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CIVIL AND STRUCTURAL CONSULTING ENGINEERS

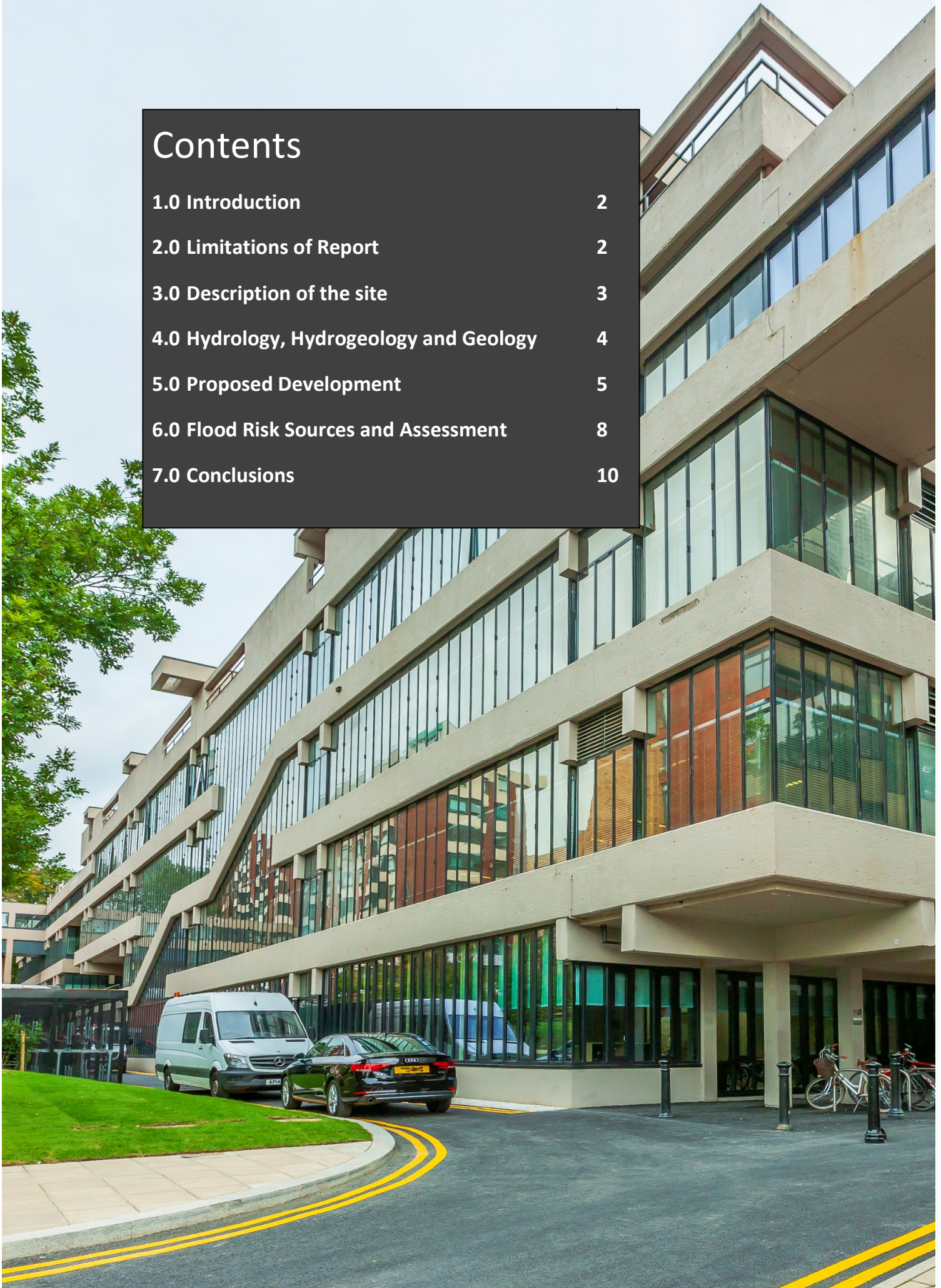


DRAINAGE STATEMENT

168 BURY OLD ROAD, MANCHESTER

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Client: Mayfair & Co Developments Ltd.

Project Name: 168 Bury Old Road, Manchester

Report Title: Drainage Statement

Report Author: Bilal Ashraf

Document ref: 100.20004-ACE-XX-XX-RP-C-0001

Date: 12/05/20

Revision	Suitability	Date	Author	Checked	Approved	Description
P1	S2	15/05/20	BA	NB	NB	FIRST ISSUE
P2	S2	07/09/20	JBW	JS	NB	Drainage Layout Updated

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1.0 Introduction

Adept Consulting Engineers Ltd was commissioned to provide a Drainage Statement (DS) for Mayfair & Co Developments Ltd in support of a full planning application for a residential development on land off Bury Old Road, Manchester. This report has been produced cognizant of the guidance given in the Manchester City Council Local Flood Risk Management Strategy 2014, henceforth referred to as the “design guide”.

2.0 Limitations of Report

The report is based on the interpretation and assessment of data provided by third parties. Adept Consulting Engineers Limited cannot guarantee the reliability of the third-party information obtained. The conclusions and findings of the report may change if the third-party data is subsequently amended or updated.

3.0 Description of the site

The site is located between Bury Old Road and Catherine Road, approximately 4km north of Manchester City Centre, adjacent to Cheetham Hill Cricket Club.

The nearest postcode is M7 4QY and the NGR is SD 83317 02315. The site is identified on the appended location plan.

Site description	
Total Site Area	0.225 Ha
Existing Impermeable Area	0.070 Ha
Land use	Residential
Topography	Approximately 450m of fall from north to south

The site is approximately rectangular and flat (83mAOD to 84mAOD) with average plan dimensions of 42m east to west and 52m north to south.

The site formerly hosted two large semi-detached Victorian villas which were demolished circa 2013 due to fire damage. The original properties occupied approximately 30% of the land

The site is vacant and secured by wooden hoarding. A deep layer of crushed material was installed across the site by travelers trespassing on the property. This layer of material has covered access to any existing drainage lines that may exist under the site

A topographic survey, that was undertaken before the site was backfilled with crushed material, is appended to this report

4.0 Hydrology, Hydrogeology and Geology

4.1. Watercourses and waterbodies

There are no nearby water courses within the 1km of the site. The closest water course is the River Irk which is over 2.5km from the site.

4.1.1. Sewerage

Sewer plans are appended,

4.1.2. Geology (BGS)

Bedrock:

Manchester Marls Formation - Mudstone. Sedimentary Bedrock formed approximately 252 to 272 million years ago in the Permian Period. Local environment previously dominated by lakes and lagoons.

Superficial Geology:

Glaciofluvial Sheet Deposits, Devensian - Sand and Gravel. Superficial Deposits formed up to 2 million years ago in the Quaternary Period. Local environment previously dominated by ice age conditions (UGF).

Borehole Logs:

The nearest borehole log approximately 1km away indicates layer banding of sands and clays within the area.

A Phase 1 Geotechnical and Environmental report has been undertaken. A Phase 2 report to confirm the ground conditions within the site is still to be undertaken.

5.0 Proposed Development

5.1. Development Outline

The proposed residential development includes six semi-detached properties to face Bury Old Road and six semi-detached properties to face Catherine Road. Each property will have a driveway to the front and a rear grassed area within the garden.

