



RIDGE

**TAN YARD BROW, MANCHESTER
FLOOD RISK ASSESSMENT &
DRAINAGE STRATEGY REPORT**

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TAN YARD BROW, MANCHESTER FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY REPORT

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1. EXECUTIVE SUMMARY

This report details the Flood Risk and Drainage Strategy for the new development. The proposals are for Construction of 25 dwellings (Use Class C3), including a mix of apartments and cottages, creation of a new access point and provision of landscaping. The new development will be located on the existing greenfield land. **Table 1** below provides a summary of the Flood Risk and Drainage / SuDS Strategy for the scheme.

Table 1 – Drainage / SuDS Summary

Item	Brief Description
Flood Zone	Majority of the development lies within Flood zone 1 (Low Probability) - land defined as having an annual probability of fluvial flooding of less than 1 in 1000 in any year (<0.1%). Small part of the site lies in Fluvial Flood Zone 2 (medium probability). defined as land having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1% AEP); or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1% AEP) - See Figure 2 .
Flood Risk Assessment	The site is of low risk of flooding from all other sources.
Geology	Ground Assessment was completed June 2024. Borehole logs had been provided, and this information is attached within Appendix B . The report confirmed made ground up to 1.5m bgl over Devensian till (heterogenous clays) up to 15.15m bgl. Groundwater was also encountered during the investigation on site, this varied from 1.9m – 5.45m bgl.
Infiltration Rate	The Site Investigation Report also confirmed the Falling Head tests undertaken at the site had failed due to the below ground conditions noted above. Results can be seen in Appendix B .
Nearest Watercourses	The closest watercourse is Gore Brook which is located approximately 10m to the north of the site at its closest point. Gorton Lower Reservoir is also located approximately 200m to the east of the site.
Nearest Adopted Sewers	United Utilities mapping shows there are public surface and combined water sewers in proximity to the site, located within Tan Yard Brow highway (west of the site boundary) - see Figure 5 .

Item	Brief Description
Surface Water Outfall and SuDS Hierarchical Approach	Based on the above, Infiltration – discounted based on the falling head tests failing to provide a permeability rate. Watercourse – Due to the steep embankment (at the northern boundary) into Gore Brook watercourse, constructing an outfall would not be viable. Furthermore, due to the existing trees in this area and Tree Protection Zone, this approach has been discounted. Surface Water Sewer – There is a public surface water sewer within Tan Yard Brow highway. This public sewer currently discharges into the Gore Brook watercourse located downstream of the proposed development. As such this is option is considered feasible. Combined Water Sewer – discounted as a method higher up in the SuDS hierarchy is feasible.
Existing SW Discharge Rate	The Existing Greenfield rates are from Infodrainage and its runoff rate calculation tool. Calculations can be found in Appendix D. QBAR Rural: 2.2 l/s Q 1(years): 1.9 l/s Q 30(years): 3.8 l/s Q 100(years): 4.6 l/s
Proposed SW Discharge Rate	The proposed maximum runoff rate for the development is limited to 5 l/s. This is as per the United Utilities comments made within the Pre Development Enquiry dated 7th May 2024.
Allowance for Climate Change	Upper Mersey Management Catchment, Upper End Allowance, 2070's: 3.3% AEP - 40% 1% AEP % - 45% The climate change allowances highlighted above has been applied to the modelled drainage calculations.
Coefficient Values within the Hydraulic Model	Cv value of 0.90 has been used in the Hydraulic model attached within Appendix D.
Proposed Attenuation Method and Volume	Geocellular Storage Tank and oversized pipes Proposed development – 92m³ to contain the 100 year + 45% event.
SuDS features	Water Quantity - Geocellular Storage Tanks and oversized pipes. Water Quality – Gullies, catchpit manholes and Silt traps.
Maintenance Responsibility	Management Company / Site owner
Foul Drainage Outfall	Based on the above, foul water from the Proposed development will discharge into the United Utilities 300mm Combined Water sewer, located west of the site within the public highway.

There is a reduction in surface water flood risk from the development site to the surrounding district due to the reduction of existing storm water flow rates. Therefore, the development does not

increase the risk of flooding to the other adjacent properties and roads. Out of chamber or gully flooding for the events in excess of the 100-year plus 45% climate change event may occur within the development site and is classed as exceedance flows. Flood water from this event will be contained within the development site and directed away from the buildings to the external hard and soft landscaped areas.

2. INTRODUCTION

- 2.1 Ridge & Partners LLP have been appointed by Franstep Ltd to prepare this Flood Risk Assessment (FRA) and Drainage Strategy Report to support the Construction of 25 dwellings (Use Class C3), including a mix of apartments and cottages, creation of a new access point and provision of landscaping. The assessment has been undertaken in line with the new 'National Planning Policy Framework' (NPPF), plus the accompanying 'Flood Risk and Coastal Change' chapter of the National Planning Practice Guidance.
- 2.2 This report has been commissioned by Franstep Ltd and is specific to their interests in the development proposals as described by the Architectural plan in **Appendix A**.
- 2.3 The report has been commissioned to identify any drainage-related issues associated with the proposed development and which are subsequently addressed within this report.
- Identify available data relating to flood risk at the site.
 - Determine whether the site is at risk from flooding from all sources, including from breach or overtopping of any existing flood defences, surface water flooding and/or groundwater flooding.
 - Consider the flood risk from all other sources.
 - Determine the current surface water drainage regime and assess any potential increase in surface water runoff as a result of the proposed development.
 - Discuss Sustainable Drainage Systems (SuDS) as an option for reducing surface water flood risk.
 - Devise an appropriate outline surface water drainage strategy (including calculation where appropriate) to deal with any potential increase in surface water runoff and include for climate change.
 - Devise an appropriate outline foul water drainage strategy.
 - Consider the recommendations of Manchester City Council Level 1 & 2 Strategic Flood Risk Assessment (SFRA) and Manchester City Council Local Plan
 - Assess mitigation measures & off-site impacts and define any residual risks.

