

Warrior Developments Ltd

**Flood Risk Assessment with
Outline Drainage Strategy**

For

**Proposed redevelopment on the corner of High
Street and Doncaster Road**

At

Goldthorpe
S63 9NG

Beam Consulting
14 Bond Street
Wakefield
West Yorkshire
WF1 2QP

Ref: 171-10-DOC-001 A

Date: 29 November 2018

REVISION RECORD

Revision	Description	Date	Prepared	Checked	Approved
-	First Issue	29-11-2018	KA	KGP	KGP
A	Site plan updated	07-02-2019	KA	KGP	KGP

CONTENTS

EXECUTIVE SUMMARY.....	1
1.0 INTRODUCTION	2
2.0 BACKGROUND INFORMATION	3
2.1 EXISTING DEVELOPMENT	3
2.2 PROPOSED DEVELOPMENT	3
3.0 FLOOD RISK.....	4
3.1 RISK OF FLOODING OF DEVELOPMENT SITE	4
3.3 SOURCES OF FLOODING AND FLOOD RISK.....	5
3.4 SEQUENTIAL AND EXCEPTION TEST	6
4.0 DRAINAGE ASSESSMENT AND STRATEGY.....	8
4.1 SURFACE WATER DRAINAGE	8
4.2 FOUL WATER DRAINAGE	10
5.0 RECOMMENDATIONS.....	11

APPENDIX A - SITE LOCATION

APPENDIX B - PROPOSED SITE DRAWINGS

APPENDIX C - ENVIRONMENT AGENCY FLOOD MAP

APPENDIX D - DRAINAGE CALCULATIONS

APPENDIX E - PROPOSED DEVELOPMENT DRAINAGE STRATEGY

APPENDIX F - EXISTING SITE INFORMATION

EXECUTIVE SUMMARY

This Flood Risk Assessment (FRA) has been prepared for Warrior Developments Ltd for the proposed redevelopment on the corner of High Street and Doncaster Road, Goldthorpe S63 9NG.

The Assessment has been undertaken in accordance with the requirements of the National Planning Policy Framework (NPPF) March 2012 and its Technical Guidance.

Flood risk

The site is located within Flood Zone 1 – very low probability of flooding from Surface water runoff, rivers and sea that comprises land assessed as having a less than 1 in 1,000 annual probability of flooding (<0.1%). There is no risk of flooding from reservoirs. As the site is within low flood risk area based on EA flood maps then no further consultation with Environment Agency has been undertaken. The Environment Agency flood map is enclosed within Appendix C.

Surface water drainage

Due to the age of the adjacent properties it is likely that properties will have basements therefore the use of site infiltration and other similar SUDS systems are not suitable for this development.

Therefore, based on the above assessment the most feasible option would be to provide a surface water drainage system that will include on site attenuation and interceptor, prior to connecting into the flow control manhole. The surface water discharge will be into the existing surface water sewer located to the west of the site in High Street.

The site area is 9,833m² and will comprise a total impermeable area of 9,308m². Based on the greenfield surface water run-off rate of 5.0 litre/sec/hectare this gives an allowable discharge of 4.92 litre/sec, to be limited by a flow control. Based on 1 in 100 year rainfall and 30% allowance for climate change a 680m³ on site attenuation. This can be provided using a traditional attenuation system located within the car parking/road areas of the development. The 30% climate change allowance will ensure that the proposed development drainage system can cope with future predicted rainfall increase. See Appendix D for calculations.

Outline Drainage Strategy drawing 171-10-500A in Appendix E indicates the proposed layout.

The final solution for the drainage will depend on further investigation and development of detailed design.

Foul water drainage

The proposed foul water drainage from the development should be discharged into either of the existing foul water manholes onsite which then discharge into the foul water sewer to the west of the site in High Street (see STATS searches in Appendix F).

The final solution to be adopted will depend on further investigation and development of the detailed design.

Outline Drainage Strategy drawing 171-10-500A in Appendix E indicates the proposed layout.

1.0 INTRODUCTION

This Flood Risk Assessment (FRA) has been prepared for Warrior Developments Ltd for the proposed redevelopment on the corner of High Street and Doncaster Road, Goldthorpe S63 9NG.

The assessment has been undertaken in accordance with the requirements of the National Planning Policy Framework (NPPF) March 2012 and its Technical Guidance.

The Report is based on the following information:

- i. Site location
- ii. Current Clients' proposal
- iii. EA online Flood Maps which show indicative hydraulically modelled flooding from rivers or sea without defences - the natural flood plain area that could be affected in the event of flooding from rivers and the sea - based on Light Detection And Ranging (LIDAR) satellite digital terrain maps (DTMs).

All comments and opinions contained in this report, including any conclusions are based on information available to Beam Consulting Engineers during investigations prior to completion of the report. Conclusions drawn by Beam Consulting Engineers may differ if the available information is subsequently found to be inaccurate, incomplete or misleading. Beam Consulting Engineers accept no responsibility should this prove to be the case, nor if additional information exists or becomes available in relation to this site.

Except as otherwise requested by the Client, Beam Consulting Engineers are not obliged and disclaim any obligation to update the report for events outside Beam Consulting Engineers' direct control taking place after:

- i. The date on which the assessment was undertaken, and
- ii. The date on which the report is issued.

Beam Consulting Engineers make no representation whatsoever in relation to the legal significance of findings reported or any legal matters referred to in the following report.

This document is a risk assessment of flooding issues associated with the noted site. The information presented and recommendations/conclusions stated are based on published statistical data and are for guidance only. The statements provide no guarantee against flooding of the site or elsewhere, nor as to the absolute accuracy of water levels, flow rates and associated probabilities referenced. This Report is the copyright of Beam Consulting Engineers Ltd. It cannot be used or reproduced without the express written authority of Beam Consulting Engineers Ltd and payment thereof.

