

Teledata – MAN2

**Flood Risk Assessment and
Sustainable Drainage
Strategy (SuDS) Report**

- **For Planning**

Job Number: 23042

Reference: 23042-LON-ZZ-XX-RP-C-0001

Revision: P01

Date: 14th June 2023

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Document Control

Remarks		Flood Risk Assessment and Drainage Strategy Report						Date
Rev	P01	Prepared	YW	Checked	AS	Approved	KL	14.06.2023

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1. Introduction

- 1.1 Lyons O'Neill have been commissioned by the client to prepare a site-specific Flood Risk Assessment and Sustainable Drainage Strategy (SuDS) report in support of a full planning application for a new data centre in Wythenshaw Town Centre, Manchester.
- 1.2 The government flood map for planning <https://flood-map-for-planning.service.gov.uk/> indicates that the site is in Flood Zone 1 (low probability).

2. Site Description

2.1 Site Location

- 2.1.1 The application site has an area of 7572.01m² and is located on the corner of Wavell Road and Brownley Road in Wythenshaw (See Figure 1 – Site Location Plan). It consists of Simon House, vacant two storey flat roof building surrounded by parking and hard standing and the site of the existing 8 storey Delta House.
- 2.1.2 The site is to the east of the town centre, within an industrial/commercial park. The surrounding area is largely commercial in nature. Brownley Road establishes a boundary for this and residential properties to the east. Immediately adjacent Simon House is Delta House the existing data centre operated by the applicants, which is an 8 storey building designed in a three-pronged star shape.

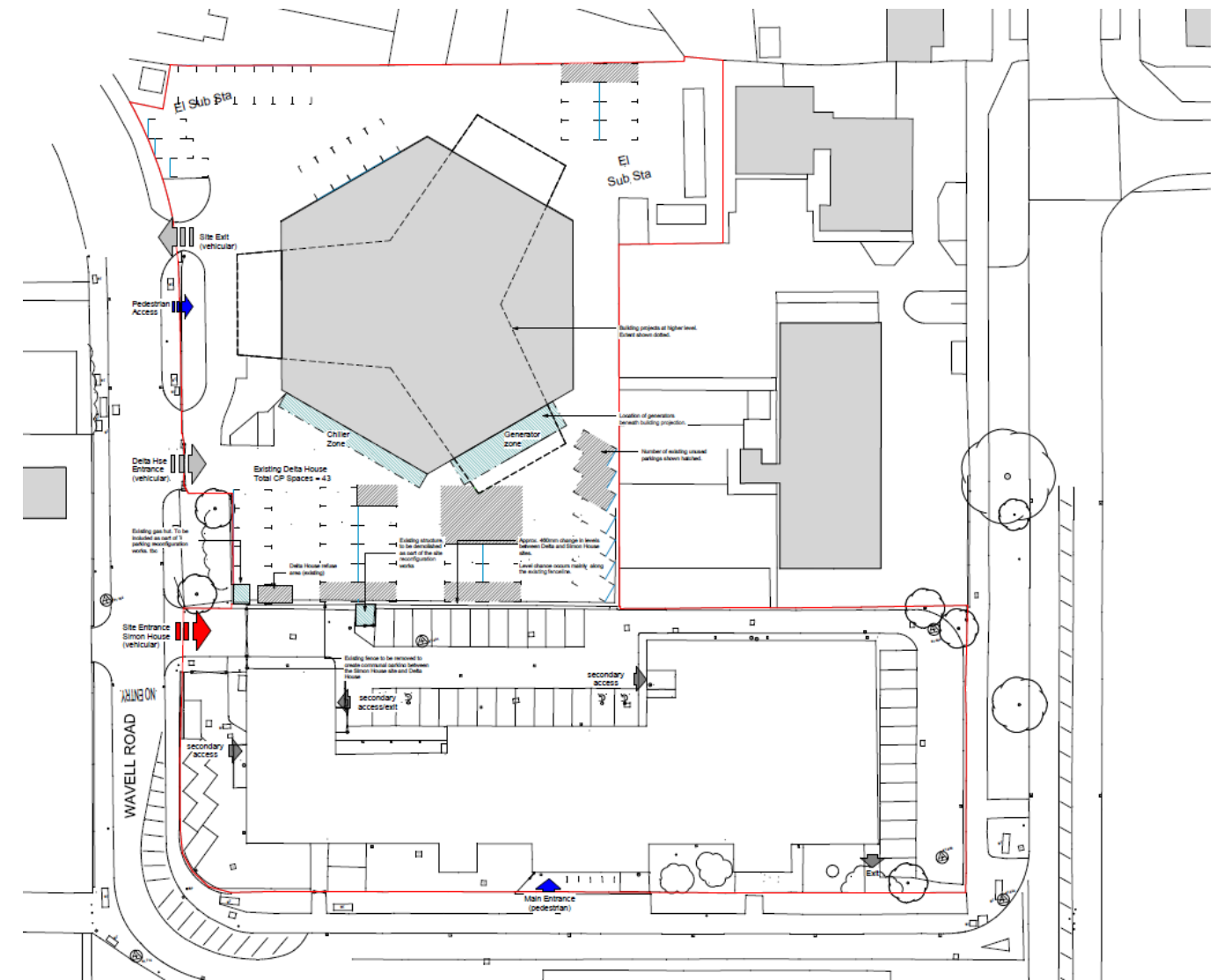


Figure 1- Site Location Plan

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2.2 Existing Development

- 2.2.1 The existing building currently benefits from planning permission for the change of use from its existing commercial use (Use Class E) to a mixed use data centre and offices (Sui Generis) (Reference 132638/FO/2022). This gives approximately 1,007 sqm of data centre floorspace. The acquisition of Teledata brings with it the opportunity for the new facility which was previously not an option.
- 2.2.2 The existing building does not provide enough floor space and the comprehensive development delivers a more operationally efficient building with substantively improved sustainability and energy credentials. There is a need for additional capacity to meet the demands of colocation and cloud hosting customers looking for a Manchester presence. The new facility in conjunction with Delta House will deliver a data centre 'campus', which will be a focus for such technology and a catalyst for further investment into the region.

2.3 Proposed Development

- 2.3.1 The proposed building will comprise will house a large data hall and cooling corridor across both the ground and first floor levels along with other various elements including electrical plant rooms, storage rooms, a reception area, ancillary offices for casual use and WCs. The proposals include no.3 emergency standby generators at ground floor and a chiller deck above.
- 2.3.2 The site currently has no landscaping, and the proposals includes boundary treatment with the introduction of planting and trees.
- 2.3.3 A copy of the proposed architect layout ground floor plan is included in the Appendix A of this report.

3. Planning Policy

3.1 National Planning Policy Framework (NPPF) – July 2021

- 3.1.1 The National Planning Policy Framework (NPPF) was revised on 20 July 2021 and sets out the government's planning policies for England and how these are expected to be applied. This revised NPPF is supported by the Planning Practice Guidance (PPG), an online resource published in 2016. The PPG supersedes the PPS25 Practice Guide and the Technical Guidance to the National Planning Policy, as detailed in the Ministerial Statement 'Making the planning system work more efficiently and effectively.
- 3.1.2 The NPPF and PPG must be taken into account in the preparation of local and neighbourhood plans, and are a material consideration in planning decisions. They constitute guidance for local planning authorities (LPAs) and decision-takers, both in drawing up plans and as a material consideration in determining applications.
- 3.1.3 The NPPF and PPG recommend that Local Plans should be supported by a SFRA and develop policies to manage flood risk from all sources, taking account of advice from the EA and other relevant flood risk management bodies, such as LLFAs and Internal Drainage Boards (IDBs). Paragraph 161 of the NPPF states *"All plans should apply a sequential, risk-based approach to the location of development – taking into account the current and future implications of climate change – so to avoid, where possible, flood risk to people and property, they should do this, and manage any residual risk, by:*
- *Applying the Sequential Test and then, if necessary, the Exception Test as set out below;*
 - *Safeguarding land from development that is required, or likely to be required, for current and future flood management;*
 - *Using opportunities provided by new development and improvements in green and other infrastructure to reduce the causes and impacts of flooding, (making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management); and*
 - *Where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations".*

