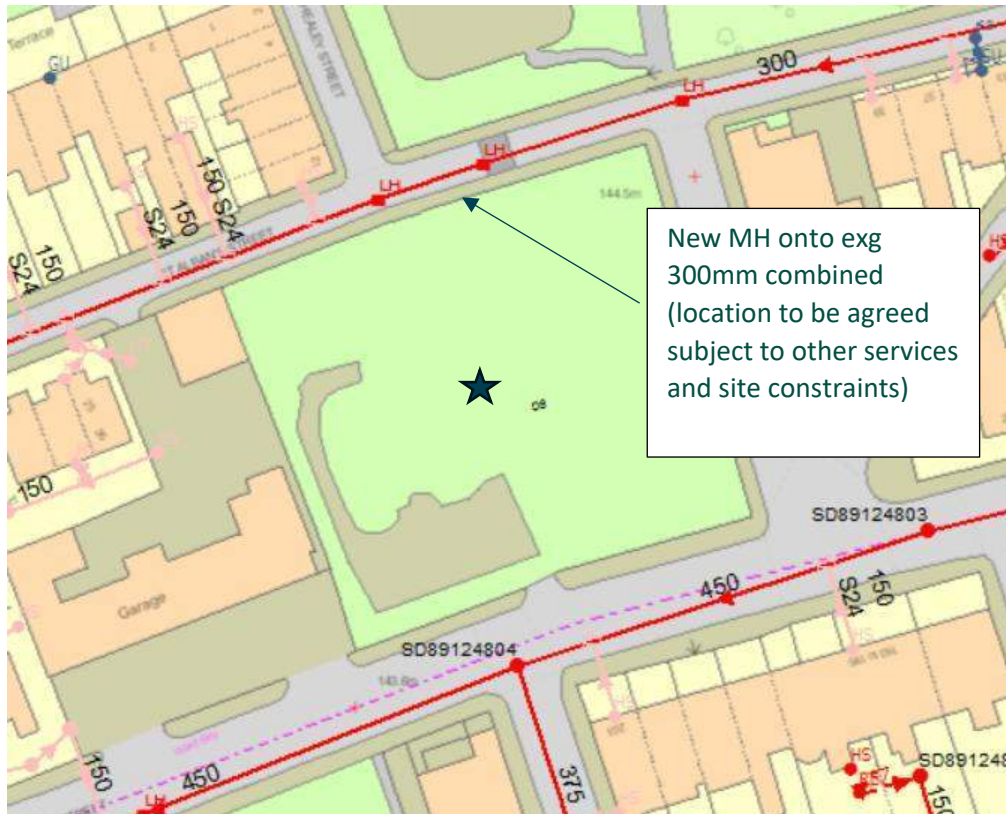
United Utilities will consider a connection from this site will be allowed to drain into the public combined sewer system.

Our preferred point of discharge would be to the 300mm diameter public combined sewer within St Alban's street located North of your proposed development at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities requests that any agreed rate does not exceed 5l/s.

Manhole reference: this would be to the new manhole, we have no objection of, onto the 300mm combined sewer.

[Please see images at the end of this letter for clarification](#)

Site Images



HBL Associates

**Brook House
Weybrook Road,
Stockport,
M19 2QD**

FAO:**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: 11524
Our Ref: UUPS-ORD-708519
Date: 16/02/2026**

Dear Sirs**Location: 11524 - Land of Drake St**

I acknowledge with thanks your request dated 09/02/2026 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.



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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Reho	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad	Reho	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad							
6607	143.32	CO	0	141.46	225	VC	17.46332	VC	0	6607	143.32	CO	0	141.46	225	VC	17.46332	VC	0							
2802	138.98	CO	0	138.83	300	VC	85.3815	VC	1 in 19	2802	138.98	CO	0	138.83	300	VC	85.3815	VC	1 in 19							
5708	144.41	CO	0	141.93	150	VC	5.09902	VC	0	5708	144.41	CO	0	141.93	150	VC	5.09902	VC	0							
6511	0	CO	0	150	VC	18.96952	VC	0	0	6511	0	CO	0	150	VC	18.96952	VC	0								
3706	143.43	CO	0	141.46	300	VC	50.92151	VC	1 in 424	3706	143.43	CO	0	141.46	300	VC	50.92151	VC	1 in 424							
4701	144.41	CO	0	140.52	275	VC	48.38388	VC	1 in 67	4701	144.41	CO	0	140.52	275	VC	48.38388	VC	1 in 67							
5804	144.53	CO	0	141.77	550	BR	8.544003	BR	1 in 122	5804	144.53	CO	0	141.77	550	BR	8.544003	BR	1 in 122							
3801	140.69	CO	0	137.27	360	VC	31.62277	VC	1 in 19	3801	140.69	CO	0	137.27	360	VC	31.62277	VC	1 in 19							
1704	137.17	CO	0	135.5	225	VC	8.544003	VC	1 in 5	1704	137.17	CO	0	135.5	225	VC	8.544003	VC	1 in 5							
3002	128.41	SW	128.8	375	VC	15.20706	VC	0	0	3002	128.41	SW	128.8	375	VC	15.20706	VC	0								
6613	0	CO	0	17	19406	VC	8.246211	VC	1 in 50	6613	0	CO	0	17	19406	VC	8.246211	VC	1 in 50							
1706	137.98	CO	0	132.44	525	VC	13	VC	0	1706	137.98	CO	0	132.44	525	VC	13	VC	0							
5629	144.36	CO	0	140.98	300	VC	13.24892	VC	1 in 81	5629	144.36	CO	0	140.98	300	VC	13.24892	VC	1 in 81							
4604	144.87	CO	0	141.98	225	VC	64.25729	VC	1 in 247	4604	144.87	CO	0	141.98	225	VC	64.25729	VC	1 in 247							
5509	0	CO	0	100	VC	12.96977	VC	0	0	5509	0	CO	0	100	VC	12.96977	VC	0								
5504	0	CO	0	6.819027	225	VC	6.819027	VC	0	5504	0	CO	0	6.819027	225	VC	6.819027	VC	0							
4702	144.32	CO	0	141.88	225	VC	8.544003	VC	0	4702	144.32	CO	0	141.88	225	VC	8.544003	VC	0							
5703	144.49	CO	0	142.86	225	VC	6.324555	VC	0	5703	144.49	CO	0	142.86	225	VC	6.324555	VC	0							
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7714	0	CO	0	151.5715	150	VC	21.57175	VC	0	7714	0	CO	0	151.5715	150	VC	21.57175	VC	0							
6501	0	CO	0	225	VC	8.246211	VC	0	0	6501	0	CO	0	225	VC	8.246211	VC	0								
1609	0	CO	0	150	VC	37.48333	VC	0	0	1609	0	CO	0	150	VC	37.48333	VC	0								
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5608	0	CO	0	136.05	450	VC	32.23342	VC	0	5608	0	CO	0	136.05	450	VC	32.23342	VC	0							
1502	141.09	CO	0	139.72	225	VC	34.36558	VC	1 in 55	1502	141.09	CO	0	139.72	225	VC	34.36558	VC	1 in 55							
1701	141.39	CO	0	139.72	225	VC	47.2639	VC	0	1701	141.39	CO	0	139.72	225	VC	47.2639	VC	0							
5605	0	CO	0	470	VC	16.70305	VC	0	0	5605	0	CO	0	470	VC	16.70305	VC	0								
4711	0	CO	0	150	VC	4.646977	VC	0	0	4711	0	CO	0	150	VC	4.646977	VC	0								
3104	124.84	SW	122	150	VC	11.16334	VC	1 in 559	3104	124.84	SW	122	150	VC	11.16334	VC	1 in 559	3104	124.84	SW	122	150	VC	11.16334	VC	1 in 559
1006	117.45	SW	115.8	150	VC	11.16334	VC	1 in 61	1006	117.45	SW	115.8	150	VC	11.16334	VC	1 in 61	1006	117.45	SW	115.8	150	VC	11.16334	VC	1 in 61
6805	0	CO	0	150	VC	24	VC	0	0	6805	0	CO	0	150	VC	24	VC	0	0							
2707	139.5	CO	0	134.47	450	CO	6.082703	CO	1 in 34	2707	139.5	CO	0	134.47	450	CO	6.082703	CO	1 in 34							
3704	141.4	CO	0	138.9	300	VC	12.36932	VC	1 in 30	3704	141.4	CO	0	138.9	300	VC	12.36932	VC	1 in 30							
6702	144.8	CO	0	141.3	225	VC	5.09902	VC	0	6702	144.8	CO	0	141.3	225	VC	5.09902	VC	0							
3701	141.93	CO	0	137.49	525	VC	60.01244	VC	1 in 32	3701	141.93	CO	0	137.49	525	VC	60.01244	VC	1 in 32							
6508	141.98	CO	0	131.89	225	VC	31.62278	VC	1 in 47	6508	141.98	CO	0	131.89	225	VC	31.62278	VC	1 in 47							
3105	125	SW	117.73	1200	CO	39.69867	CO	1 in 120	3105	125	SW	117.73	1200	CO	39.69867	CO	1 in 120	3105	125	SW	117.73	1200	CO	39.69867	CO	1 in 120
2703	140.33	CO	0	138.16	300	CO	4.24284	CO	0	2703	140.33	CO	0	138.16	300	CO	4.24284	CO	0							
5503	0	CO	0	15	51339	BR	15.81339	BR	0	5503	0	CO	0	15	51339	BR	15.81339	BR	0							
6716	0	CO	0	100	VC	6.56384	VC	0	0	6716	0	CO	0	100	VC	6.56384	VC	0	0							
6819	0	CO	0	100	VC	17.54915	VC	0	0	6819	0	CO	0	100	VC	17.54915	VC	0	0							
1606	140.65	CO	0	134.51	450	CO	40.33901	CO	1 in 50	1606	140.65	CO	0	134.51	450	CO	40.33901	CO	1 in 50							
2001	127.96	SW	124.16	300	VC	63.15001	VC	1 in 516	2001	127.96	SW	124.16	300	VC	63.15001	VC	1 in 516	2001	127.96	SW	124.16	300	VC	63.15001	VC	1 in 516
2902	130.87	CO	0	126.82	600	BR	68.7771	BR	0	2902	130.87	CO	0	126.82	600	BR	68.7771	BR	0							
6612	144.72	CO	0	140.62	225	VC	35.86786	VC	0	6612	144.72	CO	0	140.62	225	VC	35.86786	VC	0							
6016	0	CO	0	141.97	225	VC	41.79123	VC	0	6016	0	CO	0	141.97	225	VC	41.79123	VC	0							
1604	139.75	CO	0	136.98	150	VC	4.123106	VC	1 in 23	1604	139.75	CO	0	136.98	150	VC	4.123106	VC	1 in 23							
5702	0	CO	0	480	VC	10.77033	VC	0	0	5702	0	CO	0	480	VC	10.77033	VC	0	0							
6610	0	CO	0	24	21094	BR	24.21094	BR	0	6610	0	CO	0	24	21094	BR	24.21094	BR	0							
6802	144.9	CO	0	142.09	225	VC	49.64877	VC	1 in 94	6802	144.9	CO	0	142.09	225	VC	49.64877	VC	1 in 94							
8606	0	CO	0	51	52302	VC	51.52302	VC	0	8606	0	CO	0	51	52302	VC	51.52302	VC	0							
2101	121.84	CO	0	115.2	300	VC	6.082703	VC	0	2101	121.84	CO	0	115.2	300	VC	6.082703	VC	0							
3101	126	SW	124.9	225	VC	21.47091	VC	0	3101	126	SW	124.9	225	VC	21.47091	VC	0	3101	126	SW	124.9	225	VC	21.47091	VC	0
6504	142.99	CO	0	140.66	225	VC	22.80301	VC	1 in 85	6504	142.99	CO	0	140.66	225	VC	22.80301	VC	1 in 85							
5903	144.07	CO	0	140.71	450	VC	19.64688	VC	1 in 98	5903	144.07	CO	0	140.71	450	VC	19.64688	VC	1 in 98							
7914	0	CO	0	9	330004	VC	9.330004	VC	0	7914	0	CO	0	9	330004	VC	9.330004	VC	0							
5504	143.23	CO	0	138.73	530	VC	16.76305	VC	0	5504	143.23	CO	0	138.73	530	VC	16.76305	VC	0							
3707	143.44	CO	0	141.47	300	VC	6.324555	VC	0	3707	143.44	CO	0	141.47	300	VC	6.324555	VC	0							
4501	144.84	SW	141.51	300	VC	60.08327	VC	1 in 46	4501	144.84	SW	141.51	300	VC	60.08327	VC	1 in 46	4501	144.84	SW	141.51	300	VC	60.08327	VC	1 in 46
3708	137.26	CO	0	132.13	525	VC	35.1141	VC	1 in 48	3708	137.26	CO	0	132.13	525	VC	35.1141	VC	1 in 48							
7004	143.88	CO	0	141.57	225	VC	15.13907	VC	1 in 65	7004	143.88	CO	0	141.57	225	VC	15.13907	VC	1 in 65							
4622	144.94	CO	0	143.6	225	VC	5.09902	VC	0	4622	144.94	CO	0	143.6	225	VC	5.09902	VC	0							
5627	0	CO	0	225	VC	26.35423	VC	0	0	5627	0	CO	0	225	VC	26.35423	VC	0	0							
6824	0	CO	0	150	VC	17.85663	VC	0	0	6824	0	CO	0	150	VC	17.85663	VC	0	0							
1708	138.97	CO	0	137.73	150	VC	21.42268	VC	1 in 18	1708	138.97	CO	0	137.73	150	VC	21.42268	VC	1 in 18							
7520	0	CO	0	1																						

D.3 Lead Local Flood Authority Consultation

Highways and Engineering Service – Economy and Environment

DRAINAGE CONSULTATION ON APPLICATION – PRE/2026/0164 – VACANT LAND NORTH OF DRAKE STREET, ROCHDALE, OL16 1PJ

LLFA Consultation Response on behalf of Head of Highways and Engineering

Date of Response: 30th March 2026

LOCATION & PROPOSED DEVELOPMENT

Vacant land north of Drake Street, Rochdale, OL16 1PJ

Residential development comprising of 26 dwellings (one apartment building and a terrace of 4 family houses with associated external works, access, refuse and cycle store.

DOCUMENTS REVIEWED

- Site Location Plan
- Proposed Plans and Elevations
- Pre-application Statement
- EA Flood Maps for Planning
- UU Safe Dig Map

DRAINAGE & FLOOD OFFICER COMMENTS

1. No drainage plan or information has been provided. The site lies entirely in Flood Zone 1 and isn't threatened by any other sources of flooding e.g. surface water, reservoir. However, any subsequent application (Full or Outline) must be supported by a detailed drainage plan. Additionally, an application for a development of this scale must also provide a Sustainable Drainage Assessment.
2. The aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable: The ordered drainage techniques to be assessed with the aim to reduce or omit lower techniques:
 - Control at Source (Infiltration / Recycling)
 - On Site Treatment (Basins, Swales, Rain gardens, Tree pits)
 - Local Treatment (Adoptable Ponds, Basins, Swales etc)
 - Regional Treatment (ditto usually to a larger scale)
 - Discharge to Watercourses / Bodies
 - Discharge to SW Sewers
 - Discharge to Combined Sewers
3. Any drainage plan should include an assessment of infiltration potential conducted with site-specific BRE365 testing. It is noted that there are no watercourse or SW sewers in proximity to the site. Therefore, if infiltration is found not to be feasible then proposals should include for recycling rainwater for all weather usage (eg WC flushing).

