Aqua Civils, Sunny Nook, Jollys Lane, Porthtowan, TR4 8AX
Email: info@aqua-civils.com
07773 352999

Aqua Civils Ref: C1065-1 Rev B
19.11.2023

Client: Wold Top Developments

PROPOSED DEVELOPMENT; ERECTION OF TWO DWELLINGS AND DOUBLE GARAGE RYBURNDENE, GROSVENOR ROAD, YORK
PA20/02012/FUL

SURFACE & FOUL WATER DRAINAGE STATEMENT

Sirs,
The information provided below is to support the discharge of Condition 10 of the above application.

The proposed development plan is included as Annex A.
Topographic survey to Ordnance Datum is included as Annex B.
Yorkshire Water Sewage Enquiry Map is included as Annex C.
Hydraulic worksheets are included as Annex D.

The approved planning condition is worded as follows;

No development shall take place until details of the proposed means of foul and surface water drainage, including details of any balancing works and off site works, have been submitted to and approved by the Local Planning Authority. The development shall not be occupied until the approved details have been implemented.
Reason: So that the Local Planning Authority may be satisfied with these details for the proper and sustainable drainage of the site.

Design considerations.

1. *The developer's attention is drawn to Requirement H3 of the Building Regulations 2000 with regards to hierarchy for surface water dispersal and the use of Sustainable Drainage Systems (SuD's). Consideration should be given to discharge to soakaway, infiltration system and watercourse in that priority order. Surface water discharge to the existing public sewer network must only be as a last resort therefore sufficient evidence should be provided i.e. witnessed by CYC infiltration tests to BRE Digest 365 to discount the use of SuD's.*

2. *If the proposed method of surface water disposal is via soakaways, these should be shown to work through an appropriate assessment carried out under BRE Digest 365, (preferably carried out in winter), to prove that the ground has sufficient capacity to except surface water discharge, and to prevent flooding of the surrounding land and the site itself. City of York Council's Flood Risk Management Team should witness the BRE Digest 365 test.*

3. *If SuDs methods can be proven to be unsuitable then In accordance with City of York Councils City of York Councils Sustainable Drainage Systems Guidance for Developers (August 2018) and in agreement with the Environment Agency and the York Consortium of*

Internal Drainage Boards, peak run-off from Brownfield developments must be attenuated to 70% of the existing rate (based on 140 l/s/ha of proven by way of CCTV drainage survey connected impermeable areas).

4. *Storage volume calculations, using computer modelling, must accommodate a 1:30 year storm with no surface flooding, along with no internal flooding of buildings or surface run-off from the site in a 1:100 year storm. Proposed areas within the model must also include an additional 30% allowance for climate change. The modelling must use a range of storm durations, with both summer and winter profiles, to find the worst-case volume required.*

5. *If existing connected impermeable areas not proven then Greenfield sites are to limit the discharge rate to the pre developed run off rate. The pre development run off rate should be calculated using either IOH 124 or FEH methods (depending on catchment size).*

6. *In some instances design flows from minor developments may be so small that the restriction of flows may be difficult to achieve. However, through careful selection of source control or SuDS techniques it should be possible to manage or restrict flows from the site to a minimum 0.5 l/sec for individual residential properties, please discuss any design issues with the City of York Council Flood Risk Management Team.*

7. *Where calculated runoff rates are not available the widely used 1.4l/s/ha rate can be used as a proxy, however, if the developer can demonstrate that the existing site discharges more than 1.4l/s/ha a higher existing runoff rate may be agreed and used as the discharge limit for the proposed development. If discharge to public sewer is required, and all alternatives have been discounted, the receiving public sewer may not have adequate capacity and it is recommend discussing discharge rate with Yorkshire Water Services Ltd at an early stage.*

8. *Surface water shall not be connected to any foul / combined sewer, if a suitable surface water sewer is available.*

9. *The applicant should provide a topographical survey showing the existing and proposed ground and finished floor levels to ordnance datum for the site and adjacent properties. The development should not be raised above the level of the adjacent land, to prevent runoff from the site affecting nearby properties.*

10. *Details of the future management and maintenance of the proposed drainage scheme shall be provided.*

Aqua Civils

Foul Drainage Statement

A public sewer (combined) runs along Grosvenor Road to the north of the site. It is proposed to connect foul flows from the site to the public system via a new connection. A sewer connection application will be submitted to Yorkshire Water to formalise this process.

