Eric Wright Construction Ltd.

Clitheroe Care Home

Drainage Strategy

220018-JPS-XX-XX-RP-C-0001

Rev: P04

March 2023

JPS CIVIL + STRUCTURAL ENGINEERS

Document History

JPS Job Number: 113001		Document Ref: 220018-JPS-XX-XX-RP-C-0001		
P04	Surface water drainage amended	JR	JP	14.06.2023
P03	Site layout amended	JR	JP	27.03.2023
P02	Additional information added	JR	JP	15.02.2023
P01	Drainage Strategy	JR	JP	09.02.2023
Revision	Purpose Description	Originated	Authorised	Date

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1 Introduction

1.1 Commission

JP Structural Design were appointed by Eric Wright Construction Ltd. to produce a Drainage Strategy for a new build care home with access and car parking area at Clitheroe, Lancashire.

1.2 Limitations

The findings of this Strategy have been based on data available at the time of the study and on the review of available information that has been undertaken to date. They relate to the current proposed layout as outlined in **Appendix A**. Should the proposed end use of the site change after the completion of this assessment, then the findings of this report will need to be reviewed and updated accordingly.

2 Existing Site and Proposed Development

2.1 Existing Site

The site is located on land off Dyke Nook, Clitheroe, Lancashire. The centre of the site is at National Grid Reference SD748407. The proposed site covers an area of approximately 0.990ha. See **Appendix B** for the Site Information Drawing.

The site is roughly triangular in shape and it is located to the south east of Clitheroe. The site is part of a wider proposed residential development within the area which will surround the site once completed. The site is currently agricultural land, there is a hedgerow in the north and a tree present in the centre of the site, there are no structures present.

A review of the topographical survey shows that the site falls in a northern direction. The survey indicates that the site has a high point of 103.850m (Above Ordnance Datum) AOD located in the south west of the site. The low point is located in the north west of the site at 101.300m AOD, with levels of 102.600m AOD and 103.280m AOD in the north east and south east corners respectively. Additionally, there is a 1.3-1.5m high earthworks mound located 15-20m from the west of the site boundary. The topographical survey of the site is provided in **Appendix C**.

2.2 Ground Conditions

The surface geology of the site has been reviewed from the British Geological Survey (BGS) online geology maps. The geology map indicates that the site is superficially underlain by "Till, Devensian - Diamicton. Sedimentary superficial deposit formed between 116 and 11.8 thousand years ago during the Quaternary period." The bedrock geology is described as "Clitheroe Limestone Formation and Hodder Mudstone Formation - Mudstone. Sedimentary bedrock formed between 346.7 and 337 million years ago during the Carboniferous period."

According to the Soilscapes soils dataset (http://www.landis.org.uk/soilscapes/), soil conditions at the site and within the surrounding area are slowly permeable seasonally wet acid loamy and clayey soils with impeded drainage.

E3P carried out soakaway testing on 19 December 2022 in accordance with BRE365 to determine infiltration rates of the site. A summary of the findings are provided in **Appendix D**. The testing was undertaken in three locations on site. The E3P report states the following:

"Within all three locations, soakaway testing failed, with the water level failing to soakaway below 75% effective storage. As such, soakaway drainage is not unlikely to be suitable on the site."

No groundwater was encountered within any of the exploratory holes.

2.3 Existing Waterbodies

There is an unnamed watercourse to the west of the site that discharges to Pendleton Brook.

There are no other water bodies within the immediate vicinity of the site.

2.4 Existing Drainage

Public sewer records obtained from United Utilities (UU) (refer to **Appendix E**) indicate that there are public sewers serving the existing residential areas to the north and west of the site but that there are no public sewers within the immediate vicinity of the site.

The site is undeveloped greenfield, given site topography and ground conditions, surface water runoff would be expected to flow overland in a north west direction.

The Coopers Chartered Consulting Engineers drawings 6263 / sp-a-03-1,2,3 and 4 for the Spine Road of Phase A of the wider development have been reviewed as part of this assessment (refer to **Appendix F**). The drawings indicate the following:

- A system comprising 300mm, 375mm and 450mm diameter surface water sewers situated within the proposed spine road as shown on the existing drainage layout in **Appendix G**. The system appears to discharge to the unnamed watercourse to the west of the site that ultimately discharges to Pendleton Brook.
- A system comprising 150mm, 225mm and 300mm diameter foul water sewers situated within the proposed spine road as shown on the existing drainage layout in **Appendix G**. The system appears to discharge to the 225mm / 300mm diameter public combined sewer situated within Littlemoor Road to the west of the site.

2.5 Existing Flood Risk

The Environment Agency Flood Map for Planning (Rivers and Sea) indicates the site is located in flood zone 1. Flood zones refer to the probability of river and sea flooding. Table 1 of the NPPG defines flood zones as follows:

- Flood zone 1: Low Probability. Land having a less than 1 in 1,000 annual probability of river or sea flooding.
- Flood zone 2: Medium Probability. Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.
- Flood zone 3a: High Probability. Land having a 1 in 100 or greater annual probability of river flooding or a 1 in 200 or greater annual probability of sea flooding.
- Flood zone 3b: Functional Floodplain. Land where water has to flow or be stored in times of flood.

The management of surface water run-off generated by the post development site will be the principal flood risk associated with this scheme, therefore reduction of any flood risk is discussed in Section 3 of this report.

2.6 Proposed Development

The scheme consists of the construction of a new 2 storey 68 bed care home over in Clitheroe. The development will include a new building, landscaped areas and vehicular parking area. See **Appendix A** for proposed site layout.

3 Drainage Proposals

3.1 Foul Drainage

The proposed peak foul discharge generated by the development has been calculated based upon an occupancy rate of 1.5 persons per 1 bedroom, (allowing for residents and support staff) which equates to 102 persons. Therefore, allowing a typical usage of 350 l/person/day over a 24-hour day with a peak factor of 6, generates a peak foul flow of 2.5 l/s.

As the existing site is greenfield the peak foul flows from the proposed development will be greater than the existing.

It is proposed to discharge foul flows from the site to the existing manhole F10 via the existing 150mm diameter spur connection currently present in the south of the site as indicated on the preliminary drainage layout presented in **Appendix H**.

3.2 Surface Water Drainage

It is acknowledged that the satisfactory collection, control and discharge of storm water is now a principle planning and design consideration. Part H of the Building Regulations 2002 recommends that surface water run-off 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.

It is necessary to identify the most appropriate method of controlling and discharging surface water. The design should seek to improve the local run-off profile by using systems that can either attenuate run-off and reduce peak flow rates or positively impact on the existing flood profile.

3.2.1 Ground Infiltration Techniques

As detailed in Section 2, infiltration testing has been undertaken by E3P in accordance with the guidelines in BRE365. However, within all three locations, soakaway testing failed. As such the disposal of surface water via infiltration has been discounted for the site.

3.2.2 Discharge To Watercourse

It is therefore proposed to discharge surface water runoff from the site to the existing manhole S11 via the existing 150mm diameter spur connection currently present in the south of the site. This is indicated on the preliminary drainage layout presented in **Appendix H.** The existing system discharges to the unnamed watercourse to the west of the site that ultimately discharges to Pendleton Brook.

3.3 Surface Water Calculations

3.3.1 Proposed Discharge Rate

The greenfield runoff rate for the existing area have been calculated using the "Pre-development discharge" function of Causeway Flow. The following parameters were used in the calculation.

- The site has a total area of 0.990ha; however, the proposed developable area is taken as approximately 0.544ha. This excludes the areas of the site which are to remain undeveloped and are expected to continue to drain as existing (refer to **Appendix B)**.
- SAAR (Standard Annual Average Rainfall) = 1203mm, Soil Index = 4, SPR (Surface Precipitation Rate) = 0.47, Region = 10.

The peak discharges of surface runoff from impermeable areas of the existing site are shown in the table 1 below:

Above Exceedance Probability of rainfall event	Existing Greenfield Runoff Rate (l/s)
1:1	4.2
QBAR	5.0
1:30	9.7
1:100	12.3

Table 1.0 – Peak Runoff Rate – Existing Site

It is proposed to restrict runoff from impermeable surfaces of the development to the existing greenfield QBAR rate of 5l/s.

3.3.2 Attenuation Storage

Attenuation storage will be provided to restrict surface water runoff generated across roofs and hardstanding.

The attenuation storage facility has been modelled using Causeway Flow (refer to **Appendix I**). The required storage volume has been sized to store the 1:100 rainfall event including a 50% increase in rainfall intensity to allow for climate change in accordance with Lead Local Flood Authority guidance. Based on a peak discharge rate of 5l/s, a total storage volume of 301m³ would be required. It is proposed that this storage is provided in a geo-cellular attenuation tank with a plan area of 198m² and a depth of 1.6m.

The proposed attenuation tank is to be located within the car park area to the south of the proposed building.

Additional storage is provided in the proposed network of pipes and manholes. A preliminary surface water drainage layout is provided in **Appendix H**.

4 Planning Requirements

4.1 Water Quality

The proposed sump gullies and proposed vortex flow control catch pit manhole are deemed to be sufficient to remove the suspended sediments from the roof and car park surface water for a development of this size and nature.

4.2 Exceedance Events

Flooding is not expected to occur in the 1:100 year rainfall event plus 50% climate change for the site. It is anticipated that flood flows from rainfall events above this will be directed towards the access road and car parking areas respectively, with the site being profiled to ensure that flood flows are directed away from built development.

4.3 O&M Manuals

During the detail design stage & construction, full details of the final design will be submitted and included in the O&M manuals to ensure the drainage system is regularly maintained with particular regards to the surface water system. This will include manufacturer's guidelines for maintenance and replacement and full details of the flow control device as well as means to operate the drain down features in a blockage situation.

5 Conclusions

The proposed development is not expected to be affected by general objections in respect to draining the site. There will be suitable conditions imposed to ensure that the drainage proposals are designed and constructed in accordance with relevant statutory requirements, including Building Regulations 2010 and the requirements of Lancashire Lead Local Flood Authority.

Appendix A – Proposed Layout

BOUNDARY TREATMENTS KEY:

LOW HEIGHT STONE WALL

1800MM HIGH METAL HOOP TOP RAILINGS

1800MM HIGH CLOSE BOARDED TIMBER FENCE

EXISTING GREEN MESH FENCE TO SCHOOL BOUNDARY

HEDGING

NEW 1800MM HIGH MESH FENCING

NOTE: PLAN PRODUCED USING ALMAGATED INFORMATION FROM PLANNING APPLICATIONS:

21/0957
22/0116
21/0951

AND SUBJECT TO CHANGE.

PLEASE SEE DRAWING BY SUMO SERVICES SU-MO-10800 FOR LEVEL INFORMATION WITHIN RED LINE BOUNDARY.

NOTE: For final landscaping proposals refer to TEL Landscape drawings ref MR22-142/101 & MR22-142/102.

DRAWING REVISIONS

REV	DESCRIPTION	DATE	BY	CHK
A	Drawings updated to suit general comments from client. Amendments include riser positions being indicated, additional doors being added & re-conguigaration of the servery and dining layout.	18.01.23	JA	TE
B	Service road redcued to single lane at a width of 3.7m. Additional path added at the side of service road for staff access.	10.02.23	JA	TE
C	Close boarded fencing to the east boundary omitted and replaced with metal mesh fencing. Change made to suit client comments.	20.02.23	JA	TE
D	Proposed sub-station location indicated on drawing in green hatch with annotation & dimensions to suit.	07.03.23	JA	TE
E	Footpath location amended	16.03.23	JA	TE
F	General amendments made including wall vent locations indicatively shown on drawing. PV panel numbers updated as guided by M&E Consultant. Landscaping co-ordinated to suit TEL Landscape drawings.	24.03.23	JA	TE

NOTES

DO NOT SCALE, USE FIGURED DIMENSIONS ONLY.

ALL DIMENSIONS TO BE VERIFIED ON SITE PRIOR TO THE COMMENCEMENT OF ANY WORK OR THE PRODUCTION OF ANY SHOP DRAWING. ALL DISCREPANCIES TO BE REPORTED TO THE ARCHITECT.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELATED ARCHITECTS AND ENGINEERS DRAWINGS AND ANY OTHER RELEVANT INFORMATION.