5.2. Proposed Surface Water Drainage Strategy

The Strategic Flood Risk Assessment for the city of Manchester requires all redevelopment sites to achieve a Greenfield discharge. The Greenfield run-off calculation for the site determines a rate of 1.53 L s^{-1} which is not possible to achieve with a subterranean vortex control. A discharge rate of this value will require an orifice significantly smaller than the 75mm diameter which is recommended to avoid blockages within the system and any subsequent flooding.

The discharge rate for the site has therefore been based on 3.5 L s^{-1} which has been selected to align with the standard rate adopted by authorities to control blockages and flooding through suitable orifice sizing.

The following design criteria have been incorporated into the scheme:

- Total site area - **0.225 Ha**
- Peak discharge from site - **3.5 L s^{-1}**
- M100 + 40% Climate Change Storm
- Attenuation Storage Required - **64.0 m^3**

Considering that the site is enclosed on all sides, urban creep has not been included as the site is to be developed to an extent that any additional build would not be possible.

A drainage strategy drawing, and appropriate asset information is appended. Drainage calculations illustrating the run off and attenuation volume has been appended.

Surface water will be attenuated in geocells located to the south of the site. The attenuation tank will have a controlled release to the existing and adopted combined sewers located within Bury Old Road.

A section 106 agreement will be required with United Utilities Ltd for the ultimate discharge connection into the public sewer system.

The development does not include any adoptable assets. As such a maintenance regime is required to afford the correct operation of the surface water assets. These include, gully clearance, flow control maintenance and attenuation asset inspection and cleansing. The gullies, vortex control and attenuation structure are all proprietary items and will be specified to current British Standards and accordingly will be accompanied by detailed and specific maintenance information.

A schedule of maintenance is provided below in accordance with the SuDs Manual.

Drainage Component	Maintenance activity	Maintenance Interval and regularity	Responsible Party
Manhole and pipework (foul and surface water) including flow control chamber.	Visual inspection	Min. every quarter or after severe storm	Facilities Management
Manhole and pipework (foul and surface water) including flow control chamber.	Litter and debris removal		Facilities Management
Manhole and pipework (foul and surface water) including flow control chamber.	Sediment management		Facilities Management
Gullies and associated ancillaries.	Sediment management	Biannual or after severe storm	Facilities Management
Gullies and associated ancillaries.	Litter and debris removal	Biannual or after severe storm	Facilities Management
Private threshold drainage and associated ancillaries	Sediment management	Biannual or after severe storm	Facilities Management
Geo-cellular attenuation	Sediment management	Annual CCTV inspected and jetting and cleaning as necessary.	Facilities Management

5.3. SuDS Assessment and Water Quality

The SuDS hierarchy requires that the following options are considered in the following order,

- Infiltration
- Discharge to a watercourse and
- Discharge to public sewer.

Descriptions of the hierarchy solutions are as stated below.

- The noted presence of clays within the local boreholes' points to the unsuitability of the surrounding ground to install a soak away.
- There are no known watercourses in the vicinity to make a connection.
- The only discharge solution remaining is that of a gravity connection to the public sewers located to the north and south of the site in Catherine Road, and Bury Old Road. As a result, a positive discharge must be made to the combined sewers.

Consideration of SuDS assets within the surface water system is assessed below.

- The limited space available on the site and the style of the buildings prohibits the use of a surface pond to provide meaningful storage.
- As previously indicated, 64.0 m³ of attenuation is required, Although soft SuDS attenuation is not viable on this development based on the volume required, consideration may be given to the use of soft SuDS in localized areas to treat water and absorb the initial runoff from shorter lower intensity storms.
- The design of the building, in keeping with the surrounding roof profiles, prohibits the use of the roof area for green roofs.
- The green spaces located externally to the front of the buildings, facing Bury Old Road, are unusable as an overflow connection to the central storage as these are raised above road level and would flood the public areas.

5.4. Foul Drainage

A combined sewer will discharge directly to the 450mm combined sewer located within Catherine Road. A section 106 agreement will be required to be entered into with United Utilities Ltd.

6.0 Flood Risk Sources and Assessment

6.1. Summary

A summary of the sources and level of flood risk (negligible, low, medium or high) is given in the table below. Information sourced from .gov.uk Flood Maps

Table 1. Summary of the Sources and Extent of Flood Risk	
Source	Risk Level
Fluvial	low
Tidal - Coastal	low
Surface Water / Pluvial	low
Groundwater	low
Surcharged Sewers	low
Other Man Made Sources	low

The site is in Flood Zone 1 and is not at risk from any sources of flooding and as such will not require a sequential test.

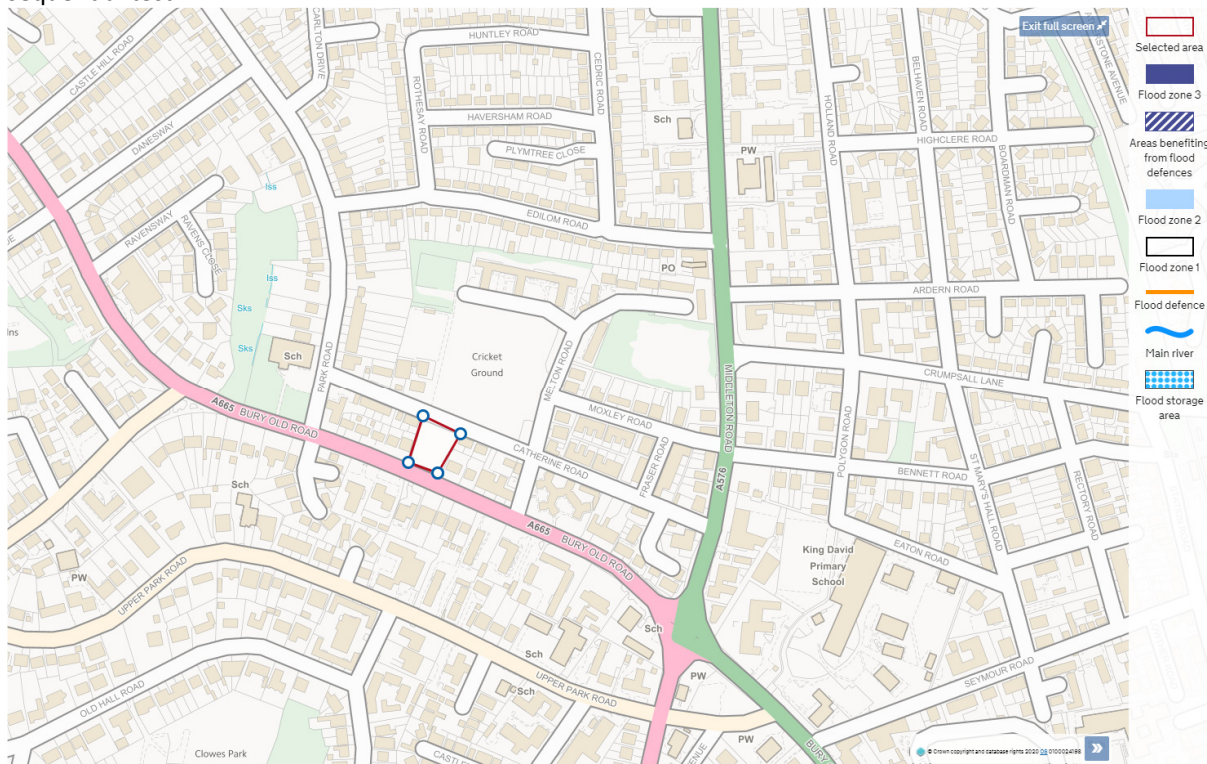


Figure 1. Flood Flood Risk

6.2. Climate Change

Based on a typical lifespan for this type of development of 100 years, the contingency allowance for climate change has been based on 40% climate change.

