

Drainage Technical Note

Whitefield Centre
Temporary Modular School

for
Bury Council



14 / 03 / 2025

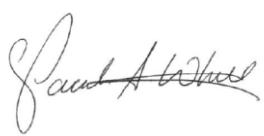


COMPLEX CHALLENGES ...
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Drainage Technical Note

Whitefield Centre
Temporary Modular School

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Bury Council

TITLE	NAME	SIGNATURE	DATE
Report Author	ANDY JAMES		14/03/2025
Approved By	PAUL WHITE		14/04/2025
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Issue No REV02			
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1.0 71228 CONDITION 5

Prior to the commencement of development, details of a sustainable surface water drainage scheme and a foul water drainage scheme shall be submitted to and approved in writing by the Local Planning Authority. The drainage schemes must include:

- (i) An investigation of the hierarchy of drainage options in the National Planning Practice Guidance (or any subsequent amendment thereof). This investigation shall include evidence of an assessment of ground conditions and the potential for infiltration of surface water in accordance with BRE365;
- (ii) A restricted rate of discharge of surface water agreed with the local planning authority (if it is agreed that infiltration is discounted by the investigations);
- (iii) Levels of the proposed drainage systems including proposed ground and finished floor levels in AOD;
- (iv) Incorporate mitigation measures to manage the risk of sewer surcharge where applicable; and
- (v) Foul and surface water shall drain on separate systems.

The approved schemes shall also be in accordance with the Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) or any subsequent replacement national standards.

Prior to occupation of the proposed development, the drainage schemes shall be completed in accordance with the approved details and retained thereafter for the lifetime of the development.

Reason.

The current application contains insufficient information regarding the proposed drainage scheme to fully assess the impact. To promote sustainable development, secure proper drainage and to manage the risk of flooding and pollution pursuant to PfE Policy JP-S4 - Flood Risk and the Water Environment and chapter 14 - Meeting the challenge of climate change, flooding and coastal change of the NPPF.



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2.0 INTRODUCTION

2.1 Purpose of the Report

This drainage technical note has been prepared for Bury Council Lead Local Flood Authority to satisfy Condition 5 of application 71228 which was granted consent on the 19/02/2025.

This document should be read in conjunction with the following drawings:

4872-ROC-ZZ-XX-DR-C-0500	Existing Drainage Survey & Catchment Areas
4872-ROC-ZZ-XX-DR-C-0501	Foul & Surface Drainage General Arrangement
4872-ROC-ZZ-XX-DR-C-0502	Foul & Surface Drainage Manhole Schedules
4872-ROC-ZZ-XX-DR-C-0503	Typical Drainage Construction Details Sheet 1
4872-ROC-ZZ-XX-DR-C-0504	Typical Drainage Construction Details Sheet 2

2.2 Proposed Development

The proposal is for the installation of new temporary modular buildings at Whittaker Street, Bury. The temporary structures will be used as additional classrooms and facilities to accommodate increased student numbers at the Whitefield Centre.

The temporary accommodation will be used for a period of four years, during which time a permanent structure will be built. The temporary nature of the proposal ensures that the site can revert to its original state once the buildings are no longer required.

A copy of the site layout is included in Appendix A.

2.3 Existing Site and Location

The site is located between Whittaker Street and Parsonage Street, Radcliffe, Bury. A 2-storey red brick building previously occupied the site, which was a former school building and, in more recent times, had been used as office space. This has since been demolished to make way for the proposed development.

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Figure 1.0 – Pre Demolition Site

The existing site is currently vacant and unused following removal of the buildings and areas of hardstanding. There are a few mature trees and shrubs in the northwest corner which are to be retained. The boundary conditions are a mixture of brick walls, fencing and railings.

A topographic survey of the post-demolition site is provided in Appendix B

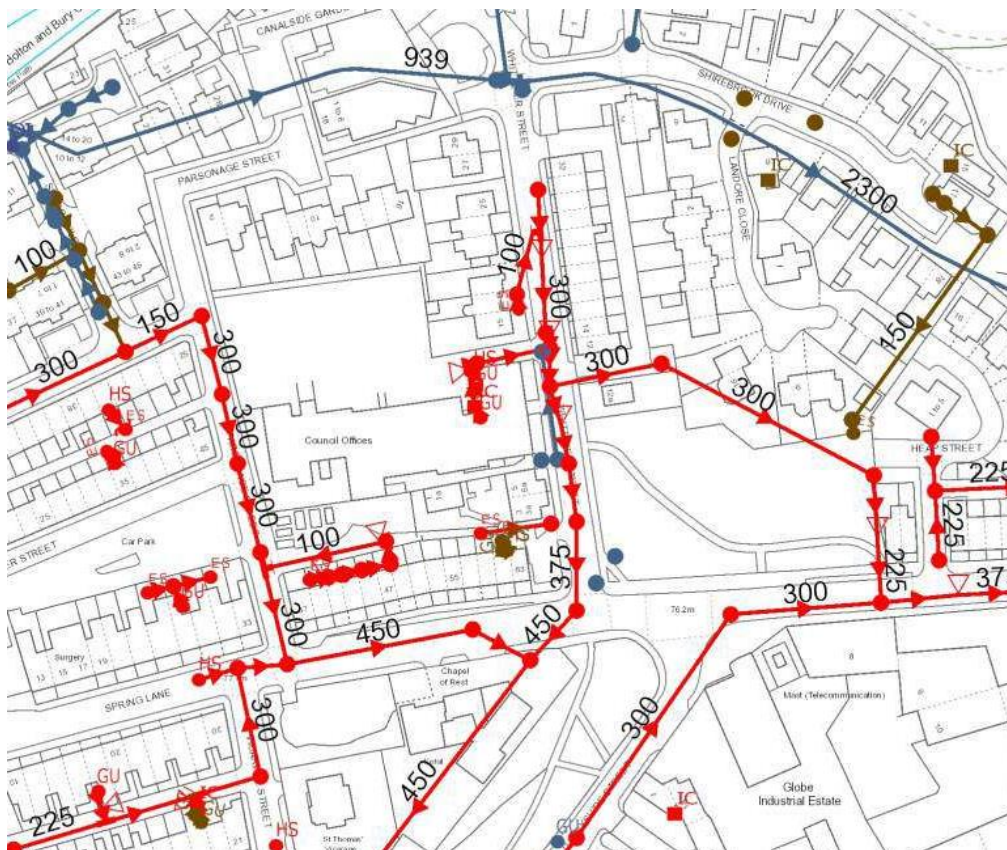
3.0 DRAINAGE STRATEGY

3.1 Existing Drainage

Public Sewers

United Utilities records indicate a number of sewers within the highway network surrounding the site.

Combined sewers, 300mm in diameter, are indicated in both Whittaker Street and Parsonage Street either side of the site. These flow in a southerly direction. A small section of combined sewer is also indicated within the site which served the now demolished Council building. This is to be retained and utilised within the proposed drainage scheme.



In addition, a short length of surface water sewer is also shown to be present within Whittaker Street. This is suggested to flow northward towards what appears to be a culverted watercourse at the junction with Shirebrook Drive. However, the records are incomplete, and it is not clear where the sewer connects to.

A copy of the public sewer records are included in Appendix C.

Private Drainage

In addition to the public sewers, the site also contains private drainage which served the former council building and external hard paved areas. Some of this was removed as part of the demolition/ remediation of the site however, there are remnants of this system still present.

A drainage CCTV survey was undertaken to establish condition and connectivity of this network, a copy of this along with other drainage record information if provided in Appendix C.

3.2 Surface Water Drainage

3.2.1 Pre-development Surface Water Runoff

For the purpose of determining the existing rate of surface water runoff, the development is considered to be brownfield.

An assessment of existing surface water discharge rates has been undertaken by modelling the existing drainage network using the survey/ record information available and the topographic survey. A copy of these calculations and the associated drawing can be found in Appendix D.

The table below summarises the peak surface water discharge rates for the existing site.

Q1 (l/s)	Q30 (l/s)	Q100 (l/s)
43.8	116.3	149.4

3.2.2 Methods of Surface Water Management

There are three methods that have been reviewed for the management and discharge of surface water which are detailed below; these may be applied individually or collectively to form a complete strategy. They should be applied in the order of priority as listed.

- Discharge via infiltration;
- Discharge to watercourse;
- Discharge to public sewerage system.

Discharge via Infiltration

The BGS website defines the Superficial geology as glacial till (Secondary Undifferentiated Aquifer) comprising clay to sandy clay, unsorted, with common pebbles, cobbles and some boulders (Diamicton). Solid geology is shown to be Upper Carboniferous (Pennsylvanian) (Secondary A Aquifer) strata of the Pennine Middle Coal Measures Formation which are described as mudstone and siltstone interbedded with fine- to medium grained sandstone, marine bands and coal seams.

The LandIs soilscape map viewer indicates that the site is in an area with slowly permeable seasonally wet acid loamy and clayey soils with impeded drainage.

No intrusive investigation works have been undertaken at the site. However, a review of the Phase 2 site investigation report that accompanied the nearby Star Radcliffe Academy development (200m east) indicates infiltration rates ranging from $\times 10^{-5}$ to $\times 10^{-7}$. It is anticipated that similar values can be expected here.

Taking the above into consideration, along with the brownfield nature of the existing site, discharge by infiltration is not expected to be feasible.

Discharge to Watercourse or other Water Feature

The nearest open watercourse is the River Irwell which is circa 500m to the South of the site. The Manchester, Bolton & Bury Canal (disused) is located circa 150m to the North. A connection to either of these features is not considered to be practicable.

Discharge to Surface Water Sewer

A surface water sewer is present within Whittaker Street which potentially connects into a culverted watercourse identified further north however, the extent of this has not been proven.

Whilst a connection to this feature would be technically feasible, as the existing site discharges to the combined sewer network, any new connection would require discharge to be limited to greenfield run-off. This would subsequently require significant surface water attenuation to be provided along with proprietary water quality measures which are not considered a practicable solution for a temporary time limited development such as this.

Discharge to Combined Sewer

The final option in the drainage hierarchy is a connection to the public combined sewer network which is present within and adjacent to the site. This would be in line with the existing site regime and allow re-use of existing drainage apparatus, minimising any off-site works.

3.2.3 Surface Water Drainage Scheme

As described above, the most appropriate method of surface water disposal for this temporary development is to maintain the existing site regime and discharge to the on-site public combined sewer network, subject to agreement with the LLFA and United Utilities.

This would help to minimise the extent of any proposed drainage works that would be required to serve the temporary development.

The proposed drainage scheme has been developed to provide a new surface water drainage system which collects run-off from the modular buildings along with external areas of hardstanding. This is then conveyed towards Whittaker Street where it connects onto the public combined sewer near the eastern boundary.

The drainage system has been modelled with both a free flowing and surcharged outfall with both sets of calculations provided in Appendix F and G respectively.

The calculations demonstrate that the proposed surface water drainage system operates satisfactorily, and discharge rates do not exceed the pre-development scenario.

The table below summarises the peak surface water discharge rates for the proposed site.

Q1 (l/s)	Q30 (l/s)	Q100 (l/s)
42.1	106.1	133.2



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A copy of the drainage layout drawing is included in Appendix D.

3.3 Foul Water Drainage

It is proposed to install a new foul drainage system to serve the proposed modular buildings.

The foul water system has been designed in accordance with the current Building Regulations, BS EN:752 'Drainage and Sewer Systems Outside Buildings' and Sewerage Sector Guidance (Appendix C).

Foul flow rates have been calculated based on appliances shown on the architectural layouts in accordance with BS EN 12056-2:2000.

The approximate peak foul flow generated through this methodology is in the region of **3.54 l/s**. A pre-development enquiry has been submitted to United Utilities based on this figure and a response is awaited.

Similar to the surface water drainage, it is proposed that foul water will utilise the existing on-site piped network which ultimately discharges to the public combined sewer system in Whittaker Street.

4.0 MANAGEMENT PLAN

The proposed drainage system for the development adopts a series of traditional drainage techniques. It is important that these are maintained to ensure that all elements operate effectively. Effective maintenance will help to ensure that the drainage features continue to function as they were intended.

The following table sets out typical maintenance requirements for the various drainage features across the site.

Drainage Feature		Action Required	Typical Frequency
Gully's & Channels	Occasional Maintenance	Inspect cover and frame for any defects, repair and replace as necessary.	Quarterly
		Inspect channels for the build-up of silt and debris. Removal of silt and debris by means of vacuum suction and or jetting/ rodding.	
		Inspect sumps and outgoing pipework for the build-up of silt and debris. Removal of silt and debris by means of vacuum suction and or jetting/ rodding.	
Manholes/ Catchpits	Occasional Maintenance	Inspect chamber cover and frame for any defects, repair and replace as necessary. Inspect chamber interior and incoming/ outgoing pipes for the build-up of silt and debris. Removal of silt and debris by means of vacuum suction and or jetting/ rodding. Ensure manhole access steps/ ladders are secured and inspect for corrosion.	Quarterly

