
Development at Cleckheaton Timber Yard Scholes Cleckheaton

Drainage Strategy Report

Client:

Mt J. Wilkinson
1096 Halifax Road
Scholes
Cleckheaton
BD19 6PE

Prepared by:

joc consultants ltd

Park Farm House
Leathley Lane
Leathley
Otley
LS21 2JU

REVISION HISTORY

Revision	Date	Details
00	13 th December 2022	First issue
01	8 th January 2024	Revised drainage layout
02	12 th January 2024	Further revision to drainage layout
03	31 st January 2024	Additional notes added to drainage strategy plan

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1.0 INTRODUCTION

- 1.1. JOC Consultants Ltd is instructed by Mr J. Wilkinson (the Client) to prepare this Drainage Strategy report in connection with an application to Kirklees Metropolitan Borough Council under reference 2021/21319 for a residential development at Cleckheaton Timber Yard, Halifax Road, Scholes, Cleckheaton.
- 1.2. The location of the site is shown outlined in red in Figure 1 in Appendix A and the coordinates at the approximate centre of the site are: 416700E, 424950N. Existing site details and ground levels are shown on the Topographical Survey Plan in Appendix B.
- 1.3. Following comments received from the Kirklees Highways Development Management team in June 2023, and receipt of the revised site layout plan in November 2023, the proposed drainage layout has been amended. The attenuation storage tanks have been relocated from the proposed adoptable roads to non-adoptable areas. This revision of the report includes the amended drainage plan, revision B.
- 1.4. This report is prepared specifically for the Client for the purpose of the above mentioned application and the report may not be used for any purpose other than for the purpose for which it was commissioned, and it may not be assigned to any third party without our written permission.
- 1.5. In the preparation of this FRA report, JOC Consultants Ltd has relied on published information and on information provided by the Client and accepts no liability for the accuracy or adequacy of that information or for the consequences of any changes to or re-assessment of this information in the future.

2.0 THE DEVELOPMENT

2.1 Site Layout plan

- 2.1.1. It is proposed to demolish existing buildings and redevelop site for residential use. A development of 10 houses is proposed, as shown on the site layout plan in Appendix C.
- 2.1.2. The gross area of the site within the red line boundary is approximately 0.39ha and the post-development impervious area amounts to approximately 0.22ha.

3.0 DATA COLLECTION

3.1 Yorkshire Water pre-planning advice

3.1.1. Pre-planning advice was requested from Yorkshire Water on 17th November 2022 and received on 28th November 2022. The advice is provided in Appendix D.

3.1.2. The Yorkshire Water sewer plan provided with the pre-planning advice shows a 300mm diameter combined sewer in Halifax Road to which the existing site drains. Yorkshire Water confirmed in its advice that foul water from the development may be discharged to this sewer and surface water may be discharged to the public sewer if disposal by infiltration or to a watercourse is not feasible.

3.2 Topographical survey

3.2.1. The topographical survey plan in Appendix B shows ground levels generally fall from north-west to south-east.

4.0 WASTE WATER DISPOSAL

4.1 Design Flow Rate

4.1.1. In accordance with Table 5 of Approved Document H1 in the Building Regulations, the design wastewater flow rate generated by 10 dwellings is 4.1 l/s.

4.2 Proposed Layout

4.2.1. The proposed layout is shown on the Drainage Strategy Plan in Appendix E.

4.2.2. Two separate drainage areas are proposed:

- North-west area serving plots 1 to 3; and
- South-east area serving plots 4 to 10.

4.2.3. There is an existing combined sewer passing through the north-west area which discharges to the 300mm diameter combined sewer in Halifax Road. Wastewater from plots 1 to 3 will be discharged into this sewer, as shown on the drainage plan.

4.2.4. In the south-east area, wastewater from plots 4 to 9 will be discharged to a new foul sewer in the access road. This sewer will discharge to the existing combined sewer manhole in the entrance to the existing timber yard.

4.2.5. The required minimum foul drain diameter of 100mm will be sufficient for the development. The capacity of a 100mm drain laid at the minimum gradient for wastewater of 1 in 80 is approximately 7.95 l/s.

5.0 SURFACE WATER DISPOSAL

5.1 The Building Regulations

5.1.1. The regulations affecting surface water drainage are stated in the Building Regulations Approved Document H as section H3 as follows:

(1): Adequate provision shall be made for rainwater to be carried from the roof of the building.

(2) Paved areas around buildings shall be so constructed as to be adequately drained.

(3) Rainwater from a system pursuant to (1) or (2) shall discharge to one of the following, listed in order of priority:

(a) an adequate soakaway or some other adequate infiltration system; or, where that is not reasonably practicable,

(b) a watercourse; or, where that is not reasonably practicable;

(c) a sewer.

5.2 SuDS hierarchy of disposal options

Disposal by infiltration to ground

5.2.1. A Phase 1 geo-environmental desk study report was prepared for the site by EPS in October 2022. The page 4 extract from the report in Appendix F confirms the underlying geology to be the Pennine Lower Coal Measured Formation. This comprises mudstone, siltstone and sandstone.

5.2.2. Owing to the presence of made ground which the report concludes has a moderate risk of contamination, and the presence of low permeability sub-strata, the site is not suitable

infiltration drainage, as stated in the page 15 extract from the report in Appendix F. Infiltration tests were not therefore justified.

Disposal to a watercourse

- 5.2.3. There are no watercourses to which the site has access and therefore this method of disposal is not feasible.

Disposal to a surface water sewer

- 5.2.4. There are no surface water sewers in the vicinity of the site.

Disposal to a combined sewer

- 5.2.5. In the absence of alternative feasible methods for the disposal of surface water from the development it is proposed to discharge surface water to the existing combined sewers and drains within the site. These are connected to the 300mm combined sewer in Halifax Road.

5.3 Peak surface water discharge rate

- 5.3.1. Yorkshire Water in its pre planning advice letter dated 28th November 2022 stated that, in the absence of feasible alternative methods, surface water may be discharged to the public sewer at a rate equivalent to the discharge rate from the site in a 1 in 1 year storm, less 30%.
- 5.3.2. Estimates of peak surface water runoff rates and volumes from the existing site were prepared using FEH 2013 rainfall data and the REFH2 model. And the results are provided in Appendix G. In a 1 in 1 years event, the peak surface water runoff rate is 2.52 l/s and 70% of this would be only 1.76 l/s. A discharge at this rate would be likely to lead to siltation in the drainage system. In order to achieve adequate flushing velocity it is proposed to discharge surface water a rate not exceeding 3.5 l/s. This is normally acceptable to Yorkshire Water. The flow rate will be controlled by a Hydro Brake, the details of which are provided in Appendix H.

5.4 Proposed layout

- 5.4.1. As with the wastewater drainage system, the site is divided into the north-west and south-east sub-catchments.
- 5.4.2. The surface water drainage scheme layout is shown on the drainage layout plan in Appendix E. The depth of the exiting combined sewer in the north-west catchment area will

need to be verified by survey at the detailed design stage. For the purposes of this drainage strategy it is assumed that the sewer is at the minimum depth of 1.20m to the pipe soffit.

- 5.4.3. The depth to invert of the existing manhole in the site entrance (in the south-east catchment) is understood from the Client to be approximately 1.20m. This will also need to be verified at the detailed design stage, but as the drain is unlikely to be less than 1.20m deep, it is evidently feasible for the development to discharge to this manhole chamber.

5.5 Attenuation storage

- 5.5.1. Attenuation storage is designed for the 1% AEP_{45%} CCA event. Rainfall depths were obtained from the FEH 2013 depth-duration-frequency dataset and runoff volumes were calculated for a range of durations up to 12 hours. The calculation assumes 100% runoff from impervious areas and 40% runoff from pervious areas. The critical duration when the discharge rate is limited to 3.5 l/s is approximately 0.5 hour in the north-west catchment and approximately 1 hour in the south-east catchment, as shown in the tables of data in Appendix I.

- 5.5.2. At a controlled discharge rate of 3.5 l/s, the required attenuation storage capacities are:

- north-west catchment: 10.61m³; and
- South-east catchment: 49.62m³.

- 5.5.3. It is proposed to provide most of the required attenuation storage for each catchment in cellular storm tanks having 95% voids and a height of 600mm. These are located beneath parking areas that are not within the adoptable road area as shown on the drainage plan. The residual storage requirement will be provided in a 600mm diameter over-sized sewer on the access road, as shown on the drainage strategy plan in Appendix E.

- 5.5.4. The impervious areas in the existing and post-development conditions are shown in Appendix J.

- 5.5.5. The calculations for the required attenuation storage are provided in Appendix K.