4. The Pre-Application Statement cites the layout provides 'amenity', this specifically would be further enhanced, simultaneous with water quality and flood risk, through the implementation of SuDS features within its drainage e.g. ponds, rain gardens, etc.
5. Initial site layouts indicate landscaped green spaces with opportunity for source control implementation. In addition a proportion of the site seems to be paved, which may be appropriate to incorporate for permeable paving.
6. Rainwater harvesting and water reuse should be investigated particularly for large residential developments of this type.
7. For any drainage design, calculations should be provided showing the proposal's drainage system to be feasible for a 1-in-100-year storm event + 45% climate change allowance, appropriate for the 'Irwell Management' Catchment area.
8. For general guidance on planning application requirements, please refer to the 'Validation of Planning Applications – Local List' (September 2020). This document outlines the required form and content of supporting information to accompany planning submissions.

DRAINAGE & FLOOD OFFICER SUMMARY:

- I. No drainage proposals or information has been provided and is required in a submission.
- II. Any subsequent application submission (Full or Outline) will require a Drainage Strategy which also incorporates a Sustainable Drainage Assessment.
- III. Rainwater harvesting / recycling may be required.

Consultation by Keith Mealey

Drainage & Flooding Officer

 keith.mealey@rochdale.gov.uk

Edyta Savage

From: Edyta Savage
Sent: 22 May 2026 10:05
To: Keith Mealey (Keith.Mealey@Rochdale.Gov.UK)
Cc: Ryan Jones
Subject: 11524 - PRE/2026/0164 - Drake Street, Rochdale – LLFA Pre-Application Drainage Follow-Up [Filed 28 May 2026 12:02]
Attachments: 11524-HBL-XX-XX-DR-C-5100_P02_EXISTING CONTRIBUTING AREAS PLAN.pdf; 11524-HBL-XX-XX-DR-C-5102_P03_PROPOSED CONTRIBUTING AREAS PLAN.pdf; 11524-HBL-XX-XX-DR-C-5103_P03_PROPOSED DRAINAGE STRATEGY PLAN.pdf; 11524-HBL-XX-XX-RP-C-5000_P01_PRELIMINARY APPRAISAL SUMMARY.pdf; 08992657 Pre Development response 04.03.26.pdf; LLFA CONSULTATION 30.03.2026.pdf; 11524-HBL-XX-XX-DR-C-5105_P03_PROPOSED EXTERNAL LEVELS.pdf
Categories: Filed by Mail Manager

Dear Keith,

PRE/2026/0164 - Drake Street, Rochdale – LLFA Pre-Application Drainage Follow-Up

Further to your LLFA pre-application consultation response dated 30 March 2026 for the proposed residential development on vacant land north of Drake Street, we have now progressed the drainage strategy based on the agreed site layout.

Please find attached the following documents for your review:

- Proposed Drainage Strategy Plan – Draft
- Site Drainage Appraisal
- Existing Contributing Areas Plan
- Proposed Contributing Areas Plan
- United Utilities Pre-Development Enquiry response

By way of summary, the emerging drainage strategy is based on the following principles:

1. the site is located within Flood Zone 1;
2. infiltration has been discounted due to ground conditions, contamination risk and groundwater constraints, as supported by the Phase 2 SI and BRE365 testing;
3. no suitable nearby watercourse or surface water sewer outfall has been identified;
4. United Utilities has accepted, in principle, a restricted surface water discharge to the existing combined sewer network within St Alban's Street, at a rate not exceeding 5.0 l/s;
5. a new adoptable chamber, CW02, is proposed on the existing United Utilities 300 mm diameter combined sewer within St Alban's Street, replacing the existing lamp hole;
6. attenuation storage is proposed, currently estimated at approximately 125 m³;
7. SuDS measures are proposed where practicable, including permeable surfacing and lined rain gardens / bioretention areas with underdrains, coordinated with the levels strategy; and#

8. rainwater reuse has been considered, with water butts proposed for the individual dwellings. A communal non-potable reuse system for the apartment block has also been reviewed, but is not currently considered proportionate or reasonably practicable due to management, maintenance, plant space and long-term operational responsibility considerations associated with the affordable residential use.

The proposed contributing areas plan identifies a total site area of approximately 0.335 ha, with approximately 0.217 ha of impermeable area to be positively drained, including a 10% urban creep allowance applied to the dwelling roof areas.

We would be grateful if you could review the enclosed information and provide any comments at your earliest convenience.

In particular, we would welcome confirmation that the proposed drainage principles, 5.0 l/s restricted discharge rate, SuDS measures and attenuation approach are broadly acceptable to the LLFA at this stage, subject to the detailed drainage design and hydraulic calculations being submitted with the planning application.

Should you require any further information, please do not hesitate to contact me.

Kind regards,



Edyta Savage

Engineering Technician



Craig House, 33 Ballbrook Avenue, Didsbury, Manchester M20 3JG



Edyta.Savage@hbl.ltd



T: 0161 432 9977



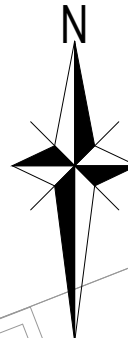
www.hbl.ltd



**CHARITY 5-A-SIDE
FOOTBALL TOURNAMENT**

⌚ When? Friday 19th June, 1-5pm
📍 Where? Manchester Central PowerLeague
💷 Min. £300 donation per team
👉 Every penny goes to the Francis House Children's Hospice
✉ To enter a team, please email HBLcharity@hbl.ltd

APPENDIX E – PROPOSED DRAINAGE STRATEGY DRAWINGS



CONTRIBUTING AREAS COMPARISON		
	SQ M	HA
SITE AREA	3345	0.335
EXISTING IMPERMEABLE AREAS	360	0.036
EXISTING PIMP %	11%	
EXISTING LANDSCAPED / GRAVEL AREAS	2985	0.299
PROPOSED IMPERMEABLE AREAS POSITIVELY DRAINED	2145	0.215
PROPOSED PIMP %	64%	
PROPOSED LANDSCAPED AREAS	1200	0.120

WATER HARVESTING	WATER BUTTS TO DWELLINGS ARE PROPOSED AS PART OF THE STRATEGY.
IN TO THE GROUND - INFILTRATION	NOT FEASIBLE DUE TO GROUND CONDITIONS (CONTAMINATION, GROUNDWATER) REFER TO PHASE 2 SI AND BRE 365 INFILTRATION TEST.
TO A SURFACE WATER BODY	NOT FEASIBLE – NO SUITABLE SURFACE WATER BODY NEARBY.
TO A SURFACE WATER SEWER, HIGHWAY DRAIN, OR ANOTHER SURFACE WATER DRAINAGE SYSTEM;	NOT FEASIBLE – NO PUBLIC SURFACE WATER SEWERS OR SUITABLE ALTERNATIVE DRAINAGE SYSTEMS NEARBY.
TO A COMBINED SEWER	DISCHARGE PROPOSED TO THE EXISTING COMBINED PUBLIC SEWER IN ST. ALBAN'S STREET

DISCHARGE RATE COMPARISON				
	QBAR	Q1 L/S	Q30 L/S	Q100 L/S
FEH22 GREENFIELD RUNOFF RATE	0.9	0.8	1.5	1.8
Q (l/s) BROWNFIELD - MODIFIED RATIONAL METHOD (11% P1MP)		2.0	8.3	10.8
Q (l/s) BROWNFIELD WITH 50% BETTERMENT		1.0	4.2	5.3
MAXIMUM PROPOSED DISCHARGE RATE AGREED WITH UNITED UTILITIES VIA PRE-DEVELOPMENT ENQUIRY UO REFERENCE NUMBER: 08992657				5.0

	ATTENUATION VOLUME V (m³) Contributing area = 0.217 ha Discharge rate = 50 l/s
2YR (100% AEP)	13m³ < V< 30m³
30YR (3.3% AEP)	52m³ < V< 84m³
100YR+CC (1% AEP)	120m³ < V< 201m³

- | | |
|--|---|
| | <p>SITE BOUNDARY - 3345m² (0.335ha)</p> <p>ROOF AREAS (APARTMENT BLOCK) - 709m² (0.071ha)</p> <p>ROOF AREA (HOUSES) - 223m² (0.023ha)</p> <p>ROOF AREA (HOUSES) WITH 10% URBAN CREEP- 245.3m² (0.0245ha)</p> <p>BIN STORE AREA ROOF - 33m² (0.0033ha)</p> <p>HARDSTANDINGS - 1180m² (0.118ha)</p> |
| | <p>TOTAL IMPERMEABLE AREAS - 2145m² (0.215)</p> <p>PROPOSED PERCENTAGE OF IMPERMEABLE AREA (PIMP) 64%</p> |
| | <p>TOTAL PROPOSED CONTRIBUTING AREAS TO BE POSITIVELY DRAINED INCLUDING 10% URBAN CREEP (HOUSES) - 2167.3m² (0.217ha)</p> |
| | <p>GREENFIELD/LANDSCAPED AREA - 1200m² (0.120ha)</p> |
| | <p>EXISTING COMBINED WATER PUBLIC SEWER</p> |
| | <p>EXISTING COMBINED WATER ACCESS CHAMBER</p> |
| | <p>EXISTING COMBINED WATER LAMP HOLE</p> |
| | <p>PROPOSED SURFACE WATER</p> |
| | <p>PROPOSED FLOW CONTROL CHAMBER</p> |
| | <p>PROPOSED FOUL WATER</p> |
| | <p>PROPOSED COMBINED WATER</p> |
| | <p>PROPOSED RAIN WATER PIPE</p> |
| | <p>PROPOSED SOIL PIPE/SOIL VENT PIPE</p> |
| | <p>PROPOSED RODDING EYE</p> |
| | <p>PROPOSED SURFACE WATER GULLY</p> |
| | <p>PROPOSED FOUL WATER GULLY</p> |
| | <p>DRAINAGE CHANNEL - PEDESTRIAN AREAS</p> |
| | <p>DRAINAGE CHANNEL - VEHICULAR AREAS</p> |
| | <p>PROPOSED PERMEABLE SURFACES</p> |
| | <p>MINIMUM 300 mm SUB-BASE STORAGE LAYER WITH 30% VOID RATIO
SUBJECT TO CBR TESTING AT FORMATION LEVEL</p> |
| | <p>PROPOSED SURFACE WATER ATTENUATION
STORAGE STRUCTURE (95% VOID RATIO) INSTALLED IN STRICT ACCORDANCE
WITH MANUFACTURER'S DESIGN AND INSTRUCTIONS.</p> |
| | <p>PERMEABLE SURFACE SUB-BASE DIFFUSER UNIT</p> |
| | <p>BIORETENTION AREAS WITH FLUSH OR DROP-INLET KERB
CONTINGEMENT ARRANGEMENT HYDROPLANTER FLEX OR SIMILAR
APPROVED WITH INSPECTION CHAMBER AND OVERFLOW</p> |
| | <p>WATER BUTT WITH SUDS PLANTER</p> |
| | <p>PROPOSED FFL LEVELS</p> |

PRELIMINARY SCHEME
FOR COMMENT AND REVIEW ONLY.
DESIGN IS BASED UPON INFORMATION AVAILABLE AT THE TIME.
DESIGN IS SUBJECT TO FULL REVIEW AS ADDITIONAL INFORMATION BECOMES AVAILABLE.
DESIGN IS SUBJECT TO FULL REVIEW UPON RECEIPT OF COMMENTS FROM/:

- DEVELOPMENT CONTROL
- LA PLANNING AUTHORITY
- ENVIRONMENT AGENCY
- LA HIGHWAYS DEPARTMENT
- SEWERAGE UNDERTAKER

SOURCE INFORMATION USED:

1. TOPOGRAPHICAL SURVEY
 - 1.1. Malcolm Hughes 62032/1 August 2024.
2. SEWER RECORDS
 - 2.1. UUPS-ORD-708519 (16-02-26)
 - 2.2. Partial CCTV survey provided by client WRC WINCAN 23.04.2026
3. LAYOUT INFORMATION
 - 3.1. 19146-PJA-00-ZZ-DRA-A-1200-K- Proposed Site Plan