2.0 BACKGROUND INFORMATION

The site is located corner of High Street and Doncaster Road, Goldthorpe S63 9NG.

National Grid reference for the site is 446259, 404318. The site location plan is enclosed within Appendix A.

2.1 EXISTING DEVELOPMENT

The existing 9833 m² (0.9833 ha) brownfield site was formerly Dearne Goldthorpe Primary School, which consisted of four buildings, car parking, hardstanding and a grassed playing field. The buildings were demolished in approximately 2016/2017. The site is currently a mixture of hardstanding and grassed/shrubby areas.

2.2 PROPOSED DEVELOPMENT

It is proposed to redevelop the site as a retail development with associated car parking and service area.

The proposed site layout drawing is enclosed within Appendix B.

3.0 FLOOD RISK

3.1 RISK OF FLOODING OF DEVELOPMENT SITE

The flood risk and site drainage assessment is based on the following sources of information:

i. EA online Flood Maps:

The site is located within Flood Zone 1 – very low probability of flooding from Surface water run off, rivers and sea that comprises land assessed as having a less than 1 in 1,000 annual probability of flooding (<0.1%). There is no risk of flooding from reservoirs. As the site is within low flood risk area based on EA flood maps then no further consultation with Environment Agency has been undertaken. The Environment Agency flood map is enclosed within Appendix C.

Based on the above, surface water flooding within the site and surrounding areas is very unlikely, hence the proposed development is acceptable. No flood protection measures are required. Proposed site levels are to be similar to existing and the proposed building floor level should be higher than external levels.

The proposed development shall embody SUDS (Sustainable Urban Drainage Systems) principles. The site surface water is to be collected by proposed drainage with an attenuation tank and petrol interceptor prior to exiting the site using the existing combined drainage.

3.2 SOURCES OF FLOODING AND FLOOD RISK

Sources of flooding	Flood risk
Streams and rivers Flooding that can take place from flows that are not contained within the channel due to high levels of rainfall in the catchment.	There are no streams or rivers recorded within the site area. Thurnscoe Dike is located approximately 1 km to the northwest of the site and is the major cause of flooding in the area. There are also West Moor Dike, approximately 1.1 Km to the southeast, Far Moor Dike, approximately 590m to the southeast, and Brick Pond, approximately 910m to the southwest.
Coastal or estuarine Flooding that can occur from the sea due to a particularly high tide or surge, or combination of both.	The site is located inland and therefore is not at risk of flooding from the sea.
Groundwater Where the water table rises to such a height where flooding occurs. Most common in low-lying areas underlain by permeable ground (aquifers), usually due to extended periods of wet weather.	The site is located in a higher-lying area and therefore is not at risk of flooding from groundwater.
Sewers and highway drains Combined, foul or surface water sewers and highway drains that are temporarily over-loaded due to excessive rainfall or due to blockage.	The highways next to the site and adjacent developments have their own drainage systems in place. In the case of them being temporarily over-loaded due to excessive rainfall or due to blockage the water is collected within highways, car parks or landscaped areas.
Surface water The net rainfall falling on a surface (on or off the site) which acts as runoff which has not infiltrated into the ground or entered into a drainage system.	The highways next to the site and adjacent developments have their own drainage systems in place. In the case of them being temporarily over-loaded due to excessive rainfall or due to blockage the water is collected within highways, car parks or landscaped areas.
Infrastructure failure Canals, reservoirs, industrial processes, burst water mains, blocked sewers or failed pumping stations.	The highways next to the site and adjacent developments have their own drainage systems in place. In the case of them being temporarily over-loaded due to excessive rainfall or due to blockage the water is collected within highways, car parks or landscaped areas.

3.3 SEQUENTIAL AND EXCEPTION TEST

Based on NPPF and its Technical Guidance the sequential and exception tests are not applicable as the site is within Flood Zone 1 and hence outside the floodplain.

Whilst the Sequential Test is not applied the principles are followed in general in the flood risk assessment below:

Possible Hazard	Comments/ Remediation
A. Effect of Development on General Flood Risk Flooding caused by local sources - natural watercourses on or near to the site?	The proposed development shall have its own drainage system in place. In excessive rainfall or due to blockage the water shall be collected within highway, car parking spaces or landscaped areas.
B. Effect of Development on General Flood Risk Flooding caused to local sources - run-off from adjacent properties/ adjoining land	The proposed development shall have its own drainage system in place. In excessive rainfall or due to blockage the water shall be collected within highway, car parking spaces or landscaped areas.
C. Contribution to Flood Flows from Development Drainage Flooding caused to adjacent properties from surface run-off from hard-paved areas.	The proposed development shall have its own drainage system in place. In excessive rainfall or due to blockage the water shall be collected within highway, car parking spaces or landscaped areas.
D. Contribution to Flood Flows from Development Flooding caused to 3rd party properties	The proposed development shall have its own drainage system in place. In excessive rainfall or due to blockage the water shall be collected within highway, car parking spaces or landscaped areas.

Whilst the Exception Test is not applied the principles are followed in general in the flood risk assessment below:

Possible Issue	Comments/ Remediation
E. Benefit of Site Development to the Wider Community over Flood Risk	The proposed development shall have its own drainage system in place. In excessive rainfall or due to blockage the water shall be collected within highway, car parking spaces or landscaped areas.
F. Does an alternative site exist for the development?	The site is at a suitable location for the proposed development with sufficient space to accommodate it.
G. Can the site be made safe?	The proposed development shall consider and embody SUDS (Sustainable Urban Drainage Systems) principles if suitable. Any site surface water runoff shall be restricted and collected within an onsite attenuation prior to discharging into existing sewer. In excessive rainfall or due to blockage the water shall be collected within highway, car parking spaces or landscaped areas.

