Wythenshawe Civic, Manchester – Brotherton House

Flood Risk Assessment and Drainage Strategy

November 2025

PREPARED FOR

Muse Places & Wythenshawe Community Housing Group



Flood Risk Assessment

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1. Introduction

1.1. Project Background

Civic has been appointed by Muse Places & Wythenshawe Community Housing Group to prepare a site-specific Flood Risk Assessment (FRA) and Drainage Strategy (DS) to support a full planning application for the revitalisation of Wythenshawe Civic at the location of the present Civic complex in Wythenshawe, Manchester, United Kingdom.

The wider Wythenshawe development forms part of a broader regeneration initiative aimed at enhancing the local area. The proposed masterplan development will involve around 2,000 new homes across a mixture of tenures and housing types to meet the needs of a diverse community.

This report specifically relates to Brotherton House, located within the North-Western section of the development. The Site measures approximately 1.7 hectares and comprises Brotherton House, a vacant office building formerly occupied by Lloyds Banking Group. There are also three ancillary outbuildings within the Site alongside large areas of surface car parking. It also includes established trees and vegetation around the perimeter of the Site. Vehicular access is from Cornfield Drive located in the south-eastern corner of the Site.

Whilst this report specifically addresses Brotherton House, consideration has been given to the wider development where there is insufficient data for plot specific areas.

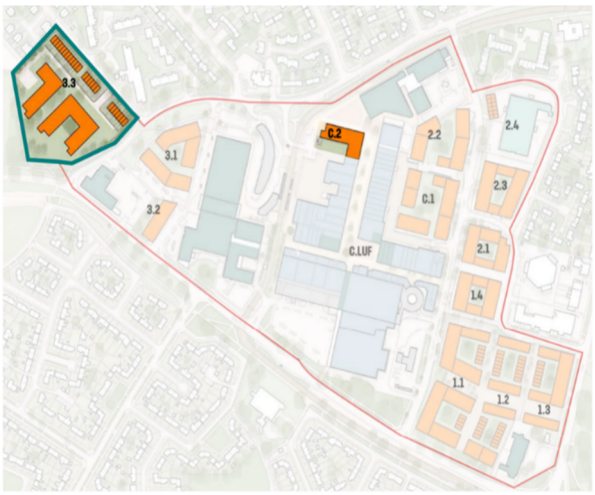


Figure 1: Plot Location in respect to wider development



Figure 2: Landscape Plan

Scope and Objectives

This report provides an overview of the nature of flood risk and the drainage strategy for the Site in line with relevant national and local guidance.

The report will detail how risk will be mitigated throughout the expected lifetime of the development whilst considering the context of the wider development.

In particular, this FRA and DS shall:

- Provide information on the existing hydrological aspects of the Site and identify any changes to this as a result of the proposed development.
- Provide an assessment of the existing and future risk of flooding to the Site from all sources, with specific regard to the effects of climate change, as well as the impact of proposals on flood risk outside of the Site.
- Outline and summarise the guidance and documentation used to inform the above assessment.
- Propose an outline drainage strategy and further measures to mitigate any residual risks of flooding.

This document is prepared for the exclusive use of Civic, the Client, Lead Local Flood Authority and Local Planning Authority. All comments and conclusions contained within are based upon the assumption that the sourced data is reliable. Civic accepts no liability for any inaccurate conclusions or assumptions resulting from inaccurate information.

2. Site Information

2.1. Location and Existing Site Description

The site address is as follows:

Brotherton House, Cornfield Drive, Wythenshawe, Manchester, M22 9QX

The Site measures approximately 1.7 hectares and comprises Brotherton House, a vacant office building formerly occupied by Lloyds Banking Group. There are also three ancillary outbuildings within the Site alongside large areas of surface car parking. It also includes established trees and vegetation around the perimeter of the Site. Vehicular access is from Cornfield Drive located in the south-eastern corner of the Site.



Figure 3: Plot Location Plan, with an indicative red line boundary

The surrounding area is characterised by a mix of different land uses. The Site is bound by existing two storey residential properties on Ribchester Drive to the north; Cornfield Drive to the east; Poundswick Lane to the south and an all-weather playing pitch with floodlights used by Manchester Enterprise Academy to the west.

Four distinct areas occupy the existing Site, which can be seen in Figure 4 the most prominent being a 4-storey office (the “tower”), a single storey conference building, an adjacent single storey plant and delivery building and a car park area that occupies the Southern and Northern edges of the conference building, respectively. Finally, grassland, hedgerows and several trees occupy the remainder of the Site.



Figure 4: Existing site areas

2.2. Existing Topography

A topographical survey was produced by ND Oliver & Co Ltd in April 2025. The topography of Plot Brotherton House varies across the site, with ground levels ranging from approximately 59.77m AOD at the south-west corner to approximately 58.38m AOD at the north-west corner. Overall, the site slopes generally South to North, with a fall of around 1.39m across the plot. There are no pronounced depressions or elevated areas that would significantly influence water flow.

The full topographical survey, including all spot levels, and details, is provided in Appendix A.

2.3. Existing Ground Conditions

Civic Earth produced a Preliminary Ground Conditions Assessment (51143-CE-XX-XX-R-G-1008: 11/04/25 – provided separately) for Brotherton House, based on a review of historical mapping, published and unpublished geotechnical records, and desk study information.

The Plot is underlain by Made Ground, up to approximately 1.4m thick, overlaying Glacial Till, with bedrock of the Bollin Mudstone Member recorded between approximately 1.0m and 3.5m below ground level. *"Historical mapping indicates the area was originally greenfield land, with later development introducing structures and Made Ground from around 1978 onwards".* It is assessed to present very low to insignificant geotechnical risk, with minimal potential for soil instability or subsidence that could impact surface water flow or flood risk. *"Historical land use and Made Ground may present potential sources of contamination, including heavy metals, hydrocarbons, and asbestos (if present)".*

Intrusive site investigation works occurred in August 2025 which confirmed the ground conditions previously identified in the *Preliminary Ground Conditions Assessment.* A summary of the data is: Made Ground was recorded across the site, with thickness varying between approximately 1.4m and 1.5m, overlaying the Bollin Mudstone Member, which extends to depths of around 15mbgl. Glacial Till was also encountered locally, consistent with wider site mapping. Materials identified within the Made Ground included minor occurrences of hydrocarbons, and other contaminants. Overall, the intrusive testing is consistent with the initial assessment, indicting very low to negligible geotechnical risk, with the potential for contamination reflecting historical land use and Made Ground.

From BGS online view, the bedrock geology for the site is different on the south west to the rest of the site, see Figure 5.

For the majority of the site - Bollin Mudstone Member - Mudstone. Sedimentary bedrock formed between 247.1 and 241.5 million years ago during the Triassic period. There are also Superficial deposits of Till, Devensian - Diamicton. Sedimentary superficial deposit formed between 116 and 11.8 thousand years ago during the Quaternary period.

For the smaller, area to the southwest of the site there is no information on the sedimentary superficial deposits.



Figure 5: BGS online viewer - geology

2.4. Existing Drainage and Hydrology

The drainage network generally conveys flows across the site, from north – south. The surface water connects to the surrounding 450mm United Utility (UU) sewer to the south of the site in Poundswick Lane.

The head of the onsite surface water drainage network is in the northwest of the site, within the corridor between the Plant & Delivery building and the Conference building. The network then conveys flows southeast, beneath the carpark and into the UU sewer offsite.

There is limited information about the surface water flows from the P&D building and the Tower within the carpark area. A 300mm surface water pipe is shown originating from the P&D building travelling 4.5m southeast into the carpark to a manhole where additional flows enter from the car park and the Tower. Flows are then conveyed in a northeasterly direction to a seized manhole and the survey ends there. It is assumed these connect onto the main onsite 450mm sewer but this will need to be located on site.

A secondary catchment, assumed to take flows from the P&D roof, attenuates flows in the Pond to the southwest of the P&D building, and then translates flows west-east. This carrier pipe receives additional flows from the 'Tower' further and connects to the 450mm UU sewer in Poundswick Lane.

In the wider area, Baguley Brook, the nearest culverted watercourse, is located approximately 250m west of the plot running north-south which feeds into the nearest significant body of water, a lake situated around 860m to the south. Additional small ponds and un-named streams/ditches are preset around 780m northeast of the Plot within Park Wood.

2.5. Existing Watercourses and Waterbodies

The nearest watercourse to the site is the culverted watercourse, c.140m to the south of the site. This was identified in a pre-development enquiry with United Utilities (UU). From UU records, the 825mm diameter culverted watercourse, ref 5801 has an invert level of 59.02, this manhole is south of Simonsway and south of the metrolink line. The other, closer smaller culverted watercourse, a 225mm diameter section, ref 5802 has an invert level 59.84. This is south of Simonsway but north of the metrolink line.

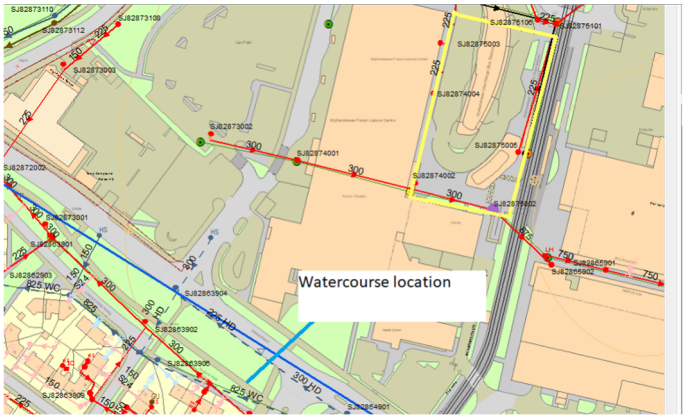


Figure 6: UU pre development enquiry - culverted watercourse

The nearest waterbody to the site is an open section of the Statutory Main River, Baguley Brook, which is 0.35km to the west of the site. There is a c.110m open section of this brook which is culverted until it is approximately 0.5km to the south of the site and discharges into the artificial lake in Painswick Park. 1.69km to the east of the site is another Statutory Main River, Gatley Brook, see Figure 7.

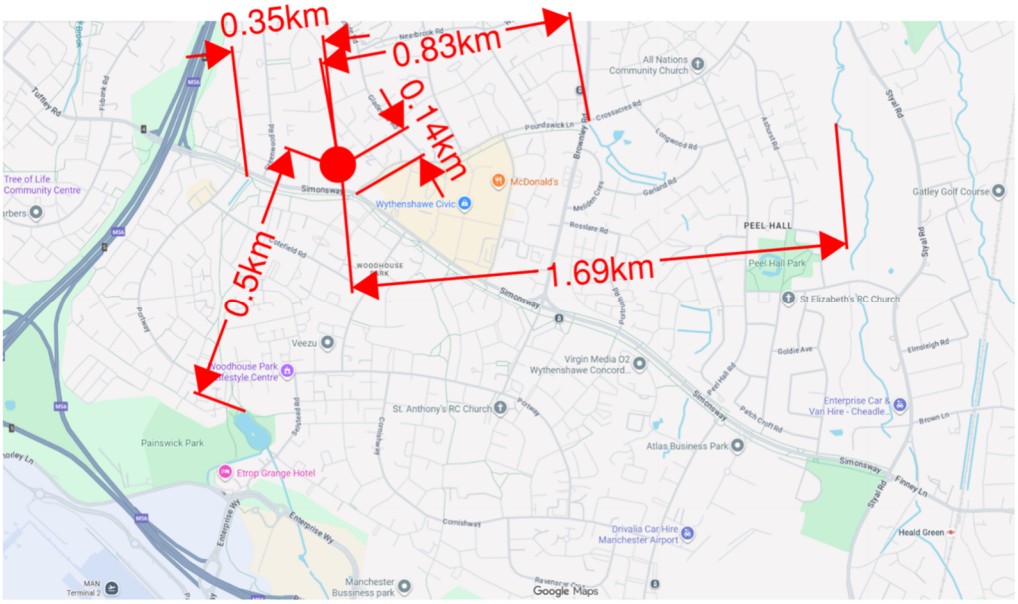


Figure 7: Proximity to Existing Watercourses and Waterbodies

3. Development Proposals

The proposed development can be described as follows. Erection of extra care apartments (Use Class C2) older living apartments, and dwellinghouses (Use Class C3), car and cycle parking, landscaping and other associated works following demolition of existing buildings. The latest proposed site layout is provided in Appendix B.

4. Planning Policy Context

The Environment Agency's (EA) Flood Map for Planning has been consulted and the Site is shown to lie within Flood Zone 1, as shown in Figure 8.