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CLIENT
Eric Wright Group

PROJECT
Proposed Care Home, Standen
Central Site, Clitheroe

DRAWING TITLE
Proposed Site Plan

DWA PROJECT NO.	DWA DWG NO.	REV
G5709	192	F

DRAWING STATUS
PLANNING

SCALE	DATE	DRAWN BY	CHECKED BY
As indicated @ A1	21.12.22	JA	TE

BIM JOB NO. 220018
SUITABILITY CODE
SUITABILITY DESCRIPTION

DOCUMENT NAME (BS EN ISO 19650)
220018-DWA-XX-XX-DR-A-192-F-Proposed Site Plan

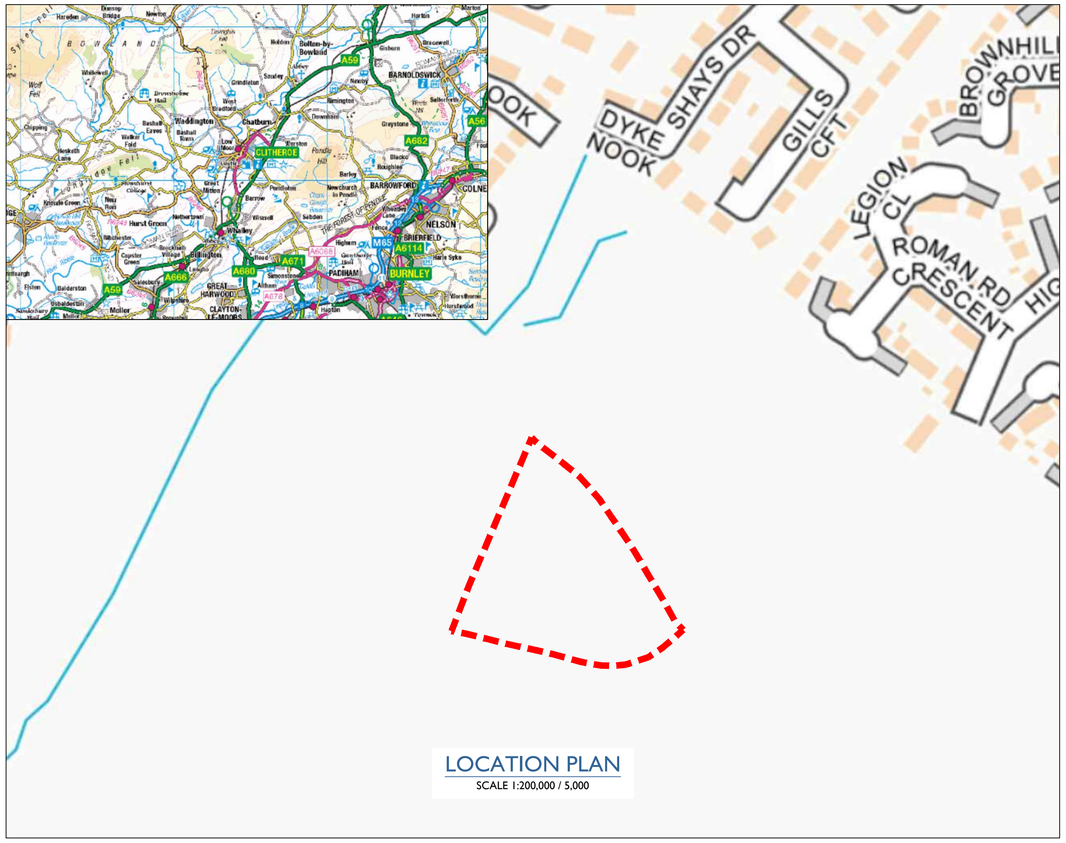
Proposed Site Plan

1 : 500

VISUAL SCALE 1:500

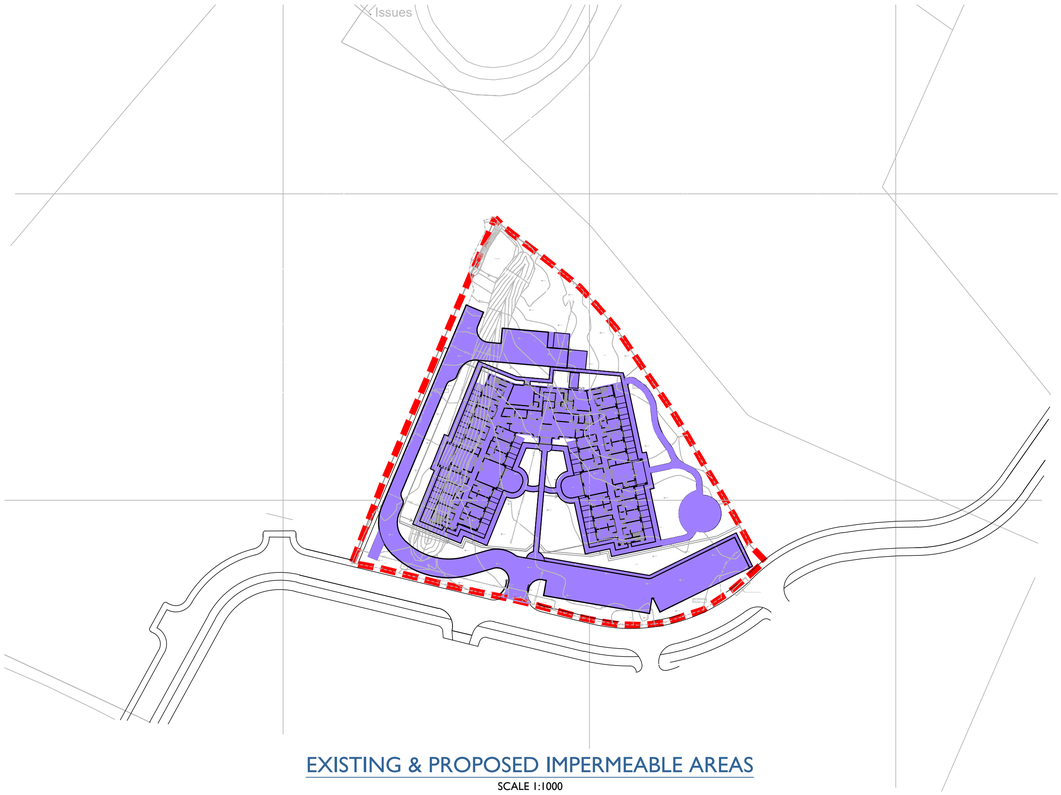
0m 10m 20m 30m 40m 50m

Appendix B – Site Information Drawing



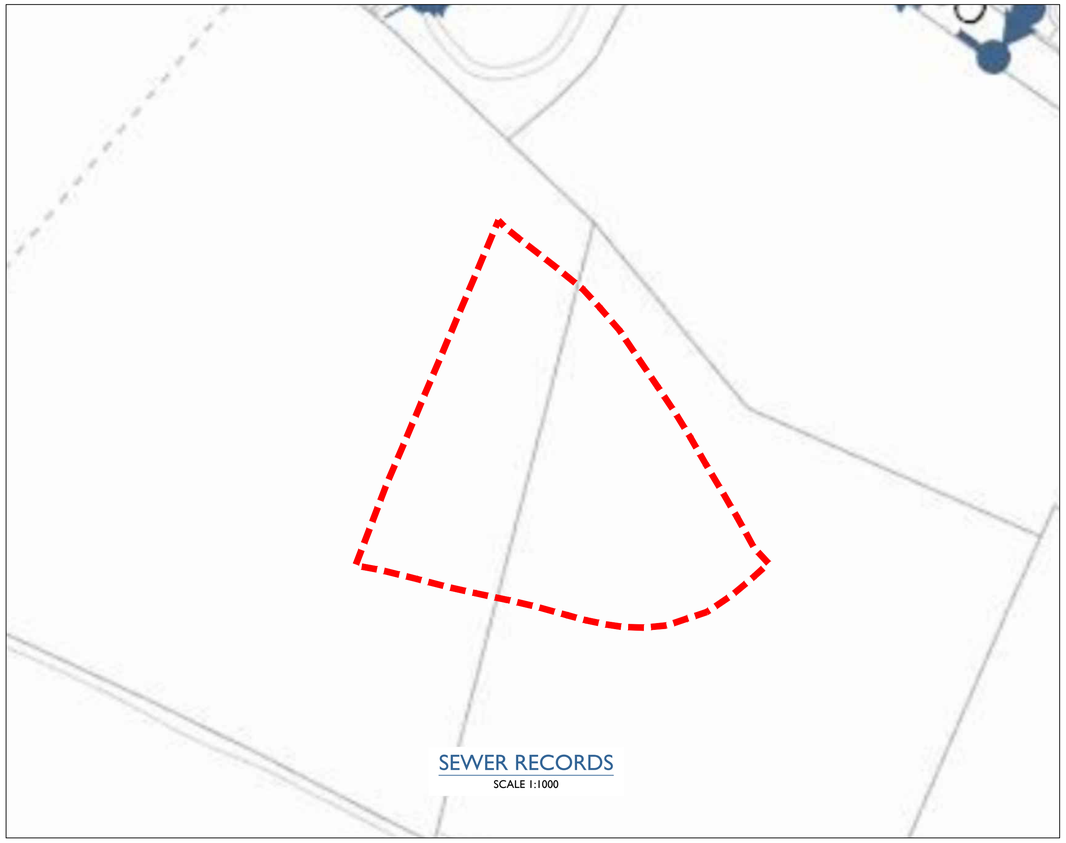
LOCATION PLAN

SCALE 1:200,000 / 5,000



EXISTING & PROPOSED IMPERMEABLE AREAS

SCALE 1:1000



SEWER RECORDS

SCALE 1:1000

SATELITE IMAGE OF THE SITE

SCALE 1:1000

NOTE

1. DO NOT SCALE FROM THIS DRAWING, WORK FROM FIGURED DIMENSIONS ONLY. ALL DIMENSIONS ARE IN MILLIMETRES AND ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM U.N.O.

2. NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING WILL BE ALLOWED WITHOUT THE PRIOR PERMISSION IN WRITING.

3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALIST DRAWINGS AND SPECIFICATIONS.

SITE CO-ORDINATES

OS X (Eastings)	374889
OS Y (Northings)	440726
Nearest Post Code	BB7 1FZ
Nat Grid	SD748407 / SD7488940726

AREAS

SITE BOUNDARY
9,900m² (0.990 ha)

ADDITIONAL IMPERMEABLE AREA
5,440m² (0.544 ha)

REV	DESCRIPTION	BY	CHK	APR	DATE
P02	SITE LAYOUT AMENDED	JR	RH	MM	27.03.2023

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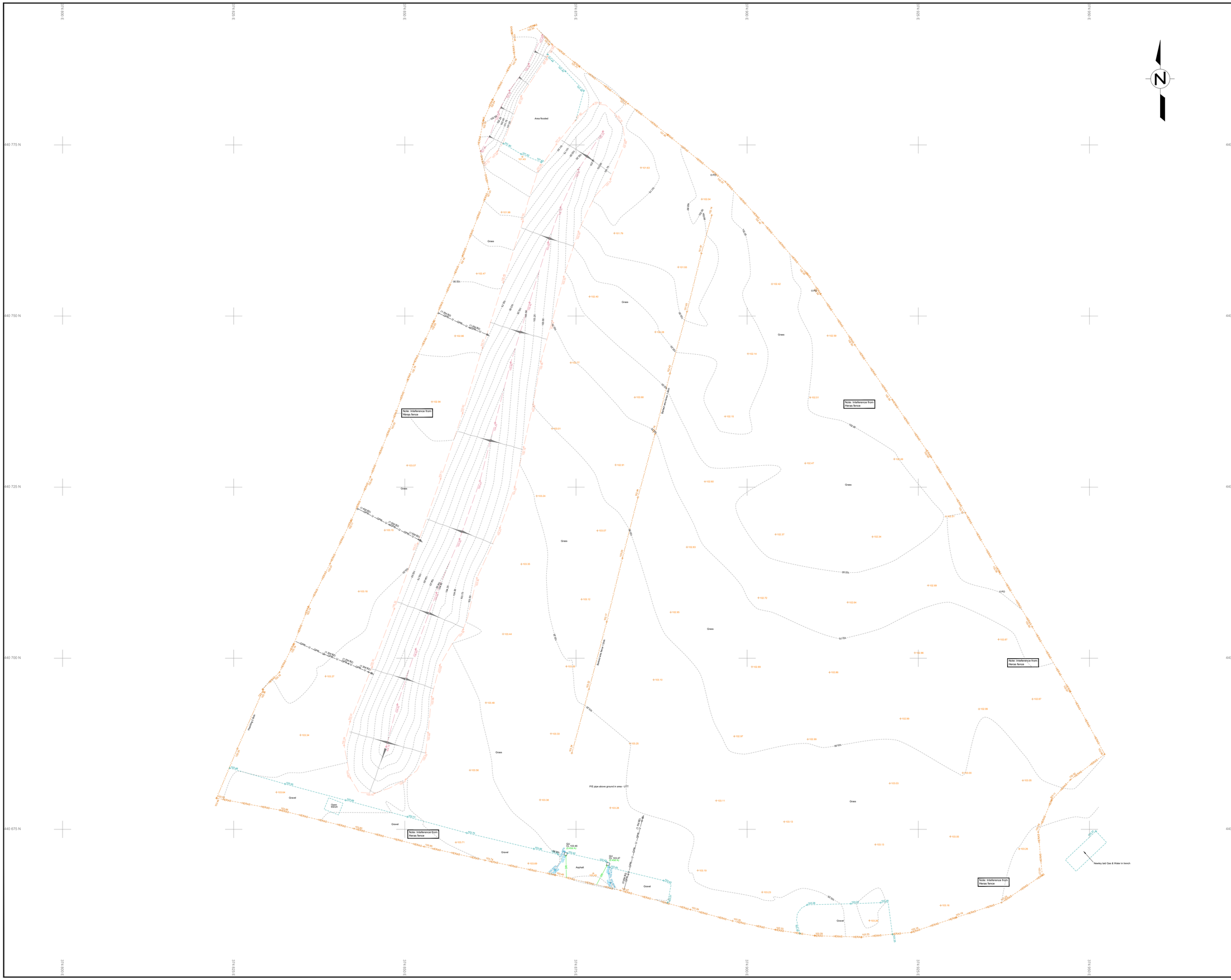
PURPOSE OF ISSUE: STAGE 2	STATUS: S2
PROJECT: CLITHEROE CARE HOME	
TITLE: DRAINAGE SCHEME SITE INFORMATION	
CLIENT: ERIC WRIGHT CONSTRUCTION LTD	
DRAWN BY: JR	CHECKED BY: RH / APPROVED BY: MM
DATE: 08.02.2023	SCALE (@ A1): AS SHOWN / PROJECT NUMBER: 113001
DRAWING NUMBER: 220018-JPS-ZZ-ZZ-DR-C-00500	REV: P02

