

Manchester Life Plot A - Phoenix Ironworks, Manchester

Flood Risk Assessment and Drainage Strategy

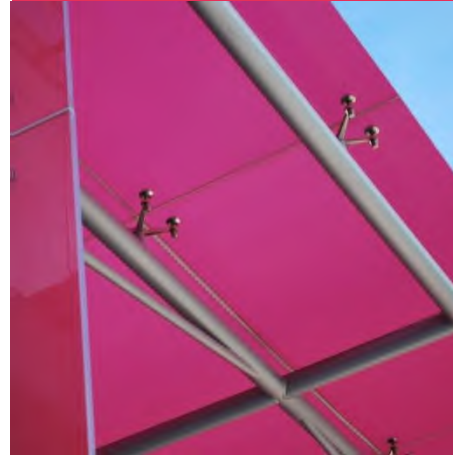
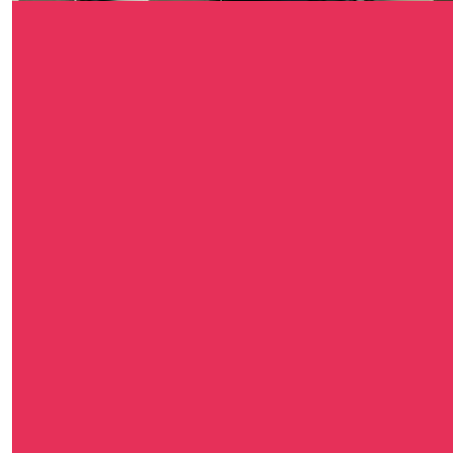
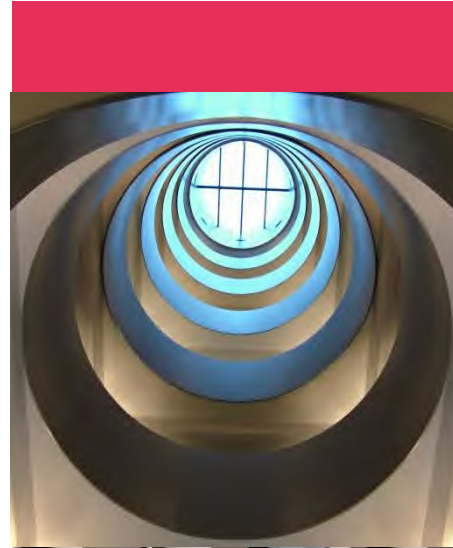
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Control Sheet

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1.0 Introduction

1.1 Project Background

- 1.1.1 Curtins has been appointed by Manchester Life Development Company 3 Ltd to provide a Flood Risk Assessment (FRA) and Drainage Strategy for the proposed scheme 'Phoenix Ironworks' located at land bound by Jersey Street to the south, Naval Street to the north, Radium Street to the west and Poland Street to the east. Phoenix works, Ancoats, Manchester M4 6LN.
- 1.1.2 The report provides information on the nature of flood risk at the site and follows Government guidance regarding development and flood risk.
- 1.1.3 The report is based on currently available information and preliminary discussions.
- 1.1.4 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.
- 1.1.5 Where the proposed works to which this report refers are undertaken more than twelve months following the issue of this report, Curtins shall reserve the right to re-validate the findings and conclusions by undertaking appropriate further investigations at no cost to Curtins.

1.2 Scope of Assessment

- 1.2.1 The assessment is to be undertaken in accordance with the standing advice and requirements of the Environment Agency (EA) for Flood Risk Assessments as outlined in the Communities and Local Governments Planning Policy Guidance to the National Planning Policy Framework (NPPF).
- 1.2.2 The assessment will:
 - Investigate all potential risks of flooding to the site,
 - Consider the impact the development may have elsewhere with regards to flooding,
 - Consider design proposals to mitigate any potential risk of flooding determined to be present; and
 - Consider foul and surface water drainage proposals for the proposed development.
- 1.2.3 The total site area is approximately 0.79 hectares and following scrutiny of the Environment Agency flood maps it has been identified that site lies within Flood Zone 1. However, the Manchester Strategic Flood Risk Assessment (SFRA) has designated the site within a Critical Drainage Area (CDA) therefore, a Flood Risk Assessment is required to support a planning application.

- 1.2.4 In April 2015, the Government made changes to the National Planning Policy Framework which made Sustainable Urban Drainage Systems (SuDS) a material consideration in the determination of planning applications for all developments.
- 1.2.5 A Drainage Strategy will therefore be required as part of the Planning Application for the development, as the site is considered to be 'major' development by the Town and Country Planning Order 2015.
- 1.2.6 This Flood Risk Assessment and Drainage Strategy reviews the following information:
- Environment Agency flood maps for rivers and sea flooding.
 - UK Government Flood Warning Information Service maps for surface water flooding and reservoir flooding.
 - Manchester City, Salford City and Trafford Councils Level 1 Hybrid Strategic Flood Risk Assessment (SFRA) published in March 2010.
 - Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA, User Guide, Final, dated May 2010.
 - Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment (SFRA) published in March 2011.
 - Preliminary Flood Risk Assessment (PFRA) for Manchester County Council dated May 2011.
 - Manchester City Council SuDS Requirements for New Developments.
 - United Utilities Public Sewer Records dated July 2020.
 - Topographical Survey by Malcolm Hughes Land Surveyors dated February 2021
 - A CCTV survey of the site was carried out by Survey and Engineering Projects in August 2022.