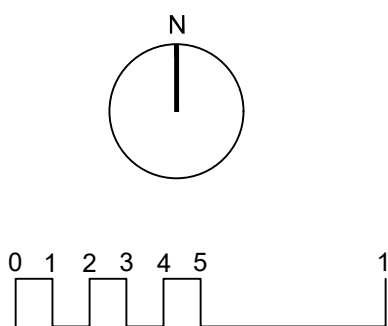


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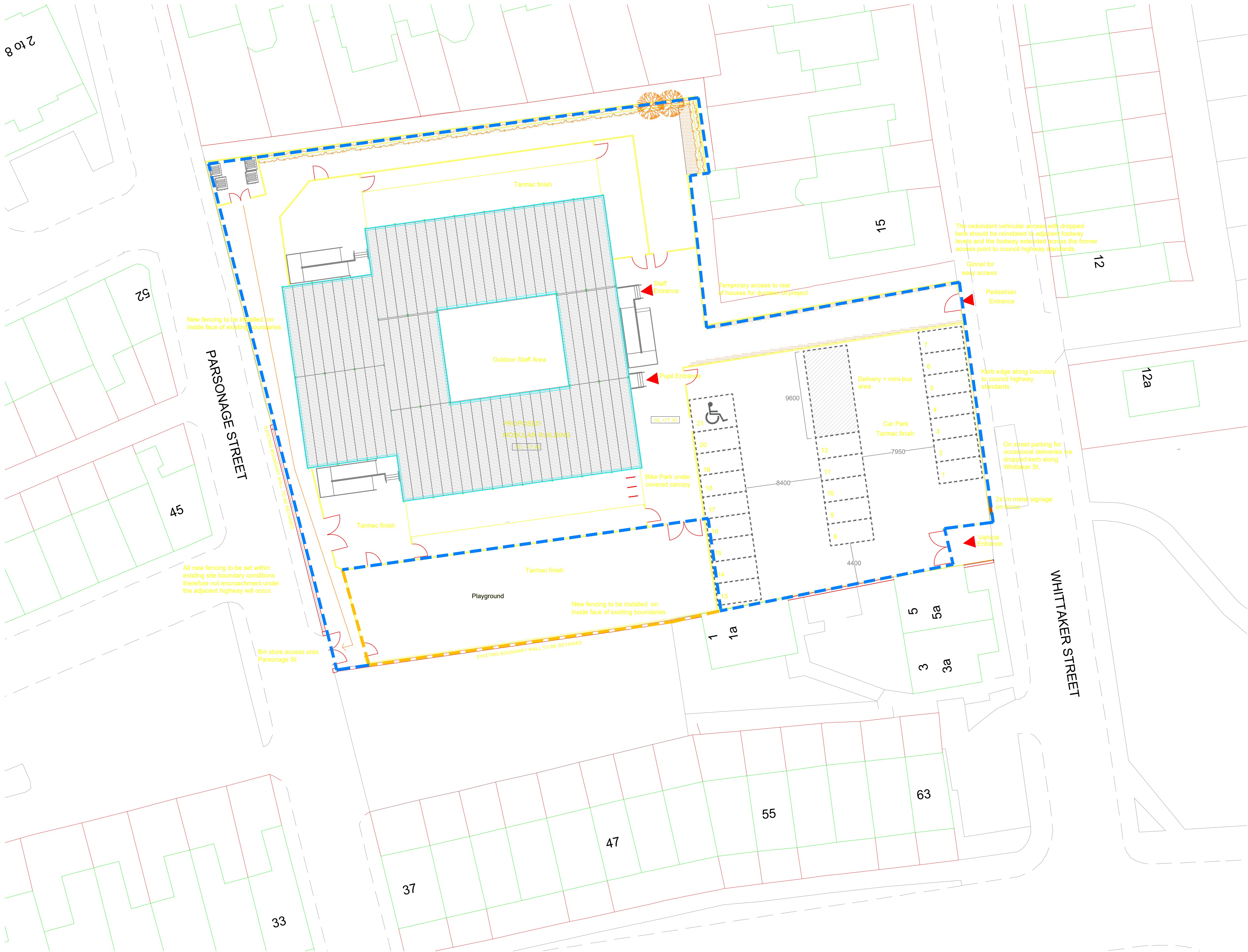
APPENDIX A – Site Layout

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2.4m HIGH PALADIN FENCING
3.0m HIGH PALADIN FENCING



D	PLANNING AMENDMENTS	29.01.25
C	PLANNING AMENDMENTS	22.01.25
B	PLANNING AMENDMENTS	16.01.25
A1	Issued for approval	--/--/--
Rev	Description	Date
Client:		
Project: SCHOOL, WHITEFIELD, BURY		
Title: PROPOSED SITE / BLOCK PLAN		
Project No:	Drawing No:	Revision:
•MM2407	•P-002	•C
Drawn By:	Date:	
GM	12/09/24	
Scale:	Approved:	
1:200 @ A1	XX	
Drawing Status: PLANNING		
\\L:\MM2 - MM2402 Kershaw, Bury\MM2402 03-Stage 0-3 Design\SitePlan\Planning		
3 Creagh Business Park Creagh, Toomebridge, BT41 3UF email: info@pmcveybuildingsystems.com Tel: 028 7941 8670 www.pmcveybuildingsystems.com		

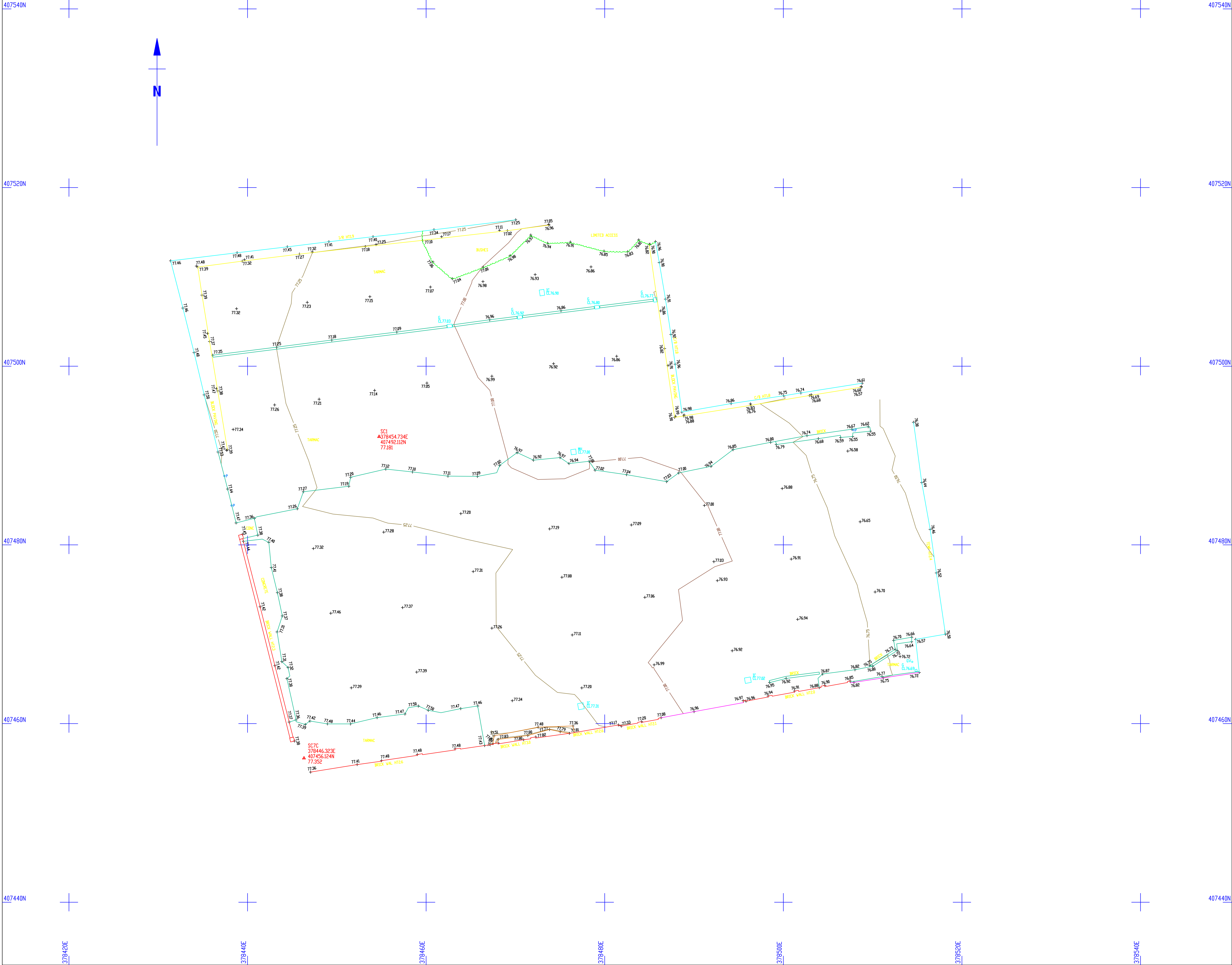


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APPENDIX B – Topo Survey

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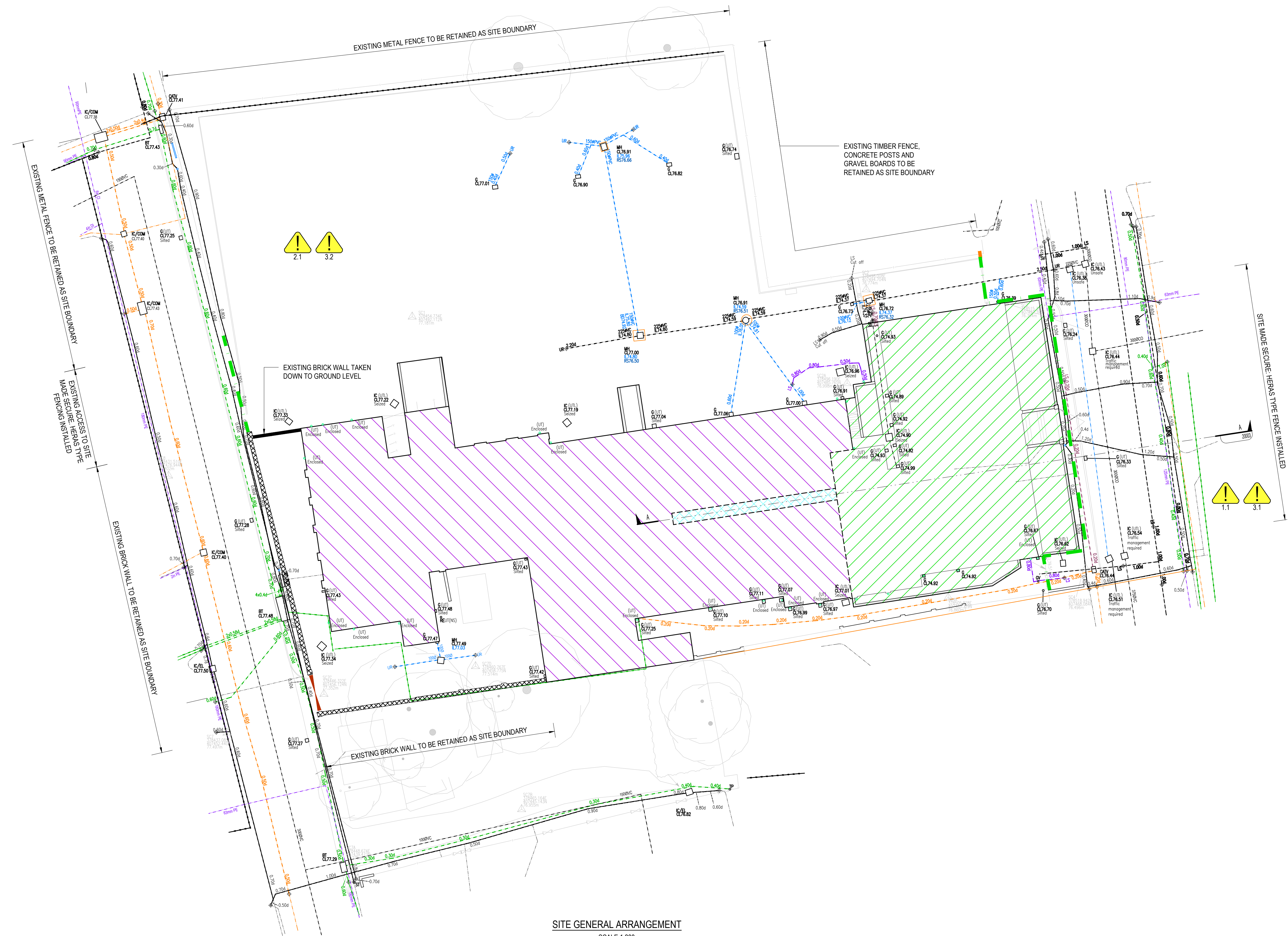


A1	Issued for approval	---/---/---
Rev	Description	Date
Client:		
Project: SCHOOL, WHITEFIELD, BURY		
Title: TOPOGRAPHICAL SURVEY		
Project No: •MM2407	Drawing No: •P-003	Revision: •A1
Drawn By: GM	Date: 12/09/24	
Scale: 1:200 @ A1	Approved: XX	
Drawing Status: PLANNING		
\Screenshot 2024-09-17 100102.jpg		
3 Creagh Business Park Creagh, Toomebridge, BT41 3UF email: info@pmcveybuildingsystems.com Tel: 028 7941 8670 www.pmcveybuildingsystems.com		



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APPENDIX C – Existing Drainage



SITE GENERAL ARRANGEMENT
SCALE 1:200

SECTION 'A-A'
SCALE 1:100

GENERAL NOTES:

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- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
- FOR GENERAL NOTES REFER TO DRAWING.
- ALL DIMENSIONS ON THIS DRAWING ARE ESTIMATED AND NOT BASED ON MEASURED SURVEY. ALL DIMENSIONS TO BE CONFIRMED ON SITE.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH PROPOSED DEMOLITION SPECIFICATION DOCUMENT 083254-CUR-ZZ-ZZ-T-S-00003 AND PRE-DEMOLITION SPECIFICATION DOCUMENT 083254-CUR-ZZ-ZZ-T-S-0002.

LEGEND:

- HATCHED AREA INDICATES EXISTING UNDER FLOOR DUCT TO BE INFILLED. TOP OF INFILL TO BE APPROXIMATELY 77.40
- HATCHED AREA INDICATES EXISTING GROUND FLOOR REMOVED. TOP OF INFILL TO BE APPROXIMATELY 77.40
- HATCHED AREA INDICATES EXISTING BASEMENT TO BE INFILLED. TOP OF INFILL TO BE APPROXIMATELY 77.40
- DENOTES EXTENTS OF SUGGESTED HERAS TYPE FENCING
- DENOTES BACKFILL TO TIE IN WITH EXISTING SURROUNDING LEVELS. BACKFILL TO BE LAID AND COMPACTED IN MAXIMUM 150mm THICK LAYERS. BACKFILL TO BE PLACED BY DEMOLITION CONTRACTOR TO ACHIEVE A MINIMUM CBR = 5%.