3. PLANNING POLICY AND CONSULTATION

3.1. Planning Policy Framework

- 3.1.1. The flood maps provided by the Environment Agency (EA) indicates majority of the site within Flood Zone 1, land defined as having an annual probability of fluvial flooding of less than 1 in 1000 in any year (<0.1%). Small part of the site lies within Flood Zone 2, i.e. land defined as land having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1% AEP); or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1% AEP). As a requirement of the NPPF (2024) and accompanying National Planning Practice Guidance (NPPG), the proposed development has to satisfy the requirements of the Sequential Test and where applicable the Exception Test.
- 3.1.2. Sequential Test:
Under the NPPF, Zone 2 is defined as medium probability flood risk. The proposal is for a new residential development, which in line with Table 2 is classified as 'More Vulnerable'.
- 3.1.3. Placing both these criteria into Table 3 (Flood Risk Vulnerability and Flood Zone 'Compatibility'), More Vulnerable development in Flood Zone 2 determines that 'Development is Appropriate'.
- 3.1.4. Exception Test:
As the Sequential Test is passed, the Exception Test is not required.

3.2. Manchester City Council Level 1 & 2 Strategic Flood Risk Assessment (SFRA)

- 3.2.1. SFRA's assess the risk associated with all types of flooding and provide the information required to identify the amount of development permitted in an area; how drainage systems in the area should function and also how risks in vulnerable areas can be reduced and/or mitigated. The NPPF states that Regional Planning Bodies (RPB's) or Local Planning Authorities (LPA's) should prepare SFRA's in consultation with the EA
- 3.2.2. A summary of the main elements from the SFRA is detailed below. The full report can be found on the Manchester City Council website.
- Site-specific Flood Risk Assessments will be required for all development on sites of 0.5 hectares or more in Critical Drainage Areas as defined in the Strategic Flood Risk Assessment.
 - For Critical Drainage Areas (CDAs), specific drainage approaches are recommended in these areas to help reduce local flood risk.
 - Development should aim for implementation of SUDS to reduce flows into in the sewer networks.
 - Development should be designed so that there is no flooding to the development in a 1 in 30 year event and so that there is no property flooding in a 1 in 100 year plus climate change event.
- 3.2.3. A summary of the findings from the SFRA maps is detailed below:
- Majority of the development is located within a Flood Zone 1 (low risk of fluvial flooding). Small part of the proposed development is located within a Flood Zone 2 (medium risk of fluvial flooding)

- Finish Floor Levels to be raised to typically 600mm above the water level during the 1 in 100 year flood event plus climate change.
- No incidents of groundwater flooding have been reported at the site.
- Site is located within a Critical Drainage Area (CDA).
- Measures taken within a CDA is to either increase infiltration or reduce surface water runoff would therefore contribute towards a reduction in flood risk.

3.3. Manchester City Council – Local Plan

3.3.1. This document supports the Manchester City Council SFRA, 2011 produced by JBA Consulting.

3.3.2. Of particular relevance within the Manchester City Council Local Plan is Policy EN14, Flood Risk. A summary of the main elements from the Local Plan is detailed below. The full report can be found on the Manchester City Council website.

- In line with the risk-based sequential approach contained within PPS25, development should be directed away from sites at the greatest risk of flooding, and towards sites with little or no risk of flooding; this should take account of all sources of flooding identified in the Manchester-Salford-Trafford Strategic Flood Risk Assessment (SFRA).
- In addition to the requirements for site-specific Flood Risk Assessments (FRAs) set out in PPS25, an appropriate FRA will also be required for all development proposals, including changes of use, on sites greater than 0.5ha within Critical Drainage Areas (CDAs) and Canal Hazard Zones identified in the SFRA.
- All new development should minimise surface water run-off, including through Sustainable Drainage Systems (SUDS) and the appropriate use of Green Infrastructure. Developers should have regard to the surface water run-off rates in the SFRA User Guide. In CDAs, evidence to justify the surface water run-off approach / rates will be required.

4. THE SITE

4.1. Site Details

4.1.1. The site details are summarised in Table 2 below:

Table 2: Site Referencing Information

Item	Brief Description
Site name	Tan Yard Brow
Site address and location	Tan Yard Brow, Manchester, M18 7FN
Planning Authority	Manchester City Council
Lead Local Flood Authority	Manchester City Council
Drainage Statutory Undertaker	United Utilities
Site Area	0.38ha
Approximate Grid Reference	OS: 389176, 395944
General Locality	The site is located approximately 5.5km to the Southeast of Manchester City Centre and is situated on the corner of the junction between Tan Yard Brow and Hyde Road.

4.2. Site Description

4.2.1. The existing site surrounding boundary conditions is shown **Figure 1**. The redline boundary denotes the detailed application boundary.

4.2.2. The area of the proposed development is approximately 0.38 Ha and is located to the Southeast of Manchester City Centre. To the immediate North and East of the site is woodland area. The west of the site is bordered by Tan Yard Brow and to the South by is a small area of greenfield land.



Figure 1: Aerial Photograph of Existing Site (Microsoft Maxar, 2025)

4.3. Proposed Development

- 4.3.1. The report is prepared to support Construction of 25 dwellings (Use Class C3), including a mix of apartments and cottages, creation of a new access point and provision of landscaping.
- 4.3.2. The new development extends to approximately 0.38 Ha in area.
- 4.3.3. The site can be accessed Via Tan Yard Brow, located the West of the site.
- 4.3.4. The current outline General Arrangement of the proposed development attached within **Appendix A** provides an indication of the proposals of the site.

5. DEFINITION OF FLOOD HAZARD

5.1. Sources of information

- 5.1.1. The NPPF (2024) requires the developer to consider the impact of runoff generated by the proposed development onto the downstream catchment, and to assess the risk of runoff from the surrounding district impacting on the development footprint. Further, the report is to consider flood risk from all other sources. The following section defines the flood risk receptors and anticipated flood risk. Section 5 then discusses in further detail the probability of flooding and the likely impacts.