6.3. Design Consideration and Flood Mitigation

Due to the minimal natural sloping topography of the development site, it is viable to honor the normal flood mitigation strategy of raising finished floor levels by 150mm above existing levels

The external areas to the front and rear of all buildings will be set be at 150mm below the finished floor levels. This will ensure flooding of the development is avoided by directing the overland flow routes around the buildings and through the courtyard to Bury Old Road. (as per the current over ground flows)

A flood route exceedance plan is appended, highlighting flow paths from the building and the surrounding area. The design as proposed does include some 1144mm of freeboard within the attenuation asset.

6.4. Discussions with Statutory Bodies

Discussion with the Environment Agency – Discussions with the EA are not required at this stage

Discussion with the Lead Local Flood Authority – To be followed up with planning submission

Discussion with Sewerage Undertaker – Developer enquiry has been submitted to United Utilities

7.0 Conclusions

7.1. Existing Drainage

Existing public sewerage is located adjacent to the site and will be utilised to drain the development.

7.2. Proposed Drainage Strategy and SuDS Hierachy

The SuDS hierarchy can be deemed to have been fulfilled due to the following:

- infiltration is not viable for this enclosed development due to the local ground conditions
- a watercourse is not available for direct connection
- a connection to the surface water system is the viable option

All gullies and attenuation will be silt trapped to achieve the pollution reduction requirements of the SuDS Manual Simple Index Approach, which confirms roof water as very low hazard and requires the gross solids and sediment to be removed. With the proposed system, this achieves the requirements of the SuDS Manual.

The use of the courtyard and driveways for soft SuDS would add very little in terms of pollution removal efficacy, water storage and there would be a resultant loss of garden utility, increased cost, and the creation of a maintenance requirement.

The proposed rate of discharge (3.5ls^{-1}) is in line with vortex flow control lower operational limits and is the rate regularly defined by the sewerage undertaker and LLFA for a connection into a combined sewer.

The Greenfield rate fort the site (1.53ls^{-1}) will require an orifice size significantly below the safe operating value of 75mm. The use of an orifice below 75mm will cause blockages and potential flooding to the system and properties.

7.3. Flood Risk

The site is not at risk of flooding from any source, as supported by government flood maps.

7.4. Recommendations for further work/investigation and obtaining agreement

Section 106 agreements will be required with United Utilities Water Ltd.

Confirmation of surface water asset management provisions, namely Facilities Management or Management Company.

Removal of crushed material backfill over site to enable further geotechnical and drainage surveys to be undertaken

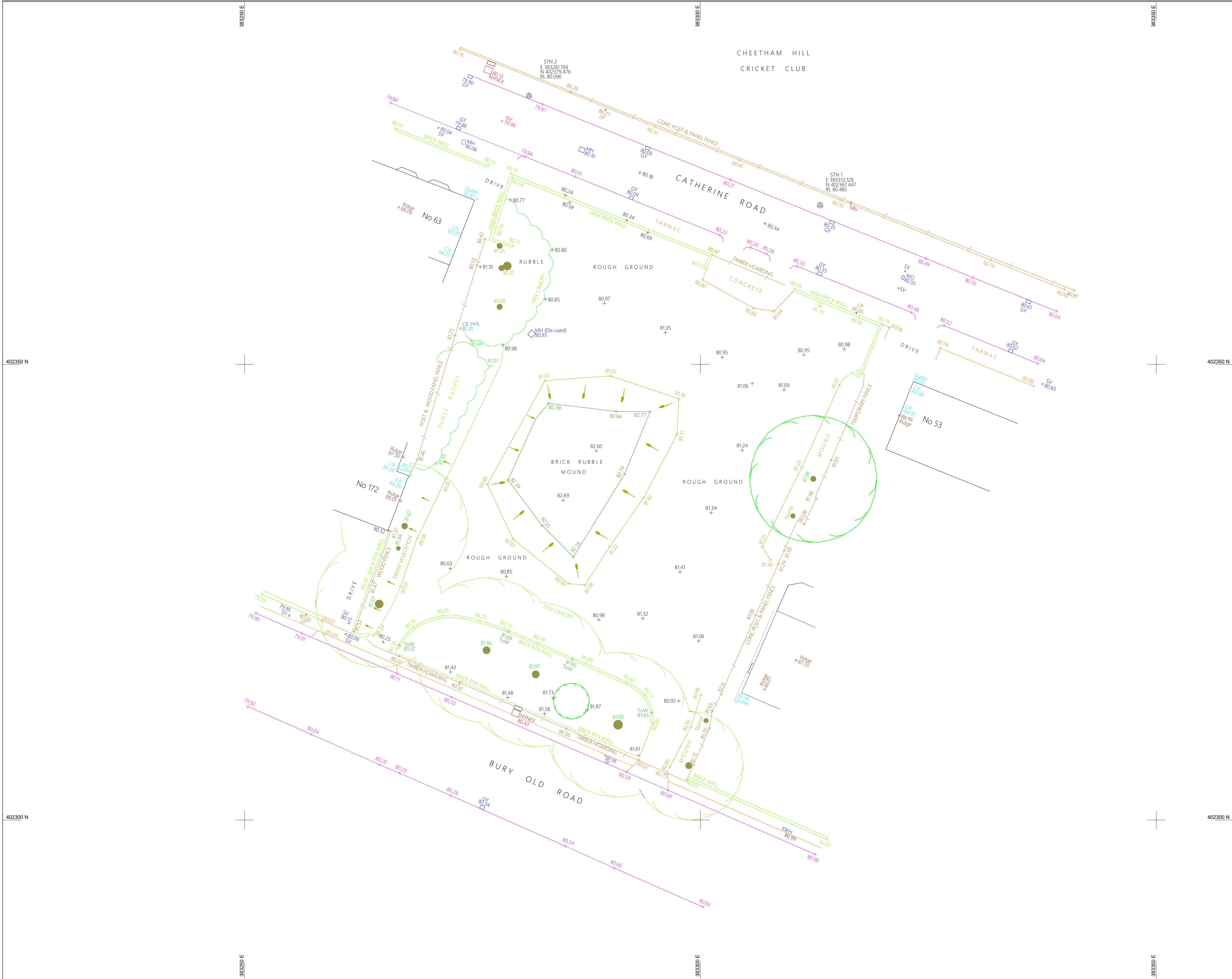
Phase 2 geotechnical investigation to be undertaken to confirm site strata and water table level.