4.0 DRAINAGE ASSESSMENT AND STRATEGY

4.1 SURFACE WATER DRAINAGE

The existing site area is 9,833² (0.9833ha). The site is a brownfield site which currently is a mixture of hardstanding and grassed areas. The previous four school buildings have been demolished in approximately 2016/2017. It is proposed to develop the site for retail properties with associated car parking, drainage and landscaping (see Appendix B).

The proposed redevelopment areas are as follows:

Roofs	2,074
Roads and parking	7,234
Grass and permeable surfacing	525
TOTAL	9,833 m²

In compliance with SUDS (Sustainable Urban Drainage Systems) various surface water discharge methods and reducing the amount discharged to the water course/sewer have been considered as per the table below.

Infiltration	The use of soakaways is generally an ideal SUDS solution for developments. Permeability testing in accordance with BRE Digest 365 should be carried out and this information then used to determine the viability of the use of soakaways to deal with rainwater runoff. Soakaways can be used to deal with run-off both from buildings and paved areas. It should also be noted that soakaways can cause flooding to nearby basements and properties. Hence, the groundwater flow paths should be determined by a geotechnical investigation. Soakaways should be located in landscaped areas of the site. In accordance with Building Regulations soakaways are not to be located within 5m of any structure. Soakaways must be designed to cope with a 1 in 30 year storm with an allowance for climate change and a factor of safety greater or equal to 2. It is possible that the car parking or other areas could, with the management of kerbs and levels, be designed to contribute to the additional storage capacity requirements for a 1 in 100 year storm. However if this is not possible then the soakaways would have to be designed for the 1 in 100 year event.
Ponds or wetlands	Ponds or wetlands can be used in conjunction with restricted discharge outlets to control the maximum rate of discharge from a site. However, the health and safety risks associated with ponds and wetlands may make them inappropriate without incorporating significant control measures into the scheme design.
Swales	Swales are similar to wetlands except they are designed to empty when not required to balance flows; similar comments apply as above.

Permeable paving/discharge to soft landscape	The use of permeable surfacing for parking areas combined with discharge from paths onto adjacent soft areas are ideal for reducing run-off via drainage systems. Permeable paving can be used as an infiltration mechanism to discharge direct to the ground if the sub-strata is sufficiently permeable or alternatively can be used as on-site storage where used in conjunction with a flow restriction to attenuate flows into existing drainage systems.
French drains	French drains can be located in landscaped areas of the site. See the notes on soakaways. It is also possible to use French drain construction lined with an impermeable barrier as a storage facility.
Restricted flows combined with onsite storage	If the above solutions are inappropriate then the final drainage system may incorporate a flow restriction and on-site storage. This could be in the form of oversized pipes or tanks to attenuate the additional flows and then discharge into the existing surface water sewer system or into the water subject to consent and approvals. The underground storage system must be designed to accommodate the calculated flows for a 1 in 30 year return period together with an allowance for climate change. The road, with the management of kerbs and levels, can be designed to contribute to the storage capacity for a 1 in 100 year storm. Alternatively the underground storage system should be designed to accommodate the 1 in 100 year event. 30% shall be allowed for climate change. Options for on-site storage include: a) Buried tanks b) Lined French drains c) Oversized pipes and manholes d) Paving with under paving storage The choice of solution depends upon relative levels of surfacing, inlet and discharge points and forms part of the detailed drainage design.

Due to the age of the adjacent properties it is likely that properties will have basements therefore the use of site infiltration and other similar SUDS systems are not suitable for this development.

Therefore, based on the above assessment the most feasible option would be to provide a surface water drainage system that will include on site attenuation and interceptor, prior to connecting into the flow control manhole. The surface water discharge will be into the existing surface water sewer located to the west of the site in High Street.

The site area is 9,833m² and will comprise a total impermeable area of 9,308m². Based on the greenfield surface water run-off rate of 5.0 litre/sec/hectare this gives an allowable discharge of 4.92 litre/sec, to be limited by a flow control. Based on 1 in 100 year rainfall and 30% allowance for climate change a 680m³ on site attenuation. This can be provided using a traditional attenuation system located within the car parking/road areas of the development. The 30% climate change allowance will

ensure that the proposed development drainage system can cope with future predicted rainfall increase. See Appendix D for calculations.

Outline Drainage Strategy drawing 171-10-500A in Appendix E indicates the proposed layout.

The final solution for the drainage will depend on further investigation and development of detailed design.

4.2 FOUL WATER DRAINAGE

The proposed foul water drainage from the development should be discharged into either of the existing foul water manholes onsite which then discharge into the foul water sewer to the west of the site in High Street (see STATS searches in Appendix F).

The final solution to be adopted will depend on further investigation and development of the detailed design.

Outline Drainage Strategy drawing 171-10-500A in Appendix E indicates the proposed layout.

5.0 RECOMMENDATIONS

Based on the flood risk assessment our recommendations are as follows:

Flood risk

The site is located within Flood Zone 1 – very low probability of flooding from Surface water runoff, rivers and sea that comprises land assessed as having a less than 1 in 1,000 annual probability of flooding (<0.1%). There is no risk of flooding from reservoirs. As the site is within low flood risk area based on EA flood maps then no further consultation with Environment Agency has been undertaken. The Environment Agency flood map is enclosed within Appendix C.

Surface water drainage

Due to the age of the adjacent properties it is likely that properties will have basements therefore the use of site infiltration and other similar SUDS systems are not suitable for this development.

Therefore, based on the above assessment the most feasible option would be to provide a surface water drainage system that will include on site attenuation and interceptor, prior to connecting into the flow control manhole. The surface water discharge will be into the existing surface water sewer located to the west of the site in High Street.