Surface Water Drainage

The proposed development site comprises an area of 390 m^2. This comprises garages/outbuildings and paved areas. The entire area is informally drained.

Falling head tests were undertaken as part of the site investigation (provided to support this application). The site investigation concluded the following;

From the results of the tests, permeability values have been calculated which indicates poor to practically impervious drainage characteristics, with a very low to practically impermeable permeability classification. It is felt that, due to the presence of low permeability drift deposits along with the results of the permeability testing, the natural deposits are not deemed to be suitable for use as traditional soakaways.

Given the unsuitability of the subsoil for infiltration techniques it is proposed to drain surface water from the site at an attenuated rate to the most appropriate receptor.

No watercourses have been identified in the vicinity of the site. It is therefore proposed to discharge surface water at an attenuated rate to the adjacent Yorkshire Water surface water sewer that runs in an easterly direction across the site frontage.

No evidence is available confirming existing connection of impermeable areas to a positive drainage system. It is therefore proposed to discharge surface water at equivalent greenfield rates. Greenfield runoff rates are calculated using IoH124 method and presented in Annex D of this report. This method suggests greenfield rate of 0.1 l/s during a 1 in 100 yr event. Accordingly, it is proposed that surface water discharge is attenuated to no greater than 0.5 l/s during all storm events up to 1 in 100 yrs including an allowance of 30 % for climate change for this two dwelling development site.

A hydraulic simulation of the attenuation system has been constructed using Microdrainage software to demonstrate that the proposed arrangement is suitable to manage the flows resulting from the development. Worksheets are included as Annex D.

This indicates a tank comprised of geocellular units with invert of 11.21 mAOD and plan area 7.0 m long x 4.0 m wide x 0.7 m deep (from Polypipe Polystorm units or similar) has capacity to attenuate rainfall runoff from the 1 in 100 + 30% storm event. Maximum water levels would reach 0.70 m during the critical design storm event. Discharge from site would be via a suitable hydrobrake chamber as detailed in Annex D. Due to the small orifice associated with the proposed flow control device, all gullys receiving surface water should be fitted with suitable catchpit configurations. The arrangement is shown on the proposed development plan included as Annex A.

Management & Maintenance

The surface water attenuation system is to be partially located in private garden areas associated with the two new dwellings. The system will be maintained by a suitable management agreement. The following activities should be undertaken to ensure suitable performance of the system;