Appendix C – Topographic Survey



TOPOGRAPHIC LEGEND

Barrier (symbol - sized)		Pipe into Ground (symbol)	
Bellaha Beacon (symbol)	BO	Post (symbol)	PO
Bollard (symbol)	RWP	Rain Water Pipe (symbol)	
Borehole (symbol)	RS	Road Sign (symbol)	
British Telecoms IC (sized)	BTIC	RE	Rodding Eye (symbol)
Building (incomplete detail)		Sapling (symbol)	
Cable into Ground (symbol)		SP	Sign Post (symbol)
Cable TV Box (symbol)	CTV	SL	Spot Light (symbol)
CCTV Camera (symbol)		00.00 +	Spot Height
Cover Level in metres	CL 50.00	SC	Stop Cock (symbol)
Direction of Flow (Drainage)		SV	Stop Valve (symbol)
Distribution Board (symbol)	DB		Survey Station (symbol)
Earth Rod (symbol)	ER	TP	Telephone Pole (symbol)
Electric Cabinet (sized)	EC	B	Traffic Bollard (symbol)
Electric Pole (symbol)	EP		Tree (dimensions in metres - e.g.)
Electric Sign (symbol)	ES	Dia. 0.3 Ht. 10.2 Maple	Diameter at 1mtr. (bole) Height Species:
Embankment Slope (symbol)			
Feeder Pillar (sized)	FP		Traffic Light (symbol)
Fire Hydrant (sized)	FH	UV	Unknown Valve (symbol)
Flag Pole (symbol)	FP	VP	Vent Pipe (symbol)
Flood Light (symbol)	FL		Wall
Gas Valve (symbol)	GV	WP	Waste Pipe (symbol)
Gate		WM	Water Meter (symbol)
Ground Level in metres	GL 50.00	WV	Water Valve (symbol)
Gulley (sized)	GU		
Inspection Cover (sized)	IC		Building Canopy
Invert Level in metres	IL 50.00		Crash Barrier
Junction Box - BT (sized)	JB BT	Drainage Channel	Drainage Channel
Junction Box - Comms (sized)	JB COM		Drop Kerb (level in metres)
Junction Box - Elec (sized)	JB		Edge Detail (level in metres)
Lamp Post (symbol)	LP		Footpath (level in metres)
Light Bollard (symbol)	LB		Fence
Light in ground (symbol)	LG	HERAS	Heras Fence
Manhole (sized)	MH		Kerb channel (m)
Manhole Capped Port			Kerb top (m)
Parapet Level (m)	PL 50.00	OHS	Overhead Service Line
Pipe Diameter (mm)	900		Pedestrian Railing

UTILITY LEGEND

UTILITY LINETYPES

BT	British Telecom	G	Gas
CATV	Cable Television	HP	Heating Pipes
CCTV	Closed Circuit Television	HV	HV Cables
C	Communications	MSR	Multiple Services Route
DR	Drainage	OIL	Oil
CW	Drainage - Combined Water	OXY	Oxygen
FW	Drainage - Foul Water	SL	Street Lighting
SW	Drainage - Storm Water	TSL	Traffic Signal Loop
ED	Empty Duct	GPR U	Unknown found by GPR
E	Electric	U	Unknown
FH	Fire Hydrant Main	UC	Unknown Cable
FO	Fibre Optic	UPL	Unknown Pipeline
FUEL	Fuel	W	Water

Assumed Service Route - See GENERAL NOTES
(Using abbreviation of service and colour as above)

ASR XXX ASR XXX

UTILITY SURVEY INFORMATION

AOC	Area of Concern	UTS	Unable to Survey
BUY AREA	Contracted Survey Area	UTL	Unable to Lift (cover)
PREVIOUS	Previous Survey Area		Unable to Trace
GPR Survey	Post processed GPR Area		Unable to Trace (due to blockage)
(0.60d)	Depth to Top of Service (m)		Unable to Trace Further
			End of Trace

ABREVIATIONS used on a PAS 128 Survey

(O.65d B2P) 0.65d = Depth in metres, B2 = Quality Level, P = Post processed GPR

GENERAL NOTES

Irrespective of the information provided by a utility survey and statutory plans, excavation work should be undertaken with extreme caution and in accordance with HSE Guidelines - HSG47 Avoiding Danger from Underground Services

Only sub-surface utility information is provided. Above ground utility information may be shown where it assists with positional referencing.

Utilities may continue outside of the survey area. Any paint marks outside of the area are for investigative purposes only and may not represent the full extent of the sub-surface utilities.

Where logic indicates a utility exists but which cannot be positively confirmed with the technology, an assumed route (ASR) is recorded. All assumed service routes (ASR) have been highlighted with a background yellow colour for visual enhancement.

Sewer and manhole details shown on this drawing have been obtained by observation and measurement from the surface and as such cannot be guaranteed

Vertical & Horizontal Position - Vertical position (depth) is indicative to the top of the utility/feature and is recorded as (x.xxd) i.e. (1.25d) - (depth to top of service) and should not be taken as exact, as this could be the surround to the service rather than the service itself. Where depth information from the technology is unclear, depth is not shown. Drains and pipes/ducts may have been detected using threading and the depth indicated could be between the top (soffit) and the bottom (invert). Horizontal position is indicative to the centre of the utility/feature and should not be taken as exact.

Warranty - Biodegradable paints are used to mark-out the position of the utilities. Markings may become illegible quickly depending on ground, weather and traffic conditions. No warranty is given in respect of the durability of the paint markings and that they are a complete representation of the sub-surface utilities, therefore, this drawing should be used as the primary reference for the survey results.

This drawing does not provide an absolute representation of the sub-surface. Utilities have been detected using non-invasive techniques only and the performance can be adversely affected by ground, weather and site conditions outside of SUMO's control, therefore, some utilities may be undetectable. While SUMO uses reasonable endeavours to detect all utilities, it does not warrant that 100% detection will be achieved and that approximate depth penetration of the technologies SUMO uses will not be greater than two metres.

Rev	Notes	Drawn	Date

Notes:

Survey is referenced to OS Grid and Level Datum.

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Title:
Utilities & Topographical Details

Client:
Eric Wright Construction Ltd

Project:
Standen Hall, Clitheroe, Lancashire

Date Completed:	06 December 2022	Post Code:	BB7 1PR

Surveyed:	TB, RW	Scale:	1/250 (A1 Sheet)
Drawn:	PC		
Checked:	RW		

Dwg No:	Job No:	Rev:
Sheet 01	SU<MO-10800=1	

Appendix D – Soakaway Test Summary

3.12. SOIL INFILTRATION

In-situ BRE 365 Soakaway tests were undertaken within trial pits completed as SA101-SA103.

The results are presented in Table 3.7 below and the test certificates are included within Appendix IX.

TABLE 3.7 BRE365 SOAKAWAY TESTING RESULTS

LOCATION	DEPTH (m)	MATERIAL	TEST NO.	SOIL INFILTRATION RATE (m/s)
SA101/TP101b	2.10	Gravelly CLAY	Test No.1	N/A
SA102/TP102	1.70	Slightly sandy gravelly CLAY	Test No.1	N/A
SA103/TP103	1.90	Sandy gravelly CLAY	Test No.1	N/A

All three tests did not record a sufficient fall in water level to allow reliable calculation of the infiltration rate.

The tests suggest the cohesive drift deposits are unlikely to be suitable for soakaway drainage.

However, the application of soakaway drainage will ultimately be dependent on the specific requirements of the development. All soakaways should be designed in accordance with BRE Special Digest 365 – *Soakaway Design*.

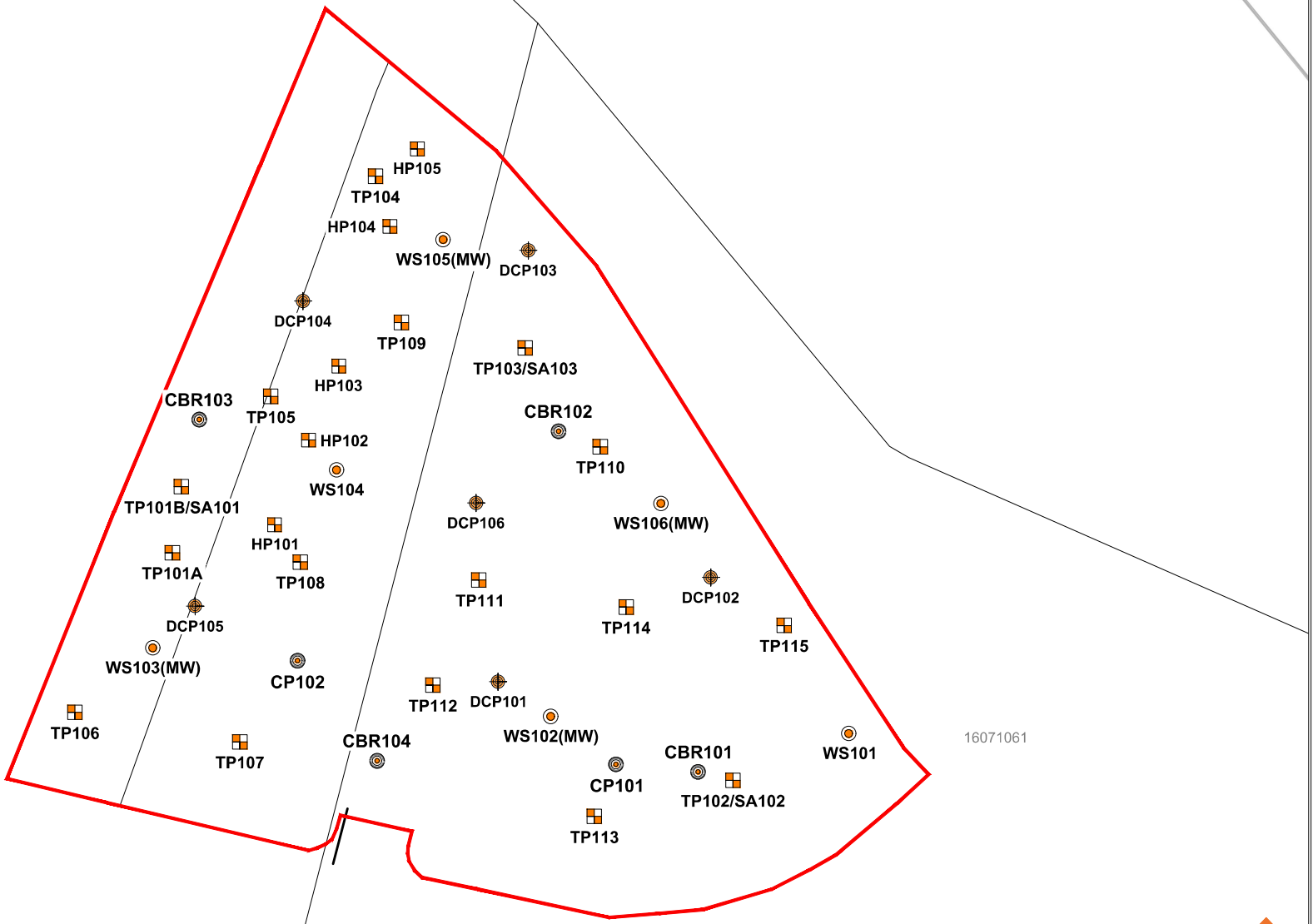
3.13. SOIL PLASTICITY

The Atterberg limits determinations, summarised in Table 3.8, show the clay to be of predominantly low plasticity with discrete areas of moderate plasticity clay.

TABLE 3.8 SUMMARY OF PLASTICITY INDEX TEST RESULTS

LOCATION	DEPTH (m)	NATURAL MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	PASSING 425 µm SIEVE (%)	MODIFIED PLASTICITY INDEX	NHBC VOLUME CHANGE POTENTIAL
WS104	1.00	13	14	29	15	62	9.3	Low
WS105	1.00	16	15	32	17	64	10.88	Low
WS102	2.00	16	13	27	14	60	8.4	Low
WS101	2.00	14	15	31	16	73	11.68	Low
CP101	5.00	11	13	28	15	64	9.6	Low
CP102	1.20	30	23	47	24	89	21.36	Medium
CP102	3.00	11	13	27	14	65	9.1	Low

The results of the Atterberg limits testing confirmed that the soils would be deemed to be "Low Potential" in accordance with the classification system utilised by the LABC/NHBC industry guidance.



Location Symbols

- Approximate Window Sample Probehole Location
- Approximate Trial Pit Location
- Approximate Cable Percussive Borehole Location
- Approximate Soakaway Test Location
- Approximate Hand Dug Pit Location
- Approximate California Bearing Ratio Test Location
- Approximate Dynamic Cone Penetrometer Test Location

Notes:

Phase	Issue	Date	Drawn	Checked
P1	REVB	06.02.2023	OW	EC
P1	REVA	16.12.2022	OW	EC

Client: Eric Wright

Job No: 16-499

Date: 06.02.2023

Drawing No: 005

Scale: NTS @ A3

Job Title: Standen Central

Drawing Title: Exploratory Hole Location Plan

e3p
Environmental Engineering Partnership Ltd
Taylor Road, Trafford Park
Urmston, Manchester, M41 7JQ
Tel: 0161 707 9612
E-mail: info@e3p.co.uk
Website: www.e3p.co.uk

Trial Pit Log

TrialPit No SA101/ TP101b
Sheet 1 of 1

Project Name: Standen Central	Project No. 16499	Co-ords: 374848.00 - 440718.00 Level:	Date 19/12/2022
Location: Clitheroe		Dimensions (m): 1.90 × 0.70 Depth 2.10	Scale 1:30
Client: Eric Wright			Logged E. Canham

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.20			Brown sandy CLAY with occasional rootlets. (Topsoil)
							Very stiff greyish brown mottled orange sandy gravelly CLAY with frequent cobbles and occasional boulders. Gravel is fine to coarse subangular to subrounded of mudstone. Cobbles and boulders are subrounded mudstone.
				2.10			End of Pit at 2.10m

1
2
3
4

Trial Pit Photographs

Soakaway 101/ Trial Pit 101b

Soakaway 101/ Trial Pit 101b Spoil

Remarks: 1. Complete 2. Soakaway test completed

Stability: Stable.

