

BURNCROSS ROAD, CHAPELTOWN, SHEFFIELD DRAINAGE STATEMENT

INTRODUCTION

This document has been produced to support the planning application by Residential S72 LTD for the proposed residential development to the rear of 241 Burncross Road, Chapelton, Sheffield.

The site is a 0.83ha in size and is currently a residential property with grassland/woodland to the south of the site. The site is steeply sloping, between 1in16 and 1in10, from a high point on the southern boundary to a low point to the rear of 241 Burncross Road and the northern part of the site falls south to the low point, typically 1in15. The site typically borders residential properties, with allotment gardens on the eastern boundary and Burncross Road on the northern boundary.

It is proposed to construct 14 new residential dwellings and associated infrastructure, see attached Residential S72 Sketch Layout.

EXISTING SITE DRAINAGE

Yorkshire Water sewer records confirm a 900mm diameter surface water sewer crosses the site and 300mm & 375mm diameter combined water sewers within Burncross Road at the site frontage, see attached FORTEM Drawing 1191-002 Existing Drainage Plan and Yorkshire Water record drawings.

241 Burncross Road is currently served by a private surface water drainage system which discharges to the Yorkshire Water network. As part of the new residential development, the existing surface water drainage is to be reconfigured with the drainage from No. 241 discharging into the new development drainage system.

An assessment has been carried out on the existing impermeable area, which is confirmed as being 0.03ha. Therefore, the existing brownfield runoff for the site is:

Existing Impermeable Area	Brownfield Runoff Rate	Existing Brownfield Runoff
0.03ha	x 140 l/s/ha	= <u>4.2 l/s</u>

The greenfield run-off for the site has been calculated for the undeveloped part of the site using the IH124 method for 50ha, with a resulting QBar of 105.4 l/s, which is equivalent to 2.11 l/s/ha, see attached calculations. Therefore, the existing greenfield runoff for the site is:

Development Area	Greenfield Runoff Rate	Existing Greenfield Runoff
0.70ha	x 2.11 l/s/ha	= <u>1.48 l/s</u>

FLOOD RISK

Environment Agency Flood Mapping confirms that the site is located within Flood Zone 1.

Surface water flood mapping shows there is a medium-high risk of flooding from surface water at the low point in the site. It is considered that the introduction of a positive drainage system would mitigate the risk of flooding to low.

The following standard mitigation measures are also recommended:

- Finished floor levels to be set minimum 150mm above external levels;
- Blockage and exceedance events to be considered as part of the design;
- Development surface water drainage to be designed such that there is no external flooding for the 1in30 year event, with all flows retained on site for up to the 1in100 year event plus climate change (45%).

SURFACE WATER DRAINAGE

The proposed development has been assessed for the potential surface water outfall/discharge in accordance with National Planning Practice Guidance, see summary below:

Outfall/Discharge Option (Ranked in order of Preference)	✓/✗	Notes
1. Infiltration	✗	BGS records and ground investigations carried out on adjacent developments (planning ref: 19/04560) confirm the area is underlain by mudstone, siltstone and sandstone of the Pennine Lower Coal Measures Formation. Based upon the ground conditions and assessment of neighbouring land, infiltration drainage is considered not suitable for the proposed development.
2. Discharge to Watercourse	✗	There are no recorded watercourses within or near the site.
3. Discharge to Public Surface Water Sewer.	✓	Yorkshire Water sewer records show that there is an existing 900mm diameter surface water sewer crossing the site.
4. Discharge to Public Combined Sewer.	✗	Yorkshire Water sewer records show 300mm and 375mm diameter surface water sewers in Burncross Road, to the north of the site. Discharge to the public combined sewer has been discounted as surface water sewers are available.

In accordance with the review above, it is proposed to discharge surface water from the site to the existing 900mm diameter surface water sewer crossing the site.

It is proposed to restrict the discharge rate to 3.5l/s as the minimum discharge rate accepted by Yorkshire Water, resulting in a reduction of 40% of the existing run off for the development (5.68 l/s).

The proposed development surface water drainage is to be designed such that there is no external flooding for the 1in30 year event, and all flows are retained on site for up to the 1in100 year event plus climate change. Based on a discharge rate of 3.5l/s, the attenuation required for the development is 340m³ (1in100year event + 45% climate change), see attached storage calculations.