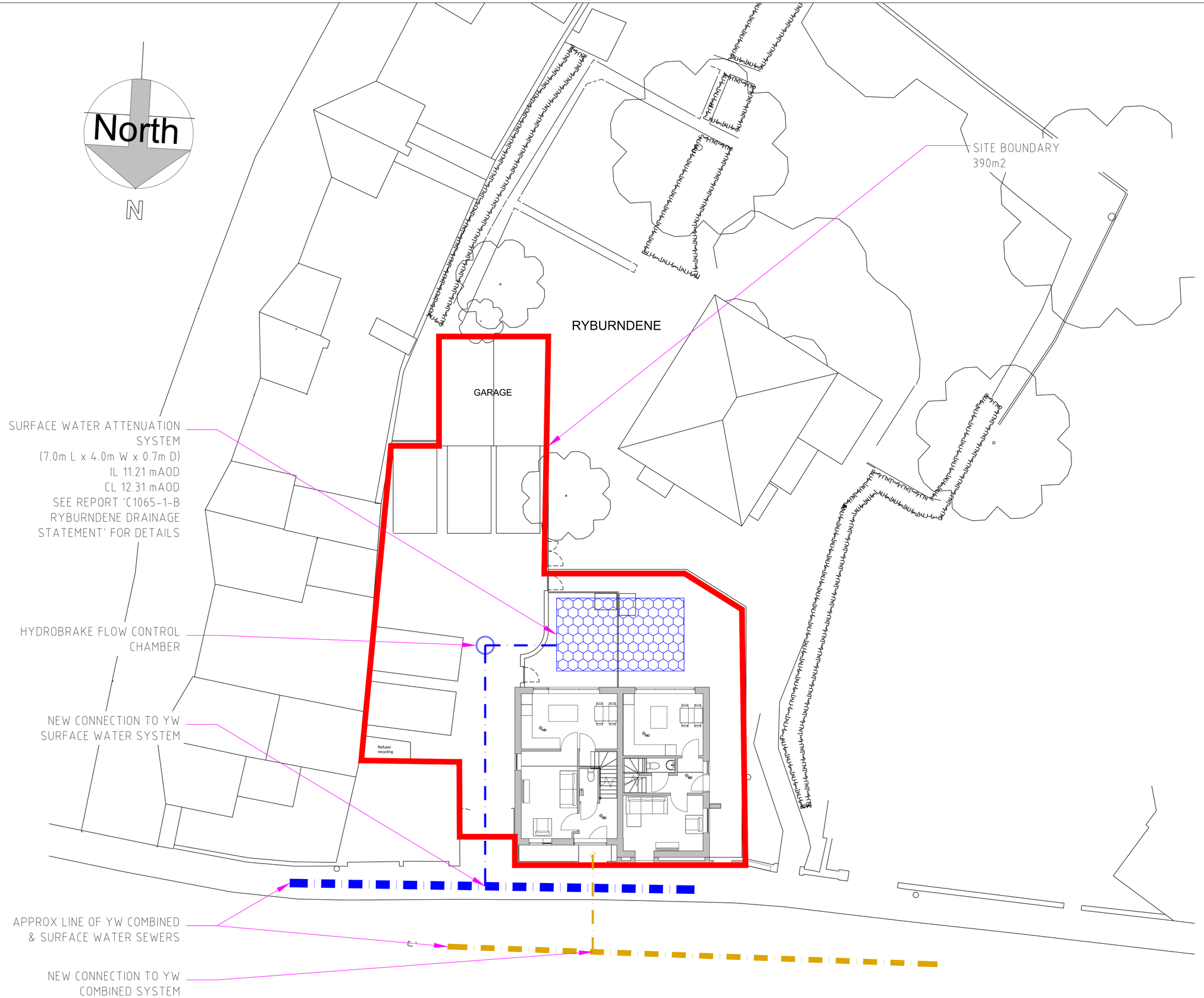
- Hydrobrake chamber, attenuation tank and catchpit gullys; inspected regularly – at least every 6 months, silt and debris cleared/jetted if observed

Yours sincerely
On behalf of **Aqua Civils Limited**

Daniel Laessing
Principal Engineer, Aqua Civils Limited

Aqua Civils

ANNEX A PROPOSED DEVELOPMENT PLAN



NOTES

1. This drawing is copyright. Refer to details above.
2. This drawing is only to be used for the purposes described in the status box below.
   Work to figured dimensions only, do not scale.
3. This drawing is to be read in conjunction with all other drawings, details and specifications pertaining to the work described.
4. Materials and workmanship shall comply to the appropriate British Standards and Codes of Practice unless otherwise stated.
5. The activities required to construct the work, shown on drawings clearly marked FOR CONSTRUCTION, may be subject to the provisions of the The Construction (Design and Management) Regulations 2015 The Contractor and Client must ensure that they are adequately conversant with these regulations and that the appropriate procedures required under the regulations are observed at all times.

LEGEND

- PROPOSED PRIVATE SURFACE WATER INFRASTRUCTURE
- PROPOSED FOUL WATER INFRASTRUCTURE
- PROPOSED GEOCELLULAR ATTENUATION TANK

DATE	DRWN.	CHKD.	REV.	NOTES
19:11:23	DEL	-	B	TANK IL UPDATED TO OS DATUM MAX SW DISCHARGE 0.5 l/s FOR SITE
21:08:23	DEL	-	A	INITIAL ISSUE

SCALE & SHEET SIZE:- 1:100 @ A1

PLANNING

Aqua Civils
Aqua Civils, Sunny Nook, Jollys Lane, Porthtowan, TR4 8AX
Email: info@aqua-civils.com
07773 352999