3.2 Local Planning Policy – Manchester's Local Development Framework Core Strategy Development Plan Document

Policy EN 14: Flood Risk

- *In line with the risk-based sequential approach contained within PPS25, development should be directed away from sites at the greatest risk of flooding, and towards sites with little or no risk of flooding; this should take account of all sources of flooding identified in the Manchester-Salford-Trafford Strategic Flood Risk Assessment (SFRA).*
- *In addition to the requirements for site-specific Flood Risk Assessments (FRAs) set out in PPS25, an appropriate FRA will also be required for all development proposals, including changes of use, on sites greater than 0.5ha within Critical Drainage Areas (CDAs) and Canal Hazard Zones identified in the SFRA.*
- *All new development should minimise surface water run-off, including through Sustainable Drainage Systems (SUDS) and the appropriate use of Green Infrastructure. Developers should have regard to the surface water run-off rates in the SFRA User Guide. In CDAs, evidence to justify the surface water run-off approach / rates will be required.*
- *The City of Manchester contains many sections of rivers which are culverted or 'hidden'; where these are indicated in the SFRA beneath the proposed development site, further investigation will be required and the development proposal should take this into account; where feasible and appropriate development should seek to open up culverted/hidden rivers to reduce the associated flood risk and danger of collapse, taking advantage of opportunities to enhance biodiversity and Green Infrastructure.*

3.3 Strategic Documents

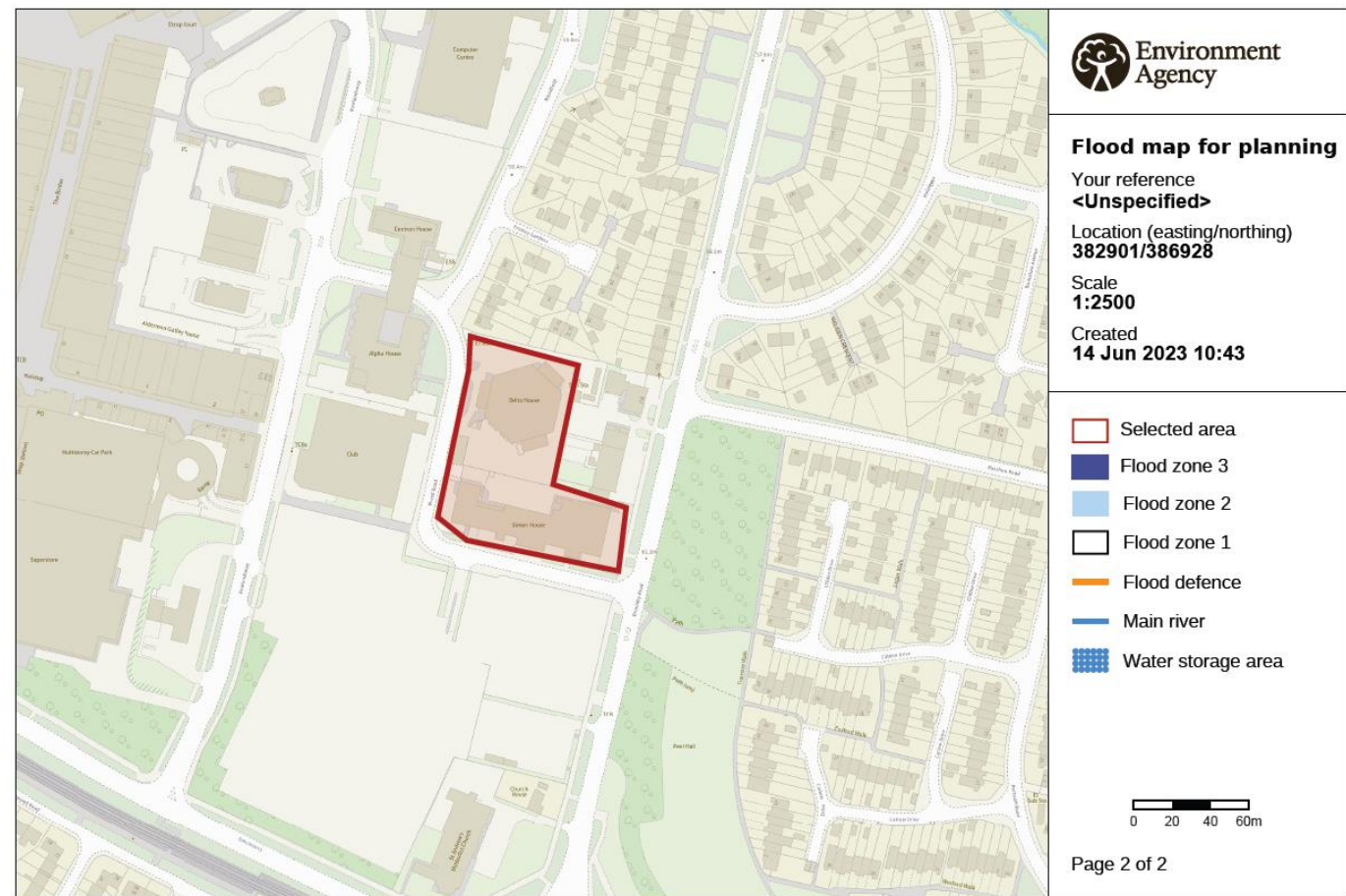
3.3.1 The following strategic documents were used to inform the report's findings:

- Manchester's Local Development Framework Core Strategy Development Plan Document (adopted 11th July 2012)
- Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA Level 1 SFRA (March 2010)
- Manchester City Council Local Flood Risk Management Plan March 2014
- National Planning Policy Framework (latest version: July 2021)
- Defra non-statutory technical standards for sustainable drainage systems (March 2015)
- CIRIA – The SuDS Manual (C753), December 2015
- CIRIA – Development and Flood Risk Guidance for Construction Industry (C624), 2004
- Building Regulations 2010 – Approved Document Part H (Drainage and waste disposal)
- BS8582 – Code of practice for surface water management for development sites

4. Assessment Methodology

4.1 Introduction

4.1.1 The latest online Environmental Agency flood zone map for planning shows that the site is in Flood Zone 1, an area with a low probability of flooding. See Figure 2 below:



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Figure 2 – Flood Zone Map for Planning (source: <https://flood-map-for-planning.service.gov.uk/confirm-location?easting=482197&northing=100971>)

4.2 Flood Risk Vulnerability Classification

4.2.1 The PPG provides the flood risk vulnerability classification for the development in both the existing and proposed cases. These classifications are essential infrastructure, highly vulnerable, more vulnerable, less vulnerable and water compatible development.

4.2.2 The proposal is to have a new data centre in Flood Zone 1. In PPG, data centres are classed as “Less Vulnerable”. See Table 1 below from the National Planning Practice

Guidance (NPPG) defined the flood risk vulnerability classification for “Less Vulnerable” developments.

Less vulnerable

- Police, ambulance and fire stations which are not required to be operational during flooding.
- Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the ‘more vulnerable’ class; and assembly and leisure.
- Land and buildings used for agriculture and forestry.
- Waste treatment (except landfill* and hazardous waste facilities).
- Minerals working and processing (except for sand and gravel working).
- Water treatment works which do not need to remain operational during times of flood.
- Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.
- Car parks.

Table 1 - Flood Risk Vulnerability Classification
(Source: <https://www.gov.uk/guidance/flood-risk-and-coastal-change>)

4.2.3 Following EA food fisk vulnerability and flood zone compatibility (see Table 2 below), our site is classed as a *permitted* development.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓ *

Key:
✓ Exception test is not required
X Development should not be permitted

Table 2 - Flood Risk Vulnerability Classification
(Source: <https://www.gov.uk/guidance/flood-risk-and-coastal-change>)

4.3 Sequential and Exception Tests

- 4.3.1 As set out in the NPPF, the aim of the sequential test is to steer new development to areas with the lowest probability of flooding.
- 4.3.2 As our development is in Flood Zone 1, both sequential and exception tests are passed by default.

4.4 Climate Change Allowances

- 4.4.1 The recent “Flood Risk Assessment: Climate Change Allowance Guidance” published by the EA indicates that climate change is currently expected to result in increased peak rainfall and rising sea level.

Table 3 shows anticipated changes in extreme rainfall intensity for East Hampshire catchment area where our site is located. 50 years is appropriate design life for our proposed development. Both 1% and 3.3% annual exceedance probabaility will be assessed in the report.