PLANNING DRAWING - NOT FOR CONSTRUCTION

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH
ALL OTHER HBL DRAWINGS ISSUED FOR THIS PROJECT

1. ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS IN METERS UNLESS OTHERWISE SPECIFIED.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELATED DRAWINGS AND SPECIFICATIONS.
3. THE DRAINAGE CONTRACTOR IS RESPONSIBLE TO MAKING AN APPLICATION TO ANY SEWERAGE UNDERTAKER PRIOR TO CONSTRUCTION OF ANY CONNECTION INTO A PUBLIC MANHOLE.
4. THE ENGINEER IS TO BE NOTIFIED OF ANY DISCREPANCIES TO THE DETAILS SHOWN ON THE DRAINAGE AND ANY UNRECORDED CONNECTIONS NOT SHOWN ON THE DRAWINGS.
5. THE CONTRACTOR IS RESPONSIBLE FOR CHECKING DIMENSIONS AND LEVELS AND FOR CONFIRMING THE GIVEN LEVELS OF OUTFALL INTO PUBLIC SEWER, WATERCOURSE OR OTHER OUTFALL PRIOR TO CONSTRUCTION WORKS COMMENCING.
6. UNTIL TECHNICAL APPROVAL HAS BEEN OBTAINED FROM THE RELEVANT AUTHORITIES ALL DRAWINGS ISSUED AS PRELIMINARY ARE TO BE USED FOR MOTIVATION PURPOSES. THE CONTRACTOR COMMENCE WORK PRIOR TO APPROVAL BEING GIVEN. IT IS ENTIRELY AT THEIR OWN RISK.
7. TO PROTECT THE DRAINAGE SYSTEM FROM CONSTRUCTION SITE DERBIES, THE CONTRACTOR SHALL ENSURE THAT STOPPERS ARE SECURELY PLACED IN ALL CONNECTIONS IMMEDIATELY UPSTREAM OF THE STOPPER. ONLY TO BE REMOVED ONCE THE FINAL CLEANING OF THE DRAINS/ DRAINAGE HAS BEEN COMPLETED.
8. THE DESIGN IS BASED ON THE INFORMATION AVAILABLE ON THE DATE OF ISSUE FROM OTHER PARTIES (E.G ARCHITECT AND M&E ENGINEER). IT IS SUBJECT TO CHANGE RESULTING FROM UPDATES TO THE AVAILABLE INFORMATION FROM OTHERS.
9. NEW DRAINS AND SEWERS TO BE AS FOLLOWS:
- 9.1. CONSTRUCTION AND MATERIALS OF PRIVATE SURFACE, FOUL & COMBINED WATER SEWAGE SYSTEMS TO BE IN ACCORDANCE WITH BUILDING REGULATIONS - APPROVED DOCUMENT H1 & BS EN 752-2017 DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS"
- 9.2. CONSTRUCTION AND MATERIALS OF PUBLIC SURFACE, FOUL & COMBINED WATER SEWERS TO BE IN ACCORDANCE WITH DESIGN & CONSTRUCTION GUIDANCE, SEWERAGE SECTOR GUIDANCE APPENDIX C AND IN ACCORDANCE WITH LOCAL SEWERAGE UNDERTAKER
- 9.3.1. MINIMUM PIPE SIZE FOR ACCEPTABLE FLOW: DRAINAGE IS 150mm DN
- 9.3.2. 150mm DN AT MIN 1:100 FOR 10 DWELLINGS OR LESS
- 9.3.3. 150mm DN AT MIN 1:150 FOR GREATER THAN 10 DWELLINGS
- 9.3.4. MINIMUM PIPE SIZE FOR ACCEPTABLE FLOW: DRAINAGE IS 100mm DN
- 9.4. 100mm DN 1:40 WHERE TO DWELLINGS OR LESS AND NO WC
- 9.4.2. 100mm DN 1:80 WHERE GREATER THAN 10 DWELLINGS AND AT LEAST 1 WC
- 9.4.3. ALL ROAD GULLY FLOWWORK SPURS TO BE 150mm UNLESS OTHERWISE SPECIFIED
10. LOAD CLASS SPECIFICATION TO COMPLY WITH BS EN 124
- 10.1. LOAD CLASS B15 - AREAS INACCESSIBLE TO MOTOR VEHICLES
- 10.2. LOAD CLASS B125 - FOOTWAYS, PEDESTRIAN AREAS ETC.
- 10.3. LOAD CLASS D250 - GULLY TOPS IN KERBSIDE CHANNELS OF ROADS
- 10.4. LOAD CLASS D400 - CARRIAGES OF HEAVY DUTY
- 10.5. LOAD CLASS E500 - AREAS IMPOSING HIGH WHEEL LOADS
- 10.6. LOAD CLASS F900 - AREAS IMPOSING PARTICULARLY HIGH WHEEL LOADS
11. ALL FOUL DRAINS BENEATH BUILDINGS AND FROM SOIL VENT PIPES, GULLIES AND WC CONNECTIONS BE 100mm DN AT A GRADIENT NOT LESS THAN OF 1:40.
12. ALL FOUL CONNECTIONS TO BE FULLY TRAPPED AND EACH FOUL CONNECTION TO A BRANCH DRAIN TO HAVE FULL RIDDING ACCESS (E.G. LOW LEVEL RIDDING ACCESS).
13. RAINWATER DOWN PIPES ARE TO CONNECT TO A DRAIN VIA A REST BEND.
14. WHERE DRAINAGE IS COMBINED A "P" TRAP MUST BE PROVIDED ABOVE PROPOSED FLOOR SLAB LEVEL.
15. MINIMUM DEPTH OF COVER TO THE COVER OF GRAVITY PIPES WITHOUT PROTECTION SHOULD BE AS FOLLOWS (IN ACCORDANCE WITH DESIGN & CONSTRUCTION GUIDANCE, SEWERAGE SECTOR GUIDANCE APPENDIX C)
- 15.1. 350mm - DOMESTIC DRIVEWAYS, PARKING AREAS AND YARDS WITH HIGH RESTRICTIONS TO TRAFFIC
- 15.2. 600mm - DOMESTIC DRIVEWAYS, PARKING AREAS AND YARDS WITH HIGH RESTRICTIONS TO TRAFFIC
- 15.3. 900mm - DOMESTIC DRIVEWAYS, PARKING AREAS AND NARROW STREETS WITH LIMITED ACCESS FOR VEHICLES WITH A GROSS WEIGHT IN EXCESS OF 7.5 TONNES
- 15.4. 1200mm - HIGHWAYS AND PARKING AREAS WITH UNRESTRICTED ACCESS TO VEHICLE WITH A GROSS WEIGHT IN EXCESS OF 7.5 TONNES
- 15.5. 1200mm - HIGHWAYS AND PARKING AREAS WITH UNRESTRICTED ACCESS TO VEHICLE WITH A GROSS WEIGHT IN EXCESS OF 7.5 TONNES
16. BACKFILL TO DRAINAGE TRENCHES UNDER CARRIAGeways TO BE TYPE 1 SUB-BASE MATERIAL. SUBSEQUENT BACKFILL TO BE TYPE 3 OR BETTER CONSTRUCTION GUIDANCE, SEWERAGE SECTOR GUIDANCE APPENDIX C. FREE FROM RUBBISH, ORGANIC MATTER, FROZEN SOIL, CLAY LUMPS AND LARGE STONES. TO BE COMPLETED IN LAYERS NOT EXCEEDING 250mm THICK.
17. A FLEXIBLE JOINT SHALL BE PROVIDED AS CLOSE AS IS FEASIBLE TO THE OUTSIDE FACE OF ANY STRUCTURE INTO WHICH A PIPE IS BUILT. COMPATIBLE WITH THE SATISFACTORY COMPLETION AND SUBSEQUENT MOVEMENTS OF THE PIPE. THE LENGTH OF THE NEXT PIPE (ROCKER PIPE) IS TO BE IN ACCORDANCE WITH THE TABLE BELOW
- 17.1. 150-600mm DN - 600mm LONG ROCKER PIPE
- 17.2. 601-750mm DN - 1000mm LONG ROCKER PIPE
- 17.3. 751mm DN AND ABOVE - 1250mm LONG ROCKER PIPE
18. PIPE CROSSEOVERS TO HAVE MINIMUM OF 300mm CLEARANCE BETWEEN OUTSIDE TOP OF THE LOWER PIPE AND OUTSIDE BOTTOM OF THE UPPER PIPE. WHERE THIS CANNOT BE ACHIEVED A SEPARATION, COMBINED SURROUNDING FOUNDATIONS AND FITTED WITH ROCKER PIPE. FOUNDATIONS ADJACENT TO THE CROSSING POINT, THE EXTENT OF THE CONCRETE SHOULD BE WITHIN 150mm OF A FLEXIBLE PIPE JOINT. THE CONCRETE SPECIFICATION SHOULD BE IN ACCORDANCE WITH THE STANDARD DETAILS FOR PIPE BED AND SURROUND AS ISSUED BY THE ENGINEER.
19. CONCRETE MIXES INDICATED ON THIS DRAWING ARE DESIGNATED MIXES CONFORMING TO BS 8001. ALL CONCRETE TO BE CAST TO THE SATISFACTORY COMPLETION AND ALLOWANCE FOR CARRYING OUT TESTINGS ON SITE TO CONFIRM SULPHATE LEVEL CLASSIFICATION.
20. ALL PRIVATE MANHOLES AND INSPECTION CHAMBERS TO BE CONSTRUCTED IN ACCORDANCE WITH "BUILDING REGULATIONS - APPROVED DOCUMENT H & BS EN 752-2017 DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS"
21. ALL MANHOLES AND INSPECTION CHAMBERS TO BE ADOPTED TO BE CONSTRUCTED IN ACCORDANCE WITH "IN ACCORDANCE WITH DESIGN & CONSTRUCTION GUIDANCE, SEWERAGE SECTOR GUIDANCE APPENDIX C AND IN ACCORDANCE WITH LOCAL SEWERAGE UNDERTAKER.
22. CCTV SURVEY OF ALL THE DRAINAGE SHOULD BE CARRIED OUT ON COMPLETION OF THE BUILDING WORKS AND PASSED ON TO THE CLIENT.
23. ANY EXISTING DRAINAGE INFRASTRUCTURE TO BE RETAINED TO HAVE FULL COVERS AND FRAMES TO SUIT NEW LEVELS AND SURFACING.
24. WHERE DRAINAGE RUNS PASS BELOW FOUNDATIONS, PIPES TO BE ENCASED IN MIN 100mm COMPRESSIBLE SURROUND AND FOUNDATIONS WRAPPED IN 100mm COMPRESSIBLE MATERIAL (TOP & SIDES). PIPE SLEEVED THROUGH FOUNDATIONS AND FITTED WITH ROCKER PIPE. FOUNDATIONS ADJACENT TO THE CROSSING POINT TO BE DEEPER THAN THE DRAINAGE PIPE TO AVOID SURCHARGE LOADING.
25. WHERE DRAINAGE RUNS PASS ABOVE FOUNDATIONS, PROVIDE 65mm DEEP PRE-STRESSED CONCRETE LINTELS E.G. "NAYLOR" REF P100

PLEASE NOTE HBL ASSOCIATES ARE USING NEW AND UPDATED
TITLE BOX TEMPLATES. THEREFORE, PRESENTATION MAY DIFFER BETWEEN
TECHNICAL DRAWINGS.

P06	05.06.2026	ES	PLANNING ISSUE (HYDRAULIC MODEL P04)	MS	MS
P05	29.05.2026	ES	PLANNING ISSUE (HYDRAULIC MODEL P03)	MS	MS
P04	22.05.2026	ES	RAINWATER HARVESTING TANK POSITION INDICATED	ES	RJ
P03	21.05.2026	ES	PRE-PLANNING ISSUE (SITE PLAN 1200..J)	ES	RJ
P02	14.05.2026	ES	REVISED TO UPDATED SITE PLAN (1200..G)	ES	RJ
P01	20.02.2026	SP	FIRST ISSUE - FOR COMMENTS	ES	RJ
REV.	DATE	DRAWN	DESCRIPTION	CHKD	APPR

FOR INFORMATION

S2



PROJECT

LAND ON DRAKE STREET
ROCHDALE

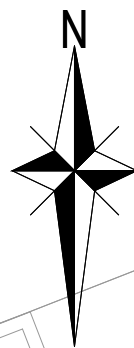
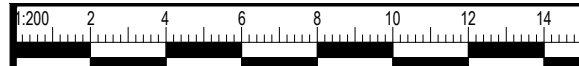
PROPOSED DRAINAGE STRATEGY PLAN

GREAT PLACES HOUSING GROUP

HBL REF. 11524	DATE 16.02.26	SCALE(S) 1:200	A1
DRAWN ES	CHECKED MS	APPROVED MS	

11524-HBL-XX-XX-DR-C-5103

P06



KEY

- SITE BOUNDARY - 3345m² (0.335ha)
- ROOF AREAS (APARTMENT BLOCK) - 709m² (0.071ha)
- ROOF AREA (HOUSES) - 223m² (0.0223ha)
- ROOF AREA (HOUSES) WITH 10% URBAN CREEP- 245.3m² (0.02453ha)
- BIN STORE AREA ROOF - 33m² (0.0033ha)
- HARDSTANDINGS - 1180m² (0.118ha)
- TOTAL IMPERMEABLE AREAS - 2145m² (0.215)
- PROPOSED PERCENTAGE OF IMPERMEABLE AREA (PIMP) 64%
- TOTAL PROPOSED CONTRIBUTING AREAS TO BE POSITIVELY DRAINED INCLUDING 10% URBAN CREEP (HOUSES) - 2167.3m² (0.217ha)
- GREENFIELD/LANDSCAPED AREA - 1200m² (0.120ha)
- EXISTING COMBINED WATER PUBLIC SEWER
- EXISTING COMBINED WATER ACCESS CHAMBER
- EXISTING COMBINED WATER LAMP HOLE
- PROPOSED SURFACE WATER
- PROPOSED FLOOD CONTROL CHAMBER
- PROPOSED COMBINED WATER
- PROPOSED RAIN WATER PIPE
- PROPOSED RODDING EYE
- PROPOSED SURFACE WATER GULLY
- DRAINAGE CHANNEL - PEDESTRIAN AREAS
- DRAINAGE CHANNEL - VEHICULAR AREAS
- PROPOSED PERMEABLE SURFACES
MINIMUM 300 mm SUB-BASE STORAGE LAYER WITH 30% VOID RATIO
SUBJECT TO CBR TESTING AT FORMATION LEVEL
- PROPOSED SURFACE WATER ATTENUATION
STORAGE STRUCTURE (95% VOID RATIO) INSTALLED IN STRICT ACCORDANCE
WITH MANUFACTURER'S DESIGN AND INSTRUCTIONS.
- PERMEABLE SURFACE SUB-BASE DIFFUSER UNIT
- BIORETENTION AREAS - FLUSH OR DROP/INLET KERB
RAIN GARDENS - SCHEMATIC ARRANGEMENT HYDROPLANTER FLEX
OR SIMILAR APPROVED WITH INSPECTION CHAMBER AND OVERFLOW
- RAINWATER HARVESTING - WATER BUTT
- PROPOSED FFL LEVELS
- INDICATIVE SURFACE FALL
- FLOOD EXCEEDANCE ROUTING
ROUTING SHOULD ONLY OCCUR WHEN RAINFALL EVENTS EXCEEDING THE DESIGN PARAMETERS
OR SHOULD THE SWS NETWORK CRITICALLY FAIL
THE SWS NETWORK IS DESIGNED TO ACCOMMODATE ALL FLOWS WITH NO FLOODING UP TO
100YR +45% CLIMATE CHANGE ALLOWANCE.