CLIENT
WOLD TOP DEVELOPMENTS

PROJECT
RYBURNDENE, YORK

DRAWING TITLE
DRAINAGE STRATEGY

PROJECT No.	DRAWING No.	REV.
C-1065	101	B

Aqua Civils

ANNEX B TOPOGRAPHIC SURVEY

SYMBOL LEGEND

- Borehole
- Benchmark
- Bollard
- Bus Stop
- Electric Box
- Electricity Pole
- Fence Post
- Gas Stop Valve
- Gate Post
- Gas Marker
- Gully Drain
- Electric Inspection Cover
- Kerb Outlet
- Litter Bin
- BT Inspection chamber
- Lamp Post
- Manhole Point
- MH Triangular
- MH Square
- MH Round
- Marker Post
- Pylon
- Rodding Eye
- BT Exchange Box
- Sign Post
- Spot Height
- Eave Level
- Ridge Level
- Stile
- Survey Station
- Traffic Camera
- Telephone Box
- Trial Pit
- Telegraph Pole
- Deciduous Tree
- Road Sign
- GATE
- Fire Hydrant
- Water Meter
- Letter Box
- CATV Inspection Chamber
- Water Stop Valve

ABBREVIATIONS

LP.	Lamp Post
TP.	Telegraph Pole
EP.	Electricity Pole
SP.	Sign Post
TSL	Traffic Sign
BS.	Bus Stop
GM.	Gas Marker

LINETYPE LEGEND

- Bridge
- Bottom of Bank
- Building
- Canopy Edge
- Concrete Edge
- Ditch
- Drop Kerb
- Overhead Cable
- Grid
- Tactilite Paver
- Kerb
- Path
- Pipe Line
- FOUL SEWER
- SURFACE WATER SEWER
- Channel Line
- Road Centre Line
- Tarmac Edge
- Top of Bank
- Track
- Wall
- Verge
- Flagstone Paving
- Stone
- Hedgeline
- Grass Edge
- Vegetation Line
- Post and Rail Fence
- Post and Wire Fence
- Contour Normal
- Contour Prominent

ABBREVIATIONS CONTINUED

MH.	Manhole
GU.	Gully
FH.	Fire Hydrant
CATV.	Cable Television Point
WM.	Water Meter
WSV.	Water Stop Valve
GSV.	Gas Stop Valve
RE.	Rodding Eye
GU.	Gully
FH.	Fire Hydrant
CATV.	Cable Television Point
WM.	Water Meter
WSV.	Water Stop Valve
GSV.	Gas Stop Valve
RE.	Rodding Eye

SURVEY BASED ON LOCAL GRID AND LEVEL

THIS SURVEY SHOWS PHYSICAL SITE BOUNDARIES ONLY. CONFIRMATION OF LEGAL OWNERSHIP BOUNDARIES SHOULD BE OBTAINED BY REFERENCE TO THE H.M. LAND REGISTRY TITLE PLAN.
EVERY EFFORT IS MADE TO IDENTIFY ALL VISIBLE ABOVE GROUND FEATURES. HOWEVER, IT SHOULD BE BORNE IN MIND THAT THERE MAY BE ITEMS OBSCURED AT THE TIME OF SURVEY.
THIS PLAN SCALE IS FOR GUIDANCE ONLY.
IF IN DOUBT, ASK FOR DIMENSIONS.
IF IN DOUBT, PLEASE ASK.

THE CONTRACTOR IS TO CHECK AND VERIFY ALL BUILDING AND SITE DIMENSIONS,LEVELS AND SEWER INVERT LEVELS AT CONNECTION POINTS BEFORE WORK STARTS. SHOULD THERE BE ANY CONFLICT BETWEEN THE DETAILS INDICATED ON THIS DRAWING AND WHICH APPEAR ON OTHER DRAWINGS, THE ENGINEER SHOULD BE INFORMED PRIOR TO CONSTRUCTION ON SITE.

REV	DESCRIPTION	DATE

PD SITE SURVEYS

1 ISLINGTON DRIVE
BESSACARR
DONCASTER
DN4 6FA

T - 01302 355928
M - 07515 381674

E - peter.dickinson29@gmail.com

CLIENT

Holly Tree House,
Harwood Road,
Northminster Business
Park,
York
YO26 6QU

SITE TITLE

RYBURNDENE,
GROSVENOR ROAD

DRAWING TITLE

TOPO

DRAWN	SIGNATURE	DATE	STATUS
PD		25/09/2019	FOR COMMENT ☐
APPROVED	SIGNATURE	DATE	FOR APPROVAL ☐
PD		25/09/2019	DRAFT ☐
			FINAL ☑

SCALE	SIZE	JOB NUMBER	REVISION
1:125	A1	0989-001	#

Approximate Direction of North

GRID
LOCAL GRID.