DEVELOPMENT SUDS ASSESSMENT

The proposed development has been assessed for the use of SuDS components against those detailed in the SuDS Manual (Ciria C753);

SuDS Component	Description	✓/✗	Notes
Rainwater Harvesting	Storage system designed to retain runoff within the property boundary for re-use on site	✓/✗	Individual storage capacity unlikely to meet volume requirement. Water butts could be used for garden watering.
Green Roofs	Vegetated surface that provides retention and treatment and promotes evapotranspiration	✗	Traditional pitched roofed houses expected to be required through planning.
Infiltration Systems	Designed to promote the infiltration of surface water runoff into the ground. Including; soakaways, infiltration trenches and infiltration basins	✗	Expected impermeable ground
Propriety Treatment	Manufactured products designed to remove surface water contaminants	✗	Unlikely to be adopted through S104
Filter Strips	Vegetated area of gently sloping ground designed to treat runoff	✗	Expected impermeable ground
Filter Drains	Linear drains comprising trench filled with a permeable aggregate	✗	Expected impermeable ground
Swales	Shallow vegetated depression to convey and treat runoff	✗	Lack of suitable public open space
Bioretention Systems	Shallow planted depressions that allow runoff to pond before filtering through vegetation	✓	Possible use of rain gardens within plots.
Permeable Paving	Paving which allows the infiltration of runoff into underlying foundation layers / drains	✓	Use on private drives –use may be limited due to site topography
Attenuation Storage Tank	Below ground feature for the temporary storage of runoff before controlled release; oversized pipework, tank or modular.	✓	Suitable to provide 340m ³ required through box culvert and oversized pipework.
Detention Basins	Normally dry, landscaped depression for the temporary storage of runoff before controlled release.	✗	Lack of suitable public open space
Ponds & Wetlands	Landscaped depression for the temporary storage of runoff above permanently wet pools which promote settlement and treatment, before controlled release.	✗	Lack of suitable public open space

In accordance with the review above, it is proposed to attenuate surface water flows in below ground storage structure(s), due to the size required and site constraints. With the use of permeable paving or rain gardens to provide treatment of surface water runoff prior to discharge to the surface water sewer.

The SuDS components selected have been assessed against Chapter 26 (Water Quality Management) of the SuDS Manual;

C753 Table 26.2: Pollution Hazard Indices			
Land use	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	0.2	0.2	0.05
Individual driveways, residential car parks and low traffic roads.	0.5	0.4	0.4

C753 Table 26.3: SuDS Mitigation Indices (discharge to surface waters)			
SuDS Component	Total suspended solids (TSS)	Metals	Hydrocarbons
Bioretention system (rain garden)	0.8	0.8	0.8
Permeable paving	0.7	0.6	0.7

The above pollution mitigation confirms the suitability of the SuDS components to provide suitable water treatment of surface water runoff in accordance with the requirements of the SuDS Manual.

FOUL WATER DRAINAGE

It is proposed for foul water flows will discharge to the existing 375mm diameter foul water sewer in Burncross Road.

MAINTENANCE

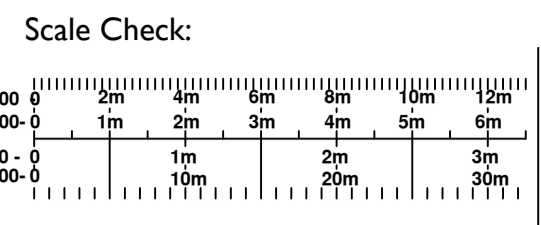
It is proposed for both the foul and surface water drainage networks to be adopted by Yorkshire Water under a Section 104 agreement. The long term maintenance of the adoptable drainage system will therefore be the responsibility of Yorkshire Water.

Supporting Documents:

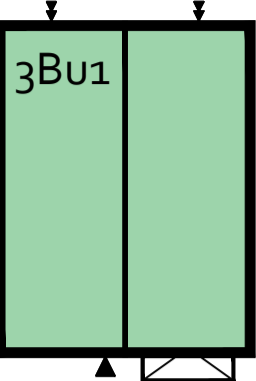
- Residential S72 Sketch Layout
- FORTEM drawing 1191-002 - Existing Drainage Plan
- Yorkshire Water Sewer Records
- Greenfield runoff calculations
- Attenuation calculations

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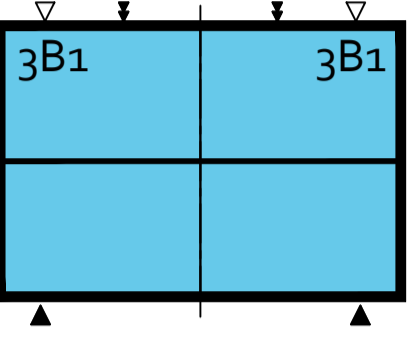
land to rear of 241 burncross road chapeltown



