

Cown Top Lane, Rochdale

Report on Drainage Strategy to Accompany Planning Application

by

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Revision	Date	Prepared By	Revision Notes
-	June 23	LB	PRELIMINARY ONLY – WATER TREATMENT PROPOSAL.
B	June 24.	RB	Updated to suit latest planning layout.
C	June 24	LB	Added swale detail drawing.
D	July 24	LB	Updated Water Quality Treatment Assessment and Prelim Surface Water Strategy drawing.
E	July 24	LB	Changed for storm events up to and including 1in100yr 6 hour storm events from 40% to upper end allowance.

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List of Appended Drawings

1. Topographical Survey Drg No BH.TS.08_D
2. Preliminary Surface Water Strategy Drg. H8544-BAH-XX-XX-DR-CE-300003-P01
3. Preliminary Foul Water Strategy Drg. H8544-BAH-XX-XX-DR-CE-300004-P01
4. Preliminary Engineering Layout Drg. H8544-BAH-XX-XX-DR-CE-300001-P04/30002-P05
5. Proposed SUDs Details H8544-BAH-XX-XX-DR-CE-300120-P02/300121-P02
6. Proposed Pump Station 2 Civils GA - H8544-BAH-XX-XX-DR-DR-301500-P01

Appendices List

- A. FRA, Ciria SuDS Manual C753 and United Utilities S104 SuDS Guidance Doc
- B. Site Investigation inc Soakaway Test Results
- C. Info-drainage Simulations
 - a. 1 in 1 Year
 - b. 1 in 30 Year
 - c. 1 in 100 Year + Climate Change (Central Allowance of 30%)
 - d. Exceedance – (1:100yr + Upper Allowance Climate Change of 45%)

Introduction

A Full planning Application (ref 22/01190/FUL) was submitted for the development of the land south of Cown Top Lane, Castleton, Rochdale for up to 495 dwellings. The overall site is a Residential developer site which also includes associated access, car parking, landscaping and infrastructure.

The following document has been prepared to assist the designer's preparation and the readers understanding of the drainage theory and calculations in one reference document.

Site Details

Development Name	Cown Top Lane Rochdale
Site Address	Cown Top Lane, Rochdale, OL11 2PU
Longitude, Latitude (or OS Grid Ref)	389181; 410312
Site Description	The site currently consists of open fields separated by stock fencing. The fields are in use for grazing.
Topographical Survey Drg No	BH.TS.08_D
Site Area (Ha)	Approx. 20 Ha
Site Area for Calculation of Greenfield Run Off Rate (Ha)	19.65ha
Existing Permeable Area (Ha)	19.625ha
Existing Impermeable Area (Ha)	0.025ha
FRA Report Reference	881680 R1(07) FRA
Is the Site Steeply Sloping (Y/N), If "Yes" Typical Gradient.	Yes- average gradient of 1 in 6.

Table 1

Pre-development Greenfield Run-off Rates and Volumes

Refer to the site specific FRA produced by 881680 R1(07) FRA dated August 2022

Return Period	Greenfield Rate (L/s)
Qbar Total Site Area (l/s)	144.60
1 in 1 Year (l/s)	125.80
1 in 30 Year (l/s)	245.20
1 in 100 Year (l/s)	300.80

Table 2

Where compliance to 100 year volumetric criterion is not provided, the limiting discharge for any return period up to the 100 year 6 hour event, shall be not greater than Qbar or 2L/s/Ha, whichever is greater.

Soakaway Testing

A site specific site investigation was carried out by Smith Grant dated September 2017. A copy of the site investigation is presented in Appendix B

Ground conditions are typically 0.4m of topsoil overlaying Hummocky Glacial Deposits recorded to 20.45m bgl – not bottomed out. Soils comprised sand and silt but with local variation of clay and gravel.

8No soakaway tests were carried out as part of the site investigation.

Infiltration rates in the order of 1×10^{-6} were experienced; therefore the soakaway test results indicate that infiltration drainage is NOT a feasible option.

Post-Development Surface Water Allowable Discharge Rates

Discharge rates have been limited to existing greenfield runoff rates of Qbar for all storm return periods. Refer to the Phase specific FRA, and Table 2 above for details of the greenfield runoff rates.

	Qbar	1 in 1 Year	1 in 30 Year	1 in 100 Year
Developable Area (Ha)	Allowable Discharge Rate L/s	Allowable Discharge Rate L/s	Allowable Discharge Rate L/s	Allowable Discharge Rate L/s
13.55 (increases to 13.98 when allowing for access roads)	102.89	89.47	174.47	214.03
Western Parcel 6.44ha	47.39	41.21	80.37	98.59
Eastern Parcel 7.56ha	55.64	48.38	94.34	115.74

Table 3

Summary of Drainage Design

Summary of Existing Drainage Scenario

A full assessment to monitor the onsite flows was undertaken, two valley features orientated to the north-east and to the south-west are found within the eastern and western half of the site. The flow data collected from these locations are considered very low and it is anticipated that the flows from these springs are negligible (RSK 881680 R1 FRA Appendix A).

The existing site is steeply sloping, falling from North to South. The existing land form can largely be considered as split into eastern and western flanks, each with their own on-site catchment areas naturally dished and conveying run-off southwards towards the receiving watercourse Trub Brook.

Trub Brook has historically been dammed to form several mill ponds with interconnecting channels and weirs and which are currently used as fishing lodges.

Discussions with the fishing club along with drainage investigation work have suggested that the majority flow entering the lodges comes from third party lands to the East entering the upstream inlet to 'John Player Lodge'. Flows from this source are believed to cascade through a series of fishing lodges: John Player Lodge > Eddie Fletcher Lodge > Starch Lodge > Bottom Lodge > to outfall.

The Western half of the development parcel witnesses some minor field drainage in its southern lower lying region, with undersized informal connections to Trub Brook' within the reach of 'Bottom Lodge'. Existing flows from the western half of the development parcel are therefore seen to enter Trub Brook at a point downstream of the main fishing lodges, only passing through 'Bottom Lodge'.

The southern end of the Eastern section witnesses the beginnings of collects and channelization, which is identified on OS as being the head of a watercourse. Drainage investigations and discussions with the fishing club have identified that existing flows from the Eastern half of the proposed development

channelize to a watercourse and provide one of 2no. feeds for 'Tom Meyrick Lodge'. The other feed is a further watercourse/ditch that is shown on OS, that is seen to run centrally within the development parcel, with a nominal contributing area.

Tom Meyrick Lodge then has a controlled outfall into 'Nursery Lodge' prior to outfall into the main line, upstream of Bottom Lodge.

Investigations and discussions have not shown any other upstream connectivity/feeds into Tom Meyrick and Nursery Lodge, which are both thought to be off-line from the main East-west cascading lodges fed by waters from the East.

Existing land falls suggest that a small south-eastern catchment within the Eastern parcel currently flows overland southwards towards 'John Player Lodge', bypassing Meyrick and Nursery Lodge.

Exploring Drainage Solutions

In accordance with the National Planning Practice Guidance, Paragraph 80, proposed development should drain in-line with the drainage hierarchy:

1. Into Ground (Infiltration via Soakaway Techniques)
2. To a Surface Water Body.
3. To a Surface Water Sewer or Highway Drain.
4. To a Combined Sewer.

In order to try to adhere to this hierarchy, Infiltration techniques were considered first.

Infiltration testing was been undertaken to the site by Smith Grant LLP in September 2017. As presented within the RSK FRA, the results provided an early estimate of the potential infiltration rates, giving a range of between 1.4×10^{-7} m/s up to 1.9×10^{-6} /. These rates were not considered to be conducive to the use of traditional soakaway designs, as necessary half-drain times will not be achieved.

As the site will undergo a major cut/fill operation, advice was sought from the geotechnical engineers preparing the remediation and compaction specification. Their recommendations were that directly draining to ground would conflict with the compaction strategy, associated with the sand particle size present across the site. Draining via infiltration techniques was therefore ruled out as non-feasible.

Neither drainage hierarchy options 3 or 4, (which are the last options available) were considered viable as none of these features are present within reasonable or achievable distances from the site boundary.

Drainage hierarchy option 2 was assessed. - To Surface Water Body.

As reported within the RSK FRA and the topo survey contours contained within, the existing site is seen to run-off at green-field run-off rates southwards to an existing watercourse (Trub Brook) that has been historically dammed, initially to form mill ponds/reservoirs, but are now interconnecting fishing lakes. As these are currently partially fed from surface water run-off from the development site, this option was deemed to be the most suitable surface water discharge option, by both discharging to a surface water body and by providing a means of continuing surface water flows in a way that mimics existing flow paths and to keep the fishing lodges topped up.

Initial discussions with the fishing club suggested that the principle of maintaining flows to the Tom Meyrick and Nursery Lodges would be beneficial to prevent these being starved of fresh flows, given

that these are not replenished by any other means. This though is subject to them being in receipt of full proposals.

Summary of Chosen Drainage Design

The drainage has been designed in accordance with the site specific FRA produced by RSK dated August 2022.

The drainage has also been designed to comply with DEFRA's Non-statutory technical standards for sustainable drainage systems dated March 2015. Compliance to such is demonstrated in Section 15.

Following review of the existing drainage situation, the proposed surface water strategy is to mimic the existing green-field run-off situation, by discharging surface water flows southwards to Trub Brook, which has historically been dammed to form several mill ponds with interconnecting channels and weirs and which are currently used as fishing lodges.

To match the on-site flow routes the proposed surface water drainage will be split into 3no. outfall routes, each limited to the pre-development Greenfield runoff rates equivalent to the developable area, as recommended within the Flood Risk assessment 'RSK 881680 R1 FRA Appendix A', $Q_{Bar}=7.36 \text{ l/s/Ha}$.

Restricting the proposed flow rates to existing green-field run-off rates (Q_{Bar}) results in the requirement of on-site surface water attenuation. For this development, there is a requirement to provide attenuation for all flows up to an including the 1 in 100 year storm event plus a 40% allowance for climate change. For this semi-rural setting, it is proposed that the necessary attenuation will be provided in the form of 'SUDS' (Sustainable Urban Drainage Systems). This can also provide benefits to water quality, along with amenity benefits compared to piped systems.

The steep nature of the site, rendered the provision of open SUDs features as challenging, though feasible.

Western System – Network 1

The Western parcel will be via a new surface water outfall adjacent to an existing drainage pipe into a watercourse at 47.39 l/s . As per the above discussion, this bypasses most of the fishing lodge networks entering 'Bottom Lodge'.

Positioning of a SUDs feature to accommodate the lower-lying southern leg of the site isn't feasible, due to land constraints and steeply sloping ground. The proposal for this Network therefore is to have the surface water attenuation split over two levels. The majority of the site is to pass through an area of 3no. cascading SUDs Basins designed to Ciria Guidance, whilst the nominal additional surface water attenuation required for the lower-lying roadway/emergency access will be accommodated within oversized pipes.

Discussions with Rochdale Planning Officers to date have raised opportunity to introduce further SUDs features in the form of drainage swales with check dams further up the system.

On geotechnical consultants advice, infiltration from these features is not considered viable due to the particle size of the sands/silts available on site. Therefore although there will be benefits of evapotranspiration and from plant uptake that will provide some level of volumetric reduction, volumetric reduction via infiltration can not be accommodated into the design.