DATUM
OS LEVEL DATUM.
Using the OS GPS Network and applying OSGM15 National Geoid Model to obtain local area corrections.

SURVEY NOTES

Survey drawing has been supplied by RJ Design and the drawing levels have been amended by MT Surveys to match OS GPS Datum.

MT Surveys have not checked the reliability of the original topographical survey.

The original survey levels have been amended by a value of -37.84m.

(w) www.mtsurveys.com
(e) admin@mtsurveys.com
(t) (0)1274 408352

MT Surveys Ltd
Unit 8
Parkview Court
Shipley
BD18 3DZ

CLIENT

RJ Design (Architectural Services) Ltd

SITE

Grosvenor Road, York
Site Address

DRAWING TITLE

Survey Amendment to OS GPS Datum

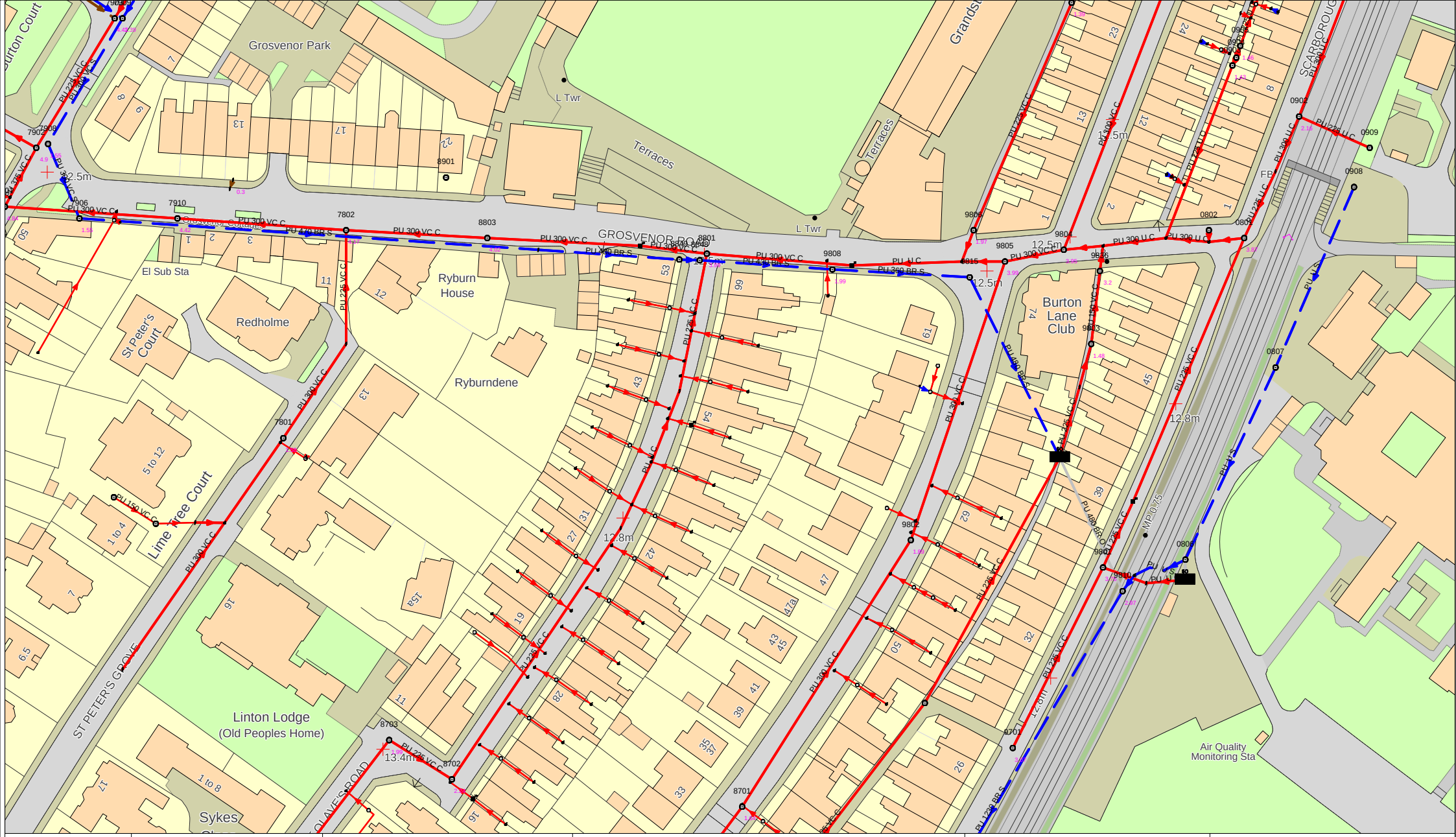
DRAWING REF (LAYOUT TAB)	SCALE@A1
1183-114 (A1)	1/200
PROJECT REF	REV
1183-114	Ø