PRELIMINARY SCHEME
FOR COMMENT AND REVIEW ONLY.
DESIGN IS BASED UPON INFORMATION AVAILABLE AT THE TIME.
DESIGN IS SUBJECT TO FULL REVIEW AS ADDITIONAL INFORMATION BECOMES AVAILABLE.
DESIGN IS SUBJECT TO FULL REVIEW UPON RECEIPT OF COMMENTS FROM/:

- DEVELOPMENT CONTROL
- LA PLANNING AUTHORITY
- ENVIRONMENT AGENCY
- LA HIGHWAYS DEPARTMENT
- SEWERAGE UNDERTAKER

SOURCE INFORMATION USED:

- TOPOGRAPHICAL SURVEY
 - 1.1. Malcolm Hughes 62032/1 August 2024.
- SEWER RECORDS
 - 2.1. UUPS-ORD-708519 (16-02-26)
 - 2.2. Partial CCTV survey provided by client WRC WINCAN 23.04.2026
- LAYOUT INFORMATION
 - 3.1. 19146-PJA-00-ZZ-DR-A-1200-K - Proposed Site Plan

PLANNING DRAWING - NOT FOR CONSTRUCTION

NOTES

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER HBL DRAWINGS ISSUED FOR THIS PROJECT
- ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS IN METERS UNLESS OTHERWISE SPECIFIED.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELATED DRAWINGS AND SPECIFICATIONS.
- THE DRAINAGE CONTRACTOR IS RESPONSIBLE TO MAKING AN APPLICATION TO ANY SEWERAGE UNDERTAKER PRIOR TO CONSTRUCTION OF ANY CONNECTION INTO A PUBLIC MANHOLE.
- THE ENGINEER IS TO BE NOTIFIED OF ANY DISCREPANCIES TO THE DETAILS SHOWN ON THE DRAINAGE AND ANY UNRECORDED CONNECTIONS NOT SHOWN ON THE DRAWINGS.
- THE CONTRACTOR IS RESPONSIBLE FOR CHECKING DIMENSIONS AND LEVELS AND FOR CONFIRMING THE GIVEN LEVEL OF OUTFALL INTO PUBLIC SEWER, WATERCOURSE OR OTHER OUTFALL PRIOR TO CONSTRUCTION WORKS COMMENCING.
- UNTIL TECHNICAL APPROVAL HAS BEEN OBTAINED FROM THE RELEVANT AUTHORITIES ALL DRAWINGS ISSUED ARE AS PRELIMINARY AND NOT FOR CONSTRUCTION. SHOULD THE CONTRACTOR COMMENCE SITE WORK PRIOR TO APPROVAL BEING GIVEN, IT IS ENTIRELY AT THEIR OWN RISK.
- TO PROTECT THE DRAINAGE SYSTEM FROM CONSTRUCTION SITE DERIVIES, THE CONTRACTOR SHALL ENSURE THAT STOPPERS ARE SECURELY PLACED IN ALL CONNECTIONS IMMEDIATELY UPSTREAM OF THE TANK, ONLY TO BE REMOVED ONCE THE FINAL CLEANING OF THE ROADS/ DRAINAGE HAS BEEN COMPLETED.
- THE DESIGN IS BASED ON THE INFORMATION AVAILABLE ON THE DATE OF ISSUE FROM OTHER PARTIES (E.G. ARCHITECT AND M&E ENGINEER). IT IS SUBJECT TO CHANGE RESULTING FROM UPDATES TO THE AVAILABLE INFORMATION FROM OTHERS.
- NEW DRAINS AND SEWERS TO BE AS FOLLOWS:
 - CONSTRUCTION AND MATERIALS OF PRIVATE SURFACE, FOUL & COMBINED WATER SEWERAGE SYSTEM TO BE IN ACCORDANCE WITH "BUILDING REGULATIONS - APPROVED DOCUMENT H" & "BS EN 752:2017 DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS"
 - CONSTRUCTION AND MATERIALS OF PUBLIC SURFACE, FOUL & COMBINED WATER SEWERS TO BE IN ACCORDANCE WITH "DESIGN & CONSTRUCTION GUIDANCE, SEWERAGE SECTOR GUIDANCE APPENDIX C" AND IN ACCORDANCE WITH LOCAL SEWERAGE UNDERTAKER
 - MINIMUM PIPE SIZE FOR ADAPTABLE SURFACE WATER DRAINAGE IS 150mmDN
 - 100mmDN AT MIN 1:100 FOR 10 DWELLINGS OR LESS
 - 150mmDN AT MIN 1:150 FOR GREATER THAN 10 DWELLINGS
 - MINIMUM PIPE SIZE FOR ADAPTABLE FOUL WATER DRAINAGE IS 100mmDN
 - 100mmDN 1:40 WHERE 10 DWELLINGS OR LESS AND NO WC
 - 100mmDN 1:80 WHERE GREATER THAN 10 DWELLINGS AND AT LEAST 1 WC
 - ALL ROAD GULLY PIPEWORK SPURS TO BE 150mmDN UNLESS OTHERWISE SPECIFIED
- LOAD CLASS SELECTION TO COMPLY WITH BS EN 124
 - LOAD CLASS A15 - AREAS INACCESSIBLE TO MOTOR VEHICLES
 - LOAD CLASS B125 - FOOTWAYS, PEDESTRIAN AREAS ETC
 - LOAD CLASS D250 - GULLY TOPS IN KERBSIDE CHANNELS OF ROADS
 - LOAD CLASS F400 - CARRIAGEWAYS OF ROADS (HEAVY DUTY)
 - LOAD CLASS E600 - AREAS IMPOSING HIGH WHEEL LOADS
 - LOAD CLASS F900 - AREAS IMPOSING PARTICULARLY HIGH WHEEL LOADS
- ALL FOUL DRAINS BENEATH BUILDINGS AND FROM SOIL VENT PIPES, GULLIES AND WC CONNECTIONS BE 100mmDN AT A GRADIENT NOT LESS THAN OF 1:40.
- ALL FOUL CONNECTIONS TO BE FULLY TRAPPED AND EACH FOUL CONNECTION TO A BRANCH DRAIN TO HAVE FULL RODDING ACCESS (E.G. LOW LEVEL RODDING ACCESS).
- RAINWATER DOWN PIPES ARE TO CONNECT TO A DRAIN VIA A REST BEND.
- WHERE DRAINAGE IS COMBINED A "P" TRAP MUST BE PROVIDED ABOVE PROPOSED FLOOR SLAB LEVEL.
- MINIMUM DEPTH OF COVER TO THE CROWN OF GRAVITY PIPES WITHOUT PROTECTION SHOULD BE AS FOLLOWS (IN ACCORDANCE WITH "DESIGN & CONSTRUCTION GUIDANCE, SEWERAGE SECTOR GUIDANCE APPENDIX C")
 - 350mm - DOMESTIC GARDENS AND PATHWAYS WITHOUT ANY POSSIBILITY OF VEHICULAR ACCESS.
 - 500mm - DOMESTIC DRIVEWAYS, PARKING AREAS AND YARDS WITH HEIGHT RESTRICTIONS TO PREVENT ENTRY BY VEHICLES WITH A GROSS WEIGHT IN EXCESS OF 7.5 TONNES.
 - 900mm - DOMESTIC DRIVEWAYS, PARKING AREAS AND NARROW STREETS WITH LIMITED ACCESS FOR VEHICLES WITH A GROSS WEIGHT IN EXCESS OF 7.5 TONNES.
 - 800mm - AGRICULTURAL LAND & PUBLIC OPEN SPACE
 - 1200mm - HIGHWAYS AND PARKING AREAS WITH UNRESTRICTED ACCESS TO VEHICLE WITH A GROSS WEIGHT IN EXCESS OF 7.5 TONNES.
- BACKFILL TO DRAINAGE TRENCHES UNDER CARRIAGEWAYS TO BE TYPE 1 SUB-BASE MATERIAL ELSEWHERE DRAINING READILY AVAILABLE COMPACTABLE MATERIAL FREE FROM RUBBISH, ORGANIC MATTER, FROZEN SOIL, CLAY LUMPS AND LARGE STONES. TO BE COMPACTED IN LAYERS NOT EXCEEDING 250mm THICK
- A FLEXIBLE JOINT SHALL BE PROVIDED AS CLOSE AS IS FEASIBLE TO THE OUTSIDE FACE OF ANY STRUCTURE INTO WHICH A PIPE IS BUILT. COMPATIBLE WITH THE SATISFACTORY COMPLETION AND SUBSEQUENT MOVEMENTS OF THE JOINT. LENGTH OF THE NEXT PIPE (ROCKER PIPE) IS TO BE IN ACCORDANCE WITH THE TABLE BELOW
 - 150-600mmDN - 600mm LONG ROCKER PIPE
 - 601-750mmDN - 1000mm LONG ROCKER PIPE
 - 751mmDN AND ABOVE - 1250mm LONG ROCKER PIPE
- PIPE CROSSOVERS TO HAVE MINIMUM OF 300mm CLEARANCE BETWEEN OUTSIDE TOP OF THE LOWER PIPE AND OUTSIDE BOTTOM OF THE UPPER PIPE. WHERE THIS CANNOT BE ACHIEVED A SEPARATION, CONCRETE SURROUND IS TO BE FORMED WHICH WILL EXTEND NOT LESS THE 1000mm EACH SIDE OF THE CROSSING POINT. THE EXTENT OF THE CONCRETE SHOULD BE WITHIN 150mm OF A FLEXIBLE PIPE JOINT. THE CONCRETE SPECIFICATION SHOULD BE IN ACCORDANCE WITH THE STANDARD DETAILS FOR PIPE BED AND SURROUND AS ISSUED BY THE ENGINEER.
- CONCRETE MIXES INDICATED ON THIS DRAWING ARE DESIGNATED MIXES CONFORMING TO BS 8501-1:2006. ALL CONCRETE TO BE SULPHATE RESISTANT. CONTRACTOR SHOULD ALLOWANCE FOR CARRYING OUT TESTING ONSITE TO CONFIRM SULPHATE LEVEL CLASSIFICATION.
- ALL PRIVATE MANHOLES AND INSPECTION CHAMBERS TO BE CONSTRUCTED IN ACCORDANCE WITH "BUILDING REGULATIONS - APPROVED DOCUMENT H" & "BS EN 752:2017 DRAIN AND SEWER SYSTEMS OUTSIDE BUILDINGS"
- ALL MANHOLES AND INSPECTION CHAMBERS TO BE ADOPTED TO BE CONSTRUCTED IN ACCORDANCE WITH "IN ACCORDANCE WITH "DESIGN & CONSTRUCTION GUIDANCE, SEWERAGE SECTOR GUIDANCE APPENDIX C" AND IN ACCORDANCE WITH LOCAL SEWERAGE UNDERTAKER.
- CCTV SURVEY OF ALL THE DRAINAGE SHOULD BE CARRIED OUT ON COMPLETION OF THE BUILDING WORKS AND PASSED ON TO THE CLIENT.
- ANY EXISTING DRAINAGE INFRASTRUCTURE TO BE RETAINED TO HAVE NEW COVERS AND FRAMES TO SUIT NEW LEVELS AND SURFACING.
- WHERE DRAINAGE RUNS PASS BELOW FOUNDATIONS, PIPES TO BE ENCASED IN MIN. 100mm CONCRETE SURROUND AND SURROUND WRAPPED IN 50mm COMPRESSIBLE MATERIAL (TOP & SIDES) PIPE SLEEVED THROUGH FOUNDATIONS AND FITTED WITH ROCKER PIPE. FOUNDATIONS ADJACENT TO DRAIN RUN TO BE DEEPEENED LOCALLY TO INVERT OF DRAINAGE PIPE TO AVOID SURCHARGE LOADING
- WHERE DRAINAGE RUNS PASS ABOVE FOUNDATIONS, PROVIDE 65mm DEEP PRE-STRESSED CONCRETE LINTELS e.g. "NAYLOR" Ref. P100

PLEASE NOTE HBL ASSOCIATES ARE USING NEW AND UPDATED TITLE BOX TEMPLATES. THEREFORE, PRESENTATION MAY DIFFER BETWEEN TECHNICAL DRAWINGS.

REV.	DATE	DRAWN	DESCRIPTION	CHKD	APPRD	STATUS
P02	02.06.2026	ES	PLANNING ISSUE (HYDRAULIC MODEL P04)	MS	MS	
P01	29.05.2026	ES	PLANNING ISSUE (HYDRAULIC MODEL P03)	ES	MS	
REV.	DATE	DRAWN	DESCRIPTION	CHKD	APPRD	STATUS
						S2

FOR INFORMATION

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PROJECT LAND ON DRAKE STREET ROCHDALE

DRAWING TITLE PROPOSED FLOOD EXCEEDANCE ROUTING PLAN

CLIENT GREAT PLACES HOUSING GROUP

HBL REF.	DATE	SCALE(S)	
11524	16.02.26	1:200	A1

DRAWN	CHECKED	APPROVED	
ES	MS	MS	

DRAWING No. 11524-HBL-XX-XX-DR-C-5104 REV. P02

APPENDIX F – HYDRAULIC CALCULATIONS

F.1 Pre-development – Brownfield and Greenfield Calculations

F.2 Proposed Surface Water System (SWS) Hydraulic Calculations

F.3 Proposed Foul Water System (FWS) Hydraulic Calculations

F.1 Pre-development – Brownfield and Greenfield Calculations

Pre-development runoff rate estimation.

Pre-development discharge

Site Makeup: Brownfield

Brownfield Method: MRM

Contributing Area (ha): 0.335

PIMP (%): 11

CV: 0.900

Time of Concentration (mins): 15.00

Betterment (%): 0

Note: FEH point descriptors can be downloaded from fehweb.ceh.ac.uk

Only XML file format can be used

FEH-22 is the current FEH data and this should be used for new development

ReFH2 legacy – Doesn't contain the new BFIHOST19 descriptor
ReFH2 – Contains the new BFIHOST19 descriptor

Return Period (years)	Q (l/s)
1	2.1
30	8.3
100	10.5

Pre-development runoff volume estimation.

Pre-development discharge

Site Makeup: Brownfield

Brownfield Method: MRM

Contributing Area (ha): 0.036

PIMP (%): 100

CV: 0.900

Return Period (years): 100

Climate Change (%): 0

Storm Duration (mins): 360

Betterment (%): 0

PR: 0.900

Runoff Volume (m³): 21

Pre-development discharge

Site Makeup: Greenfield

Greenfield Method: FSR/FEH

Positively Drained Area (ha): 0.299

Soil Index: 5

SPR: 0.53

Catchment Wetness Index: 125.603

Return Period (years): 100

Climate Change (%): 0

Storm Duration (mins): 360

Betterment (%): 0

PR: 0.575

Runoff Volume (m³): 113

113+21= 152m³

Greenfield runoff volume estimation.