RESIDUAL HAZARD REGISTER

(RELATES TO CIVIL/STRUCTURAL MATTERS ONLY) MUST BE READ IN CONJUNCTION WITH CURTINS RESIDUAL HAZARD REGISTER 083254-CUR-00-00-44-10001. HAZARDS THAT SHOULD BE OBVIOUS TO A COMPETENT CONTRACTOR HAVE NOT BEEN INDICATED ON THIS DRAWING. SHOULD ANY ADDITIONAL HAZARDS BE IDENTIFIED, THE CONTRACTOR SHOULD NOTIFY ALL RELEVANT PROJECT TEAM MEMBERS

HAZARD REF No.	ITEM (FEATURE, ELEMENT OR ACTIVITY)	RESIDUAL HAZARD
1.1	Proximity to busy highway	Dangers entering/exiting site and danger of disturbing highway retention structures
3.1	Existing services in pavement on Whittaker Street	Excavation / demolition adjacent to existing live services.
3.2	Existing services on wider site	Unknown services on sections of site to be re-levelled. SI required to determine exact locations prior to works

CR	CONSTRUCTION RECORD	05.08.24	KRT	JRR
Rev:	Description:	Date:	By:	Chkd:

Curtins

Units 24-25 Riverside Place, K Village, Lound Road, Kendal, LA9 7FH
01539 724823
kendal@curtins.com
www.curtins.com

Civils & Structures • Transport Planning • Environmental • Infrastructure • Geotechnical • Conservation & Heritage • Principal Designer
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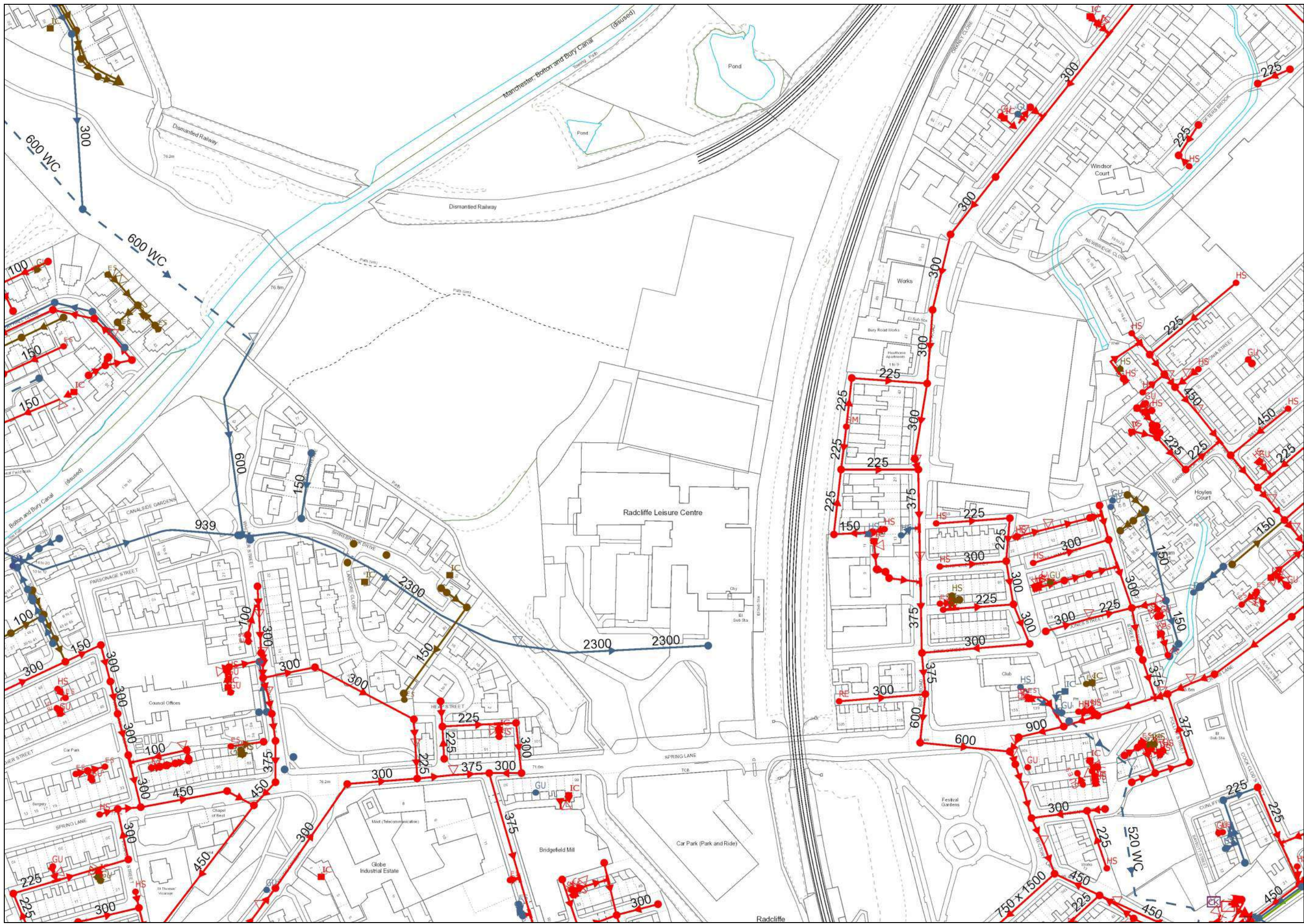
Status: **FINAL CONSTRUCTION** **CR**

Project: **WHITTAKER STREET, RADCLIFFE**

Dwg Title: **POST DEMOLITION REDUCED LEVELS**

Drawn By NG	Designed By JR	Checked By JR
Date 18/07/23	Scales @ A1 1:100/200	Revision

Project No - Originator - Function - Spatial - Form - Discipline - Number
083254 - CUR - ZZ - ZZ - D - S - 20003 **CR**



United Utilities Maps
for SafeDig

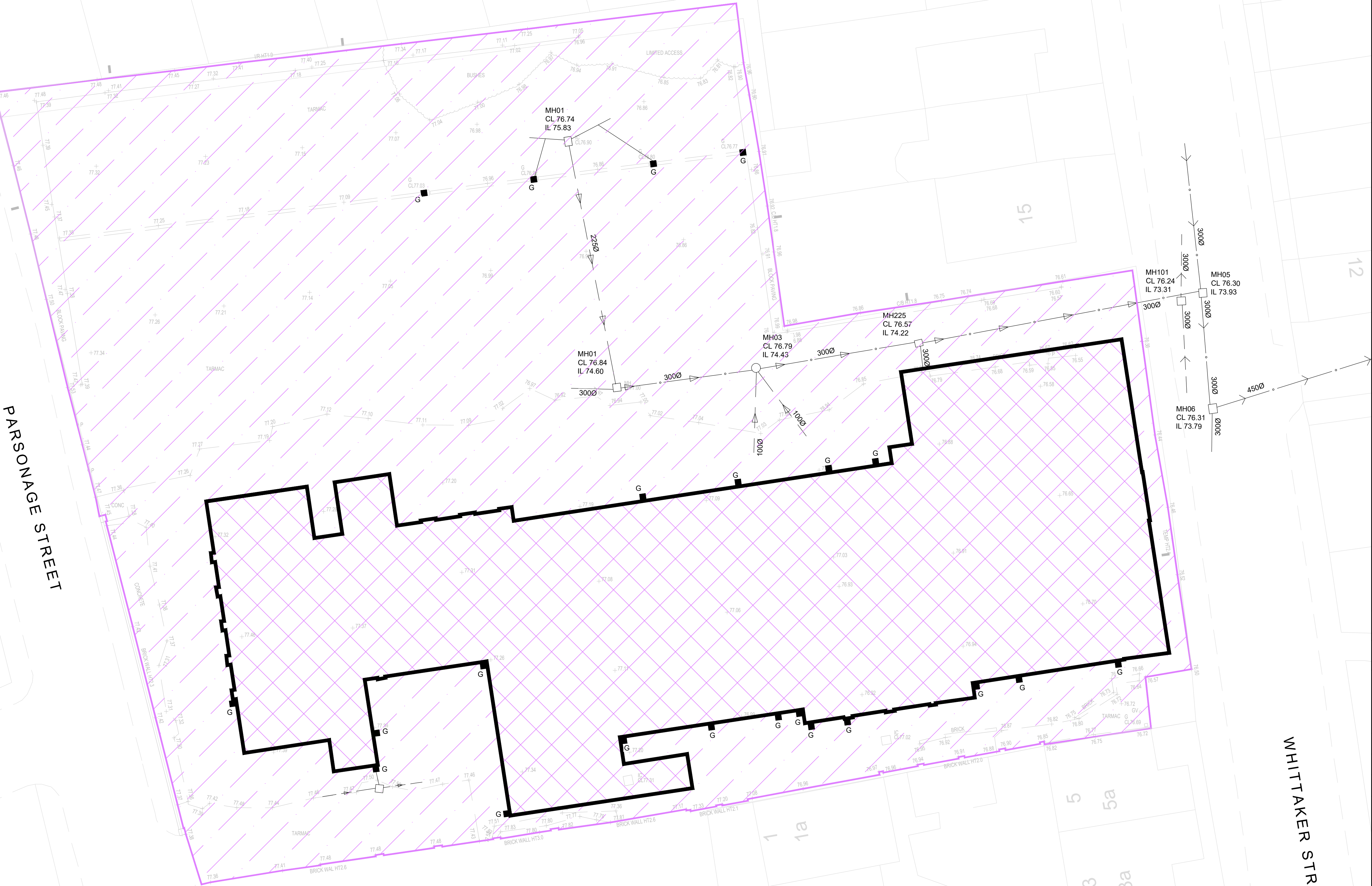
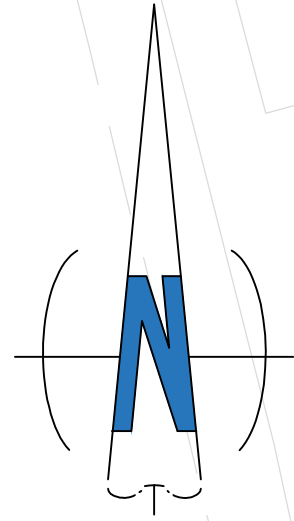
Date :	
Centre X:	378736
Centre Y:	407606
Scale :	2000
UserName:	

Extract from maps of United Utilities'
Underground Assets

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private service pipes may be shown by a blue broken line. United Utilities Water will not accept liability for any damage caused by the actual position being different from those shown.

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PARSONAGE STREET

WHITTAKER STREET

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 - ALL DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL AUTHORITY AND IN CONJUNCTION WITH ALL RELEVANT BRITISH STANDARDS, CODES OF PRACTICE AND WATER UK DOCUMENT DESIGN AND CONSTRUCTION GUIDANCE FOR FOUL AND SURFACE WATER SEWERS.
 - THE PROPOSED BUILDING LAYOUTS SHOWN ON THIS DRAWING ARE FOR INFORMATION ONLY. REFER TO ARCHITECTS PLANS FOR PRECISE LOCATION SETTING OUT INFORMATION AND DETAILS.

- LEGEND**
- DEMOLISHED BUILDING
 - EXISTING HARDSTANDING
 - EXISTING BUILDING
 - EXISTING COMBINED DRAIN
 - EXISTING SURFACE WATER DRAIN
 - EXISTING GULLY
 - EXISTING COMBINED SEWER
 - EXISTING SURFACE WATER SEWER

P01	17.03.25	PRELIMINARY ISSUE	ARJ	MN
REV	DATE	DETAILS	DRN	CHK

DRAWING STATUS
PLANNING

RIBA STAGE
STAGE 4



Fourways House
RoC Consulting
3rd Floor, 57 Hilton Street
Manchester M1 2EJ
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W rococonsulting.com

DRAWN ARJ	DATE MAR 25	SCALES 1:150
CHECKED FAW	DATE MAR 25	THE ABOVE SCALES APPLY WHEN PLOTTED AT 1:150 -DO NOT SCALE-
APPRVD. MN	DATE MAR 25	EMAIL FOR DRAWINGS info@rococonsulting.com

CLIENT

PROJECT TITLE
**WHITEFIELD CENTRE
TEMPORARY MODULAR SCHOOL**

DRAWING TITLE
**EXISTING DRAINAGE SURVEY
AND CATCHMENT AREAS**

DRAWING No. 4872/ROC/ZZ/XX/DR/C/0500	REV. P01
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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for EX STORM

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales			
Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.306	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for EX STORM

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.340	4-8	0.039

Total Area Contributing (ha) = 0.379

Total Pipe Volume (m³) = 3.751

Network Design Table for EX STORM

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	18.226	1.080	16.9	0.192	4.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	10.229	0.170	60.2	0.187	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.002	11.914	0.210	56.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.003	20.664	0.290	71.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	4.09	75.830	0.192	0.0	0.0	0.0	3.20	127.3	26.0
S1.001	50.00	4.18	74.675	0.379	0.0	0.0	0.0	2.03	143.5	51.3
S1.002	50.00	4.27	74.505	0.379	0.0	0.0	0.0	2.09	147.8	51.3
S1.003	50.00	4.46	74.295	0.379	0.0	0.0	0.0	1.86	131.8	51.3

Area Summary for EX STORM

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.192	0.192	0.192
1.001	-	-	100	0.187	0.187	0.187
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.379	0.379	0.379

Free Flowing Outfall Details for EX STORM

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S1.003	S	76.300	74.005	0.000	0	0

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

Simulation Criteria			
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
		Number of Storage Structures	0
		Number of Real Time Controls	0
Synthetic Rainfall Details			
Rainfall Model	FSR M5-60 (mm)	19.000	Cv (Summer) 0.750
Region England and Wales	Ratio R	0.310	Cv (Winter) 0.840
Margin for Flood Risk Warning (mm)			300.0
Analysis Timestep	2.5 Second Increment (Extended)		
DTS Status			OFF
DVD Status			OFF
Inertia Status			OFF
Profile(s)			Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880		
Return Period(s) (years)			1, 30, 100
Climate Change (%)			0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1	15 Winter	1	+0%					75.901	-0.154	0.000
S1.001	S2	15 Winter	1	+0%	30/15 Summer				74.812	-0.163	0.000
S1.002	S3	15 Winter	1	+0%	30/15 Summer				74.634	-0.171	0.000
S1.003	S4	15 Winter	1	+0%	100/15 Summer				74.424	-0.171	0.000

PN	US/MH Name	Flow / Cap.	Half Drain Time (mins)	Pipe Flow (l/s)	Level Exceeded
S1.000	S1	0.22		25.0	OK
S1.001	S2	0.43		44.2	OK
S1.002	S3	0.38		44.1	OK
S1.003	S4	0.38		43.8	OK

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

Simulation Criteria			
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
		Number of Storage Structures	0
		Number of Real Time Controls	0
Synthetic Rainfall Details			
Rainfall Model	FSR M5-60 (mm)	19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R	0.310
		Cv (Winter)	0.840
Margin for Flood Risk Warning (mm)			300.0
Analysis Timestep	2.5 Second Increment (Extended)		
DTS Status			OFF
DVD Status			OFF
Inertia Status			OFF
Profile(s)			Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880		
Return Period(s) (years)			1, 30, 100
Climate Change (%)			0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1	15 Winter	30	+0%					75.947	-0.108	0.000
S1.001	S2	15 Winter	30	+0%	30/15 Summer				75.044	0.069	0.000
S1.002	S3	15 Winter	30	+0%	30/15 Summer				74.814	0.009	0.000
S1.003	S4	15 Winter	30	+0%	100/15 Summer				74.582	-0.013	0.000

PN	US/MH Name	Flow / Cap.	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.53		61.0	OK	
S1.001	S2	1.16		119.9	SURCHARGED	
S1.002	S3	1.03		118.1	SURCHARGED	
S1.003	S4	1.01		116.3	OK	

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

Simulation Criteria			
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
		Number of Storage Structures	0
		Number of Real Time Controls	0
Synthetic Rainfall Details			
Rainfall Model	FSR M5-60 (mm)	19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R	0.310
		Cv (Winter)	0.840
Margin for Flood Risk Warning (mm)			300.0
Analysis Timestep	2.5	Second Increment (Extended)	
DTS Status			OFF
DVD Status			OFF
Inertia Status			OFF
Profile(s)			Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880		
Return Period(s) (years)			1, 30, 100
Climate Change (%)			0, 0, 0

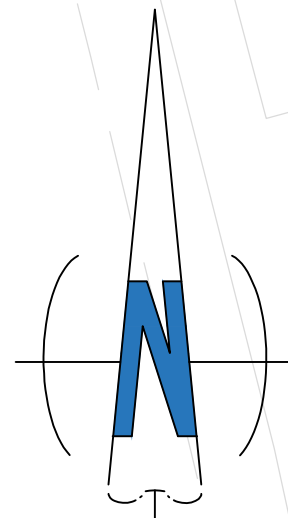
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1	15 Winter	100	+0%					76.001	-0.054	0.000
S1.001	S2	15 Winter	100	+0%	30/15 Summer				75.516	0.541	0.000
S1.002	S3	15 Winter	100	+0%	30/15 Summer				75.148	0.343	0.000
S1.003	S4	15 Winter	100	+0%	100/15 Summer				74.783	0.188	0.000

PN	US/MH Name	Flow / Cap.	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.68		77.9	OK	
S1.001	S2	1.45		149.9	SURCHARGED	
S1.002	S3	1.29		147.6	SURCHARGED	
S1.003	S4	1.30		149.4	SURCHARGED	



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APPENDIX D – Drainage Proposals



WORK IN PROGRESS

ALL DRAINAGE INFORMATION ON THIS DRAWING IS SUBJECT TO CHANGE AS THE FOLLOWING INFORMATION IS EITHER YET TO BE FINALISED OR AGREED.