SURVEYED	HR	DRAWN	HR
CHECKED	MT	DATE	31 / 10 / 2023

REV	DATE	DRAWN	DESCRIPTION	CHECKED
-	-- / -- / ----	--	--	--

Aqua Civils

ANNEX C YW SEWER PLAN



459719 : 452752	Map Name : SE5952NE	Title	Partial Key Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS
Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : G Mullaney Contact Tel :		Notes (Ody) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO © Crown copyright and database 2014. All rights reserved Ordnance Survey Licence number 100022432	This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connections are shown.
			Date Req : 13/06/2023, 11:27:43
			Date Gen : 13/06/2023, 11:27:59
			Source : Sewer Network Enquiry

UPN: Undefined Originator: G Mullaney, ,

Aqua Civils

ANNEX D SURFACE WATER ATTENUATION SYSTEM MICRODRAINAGE WORKSHEETS

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.300
Area (ha)	0.039	Urban	0.000
SAAR (mm)	620	Region Number	Region 3

Results l/s

QBAR Rural	0.1
QBAR Urban	0.1
Q100 years	0.1
Q1 year	0.1
Q30 years	0.1
Q100 years	0.1

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 372 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control Σ Outflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	11.504	0.294	0.0	0.3	0.3	7.8	O K
30 min Summer	11.599	0.389	0.0	0.4	0.4	10.3	O K
60 min Summer	11.694	0.484	0.0	0.4	0.4	12.9	O K
120 min Summer	11.777	0.567	0.0	0.4	0.4	15.1	O K
180 min Summer	11.809	0.599	0.0	0.5	0.5	15.9	O K
240 min Summer	11.819	0.609	0.0	0.5	0.5	16.2	O K
360 min Summer	11.816	0.606	0.0	0.5	0.5	16.1	O K
480 min Summer	11.807	0.597	0.0	0.5	0.5	15.9	O K
600 min Summer	11.794	0.584	0.0	0.5	0.5	15.5	O K
720 min Summer	11.780	0.570	0.0	0.4	0.4	15.2	O K
960 min Summer	11.755	0.545	0.0	0.4	0.4	14.5	O K
1440 min Summer	11.710	0.500	0.0	0.4	0.4	13.3	O K
2160 min Summer	11.650	0.440	0.0	0.4	0.4	11.7	O K
2880 min Summer	11.597	0.387	0.0	0.4	0.4	10.3	O K
4320 min Summer	11.511	0.301	0.0	0.3	0.3	8.0	O K
5760 min Summer	11.444	0.234	0.0	0.3	0.3	6.2	O K
7200 min Summer	11.392	0.182	0.0	0.3	0.3	4.8	O K
8640 min Summer	11.349	0.139	0.0	0.2	0.2	3.7	O K
10080 min Summer	11.313	0.103	0.0	0.2	0.2	2.7	O K
15 min Winter	11.540	0.330	0.0	0.4	0.4	8.8	O K
30 min Winter	11.648	0.438	0.0	0.4	0.4	11.6	O K
60 min Winter	11.756	0.546	0.0	0.4	0.4	14.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	110.946	0.0	8.1	19
30 min Summer	74.659	0.0	10.9	33
60 min Summer	48.012	0.0	14.0	62
120 min Summer	29.859	0.0	17.5	122
180 min Summer	22.303	0.0	19.5	180
240 min Summer	18.012	0.0	21.1	240
360 min Summer	13.237	0.0	23.2	300
480 min Summer	10.643	0.0	24.9	362
600 min Summer	8.979	0.0	26.2	428
720 min Summer	7.810	0.0	27.4	498
960 min Summer	6.261	0.0	29.3	636
1440 min Summer	4.577	0.0	32.1	910
2160 min Summer	3.339	0.0	35.1	1320
2880 min Summer	2.666	0.0	37.4	1704
4320 min Summer	1.937	0.0	40.8	2468
5760 min Summer	1.543	0.0	43.3	3224
7200 min Summer	1.292	0.0	45.4	3968
8640 min Summer	1.118	0.0	47.1	4752
10080 min Summer	0.989	0.0	48.6	5456
15 min Winter	110.946	0.0	9.1	18
30 min Winter	74.659	0.0	12.2	33
60 min Winter	48.012	0.0	15.7	62

