

Drainage Strategy

Prepared by: Georgia Hirst

For: Five Star Triangle

Site: The Triangle, Huddersfield

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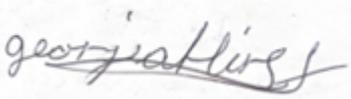
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1. Introduction

1.1 Acknowledgement

1.1.1 This report has been prepared for the sole and exclusive use of Five Star Triangle in accordance with the scope of work presented by Arthian via Letter Agreement (Reference: 319469/GO/07052025/1.0), dated 07/05/2025. This report is based on information and data collected by Arthian. Should any of the information be incorrect, incomplete, or subject to change, Arthian may wish to revise the report accordingly.

1.1.2 Arthian have been instructed to provide a Drainage Strategy (DS) on land at the Triangle, Paddock, Huddersfield, HD1 4RN (the site).

1.2 Project Understanding

1.2.1 The aim of this report is to assess the impact of the proposed development on flood risk elsewhere, and the proposed measures which could be incorporated to mitigate the identified risk (if required). This report has been prepared in accordance with the guidance contained in the National Planning Policy Framework (NPPF) revised in February 2025, and the National Planning Practice Guidance (NPPG) Flood Risk and Coastal Change.

1.2.2 The aim of the Sustainable Drainage Strategy is to identify water management measures, including Sustainable Drainage Systems (SuDS), to provide surface water runoff reduction and treatment.

1.2.3 This report takes into account the following national and local policies:

- National Planning Policy Framework (NPPF) (2025)¹;
- National Planning Practice Guidance (NPPG) (2022)²;
- CIRIA Guidance: The SuDS Manual (C753) (2017)³; and
- Kirklees Borough Council Local Development and Planning Policies.

1.3 Sources of Information

1.3.1 The following sources of information have been reviewed and assessed for the purpose of this DS:

- EA online flood maps⁴;
- British Geological Society (BGS) Interactive Map⁵;

¹ <https://assets.publishing.service.gov.uk/media/675abd214cbda57cacd3476e/NPPF-December-2024.pdf>

² <http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/>

³ https://www.ciria.org/Resources/Free_publications/SuDS_manual_C753.aspx

⁴ <https://flood-map-for-planning.service.gov.uk/>

⁵ <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>



- MAGIC Interactive Map⁶;
- Calderdale Council Preliminary Flood Risk Assessment (2011 PFRA)⁷;
- Calder Catchment Strategic Flood Risk Assessment Volume I and II (2016 SFRA)^{8,9};
- Kirklees Council Local Plan (2019 LP)¹⁰; and
- Kirklees Council Local Flood Risk Management Strategy (2024 LFRMS)¹¹.

1.4 Project Limitations

1.4.1 The wider Arthian limitations are contained within Appendix A.

⁶ <http://www.magic.gov.uk/>

⁷ https://www.calderdale.gov.uk/ords//nweb/COUNCIL.minutes_pkg.view_doc?p_Type=AR&p_ID=12275#:~:text=The%20purpose%20of%20the%20PFRA,from%20a%20data%20collection%20exercise.

⁸ <https://www.kirklees.gov.uk/beta/planning-policy/pdf/flood-risk/strategic-flood-risk-assessment-1.pdf>

⁹ <https://www.kirklees.gov.uk/beta/planning-policy/pdf/flood-risk/strategic-flood-risk-assessment-1.pdf>

¹⁰ <https://www.kirklees.gov.uk/beta/planning-policy/pdf/local-plan-strategy-and-policies.pdf>

¹¹ <https://www.kirklees.gov.uk/beta/flooding-and-drainage/pdf/local-flood-risk-management-full-strategy.pdf>



2. Site Details

2.1.1 The aim of this section of the report is to outline key environmental information.

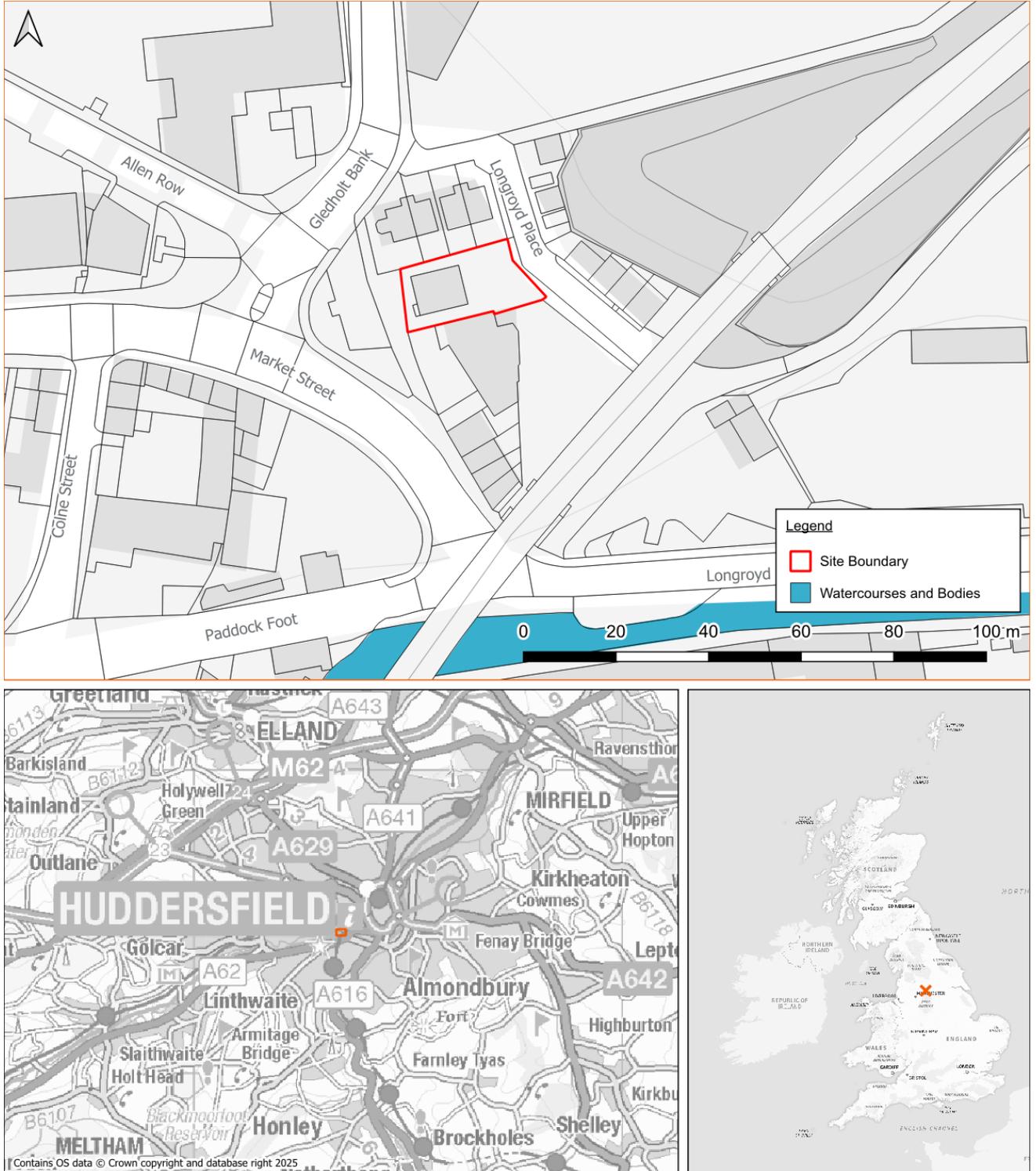


Figure 1: Site Location



2.2 Site Location

2.2.1 The site is located in an industrial area to the southeast of The Triangle Business Park. The closest train station is Lockwood situated approximately 820m south of the site. The National Grid Reference for the site is 413410, 416200.