Network 1 will be restricted to $Q_{BAR}=47.39 \text{ l/s}$.

Eastern Systems – Networks 2 and 3

Again, attenuation storage for the eastern outfall is provided in the form of SuDS in public open spaces in the form of attenuation basins to Ciria guidance.

Routing the surface water flows from the Eastern parcel to a point downstream of the fishing lodges isn't deemed viable due to level and clashes with existing lodge connecting pipes. Outfall from the Western parcel will therefore be via a new surface water outfall to a proposed discharge point to the upstream of 'Eddie Fletcher Lodge at a maximum permissible discharge rate of 45.64l/s via means of a mechanical flow control device.

'Topping up' of 'Tom Meyrick Lodge' and 'Nursery Lodge' is proposed by discharging a nominal 10 l/s into the existing watercourse upstream of Tom Meyrick Lodge from Network 2.

The 2no. Eastern systems (Network 1 and Network 2) therefore will discharge a total maximum discharge rate of 55.64 l/s.

Summary of Proposed Flows against Existing

Infodrainage simulations are available in Appendix C

Return Period	Western Parcel Proposed Discharge Rate (Network 1)	Western Parcel Proposed Discharge Rate
1 in 1 Year (l/s)	41.21	18.60
1 in 30 Year (l/s)	47.39	29.10
1 in 100 Year (l/s)	47.39	40.10
1 in 100+40cc Year (l/s)	47.39	47.39

Table 6

Return Period	Eastern Parcel Proposed Discharge Rate (Network 2)	Eastern Parcel Proposed Discharge Rate (Network 3)	Total Eastern Parcel Discharge Rate
1 in 1 Year (l/s)	18.60	9.40	28.00
1 in 30 Year (l/s)	28.70	10.00	38.70
1 in 100 Year (l/s)	32.90	10.00	42.90
1 in 100+40cc Year (l/s)	45.64	10.00	55.64

Table 7

Design Parameters

A summary of the design presented:

NETWORK 1	
Surface Water Drainage Strategy Plan	H8544-BAH-XX-XX-DR-CE-300003-P01
Proposed Impermeable Areas Drg No	H8544-BAH-XX-XX-DR-CE-300260-P01
Foul Water Drainage Strategy Plan	H8544-BAH-XX-XX-DR-CE-300004-P01
Urban Creep included in Design	10%
Lowest FFL	159.00. (NB: FW Pump Station 1 CL=158.65)
Level at lowest point u/s of storage (first flood point)	157.80 – Lowest gully on Road 1.
Designed Maximum TWL within Basin	156.20m –Thus OK
M5-60	19
Ratio R	0.287
MADD Factor	2.0
Climate Change Allowance (Central Allowance)	30%
Discharge location minimum level	143.47
Surcharged Outfall Level	143.17 (Lower than flow control invert, so n/a)
Point of Connection	Watercourses-Trub Brook to the south of the site. Entering Eddie Fletcher Lodge
Point of Connection Approved By UU (Y/N)	Foul Connections-Yes. SW-Subject to approval by LLFA/EA & Fishing Club.

Table 4

NETWORK 2	
Surface Water Drainage Strategy Plan	H8544-BAH-XX-XX-DR-CE-300003-P01
Proposed Impermeable Areas Drg No	H8544-BAH-XX-XX-DR-CE-300260-P01
Foul Water Drainage Strategy Plan	H8544-BAH-XX-XX-DR-CE-300004-P01
Urban Creep included in Design	10%
Lowest FFL	159.75
Level at lowest point u/s of storage (first flood point)	159.0 (Gable of plot D080)
Designed Maximum TWL within Basin	157.80 Thus OK
M5-60	19
Ratio R	0.287
MADD Factor	2.0
Climate Change Allowance (Central Allowance)	30%
Discharge location minimum level	149.85
Surcharged Outfall Level	149.00 (Lower than flow control invert, so n/a)
Point of Connection	Watercourse-tributary to south. Entering 'Tom Meyrick Lodge' then on to Trub Brook via 'Nursery Lodge'
Point of Connection Approved By UU (Y/N)	Foul Connections-Yes. SW-Subject to approval by LLFA/EA & Fishing Club.

Table 5

NETWORK 3	
Surface Water Drainage Strategy Plan	H8544-BAH-XX-XX-DR-CE-300003-P01
Proposed Impermeable Areas Drg No	H8544-BAH-XX-XX-DR-CE-300260-P01
Foul Water Drainage Strategy Plan	H8544-BAH-XX-XX-DR-CE-300004-P01
Urban Creep included in Design	10%
Lowest FFL	157.15
Level at lowest point u/s of storage (first flood point)	156.25 (Road close to pumpstation 2)
Designed Maximum TWL within Basin	154.60 Thus OK
M5-60	19
Ratio R	0.287
MADD Factor	2.0
Climate Change Allowance (Central Allowance)	30%
Discharge location minimum level	149.85
Surcharged Outfall Level	149.00 (Lower than flow control invert, so n/a)
Point of Connection	Watercourse-Trub Brook to the south of the site. Entering Eddie Fletcher Lodge
Point of Connection Approved By UU (Y/N)	Foul Connections-Yes. SW-Subject to approval by LLFA/EA & Fishing Club.

Table 6

Design for Exceedance

As per DEFRA guidance, all surface water drainage models have been modelled for storm events greater than the 1 in 100 Year plus Central Allowance climate change event to determine the impact of flooding. DEFRA climate change allowances are provided on <https://environment.data.gov.uk> website. As of June 2024, using the 2070s epoch, Rochdale Borough Councils requirement for uplift for climate change is given as 30%. This has been duly used as the basis for the above modelling and forms the general design criteria, to which Basin top water levels, freeboard and Ciria guidance is applied.

In addition to ensuring that the SUDs features are designed to meet the above criteria, consideration must also be given by the designer to demonstrate the impact on the system and development for rainfall events that exceed those above and beyond the design criteria (Exceedance).

The DEFRA website therefore provides further uplifted percentage in climate change figures for the 'Upper End Allowance'. For Rochdale MBC, this is provided as 45% Upper End Climate Change. For this exceedance event, the designer is to demonstrate how the exceedance flows will be via controlled flooding and/or directed. i.e an acceptable example of this would be by demonstrating that these additional exceedance volumes may be partially or fully contained within the free-board of any SUDs basins/ponds/swales, or by demonstrating that exceedance flood routing safely passes overland without flooding existing or proposed property thresholds.

The Flood locations for this site are shown on the attached Flood Routing and over land flow drawing. Any exceedance flooding has been demonstrated to be managed within the site where reasonably practicable.

This demonstrates that existing or proposed properties are unlikely to flood during extreme flood events.

Water Quality Treatment Assessment

1. Background

The following is based upon CIRIA SuDS C753 Manual Chapter 26.

Land use is the primary influencing factor in the quality of urban surface water run-off. Determining the hazard posed by the different land use activities, and the extent to which underlying soils and/or proposed treatment components reduce the associated risk, can be done using a variety of methods.

Table 4.3 sets out which of these methods are required, for different generic land use types and receiving waters.

Land use	Pollution hazard level	Requirements for discharge to surface waters, including coasts and estuaries ²	Requirements for discharge to groundwater
Residential roofs	Very low	Removal of gross solids and sediments only	
Individual property driveways, roofs (excluding residential), residential car parks, low traffic roads (eg cul de sacs, home zones, general access roads), non-residential car parking with infrequent change (eg schools, offices)	Low	Simple index approach ³ <i>Note: extra measures may be required for discharges to protected resources¹</i>	
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	Simple index approach ³ <i>Note: extra measures may be required for discharges to protected resources¹</i>	Simple index approach ³ <i>Note: extra measures may be required for discharges to protected resources¹</i> In England and Wales, Risk Screening ⁴ must be undertaken first to determine whether consultation with the environmental regulator is required. In Northern Ireland, the need for risk screening should be agreed with the environmental regulator.
Trunk roads and motorways	High	Follow the guidance and risk assessment process set out in HA (2009)	
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured, industrial sites	High	Discharges may require an environmental licence or permit ⁵ . Obtain pre-permitting advice from the environmental regulator. Risk assessment is likely to be required ⁶ .	

For residential sites from Table 4.3, the pollution hazard level is Low, and the preferred design method is the **Simple Index Approach**.

2. Simple Index Approach

The Simple Index Approach is summarised in CIRIA SuDS manual C753 Box 26.2, and is applied to this development.

BOX 26.2 Steps of the simple index approach

- Step 1** – Allocate suitable pollution hazard indices for the proposed land use
- Step 2** – Select SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index
- Step 3** – Where the discharge is to protected¹ surface waters or groundwater, consider the need for a more precautionary approach
- Note:**
- 1 Designated as those protected for the supply of drinking water (Table 4.3).

3. Step 1 – Allocate Suitable Pollution Hazard Indices for the Proposed Land Use

We can allocate the pollution hazard indices using CIRA SuDs manual C753 Table 26.2

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

To improve water quality management, guidance has been followed by using a point scoring system based on pollution hazard indices for different land use classifications from CIRA SuDs manual C753 (See Water Quality Treatment Assessment table 26.2) in Appendix D.

The site falls into the low pollution hazard level; in order to provide adequate treatment, the selected detention basin SuDs component will have a total mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index from the CIRA SuDs manual C753 (See Water Quality Treatment Assessment table 26.3).

Additional pre-treatment will be provided in the form of catch-pit manholes upstream of the detention basin which is an additional design requirement presented in the S104 SuDs guidance document by the adopting water and wastewater undertaker (United Utilities).

The use of petrol interceptors as a type of pre-treatment was discussed via email with the adopting water and wastewater undertaker (United Utilities). Their response is attached in appendix D, and it states that they will not adopt petrol interceptors into their network.

For storm events exceeding 1 in 30 year rainfall events, long term storage is provided in above ground storage areas to ensure no flooding to properties occurs for all storm events up to and including 1 in 100 year 6 hour storm event plus a Upper end allowance for climate change (DEFRA).

Some minor flooding to highways is accepted for the 1 in 100 year 6 hour event. Volumes of flooding are shown on the attached info-drainage simulations in Appendix C. Flooding is only permitted where it can be demonstrated that minor flooded is contained wholly within the adopted highway and will Not flood properties. The location and flood extent are shown on the Flood Routing and Overland Flow drawing.

On this development we have:

- Residential Roofs
- Individual Property Driveways
- Low Traffic Roads

The Pollution Hazard Indices are as follows:

Pollution Hazard Indices – Residential Roofs	
Pollution Hazard Level	Very Low
Total Suspended Solids	0.2
Metals	0.2
Hydrocarbons	0.05

Pollution Hazard Indices – Driveways & Low Traffic Roads	
Pollution Hazard Level	Low
Total Suspended Solids	0.5
Metals	0.4
Hydrocarbons	0.4

4. Step 2 – Select SuDS

We must select SuDS with total pollution mitigation indices which equal or exceed the maximum pollution hazard index identified in Step 1 (driveways and low traffic roads). As this site discharges to a watercourse we use CIRA SuDs manual C753 Table 26.3.