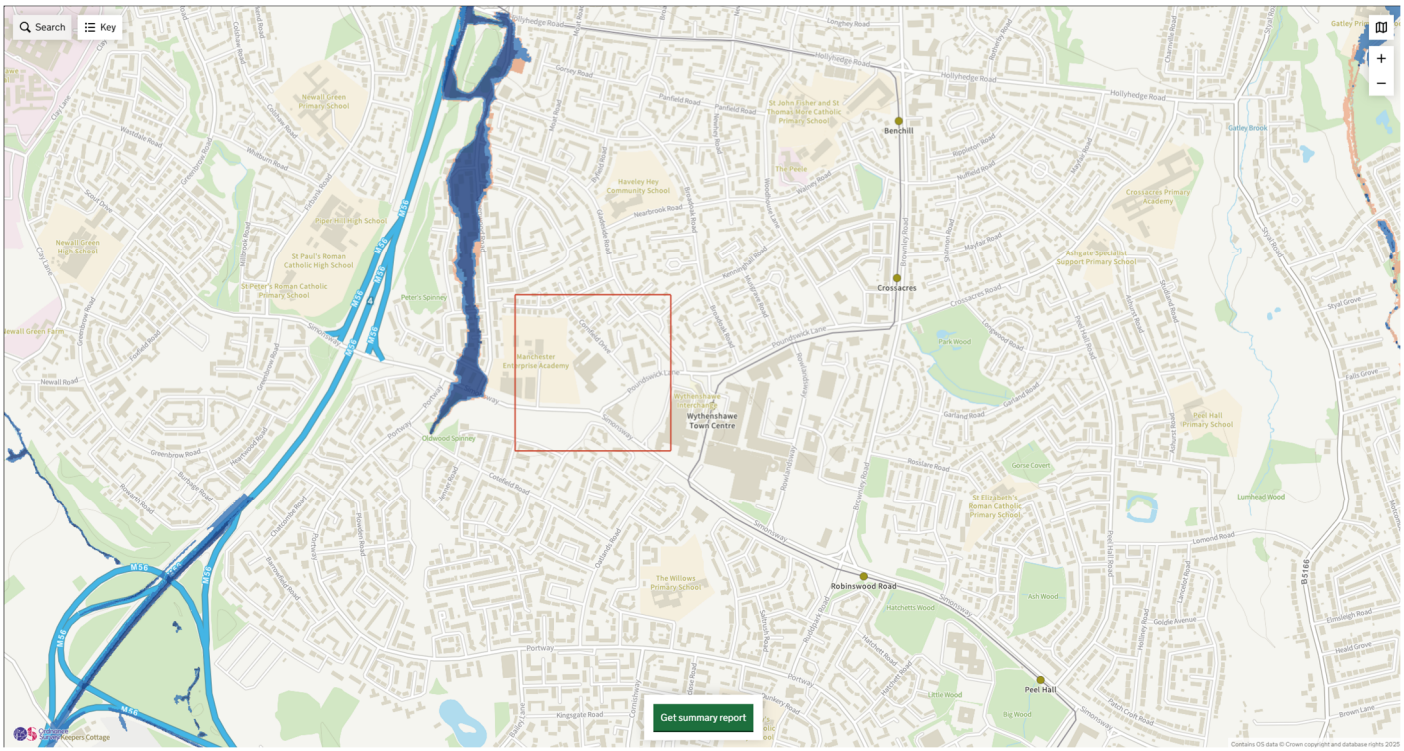


Figure 8: Flood zone mapping for planning

The National Planning Policy Framework (NPPF) 2024 states that a Flood Risk Assessment (FRA) is only required for sites within Flood Zone 1 where one or more of the following points apply:

- The development has a site area of 1 ha or more.
- The site lies within an area with critical drainage problems (areas of critical drainage problems are currently only located within Devon and Cornwall).
- The local planning authority's Strategic Flood Risk Assessment (SFRA) shows it will be at increased flood risk in future.
- The site is at risk from other sources of flooding and its development would increase its vulnerability classification.

Local planning authorities may stipulate individual requirements for FRAs for developments within their administrative area. Policy EN14 (Flood Risk) of the Manchester Core Strategy 2012 requires that developments with an area of greater than 0.5ha residing in Critical Drainage Areas (CDA) identified in the Manchester, Salford, Trafford SFRA 2011will require submission of an FRA. The site lies within a Critical Drainage Area and is greater than 0.5ha in size.

Sections of Policy EN14 and Policy EN17 (Water Quality) of the Manchester Core Strategy have been superseded by Places for Everyone (PfE) Policy JP-S4, outlined in the Places for Everyone Joint Development Plan Document for Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford

and Wigan 2022 to 2039, which was adopted by Manchester City Council on 21st March 2024.

The following points detailed in PfE Policy JP-S4 are relevant to this planning application:

- Locating and designing development so as to minimise the impacts of current and future flood risk, including retrofitting or relocating existing developments, infrastructure and places to increase resilience to flooding;
- Expecting developments to manage surface water run-off through sustainable drainage systems and as close to source as possible. Development should achieve greenfield run-off rates unless it is demonstrated to be impracticable. District local plans should consider setting more detailed surface water drainage policies to reflect local circumstances, including alternative surface water discharge rates, such as in areas with critical drainage issues;
- Ensuring that sustainable drainage systems:
    - Are designed to provide multifunctional benefits wherever possible,
    - including for water quality, nature conservation and recreation;
    - Avoid adverse impacts on water quality and any possibility of discharging hazardous substances to ground;
    - Are delivered in a holistic and integrated manner, including on larger sites split into different phases; and
    - Are managed and maintained appropriately to ensure their proper functioning over the lifetime of the development.

5. Relevant Legislation, Policies and Guidance

This statement has been produced following the requirements of the NPPF and Planning Practice Guidance (PPG), as well as complying with or referencing the following regional or local policy and documentation:

- Greater Manchester Combined Authority (GMCA) Level 1 Strategic Flood Risk Assessment (SFRA) 2019
- GMCA Hybrid Level 2 SFRA 2021
- Greater Manchester Surface Water Management Plan 2012
- Manchester Core Strategy Development Plan 2024
- Places for Everyone (PfE) Policy JP-S4 Flood Risk and the Water Environment
- Policy EN8 Adapting to Climate Change

Particularly relevant guidance provided within these documents and frameworks is presented below.

5.1. National Planning Policy Framework

The NPPF outlines planning policies within England and provides information on their application. The framework is supported by the Planning Practice Guidance, which includes advice on the assessment and management of flood risk during the planning and development process.

With regard to flood risk, the NPPF primarily aims to steer development away from areas with an unacceptable risk of flooding and relocate them in areas deemed more appropriate. The NPPF refers to the Flood Zones which are shown on the Environment Agency Flood Map, and establishes the range of uses which are appropriate, or compatible, land uses for each Flood Zone.

Annex 3 of the National Planning Policy Framework (NPPF) lists these land uses in the context of their flood risk vulnerability. The following extract below outlines the NPPF Flood Risk Vulnerability Classifications and their associated land uses:

- ESSENTIAL INFRASTRUCTURE
- HIGHLY VULENERABLE
- MORE VULNERABLE
- LESS VULNERABLE
- WATER-COMPATIBLE DEVELOPMENT

The Flood Zones can be summarised as follows:

- Zone 1: Low Probability. This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any one year. (<0.1%)

- Zone 2: Medium Probability. This zone comprises land assessed as having between 1 in 100 and 1 in 1000 annual probability of river flooding (1%-0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.

- Zone 3a: High Probability. This zone comprises land assessed as having 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

- Zone 3b: Functional Flood Plain. This zone comprises land where water must flow or be stored in times of flood. Strategic Flood Risk Assessments should identify this zone.

The flood risk vulnerability and flood zone ‘compatibility’ has been summarised in Table 1 below. The EA presents a set of recommendations based on the level of vulnerability of a proposed structure and its flood zone.

Table 1: Flood Risk vulnerability and Flood Zone compatibility from NPPF Technical Guide

Flood Risk Vulnerability Classification		Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Flood Zone (See Table 1)	Zone 1	√	√	√	√	√
	Zone 2	√	Exception Test Required	√	√	√
	Zone 3a	Exception Test Required	×	Exception Test Required	√	√
	Zone 3b (functional floodplain)	Exception Test Required	×	×	×	√
	√ Development is appropriate × Development should not be permitted.					

The flood zone categorisation for the site and evaluation of whether the development is appropriate is carried out in Section 5.3.

5.2. Sequential Test

A sequential test is one of the primary measures of mitigating flood risk and considers alternative available sites within the vicinity of a proposed development, assessing whether these have a lower risk of flooding than the currently proposed development location with the intention of prioritising development within areas with reduced flood risk.

5.3. Development Suitability

Where a sequential test has been passed or is not required, a comparison of a Site's flood risk probability and vulnerability, informed by the EA's Flood Map for Planning and a classification of vulnerability based on land use, determines the suitability of a development within a given location.

Flood Vulnerability Classification

The Planning Practice Guidance defines five classifications of flood vulnerability based on development usage: 'Water-Compatible', 'Less Vulnerable', 'More Vulnerable', 'Highly Vulnerable' and 'Essential Infrastructure'. Descriptions of developments encompassed by the classifications are provided in Section 3.2. The development is categorised as more vulnerable based on its planned use ('Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs, and hotels').

Assessment

To assess the suitability of a particular development within a given location, Table 1 is used to compare the proposed development's flood risk vulnerability classification with its Flood Zone and defines whether the development is considered appropriate, as well as outlining whether an Exception Test is required. A more vulnerable development within Flood Zone 1 is deemed appropriate.

5.4. Manchester City Council Strategic Flood Risk Assessment (SFRA) and Manchester Core Strategy 2024

Manchester City Council SFRA states:

"Development should aim for a minimum reduction in surface water runoff rates of 50% for Brownfield sites, with an aim of reducing runoff to Greenfield rates up to a 1 in 100 year storm event, considering climate change.

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.

Policy EN 8 (Adapting to Climate Change) of the Manchester Core Strategy requires that:

- Expecting developments to manage surface water run-off through sustainable drainage systems and as close to source as possible.
- Development should achieve greenfield run-off rates unless it is demonstrated to be impracticable. District local plans should consider setting more detailed surface water drainage policies to reflect local circumstances, including alternative surface water discharge rates, such as in areas with critical drainage issues.

5.5. Places for Everyone Joint Development Plan 2024 Policy JP-S4

The Places for Everyone Joint Development Plan is the Development Plan of nine Greater Manchester local authorities. It forms part of the council's statutory development plan following its adoption on 13th March 2024. Policy JP-S4 (Flood Risk and the Water Environment) does not provide additional requirements for FRAs, however, the following aspects of the policy are relevant to the development of the drainage strategy for the proposed development.

- Developments are expected to utilise SuDS and source control, working with natural processes and adopting a natural flood management approach to slow runoff and intercept pollutants.
- SuDS should be designed to:
    - Provide multifunctional benefits (e.g., for water quality, nature conservation and recreation), wherever possible,
    - Be delivered in a holistic and integrated manner, including on larger sites split into separate phases, and
    - Be managed and maintained appropriately over the lifetime of the development.

Developments should achieve greenfield runoff rates unless it is demonstrated to be impracticable.

6. Flood Risk Assessment

6.1. Criteria for Assessment

6.1.1. Design Flood

Estimation of probable flood levels across the site following a flood event is based on the 'design flood'. This is considered to be the following flood events with associated annual probabilities:

- River flooding with an annual probability of 1 in 100 (1%) in any given year.
- Tidal flooding with an annual probability of 1 in 200 (0.5%) in any given year.
- Surface water flooding with an annual probability of 1 in 100 (1%) in any given year.

The above events should include an allowance for 45% climate change as detailed in the following section.

6.1.2. Climate Change Allowances

To account for changes to peak river flow, peak rainfall intensity, sea level rise, offshore wind speed and extreme wave height, as a result of climate change, the EA publishes climate change allowances to enable future flood risk to sites to be assessed and to facilitate resilient design of developments.

The site is located within the Upper Mersey Catchment, as defined by the Department for Environment, Food and Rural Affairs (Defra) Peak Rainfall Climate Change Allowances map.

The proposed development is expected to have a minimum lifespan of 100 years, as it is a residential development, which means that the 2070s epoch applies. To comply with the guidance, the surface water drainage system will be designed with a 45% climate change allowance for the 1% annual exceedance rainfall event, ensuring there is no increase in flood risk elsewhere and that the development is protected from surface water flooding.

EA guidance on the application of climate change allowances provides the following recommendations:

- Residential development should be considered to have a minimum lifetime of 100 years.
- FRAs should assess the upper-end allowances for peak rainfall for events with an annual probability of 1 in 30 (3.3%) and 1 in 100 (1%) in any given year.
- Assessment of peak river flow allowances is not required where a development is located in Flood Zone 1 and is not at an increased risk of flooding from rivers and seas in the future.
- Developments should be designed to be safe from surface water flooding and not increase flood risk elsewhere based on the upper-end allowance for peak rainfall for events with an annual probability of 1 in 100 (1%) in any given year.

The peak river flow (supplied for reference) and rainfall allowances for the site are provided in Table 2 and Table 3 below, respectively.

An upper-end allowance of 40% is adopted for peak rainfall in the assessment of surface water flood risk in the 1 in 30-year event, with an upper-end allowance of 45% adopted for peak rainfall in the assessment of surface water flood risk in the 1 in 100-year event.

Furthermore, an upper-end allowance of 45% is adopted for peak rainfall in the design of the proposed drainage system for the 1 in 100-year.

Table 2: Peak river flow allowances for the Upper Mersey Catchment

ALLOWANCE CATEGORY	TOTAL POTENTIAL CHANGE ANTICIPATED FOR THE '2020s' (2015 TO 2039)	TOTAL POTENTIAL CHANGE ANTICIPATED FOR THE '2050s' (2040 TO 2069)	TOTAL POTENTIAL CHANGE ANTICIPATED FOR THE '2080s' (2070 TO 2115)
Central	13%	22%	41%
Higher	17%	31%	53%
Upper	27%	51%	85%

Table 3: Peak rainfall allowances for the Upper Mersey Catchment

ALLOWANCE CATEGORY	TOTAL POTENTIAL CHANGE ANTICIPATED FOR THE 2050s (UP TO 2060)	TOTAL POTENTIAL CHANGE ANTICIPATED FOR THE 2070s (UP TO 2125)
3.3% AEP rainfall event		
Central	20%	30%
Upper end	35%	40%
1% AEP rainfall event		
Central	25%	30%
Upper end	40%	45%

Environment Agency datasets and mapping contained within the SFRA have been consulted to provide a brief overview of the Site's existing flood risk. The potential sources of flooding to the development have been assessed and are discussed below.

6.2. Tidal / Fluvial (Rivers and Sea) Flood Risk

Fluvial (main river) flooding occurs when the capacity of a main river is exceeded, resulting in water overtopping its banks. Heavy or prolonged rainfall, melting of ice and snow and – in rivers subjected to tidal processes – high tides and storm surges are the primary causes of this source of flooding.

- Where a site is in a dark blue shaded zone, this indicates that the site is within high flood risk where there is a chance of flooding of greater than 1 in 30 (3.3%)
- Where a site is in a blue shaded zone, this indicates that the site is within a medium flood risk where there is a chance of flooding between 1 in 100 (1%) and q in 30 (3.3%)
- Where a site is in lighter blue shaded colour zone, this indicates that the site is within low flood risk where there is a chance of flooding between 1 in 1000 (0.1%) and 1 in 100(1%)

- Where a site is in the lightest blue shaded zone, this indicates that the site is within very low flood risk where there is a chance of flooding of less than 1 in 1000 (0.1%)

The EA flood maps for planning show the site to be located within flood zone 1.