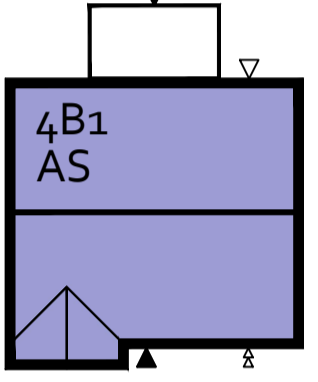
Housetype Legend



3Bu1
3bed bungalow
1No



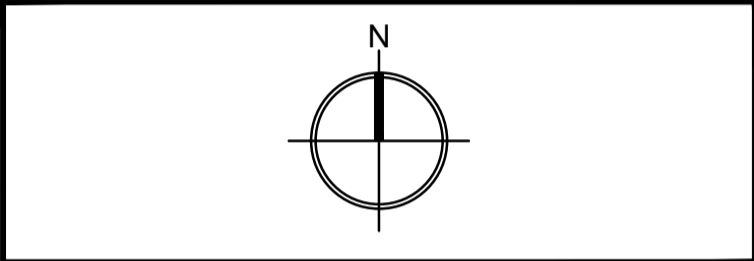
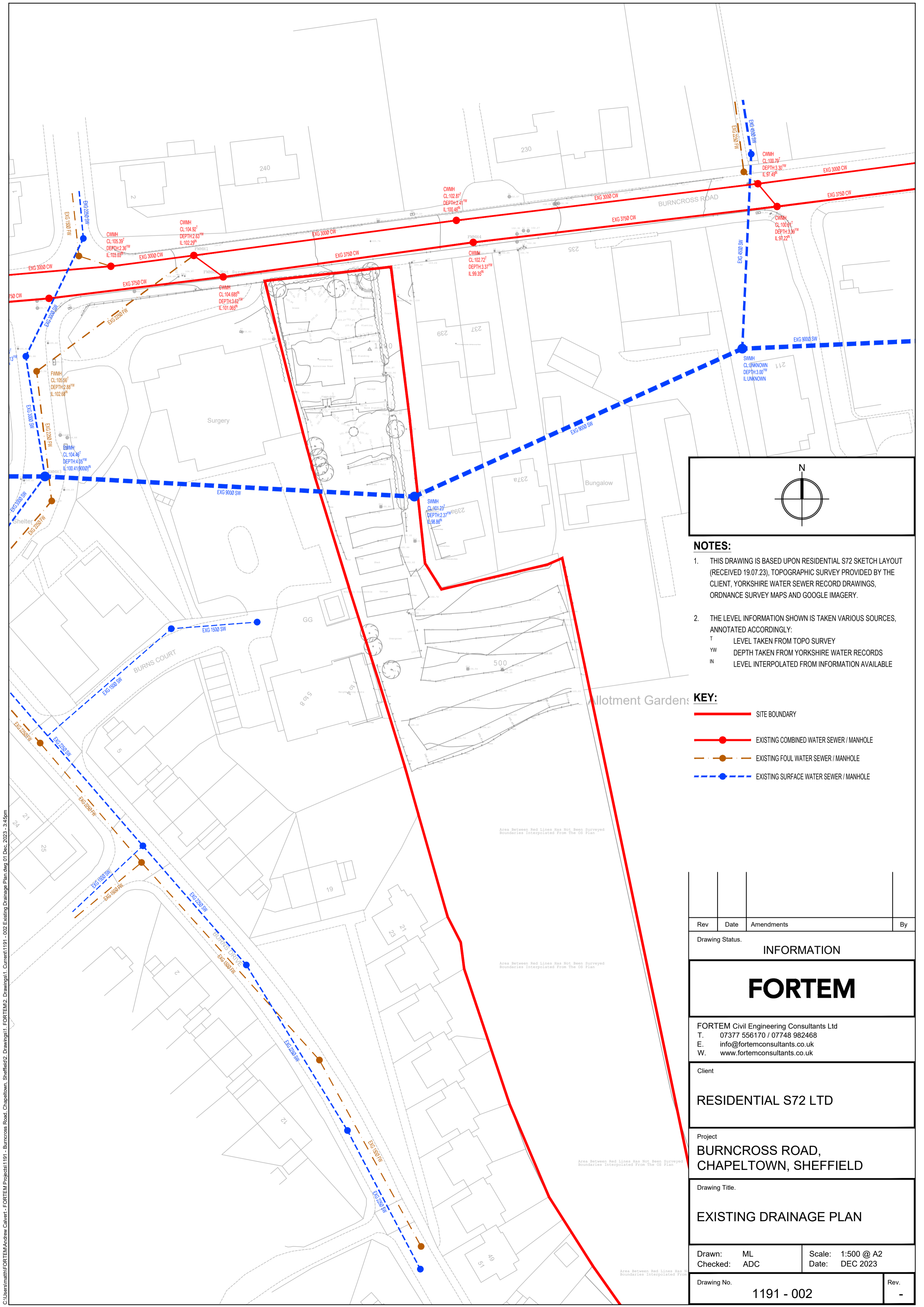
3B1 3B1
3bed semi detached house
4No