2.3 Existing Site Conditions

2.3.1 Online mapping (including Google Maps / Google Streetview imagery, accessed 26/05/2025) shows that the site comprises a building associated with an accountants firm which includes car parking and access. The site is bordered by a car dealer building to the south, two residential dwellings to the north, a junction and other industrial units to the west, and residential dwellings/agricultural land to the east of the site. There is also a railway line to the south/southeast of the site. Access to the site is provided via an unnamed road adjacent to the west which leads to Gledholt Bank Road to the north or Market Street Road to the south.

2.3.2 Hardstanding areas on site currently occupies around 316.7m² or 86.5% of the total site area. The remaining permeable, soft landscaped areas occupy 49.33m² or 13.5% of the total site area. This value was calculated using the existing site plan provided by the Client (included in Appendix B) and QGIS.

2.4 Topography

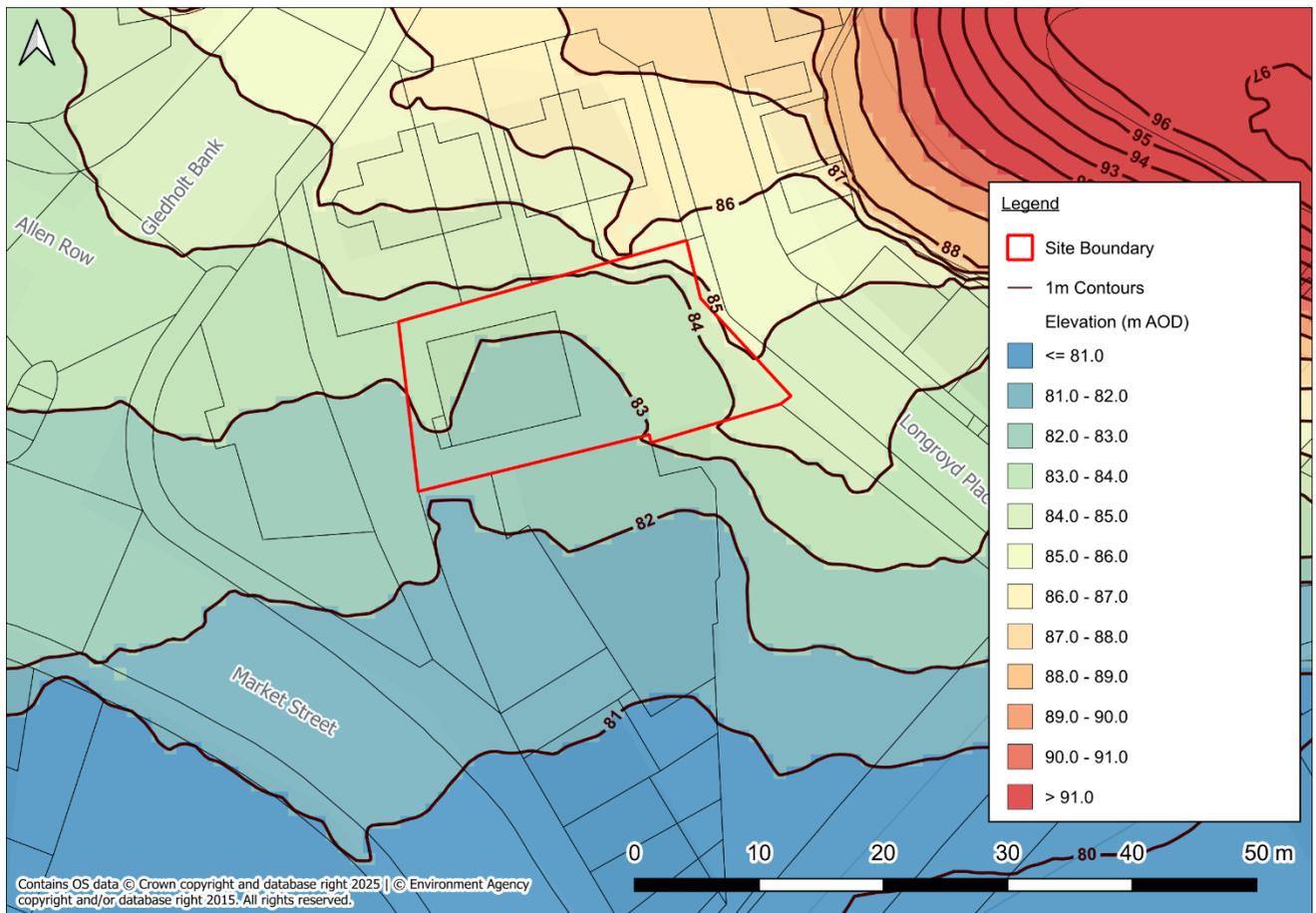


Figure 2: LiDAR Plan



2.4.1 Topographic levels to metres Above Ordnance Datum (m AOD) have been derived from a 1m resolution Environment Agency (EA) composite ‘Light Detecting and Ranging’ (LiDAR) Digital Terrain Model (DTM). A review of LiDAR ground elevation data shows that the site slopes from approximately 85.5m AOD in the northeast corner to approximately 82.5m AOD in the southwest corner of the site (Figure 2).

2.5 Hydrology

2.5.1 The nearest watercourse is the Huddersfield Narrow Canal which is located approximately 65m south of the site. There is also the River Colne (a Main River) which appears to be a canalised watercourse that runs parallel to the canal. Both the Huddersfield Narrow Canal and the River Colne flow in a northeasterly direction.

2.5.2 There is also Gledholt Beck (an Ordinary Watercourse) approximately 190m north of the site which flows in a southerly direction.

2.5.3 Main rivers are within the responsibility of the EA and ordinary watercourses fall within the responsibility of the LLFA to maintain.