Total SuDS Mitigation Index >= Pollution Hazard Index [for each contaminant type]

Where the mitigation index of an individual component is insufficient, two components (or more) in series will be required, known as a SuDS Management Train.

$$\text{Total SuDS Mitigation Index} \geq \text{Mitigation Index}_1 + 0.5 \times \text{Mitigation Index}_2 + 0.5 \times \text{Mitigation Index}_3$$

A factor of 0.5 is used to account for the reduced performance of the secondary or tertiary components associated with already reduced inflow concentrations.

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters				
Type of SuDS component	Mitigation indices ¹			
	TSS	Metals	Hydrocarbons	
Filter strip	0.4	0.4	0.5	
Filter drain	0.4 ²	0.4	0.4	
Swale	0.5	0.6	0.6	
Bioretention system	0.8	0.8	0.8	
Permeable pavement	0.7	0.6	0.7	
Detention basin	0.5	0.5	0.6	
Pond ⁴	0.7 ³	0.7	0.5	
Wetland	0.8 ³	0.8	0.8	
Proprietary treatment systems ^{5,6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.			

Notes

- 1 SuDS components only deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters.
- 2 Filter drains can remove coarse sediments, but their use for this purpose will have significant implications with respect to maintenance requirements, and this should be taken into account in the design and Maintenance Plan.
- 3 Ponds and wetlands can remove coarse sediments, but their use for this purpose will have significant implications with respect to the maintenance requirements and amenity value of the system. Sediment should normally be removed upstream, unless they are specifically designed to retain sediment in a separate part of the component, where it cannot easily migrate to the main body of water.
- 4 Where a wetland is not specifically designed to provide significantly enhanced treatment, it should be considered as having the same mitigation indices as a pond.
- 5 See Chapter 14 for approaches to demonstrate product performance. A British Water/Environment Agency assessment code of practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: <http://tinyurl.com/qf7yuj7>
- 6 SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. SEPA (2014) also provides a flowchart with a summary of checks on suitability of a proprietary system.

The FRA suggest that one level of treatment is required for residential roof, driveways and low traffic roads. The drainage strategy has all water drainage draining via adopted sewers to an adopted detention basin. The following simple index approach will demonstrate whether the detention basin alone is considered suitable for water quality treatment.

Residential Roofs			
Pollution Hazard Indices		SuDS Mitigation Indices from Table 26.3	
		Detention Basin	
Total Suspended Solids	0.2	0.5	
Metals	0.2	0.5	
Hydrocarbons	0.05	0.6	

Driveways & Low Traffic Roads				
Pollution Hazard Indices		SuDS Mitigation Indices from Table 26.3		
		Detention Basin		
Total Suspended Solids	0.5	0.5		
Metals	0.4	0.5		
Hydrocarbons	0.4	0.6		

The Total SuDS Mitigation Index [shown in Green] are $\geq$ Pollution Hazard Index [for each contaminant type] and therefore deemed to comply with the requirements of the simple index approach of the SuDS manual.

To further improve water quality management, two mitigation components will be added in the form of a sediment forebay set at the 1 in 30 yr level; greater than 10 m² will be formed by building a rock-filled gabion after the inlet (see chapter 23.8.1. CIRIA C753) and a small wetland area at a shallow depth of 0.8m at the outlet (see chapter 23.1. CIRIA C753). Keeping the permanent water shallow allows oxygen to reach the bottom of the pond, enabling the biodegradation of oils by natural organisms (see chapter 23.2 of CIRIA C753). This is subject to approval by United Utilities.

Residential Roofs, Driveways & Low Traffic Roads					
Pollution Hazard Indices		SuDS Mitigation Indices from Table 26.3			Total SuDS Mitigation Index
		Detention Basin	Wetland (x0.5)	Pre-treatment system/sediment control (x0.5)	
Total Suspended Solids	0.5	0.5	0.8 (0.4)	0.5 (0.25) ¹	1.150
Metals	0.5	0.5	0.8 (0.4)	0.5 (0.25) ¹	1.150
Hydrocarbons	0.5	0.6	0.8 (0.4)	0.6 (0.3) ¹	1.30

Notes

1. There is no level of betterment in the SuDS mitigation indices for pre-treatment systems or sediment control. A sediment forebay is the only suitable management option at the site to provide effective pre-treatment (that removes coarse sediments and floating oils). The sediment deposition area may be designed to be intermittently dry, which will aid the biodegradation of organic pollutants. Planting will be used to screen and/or enhance sediment deposition areas (see chapter 23.1 of CIRIA C753). So, an approximate point score has been indicated as a level of treatment.
2. Additional SUD features in the form of drainage swales with check dams have been added further up the system. A fraction of Network 1 flows via the SUD components. Consequently, incorporating an additional degree of pre-treatment will elevate the total within the overall SuDS mitigation index for that section of Network 1. Since the SuDS only partially pre-treats Network 1, it is deemed appropriate to acknowledge an increase in mitigation without including it in the final total shown in the table above.

Water Quality Treatment Assessment Summary

Table 26.2 of the CIRIA SuDs manual C753 shows that one type of SuD provides enough mitigation to fulfil the LOW pollution hazard index for different land use classifications.

Multiple SuD components have been introduced after the initial SuD, in a series known as a Management Train, before the outfall to the fisheries. This will minimise pollution hazards by more than twice the required values stated in table 26.2 from the CIRIA SuDs manual C753.

Therefore, the SuDs management train specified above provides more than enough treatment to remove pollution hazards and contaminants upstream of the fisheries.

Foul Water Strategy

A pre-development enquiry was sent to United Utilities in 2019, requesting confirmation on their stance on possible foul water outfall points for the development. This queried whether connection northwards to an existing foul sewer in Cowm Top Lane, or a connection to an existing foul sewer just within 3rd party land north of Trows Lane would be acceptable. An emailed was received on the 05.03.2019 confirming that either connection point would be acceptable.

The existing land form falls southwards via two main flanks (East and West). A gravity solution down the western emergency access to Trows Lane is deemed technically feasible for the Western Parcel and could extend eastwards in order to also serve the northern half of the Eastern parcel though would involve a sewer requisition to enter the discharge point (UU MH 5012, or unreferenced UU MH some 10m upstream). Trows Lane is a narrow concrete roadway containing various existing services and with a steep sided embankment down to Trows Brook along its southern kerbline. The laying of this gravity connection along Trows Lane would result in the likely temporary full closure of Trows Lane for the duration of the works, with no other access route available for the existing residents, businesses and leisure facilities that it serves.

A gravity system is deemed to be unfeasible for the lower Eastern parcel, as excessive lengths of off-site sewers would have to be routed through various third party lands including the fisheries land in close proximity to the fishing lodges. A pumped solution is therefore required for at least the lower Eastern parcel.

It is understood that the existing adopted/adoptable foul sewer within Cowm Top has been installed by the associated commercial developers. The proposed drainage strategy and detailed design for the foul drainage on site is via two pumped systems northwards to the head of this existing foul water manhole in Cowm Top Lane, as denoted on the Preliminary Foul Water Drainage Strategy plan H8544-BAH-XX-XX-DR-CE-300004, rev P01. This existing system then falls northwards away from the development site.

Both foul water pump-stations will be put forward for adoption by United Utilities. To meet UU standards, each will hold emergency foul storage to current DSG drainage guidance standards and will both have telemetry fitted so as the performance of each can be monitored by United Utilities. Following concerns raised by the Fishing Club as to the need for a visual warning that the pump-station may be failing, Pumpstation civils GA drawing H8544-BAH-XX-XX-DR-DE-301500-P01 has been prepared to demonstrate how a localised bund will be incorporated around the rear of Pump-station 2. United Utilities will also be asked for permission for ourselves to include a warning light on Pump-station 2, though is subject to their approval at detailed design.

Maintenance

All Surface Water (coloured Blue) on the attached preliminary Surface Water Drainage Strategy drawing, will be put forward for adoption under a S104 agreement with United Utilities. Prior to issue of the Vesting Declaration by United Utilities, the drainage shown on the included plan will be maintainable by Barratt Manchester and at the expense of Barratt Manchester.

All areas of public open space will be transferred to the management company for adoption and maintenance. This includes the Overflow areas/Ponds on the attached SUDs GA Plans. The management and maintenance will be funded by the purchasers/owners of the development by way of an annual fee levied on the owner. In order to ensure the long term operation of the swales, the maintenance contract will stipulate regular maintenance of the SUDS network, in accordance with this management plan.

All highway gullies and highway drains on the attached plan will be put forward for adoption under a S38 agreement with Rochdale Borough Council. After issue of the highway final certificate, the highway and Highway Drains, Gullies, and gully pipes on the S38 plan, will be maintainable by the Local Highway Authority at public expense. Prior to issue of the final Certificate by Rochdale Borough Council, the highway drains shown on the included plan will be maintainable by Barratt Manchester and at the expense of Barratt Manchester.

All Foul drainage (coloured Brown) on the attached Preliminary Foul Water Drainage Strategy Plan will be put forward for adoption under a S104 agreement with United Utilities. Prior to issue of the Vesting Declaration by United Utilities, the drainage shown on the included plan will be maintainable by Barratt Manchester and at the expense of Barratt Manchester.

A draft inspection & maintenance schedule for elements of the SUDS/Drainage infrastructure is shown in Table 8 & 9.

Drainage Element	Maintenance Requirement	Frequency
Surface Water Pipes and Manholes (prior to adoption)	Inspect. Remove excess silt & debris, Clear Blockage	Inspect Annually. CCTV if required. Silt & debris removed as necessary.
Catchpits	Inspect. Remove excess silt & debris, Clear Blockage	Inspected every 3 months. Silt & debris removed as necessary.
Ditches/Swales	Inspect. Remove excess vegetation. Clear blockages, silt & debris.	Inspected every 1 Month. Blockages, silt & debris removed as necessary.
Flow Controls	Inspect. Remove excess silt & debris, clear blockage. Test functionality of Bypass doors.	Inspect Annually Silt & debris removed as necessary. Flow control repaired, maintained as necessary.
Overflow Ponds (and POS)	Inspect. Remove excess vegetation. Clear blockages, silt & debris.	Inspected monthly, or after significant storm events. Blockages, silt & debris removed as necessary.

Table 8

Maintenance of the Adoptable Detention Basin:

Responsible Organisation	Basin	Frequency
Private Management Company	Remove litter and debris	Monthly or as required
	Cut the grass	
	Inspect the bankside vegetation and remove nuisance plants	
United Utilities (after adoption)	Inspect and clear blockages	Monthly or as required
	Inspection water for signs of reduced water quality	
United Utilities (after adoption)	Inspect silt accumulation rates. Undertake contamination testing	Half yearly
	Check flow controls	
Private Management Company	Remove excess vegetation	Annually
	Tidy all dead growth prior to growing season	
United Utilities (after adoption)	Remove sediment from one quadrant of the main body of basin	Every 1-5 years or as required

Table 9

5. DEFECT REPORTING

Prior to adoption of the highway drains, foul drains, Surface water drains or SUDS, defects may be reported to Barratt Manchester by the local authority, local residents or members of the public.