The site area is 9,833m² and will comprise a total impermeable area of 9,308m². Based on the greenfield surface water run-off rate of 5.0 litre/sec/hectare this gives an allowable discharge of 4.92 litre/sec, to be limited by a flow control. Based on 1 in 100 year rainfall and 30% allowance for climate change a 680m³ on site attenuation. This can be provided using a traditional attenuation system located within the car parking/road areas of the development. The 30% climate change allowance will ensure that the proposed development drainage system can cope with future predicted rainfall increase. See Appendix D for calculations.

Outline Drainage Strategy drawing 171-10-500A in Appendix E indicates the proposed layout.

The final solution for the drainage will depend on further investigation and development of detailed design.

Foul water drainage

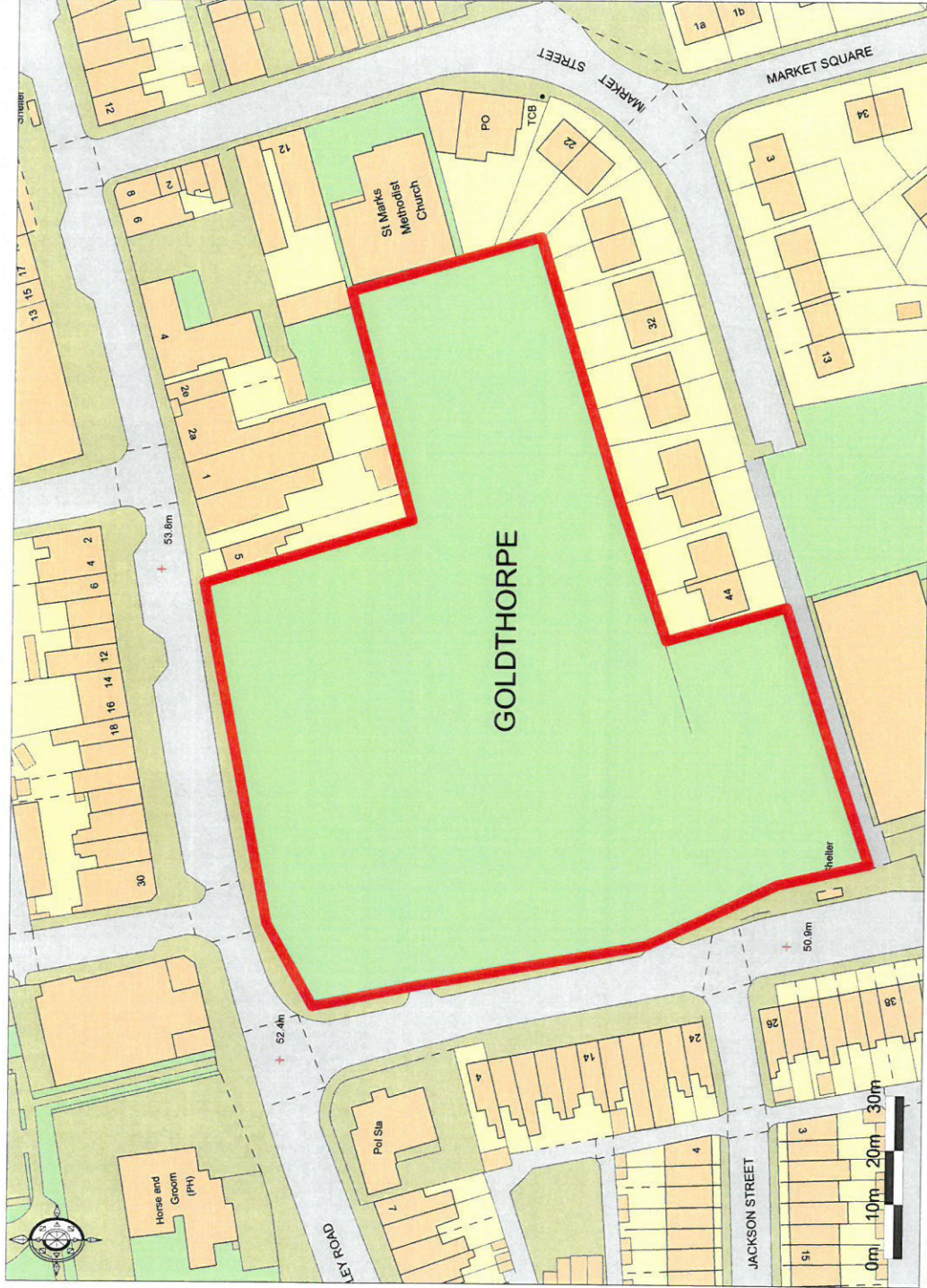
The proposed foul water drainage from the development should be discharged into either of the existing foul water manholes onsite which then discharge into the foul water sewer to the west of the site in High Street (see STATS searches in Appendix F).

The final solution to be adopted will depend on further investigation and development of the detailed design.

Outline Drainage Strategy drawing 171-10-500A in Appendix E indicates the proposed layout.

APPENDIX A - SITE LOCATION

Location Plan



Ordnance Survey © Crown Copyright 2018. All rights reserved. Licence number 100022432. Plotted Scale - 1:1250

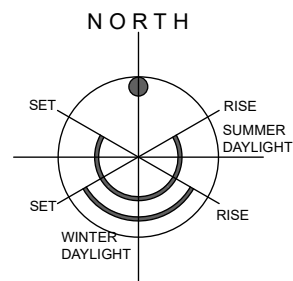


Land off High Street, Goldthorpe

APPENDIX B - PROPOSED SITE DRAWINGS



Station	Easting	Northing	Level
ST01	446262.644	404327.095	52.560
ST02	446214.827	404375.443	52.351
ST03	446188.643	404315.187	51.205
ST04	446227.482	404294.019	51.823



BOUNDARY LEGEND

- A-B - Existing paladin fence on brick wall to be retained and repaired as required
- B-C - Existing brick wall retained and made good
- C-D - Retained palsade fence
- D-E - Retained paladin fence
- E-G - Existing brick wall
- G-H - Existing brick wall with railing above retained and made good where required
- H-I - Retained existing brick wall, new wall to areas of blocked up openings to match existing and made good as required
- I-A - Existing wall removed

NOTES
ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH THE BUILDING REGULATIONS AND THE REQUIREMENTS OF THE LOCAL AUTHORITY.