5.6 Exceedance flows

- 5.6.1. The surface water drainage system is designed for the 1% AEP_{45%} CCA rainfall event. In the event of more extreme rainfall, the attenuation storage capacity could be exceeded and the water level in the drainage systems could rise and emerge from highway gullies close to Halifax Road.. Any such emergence would flow out of the site access road into Halifax Road

where it would disperse as overland flow towards the south-east, entering highway gullies along the way.

6.0 MANAGEMENT AND MAINTENANCE

- 6.1. Maintenance of the drainage system can be provided by a management company, pending adoption of the system by Yorkshire Water.
- 6.2. The drainage system should require very little maintenance but it is recommended that the inspection chambers and the storage tank should be inspected every 3 months and, if necessary, any accumulation of silt or other solid materials should be removed.
- 6.3. The Hydro Bake installations should be inspected at least quarterly to ensure it is free from any blockage and is operating correctly.

APPENDIX A

Figure 1: Location Plan

Cleckheaton Timber Yard, Halifax Road, Scholes, Cleckheaton, BD19 6PE

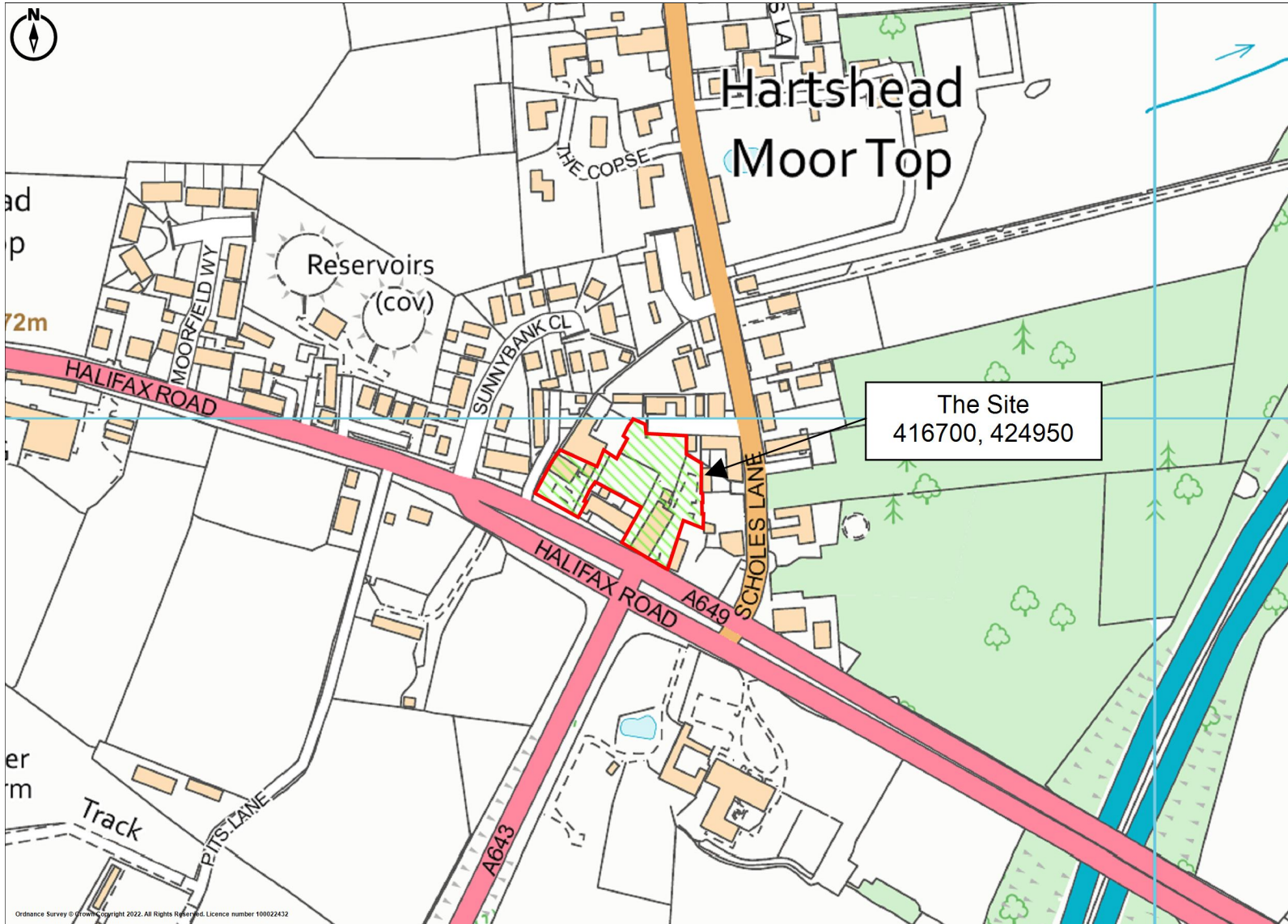
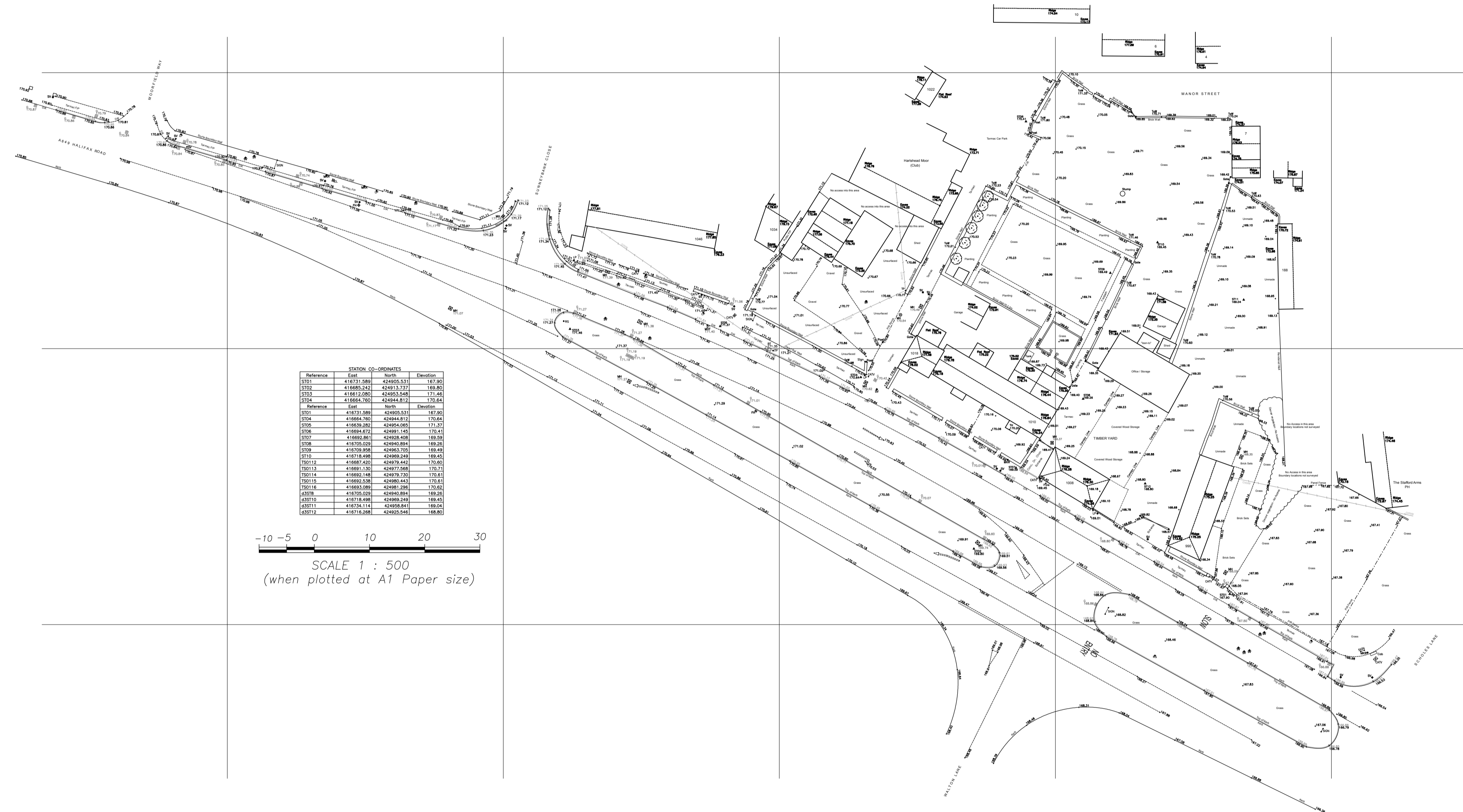


Figure 1: Location Plan

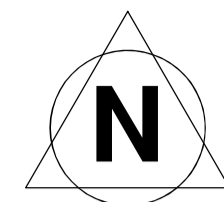
APPENDIX B

Topographical survey plan



STATION CO-ORDINATES			
Reference	East	North	Elevation
ST01	418721.540	424925.537	187.20
ST02	418686.242	424913.737	189.80
ST03	418612.090	424923.548	171.49
ST04	418666.700	424848.812	175.84
ST05	41871.590	424925.537	187.20
ST06	418684.760	424944.812	170.84
ST07	418620.200	424984.000	171.70
ST08	418684.872	424911.140	170.47
ST09	418680.840	424984.000	189.20
ST10	418705.020	424900.894	189.20
ST11	418709.890	424984.700	189.49
ST12	418718.490	424989.240	189.45
ST13	418680.400	424978.440	170.00
ST14	418680.130	424977.560	170.71
ST15	418680.140	424978.700	170.81
ST16	418682.330	424980.440	170.87
ST17	418680.090	424981.200	170.82
ST18	418705.020	424900.894	189.20
ST19	418718.490	424989.240	189.45
ST20	418724.114	424928.841	189.24
ST21	418718.490	424928.841	189.80

SCALE 1 : 500
(when plotted at A1 Paper size)



Abbreviation & Symbol Key.