2.6 Geology

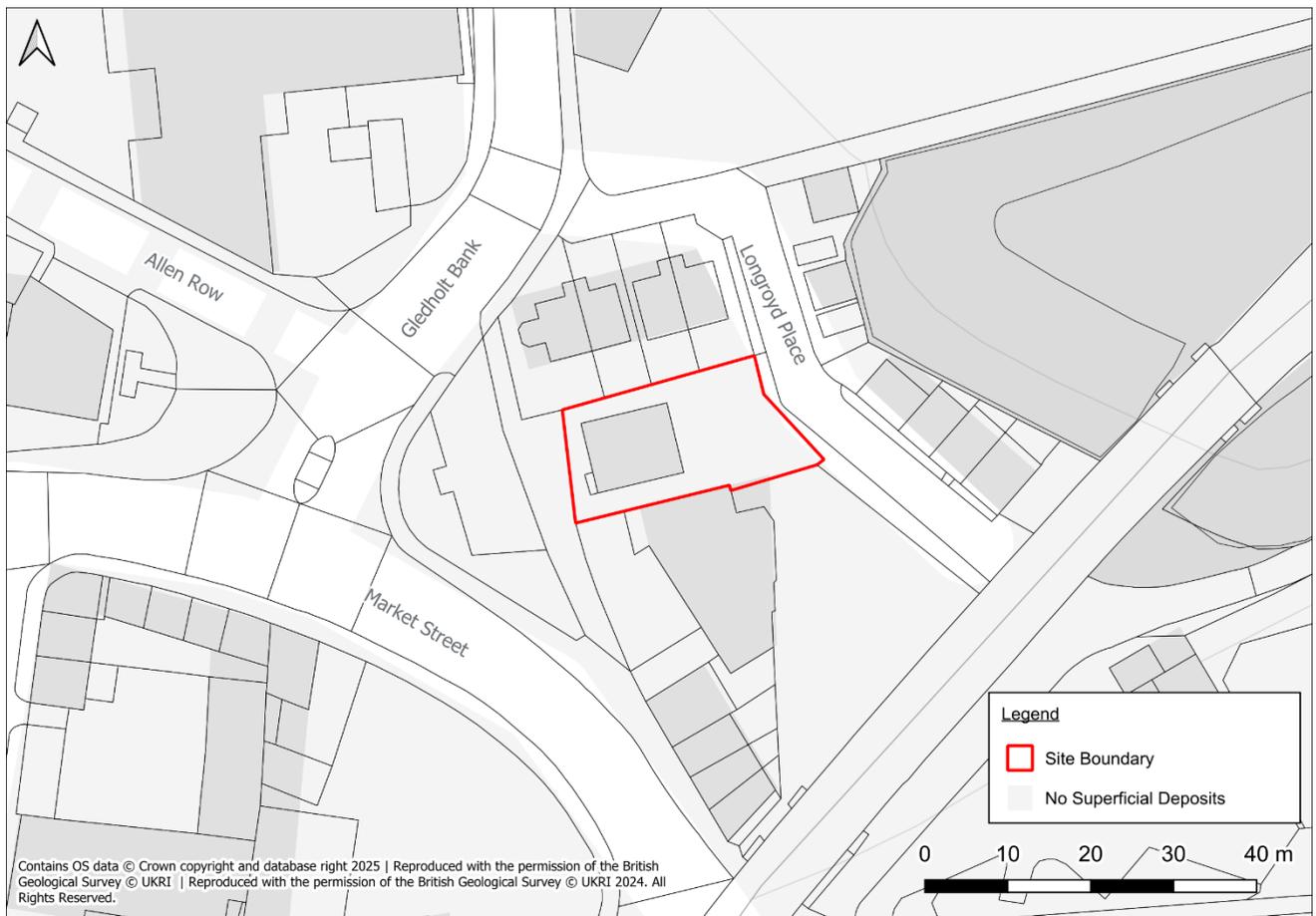


Figure 3: Superficial Deposits

2.6.1 Reference to the British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that the site



is underlain by no superficial deposits (Figure 3). The underlying bedrock is primarily Pennine Lower Coal Measures with the exception of the southwest corner underlain by Rough Rock (Figure 4).

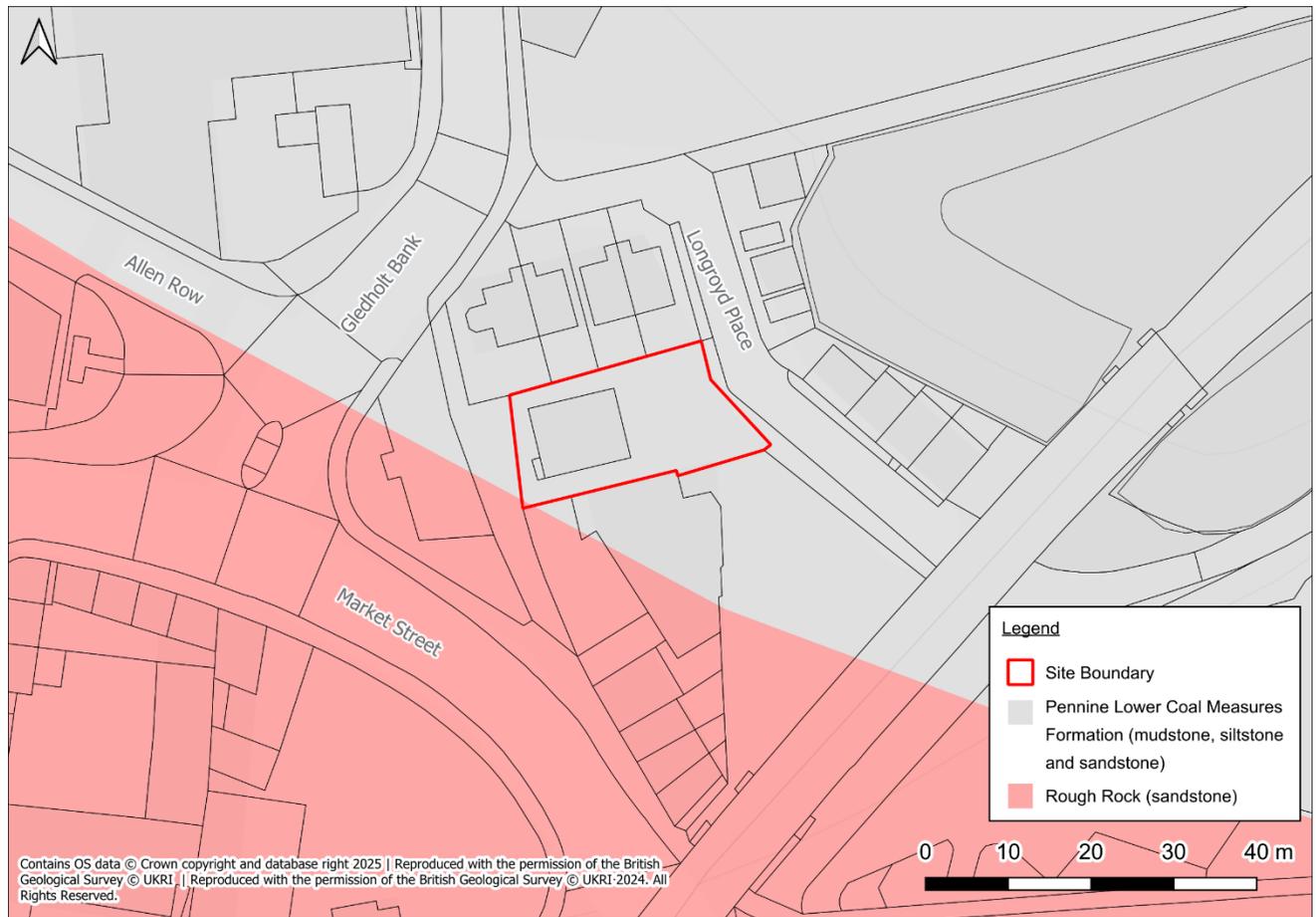


Figure 4: Bedrock Deposits

2.6.2 The geological mapping is available at a scale of 1:50,000 and as such may not be accurate on a site-specific basis.

2.6.3 There are no historical BGS borehole records in the near vicinity of the site. The closest borehole is located over 200m from the site and therefore is likely not representative of the geology onsite.

2.7 Hydrogeology

2.7.1 According to the EA’s Aquifer Designation data, obtained from MAGIC Map’s online mapping [accessed 27/05/2025], the underlying primarily Pennine Lower Coal Measures with the exception of the southwest corner underlain by Rough Rock is described as a Secondary A Aquifer.

2.7.2 The EA’s ‘Source Protection Zones’ data, obtained from MAGIC Map’s online mapping [accessed 27/05/2025] indicates that the site is not located within a Groundwater Source Protection Zone.

2.8 Local Drainage

2.8.1 Public sewer records have been obtained from Yorkshire Water and are included in Appendix C. The



Yorkshire Water sewer records show that there is a public combined sewer surrounding the site. The closest sewer to the site is a 375mm located adjacent to the west of the site or within Longroyd Place to the east of the site. No invert levels have been provided for the site.

2.9 Development Proposals

- 2.9.1 The proposed development is for converting the existing site into a car park for car storage within a car sales showroom. Proposed development plans are included in Appendix D.
- 2.9.2 The proposed development will result in a decrease in hardstanding areas in the form of car parking and access. Hardstanding will comprise 276.2m² or 75.4% of the total site area. The remaining permeable, soft landscaped areas will occupy 89.7m² or 24.6% of the total site area. This value was calculated using the proposed development plan (Drawing: 2504101-P02 – Proposed Parking) provided by the Client and AutoCAD.