- CONDITION DISCHARGE
- EXTERNAL FINISHED LEVELS
- COVER LEVELS
- DRAINAGE CHANNEL/ GULLY POSITIONS
- FOUL WATER FLOW RATES
- SURFACE WATER FLOW RATES
- S106 APPLICATION
- EXTERNAL BELOW GROUND UTILITIES

LEGEND

- SITE BOUNDARY
- EXISTING DRAINAGE
- COMBINED SEWER
- SURFACE WATER SEWER
- FOUL WATER DRAIN
- SURFACE WATER DRAIN
- SURFACE WATER GULLY
- PROPOSED DRAINAGE
- INDICATIVE SURFACE FALL
- SURFACE WATER DRAIN
- ACO ROADRAIN & SUMP UNIT
- ROAD GULLY
- RAINWATER DOWNPIPE
- FOUL WATER DRAIN
- FOULWATER POP-UP

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NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS.
3. ANY DISCREPANCIES SHOULD BE REPORTED TO THE ENGINEER IMMEDIATELY SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO THE COMMENCEMENT OF WORK.
4. BEFORE STARTING ANY WORKS, CONTRACTOR TO CHECK INVERT LEVELS AND POSITIONS OF EXISTING DRAINS, SEWERS, INSPECTION CHAMBERS AND MANHOLES AGAINST INFORMATION SHOWN ON THIS DRAWING.
5. ROCKER PIPES ARE TO BE PROVIDED AT ALL CONCRETE CASED INTERFACES.
6. CLASS 2 CONCRETE SURROUND TO BE PROVIDED FOR PIPES WITH COVER LESS THAN 0.9m ABOVE THE CROWN OF THE PIPE FOR ROADS AND 0.6m FOR SOFT AND PEDESTRIAN AREAS ONLY AND UNDER ALL FOUNDATIONS AND WHERE PIPES LAID WITHIN 1m OF FOUNDATIONS.
7. CONNECTIONS TO EXISTING PUBLIC SEWERS IN ACCORDANCE WITH UNITED UTILITIES REQUIREMENTS, TO BE APPROVED/ AGREED WITH THE WATER AUTHORITY.
8. PROPOSED COVER LEVELS ARE INDICATIVE ONLY AND SHALL BE CHECKED BY THE CONTRACTOR ON SITE TO SUIT THE EXACT FINISHED LEVEL AND GRADIENT.
9. ALL DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL AUTHORITY BUILDING CONTROL AND IN CONJUNCTION WITH ALL RELEVANT BRITISH STANDARDS, CODES OF PRACTICE AND WATER UK DOCUMENT DESIGN AND CONSTRUCTION GUIDANCE FOR FOUL AND SURFACE WATER SEWERS.
10. ACCESS COVERS AND FRAMES SHALL COMPLY WITH THE LOADINGS SPECIFIED AND TO BS EN 124 AND KITEMARKED OR IF RECESSED COVERS ARE SPECIFIED THEN IN ACCORDANCE WITH FACTA ASSOCIATION EQUIVALENT. ALLOW FOR RECESSED MANHOLE COVERS TO ACCEPT LANDSCAPE ARCHITECT FINISHES TO ALL NON-ASPHALT EXTERNAL AREAS.
11. THE PROPOSED BUILDING LAYOUTS SHOWN ON THIS DRAWING ARE FOR INFORMATION ONLY. REFER TO ARCHITECTS PLANS FOR PRECISE LOCATION SETTING OUT INFORMATION AND DETAILS.
12. FOR SETTING OUT DIMENSIONS OF SSS, SVPS, RWPS, FLOOR GULLYS & OTHER DRAINAGE POP-UP LOCATIONS, REFER TO ARCHITECTS OR MECHANICAL & ELECTRICAL ENGINEERS DRAWINGS.
13. ALL DRAINAGE PIPEWORK SHOWN SHALL BE 100mm DIAMETER FOR FOUL AND 150mm FOR SURFACE WATER UNLESS NOTED OTHERWISE. ALL DRAINAGE PIPEWORK SHALL BE LAID SUFFIT TO SUFFIT UNLESS OTHERWISE STATED.
14. ALL UNDERSLAB DRAINAGE SHALL BE LAID AT GRADIENTS OF 1:80 MIN. FOR FOUL PIPEWORK AND 1:100 MIN. FOR SURFACE WATER UNLESS NOTED OTHERWISE. ALL UNDERSLAB DRAINAGE SHALL BE CLEAR OF FOUNDATIONS UNLESS SHOWN OTHERWISE. USE OF SHORT/LONG RADIUS BENDS IS ACCEPTABLE PROVIDED THEY ARE KEPT TO A MINIMUM AND USED WHERE UNAVOIDABLE.
15. AT LEAST ONE SOIL PIPE AT THE HEAD OF EACH FOUL RUN SHALL BE VENTED TO THE ATMOSPHERE. ALL RAINWATER PIPES SHALL HAVE ABOVE GROUND RIDDING ACCESS.
16. ALL PRIVATE DRAINAGE PIPEWORK FOR FOUL AND SURFACE WATER SYSTEMS HAVE BEEN DESIGNED ON THE BASIS OF UPVC TO BS EN 1401-1, UNLESS NOTED OTHERWISE.
17. CONCRETE ENCASUREMENT OF THE PIPEWORK SHALL BE REQUIRED WHERE THE VERTICAL CLEARANCE BETWEEN TWO PIPES CROSSING IS LESS THAN 300MM.
18. WHERE NEW DRAINAGE IS SITUATED WITHIN 3 METRES OF NEW OR EXISTING TREES THE PIPEWORK SHALL BE ENCASED IN CONCRETE TO REDUCE THE RISK OF ROOT INGRESS.
19. ALL NEW DRAINAGE INSTALLATIONS TOGETHER WITH ANY EXISTING DRAINAGE RETAINED SHALL BE JETTED AND CCTV SURVEYED UPON COMPLETION. CONTRACTOR TO ENSURE THAT THE DRAINAGE SYSTEM IS FULLY OPERATIONAL, FREE OF EXCESS DEBRIS/SILT AND ALL IDENTIFIED FAULTS RECTIFIED.

INDICATIVE SURFACE WATER CONNECTION TO EXISTING PRIVATE DRAIN. SUBJECT TO AGREEMENT WITH THE LLFA & UU

EXISTING SITE DISCHARGE
Q1: 43.8 l/s, Q30: 116.3 l/s, Q100: 149.4 l/s
PROPOSED SITE DISCHARGE
Q1: 42.1 l/s, Q30: 106.1 l/s, Q100: 133.2 l/s

PROPOSED FOUL WATER BACKDROP CONNECTION TO EXISTING PRIVATE MANHOLE
PEAK FLOW: 3.5 l/s

WHITTAKER STREET

PARSONAGE STREET

P01	17.03.25	PRELIMINARY ISSUE	ARJ	MN
REV	DATE	DETAILS	DRN	CHK

DRAWING STATUS
PLANNING

RIBA STAGE
STAGE 4



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RoC Consulting
3rd Floor, 57 Hilton Street
Manchester M1 2EJ
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W roccoconsulting.com

DRAWN ARJ	DATE MAR 25	SCALES 1:150
CHECKED PAW	DATE MAR 25	THE ABOVE SCALES APPLY WHEN PLOTTED AT A1 SIZE -DO NOT SCALE-
APPRVD. MN	DATE MAR 25	EMAIL FOR DRAWINGS info@roccoconsulting.com

CLIENT

PROJECT TITLE
**WHITEFIELD CENTRE
TEMPORARY MODULAR SCHOOL**

DRAWING TITLE
**FOUL & SURFACE DRAINAGE
GENERAL ARRANGEMENT**

DRAWING No. 4872/ROC/ZZ/XX/DR/C/0501	REV. P01
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COMPLEX CHALLENGES ...
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APPENDIX E – Microdrainage (No Surcharge)

Network Design Table for SW Net1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.005	5.027	0.072	70.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.005	100.00	4.91	74.000	0.357	0.0	0.0	0.0	1.88	133.0	96.7

Manhole Schedules for SW Net1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1.00	77.300	0.900	Open Manhole	450	S1.000	76.400	150				
S1.01	76.920	1.075	Open Manhole	450	S1.001	75.845	150	S1.000	75.845	150	
S1.02	77.300	1.200	Open Manhole	450	S2.000	76.100	150				
S1.03	76.920	1.275	Open Manhole	600	S1.002	75.645	150	S1.001	75.645	150	
								S2.000	75.775	150	130
S1.04	77.300	1.200	Open Manhole	600	S3.000	76.100	225				
S1.05	77.200	1.710	Open Manhole	600	S3.001	75.490	225	S3.000	75.490	225	
S1.06	77.150	1.970	Open Manhole	1200	S1.003	75.180	300	S1.002	75.330	150	
								S3.001	75.255	225	
S1.07	76.450	1.716	Open Manhole	1200	S1.004	74.734	300	S1.003	74.734	300	
SJ1	76.400	2.400	Junction		S1.005	74.000	300	S1.004	74.000	300	
SMH05	76.300	2.372	Open Manhole	0		OUTFALL		S1.005	73.928	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1.00	378449.600	407504.206	378449.600	407504.206	Required	
S1.01	378482.649	407508.349	378482.649	407508.349	Required	
S1.02	378458.358	407492.826	378458.358	407492.826	Required	
S1.03	378484.814	407496.546	378484.814	407496.546	Required	
S1.04	378451.092	407470.069	378451.092	407470.069	Required	
S1.05	378487.246	407475.657	378487.246	407475.657	Required	
S1.06	378485.776	407489.700	378485.776	407489.700	Required	
S1.07	378512.273	407493.426	378512.273	407493.426	Required	
SJ1	378513.742	407496.453			No Entry	
SMH05	378518.684	407497.376			No Entry	

Area Summary for SW Net1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.027	0.027	0.027
	User	-	100	0.045	0.045	0.072
1.001	-	-	100	0.000	0.000	0.000
2.000	User	-	100	0.007	0.007	0.007
	User	-	100	0.007	0.007	0.013
	User	-	100	0.013	0.013	0.027
1.002	User	-	100	0.027	0.027	0.027
3.000	User	-	100	0.008	0.008	0.008
	User	-	100	0.010	0.010	0.018
	User	-	100	0.067	0.067	0.084
	User	-	100	0.026	0.026	0.111
3.001	-	-	100	0.000	0.000	0.000
1.003	User	-	100	0.018	0.018	0.018
1.004	User	-	100	0.103	0.103	0.103
1.005	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.357	0.357	0.357

Free Flowing Outfall Details for SW Net1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.005	SMH05	76.300	73.928	0.000	0	0

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW Net1

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 0.000

Hot Start Level (mm) 0

Inlet Coeffiecient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Offline Controls 0

Number of Time/Area Diagrams 0

Number of Online Controls 0

Number of Storage Structures 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.000

Cv (Summer) 0.750

Region England and Wales

Ratio R 0.310

Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status OFF

DVD Status OFF

Inertia Status OFF

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 0, 0

	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water	Surcharged	Flooded	
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level (m)	Depth (m)	Volume (m³)	Flow / Cap.
S1.000	S1.00	15 Winter	1	+0%	30/15 Summer				76.468	-0.082	0.000	0.42
S1.001	S1.01	15 Winter	1	+0%	30/15 Summer				75.915	-0.080	0.000	0.44
S2.000	S1.02	15 Winter	1	+0%					76.143	-0.107	0.000	0.19
S1.002	S1.03	15 Winter	1	+0%	30/15 Summer				75.718	-0.077	0.000	0.48
S3.000	S1.04	15 Winter	1	+0%					76.172	-0.153	0.000	0.23
S3.001	S1.05	15 Winter	1	+0%					75.565	-0.150	0.000	0.24
S1.003	S1.06	15 Winter	1	+0%					75.281	-0.199	0.000	0.24
S1.004	S1.07	15 Winter	1	+0%					74.824	-0.210	0.000	0.19
S1.005	SJ1	15 Winter	1	+0%					74.174	-0.126	0.000	0.63

		Half Drain		Pipe		
PN	US/MH Name	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
S1.000	S1.00			9.3	OK	
S1.001	S1.01			9.2	OK	
S2.000	S1.02			3.5	OK	
S1.002	S1.03			15.5	OK	
S3.000	S1.04			14.3	OK	
S3.001	S1.05			14.3	OK	
S1.003	S1.06			31.5	OK	
S1.004	S1.07			41.8	OK	
S1.005	SJ1			42.1	OK*	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW Net1

Simulation Criteria			
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
		Number of Storage Structures	0
		Number of Real Time Controls	0
Synthetic Rainfall Details			
Rainfall Model	FSR M5-60 (mm)	19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R	0.310
		Cv (Winter)	0.840
Margin for Flood Risk Warning (mm)			300.0
Analysis Timestep	2.5 Second Increment (Extended)		
DTS Status			OFF
DVD Status			OFF
Inertia Status			OFF
Profile(s)			Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880		
Return Period(s) (years)			1, 30, 100
Climate Change (%)			0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S1.00	15 Winter	30	+0%	30/15	Summer			76.661	0.111	0.000	0.99
S1.001	S1.01	15 Winter	30	+0%	30/15	Summer			76.100	0.105	0.000	1.04
S2.000	S1.02	15 Winter	30	+0%					76.171	-0.079	0.000	0.45
S1.002	S1.03	15 Winter	30	+0%	30/15	Summer			75.890	0.095	0.000	1.15
S3.000	S1.04	15 Winter	30	+0%					76.219	-0.106	0.000	0.55
S3.001	S1.05	15 Winter	30	+0%					75.616	-0.099	0.000	0.60
S1.003	S1.06	15 Winter	30	+0%					75.348	-0.132	0.000	0.59
S1.004	S1.07	15 Winter	30	+0%					74.886	-0.148	0.000	0.50
S1.005	SJ1	15 Summer	30	+0%					74.300	0.000	0.000	1.58