All defects are can be reported to Barratt Manchester Customer Care Line using the following details:

Email: manchester@newhomecare.co.uk

Phone number during office hours: 0161 447 5800 option 3

Phone number out-of-hours: 0345 6016084

The customer care line normal working hours are Monday to Friday 9am to 5.30pm, excluding bank holidays. For reports of defects outside normal working hours, a 24 hours out of hours call centre is in operation.

After adoption, the following numbers may be useful.

Management Company: TBC

Rochdale Borough Council

Highway Issues should be reported online at:

<https://www.rochdale.gov.uk/roadworks-repairs-restrictions>

Tel: 0300 303 8879 - Monday to Friday 8.30am to 5.30pm (excluding bank holidays)

Email: highways@rochdale.go.uk

United Utilities

Tel: 0345 672 3723

Environment Agency

Tel: 0800 80 70 60 (24 Hours)

6. RESPONSE TIMES

All non-urgent defects will be repaired within 10 weeks of being reported.

All urgent defects will be made safe within 48 hours, or sooner if practicable. Any works to “Make Safe” may be of a temporary nature in order to protect the public, and allow sufficient time to procure the permanent remedial works. This may include temporary “fencing off” of the hazard until permanent remedials can be completed.

United Utilities, LA, EA and The Management Company may operate to alternative response times.

Compliance with DEFRA’s Non-statutory Technical Standards for Sustainable Drainage Systems dated March 2015

Flood risk outside the development

Criteria	Designers Comments
S1 Where the drainage system discharges to a surface water body that can accommodate uncontrolled surface water discharges without any impact on flood risk from that surface water body (e.g. the sea or a large estuary) the peak flow control standards (S2 and S3 below) and volume control technical standards (S4 and S6 below) need not apply.	The surface water discharges to existing watercourse/sewer, therefore this criteria does not apply.

Peak flow control

Criteria	Designers Comments
S2 For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should never exceed the peak greenfield runoff rate for the same event.	All proposed discharge rates are less than or equal to Qbar. All proposed discharge rates are less than or equal to the equivalent greenfield discharge rate. Therefore this criteria is deemed to comply.
S3 For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.	The site is greenfield therefore not applicable. Therefore, this criteria is deemed to comply.

Volume control

Criteria	Designers Comments
S4 Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.	As the infiltration test results do not allow infiltration drainage, it is not possible to reduce the run-off volume to the greenfield volume, therefore Criteria S6 will apply.
S5 Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.	The site is Greenfield therefore not applicable.
S6 Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with S4 or S5 above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.	As the infiltration test results do not allow infiltration drainage, it is not possible to reduce the run-off volume to the greenfield volume, therefore the discharge rate has been reduced to the equivalent greenfield discharge rate for all rainfall events up to and including 1 in 100 year 6 hour event.

Flood risk within the development

Criteria	Designers Comments
S7 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30 year rainfall event.	The drainage system has been designed to ensure no flooding occurs for any part of the site for a 1 in 30 year event. Info drainage simulation for a 1 in 30 year event are attached in Appendix C
S8 The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100 year rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.	The drainage system has been designed to ensure no flooding to properties occurs for any part of the site for a 1 in 100 year 6 Hour event. For flows in excess of the 1 in 30 year event, flows are allowed to overflow into Long Term Storage areas located in public open spaces. Some minor flooding to highways is accepted for the 1 in 100 year 6 hour event. Flooding is only permitted where it can be demonstrated that minor flooded is contained wholly within the adopted highway and will not flood properties. The location and flood extent are shown on the Flood Routing and Overland Flow drawing. Info drainage simulation for a 1 in 100 year event are attached in Appendix C
S9 The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1 in 100 year rainfall event are managed	All surface water drainage models have been modelled for storm events greater than the 1 in 100 Year event to determine the impact of flooding. Any exceedance flooding has been demonstrated to be managed within the site where reasonably practicable.

Structural Integrity

Criteria	Designers Comments
S10 Components must be designed to ensure structural integrity of the drainage system and any adjacent structures or infrastructure under anticipated loading conditions over the design life of the development taking into account the requirement for reasonable levels of maintenance.	All Sewers are to be covered under a S104 agreement with United Utilities for future adoption. All sewers to be built to UU adoptable standards. A 12 month maintenance period is standard with all S104 sewers
S11 The materials, including products, components, fittings or naturally occurring materials, which are specified by the designer must be of a suitable nature and quality for their intended use.	All main sewers to be constructed to adoptable standards. All SUDS to be constructed in accordance with the Typical details as provided.

Designing for maintenance considerations

Criteria	Designers Comments
S12 Pumping should only be used to facilitate drainage for those parts of the site where it is not reasonably practicable to drain water by gravity.	A Foul ONLY Pump Stations is provided only where it is not possible to drain foul by gravity.

Construction

Criteria	Designers Comments
S13 The mode of construction of any communication with an existing sewer or drainage system must be such that the making of the communication would not be prejudicial to the structural integrity and functionality of the sewerage or drainage system.	All Sewers are to be covered under a S104 agreement with United Utilities for future adoption. All sewers to be built to UU adoptable standards. The connection to the existing sewer will be in accordance with United Utilities Requirements and a Part 2 Application. Connection to the ordinary watercourse will require LLFA land drainage consent. Details of the works will be submitted to the LLFA for subsequent approval. No works to within 8m of an ordinary watercourse will be permitted without LLFA approval.
S14 Damage to the drainage system resulting from associated construction activities must be minimised and must be rectified before the drainage system is considered to be completed.	All Sewers are to be covered under a S104 agreement with United Utilities for future adoption. All sewers to be built to UU adoptable standards. A 12 month maintenance period is standard with all S104 sewers. Connection to the ordinary watercourse will require LLFA land drainage consent. Details of the works will be submitted to the LLFA for subsequent approval. No works to within 8m of an ordinary watercourse will be permitted without LLFA consent. LLFA consent will be formally requested post planning approval.

Appendices

Drawings
Topographical Survey

PRISM VOLUMES : PROJECTION TO GL							
Group	Volumes			Areas		Ave Depths	
	Cut/Material	Fill/Void	Balance	Cut/Material	Fill/Void	Cut/Material	Fill/Void
STOCKPILE 01	3.87	0.00	3.87	33.60	0.00	0.115	0.000
STOCKPILE 02	3.43	0.00	3.43	18.60	0.00	0.164	0.000
STOCKPILE 03	1.98	0.00	1.98	10.99	0.00	0.180	0.000
STOCKPILE 04	9.30	0.00	9.30	58.07	0.00	0.160	0.000
STOCKPILE 05	9.42	0.00	9.42	28.30	0.00	0.333	0.000
STOCKPILE 06	49.05	0.00	49.05	114.90	0.00	0.427	0.000
STOCKPILE 07	2.42	0.00	2.42	8.69	0.00	0.278	0.000
STOCKPILE 08	12.52	0.00	12.52	33.52	0.00	0.374	0.000
Total	91.99	0.00	91.99	306.67	0.00	0.300	0.000

[illegible]

ONLY MANHOLES AND SERVICES SHOWN WERE VISIBLE AT THE TIME OF SURVEY.
MAN ENTRY TO SEWERS HAS NOT BEEN UNDERTAKEN, DEPTHS, PIPESIZES ETC
ARE MEASURED FROM GROUND LEVEL.
DRAINAGE INFORMATION MUST BE CHECKED AND VERIFIED PRIOR TO ANY WORK
COMMENCING.

ALL LEVELS ARE RELATED TO O.S. DATUM (090836-15)
ESTABLISHED AT SE1 USING THE LEICA SMARTNET GPS NETWORK

[illegible]

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TOPO UPDATED, 3D MESH / MODEL COMBINED	C	16.05.22	BM	-
TOPO UPDATED	B	30.01.19	BM	-
SITE INVESTIGATIONS ANNOTATED	A	11.01.19	SH	-
DESCRIPTION	REV	DATE	DRWN	APPR



DRAWING DETAIL

TOPOGRAPHICAL LAND SURVEY

PROJECT ENGINEER	JLP	DATE	01.10.2018
DRAWN	BM	SCALE	1:500@A0

DRAWING NUMBER BH.TS.08	REVISION C
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Drawings

Preliminary Surface Water Strategy

SURFACE WATER DRAINAGE STRATEGY NOTES

This strategy has been produced in conjunction with the RSK Flood Risk Assessment and Drainage Report reference 881680 R1 (07)FRA.

This preliminary strategy drawing should be read in conjunction with the 'Report on Drainage Design Strategy to Accompany Planning Application Rev B'.

SURFACE WATER DRAINAGE STRATEGY KEY

- [illegible]

PRELIMINARY ONLY

DRAINAGE DESIGN IS SUBJECT TO FULL
TECHNICAL APPROVAL BY UNITED
UTILITIES/ NAV AND THE LLFA.