4B1 AS
4bed detached house
9No

CLIENT DETAILS	PROJECT DETAILS	TITLE	REV	DESCRIPTION	DATE	
Residential S72 Ltd	Burncross Road Chapelton	Sketch Layout				<p>Residential S72 Ltd 9 Malham Close Barnsley S72 8PE M - 07305 270468 E - ian@residentials72.co.uk</p> <p style="font-size: small;">©This drawing is copyright of Residential S72 Ltd</p>
	REFERENCE: RS72-2023-0110	SCALE- 1:500@A1 DATE- 19.07.23		DRAWN- IKC CHECKED-		





NOTES:

- THIS DRAWING IS BASED UPON RESIDENTIAL S72 SKETCH LAYOUT (RECEIVED 19.07.23), TOPOGRAPHIC SURVEY PROVIDED BY THE CLIENT, YORKSHIRE WATER SEWER RECORD DRAWINGS, ORDANCE SURVEY MAPS AND GOOGLE IMAGERY.
- THE LEVEL INFORMATION SHOWN IS TAKEN VARIOUS SOURCES, ANNOTATED ACCORDINGLY:
 T LEVEL TAKEN FROM TOPO SURVEY
 YW DEPTH TAKEN FROM YORKSHIRE WATER RECORDS
 IN LEVEL INTERPOLATED FROM INFORMATION AVAILABLE

KEY:

- SITE BOUNDARY
- EXISTING COMBINED WATER SEWER / MANHOLE
- - - EXISTING FOUL WATER SEWER / MANHOLE
- - - EXISTING SURFACE WATER SEWER / MANHOLE

Area Between Red Lines Has Not Been Surveyed
Boundaries Interpolated From The OS Plan

Area Between Red Lines Has Not Been Surveyed
Boundaries Interpolated From The OS Plan

Area Between Red Lines Has Not Been Surveyed
Boundaries Interpolated From The OS Plan

Area Between Red Lines Has Not Been Surveyed
Boundaries Interpolated From The OS Plan

Rev	Date	Amendments	By

Drawing Status: **INFORMATION**

FORTEM

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Client
RESIDENTIAL S72 LTD

Project
**BURNCROSS ROAD,
 CHAPELTOWN, SHEFFIELD**

Drawing Title:
EXISTING DRAINAGE PLAN

Drawn: ML	Scale: 1:500 @ A2
Checked: ADC	Date: DEC 2023

Drawing No. 1191 - 002	Rev. -
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FORTEM Civil Engineering Consultants Ltd		Page 1
11 The Covert York YO24 1JN	1191 Burncross Road Chapelton, Sheffield Greenfield Runoff Calc	
Date 15/11/2023 11:26 File	Designed by ML Checked by RD	
XP Solutions	Source Control 2017.1.2	

IH 124 Mean Annual Flood

Input

Return Period (years) 1 SAAR (mm) 793 Urban 0.000
Area (ha) 50.000 Soil 0.300 Region Number Region 3

Results l/s

QBAR Rural 105.4
QBAR Urban 105.4

Q1 year 90.7

Q1 year 90.7
Q2 years 99.5
Q5 years 131.8
Q10 years 152.9
Q20 years 173.2
Q25 years 179.9
Q30 years 185.3
Q50 years 199.7
Q100 years 219.3
Q200 years 248.8
Q250 years 258.3
Q1000 years 320.5

11 The Covert
 York
 YO24 1JN



Date 15/11/2023 11:42
 File 231115-1191-QSE-0.42ha 3...