PN	US/MH Name	Half Drain Overflow (l/s)	Pipe Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1.00			22.0	SURCHARGED	
S1.001	S1.01			21.6	SURCHARGED	
S2.000	S1.02			8.5	OK	
S1.002	S1.03			37.2	SURCHARGED	
S3.000	S1.04			35.1	OK	
S3.001	S1.05			35.0	OK	
S1.003	S1.06			76.3	OK	
S1.004	S1.07			108.1	OK	
S1.005	SJ1			106.1	SURCHARGED*	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW Net1

Simulation Criteria			
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
		Number of Storage Structures	0
		Number of Real Time Controls	0
Synthetic Rainfall Details			
Rainfall Model	FSR M5-60 (mm)	19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R	0.310
		Cv (Winter)	0.840
Margin for Flood Risk Warning (mm)			300.0
Analysis Timestep	2.5 Second Increment (Extended)		
DTS Status			OFF
DVD Status			OFF
Inertia Status			OFF
Profile(s)			Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880		
Return Period(s) (years)			1, 30, 100
Climate Change (%)			0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S1.00	15 Winter	100	+0%	30/15	Summer			77.258	0.708	0.000	1.22
S1.001	S1.01	15 Winter	100	+0%	30/15	Summer			76.414	0.419	0.000	1.27
S2.000	S1.02	15 Winter	100	+0%					76.185	-0.065	0.000	0.59
S1.002	S1.03	15 Winter	100	+0%	30/15	Summer			76.093	0.298	0.000	1.39
S3.000	S1.04	15 Winter	100	+0%					76.241	-0.084	0.000	0.71
S3.001	S1.05	15 Winter	100	+0%					75.639	-0.076	0.000	0.77
S1.003	S1.06	15 Winter	100	+0%					75.375	-0.105	0.000	0.74
S1.004	S1.07	15 Winter	100	+0%					74.910	-0.124	0.000	0.63
S1.005	SJ1	15 Summer	100	+0%					74.300	0.000	0.000	1.98

PN	US/MH Name	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1.00			27.0	FLOOD RISK	
S1.001	S1.01			26.5	SURCHARGED	
S2.000	S1.02			11.0	OK	
S1.002	S1.03			45.1	SURCHARGED	
S3.000	S1.04			45.3	OK	
S3.001	S1.05			45.2	OK	
S1.003	S1.06			95.0	OK	
S1.004	S1.07			134.8	OK	
S1.005	SJ1			133.2	SURCHARGED*	



COMPLEX CHALLENGES ...
MADE SIMPLE

APPENDIX F – Microdrainage (Surcharged Outfall)

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for SW Net1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales			
Return Period (years)	30	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.308	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	100	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	0.900
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for SW Net1

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.310	4-8	0.047

Total Area Contributing (ha) = 0.357

Total Pipe Volume (m³) = 5.895

Network Design Table for SW Net1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	33.308	0.555	60.0	0.072	4.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	11.999	0.200	60.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.000	26.715	0.325	82.2	0.027	4.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	6.913	0.315	21.9	0.027	0.00	0.0	0.600	o	150	Pipe/Conduit	
S3.000	36.583	0.610	60.0	0.111	4.00	0.0	0.600	o	225	Pipe/Conduit	
S3.001	14.120	0.235	60.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	26.758	0.446	60.0	0.018	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	3.365	0.734	4.6	0.103	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	100.00	4.43	76.400	0.072	0.0	0.0	0.0	1.30	23.0	19.4
S1.001	100.00	4.58	75.845	0.072	0.0	0.0	0.0	1.30	23.0	19.4
S2.000	100.00	4.40	76.100	0.027	0.0	0.0	0.0	1.11	19.6	7.3
S1.002	100.00	4.63	75.645	0.126	0.0	0.0	0.0	2.16	38.2	34.1
S3.000	100.00	4.36	76.100	0.111	0.0	0.0	0.0	1.69	67.3	29.9
S3.001	100.00	4.50	75.490	0.111	0.0	0.0	0.0	1.69	67.2	29.9
S1.003	100.00	4.85	75.180	0.255	0.0	0.0	0.0	2.03	143.7	68.9
S1.004	100.00	4.86	74.734	0.357	0.0	0.0	0.0	7.39	522.4	96.7

Network Design Table for SW Net1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.005	5.027	0.072	70.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.005	100.00	4.91	74.000	0.357	0.0	0.0	0.0	1.88	133.0	96.7

Manhole Schedules for SW Net1

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1.00	77.300	0.900	Open Manhole	450	S1.000	76.400	150				
S1.01	76.920	1.075	Open Manhole	450	S1.001	75.845	150	S1.000	75.845	150	
S1.02	77.300	1.200	Open Manhole	450	S2.000	76.100	150				
S1.03	76.920	1.275	Open Manhole	600	S1.002	75.645	150	S1.001	75.645	150	
								S2.000	75.775	150	130
S1.04	77.300	1.200	Open Manhole	600	S3.000	76.100	225				
S1.05	77.200	1.710	Open Manhole	600	S3.001	75.490	225	S3.000	75.490	225	
S1.06	77.150	1.970	Open Manhole	1200	S1.003	75.180	300	S1.002	75.330	150	
								S3.001	75.255	225	
S1.07	76.450	1.716	Open Manhole	1200	S1.004	74.734	300	S1.003	74.734	300	
SJ1	76.400	2.400	Junction		S1.005	74.000	300	S1.004	74.000	300	
SMH05	76.300	2.372	Open Manhole	0		OUTFALL		S1.005	73.928	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1.00	378449.600	407504.206	378449.600	407504.206	Required	
S1.01	378482.649	407508.349	378482.649	407508.349	Required	
S1.02	378458.358	407492.826	378458.358	407492.826	Required	
S1.03	378484.814	407496.546	378484.814	407496.546	Required	
S1.04	378451.092	407470.069	378451.092	407470.069	Required	
S1.05	378487.246	407475.657	378487.246	407475.657	Required	
S1.06	378485.776	407489.700	378485.776	407489.700	Required	
S1.07	378512.273	407493.426	378512.273	407493.426	Required	
SJ1	378513.742	407496.453			No Entry	
SMH05	378518.684	407497.376			No Entry	

Area Summary for SW Net1

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.027	0.027	0.027
	User	-	100	0.045	0.045	0.072
1.001	-	-	100	0.000	0.000	0.000
2.000	User	-	100	0.007	0.007	0.007
	User	-	100	0.007	0.007	0.013
	User	-	100	0.013	0.013	0.027
1.002	User	-	100	0.027	0.027	0.027
3.000	User	-	100	0.008	0.008	0.008
	User	-	100	0.010	0.010	0.018
	User	-	100	0.067	0.067	0.084
	User	-	100	0.026	0.026	0.111
3.001	-	-	100	0.000	0.000	0.000
1.003	User	-	100	0.018	0.018	0.018
1.004	User	-	100	0.103	0.103	0.103
1.005	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.357	0.357	0.357

Surcharged Outfall Details for SW Net1

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.005	SMH05	76.300	73.928	0.000	0	0
Datum (m) 73.928 Offset (mins) 0						

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	1.300	30	1.300	59	1.300	88	1.300	117	1.300	146	1.300	175	1.300
2	1.300	31	1.300	60	1.300	89	1.300	118	1.300	147	1.300	176	1.300
3	1.300	32	1.300	61	1.300	90	1.300	119	1.300	148	1.300	177	1.300
4	1.300	33	1.300	62	1.300	91	1.300	120	1.300	149	1.300	178	1.300
5	1.300	34	1.300	63	1.300	92	1.300	121	1.300	150	1.300	179	1.300
6	1.300	35	1.300	64	1.300	93	1.300	122	1.300	151	1.300	180	1.300
7	1.300	36	1.300	65	1.300	94	1.300	123	1.300	152	1.300	181	1.300
8	1.300	37	1.300	66	1.300	95	1.300	124	1.300	153	1.300	182	1.300
9	1.300	38	1.300	67	1.300	96	1.300	125	1.300	154	1.300	183	1.300
10	1.300	39	1.300	68	1.300	97	1.300	126	1.300	155	1.300	184	1.300
11	1.300	40	1.300	69	1.300	98	1.300	127	1.300	156	1.300	185	1.300
12	1.300	41	1.300	70	1.300	99	1.300	128	1.300	157	1.300	186	1.300
13	1.300	42	1.300	71	1.300	100	1.300	129	1.300	158	1.300	187	1.300
14	1.300	43	1.300	72	1.300	101	1.300	130	1.300	159	1.300	188	1.300
15	1.300	44	1.300	73	1.300	102	1.300	131	1.300	160	1.300	189	1.300
16	1.300	45	1.300	74	1.300	103	1.300	132	1.300	161	1.300	190	1.300
17	1.300	46	1.300	75	1.300	104	1.300	133	1.300	162	1.300	191	1.300
18	1.300	47	1.300	76	1.300	105	1.300	134	1.300	163	1.300	192	1.300
19	1.300	48	1.300	77	1.300	106	1.300	135	1.300	164	1.300	193	1.300
20	1.300	49	1.300	78	1.300	107	1.300	136	1.300	165	1.300	194	1.300
21	1.300	50	1.300	79	1.300	108	1.300	137	1.300	166	1.300	195	1.300
22	1.300	51	1.300	80	1.300	109	1.300	138	1.300	167	1.300	196	1.300
23	1.300	52	1.300	81	1.300	110	1.300	139	1.300	168	1.300	197	1.300
24	1.300	53	1.300	82	1.300	111	1.300	140	1.300	169	1.300	198	1.300
25	1.300	54	1.300	83	1.300	112	1.300	141	1.300	170	1.300	199	1.300
26	1.300	55	1.300	84	1.300	113	1.300	142	1.300	171	1.300	200	1.300
27	1.300	56	1.300	85	1.300	114	1.300	143	1.300	172	1.300	201	1.300
28	1.300	57	1.300	86	1.300	115	1.300	144	1.300	173	1.300	202	1.300
29	1.300	58	1.300	87	1.300	116	1.300	145	1.300	174	1.300	203	1.300

Surcharged Outfall Details for SW Net1

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
233	1.300	294	1.300	355	1.300	416	1.300	477	1.300	538	1.300	599	1.300	660	1.300
234	1.300	295	1.300	356	1.300	417	1.300	478	1.300	539	1.300	600	1.300	661	1.300
235	1.300	296	1.300	357	1.300	418	1.300	479	1.300	540	1.300	601	1.300	662	1.300
236	1.300	297	1.300	358	1.300	419	1.300	480	1.300	541	1.300	602	1.300	663	1.300
237	1.300	298	1.300	359	1.300	420	1.300	481	1.300	542	1.300	603	1.300	664	1.300
238	1.300	299	1.300	360	1.300	421	1.300	482	1.300	543	1.300	604	1.300	665	1.300
239	1.300	300	1.300	361	1.300	422	1.300	483	1.300	544	1.300	605	1.300	666	1.300
240	1.300	301	1.300	362	1.300	423	1.300	484	1.300	545	1.300	606	1.300	667	1.300
241	1.300	302	1.300	363	1.300	424	1.300	485	1.300	546	1.300	607	1.300	668	1.300
242	1.300	303	1.300	364	1.300	425	1.300	486	1.300	547	1.300	608	1.300	669	1.300
243	1.300	304	1.300	365	1.300	426	1.300	487	1.300	548	1.300	609	1.300	670	1.300
244	1.300	305	1.300	366	1.300	427	1.300	488	1.300	549	1.300	610	1.300	671	1.300
245	1.300	306	1.300	367	1.300	428	1.300	489	1.300	550	1.300	611	1.300	672	1.300
246	1.300	307	1.300	368	1.300	429	1.300	490	1.300	551	1.300	612	1.300	673	1.300
247	1.300	308	1.300	369	1.300	430	1.300	491	1.300	552	1.300	613	1.300	674	1.300
248	1.300	309	1.300	370	1.300	431	1.300	492	1.300	553	1.300	614	1.300	675	1.300
249	1.300	310	1.300	371	1.300	432	1.300	493	1.300	554	1.300	615	1.300	676	1.300
250	1.300	311	1.300	372	1.300	433	1.300	494	1.300	555	1.300	616	1.300	677	1.300
251	1.300	312	1.300	373	1.300	434	1.300	495	1.300	556	1.300	617	1.300	678	1.300
252	1.300	313	1.300	374	1.300	435	1.300	496	1.300	557	1.300	618	1.300	679	1.300
253	1.300	314	1.300	375	1.300	436	1.300	497	1.300	558	1.300	619	1.300	680	1.300
254	1.300	315	1.300	376	1.300	437	1.300	498	1.300	559	1.300	620	1.300	681	1.300
255	1.300	316	1.300	377	1.300	438	1.300	499	1.300	560	1.300	621	1.300	682	1.300
256	1.300	317	1.300	378	1.300	439	1.300	500	1.300	561	1.300	622	1.300	683	1.300
257	1.300	318	1.300	379	1.300	440	1.300	501	1.300	562	1.300	623	1.300	684	1.300
258	1.300	319	1.300	380	1.300	441	1.300	502	1.300	563	1.300	624	1.300	685	1.300
259	1.300	320	1.300	381	1.300	442	1.300	503	1.300	564	1.300	625	1.300	686	1.300
260	1.300	321	1.300	382	1.300	443	1.300	504	1.300	565	1.300	626	1.300	687	1.300
261	1.300	322	1.300	383	1.300	444	1.300	505	1.300	566	1.300	627	1.300	688	1.300
262	1.300	323	1.300	384	1.300	445	1.300	506	1.300	567	1.300	628	1.300	689	1.300
263	1.300	324	1.300	385	1.300	446	1.300	507	1.300	568	1.300	629	1.300	690	1.300
264	1.300	325	1.300	386	1.300	447	1.300	508	1.300	569	1.300	630	1.300	691	1.300
265	1.300	326	1.300	387	1.300	448	1.300	509	1.300	570	1.300	631	1.300	692	1.300
266	1.300	327	1.300	388	1.300	449	1.300	510	1.300	571	1.300	632	1.300	693	1.300
267	1.300	328	1.300	389	1.300	450	1.300	511	1.300	572	1.300	633	1.300	694	1.300
268	1.300	329	1.300	390	1.300	451	1.300	512	1.300	573	1.300	634	1.300	695	1.300
269	1.300	330	1.300	391	1.300	452	1.300	513	1.300	574	1.300	635	1.300	696	1.300
270	1.300	331	1.300	392	1.300	453	1.300	514	1.300	575	1.300	636	1.300	697	1.300
271	1.300	332	1.300	393	1.300	454	1.300	515	1.300	576	1.300	637	1.300	698	1.300
272	1.300	333	1.300	394	1.300	455	1.300	516	1.300	577	1.300	638	1.300	699	1.300
273	1.300	334	1.300	395	1.300	456	1.300	517	1.300	578	1.300	639	1.300	700	1.300
274	1.300	335	1.300	396	1.300	457	1.300	518	1.300	579	1.300	640	1.300	701	1.300
275	1.300	336	1.300	397	1.300	458	1.300	519	1.300	580	1.300	641	1.300	702	1.300
276	1.300	337	1.300	398	1.300	459	1.300	520	1.300	581	1.300	642	1.300	703	1.300
277	1.300	338	1.300	399	1.300	460	1.300	521	1.300	582	1.300	643	1.300	704	1.300
278	1.300	339	1.300	400	1.300	461	1.300	522	1.300	583	1.300	644	1.300	705	1.300
279	1.300	340	1.300	401	1.300	462	1.300	523	1.300	584	1.300	645	1.300	706	1.300
280	1.300	341	1.300	402	1.300	463	1.300	524	1.300	585	1.300	646	1.300	707	1.300
281	1.300	342	1.300	403	1.300	464	1.300	525	1.300	586	1.300	647	1.300	708	1.300
282	1.300	343	1.300	404	1.300	465	1.300	526	1.300	587	1.300	648	1.300	709	1.300
283	1.300	344	1.300	405	1.300	466	1.300	527	1.300	588	1.300	649	1.300	710	1.300
284	1.300	345	1.300	406	1.300	467	1.300	528	1.300	589	1.300	650	1.300	711	1.300
285	1.300	346	1.300	407	1.300	468	1.300	529	1.300	590	1.300	651	1.300	712	1.300
286	1.300	347	1.300	408	1.300	469	1.300	530	1.300	591	1.300	652	1.300	713	1.300
287	1.300	348	1.300	409	1.300	470	1.300	531	1.300	592	1.300	653	1.300	714	1.300
288	1.300	349	1.300	410	1.300	471	1.300	532	1.300	593	1.300	654	1.300	715	1.300
289	1.300	350	1.300	411	1.300	472	1.300	533	1.300	594	1.300	655	1.300	716	1.300
290	1.300	351	1.300	412	1.300	473	1.300	534	1.300	595	1.300	656	1.300	717	1.300
291	1.300	352	1.300	413	1.300	474	1.300	535	1.300	596	1.300	657	1.300	718	1.300
292	1.300	353	1.300	414	1.300	475	1.300	536	1.300	597	1.300	658	1.300	719	1.300
293	1.300	354	1.300	415	1.300	476	1.300	537	1.300	598	1.300	659	1.300	720	1.300