3. Relevant Planning Policy and Guidance

3.1 Introduction

3.1.1 The aim of this section of the report is to discuss the main aspects of the local and national planning policies that are relevant to any proposed development on the site and relevant guidance and legislation.

3.2 Local Policy

3.2.1 Kirklees Council Local Plan (2019 LP) contains the following guidance relating to drainage:

“Policy LP28 – Drainage:

The presumption is that Sustainable Drainage Systems (SuDS) will be used to assist in achieving the following on each site:

- a. for proposals on greenfield sites, typical greenfield run-off rates should not be exceeded;*
- b. for proposals on brownfield sites there should be a minimum 30% reduction in surface water run-off where previous positive surface water connections from the site can be proven. New connections will be subject to at least greenfield restrictions;*
- c. No negative impact on local water quality and improvements in water quality where practicable;*
- d. Consider whether proposed open spaces and green infrastructure within sites can contribute to the sustainable drainage of the site*

Local conditions including the existence of critical drainage areas may require a lower run-off rate to be agreed to reflect volume control, local surface water risks, water course capacity and flood risk further downstream.

There will be a general presumption against pumping surface water. It must also be demonstrated that the surface water management solution is designed to meet requirements over the lifetime of the development including evidence that management and maintenance arrangements have been secured to cover that period. This includes ensuring proposals to store water meet national standards and latest best practice.

Development will only be permitted if it can be demonstrated that the water supply and waste water infrastructure required is available or can be co-ordinated to meet the demand generated by the new development.

Policy LP34 – Conserving and enhancing the water environment:

3. Dispose of surface water appropriately (in accordance with the Local Plan drainage policy) adhering to the following networks in order of preference:

- a. to an infiltration based system wherever possible (such as soakaways);*
- b. discharge into a watercourse with the prior approval of the landowner, navigation authority or Environment Agency, where applicable. To comply with part 1 of this policy this must be following treatment where necessary or where no treatment is required to prevent pollution of the receiving watercourse;*
- c. discharge to a public sewer.*



Proposals are encouraged to:

6. Improve water quality through the incorporation of appropriately constructed and maintained Sustainable Drainage Systems and surface water management techniques taking into account the sensitivity of groundwater”

3.3 Climate Change

3.3.1 The EA ‘Flood Risk Assessments: Climate Change Allowances’ Guidance states that Less Vulnerable developments should utilise the Central Allowance. The EA’s Online Peak River Flow Map¹² indicates that within the Aire and Calder Management Catchment, the Central Allowance equates to 13% for the 2050s epoch and 23% for the 2080s epoch.

3.3.2 The EA’s Online Peak Rainfall Allowance Map indicates that within the Aire and Calder Management Catchment, the central allowance equates to 20% for the 2050s epoch and 25% for the 2080s epoch.

¹² Environment Agency Climate Change Guidance: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>



4. Drainage Strategy

4.1 Introduction

- 4.1.1 The site currently comprises a building associated with an accountants firm with car parking and access. It is assumed the site currently drains to the Yorkshire Water public combined sewer to the west of the site.
- 4.1.2 The proposed development is for the conversion of the existing site into a car park which will result in an overall hardstanding of 276.2m² (a decrease from the existing area) in the form of car parking and access.
- 4.1.3 The proposed development will decrease the hardstanding area and will result in a change to the surface water runoff rates and volumes. In order to ensure the proposed development will not increase flood risk elsewhere, surface water discharge from the site will be controlled.

4.2 Drainage Hierarchy

- 4.2.1 The recommended surface water drainage hierarchy (Paragraph 080 of the NPPG: Flood Risk and Coastal Change) is to utilise soakaway systems or infiltration as the preferred option, followed by discharging to an appropriate watercourse. If this is not feasible, the final option is to discharge to an existing public sewer.

Surface Water Discharge to Soakaway

- 4.2.2 The first consideration for the disposal of surface water is infiltration. As described above the site is underlain by no superficial deposits and the underlying bedrock comprises mainly Pennine Lower Coal Measures with the exception of the southwest corner underlain by Rough Rock. The Pennine Lower Coal Measures consist of lithologies of varying permeability. Soilsclapes describes the site as having freely draining soil.
- 4.2.3 However, given the size of the site and that the site is currently hardstanding, it can be concluded that soakaways will not be suitable for the discharge of surface water runoff.

Surface Water Discharge to Watercourse

- 4.2.4 Where soakaways are not suitable a connection to watercourse is the next consideration.
- 4.2.5 The site is separated from the Huddersfield Narrow Canal and the River Colne by third party, urbanised land. Therefore, discharge to a watercourse is not feasible.

Surface Water Discharge to Sewer

- 4.2.6 Where disposal of surface water to watercourse is not possible, a connection to the public sewer system is the final consideration. There is a 375mm public combined sewer located adjacent to the west of the site within the road. A gravity connection to this sewer appears to be a feasible option. This should be agreed with Yorkshire Water.



4.3 Surface Water Discharge

4.3.1 Based on the current brownfield nature of the site, existing brownfield runoff rates have been estimated using the Modified Rational Method which is set out as follows:

$$2.78 \times \text{Rainfall Intensity (mm)} \times \text{Impermeable Drainage Area (ha)}$$

4.3.2 The existing brownfield runoff rates are summarised below. The existing 1 in 2 year event brownfield rate based on an impermeable catchment area of 0.0316Ha is 2.0l/s.

Table 1: Runoff Rates

Return Period (Years)	Runoff Rate (l/s)
1 in 2	2.0
1 in 10	3.3
1 in 30	4.3
1 in 100	5.8
1 in 1000	8.7

4.3.3 As stated above, the 2019 LP Policy LP28 indicates that “for proposals on brownfield sites there should be a minimum 30% reduction in surface water run-off where previous positive surface water connections from the site can be proven”. Therefore, a flow rate of 1.4l/s is proposed for this site which provides a 30% betterment from the existing 1 in 2 year rate.

4.4 Attenuation Storage

4.4.1 In order to achieve a discharge rate of 1.4l/s, attenuation storage will be required. Storage estimates have been provided using Causeway Flow and are included in Appendix E. The table below provides the input parameters for the calculations and the estimated storage volumes:

Table 2: Attenuation Storage Volume Parameters

Proposed Discharge Rate	1.4l/s
Total Proposed Impermeable Area	276.2m ²
Design Head	1m
Flow Control Device	Hydrobrake
Estimated Storage Volume (1 in 100 year + 25% CC)	7.3m ³

4.4.2 The attenuation volumes are provided for indicative purposes only and should be verified at the detailed design stage.

4.5 Sustainable Drainage Systems

4.5.1 Attenuation storage should be provided in the form of Sustainable Drainage Systems (SuDS) where practical. The following SuDS options have been considered:



Soakaways

4.5.2 As described above, the use of soakaways is not considered to be feasible given the size of the site.

Swales, Detention Basins and Ponds

4.5.3 The site will be occupied by an access road and car parking spaces and there is limited space to accommodate above ground storage features such as ponds and basins.

Filter Drains/Strips

4.5.4 Filter drains are trenches filled with stone/gravel that create temporary subsurface storage for the filtration, attenuation, and conveyance of surface water runoff. Ideally, filter drains receive lateral inflow from adjacent impermeable surfaces pretreated over a filter strip. Filter drains can help manage peak flows by naturally limiting rates of conveyance through the filter medium and by providing attenuation storage when the rate of flow at the outlet is controlled. However, given there is limited space on the site, filter drains are considered not commensurate.