Trial Pit Log

TrialPit No SA102/ TP102
Sheet 1 of 1

Project Name: Standen Central	Project No. 16499	Co-ords: 374927.00 - 440675.00 Level:	Date 19/12/2022
Location: Clitheroe		Dimensions (m): 1.90 × 0.70 Depth 1.70	Scale 1:30
Client: Eric Wright			Logged E. Canham

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
				0.30			Dark brown silty sandy CLAY with occasional rootlets. (Topsoil)
	0.60	HVP	66				Firm light brown slightly silty slightly sandy CLAY with occasional rootlets.
	0.80	ES		1.00			Firm to stiff dark greyish brown slightly sandy gravelly CLAY with frequent cobbles and occasional boulders. Gravel is fine to coarse subangular to subrounded of mudstone. Cobbles and boulders are subrounded mudstone.
				1.70			End of Pit at 1.70m

1
2
3
4

Trial Pit Photographs

Soakaway 102/ Trial Pit 102

Trial Pit 102/ Soakaway 102 Spoil

Remarks: 1. Complete 2. Soakaway test completed

Stability: Stable.

Trial Pit Log

TrialPit No SA103/ TP103
Sheet 1 of 1

Project Name: Standen Central	Project No. 16499	Co-ords: 374901.00 - 440746.00 Level:	Date 19/12/2022
Location: Clitheroe		Dimensions (m): Depth 1.90 — 1.90 × 0.70	Scale 1:30
Client: Eric Wright			Logged E. Canham

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.25	ES		0.30			Dark brown silty sandy CLAY with occasional rootlets. (Topsoil)
	0.50	HVP	98	0.60			Firm to stiff greyish brown mottled orange slightly silty sandy CLAY with occasional rootlets.
				1.90			Very stiff greyish brown sandy gravelly CLAY with frequent cobbles and occasional large boulders. Gravel is fine to coarse subrounded to rounded of mudstone. Cobbles and boulders are subrounded of mudstone.
							End of Pit at 1.90m

1 2 3 4

Trial Pit Photographs

Trial Pit 103/ Soakaway 103

Soakaway 103/ Trial Pit 103 Spoil

Remarks: 1. Complete 2. Soakaway test completed

Stability: Stable.

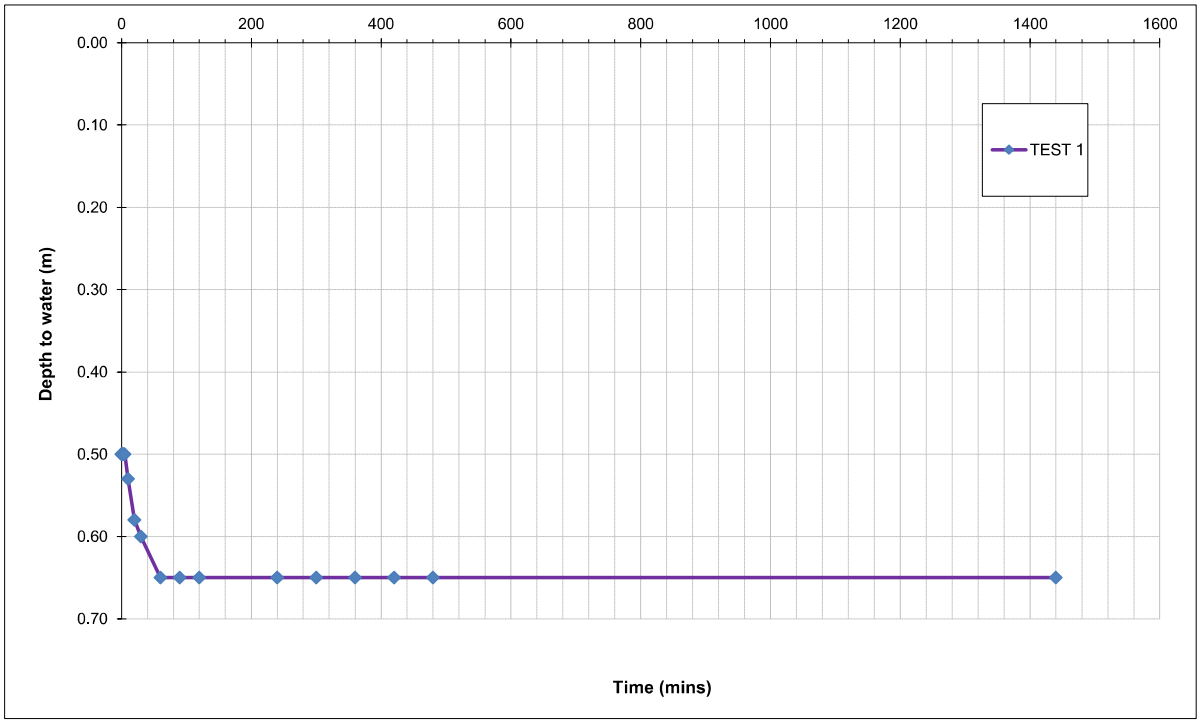
	Site:	Standen Central	**Trial Pit Number:** 101
	Job Number:	16-499	**Length:** 2.00 m
	Date of Test:	19/12/2022	**Width:** 0.60 m
			Depth: 1.90 m
			Groundwater Level: N/A m

Test 1 did not reach 75% or 25% effective storgae depth, therefore an infiltration rate could not be calculated.

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0	0.50				
1	0.50				
2	0.50				
3	0.50				
4	0.50				
5	0.50				
10	0.53				
20	0.58				
30	0.60				
60	0.65				
90	0.65				
120	0.65				
240.00	0.65				
300.00	0.65				
360.00	0.65				
420.00	0.65				
480.00	0.65				
1440.00	0.65				

Effective Storage Depth	m	1.40		
75% Effective Storage Depth	m	1.05		
(i.e. depth below GL)	m	0.85		
25% Effective Storage Depth	m	0.35		
(i.e. depth below GL)	m	1.55		
Effective Storage Depth 75%-25%	m	0.70		
Time to fall to 75% effective depth	mins	N/A		
Time to fall to 25% effective depth	mins	N/A		
V (75%-25%)	m3	0.84		
a (50%)	m2	4.84		
t (75%-25%)	mins	N/A		
SOIL INFILTRATION RATE	m/s	**N/A**		

DESIGN SOIL INFILTRATION RATE, f	**N/A**



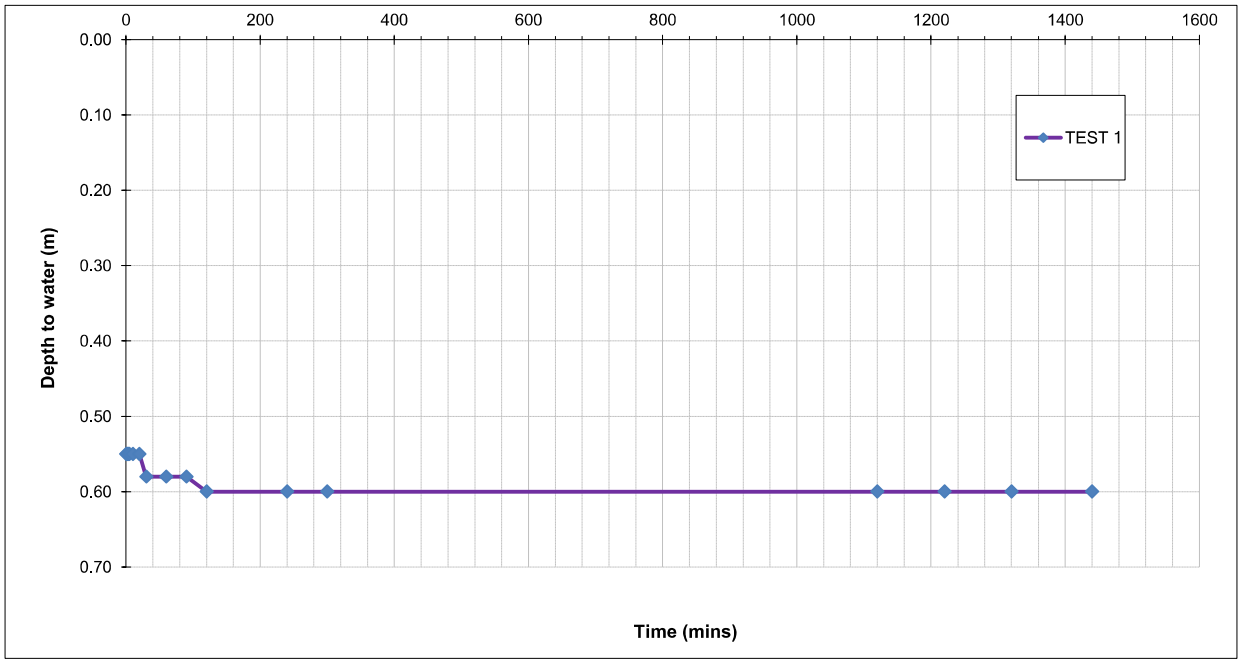
Site:	Standen Central		**Trial Pit Number:**	102
Job Number:	16-499		**Length:**	1.75 m
Date of Test:	19/12/2022		**Width:**	0.69 m
			Depth:	1.90 m
			Groundwater Level:	N/A m

Test 1 did not reach 75% or 25% effective storgae depth, therefore an infiltration rate could not be calculated.

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0	0.55				
1	0.55				
2	0.55				
3	0.55				
4	0.55				
5	0.55				
10	0.55				
20	0.55				
30	0.58				
60	0.58				
90	0.58				
120	0.60				
240	0.6				
300.00	0.6				
1120.00	0.60				
1220.00	0.60				
1320.00	0.60				
1440.00	0.60				

Effective Storage Depth	m	1.35		
75% Effective Storage Depth	m	1.01		
(i.e. depth below GL)	m	0.89		
25% Effective Storage Depth	m	0.34		
(i.e. depth below GL)	m	1.56		
Effective Storage Depth 75%-25%	m	0.68		
Time to fall to 75% effective depth	mins	N/A		
Time to fall to 25% effective depth	mins	N/A		
V (75%-25%)	m3	0.82		
a (50%)	m2	4.50		
t (75%-25%)	mins	N/A		
SOIL INFILTRATION RATE	m/s	**N/A**		

DESIGN SOIL INFILTRATION RATE, f	**N/A**

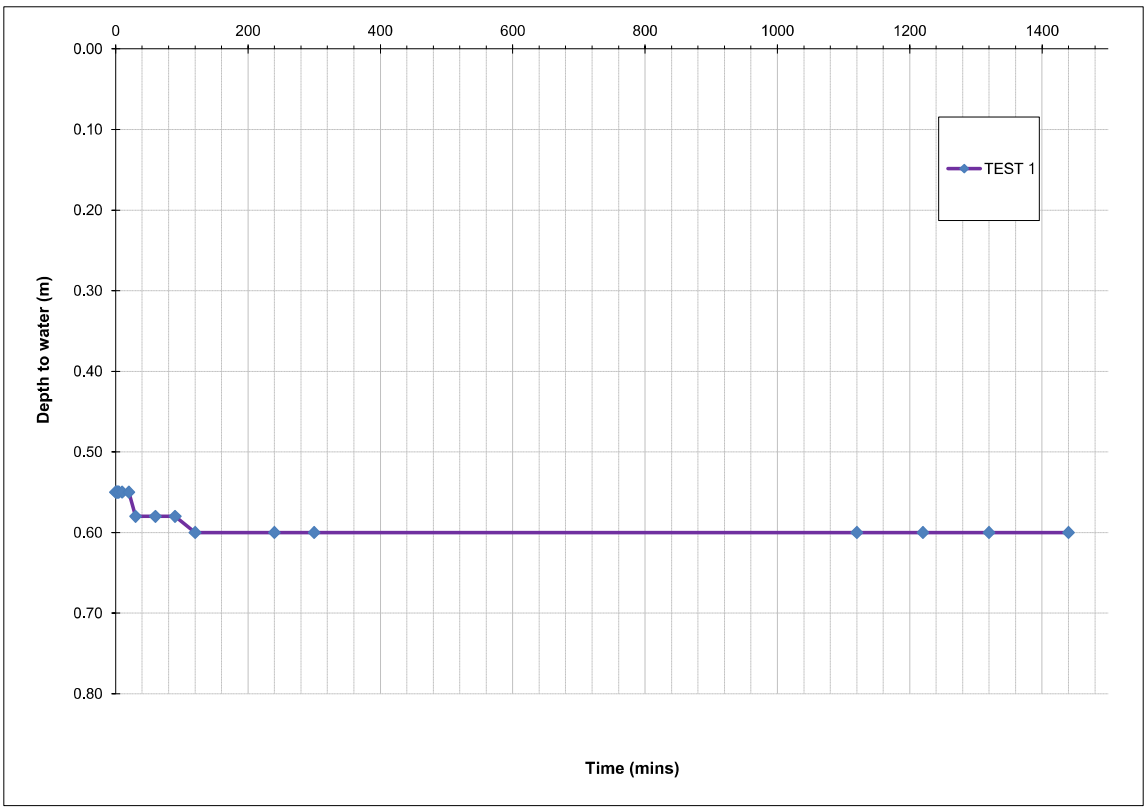


e3p	**Site:** Standen Central **Job Number:** 16-499 **Date of Test:** 19/12/2022	**Trial Pit Number:** 103 **Length:** 1.75 m **Width:** 0.69 m **Depth:** 1.90 m **Groundwater Level:** N/A m	

Test 1 did not reach 75% or 25% effective storgae depth, therefore an infiltration rate could not be calculated.

	TEST 1		TEST 2		TEST 3	
	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
	0.00	0.55				
	1	0.55				
	2	0.55				
	3	0.55				
	4	0.55				
	5	0.55				
	10	0.55				
	20	0.55				
	30	0.58				
	60	0.58				
	90	0.58				
	120	0.60				
	240	0.6				
	300	0.6				
	1120.00	0.60				
	1220.00	0.60				
	1320.00	0.60				
	1440.00	0.60				
Effective Storage Depth	m	1.35				
75% Effective Storage Depth	m	1.01				
(i.e. depth below GL)	m	0.89				
25% Effective Storage Depth	m	0.34				
(i.e. depth below GL)	m	1.56				
Effective Storage Depth 75%-25%	m	0.68				
Time to fall to 75% effective depth	mins	N/A				
Time to fall to 25% effective depth	mins	N/A				
V (75%-25%)	m3	0.82				
a (50%)	m2	4.50				
t (75%-25%)	mins	N/A				
SOIL INFILTRATION RATE	m/s	**N/A**				

DESIGN SOIL INFILTRATION RATE, f	**N/A**



Appendix E – Public Sewer Record

Water for the North West

How to contact us:

United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

JP STRUCTURAL DESIGN LTD

Regus House
Chester Business Park, JP STRUCTURAL DESIGN LTD
Chester,
CH4 9QR

FAO:

Your Ref: 113001
Our Ref: UUPS-ORD-460622
Date: 27/01/2023

Dear Sirs

Location: Clitheroe Care Home

I acknowledge with thanks your request dated 27/01/2023 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. http://www.unitedutilities.com/work-near-asset.aspx .