Expose existing site manholes to confirm extent of existing drainage via CCTV survey. The manholes are currently buried under crushed material backfill and cannot be accessed

Appendices

- Location Plan
- Topographical Survey
- Site layout
- Sewer Records
- Drainage Layouts
- Drainage Calculations





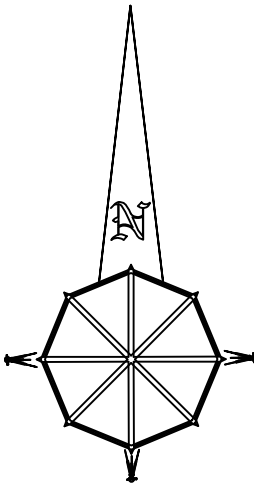
NOTES

ALL LEVELS ARE IN METRES RELATED TO
ORDNANCE SURVEY LEVEL

ALL CO-ORDINATES ARE IN METRES RELATED TO
NATIONAL GRID CO-ORDINATES FIXED BY G P S

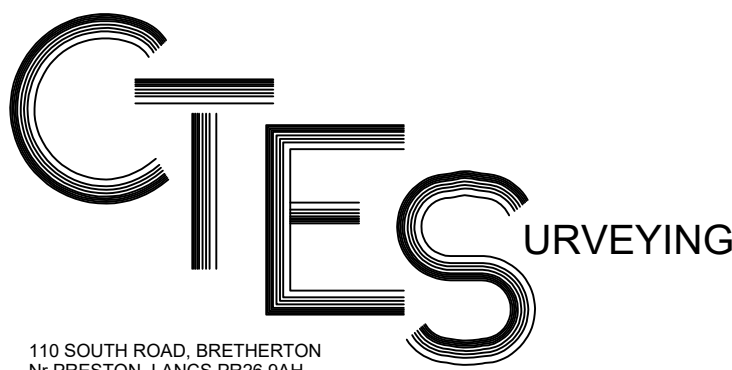
ALL SERVICES & MANHOLES SHOWN VISIBLE AT TIME
OF SURVEY

ALL DIMENSIONS TO BE CHECKED PRIOR TO
COMMENCEMENT OF WORK



Topographical Survey
Legend

Bol	Bollard	MP	Mile post
Bin	Litter bin	Pt	Post
BL	Bed level	PM	Parking meter
BS	Bus stop	PP	Power point
BT	British Telecom	RE	Rodding eye
Cam	Security Camera	Ridge	Roof/ridge level
CATV	Cable television cover	RS	Road sign
CL	Cover level	Rwp	Rain water pipe
DR	Drain	SL	Soffit level
Elec	Electrical ic	Slab	Slab level
EC	Electric Cable	Stay	Cable stay
EL	Eaves level	Step	Step level
EP	Elec. pole	SV	Stop valve
ER	Earth rod	Svp	Soil pipe
FP	Flagpole	TL	Traffic light
FT	Floodlight	ToB	Top of Building
GY	Gully	ToW	Top of wall level
GP	Gate post	TP	Telegraph pole
GV	Gas valve	TS	Traffic Signal
FH	Hydrant	TT	Tac Tile
FL	Floor level	VP	Vent pipe
IC	Inspection cover	WL	Water level
IL	Invert level	WM	Water meter
LP	Lamp post	Utl	Unable to lift
MH	Manhole	ZCB	Zebra Crossing Beacon
Mkr	Utility marker		



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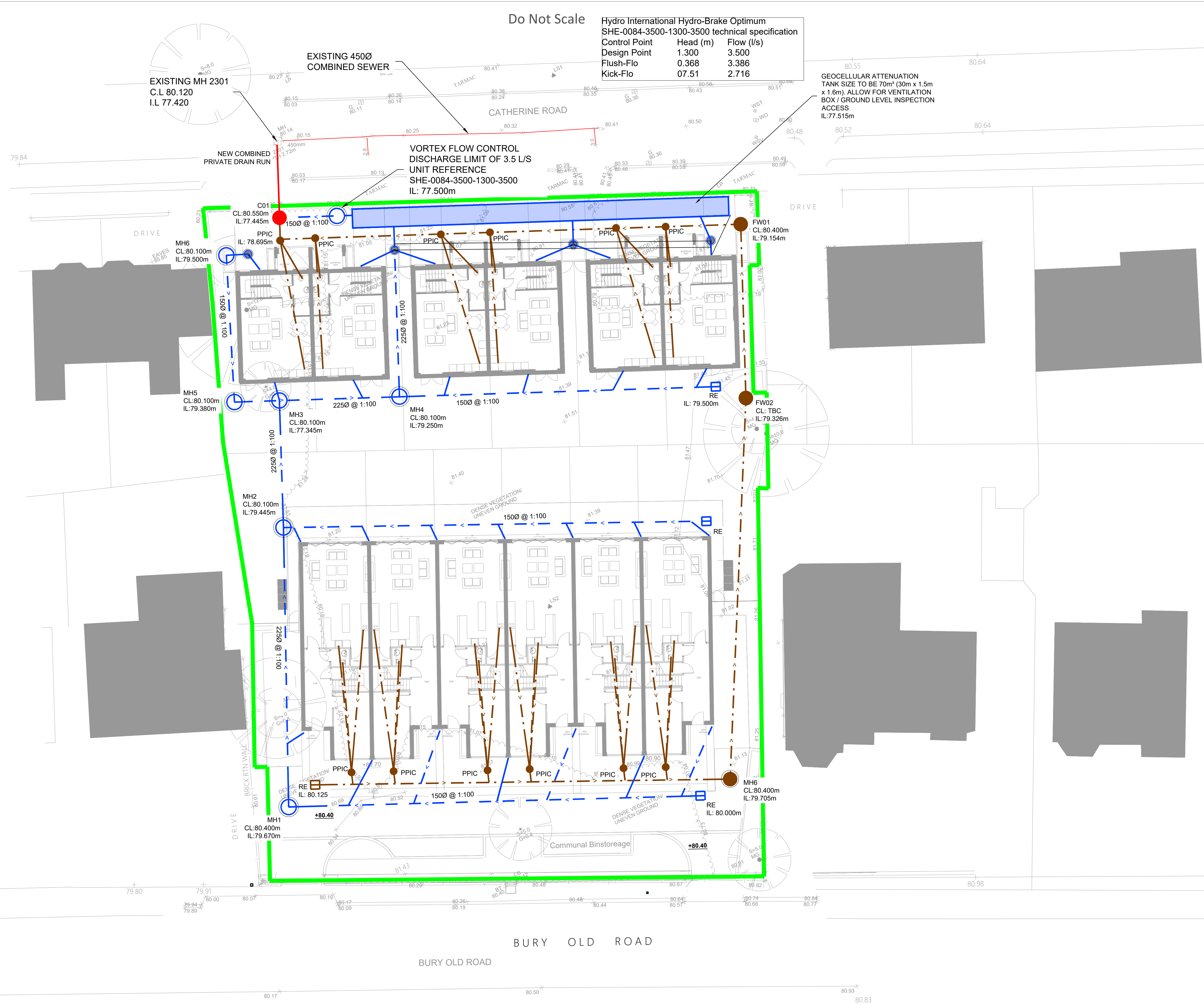
CLIENT

TRANSOM DEVELOPMENTS

JOB TITLE

LAND BETWEEN BURY OLD RD, CATHERINE RD
MANCHESTER

SCALE	DATE	JOB REF
1:200	JAN 2016	TRANSOM(BURY OLD RD)
REVISIONS		



NOTES

1. The proposed foul and SW networks to remain private and be maintained privately under contract in the future
2. It is assumed at this stage infiltration is not viable due to proximity of other buildings
3. There are no watercourses in the vicinity of the site.
4. It is proposed to restrict surface water discharge from the site to 3.5 l/s for storm events up to the 1 in 100 year storm event with 40% climate change allowance.
5. Discharge rates and location to be agreed with local council and United Utilities; it is proposed that surface water discharge to the combined sewer to the north of the site.
6. Proposed levels shown indicatively, to be determined by architect
7. Further survey required to determine existing drainage networks on site for suitability of re-use.
8. Drainage channels and gullies for driveways/hardstanding areas not currently shown. Run off from hardstanding areas to discharge to new private surface water drainage network and be attenuated prior to discharge off site.