Designed by matth
 Checked by

XP Solutions Source Control 2017.1.2

Summary of Results for 100 year Return Period (+45%)


Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	99.077	0.577	3.1	131.6	O K
30 min Summer	99.275	0.775	3.1	176.8	O K
60 min Summer	99.485	0.985	3.1	224.5	O K
120 min Summer	99.691	1.191	3.1	271.5	O K
180 min Summer	99.798	1.298	3.3	296.0	O K
240 min Summer	99.861	1.361	3.3	310.3	O K
360 min Summer	99.931	1.431	3.4	326.3	O K
480 min Summer	99.964	1.464	3.5	333.8	O K
600 min Summer	99.975	1.475	3.5	336.2	O K
720 min Summer	99.971	1.471	3.5	335.4	O K
960 min Summer	99.952	1.452	3.4	331.0	O K
1440 min Summer	99.902	1.402	3.4	319.6	O K
2160 min Summer	99.821	1.321	3.3	301.3	O K
2880 min Summer	99.742	1.242	3.2	283.2	O K
4320 min Summer	99.593	1.093	3.1	249.2	O K
5760 min Summer	99.452	0.952	3.1	217.0	O K
7200 min Summer	99.314	0.814	3.1	185.6	O K
8640 min Summer	99.146	0.646	3.1	147.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	128.566	0.0	132.9	26
30 min Summer	86.602	0.0	178.6	41
60 min Summer	55.699	0.0	232.9	70
120 min Summer	34.594	0.0	289.3	130
180 min Summer	25.792	0.0	323.5	188
240 min Summer	20.790	0.0	347.6	246
360 min Summer	15.300	0.0	383.4	364
480 min Summer	12.304	0.0	410.8	484
600 min Summer	10.380	0.0	432.7	602
720 min Summer	9.030	0.0	450.9	714
960 min Summer	7.240	0.0	478.8	818
1440 min Summer	5.292	0.0	486.2	1072
2160 min Summer	3.860	0.0	582.9	1480
2880 min Summer	3.082	0.0	620.4	1904
4320 min Summer	2.240	0.0	675.5	2728
5760 min Summer	1.783	0.0	718.8	3536
7200 min Summer	1.494	0.0	752.4	4392
8640 min Summer	1.294	0.0	781.9	5096

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
10080 min Summer	99.014	0.514	3.1	117.2	O K
15 min Winter	99.077	0.577	3.1	131.6	O K
30 min Winter	99.275	0.775	3.1	176.8	O K
60 min Winter	99.485	0.985	3.1	224.6	O K
120 min Winter	99.693	1.193	3.1	272.0	O K
180 min Winter	99.802	1.302	3.3	296.8	O K
240 min Winter	99.866	1.366	3.3	311.4	O K
360 min Winter	99.939	1.439	3.4	328.1	O K
480 min Winter	99.975	1.475	3.5	336.3	O K
600 min Winter	99.989	1.489	3.5	339.5	O K
720 min Winter	99.989	1.489	3.5	339.6	O K
960 min Winter	99.966	1.466	3.5	334.2	O K
1440 min Winter	99.902	1.402	3.4	319.7	O K
2160 min Winter	99.793	1.293	3.3	294.8	O K
2880 min Winter	99.679	1.179	3.1	268.8	O K
4320 min Winter	99.456	0.956	3.1	218.0	O K
5760 min Winter	99.207	0.707	3.1	161.1	O K
7200 min Winter	98.966	0.466	3.1	106.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
10080 min Summer	1.146	0.0	807.4	5744
15 min Winter	128.566	0.0	132.9	26
30 min Winter	86.602	0.0	178.6	41
60 min Winter	55.699	0.0	232.9	70
120 min Winter	34.594	0.0	289.3	126
180 min Winter	25.792	0.0	323.5	184
240 min Winter	20.790	0.0	347.6	242
360 min Winter	15.300	0.0	383.4	358
480 min Winter	12.304	0.0	410.8	472
600 min Winter	10.380	0.0	432.7	582
720 min Winter	9.030	0.0	450.9	692
960 min Winter	7.240	0.0	478.6	896
1440 min Winter	5.292	0.0	485.5	1116
2160 min Winter	3.860	0.0	582.9	1584
2880 min Winter	3.082	0.0	620.4	2048
4320 min Winter	2.240	0.0	675.6	2940
5760 min Winter	1.783	0.0	718.8	3808
7200 min Winter	1.494	0.0	752.4	4392

FORTEM Civil Engineering Consultants Ltd		Page 3
11 The Covert York YO24 1JN		
Date 15/11/2023 11:42 File 231115-1191-QSE-0.42ha 3...	Designed by matth Checked by	
XP Solutions	Source Control 2017.1.2	

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
8640 min Winter	98.819	0.319	3.1	72.7	O K
10080 min Winter	98.726	0.226	3.0	51.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
8640 min Winter	1.294	0.0	781.9	5008
10080 min Winter	1.146	0.0	807.5	5560