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Trinity Islands – Plot C1
Drainage Strategy

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Site Address: Trinity Island, Trinity Way, Manchester (Site C – Plot C1)

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1 Introduction

1.1 Project Background

Curtins has been appointed by Renaker Build Ltd to provide a Drainage Strategy Report for the for the proposed development of Plot C1 at Trinity Islands, Trinity Way, Manchester. The British National Grid co-ordinates for the site is approximately Easting 382846, Northing 397796.

This design has been developed based on the principles of the approved Flood Risk Assessment and Drainage Strategy report referenced 078567-CUR-XX-XX-RP-C-92000 Revision V03 dated 12th November 2021 of which the planning approval references. The Flood Risk Assessment includes plots C1, C2, D1 and D2, however this report relates to Plot C1 only.

This report summarises the key principles agreed within the approved Flood Risk Assessment and Drainage Strategy Report, however they key objective of this report it to confirm the design aligns with the approved strategy and provides more detail on the design and reference to the most up to date design drawings and calculations.

The approved Flood Risk Assessment and Drainage Strategy Report should be referred to for further information agreed during the planning approval process.

This report is based on currently available information and preliminary discussions.

Proposals contained or forming part of this report represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design and are deemed a material deviation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.

2 Flood Risk

2.1 Approved Flood Risk Assessment

The approved Flood Risk Assessment investigated the risk from different types of flooding to the development and the risk of flooding from the development, taking into consideration climate change, as well as how flood risks should be managed.

The approach to assessing flood risk at the development site was informed by the requirements of NPPF in conjunction with the client and Environment Agency and Lead Local Flood Authority requirements.

The Flood Risk Assessment confirmed that the majority of the site is classified as within Flood Zone 2 (medium risk) with areas of Flood Zone 1 (low risk) along the eastern boundary of Site C.

2.2 Summary of Flood Risk and Mitigation

The Flood Risk Assessment considered current and future flooding for the following sources:

- Fluvial Flooding (rivers and streams)
- Tidal Flooding
- Reservoir Flooding
- Canal Flooding
- Groundwater Flooding
- Infrastructure Failure
- Pluvial Flooding (Surface Water) to and from the site.

Table 1 summarises the risk level identified within the approved Flood Risk Assessment and the mitigation measures, where required, for each source.

Table 1: Flood Risk Summary

Source	***Risk***	***Mitigation***
Fluvial	Medium – Flood Zone 2 Estimated Flood Levels 1 in 100 Year =24.130m 1 in 100 Year +35% =24.620m 1 in 100 Year +70% =25.540m 1 in 1000 Year =25.790m 1 in 1000 year with a gate closed =25.820m	Proposed floor levels should be set a minimum of **25.840m AoD** 1 in 100 year +70% flood level plus 300mm freeboard as agreed with the LLFA. The development constructed Finished floor levels are as follows: • Basement level 2 = 21.000 • Basement Level 1 = 23.700 • Ground Floor Level = 26.500-27.400 Ground floor levels are set at a level of 26.55m AOD or above, which is in excess of the recommended finished floor levels and therefore above predicted flood scenarios. Proposed access into the basement levels is from ground level, thus providing the same level of protection as ground floor level. Drainage connections to the River Irwell and along the riverside walkway include non-return valves. Flood Emergency Plan recommended.
Tidal	Low	N/A

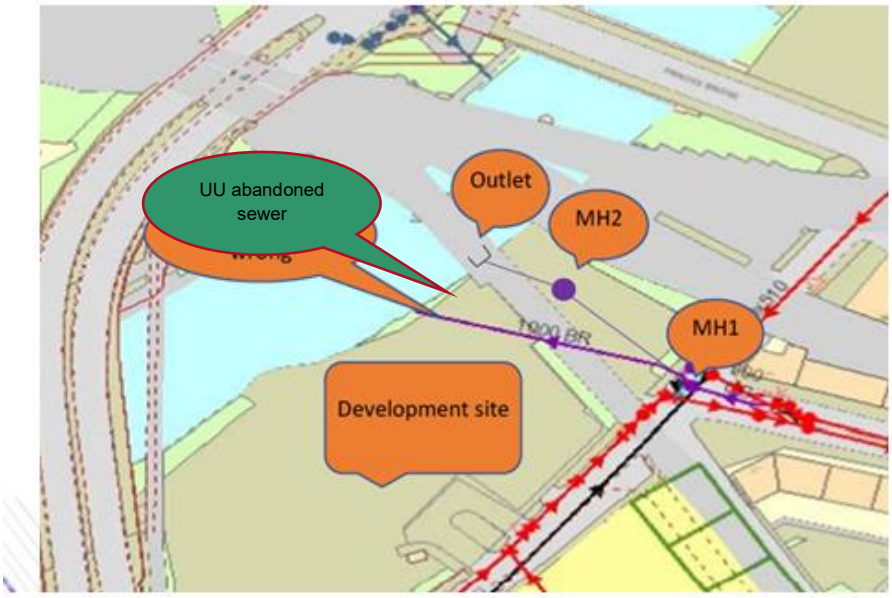
Reservoir	Medium Potential for the flood extents to inundate the site, with the maximum flood depth varying between 0.3m and 2m depth across the site.	Based on the proposed recommendations to raise ground levels to provide mitigation from fluvial flood risk, the likelihood and extent of flooding by reservoir failure impacting on the site has been significantly reduced. Flood Emergency Plan recommended.
Canal	Low	N/A
Groundwater	Medium Groundwater monitoring indicates the main groundwater table lies at approximately 22.5m AOD within the Granular Alluvium or Weathered Chester Formation Sandstone.	Finished floor levels are as follows: • Basement level 2 = 21.000 • Basement Level 1 = 23.700 • Ground Floor Level = 26.500-27.400 The basement levels are waterproofed and sealed up to ground level. The lowest level of exposure externally are doors located at external ground level to the eastern elevation at 26.500m and therefore 4m above estimated groundwater level. Ground levels fall away from building façade areas and entrances.
Infrastructure Failure	Low	N/A
Pluvial Flooding to the site	Low	N/A
Pluvial Flooding from the site	Medium	Discharge of surface water to river, reducing load on combined system. Proposed drainage designed in accordance with current best practice to provide adequate capacity not to flood for the critical 1 in 30-year storm event and flood water generated from up to the critical 1 in 100-year plus climate change storm event shall be constrained within the areas on site so not to cause damage to buildings, essential services or adjoining developments & services. Adequate inlet capacities Sustainable drainage where appropriate Maintenance Strategy.