B	Bollard	RSC	Roller Steel Column
BB	British Beacon	RSJ	Roller Steel Joint
BT	British Telecom Cover	RWP	Rain Water Pipe
BM	Bench Mark	SC	Stop Cock
CL	Cover Level	SP	Sign Post
DK	Drop Kerb	STP	Stand Pipe
EL	Electricity Cover	SV	Stop Valve
EP	Electricity Pole	SVP	Soil Vent Pipe
FH	Fire Hydrant	SWG	Storm Water Gully
FFP	Flagged Footpath	SW	Storm water
G	Gully	TFFP	Tarmac Footpath
GM	Gas Meter	TL	Traffic Light
GV	Gas Valve	TP	Telegraph Pole
IC	Inspection Cover	UTL	Unable To Lift
IL	Invert Level	VP	Vent Pipe
LB	Letter Box	WM	Water Meter
LP	Lamp Post	WP	Waste Pipe
MB	Multi Bole		
MH	Man Hole	Fences & Walls	
Mx	Marker Post	RET	Retaining Wall
MS	Mill Stone	BW	Barbed Wire
CATV	Cable Telecommunications	C/B	Close Boarded
NB	Noise Board	C/I	Corrugated Iron
NFI	No Further Information	C/L	Chain Link
OSBM	Ordnance Survey BM	C/P	Chestnut Paling
P	Post	IR	Iron Railing
PB	Post Box	Lat	Lattice
RE	Rodding Eye	P/C	Post & Chain
RL	Route Line	P/R	Post & Rail
RS	Road Sign	P/W	Post & Wire
SS	Street Name Sign		
NS	Non Slip Paving		
		Traces	
		0.25/10/10/Syc	
		Diameter/Height/Spread/Species	

General
Details of services hidden or obscured by vegetation, debris or vehicles at survey dates may be omitted. Hedge & Vegetation details are outline

Control & Datum Information

Grid - Station ST01 Coordinates are OS GPS RTK
All other Stations are relative to this in Plane Grid Projection and Grid North

Datum - Station ST01 datum is OS GPS RTK
All other Stations are relative to this in Plane Grid Projection

Grid @ 50.0m to cover Site

Boundaries treatments shown do not indicate Legal ownership

Revision	Description	By	Date

Surv.	Drawn	Date	Chkd	Date	Appr'd	Date
GH,SH	SH	26/9/22				

This drawing is the property of H&H Surveys. Copyright is reserved by them and the drawing is issued on the condition that it is not copied either wholly or in part without consent in writing of H&H Surveys. Figured dimensions to take preference over those scaled. All dimensions to be checked on site before commencement of any work or stop drawings. This drawing is to be read in conjunction with the specification when existing and all other consultants drawings.

Client.

Mr John Wilkinson

Title. SITE PLAN
Site. Timber Yard
Hartshead Moor Top
Cleckheaton BD19 6PE

HH
SURVEYS LTD
41 Brampton Crescent
Wombwell
Barnsley
Yorkshire S73 0SZ
T: 01226 734099 , E: stephen@hhsurveys.co.uk
Web: hh-surveys.com

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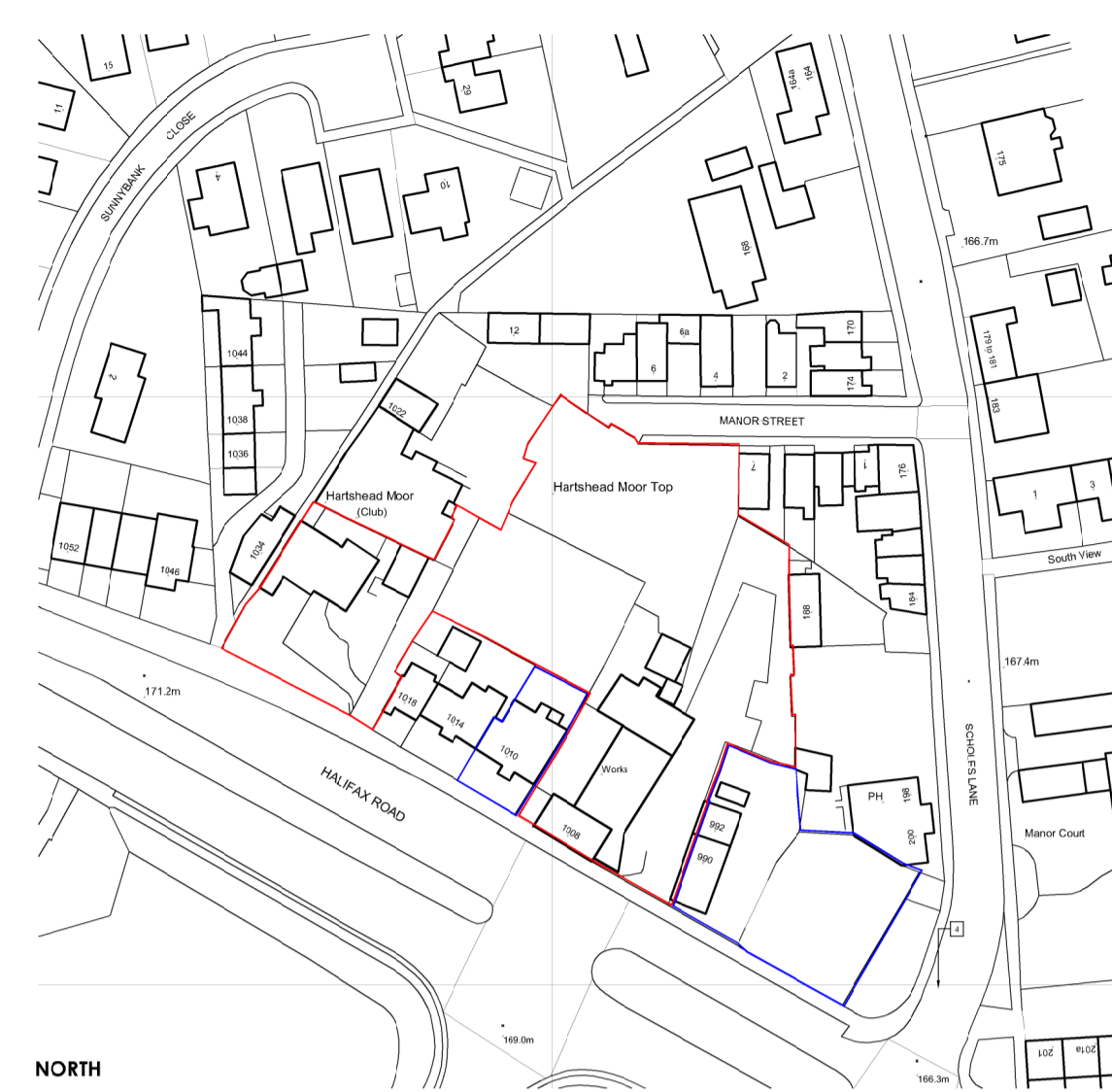
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Sheet No.