Bioretention Systems

4.5.5 Bioretention systems (including rain gardens and raised box planters) are shallow landscaped depressions that can reduce runoff rates and volumes and treat pollution. They also provide attractive landscape features and biodiversity. Bioretention systems can help reduce flow rates from a site by promoting infiltration / evapotranspiration and providing some attenuation storage. Bioretention systems can also provide very effective treatment functionality. Bioretention systems are a very flexible surface water management component that can be integrated into a wide variety of developments / densities using different shapes, materials, planting, and dimensions. Bioretention systems (including rain gardens) should be considered within the detailed drainage design. However, given there is limited space on the site, bioretention systems could be considered not commensurate.

Rainwater Harvesting

4.5.6 The attenuation benefits provided through the use of rainwater harvesting are considered to be limited and would only be realised when the tanks were not full. In addition, there is limited space on the site and therefore rainwater harvesting could be considered not commensurate. However, rainwater harvesting techniques could be incorporated within the final design.

Green Roofs

4.5.7 Green roofs are not identified on development plans and the site is for car parking.

Porous/Permeable Surfacing

4.5.8 Permeable surfacing could be incorporated within private roads and driveways. Storage would be provided within the sub-grade material prior to controlled release to the receiving sewer. The amount of storage offered by permeable paving is subject to sub-grade depth and site gradient. The use of permeable paving should be considered at the detailed design stage.



4.5.9 Based on the area of the 11 proposed car parking spaces at approximately 127m², a sub-grade depth of 0.2m and a void ratio of 30%, there is potential to accommodate 7.6m³ of attenuation storage (sufficient to accommodate the 1 in 100 year plus 25% climate change event) within the sub-grade of permeable surfacing (assuming the base of the sub-grade will be formed at a level gradient).

Underground Attenuation Tanks

4.5.10 Alternatively, storage could be provided within underground attenuation tanks or within oversized pipes. Sufficient space for an underground tank is provided within the west of the site. This can be considered further during the detailed design stage.

4.6 Preferred Drainage Scheme

4.6.1 Soakaways are not considered feasible for this site. Surface water runoff will be discharged to the 375mm public combined sewer located adjacent to the west of the site at a rate of 1.4l/s. Surface water runoff up to the 1 in 100 year plus 25% climate change allowance event will be attenuated on site. A total attenuation volume of 7.3m³ will be required to achieve the discharge rate and will be provided in the form of permeable surfacing located within the 11 car parking spaces on the site. This can be seen within the conceptual Drainage Sketch included in Appendix F.

4.6.2 The proposed surface water drainage scheme will ensure no increase in runoff over the lifetime of the development.

4.6.3 The alternative is to provide below ground storage to accommodate the 1 in 100 year plus 25% CC event. Storm events in excess of the 1 in 100 year plus 25% CC event should be permitted to produce temporary shallow depth flooding within the car park and or the access road prior to draining back into the sites drainage system.

4.7 Event Exceedance

4.7.1 Storage will be provided for the 1 in 100 year plus 25% CC event. Storm events in excess of the 1 in 100 year plus 25% CC event should be permitted to produce temporary shallow depth flooding within the car park and or the access road.

4.8 Surface Water Treatment

4.8.1 In accordance with the CIRIA C753 publication ‘The SuDS Manual’ (2015), commercial yard areas have a ‘medium’ pollution hazard level, with non-residential car parking classified as having a ‘medium’ pollution hazard level. The Table below shows the pollution hazard indices for each land use.

Table 3: Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Commercial Yard and Delivery Areas, Non-residential Car Parking and all roads	Medium	0.7	0.6	0.7



except Low Traffic Roads				
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Table extract taken from the CIRIA C753 publication ‘The SuDS Manual’ – Table 26.2

4.8.2 Where practical, runoff from roads will be directed towards the permeable surfacing within the 11 car parking spaces. The Table below demonstrates that permeable surfacing provides sufficient treatment.

Table 4: SuDS Mitigation Indices

Type of SuDS	Mitigation Indices		
	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Permeable Surfacing	0.7	0.6	0.7

Table extract taken from the CIRIA C753 publication ‘The SuDS Manual’ -Table 26.3

4.8.3 It can be concluded that the inclusion of permeable surfacing will provide sufficient treatment.

4.9 Maintenance

4.9.1 Maintenance of communal drainage features such as permeable paving will be the responsibility of the site owner. Maintenance of shared surface water drainage systems can be arranged through appointment of a site management company.

4.9.2 Maintenance schedules for permeable paving are included in Appendix G. Maintenance of the separator will be as per the manufacturer’s guidance.



5. Conclusions and Recommendations

5.1 Conclusions

- 5.1.1 The proposed development is for converting a site into a car parking area. The impermeable drainage areas for the proposed development consist of car parking and access. In order to ensure no increase in surface water runoff, flow control will be used, and attenuation provided on site to accommodate storm events up to and including the 1 in 100 year plus 25% climate change event.
- 5.1.2 All methods of surface water discharge have been assessed. Soakaways are not considered possible, therefore discharge of surface water to the 375mm public combined sewer at a rate of 1.4l/s appears to be the most practical option. This should be agreed with Yorkshire Water prior to development.
- 5.1.3 Attenuation storage will be required on site in order to restrict surface water discharge to 1.4l/s. Attenuation can be provided within the sub-grade of permeable paving within the 11 car parking spaces or alternatively within an underground tank located within the west of the site.

5.2 Recommendations

Drainage Strategy

- Verify the attenuation volumes included in this report when undertaking detailed drainage design;
- Contact Yorkshire Water to confirm connection; and
- Confirm invert levels for the combined sewer.



Appendices

Appendix A – Limitations



Limitations

This report contains recommendations from Arthian, which are based on the information listed in the report and reflect the professional opinions of an experienced Environmental Consultant. Arthian obtained, reviewed, and evaluated information from the Client and others to prepare this report. The conclusions, opinions, and recommendations presented in this report are based on this information. However, Arthian does not guarantee the accuracy of the information provided and will not be held responsible for any opinions or conclusions reached based on information that is later proven to be inaccurate.