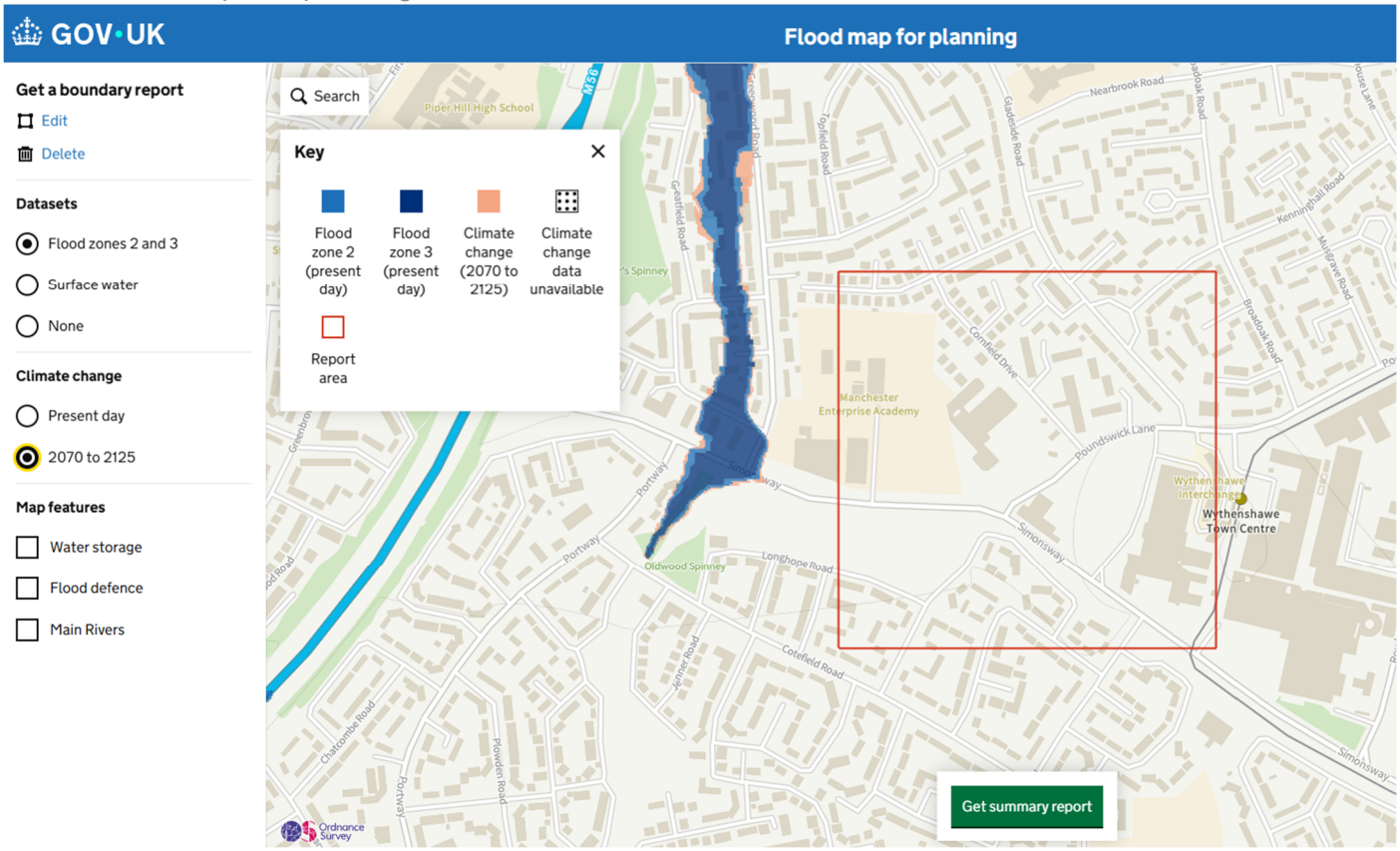


Figure 9: EA Floor risk from rivers of the sea

Based on the above, the site is considered to be at very low risk of flooding from rivers of sea.

6.3. Surface Water

Surface water flooding can be caused when rainwater, during extreme rainfall events, does not drain away through the normal drainage system or soak into the ground. Surcharging sewers can result in overland flows which if originating at a higher elevation than a development site can potentially pose a flood risk.

Surface water flooding is dependent primarily on topography, which dictates either the flow path of overland flow which is not contained within public sewers, or areas in which ponding may occur. Surface water flooding is more difficult to predict than the risk of flooding from Rivers or Sea as it is dependent on the amount of rain which will fall in a very localised area, the specific topography of that region and the capacity and functionality of the drainage network within that section.

From the UK Government's Flood Risk from Surface Water (extent of flooding) map.

- Where a site is High chance, this indicates more than 3.3% chance of a flood each year.
- Where a site is Medium chance, this indicates between 1% and 3.3% chance of a flood each year.
- Where a site is Low chance, this indicates between 0.1% and 1% chance of a flood each year.
- Where a site is Very Low chance, this indicates less than 0.1% of a flood each year.

The EA's Risk of Flooding from Surface Water map (Figure 10) shows the majority of the site at a very low

chance of surface water flooding (<0.1% chance), with the exception of a small portion of the site at low, medium or high risk of pluvial flooding. A detailed drainage strategy, supported by hydraulic calculations, has been prepared to demonstrate clearly that the proposed layout, design and mitigation measures would ensure there would be minimal risk of surface water flooding to occupiers and users throughout the lifetime of the development, without increasing flood risk elsewhere. Therefore, a sequential test need not be applied.



Figure 10: Risk of flooding from surface water, © Environment Agency

6.4. Reservoir Flood Risk

The EA's 'Flood Risk Map from reservoirs', shown in Figure 11, does not identify the Site as an area at risk of flooding from reservoirs. Reservoirs may flood in the event of a dam collapse, resulting in the release of a significantly large volume of water, however, reservoirs in the UK have an excellent safety record and the probability of such an event is considered extremely low.

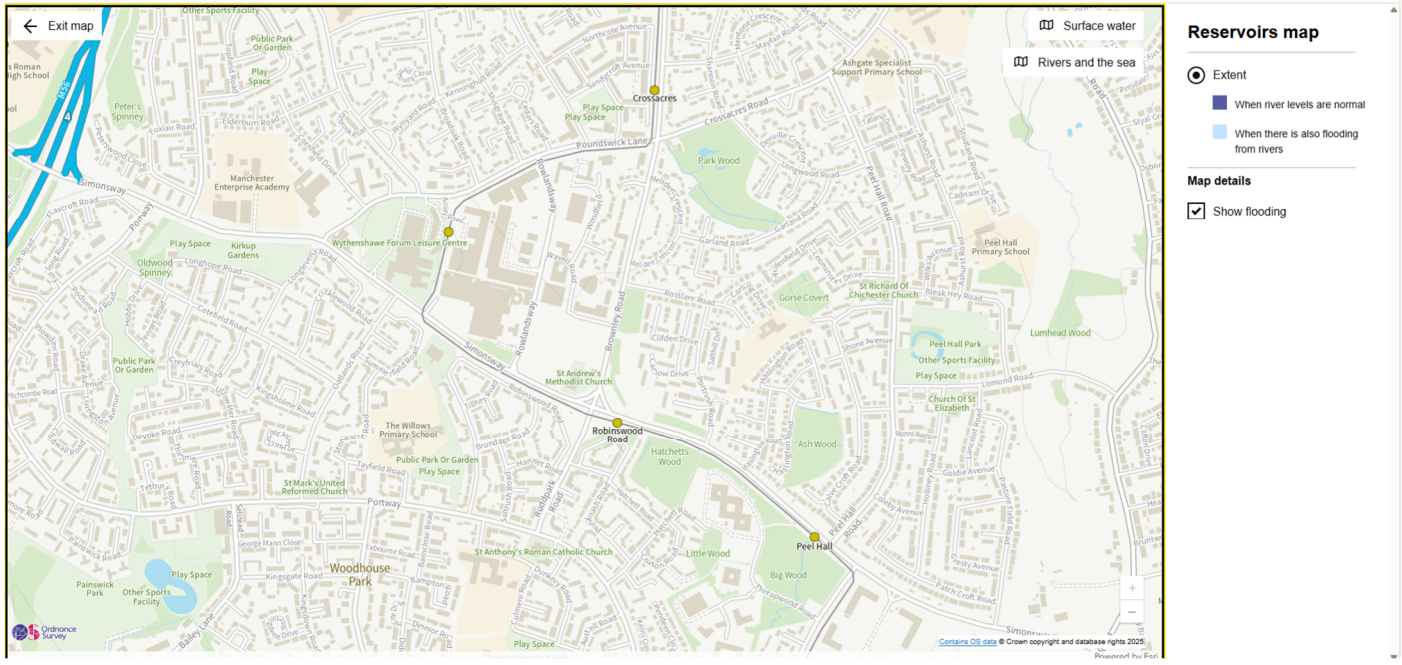


Figure 11: Reservoir Flood Risk

6.5. Canals Flood Risk

In comparison to rivers, canals are generally less susceptible to significant changes in water level due to rainfall. The Bridgewater Canal is located approximately 5.38km from the site and based on this distance, the risk of flooding from canals is considered to be extremely low.

6.6. Groundwater

Groundwater flooding is the result of an elevated underground water table enabling water to permeate to the surface. The risk to life is generally insignificant owing to the slow rate at which flooding takes place, although substantial damage to property can occur.

The EA magic Map: Ground Vulnerability maps (Figure) suggest that Brotherton House is located in an area considered to be a medium to low risk of groundwater vulnerability.



Figure 12: EA Magic Map: Ground Water Vulnerability Extract

At present, the risk of groundwater flooding can be deemed to be low based on available mapping. A recent intrusive site investigation, which included boreholes and other intrusive methods, recorded groundwater levels striking between approximately 5.0mbgl and 12.0mbgl. This aligns with the underlying Bollin Mudstone Member bedrock and indicates an overall low groundwater flood risk.

6.7. Reservoir Flooding

Reservoirs may flood in the event of a dam collapse resulting in the release of a significantly large volume of water, however, reservoirs in the UK have an excellent safety record and the probability of such an event is considered extremely low as there has been no recorded loss of life in the UK from reservoirs flooding since 1925.

Flood risk to the site from reservoirs is indicated in Figure 13 below, there is very low extent of reservoir flooding around or near this site therefore the overall risk of flooding is considered low.



Figure 13: Extent of flooding in event of reservoir failure © Environment Agency.

6.8. Risk of Flooding from Sewers

In relation to the wider development the surrounding sewers are presumed to be adopted assets maintained by United Utilities. No recorded incidents of flooding of these assets have been found. It is presumed that the risk of sewer flooding is very low provided the statutory undertaker carry out their responsibilities to minor and regularly maintain these assets.

6.9. Summary of Flood Risk

From the evidence collected, the flood risk proposed to the development can be summarised as follows:

- Rivers and Sea – Very Low Risk
- Reservoir – Very Low Risk
- Ground Water – Low Risk
- Sewers – Very Low Risk
- Surface Water – Low and areas of Medium to High Risk

Although EA's Risk of Flooding from Surface Water map indicates that some minor areas of the site are at low, medium and high risk of surface water flooding, a detailed drainage strategy, supported by hydraulic calculations, has been prepared to demonstrate clearly that the proposed layout, design and mitigation measures would ensure there would be minimal risk of surface water flooding to occupiers and users throughout the lifetime of the development - without increasing flood risk elsewhere. Therefore, a sequential test need not be applied.

7. Proposed Drainage Strategy

7.1. Disposal of surface water

The method for removal of surface water from the site has been selected in accordance with the hierarchy outlined in Building Regulations Part H as summarised below:

- Infiltration to the ground
- Discharge to a watercourse

- Connection to a surface water sewer
- Connection to a combined sewer

As described in section 2.3 of this report, the majority of the site is underlain by Bollin Mudstone Member – Mudstone and has superficial deposits of Till, Devensian - Diamicton. The SI undertaken states the Glacial till underlaying the site constitutes of clay which is unfavourable to infiltration.

However, the Bolin Mudstone Member underlies the Glacial Till which may be more favourable to infiltration, as such it is recommended to understand BRE 365 soakaway tests to understand whether this is feasible.

The site has an area of 1.75ha and the equivalent greenfield discharge rate is 10.2l/s.

The drainage strategy has been considered in cognisance of the wider project maintenance strategy that will result in an application to the local statutory undertaker to adopt the main roads. Principles for adoption dictate pavement construction depths which drives the soffit level of the drainage assets within the road corridor deeper. This allows for adequate cover of proposed adoptable assets. Furthermore, drainage adoption principles state the 1 in 30 year storm event must be attenuated within the adoptable assets, and for this storm event private attenuation must not be used. To satisfy this hydraulically, the private drainage will be shallower than the public drainage and the invert level of the private drainage attenuation is above the attenuated water level for the 1 in 30 year storm event of the public, proposed adoptable attenuation.

For the whole site, restricting flows to 10.2 l/s, approximately 755m^3 storage is required on site to attenuate the surface water flows in a 100 + 45% climate change storm event. This is shared between c.268

The attenuation storage will be designed to ensure that there is no surface water flooding on site for rainfall events up to and including the 1 in 30 year storm event. The attenuation storage will be designed to ensure that surface water runoff for storm events up to and including the 100 year storm plus a 45% allowance will

The network is then positively drained to the local 450mm UU surface water sewer.

7.1. Post-Development Runoff and Attenuation

In accordance with the requirements of The Places for Everyone Joint Development Plan, it is proposed that the site will be restricted to the equivalent greenfield run-off rate, which is defined as the Qbar value for the development site by DEFRA publication National Standards for Sustainable Drainage Systems.

All surface water run-off from the development shall be restricted to the greenfield run-off rate with all excess rainwater being contained within the site demise for storm events up to the 1 in 100 year plus 45% allowance for climate change.

It is proposed to attenuate these flows in twin oversized drainage pipes within the main road and an online concrete box culvert attenuation storage tank to attenuate the 1 in 30 year storm event, these are proposed to be adoptable assets, beyond this storm event flows will be attenuated in the geocellular tanks and permeable paving for the 1 in 100 year event and then flows from the 1 in 100 year + 45% climate change event will be retained on site.

The required volume of attenuation has been calculated to be approximately 755m^3 using the quick storage estimate function in Infodrainage software.

7.2. Drainage Hierarchy Points of Discharge

The NPPF Planning Practice Guidance Paragraph 080 states that:

“Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:

1. into the ground (infiltration);
2. to a surface water body;
3. to a surface water sewer, highway drain, or another drainage system;
4. to a combined sewer.”

Infiltration Potential of Sustainable Drainage Systems (SuDS)

As described in section 2.3 of this report, the majority of the site is underlain by Bollin Mudstone Member – Mudstone and has superficial deposits of Till, Devensian - Diamicton. The SI undertaken states the Glacial till underlaying the site constitutes of clay which is unfavourable to infiltration.