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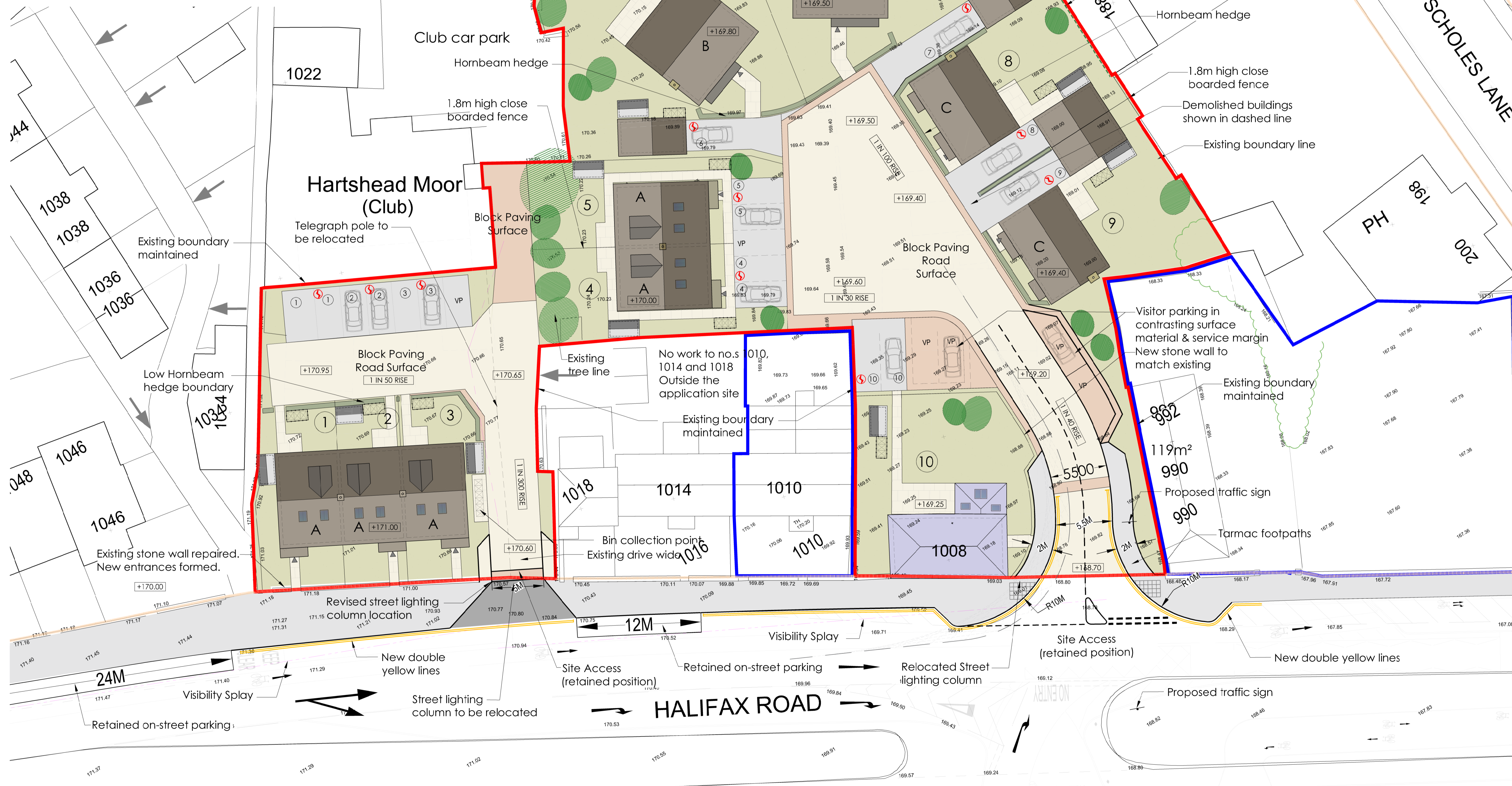
APPENDIX C

Site layout plan

Townscape Architects Drawing No. H-20078 revision H



SITE LOCATION PLAN
SCALE 1:1250 @ A1



PROPOSED SITE PLAN
SCALE 1:200 @ A1

0 10m
scale at 1:200

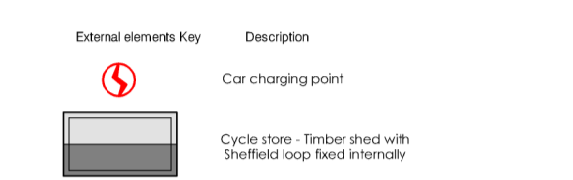
NOTES:
DO NOT SCALE FROM DRAWING.
SITE LEVELS AND ELEVATIONS ARE BASED ON THE SURVEYED TOPOGRAPHICAL SURVEY DRAWING 02/003P. ANY DISCREPANCIES TO BE REPORTED TO THE ARCHITECT.
ALL HIGHWAY / PARKING LAYOUTS AND DETAILS ARE INDICATIVE ONLY AND ARE BASED ON THE HIGHWAY ENGINEERS DESIGN BY OPTIMA CONSULTANTS LTD TRANSPORT STATEMENT 2020 P1.
FOR ALL ARCHITECTURAL & ECOLOGICAL DETAILS REFER TO THE JCA LTD PRELIMINARY ECOLOGICAL APPRAISAL REPORT, BIODIVERSITY & THE FOR ALL DRAINAGE DETAILS REFER TO JCA CONSULTANT DESIGN.
FOR ALL ACCIDENTAL DETAILS REFER TO ENVIRONMENTAL NOISE SOURCES LTD NOISE MANAGEMENT REPORT No. 1006-23-1025.
ALL STRUCTURAL DETAILS TO STRUCTURAL ENGINEERS DESIGN.

AREA SCHEDULE
SEE AREA - 0.39ha
0.39ha Area

INDICATIVE HOUSING SCHEDULE
TYPE A PLOT 13 3 BED / 2.5P 124.2m² / 1340m²
TYPE B PLOT 6 4 BED / 2.5P 188.2m² / 1120m²
TYPE C PLOT 8 4 BED / 2.5P 188.2m² / 1120m²
TYPE D PLOT 10 3 BED / 2.5P 122.2m² / 1315m²

TOTAL 1061 13,419m²

To be read in conjunction with other consultants:
Architect: Environment House Solutions
Access/Drainage: Tree Care
Drainage Consultant: JSC Contractors Limited
Ecology: JCA Limited
Highway Consultant: Optima Highways



Construction staff and operatives must ensure the principle contractor has provided thorough and accurate information on all Health and Safety aspects relating to the design, identified on this drawing, including the review of:

- Design/Contractor risk assessment
- Method statements
- Permit to work
- Construction phase Health and safety plan

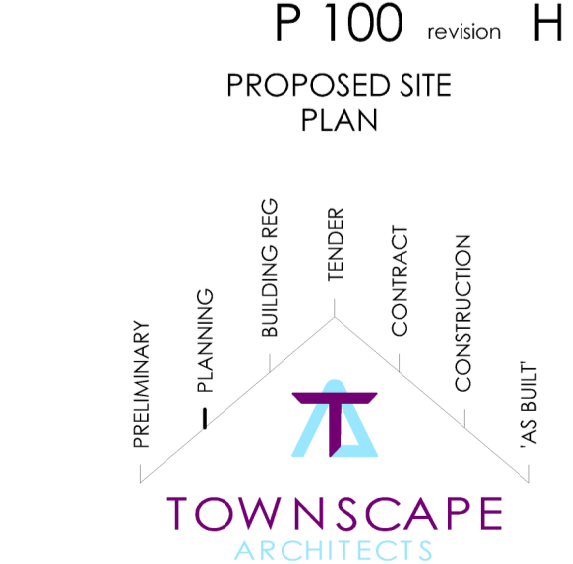
The Designer notes that the following health and safety risks have not been abstracted during the design process:

No.	Description	Date
H	Turning head removed / BCP moved / Foot 12 wall removed	15.08.2023
G	Amended to Highway design (27.10) / P1015 building raised / Barn extension roof applied / Roof plans house type 1, 2 & 3 updated / Bin lines & treatment drawn	23.11.2023
F	Highway indicative gradients added	15.08.2023
E	Material key added and highways updated	14.08.2023

Drawn by: RP
Checked by: RT

Client: MR J WILKINSON
LR PEARSON TIMBER YARD,
HARTSHED MOOR TOP,
CLECKHEATON

Project name:
Project number: H-20078
Date: 01.11.2022
Scale: 1:200 @ A1



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APPENDIX D

Yorkshire Water pre planning advice



YorkshireWater

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 Otley
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 LS21 2JU
 john@jocconsultants.co.uk

Yorkshire Water Services
 Developer Services
 Pre-Development Team
 PO BOX 52
 Bradford
 BD3 7AY

Tel: 0345 120 8482
 Fax:

Email:
 technical.sewerage@yorkshirewater.co.uk

Your Ref:
 Our Ref: Y014088

For telephone enquiries ring:
 George Mullaney on 0345 120 8482

28th November 2022

Dear Mr O'Connor,

Cleckheaton Timber Yard, Halifax Road, Scholes, Cleckheaton, BD19 6PE – Pre-planning Enquiry U849505

Thank you for your recent enquiry and remittance. Our official VAT receipt has been sent to you under separate cover. Please find enclosed a complimentary extract from the Statutory Sewer Map which indicates the recorded position of the public sewers. Please note that as of October 2011 and the private to public sewer transfer, there are many uncharted Yorkshire Water assets currently not shown on our records.