Upper Mersey Management Catchment peak rainfall allowances

3.3% annual exceedance rainfall event

Epoch	Central allowance	Upper end allowance
2050s	20%	35%
2070s	30%	40%

1% annual exceedance rainfall event

Epoch	Central allowance	Upper end allowance
2050s	25%	40%
2070s	30%	45%

*Use '2050s' for development with a lifetime up 2060 and use the 2070s epoch for development with a lifetime between 2061 and 2125.

This map contains information generated by Met Office Hadley Centre (2019): UKCP Local Projections on a 5km grid over the UK for 1980-2080. Centre for Environmental Data Analysis, 2022

Table 3 - Peak rainfall intensity allowance in small catchments (less than 5km2) or urban drainage catchments (Source: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>)

- 4.4.2 The “Flood Risk Assessment: Climate Change Allowance Guidance” published by the EA indicates that climate change is currently expected to result in increased peak rainfall and rising sea level. Table 4 shows anticipated changes in extreme rainfall intensity in small and urban catchments within England. 100 years is appropriate design life for the proposed development corresponds to the “2080s” and 40% in rainfall intensity allowance has been considered when developing the surface water drainage strategy.

Applies across all of England	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)
Upper end	10%	20%	40%
Central	5%	10%	20%

Table 4 - Peak rainfall intensity allowance in small catchments (less than 5km2) or urban drainage catchments (Source: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>)

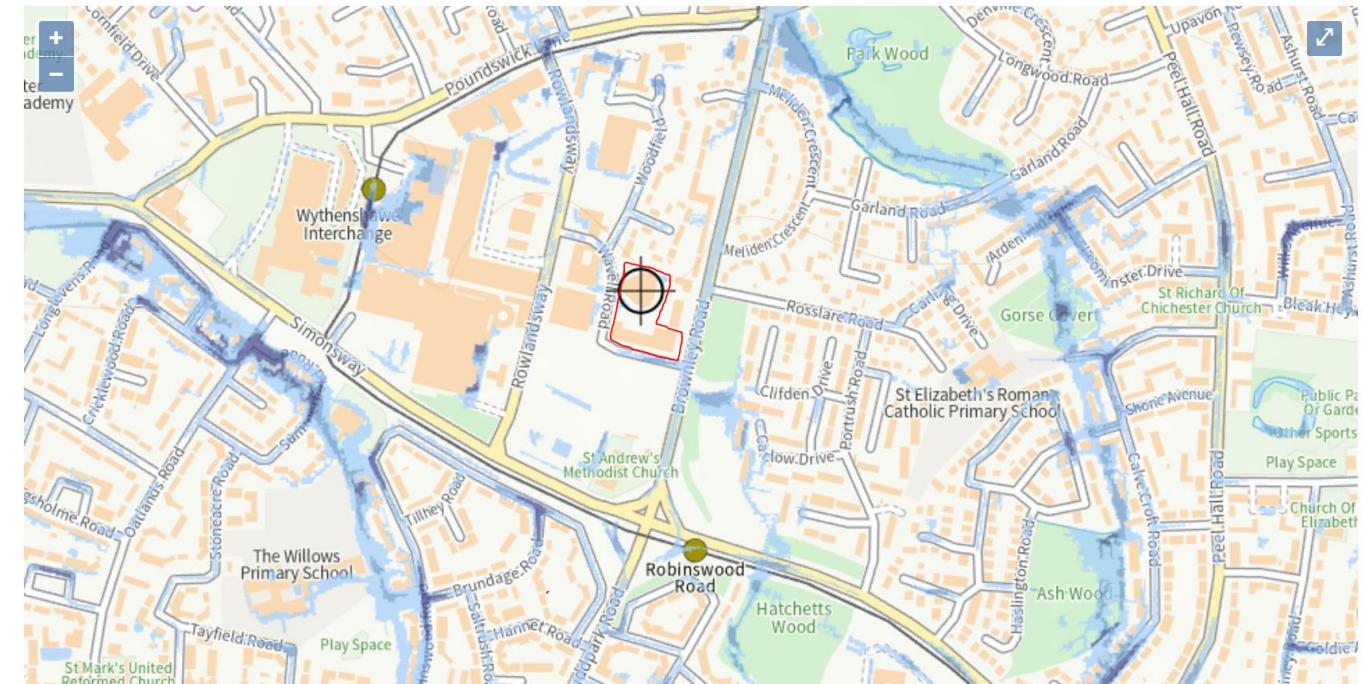
5. Flood Risk

5.1 Flooding from River and Sea (Fluvial/Tidal Flooding)

- 5.1.1 The CIRIA Report C624 defines fluvial flooding as *“Flooding from rivers, streams and other inland natural watercourses is usually caused by prolonged or intense rainfall, generating high rates of runoff which overwhelm the capacity of the river or channel to transmit the water downstream.”*
- 5.1.2 The CIRIA Report C624 defines tidal flooding (also known as coastal flooding) is *“caused by high tides and extreme weather conditions.”*
- 5.1.3 Manchester City SFRA indicates that our site had no historic flooding incidents, and the site is within Flood Zone 1. Therefore, the risk of flooding from river and sea is low.

5.2 Flooding from Surface Water (Pluvial)

- 5.2.1 Historic surface water sewer systems were typically designed to standards as low as a 1 in 2 year return period. As a result, high intensity rainfall in developed areas is unable to drain to the sewers and flows overland following the topography. This is known as surface water or pluvial flooding.
- 5.2.2 The EA long term surface water flood risk map shows our site is at very low risk of surface water flooding (see Figure 3 below).
- 5.2.3 Furthermore, our sites surface levels (See Appendix B – Topographical Survey) are higher than adjacent areas and more soft landscape areas are proposed for the site. Therefore, the risk of flooding from surface water is low.
- 5.2.4 Although the site has a low surface water flooding risk, sustainable drainage features should still be proposed to reduce flooding risk at downstream. This is discussed in detail in Section 7 below.



Extent of flooding from surface water

● High ● Medium ● Low ○ Very low ⊕ Location you selected

Figure 3 – EA long term flood map: Pluvial (source: www.gov.uk)

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5.3 Flooding from Groundwater

- 5.3.1 Groundwater flooding occurs when the water table rises above ground elevations. It is most likely to happen in low lying areas underlain by permeable geology. This may be regional scale chalk or sandstone aquifers, or localised deposits of sands and gravels underlain by less permeable strata such as that in a river valley.
- 5.3.2 British Geological Survey (BGS) mapping identifies the underlying bedrock geology to be comprised of Bollin Mudstone Member - Mudstone and superficial deposits to be comprised of Till Devensian – Diamicton.
- 5.3.3 According to Great Manchester sub-regional SFRA there are no known report of groundwater flooding in the Manchester, Trafford and Salford authorities. Therefore, the risk of groundwater flooding is low.

5.4 Flooding for Sewers

- 5.4.1 Sewer flooding can occur when the capacity of the infrastructure is exceeded by excessive flows, or as a result of a reduction in capacity due to collapse or blockage, or if the downstream system becomes surcharged. This can lead to the sewers flooding onto the surrounding ground via manholes and gullies, which can generate overland flows.
- 5.4.2 According to the Manchester SFRA, our site is not within the area of sewer flooding, and no historic sewer flooding occurs on our site. Therefore, the risk of sewer flooding is low.

5.5 Flooding from Artificial Sources

- 5.5.1 Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain water in times of flood. Although unlikely, reservoirs and large waterbodies could overtop or breach leading to rapid inundation of the downstream floodplain.
- 5.5.2 Reservoirs in the UK have an extremely good safety record. The EA is the enforcement authority for the Reservoirs Act 175 in England and Wales. All large reservoirs must be inspected and supervised by reservoir panel engineers.
- 5.5.3 The EA Long Term Flood Map (Figure 4) shows the site is not in a risk of reservoir flooding.