Drawings

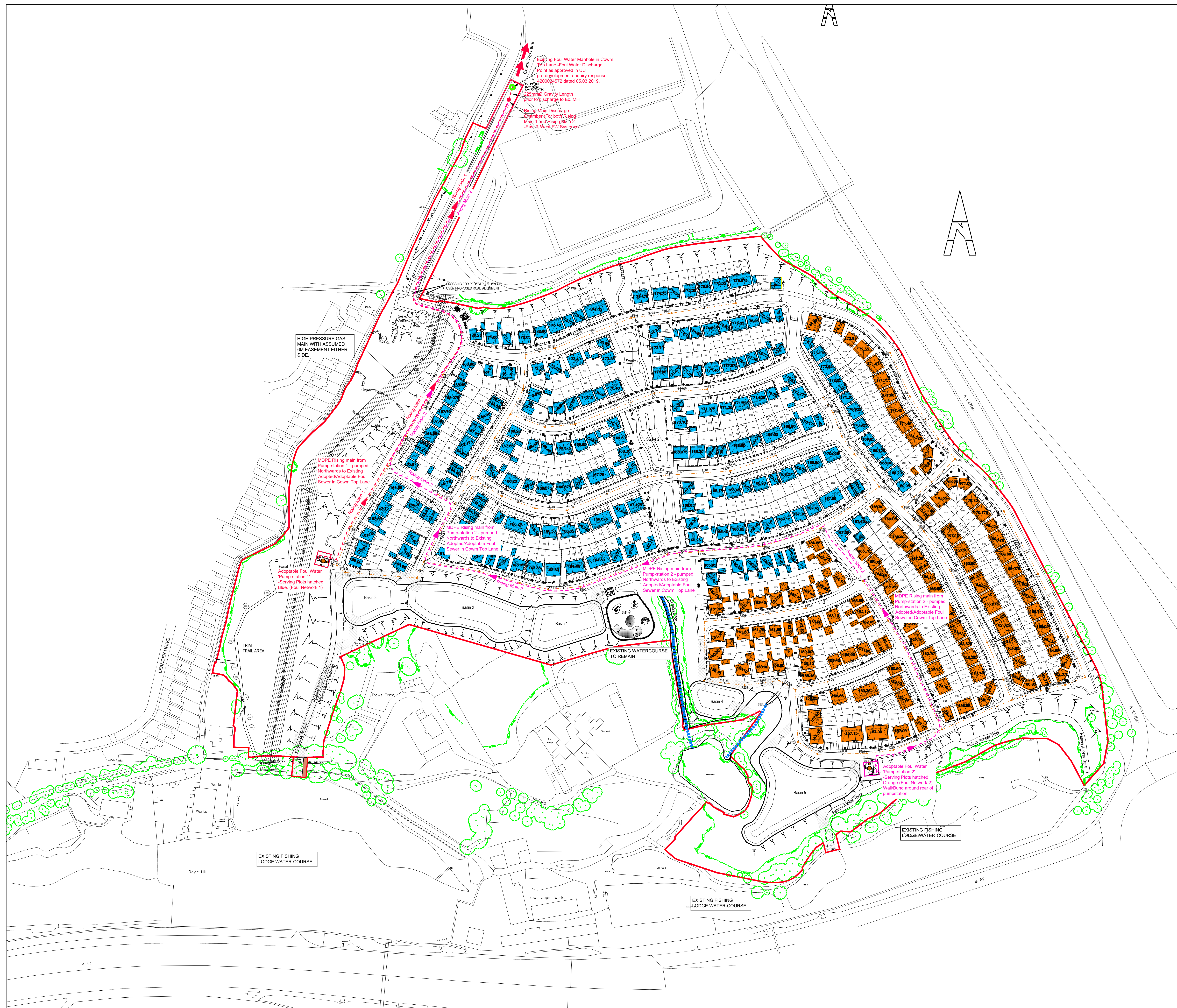
Preliminary Foul Water Strategy

FOUL WATER STRATEGY KEY

- United Utilities Approval Foul Water Outfall connection point via response dated 05.03.19 to Barratt Homes Pre-development enquiry.
- Direction of flow of existing local foul water network, shown by arrow, to be confirmed by competent developers in Cwm Tŷn Lane & put forward by them to UU for adoption)
- S104 Adoptable Foul Water Manhole and Sewer. MH & Pipe references and final sewer depths subject to final approved detailed drainage design.
- Private Foul Drag-Out Connection
- Approx. Proposed S104 Sewer Easement
- Proposed Adoptable Foul-Water Pumpstation 1 (Network 1)
- Providing emergency storage and telemetry/monitoring as required within DCG Design and Construction Guidance Approved version 2.3 published 11 Nov 2023
- Proposed Adoptable Foul Water Rising Main (Network 1)
- Proposed Adoptable Foul-Water Pumpstation 2 (Network 2)
- Providing emergency storage and telemetry/monitoring as required within DCG Design and Construction Guidance Approved version 2.3 published 11 Nov 2023
- Proposed Adoptable Foul Water Rising Main (Network 2)

PRELIMINARY ONLY

DRAINAGE DESIGN IS SUBJECT TO FULL
TECHNICAL APPROVAL BY UNITED
UTILITIES/CHOSEN NAV AND THE LLFA.



Revision	Description	Date	Design

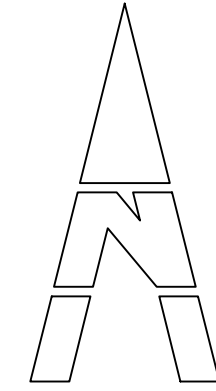
Project: Covwm Top, Rochdale			
Description: Preliminary Foul Water Drainage Strategy			
Design By: RB	Date: 05/06/24	Scale at A0: 1:1000	Revision: P01
Prepared HR54 - RAH -	Checked XX -	Spinal Form XX - NR - CF -	Number 300004

Drawings

Preliminary Engineering Layout

PRELIMINARY ONLY

DRAINAGE DESIGN IS SUBJECT TO FULL
TECHNICAL APPROVAL BY UNITED
UTILITIES/CHOSEN NAV AND THE LLFA.



ENGINEERING LAYOUT NOTES

1. All adoptable drainage works have been designed and are to be constructed in accordance with "Sewerage Factors Guidance Appendix C: Design and Construction Guide v1.1" and United Utilities Guidance. Where specification surfaces, BS guidelines shall take precedence.
2. All day pipe work shall be extra strength dayware to BS 256 and BS595 (SR only).
3. All external concrete pipework shall be to Class 3 in accordance with BS5911 Part 1, BS EN 1916 and bear the BS Mark.
4. All adoptable drainage to be bedded in Class 3 granular surround unless otherwise stated on the forgoings.
5. All concrete manholes and soakaways rings, and concrete cover seats to be manufactured to BS EN 1917 and BS5911 Part 1.
6. Ringing mains to black polyethylene pipes complying to BS EN 12242. Polyethylene fittings, including fusion joints, and electro-fusion fittings shall comply with BS EN 12242-2.
7. All levels relate to Ordnance Datum. Contractor to ensure that this drawing is used in conjunction with the site specific topographical survey provided to United Utilities and the besterman provided.
8. This drawing is to be read in accordance with all other relevant drawings.
9. The contractor shall be responsible for ensuring that any existing street levels indicated on the drawings are correct before work commences.
10. All proposed connections to the sewer shall be 1500 unless stated otherwise.
11. All proposed sewer drainage shall be 1000 and all drop not connections shall be 1000 at a minimum gradient of 1:80 unless otherwise stated, and laid in accordance with Part 4 of the Building Regulations.
12. Runoff from private surfaces shall not discharge across the highway. Gullies or channels shall be provided as appropriate to prevent this.
13. Street crossings shall be provided at the most relevant points of all junctions.
14. Pipes shall be protected from concentrated loading by construction traffic during the construction period when insufficient cover to the pipe may make them vulnerable to damage.
15. Road GSI levels of the road formation shall be used to determine the depth of pavement construction. Request: This is to be approved by St Helens Borough Council prior to construction of the road pavements.
16. Groundwater to ensure that plot drainage be within the curtilage of the plot they serve where possible and inspection covers kept within handstanding where possible.
17. Contractor to provide United Utilities with sufficient notice prior to commencement of sewer works on their inspection telephone number.
18. Contractor to obtain all necessary highway opening notices from St Helens Borough Council; obtain approval to work on United Utilities Drainage System; obtain approval to install elements from the Environment Agency under the Local Land Flood Authority for any works affecting a watercourse.

ENGINEERING KEY

- S100: S104 Adoptable Surface water Manhole and Sewer, 100 & Pipe reference and final sewer depths subject to final approved detailed drainage design.
- F1: S104 Adoptable Foul water Manhole and Sewer, 100 & Pipe reference and final sewer depths subject to final approved detailed drainage design.
- Surface water lateral drain. Final lateral drain depths subject to final approved detailed design.
- Foul water lateral drain. Final lateral drain depths subject to final approved detailed design.
- S100: S104 Adoptable manhole.
- Approx. proposed S104 Sewer Extension.
- Proposed Adoptable Foul Water Pumpstation. Providing emergency storage and sewerage treatment as required with DCC Design and Construction Guidance Approved version 2.3 published 11 May 2023.
- Approx. Proposed Adoptable Foul Water Rising Main(s).
- Street Name Pipe.
- Lead required temporarily by the developer and developer's contractor in order to complete initial works.

SURE GAS
ASSUMED
ENT EITHER

HIGH PRESSURE GAS
MAIN WITH ASSUMED
6M EASEMENT EITHER
SIDE.

Network 1- Basin 3
Approx. Bed Level: 154.90m AOD
Approx. Top of Bank: 156.50m AOD
Approx. Total SW Volume: 812m³

Network 1- Basin 2
Approx. Bed Level: 157.25m AOD
Approx. Top of Bank: 158.95m AOD
Approx. Total SW Volume: 2179m³

Network 1- Basin 1
Approx. Bed Level: 160.125m AOD
Approx. Top of Bank: 161.925m AOD
Approx. Total SW Volume: 1331m³

Upper Flow Control-Net 1 MH S143
Design Max Flow=47.39 l/s

SW Network 1
Original Estimated Total Storage Volume Required
from Quick Storage Est:
1in30yr = 1894m³ Rqd
1in100yr = 2643m³ Rqd
1in100yr+40CC = 4157m³ Rqd

Network 1- Western Detention Basins 1-3

Designed as C
path lengths as
guidance.
Surface Water
these 3no. bas

Additional Flow Control required for
impermeable area of emergency
access, situated lower than proposed
attenuation basin. Nominal additional
SW attenuation in oversized pipes
Max Flow=47.39 l/s

PROPOSED ROAD
LOCATION

PROPOSED WESTERN OUTFALL
Proposed new SW outfall route
and associated 8 metre easement
to existing reservoir. Flow-rates
to be agreed with LLFA.
*RISK- THROUGH BOTH THIRD
PARTY LAND AND UNREGISTERED
LAND- LAND DEPT TO ADVISE.

Additional Flow C
impermeable are
access, situated
attenuation basin
SW attenuation i
Max Flow=47.39

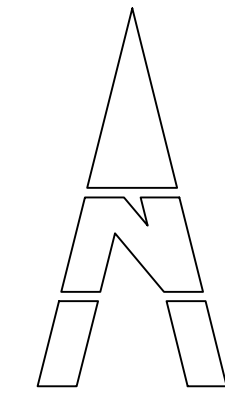
SW Network 2
Original Estimated Total Storage
Volume Rqd from Quick Storage Est:
1in30yr = 245m³ Rqd
1in100yr = 348m³ Rqd
1in100yr+40CC = 520m³ Rqd
Surface Water Attenuation is provided
in Basin 4. 521m³ Provided.

Basin 4
Approx. Bed Level: 156.50m AOD
Approx. Top of Bank: 158.1m AOD
Approx. Total volume: 521m³

Flow Control-Net 2
Design Max Flow=10.0 l/s

P04	Drainage runs, FFLs, plot drainage and drag-outs amended to the new planning layout. In order to ensure that the pipes and ducts are sized correctly, the storm simulations were modelled in info drainage and will be refined at final approved detailed design.	Jun 24	LB
P03	Revised to New Layout. Drawing reference changed.	15.03.24	SPG
A	Amendments to drainage runs, FFLs, plot drainage and drag-outs. In order to ensure that the pipes and ducts are sized correctly, the storm simulations were modelled in info drainage.	04.04.23	RB
Revision	Description	Date	Design By

Warning to House Purchasers
Buyers are advised that this is a working drawing and the contents of this drawing may be subject to change during the build process. The layout, form, content, and dimensions specified are included for general guidance only. Fixtures or fittings shown may be subject to change without notice. Whilst every effort is made to ensure the drawings are up to date, the drawings are not to be used for construction purposes. It is the responsibility of the purchaser to ensure that the drawings are up to date. The drawings are not to be used for construction purposes. It is the responsibility of the purchaser to ensure that the drawings are up to date. The drawings are not to be used for construction purposes. It is the responsibility of the purchaser to ensure that the drawings are up to date.