Water Body

The nearest waterbody to the site is an open section of the Statutory Main River, Baguley Brook, which is 0.35km to the southwest of the site. There is a c.110m open section of this brook which is culverted until it is approximately 0.5km to the south of the site and discharges into the artificial lake in Painswick Park. 1.69km to the east of the site is another Statutory Main River, Gatley Brook.Disposal of surface water via discharge to a water body is not deemed feasible due to the distance to the water body and the constraints imposed by crossing third-party land ownerships.

Surface Water Sewer

The nearest surface water sewer is the 450mm UU sewer in Poundswick lane to the east and south of the site. It is deemed appropriate to discharge to this sewer.

Combined Sewer

The nearest sewer is a surface water sewer so discharging to a Combined Sewer is not a preferable solution.

7.1. Sustainable Drainage Systems

Sustainable Drainage Systems (SuDS) will be utilised in line with The SuDS Manual (C753) guidance and aim to minimise the impact the development has on runoff quantity and quality and maximise amenity and biodiversity opportunities.

The management train approach is a fundamental principle of SuDS, it aims to primarily reduce pollution, flow rates and volume of runoff from the site. The main objective is to treat the runoff as close to the source as possible and it is imperative that **at least two** of the following should be included within the drainage strategy.

- **Prevention** – The use of good site design and rainwater re-use measures to prevent runoff.
- **Source Control** – Controlling the runoff as close to source as possible by using; green roofs, permeable pavements and soakaways.
- **Site Control** – Use of water management techniques within local area, i.e. detention basins and geo-cellular storage.
- **Regional Control** – Management of water from a number of sites in a specific location, i.e. balancing ponds and wetlands.

The drainage strategy for this development will incorporate **Source Control**; permeable paving and **Site Control**; flow control and geo-cellular storage.

Details of how the SuDS hierarchy have been reviewed are shown in the table below.

Table 4: Detailed SuDS Hierarchy review:

Order of Priority	Sustainable Drainage Measures	Suitability (Y/N)	Comments
1	Store rainwater for later use	N	Discounted – not adequate area required for irrigation to make proposal commercially viable for both blocks and residential developments.
2	Use infiltration techniques, such as porous surfaces in non-clay areas	N	Discounted – the underlying soil characteristics inhibit using infiltration as a method of disposal i.e. soakaways. Borehole records show low permeability substrate not allowing significant infiltration.
3	Attenuate rainwater in ponds or open water features for gradual release	N	Discounted – spatial constraints and alternative filtration and attenuation provided elsewhere.
4	Implement green roofs or raingardens for water retention	N	Discounted – lack of commercial viability for implementing green roofs on block or

			residential buildings. The only feasibile location for rain gardens are to the south and west of the development however there are existing trees identified to be retained, therefore this is not feasible.
5	Attenuate rainwater beneath permeable surfaces such as car parks	Y	Attenuation has been provided in the form of permeable paving
6	Attenuate rainwater by storing in tanks or sealed water features for gradual release	Y	Attenuation tanks have been proposed to retain additional flows greater than 10.2l/s to provide additional attenuation, secondary to the raingardens and permeable paving.
7	Discharge rainwater direct to a watercourse	N	Discounted – all flows are controlled at source and proximity to watercourse makes this unfeasible.
8	Discharge rainwater to a surface water sewer/drain	Y	450mm UU sewer in Poundswick Lane is preferred local connection point.
9	Discharge rainwater to the combined sewer	N	Discounted - Proximity to combined sewer makes this unfeasible, and preferred approach to discharge to surface water sewer is available.

7.2. Surface Water Drainage Design

In order to restrict surface water run-off from the development site to xl/s run-off rate, on-site storage will be required to accommodate excess run-off.

This is achieved utilising **Source Control** and **Site Control**.

Within the current design, it is anticipated that storage will be provided by permeable paving and a geo-cellular buried system as an additional storage to support the previously mentioned SuDS feature.

8. Foul Water Drainage Strategy

The proposed foul water drainage network is to be a separate piped gravity network that conveys foul water flows from the proposed building within the development to the public combined sewer, and shall be designed in accordance with:

- BS EN 752:2008 (Drain and sewer systems outside buildings)
- Sewers for Adoption (7th Edition)
- Technical Guidance to the National Planning Policy Framework document (Department for Communities and Local Government, March 2012)
- BS EN 12056-2:2000 (Drainage systems inside buildings)
- Building Regulations Approved Document H, Drainage and waste disposal. (Office of the Deputy Prime Minister, December 2010)

No drainage pipes will be less than 100mm in diameter, and the design will ensure all velocities are over 0.75 m/s. Adequate access will be provided to ensure that maintenance activity can be carried out. Foul water drainage will be conveyed via a new below-ground pipe network and discharged from the site to the existing combined sewer located beyond the northwest corner of the site.

It is anticipated that the foul water from the development will discharge to the UU combined sewer in Poundswick Lane. There may be an option to utilise the existing manhole, alternatively a saddle connection will be required.

Any connection to the public sewer is subject to formal agreement with United Utilities under Section 106 of the Water Industry Act 1991.

The site drainage proposals are shown on the Drainage Strategy drawing in Appendix C.

9. Maintenance

Reference should be made to the Drainage Inspection and Maintenance Schedule in Appendix D, which includes required actions and typical frequencies for all drainage infrastructure serving the development.

Once specific assets are adopted it is assumed the adopting body will have their own maintenance strategy, frequency and the adoptable assets are assumed to

The rest of the drainage, permeable paving and geo-cellular tanks will be managed and maintained by an appointed Management Company.

10. Conclusion

This report has assessed the current and future flood risk to Brotherton House within Wythenshawe Civic redevelopment. The proposed development comprises the erection of extra care apartments (Use Class C2) older living apartments, and dwellinghouses (Use Class C3), car and cycle parking, landscaping and other associated works following demolition of existing buildings.

The assessment has been undertaken in accordance with the National Planning Policy Framework (NPPF) and associated guidance on flood risk and coastal change contained within the Planning Practice Guidance. Manchester City Council. Salford City Council and Trafford Councils Strategic Flood Risk Assessment (SFRA), the Manchester Core Strategy 2012 and Addendum to Manchester Core Strategy 2024 which have served as a further source of information and guidance where relevant.

The assessment indicates that the site is located within flood zone 1, at very low risk from fluvial and tidal flooding, surface water flooding is the main source of potential risk, with EA mapping highlighting localised low, medium and high-risk areas. Although EA's Risk of Flooding from Surface Water map indicates that some minor areas of the site are at low, medium and high risk of surface water flooding, a detailed drainage strategy, supported by hydraulic calculations, has been prepared to demonstrate clearly that the proposed layout, design and mitigation measures would ensure there would be minimal risk of surface water flooding to occupiers and users throughout the lifetime of the development - without increasing flood risk elsewhere. Therefore, a sequential test need not be applied.

Climate change may increase rainfall intensities by up to 45% during the lifetime of the development, which could express these surface water risks. However, planned adjustments to site levels in line with the proposed layout, mitigate this flooding for the 1in30 and no impact to wider developments for the 1in100 + climate change event.

The drainage strategy for the Site includes several SuDS components such as permeable paving, geo-cellular attenuation and a concrete box culvert, adhering to the fundamental management approach of SuDS Manual (C753), delivering source control and site control, respectively. Borehole records show low permeability substrate not allowing significant infiltration.

Attenuation has been provided in the form of permeable paving, geo-cellular attenuation and a concrete box culvert.

The proposed surface water outfall is the local surface water sewer in Poundswick Lane, as other discharge options are not deemed feasible due to the site's location and underlying ground conditions. The outfall to the surface water sewer will be subject to agreement with the Lead Local Flood Authority (LLFA) and United Utilities, the statutory undertaker for the sewer. It is proposed to limit surface water discharge to 10.2l/s in line with the greenfield runoff rate.

Foul water flows will be conveyed using a traditional piped gravity system, discharging to the foul sewer in Poundswick Lane to the east of the site. This connection is additionally subject to approval from United Utilities under S106 of the Water Industry Act 1991.

Appendix A - Topographical Survey

NOTES

KEY

Grid & Datum - Local Plane Grid related to OS National Grid & Datum By GNSS RTK Observations

STANDARD ABBREVIATIONS

STREET FURNITURE

AC - AIR CONDITIONING
AE - AERIAL
AL - ALARM
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MH - MANHOLE
MO - MONUMENT
MP - MARKER POST
MR - MOORING RING
MW - MONITORING WELL
NP - NAME PLATE
OH - OVERHEAD
OSBM - BENCHMARK SURVEY
PA - PLANT ATTENUATOR
PB - PILLAR BOX
PH - PUBLIC HOUSE
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SU - STUMP
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PP - POST & PANEL
PR - POST & RAIL
PSB - PEDESTRIAN SAFETY BARRIER
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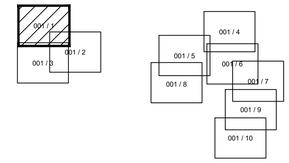
LEVELS

BL43.45 - BED LEVEL
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SYMBOLS

HEDGE
GATE
BUILDING
TREE CANOPY
CONTROL STATION
EMBANKMENT
TREE
BUSH

SHEET LAYOUT



UNDERGROUND SERVICE KEY

Foul/Combined water drain
Foul/Combined drain 3000 and above
Surface water drain
Surface water drain 3000 and above
Combined Water Drain
Surface water drain 3000 and above
End of trace
Electric cables
HV cables
Gas
Water
Telephone
Catv
CCTV
Comms
Fibre Optics
Pipe
Vents
Fuel
Offsets
Vapour Recovery
Gauge Lines
Unidentified GPR
Unidentified EML
Taken From Records
Assumed Routes
Empty Ducts
Earth Rod
Rising Main
Overhead
Heating Pipes
Traffic Signals
Multi User
Trench Scar
Service Duct

Where chamber extents are significantly greater than the cover size, their approximate extents are shown thus;

ABBREVIATION KEY

AR assumed route
BD base dead
BG backdrop
CP cable pit
COL cover level
CR cable riser
DG down gully
DBD dropped back drop
EP end of trace
ELP electricity pole
FH fire hydrant
FL flooded
GY gully
GV gas valve
HDR head of run
HL high level
IC inspection chamber
IBD internal back drop
IL invert level
MH manhole
PL pit level
PR pipe riser
RE nodding eye
RWP rainwater pipe
SIL silted
SL silt level
SV stop valve
SVP soil vent pipe
TF trapped exit
TFR taken from records
TP telegraph pole
UDO unable to determine outfall
UIT unable to find
UTL unable to lift
UTS unable to survey
VRC vent to trace
VP vent pipe
WL water level
WM water meter
WO wash out valve

UTILITY SURVEY NOTES

ELECTROMAGNETIC AND/OR GROUND PENETRATING RADAR TECHNIQUES HAVE BEEN USED TO LOCATE AND MAP UNDERGROUND UTILITIES AND FEATURES ON THIS SURVEY. THESE METHODS ARE SUBJECT TO LIMITATIONS AND THEIR SUCCESS IN DETECTING FEATURES DEPENDS ON THE NATURE OF THE FEATURE, ACCURACY AND OF THE HIGHEST QUALITY. HOWEVER, THE RESULTS FROM THESE TYPES OF SURVEYS ARE NOT INFALLIBLE AND SHOULD THE LOCATION OR DEPTH OF SERVICES/FEATURES BE OF PARTICULAR IMPORTANCE TO A PROJECT, THEN IT IS STRONGLY ADVISED THAT TRIAL EXCAVATIONS SHOULD BE UNDERTAKEN TO CONFIRM SURVEY RESULTS.

N D OLIVER & CO LTD HAVE USED ALL RECORD DRAWINGS THAT WERE AVAILABLE TO US BY THE CLIENT OR BY THE STATUTORY UTILITY PROVIDERS AT THE TIME OF THE SURVEY. ANY INFORMATION TAKEN FROM THESE DRAWINGS IS, IF NOT, MATERIALS IS NOT GUARANTEED, SERVICES LOCATED FROM RECORD DRAWINGS WILL BE SHOWN AND ANNOTATED AS TAKEN FROM RECORDS (TFR). HISTORIC RECORD INFORMATION IS OFTEN INCOMPLETE/INACCURATE AND CANNOT BE RELIED UPON.

A SINGLE LINE INDICATING A UTILITY MAY INDICATE THE PRESENCE OF MULTIPLE SERVICES WITHIN CLOSE PROXIMITY TO EACH OTHER, WHERE A SINGLE LINE TYPE IS SHOWN WE RECOMMEND HAND DIGGING WITHIN 0.5m, TO EXPOSE HIDDEN SERVICES.

WHERE DEPTHS, DEPTH INFORMATION OF UNDERGROUND SERVICES/FEATURES IS STATED, DEPTHS ARE GENERALLY WITHIN +/- 10% ACCURATE, BUT CANNOT BE GUARANTEED, ANY DEPTHS SHOWN ARE USUALLY TO THE TOP OF THE SERVICE/FEATURE, GRAPHIC SYMBOLS AND DRAWN ARE USUALLY TO WIDEST EXTENT OF DRAWNAGE CHANNELS UNLESS OTHERWISE STATED.

AT N D OLIVER & CO LTD WE USE SKILLED STAFF AND MODERN CALIBRATED EQUIPMENT TO PERFORM OUR SURVEYS, HOWEVER, THE COMPLETENESS OF ANY UNDERGROUND SURVEY CANNOT BE 100% GUARANTEED AND WE CANNOT BE HELD RESPONSIBLE FOR ANY INACCURACIES BEYOND THOSE THAT COULD BE REASONABLY EXPECTED BY A COMPETENT SURVEYOR.

CONTRACTORS UTILISING OUR DRAWINGS FOR INTRUSIVE WORK SHOULD TAKE ALL REASONABLE MEASURES TO WORK SAFELY IN ACCORDANCE WITH HSG47 GUIDELINES "AVOIDING DANGER FROM UNDERGROUND SERVICES".