REV	DESCRIPTION	IR	BY	CHKD	DATE
-----	-------------	----	----	------	------

LOROC
ARCHITECTS

25A PARK SQUARE WEST, LEEDS, LS1 2PW
T: 0113 333 7755
W: www.loroc.co.uk

3RD FLOOR, 86-90 PAUL STREET, LONDON, EC2A 4NE
T: 0203 875 5333

CLIENT
WARRIOR DEVELOPMENTS LIMITED

PROJECT
HIGH STREET / DONCASTER ROAD
GOLDTHORPE, S63 9NG

TITLE
Planning Information
PROPOSED SITE PLAN

DRAWING NO. 1526-101(P) REVISION A

SCALE 1:500 @ A2 DATE JAN 19

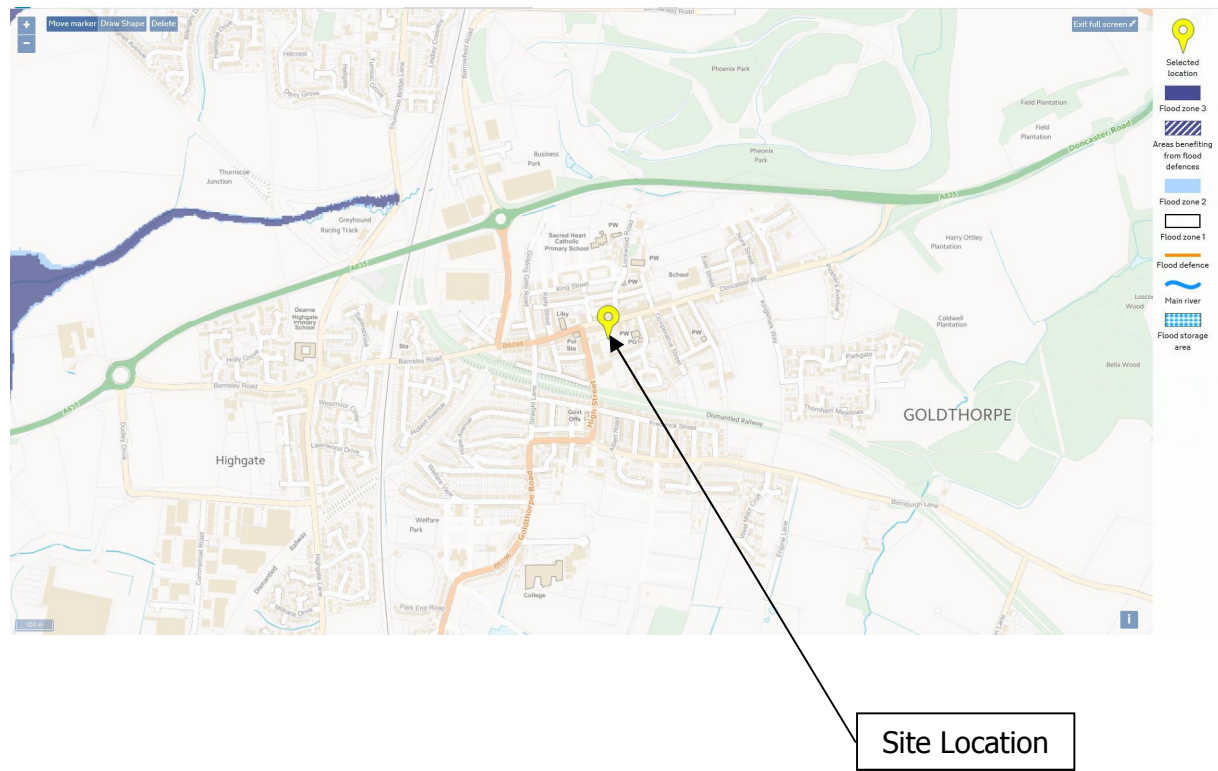
DRAWN BY CHECKED BY

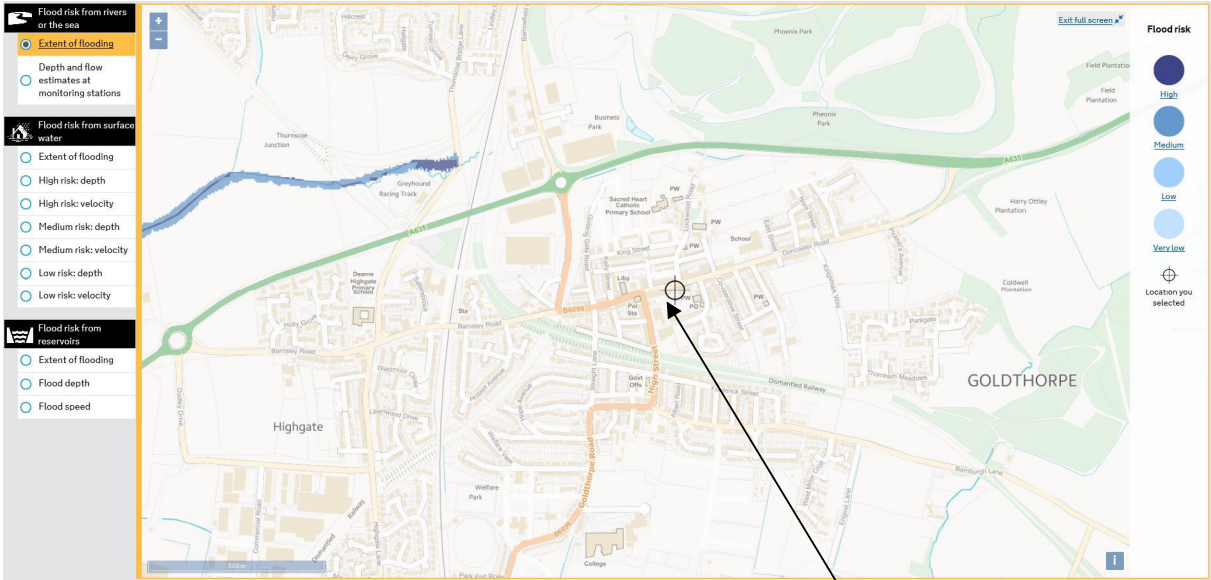
PURPOSE OF ISSUE
☒ PLANNING ☐ BUILDING REGS ☐ TENDER
☐ COMMENT ☐ INFORMATION ☐ CONSTRUCTION