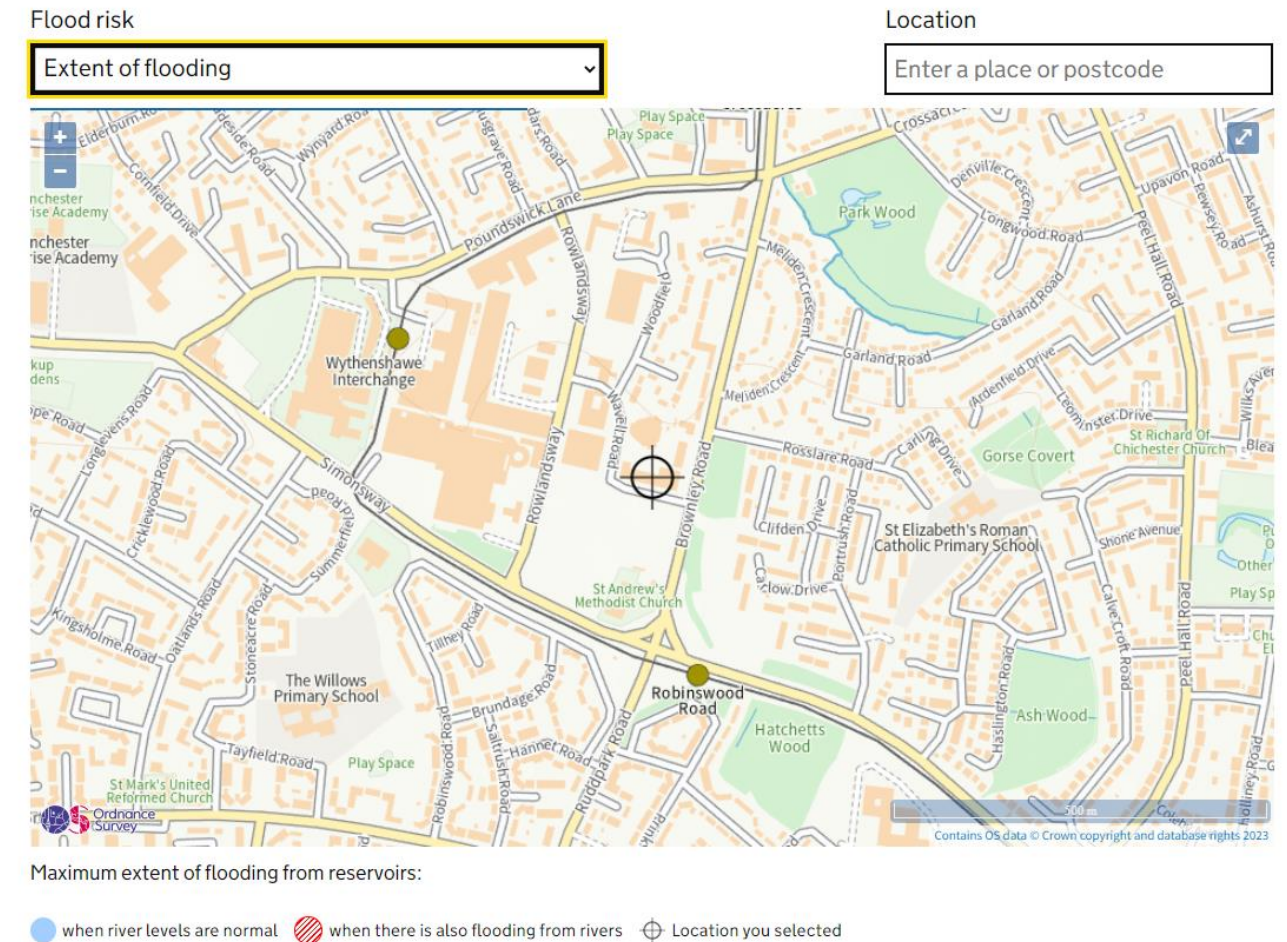


Figure 4 – EA long term flood map: Reservoir (source: www.gov.uk)

5.5.4 Therefore, the risk of artificial flooding is considered to be very low.

6. Existing Drainage

6.1 Existing Private Drainage

6.1.1 In February 2023, a topographical survey was carried out by JLP Surveying for the site. The survey has identified a number of existing manholes are located within the site boundary to serve existing building. Further CCTV drainage survey will be carried out post planning to confirm existing drainage routes and conditions.

6.1.2 Based on United Utilities sewer record (See Figure 5 below, extracted from Appendix C) and topographical survey information (Appendix B), manhole MH8903 is the closest existing manhole to be reused in the proposed drainage strategy.

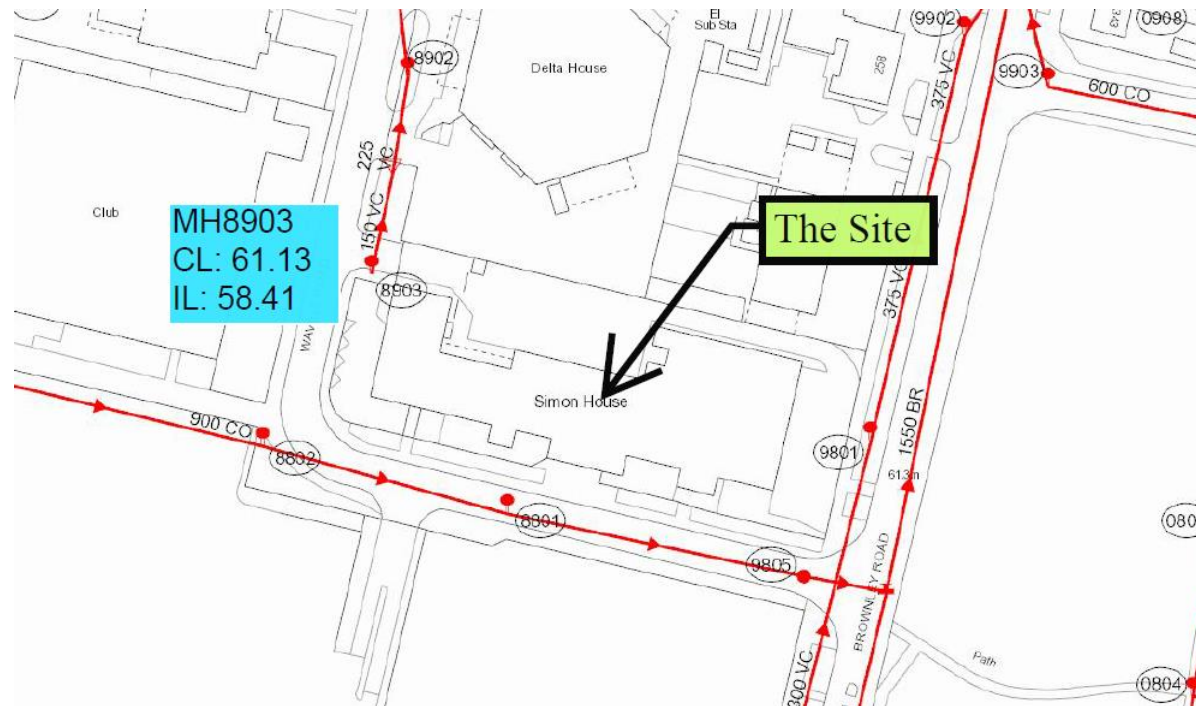


Figure 5 – United Utilities Asset Record

6.2 Greenfield Runoff Rates

6.2.1 Greenfield runoff rates for the site have been estimated from the www.uksuds.com website using IH124 method. Table 5 below shows the Greenfield runoff rates for the site. A copy of the greenfield runoff calculation is included in the Appendix D of this report.

Return Period	Greenfield Runoff Rates (l/s)
1 in 1 year	3.85
Qbar	4.42
1 in 30 year	7.52
1 in 100 year	9.20

Table 5 – Greenfield Runoff Rates

6.3 Existing Surface Water Discharge

6.2.1 The existing surface water runoff rates have been calculated in accordance with the Modified Rational Method. See Table 6 below summary of the existing surface water discharge rates.