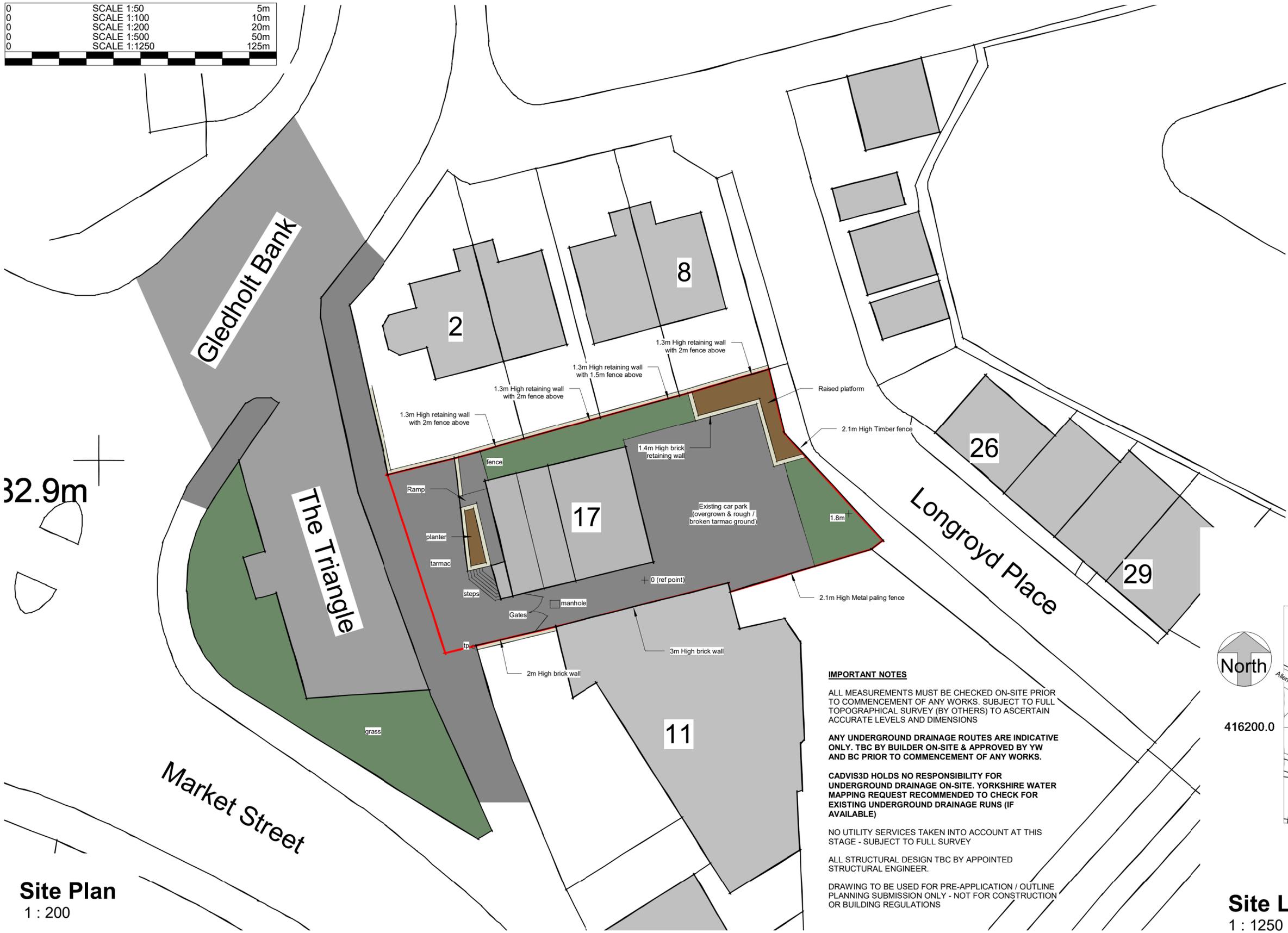
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Appendix B – Existing Site Plans



0	SCALE 1:50	5m
0	SCALE 1:100	10m
0	SCALE 1:200	20m
0	SCALE 1:500	50m
0	SCALE 1:1250	125m



IMPORTANT NOTES

ALL MEASUREMENTS MUST BE CHECKED ON-SITE PRIOR TO COMMENCEMENT OF ANY WORKS.

ANY UNDERGROUND DRAINAGE ROUTES ARE INDICATIVE ONLY. TBC BY BUILDER ON-SITE & APPROVED BY YW AND BC PRIOR TO COMMENCEMENT OF ANY WORKS.

CADVIS3D HOLDS NO RESPONSIBILITY FOR UNDERGROUND DRAINAGE ON-SITE. YORKSHIRE WATER MAPPING REQUEST RECOMMENDED TO CHECK FOR EXISTING UNDERGROUND DRAINAGE RUNS (IF AVAILABLE)

ALL STRUCTURAL ALTERATIONS TBC BY APPOINTED STRUCTURAL ENGINEER. ANY ALTERATIONS TO PROPOSED DESIGN DUE TO STRUCTURAL CONSTRAINTS IDENTIFIED BY ENGINEER TO BE AGREED/APPROVED BY CLIENT PRIOR TO COMMENCEMENT OF ANY WORKS

CDM DUTIES TO BE CARRIED OUT BY PRINCIPLE CONTRACTOR. PRE CONSTRUCTION INFORMATION & HEALTH AND SAFETY FILE TO BE PROVIDED BY PRINCIPLE DESIGNER PRIOR TO COMMENCEMENT OF ANY WORKS.

CLIENT TO BE MADE AWARE OF DUTIES UNDER CDM AND ENSURE HEALTH AND SAFETY MEASURES ARE IN PLACE. ALL CONTRACTORS AND DESIGNERS TO BE COMPETENT TO CARRY OUT THEIR DUTIES UNDER CDM. SEE RELEVANT GOVERNMENT WEBSITE FOR MORE INFORMATION

WORK MUST NOT COMMENCE UNTIL ALL RELEVANT BUILDING REGULATIONS APPROVALS ARE IN PLACE & CDM / HSE DOCUMENTATION IS COMPLETE AND ISSUED TO ALL RELEVANT PARTIES

DRAWING TO BE USED FOR PLANNING PURPOSES ONLY NOT FOR CONSTRUCTION

IMPORTANT NOTES

ALL MEASUREMENTS MUST BE CHECKED ON-SITE PRIOR TO COMMENCEMENT OF ANY WORKS. SUBJECT TO FULL TOPOGRAPHICAL SURVEY (BY OTHERS) TO ASCERTAIN ACCURATE LEVELS AND DIMENSIONS

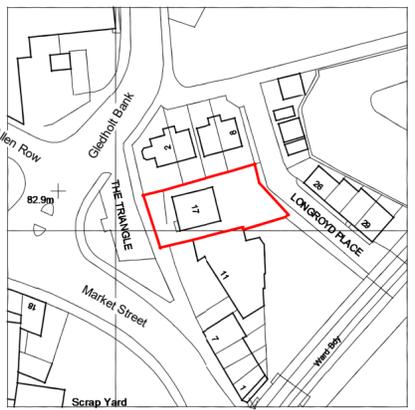
ANY UNDERGROUND DRAINAGE ROUTES ARE INDICATIVE ONLY. TBC BY BUILDER ON-SITE & APPROVED BY YW AND BC PRIOR TO COMMENCEMENT OF ANY WORKS.

CADVIS3D HOLDS NO RESPONSIBILITY FOR UNDERGROUND DRAINAGE ON-SITE. YORKSHIRE WATER MAPPING REQUEST RECOMMENDED TO CHECK FOR EXISTING UNDERGROUND DRAINAGE RUNS (IF AVAILABLE)

NO UTILITY SERVICES TAKEN INTO ACCOUNT AT THIS STAGE - SUBJECT TO FULL SURVEY

ALL STRUCTURAL DESIGN TBC BY APPOINTED STRUCTURAL ENGINEER.

DRAWING TO BE USED FOR PRE-APPLICATION / OUTLINE PLANNING SUBMISSION ONLY - NOT FOR CONSTRUCTION OR BUILDING REGULATIONS



Site Location Plan
1 : 1250

Site Plan
1 : 200

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project
Potential Redevelopment at
Hartrose Associates,
17 The Triangle, Paddock,
Huddersfield, HD1 4RN

title
Site Plan - As Existing

client
Mr Hussian

GENERAL
DO NOT SCALE FROM THIS DRAWING.
ALL DIMENSIONS ARE TO BE CHECKED ON SITE AND CONFIRMED TO AUTHOR.
ALL FEASIBILITY STUDIES ARE SUBJECT TO FULL SITE SURVEY + LOCAL AUTHORITY APPROVALS.
ANY DISCREPANCIES OR VARIATIONS SHALL BE NOTIFIED TO CADVIS3D BEFORE WORK ON THE RELEVANT SECTION COMMENCES.
THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT CONSULTANTS AND / OR SPECIALISTS DRAWINGS / DOCUMENTS.
THE MATERIALS AND WORKMANSHIP OF ALL RELEVANT TRADES AND BUILDING OPERATIONS SHALL COMPLY WITH THE RECOMMENDATIONS OF CURRENT BRITISH STANDARDS AND CODES OF PRACTICE.
AS FAR AS REASONABLY PRACTICABLE, THIS DESIGN HAS BEEN PREPARED IN SUCH A WAY AS TO REDUCE THE RISKS TO THE HEALTH AND SAFETY OF PERSON(S) WHO MAY BE AFFECTED.