Pre-development discharge

Site Makeup: Greenfield

Greenfield Method: FSR/FEH

Positively Drained Area (ha): 0.335

Soil Index: 5

SPR: 0.53

Catchment Wetness Index: 125.603

Return Period (years): 100

Climate Change (%): 0

Storm Duration (mins): 360

Betterment (%): 0

Note: FEH point descriptors can be downloaded from fehweb.ceh.ac.uk

Only XML file format can be used

FEH-22 is the current FEH data and this should be used for new development

ReFH2 legacy – Doesn't contain the new BFIHOST19 descriptor
ReFH2 – Contains the new BFIHOST19 descriptor

PR: 0.575

Runoff Volume (m³): 127

F.2 Proposed Surface Water System (SWS) Hydraulic Calculations

Results for 100 year 360 minute summer. 600 minute analysis at 8 minute timestep.																
US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Node T50% (mins)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Link T50% (mins)	Discharge Vol (m³)
S1	184	143.359	0.046	4.6	0.0131	0.0000		OK	1.000	S2	4.6	0.853	0.088	0.1999		
S2	184	142.982	0.041	5.8	0.0115	0.0000		OK	1.001	S3	5.7	0.735	0.072	0.1637		
S3	184	142.533	0.073	11.4	0.0205	0.0000	Unknown	OK	1.002	S6	11.4	0.982	0.219	0.3196		
									Infiltration		0.0					
S4	184	142.730	0.027	1.2	0.0043	0.0000	Unknown	OK	2.000	S3	1.2	0.568	0.067	0.0354		
									Infiltration		0.0					
RE1	184	143.564	0.014	0.6	0.0000	0.0000		OK	3.000	S5	0.6	0.735	0.017	0.0171		
RG4	176	143.208	0.008	0.2	0.0013	0.0000		OK	4.000	S5	0.2	0.701	0.012	0.0022		
S5	208	143.024	0.024	1.7	5.7295	0.0000	0	OK	3.001	S6	1.0	0.583	0.052	0.0295		
									Infiltration		0.0					
S6	184	142.263	0.078	12.9	0.0877	0.0000	Unknown	OK	1.003	S11	12.8	1.430	0.205	0.0535		
S7	184	143.669	0.028	1.4	0.0045	0.0000		OK	5.000	S8	1.4	0.518	0.079	0.0617		
S8	184	143.449	0.035	2.1	0.0055	0.0000		OK	5.001	S10	2.1	0.530	0.117	0.0470		
S9	184	143.651	0.025	1.3	0.0040	0.0000		OK	6.000	S10	1.3	0.392	0.061	0.0782		
S10	184	143.343	0.048	4.6	0.0076	0.0000		OK	5.002	S11	4.5	0.964	0.205	0.0596		
S11	184	142.147	0.047	18.7	0.0535	0.0000		OK	1.004	S12	18.6	0.980	0.098	0.1413		
S12	256	141.904	0.624	19.1	0.1766	0.0000	Unknown	SURCHARGED	1.005	TANK	19.0	0.935	0.515	0.3705		
TANK	256	141.904	0.671	21.5	70.0700	0.0000	Unknown	SURCHARGED	1.006	S13 (FCC)	4.9	0.147	0.135	0.2648		
S13 (FCC)	256	141.903	0.703	5.3	1.2421	0.0000		SURCHARGED	1.007	CW01	5.0	1.229	0.224	0.0263		
S14	256	141.904	0.059	2.6	0.0093	0.0000		OK	7.000	TANK	2.6	1.027	0.087	0.1165		
CW01	184	141.131	0.031	5.0	0.0348	0.0000		OK	1.009	CW02	5.0	1.993	0.084	0.0160		132.0
CW02	184	140.419	0.029	5.0	0.0000	0.0000		OK								

Results for 100 year +45% CC 360 minute summer. 600 minute analysis at 8 minute timestep.																
US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Node T50% (mins)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Link T50% (mins)	Discharge Vol (m³)
S1	184	143.369	0.056	6.7	0.0158	0.0000		OK	1.000	S2	6.7	0.951	0.128	0.2610		
S2	184	142.990	0.049	8.4	0.0138	0.0000		OK	1.001	S3	8.3	0.814	0.104	0.2137		
S3	184	142.548	0.088	16.5	0.0250	0.0000	Unknown	OK	1.002	S6	16.4	1.043	0.317	0.5101		
									Infiltration		0.0					
S4	184	142.735	0.032	1.7	0.0051	0.0000	Unknown	OK	2.000	S3	1.7	0.629	0.096	0.0454		
									Infiltration		0.0					
RE1	184	143.567	0.017	0.9	0.0000	0.0000		OK	3.000	S5	0.9	0.735	0.026	0.0294		
RG4	184	143.210	0.009	0.3	0.0015	0.0000		OK	4.000	S5	0.3	0.701	0.018	0.0038		
S5	192	143.034	0.034	2.6	6.2371	0.0000	0	OK	3.001	S6	2.2	0.723	0.110	0.0503		
									Infiltration		0.0					
S6	280	142.363	0.178	20.3	0.2008	0.0000	Unknown	OK	1.003	S11	20.2	1.620	0.324	0.2163		
S7	184	143.675	0.034	2.0	0.0054	0.0000		OK	5.000	S8	2.0	0.575	0.113	0.0796		
S8	184	143.456	0.042	3.0	0.0066	0.0000		OK	5.001	S10	3.0	0.585	0.168	0.0610		
S9	184	143.655	0.029	1.8	0.0047	0.0000		OK	6.000	S10	1.8	0.421	0.084	0.1007		
S10	184	143.353	0.058	6.5	0.0092	0.0000		OK	5.002	S11	6.4	1.058	0.292	0.0771		
S11	280	142.362	0.262	28.6	0.2967	0.0000		SURCHARGED	1.004	S12	28.6	0.991	0.150	0.2453		
S12	280	142.362	1.082	29.3	0.3061	0.0000	Unknown	SURCHARGED	1.005	TANK	28.9	1.034	0.787	0.3705		
TANK	280	142.361	1.128	32.7	117.8912	0.0000	Unknown	SURCHARGED	1.006	S13 (FCC)	4.8	0.134	0.132	0.2648		
S13 (FCC)	280	142.361	1.160	5.4	2.0506	0.0000		SURCHARGED	1.007	CW01	5.0	1.229	0.224	0.0262		
S14	280	142.361	0.516	3.8	0.0821	0.0000		SURCHARGED	7.000	TANK	3.8	1.038	0.128	0.1712		
CW01	168	141.131	0.031	5.0	0.0348	0.0000		OK	1.009	CW02	5.0	1.993	0.084	0.0160		144.8
CW02	168	140.419	0.029	5.0	0.0000	0.0000		OK								

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	1.000
CV	1.000	Preferred Cover Depth (m)	0.600
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
S1	0.039	5.00	144.138	600	389451.148	412839.267	0.825	143.313
S2	0.010	5.00	144.102	600	389415.560	412828.398	1.161	142.941
S3	0.038	5.00	143.994	600	389409.140	412847.921	1.534	142.460
S4	0.010	5.00	143.753	450	389404.101	412864.049	1.050	142.703
RE1	0.005	5.00	144.300		389456.469	412846.700	0.750	143.550
RG4	0.002	5.00	144.050	450	389452.847	412863.408	0.850	143.200
S5	0.008	5.00	144.050	450	389451.711	412860.910	1.050	143.000
S6	0.013	5.00	144.190	1200	389435.492	412856.155	2.005	142.185
S7	0.012	5.00	144.391	450	389451.043	412890.605	0.750	143.641
S8	0.006	5.00	144.329	450	389457.320	412868.592	0.915	143.414
S9	0.011	5.00	144.376	450	389439.710	412887.567	0.750	143.626
S10	0.010	5.00	144.299	450	389445.887	412865.289	1.004	143.295
S11	0.011	5.00	144.203	1200	389433.734	412861.781	2.103	142.100
S12	0.004	5.00	144.233	600	389431.906	412867.672	3.253	140.980
TANK			143.400		389429.120	412876.561	2.167	141.233
S13 (FCC)	0.016	5.00	143.625	1500	389427.138	412882.918	2.425	141.200
CW01			143.515	1200	389421.990	412883.462	2.415	141.100
CW02			143.110	1500	389413.773	412887.454	2.720	140.390
S14	0.022	5.00	143.500	450	389420.372	412880.802	1.955	141.545

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	S1	S2	37.211	0.600	143.313	142.941	0.372	100.0	225	5.47	50.0
1.001	S2	S3	20.551	0.600	142.941	142.460	0.481	42.7	225	5.65	50.0
2.000	S4	S3	16.897	0.600	142.703	142.535	0.168	100.6	150	5.28	50.0
1.002	S3	S6	27.608	0.600	142.460	142.185	0.275	100.4	225	6.00	50.0
3.001	S5	S6	16.902	0.600	143.000	142.795	0.205	82.4	150	5.38	50.0
1.003	S6	S11	5.894	0.600	142.185	142.100	0.085	69.3	225	6.06	50.0
5.000	S7	S8	22.891	0.600	143.641	143.414	0.227	100.8	150	5.38	50.0
5.001	S8	S10	11.900	0.600	143.414	143.295	0.119	100.0	150	5.58	50.0
6.000	S9	S10	23.118	0.600	143.626	143.295	0.331	69.8	150	5.32	50.0
5.002	S10	S11	12.649	0.600	143.295	143.100	0.195	64.9	150	5.75	50.0
1.004	S11	S12	6.168	0.600	142.100	141.280	0.820	7.5	225	6.08	50.0
1.005	S12	TANK	9.315	0.600	141.280	141.233	0.047	198.2	225	6.25	50.0
1.006	TANK	S13 (FCC)	6.658	0.600	141.233	141.200	0.033	201.8	225	6.37	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	1.307	52.0	7.0	0.600	0.936	0.039	0.0	56	0.920
1.001	2.007	79.8	8.9	0.936	1.309	0.049	0.0	51	1.336
2.000	1.002	17.7	1.8	0.900	1.309	0.010	0.0	33	0.647
1.002	1.305	51.9	17.6	1.309	1.780	0.097	0.0	90	1.181
3.001	1.108	19.6	2.7	0.900	1.245	0.015	0.0	37	0.775
1.003	1.572	62.5	22.6	1.780	1.878	0.125	0.0	94	1.450
5.000	1.000	17.7	2.1	0.600	0.765	0.012	0.0	35	0.680
5.001	1.005	17.8	3.2	0.765	0.854	0.018	0.0	43	0.763
6.000	1.205	21.3	1.9	0.600	0.854	0.011	0.0	31	0.754
5.002	1.250	22.1	7.0	0.854	0.953	0.039	0.0	58	1.109
1.004	4.800	190.9	31.5	1.878	2.728	0.174	0.0	62	3.588
1.005	0.925	36.8	32.3	2.728	1.942	0.179	0.0	164	1.040
1.006	0.917	36.4	36.3	1.942	2.200	0.201	0.0	184	1.040

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)
1.007	S13 (FCC)	CW01	6.349	0.600	141.200	141.100	0.100	63.5	150	6.45	50.0
1.009	CW01	CW02	6.380	0.600	141.100	140.390	0.710	9.0	150	6.49	50.0
3.000	RE1	S5	14.985	0.600	143.550	143.000	0.550	27.2	150	5.13	50.0
4.000	RG4	S5	2.744	0.600	143.200	143.000	0.200	13.7	100	5.02	50.0
7.000	S14	TANK	9.722	0.600	141.845	141.575	0.270	36.0	150	5.10	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)
1.007	1.264	22.3	39.1	2.275	2.265	0.217	0.0	150	1.288
1.009	3.381	59.7	39.1	2.265	2.570	0.217	0.0	89	3.602
3.000	1.936	34.2	0.9	0.600	0.900	0.005	0.0	17	0.829
4.000	2.096	16.5	0.4	0.750	0.950	0.002	0.0	11	0.854
7.000	1.683	29.7	4.0	1.505	1.675	0.022	0.0	37	1.179

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	37.211	100.0	225	Circular	144.138	143.313	0.600	144.102	142.941	0.936
1.001	20.551	42.7	225	Circular	144.102	142.941	0.936	143.994	142.460	1.309
2.000	16.897	100.6	150	Circular	143.753	142.703	0.900	143.994	142.535	1.309
1.002	27.608	100.4	225	Circular	143.994	142.460	1.309	144.190	142.185	1.780
3.001	16.902	82.4	150	Circular	144.050	143.000	0.900	144.190	142.795	1.245
1.003	5.894	69.3	225	Circular	144.190	142.185	1.780	144.203	142.100	1.878
5.000	22.891	100.8	150	Circular	144.391	143.641	0.600	144.329	143.414	0.765
5.001	11.900	100.0	150	Circular	144.329	143.414	0.765	144.299	143.295	0.854
6.000	23.118	69.8	150	Circular	144.376	143.626	0.600	144.299	143.295	0.854
5.002	12.649	64.9	150	Circular	144.299	143.295	0.854	144.203	143.100	0.953
1.004	6.168	7.5	225	Circular	144.203	142.100	1.878	144.233	141.280	2.728
1.005	9.315	198.2	225	Circular	144.233	141.280	2.728	143.400	141.233	1.942
1.006	6.658	201.8	225	Circular	143.400	141.233	1.942	143.625	141.200	2.200
1.007	6.349	63.5	150	Circular	143.625	141.200	2.275	143.515	141.100	2.265
1.009	6.380	9.0	150	Circular	143.515	141.100	2.265	143.110	140.390	2.570
3.000	14.985	27.2	150	Circular	144.300	143.550	0.600	144.050	143.000	0.900
4.000	2.744	13.7	100	Circular	144.050	143.200	0.750	144.050	143.000	0.950
7.000	9.722	36.0	150	Circular	143.500	141.845	1.505	143.400	141.575	1.675

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	600	Manhole	Plastic Inspection Chamber	S2	600	Manhole	Plastic Inspection Chamber
1.001	S2	600	Manhole	Plastic Inspection Chamber	S3	600	Manhole	Plastic Inspection Chamber
2.000	S4	450	Manhole	Concrete Manhole Chamber	S3	600	Manhole	Plastic Inspection Chamber
1.002	S3	600	Manhole	Plastic Inspection Chamber	S6	1200	Manhole	Plastic Inspection Chamber
3.001	S5	450	Manhole	Plastic Inspection Chamber	S6	1200	Manhole	Plastic Inspection Chamber
1.003	S6	1200	Manhole	Plastic Inspection Chamber	S11	1200	Manhole	Plastic Inspection Chamber
5.000	S7	450	Manhole	Plastic Inspection Chamber	S8	450	Manhole	Plastic Inspection Chamber
5.001	S8	450	Manhole	Plastic Inspection Chamber	S10	450	Manhole	Plastic Inspection Chamber
6.000	S9	450	Manhole	Plastic Inspection Chamber	S10	450	Manhole	Plastic Inspection Chamber
5.002	S10	450	Manhole	Plastic Inspection Chamber	S11	1200	Manhole	Plastic Inspection Chamber
1.004	S11	1200	Manhole	Plastic Inspection Chamber	S12	600	Manhole	Plastic Inspection Chamber
1.005	S12	600	Manhole	Plastic Inspection Chamber	TANK		Junction	
1.006	TANK		Junction		S13 (FCC)	1500	Manhole	Plastic Inspection Chamber
1.007	S13 (FCC)	1500	Manhole	Plastic Inspection Chamber	CW01	1200	Manhole	Concrete Manhole Chamber
1.009	CW01	1200	Manhole	Concrete Manhole Chamber	CW02	1500	Manhole	Concrete Manhole Chamber
3.000	RE1		Junction		S5	450	Manhole	Plastic Inspection Chamber
4.000	RG4	450	Manhole	Concrete Manhole Chamber	S5	450	Manhole	Plastic Inspection Chamber
7.000	S14	450	Manhole	Plastic Inspection Chamber	TANK		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1	389451.148	412839.267	144.138	0.825	600				
						0	1.000	143.313	225
S2	389415.560	412828.398	144.102	1.161	600		1	1.000	142.941
						0	1.001	142.941	225
S3	389409.140	412847.921	143.994	1.534	600		1	2.000	142.535
						2	1.001	142.460	225
						0	1.002	142.460	225
S4	389404.101	412864.049	143.753	1.050	450		0	2.000	142.703
RE1	389456.469	412846.700	144.300	0.750			0	3.000	143.550
RG4	389452.847	412863.408	144.050	0.850	450		0	4.000	143.200
S5	389451.711	412860.910	144.050	1.050	450		1	4.000	143.000
						2	3.000	143.000	150
						0	3.001	143.000	150
S6	389435.492	412856.155	144.190	2.005	1200		1	3.001	142.795
						2	1.002	142.185	225
						0	1.003	142.185	225
S7	389451.043	412890.605	144.391	0.750	450		0	5.000	143.641
S8	389457.320	412868.592	144.329	0.915	450		1	5.000	143.414
						0	5.001	143.414	150
S9	389439.710	412887.567	144.376	0.750	450		0	6.000	143.626
S10	389445.887	412865.289	144.299	1.004	450		1	6.000	143.295
						2	5.001	143.295	150
						0	5.002	143.295	150
S11	389433.734	412861.781	144.203	2.103	1200		1	5.002	143.100
						2	1.003	142.100	225
						0	1.004	142.100	225
S12	389431.906	412867.672	144.233	3.253	600		1	1.004	141.280
						0	1.005	141.280	225
TANK	389429.120	412876.561	143.400	2.167			1	7.000	141.575
						2	1.005	141.233	225
						0	1.006	141.233	225
S13 (FCC)	389427.138	412882.918	143.625	2.425	1500		1	1.006	141.200
						0	1.007	141.200	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
CW01	389421.990	412883.462	143.515	2.415	1200		1 1.007	141.100	150
							0 1.009	141.100	150
CW02	389413.773	412887.454	143.110	2.720	1500		1 1.009	140.390	150
S14	389420.372	412880.802	143.500	1.955	450		0 7.000	141.845	150