Return Period	Existing Runoff Rates (l/s)
1 in 1 year	57.49
1 in 30 year	140.69
1 in 100 year	181.75

Table 6 – Existing surface water discharge rate

6.2.2 A copy of the existing surface water flow rate calculation is included in the Appendix E of this report.

7. Proposed Drainage Strategy

7.1 Surface Water Drainage Hierarchy

7.1.1 The proposed drainage strategy for the design of the surface water system should in line with surface water drainage hierarchy below:

- *to ground*
- *to a surface water body*
- *to a surface water sewer, highway drain, or another drainage system,*
- *to a combined sewer where there are absolutely no other options, and only where agreed in advance with the relevant sewerage undertaker.*

1) *to ground*

BGS online borehole records indicate the superficial till deposit are clay-dominated with thickness ranging from 0m to 2.8mbgl. The underlying bedrock comprised predominantly mudstone and siltstones. Therefore, infiltration is not feasible for our site. Further infiltration tests will be carried out post planning to verify the ground conditions.

2) *to a surface water body*

There is no existing surface water body in the vicinity of the site.

3) *to a surface water sewer, highway drain, or another drainage system*

There is no existing surface water sewer in the vicinity of the site

4) *to a combined sewer where there are absolutely no other options, and only where agreed in advance with the relevant sewerage undertaker.*

Discharge into a combined sewer is the only option.

7.2 Sustainable Urban Drainage Systems (SuDS)

7.2.1 SuDS will be used where practicable and viable throughout the site to provide source control management, improve water quality, reduce flood risk and provide amenity and biodiversity.

7.2.2 A variety of SuDS have been considered for the site to aid in the capture of surface water. An analysis of the suitability of each of these systems for the site is described below.

Rainwater Harvesting

Rainwater harvesting tanks are used to store surface water for later reuse either for irrigation purposes or for flushing of toilets. This water is taken directly from the roof and not paving areas to ensure that pollution of water is kept to a minimum. An overflow from the rainwater tank is required to connect to the surface water drainage system to allow for surplus water to be disposed of.

A rainwater harvesting tank is a feasible option to help to reuse surface water runoff to flush toilet. Further investigations need to be carried out during design phase.

Green Roofs

Green roofs aid with slowing down the runoff from the site and in dry periods capturing the first few millimetres of rain that falls. They will also help clean any water prior to it discharging off site. Blue roofs store rainwater at high level prior to discharge to the below ground drainage system.

Green roof is not feasible as the proposed roof is a curved roof.

Soakaways

Soakaway systems are reliant on infiltration into the ground to drain surface water. The feasibility of infiltrating surface water into the ground is reliant on the hydrogeology of the site.

A soakaway system is not feasible as the site is not suitable for infiltration.

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Attenuation Basins/Ponds

Attenuation basins and ponds typically rely on infiltration into the ground to drain surface water. They can also be used to store large volumes of rainwater which can then be drained away from the site in a controlled manner using a flow restriction device.

An attenuation basin is not feasible as the site is an industrial site and not suitable for infiltration.

Swales & Filter Drains

As with soakaways, swales and filter drains rely on infiltration into the ground to drain surface water and as such they are not suitable on their own as a solution to drain surface water from the site. Both swales and filter drains can be used to clean water and enhance water quality if they are positively drained at their base. Filter drains rely on being located within natural ground and not above any basement areas or immediately adjacent to structures.

Shallow swales (with open grade aggregates and perforated pipes) are proposed at the rear of the building to convey surface water runoff from external hard-surfacing areas.

Permeable Paving / Porous surface

Permeable paving / porous surface allows water to soak through the surface course into a clean washed stone below for storage before either infiltrating into the ground or discharging into perforated drains set beneath the stone layers. The depth of this paving construction is typically 350-450mm in depth to allow for storage in the stone layers.

Permeable paving are proposed in the car park to provide water treatment for petrol spillage.

7.3 Proposed Surface Water Drainage Strategy

7.3.1 SuDS will be used where practicable and viable throughout the site to provide source control management, improve water quality, reduce flood risk and provide amenity and biodiversity.

7.3.2 In practice the proposed drainage strategy will aim to manage surface water runoff from the source via a range of measures, which are expected to comprise:

- A below ground attenuation tank (size: 215m³) is proposed to attenuate surface water runoff. A hydrobrake manhole is proposed at downstream to limit surface water runoff to 2.07 l/s (Q_{bar}) into the existing combined manhole 8903 via gravity.
- Swales are proposed at the rear of the data centre to convey surface water runoff from external hard-surfacing areas

7.3.3 Table 7 below shows our proposed surface water discharge rates compared to greenfield runoff rates and existing surface water discharge rate.

Return Period	Greenfield Runoff Rates(l/s)	Existing discharge rates (l/s)	Proposed maximum discharge rates (l/s)
1 year	3.85	57.49	2.07
Q _{bar}	4.42	n/a	
30 year	7.52	140.69	
100 year	9.20	181.75	

Table 7 – Comparison between Greenfield, Existing and Proposed Discharge Rates

7.3.4 In order to achieve 2.07 l/s discharge rate, an approx. attenuation volume of 215m³ is required to ensure no flooding for all storm events up to 1 in 100 years + 40% climate change. A copy of the hydraulic calculations is included in the Appendix F of this report.

The attenuation volume will be provided in a combination of open-grade aggregate sub-base layer underneath the permeable paving and below ground attenuation tank. runoff.

7.3.5 A proposed drainage plan is included in the Appendix G of this report.

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7.4 Drainage Components and SuDS Maintenance

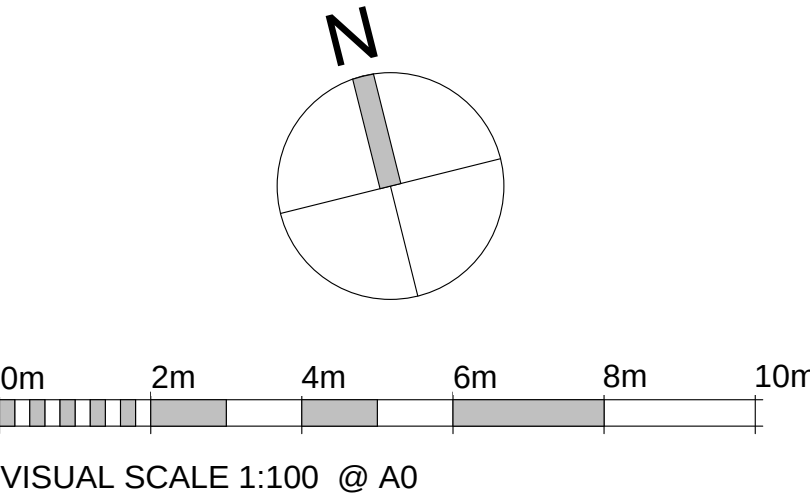
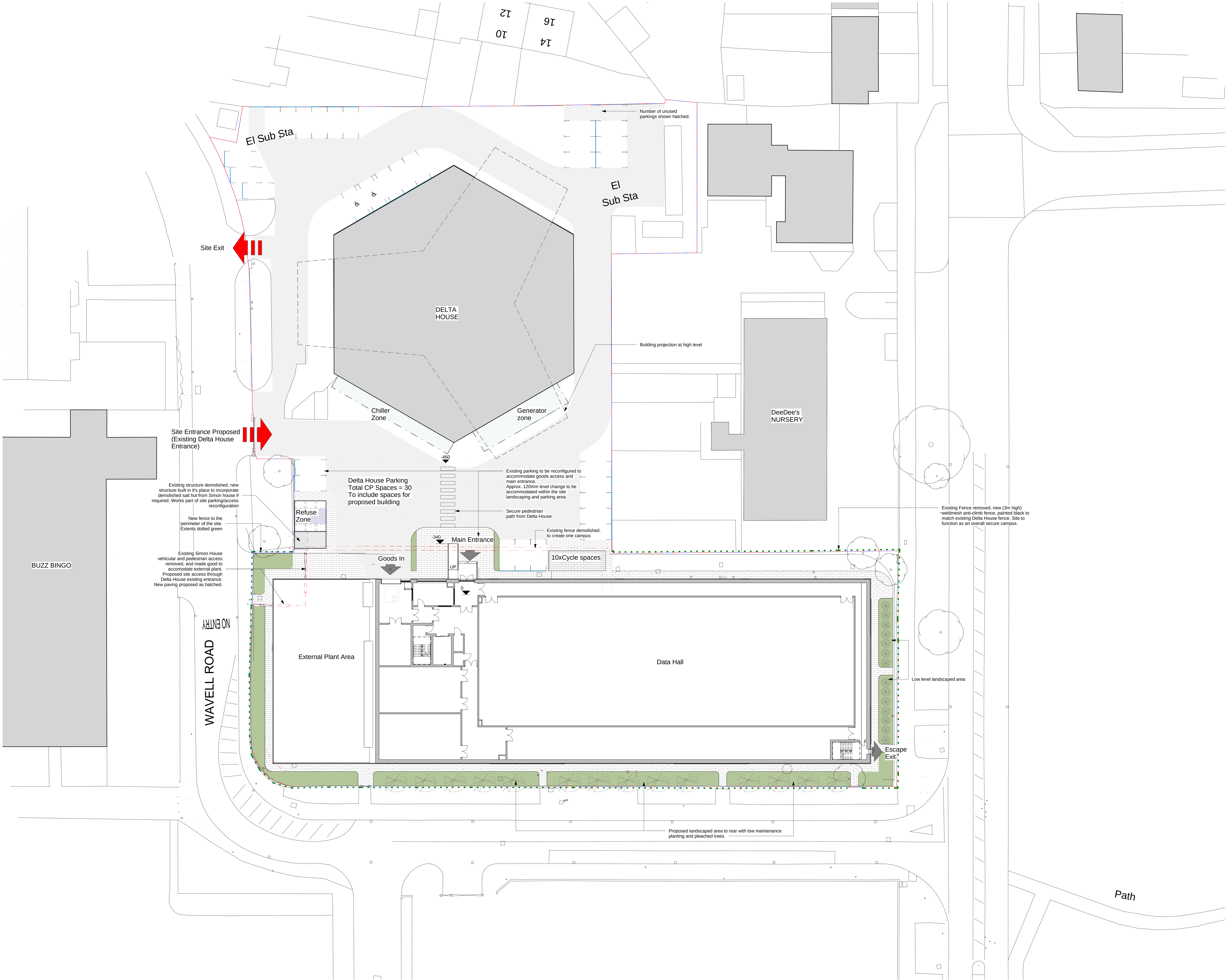
- 7.4.1 The ongoing management and maintenance of the proposed surface water drainage systems will fall under the responsibility of the site owner.
- 7.4.2 Best practice maintenance information is provided within the CIRIA SUDS Manual. A copy of drainage components and SuDS maintenance plan is included in the Appendix H of this report.