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control Σ Outflow (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
120 min Winter	11.854	0.644	0.0	0.5	0.5	17.1	O K
180 min Winter	11.895	0.685	0.0	0.5	0.5	18.2	O K
240 min Winter	11.911	0.701	0.0	0.5	0.5	18.6	O K
360 min Winter	11.910	0.700	0.0	0.5	0.5	18.6	O K
480 min Winter	11.901	0.691	0.0	0.5	0.5	18.4	O K
600 min Winter	11.889	0.679	0.0	0.5	0.5	18.1	O K
720 min Winter	11.872	0.662	0.0	0.5	0.5	17.6	O K
960 min Winter	11.833	0.623	0.0	0.5	0.5	16.6	O K
1440 min Winter	11.764	0.554	0.0	0.4	0.4	14.7	O K
2160 min Winter	11.674	0.464	0.0	0.4	0.4	12.3	O K
2880 min Winter	11.598	0.388	0.0	0.4	0.4	10.3	O K
4320 min Winter	11.483	0.273	0.0	0.3	0.3	7.3	O K
5760 min Winter	11.401	0.191	0.0	0.3	0.3	5.1	O K
7200 min Winter	11.338	0.128	0.0	0.2	0.2	3.4	O K
8640 min Winter	11.260	0.050	0.0	0.2	0.2	1.3	O K
10080 min Winter	11.210	0.000	0.0	0.2	0.2	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
120 min Winter	29.859	0.0	19.5	120
180 min Winter	22.303	0.0	21.9	176
240 min Winter	18.012	0.0	23.6	232
360 min Winter	13.237	0.0	26.0	336
480 min Winter	10.643	0.0	27.9	380
600 min Winter	8.979	0.0	29.4	458
720 min Winter	7.810	0.0	30.7	534
960 min Winter	6.261	0.0	32.8	686
1440 min Winter	4.577	0.0	36.0	982
2160 min Winter	3.339	0.0	39.3	1404
2880 min Winter	2.666	0.0	41.9	1816
4320 min Winter	1.937	0.0	45.7	2592
5760 min Winter	1.543	0.0	48.5	3352
7200 min Winter	1.292	0.0	50.8	4176
8640 min Winter	1.118	0.0	52.7	5096
10080 min Winter	0.989	0.0	54.5	0

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.300	Shortest Storm (mins)	15
Ratio R	0.349	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.039

Time (mins) From:	To:	Area (ha)
0	4	0.039

Model Details

Storage is Online Cover Level (m) 12.310

Cellular Storage Structure

Invert Level (m) 11.210 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	28.0	10.1	0.700	28.0	23.5

Hydro-Brake® Outflow Control

Design Head (m) 0.700 Hydro-Brake® Type Md4 Invert Level (m) 11.160
Design Flow (l/s) 0.5 Diameter (mm) 27

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.2	1.200	0.6	3.000	1.0	7.000	1.5
0.200	0.3	1.400	0.7	3.500	1.1	7.500	1.6
0.300	0.3	1.600	0.7	4.000	1.1	8.000	1.6
0.400	0.4	1.800	0.8	4.500	1.2	8.500	1.7
0.500	0.4	2.000	0.8	5.000	1.3	9.000	1.7
0.600	0.4	2.200	0.8	5.500	1.3	9.500	1.8
0.800	0.5	2.400	0.9	6.000	1.4		
1.000	0.6	2.600	0.9	6.500	1.4		