Rev	Date	Drawn	Description	Ch'k'd	App'd
C	09.06.25	NDO/AUL	Survey Area Expanded	AM	NDO

N D OLIVER & CO
CHARTERED GEOMATIC SURVEYORS
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E: mail@ndoliver.com www.ndoliver.com

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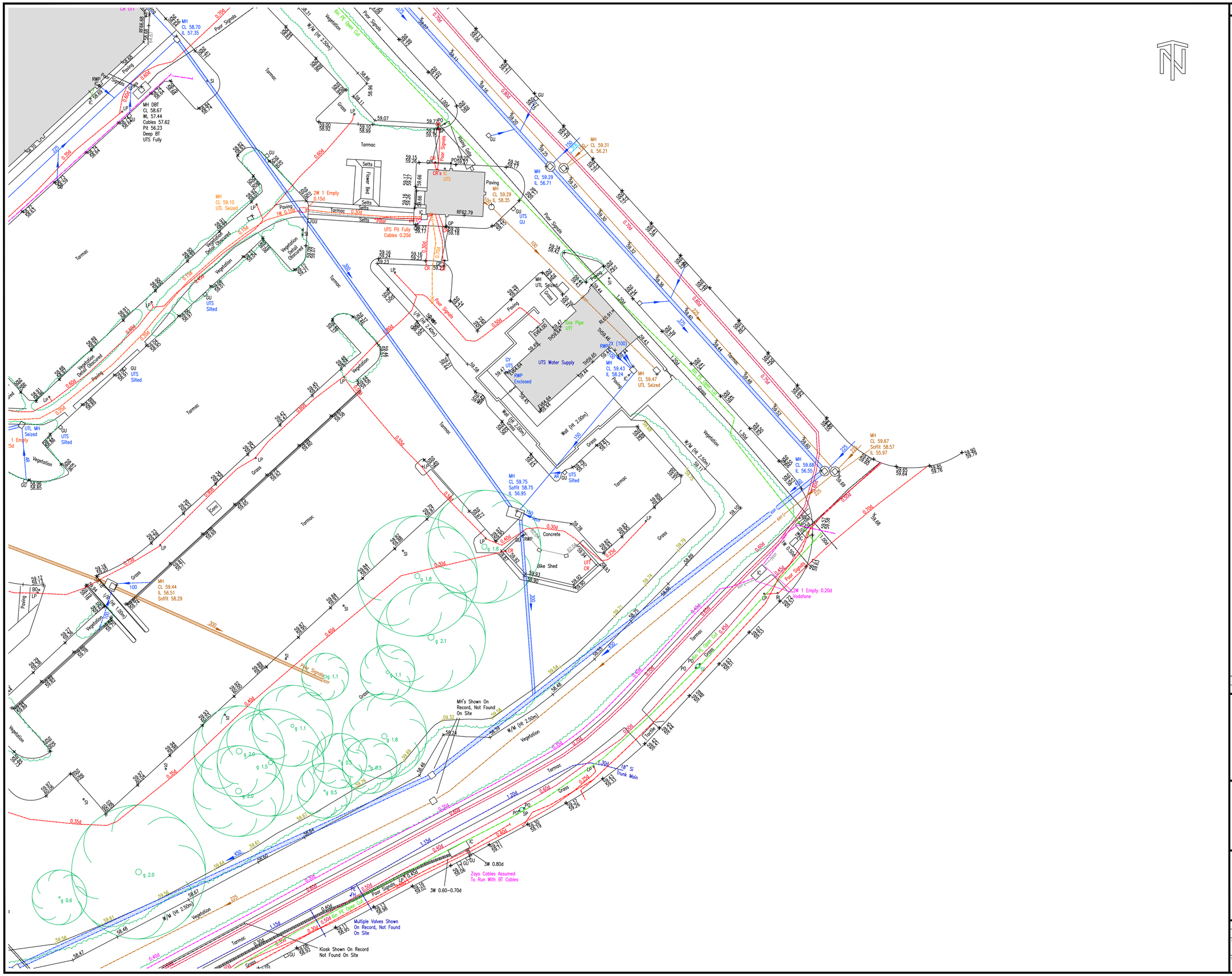
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WYTHENSHAWE CIVIC CENTRE
WYTHENSHAWE
M22 5RQ

TOPOGRAPHICAL & UTILITIES SURVEY
SHEET 1 OF 10

Surveyed	PG/HS/OB	Drawn	HS/PK/OB	Drawn Date:
Checked	AM	Approved	NDO	30/04/2025

Scale	Project	Status
1:200 @ A1	13162	REV
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Drawing No 13162 / 001C / 1		Rev C



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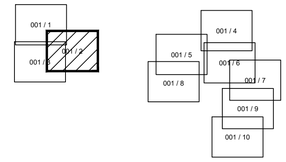
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Gas
Water
Telephone
Catv
CCTV
Comms
Fibre Optics
Pipe
Vents
Fuel
Offsets
Vapour Recovery
Gauge Lines
Unidentified GPR
Unidentified EML
Taken From Records
Assumed Routes
Empty Ducts
Earth Rod
Rising Main
Overhead
Heating Pipes
Traffic Signals
Multi User
Trench Scar
Service Duct

Where chamber extents are significantly greater than the cover size, their approximate extents are shown thus;

ABBREVIATION KEY

AR assumed route
BD base bend
BG backdrop
CP cable pit
CL ground level
CR cable riser
DP down pipe
EBD external back drop
EOT end of trace
EP electricity pole
FH fire hydrontt
FL flooded
G gully
GV gas valve
HDR head of run
HL high level
IC inspection chamber
IBD internal back drop
LL low level
MH manhole
PI pit level
PR pipe riser
RE rodding eye
RWP rainwater pipe
SL silted
SL sump level
SV stop valve
SVP soil vent pipe
TE trapped exit
TFR taken from records
TP telegraph pole
UDO unable to determine outfall
UTL unable to lift
UTL unable to lift
UTS unable to survey
UTT unable to trace
VP vent pipe
WC water closet
WM water meter
WO wash out valve

UTILITY SURVEY NOTES

ELECTROMAGNETIC AND/OR GROUND PENETRATING RADAR TECHNIQUES HAVE BEEN USED TO LOCATE AND MAP UNDERGROUND UTILITIES AND FIXTURES ON THIS DRAWING. N D OLIVER & CO LTD HAVE MADE EVERY ENDEAVOUR TO MAKE SURE THAT THE INFORMATION CONTAINED WITHIN THIS DRAWING IS ACCURATE AND OF THE HIGHEST QUALITY. HOWEVER, THE RESULTS FROM THESE TYPES OF SURVEYS ARE NOT INFALLIBLE AND SHOULD THE LOCATION OR EXISTENCE OF ANY UNDERGROUND SERVICE BE CRUCIALLY IMPORTANT TO A PROJECT, THEN IT IS STRONGLY ADVISED THAT TRIAL EXCAVATIONS SHOULD BE UNDERTAKEN TO CONFIRM DETAILS.

N D OLIVER & CO LTD HAVE USED ALL RECORD DRAWINGS THAT WERE AVAILABLE TO US BY THE CLIENT OR BY THE STATUTORY UTILITY PROVIDERS AT THE TIME OF THE SURVEY. ANY INFORMATION TAKEN FROM THESE DRAWINGS OF PIPE SIZES, MATERIALS IS NOT GUARANTEED. SERVICES LOCATED FROM RECORDS MAY NOT BE SHOWN ON THIS DRAWING AND ANNOTATED AS SUCH FROM RECORDS ONLY. HISTORIC RECORD INFORMATION IS OFTEN INCONCLUSIVE/INACCURATE AND CANNOT BE RELIED UPON.

A SINGLE LINE INDICATING A UTILITY MAY INDICATE THE PRESENCE OF MULTIPLE SERVICES WITHIN CLOSE PROXIMITY TO EACH OTHER. WHERE A SINGLE LINE TYPE IS SHOWN WE RECOMMEND HAND DIGGING WITHIN 0.5m, TO EXPOSE HIDDEN SERVICES.

WHERE QUOTED, DEPTH INFORMATION OF UNDERGROUND SERVICES/FIXTURES IS STATED. DEPTHS ARE GENERALLY WITHIN +/- 10% ACCURATE, BUT CANNOT BE GUARANTEED. ANY DEPTHS SHOWN ARE USUALLY TO THE TOP OF THE SERVICE/FEATURE. GRAVITY SEWERS AND DRAINS ARE USUALLY TO INVERT (BASE OF DRAINAGE CHANNEL) UNLESS OTHERWISE STATED.

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CONTRACTORS UTILISING OUR DRAWINGS FOR INTRUSIVE WORK SHOULD TAKE ALL REASONABLE MEASURES TO WORK SAFELY IN ACCORDANCE WITH HSG47 GUIDELINES "AVOIDING DANGER FROM UNDERGROUND SERVICES".

Rev	Date	Drawn	Description	Ch'k'd	App'd
C	09.06.25	NDO/AUL	Survey Area Expanded	AM	NDO

N D OLIVER & CO
CHARTERED GEOMATIC SURVEYORS
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E: mail@ndoliver.com www.ndoliver.com

Client

WALKER SIME LTD
THE CORNERHOUSE
FOURTH AVENUE
TRAFFORD PARK
MANCHESTER, M14 7DB

Title

WYTHENSHAWE CIVIC CENTRE
WYTHENSHAWE
M22 5RQ

TOPOGRAPHICAL & UTILITIES SURVEY
SHEET 2 OF 10

Surveyed	PG/HS/OB	Drawn	HS/PK/OB	Drawn Date: 30/04/2025
Checked	AM	Approved	NDO	
Scale 1:200 @ A1		Project 13162		Status REV
		CAD File P:\13162\DRAWINGS\13162_001C.DWG		
Drawing No 13162 / 001C / 2				Rev C

NOTES

KEY

Grid & Datum - Local Plane Grid related to OS National Grid & Datum By GNSS RTK Observations

STANDARD ABBREVIATIONS

STREET FURNITURE

AC - AIR CONDITIONING
AL - ALARM
AV - AIR VALVE
BA - BUOYANCY AID
BB - BELISHA BEACON
BH - BOREHOLE
BI - BOLLARD ILLUMINATED
BL - BASEMENT LIGHT
BO - BOLLARD
BP - BOUNDARY POST
BR - BUS RTR
BS - BUS STOP
BU - BUST
CA - CABLE
CB - CONTROL BOX
CC - CLOSE CIRCUIT TV
CH - CHIMNEY BIN
CO - COLUMN
CT - CLOSE CIRCUIT TV POLE
DP - DOWN PIPE
DR - DRAIN
DU - DUCT/CABLE CHANNEL
DUCT - DUCT
EL - ELECTRIC
EP - ELECTRICITY POLE
ER - EARTH ROD
FA - FENDOR ANCHOR
FB - FLOWER BED
FE - FIRE EXTINGUISHER
FL - FLOODLIGHT
FS - FLAG STAFF
GA - GAS
GM - GAS METER
GO - GATE OPEN
GP - GATE POST
GU - GULLY
GV - GAS VALVE
Hyd - HYDRANT
IC - INSPECTION COVER
JB - JUNCTION BOX
KO - KERB OFFLET
LA - LADDER
LB - LITTER BIN
LC - LIGHTING COLUMN
LI - LIGHT
LP - LAMP POST
MBO - MOORING BOLLARD
MA - MAST
MH - MANHOLE
MO - MONUMENT
MP - MARKER POST
MR - MOORING RING
MW - MONITORING WELL
NP - NAME PLATE
O/H - OVERHEAD
OSBM - ORDNANCE SURVEY BENCH MARK
PA - PLANT APPARATUS
PB - PILLAR BOX
PH - PUBLIC HOUSE
PI - PIPE
PL - PLANT
PM - PARKING METER
PN - PLANTER
PO - POST
PP - PETROL PUMP
RH - RIDGE HEIGHT
RI - RAIN WATER
RS - ROAD SIGN ILLUMINATED
RTW - RETAINING WALL
RWP - RAINWATER PIPE
SA - STANCHION
SC - SPEED CAMERA
SD - SATELITTE DISH
SF - SECURITY FENCE
SG - SIGNAL
SI - SIGN
SI - SIGN ILLUMINATED
SMP - SERVICE MARKER POST
SN - SMOKE SENSOR
ST - STOP TAP
SU - STUMP
SV - STOP VALVE
SW - SWITCHGEAR
TA - TANK
TC - TRAFFIC CONTROLLER
TBM - TEMPORARY BENCH MARK
TCB - TELEPHONE CALL BOX
TE - TELEPHONE
TM - TICKET MACHINE
TS - TRAFFIC SIGNAL
TT - TELEGRAPH POLE
UTL - UNDERGROUND TANK
VDP - VEHICLE DETRECTOR PAD
VP - VENT PIPE
WB - WHISTLE BLOW
WM - WATER METER
WP - WATER POST
WP - WASTE PIPE

FENCE TYPES

BAW - BARBED WIRE
CUB - CLOSE BOARDED
CI - CORRUGATED IRON
CPF - CONCRETE PANEL
HR - HANDRAIL
IR - IRON RAILING
PAL - PALISADE
PC - POST & CHAIN
PIF - POST & PANEL
PIR - POST & RAIL
PSB - PEDESTRIAN SAFETY BARRIER
PW - POST & WIRE
WM - WIRE MESH

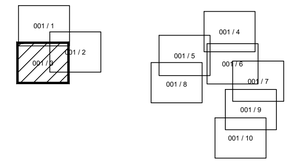
LEVELS

BL43.45 - BED LEVEL
EV43.45 - EAVE LEVEL
IL43.45 - INVERT LEVEL
43.45 - SPOT LEVEL
RF43.45 - ROOF LEVEL
RL43.45 - RIDGE LEVEL
SB43.45 - SOFT BED LEVEL
SL43.45 - SOFFIT LEVEL
TH43.45 - THRESHOLD LEVEL
WL43.45 - WATER LEVEL

SYMBOLS

HEDGE
GATE
BUILDING
TREE CANOPY
CONTROL STATION
EMBANKMENT
TREE
BUSH

SHEET LAYOUT



UNDERGROUND SERVICE KEY

Foul/Combined water drain
Foul/Combined drain 3000 and above
Surface water drain
Surface water drain 3000 and above
Combined Water Drain
Surface water drain 3000 and above
End of trace
Electric cables
HV cables
Gas
Water
Telephone
Catv
CCTV
Comms
Fibre Optics
Pipe
EOT
Vents
Fuel
Offsets
Vapour Recovery
Gauge Lines
Unidentified GPR
Unidentified EML
Taken From Records
Assumed Routes
Empty Ducts
Earth Rod
Rising Main
Overhead
Heating Pipes
Traffic Signals
Multi User
Trench Scar
Service Duct

Where chamber extents are significantly greater than the cover size, their approximate extents are shown thus;

ABBREVIATION KEY

AR assumed route
BB base bend
BD backdrop
CP cable pit
CL cover level
CP capture pipe
DP down pipe
EBD external back drop
EOT end of trace
EP electricity pole
FH fire hydrant
FT flushed
GV gas valve
HOR head of run
HL high level
IC inspection chamber
IBD internal back drop
IL invert level
MH manhole
PI pipe
PR pipe riser
RE rodding eye
RWP rainwater pipe
SIL silted
SL silt level
SV stop valve
SVP soil vent pipe
TF trapped exit
TFR token from records
TP telegraph pole
UDO unable to determine outfall
UTF unable to find
UTI unable to identify
UTS unable to survey
UTT unable to trace
VP vent pipe
WD water diesel
WM water meter
WO wash out valve

UTILITY SURVEY NOTES

ELECTROMAGNETIC AND/OR GROUND PENETRATING RADAR TECHNIQUES HAVE BEEN USED TO LOCATE AND MAP UNDERGROUND UTILITIES AND FEATURES ON THIS DRAWING. N D OLIVER & CO LTD HAVE MADE EVERY ENDEAVOUR TO MAKE SURE THAT THE INFORMATION CONTAINED WITHIN THIS DRAWING IS ACCURATE AND OF THE HIGHEST QUALITY. HOWEVER, THE RESULTS FROM THESE TYPES OF SURVEYS ARE NOT INFALLIBLE AND SHOULD THE LOCATION OR DEPTH OF SERVICES/FEATURES BE OF PARTICULAR IMPORTANCE TO A PROJECT, THEY IF IS STRONGLY ADVISED THAT TRIAL EXCAVATIONS SHOULD BE UNDERTAKEN TO CONFIRM SURVEY RESULTS.