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please contact us .

Yours Faithfully,

Karen McCormack
Property Searches Manager

United Utilities Water Limited
Registered In England & Wales No. 2366678
Registered Office Haweswater House, Lingley Mere Business Park,
Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP

Water for the North West

TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

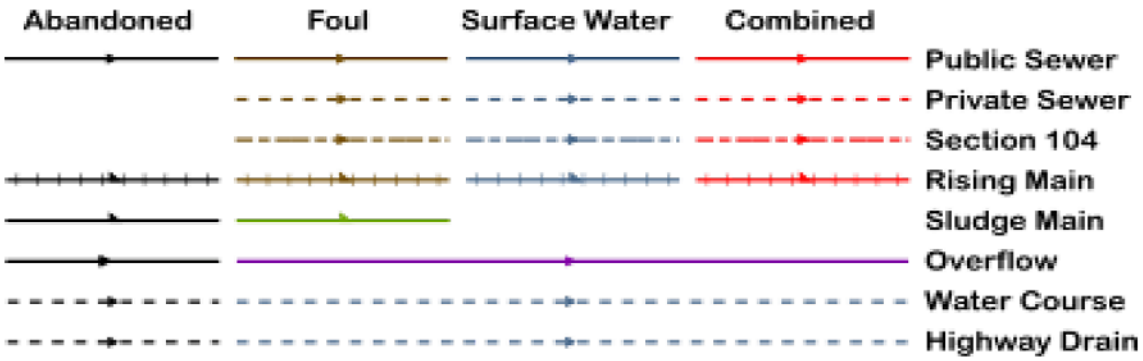
TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

United Utilities Water Limited
Registered In England & Wales No. 2366678
Registered Office Haweswater House, Lingley Mere Business Park,
Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP

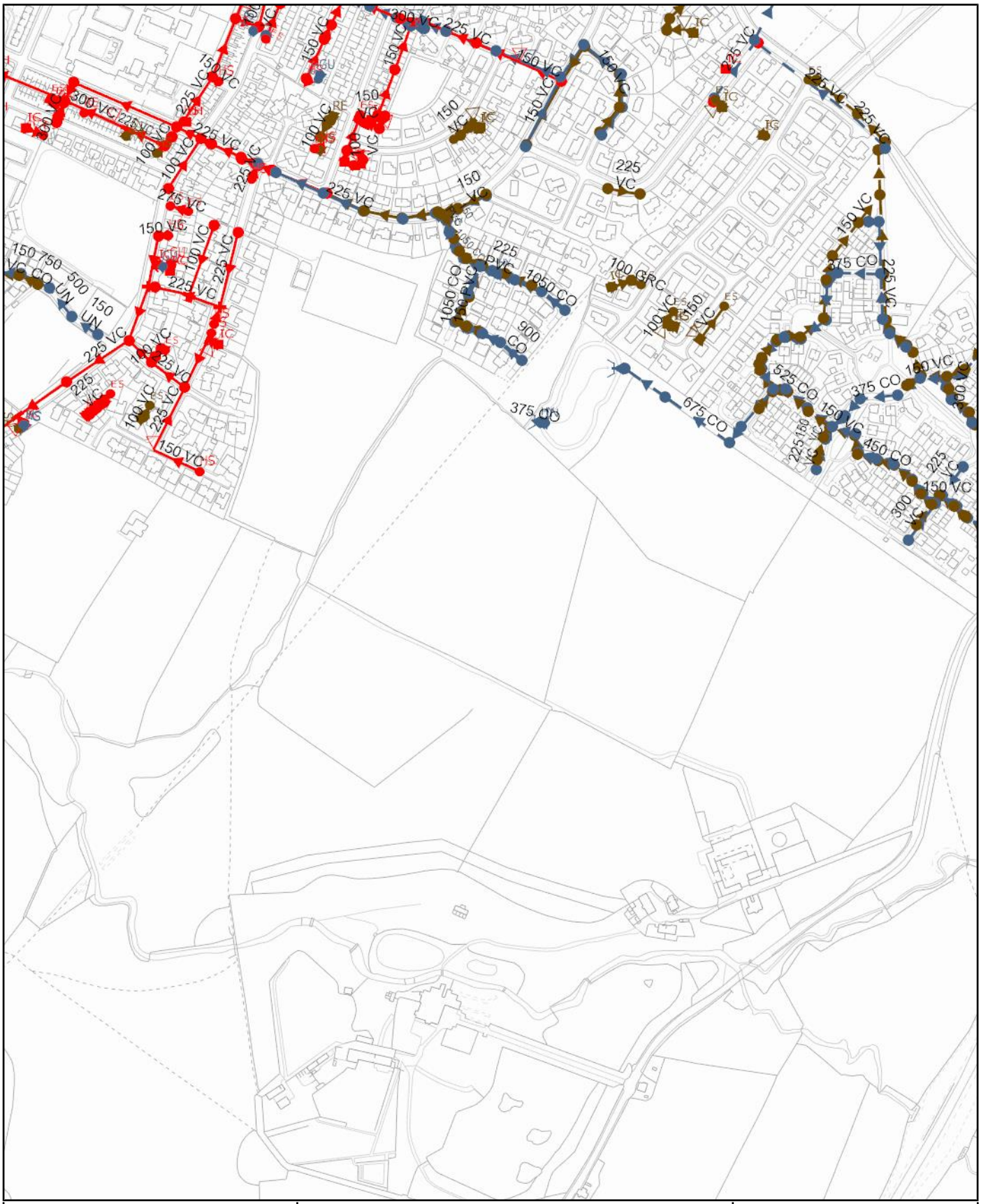
United Utilities
Water for the North West

Wastewater Symbology



All point assets follow the standard colour convention: red – combined, brown - foul, blue – surface water, purple - overflow

- Manhole
- HS Head of System
- ES Extent of Survey
- RE Rodding Eye
- IN Inlet
- DP Discharge Point
- HY Vortex
- PE Penstock
- WO Washout Chamber
- VA Valve
- AV Air Valve
- NRV Non Return Valve
- SO Soakaway
- GU Gully
- CA Cascade
- FM Flow Meter
- HA Hatch Box
- OI Oil Interceptor
- SM Summit
- DS Drop Shaft
- OP Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- IC Inspection Chamber
- Bifurcation Chamber
- LH Lamp Hole
- T Junction / Saddle
- CA Catchpit
- VC Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- T Network Storage Tank
- V Sewer Overflow
- WwTW Ww Treatment Works
- Ww Pumping Station
- ST Septic Tank
- CK Control Kiosk
- Change of Characteristic



Scale: 1:5329

Date: 27/01/2023

SEWER RECORDS

United Utilities

Water for the North West

Address or Site Reference: Clitheroe Care Home

Printed by: Property Searches

Appendix F – Wider Development Drainage

DO NOT SCALE

PHASE 1

PHASE 1

CUT LINE
REFER TO DRAWING 6263 / SP-A-03-2

Foul spur for future development

Assumed 9 Plots from Phase 3

Surface Water spur for future development

Assumed impermeable Area = 0.058 Ha from Phase 3

Foul spur for future development

Assumed 71 Plots from Phase 2

Surface Water spur for future development

Assumed impermeable Area = 0.05 Ha from Phase 3

Foul spur for future development

Assumed 6 Plots from Phase 3

Surface Water spur for future development

Assumed impermeable Area = 0.05 Ha from Phase 2

Foul spur for future development

Assumed 41 Plots - Phase 3

Foul spur for future development

Assumed 143 plots - Phase 4

Surface Water spur for future development

Assumed impermeable Area = 1.27 Ha from Phase 2

Surface Water spur for future development

Assumed impermeable Area = 2.55 Ha from Phase 4

ul spur for
ure retirement
velopment

sumed
plots - retirement

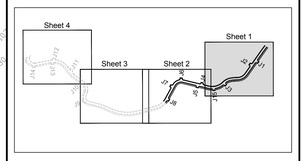
S1 CL106.770
F1 CL103.840
S2 CL105.661
F2 CL104.942
S3 CL105.881
S4 CL103.996
F3 CL103.701
F4 CL102.460
S5 CL105.400
F5 CL103.640
S7 CL104.695
S6 CL103.481
F6 CL103.910
S8 CL103.406
F7 CL103.657
F8 CL103.257
S9 CL103.262
F9 CL103.372
S10 CL103.393

© Copyright The original of this drawing contained coloured symbols and/or textures. Any black and white reproduction should not be relied upon.

0 1 2 4 6 8 10 15 20
SCALEBAR (m)

Notes

1. Setting out shall be undertaken using only the information given. Distances should not be scaled from this drawing.
2. All sewers shall be constructed in accordance with Sewers for Adoption 6th Edition and United Utilities Details & Guidelines.
3. The minimum gravity pipe diameter under adoptable highways shall be 150mm
4. It is the responsibility of the Contractor to verify all information given with regards to existing services and drainage connections etc. prior to commencing the works. The rates shall include for hand dig around services where necessary. The Contractor shall adhere to the CDM Regulations at all times
5. The outsides of all sewers shall be a minimum of 1.0m from kerb lines and the outside of manholes shall be a minimum of 0.5m from kerb lines
6. Existing flows in watercourses, sewers and land drains shall be maintained at all times
7. Only trained personnel shall be permitted to enter confined spaces
8. All materials to bear the relevant B.S. Kitemark and comply fully with the specifications. All concrete & concrete products must use Sulphate resistant cement to withstand Class 3 condition (unless the site investigation report proves that sulphate attack from soils and groundwater will not occur).
9. All opening notices etc. as required under Highways Acts etc. are to be obtained prior to commencement of works. All works are to be inspected by L.A., NHBC or the Network Operator as applicable.
10. Where "Ultra Rib" UPVC pipes (or similar approved) are used in adoptable drainage they shall be handled and laid in accordance with the manufacturers instructions and will be subject to post installation deformation testing prior to adoption.
    A Class S Bed and Surround must be used for "Ultra Rib" pipes
11. Trench backfill in highways to within 1m of highway shall, as directed by the Highway Authority be a suitable granular material all in accordance with Sewers for Adoption.
12. Slab levels shall not be varied without reference to the Engineer for guidance.
13. Pipes have not been designed to accommodate construction traffic loading. The contractor is responsible for providing adequate protection to the pipes during construction.



KEY PLAN

Legend

Proposed

- S01 — Adoptable Surface Water Sewer
- F01 — Adoptable Foul Sewer
- F101 — Private Lateral
- G — Highway Gully
- Sewer Easement

APPROVAL

Rev.	Date	Revision	By	Appd.
A	30.07.21	Highway extended to site boundary	PJN	AJ

coopers
chartered consulting engineers
Park House
Sandpiper Court
Chester Business Park
Chester
CH4 9QU
Tel: 01244 684910
Email: admin@coopers.co.uk
Web: http://coopers.co.uk

Client: Taylor Wimpey

Project: STANDEN HALL CLITHEROE

Title: Spine Road Phase A (Phase 2-4) Drainage Layout Sheet 1 of 4

DRAWING NUMBER	SCALE at A0	1:250	
6263 / SP-A-03-1	DATE	31.03.21	REVISION
	DRAWN	PJN	A
	CHECKED	AJ	

DO NOT SCALE

NORTH

CUT LINE
REFER TO DRAWING 6263 / SP-A-03-3

Surface Water spur for future school development

Allowable Design flow rate = 10 l/s

Foul spur for future development

Assumed 6.3l/s base flow from school

Foul spur from Phase 3 residential development

Surface Water spur for future retirement development

Allowable Design flow rate = 11 l/s

Foul spur for future retirement development

Assumed 79 plots - retirement

Surface Water spur for future development

Assumed impermeable Area = 0.41 Ha from Retail

Surface Water spur for future development

Assumed impermeable Area = 0.766 Ha from Phase 4b

Foul spur for future development

Assumed 35 Plots from Phase 4b

Foul spur for future development

assumed 0.2l/s base flow from Phase retail

Foul spur for future development

assumed 78 plots - Phase 4c

Surface Water spur for future development

Assumed impermeable Area = 1.52 Ha from Phase 4c

PHASE A

FUTURE PHASES

PHASE A

FUTURE PHASES

F10 CL103.696
F11 CL103.636
F12 CL103.309
F13 CL100.794
F14 CL100.048
F15 CL101.970
F16 CL101.490
F17 CL100.890
F18 CL100.520
F19 CL99.884
F20 CL99.606

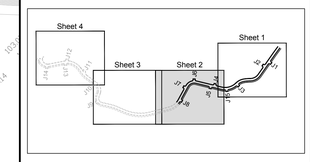
S10 CL100.144
S11 CL103.163
S12 CL103.891
S13 CL103.704
S14 CL102.654
S15 CL102.013
S16 CL101.551
S17 CL101.299
S18 CL100.843
S19 CL100.483
S20 CL99.869