Table 2: Sources of information used in the identification of flood risk

Source of Information	Details
Environment Agency Flood Map	Indicative Flood Maps
United Utilities	Sewer Records
Historic Maps	From various websites
Liverpool City Council SFRA	Report & Various Maps from the SFRA

5.2. Flooding from Rivers (Fluvial)

- 5.2.1. The closest watercourse, 'Gore Brook' is located approximately 10m to the north of the site at its closest point. Gorton Lower Reservoir is also located approximately 200m to the east of the site.

Flooding from watercourses occurs when flows exceed the capacity of the channel, or where a restrictive structure is encountered, which leads to water overtopping the banks into the floodplain. This process can be exacerbated when debris is mobilised by high flows and accumulates at structures.

Figure 2 below locates the site on the Environment Agency's indicative flood zone map. It is considered majority of the site lays within a Flood Zone 1, with a small area lying in 'Flood Zone 2'. The EA Flood Zones have been modelled (a plan has been attached within **Appendix C**).

- 5.2.2. The watercourse is significantly below the development level, and the watercourse is separated from the site by a steep embankment.
- 5.2.3. The EA have been consulted and have provided flood level data as taken from the Chorlton Platt Gore Model. Refer to Appendix E for full details. **Table 3** provides the various flood level data at the nearest node point for the various storm events with climate change also considered.

Table 3: Peak Flood Level of Gore Brook

	1 in 100 year	1 in 100 year (1% AEP) + 53% CC	1 in 100 year (1% AEP) + 85% CC	1 in 1000 year
Defended	61.790m AOD	63.260m AOD	64.310m AOD	64.190m AOD
Undefended	61.790m AOD	63.260m AOD	64.340m AOD	64.190m AOD

- 5.2.4. The product 4 data provided by the EA indicates the water level during the 'undefended' 1 in 100 year plus 53% climate change to be 63.260m AOD. This Flood level has been modelled, and the true reflection of the flood level extent is presented in Ridge drawing 5025143-RDG-ZZ-ST-D-C-050012 attached in **Appendix C**.
- 5.2.5. The lowest Finish Floor Level within the proposed development is 64.300m AOD. The level difference is greater than 600mm and this satisfies current EA recommendation on the minimum floor levels of residential developments - FFL's to be set minimum 600mm above the 1% annual probability (1 in 100 year) flood level.
- 5.2.6. Therefore, the flood risk associated with this source is considered low.



Figure 2 – The EA's Flood Zone Map

5.3. Flooding From Land (Overland Flow)

- 5.3.1. Any surface water runoff from the surrounding area is captured by the existing drainage infrastructure, both private and adopted and conveyed away from the site.

The indicative surface water flood map shows the site is located within a very low risk of surface water flooding as illustrated in **Figure 3**. There are no existing surface water flow routes through the site that need to be maintained.

- 5.3.2. The proposed Surface Water Drainage Strategy is to be designed so that no surface water flooding / overland flow occurs up to the 1:30 year event. Exceedance flows beyond the 1:30 year up to the 1:100 year + climate change events are permitted to flood the surrounding hardstanding areas. However, these flows shall be kept away from the buildings and surrounding areas. As such, by incorporating appropriate mitigation measures and designing the drainage strategy to current best practice guidance to ensure that any surface water flooding is controlled, the risk of flooding from overland flow is considered to be low.



Figure 3 – The EA's Indicative Surface Water Flood map

5.4. Flooding from Sewers

- 5.4.1. United Utilities (UU) sewer records have been reviewed and confirms there are two public sewers within close proximity to the site. There is a combined water (CW) and Surface Water (SW) public sewers located within Tan Yard Brow highway.
- 5.4.2. An extract of the UU sewer records is shown in **Figure 4**.
- 5.4.3. It is anticipated that no private drainage is located within the proposed site boundary.
- 5.4.4. The SFRA does not highlighted problems of sewer flooding at the site or nearby. At the time of writing the report the DG5 records had not been available.
- 5.4.5. Failures in areas of this nature are usually notified to the asset owner within a short period of time of the failure occurring and remedial work is usually implemented soon thereafter to prevent subsequent highway damage and inconvenience to road users.
- 5.4.6. It is anticipated that the SW private sewer network have been designed to accommodate a minimum of 1:30 year event. Beyond this projection, there may be a small degree of peripheral 'Exceedance' flooding within the areas above the sewers. However, this is expected to be localised and restricted to the location of specific manhole covers located outside the development footprint.

- 5.4.7. The existing private drains on site will be abandoned / demolished to facilitate the proposed development and ensure that the required UU easements are adhered to Design & Construction Guidance (DCG), BS EN 752: 2008 and Building Regulations Part H guidance.
- 5.4.8. As such the risk of flooding at the site is regarded as low.