The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site and are valid for a maximum period of twelve months:

Existing Infrastructure

There are several public combined sewer recorded on the site. In this instance, building-over may take place under the control of Part H4 Building Regulations 2010. No trees planted within 5 (five) metres of this public sewer. It may not be acceptable to raise or lower ground levels over the sewer, nor to restrict access to the manholes on the sewer. If you wish to have this sewer diverted under Section 185 of the Water Industry Act 1991 an application should be made in writing. To discuss this matter, please telephone 0345 120





84 82.

Foul Water

Development of the site should take place with separate systems for foul and surface water drainage. The separate system should preferably extend to the public sewer.

Foul water domestic waste can discharge to the 300 mm diameter public combined sewer recorded in Halifax Road, at a point to the south of the site.

Surface Water

The developer's attention is drawn to Requirement H3 of the Building Regulations 2010. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway, infiltration system and watercourse in that priority order.

Sustainable Drainage Systems (SuDS), for example the use of soakaways and/or permeable hardstanding etc, may be a suitable solution for surface water disposal appropriate in this situation. You are advised to seek comments on the suitability of SuDS in this instance from the appropriate authorities.

If other methods of surface water disposal are not viable and subject to providing satisfactory evidence as to why they have been discounted, curtilage surface water discharges to the public sewer will be restricted to the level of run-off - i.e. same rate of discharge - to that from the existing use of the site less a 30% reduction in the existing discharge. Any discharge of surface water from the site should discharge to similar points of connection to that of the existing use of the site. You will need to demonstrate positive drainage, based on a 1 in 1 year storm, to the public sewer to Yorkshire Water by means of investigation and calculation carried out at your expense.

To do this, Yorkshire Water requires to see existing and proposed drainage layouts with pipe sizes, gradients, gullies, downpipes and connection points, measured impermeable areas of the present and proposed use of the site, along with the calculations that show the existing and proposed discharge rate from the site to the public sewer.

Please note further restrictions on surface water disposal from the site may be imposed by other parties. You are strongly advised to seek advice/comments from the Environment Agency/Land Drainage Authority/Internal Drainage Board, with regard to surface water disposal from the site.

Other Observations

Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may apply on line or obtain an application form from our website (www.yorkshirewater.com) or by telephoning 0345 120 84 82.



Under the provisions of section 111 of the Water Industry Act 1991 it is unlawful to pass into any public sewer (or into any drain or private sewer communicating with the public sewer network) any items likely to cause damage to the public sewer network interfere with the free flow of its contents or affect the treatment and disposal of its contents. Amongst other things this includes fat, oil, nappies, bandages, syringes, medicines, sanitary towels and incontinence pants. Contravention of the provisions of section 111 is a criminal offence.

An off-site foul and surface water sewer may be required which may be provided by the developer and considered for Code for Adoption under Section 104 of the Water Industry Act 1991. Please telephone 0345 120 84 82 for advice on sewer adoptions. Alternatively, the developer may in certain circumstances be able to requisition off-site sewers under Section 98 of the Water Industry Act 1991 for which an application must be made in writing. For further information, please telephone 0345 120 84 82.

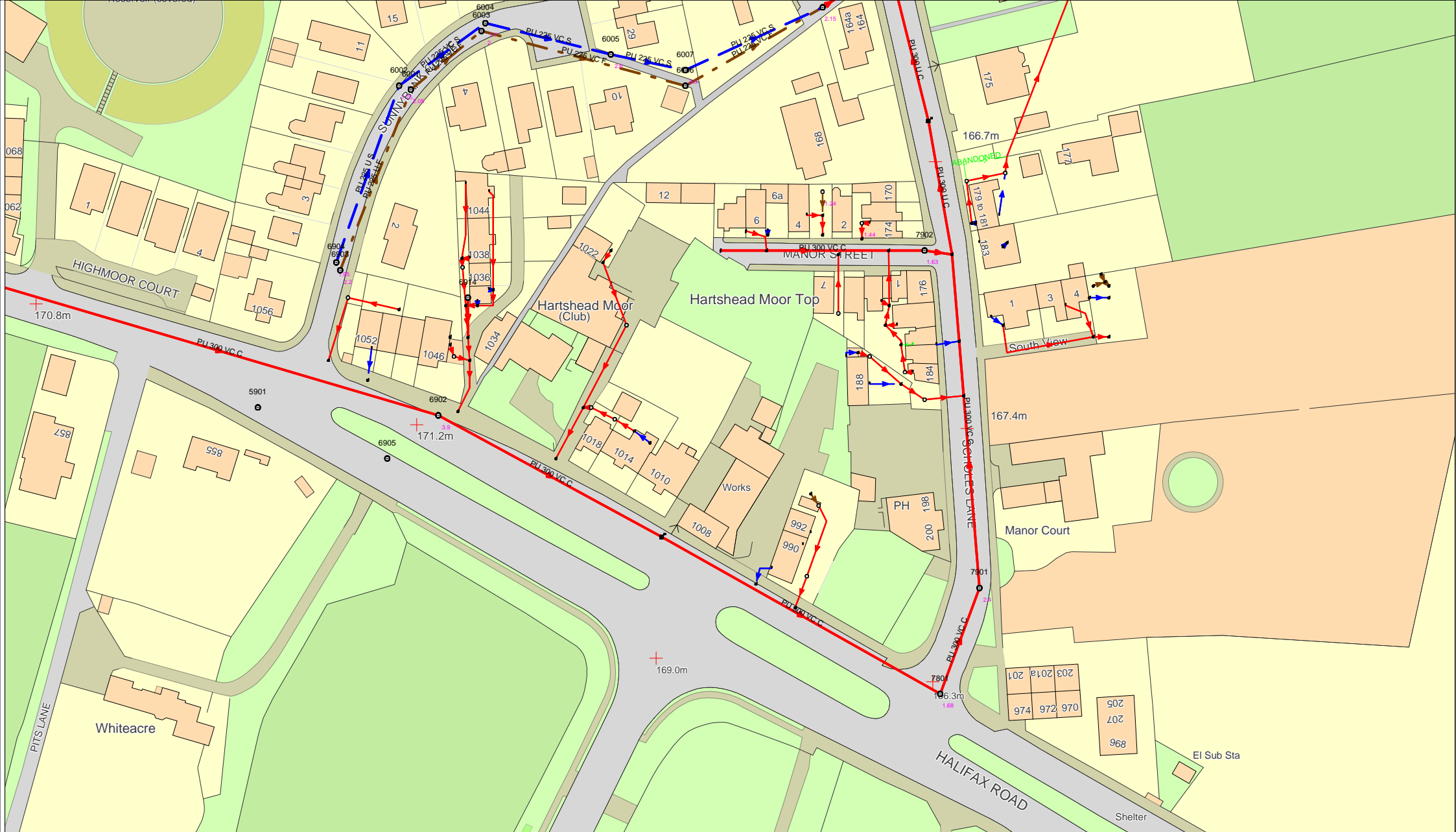
Prospectively adoptable sewers and pumping stations must be designed and constructed in accordance with the Code for Adoption 2021/22, pursuant to an agreement under Section 104 of the Water Industry Act 1991. We are happy to offer pre-development technical advice on any prospective sites that you would like to put forward for adoption, prior to submission of your adoption application.


An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our Sewer Adoption, Diversion and Requisition (telephone 0345 120 84 82) or email technical.sewerage@yorkshirewater.co.uk or visit - <https://www.yorkshirewater.com/developers/sewerage/sewer-adoptions/> for further information.

All the above comments are based upon the information and records available at the present time and is subject to formal planning approval agreement. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith. Please note that capacity in the public sewer network is not reserved for specific future development. It is used up on a 'first come, first served' basis. You should visit the site and establish the line and level of any public sewers affecting your proposals before the commencement of any design work.