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0	30	40	0	0
10	0	0	0	100	0	0	0
30	0	0	0	100	25	0	0
30	25	0	0	100	45	0	0

Node S13 (FCC) Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	141.200	Product Number	CTL-SHE-0103-5000-1200-5000
Design Depth (m)	1.200	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	141.233
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	244

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	110.0	110.0	1.200	110.0	154.6	1.201	0.0	154.6

Node TANK Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	143.176	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

Node S12 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	143.783	Slope (1:X)	30.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

Node S6 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	143.753	Slope (1:X)	50.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.30	Length (m)	17.400		

Node S3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	143.419	Slope (1:X)	60.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

Node S3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)			0.00500			Safety Factor			10.0			Invert Level (m)			143.144		
Side Inf Coefficient (m/hr)			0.00000			Porosity			1.00			Time to half empty (mins)					
Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)			
0.000	45.6	45.6	0.181	38.4	49.9	0.730	45.6	49.9	0.810	156.0	49.9	0.831	0.0	49.9			
0.180	45.6	49.9	0.680	38.4	49.9	0.731	45.6	49.9	0.830	156.0	49.9						

Node S4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	143.303	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.300
Safety Factor	2.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

Node S4 Depth/Area Storage Structure

Base Inf Coefficient (m/hr) 0.00500						Safety Factor 10.0			Invert Level (m) 142.903					
Side Inf Coefficient (m/hr) 0.00000						Porosity 1.00			Time to half empty (mins) 0					
Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	24.7	24.7	0.181	20.8	27.9	0.730	24.7	27.9	0.810	84.5	27.9	0.831	0.0	27.9
0.180	24.7	27.9	0.680	20.8	27.9	0.731	24.7	27.9	0.830	84.5	27.9			

Node S5 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00500	Safety Factor	10.0	Invert Level (m)	142.903
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	47.5	47.5	0.181	40.0	51.9	0.730	47.5	51.9	0.810	162.5	51.9	0.831	0.0	51.9
0.180	47.5	51.9	0.680	40.0	51.9	0.731	47.5	51.9	0.830	162.5	51.9			

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	143.366	0.053	6.0	0.0150	0.0000	OK
15 minute summer	S2	11	142.987	0.046	7.4	0.0131	0.0000	OK
15 minute summer	S3	10	142.543	0.083	14.8	0.0236	0.0000	OK
15 minute summer	S4	10	142.734	0.031	1.6	0.0049	0.0000	OK
15 minute summer	RE1	10	143.566	0.016	0.8	0.0000	0.0000	OK
30 minute summer	RG4	19	143.210	0.010	0.3	0.0015	0.0000	OK
1440 minute winter	S5	960	142.984	-0.016	0.2	3.8352	0.0000	OK
15 minute summer	S6	11	142.275	0.090	16.6	0.1014	0.0000	OK
15 minute summer	S7	11	143.673	0.032	1.8	0.0051	0.0000	OK
15 minute summer	S8	11	143.454	0.039	2.7	0.0063	0.0000	OK
15 minute summer	S9	10	143.655	0.028	1.7	0.0045	0.0000	OK
15 minute summer	S10	11	143.350	0.055	5.9	0.0087	0.0000	OK
15 minute summer	S11	11	142.154	0.054	24.2	0.0609	0.0000	OK
240 minute summer	S12	152	141.425	0.145	9.8	0.0410	0.0000	OK
240 minute summer	TANK	152	141.425	0.192	11.0	20.0270	0.0000	OK
240 minute summer	S13 (FCC)	152	141.424	0.224	4.6	0.3962	0.0000	SURCHARGED
240 minute summer	CW01	152	141.129	0.029	4.6	0.0333	0.0000	OK
240 minute summer	CW02	152	140.418	0.028	4.6	0.0000	0.0000	OK
15 minute summer	S14	10	141.880	0.035	3.4	0.0055	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	S1	1.000	S2	5.9	0.923	0.114	0.2401	
15 minute summer	S2	1.001	S3	7.4	0.788	0.093	0.1970	
15 minute summer	S3	1.002	S6	14.7	1.049	0.284	0.3874	
15 minute summer	S3	Infiltration		0.0				
15 minute summer	S4	2.000	S3	1.6	0.614	0.088	0.0429	
15 minute summer	S4	Infiltration		0.0				
15 minute summer	RE1	3.000	S5	0.8	0.793	0.023	0.0146	
30 minute summer	RG4	4.000	S5	0.3	0.791	0.018	0.0010	
1440 minute winter	S5	3.001	S6	0.0	0.000	0.000	0.0000	
1440 minute winter	S5	Infiltration		0.0				
15 minute summer	S6	1.003	S11	16.7	1.535	0.267	0.0649	
15 minute summer	S7	5.000	S8	1.8	0.558	0.102	0.0741	
15 minute summer	S8	5.001	S10	2.7	0.573	0.152	0.0567	
15 minute summer	S9	6.000	S10	1.7	0.425	0.079	0.0937	
15 minute summer	S10	5.002	S11	5.9	1.032	0.265	0.0717	
15 minute summer	S11	1.004	S12	24.2	1.545	0.127	0.0983	
240 minute summer	S12	1.005	TANK	9.7	0.882	0.263	0.2937	
240 minute summer	TANK	1.006	S13 (FCC)	4.4	0.147	0.119	0.2523	
240 minute summer	S13 (FCC)	1.007	CW01	4.6	1.202	0.206	0.0247	
240 minute summer	CW01	1.009	CW02	4.6	1.946	0.077	0.0151	46.1
15 minute summer	S14	7.000	TANK	3.4	1.106	0.113	0.0296	

Results for 10 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	143.389	0.076	12.0	0.0214	0.0000	OK
15 minute summer	S2	10	143.006	0.065	14.9	0.0185	0.0000	OK
15 minute summer	S3	10	142.586	0.126	29.5	0.0356	0.0000	OK
15 minute summer	S4	10	142.745	0.042	3.1	0.0067	0.0000	OK
15 minute summer	RE1	11	143.572	0.022	1.5	0.0000	0.0000	OK
15 minute summer	RG4	11	143.214	0.014	0.6	0.0022	0.0000	OK
480 minute winter	S5	320	143.012	0.012	0.6	5.1977	0.0000	OK
15 minute summer	S6	11	142.319	0.134	33.0	0.1515	0.0000	OK
15 minute summer	S7	10	143.687	0.046	3.7	0.0073	0.0000	OK
15 minute summer	S8	10	143.471	0.057	5.5	0.0091	0.0000	OK
15 minute summer	S9	10	143.666	0.040	3.3	0.0063	0.0000	OK
15 minute summer	S10	11	143.377	0.082	11.8	0.0131	0.0000	OK
15 minute summer	S11	11	142.177	0.077	48.0	0.0866	0.0000	OK
180 minute summer	S12	128	141.601	0.321	19.1	0.0909	0.0000	SURCHARGED
180 minute summer	TANK	128	141.601	0.368	21.3	38.4334	0.0000	SURCHARGED
180 minute summer	S13 (FCC)	128	141.600	0.400	5.2	0.7069	0.0000	SURCHARGED
180 minute summer	CW01	128	141.131	0.031	5.0	0.0348	0.0000	OK
180 minute summer	CW02	128	140.419	0.029	5.0	0.0000	0.0000	OK
15 minute summer	S14	10	141.895	0.050	6.8	0.0079	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	S1	1.000	S2	11.9	1.117	0.228	0.3953	
15 minute summer	S2	1.001	S3	14.7	0.920	0.185	0.3324	
15 minute summer	S3	1.002	S6	29.2	1.235	0.563	0.6531	
15 minute summer	S3	Infiltration		0.0				
15 minute summer	S4	2.000	S3	3.1	0.709	0.175	0.0789	
15 minute summer	S4	Infiltration		0.0				
15 minute summer	RE1	3.000	S5	1.5	0.969	0.044	0.0232	
15 minute summer	RG4	4.000	S5	0.6	0.968	0.036	0.0017	
480 minute winter	S5	3.001	S6	0.3	0.390	0.014	0.0115	
480 minute winter	S5	Infiltration		0.0				
15 minute summer	S6	1.003	S11	33.2	1.824	0.531	0.1077	
15 minute summer	S7	5.000	S8	3.7	0.678	0.207	0.1236	
15 minute summer	S8	5.001	S10	5.4	0.676	0.305	0.0956	
15 minute summer	S9	6.000	S10	3.3	0.491	0.153	0.1570	
15 minute summer	S10	5.002	S11	11.6	1.223	0.526	0.1201	
15 minute summer	S11	1.004	S12	48.1	1.953	0.252	0.1477	
180 minute summer	S12	1.005	TANK	18.8	0.953	0.512	0.3705	
180 minute summer	TANK	1.006	S13 (FCC)	4.9	0.147	0.134	0.2648	
180 minute summer	S13 (FCC)	1.007	CW01	5.0	1.229	0.224	0.0263	
180 minute summer	CW01	1.009	CW02	5.0	1.993	0.084	0.0160	68.2
15 minute summer	S14	7.000	TANK	6.7	1.341	0.227	0.0489	

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	143.401	0.088	15.7	0.0248	0.0000	OK
15 minute summer	S2	10	143.016	0.075	19.5	0.0212	0.0000	OK
15 minute summer	S3	10	142.612	0.152	38.6	0.0429	0.0000	OK
15 minute summer	S4	10	142.752	0.049	4.1	0.0078	0.0000	OK
15 minute summer	RE1	10	143.575	0.025	2.0	0.0000	0.0000	OK
15 minute summer	RG4	11	143.216	0.016	0.8	0.0025	0.0000	OK
720 minute summer	S5	420	143.018	0.018	0.8	5.4497	0.0000	OK
15 minute summer	S6	11	142.344	0.159	43.1	0.1797	0.0000	OK
15 minute summer	S7	10	143.694	0.053	4.8	0.0084	0.0000	OK
15 minute summer	S8	10	143.481	0.067	7.2	0.0106	0.0000	OK
15 minute summer	S9	10	143.672	0.045	4.3	0.0072	0.0000	OK
15 minute summer	S10	11	143.393	0.098	15.4	0.0156	0.0000	OK
15 minute summer	S11	11	142.194	0.094	62.8	0.1058	0.0000	OK
180 minute summer	S12	136	141.738	0.458	24.1	0.1297	0.0000	SURCHARGED
180 minute summer	TANK	136	141.738	0.505	27.1	52.7206	0.0000	SURCHARGED
180 minute summer	S13 (FCC)	136	141.737	0.537	5.4	0.9485	0.0000	SURCHARGED
30 minute winter	CW01	40	141.131	0.031	5.0	0.0348	0.0000	OK
30 minute winter	CW02	40	140.419	0.029	5.0	0.0000	0.0000	OK
15 minute summer	S14	10	141.903	0.058	8.8	0.0091	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	S1	1.000	S2	15.5	1.202	0.299	0.4807	
15 minute summer	S2	1.001	S3	19.3	0.964	0.242	0.4110	
15 minute summer	S3	1.002	S6	38.2	1.311	0.737	0.8050	
15 minute summer	S3	Infiltration		0.0				
15 minute summer	S4	2.000	S3	4.1	0.714	0.230	0.1183	
15 minute summer	S4	Infiltration		0.0				
15 minute summer	RE1	3.000	S5	2.0	1.051	0.058	0.0283	
15 minute summer	RG4	4.000	S5	0.8	1.050	0.049	0.0021	
720 minute summer	S5	3.001	S6	0.6	0.488	0.029	0.0195	
720 minute summer	S5	Infiltration		0.0				
15 minute summer	S6	1.003	S11	43.4	1.898	0.695	0.1343	
15 minute summer	S7	5.000	S8	4.8	0.726	0.269	0.1504	
15 minute summer	S8	5.001	S10	7.1	0.716	0.400	0.1179	
15 minute summer	S9	6.000	S10	4.3	0.524	0.200	0.1935	
15 minute summer	S10	5.002	S11	15.2	1.294	0.687	0.1482	
15 minute summer	S11	1.004	S12	62.8	2.030	0.329	0.1708	
180 minute summer	S12	1.005	TANK	23.9	1.029	0.649	0.3705	
180 minute summer	TANK	1.006	S13 (FCC)	4.9	0.147	0.135	0.2648	
180 minute summer	S13 (FCC)	1.007	CW01	5.0	1.229	0.224	0.0263	
30 minute winter	CW01	1.009	CW02	5.0	1.993	0.084	0.0160	46.9
15 minute summer	S14	7.000	TANK	8.8	1.438	0.294	0.0592	