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Rev	Date	Description	Ch'k'd	App'd
C	09.06.25	NDO/AUL Survey Area Expanded	AM	NDO

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Client

WALKER SIME LTD
THE CORNERHOUSE
FOURTH AVENUE
TRAFFORD PARK
MANCHESTER, M14 7DB

Title

WYTHENSHAWE CIVIC CENTRE
WYTHENSHAWE
M22 5RQ

TOPOGRAPHICAL & UTILITIES SURVEY
SHEET 3 OF 10

Surveyed	PG/HS/OB	Drawn	HS/PK/OB	Drawn Date: 30/04/2025
Checked	AM	Approved	NDO	

Scale 1:200 @ A1
Project 13162
Status REV
CAD File P:\13162\DRAWINGS\13162_001C.DWG
Drawing No 13162 / 001C / 3
Rev C

Appendix B - Proposed Development – Site Layout

1. Open lawn with tiered lawn seating taking up the level change. The central lawn space is slightly lower than the footpath creating a flexible space surrounded by trees and vegetation
2. Cycle store
3. Substation/Generator
4. Parking Court
5. Dementia Garden
6. Dementia Lounge Garden
7. Extra Care Garden
8. Grow space with raised planters and a shed for storage
9. Mown path through woodland with integrated seating along the way

RIBCHE

D DRIVE

El
Sub Sta

ESS

9 to 17

1 to 7

2 to 8

Frank
Price
Court

2a

2

LOADING

59.2m

ONSWAY

KEY

Paving Type 1
High Quality Concrete Block Paving
Grey

Paving Type 2
High Quality Concrete Block Paving
Buff

Tarmac

Compacted Gravel

Resin Bound Gravel

Ornamental Planting
Mixed shrub, herbaceous perennial & ornamental grass planting
Notes: 300mm topsoil over 300mm subsoil
Subject to detailed planting plan. Reuse soil on site where feasible

Amenity Lawn
Managed as close cut lawn
To include 10% bulb planting
Lawn Turf laid over 150mm Topsoil over 150mm Subsoil / 300mm if surplus available. Reuse soil on site where feasible

Rain Gardens
Meadow wildflower
0.5m deep swale
Notes: 300mm topsoil over 300mm subsoil

Native Scrub
Notes: 300mm topsoil over 300mm subsoil
Reuse soil on site where feasible

Wildflower Meadow
Wildflower mix
Notes: 150mm Topsoil over 150mm Subsoil / 300mm if surplus available
Reuse soil on site where feasible

Instant Hedgerow
Mixed Native Species
Notes: 10L pot size, 3/lin m and double staggered

Hedgerow
Mixed Native Species
Notes: double staggered whip planting

Climbers
Twining climber species

Existing Tree Retained

Proposed Feature Tree
Semi-mature tree
30-35cm girth
Notes: 300mm topsoil over 600mm subsoil

Proposed Street Tree
Semi-mature tree
20-25cm girth
Notes: 300mm topsoil over 600mm subsoil

Proposed Multistem Tree
Notes: 300mm topsoil over 600mm subsoil

Proposed Fruit Tree
200-300mm height
Notes: 300mm topsoil over 600mm subsoil

Whip Planting
Planted at 2.5m centres
Notes: 300mm topsoil over 600mm subsoil

Seating
Provisional sum to be provided for a palette of external furniture across the scheme

Landscape Structures
Provisional sum to be provided for pergola structures and ornamental arch structure. From Bailey Streetscene or equal and approved

Grow Beds
Provisional sum to be provided for raised grow beds situated in hard and grow beds situated in ground

Shed
Standard wooden garden shed (6ft x 4ft) with secure, lockable door from Shed Store or equal and approved

Railing
Hight: 1.8m with climber planting

Fence
Height: 2.2m with fob access

Lockable Gate

Bird and Bat boxes
Schwegler bird and bat box or equal and approved

Low brick wall
With railing on top
Wall height 1.2m
Wall height with railing 1.8m

Handrail
To sloped footpaths

Bin Store
Bin store with extended section as a seat/parcel store
Constructed out of brick with a green roof to the bin store and timber top to seat/parcel store

ROAD KERBS (not shown)
To road edge
Pre-cast granite effect concrete kerb.
Product: Fusion Kerb
Supplier: Tobermore or similar approved
Size: 146 x 295 x 915mm
Colour: Granite Effect

PIN KERB (not shown)
To footpath edge
Product: Proprietary 50mm concrete pin kerb.
Finish: Square edged, smooth.
Colour: Silver Grey
Laying: Mortar bed or acceptable equivalent.
Laying: Laid flush.

METAL EDGE (not shown)
To Planter edges

TIMBER EDGE (not shown)
To Compacted gravel footpaths

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NOTES:
1. Do not scale from this drawing.
2. Always work to noted dimensions.
3. All dimensions are in millimetres unless otherwise stated.
4. All setting out, levels and dimensions to be agreed on site.
5. The dimensions of all materials must be checked on site before being laid out.
6. This drawing must be read with the relevant specification clauses and detail drawings.
7. Order of construction and setting out to be agreed on site.

Revision	Date	Description	Drawn	Apprvd.
P04	03/10/25	For Information	CB	SC
P03	30/09/25	For information	CB	SC
P02	25/09/25	For information	CB	SPL
P01	22/09/25	For costing review	CB	SPL

PLANIT

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Client	Muse
Project	Wythenshawe Civic Plot 3.3
Drg Title	General Arrangement

Created on	Created by	Approved by
13-08-25	MB	SPL

Scale	Size	Workstage
1:500	A2	RIBA 2

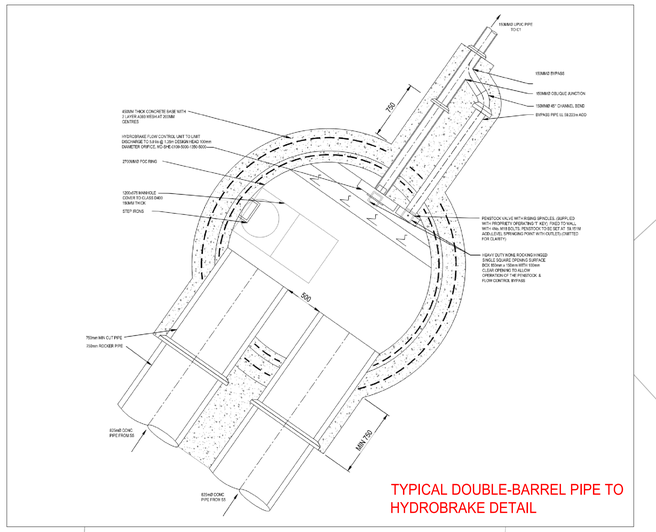
Drg No. 3475b-PLA-XX-XX-DR-L-0001

Suitability S1 **Revision** P04

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Internal Source file:3475b-PLA-XX-XX-DR-L-0002-Wythenshawe-Plot-3.3-Sheets-File.vwx

Appendix C - Drainage Strategy



TYPICAL DOUBLE-BARREL PIPE TO HYDROBRAKE DETAIL

0 2.5 5 7.5 10 12.5 15 20 m

SCALE 1:250 @ A0

STANDARD NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEER'S DRAWINGS AND THE SPECIFICATIONS.
2. THIS DRAWING SHOULD NOT BE SCALED.
3. ALL DIMENSIONS ARE TO BE VERIFIED BY THE CONTRACTOR ON SITE.
4. ALL DISCREPANCIES SHOULD BE REPORTED TO C.A.E.A. PRIOR TO THE COMMENCEMENT OF WORKS.

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NOTES

1. OS BASE PROVIDED BY FCB, RECEIVED 12.02.25.
2. PROPOSED LAYOUT PROVIDED BY PLANIT, RECEIVED 21.10.25.
3. TOPOGRAPHICAL SURVEY IS TAKEN FROM N D OLIVER & CO DRAWING NUMBER 13162/001/C/1 REV C DATED 09.06.25

KEY

- SITE BOUNDARY
- PROPOSED SW / FW / CW MANHOLE
- PROPOSED SW / FW INSPECTION CHAMBER
- PROPOSED SW FLOW CONTROL MANHOLE
- PROPOSED SW SOLID WALL DRAIN
- PROPOSED FW DRAIN
- EXISTING SW SEWER
- EXISTING FW SEWER
- PROPOSED PERMEABLE PAVING 300mm SUB-BASE
- PROPOSED ATTENUATION TANK
- PROPOSED CONCRETE BOX CULVERT

DRAWING NOTES

1. FOUL WATER DRAINAGE STRATEGY INDICATIVE ONLY TO PROVE CONNECTION TO EXISTING COMBINED SEWER IS FEASIBLE VIA A GRAVITY NETWORK. DEPTH AND NUMBER OF INSPECTION CHAMBERS TO BE CONFIRMED ONCE FOUNDATION STRATEGY AND NUMBER/POSITION OF POP UPS ARE CONFIRMED.
2. SURFACE WATER DRAINAGE DISCHARGE RATE AND METHOD OF DISCHARGE TO BE AGREED WITH UNITED UTILITIES AND LLFA.
3. RAINWATER DOWNPIPE POSITIONS TO BE CONFIRMED BY ARCHITECT
4. PROPOSED SURFACE WATER NETWORK SIZED BASED ON THE 1 IN 100 YEAR EVENT + 45% CLIMATE CHANGE ALLOWANCE
5. DETAILED DESIGN OF LATERAL DRAINS AND PERMEABLE PAVING TO BE UNDERTAKEN AT STAGE 3.

FLOW CONTROL SUMMARY

MH NUMBER	FLOW CONTROL	DESIGN FLOW (l/s)	PRODUCT REFERENCE
SW4	HYDROBRAKE (OR SIMILAR APPROVED)	10.2	CHE-123-1020-2000-1020

THE INFORMATION SHOWN ON THIS DRAWING IS INDICATIVE ONLY AND IS SUBJECT TO CHANGE DURING DETAILED DESIGN STAGE

DATE	REV.	DESCRIPTION	DRAWN	CHKD
14.11.25	P01	DRAFT ISSUE	TPR	JDL

CIVIC ENGINEERS

civicengineers.com

PROJECT

MUSE WYTHENSHAWE
PLOT 3.3

TITLE

PROPOSED GENERAL ARRANGEMENT

DRAWING STATUS				STATUS CODE
DRAFT ONLY				-
CE PROJECT No.	SCALE @ A0	DATE CREATED	DRAWN	CHECKED
3323-02	1:250	NOV 25	TPR	JDL
DRAWING No.				REV
18704-CIV-XX-XX-D-C-30001				P01

FILE LOCATION PATH - P:\PROJECTS\OT\3323-02 MUSE - WYTHENSHAWE - PLOTS C2 AND 3.3\004 BIM\CIVIL\DRAWINGS\BROTHERTON\18704-CIV-XX-XX-D-C-30001_PROPOSED DRAINAGE.DWG

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Company Address:		



Catchment Area

Type : Catchment Area

Area (ha)	0.063

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (1)

Type : Catchment Area

Area (ha)	0.008

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (2)

Type : Catchment Area

Area (ha)	0.038

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (3)

Type : Catchment Area

Area (ha)	0.017

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Company Address:		



Catchment Area (4)

Type : Catchment Area

Area (ha)	0.025

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (6)

Type : Catchment Area

Area (ha)	0.028

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (5)

Type : Catchment Area

Area (ha)	0.027

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (7)

Type : Catchment Area

Area (ha)	0.068

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (8)

Type : Catchment Area

Area (ha)	0.039

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (9)

Type : Catchment Area

Area (ha)	0.035

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (10)

Type : Catchment Area

Area (ha)	0.031

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (11)

Type : Catchment Area

Area (ha)	0.073

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Company Address:		

Catchment Area (13) Type : Catchment Area

Area (ha)	0.049

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100

Catchment Area (14) Type : Catchment Area

Area (ha)	0.041

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100

Catchment Area (15) Type : Catchment Area

Area (ha)	0.017

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100

Catchment Area (16) Type : Catchment Area

Area (ha)	0.01

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (18)

Type : Catchment Area

Area (ha)	0.019

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (19)

Type : Catchment Area

Area (ha)	0.023

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (20)

Type : Catchment Area

Area (ha)	0.023

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (21)

Type : Catchment Area

Area (ha)	0.033

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (22)

Type : Catchment Area

Area (ha)	0.023

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (23)

Type : Catchment Area

Area (ha)	0.03

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (24)

Type : Catchment Area

Area (ha)	0.022

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (25)

Type : Catchment Area

Area (ha)	0.014

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (26)

Type : Catchment Area

Area (ha)	0.016

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (27)

Type : Catchment Area

Area (ha)	0.02

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (28)

Type : Catchment Area

Area (ha)	0.014

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (29)

Type : Catchment Area

Area (ha)	0.017

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (30)

Type : Catchment Area

Area (ha)	0.029

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (31)