Yours sincerely

George Mullaney
Development Services Technician



<p>416636 : 424912</p>  <p>YorkshireWater</p>	<p>Map Name : SE1624NE</p> <p>Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ</p> <p>Contact Name : G Mullaney</p> <p>Contact Tel :</p>	<p>Title</p> <p>Notes</p> <p>(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</p>	<p>Partial Key</p> <ul style="list-style-type: none"> Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS <p>Date Req : 28/11/2022, 12:37:19</p> <p>Source : Sewer Network Enquiry</p>	<p>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.</p> <p>Date Gen : 28/11/2022, 12:38:55</p>
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APPENDIX E

Drainage Strategy Plan

Drawing No. 22-028-001 revision C

Notes

- All site drains are 100mm minimum diameter.
- Diameters and depths of existing sewers and drains to be verified by survey at detailed design stage.
- Attenuation storage to be verified at detailed design stage.
- Precast concrete manhole units including their PCC cover slabs shall comply with the relevant provisions of BS EN 1917 and BS 5911-3 and shall be manufactured from concrete with a Design Chemical Class DC-4 unless satisfactory evidence through soil analysis can be provided that a lower class will resist attack from soils and groundwater.
- All manhole cross sectional details should clearly show a minimum cover depth of 300mm to PCC corbel/cover slab in compliance with the requirement of BS5911-3 (Table 7).
- All PCC units in oversize manholes must have a design working life of 100 years (min) in accordance with BS8500-2015+A2:2019-Table A.5.

KEY:

- Combined sewer/drain
- Foul sewer/drain
- Surface water sewer/drain



C	Notes 4, 5 and 6 added	JOC	31/01/24
B	Revised drainage layout	JOC	09/01/24
A	Revised drainage layout	JOC	05/01/24
REV:	DESCRIPTION:	BY:	DATE:

STATUS: **Planning**

CONSULTING ENGINEER:
joc consultants ltd
 Park Farm House
 Leathley Lane
 Leathley
 Otley
 LS21 2JU
 Tel/fax: 0113 284 2838
 www.jocconsultants.co.uk

CLIENT:
Mr. John Wilkinson
 1096 Halifax Road, Scholes
 Cleckheaton

ARCHITECT:
Townscape Architects
 The Studio
 9a Albert Street, Harrogate, HG1 1GX

PROJECT: Cleckheaton Timber Yard			
DRAWING TITLE: Drainage Strategy Plan			
SCALE AT A1: 1:200	DATE: 13/12/22	DRAWN: JOC	CHECKED: JOC
PROJECT NO: 22/028	DRAWING NO: 22-028-001	REVISION:	C

APPENDIX F

Extracts from Geo-environmental report

EPS report number: UK22.6071: page 4 and page 15

2.2 Environmental Setting

Detail	Description																
Geology	<p>British Geological Survey (BGS) maps of the area show the site to be underlain by Pennine Lower Coal Measures Formation (Sandstone). No superficial deposits are recorded.</p> <p>Records show geological faults are present to the north, east and west of site with a coal outcrop to the north west of site. Geological Maps are included as Appendix C.</p> <p>Geological maps also record a large area of infilled ground around 150m northwest, which is associated with former unlicensed opencast coal mining according to the Coal Authority Consultant's Report that has been included as Appendix D.</p>																
British Geological Survey (BGS)	<p>Two recorded mineral sites are present within a 500m search radius. Both record their status as "ceased". The nearest is called "Thornhill", recorded as an opencast sandstone quarry around 360m southwest. Another opencast quarry/mine called 'Primrose Hill' is recorded 460m north and supplied common clay and shale.</p>																
Geological Hazards	<table border="1"> <thead> <tr> <th>Hazard</th> <th>On Site Risk</th> </tr> </thead> <tbody> <tr> <td>Mining (non coal)</td> <td>Highly Unlikely</td> </tr> <tr> <td>Collapsible Ground</td> <td>Very Low</td> </tr> <tr> <td>Compressible Ground</td> <td>No Hazard Moderate risk 104m NW</td> </tr> <tr> <td>Ground Dissolution</td> <td>No Hazard</td> </tr> <tr> <td>Running Sand</td> <td>No Hazard Very low 104m NW</td> </tr> <tr> <td>Landslide</td> <td>Very Low Low 206m SE</td> </tr> <tr> <td>Shrinking / Swelling Clay</td> <td>No Hazard Very low 76m N</td> </tr> </tbody> </table>	Hazard	On Site Risk	Mining (non coal)	Highly Unlikely	Collapsible Ground	Very Low	Compressible Ground	No Hazard Moderate risk 104m NW	Ground Dissolution	No Hazard	Running Sand	No Hazard Very low 104m NW	Landslide	Very Low Low 206m SE	Shrinking / Swelling Clay	No Hazard Very low 76m N
	Hazard	On Site Risk															
	Mining (non coal)	Highly Unlikely															
	Collapsible Ground	Very Low															
	Compressible Ground	No Hazard Moderate risk 104m NW															
	Ground Dissolution	No Hazard															
	Running Sand	No Hazard Very low 104m NW															
	Landslide	Very Low Low 206m SE															
Shrinking / Swelling Clay	No Hazard Very low 76m N																
Radon	<p>The Envirocheck indicates the property is in a lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level) and no radon protective measures are necessary in the construction of new dwellings or extensions.</p>																
Hydrogeology	<p>Groundwater vulnerability maps for the area show that the underlying geology is classified as a Secondary Aquifer of medium vulnerability consisting of a productive bedrock aquifer with no superficial aquifer. The site does not lie within a Source Protection Zone for local groundwater abstraction.</p> <p>A groundwater abstraction license is recorded 60m northwest and related to a domestic and agricultural abstraction, the license is recorded as revoked.</p> <p>There are no discharge consents to groundwater within 500m.</p> <p>Groundwater vulnerability maps are included as Appendix E.</p>																

4 GEOTECHNICAL GROUND MODEL

Geological records indicate the ground conditions to comprise alluvium overlying granite, although given the historic use, significant amounts of made ground is anticipated to be present at the surface. A conceptual geotechnical ground model is provided in the table below which assesses design elements, anticipated strata and ground conditions:

Element	Anticipated Strata	Parameter(s)	Anticipated Conditions
Foundations	Made Ground	Allowable Bearing Pressure	Not appropriate as a bearing strata
		Settlement	High sensitivity
		Volume Change	Depends upon the soil composition
	Pennine Coal Measures	Allowable Bearing Pressure	>100kN/m ²
		Settlement	Low risk
		Volume Change	Low risk
Drainage	Made Ground	Permeability	Not suitable for infiltration drainage
	Pennine Coal Measures		Unlikely to be suitable depending on weathering profile
Concrete Grade	Made Ground	Grade	Low to moderate risk of high sulphate levels
	Pennine Coal Measures		Moderate risk of high sulphate levels
Potential Hazard	Comment		
Trees & Vegetation	Whilst no large trees currently exist on site, a number of tree stumps, including a large one in the grassed area behind the timber yard, are present, some smaller trees, shrubs and vegetation are present. If the weathered horizon of the Pennine Lower Coal Measures are cohesive then consideration may need to be given to deepening of foundations.		
Below Ground Structures	The site has a history of use and the usual utilities are anticipated. There were no obvious basements recorded on the property. A void was recorded in the western area, which comprised of a brick structure full of debris.		
Excavation Stability	Some Made Ground material is expected, which is likely to be unstable in unsupported excavations. Pennine Lower Coal Measures are likely to provide short term stability, however, they should not be relied upon in the long term.		

APPENDIX G

Estimates of surface water runoff rates and volumes from existing site

22/028: Cleckheaton Timber Yard

REFH2 estimates of surface water runoff rates and volumes from existing site

Description	Return period (yrs)	Urbanised peak flow (l/s)	Urbanised direct runoff (m ³)	As-rural peak flow (l/s)	As-rural direct runoff (m ³)
1 year	1	2.52	15.68	1.71	10.76
2 year	2	2.95	18.42	2.00	12.68
5 year	5	4.39	27.81	2.98	19.35
10 year	10	5.47	34.80	3.73	24.40
30 year	30	7.33	46.92	5.04	33.31
30 year 1.4 CC	30	10.43	67.24	7.29	48.66
50 year	50	8.31	53.35	5.75	38.12
75 year	75	9.19	59.11	6.38	42.46
100 year	100	9.87	63.60	6.89	45.88
100 year 1.45 CC	100	14.70	95.43	10.51	70.69
200 year	200	11.77	76.11	8.29	55.50
1000 year	1000	17.93	116.88	13.02	87.95