THIS DRAWING IS COPYRIGHT AND THE INTELLECTUAL PROPERTY OF LOROC ARCHITECTS LIMITED. THIS DRAWING MAY NOT BE REPRODUCED IN WHOLE OR IN PART WITHOUT WRITTEN AUTHORITY. NO DIMENSIONS TO BE SCALED FROM THIS DRAWING. ALL DIMENSIONS TO BE CHECKED ON SITE PRIOR TO COMMENCEMENT OF WORKS AND ANY DISCREPANCIES REPORTED TO THE ARCHITECT/ENGINEER/CONTRACTOR.

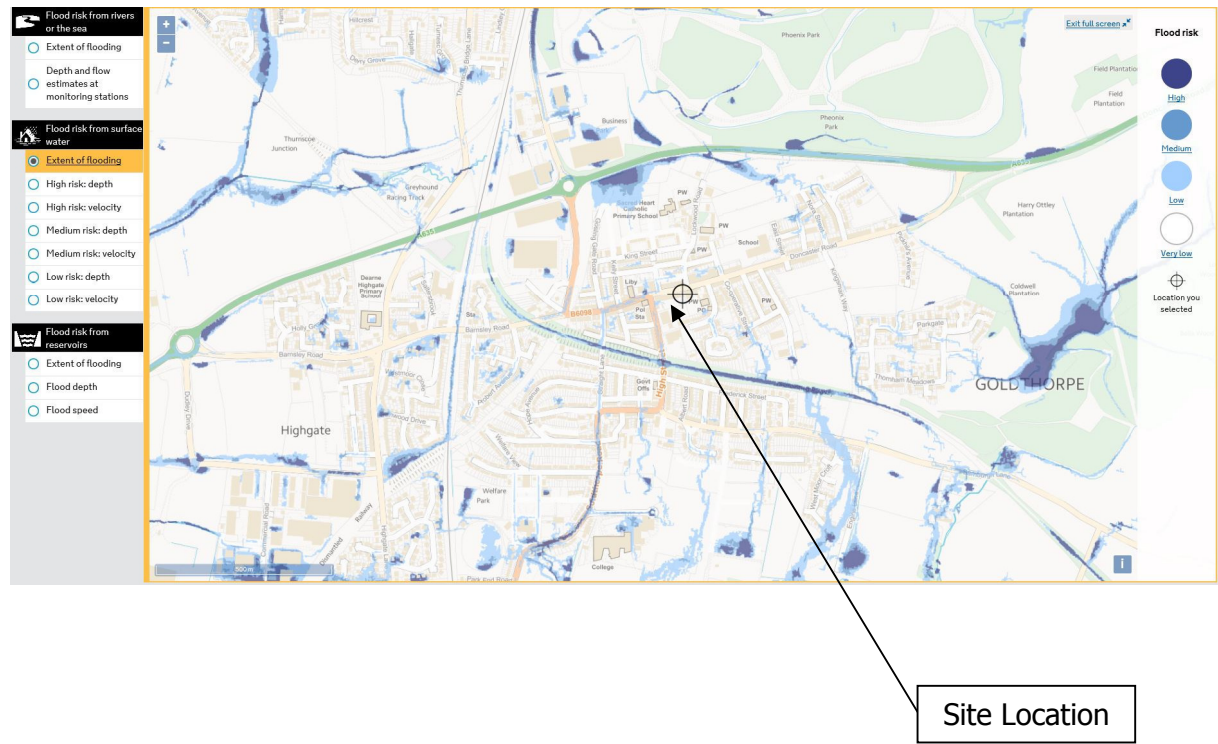


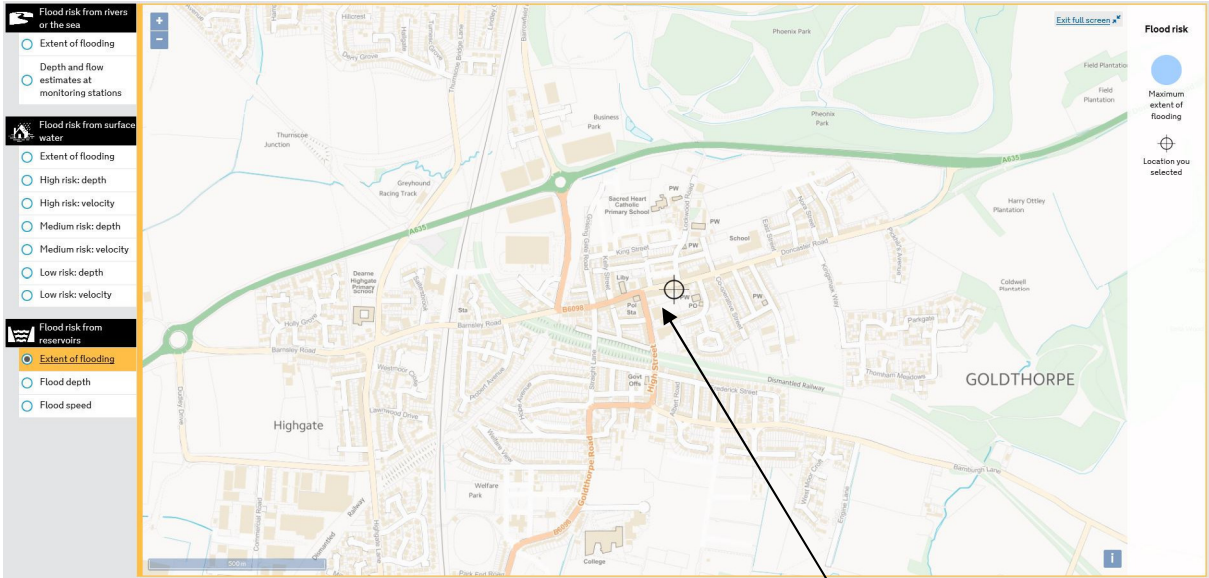
APPENDIX C - ENVIRONMENT AGENCY FLOOD MAP