8. Conclusion

8.1.1 The Flood Risk Assessment and Drainage Strategy can be summarised as follows:

- The proposed development is categorised as “Less Vulnerable” development within Flood Zone 1.
- The flood risk from fluvial and tidal is assessed as low.
- The flood risk from surface water (pluvial) is assessed low.
- The flood risk from groundwater is assessed as low.
- The flood risk from sewers is assessed as low.
- The flood risk from reservoir is assessed as very low.
- Swales, below ground tank, and permeable paving are proposed to improve water quality, reduce flood risk, reduce nitrate and provide amenity and biodiversity for our site.
- Proposed surface water flow rate will be restricted to 2.07l/s and below ground tank has been size to accommodate the flow for 1 in 100 years + 40% climate change.

Appendix A – General Arrangement Plan



GENERAL NOTE:
Existing drawings based on information by
ACAD Design and Surveys,
Topo Survey by JLP Surveying Consultants

- KEY**
- Application Boundary
 - Extent of new boundary fence
 - Existing to be removed
 - Proposed paving
 - Proposed landscaping
 - Refuse Zone
 - Existing Structure (indicative)

WIP

P04	07.02.2023	Issued for review	DM	IM
P03	02.06.2023	Issued for review	DM	IM
P02	25.05.2023	Issued for information comment	DM	IM
P01	22.05.2023	Draft issue for information	DM	IM

Rev	Date	Description	By	Ch'd
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Drawing Status
FOR INFORMATION

Project Title
KEYSOURCE - TELEDATA MAN2

Drawing Title
Site Plan - Proposed

Sheet Scale Date Drawn Ch'd
A0 As 26.04.2023 DM IM

Project No.
3447

Drawing No.
3447-TSP-ZZ-XX-DR-A-00-002

Rev
P04

ttsp

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Appendix B – Topo Survey

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Appendix C – United Utilities Asset Search

Keysource Ltd

**3
City Place,
London Gatwick Airport,
RH6 0PA**

FAO:

How to contact us:

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

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

**Your Ref: Simon House
Our Ref: UUPS-ORD-486583
Date: 10/05/2023**

Dear Sirs

Location: Simon House

I acknowledge with thanks your request dated 05/05/2023 for information on the location of our services.

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

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

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

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

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



Karen McCormack
Property Searches Manager

TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

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

TERMS AND CONDITIONS:

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

Teledata MAN2, M22 5RA

Appendix D – Greenfield Runoff Results

Calculated by:

Yu Wu

Site name:

Teledata - MAN2

Site location:

M22 5QZ

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.

Site Details

Latitude:

53.37857°

Longitude:

2.25862°

Reference:

30566172

Date:

May 19 2023 16:

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):

0.3542

Methodology

 Q_{BAR} estimation method:

Calculate from SPR and SAAR

SPR estimation method:

Calculate from SOIL type

Notes

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

Soil characteristics

Default

Edited

SOIL type:

4

4

HOST class:

N/A

N/A

SPR/SPRHOST:

0.47

0.47

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

Hydrological characteristics

Default

Edited

SAAR (mm):

824

824

Hydrological region:

10

10

Growth curve factor 1 year:

0.87

0.87

Growth curve factor 30 years:

1.7

1.7

Growth curve factor 100 years:

2.08

2.08

Growth curve factor 200 years:

2.37

2.37

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	2.07	2.07
1 in 1 year (l/s):	1.8	1.8
1 in 30 years (l/s):	3.52	3.52
1 in 100 year (l/s):	4.3	4.3
1 in 200 years (l/s):	4.9	4.9

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at 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 www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of 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, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Appendix E – Existing Surface Water Runoff Rate

Lyons O'Neill Structural Engineers 79-81 Borough Rd London SE1 1DN	Project: Teledata – MAN2				Job No: 23042	
	Section: Pre-development Runoff Rates				Sheet No: 1	
	By: YW	Date: 14/06/23	Chk'd by: YW	Date: 14/06/23	App'd by: KL	Date: 14/06/23

Overview

In accordance with the CIRIA SuDS Manual 2015 where a site has been previously developed, there may be agreement that discharge limits can correspond to rates that the exist for the current state of the site (or a proportion of those rates). The preferred position should be to aspire to meet greenfield runoff rates and volumes, and any relaxation of this should be subject to an assessment of the current and future capacity of the receiving sewer or watercourse and agreement with the environmental regulator, drainage approving body and/or relevant sewerage company.

Pre-development Runoff Rates

The pre-development runoff rates have been calculated based on the Wallingford Procedure 'Modified Rational Method' equation shown below.

$$Q = 2.78 C i A$$

where:

- Q = design event peak rate of runoff (l/s)
 C = non-dimensional runoff coefficient which is dependent on the catchment characteristics

$$C = C_V C_R$$

- where C_V = volumetric runoff coefficient
 C_R = dimensionless routing coefficient

- i = rainfall intensity for the design return period (in mm/hr) and for a duration equal to the "time of concentration" of the network

- A = total catchment area being drained (ha)

Note: 2.78 is a conversion factor to address the rainfall unit being in mm/hr.