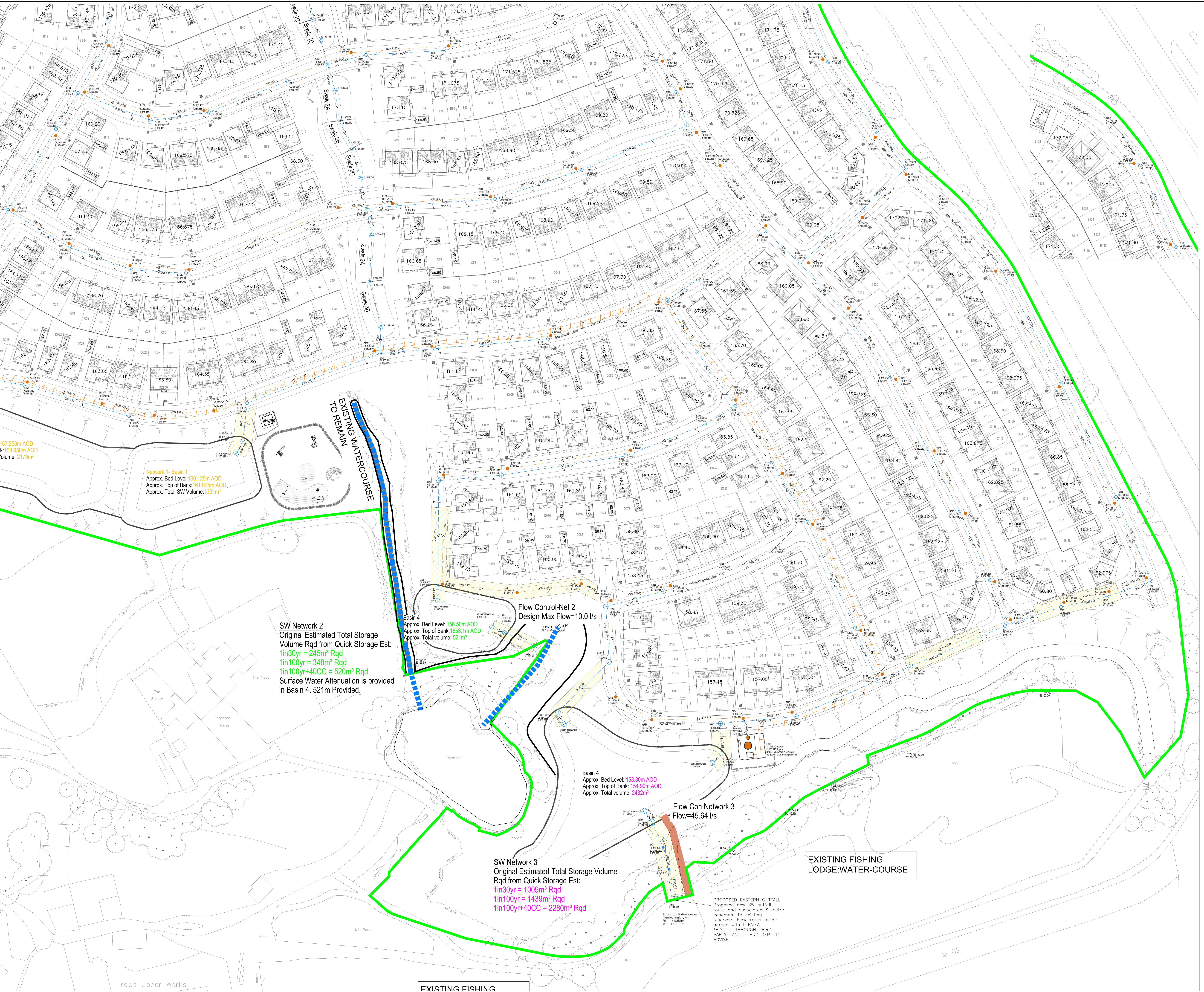


- ENGINEERING LAYOUT NOTES**
- All adoptable drainage works have been designed and are to be constructed in accordance with 'Township Sector Guidance Appendix C: Drainage and Sewerage' and 'United Utilities Guidelines'. Where applicable, conflict, (U) guidelines shall take precedence.
 - All day pipe work shall be cast in situ concrete to BS 595 and BS595 (SW 1994).
 - All proposed concrete pipework shall be to Class 5 in accordance with BS5951 Part 1, BS EN 1916 and bear the BS 5951 mark.
 - All adoptable drainage to be located in Class 5 granular surround unless otherwise indicated on the longitudes.
 - All concrete manhole and catchway rings, and concrete cover able to be manufactured to BS EN 1917 and BS5951 Part 3.
 - Ring mains to be black polyethylene pipe complying to BS EN 12454-2. Polyethylene fittings, including flange pipes, and electro-fusion fittings shall comply with BS EN 12454-2.
 - All levels relate to Ordnance Datum. Contractor to ensure that this drawing is read in conjunction with the site specific topographical survey provided by United Utilities and the drainage information provided.
 - The drawings to be read in accordance with all other relevant drawings.
 - The contractor shall be responsible for ensuring that any existing invert levels indicated on the drawings are correct before work commences.
 - All proposed connections to the sewer shall be 150mm standard size.
 - All private house drainage shall be 150mm and all drainage connections shall be 150mm at a minimum gradient of 1:80 unless otherwise stated and in accordance with Part 4 of the Building Regulations.
 - Runoff from private surfaces shall not discharge across the highway. Gullies or channels shall be provided as appropriate to prevent this.
 - Private coverings shall be provided at the lower tangent points of all junctions.
 - Pipes shall be protected from concentrated loading by construction traffic during the construction period when insufficient cover to the pipe may cause them to be damaged.
 - 15m dia CRP (as the road formation level) is to be carried out to determine the depth of pavement construction required. This to be approved by United Utilities and the drainage information provided.
 - Groundwater to ensure that plot drainage be within the cuttings of the plot key where possible and inspection covers kept within handstanding where possible.
 - Contractor to provide United Utilities with sufficient notice prior to commencement of sewer works on their inspection inspection number.
 - Contractor to obtain all necessary highway opening notices from St Helens Borough Council, obtain approval to work on United Utilities Sewerage System, obtain approval to install manholes from the Environment Agency and/or the Local Flood Authority for any works affecting a watercourse.

- ENGINEERING KEY**
- S100 S100 Adoptable Surface Water Mainline and Sewer: 100mm & Pipe references and final sewer depths subject to final approved detailed drainage design.
 - F1 S100 Adoptable Foul Water Mainline and Sewer: 100mm & Pipe references and final sewer depths subject to final approved detailed drainage design.
 - Surface water lateral drain. Final lateral drain depths subject to final approved detailed design.
 - Foul water lateral drain. Final lateral drain depths subject to final approved detailed design.
 - S38 Adoptable road gully.
 - Approx. proposed S104 Sewer Easement.
 - Proposed Adoptable Foul Water Pumping Station. Proposed emergency storage and waterhydraulics as required within S104 Design and Construction Guidance Appendix 2.3 published 11 Nov 2023.
 - Approx. Proposed Adoptable Foul Water Rising Main(s).
 - Street Name Plate.
 - Land required temporarily by the developer and developers contractor in order to complete initial works.

PRELIMINARY ONLY

DRAINAGE DESIGN IS SUBJECT TO FULL TECHNICAL APPROVAL BY UNITED UTILITIES/CHOSEN NAV AND THE LLFA.



157.250m AOD
k:158.950m AOD
Volume: 2179m³

Network 1- Basin 1
Approx. Bed Level: 160.125m AOD
Approx. Top of Bank: 161.925m AOD
Approx. Total SW Volume: 1331m³

SW Network 2
Original Estimated Total Storage Volume Rqd from Quick Storage Est:
1in30yr = 245m³ Rqd
1in100yr = 348m³ Rqd
1in100yr+40CC = 520m³ Rqd
Surface Water Attenuation is provided in Basin 4. 521m Provided.

Basin 4
Approx. Bed Level: 156.50m AOD
Approx. Top of Bank: 165.1m AOD
Approx. Total volume: 521m³

Flow Control-Net 2
Design Max Flow=10.0 l/s

Basin 4
Approx. Bed Level: 153.30m AOD
Approx. Top of Bank: 154.90m AOD
Approx. Total volume: 2432m³

Flow Con Network 3
Flow=45.64 l/s

SW Network 3
Original Estimated Total Storage Volume Rqd from Quick Storage Est:
1in30yr = 1009m³ Rqd
1in100yr = 1439m³ Rqd
1in100yr+40CC = 2280m³ Rqd

PROPOSED EASTERN OUTFALL
Proposed new SW outfall route and associated 8 metre easement to existing reservoir. Flow-rates to be agreed with LLFA/EA.
*RISK - THROUGH THIRD PARTY LAND - LAND DEPT TO ADVISE

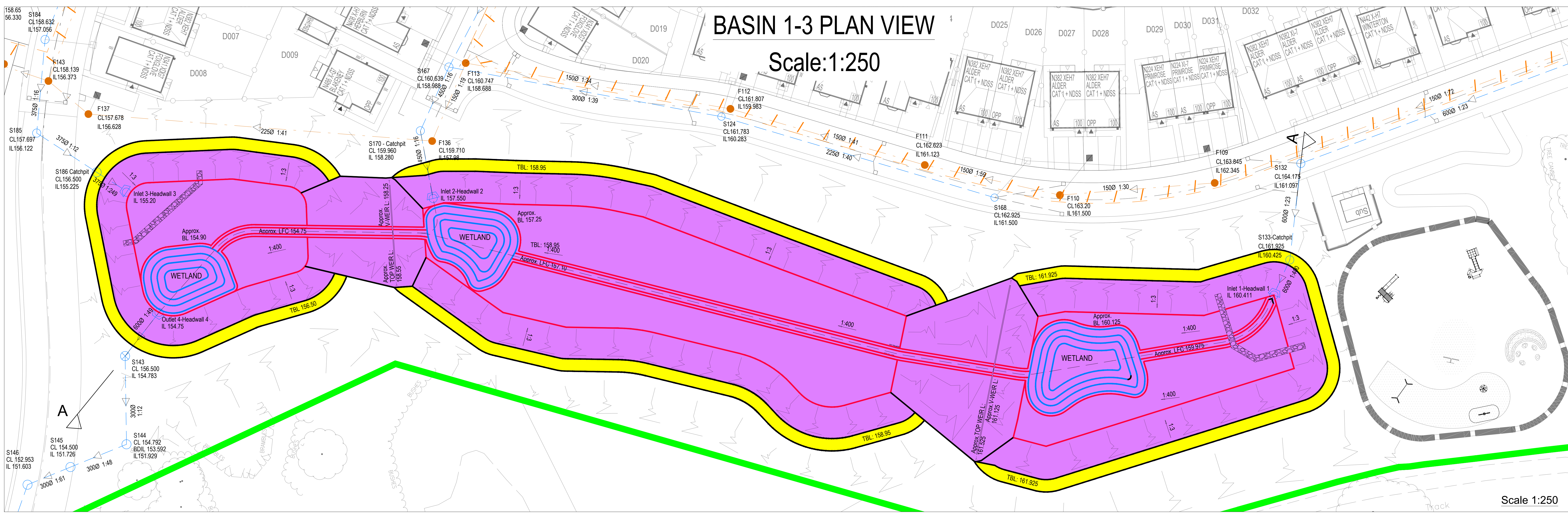
EXISTING FISHING LODGE: WATER-COURSE

P05	Drainage runs, FFLs, and drainage and drag-out amended to the new planning layout. In order to ensure that the pipes and S&Us are sized correctly, the storm simulations were modelled in info drainage and will be refined at final approved detailed design.	Jan 24	LB
P04	Revised to New Layout. Drawing reference changed.	15.03.24	SPG
B	Amendments to drainage runs, FFLs, plot drainage and drag-out. In order to ensure that the pipes and S&Us are sized correctly, the storm simulations were modelled in info drainage.	04.04.23	RB
A	Added notes throughout to show missing drainage runs S28-S31 and F28-F35.	Oct 22	LB
Revision	Description	Date	Design By