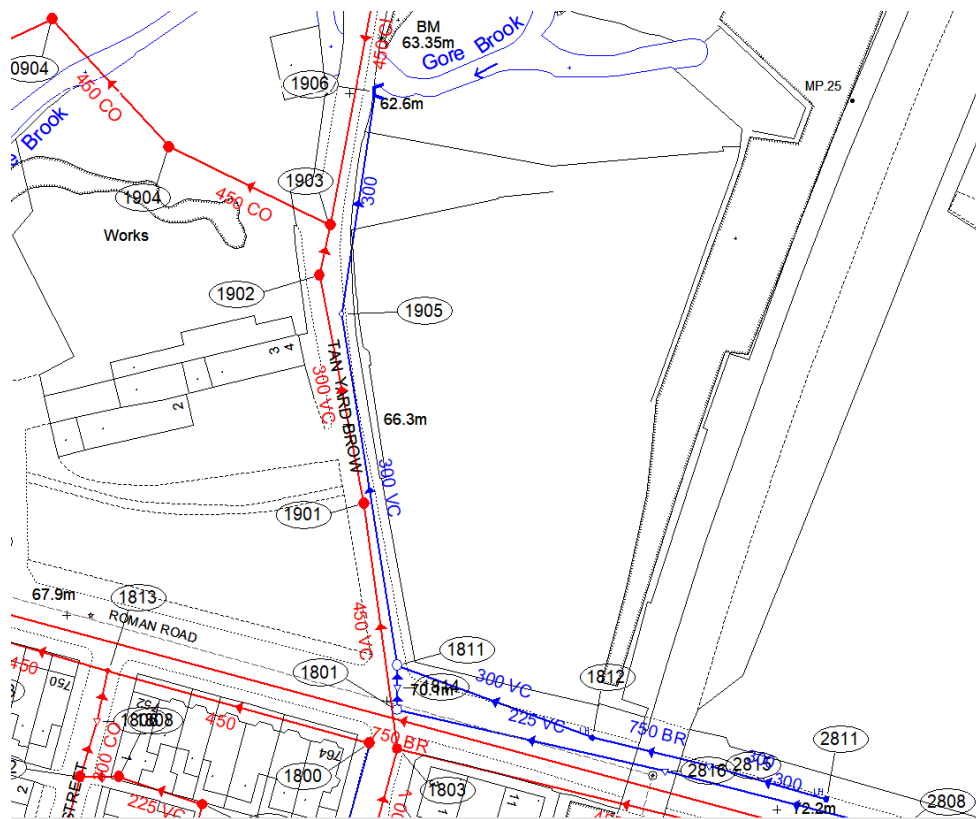


Figure 4 – Extract of United Utilities Sewer Records

5.5. Flooding from Groundwater

- 5.5.1. The SFRA map indicates the site has no risk of groundwater flooding.
- 5.5.2. Online groundwater vulnerability mapping indicates the site to lie within a medium to low zone. Also, the online tool indicated the site bedrock strata to be wholly designated as a principal Aquifer.
- 5.5.3. The Ground Assessment report identified groundwater was encountered between 1.9m and 5.45mbgl. Therefore, dewatering may be required when digging for foundation and drainage pipework installation.
- 5.5.4. The proposals for the site do not include any basement or underground structures that would be susceptible to the risk of groundwater, therefore flooding from groundwater is considered low.

5.6. Flooding from Artificial Sources

- 5.6.1. According to the EA maps, the proposed development is at risk from reservoir flooding.

- 5.6.2. Due to the stringent processes in place to ensure that reservoirs are managed and maintained by Environment agency, the risk of flooding from this source remains very low and it is likely that any mitigation in place to deal with fluvial risk will also be sufficient.
- 5.6.3. FFL's are set above modelled fluvial levels which is sufficient to mitigate this risk.

6. ASSESSMENT OF FLOOD RISK ON DEVELOPMENT SITE (PROBABILITY)

6.1. Summary

- 6.1.1. Section 5 has defined the anticipated flood risks from all sources. **Table 3** below considers each of the sources and defines in tabular format the Probability of Flood Risk associated to each and the likely impacts to the proposed development. Below is a table summary of the flood risks associated with the Unit 1 development site.

Table 3 – Flood Risk Summary

Source	Flood Risk	Likely Impacts	Remarks
Tidal	Low	Low	Site not tidally influenced.
Fluvial (Watercourse)	Medium	Low	EA data highlights the undefended 1 in 100 year + 53% CC to be 63.260. Proposed minimum Finish Floor Levels for the residential development will be 64.300m. This greater than 600mm.
Overland Flow	Low	Low	Indicative EA mapping shows site is at Low risk. There are no flow routes through the site that need to be maintained.
Sewers	Low	Low	Failures within the public assets are usually for a short period as the asset owner is notified immediately. Any existing private SW drains found on site are to be removed and proposed drainage infrastructure is to attenuate up to the 1 in 100 year + 45 Climate Change.
Groundwater	low	Low	Shallow groundwater not encountered during the Site Investigations on site. Also, the proposed plans do not indicate any basement / underground structures.
Artificial Sources	Low	Low	EA guidance also states that reservoir flooding is extremely unlikely.

7. OUTLINE DRAINAGE STRATEGY

7.1. Existing Surface Water Runoff

- 7.1.1. The existing site is approximately 0.38ha in area and is classified as Greenfield and is considered to discharge directly to ground or flow overland into the local drainage infrastructure, following the natural topography
- 7.1.2. To calculate the Greenfield runoff rates, Infodrainage the hydraulic software tool has been used The Greenfield runoff rates for the existing area are tabulated below in **Table 4**. A copy of the greenfield calculations is included in **Appendix D**.

Table 4: Greenfield Runoff Rates

Impermeable Area (m ²)	Greenfield Runoff Rate (l/s)			
3800	1 in 1 Year	Qbar	1 in 30 Year	1 in 100 Year
	1.9	2.2	3.8	4.6

7.2. Geology

- 7.2.1. A Ground Assessment of the site was completed June 2024. Borehole logs had been provided, and this information is attached within **Appendix B**. The report confirmed made ground up to 1.5m bgl over Devensian till (heterogenous clays) up to 15.15m bgl.
- 7.2.2. Groundwater was also encountered during the investigation on site, this varied from 1.9m – 5.45m bgl.
- 7.2.3. The Site Investigation Report also confirmed the Falling Head tests undertaken at the site had failed due to the below ground conditions noted above.
- 7.2.4. The findings from the report Results can be seen in **Appendix B**.

7.3. Hydrology

- 7.3.1. The closest watercourse is Gore Brook which is located approximately 10m to the north of the site at its closest point. Gorton Lower Reservoir is also located approximately 200m to the east of the site

7.4. Existing Drainage

- 7.4.1. There are existing public surface water and combined water sewers located within Tan Yard Brow highway located west of the site boundary.
- 7.4.2. The United Utilities sewer records plan is attached within the **Appendix B**.