No.	Date	Dr	Description	scale	drawn	apprv
				As indicated	PSI	SH
	NOV 2024				path	
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					PLANNING	
job no	dwg no		rev			
2366	A(00)-01					

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Appendix C – Sewer Plans



YORKSHIRE WATER PROTECTION OF MAINS AND SERVICES

1. The position of Yorkshire Water Services Ltd (YWS) apparatus shown on the existing mains record drawing(s) indicates the **general** position and nature of our apparatus and the accuracy of this information cannot be guaranteed. Any damage to YWS apparatus as a result of your works may have serious consequences and you will be held responsible for all costs incurred. Prior to commencing major works, the exact location of apparatus must be determined on site, if necessary by excavating trial holes. The actual position of such apparatus and that of service pipes which have not been indicated must be established on site by contacting the Customer Helpline on 0345 124 24 24 for both water and sewerage.
2. The public sewer and water network is lawfully retained in its existing position and the sewerage and water undertaker is entitled to have it remain so without any disturbance. The provisions of section 159 of the Water Industry Act 1991 provides that the undertaker may "inspect, maintain, adjust, repair or alter" the network. Those rights are given to enable the undertaker to perform its statutory duties. Any development of the land or any other action that unacceptably hindered the exercise of those rights would be unlawful. The provisions contained in Section 185 of the Water Industry Act 1991 state that where it is reasonable to do so, a person may require the water supply undertaker to alter or remove a pipe where it is necessary to enable that person to carry out a proposed change of use of the land. The provisions contained in Section 185 also require the person making the request to pay the full cost of carrying out the necessary works.
3. Ground levels over existing YWS apparatus are to be maintained. Sewers in highways will **generally** be laid to give 1200mm of cover from finished ground level working to kerb races, other permanent identification of the limits of the road or to an agreed line and level. Substantial increases or decreases to this 1200mm depth of cover will result in the sewer being re-laid at your expense. Water mains and services will **generally** be laid with a minimum of 750mm depth of cover however some mains and services usually those installed over 50 years ago may have less ground cover.
4. If surface levels are to be decreased / increased significantly the effects on existing water supply apparatus will be carefully considered and if any alterations are necessary, the costs of the alterations will be recharged to you in full. Outlets on fire hydrants must be no more than 300mm below the new levels and all surface boxes must be adjusted as part of the scheme.
5. To enable future repair works to be carried out without hindrance; any pipe, cable, duct, etc. installed parallel to a water main or service pipe should not be installed directly over or within 300mm of a water main or service pipe or 1000mm of a waste water asset. Where a pipe, cable, duct, etc. crosses a main or service it should preferably cross perpendicular or at an angle of no less than 45° and with a minimum clearance of 150mm. These requirements apply to activities within an existing highway and are relevant to the installation of pipes, cables, ducts, etc. up to and including 250mm in diameter (*see illustration below*). Necessary protection measures for installations greater than 250mm in diameter and/or in private land will need to be agreed on an individual basis. Installations within a new development site must comply with the National Joint Utilities Group publication Volume 2: NJUG Guidelines On The Positioning Of Underground Utilities Apparatus For New Development Sites.
6. All excavation works near to YW apparatus should be by hand digging only.
7. Backfilling with a suitable material to a minimum 300mm above YW apparatus is required.
8. Adequate support must be provided where any works pass under YW apparatus.
9. Jointing chambers, lighting columns and other structures must be installed in such a way that future repair or maintenance works to YW apparatus will not be hindered.
10. Apparatus such as; railings, sign posts, etc. must not be placed in such a way that they prevent access to or full operation of controlling valves, hydrants or similar apparatus. YWS surface boxes must not be covered or buried. Any adjustment, alteration or replacement of manhole covers must be agreed on site prior to the commencement of the works with a YWS Inspector who may be contacted via our Call Centre on 0345 124 24 24.
11. Explosives shall not be used within 100 metres of any Yorkshire Water Services apparatus or installations.
12. Vibrating plant should not be used directly over any apparatus. Movement or operation by vehicles or heavy plant is not to be permitted in the immediate vicinity of YWS plant or apparatus unless there has been prior consultation and, if necessary, adequate protection provided without cost to YWS.
13. **Under no circumstances** should thrust boring or similar trenchless techniques commence until the actual position of the Company's mains/services along the proposed route have been confirmed by trial holes.
14. Any alterations to the highway should be notified following the procedures outlined in the New Road and Street Works Act 1991 Code of Practice; Measures Necessary Where Apparatus Is Affected By Major Works (Diversionary Works).
15. You will be held responsible for any damage or loss to YWS apparatus during and after completion of work, caused by yourselves, your servant or agent. Any damage caused or observed to YWS plant or apparatus should be immediately reported to YWS. Should YW incur any costs as a result of non-compliance with the above, all costs will be rechargeable in full.
16. You should ensure that nothing is done on the site to prejudice the safety or operation of YWS employees, plant or apparatus.
17. In accordance with the New Roads and Street Works Act 1991, Chapter 22, Part 3, Section 80. The location of any identified YW asset "*which is not marked, or is wrongly marked, on the records made available*" should be communicated back to Yorkshire Water. The location of the apparatus should be identified on copies of the supplied plans which should be returned to Yorkshire Water (Asset Records Team) with photographic supporting evidence where possible.
18. The Government has decided that responsibility for private sewers serving two or more properties and lateral drains (the section of pipe beyond the boundary of a single property, connecting it to the public sewer) will be transferred to the water companies on Oct 1 2011.

Private pumping stations will also transfer during the period 1 October 2011 – 1 Oct 2016. Records of these assets may not yet be shown on the existing mains record drawing(s). If you encounter any of these assets you must inform Yorkshire Water Services Ltd (YWS).

19. Please note that the information supplied on the enclosed plans is reproduced from Ordnance Survey material with the permission of the Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. Licence Number AC0000857457.
20. This information is for guidance only and the position and depth of any YW apparatus is approximate only. Likewise, the nature and condition of any YW apparatus cannot be guaranteed. YW has no responsibility for recording the locations of privately owned apparatus. As of 1 October 2011, there may be some lateral drains and/or public sewers which are not documented on YW records but may still be present. For the avoidance of doubt, this information is not a substitute for appropriate professional and/or legal advice. YW accepts no responsibility for any inaccuracy or omissions in this information. The actual position of YW apparatus must be determined on site by excavating trial holes by hand. YW requires a minimum of two working days' written notice of the intention to excavate any trial holes before any excavation can be undertaken. If there are any queries in this respect please contact Yorkshire Water on 0345 124 24 24.