Project Number	Originator	Volume	Level	Type	Role	Drg. No.	Rev.
100.20004-ACE-XX-XX-DR-C-1001							P03

Project: 100.202004 Bury Old Road, Prestwich	Date: 25/08/2022			
	Designed by: GT	Checked by: JS	Approved By:	
Report Details: Type: Inflows Storm Phase: Phase	Company Address: 1912 Mill, Sunny Bank Mills, Town Street, Farsley LS28 5UJ			



1

Type : Catchment Area

Area (ha)	0.089
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Preliminary Sizing

Volumetric Runoff Coefficient	0.750
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



2

Type : Catchment Area

Area (ha)	0.047
-----------	-------

Preliminary Sizing

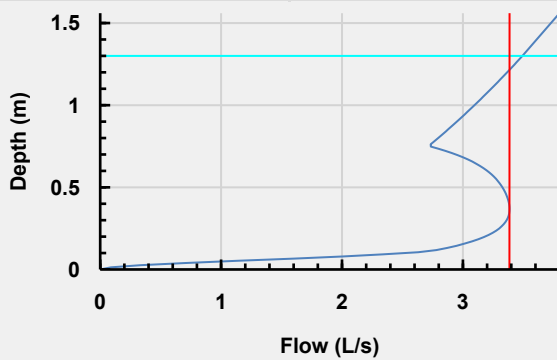
Volumetric Runoff Coefficient	0.750
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project: 100.202004 Bury Old Road, Prestwich	Date: 25/08/2022			
	Designed by: GT	Checked by: JS		Approved By:
Report Details: Type: Junctions Storm Phase: Phase	Company Address: 1912 Mill, Sunny Bank Mills, Town Street, Farsley LS28 5UJ			

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
Manhole	Outlet	(None)	Hydro-Brake®
	Invert Level (m)	77.650	
	Design Depth (m)	1.300	
	Design Flow (L/s)	3.5	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☒	
	Unit Reference	SHE-0084-3500-1300-3500	
			

Project: 100.202004 Bury Old Road, Prestwich	Date: 25/08/2022		
	Designed by: GT	Checked by: JS	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: 1912 Mill, Sunny Bank Mills, Town Street, Farsley LS28 5UJ		



Tank

Type : Tank

Dimensions

Exceedence Level (m)	80.500
Depth (m)	2.800
Base Level (m)	77.700
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	95
Average Slope (1:x)	0.00
Total Volume (m³)	69.642

Depth (m)	Area (m²)	Volume (m³)
0.000	45.00	0.000
1.600	45.00	68.400
1.601	45.00	68.443

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	2
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	26.877

Project: 100.202004 Bury Old Road, Prestwich		Date: 25/08/2022			
		Designed by: GT	Checked by: JS		Approved By:
Report Details: Type: Connections Storm Phase: Phase		Company Address: 1912 Mill, Sunny Bank Mills, Town Street, Farsley LS28 5UJ			

Name	Length (m)	Connection Type	Slope (1:x)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)
Pipe	2.228	Pipe	44.557		0.6	150	80.500	77.700

Name	Downstream Cover Level (m)	Downstream Invert Level (m)
Pipe	80.500	77.650

Project: 100.202004 Bury Old Road, Prestwich		Date: 25/08/2022			
		Designed by: GT	Checked by: JS		Approved By:
Report Details: Type: Manhole Schedule Storm Phase: Phase		Company Address: 1912 Mill, Sunny Bank Mills, Town Street, Farsley LS28 5UJ			

Name	Cover Level (m) Invert Level (m)		Connection Details				Type
Coordinates (m)	Depth (m)	Manhole Size (m)	Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
Manhole	80.500 77.650	Diameter / Length: 1.200	{1} Pipe	Pipe	77.650	Diam/Width: 150	Manhole - Access not Required
E:383288.824	2.850						
N:402366.199							Not Applicable

Project: 100.202004 Bury Old Road, Prestwich	Date: 25/08/2022			
	Designed by: GT	Checked by: JS	Approved By:	
Report Details: Type: Network Design Criteria Storm Phase: Phase	Company Address: 1912 Mill, Sunny Bank Mills, Town Street, Farsley LS28 5UJ			

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Level	Level Inverts
Min. Cover Depth (m)	1.200
Min. Slope (1:x)	500.00
Max. Slope (1:x)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Pipe Size Library

Default

Add. Increment (mm)	75
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Diameter (mm)	Min. Slope (1:x)	Max. Slope (1:x)
100	0.00	0.00
150	0.00	0.00

Project: 100.202004 Bury Old Road, Prestwich	Date: 25/08/2022			
	Designed by: GT	Checked by: JS	Approved By:	
Report Details: Type: Network Design Criteria Storm Phase: Phase	Company Address: 1912 Mill, Sunny Bank Mills, Town Street, Farsley LS28 5UJ			

Manhole Options

Apply Offset	☐
Synchronise Manhole Invert Levels	☒

Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.200	0.000
375	1.350	0.000
500	1.500	0.000
750	1.800	0.000

Additional Sizing

Connection (mm)	900
Diameter / Length (m)	0.900
Width (m)	0.000

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.000	1.050	0.000
1.500	1.200	0.000

Access

Depth (m)	Ladder Protrusion (mm)
0.000	130
3.000	230

Benching Requirements

Landing Width (mm)	500
Benching Width (mm)	225

Project: 100.202004 Bury Old Road, Prestwich	Date: 25/08/2022			
	Designed by: GT	Checked by: JS	Approved By:	
Report Details: Type: Outfall Details Storm Phase: Phase	Company Address: 1912 Mill, Sunny Bank Mills, Town Street, Farsley LS28 5UJ			

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Manhole	Free Discharge		

Project: 100.202004 Bury Old Road, Prestwich	Date: 25/08/2022		
	Designed by: GT	Checked by: JS	
Report Title: Rainfall Analysis Criteria	Company Address: 1912 Mill, Sunny Bank Mills, Town Street, Farsley LS28 5UJ		

Runoff Type	Dynamic
Output Interval (mins)	1
Time Step	Shortest
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FSR Type: FSR

Region	England and Wales
M5-60 (mm)	18.4
Ratio R	0.350
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
100.0	40

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project: 100.202004 Bury Old Road, Prestwich		Date: 25/08/2022			
		Designed by: GT	Checked by: JS		Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase		Company Address: 1912 Mill, Sunny Bank Mills, Town Street, Farsley LS28 5UJ			



Critical Storm

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Manhole	FSR: 100 years: +40 %: 120 mins: Winter	80.50 0	77.65 0	78.911	1.261	3.9	1.426	0.000	3.4	42.734	OK

Project: 100.202004 Bury Old Road, Prestwich		Date: 25/08/2022			
		Designed by: GT	Checked by: JS		Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Company Address: 1912 Mill, Sunny Bank Mills, Town Street, Farsley LS28 5UJ			



Critical Storm

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Tank	FSR: 100 years: +40 %: 120 mins: Winter	78.912	78.912	1.212	1.212	25.7	51.829	0.000	0.000	3.9	43.632	26	OK

Project: 100.202004 Bury Old Road, Prestwich	Date: 25/08/2022		
	Designed by: GT	Checked by: JS	Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Phase	Company Address: 1912 Mill, Sunny Bank Mills, Town Street, Farsley LS28 5UJ		