Lyons O'Neill Structural Engineers 79-81 Borough Rd London SE1 1DN	Project: Teledata – MAN2				Job No: 23042	
	Section: Pre-development Runoff Rates				Sheet No: 2	
	By: YW	Date: 14/06/23	Chk'd by: YW	Date: 14/06/23	App'd by: KL	Date: 14/06/23

Pre-development 1-year	
<i>From Wallingford Procedure, Volume 3 Maps</i>	
Rainfall Depths (M5 – 60min)	18.000
Rainfall Ratio (r)	0.380
Design Storm Return Period (P)	1 year
Time of Concentration (T _c)	15 mins
Average point intensity, i	27.310 mm/hr
Non-dimensional runoff coefficient, C	1.0
Total catchment area being drained, A	0.7572 ha
Q₁ = 2.78 x C x i x A	57.49 l/sec
Pre-development 30-year	
<i>From Wallingford Procedure, Volume 3 Maps</i>	
Rainfall Depths (M5 – 60min)	18.000
Rainfall Ratio (r)	0.380
Design Storm Return Period (P)	30 year
Time of Concentration (T _c)	15 mins
Average point intensity, i	66.835 mm/hr
Non-dimensional runoff coefficient, C	1.0
Total catchment area being drained, A	0.7572 ha
Q₃₀ = 2.78 x C x i x A	140.69 l/sec
Pre-development 100-year	
<i>From Wallingford Procedure, Volume 3 Maps</i>	
Rainfall Depths (M5 – 60min)	18.000
Rainfall Ratio (r)	0.380
Design Storm Return Period (P)	100 year
Time of Concentration (T _c)	15 mins
Average point intensity, i	86.343 mm/hr
Non-dimensional runoff coefficient, C	1.0
Total catchment area being drained, A	0.7572 ha
Q₁₀₀ = 2.78 x C x i x A	181.75 l/sec

Teledata MAN2, M22 5RA

Appendix F – MicroDrainage Results

Lyons O'Neill

Page 1

5 Maidstone Mews
72-76 Borough High Street
London SE1 1GN

Teledata - MAN2
Below Ground Attenuation Size Calculation

Date 5/22/2023 3:42 PM
File

Designed by YW
Checked by KL

XP Solutions

Source Control 2018.1

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 880 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	59.669	0.365	0.0	2.1	2.1	78.0	O K
30 min Summer	59.786	0.482	0.0	2.1	2.1	103.0	O K
60 min Summer	59.907	0.603	0.0	2.1	2.1	129.0	O K
120 min Summer	60.026	0.722	0.0	2.1	2.1	154.2	O K
180 min Summer	60.086	0.782	0.0	2.1	2.1	167.2	O K
240 min Summer	60.122	0.818	0.0	2.1	2.1	174.9	O K
360 min Summer	60.155	0.851	0.0	2.1	2.1	182.0	O K
480 min Summer	60.167	0.863	0.0	2.1	2.1	184.6	O K
600 min Summer	60.168	0.864	0.0	2.1	2.1	184.7	O K
720 min Summer	60.161	0.857	0.0	2.1	2.1	183.1	O K
960 min Summer	60.142	0.838	0.0	2.1	2.1	179.1	O K
1440 min Summer	60.102	0.798	0.0	2.1	2.1	170.5	O K
2160 min Summer	60.040	0.736	0.0	2.1	2.1	157.4	O K
2880 min Summer	59.979	0.675	0.0	2.1	2.1	144.3	O K
4320 min Summer	59.843	0.539	0.0	2.1	2.1	115.3	O K
5760 min Summer	59.730	0.426	0.0	2.1	2.1	91.0	O K
7200 min Summer	59.640	0.336	0.0	2.1	2.1	71.8	O K
8640 min Summer	59.571	0.267	0.0	2.1	2.1	57.0	O K
10080 min Summer	59.519	0.215	0.0	2.0	2.0	45.9	O K
15 min Winter	59.714	0.410	0.0	2.1	2.1	87.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	120.881	0.0	78.4	26
30 min Summer	80.193	0.0	104.1	41
60 min Summer	50.812	0.0	134.0	70
120 min Summer	31.176	0.0	164.5	130
180 min Summer	23.138	0.0	183.1	188
240 min Summer	18.623	0.0	196.5	246
360 min Summer	13.598	0.0	215.1	364
480 min Summer	10.872	0.0	229.2	482
600 min Summer	9.137	0.0	240.6	602
720 min Summer	7.924	0.0	250.2	704
960 min Summer	6.324	0.0	265.6	812
1440 min Summer	4.594	0.0	285.9	1066
2160 min Summer	3.332	0.0	317.8	1476
2880 min Summer	2.650	0.0	337.0	1904
4320 min Summer	1.916	0.0	365.2	2680
5760 min Summer	1.520	0.0	387.2	3400
7200 min Summer	1.270	0.0	404.2	4104
8640 min Summer	1.096	0.0	418.4	4760
10080 min Summer	0.967	0.0	430.4	5448
15 min Winter	120.881	0.0	87.9	26

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Lyons O'Neill		Page 3
5 Maidstone Mews 72-76 Borough High Street London SE1 1GN	Teledata - MAN2 Below Ground Attenuation Size Calculation	
Date 5/22/2023 3:42 PM File	Designed by YW Checked by KL	
XP Solutions Source Control 2018.1		

Model Details

Storage is Online Cover Level (m) 61.304

Cellular Storage Structure

Invert Level (m) 59.304 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	225.0	0.0	1.001	0.0	0.0
1.000	225.0	0.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0069-2100-1000-2100
Design Head (m) 1.000
Design Flow (l/s) 2.1
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 69
Invert Level (m) 59.304
Minimum Outlet Pipe Diameter (mm) 100
Suggested Manhole Diameter (mm) 1200

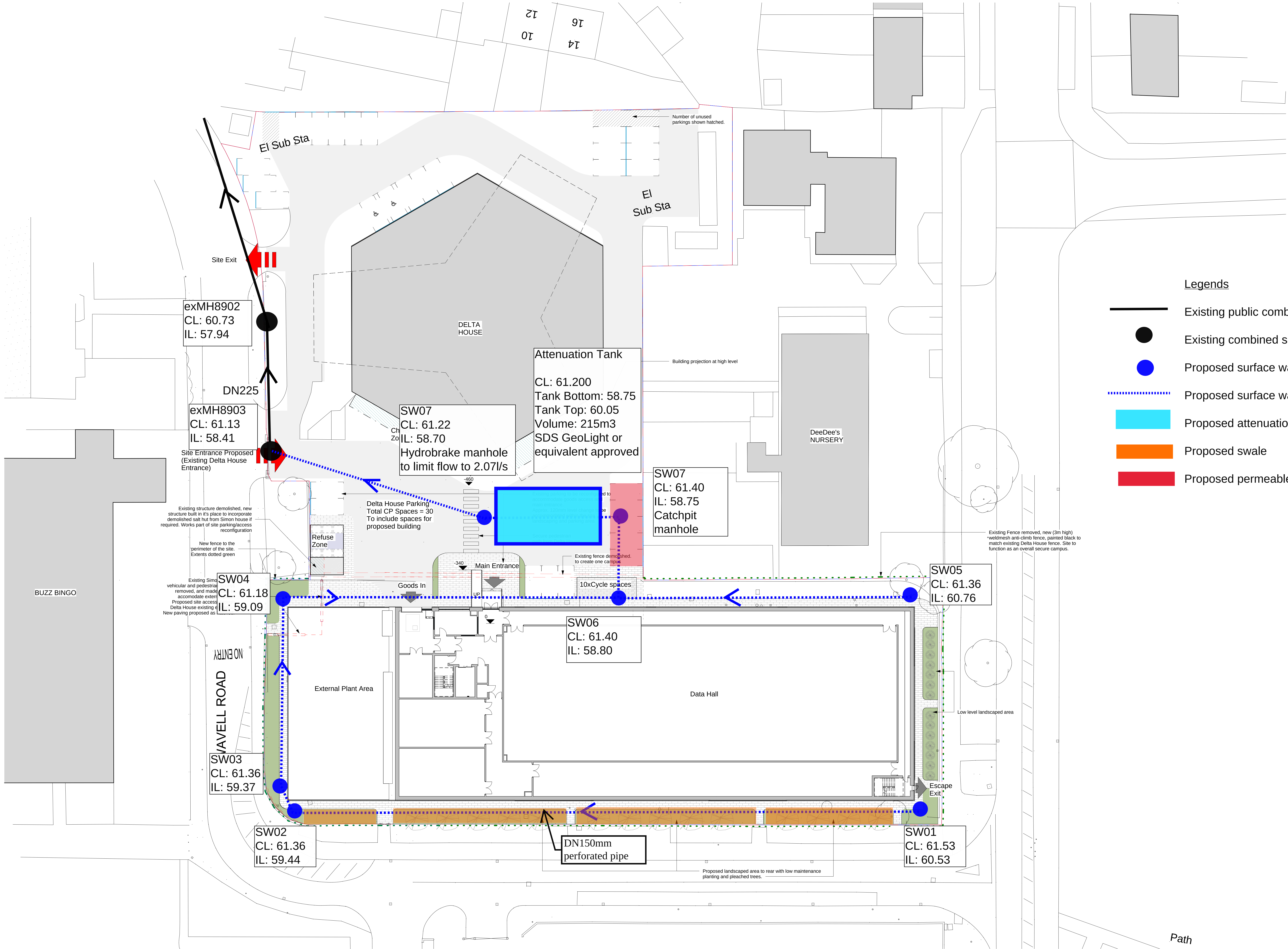
Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	2.1
Flush-Flo™	0.302	2.1
Kick-Flo®	0.614	1.7
Mean Flow over Head Range	-	1.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