Diam 150 Grad 1 in 136 CLAY 34.142m
Diam 300 Grad 1 in 203 CLAY 34.689m
Diam 150 Grad 1 in 100
Diam 225 Grad 1 in 170
Diam 225 Grad 1 in 135 CLAY 14.045m
Diam 450 Grad 1 in 322 CONC 14.814m
Diam 225 Grad 1 in 93 CLAY 49.719m
Diam 375 Grad 1 in 127 CONC 48.641m
Diam 150 Grad 1 in 136 CLAY 13.660m
Diam 375 Grad 1 in 93 CONC 13.922m
Diam 225 Grad 1 in 135 CLAY 18.298m
Diam 450 Grad 1 in 291 CONC 16.302m
Diam 225 Grad 1 in 47 CLAY 22.287m
Diam 450 Grad 1 in 97 CONC 19.624m
Diam 450 Grad 1 in 24 CONC 18.461m
Diam 225 Grad 1 in 47 CLAY 16.290m
Diam 450 Grad 1 in 49 CONC 36.394m
Diam 225 Grad 1 in 35 CLAY 31.401m
Diam 450 Grad 1 in 26 CONC 94.148m
Diam 450 Grad 1 in 320 CONC 23.660m
Diam 225 Grad 1 in 170
Diam 150 Grad 1 in 100
Diam 150 Grad 1 in 80

30m

Notes

1. Setting out shall be undertaken using only the information given. Distances should not be scaled from this drawing.
2. All sewers shall be constructed in accordance with Sewers for Adoption 6th Edition and United Utilities Details & Guidelines.
3. The minimum gravity pipe diameter under adoptable highways shall be 150mm
4. It is the responsibility of the Contractor to verify all information given with regards to existing services and drainage connections etc. prior to commencing the works. The rates shall include for hand dig around services where necessary. The Contractor shall adhere to the CDM Regulations at all times
5. The outsides of all sewers shall be a minimum of 1.0m from kerb lines and the outside of manholes shall be a minimum of 0.5m from kerb lines
6. Existing flows in watercourses, sewers and land drains shall be maintained at all times
7. Only trained personnel shall be permitted to enter confined spaces
8. All materials to bear the relevant B.S. Kitemark and comply fully with the specifications. All concrete & concrete products must use Sulphate resistant cement to withstand Class 3 condition (unless the site investigation report proves that sulphate attack from soils and groundwater will not occur).
9. All opening notices etc. as required under Highways Acts etc. are to be obtained prior to commencement of works. All works are to be inspected by L.A., NHBC or the Network Operator as applicable.
10. Where "Ultra Rib" UPVC pipes (or similar approved) are used in adoptable drainage they shall be handled and laid in accordance with the manufacturers instructions and will be subject to post installation deformation testing prior to adoption.
    A Class S Bed and Surround must be used for "Ultra Rib" pipes
11. Trench backfill in highways to within 1m of highway shall, as directed by the Highway Authority be a suitable granular material all in accordance with Sewers for Adoption.
12. Slab levels shall not be varied without reference to the Engineer for guidance.
13. Pipes have not been designed to accommodate construction traffic loading. The contractor is responsible for providing adequate protection to the pipes during construction.



KEY PLAN

Legend

Proposed

- S01 — Adoptable Surface Water Sewer
- F01 — Adoptable Foul Sewer
- F101 — Private Lateral
- G — Highway Gully
- Sewer Easement

APPROVAL

Rev.	Date	Revision	By	Appd
A	28.07.21	School, Retirement, Phase 3 parcel notes updated	AJ	AJ

coopers
chartered consulting engineers
Park House
Sandpiper Court
Chester Business Park
Chester
CH4 9QU
Tel: 01244 684910
Email: admin@coopers.co.uk
Web: http://coopers.co.uk

Client: Taylor Wimpey

Project: STANDEN HALL CLITHEROE

Title: Spine Road Phase A (Phase 2-4) Drainage Layout Sheet 2 of 4

DRAWING NUMBER	SCALE at A0	1:250	
6263 / SP-A-03-2	DATE	31.03.21	REVISION
	DRAWN	PJN	A
	CHECKED	AJ	

SCALEBAR (m) 0 1 2 4 6 8 10 15 20

DO NOT SCALE

NORTH

CUT LINE
REFER TO DRAWING 6263 / SP-A-03-4

F33 CL92.853
F32 CL93.270
F31 CL93.676
F30 CL93.954
F29 CL93.748
F28 CL93.392
F27 CL92.876
F26 CL91.860
F25 CL92.605
F24 CL93.223
F23 CL94.162
F22 CL95.788
F21 CL97.134
S01 CL94.182
S02 CL94.049
S03 CL92.421
S04 CL93.136
S05 CL94.057
S06 CL95.673
S07 CL97.003

CW11
CW10

PIPE 93.40
PIPE 93.48
PIPE 90.07

WATERCOURSE

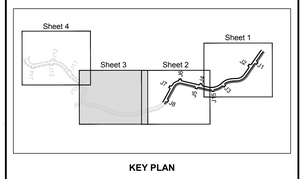
S25
(2.4 Dia Flow control manhole)
213 mm Dia. orifice plate
Restricting Flow:
Q2 = 108.2l/s
Q30 = 132.7l/s
Q100 = 172.0l/s
Max WL 92.321

50m² x 0.8m deep
Cellular buried storage
for Q100 + cc event.
Base Level = 90.750
Q30 WL = 90.729

SCALEBAR (m) 0 1 2 4 6 8 10 15 20

Notes

1. Setting out shall be undertaken using only the information given. Distances should not be scaled from this drawing.
2. All sewers shall be constructed in accordance with Sewers for Adoption 6th Edition and United Utilities Details & Guidelines.
3. The minimum gravity pipe diameter under adoptable highways shall be 150mm
4. It is the responsibility of the Contractor to verify all information given with regards to existing services and drainage connections etc. prior to commencing the works. The rates shall include for hand dig around services where necessary. The Contractor shall adhere to the CDM Regulations at all times
5. The outsides of all sewers shall be a minimum of 1.0m from kerb lines and the outside of manholes shall be a minimum of 0.5m from kerb lines
6. Existing flows in watercourses, sewers and land drains shall be maintained at all times
7. Only trained personnel shall be permitted to enter confined spaces
8. All materials to bear the relevant B.S. Kitemark and comply fully with the specifications. All concrete & concrete products must use Sulphate resistant cement to withstand Class 3 condition (unless the site investigation report proves that sulphate attack from soils and groundwater will not occur).
9. All opening notices etc. as required under Highways Acts etc. are to be obtained prior to commencement of works. All works are to be inspected by L.A., NHBC or the Network Operator as applicable.
10. Where "Ultra Rib" UPVC pipes (or similar approved) are used in adoptable drainage they shall be handled and laid in accordance with the manufacturers instructions and will be subject to post installation deformation testing prior to adoption.
A Class S Bed and Surround must be used for "Ultra Rib" pipes
11. Trench backfill in highways to within 1m of highway shall, as directed by the Highway Authority be a suitable granular material all in accordance with Sewers for Adoption.
12. Slab levels shall not be varied without reference to the Engineer for guidance.
13. Pipes have not been designed to accommodate construction traffic loading. The contractor is responsible for providing adequate protection to the pipes during construction.



KEY PLAN

Legend

Proposed

- S01 — Adoptable Surface Water Sewer
- F01 — Adoptable Foul Sewer
- F101 — Private Lateral
- G — Highway Gully
- Sewer Easement

APPROVAL

Rev.	Date	Revision	By	Appd.

coopers
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CH4 9QU
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Client: Taylor Wimpey

Project: STANDEN HALL
CLITHEROE

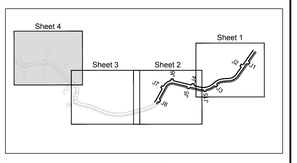
Title: Spine Road Phase A (Phase 2-4)
Drainage Layout
Sheet 3 of 4

DRAWING NUMBER	SCALE at A0	1:250	
6263 / SP-A-03-3	DATE	31.03.21	REVISION
	DRAWN	PJN	-
	CHECKED	AJ	

DO NOT SCALE

Notes

1. Setting out shall be undertaken using only the information given. Distances should not be scaled from this drawing.
2. All sewers shall be constructed in accordance with Sewers for Adoption 6th Edition and United Utilities Details & Guidelines.
3. The minimum gravity pipe diameter under adoptable highways shall be 150mm
4. It is the responsibility of the Contractor to verify all information given with regards to existing services and drainage connections etc. prior to commencing the works. The rates shall include for hand dig around services where necessary. The Contractor shall adhere to the CDM Regulations at all times
5. The outsides of all sewers shall be a minimum of 1.0m from kerb lines and the outside of manholes shall be a minimum of 0.5m from kerb lines
6. Existing flows in watercourses, sewers and land drains shall be maintained at all times
7. Only trained personnel shall be permitted to enter confined spaces
8. All materials to bear the relevant B.S. Kitemark and comply fully with the specifications. All concrete & concrete products must use Sulphate resistant cement to withstand Class 3 condition (unless the site investigation report proves that sulphate attack from soils and groundwater will not occur).
9. All opening notices etc. as required under Highways Acts etc. are to be obtained prior to commencement of works. All works are to be inspected by L.A., NHBC or the Network Operator as applicable.
10. Where "Ultra Rib" UPVC pipes (or similar approved) are used in adoptable drainage they shall be handled and laid in accordance with the manufacturers instructions and will be subject to post installation deformation testing prior to adoption.
    A Class S Bed and Surround must be used for "Ultra Rib" pipes
11. Trench backfill in highways to within 1m of highway shall, as directed by the Highway Authority be a suitable granular material all in accordance with Sewers for Adoption.
12. Slab levels shall not be varied without reference to the Engineer for guidance.
13. Pipes have not been designed to accommodate construction traffic loading. The contractor is responsible for providing adequate protection to the pipes during construction.



KEY PLAN

Legend

Proposed

- S01 — Adoptable Surface Water Sewer
- F01 — Adoptable Foul Sewer
- F101 — Private Lateral
- G — Highway Gully
- Sewer Easement

APPROVAL

Rev.	Date	Revision	By	Appd.

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Web: http://coopers.co.uk

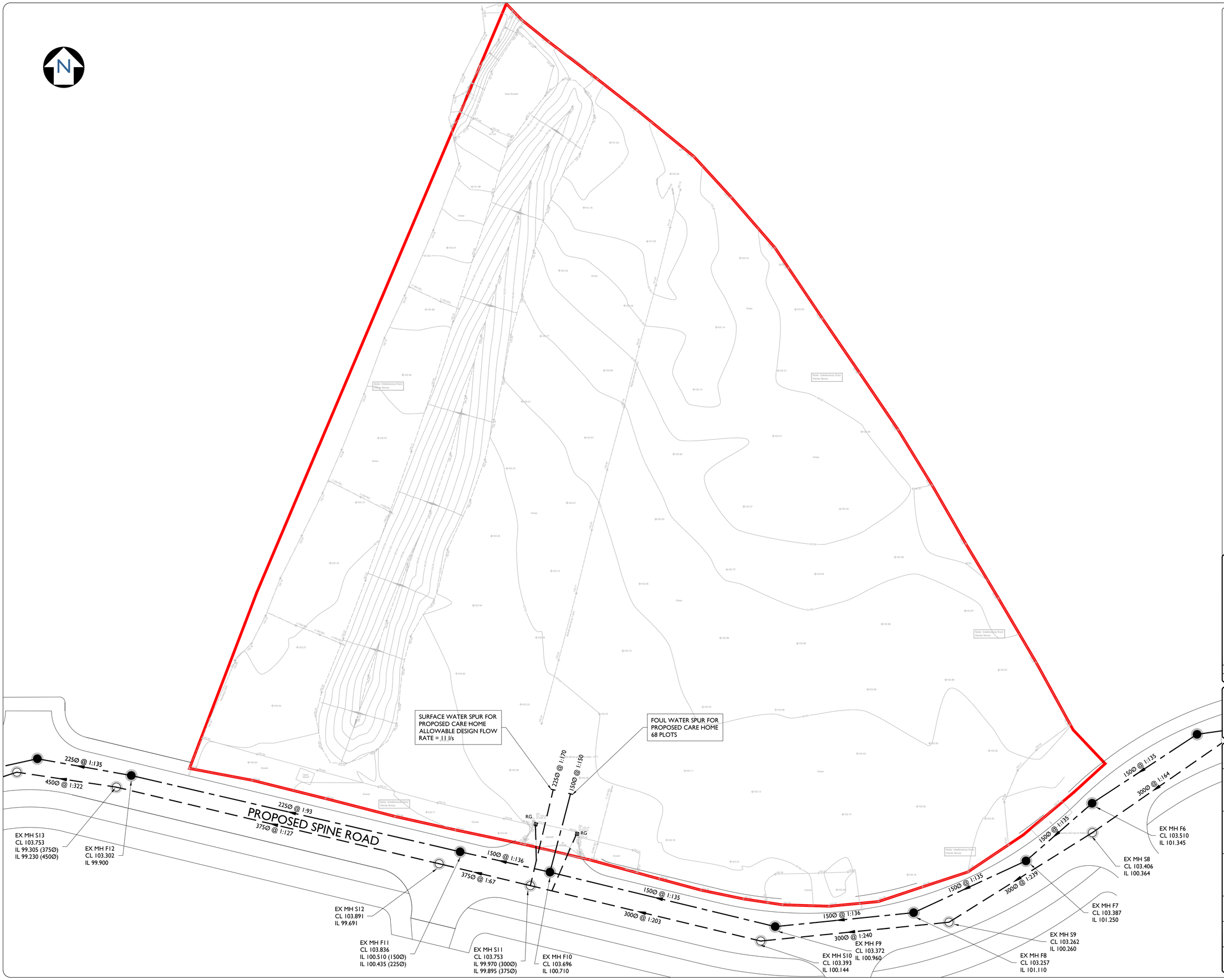
Client: Taylor Wimpey

Project: STANDEN HALL CLITHEROE

Title: Spine Road Phase A (Phase 2-4) Drainage Layout Sheet 4 of 4

DRAWING NUMBER	SCALE at A0	1:250	
6263 / SP-A-03-4	DATE	31.03.21	REVISION
	DRAWN	PJN	-
	CHECKED	AJ	

Appendix G – Existing Drainage Plan



EXISTING DRAINAGE NOTES

THE LOCATION LINE & LEVEL OF ALL KNOWN EXISTING DRAINAGE PIPEWORK INDICATED ON THIS DRAWING IS APPROXIMATE AND FOR GUIDANCE PURPOSES ONLY.

IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THEIR EXACT LINE AND LEVEL, BY WAY OF HAND EXCAVATED TRIAL PITS, PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION WORKS ON SITE. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS AND MAINTAIN THE STRUCTURAL INTEGRITY OF ALL ABOVE AND BELOW GROUND SERVICE INSTALLATIONS.

KEY

EXISTING FOUL WATER DRAIN

EXISTING SW DRAIN

RG EXISTING ROAD GULLY

NOTE
THE EXISTING DRAINAGE AND CONNECTIONS AS SHOWN HAVE BEEN TAKEN FROM A NUMBER OF SOURCES INCLUDING COOPERS CHARTERED CONSULTING ENGINEERS DRAWINGS 6263 / SP-A-03-1 (30.07.21) REV A - 6263 / SP-A-03-2 (28.07.21) REV A AND SITE SURVEY UNDERTAKEN BY ERIC WRIGHT CONSTRUCTION LTD AND WILL NEED TO BE VERIFIED.

REV	DESCRIPTION	BY	CHK	APR	DATE
-	-	-	-	-	-

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PURPOSE OF ISSUE: STAGE 2	STATUS: S2
PROJECT: CLITHEROE CARE HOME	
TITLE: DRAINAGE SCHEME EXISTING LAYOUT	
CLIENT: ERIC WRIGHT CONSTRUCTION LTD	
DRAWN BY: JR	CHECKED BY: RH / APPROVED BY: MM
DATE: 08.02.2023	SCALE (@ A1): 1:250 / PROJECT NUMBER: 113001
DRAWING NUMBER: 220018-JPS-ZZ-ZZ-DR-C-00501	REV: P01

Appendix H – Proposed Drainage Layout

NOTE
THE EXISTING DRAINAGE AND CONNECTIONS AS SHOWN HAVE BEEN TAKEN FROM A NUMBER OF SOURCES INCLUDING COOPERS CHARTERED CONSULTING ENGINEERS DRAWINGS 6263 / SP-A-03-1 (30.07.21) REV A - 6263 / SP-A-03-2 (28.07.21) REV A AND SITE SURVEY UNDERTAKEN BY ERIC WRIGHT CONSTRUCTION LTD AND WILL NEED TO BE VERIFIED.

NOTES

1. THE WORKS SHALL BE IN ACCORDANCE WITH THE FOLLOWING SPECIFICATIONS, NATIONAL BUILDING SPECIFICATION (NBS) AND SEWERS FOR ADOPTION, 7TH EDITION.

2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS DRAWINGS, ARCHITECTS DRAWINGS, MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.

3. THE LOCATION, LINE & LEVEL OF ALL KNOWN EXISTING BURIED SERVICE MAINS AND DRAINAGE PIPEWORK INDICATED ON THE DRAWINGS ARE APPROXIMATE AND FOR GUIDANCE PURPOSES ONLY. IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THEIR EXACT LINE & LEVEL, BY WAY OF HAND EXCAVATED TRIAL PITS, PRIOR TO THE COMMENCEMENT OF ANY EXCAVATION WORKS ON SITE. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO MAINTAIN THE STRUCTURAL INTEGRITY OF ALL ABOVE AND BELOW GROUND SERVICE MAINS / DRAINAGE INSTALLATIONS.

4. THE CONTRACTOR MUST COMPLY WITH ALL CURRENT LEGISLATION RELATING TO HEALTH & SAFETY.

5. THE MAIN CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF ALL TEMPORARY WORKS, AND IS ALSO RESPONSIBLE FOR THE SAFE MAINTENANCE AND STABILITY OF EXISTING BUILDINGS AT ALL TIMES.

6. THE MAIN CONTRACTOR IS RESPONSIBLE FOR THE MITIGATION OF ALL OCCURRENCES OF GROUND WATER DURING THE CONSTRUCTION PERIOD.

7. THE CONTRACTOR SHALL MAKE ALLOWANCE FOR RAISING / LOWERING ALL EXISTING ACCESS COVERS & FRAMES TO SUIT NEW FINISHED LEVELS.

8. ALL SOFT / HARD PAVED AREAS AFFECTED BY THE WORKS SHALL BE FULLY REINSTATED UPON COMPLETION OF THE WORKS. ALL SURFACE MARKINGS DAMAGED BY THE WORKS SHALL BE FULLY REINSTATED.

9. ALL SURPLUS EXCAVATED MATERIAL SHALL BE DISPOSED OF OFF SITE.

10. ALL LEVELS ARE TO ORDNANCE DATUM

KEY

- EXISTING FOUL WATER DRAIN
- EXISTING SW DRAIN
- PROPOSED FOUL SEWER
- PROPOSED SW SEWER
- PROPOSED ATTENUATION CRATES
- LINEAR DRAINAGE CHANNEL. CHANNEL (SU - UNIVERSAL SUMP UNIT WITH AIR TRAP)
- RG — PROPOSED TRAPPED ROAD GULLY (150Ø OUTLET)
- RWP — PROPOSED RAIN WATER DOWN PIPE (100Ø OUTLET)
- FO — PROPOSED FOUL OUTLET (150Ø OUTLET)

SMH 1.1
CL 103.200
IL 101.240

FMH 5.1
CL 103.000
IL 101.970

1.000 26.5m 300Ø @ 1:238

SMH 1.0
CL 102.850
IL 101.350

FMH 1.0
CL 103.000
IL 101.850 (OUTLET)

FMH 1a
CL 102.500
IL 101.925

SMH 3.1
CL 102.850
IL 101.935 (150Ø)
IL 101.860 (225Ø)

SMH 3.0
CL 102.850
IL 102.200 (OUTLET)

150Ø @ 1:80

FMH 5.0
CL 103.000
IL 102.100 (OUTLET)

FMH 1.1
CL 102.850
IL 101.715

FMH 1b
CL 102.850
IL 101.700 (OUTLET)

3.000 9.5m 150Ø @ 1:42

FMH 5a
CL 103.000
IL 101.950 (OUTLET)

FMH 5b
CL 103.000
IL 101.900 (OUTLET)

FMH 5c
CL 103.000
IL 101.850 (OUTLET)

FMH 5d
CL 103.000
IL 101.820 (OUTLET)

FMH 5e
CL 103.000
IL 101.750 (OUTLET)

FMH 5f
CL 103.000
IL 101.720 (OUTLET)

FMH 5g
CL 103.000
IL 101.700 (OUTLET)

FMH 5.2
CL 103.000
IL 101.590 (OUTLET)

FMH 6.1
CL 103.000
IL 101.900

FMH 6c
CL 103.000
IL 101.950 (OUTLET)

FMH 6b
CL 103.000
IL 102.050 (OUTLET)

FMH 6a
CL 103.000
IL 102.050 (OUTLET)

FMH 6.0
CL 103.000
IL 102.100 (OUTLET)

FMH 8a
CL 103.000
IL 102.000 (OUTLET)

1.001 61.5m 300Ø @ 1:228

150Ø @ 1:80

150Ø @ 1:35

150Ø @ 1:100

150Ø @ 1:28

150Ø @ 1:22

150Ø @ 1:30

2.000 56.4m 150Ø @ 1:35

FMH 7.0
CL 103.000
IL 102.100 (OUTLET)

FMH 7a
CL 103.000
IL 101.850 (OUTLET)

FMH 7b
CL 103.000
IL 101.750 (OUTLET)

FMH 8c
CL 103.000
IL 101.750 (OUTLET)

FMH 8b
CL 103.000
IL 101.800 (OUTLET)

SMH 2.1
CL 102.850
IL 101.175 (150Ø)
IL 101.100 (225Ø)

FMH 5.3
CL 103.000
IL 101.400

SMH 2.0
CL 102.850
IL 102.200 (OUTLET)

FFL
+103.000

SMH 4.0
CL 102.850
IL 102.200 (OUTLET)

FMH 3.0
CL 103.000
IL 102.100 (OUTLET)

FMH 3a
CL 103.000
IL 101.850 (OUTLET)

FMH 3b
CL 103.000
IL 101.750 (OUTLET)

FMH 1.4
CL 103.000
IL 101.005

FMH 1.3
CL 103.000
IL 101.180

FMH 4c
CL 103.000
IL 101.650 (OUTLET)

FMH 4b
CL 103.000
IL 101.750 (OUTLET)

FMH 4a
CL 103.000
IL 102.000 (OUTLET)

150Ø @ 1:80

150Ø @ 1:10

150Ø @ 1:12

3.000 55.2m 225Ø @ 1:100

4.000 36.4m 150Ø @ 1:35

150Ø @ 1:110

150Ø @ 1:19

150Ø @ 1:80

FMH 1c
CL 102.850
IL 101.650 (OUTLET)

FMH 1d
CL 103.000
IL 101.590 (OUTLET)

FMH 1e
CL 103.000
IL 101.560 (OUTLET)

FMH 1f
CL 103.000
IL 101.500 (OUTLET)

FMH 1g
CL 103.000
IL 101.450 (OUTLET)

FMH 1h
CL 103.000
IL 101.450 (OUTLET)

FMH 1.2
CL 103.000
IL 101.350

FMH 2.1
CL 103.000
IL 101.650

FMH 2c
CL 103.000
IL 101.800 (OUTLET)

FMH 2b
CL 103.000
IL 101.920 (OUTLET)

FMH 2a
CL 103.000
IL 101.950 (OUTLET)

FMH 2.0
CL 103.000
IL 102.100 (OUTLET)

SMH 3.2
CL 102.850
IL 101.305

SMH 1.2
CL 103.300
IL 100.970

1.002 21.8m 300Ø @ 1:229

SMH 1.3
CL 103.700
IL 100.875

SMH 1.4
CL 103.600
IL 100.865 (225Ø)
IL 100.790 (300Ø)

FMH 8.0
CL 103.000
IL 102.100 (OUTLET)

2.001 5m
225Ø @ 1:21

1.004 10m
300Ø @ 1:28

1.003 18.9m 300Ø @ 1:222

3.004 19m 300Ø @ 1:238

1.005 2m
225Ø @ 1:38

FMH 1.5
CL 103.400
IL 100.790

SCP 3.4
CL 103.150
IL 100.365 (225Ø)
IL 100.290 (300Ø)
BL 99.990
(300mm SUMP)

FMH 4.0
CL 103.000
IL 102.100 (OUTLET)

3.003 7.5m
225Ø @ 1:11

SMH 3.3
CL 102.850
IL 101.175 (150Ø)
IL 101.100 (225Ø)

3.002 20.1m 225Ø @ 1:100

5.000 23m 300Ø @ 1:80

SCP 5.1
CL 102.500
IL 100.310
BL 100.010
(300mm SUMP)

SMH 5.0
CL 102.850
IL 100.600

225Ø @ 1:135

450Ø @ 1:322

PROPOSED SPINE ROAD

225Ø @ 1:93

375Ø @ 1:127

EX MH S13
CL 103.753
IL 99.305 (375Ø)
IL 99.230 (450Ø)

EX MH F12
CL 103.302
IL 99.900

SCP 1.5
CATCHPIT WITH WITH VORTEX FLOW CONTROL DEVICE TO LIMIT FORWARD FLOW TO 6l/s AT 2.7m HEAD
CL 103.500
IL 100.200
BL 99.700 (500mm SUMP)

SMH 1.6
CL 103.430
IL 100.130 (225Ø)

PROPOSED MANHOLE TO BE CONSTRUCTED ON LINE OF EXISTING SURFACE WATER SPUR CONNECTION
ASSUMED IL 100.130

EX MH S12
CL 103.891
IL 99.691

EX MH F11
CL 103.836
IL 100.510 (150Ø)
IL 100.435 (225Ø)

150Ø @ 1:136

375Ø @ 1:67

150Ø @ 1:135

300Ø @ 1:203

PROPOSED MANHOLE TO BE CONSTRUCTED ON LINE OF EXISTING FOUL SPUR CONNECTION
ASSUMED IL 100.790

EX MH S11
CL 103.753
IL 100.045 (225Ø)
IL 99.970 (300Ø)
IL 99.895 (375Ø)

EX MH F10
CL 103.696
IL 100.710

225Ø @ 1:470

150Ø @ 1:150

EX MH S10
CL 103.393
IL 100.144

300Ø @ 1:240

EX MH F9
CL 103.372
IL 100.960

EX MH F8
CL 103.257
IL 101.110

EX MH S9
CL 103.262
IL 100.260

150Ø @ 1:135

300Ø @ 1:239

EX MH F7
CL 103.387
IL 101.250

EX MH S8
CL 103.406
IL 100.364

150Ø @ 1:135

300Ø @ 1:164

EX MH F6
CL 103.510
IL 101.345

ATTENUATION TANK
301m³ OF ATTENUATION CONSISTING OF AQUACELL 'CORE-R' GEOCELLULAR BLOCKS -
44 UNITS x 9 UNITS x 4 UNITS (22.0m x 9.0m x 1.6m AT 95% VOID RATIO) TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S GUIDANCE & RECOMMENDATIONS
CL 102.500
TOP 101.900
IL 100.300
1 YEAR CRITICAL WATER LEVEL 100.528m AOD
2 YEAR CRITICAL WATER LEVEL 100.606m AOD
30 YEAR CRITICAL WATER LEVEL 101.036m AOD
100 YEAR +50%CC CRITICAL WATER LEVEL 101.901m AOD

REV	DESCRIPTION	BY	CHK	APR	DATE
P04	SW AMENDED FOLLOWING LLFA COMMENTS	JR	RH	MM	14.06.2023
P03	ISSUED FOR TENDER	JR	RH	MM	16.05.2023
P02	SITE LAYOUT AMENDED	JR	RH	MM	27.03.2023