Site Location





Site Location

APPENDIX D - DRAINAGE CALCULATIONS

Project Title: Goldthorpe

171-10

Prepared By: KA

Date: 11/2018

Checked By: KGP

Date: 11/2018

SURFACE WATER ATTENUATION FOR 30 YEAR RAINFALL RETURN PERIOD

DESIGN DATA

Site location =	Goldthorpe
M5-60 rainfall ratio (mm) =	20
60min rainfall ratio to 2 day rainfalls of 5 year return period, r =	0.35
Impemeable area (m ²) =	9308
Total site area (m ²) =	9833
Proposed discharge rate (l/s) =	4.92
Allowance for Climate Change (%) =	30

CALCULATIONS RESULTS

Required storage volume (m³) = 486

DETAILED CALCULATIONS

Duration, D	15	30	60	120	240	360	600	1440	2880
Z1	0.64	0.79	1.00	1.20	1.44	1.63	1.85	2.35	2.81
M5-D	12.8	15.8	20.0	24.0	28.8	32.6	37.0	47.0	56.2
Z2	1.511	1.529	1.543	1.535	1.518	1.501	1.481	1.434	1.401
M30-D	19.33	24.16	30.87	36.85	43.72	48.94	54.78	67.40	78.74
i (mm/hr)	77.34	48.33	30.87	18.42	10.93	8.16	5.48	2.81	1.64
i + Climate Change %	100.54	62.83	40.13	23.95	14.21	10.60	7.12	3.65	2.13
Area (m ²)	9308	9308	9308	9308	9308	9308	9308	9308	9308
Qp (l/s)	260.16	162.57	103.83	61.98	36.77	27.44	18.43	9.45	5.52
Qe (l/s)	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92
Balancing Q	255.24	157.65	98.91	57.06	31.85	22.52	13.51	4.53	0.60
Storage volume (m ³)	229.72	283.77	356.09	410.81	458.63	486.38	486.33	391.11	103.32

DESIGN NOTES

1. Surface water storage design is in accordance with the Wallingford Procedure - Design and Analysis of Urban Drainage. Volume 1 Principles, Methods and Practice. Volume 4 - Modified Rational Method.

Project Title: Goldthorpe

171-10

Prepared By: KA

Date: 11/2018

Checked By: KGP

Date: 11/2018

SURFACE WATER ATTENUATION FOR 100 YEAR RAINFALL RETURN PERIOD

DESIGN DATA

Site location =	Goldthorpe
M5-60 rainfall ratio (mm) =	20
60min rainfall ratio to 2 day rainfalls of 5 year return period, r =	0.35
Impemeable area (m ²) =	9308
Total site area (m ²) =	9833
Proposed discharge rate (l/s) =	4.92
Allowance for Climate Change (%) =	30

CALCULATIONS RESULTS

Required storage volume (m ³) =	680
Rainfall intensity (mm/hr) =	130

DETAILED CALCULATIONS

Duration, D	15	30	60	120	240	360	600	1440	2880
Z1	0.64	0.79	1.00	1.20	1.44	1.63	1.85	2.35	2.81
M5-D	12.8	15.8	20.0	24.0	28.8	32.6	37.0	47.0	56.2
Z2	1.955	1.996	2.030	2.014	1.980	1.949	1.914	1.834	1.768
M100-D	25.02	31.54	40.60	48.34	57.01	63.54	70.82	86.20	99.35
i (mm/hr)	100.09	63.09	40.60	24.17	14.25	10.59	7.08	3.59	2.07
i + Climate Change %	130.11	82.01	52.78	31.42	18.53	13.77	9.21	4.67	2.69
Area (m ²)	9308	9308	9308	9308	9308	9308	9308	9308	9308
Qp (l/s)	336.68	212.22	136.57	81.30	47.95	35.63	23.82	12.08	6.96
Qe (l/s)	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92	4.92
Balancing Q	331.76	207.30	131.65	76.38	43.03	30.71	18.90	7.16	2.04
Storage volume (m ³)	298.58	373.13	473.96	549.93	619.58	663.25	680.49	618.78	352.99

DESIGN NOTES

1. Surface water storage design is in accordance with the Wallingford Procedure - Design and Analysis of Urban Drainage. Volume 1 Principles, Methods and Practice. Volume 4 - Modified Rational Method.

APPENDIX E - PROPOSED DEVELOPMENT DRAINAGE STRATEGY

Key

- Existing Surface Water Drainage
- Existing Foul Water Drainage
- Existing Combined Water Drainage
- Proposed Surface Water Drainage
- Proposed Foul Water Drainage
- Proposed SW Drainage Channel
- Proposed Surface Water Gully
- Proposed Rainwater Pipe

Note:
Outline Drainage Strategy. Subject
to approval and detailed design

Note:
Existing drainage information based
on Yorkshire water sewer network
enquiry. Dated 23-10-18.