Project: Cowm Top, Rochdale
Description: Engineering Layout
Sheet 2 of 2
Design By: LB
Date: Mar 24
Scale: 1:500
Revision: P05
Project Number: 18544 - BAH - XX - XX - DR - CE - 300002
Do not scale from this drawing. Work to given dimensions only. Any discrepancies are to be reported to Originator.
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Drawings

Preliminary SUDs Details



Warning to Householders

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ENGINEERING LAYOUT NOTES

1. All adoptable drainage works have been designed and are to be constructed in accordance with 'Sewerage Sector Guidance Appendix C: Design and Construction Guide v2.1', and United Utilities Guidelines. Where specification conflicts, UU guidelines shall prevail.
2. All day pipe work shall be extra strength clayware to BS 205 and BS55 (S1 only).
3. All proposed concrete sewer shall be Class 120 in accordance with BS5911 Part 1, BS EN 1916 and see the BS kitemark.
4. All adoptable drainage to be bedded in Class S granular surround unless otherwise stated on the long sections.
5. All concrete manhole and soakaway rings, and concrete cover slabs to be manufactured to BS EN 1917 and BS5911 Part 2.
6. Rising mains to be black polyethylene pipes complying to BS EN 12344-2. Polyethylene fittings, including fusion joints, and electric fusion fittings shall comply with BS EN 12344-2.
7. All levels relate to Ordnance Datum. Contractor to ensure that this drawing is read in conjunction with the site specific topographical survey provided by Barratt Manchester and the benchmark information provided.
8. This drawing is to be read in accordance with all other relevant drawings.
9. The contractor shall be responsible for ensuring that any existing invert levels indicated on the drawings are correct before work commences.
10. All proposed connections to the sewer shall be 1500 unless stated otherwise.
11. All probe house drainage shall be 1500 and all drop-out connections shall be 1500 at a minimum gradient of 1:80 unless otherwise stated, and laid in accordance with all other relevant drawings.
12. Road from private surfaces shall not discharge across the highway. Gullies or channels shall be provided as appropriate to ground level.
13. Pavement crossings shall be provided at the inner tangent points of all junctions.
14. Pipes shall be protected from concentrated loading by construction traffic during the construction period when insufficient cover to the pipe may make them vulnerable to damage.
15. Roads, CIPR tests of the road formation levels are to be carried out to determine the depth of pavement construction required. This is to be approved by St Helens Borough Council prior to construction of the road pavements.
16. Groundwater to ensure that plot drainage is within the curbside of the plot they serve where possible and inspection covers laid with landscaping where possible.
17. Contractor to provide United Utilities with sufficient notice prior to commencement of sewer works on their inspection telephone number.
18. Contractor to obtain all necessary highway crossing notices from St Helens Borough Council, obtain approval to work on United Utilities Sewerage System, obtain approval to method statement from the Environment Agency and the Local Flood Authority for any works affecting watercourse.

ENGINEERING KEY

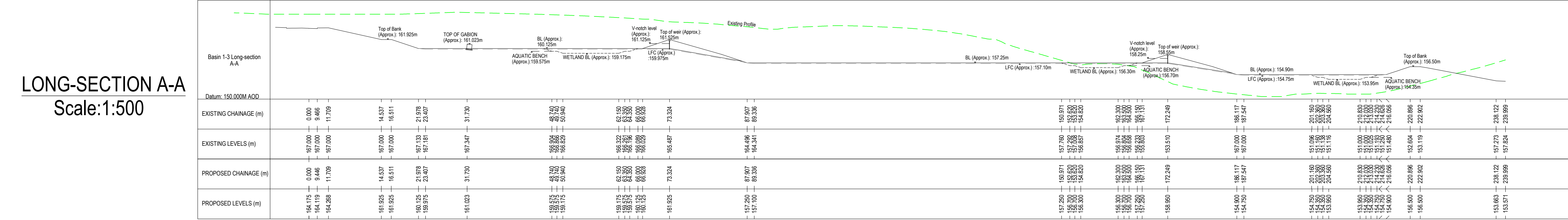
- S1 S104 Adoptable S.W. Sewer & Manhole
- S Water Drop-Out and Invert
- S38 Adoptable Road Gully
- Proposed Adoptable Foul Water Pumpstation
- Bed of SUDs Feature
- Normal permanent Water Level within SUDs
- F1 S104 Adoptable F.W. Sewer & Manhole
- F1 Foul Drop-Out and Invert
- Proposed S104 Sewer Easement
- Proposed Adoptable Foul Water Rising Main(s)
- Top Edge of SUDs Feature
- Land Dedication for S104 SUDs Feature

WATER LEVELS KEY:

- 1 in 2yr Modelled Top Water Level
- 1 in 30yr Modelled Top Water Level
- 1 in 100yr Modelled Top Water Level
- 1 in 100yr+40% Climate Change Modelled Top Water Level

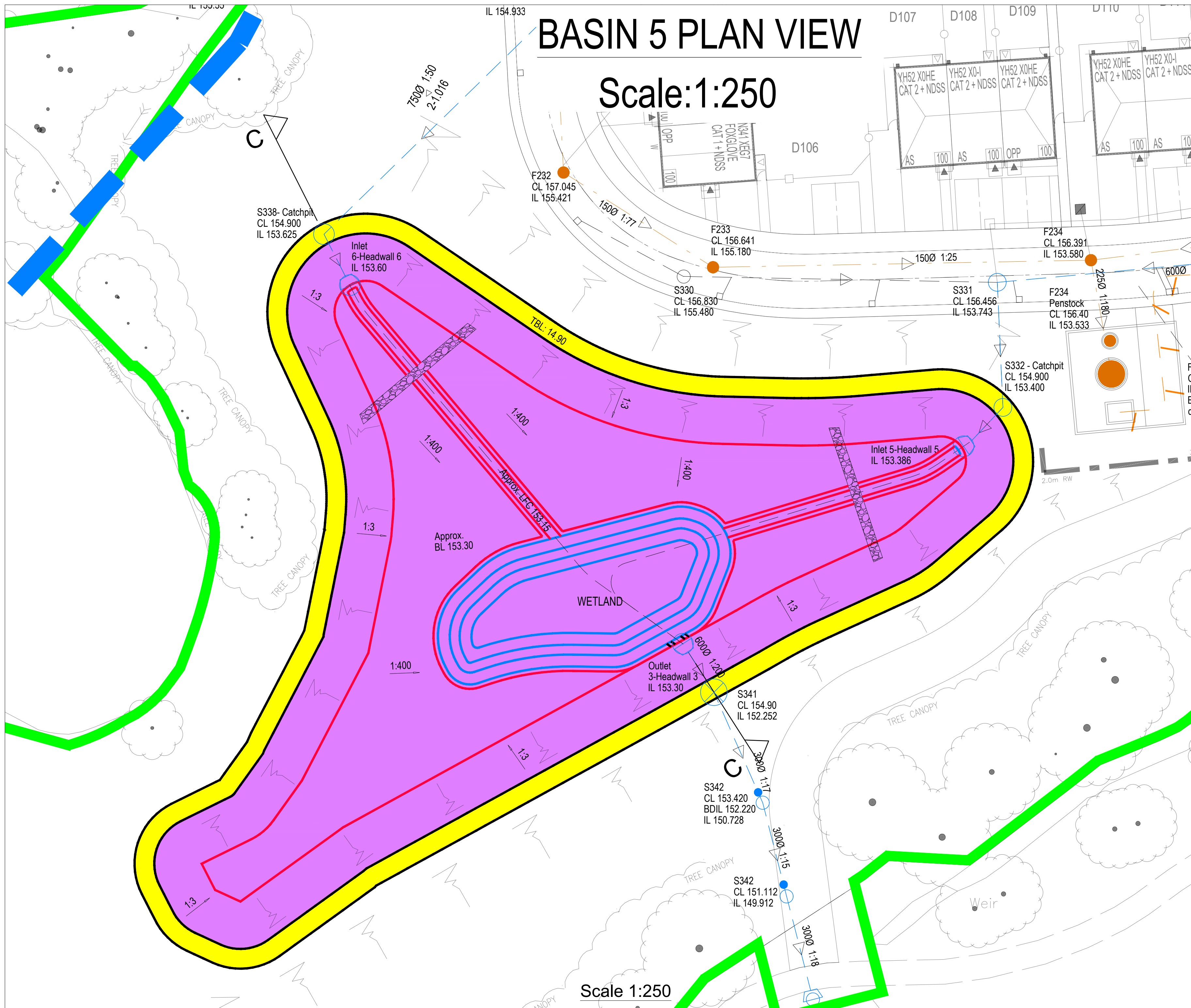
PRELIMINARY ONLY

DRAINAGE DESIGN IS SUBJECT TO FULL TECHNICAL APPROVAL BY UNITED UTILITIES/CHOSEN NAV AND THE LLFA.