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PURPOSE OF ISSUE: FOR TENDER	STATUS: D2
PROJECT: CLITHEROE CARE HOME	
TITLE: DRAINAGE SCHEME PROPOSED LAYOUT	
CLIENT: ERIC WRIGHT CONSTRUCTION LTD	
DRAWN BY: JR	CHECKED BY: RH / APPROVED BY: MM
DATE: 08.02.2023	SCALE (@ A1): 1:250 / PROJECT NUMBER: 113001
DRAWING NUMBER: 220018-JPS-ZZ-ZZ-DR-C-00502	REV: P04

Appendix I – Proposed Drainage Calculations

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.300	Additional Storage (m³/ha)	0.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
100	50	0	0

Node 1.5 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.005	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0094-6000-2700-6000
Invert Level (m)	100.200	Min Outlet Diameter (m)	0.150
Design Depth (m)	2.700	Min Node Diameter (mm)	1200
Design Flow (l/s)	6.0		

Node TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	100.300
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	198.0	0.0	1.600	198.0	0.0	1.601	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 95.28%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	3.0	10	102.235	0.035	3.1	0.0056	0.0000	OK
15 minute winter	3.1	11	101.918	0.058	8.0	0.0164	0.0000	OK
15 minute winter	3.2	11	101.383	0.078	12.1	0.0222	0.0000	OK
15 minute winter	3.3	10	101.151	0.051	17.5	0.0143	0.0000	OK
240 minute winter	3.4	184	100.528	0.237	8.8	0.4196	0.0000	OK
240 minute winter	1.5	184	100.527	0.327	8.8	0.5785	0.0000	SURCHARGED
15 minute summer	1.6	1	100.130	0.000	4.2	0.0000	0.0000	OK
15 minute winter	4.0	10	102.245	0.045	5.8	0.0071	0.0000	OK
15 minute winter	5.0	10	100.642	0.042	5.3	0.0470	0.0000	OK
240 minute winter	5.1	184	100.528	0.217	2.7	0.3843	0.0000	OK
240 minute winter	TANK	184	100.528	0.227	10.9	42.7918	0.0000	OK
15 minute winter	2.1	10	101.136	0.036	5.6	0.0103	0.0000	OK
15 minute winter	2.0	10	102.245	0.045	5.8	0.0071	0.0000	OK
15 minute winter	1.0	10	101.419	0.069	8.5	0.0775	0.0000	OK
15 minute winter	1.1	11	101.342	0.102	19.3	0.1158	0.0000	OK
15 minute winter	1.2	11	101.094	0.124	24.4	0.1404	0.0000	OK
15 minute winter	1.3	11	100.999	0.124	25.5	0.1402	0.0000	OK
15 minute winter	1.4	11	100.858	0.068	30.8	0.0767	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	3.0	3.000	3.1	3.1	1.004	0.112	0.0343	
15 minute winter	3.1	3.001	3.2	7.7	0.771	0.148	0.5623	
15 minute winter	3.2	3.002	3.3	11.9	1.272	0.227	0.1908	
15 minute winter	3.3	3.003	3.4	17.5	2.436	0.107	0.0588	
240 minute winter	3.4	3.004	1.5	-4.3	0.225	-0.060	1.3615	
240 minute winter	1.5	Hydro-Brake®	1.6	4.3				89.6
15 minute winter	4.0	4.000	3.3	5.6	1.291	0.188	0.1585	
15 minute winter	5.0	5.000	5.1	5.2	0.645	0.042	0.2818	
240 minute winter	5.1	5.001	TANK	2.4	0.913	0.022	0.0560	
240 minute winter	TANK	5.002	3.4	-8.5	-0.634	-0.077	0.0586	
15 minute winter	2.1	2.001	1.4	5.6	1.419	0.049	0.0198	
15 minute winter	2.0	2.000	2.1	5.6	1.291	0.188	0.1585	
15 minute winter	1.0	1.000	1.1	8.3	0.510	0.117	0.4383	
15 minute winter	1.1	1.001	1.2	18.8	0.783	0.256	1.4994	
15 minute winter	1.2	1.002	1.3	24.1	0.879	0.325	0.5800	
15 minute winter	1.3	1.003	1.4	25.2	1.312	0.340	0.3723	
15 minute winter	1.4	1.004	1.5	30.7	0.730	0.113	0.4023	

Results for 2 year Critical Storm Duration. Lowest mass balance: 95.28%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	3.0	10	102.240	0.040	4.0	0.0063	0.0000	OK
15 minute winter	3.1	10	101.926	0.066	10.2	0.0187	0.0000	OK
15 minute winter	3.2	11	101.395	0.090	15.5	0.0255	0.0000	OK
15 minute winter	3.3	10	101.156	0.056	22.5	0.0160	0.0000	OK
240 minute winter	3.4	184	100.613	0.323	11.5	0.5708	0.0000	SURCHARGED
240 minute winter	1.5	196	100.609	0.409	10.7	0.7225	0.0000	SURCHARGED
15 minute summer	1.6	1	100.130	0.000	4.3	0.0000	0.0000	OK
15 minute winter	4.0	10	102.251	0.051	7.5	0.0082	0.0000	OK
15 minute winter	5.0	10	100.647	0.047	6.8	0.0531	0.0000	OK
240 minute winter	5.1	184	100.607	0.297	3.3	0.5247	0.0000	OK
240 minute winter	TANK	188	100.606	0.306	14.0	57.5612	0.0000	SURCHARGED
15 minute winter	2.1	10	101.142	0.042	7.3	0.0118	0.0000	OK
15 minute winter	2.0	10	102.251	0.051	7.5	0.0082	0.0000	OK
15 minute winter	1.0	10	101.428	0.078	10.9	0.0879	0.0000	OK
15 minute winter	1.1	11	101.357	0.117	25.0	0.1327	0.0000	OK
15 minute winter	1.2	11	101.115	0.145	31.5	0.1637	0.0000	OK
15 minute winter	1.3	11	101.018	0.143	33.3	0.1615	0.0000	OK
15 minute winter	1.4	11	100.868	0.078	40.2	0.0877	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	3.0	3.000	3.1	3.9	1.077	0.144	0.0412	
15 minute winter	3.1	3.001	3.2	9.9	0.824	0.190	0.6755	
15 minute winter	3.2	3.002	3.3	15.3	1.375	0.293	0.2272	
15 minute winter	3.3	3.003	3.4	22.6	2.423	0.137	0.0793	
240 minute winter	3.4	3.004	1.5	-6.1	0.234	-0.083	1.4723	
240 minute winter	1.5	Hydro-Brake®	1.6	4.4				106.7
15 minute winter	4.0	4.000	3.3	7.3	1.387	0.244	0.1915	
15 minute winter	5.0	5.000	5.1	6.7	0.693	0.054	0.4211	
240 minute winter	5.1	5.001	TANK	2.9	1.001	0.026	0.0703	
240 minute winter	TANK	5.002	3.4	-11.1	-0.602	-0.100	0.0704	
15 minute winter	2.1	2.001	1.4	7.2	1.520	0.064	0.0240	
15 minute winter	2.0	2.000	2.1	7.3	1.387	0.244	0.1915	
15 minute winter	1.0	1.000	1.1	10.7	0.544	0.150	0.5263	
15 minute winter	1.1	1.001	1.2	24.3	0.834	0.331	1.8212	
15 minute winter	1.2	1.002	1.3	31.4	0.940	0.422	0.7036	
15 minute winter	1.3	1.003	1.4	33.0	1.413	0.444	0.4486	
15 minute winter	1.4	1.004	1.5	40.1	0.827	0.148	0.4262	

Results for 30 year Critical Storm Duration. Lowest mass balance: 95.28%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	3.0	10	102.256	0.056	7.5	0.0089	0.0000	OK
15 minute winter	3.1	10	101.953	0.093	19.3	0.0263	0.0000	OK
15 minute winter	3.2	11	101.435	0.130	29.6	0.0369	0.0000	OK
15 minute winter	3.3	10	101.178	0.078	42.7	0.0221	0.0000	OK
360 minute winter	3.4	304	101.074	0.784	17.4	1.3859	0.0000	SURCHARGED
360 minute winter	1.5	352	101.036	0.836	14.5	1.4764	0.0000	SURCHARGED
15 minute summer	1.6	1	100.130	0.000	4.4	0.0000	0.0000	OK
15 minute winter	4.0	10	102.273	0.073	14.1	0.0117	0.0000	OK
360 minute winter	5.0	352	101.039	0.439	2.2	0.4967	0.0000	SURCHARGED
360 minute winter	5.1	352	101.040	0.730	4.3	1.2901	0.0000	SURCHARGED
360 minute winter	TANK	344	101.036	0.736	22.9	138.4166	0.0000	SURCHARGED
15 minute winter	2.1	10	101.159	0.059	13.8	0.0167	0.0000	OK
15 minute winter	2.0	10	102.273	0.073	14.1	0.0117	0.0000	OK
15 minute winter	1.0	10	101.459	0.108	20.7	0.1227	0.0000	OK
15 minute winter	1.1	11	101.410	0.170	47.4	0.1921	0.0000	OK
15 minute winter	1.2	11	101.193	0.223	60.3	0.2524	0.0000	OK
15 minute winter	1.3	11	101.082	0.207	63.3	0.2339	0.0000	OK
360 minute winter	1.4	352	101.035	0.245	13.5	0.2775	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	3.0	3.000	3.1	7.4	1.276	0.272	0.0657	
15 minute winter	3.1	3.001	3.2	18.9	0.969	0.363	1.0802	
15 minute winter	3.2	3.002	3.3	29.2	1.626	0.557	0.3631	
15 minute winter	3.3	3.003	3.4	42.8	2.502	0.260	0.1814	
360 minute winter	3.4	3.004	1.5	-10.0	0.144	-0.137	1.4723	
360 minute winter	1.5	Hydro-Brake®	1.6	4.4				134.7
15 minute winter	4.0	4.000	3.3	13.8	1.639	0.461	0.3069	
360 minute winter	5.0	5.000	5.1	2.1	0.296	0.017	1.6246	
360 minute winter	5.1	5.001	TANK	6.5	0.977	0.058	0.0704	
360 minute winter	TANK	5.002	3.4	-16.4	-0.362	-0.147	0.0704	
15 minute winter	2.1	2.001	1.4	13.7	1.791	0.122	0.0387	
15 minute winter	2.0	2.000	2.1	13.8	1.639	0.461	0.3069	
15 minute winter	1.0	1.000	1.1	20.4	0.639	0.286	0.8475	
15 minute winter	1.1	1.001	1.2	46.1	0.963	0.629	2.9964	
15 minute winter	1.2	1.002	1.3	59.8	1.107	0.805	1.1395	
15 minute winter	1.3	1.003	1.4	63.2	1.637	0.851	0.7336	
360 minute winter	1.4	1.004	1.5	13.5	0.310	0.050	0.6638	

Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 95.28%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	3.0	10	102.284	0.084	14.6	0.0133	0.0000	OK
15 minute winter	3.1	10	101.999	0.138	37.6	0.0392	0.0000	OK
360 minute winter	3.2	344	101.904	0.599	9.9	0.1695	0.0000	SURCHARGED
360 minute winter	3.3	352	101.903	0.803	14.6	0.2272	0.0000	SURCHARGED
480 minute winter	3.4	408	101.907	1.617	27.1	2.8573	0.0000	SURCHARGED
600 minute winter	1.5	495	101.902	1.702	17.1	3.0071	0.0000	SURCHARGED
15 minute summer	1.6	1	100.130	0.000	4.4	0.0000	0.0000	OK
15 minute winter	4.0	10	102.316	0.116	27.4	0.0185	0.0000	OK
480 minute winter	5.0	392	101.905	1.305	3.4	1.4762	0.0000	SURCHARGED
720 minute winter	5.1	570	101.908	1.598	4.9	2.8244	0.0000	SURCHARGED
600 minute winter	TANK	570	101.901	1.601	27.1	301.0473	0.0000	SURCHARGED
600 minute winter	2.1	495	101.904	0.803	3.2	0.2274	0.0000	SURCHARGED
15 minute winter	2.0	10	102.316	0.116	27.4	0.0185	0.0000	OK
15 minute winter	1.0	12	102.270	0.920	40.2	1.0405	0.0000	SURCHARGED
15 minute winter	1.1	12	102.240	1.000	84.2	1.1306	0.0000	SURCHARGED
15 minute winter	1.2	12	101.911	0.941	106.7	1.0642	0.0000	SURCHARGED
600 minute winter	1.3	495	101.903	1.028	13.9	1.1628	0.0000	SURCHARGED
600 minute winter	1.4	495	101.903	1.113	16.0	1.2586	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	3.0	3.000	3.1	14.5	1.499	0.529	0.1089	
15 minute winter	3.1	3.001	3.2	37.0	1.112	0.709	1.7929	
360 minute winter	3.2	3.002	3.3	10.0	1.207	0.192	0.8020	
360 minute winter	3.3	3.003	3.4	14.0	1.523	0.085	0.2948	
480 minute winter	3.4	3.004	1.5	-15.6	-0.222	-0.215	1.4723	
600 minute winter	1.5	Hydro-Brake®	1.6	4.8				214.0
15 minute winter	4.0	4.000	3.3	26.8	1.878	0.894	0.5203	
480 minute winter	5.0	5.000	5.1	3.5	0.337	0.028	1.6246	
720 minute winter	5.1	5.001	TANK	8.5	0.941	0.076	0.0704	
600 minute winter	TANK	5.002	3.4	-21.6	-0.437	-0.195	0.0704	
600 minute winter	2.1	2.001	1.4	3.0	1.157	0.027	0.2002	
15 minute winter	2.0	2.000	2.1	26.8	1.873	0.894	0.5694	
15 minute winter	1.0	1.000	1.1	34.9	0.677	0.489	1.8653	
15 minute winter	1.1	1.001	1.2	80.3	1.140	1.095	4.3352	
15 minute winter	1.2	1.002	1.3	103.3	1.468	1.391	1.4858	
600 minute winter	1.3	1.003	1.4	13.4	1.029	0.181	1.3316	
600 minute winter	1.4	1.004	1.5	15.8	0.297	0.058	0.7076	