Surcharged Outfall Details for SW Net1

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
721	1.300	782	1.300	843	1.300	904	1.300	965	1.300	1026	1.300	1087	1.300	1148	1.300
722	1.300	783	1.300	844	1.300	905	1.300	966	1.300	1027	1.300	1088	1.300	1149	1.300
723	1.300	784	1.300	845	1.300	906	1.300	967	1.300	1028	1.300	1089	1.300	1150	1.300
724	1.300	785	1.300	846	1.300	907	1.300	968	1.300	1029	1.300	1090	1.300	1151	1.300
725	1.300	786	1.300	847	1.300	908	1.300	969	1.300	1030	1.300	1091	1.300	1152	1.300
726	1.300	787	1.300	848	1.300	909	1.300	970	1.300	1031	1.300	1092	1.300	1153	1.300
727	1.300	788	1.300	849	1.300	910	1.300	971	1.300	1032	1.300	1093	1.300	1154	1.300
728	1.300	789	1.300	850	1.300	911	1.300	972	1.300	1033	1.300	1094	1.300	1155	1.300
729	1.300	790	1.300	851	1.300	912	1.300	973	1.300	1034	1.300	1095	1.300	1156	1.300
730	1.300	791	1.300	852	1.300	913	1.300	974	1.300	1035	1.300	1096	1.300	1157	1.300
731	1.300	792	1.300	853	1.300	914	1.300	975	1.300	1036	1.300	1097	1.300	1158	1.300
732	1.300	793	1.300	854	1.300	915	1.300	976	1.300	1037	1.300	1098	1.300	1159	1.300
733	1.300	794	1.300	855	1.300	916	1.300	977	1.300	1038	1.300	1099	1.300	1160	1.300
734	1.300	795	1.300	856	1.300	917	1.300	978	1.300	1039	1.300	1100	1.300	1161	1.300
735	1.300	796	1.300	857	1.300	918	1.300	979	1.300	1040	1.300	1101	1.300	1162	1.300
736	1.300	797	1.300	858	1.300	919	1.300	980	1.300	1041	1.300	1102	1.300	1163	1.300
737	1.300	798	1.300	859	1.300	920	1.300	981	1.300	1042	1.300	1103	1.300	1164	1.300
738	1.300	799	1.300	860	1.300	921	1.300	982	1.300	1043	1.300	1104	1.300	1165	1.300
739	1.300	800	1.300	861	1.300	922	1.300	983	1.300	1044	1.300	1105	1.300	1166	1.300
740	1.300	801	1.300	862	1.300	923	1.300	984	1.300	1045	1.300	1106	1.300	1167	1.300
741	1.300	802	1.300	863	1.300	924	1.300	985	1.300	1046	1.300	1107	1.300	1168	1.300
742	1.300	803	1.300	864	1.300	925	1.300	986	1.300	1047	1.300	1108	1.300	1169	1.300
743	1.300	804	1.300	865	1.300	926	1.300	987	1.300	1048	1.300	1109	1.300	1170	1.300
744	1.300	805	1.300	866	1.300	927	1.300	988	1.300	1049	1.300	1110	1.300	1171	1.300
745	1.300	806	1.300	867	1.300	928	1.300	989	1.300	1050	1.300	1111	1.300	1172	1.300
746	1.300	807	1.300	868	1.300	929	1.300	990	1.300	1051	1.300	1112	1.300	1173	1.300
747	1.300	808	1.300	869	1.300	930	1.300	991	1.300	1052	1.300	1113	1.300	1174	1.300
748	1.300	809	1.300	870	1.300	931	1.300	992	1.300	1053	1.300	1114	1.300	1175	1.300
749	1.300	810	1.300	871	1.300	932	1.300	993	1.300	1054	1.300	1115	1.300	1176	1.300
750	1.300	811	1.300	872	1.300	933	1.300	994	1.300	1055	1.300	1116	1.300	1177	1.300
751	1.300	812	1.300	873	1.300	934	1.300	995	1.300	1056	1.300	1117	1.300	1178	1.300
752	1.300	813	1.300	874	1.300	935	1.300	996	1.300	1057	1.300	1118	1.300	1179	1.300
753	1.300	814	1.300	875	1.300	936	1.300	997	1.300	1058	1.300	1119	1.300	1180	1.300
754	1.300	815	1.300	876	1.300	937	1.300	998	1.300	1059	1.300	1120	1.300	1181	1.300
755	1.300	816	1.300	877	1.300	938	1.300	999	1.300	1060	1.300	1121	1.300	1182	1.300
756	1.300	817	1.300	878	1.300	939	1.300	1000	1.300	1061	1.300	1122	1.300	1183	1.300
757	1.300	818	1.300	879	1.300	940	1.300	1001	1.300	1062	1.300	1123	1.300	1184	1.300
758	1.300	819	1.300	880	1.300	941	1.300	1002	1.300	1063	1.300	1124	1.300	1185	1.300
759	1.300	820	1.300	881	1.300	942	1.300	1003	1.300	1064	1.300	1125	1.300	1186	1.300
760	1.300	821	1.300	882	1.300	943	1.300	1004	1.300	1065	1.300	1126	1.300	1187	1.300
761	1.300	822	1.300	883	1.300	944	1.300	1005	1.300	1066	1.300	1127	1.300	1188	1.300
762	1.300	823	1.300	884	1.300	945	1.300	1006	1.300	1067	1.300	1128	1.300	1189	1.300
763	1.300	824	1.300	885	1.300	946	1.300	1007	1.300	1068	1.300	1129	1.300	1190	1.300
764	1.300	825	1.300	886	1.300	947	1.300	1008	1.300	1069	1.300	1130	1.300	1191	1.300
765	1.300	826	1.300	887	1.300	948	1.300	1009	1.300	1070	1.300	1131	1.300	1192	1.300
766	1.300	827	1.300	888	1.300	949	1.300	1010	1.300	1071	1.300	1132	1.300	1193	1.300
767	1.300	828	1.300	889	1.300	950	1.300	1011	1.300	1072	1.300	1133	1.300	1194	1.300
768	1.300	829	1.300	890	1.300	951	1.300	1012	1.300	1073	1.300	1134	1.300	1195	1.300
769	1.300	830	1.300	891	1.300	952	1.300	1013	1.300	1074	1.300	1135	1.300	1196	1.300
770	1.300	831	1.300	892	1.300	953	1.300	1014	1.300	1075	1.300	1136	1.300	1197	1.300
771	1.300	832	1.300	893	1.300	954	1.300	1015	1.300	1076	1.300	1137	1.300	1198	1.300
772	1.300	833	1.300	894	1.300	955	1.300	1016	1.300	1077	1.300	1138	1.300	1199	1.300
773	1.300	834	1.300	895	1.300	956	1.300	1017	1.300	1078	1.300	1139	1.300	1200	1.300
774	1.300	835	1.300	896	1.300	957	1.300	1018	1.300	1079	1.300	1140	1.300	1201	1.300
775	1.300	836	1.300	897	1.300	958	1.300	1019	1.300	1080	1.300	1141	1.300	1202	1.300
776	1.300	837	1.300	898	1.300	959	1.300	1020	1.300	1081	1.300	1142	1.300	1203	1.300
777	1.300	838	1.300	899	1.300	960	1.300	1021	1.300	1082	1.300	1143	1.300	1204	1.300
778	1.300	839	1.300	900	1.300	961	1.300	1022	1.300	1083	1.300	1144	1.300	1205	1.300
779	1.300	840	1.300	901	1.300	962	1.300	1023	1.300	1084	1.300	1145	1.300	1206	1.300
780	1.300	841	1.300	902	1.300	963	1.300	1024	1.300	1085	1.300	1146	1.300	1207	1.300
781	1.300	842	1.300	903	1.300	964	1.300	1025	1.300	1086	1.300	1147	1.300	1208	1.300

Surcharged Outfall Details for SW Net1

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1209	1.300	1270	1.300	1331	1.300	1392	1.300	1453	1.300	1514	1.300	1575	1.300
1210	1.300	1271	1.300	1332	1.300	1393	1.300	1454	1.300	1515	1.300	1576	1.300
1211	1.300	1272	1.300	1333	1.300	1394	1.300	1455	1.300	1516	1.300	1577	1.300
1212	1.300	1273	1.300	1334	1.300	1395	1.300	1456	1.300	1517	1.300	1578	1.300
1213	1.300	1274	1.300	1335	1.300	1396	1.300	1457	1.300	1518	1.300	1579	1.300
1214	1.300	1275	1.300	1336	1.300	1397	1.300	1458	1.300	1519	1.300	1580	1.300
1215	1.300	1276	1.300	1337	1.300	1398	1.300	1459	1.300	1520	1.300	1581	1.300
1216	1.300	1277	1.300	1338	1.300	1399	1.300	1460	1.300	1521	1.300	1582	1.300
1217	1.300	1278	1.300	1339	1.300	1400	1.300	1461	1.300	1522	1.300	1583	1.300
1218	1.300	1279	1.300	1340	1.300	1401	1.300	1462	1.300	1523	1.300	1584	1.300
1219	1.300	1280	1.300	1341	1.300	1402	1.300	1463	1.300	1524	1.300	1585	1.300
1220	1.300	1281	1.300	1342	1.300	1403	1.300	1464	1.300	1525	1.300	1586	1.300
1221	1.300	1282	1.300	1343	1.300	1404	1.300	1465	1.300	1526	1.300	1587	1.300
1222	1.300	1283	1.300	1344	1.300	1405	1.300	1466	1.300	1527	1.300	1588	1.300
1223	1.300	1284	1.300	1345	1.300	1406	1.300	1467	1.300	1528	1.300	1589	1.300
1224	1.300	1285	1.300	1346	1.300	1407	1.300	1468	1.300	1529	1.300	1590	1.300
1225	1.300	1286	1.300	1347	1.300	1408	1.300	1469	1.300	1530	1.300	1591	1.300
1226	1.300	1287	1.300	1348	1.300	1409	1.300	1470	1.300	1531	1.300	1592	1.300
1227	1.300	1288	1.300	1349	1.300	1410	1.300	1471	1.300	1532	1.300	1593	1.300
1228	1.300	1289	1.300	1350	1.300	1411	1.300	1472	1.300	1533	1.300	1594	1.300
1229	1.300	1290	1.300	1351	1.300	1412	1.300	1473	1.300	1534	1.300	1595	1.300
1230	1.300	1291	1.300	1352	1.300	1413	1.300	1474	1.300	1535	1.300	1596	1.300
1231	1.300	1292	1.300	1353	1.300	1414	1.300	1475	1.300	1536	1.300	1597	1.300
1232	1.300	1293	1.300	1354	1.300	1415	1.300	1476	1.300	1537	1.300	1598	1.300
1233	1.300	1294	1.300	1355	1.300	1416	1.300	1477	1.300	1538	1.300	1599	1.300
1234	1.300	1295	1.300	1356	1.300	1417	1.300	1478	1.300	1539	1.300	1600	1.300
1235	1.300	1296	1.300	1357	1.300	1418	1.300	1479	1.300	1540	1.300	1601	1.300
1236	1.300	1297	1.300	1358	1.300	1419	1.300	1480	1.300	1541	1.300	1602	1.300
1237	1.300	1298	1.300	1359	1.300	1420	1.300	1481	1.300	1542	1.300	1603	1.300
1238	1.300	1299	1.300	1360	1.300	1421	1.300	1482	1.300	1543	1.300	1604	1.300
1239	1.300	1300	1.300	1361	1.300	1422	1.300	1483	1.300	1544	1.300	1605	1.300
1240	1.300	1301	1.300	1362	1.300	1423	1.300	1484	1.300	1545	1.300	1606	1.300
1241	1.300	1302	1.300	1363	1.300	1424	1.300	1485	1.300	1546	1.300	1607	1.300
1242	1.300	1303	1.300	1364	1.300	1425	1.300	1486	1.300	1547	1.300	1608	1.300
1243	1.300	1304	1.300	1365	1.300	1426	1.300	1487	1.300	1548	1.300	1609	1.300
1244	1.300	1305	1.300	1366	1.300	1427	1.300	1488	1.300	1549	1.300	1610	1.300
1245	1.300	1306	1.300	1367	1.300	1428	1.300	1489	1.300	1550	1.300	1611	1.300
1246	1.300	1307	1.300	1368	1.300	1429	1.300	1490	1.300	1551	1.300	1612	1.300
1247	1.300	1308	1.300	1369	1.300	1430	1.300	1491	1.300	1552	1.300	1613	1.300
1248	1.300	1309	1.300	1370	1.300	1431	1.300	1492	1.300	1553	1.300	1614	1.300
1249	1.300	1310	1.300	1371	1.300	1432	1.300	1493	1.300	1554	1.300	1615	1.300
1250	1.300	1311	1.300	1372	1.300	1433	1.300	1494	1.300	1555	1.300	1616	1.300
1251	1.300	1312	1.300	1373	1.300	1434	1.300	1495	1.300	1556	1.300	1617	1.300
1252	1.300	1313	1.300	1374	1.300	1435	1.300	1496	1.300	1557	1.300	1618	1.300
1253	1.300	1314	1.300	1375	1.300	1436	1.300	1497	1.300	1558	1.300	1619	1.300
1254	1.300	1315	1.300	1376	1.300	1437	1.300	1498	1.300	1559	1.300	1620	1.300
1255	1.300	1316	1.300	1377	1.300	1438	1.300	1499	1.300	1560	1.300	1621	1.300
1256	1.300	1317	1.300	1378	1.300	1439	1.300	1500	1.300	1561	1.300	1622	1.300
1257	1.300	1318	1.300	1379	1.300	1440	1.300	1501	1.300	1562	1.300	1623	1.300
1258	1.300	1319	1.300	1380	1.300	1441	1.300	1502	1.300	1563	1.300	1624	1.300
1259	1.300	1320	1.300	1381	1.300	1442	1.300	1503	1.300	1564	1.300	1625	1.300
1260	1.300	1321	1.300	1382	1.300	1443	1.300	1504	1.300	1565	1.300	1626	1.300
1261	1.300	1322	1.300	1383	1.300	1444	1.300	1505	1.300	1566	1.300	1627	1.300
1262	1.300	1323	1.300	1384	1.300	1445	1.300	1506	1.300	1567	1.300	1628	1.300
1263	1.300	1324	1.300	1385	1.300	1446	1.300	1507	1.300	1568	1.300	1629	1.300
1264	1.300	1325	1.300	1386	1.300	1447	1.300	1508	1.300	1569	1.300	1630	1.300
1265	1.300	1326	1.300	1387	1.300	1448	1.300	1509	1.300	1570	1.300	1631	1.300
1266	1.300	1327	1.300	1388	1.300	1449	1.300	1510	1.300	1571	1.300	1632	1.300
1267	1.300	1328	1.300	1389	1.300	1450	1.300	1511	1.300	1572	1.300	1633	1.300
1268	1.300	1329	1.300	1390	1.300	1451	1.300	1512	1.300	1573	1.300	1634	1.300
1269	1.300	1330	1.300	1391	1.300	1452	1.300	1513	1.300	1574	1.300	1635	1.300