7.5. Sustainable Drainage Systems

7.5.1. SuDS Objectives

Sustainable drainage developed in line with the ideals of sustainable development is collectively referred to as Sustainable Drainage Systems (SuDS). At a particular site, these systems are designed both to manage the environmental risks resulting from the urban runoff and to contribute wherever possible to environmental enhancement. SuDS objectives are therefore to minimise the impacts from the development on the quantity and quality of the runoff and maximise amenity and biodiversity opportunities (CIRIA C753, 2015).

7.5.2. SuDS's Design Themes

A strong design theme is essential if the maximum aesthetic benefits are to be gained from the SuDS approach. At a more local scale the SuDS should link with the individual's plot structure, planting, public open space requirements and amenity areas, gaining multiple benefits from a limited area of land.

7.5.3. The SuDS Management Train

The 'Management Train Approach' should be central to the surface water drainage strategy of the proposed site. The main objective is treatment and control of runoff as near to the source as possible protecting downstream habitats and further enhancing the amenity value of the site. This concept uses a hierarchy of drainage techniques to incrementally reduce pollution, flow rates and volumes of storm water discharge from the site, and is as follows:

1. **Prevention** – The use of good site design and housekeeping measures to prevent runoff and pollution and includes the use of rainwater reuse / harvesting.
2. **Source Controls** – Control of runoff at source or as close to source as possible (e.g. soakaways, green roofs, pervious pavements).
3. **Site Control** – Management of water in a local area and can include below ground storage / attenuation, detention basins, large infiltration devices.
4. **Regional Control** – Management of water from a site or various sites and can include wetlands and balancing ponds.

7.5.4. SuDS Site Constraints

SuDS techniques are suitable for all sites; therefore, an assessment of the existing site is required so that SuDS limitations can be determined.

- Land Use Characteristics: The size and type of the development plot allows a range of source control and site control SuDS devices to be considered are to be below and above ground.
- Site Characteristics: underlying ground conditions are clay with the falling head tests on site failing to produce a permeability rate.
- Catchment Characteristics: The site is currently classed as Greenfield.
- Environmental and Amenity Performance: The inclusion of SuDS within the overall development is a key driver in providing both amenity and habitat creation. Safety to all future occupiers is paramount and so best practice guidance will be incorporated so that these devices blend into the surrounding without the need for significant safety precautions. Maintenance plans will be prepared for all SuDS devices that are included.

7.5.5. SuDS Methods

Tables 5 and 6, below, provide an assessment of various above and below ground SuDS methods that can provide water quality treatment and management of flows to reduce runoff rates and volumes and whether they can be suitably incorporated at this development site. The purpose of this assessment is to set out options to be considered at the planning stage with consideration to time constraints, viability and lifetime maintenance of the development.

Table 5: Surface SuDS Methods

Method	Comment	Suitability for Development
Green Roofs	- Can be used on suitable low-rise buildings to provide retention, attenuation and treatment of rainwater - Promotes evaporation and local biodiversity.	<u>Not Suitable</u> Green Roofs has not been included within architectural proposals. Proposed pitch of the roof does not make this this option viable.
Water Butts	Plastic tanks placed at the base of rainwater down pipes to collect rainwater runoff from the roof areas.	<u>Not Suitable</u> - Additional costs of installation would have severe effect on viability of development. - Running and maintenance costs would not be acceptable to client and future occupiers.
Rainwater Harvesting	Rainwater harvesting reduces the total runoff volume from the developed site and reduces treated water consumption.	<u>Not Suitable:</u> - Additional costs of installation would have severe effect on viability of development. - Running and maintenance costs would not be acceptable to the client.
Infiltration Options	Reduces total run off volume from the development.	<u>Not Suitable:</u> Ground conditions indicate clay soils, and failing had test failed. Therefore, is deemed this is unsuitable for infiltration.
Permeable Surfacing (Infiltration)	- Reduces total run off volume from the development. - Can be used to enhance water quality.	<u>Not Suitable:</u> Ground conditions indicate clay soils, and failing had test failed. Therefore, is deemed this is unsuitable for infiltration.
Permeable Surfacing (Standard)	- Can be used to enhance quality of runoff water. - Sub-base provides 'source' storage and reduces the volume of storage downstream.	<u>Suitable:</u> The steep slopes of the site and change in levels throughout the site make this solution impractical.

	- The storage can be created with selection of the stone fill or use of plastic box stems. - Impermeable membrane at base of construction to prevent impact on pavement stability.	
Swales, basins and ponds	- Provide areas for above ground surface runoff storage. - Swales also improve water quality through filtration.	<u>Not Suitable:</u> There are no suitable areas large enough to install and swales, basins or ponds. Also steep slopes of the site and change in levels throughout the site make this solution impractical.
Bio Retention	- Reduced surface water pollution to the receiving water bodies. - Reduction in flooding from intense rainfalls. - Increased biodiversity.	<u>Not Suitable:</u> There are no suitable areas large enough to install and swales, basins or ponds. Also steep slopes of the site and change in levels throughout the site make this solution impractical.

Table 6: Sub-Surface SuDS Methods

Method	Comment	Suitability for Development
Geocellular Storage	- Suitable for sites with insufficient space for basins etc. - Suitable for sites where topography prevents the use of open basins etc. - Can be very effective infiltration devices subject to ground conditions.	<u>Suitable:</u> The use of geocellular attenuation may be possible to retain excess storm water.
Large Diameter Pipes, Culverts or Tanks	- Suitable for sites with insufficient space for basins etc. - Provide a volume of below ground storage with a high void ratio and good man entry provision to allow for future maintenance and cleaning. - Generally suitable for adoption by the statutory water company.	<u>Suitable:</u> The use of oversized pipes may be possible to retain excess storm water.