APPENDIX H

Details of Hydro Brake

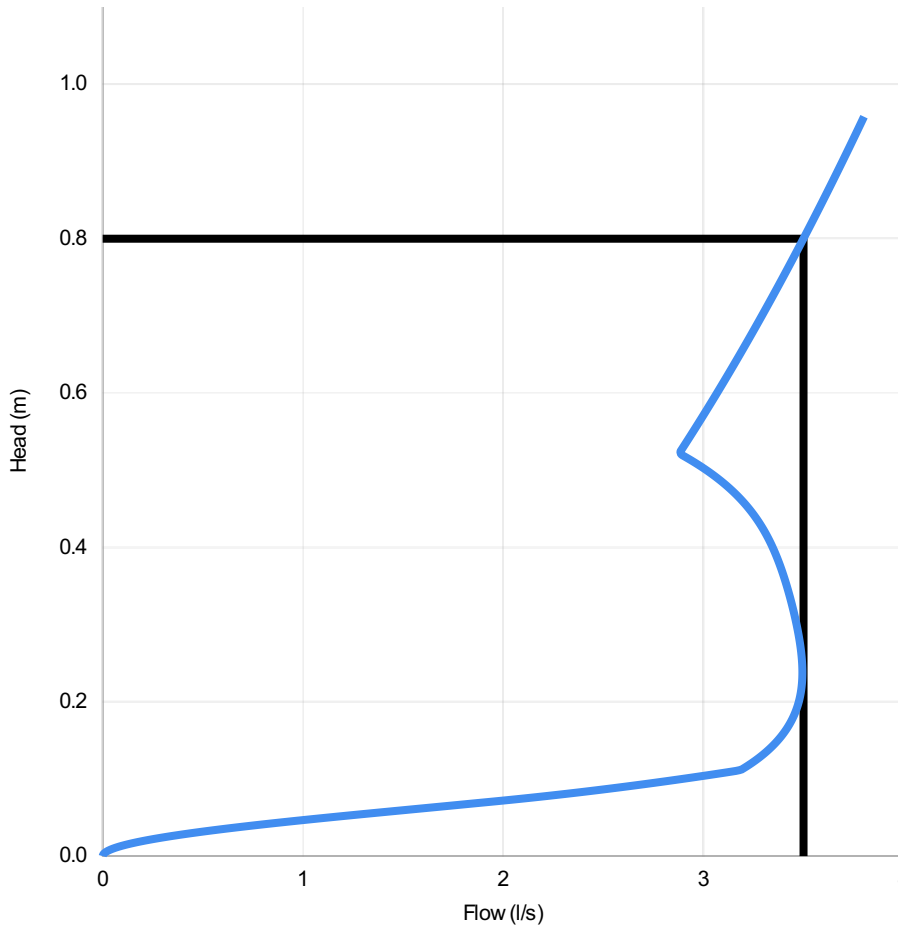
Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	0.800	3.500
Flush-Flo	0.238	3.494
Kick-Flo®	0.521	2.877
Mean Flow		3.032



PT/329/0412

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Head (m)	Flow (l/s)
0.000	0.000
0.028	0.384
0.055	1.328
0.083	2.383
0.110	3.177
0.138	3.326
0.166	3.417
0.193	3.468
0.221	3.491
0.248	3.493
0.276	3.482
0.303	3.462
0.331	3.437
0.359	3.406
0.386	3.369
0.414	3.320
0.441	3.254
0.469	3.162
0.497	3.035
0.524	2.885
0.552	2.953
0.579	3.019
0.607	3.084
0.634	3.147
0.662	3.209
0.690	3.269
0.717	3.329
0.745	3.387
0.772	3.444
0.800	3.499

DESIGN ADVICE

The head/flow characteristics of this SHE-0092-3500-0800-3500 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.



DATE	13/12/2022 13:16
Site	Cleckheaton Timber Yard
DESIGNER	John O'Connor
Ref	22/028

SHE-0092-3500-0800-3500
Hydro-Brake Optimum®

Technical Specification

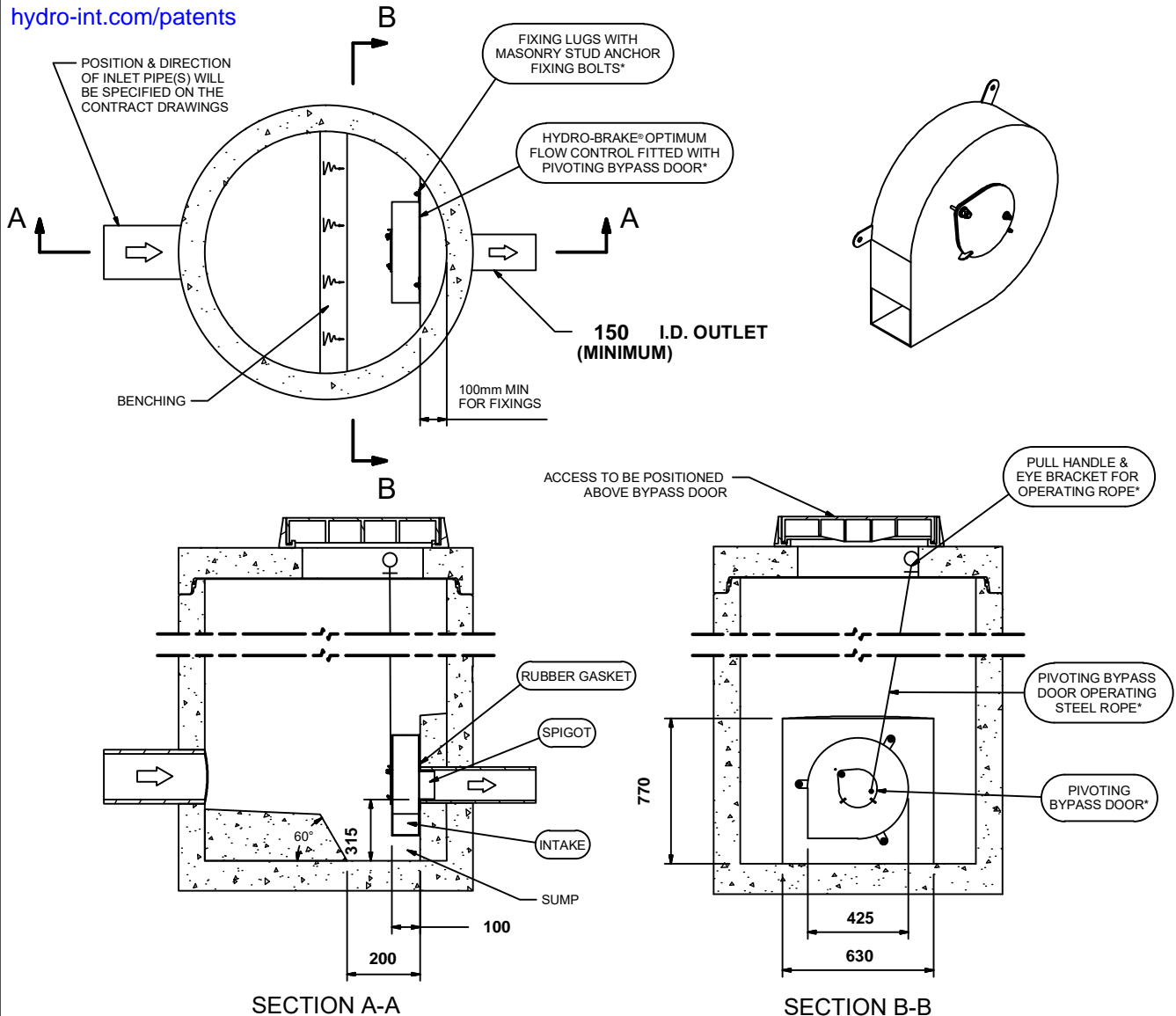
Control Point	Head (m)	Flow (l/s)
Primary Design	0.800	3.500
Flush-Flo™	0.238	3.494
Kick-Flo®	0.521	2.877
Mean Flow		3.032

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: 10 kg



hydro-int.com/patents



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-0092-3500-0800-3500 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	13/12/2022 13:16
SITE	Cleckheaton Timber Yard
DESIGNER	John O'Connor
REF	22/028

SHE-0092-3500-0800-3500
 Hydro-Brake® Optimum

APPENDIX I

Critical rainfall duration calculations and attenuation storage requirements

North west catchment

South east catchment

Post-development run-off from ground level area: 3.3% A.E.P. rainfall event including 40% CCA									
Duration hours	Rainfall at Site mm	Area (m ²)			Volume (m ³)			Controlled run off m ³	Required storage m ³
		Impervious Area (ha)	Pervious Area (ha)	Total Area (ha)	Impervious Area	Pervious Area	Run-off Volume		
		C _v 100.0%	C _v 40.0%					Controlled rate (l/s) 3.50	
0.00	0.0	0.06	0.03	0.09	0.00	0.00	0.00	0.00	0.00
0.25	15.2	0.06	0.03	0.09	9.19	0.00	9.19	3.15	6.04
0.50	20.2	0.06	0.03	0.09	12.24	0.00	12.24	6.30	5.94
1.00	25.7	0.06	0.03	0.09	15.56	0.00	15.56	12.60	2.96
2.00	33.8	0.06	0.03	0.09	20.49	0.00	20.49	25.20	0.00
3.00	39.0	0.06	0.03	0.09	23.63	0.00	23.63	37.80	0.00
4.00	43.4	0.06	0.03	0.09	26.28	0.00	26.28	50.40	0.00
6.00	50.7	0.06	0.03	0.09	30.72	0.00	30.72	75.60	0.00
8.00	54.7	0.06	0.03	0.09	33.16	0.00	33.16	100.80	0.00
12.00	61.0	0.06	0.03	0.09	37.00	0.00	37.00	151.20	0.00
Total Storage Requirement (m ³)									6.04