Property Identifier



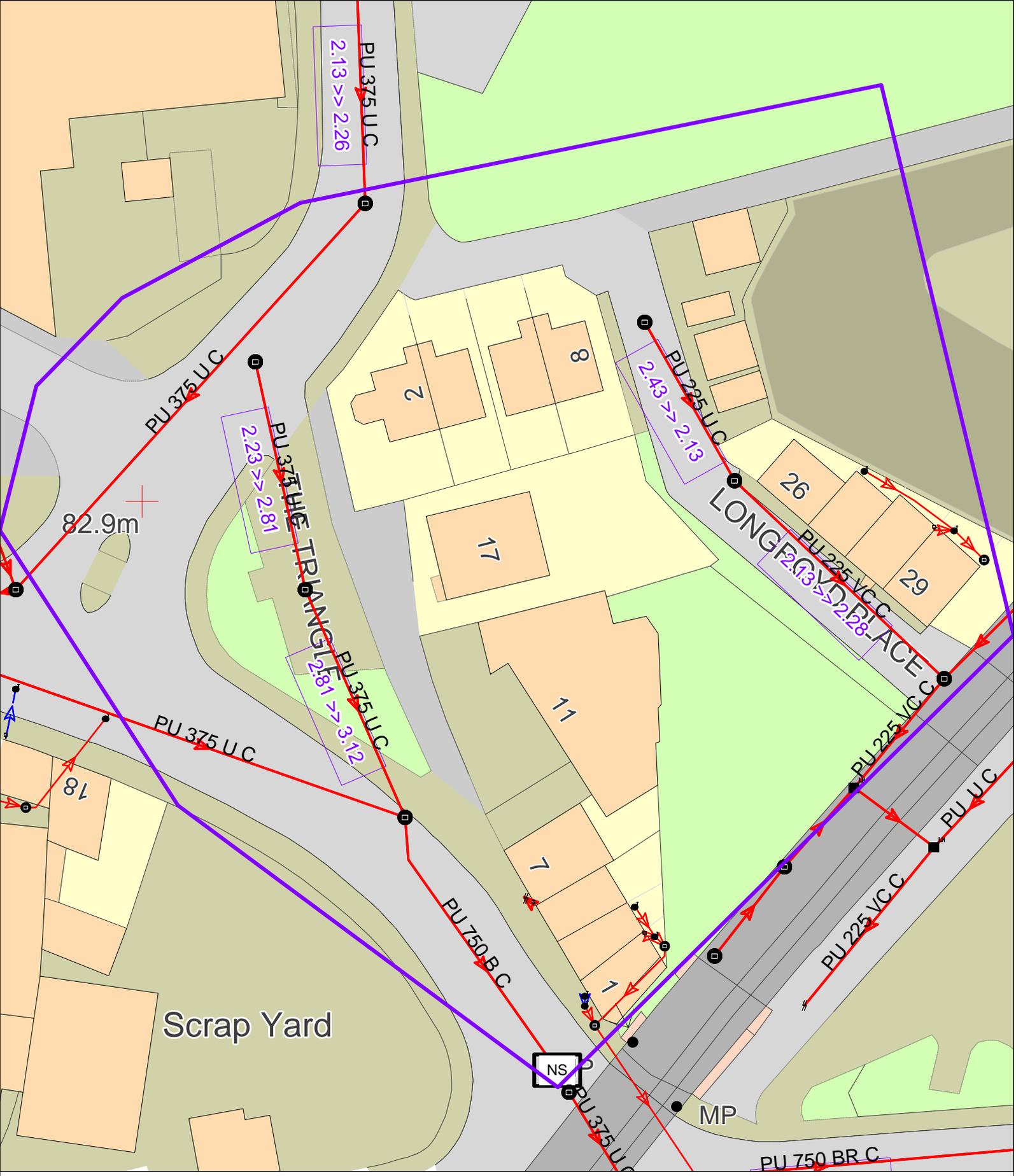
Sewer Legend

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

Please note that the direction of flow arrows may not always appear depending on the scale of the map.

Water Legend

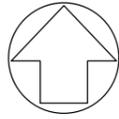
	Water Main 4" and below
	Water Main 4" and above
	Raw Water Main
	Private Water Main
	Fire Hydrant
	Pumping Station
	The assets in this area are the responsibility of another Water Undertaker



Public Waste Water Network 27/05/2025 16:34:04 OS Grid Coordinates: 413371 : 416142 Map Name : SE1316SW svcGISSafeMovePD

Appendix D – Proposed Development Plans





DO NOT SCALE



REV	DATE	BY	DESCRIPTION	CHK	APP
P02	03/06/25	JL	REVISED SITE BOUNDARY TO TITLE PLAN BOUNDARY	-	-
P01	28/05/25	JL	FIRST ISSUE	-	-

DRAWING STATUS: S0 - WORK IN PROGRESS



PROJECT: THE TRIANGLE, MARKET STREET, HUDDERSFIELD

TITLE: PROPOSED PARKING ARRANGEMENT

DRAWN: JL	APPROVED: -
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SCALE @ A3: 1:200	DATE: May 25
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DRAWING No: 2504101	REV: P02
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Appendix E – Causeway Flow Calculations



Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
Storage	0.028	5.00	100.000	0.000	0.000	2.000

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m ³ /ha)	20.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	Drain Down Time (mins)	240	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 %)
100	25	0	0

Node Storage Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	97.500	Product Number	CTL-SHE-0056-1400-1000-1400
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.4	Min Node Diameter (mm)	1200

Node Storage Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	98.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	0

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	17.9	0.0	1.000	17.9	0.0	1.001	0.0	0.0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +25% CC 15 minute summer	406.160	114.929	100 year +25% CC 60 minute winter	128.085	50.949
100 year +25% CC 15 minute winter	285.024	114.929	100 year +25% CC 120 minute summer	115.892	30.627
100 year +25% CC 30 minute summer	277.056	78.397	100 year +25% CC 120 minute winter	76.996	30.627
100 year +25% CC 30 minute winter	194.425	78.397	100 year +25% CC 180 minute summer	88.771	22.844
100 year +25% CC 60 minute summer	192.790	50.949	100 year +25% CC 180 minute winter	57.703	22.844

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +25% CC 240 minute summer	70.408	18.607	100 year +25% CC 600 minute winter	24.646	9.866
100 year +25% CC 240 minute winter	46.778	18.607	100 year +25% CC 720 minute summer	32.531	8.719
100 year +25% CC 360 minute summer	54.442	14.010	100 year +25% CC 720 minute winter	21.863	8.719
100 year +25% CC 360 minute winter	35.389	14.010	100 year +25% CC 960 minute summer	27.278	7.183
100 year +25% CC 480 minute summer	43.480	11.491	100 year +25% CC 960 minute winter	18.069	7.183
100 year +25% CC 480 minute winter	28.887	11.491	100 year +25% CC 1440 minute summer	20.307	5.442
100 year +25% CC 600 minute summer	36.072	9.866	100 year +25% CC 1440 minute winter	13.647	5.442

Results for 100 year +25% CC Critical Storm Duration. Lowest mass balance: 99.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
60 minute winter	Storage	57	98.423	0.423	8.2	7.3270	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
60 minute winter	Storage	Hydro-Brake [®]	1.4	12.0

Appendix F – Conceptual Drainage Sketch





WLEDHOLT BANK

Permeable Surfacing
Permeable Surfacing with a surface area of 127m², with a sub-grade depth of 0.2m and a void ratio of 30%, totaling in approximately 7.6m³ of attenuation

11NO. PARKING SPACES (2.4m X 4.8m)

PROPOSED FENCE IN LINE WITH EXISTING BOUNDARY WALL

7.2m

EXISTING DROPPED KERB

PROPOSED ELECTRIC SLIDING GATE (5m WIDE ACCESS)

Hydrobrake or similar flow control device to restrict surface water runoff to a rate of 1.4l/s before discharge via outfall to the 375mm public combined sewer

Legend:

-  Site Location
-  Existing Combined Sewer
-  Proposed Surface Water Sewer
-  Proposed Permeable Surfacing
-  Proposed Hydrobrake (or similar flow control device)

Final Revision:	Date:	Description:	By:	Chk:
-	-	-	-	-
-	-	-	-	-

All Dimensions to be checked on site and not scaled from this drawing.
 This drawing is not for construction
 This drawing is for planning only
 All services to be checked on site and not scaled from this drawing



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 https://www.arthian.com

DRAFT

Client: **Five Star Triangle**

Site: **The Triangle, Huddersfield**

Drawing Title: **Drainage Sketch**

Date: 16 June 2025	Scale: 4:1	Paper Size: A3 (297 x 420mm)
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Drawn By: GH	Checked By: GM	Status: Draft v1	Final Revision: -
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CAD Ref: A3 Landscape	Drawing No: / Client Ref: Figure 1
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Appendix G - Maintenance Plans



Pervious Pavements Maintenance Schedule

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required - once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth - if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Table extract taken from the CIRIA C753 publication 'The SuDS Manual' – Table 20.15