Flow control MH restricted to 5 L/s
with 677m³ on site underground
storage designed for 1:100 year rainfall
plus 30% climate change.

Proposed surface water connection
branched into existing surface
water system. Depth TBC

Proposed full retention petrol interceptor

Proposed foul connection into existing
combined MH on site. Depth TBC

Proposed Surface Water Attenuation Tank

HIGH STREET

MARKET STREET

Site plan updated.	A	07/02/2019	KA	KGP
DESCRIPTION	REV	DATE	CHK	APR

beamconsulting

Beam Consulting
14 Bond Street
Wakefield
WF1 2QP
Tel: 01924 361653
Fax: 01924 364631

PROJECT
High Street/Doncaster Road
Goldthorpe, S63 9NG

DRAWING TITLE
Proposed Drainage
Outline Design

CLIENT
Warrior Development

STATUS Information				
DRAWN	JG	DATE	29/11/18	
CHECKED	KA	SCALE	AS SHOWN @ A1	
APPROVED	KGP	REVISION	A	
DRAWING NUMBER	171-10-500			

APPENDIX F – EXISITING SITE INFORMATION

Property Identifier

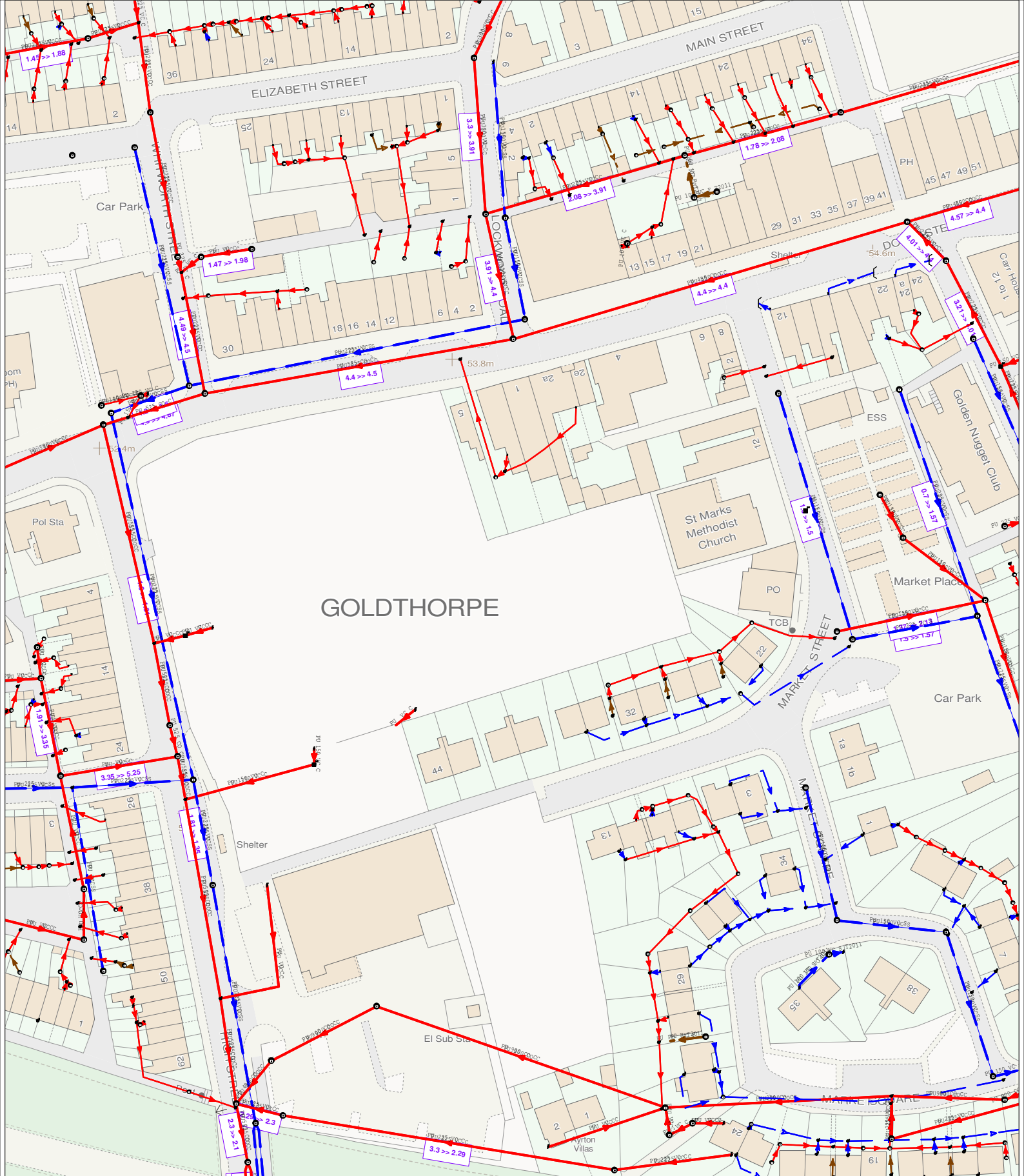


Sewer Legend

	Combined Sewer		S24 Combined Sewer
	Surface Water Sewer		S24 Surface Water Sewer
	Foul Sewer		S24 Foul Sewer
	Section 104 Sewer		Rising Main
	Overflow		Abandoned Sewer
	Syphon Sewer & Vacuum Sewer		
	Pumping Station		Public Sewer Treatment Works

Water Legend

	Water Main 4" and below
	Water Main 4" and above
	Raw Water Main
	Private Water Main
	Fire Hydrant
	Pumping Station



446133 : 404155	Map Name : SE4604SW	Title	Notes
 Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : A Hargreaves Contact Tel :		Partial Key Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS	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 : 23/10/2018, 11:33:00 Source : Sewer Network Enquiry	Date Gen: 23/10/2018, 11:33:32  SafeMove A part of Yorkshire Water