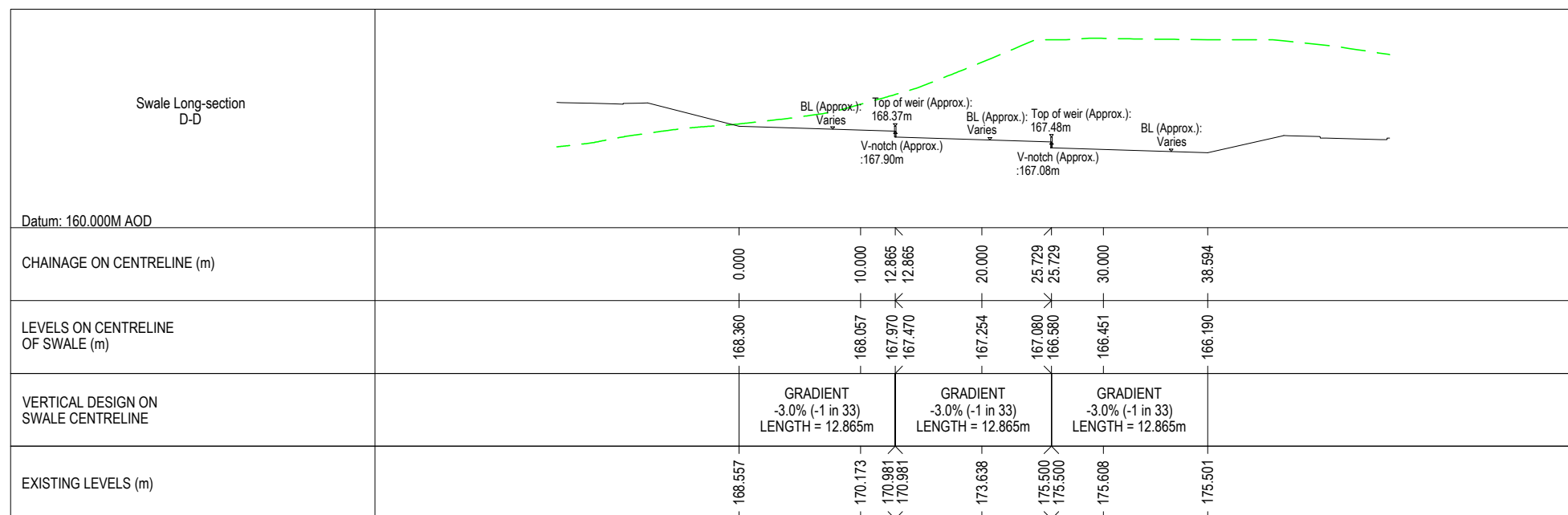


BASIN 5 PLAN VIEW

Scale:1:250

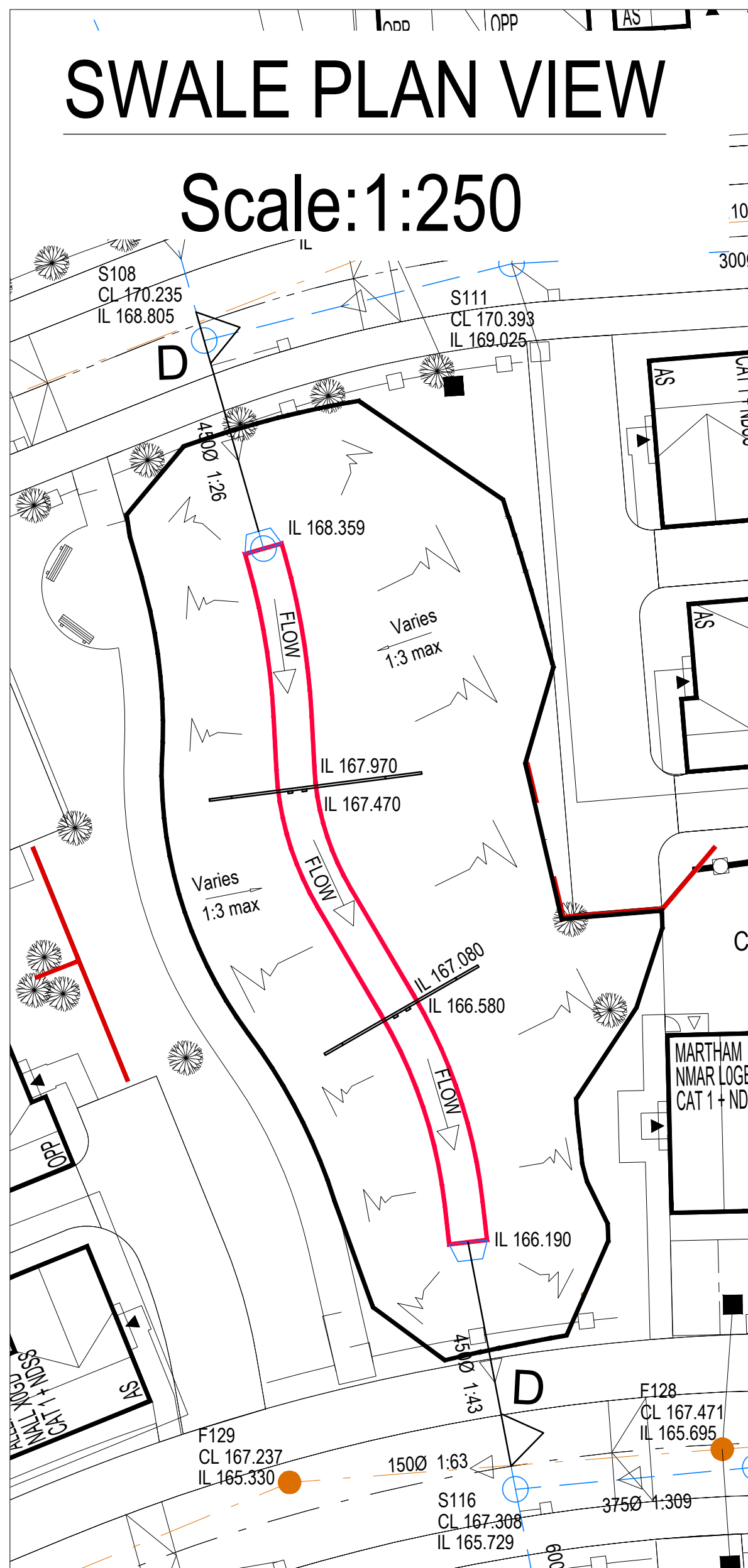
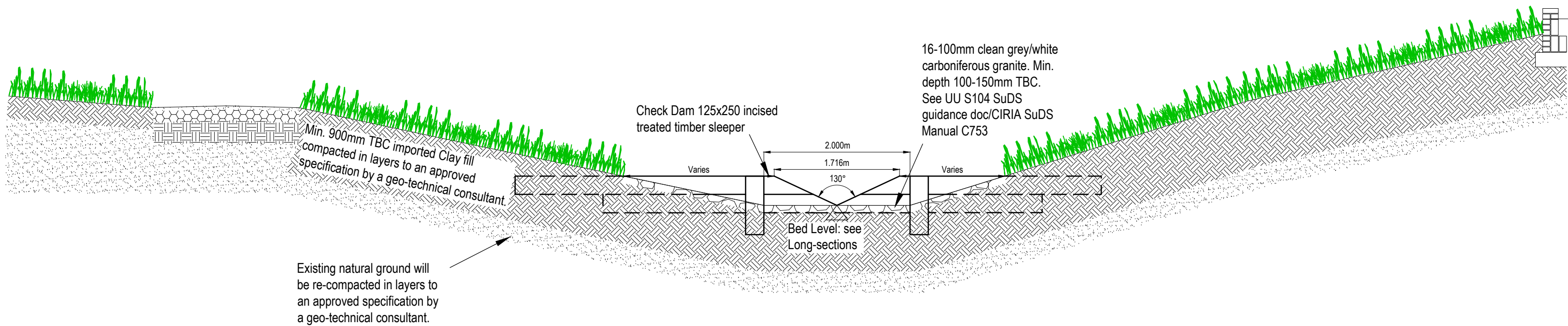


LONG-SECTION D-D
Scale:1:500



V-NOTCH CHECK DAM DETAIL (TYPICAL)

Scale:1:50



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ENGINEERING LAYOUT NOTES

4. All applicable drainage works have been designed and are to be constructed in accordance with 'Specification for Urban Drainage - C- Design and Construction Guide v2.1', and United Utilities Guidelines. Where specific conflicts, Uo guidelines shall take precedence.
5. All clay pipe work shall be extra strength clayware to BS 295 and BS65 (SW only).
6. All precast concrete pipework shall be to Class 120 in accordance with BS5911-Part 1, BS EN 1916 and bear the BS trademark.
7. All applicable drainage to be bedded in Class S granular surround unless otherwise stated on the longsections.
8. All concrete manhole and soakaways rings, and concrete cover slabs to be manufactured to BS EN 1917 and BS5911-Part 3.
9. Raising mains to be black polyethylene pipes complying to BS 1334-2. Polyethylene fittings, including fusion joints, and electro-fusion fittings shall comply with BS EN 1224-2.
10. All levels relate to Ordnance Datum. Contractor to ensure that this drawing is read in conjunction with the site specific topographical survey provided by Bantel Manchester and the benchmark information provided.
11. This drawing is to be read in accordance with all other relevant drawings.
12. The Contractor shall be responsible for ensuring that any existing invert levels indicated on the drawings are correct before work commences.
13. All proposed connections to the sewer shall be 1500 unless stated otherwise.
14. All private house drainage shall be 1000 and all Part-dug connections shall be 1500 at a minimum gradient of 1:80 unless otherwise stated; and laid in accordance with all H-d of the Building Regulations.
15. Runoff from private surfaces shall not discharge across the highway. Gullies or channels shall be provided as appropriate to prevent this.
16. Prawn crossings shall be provided at the inner tangent points of all junctions.
17. Pipes shall be protected from concentrated loading by drainage traffic during the construction period when insufficient cover to the pipe may make them vulnerable to damage.
18. In-situ CBR tests of the road formation levels are to be carried out to determine the depth of pavement construction. This is to be approved by St Helens Borough Council prior to construction of the road pavements.
19. Groundworker to ensure that plot drainage be within the outfall of the plot they serve where possible and inspection covers kept within hardstanding where possible.
20. Contractor to provide United Utilities with sufficient notice prior to commencement of sewer works or their inspections telephone number.
21. Contractor to obtain all necessary highway opening notices from St Helens Borough Council, obtain approval to work on the United Utilities Sewerage System, obtain approval by method statement from the Environment Agency and/or the Local Authority for any works affecting a watercourse.

ENGINEERING KEY

	S104 Adoptable S.W. Sewer & Manhole		S104 Adoptable F.W. Sewer & Manhole
	S. Water Drag-Out and Invert		Fault Drag-Out and Invert
(10.25)		<u>10.25</u>	
	S38 Adoptable Road Gully		
	Street Name Plate		Proposed S104 Sewer Easement
	Proposed Adoptable Foul Water Pumpstation		Proposed Adoptable Foul Water Rising Main
	Bed of SUDs Feature		Top Edge of SUDs Feature
	Normal permanent Water Level within SUDs		Land Dedication for S104 SUDs Feature

WATER LEVELS KEY:

- 1 in 2yr Modelled Top Water Level
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- 1 in 100yr Modelled Top Water Level
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UTILITIES/CHOSEN NAV AND THE LLFA.

Revision	Description	Date	Design By

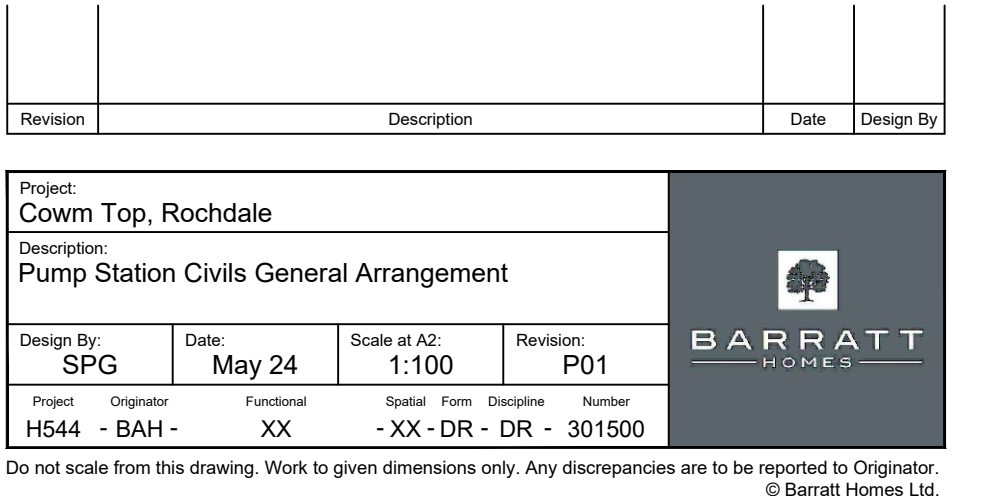
Project: Cwmn Top, Rochdale		 BARRATT HOMES	
Description: Preliminary SUDS Details			
Swale Detail			
Design By: LB	Date: Jun 24	Scale at A1: As Shown	Revision: P01
Project Originator HXXXX - BAH -	Functional XX	Spatial Form Discipline - XX - DR - DR -	Number 300122

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Drawings

Proposed Pump Station 2 Civils GA

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