Surcharged Outfall Details for SW Net1

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1697	1.300	1758	1.300	1819	1.300	1880	1.300	1941	1.300	2002	1.300	2063	1.300	2124	1.300
1698	1.300	1759	1.300	1820	1.300	1881	1.300	1942	1.300	2003	1.300	2064	1.300	2125	1.300
1699	1.300	1760	1.300	1821	1.300	1882	1.300	1943	1.300	2004	1.300	2065	1.300	2126	1.300
1700	1.300	1761	1.300	1822	1.300	1883	1.300	1944	1.300	2005	1.300	2066	1.300	2127	1.300
1701	1.300	1762	1.300	1823	1.300	1884	1.300	1945	1.300	2006	1.300	2067	1.300	2128	1.300
1702	1.300	1763	1.300	1824	1.300	1885	1.300	1946	1.300	2007	1.300	2068	1.300	2129	1.300
1703	1.300	1764	1.300	1825	1.300	1886	1.300	1947	1.300	2008	1.300	2069	1.300	2130	1.300
1704	1.300	1765	1.300	1826	1.300	1887	1.300	1948	1.300	2009	1.300	2070	1.300	2131	1.300
1705	1.300	1766	1.300	1827	1.300	1888	1.300	1949	1.300	2010	1.300	2071	1.300	2132	1.300
1706	1.300	1767	1.300	1828	1.300	1889	1.300	1950	1.300	2011	1.300	2072	1.300	2133	1.300
1707	1.300	1768	1.300	1829	1.300	1890	1.300	1951	1.300	2012	1.300	2073	1.300	2134	1.300
1708	1.300	1769	1.300	1830	1.300	1891	1.300	1952	1.300	2013	1.300	2074	1.300	2135	1.300
1709	1.300	1770	1.300	1831	1.300	1892	1.300	1953	1.300	2014	1.300	2075	1.300	2136	1.300
1710	1.300	1771	1.300	1832	1.300	1893	1.300	1954	1.300	2015	1.300	2076	1.300	2137	1.300
1711	1.300	1772	1.300	1833	1.300	1894	1.300	1955	1.300	2016	1.300	2077	1.300	2138	1.300
1712	1.300	1773	1.300	1834	1.300	1895	1.300	1956	1.300	2017	1.300	2078	1.300	2139	1.300
1713	1.300	1774	1.300	1835	1.300	1896	1.300	1957	1.300	2018	1.300	2079	1.300	2140	1.300
1714	1.300	1775	1.300	1836	1.300	1897	1.300	1958	1.300	2019	1.300	2080	1.300	2141	1.300
1715	1.300	1776	1.300	1837	1.300	1898	1.300	1959	1.300	2020	1.300	2081	1.300	2142	1.300
1716	1.300	1777	1.300	1838	1.300	1899	1.300	1960	1.300	2021	1.300	2082	1.300	2143	1.300
1717	1.300	1778	1.300	1839	1.300	1900	1.300	1961	1.300	2022	1.300	2083	1.300	2144	1.300
1718	1.300	1779	1.300	1840	1.300	1901	1.300	1962	1.300	2023	1.300	2084	1.300	2145	1.300
1719	1.300	1780	1.300	1841	1.300	1902	1.300	1963	1.300	2024	1.300	2085	1.300	2146	1.300
1720	1.300	1781	1.300	1842	1.300	1903	1.300	1964	1.300	2025	1.300	2086	1.300	2147	1.300
1721	1.300	1782	1.300	1843	1.300	1904	1.300	1965	1.300	2026	1.300	2087	1.300	2148	1.300
1722	1.300	1783	1.300	1844	1.300	1905	1.300	1966	1.300	2027	1.300	2088	1.300	2149	1.300
1723	1.300	1784	1.300	1845	1.300	1906	1.300	1967	1.300	2028	1.300	2089	1.300	2150	1.300
1724	1.300	1785	1.300	1846	1.300	1907	1.300	1968	1.300	2029	1.300	2090	1.300	2151	1.300
1725	1.300	1786	1.300	1847	1.300	1908	1.300	1969	1.300	2030	1.300	2091	1.300	2152	1.300
1726	1.300	1787	1.300	1848	1.300	1909	1.300	1970	1.300	2031	1.300	2092	1.300	2153	1.300
1727	1.300	1788	1.300	1849	1.300	1910	1.300	1971	1.300	2032	1.300	2093	1.300	2154	1.300
1728	1.300	1789	1.300	1850	1.300	1911	1.300	1972	1.300	2033	1.300	2094	1.300	2155	1.300
1729	1.300	1790	1.300	1851	1.300	1912	1.300	1973	1.300	2034	1.300	2095	1.300	2156	1.300
1730	1.300	1791	1.300	1852	1.300	1913	1.300	1974	1.300	2035	1.300	2096	1.300	2157	1.300
1731	1.300	1792	1.300	1853	1.300	1914	1.300	1975	1.300	2036	1.300	2097	1.300	2158	1.300
1732	1.300	1793	1.300	1854	1.300	1915	1.300	1976	1.300	2037	1.300	2098	1.300	2159	1.300
1733	1.300	1794	1.300	1855	1.300	1916	1.300	1977	1.300	2038	1.300	2099	1.300	2160	1.300
1734	1.300	1795	1.300	1856	1.300	1917	1.300	1978	1.300	2039	1.300	2100	1.300	2161	1.300
1735	1.300	1796	1.300	1857	1.300	1918	1.300	1979	1.300	2040	1.300	2101	1.300	2162	1.300
1736	1.300	1797	1.300	1858	1.300	1919	1.300	1980	1.300	2041	1.300	2102	1.300	2163	1.300
1737	1.300	1798	1.300	1859	1.300	1920	1.300	1981	1.300	2042	1.300	2103	1.300	2164	1.300
1738	1.300	1799	1.300	1860	1.300	1921	1.300	1982	1.300	2043	1.300	2104	1.300	2165	1.300
1739	1.300	1800	1.300	1861	1.300	1922	1.300	1983	1.300	2044	1.300	2105	1.300	2166	1.300
1740	1.300	1801	1.300	1862	1.300	1923	1.300	1984	1.300	2045	1.300	2106	1.300	2167	1.300
1741	1.300	1802	1.300	1863	1.300	1924	1.300	1985	1.300	2046	1.300	2107	1.300	2168	1.300
1742	1.300	1803	1.300	1864	1.300	1925	1.300	1986	1.300	2047	1.300	2108	1.300	2169	1.300
1743	1.300	1804	1.300	1865	1.300	1926	1.300	1987	1.300	2048	1.300	2109	1.300	2170	1.300
1744	1.300	1805	1.300	1866	1.300	1927	1.300	1988	1.300	2049	1.300	2110	1.300	2171	1.300
1745	1.300	1806	1.300	1867	1.300	1928	1.300	1989	1.300	2050	1.300	2111	1.300	2172	1.300
1746	1.300	1807	1.300	1868	1.300	1929	1.300	1990	1.300	2051	1.300	2112	1.300	2173	1.300
1747	1.300	1808	1.300	1869	1.300	1930	1.300	1991	1.300	2052	1.300	2113	1.300	2174	1.300
1748	1.300	1809	1.300	1870	1.300	1931	1.300	1992	1.300	2053	1.300	2114	1.300	2175	1.300
1749	1.300	1810	1.300	1871	1.300	1932	1.300	1993	1.300	2054	1.300	2115	1.300	2176	1.300
1750	1.300	1811	1.300	1872	1.300	1933	1.300	1994	1.300	2055	1.300	2116	1.300	2177	1.300
1751	1.300	1812	1.300	1873	1.300	1934	1.300	1995	1.300	2056	1.300	2117	1.300	2178	1.300
1752	1.300	1813	1.300	1874	1.300	1935	1.300	1996	1.300	2057	1.300	2118	1.300	2179	1.300
1753	1.300	1814	1.300	1875	1.300	1936	1.300	1997	1.300	2058	1.300	2119	1.300	2180	1.300
1754	1.300	1815	1.300	1876	1.300	1937	1.300	1998	1.300	2059	1.300	2120	1.300	2181	1.300
1755	1.300	1816	1.300	1877	1.300	1938	1.300	1999	1.300	2060	1.300	2121	1.300	2182	1.300
1756	1.300	1817	1.300	1878	1.300	1939	1.300	2000	1.300	2061	1.300	2122	1.300	2183	1.300
1757	1.300	1818	1.300	1879	1.300	1940	1.300	2001	1.300	2062	1.300	2123	1.300	2184	1.300