Results for 30 year +25% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	143.412	0.099	19.6	0.0281	0.0000	OK
15 minute summer	S2	10	143.026	0.084	24.4	0.0239	0.0000	OK
15 minute summer	S3	11	142.644	0.184	48.3	0.0520	0.0000	OK
15 minute summer	S4	10	142.758	0.055	5.1	0.0087	0.0000	OK
15 minute summer	RE1	10	143.578	0.028	2.5	0.0000	0.0000	OK
15 minute summer	RG4	11	143.218	0.018	1.0	0.0028	0.0000	OK
240 minute summer	S5	148	143.024	0.024	2.3	5.7388	0.0000	OK
15 minute summer	S6	11	142.373	0.188	54.0	0.2126	0.0000	OK
15 minute summer	S7	10	143.701	0.060	6.0	0.0095	0.0000	OK
15 minute summer	S8	10	143.490	0.076	8.9	0.0120	0.0000	OK
15 minute summer	S9	10	143.677	0.051	5.4	0.0081	0.0000	OK
15 minute summer	S10	11	143.413	0.118	19.2	0.0187	0.0000	OK
30 minute summer	S11	19	142.223	0.123	75.7	0.1388	0.0000	OK
240 minute summer	S12	192	141.933	0.653	25.3	0.1848	0.0000	SURCHARGED
240 minute summer	TANK	192	141.932	0.699	28.5	73.0875	0.0000	SURCHARGED
240 minute summer	S13 (FCC)	192	141.932	0.732	5.4	1.2931	0.0000	SURCHARGED
60 minute winter	CW01	161	141.131	0.031	5.0	0.0348	0.0000	OK
60 minute winter	CW02	161	140.419	0.029	5.0	0.0000	0.0000	OK
240 minute summer	S14	192	141.932	0.087	3.4	0.0139	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	S1	1.000	S2	19.4	1.275	0.373	0.5667	
15 minute summer	S2	1.001	S3	24.2	0.983	0.303	0.4961	
15 minute summer	S3	1.002	S6	47.8	1.363	0.922	0.9684	
15 minute summer	S3	Infiltration		0.0				
15 minute summer	S4	2.000	S3	5.1	0.680	0.286	0.1644	
15 minute summer	S4	Infiltration		0.0				
15 minute summer	RE1	3.000	S5	2.5	1.122	0.073	0.0331	
15 minute summer	RG4	4.000	S5	1.0	1.116	0.061	0.0025	
240 minute summer	S5	3.001	S6	1.0	0.586	0.053	0.0299	
240 minute summer	S5	Infiltration		0.0				
15 minute summer	S6	1.003	S11	54.3	1.892	0.868	0.1697	
15 minute summer	S7	5.000	S8	5.9	0.769	0.336	0.1769	
15 minute summer	S8	5.001	S10	8.9	0.742	0.501	0.1410	
15 minute summer	S9	6.000	S10	5.3	0.543	0.251	0.2323	
15 minute summer	S10	5.002	S11	19.0	1.342	0.860	0.1789	
30 minute summer	S11	1.004	S12	75.3	2.161	0.395	0.1909	
240 minute summer	S12	1.005	TANK	25.1	1.026	0.681	0.3705	
240 minute summer	TANK	1.006	S13 (FCC)	4.9	0.147	0.135	0.2648	
240 minute summer	S13 (FCC)	1.007	CW01	5.0	1.229	0.224	0.0263	
60 minute winter	CW01	1.009	CW02	5.0	1.993	0.084	0.0160	75.4
240 minute summer	S14	7.000	TANK	3.4	1.095	0.114	0.1374	

Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	143.419	0.106	21.9	0.0299	0.0000	OK
15 minute summer	S2	10	143.031	0.090	27.3	0.0254	0.0000	OK
15 minute summer	S3	11	142.693	0.233	54.1	0.0659	0.0000	SURCHARGED
15 minute summer	S4	10	142.761	0.058	5.7	0.0093	0.0000	OK
15 minute summer	RE1	10	143.579	0.029	2.8	0.0000	0.0000	OK
15 minute summer	RG4	11	143.219	0.019	1.1	0.0029	0.0000	OK
180 minute summer	S5	112	143.028	0.028	3.0	5.9452	0.0000	OK
15 minute summer	S6	11	142.393	0.208	59.6	0.2350	0.0000	OK
15 minute summer	S7	10	143.705	0.064	6.7	0.0102	0.0000	OK
15 minute summer	S8	10	143.495	0.081	10.0	0.0129	0.0000	OK
15 minute summer	S9	10	143.680	0.054	6.0	0.0086	0.0000	OK
15 minute summer	S10	11	143.429	0.134	21.5	0.0213	0.0000	OK
30 minute summer	S11	19	142.249	0.149	84.1	0.1690	0.0000	OK
180 minute winter	S12	176	142.066	0.786	23.1	0.2225	0.0000	SURCHARGED
180 minute winter	TANK	176	142.066	0.833	26.0	87.0203	0.0000	SURCHARGED
180 minute winter	S13 (FCC)	176	142.065	0.865	5.4	1.5288	0.0000	SURCHARGED
30 minute summer	CW01	105	141.131	0.031	5.0	0.0348	0.0000	OK
30 minute summer	CW02	105	140.419	0.029	5.0	0.0000	0.0000	OK
180 minute winter	S14	176	142.066	0.221	3.1	0.0351	0.0000	SURCHARGED
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	S1	1.000	S2	21.7	1.311	0.417	0.6156	
15 minute summer	S2	1.001	S3	27.0	0.991	0.339	0.5592	
15 minute summer	S3	1.002	S6	52.7	1.370	1.016	1.0783	
15 minute summer	S3	Infiltration		0.0				
15 minute summer	S4	2.000	S3	5.7	0.686	0.320	0.2011	
15 minute summer	S4	Infiltration		0.0				
15 minute summer	RE1	3.000	S5	2.8	1.161	0.081	0.0359	
15 minute summer	RG4	4.000	S5	1.1	1.146	0.067	0.0026	
180 minute summer	S5	3.001	S6	1.5	0.646	0.074	0.0380	
180 minute summer	S5	Infiltration		0.0				
15 minute summer	S6	1.003	S11	59.5	1.883	0.953	0.1914	
15 minute summer	S7	5.000	S8	6.6	0.790	0.376	0.1925	
15 minute summer	S8	5.001	S10	10.0	0.749	0.562	0.1551	
15 minute summer	S9	6.000	S10	6.0	0.557	0.280	0.2565	
15 minute summer	S10	5.002	S11	21.3	1.351	0.962	0.1989	
30 minute summer	S11	1.004	S12	83.6	2.276	0.438	0.2090	
180 minute winter	S12	1.005	TANK	22.9	1.126	0.622	0.3705	
180 minute winter	TANK	1.006	S13 (FCC)	4.9	0.126	0.135	0.2648	
180 minute winter	S13 (FCC)	1.007	CW01	5.0	1.229	0.224	0.0263	
30 minute summer	CW01	1.009	CW02	5.0	1.993	0.084	0.0160	63.7
180 minute winter	S14	7.000	TANK	3.1	1.071	0.104	0.1712	

Results for 100 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	143.413	0.099	19.7	0.0282	0.0000	OK
15 minute summer	S2	10	143.026	0.085	24.6	0.0240	0.0000	OK
15 minute summer	S3	11	142.645	0.185	48.6	0.0523	0.0000	OK
15 minute summer	S4	10	142.758	0.055	5.1	0.0087	0.0000	OK
15 minute summer	RE1	10	143.578	0.028	2.5	0.0000	0.0000	OK
15 minute summer	RG4	11	143.218	0.018	1.0	0.0028	0.0000	OK
480 minute summer	S5	264	143.024	0.024	1.4	5.7362	0.0000	OK
15 minute summer	S6	11	142.374	0.189	54.3	0.2135	0.0000	OK
15 minute summer	S7	10	143.701	0.060	6.0	0.0095	0.0000	OK
15 minute summer	S8	10	143.490	0.076	8.9	0.0120	0.0000	OK
15 minute summer	S9	10	143.677	0.051	5.4	0.0082	0.0000	OK
15 minute summer	S10	11	143.413	0.118	19.3	0.0188	0.0000	OK
30 minute summer	S11	19	142.227	0.127	77.5	0.1440	0.0000	OK
120 minute winter	S12	118	141.929	0.649	27.8	0.1837	0.0000	SURCHARGED
120 minute winter	TANK	120	141.929	0.696	31.2	72.6862	0.0000	SURCHARGED
120 minute winter	S13 (FCC)	118	141.928	0.728	5.5	1.2863	0.0000	SURCHARGED
120 minute winter	CW01	246	141.131	0.031	5.0	0.0348	0.0000	OK
120 minute summer	CW02	248	140.419	0.029	5.0	0.0000	0.0000	OK
120 minute winter	S14	120	141.929	0.084	3.7	0.0133	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	S1	1.000	S2	19.5	1.276	0.375	0.5693	
15 minute summer	S2	1.001	S3	24.4	0.984	0.305	0.4986	
15 minute summer	S3	1.002	S6	48.1	1.364	0.927	0.9728	
15 minute summer	S3	Infiltration		0.0				
15 minute summer	S4	2.000	S3	5.1	0.676	0.286	0.1655	
15 minute summer	S4	Infiltration		0.0				
15 minute summer	RE1	3.000	S5	2.5	1.122	0.073	0.0331	
15 minute summer	RG4	4.000	S5	1.0	1.116	0.061	0.0025	
480 minute summer	S5	3.001	S6	1.0	0.585	0.053	0.0298	
480 minute summer	S5	Infiltration		0.0				
15 minute summer	S6	1.003	S11	54.5	1.892	0.872	0.1706	
15 minute summer	S7	5.000	S8	5.9	0.770	0.336	0.1766	
15 minute summer	S8	5.001	S10	8.9	0.740	0.501	0.1414	
15 minute summer	S9	6.000	S10	5.4	0.542	0.252	0.2334	
15 minute summer	S10	5.002	S11	19.1	1.343	0.864	0.1796	
30 minute summer	S11	1.004	S12	77.0	2.186	0.404	0.1941	
120 minute winter	S12	1.005	TANK	27.5	1.236	0.749	0.3705	
120 minute winter	TANK	1.006	S13 (FCC)	4.9	0.146	0.135	0.2648	
120 minute winter	S13 (FCC)	1.007	CW01	5.0	1.229	0.224	0.0263	
120 minute winter	CW01	1.009	CW02	5.0	1.993	0.084	0.0160	91.5
120 minute winter	S14	7.000	TANK	3.7	1.137	0.124	0.1346	

Results for 100 year +25% CC Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	143.427	0.114	24.7	0.0321	0.0000	OK
15 minute summer	S2	10	143.037	0.096	30.7	0.0271	0.0000	OK
15 minute summer	S3	11	142.870	0.410	58.6	0.1159	0.0000	SURCHARGED
15 minute summer	S4	11	142.893	0.190	6.4	0.0302	0.0000	SURCHARGED
15 minute summer	RE1	10	143.581	0.031	3.2	0.0000	0.0000	OK
15 minute summer	RG4	10	143.220	0.020	1.3	0.0032	0.0000	OK
120 minute summer	S5	76	143.033	0.032	4.5	6.1564	0.0000	OK
30 minute summer	S6	19	142.459	0.274	63.4	0.3103	0.0000	SURCHARGED
15 minute summer	S7	10	143.709	0.068	7.5	0.0109	0.0000	OK
15 minute summer	S8	11	143.529	0.114	11.3	0.0182	0.0000	OK
15 minute summer	S9	10	143.684	0.058	6.8	0.0092	0.0000	OK
15 minute summer	S10	11	143.490	0.195	23.0	0.0310	0.0000	SURCHARGED
30 minute summer	S11	19	142.296	0.196	92.0	0.2212	0.0000	OK
180 minute winter	S12	176	142.187	0.907	26.1	0.2567	0.0000	SURCHARGED
180 minute winter	TANK	176	142.187	0.953	29.3	99.6396	0.0000	SURCHARGED
180 minute winter	S13 (FCC)	176	142.186	0.986	5.4	1.7421	0.0000	SURCHARGED
60 minute summer	CW01	261	141.131	0.031	5.0	0.0348	0.0000	OK
60 minute summer	CW02	261	140.419	0.029	5.0	0.0000	0.0000	OK
180 minute winter	S14	176	142.187	0.342	3.5	0.0543	0.0000	SURCHARGED
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	S1	1.000	S2	24.4	1.351	0.470	0.6733	
15 minute summer	S2	1.001	S3	30.5	0.982	0.382	0.5742	
15 minute summer	S3	1.002	S6	58.1	1.461	1.120	1.0980	
15 minute summer	S3	Infiltration		0.0				
15 minute summer	S4	2.000	S3	7.2	0.708	0.407	0.2975	
15 minute summer	S4	Infiltration		0.0				
15 minute summer	RE1	3.000	S5	3.2	1.205	0.093	0.0394	
15 minute summer	RG4	4.000	S5	1.3	1.196	0.078	0.0029	
120 minute summer	S5	3.001	S6	1.9	0.703	0.099	0.0468	
120 minute summer	S5	Infiltration		0.0				
30 minute summer	S6	1.003	S11	63.5	1.858	1.016	0.2252	
15 minute summer	S7	5.000	S8	7.5	0.794	0.422	0.2517	
15 minute summer	S8	5.001	S10	10.9	0.759	0.616	0.1906	
15 minute summer	S9	6.000	S10	6.8	0.567	0.317	0.2761	
15 minute summer	S10	5.002	S11	22.9	1.358	1.037	0.2172	
30 minute summer	S11	1.004	S12	91.8	2.341	0.481	0.2357	
180 minute winter	S12	1.005	TANK	25.8	1.146	0.703	0.3705	
180 minute winter	TANK	1.006	S13 (FCC)	4.9	0.125	0.135	0.2648	
180 minute winter	S13 (FCC)	1.007	CW01	5.0	1.229	0.224	0.0263	
60 minute summer	CW01	1.009	CW02	5.0	1.993	0.084	0.0160	78.2
180 minute winter	S14	7.000	TANK	3.5	1.080	0.118	0.1712	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	143.437	0.124	28.6	0.0350	0.0000	OK
15 minute summer	S2	11	143.058	0.117	35.8	0.0332	0.0000	OK
30 minute summer	S3	19	142.951	0.491	63.0	0.1390	0.0000	SURCHARGED
30 minute summer	S4	20	142.964	0.261	11.0	1.5716	0.0000	SURCHARGED
15 minute summer	RE1	10	143.584	0.034	3.7	0.0000	0.0000	OK
15 minute summer	RG4	10	143.222	0.022	1.5	0.0034	0.0000	OK
120 minute summer	S5	72	143.040	0.040	5.3	6.5015	0.0000	OK
30 minute summer	S6	19	142.590	0.405	67.7	0.4576	0.0000	SURCHARGED
15 minute summer	S7	10	143.715	0.074	8.7	0.0117	0.0000	OK
15 minute summer	S8	11	143.668	0.254	13.0	0.0404	0.0000	SURCHARGED
15 minute summer	S9	10	143.689	0.063	7.9	0.0100	0.0000	OK
15 minute summer	S10	11	143.594	0.298	26.9	0.0475	0.0000	SURCHARGED
30 minute summer	S11	19	142.439	0.339	97.5	0.3833	0.0000	SURCHARGED
240 minute winter	S12	228	142.382	1.102	25.8	0.3118	0.0000	SURCHARGED
240 minute winter	TANK	228	142.381	1.148	28.7	119.9777	0.0000	SURCHARGED
240 minute winter	S13 (FCC)	228	142.380	1.180	5.3	2.0858	0.0000	SURCHARGED
30 minute winter	CW01	194	141.131	0.031	5.0	0.0348	0.0000	OK
30 minute winter	CW02	194	140.419	0.029	5.0	0.0000	0.0000	OK
240 minute winter	S14	228	142.381	0.536	3.3	0.0853	0.0000	SURCHARGED
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	S1	1.000	S2	28.5	1.373	0.548	0.7883	
15 minute summer	S2	1.001	S3	34.5	0.999	0.432	0.6236	
30 minute summer	S3	1.002	S6	58.6	1.473	1.129	1.0980	
30 minute summer	S3	Infiltration		0.0				
30 minute summer	S4	2.000	S3	18.5	1.051	1.046	0.2975	
30 minute summer	S4	Infiltration		0.0				
15 minute summer	RE1	3.000	S5	3.7	1.258	0.107	0.0437	
15 minute summer	RG4	4.000	S5	1.5	1.243	0.090	0.0033	
120 minute summer	S5	3.001	S6	2.9	0.785	0.147	0.0620	
120 minute summer	S5	Infiltration		0.0				
30 minute summer	S6	1.003	S11	65.9	1.856	1.054	0.2344	
15 minute summer	S7	5.000	S8	8.6	0.815	0.489	0.3001	
15 minute summer	S8	5.001	S10	12.3	0.747	0.693	0.2095	
15 minute summer	S9	6.000	S10	7.8	0.585	0.369	0.2845	
15 minute summer	S10	5.002	S11	26.7	1.515	1.207	0.2198	
30 minute summer	S11	1.004	S12	96.0	2.415	0.503	0.2453	
240 minute winter	S12	1.005	TANK	25.5	1.082	0.695	0.3705	
240 minute winter	TANK	1.006	S13 (FCC)	4.8	0.129	0.131	0.2648	
240 minute winter	S13 (FCC)	1.007	CW01	5.0	1.229	0.224	0.0263	
30 minute winter	CW01	1.009	CW02	5.0	1.993	0.084	0.0160	73.3
240 minute winter	S14	7.000	TANK	3.3	1.049	0.111	0.1712	