7.5.6. SuDS Hierarchal Approach

Based on the SuDS assessment in **Tables 5 and 6**, plus an assessment of the local site conditions, the SuDS hierarchal approach for discharge of surface water at the development site is considered in greater detail below:

Table 7: SuDS Hierarchal Approach

Method	Suitability	Suitability for Development
Infiltration to Ground	No	Underlying ground conditions deems this approach unsuitable. See section 7.2.
Connection to Watercourse	No	Discharging directly into Gore Brook to the North has been discounted . This is the closest watercourse where it would be possible to drain via gravity. A connection would not be possible due to the number of trees obstructing the route (tree protection zone) to the watercourse and the difficulty in constructing a outfall headwall. Therefore, this approach is considered not feasible .
Connection to Surface Water Sewer	<u>Yes</u>	There is a public surface water sewer within Tan Yard Brow highway. This public sewer currently discharges into the Gore Brook watercourse located downstream of the proposed development. As such this is option is considered feasible . UU have confirmed this is a feasible solution.
Connection to Combined Sewer	No	Discounted due to the SW sewer located nearby.

7.5.7. SuDS Design Philosophy

The SuDS assessment and hierarchal approach discussed in **Tables 5, 6 and 7** above has defined the overall SuDS strategy. Thus, the SuDS philosophy for the development site is the promotion of Prevention, Source Control and Site Control techniques with discharge rates to be restricted to greenfield runoff rate (QBAR), to reduce the risk of both site and downstream flooding.

The following design philosophy is proposed:

- Surface water treatment using the 'Management Train' approach to remove and isolate contamination at all SuDS facilities prior to conveyance to the ground.
- Site control in the form of geocellular storage and oversized pipes.
- Aim to limit where possible the impermeable fraction of development.

7.6. Surface Water Drainage Strategy

7.6.1. This section should be read in conjunction with the 'Proposed Drainage Strategy' and hydraulic calculations provided in **Appendix C and D**.

7.6.2. A drainage strategy has been undertaken for the site to demonstrate that surface water runoff can be effectively managed within the site, without increasing the risk of flooding to the site or elsewhere.

7.6.3. As outlined previously in section 7.1, surface water for the proposed development is to be discharged into the surface water sewer within Tan Yard Brow highway. The post development runoff rates are shown in Table 8. This runoff rate has been agreed with United Utilities. The UU Pre development enquiry response has been attached within **Appendix E**.

Table 8: Post-Development Runoff Rates as agreed with UU

	1 Year (l/s)	30 Year (l/s)	100 year + 40% CC (l/s)
Proposed Development	5		

- 7.6.4. An infrastructure-based SW Drainage Strategy is considered feasible for the development, with run off from the hardstanding areas (highways, car park and roof) directed to the new below ground infrastructure. To achieve the post-development runoff rate (**Table 8**), flow control devices are to be situated at the downstream end of the surface water networks.
- 7.6.5. The flows from the proposed development are to be collected via series of gullies before being stored in oversized pipes or a geo-cellular tank. Thereafter, the surface water is to be discharged into the public surface water sewer at a maximum allowable rate of 5l/s.
- 7.6.6. The proposed drainage layout for the new development will be designed in accordance with Design & Construction Guidance (DCG), BS EN 752: 2008 and Building Regulations Part H guidance, i.e. up to the 30-year storm return period criterion (including the 40% increase to account for climate change) and tested for the 1 in 100 year return period including a 45% increase to account for climate change to confirm that there is no flood risk to the buildings.
- 7.6.7. Flooding can occur on a local scale beyond the 30-year criterion due to runoff exceeding the capacity of the minor system during extreme events and it can only be addressed on a site-specific basis. Design & Construction Guidance states that developments should be protected against flooding from extreme events (1 in 30 year) and that flood pathways are identified when the drainage system is exceeded.
- 7.6.8. In the case of this development, exceedance flows will be all those over and above the 30-year design criterion set by Design & Construction Guidance. Using storage within the external areas would be achievable and would direct flood water away from the proposed buildings, with flows directed back into the surface water drainage network as water levels in the drainage network receded. The exceedance flows and volumes can be calculated for the new development drainage layout. In the case of this development and due to the fall across the site, consideration will be given to make sure all water is controlled so that it does not impact on any adjoining properties.
- 7.6.9. Any future drainage calculations carried out as part of a site-wide drainage strategy or for the development layouts themselves must include the appropriate increase in rainfall to satisfy the future Climate Change allowances.

7.7. Pollution Control

- 7.7.1. There are to be multiple levels of treatment incorporated into the development, trapped gullies, silt traps and catchpit manholes. These provide filtration at various points in the system to improve water quality.
- 7.7.2. To improve the water quality from the proposed development the proposed drainage strategy has incorporated SuDS features that are line with the Simplified Index Approach (Ciria 753). The pollution

hazard for the proposed scheme is very low, as it the land use is residential (roof only), see the extract below from CIRIA 753 SuDS Manual.

Pollution hazard indices for different land use classifications				
Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
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

- 7.7.3. To mitigate the Total Suspended Solids (TSS) from site, the drainage strategy incorporates series of catchpits manholes and trapped gullies. These measures collect the sediment and debris that gets carried along the SW system and reduces the possibility of blockages occurring.

7.8. Foul Water Strategy

- 7.8.1. The outline foul water drainage strategy is to discharge into the UU CW sewer within Tan Yard Brow highway.

8. MANAGEMENT MEASURES, OFF SITE IMPACTS AND RESIDUAL RISK

8.1. Flood Risk Management Measures

- 8.1.1. The report has found the site to be at medium to low risk of flooding from various sources.
- 8.1.2. The surface water drainage strategy will restrict runoff from the Proposed development to maximum 6l/s (greenfield runoff rate), prior to discharge into the UU surface water sewer. Attenuation has been proposed in the form of below ground geocellular storage tank and oversized pipe. The new surface water networks will be designed in line with current British Standard and Design & Construction Guidance up to the 100-year storm return period including an allowance for climate change.
- 8.1.3. The use of SuDS in the form of Source Control and Site Control measures, with controlled (restricted) outflow, will help to minimise the flood risk impact to the surrounding sewer network.
- 8.1.4. There will be a site management health and safety document prepared in respect of the final development. This will include the required maintenance regime for the on-site drains and drainage facilities such as the channels, gullies, pipes, manholes and all SuDS facilities.
- 8.1.5. Should any flooding occur from the new sewers and drains it will be directed away from the buildings to the external areas.