Surcharged Outfall Details for SW Net1

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
2185	1.300	2246	1.300	2307	1.300	2368	1.300	2429	1.300	2490	1.300	2551	1.300
2186	1.300	2247	1.300	2308	1.300	2369	1.300	2430	1.300	2491	1.300	2552	1.300
2187	1.300	2248	1.300	2309	1.300	2370	1.300	2431	1.300	2492	1.300	2553	1.300
2188	1.300	2249	1.300	2310	1.300	2371	1.300	2432	1.300	2493	1.300	2554	1.300
2189	1.300	2250	1.300	2311	1.300	2372	1.300	2433	1.300	2494	1.300	2555	1.300
2190	1.300	2251	1.300	2312	1.300	2373	1.300	2434	1.300	2495	1.300	2556	1.300
2191	1.300	2252	1.300	2313	1.300	2374	1.300	2435	1.300	2496	1.300	2557	1.300
2192	1.300	2253	1.300	2314	1.300	2375	1.300	2436	1.300	2497	1.300	2558	1.300
2193	1.300	2254	1.300	2315	1.300	2376	1.300	2437	1.300	2498	1.300	2559	1.300
2194	1.300	2255	1.300	2316	1.300	2377	1.300	2438	1.300	2499	1.300	2560	1.300
2195	1.300	2256	1.300	2317	1.300	2378	1.300	2439	1.300	2500	1.300	2561	1.300
2196	1.300	2257	1.300	2318	1.300	2379	1.300	2440	1.300	2501	1.300	2562	1.300
2197	1.300	2258	1.300	2319	1.300	2380	1.300	2441	1.300	2502	1.300	2563	1.300
2198	1.300	2259	1.300	2320	1.300	2381	1.300	2442	1.300	2503	1.300	2564	1.300
2199	1.300	2260	1.300	2321	1.300	2382	1.300	2443	1.300	2504	1.300	2565	1.300
2200	1.300	2261	1.300	2322	1.300	2383	1.300	2444	1.300	2505	1.300	2566	1.300
2201	1.300	2262	1.300	2323	1.300	2384	1.300	2445	1.300	2506	1.300	2567	1.300
2202	1.300	2263	1.300	2324	1.300	2385	1.300	2446	1.300	2507	1.300	2568	1.300
2203	1.300	2264	1.300	2325	1.300	2386	1.300	2447	1.300	2508	1.300	2569	1.300
2204	1.300	2265	1.300	2326	1.300	2387	1.300	2448	1.300	2509	1.300	2570	1.300
2205	1.300	2266	1.300	2327	1.300	2388	1.300	2449	1.300	2510	1.300	2571	1.300
2206	1.300	2267	1.300	2328	1.300	2389	1.300	2450	1.300	2511	1.300	2572	1.300
2207	1.300	2268	1.300	2329	1.300	2390	1.300	2451	1.300	2512	1.300	2573	1.300
2208	1.300	2269	1.300	2330	1.300	2391	1.300	2452	1.300	2513	1.300	2574	1.300
2209	1.300	2270	1.300	2331	1.300	2392	1.300	2453	1.300	2514	1.300	2575	1.300
2210	1.300	2271	1.300	2332	1.300	2393	1.300	2454	1.300	2515	1.300	2576	1.300
2211	1.300	2272	1.300	2333	1.300	2394	1.300	2455	1.300	2516	1.300	2577	1.300
2212	1.300	2273	1.300	2334	1.300	2395	1.300	2456	1.300	2517	1.300	2578	1.300
2213	1.300	2274	1.300	2335	1.300	2396	1.300	2457	1.300	2518	1.300	2579	1.300
2214	1.300	2275	1.300	2336	1.300	2397	1.300	2458	1.300	2519	1.300	2580	1.300
2215	1.300	2276	1.300	2337	1.300	2398	1.300	2459	1.300	2520	1.300	2581	1.300
2216	1.300	2277	1.300	2338	1.300	2399	1.300	2460	1.300	2521	1.300	2582	1.300
2217	1.300	2278	1.300	2339	1.300	2400	1.300	2461	1.300	2522	1.300	2583	1.300
2218	1.300	2279	1.300	2340	1.300	2401	1.300	2462	1.300	2523	1.300	2584	1.300
2219	1.300	2280	1.300	2341	1.300	2402	1.300	2463	1.300	2524	1.300	2585	1.300
2220	1.300	2281	1.300	2342	1.300	2403	1.300	2464	1.300	2525	1.300	2586	1.300
2221	1.300	2282	1.300	2343	1.300	2404	1.300	2465	1.300	2526	1.300	2587	1.300
2222	1.300	2283	1.300	2344	1.300	2405	1.300	2466	1.300	2527	1.300	2588	1.300
2223	1.300	2284	1.300	2345	1.300	2406	1.300	2467	1.300	2528	1.300	2589	1.300
2224	1.300	2285	1.300	2346	1.300	2407	1.300	2468	1.300	2529	1.300	2590	1.300
2225	1.300	2286	1.300	2347	1.300	2408	1.300	2469	1.300	2530	1.300	2591	1.300
2226	1.300	2287	1.300	2348	1.300	2409	1.300	2470	1.300	2531	1.300	2592	1.300
2227	1.300	2288	1.300	2349	1.300	2410	1.300	2471	1.300	2532	1.300	2593	1.300
2228	1.300	2289	1.300	2350	1.300	2411	1.300	2472	1.300	2533	1.300	2594	1.300
2229	1.300	2290	1.300	2351	1.300	2412	1.300	2473	1.300	2534	1.300	2595	1.300
2230	1.300	2291	1.300	2352	1.300	2413	1.300	2474	1.300	2535	1.300	2596	1.300
2231	1.300	2292	1.300	2353	1.300	2414	1.300	2475	1.300	2536	1.300	2597	1.300
2232	1.300	2293	1.300	2354	1.300	2415	1.300	2476	1.300	2537	1.300	2598	1.300
2233	1.300	2294	1.300	2355	1.300	2416	1.300	2477	1.300	2538	1.300	2599	1.300
2234	1.300	2295	1.300	2356	1.300	2417	1.300	2478	1.300	2539	1.300	2600	1.300
2235	1.300	2296	1.300	2357	1.300	2418	1.300	2479	1.300	2540	1.300	2601	1.300
2236	1.300	2297	1.300	2358	1.300	2419	1.300	2480	1.300	2541	1.300	2602	1.300
2237	1.300	2298	1.300	2359	1.300	2420	1.300	2481	1.300	2542	1.300	2603	1.300
2238	1.300	2299	1.300	2360	1.300	2421	1.300	2482	1.300	2543	1.300	2604	1.300
2239	1.300	2300	1.300	2361	1.300	2422	1.300	2483	1.300	2544	1.300	2605	1.300
2240	1.300	2301	1.300	2362	1.300	2423	1.300	2484	1.300	2545	1.300	2606	1.300
2241	1.300	2302	1.300	2363	1.300	2424	1.300	2485	1.300	2546	1.300	2607	1.300
2242	1.300	2303	1.300	2364	1.300	2425	1.300	2486	1.300	2547	1.300	2608	1.300
2243	1.300	2304	1.300	2365	1.300	2426	1.300	2487	1.300	2548	1.300	2609	1.300
2244	1.300	2305	1.300	2366	1.300	2427	1.300	2488	1.300	2549	1.300	2610	1.300
2245	1.300	2306	1.300	2367	1.300	2428	1.300	2489	1.300	2550	1.300	2611	1.300

Surcharged Outfall Details for SW Net1

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
2673	1.300	2699	1.300	2725	1.300	2751	1.300	2777	1.300	2803	1.300	2829	1.300	2855	1.300
2674	1.300	2700	1.300	2726	1.300	2752	1.300	2778	1.300	2804	1.300	2830	1.300	2856	1.300
2675	1.300	2701	1.300	2727	1.300	2753	1.300	2779	1.300	2805	1.300	2831	1.300	2857	1.300
2676	1.300	2702	1.300	2728	1.300	2754	1.300	2780	1.300	2806	1.300	2832	1.300	2858	1.300
2677	1.300	2703	1.300	2729	1.300	2755	1.300	2781	1.300	2807	1.300	2833	1.300	2859	1.300
2678	1.300	2704	1.300	2730	1.300	2756	1.300	2782	1.300	2808	1.300	2834	1.300	2860	1.300
2679	1.300	2705	1.300	2731	1.300	2757	1.300	2783	1.300	2809	1.300	2835	1.300	2861	1.300
2680	1.300	2706	1.300	2732	1.300	2758	1.300	2784	1.300	2810	1.300	2836	1.300	2862	1.300
2681	1.300	2707	1.300	2733	1.300	2759	1.300	2785	1.300	2811	1.300	2837	1.300	2863	1.300
2682	1.300	2708	1.300	2734	1.300	2760	1.300	2786	1.300	2812	1.300	2838	1.300	2864	1.300
2683	1.300	2709	1.300	2735	1.300	2761	1.300	2787	1.300	2813	1.300	2839	1.300	2865	1.300
2684	1.300	2710	1.300	2736	1.300	2762	1.300	2788	1.300	2814	1.300	2840	1.300	2866	1.300
2685	1.300	2711	1.300	2737	1.300	2763	1.300	2789	1.300	2815	1.300	2841	1.300	2867	1.300
2686	1.300	2712	1.300	2738	1.300	2764	1.300	2790	1.300	2816	1.300	2842	1.300	2868	1.300
2687	1.300	2713	1.300	2739	1.300	2765	1.300	2791	1.300	2817	1.300	2843	1.300	2869	1.300
2688	1.300	2714	1.300	2740	1.300	2766	1.300	2792	1.300	2818	1.300	2844	1.300	2870	1.300
2689	1.300	2715	1.300	2741	1.300	2767	1.300	2793	1.300	2819	1.300	2845	1.300	2871	1.300
2690	1.300	2716	1.300	2742	1.300	2768	1.300	2794	1.300	2820	1.300	2846	1.300	2872	1.300
2691	1.300	2717	1.300	2743	1.300	2769	1.300	2795	1.300	2821	1.300	2847	1.300	2873	1.300
2692	1.300	2718	1.300	2744	1.300	2770	1.300	2796	1.300	2822	1.300	2848	1.300	2874	1.300
2693	1.300	2719	1.300	2745	1.300	2771	1.300	2797	1.300	2823	1.300	2849	1.300	2875	1.300
2694	1.300	2720	1.300	2746	1.300	2772	1.300	2798	1.300	2824	1.300	2850	1.300	2876	1.300
2695	1.300	2721	1.300	2747	1.300	2773	1.300	2799	1.300	2825	1.300	2851	1.300	2877	1.300
2696	1.300	2722	1.300	2748	1.300	2774	1.300	2800	1.300	2826	1.300	2852	1.300	2878	1.300
2697	1.300	2723	1.300	2749	1.300	2775	1.300	2801	1.300	2827	1.300	2853	1.300	2879	1.300
2698	1.300	2724	1.300	2750	1.300	2776	1.300	2802	1.300	2828	1.300	2854	1.300	2880	1.300

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW Net1

Simulation Criteria			
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
		Number of Storage Structures	0
		Number of Real Time Controls	0
Synthetic Rainfall Details			
Rainfall Model	FSR M5-60 (mm)	19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R	0.310
		Cv (Winter)	0.840
Margin for Flood Risk Warning (mm)			300.0
Analysis Timestep	2.5 Second Increment (Extended)		
DTS Status			OFF
DVD Status			OFF
Inertia Status			OFF
Profile(s)			Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880		
Return Period(s) (years)			1, 30, 100
Climate Change (%)			0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1.00	15 Winter	1	+0%	30/15 Summer	100/15 Summer			76.468	-0.082	0.000
S1.001	S1.01	15 Winter	1	+0%	30/15 Summer				75.915	-0.080	0.000
S2.000	S1.02	15 Winter	1	+0%	100/15 Summer				76.143	-0.107	0.000
S1.002	S1.03	15 Winter	1	+0%	30/15 Summer				75.718	-0.077	0.000
S3.000	S1.04	15 Winter	1	+0%	100/15 Winter				76.172	-0.153	0.000
S3.001	S1.05	15 Winter	1	+0%	30/15 Summer				75.565	-0.150	0.000
S1.003	S1.06	15 Winter	1	+0%	30/15 Summer				75.294	-0.186	0.000
S1.004	S1.07	15 Winter	1	+0%	1/15 Summer				75.253	0.219	0.000
S1.005	SJ1	15 Summer	1	+0%					74.300	0.000	0.000

PN	US/MH Name	Flow / Cap.	Half Drain Overflow (l/s)	Pipe Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1.00	0.42			9.3	OK	2
S1.001	S1.01	0.44			9.2	OK	
S2.000	S1.02	0.19			3.5	OK	
S1.002	S1.03	0.48			15.5	OK	
S3.000	S1.04	0.23			14.3	OK	
S3.001	S1.05	0.24			14.3	OK	
S1.003	S1.06	0.24			31.5	OK	
S1.004	S1.07	0.19			41.8	SURCHARGED	
S1.005	SJ1	0.61			41.0	SURCHARGED*	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW Net1

Simulation Criteria			
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
		Number of Storage Structures	0
		Number of Real Time Controls	0
Synthetic Rainfall Details			
Rainfall Model	FSR M5-60 (mm)	19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R	0.310
		Cv (Winter)	0.840
Margin for Flood Risk Warning (mm)			300.0
Analysis Timestep	2.5 Second Increment (Extended)		
DTS Status			OFF
DVD Status			OFF
Inertia Status			OFF
Profile(s)			Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880		
Return Period(s) (years)			1, 30, 100
Climate Change (%)			0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1.00	15 Winter	30	+0%	30/15 Summer	100/15 Summer			76.742	0.192	0.000
S1.001	S1.01	15 Winter	30	+0%	30/15 Summer				76.245	0.250	0.000
S2.000	S1.02	15 Winter	30	+0%	100/15 Summer				76.171	-0.079	0.000
S1.002	S1.03	15 Winter	30	+0%	30/15 Summer				76.057	0.262	0.000
S3.000	S1.04	15 Winter	30	+0%	100/15 Winter				76.219	-0.106	0.000
S3.001	S1.05	15 Winter	30	+0%	30/15 Summer				75.764	0.049	0.000
S1.003	S1.06	15 Winter	30	+0%	30/15 Summer				75.690	0.210	0.000
S1.004	S1.07	15 Winter	30	+0%	1/15 Summer				75.556	0.522	0.000
S1.005	SJ1	15 Summer	30	+0%					74.300	0.000	0.000

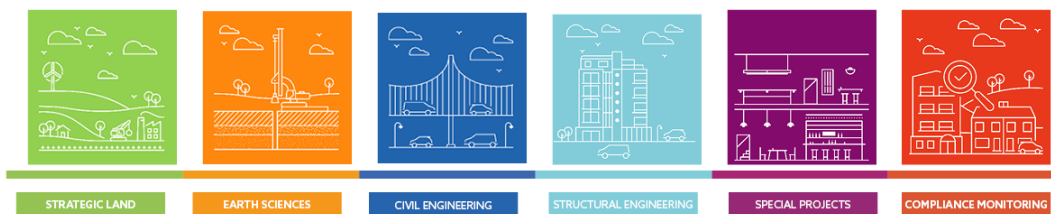
PN	US/MH Name	Flow / Cap.	Half Drain Overflow (l/s)	Pipe Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1.00	0.97			21.5	SURCHARGED	2
S1.001	S1.01	0.98			20.5	SURCHARGED	
S2.000	S1.02	0.45			8.5	OK	
S1.002	S1.03	1.08			35.1	SURCHARGED	
S3.000	S1.04	0.55			35.1	OK	
S3.001	S1.05	0.56			32.8	SURCHARGED	
S1.003	S1.06	0.56			72.1	SURCHARGED	
S1.004	S1.07	0.47			100.2	SURCHARGED	
S1.005	SJ1	1.48			99.0	SURCHARGED*	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW Net1

Simulation Criteria			
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
		Number of Storage Structures	0
		Number of Real Time Controls	0
Synthetic Rainfall Details			
Rainfall Model	FSR M5-60 (mm)	19.000	Cv (Summer) 0.750
Region	England and Wales	Ratio R	0.310
		Cv (Winter)	0.840
Margin for Flood Risk Warning (mm)			300.0
Analysis Timestep	2.5 Second Increment (Extended)		
DTS Status			OFF
DVD Status			OFF
Inertia Status			OFF
Profile(s)			Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880		
Return Period(s) (years)			1, 30, 100
Climate Change (%)			0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S1.00	15 Winter	100	+0%	30/15 Summer	100/15 Summer			77.300	0.750	0.390
S1.001	S1.01	15 Winter	100	+0%	30/15 Summer				76.768	0.773	0.000
S2.000	S1.02	15 Winter	100	+0%	100/15 Summer				76.623	0.373	0.000
S1.002	S1.03	15 Winter	100	+0%	30/15 Summer				76.526	0.731	0.000
S3.000	S1.04	15 Winter	100	+0%	100/15 Winter				76.330	0.005	0.000
S3.001	S1.05	15 Winter	100	+0%	30/15 Summer				76.052	0.337	0.000
S1.003	S1.06	15 Winter	100	+0%	30/15 Summer				75.943	0.463	0.000
S1.004	S1.07	15 Winter	100	+0%	1/15 Summer				75.732	0.698	0.000
S1.005	SJ1	15 Summer	100	+0%					74.300	0.000	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1.00	1.14			25.2	FLOOD	2
S1.001	S1.01	1.21			25.1	FLOOD RISK	
S2.000	S1.02	0.54			10.2	SURCHARGED	
S1.002	S1.03	1.32			42.9	SURCHARGED	
S3.000	S1.04	0.70			44.6	SURCHARGED	
S3.001	S1.05	0.69			40.4	SURCHARGED	
S1.003	S1.06	0.69			89.1	SURCHARGED	
S1.004	S1.07	0.58			124.9	SURCHARGED	
S1.005	SJ1	1.82			122.0	SURCHARGED*	



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