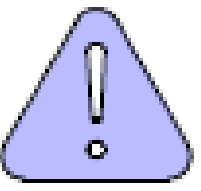
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.7	1.200	2.3	3.000	3.5	7.000	5.2
0.200	2.0	1.400	2.4	3.500	3.7	7.500	5.3
0.300	2.1	1.600	2.6	4.000	4.0	8.000	5.5
0.400	2.1	1.800	2.7	4.500	4.2	8.500	5.7
0.500	2.0	2.000	2.9	5.000	4.4	9.000	5.8
0.600	1.7	2.200	3.0	5.500	4.6	9.500	6.0
0.800	1.9	2.400	3.1	6.000	4.8		
1.000	2.1	2.600	3.3	6.500	5.0		

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Appendix G – Proposed Drainage Plan



- Legends
- Existing public combined manhole
 - Existing combined sewer
 - Proposed surface water chamber
 - Proposed surface water pipe
 - Proposed attenuation tank
 - Proposed swale
 - Proposed permeable paving

Risk Legend	
	Denotes Information Risk
IR001	
	Denotes Health & Safety Risk
HR001	

For Planning

P01 Issue for Planning 12/06/2023 YW

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Project Teledata - MAN2	
Subject Proposed Drainage Plan	

LON Project No. 23042	
Scale @ A0 1 : 125	Date
By LDM	Checked YW
Drawing No. SRP1032-LON-ZZ-00-D-C-8001	Rev P01

Teledata MAN2, M22 5RA

Appendix H – Drainage Components and SUDS Maintenance Schedule

Subject: Drainage Components and SuDS Maintenance

Ref: 23042

Rev No: P01

Date: 22.05.2023

Made by: YW

Checked by:KL

Sheet No: 1

1. Piped Drainage and Manhole Chamber Maintenance

Drainage infrastructure covered in this section includes all privately-owned manhole covers and surrounding pipework, gullies and drainage channels. Correct operation of this drainage infrastructure allows collection and transportation of water.

Table 1 Maintenance Schedule Piped Drainage and Manhole Chambers

Maintenance Schedule	Required Action	Frequency
Before Start up	Removal of any inappropriate material from within the chamber and dispose off-site All pipe lines to be flushed with water to remove silt and check for blockages	At Start At Start
Regular Maintenance	Removal of debris (which could include leaves, rubbish, branches) from areas served by drainage (where it may cause risk to performance)	Monthly
Remedial Actions	For blockages resulting in flooded manhole chambers, drain down manhole chamber and unblock For pipe blockages, rod between access points to unblock	As required As required
Monitoring	Lift covers and inspect chambers. Inspect covers, surrounding gullies and ACO channels for signs of damage and incorrect operation. If required, undertake remedial action.	As required

Subject: Drainage Components and SuDS Maintenance

Ref: 23042

Rev No: P01

Date: 22.05.2023

Made by: YW

Checked by:KL

Sheet No: 2

2. Sustainable Urban Drainage Systems (SUDS) Maintenance

2.1 Cellular Attenuation tanks

The function of the attenuation tanks is to collect and store water prior to discharging to the sewer off-site. Table 2 refers to the maintenance procedure highlighted in the SUDS Manual.

Table 2 Maintenance Schedule Cellular Attenuation tanks

Maintenance Schedule	Required Action	Frequency
From Start up	Inspect and identify any areas that are not operating correctly. This could include blocked inlets and outlets, irregularities in the cellular unit, blocked vents and excessive silt build-up in the access chambers. When required, remedial action to be undertaken.	Monthly for the first three months, then 6 monthly.
Regular Maintenance	Removal of debris (which could include leaves, rubbish, branches) from areas served by drainage (where it may cause risk to performance) Remove sediment, silt and rubbish from pre-treatment structures	Monthly Annually or as required
Remedial Actions	Repair of inlets, outlets, overflows and vents	As required
Monitoring	Inspect and check all inlets, outlets and vents to ensure that they are in good condition and operating as designed allowing surface water to be stored.	Annually or after large storms, when they are in use.

Source: SUDS Manual – Table 13.2

Subject: Drainage Components and SuDS Maintenance

Ref: 23042

Rev No: P01

Date: 22.05.2023

Made by: YW

Checked by:KL

Sheet No: 3

2.2 Dry Swales/Swales/Depressions

The function of the Dry swales/Swales/depressions is to allow above ground surface water attenuation in extreme events, those in excess of 1 in 30 year.

Table 3 Maintenance Schedule Dry Swales/Swales/Depressions

Maintenance Schedule	Required Action	Frequency
Before Start up	Removal of any debris or inappropriate material from within the swale and dispose off-site	At Start
Regular Maintenance	Litter and debris removal Grass Cutting to retain grass height within design specified range Manage other vegetation and remove nuisance plants	Monthly Monthly (during growing season) or as required. Monthly for the first 6 months, then as required
Remedial Actions	Repair erosion or other damage by re-turfing/re-seeding Re-level uneven surfaces and reinstate design levels. Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and provide compaction of soil surface	As required As required As required
Monitoring	Inspect pipe running through dry swale for blockages and clear when required Inspect base of swale for ponding, compaction and silt accumulation. Record areas where water is ponding for >48 hours Inspect facilities for sediment control – catchpits upstream.	Monthly Monthly or when required Half Yearly

Source: SUDS Manual – Table 10.3

Subject: Drainage Components and SuDS Maintenance

Ref: 23042

Rev No: P01

Date: 22.05.2023

Made by: YW

Checked by:KL

Sheet No: 4

2.3 Porous Surfacing

The function of the porous surfacing is to provide pre-treatment to the surface water before it enters the surface water drainage system, whilst also providing some element of attenuation.

Table 4 Maintenance Schedule Porous Surfacing

Maintenance Schedule	Required Action	Frequency
Before Start up – manufacturer to confirm exact requirements	Removal of any debris or inappropriate material above the surfacing material and dispose off-site Check infiltration through the surfacing material to the open graded stone below.	At Start At Start
Regular Maintenance – manufacturer to confirm exact requirements	Brushing and vacuuming of permeable surfacing – manufacturer to confirm their exact requirements	Three time a year at the end of winter, mid-summer and autumn leaf fall or as required based on site specific observations of clogging
Remedial Actions – manufacturer to confirm exact requirements	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the surfacing Remedial work to any depressions and rutting considered detrimental to the structural performance or possible risk to users Rehabilitation of surface	As required As required As required
Monitoring – manufacturer to confirm exact requirements	Evidence for poor operation and/or weed growth. If required, take immediate action Inspection silt accumulation rates and establish brushing/vacuuming frequencies Monitor inspection chambers for siltation	3 monthly, 48 hours after large storms Annually Annually

Source: SUDS Manual – Table 12.12

Subject: Drainage Components and SuDS Maintenance

Ref: 23042

Rev No: P01

Date: 22.05.2023

Made by: YW

Checked by:KL

Sheet No: 5

3. Maintenance of Flow Controls

3.1 Hydro-brake Flow Control

The hydro-brake is located at the end of the system to restrict flows surface water flows from the site.

Table 5 Maintenance Schedule Hydro-brakes

Maintenance Schedule	Required Action	Frequency
Before Start	Removal of any inappropriate material from within the chambers and dispose off-site	At Start
Regular Maintenance	Removal of debris (which could include leaves, rubbish and branches) from areas served by the drainage (where it may cause risk to performance)	Monthly
Remedial Actions	For blockages resulting in flooded manhole chambers, drain down manhole chamber and unblock	As required
Monitoring	Inspect unit and hose down is required	Monthly at the start for three months, then six monthly

Source: http://www.hydro-international.biz/stormwater/flowcontrol_maintenance.php