8.2. Off Site Impacts

- 8.2.1. Up to and including the 100-year plus increase in rainfall allowance due to climate change (CC) event, the report has justified that there is no risk of flooding.
- 8.2.2. Surface water runoff does not increase from the pre-development regime and utilises SuDS solutions to satisfy the site constraints, the proposed development will therefore not increase flood risk onto its locality.

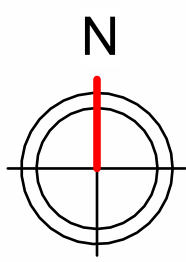
8.3. Residual Risk

- 8.3.1. With careful design of the drainage elements as described above there will be no residual flood-related risks that will remain after the development has been completed.

9. APPENDICES

- Appendix A – Architectural Site Layout
- Appendix B – Existing Site Information
- Appendix C – Ridge Design Drawings
- Appendix D – Outline Surface Water Attenuation Calculations
- Appendix E – Consultee Correspondences

APPENDIX A – ARCHITECTURAL SITE LAYOUT



NOTES

This drawing is the property of Equilibrium Architects and copyright is reserved by them. This drawing is not to be copied or disclosed by or to any unauthorised persons without the prior written consent of Equilibrium Architects.

Do not scale from this drawing.

All dimensions are to be checked on site prior to construction, manufacture of any components and ordering of materials and equipment.

Any discrepancies are to be reported to the architect for clarification.

All materials and workmanship to be in accordance with the current British Standards and codes of practice.

This drawing is to be read in conjunction with all relevant Architectural, Structural Engineers, Mechanical Engineers, Electrical Engineers and Specialists drawings and specifications.

As with all construction projects the CDM 2015 regulations apply and the work on this project may require both the issue of a notification to the HSE (because of the duration of the works on site) and the client may also need to appoint a Principal Designer because there may be more than one contractor working on site.

The Principal Designer will be able to coordinate the pre-construction information and also ensure that all duty holders under CDM comply with their relevant duties.

The building owner is to serve a Party Wall Act Notice as applicable to adjoining property owners as outlined in The Party Wall Act 1996. The Building Contractor is to verify the thickness of the party walls prior to commencement of the proposed works.

Schedule of Accommodation:

Block 1				
Type	Accommodation	NOF	NOF	NO
A	2B3P Apartment	61-68	657-732	17
Block 2				
Type	Accommodation	NOF	NOF	NO
B	1B2P Cottage	50-55	538-592	8
Total				25

Car Parking - 25no spaces - 100%
Cycle Spaces - 26no spaces - 100%

Note: cycle parking is proposed on a double rack system underneath protective canopy

Part M compliance:

Block 1 -
6no units at M4(1)
9no units at M4(2)
2no units at M4(3)

Block 2 -
6no units at M4(1)
2no units have internal compliance but stepped access due to levels on site.

Note: For further details and layout please see tech corresponding floor plans for each block.

Key:	
Line	Type
---	900mm metal railings
---	900mm timber fence
---	900mm masonry wall
---	1800mm timber fence
---	1800mm metal gate
---	Retaining wall to engineers specification

Note: Where double lines are shown the 900mm fence will be placed on top of the corresponding wall to make up 1800mm from the highest FFL

Note:
Site is subject to confirmation of levels from the engineers to determine any splits in the blocks or retaining wall positions.

DRAWING STATUS				
Rev	Description	Check	Date	
E	Boundary treatments revised to follow SPD principles		04.06.2024	
F	Two disabled parking bays added to layout		12.09.2024	
G	Move car parking out of TRP2 where possible		06.11.2024	
H	Make gate and railings added to the boundary adjacent to Hyde Road		06.03.2025	
J	Metal railing extended across full southern boundary		15.10.2025	

CLIENT:

Franstep Ltd

PROJECT:

Tan Yard Brow

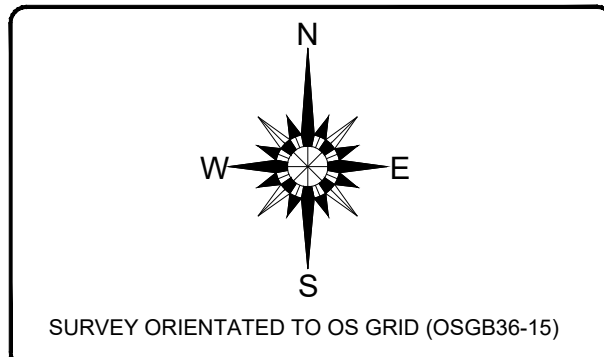
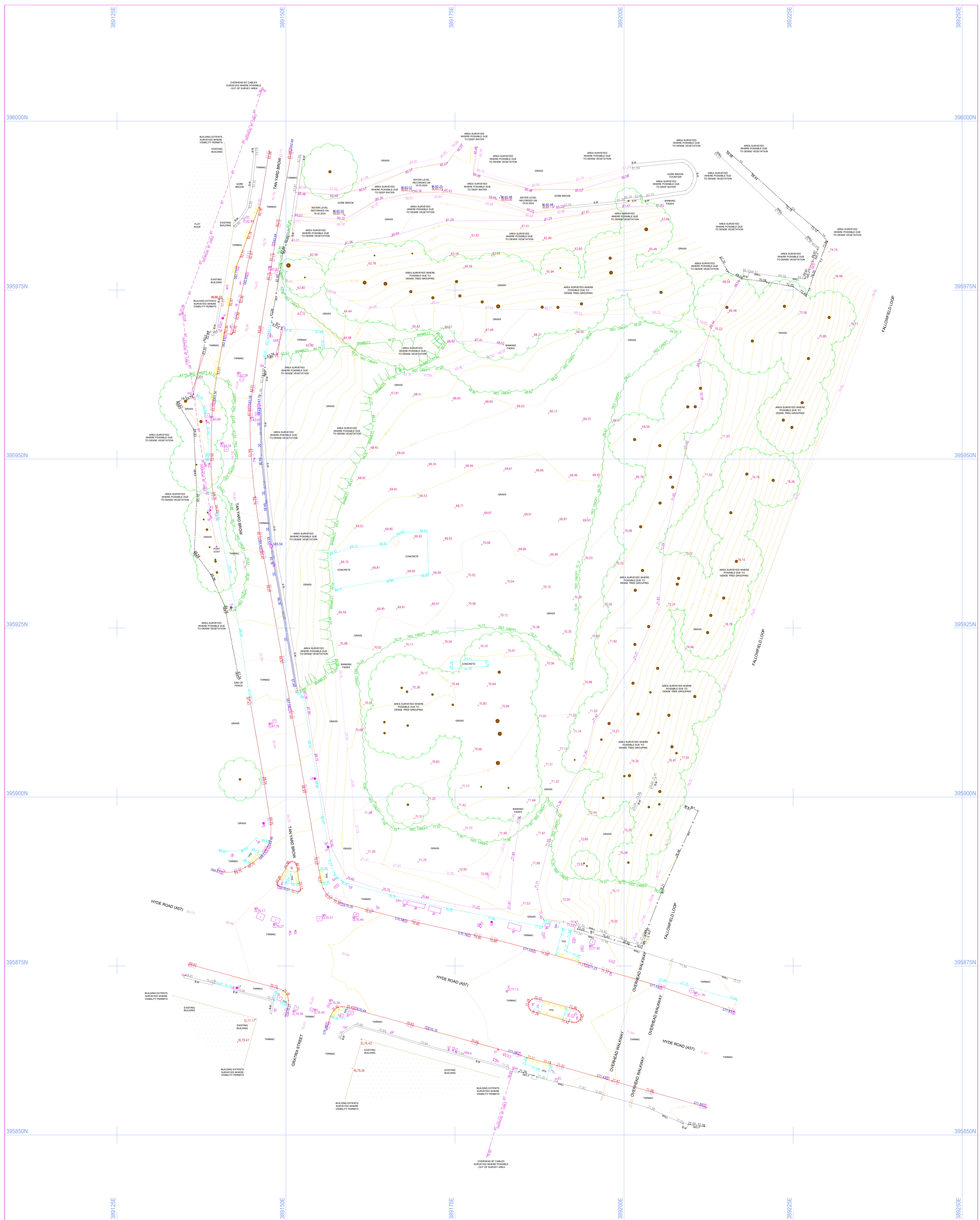
DRAWING:

Site Layout

SCALE @ A4	DATE	DRAWN	CHECKED
1 : 200	31/5/2024	KS	GRF
DRAWING NO	CAD REFERENCE NO	REVISION	
R0863-01		J	



APPENDIX B – EXISTING SITE INFORMATION



SURVEY LEGEND			
FEATURES		BOUNDARY ANNOTATIONS	
TOP OF BANK		BW F	SEC F
BOTTOM OF BANK		C/L F	SEC F
SURVEY STATION		CP&P F	TIMBER FENCE
TREE		CP&P F	BRICK WALL
HEDGE		B/W	BLOCK WALL
TREE CANOPY		IR F	CONCRETE WALL
BUSHES		IR F	G.W.
VEGETATION		KR F	MISCELLANEOUS WALL
		IR F	R.W.
		MISC F	RETAINING WALL
		P&W F	RETAINING LOO WALL
		R/S F	STONE WALL
		R/S F	

SURVEY ANNOTATIONS		
AV	AIR VALVE	CHC OVERHEAD CABLES
B	BOLLARD	CHC POST BOX
BS	BUS STOP	PM PARKING METER
BT	BOTH TELECOM IC	PCB EXIST
CP	CONCRETE PAVING SLABS	PYL ELECTRICITY PYLON
CS	CATCH PIT	RE ROODING EYE
CR	CRACK	RD ROAD SIGN
EE	ELECTRIC CONTROL BOX	RWP RAIN WATER PIPE
EL	ELECTRICAL IC	ST STOP TAP
EP	ELECTRIC POLE	SM SURVEY MARKER
ER	ERATH ROAD	SN SIGN POST
FI	FIRE HYDRANT	SV STOP VALVE / SLUICE VALVE
GL	GULLY	SOL VENT PIPE
G	GULLY	TL TELEPHONE BOX
GH	GREENHOUSE	TL TRAFFIC LIGHTS
GI	GRASS POST	TM TELEPHONE MAST
GV	GAZ VALVE	TP TELEGRAPH POLE
IC	INSPECTION COVER	TPS TACTILE PAVING SLABS
J	JUNCTION BOX	V VENT PIPE
KW	JANUARY KNOT WEED	WM WATER METER
KO	KITCHEN OUTLET	WASH OUT
LM	LAMP HOUSE	UML UNABLE TO LIFT
LP	LAMP POST/LIGHT COLUMN	UTS UNABLE TO SURVEY
MH	MANHOLE	
MP	MONITOR POINT	
NP	NAME PLATE	

CLIENT	
EQUILIBRIUM ARCHITECTS LTD	
PROJECT TITLE	
TAN YARD BROW, GORTON	
DRAWING DETAIL	
TOPOGRAPHICAL LAND SURVEY	
DRAWING NUMBER	REVISION
EQA.TS.01	-

PROJECT ENGINEER	JLP	DATE	02.04.2024		
DRAWN	LG	SCALE	1:250@A1		
DESCRIPTION	REV	DATE	DRWN	APPR	

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