Tank

Critical Storm: FSR: 100 years: Increase Rainfall (%): +40: 120 mins: Winter

Type : Tank

Tables

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
0	0.0	0.000	0.000	0.000	0.0
1	0.1	0.000	0.001	0.000	0.0
2	0.3	0.000	0.011	0.000	0.0
3	0.7	0.001	0.039	0.000	0.0
4	1.1	0.002	0.091	0.000	0.0
5	1.7	0.004	0.174	0.000	0.0
6	2.3	0.007	0.291	0.000	0.1
7	2.8	0.010	0.435	0.000	0.2
8	3.3	0.014	0.597	0.000	0.5
9	3.6	0.018	0.767	0.000	0.8
10	3.9	0.022	0.933	0.000	1.2
11	4.1	0.025	1.085	0.000	1.7
12	4.3	0.029	1.219	0.000	2.2
13	4.4	0.032	1.355	0.000	2.1
14	4.5	0.035	1.494	0.000	2.2
15	4.5	0.038	1.631	0.000	2.3
16	4.5	0.041	1.766	0.000	2.4
17	4.6	0.044	1.897	0.000	2.3
18	4.6	0.047	2.024	0.000	2.5
19	4.6	0.050	2.147	0.000	2.6
20	4.6	0.053	2.267	0.000	2.6
21	4.6	0.056	2.384	0.000	2.6
22	4.6	0.058	2.498	0.000	2.7
23	4.6	0.061	2.612	0.000	2.8
24	4.7	0.064	2.726	0.000	2.8
25	4.8	0.067	2.843	0.000	2.8
26	4.9	0.069	2.964	0.000	2.9
27	5.0	0.072	3.091	0.000	2.9
28	5.2	0.075	3.225	0.000	2.9
29	5.4	0.079	3.370	0.000	2.9
30	5.6	0.083	3.525	0.000	2.9
31	5.9	0.087	3.695	0.000	3.0
32	6.3	0.091	3.882	0.000	3.0
33	6.7	0.096	4.087	0.000	3.1
34	7.1	0.101	4.314	0.000	3.1
35	7.5	0.107	4.565	0.000	3.1
36	8.0	0.113	4.841	0.000	3.2
37	8.6	0.120	5.147	0.000	3.2
38	9.1	0.128	5.481	0.000	3.3
39	9.8	0.137	5.850	0.000	3.3
40	10.4	0.146	6.255	0.000	3.4
41	11.1	0.157	6.698	0.000	3.4
42	11.8	0.168	7.178	0.000	3.5
43	12.6	0.180	7.699	0.000	3.5
44	13.3	0.194	8.264	0.000	3.5
45	14.1	0.208	8.873	0.000	3.6
46	15.0	0.223	9.528	0.000	3.6
47	15.8	0.240	10.231	0.000	3.7
48	16.6	0.257	10.981	0.000	3.7

Project: 100.202004 Bury Old Road, Prestwich		Date: 25/08/2022			
		Designed by: GT	Checked by: JS		Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Phase		Company Address: 1912 Mill, Sunny Bank Mills, Town Street, Farsley LS28 5UJ			

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
49	17.5	0.276	11.778	0.000	3.8
50	18.3	0.296	12.624	0.000	3.8
51	19.2	0.317	13.520	0.000	3.8
52	20.0	0.339	14.464	0.000	3.8
53	20.8	0.362	15.457	0.000	3.8
54	21.5	0.386	16.496	0.000	3.9
55	22.3	0.412	17.579	0.000	3.9
56	23.0	0.438	18.705	0.000	3.9
57	23.6	0.465	19.871	0.000	3.9
58	24.3	0.494	21.077	0.000	3.8
59	24.8	0.523	22.317	0.000	3.8
60	25.2	0.552	23.588	0.000	3.8
61	25.5	0.583	24.884	0.000	3.7
62	25.7	0.613	26.198	0.000	3.7
63	25.7	0.644	27.522	0.000	3.6
64	25.5	0.675	28.848	0.000	3.4
65	25.2	0.706	30.168	0.000	3.3
66	24.8	0.737	31.469	0.000	3.4
67	24.3	0.766	32.739	0.000	3.4
68	23.7	0.795	33.973	0.000	3.4
69	23.0	0.823	35.169	0.000	3.4
70	22.3	0.850	36.322	0.000	3.5
71	21.6	0.876	37.431	0.000	3.5
72	20.8	0.901	38.494	0.000	3.5
73	20.0	0.925	39.510	0.000	3.5
74	19.2	0.947	40.476	0.000	3.5
75	18.3	0.969	41.392	0.000	3.5
76	17.5	0.989	42.256	0.000	3.5
77	16.6	1.008	43.068	0.000	3.5
78	15.8	1.026	43.831	0.000	3.5
79	15.0	1.042	44.545	0.000	3.5
80	14.2	1.058	45.208	0.000	3.5
81	13.4	1.072	45.823	0.000	3.5
82	12.6	1.085	46.390	0.000	3.5
83	11.8	1.098	46.912	0.000	3.5
84	11.1	1.109	47.390	0.000	3.5
85	10.4	1.119	47.827	0.000	3.5
86	9.8	1.128	48.223	0.000	3.5
87	9.2	1.137	48.582	0.000	3.5
88	8.6	1.144	48.904	0.000	3.5
89	8.0	1.151	49.193	0.000	3.5
90	7.5	1.157	49.451	0.000	3.5
91	7.1	1.162	49.681	0.000	3.5
92	6.7	1.167	49.885	0.000	3.5
93	6.3	1.171	50.066	0.000	3.5
94	6.0	1.175	50.226	0.000	3.5
95	5.7	1.178	50.367	0.000	3.5
96	5.4	1.181	50.492	0.000	3.5
97	5.2	1.184	50.604	0.000	3.5
98	5.0	1.186	50.704	0.000	3.5
99	4.9	1.188	50.795	0.000	3.5
100	4.8	1.190	50.878	0.000	3.5
101	4.7	1.192	50.955	0.000	3.5
102	4.6	1.194	51.028	0.000	3.5
103	4.6	1.195	51.097	0.000	3.5
104	4.6	1.197	51.165	0.000	3.5
105	4.6	1.198	51.232	0.000	3.5

Project: 100.202004 Bury Old Road, Prestwich		Date: 25/08/2022			
		Designed by: GT	Checked by: JS		Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Phase		Company Address: 1912 Mill, Sunny Bank Mills, Town Street, Farsley LS28 5UJ			

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
106	4.6	1.200	51.298	0.000	3.5
107	4.6	1.202	51.364	0.000	3.5
108	4.6	1.203	51.429	0.000	3.5
109	4.6	1.205	51.495	0.000	3.5
110	4.5	1.206	51.559	0.000	3.5
111	4.5	1.208	51.621	0.000	3.5
112	4.4	1.209	51.679	0.000	3.5
113	4.3	1.210	51.732	0.000	3.5
114	4.1	1.211	51.776	0.000	3.5
115	3.9	1.212	51.810	0.000	3.5
116	3.6	1.212	51.828	0.000	3.4
117	3.3	1.212	51.829	0.000	3.4
118	2.8	1.212	51.806	0.000	3.4
119	2.3	1.211	51.756	0.000	3.4
120	1.7	1.209	51.673	0.000	3.4
121	1.1	1.206	51.557	0.000	3.4
122	0.7	1.202	51.409	0.000	3.4
123	0.3	1.198	51.237	0.000	3.3
124	0.1	1.194	51.048	0.000	3.3
125	0.0	1.189	50.850	0.000	3.3
126	0.0	1.185	50.651	0.000	3.3
127	0.0	1.180	50.452	0.000	3.3
128	0.0	1.175	50.253	0.000	3.3
129	0.0	1.171	50.055	0.000	3.3
130	0.0	1.166	49.857	0.000	3.3
131	0.0	1.162	49.660	0.000	3.3
132	0.0	1.157	49.462	0.000	3.3
133	0.0	1.152	49.265	0.000	3.3
134	0.0	1.148	49.069	0.000	3.3
135	0.0	1.143	48.873	0.000	3.3
136	0.0	1.139	48.677	0.000	3.3
137	0.0	1.134	48.481	0.000	3.3
138	0.0	1.129	48.286	0.000	3.2
139	0.0	1.125	48.092	0.000	3.2
140	0.0	1.120	47.897	0.000	3.2
141	0.0	1.116	47.703	0.000	3.2
142	0.0	1.111	47.509	0.000	3.2
143	0.0	1.107	47.315	0.000	3.2
144	0.0	1.102	47.122	0.000	3.2
145	0.0	1.098	46.930	0.000	3.2
146	0.0	1.093	46.737	0.000	3.2
147	0.0	1.089	46.545	0.000	3.2
148	0.0	1.084	46.354	0.000	3.2
149	0.0	1.080	46.163	0.000	3.2
150	0.0	1.075	45.972	0.000	3.2
151	0.0	1.071	45.781	0.000	3.2
152	0.0	1.066	45.591	0.000	3.2
153	0.0	1.062	45.401	0.000	3.2
154	0.0	1.057	45.211	0.000	3.2
155	0.0	1.053	45.022	0.000	3.2
156	0.0	1.049	44.833	0.000	3.1
157	0.0	1.044	44.644	0.000	3.1
158	0.0	1.040	44.456	0.000	3.1
159	0.0	1.035	44.268	0.000	3.1
160	0.0	1.031	44.081	0.000	3.1
161	0.0	1.027	43.894	0.000	3.1
162	0.0	1.022	43.707	0.000	3.1