Type : Catchment Area

Area (ha)	0.017

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (32)

Type : Catchment Area

Area (ha)	0.014

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (33)

Type : Catchment Area

Area (ha)	0.006

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (34)

Type : Catchment Area

Area (ha)	0.006

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (35)

Type : Catchment Area

Area (ha)	0.002

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (36)

Type : Catchment Area

Area (ha)	0.003

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (37)

Type : Catchment Area

Area (ha)	0.001

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Company Address:		



Catchment Area (39)

Type : Catchment Area

Area (ha)	0.008

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (40)

Type : Catchment Area

Area (ha)	0.009

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (41)

Type : Catchment Area

Area (ha)	0.017

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (42)

Type : Catchment Area

Area (ha)	0.014

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (43)

Type : Catchment Area

Area (ha)	0.005

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (44)

Type : Catchment Area

Area (ha)	0.005

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (45)

Type : Catchment Area

Area (ha)	0.006

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (46)

Type : Catchment Area

Area (ha)	0.01

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Company Address:		



Catchment Area (47)

Type : Catchment Area

Area (ha)	0.002

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (48)

Type : Catchment Area

Area (ha)	0.008

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (49)

Type : Catchment Area

Area (ha)	0.02

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (50)

Type : Catchment Area

Area (ha)	0.016

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	Company Address:		



Catchment Area (51)

Type : Catchment Area

Area (ha)	0.003

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100



Catchment Area (52)

Type : Catchment Area

Area (ha)	0.007

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	10
Percentage Impervious (%)	100

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address:		



Tank

Type : Tank

Dimensions

Exceedance Level (m)	59.600
Depth (m)	2.500
Base Level (m)	57.100
Freeboard (mm)	500
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	0.00
Total Volume (m³)	193.265

Depth (m)	Area (m²)	Volume (m³)
0.000	256.019	64.418
0.750	256.019	64.418

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Pipe (6)
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (8)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	23.027

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address:		



Tank (2)

Type : Tank

Dimensions

Exceedance Level (m)	58.800
Depth (m)	1.250
Base Level (m)	57.550
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	95
Average Slope (1:X)	0.00
Total Volume (m³)	220.850

Depth (m)	Area (m²)	Volume (m³)
0.000	290.00	0.000
0.800	290.00	220.400

Inlets

Outlets

Outlet

Outgoing Connection	Pipe (10)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	45.104

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Manhole Schedule Storm Phase: Phase	Company Address:		

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
SW1	58.500 56.850	Diameter / Length: 3.000					Manhole
E:382217.224 N:387211.439	1.650		{a} Pipe	Pipe	56.850	Diam/Width:750	Not Applicable
SW2	58.400 56.801	Diameter / Length: 3.000	{1} Pipe	Pipe	56.801	Diam/Width:750	Manhole
E:382231.932 N:387224.609	1.599		{a} Pipe (1)	Pipe	56.801	Diam/Width:750	Not Applicable
SW3	59.150 56.578	Diameter / Length: 3.000	{1} Pipe (1) (1) (1) (1) {2} Pipe (5)	Pipe Pipe	56.578 56.578	Diam/Width:750 Diam/Width:750	Manhole
E:382292.651 N:387159.925	2.572		{a} Pipe (2)	Pipe	56.578	Diam/Width:750	Not Applicable
SW4	59.700 56.472	Diameter / Length: 3.000	{1} Pipe (2) (1) {2} Pipe (7)	Pipe Pipe	56.472 56.472	Diam/Width:750 Diam/Width:750	Manhole
E:382321.520 N:387129.176	3.228		{a} Pipe (3)	Pipe	56.472	Diam/Width:450	Not Applicable
OUTFALL	59.500 56.424	Diameter / Length: 1.200	{1} Pipe (3)	Pipe	56.424	Diam/Width:450	Manhole
E:382324.089 N:387123.617	3.076						Not Applicable

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Manhole Schedule Storm Phase: Phase	Company Address:		

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
SW5	58.600 56.727	Diameter / Length: 3.000	{1} Pipe (1)	Pipe	56.727	Diam/Width:750	Manhole
E:382252.166 N:387203.054	1.873		{a} Pipe (1) (1)	Pipe	56.727	Diam/Width:750	Not Applicable
SW6	58.750 56.688	Diameter / Length: 3.000	{1} Pipe (1) (1) {2} Pipe (11)	Pipe Pipe	56.688 56.688	Diam/Width:750 Diam/Width:300	Manhole
E:382262.671 N:387191.862	2.062		{a} Pipe (1) (1) (1)	Pipe	56.688	Diam/Width:750	Not Applicable
SW7	59.100 56.605	Diameter / Length: 3.000	{1} Pipe (1) (1) (1)	Pipe	56.605	Diam/Width:750	Manhole
E:382285.270 N:387167.787	2.495		{a} Pipe (1) (1) (1) (1)	Pipe	56.605	Diam/Width:750	Not Applicable
SW8	59.250 56.642	Diameter / Length: 3.000					Manhole
E:382311.038 N:387177.610	2.608		{a} Pipe (5)	Pipe	56.642	Diam/Width:750	Not Applicable
SW9	59.550 56.505	Diameter / Length: 3.000	{1} Pipe (2) (2)	Pipe	56.505	Diam/Width:750	Manhole
E:382312.538 N:387138.743	3.045		{a} Pipe (2) (1)	Pipe	56.505	Diam/Width:750	Not Applicable

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Manhole Schedule Storm Phase: Phase	Company Address:		

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
SW10	59.450 56.528	Diameter / Length: 3.000	{1} Pipe (2)	Pipe	56.528	Diam/Width:750	Manhole
E:382306.405 N:387145.275	2.922		{a} Pipe (2) (2)	Pipe	56.528	Diam/Width:750	Not Applicable
SW11	59.600 57.200	Diameter / Length: 1.800					Manhole
E:382340.837 N:387147.760	2.400		{a} Pipe (6)	Pipe	57.200	Diam/Width:750	Not Applicable
SW12	59.600 56.600	Diameter / Length: 2.100	{1} Pipe (8)	Pipe	56.600	Diam/Width:750	Manhole
E:382325.751 N:387132.975	3.000		{a} Pipe (7)	Pipe	56.600	Diam/Width:750	Not Applicable
SW13	58.800 57.373	Diameter / Length: 1.200	{1} Pipe (10)	Pipe	57.373	Diam/Width:300	Manhole
E:382242.161 N:387173.349	1.427		{a} Pipe (11)	Pipe	57.373	Diam/Width:300	Not Applicable

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Title: Rainfall Analysis Criteria	Company Address:		

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FEH

Type: FEH

Site Location	GB 382517 387053 SJ 82517 87053
Rainfall Version	2022
Summer	☑
Winter	☑

Return Period

Return Period (years)	Increase Rainfall (%)
2.0	0.000
30.0	0.000
100.0	45.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW1	FEH: 2 years: +0 %: 240 mins: Winter	58.500	56.850	57.146	0.296	5.8	2.091	0.000	5.4	32.073	OK
SW2	FEH: 2 years: +0 %: 240 mins: Winter	58.400	56.801	57.145	0.345	6.8	2.437	0.000	5.6	36.631	OK
SW3	FEH: 2 years: +0 %: 240 mins: Winter	59.150	56.578	57.146	0.568	14.7	4.013	0.000	11.2	137.711	OK
SW4	FEH: 2 years: +0 %: 240 mins: Winter	59.700	56.472	57.146	0.674	13.0	4.762	0.000	8.7	159.126	Surcharged
OUTFALL	FEH: 2 years: +0 %: 15 mins: Summer	59.500	56.424	56.476	0.052	8.2	0.000	0.000	8.2	7.923	OK
SW5	FEH: 2 years: +0 %: 240 mins: Winter	58.600	56.727	57.145	0.419	6.4	2.960	0.000	4.2	39.605	OK
SW6	FEH: 2 years: +0 %: 240 mins: Winter	58.750	56.688	57.146	0.458	11.3	3.236	0.000	7.7	84.309	OK
SW7	FEH: 2 years: +0 %: 240 mins: Winter	59.100	56.605	57.146	0.541	10.5	3.822	0.000	7.3	89.923	OK
SW8	FEH: 2 years: +0 %: 240 mins: Winter	59.250	56.642	57.146	0.504	2.8	3.561	0.000	0.7	7.926	OK
SW9	FEH: 2 years: +0 %: 240 mins: Winter	59.550	56.505	57.146	0.641	11.9	4.529	0.000	11.4	132.471	OK
SW10	FEH: 2 years: +0 %: 240 mins: Winter	59.450	56.528	57.145	0.618	11.2	4.367	0.000	10.6	125.526	OK
SW11	FEH: 2 years: +0 %: 30 mins: Summer	59.600	57.200	57.236	0.036	6.2	0.093	0.000	6.1	5.394	OK
SW12	FEH: 2 years: +0 %: 240 mins: Winter	59.600	56.600	57.146	0.546	6.9	1.890	0.000	2.6	23.397	OK
SW13	FEH: 2 years: +0 %: 15 mins: Summer	58.800	57.373	57.373	0.000	0.0	0.000	0.000	0.0	0.000	OK

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		

FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW1	FEH: 30 years: +0 %: 240 mins: Winter	58.500	56.850	57.564	0.714	11.1	5.049	0.000	9.1	55.685	OK
SW2	FEH: 30 years: +0 %: 240 mins: Winter	58.400	56.801	57.564	0.763	11.9	5.396	0.000	8.0	55.025	Surcharged
SW3	FEH: 30 years: +0 %: 240 mins: Winter	59.150	56.578	57.564	0.986	39.3	6.972	0.000	36.5	222.792	Surcharged
SW4	FEH: 30 years: +0 %: 240 mins: Winter	59.700	56.472	57.564	1.092	42.5	7.722	0.000	8.7	298.381	Surcharged
OUTFALL	FEH: 30 years: +0 %: 15 mins: Summer	59.500	56.424	56.478	0.054	8.8	0.000	0.000	8.8	8.745	OK
SW5	FEH: 30 years: +0 %: 240 mins: Winter	58.600	56.727	57.564	0.837	9.8	5.919	0.000	4.6	52.001	Surcharged
SW6	FEH: 30 years: +0 %: 240 mins: Winter	58.750	56.688	57.564	0.876	22.1	6.195	0.000	16.7	131.799	Surcharged
SW7	FEH: 30 years: +0 %: 240 mins: Winter	59.100	56.605	57.564	0.959	23.4	6.782	0.000	19.6	138.584	Surcharged
SW8	FEH: 30 years: +0 %: 240 mins: Winter	59.250	56.642	57.564	0.922	5.1	6.520	0.000	2.7	11.256	Surcharged
SW9	FEH: 30 years: +0 %: 240 mins: Winter	59.550	56.505	57.564	1.059	38.3	7.489	0.000	36.4	214.031	Surcharged
SW10	FEH: 30 years: +0 %: 240 mins: Winter	59.450	56.528	57.564	1.036	36.5	7.325	0.000	33.3	200.584	Surcharged
SW11	FEH: 30 years: +0 %: 240 mins: Winter	59.600	57.200	57.564	0.364	3.7	0.927	0.000	3.7	20.611	OK
SW12	FEH: 30 years: +0 %: 240 mins: Winter	59.600	56.600	57.565	0.965	35.2	3.341	0.000	10.8	168.005	Surcharged
SW13	FEH: 30 years: +0 %: 240 mins: Winter	58.800	57.373	57.564	0.191	0.9	0.216	0.000	0.3	2.744	OK

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		

FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Resident Volume

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW1	FEH: 100 years: +45 %: 600 mins: Winter	58.500	56.850	58.421	1.571	10.2	11.102	0.000	9.4	131.201	Flood Risk
SW2	FEH: 100 years: +45 %: 600 mins: Winter	58.400	56.801	58.420	1.620	12.0	31.791	20.488	11.2	148.104	Flood
SW3	FEH: 100 years: +45 %: 600 mins: Winter	59.150	56.578	58.421	1.843	45.7	13.025	0.000	44.0	653.577	Surcharged
SW4	FEH: 100 years: +45 %: 600 mins: Winter	59.700	56.472	58.421	1.949	51.7	13.775	0.000	9.9	767.377	Surcharged
OUTFALL	FEH: 100 years: +45 %: 15 mins: Summer	59.500	56.424	56.474	0.050	7.4	0.000	0.000	7.4	10.443	OK
SW5	FEH: 100 years: +45 %: 600 mins: Winter	58.600	56.727	58.420	1.694	12.8	11.972	0.000	12.5	154.055	Flood Risk
SW6	FEH: 100 years: +45 %: 600 mins: Winter	58.750	56.688	58.421	1.733	42.0	12.248	0.000	22.5	613.258	Surcharged
SW7	FEH: 100 years: +45 %: 600 mins: Winter	59.100	56.605	58.421	1.816	28.6	12.835	0.000	27.0	486.638	Surcharged
SW8	FEH: 100 years: +45 %: 600 mins: Winter	59.250	56.642	58.421	1.779	3.9	12.574	0.000	3.3	37.811	Surcharged
SW9	FEH: 100 years: +45 %: 600 mins: Winter	59.550	56.505	58.421	1.916	47.5	13.541	0.000	46.1	634.025	Surcharged
SW10	FEH: 100 years: +45 %: 600 mins: Winter	59.450	56.528	58.420	1.893	44.0	13.378	0.000	42.6	583.061	Surcharged
SW11	FEH: 100 years: +45 %: 600 mins: Winter	59.600	57.200	58.421	1.221	3.4	3.107	0.000	3.0	42.657	Surcharged
SW12	FEH: 100 years: +45 %: 600 mins: Winter	59.600	56.600	58.421	1.821	42.9	6.307	0.000	7.0	244.160	Surcharged
SW13	FEH: 100 years: +45 %: 600 mins: Winter	58.800	57.373	58.420	1.048	41.5	1.185	0.000	8.7	410.122	Surcharged

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address:		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Tank	FEH: 2 years: +0 %: 240 mins: Winter	57.146	57.146	0.046	0.046	7.6	11.703	0.000	0.000	2.5	18.015	93.944	OK
Tank (2)	FEH: 2 years: +0 %: 15 mins: Summer	57.550	57.550	0.000	0.000	0.0	0.000	0.000	0.000	0.0	0.000	100.000	OK

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address:		

FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Tank	FEH: 30 years: +0 %: 240 mins: Winter	57.564	57.564	0.464	0.464	38.3	118.883	0.000	0.000	10.6	67.752	38.487	OK
Tank (2)	FEH: 30 years: +0 %: 360 mins: Winter	57.559	57.559	0.009	0.009	1.3	2.485	0.000	0.000	0.3	1.951	98.875	OK

Project:	Date: 22/09/2025		
	Designed by: TomRi	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address:		

FEH: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Tank	FEH: 100 years: +45 %: 600 mins: Winter	58.421	58.421	1.321	1.321	44.8	192.675	0.000	0.000	4.5	69.213	0.305	OK
Tank (2)	FEH: 100 years: +45 %: 600 mins: Winter	58.421	58.421	0.871	0.871	41.5	220.564	0.000	0.000	8.7	187.748	0.130	OK

Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

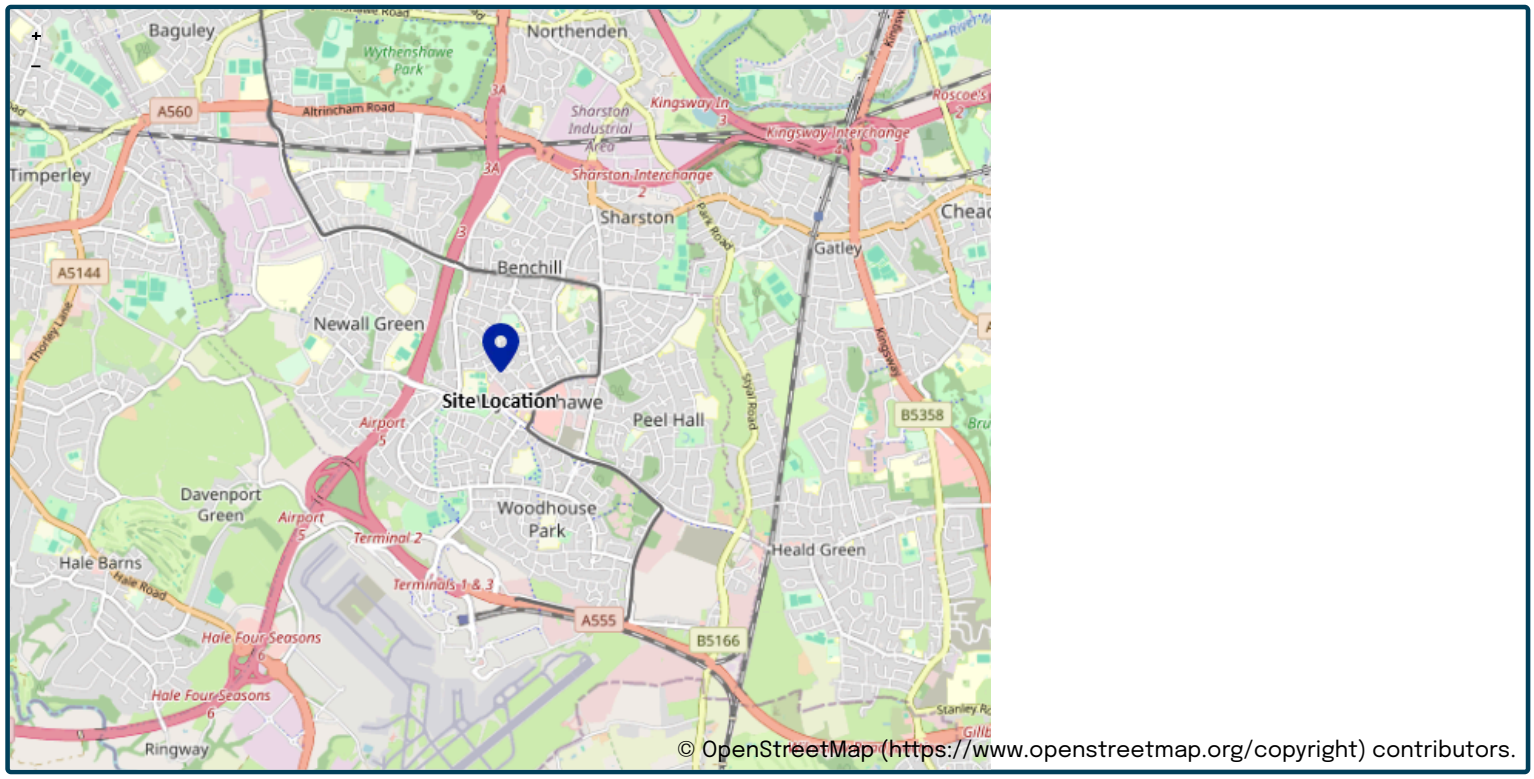
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	21/11/2025
Calculated by	Jack Lee
Reference	Brotherton - Plot 3.3
Model version	2.2.2

Location

Site name	Brotherton - Plot 3.3
Site location	



Site easting (British National Grid)	382280
Site northing (British National Grid)	387151

Site details

Total site area (ha)	1.75 ha

Greenfield runoff

Method

Method	IH124

IH124

	My value		Map value
SAAR (mm)	825 mm		825
How should SPR be derived?	WRAP soil type		
WRAP soil type	4		4
SPR	0.47		
QBar (IH124) (l/s)	10.2 l/s		

Growth curve factors

	My value		Map value
Hydrological region	10		10
1 year growth factor	0.87		
2 year growth factor	0.93		
10 year growth factor	1.38		
30 year growth factor	1.7		
100 year growth factor	2.08		
200 year growth factor	2.37		

Results

Method	IH124
Flow rate 1 year (l/s)	8.9 l/s
Flow rate 2 year (l/s)	9.5 l/s
Flow rate 10 years (l/s)	14.1 l/s
Flow rate 30 years (l/s)	17.4 l/s
Flow rate 100 years (l/s)	21.3 l/s
Flow rate 200 years (l/s)	24.3 l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.2) developed by HR Wallingford and available at uksuds.com (https://www.uksuds.com/). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Appendix D - Drainage Inspection & Maintenance Schedule

Wythenshawe Civic, Manchester – Plot C3.3 Brotherton

Drainage Inspection & Maintenance Schedule

November 2025

PREPARED FOR

Muse Places & Manchester City Council



Drainage Inspection & Maintenance Schedule

Prepared By	Jack Lee, MEng, CEng		
Reviewed By	Jack Lee, MEng, CEng		
Report Reference	18704-CIV-XX-XX-T-C-00002		
Issued	19.11.25		
Revisions			
Date	**Rev**	**Reason**	**Name**
		Initial Issue	Jack Lee, MEng, CEng

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1. Maintenance

The following document outlines the maintenance requirements for the project site. The responsibility of the required maintenance falls to multiple authorities, the below schedules set out which organisations are responsible for the various maintenance regimes.

Where elements of the drainage network are being proposed for adoption the Statutory Undertaken, United Utilities, have their own maintenance procedures and frequency. For further information on this refer to the Flood Risk Assessment and Drainage Strategy, 18704-CIV-XX-XX-T-C-0002.

1.1. General

This section is intended to give an overview of the operation and maintenance for the drainage features included with the drainage strategy and in relation to typical details. Where propriety products are specified, the manufacturer's instructions and recommendations should be followed in priority to this document unless specifically noted otherwise due to project constraints.

The recommended operations and frequencies are typical only and should be more frequent initially to ensure that there are no unforeseen issues with the operation and then adjusted to suit the site requirements.

The existing surface water network has been retained with additional SuDS features added to provide attenuation. It may be that the exceedance flows above the 1 in 30-year storm rainfall event are stored within the site partially above ground, on non-habitable external landscaping, parking, or other space. As the flows are being attenuated on site there will be a period after storm events where the network is still partially or fully surcharged and is draining down. Where this surcharging is still present after 48 hours appropriate action should be taken as noted in this section.

1.2. Components

The following components have been included within the drainage design for the proposed development:

- Inspection and manhole chambers
- Catchpits
- Pipes
- Drainage channels and gullies
- Vortex Flow Control
- Cellular Attenuation Tank

The proposed locations of the components are indicated on Civic Engineers drawings:

- 18704-CIV-XX-XX-D-C-30001

Table 1 below shows the maintenance responsibilities of the various components.

Table 1 - Maintenance Responsibility

Component	Maintenance responsibility
Private inspection chambers and manholes (internal)	Maintenance company
Private inspection chambers and manholes (external)	Maintenance company
Pipes (internal)	Maintenance company
Pipes (external)	Maintenance company
Drainage channels and plot gullies	Maintenance company
Vortex Flow Control	Maintenance company
Cellular Attenuation Tank	Maintenance company

A suitable maintenance strategy should be adopted to ensure the drainage network is cleaned regularly and the routine maintenance and cleansing regime should be documented.

A copy of the final construction drainage layout should be provided in the final operations and maintenance manual.

It is recommended that the drainage system is inspected as a minimum twice a year, with the system also being inspected after any major storm event.

Significant sediment deposition is likely in areas used for storage, so a post clean-up operation may be required including the removal of litter, vegetation, sewerage debris and larger objects, and should be disposed of appropriately.

Long-term management practices include monthly sweeping of external paved areas. The sweeping program will remove sand and contaminants directly from paved surfaces before they become mobilised during storm events and transported to the drainage system. Sand and silt must not be disposed of into the drainage network.

During the winter months, drainage features such as channels should be cleared of ice, snow, debris, or litter.

Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the upstream/downstream catchpits.

1.3. Inspection and Manhole Chambers

Access points have been located at the head of each run, at a change in direction and at a change of pipe size in accordance with building Regulations Part H.

The appropriate health and safety equipment must be used when accessing manholes. Confined space certificates must be held by any personnel entering a manhole and the appropriate permits should be obtained from the maintenance manager prior to any access. Double locked and sealed manholes must be sealed and locked correctly post maintenance operation.

1.4. Pipes

Pipes are proprietary products, and the materials can vary across the site and as such where used the manufacture's recommendations should be followed. Regardless of the product used the pipes will be fully compliant with Civic Engineers drainage specification.

Pipes are intended to be the main conveyance across the development and where oversized they form the attenuation volume required by the limitation of the drainage rate. They are intended to be dry except for during rainfall events. Pipes which are proposed simply to convey water around the site have been designed such that they are considered to be self-cleansing. Where the primary function of the pipe/tank is to provide attenuation and the pipes are therefore oversized the velocity of water in

the pipe may drop below 0.75m/s, which is considered to be self-cleansing. For larger diameter pipes the risk is reduced due to the overall pipe size, however these pipes should be inspected for sediment build up.

Access for maintenance is provided through access chambers and manholes.

Regular inspection and maintenance are important to identify areas which may have been obstructed/clogged and may not drain correctly thus exposing the development to a greater level of flood risk.

Table 2 below shows the maintenance schedule for pipes, the actions required and the frequency of which these actions need to be undertaken.

Table 2 - Maintenance Schedule for Pipes

Maintenance schedule	Required action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial inspection should be provided as post construction CCTV survey.	N/A
Regular maintenance/inspection	Inspect for evidence of poor operation via water level in chambers. If required, take remedial action.	3-monthly, 48 hours after large storms.
	Check and remove large vegetation growth near pipe runs.	Monthly or as required.
Remedial action	Rod through poorly performing runs as initial remediation.	As required
	If continued poor performance jet and CCTV survey poorly performing runs.	As required
	Seek advice as to remediation techniques suitable for the type of performance issue and location.	As required if above does not improve performance.

1.5. Drainage Channels and Gullies

Channels and gullies should be inspected and cleaned in accordance with the manufacturer's details. Channel units can be cleaned using high-pressure hose; this can be fed into the channel system through access units strategically placed along the channel run. The throat section of channel units should be kept clear at all times to ensure uninterrupted flow of surface water into the drainage channel and any debris within the throat should be removed.

Locking bolts should be replaced and sufficiently tightened, taking care that the bolt heads do not stand above the top surface of the cover or grate. If covers can move within their frame, this may cause damage to the frame or seating.

Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the car park channels.

Below, Table 3 shows the maintenance schedule for drainage channels and gullies, the actions required and the frequency of which these actions need to be undertaken.

Table 3 - Maintenance Schedule for Drainage Channels and Gullies

Maintenance schedule	Required action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial inspection including channel outlet boxes.	Half yearly and after large storms.
Regular maintenance/inspection	Litter and debris removal	Monthly or as required.
	Check and remove large vegetation growth near channel runs.	Monthly or as required.
	Inspect for evidence of poor operation and/or weed growth. If required, take remedial action. Inspect silt accumulation rates and establish appropriate brushing frequencies. Silt can also be caused by adjacent landscaping areas which should be reprofiled to provide a flat area or berm adjacent to the paving	3-monthly, 48 hours after large storms.
Remedial action	Inspect access/outlet boxes and rod through poorly performing channels and outlets as initial remediation.	As required.

1.6. Vortex Flow Control

The proposed proprietary Vortex Flow Control should be inspected and cleaned in accordance with the manufacturer's recommendations.

Locking bolts should be replaced and sufficiently tightened, taking care that the bolt heads do not stand above the top surface of the cover or grate. If covers can move within their frame, this may cause damage to the frame or seating.

Sediment/material removal should be undertaken in accordance with the manufacturers recommended protocols.

Below, Table 4 shows the maintenance schedule for drainage Hydrodynamic Vortex Separator, the actions required and the frequency of which these actions need to be undertaken.

Table 4 - Maintenance Schedule for Vortex Flow Control

Maintenance schedule	Required action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial inspection of chamber.	Half yearly and after large storms.
Regular maintenance/inspection	Litter and debris removal	Monthly or as required.
Remedial action	Inspect chamber and rod through outlets as initial remediation. Manufacturers advice to be sought if blockage issues persist	As required.

1.7. Cellular Attenuation Tank

The proposed proprietary Cellular Attenuation Tank should be inspected and cleaned in accordance with the manufacturer's recommendations.

Maintenance requirements include Regular inspection of silt traps, and air vents and connected chambers with removal of sediment and debris as required.

Below, Table 5 shows the maintenance schedule for drainage Hydrodynamic Vortex Separator, the actions required and the frequency of which these actions need to be undertaken.

Table 5 - Maintenance Schedule for Cellular Attenuation Tank

Maintenance schedule	Required action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial inspection of chambers connected to tank.	Half yearly and after large storms.
Regular maintenance/inspection	Litter and debris removal	Monthly or as required.
Remedial action	Inspect chamber and rod through as initial remediation. Manufacturers advice to be sought if blockage issues persist	As required.

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