3 Drainage Strategy

3.1 Existing Drainage

The public sewer records indicate that there is a 1000mm diameter combined sewer overflow (CSO) pipe crossing the north-east of the site and discharging into the River Irwell. However, installed drainage and sewer survey works as part of the Ordsall Chord development works confirms that the CSO pipe has been surveyed and located outside of the Trinity Islands site boundary and not as shown on the United Utilities mapping. Figure 1 shows the indicative route of the CSO pipe, and this is mapped based on the survey setting out points provided.

Figure 1: United Utilities CSO surveyed route



The information was issued to United Utilities during the planning process, and they confirmed that they were satisfied with the conclusions from this information and concur that the United Utilities mapping is incorrect. The survey and United Utilities correspondence contained within the FRA and Drainage Strategy Report should be referred to where necessary.

There are no further public sewers recorded within the site boundary.

3.2 Proposed Drainage

The proposed drainage network consists of a separate foul and surface water system, with the proposed foul water discharging into the combined public sewer in Water Street and the surface water discharging into the River Irwell.

The proposed drainage network is currently proposed as a private drainage network, with potential for some of the main external foul drainage being offered for adoption to the point of connection to the public sewer network.

3.3 Foul Drainage

The foul drainage internally has been designed by others and pipework is suspended within basement areas and directed to the external perimeter of basement along the north-east elevation. where external below ground drainage is proposed. The foul drainage network is proposed for discharge into the combined sewer in Water Street via a new manhole on the public sewer.

The current peak foul flow rate has been calculated at **39.7 l/s** based on the Discharge Units provided by the internal drainage designer.

Refer to the latest version of Curtins document C1-Z1-CUR-G580-PL-GRD-92500 for the drainage layout.

Refer to the latest version of Curtins document C1-Z1-CUR-G580-CA-GRD-92502 for the external foul water calculations.

3.4 Surface Water Drainage

Any new development site drainage should be designed in accordance with current best practice to provide adequate capacity not to flood for the critical 1 in 30-year storm event and flood water generated for up to the critical 1 in 100-year plus climate change storm event shall be constrained within the areas on site so not to cause damage to buildings, essential services or adjoining developments and services.

At the time of writing the FRA, the Environment Agency had released updated climate change allowances for peak rainfall intensities which should be applied to new developments (February 2016).

Based on the nature of the development, a lifespan in excess of 60 years is anticipated. The potential climate change allowances for 2070-2115 ranged between 20% for the central allowance and 40% for the upper end allowance. As such, an allowance of 40% for climate change on peak rainfall intensity has been included within the on-site design.

Surface Drainage to podium areas are generally permeable material which is drained to gullies within the slab and discharged internally to the basement drainage network. Impermeable areas are drainage to surface channels and gullies which are also discharged internally to the basement drainage network.

The surface water drainage internally has been designed by others and pipework is suspended within basement areas and directed to the external perimeter of basement along the north elevation (riverside), where external below ground drainage is proposed.

The surface water drainage system will discharge to the River Irwell (under agreement with Peel) at an unrestricted rate (l/s) on the basis that surface water betterment has been achieved as it relieves the combined sewer system of 100% of surface water flows. The sustainable drainage systems proposed on the podium was not required for attenuation and flow restriction but to promote a sustainable philosophy and also support the control of surface water distribution across the site.

The surface water network has been simulated in surcharged and unsurcharged outfall conditions up to the to 1 in 100 year +70% river flood level (25.540m) to confirm that flood water would not surcharge and flood basement areas. A none-return valve/Flap Valve has been specified at the outfall to the river to prevent back flow of flood water and all manholes within the riverside walkway will have sealed covers to prevent overland ingress.

The surface water discharge is based on a maximum flow velocity of 2m/s as agreed with Peel and the LLFA. The current velocity calculated during a non-surcharge event at the outfall is **1.7m/s.**

The drainage design has been sized to ensure that inlets and outlets to all permeable paving, gullies, drainage channels and drains are all suitably sized to accommodate peak storm flows for the 1 in 100 year +40% design event

For pollution control, there are areas of rain gardens and permeable paving located across the podium areas which provide an element of source control and run-off filtration. A downstream defender has been installed prior to the surface water outfall to ensure contaminants do not enter the river from the access road to the south and east of the building.

Refer to the latest version of Curtins document C1-Z1-CUR-G580-PL-GRD-92500 for the drainage layout.

Refer to the latest version of Curtins document C1-Z1-CUR-G580-CA-GRD-92500 for the surface water surcharged outfall calculations.

Refer to the latest version of Curtins document C1-Z1-CUR-G580-CA-GRD-92501 for the surface water unsurcharged outfall calculations.

3.5 Approvals

The connection to the public sewer in Water Street is to be approved under a Section 106 Agreement with United Utilities.

The connection to the River Irwell is to be approved under agreement licence with Peel.