Project: 100.202004 Bury Old Road, Prestwich		Date: 25/08/2022	
		Designed by: GT	Checked by: JS
Report Details: Type: Stormwater Control Results Storm Phase: Phase		Approved By:	
		Company Address: 1912 Mill, Sunny Bank Mills, Town Street, Farsley LS28 5UJ	



Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
163	0.0	1.018	43.521	0.000	3.1
164	0.0	1.014	43.335	0.000	3.1
165	0.0	1.009	43.150	0.000	3.1
166	0.0	1.005	42.964	0.000	3.1
167	0.0	1.001	42.779	0.000	3.1
168	0.0	0.996	42.594	0.000	3.1
169	0.0	0.992	42.410	0.000	3.1
170	0.0	0.988	42.226	0.000	3.1
171	0.0	0.983	42.042	0.000	3.1
172	0.0	0.979	41.859	0.000	3.1
173	0.0	0.975	41.676	0.000	3.0
174	0.0	0.971	41.493	0.000	3.0
175	0.0	0.966	41.311	0.000	3.0
176	0.0	0.962	41.129	0.000	3.0
177	0.0	0.958	40.948	0.000	3.0
178	0.0	0.954	40.767	0.000	3.0
179	0.0	0.949	40.586	0.000	3.0
180	0.0	0.945	40.406	0.000	3.0
181	0.0	0.941	40.226	0.000	3.0
182	0.0	0.937	40.046	0.000	3.0
183	0.0	0.932	39.867	0.000	3.0
184	0.0	0.928	39.688	0.000	3.0
185	0.0	0.924	39.509	0.000	3.0
186	0.0	0.920	39.330	0.000	3.0
187	0.0	0.916	39.152	0.000	3.0
188	0.0	0.912	38.974	0.000	3.0
189	0.0	0.907	38.797	0.000	3.0
190	0.0	0.903	38.620	0.000	2.9
191	0.0	0.899	38.443	0.000	2.9
192	0.0	0.895	38.266	0.000	2.9
193	0.0	0.891	38.090	0.000	2.9
194	0.0	0.887	37.915	0.000	2.9
195	0.0	0.883	37.739	0.000	2.9
196	0.0	0.879	37.564	0.000	2.9
197	0.0	0.875	37.390	0.000	2.9
198	0.0	0.870	37.215	0.000	2.9
199	0.0	0.866	37.041	0.000	2.9
200	0.0	0.862	36.868	0.000	2.9
201	0.0	0.858	36.695	0.000	2.9
202	0.0	0.854	36.522	0.000	2.9
203	0.0	0.850	36.349	0.000	2.9
204	0.0	0.846	36.177	0.000	2.9
205	0.0	0.842	36.006	0.000	2.9
206	0.0	0.838	35.834	0.000	2.9
207	0.0	0.834	35.663	0.000	2.8
208	0.0	0.830	35.493	0.000	2.8
209	0.0	0.826	35.322	0.000	2.8
210	0.0	0.822	35.152	0.000	2.8
211	0.0	0.818	34.983	0.000	2.8
212	0.0	0.814	34.814	0.000	2.8
213	0.0	0.810	34.645	0.000	2.8
214	0.0	0.806	34.476	0.000	2.8
215	0.0	0.802	34.308	0.000	2.8
216	0.0	0.799	34.140	0.000	2.8
217	0.0	0.795	33.973	0.000	2.8
218	0.0	0.791	33.806	0.000	2.8
219	0.0	0.787	33.639	0.000	2.8

Project: 100.202004 Bury Old Road, Prestwich		Date: 25/08/2022			
		Designed by: GT	Checked by: JS		Approved By:
Report Details: Type: Stormwater Control Results Storm Phase: Phase		Company Address: 1912 Mill, Sunny Bank Mills, Town Street, Farsley LS28 5UJ			

Time (mins)	Total Inflow (L/s)	Depth(m)	Resident Volume(m³)	Flooded Volume (m³)	Total Outflow (L/s)
220	0.0	0.783	33.472	0.000	2.8
221	0.0	0.779	33.306	0.000	2.8
222	0.0	0.775	33.140	0.000	2.8
223	0.0	0.771	32.975	0.000	2.8
224	0.0	0.767	32.810	0.000	2.7
225	0.0	0.764	32.645	0.000	2.7
226	0.0	0.760	32.481	0.000	2.7
227	0.0	0.756	32.317	0.000	2.7
228	0.0	0.752	32.153	0.000	2.7
229	0.0	0.748	31.989	0.000	2.7
230	0.0	0.744	31.826	0.000	2.7
231	0.0	0.741	31.664	0.000	2.7
232	0.0	0.737	31.501	0.000	2.7
233	0.0	0.733	31.340	0.000	2.7
234	0.0	0.729	31.178	0.000	2.7
235	0.0	0.725	31.018	0.000	2.7
236	0.0	0.722	30.857	0.000	2.7
237	0.0	0.718	30.697	0.000	2.7
238	0.0	0.714	30.537	0.000	2.7
239	0.0	0.711	30.378	0.000	2.7
240	0.0	0.707	30.218	0.000	2.7