F.3 Proposed Foul Water System (FWS) Hydraulic Calculations

Design Settings

Frequency of use (kDU)	0.70	Additional Flow (%)	0	Preferred Cover Depth (m)	0.900
Flow per dwelling per day (l/day)	4000	Minimum Velocity (m/s)	1.00	Include Intermediate Ground	x
Domestic Flow (l/s/ha)	0.0	Connection Type	Level Soffits		
Industrial Flow (l/s/ha)	0.0	Minimum Backdrop Height (m)	1.000		

Nodes

Name	Dwellings	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
F1	23	144.003	450	389407.888	412846.653	1.050	142.953
F2		144.179	450	389419.353	412849.792	1.375	142.804
F3		144.213	450	389421.780	412849.625	1.000	143.213
J-F3		144.171		389422.001	412850.899	1.403	142.768
F4		144.180	450	389427.030	412851.265	1.000	143.180
J-F4		144.197		389427.352	412852.574	1.499	142.698
F5		144.180	450	389430.092	412852.218	1.000	143.180
J-F5		144.197		389430.490	412853.551	1.540	142.657
F6		144.268	450	389437.147	412854.426	1.000	143.268
F7		144.268	450	389437.981	412854.687	1.000	143.268
F8		144.150	450	389445.870	412858.077	1.000	143.150
F9		144.251	600	389438.686	412856.112	1.701	142.550
F10	1	144.372	450	389444.316	412872.490	1.100	143.272
J-F10		144.391		389434.462	412869.629	2.018	142.373
F11	1	144.367	450	389444.079	412872.967	1.100	143.267
J-F11		144.373		389434.289	412870.182	2.012	142.361
F12	1	144.349	450	389441.390	412882.836	1.000	143.349
J-F12		143.953		389431.238	412879.949	1.720	142.233
F13	1	144.341	450	389441.292	412883.267	1.000	143.341
J-F13		143.922		389431.065	412880.503	1.701	142.221
F14		143.625	600	389429.172	412885.795	1.475	142.150
CW01		143.515		389421.990	412883.475	2.365	141.150

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
1.000	F1	F2	11.887	1.500	142.953	142.804	0.149	80.0	150
1.001_1	F2	J-F3	2.870	1.500	142.804	142.768	0.036	80.0	150
1.001_2	J-F3	J-F4	5.607	1.500	142.768	142.698	0.070	80.0	150
1.001_3	J-F4	J-F5	3.287	1.500	142.698	142.657	0.041	80.0	150
1.001_4	J-F5	F9	8.587	1.500	142.657	142.550	0.107	80.0	150
10.000	F12	J-F12	10.555	1.500	143.349	142.283	1.066	9.9	100
1.002_1	F9	J-F10	14.162	1.500	142.550	142.373	0.177	80.0	150
1.002_2	J-F10	J-F11	1.000	1.500	142.373	142.361	0.012	80.0	150
1.002_3	J-F11	J-F12	10.232	1.500	142.361	142.233	0.128	80.0	150
1.002_4	J-F12	J-F13	1.000	1.500	142.233	142.221	0.012	80.0	150
1.002_5	J-F13	F14	5.620	1.500	142.221	142.150	0.071	79.2	150
1.003	F14	CW01	7.547	1.500	142.150	141.150	1.000	7.5	150
2.000	F3	J-F3	1.293	1.500	143.213	142.818	0.395	3.3	100
3.000	F4	J-F4	1.348	1.500	143.180	142.748	0.432	3.1	100

Name	Pro Vel @ 1/3 Q (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Dwellings (ha)	Σ Units (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	0.375	0.980	17.3	1.1	0.900	1.225	0.000	23	0.0	0.0	25	0.536
1.001_1	0.375	0.980	17.3	1.1	1.225	1.253	0.000	23	0.0	0.0	25	0.536
1.001_2	0.375	0.980	17.3	1.1	1.253	1.349	0.000	23	0.0	0.0	25	0.536
1.001_3	0.375	0.980	17.3	1.1	1.349	1.390	0.000	23	0.0	0.0	25	0.536
1.001_4	0.375	0.980	17.3	1.1	1.390	1.551	0.000	23	0.0	0.0	25	0.536
10.000	0.293	2.124	16.7	0.0	0.900	1.570	0.000	1	0.0	0.0	4	0.425
1.002_1	0.375	0.980	17.3	1.1	1.551	1.868	0.000	23	0.0	0.0	25	0.536
1.002_2	0.385	0.980	17.3	1.1	1.868	1.862	0.000	24	0.0	0.0	26	0.544
1.002_3	0.385	0.980	17.3	1.2	1.862	1.570	0.000	25	0.0	0.0	27	0.552
1.002_4	0.395	0.980	17.3	1.2	1.570	1.551	0.000	26	0.0	0.0	27	0.560
1.002_5	0.397	0.985	17.4	1.3	1.551	1.325	0.000	27	0.0	0.0	27	0.563
1.003	0.907	3.201	56.6	1.3	1.325	2.215	0.000	27	0.0	0.0	16	1.266
2.000	0.000	3.698	29.0	0.0	0.900	1.253	0.000	0	0.0	0.0	0	0.000
3.000	0.000	3.788	29.7	0.0	0.900	1.349	0.000	0	0.0	0.0	0	0.000

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
4.000	F5	J-F5	1.391	1.500	143.180	142.707	0.473	2.9	100
5.000	F6	F9	2.283	1.500	143.268	142.600	0.668	3.4	100
6.000	F7	F9	10.232	1.500	143.268	142.600	0.668	15.3	100
7.000	F8	F9	7.448	1.500	143.150	142.600	0.550	13.5	100
11.000	F13	J-F13	10.594	1.500	143.341	142.271	1.070	9.9	100
8.000	F10	J-F10	10.261	1.500	143.272	142.423	0.849	12.1	100
9.000	F11	J-F11	10.178	1.500	143.267	142.411	0.856	11.9	100

Name	Pro Vel @ 1/3 Q (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Dwellings (ha)	Σ Units (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)
4.000	0.000	3.902	30.6	0.0	0.900	1.390	0.000	0	0.0	0.0	0	0.000
5.000	0.000	3.619	28.4	0.0	0.900	1.551	0.000	0	0.0	0.0	0	0.000
6.000	0.000	1.707	13.4	0.0	0.900	1.551	0.000	0	0.0	0.0	0	0.000
7.000	0.000	1.815	14.3	0.0	0.900	1.551	0.000	0	0.0	0.0	0	0.000
11.000	0.293	2.124	16.7	0.0	0.900	1.551	0.000	1	0.0	0.0	4	0.425
8.000	0.265	1.922	15.1	0.0	1.000	1.868	0.000	1	0.0	0.0	4	0.384
9.000	0.267	1.938	15.2	0.0	1.000	1.862	0.000	1	0.0	0.0	4	0.387

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	11.887	80.0	150	Circular	144.003	142.953	0.900	144.179	142.804	1.225
1.001_1	2.870	80.0	150	Circular	144.179	142.804	1.225	144.171	142.768	1.253
1.001_2	5.607	80.0	150	Circular	144.171	142.768	1.253	144.197	142.698	1.349
1.001_3	3.287	80.0	150	Circular	144.197	142.698	1.349	144.197	142.657	1.390
1.001_4	8.587	80.0	150	Circular	144.197	142.657	1.390	144.251	142.550	1.551
10.000	10.555	9.9	100	Circular	144.349	143.349	0.900	143.953	142.283	1.570
1.002_1	14.162	80.0	150	Circular	144.251	142.550	1.551	144.391	142.373	1.868
1.002_2	1.000	80.0	150	Circular	144.391	142.373	1.868	144.373	142.361	1.862
1.002_3	10.232	80.0	150	Circular	144.373	142.361	1.862	143.953	142.233	1.570
1.002_4	1.000	80.0	150	Circular	143.953	142.233	1.570	143.922	142.221	1.551
1.002_5	5.620	79.2	150	Circular	143.922	142.221	1.551	143.625	142.150	1.325
1.003	7.547	7.5	150	Circular	143.625	142.150	1.325	143.515	141.150	2.215
2.000	1.293	3.3	100	Circular	144.213	143.213	0.900	144.171	142.818	1.253
3.000	1.348	3.1	100	Circular	144.180	143.180	0.900	144.197	142.748	1.349
4.000	1.391	2.9	100	Circular	144.180	143.180	0.900	144.197	142.707	1.390
5.000	2.283	3.4	100	Circular	144.268	143.268	0.900	144.251	142.600	1.551
6.000	10.232	15.3	100	Circular	144.268	143.268	0.900	144.251	142.600	1.551
7.000	7.448	13.5	100	Circular	144.150	143.150	0.900	144.251	142.600	1.551
11.000	10.594	9.9	100	Circular	144.341	143.341	0.900	143.922	142.271	1.551
8.000	10.261	12.1	100	Circular	144.372	143.272	1.000	144.391	142.423	1.868

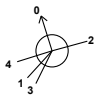
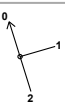
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	F1	450	Manhole	Plastic Inspection Chamber	F2	450	Manhole	Plastic Inspection Chamber
1.001_1	F1	450	Manhole	Plastic Inspection Chamber	J-F3		Junction	
1.001_2	J-F3		Junction		J-F4		Junction	
1.001_3	J-F4		Junction		J-F5		Junction	
1.001_4	J-F5		Junction		F9	600	Manhole	Concrete Manhole Chamber
10.000	F12	450	Manhole	Plastic Inspection Chamber	J-F12		Junction	
1.002_1	F9	600	Manhole	Concrete Manhole Chamber	J-F10		Junction	
1.002_2	J-F10		Junction		J-F11		Junction	
1.002_3	J-F11		Junction		J-F12		Junction	
1.002_4	J-F12		Junction		J-F13		Junction	
1.002_5	J-F13		Junction		F14	600	Manhole	Concrete Manhole Chamber
1.003	F14	600	Manhole	Concrete Manhole Chamber	CW01		Junction	
2.000	F3	450	Manhole	Plastic Inspection Chamber	J-F3		Junction	
3.000	F4	450	Manhole	Plastic Inspection Chamber	J-F4		Junction	
4.000	F5	450	Manhole	Plastic Inspection Chamber	J-F5		Junction	
5.000	F6	450	Manhole	Plastic Inspection Chamber	F9	600	Manhole	Concrete Manhole Chamber
6.000	F7	450	Manhole	Plastic Inspection Chamber	F9	600	Manhole	Concrete Manhole Chamber
7.000	F8	450	Manhole	Plastic Inspection Chamber	F9	600	Manhole	Concrete Manhole Chamber
11.000	F13	450	Manhole	Plastic Inspection Chamber	J-F13		Junction	
8.000	F10	450	Manhole	Plastic Inspection Chamber	J-F10		Junction	

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)
9.000	10.178	11.9	100	Circular	144.367	143.267	1.000	144.373	142.411	1.862

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
9.000	F11	450	Manhole	Plastic Inspection Chamber	J-F11		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
F1	389407.888	412846.653	144.003	1.050	450				
						0	1.000	142.953	150
F2	389419.353	412849.792	144.179	1.375	450		1	1.000	142.804
						0	1.001_1	142.804	150
F3	389421.780	412849.625	144.213	1.000	450				
						0	2.000	143.213	100
J-F3	389422.001	412850.899	144.171	1.403			1	2.000	142.818
						2	1.001_1	142.768	150
						0	1.001_2	142.768	150
F4	389427.030	412851.265	144.180	1.000	450				
						0	3.000	143.180	100
J-F4	389427.352	412852.574	144.197	1.499			1	3.000	142.748
						2	1.001_2	142.698	150
						0	1.001_3	142.698	150
F5	389430.092	412852.218	144.180	1.000	450				
						0	4.000	143.180	100
J-F5	389430.490	412853.551	144.197	1.540			1	4.000	142.707
						2	1.001_3	142.657	150
						0	1.001_4	142.657	150
F6	389437.147	412854.426	144.268	1.000	450				
						0	5.000	143.268	100
F7	389437.981	412854.687	144.268	1.000	450				
						0	6.000	143.268	100
F8	389445.870	412858.077	144.150	1.000	450				
						0	7.000	143.150	100
F9	389438.686	412856.112	144.251	1.701	600		1	5.000	142.600
						2	7.000	142.600	100
						3	6.000	142.600	100
						4	1.001_4	142.550	150
						0	1.002_1	142.550	150
F10	389444.316	412872.490	144.372	1.100	450				
						0	8.000	143.272	100
J-F10	389434.462	412869.629	144.391	2.018			1	8.000	142.423
						2	1.002_1	142.373	150
						0	1.002_2	142.373	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
F11	389444.079	412872.967	144.367	1.100	450					
						0	9.000	143.267	100	
J-F11	389434.289	412870.182	144.373	2.012			1	9.000	142.411	100
						2	1.002_2	142.361	150	
						0	1.002_3	142.361	150	
F12	389441.390	412882.836	144.349	1.000	450					
						0	10.000	143.349	100	
J-F12	389431.238	412879.949	143.953	1.720			1	10.000	142.283	100
						2	1.002_3	142.233	150	
						0	1.002_4	142.233	150	
F13	389441.292	412883.267	144.341	1.000	450					
						0	11.000	143.341	100	
J-F13	389431.065	412880.503	143.922	1.701			1	11.000	142.271	100
						2	1.002_4	142.221	150	
						0	1.002_5	142.221	150	
F14	389429.172	412885.795	143.625	1.475	600		1	1.002_5	142.150	150
						0	1.003	142.150	150	
CW01	389421.990	412883.475	143.515	2.365			1	1.003	141.150	150