Post-development run-off from ground level area: 1% A.E.P. rainfall event including 45% CCA									
Duration hours	Rainfall at Site mm	Area (m ²)			Volume (m ³)			Controlled run off m ³	Required storage m ³
		Impervious Area (ha)	Pervious Area (ha)	Total Area (ha)	Impervious Area	Pervious Area	Run-off Volume		
		C _v 100.0%	C _v 40.0%					Controlled rate (l/s) 3.50	
0.00	0.0	0.06	0.03	0.09	0.00	0.00	0.00	0.00	0.00
0.25	20.8	0.06	0.03	0.09	12.59	0.00	12.59	3.15	9.44
0.50	27.9	0.06	0.03	0.09	16.91	0.00	16.91	6.30	10.61
1.00	35.8	0.06	0.03	0.09	21.68	0.00	21.68	12.60	9.08
2.00	46.5	0.06	0.03	0.09	28.19	0.00	28.19	25.20	2.99
3.00	53.3	0.06	0.03	0.09	32.32	0.00	32.32	37.80	0.00
4.00	59.0	0.06	0.03	0.09	35.79	0.00	35.79	50.40	0.00
6.00	68.6	0.06	0.03	0.09	41.57	0.00	41.57	75.60	0.00
8.00	73.6	0.06	0.03	0.09	44.61	0.00	44.61	100.80	0.00
12.00	81.2	0.06	0.03	0.09	49.24	0.00	49.24	151.20	0.00
Total Storage Requirement (m ³)									10.61

Post-development run-off from ground level area: 3.3% A.E.P. rainfall event including 40% CCA									
Duration hours	Rainfall at Site mm	Area (m ²)			Volume (m ³)			Controlled run off m ³	Required storage m ³
		Impervious Area (ha)	Pervious Area (ha)	Total Area (ha)	Impervious Area	Pervious Area	Run-off Volume		
		C _v 100.0%	C _v 40.0%					Controlled rate (l/s) 3.50	
0.00	0.0	0.16	0.14	0.30	0.00	0.00	0.00	0.00	0.00
0.25	15.2	0.16	0.14	0.30	24.39	0.00	24.39	3.15	21.24
0.50	20.2	0.16	0.14	0.30	32.48	0.00	32.48	6.30	26.18
1.00	25.7	0.16	0.14	0.30	41.31	0.00	41.31	12.60	28.71
2.00	33.8	0.16	0.14	0.30	54.40	0.00	54.40	25.20	29.20
3.00	39.0	0.16	0.14	0.30	62.73	0.00	62.73	37.80	24.93
4.00	43.4	0.16	0.14	0.30	69.76	0.00	69.76	50.40	19.36
6.00	50.7	0.16	0.14	0.30	81.54	0.00	81.54	75.60	5.94
8.00	54.7	0.16	0.14	0.30	88.01	0.00	88.01	100.80	0.00
12.00	61.0	0.16	0.14	0.30	98.21	0.00	98.21	151.20	0.00
Total Storage Requirement (m ³)									29.20

Post-development run-off from ground level area: 1% A.E.P. rainfall event including 45% CCA									
Duration hours	Rainfall at Site mm	Area (m ²)			Volume (m ³)			Controlled run off m ³	Required storage m ³
		Impervious Area (ha)	Pervious Area (ha)	Total Area (ha)	Impervious Area	Pervious Area	Run-off Volume		
		C _v 100.0%	C _v 40.0%					Controlled rate (l/s) 3.50	
0.00	0.0	0.16	0.14	0.30	0.00	0.00	0.00	0.00	0.00
0.25	20.8	0.16	0.14	0.30	33.41	0.00	33.41	3.15	30.26
0.50	27.9	0.16	0.14	0.30	44.89	0.00	44.89	6.30	38.59
1.00	35.8	0.16	0.14	0.30	57.55	0.00	57.55	12.60	44.95
2.00	46.5	0.16	0.14	0.30	74.82	0.00	74.82	25.20	49.62
3.00	53.3	0.16	0.14	0.30	85.78	0.00	85.78	37.80	47.98
4.00	59.0	0.16	0.14	0.30	95.00	0.00	95.00	50.40	44.60
6.00	68.6	0.16	0.14	0.30	110.35	0.00	110.35	75.60	34.75
8.00	73.6	0.16	0.14	0.30	118.40	0.00	118.40	100.80	17.60
12.00	81.2	0.16	0.14	0.30	130.69	0.00	130.69	151.20	0.00
Total Storage Requirement (m ³)									49.62

APPENDIX J

Catchment areas

Gross area within red line application site boundary 3900.00 m²

Existing site

Impervious areas:

ID	Description	Area m ²
1	Saw mill building	156.65
2	Shed	35.74
3	Tarmac drive	146.85
4	Garage	33.93
5	Shed	7.75
6	Wood storaye/Office/Lean-to	273.24
7	Entrance tarmac driveway	139.40
8	House No 1008 Halifax Road	70.95
	Total impervious area:	<hr/> 864.51
	% impervious	22.17%
	% pervious	<hr/> 77.83%
		100.00%

NW Catchment		m ²
	Total area	863.92
A	Plots 1 to 3 inclusive	168.88
A1		3.52
A2	Paths	3.52
A3	Paths	3.52
A4	Paths	6.84
A5	Paths	7.01
A6	Paths	7.17
B	NW access road and parking areas	405.73
	Total impervious area	606.18
	Total pervious area	257.74

SE Catchment		
	Total area	3036.08
A7	Shed x 10	51.70
A8	Perimeter path at plots 4 & 5	189.78
	Less soft landscaping area	-3.76
	Less soft landscaping area	-16.15
	Less soft landscaping area	-3.39
	Less building: Plots 4 & 5	-112.41
		54.07
A9	Path x 2	4.52
A10	Path x 2	24.78
A11	Path x 1	19.67
C	Plots 4 & 5	112.41
C1	Garage x 2	47.50
D	Plots 6 & 7	180.34
E	Plots 8 & 9	127.26
F	Garage	43.54
G	Plot 10	70.95
H	SE access road and drives	872.20
	Total impervious area	1608.94
	Total pervious area	1427.14

NW & SE areas

2215.12

APPENDIX K

Attenuation storage tank calculations

22/028: Cleckheaton Timber Yard

APPENDIX K: Attenuation storage calculations: NW catchment

YW Permitted discharge rate l/s	3.50 l/s	
Required storage for 3.3% AEP_40% CCA	6.04 m ³	
Required storage for 1% AEP_45% CCA	10.61 m ³	
Assume storm cells		
Height	0.43 m	
% Voids	95.00%	
Required gross volume: 3.3%_40% CCA	6.36 m ³	
Required gross volume: 1%_45% CCA	11.17 m ³	
Required area	25.98	
Available Width	3.50	
Required length	7.42	
<u>Actual dimensions</u>		
Width	3.50	
Length	7.50	
Height	0.43	
Gross volume	11.29	
Net volume	10.72	101.05% OK

22/028: Cleckheaton Timber Yard

APPENDIX K: Attenuation storage calculations: SE catchment

YW Permitted discharge rate l/s	3.50 l/s	
Required storage for 3.3% AEP_40% CCA	29.20 m3	
Required storage for 1% AEP_45% CCA	49.62 m3	
Assume storm cells		
Height	0.60 m	
% Voids	95.00%	
Required gross volume: 3.3%_40% CCA	30.74 m3	
Required gross volume: 1%_45% CCA	52.23 m3	
Required area	87.05 m2	
Available Width	11.00 m2	
Required length	7.91 m2	
<u>Actual dimensions - Tank 1</u>		
Width	4.50	
Length	11.00	
Height	0.60	
Gross volume	29.70	
Net volume	28.22	56.86%
Residual volume	21.40	
<u>Oversized pipe between S1 & S2</u>		
Diameter	0.60 m	
CSA per m	0.28 m2	
Length	20.46 m2	
Volume	5.78 m3	
Residual volume	15.62 m3	
<u>Actual dimensions - Tank 2</u>		
Width	4.50	
Length	6.50	
Height	0.60	
Gross volume	17.55	
Net volume	16.67	
Residual volume	-1.05 m3	
Total net volume:	50.67	102.12% OK

End of Report