Technical Specification

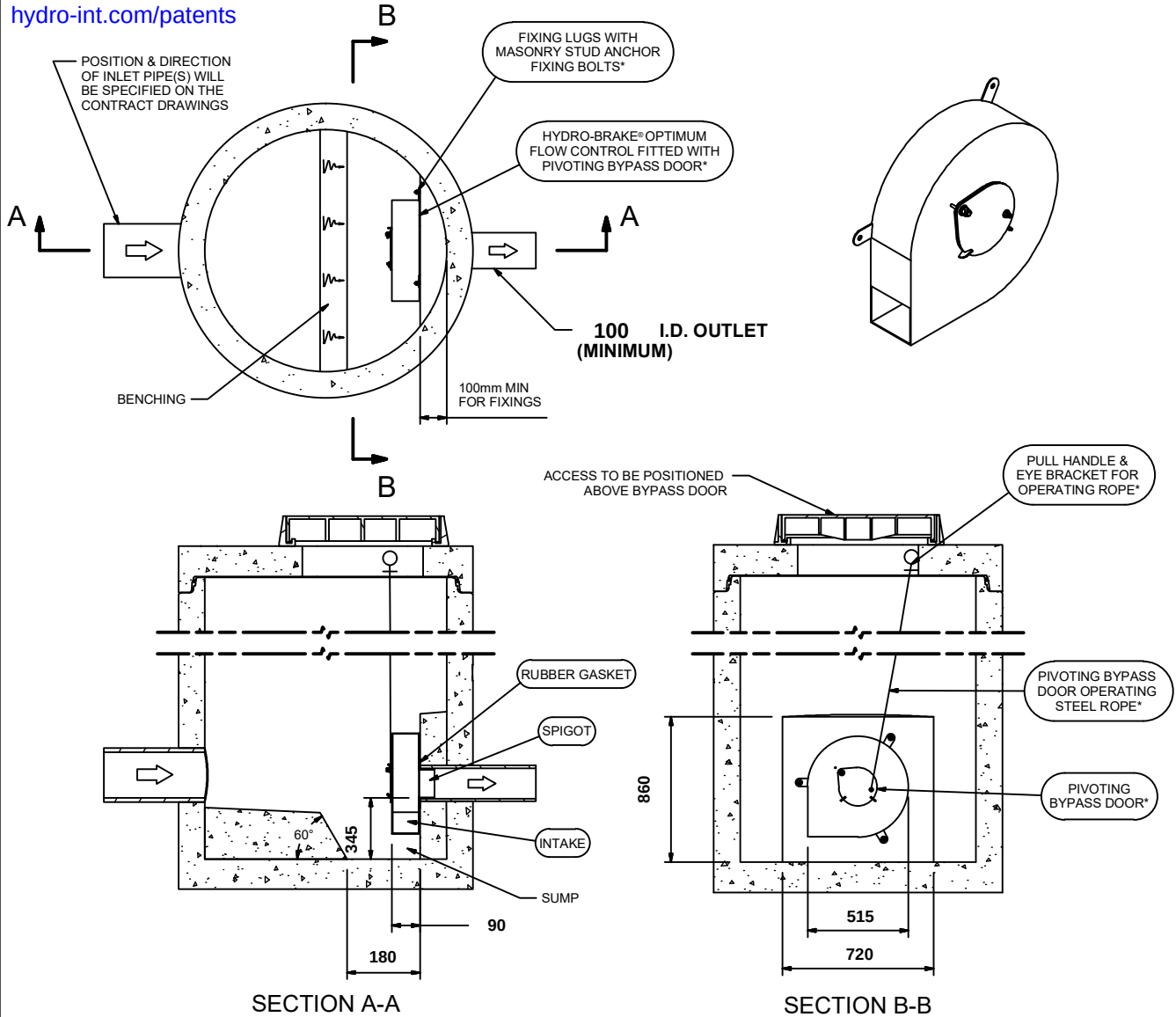
Control Point	Head (m)	Flow (l/s)
Primary Design	1.300	3.500
Flush-Flo™	0.368	3.386
Kick-Flo®	0.751	2.716
Mean Flow		3.007

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Indicative Weight: 123 kg



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IMPORTANT: ○ LIMIT OF HYDRO INTERNATIONAL SUPPLY
 THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
 FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
 ALL CIVIL AND INSTALLATION WORK BY OTHERS
 * WHERE SUPPLIED
 HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE



The head/flow characteristics of this SHE-0084-3500-1300-3500 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro
 International®

DATE 12/09/2022 16:11

SITE Bury Old Road, Prestwich

DESIGNER Gencay Tuglaci

REF 100.20004

SHE-0084-3500-1300-3500

Hydro-Brake® Optimum

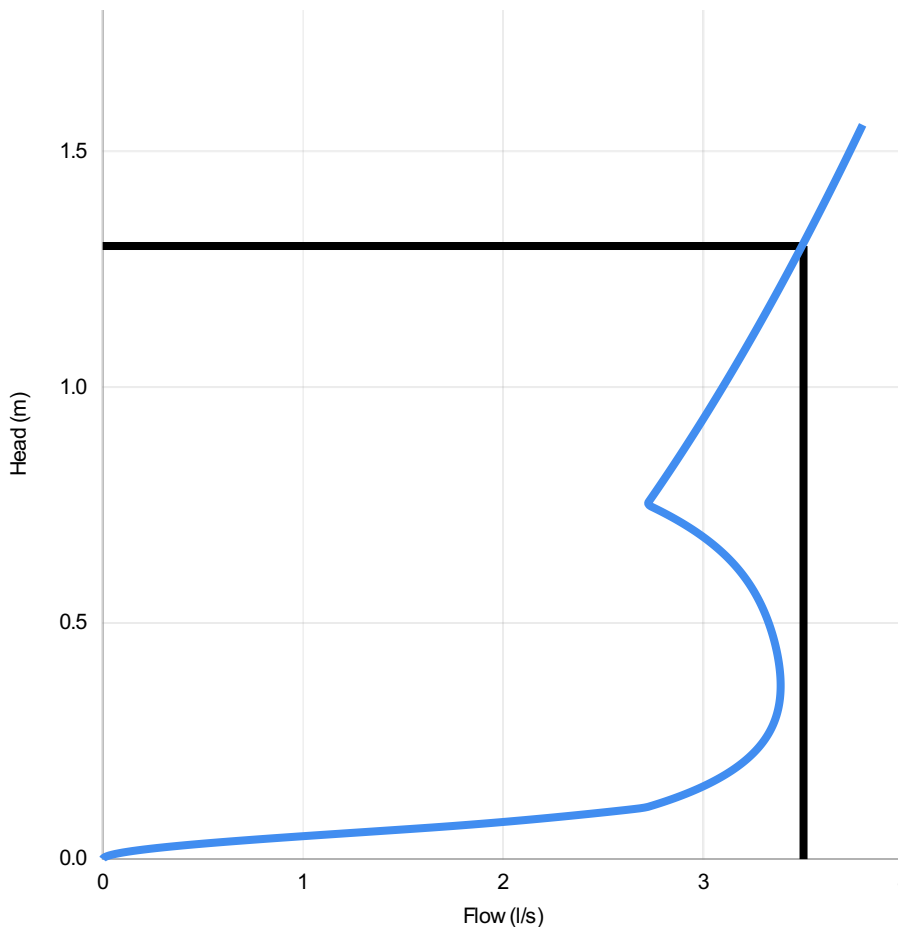
Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.300	3.500
Flush-Flo	0.368	3.386
Kick-Flo®	0.751	2.716
Mean Flow		3.007



PT/329/0412

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Head (m)	Flow (l/s)
0.000	0.000
0.045	0.872
0.090	2.282
0.134	2.889
0.179	3.110
0.224	3.248
0.269	3.329
0.314	3.371
0.359	3.385
0.403	3.381
0.448	3.362
0.493	3.332
0.538	3.290
0.583	3.230
0.628	3.148
0.672	3.033
0.717	2.875
0.762	2.734
0.807	2.806
0.852	2.876
0.897	2.945
0.941	3.011
0.986	3.076
1.031	3.139
1.076	3.201
1.121	3.262
1.166	3.321
1.210	3.379
1.255	3.436
1.300	3.492

DESIGN ADVICE



The head/flow characteristics of this SHE-0084-3500-1300-3500 Hydro-Brake Optimum® Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro
International

DATE	12/09/2022 16:11
Site	Bury Old Road, Prestwich
DESIGNER	Gencay Tuglaci
Ref	100.20004

SHE-0084-3500-1300-3500
Hydro-Brake Optimum®