1.3 Proposed Development

- 1.3.1 The proposed Development of land bounded by bounded by Naval Street to the north, Poland Street to the east, Jersey Street to the south and Radium Street to the west to deliver a residential development (Use Class C3), with ground floor commercial space (Use Class E), within a building of varied height, ranging from 5 storeys to 10 storeys, cycle provision, hard and soft landscaping, access and servicing and other associated works.
- 1.3.2 The Proposed Site Layout is enclosed in *Appendix A*.

2.0 Existing Site Details

2.1 History and Current Use

- 2.1.1 The Site is bounded by Naval Street to the north, Poland Street to the east, Jersey Street to the south and Radium Street to the west. Refer to Figure 1.
- 2.1.2 The Site currently comprises hardstanding and warehouses. The site is located within the Ancoats Conservation Area, and the Howarth Metal Garages fronting Jersey Street and the wall bounding Jersey and Poland Street are of heritage interest.
- 2.1.3 A historic infilled canal arm, the Bengal Arm was built across the Site in the 19th Century to aid development of the site and the surrounding mills. By 1850 the Site was occupied by the historical Phoenix Iron Works, which comprised a casting shop fronting onto Poland Street, a large central courtyard and a four-story office building fronting onto Jersey Street.
- 2.1.4 The Site is surrounded by a mix of industrial and residential uses. Industrial units are located to the north along Naval Street. To the east of the Site is industrial units and surface car parking. To the south of the Site is Flint Glass Works and Wharf, warehouses converted to offices and residential respectively. To the west of the site is the Grade II* listed Beehive Mill which has been converted into co-working and residential development.
- 2.1.5 The Site lies within the Ancoats and Beswick ward. During the late 18th to early 20th century, Ancoats and New Islington was a thriving industrial district of Manchester, until it suffered significant economic decline during the post-war years. The decline of Britain's textile industry saw Ancoats' population decline. By the '90s the area was suffering from high levels of crime and dereliction. From the early 1990's onward the City Council has worked in conjunction with government agencies, businesses, community stakeholders and developer partners to develop and deliver comprehensive regeneration strategies in the area. The 2008 financial crisis halted many previous regenerations and placemaking efforts. With the remaining community vulnerable and a severe housing shortfall in the city, Ancoats was identified as a priority area for intervention on the Eastern edge of the city centre.
- 2.1.6 Following a series of coordinated interventions and partnerships, Ancoats has now seen its population grow and is noted as one of the most liveable communities in the country. Developers, landlords, cultural venues, local businesses and community groups now contribute towards community cohesion, safety, and the continued improvement of public spaces. Critical infrastructure has been delivered including the completion of Cutting Room Square in 2010 and Cotton Field Park in 2011. A permanent home for the Manchester Grammar School sponsored New Islington Free School opened in September 2013. New homes have been delivered, facilitating the area's transformation into a neighbourhood of choice. Manchester Life Development Company has delivered nearly 1500 new homes for rent and sale across Ancoats and New Islington, including the refurbishment of the Grade II* Murrays' Mills. Collectively they

have won an unprecedented number of awards within two years of opening. Tenants have been identified, and leases managed closely to control opening hours and help create an attractive community for both businesses and residents, and a vibrant daytime and evening economy. To date, Manchester Life have secured two planning permissions for their third phase of development. Eliza Yard (118 residential

- 2.1.7 units with commercial at ground floor) received planning consent in July 2021 with Jersey Wharf (190 residential units with commercial at ground floor) received planning permission in September 2022. In addition to this, the Ancoats Mobility Hub, which will provide the parking for the Manchester Life schemes, received planning consent in July 2021.
- 2.1.8 The Site is located within the Ancoats Conservation Area. The nearest listed asset to the development Site is the Grade II* Listed Beehive Mill, located approximately 13m to the west of the Site.
- 2.1.9 The Site is located within Flood Zone 1 which means that there is less than 0.1% chance of flooding per annum. It falls within a Critical Drainage Area as prescribed by the Manchester, Salford and Trafford Strategic Flood Risk Assessment.
- 2.1.10 The Site is located within the Ancoats and New Islington area. The regeneration and development that has taken place so far has been guided by the Ancoats and New Islington Development Framework which was originally endorsed by Manchester City Council in October 2014.
- 2.1.11 In July 2020, Manchester City Council endorsed a refreshed Neighbourhood Development Framework which focused on the Poland Street Zone in Ancoats and was prepared to ensure future development preserved the character of the area whilst meeting future housing, sustainability and community needs. The Neighbourhood Development Framework states that the development will be a welcoming residential area with a range and mix of accommodation befitting a neighbourhood of choice within a low car use area with high levels of cycle parking.
- 2.1.12 In March 2022, an addendum to the Poland Street Zone NDF was endorsed at Manchester City Council's Executive on 16 March 2022. The addendum provides a strategy for the public realm in the area and is intended to guide the design of public realm across the neighbourhood, this is known as the 'Poland Street Zone Public Realm Strategy'.
- 2.1.13 The Site benefits from its location on the north eastern edge of Manchester City Centre, the principal economic driver for the City Region and a focus for employment, leisure, retail and cultural facilities. In addition, it benefits from excellent connections to public transport. In this regard, the site is located within walking distance of Manchester Piccadilly Station and Victoria Station which provide national and regional rail links, as well as acting as transport interchanges for local rail services and Metrolink services across Greater Manchester. In addition, Shudehill Bus Station and Metrolink Station and Market Street Metrolink station are within walking distance of the site, providing connectivity to all lines on the Metrolink network and a number of regional bus services.

Figure 1: Aerial Photograph (© Google 2021)



2.2 Existing Watercourses and Other Waterbodies

- 2.2.1 No above ground watercourses have been identified within the proposed site.
- 2.2.2 The Rochdale Canal is located 60m from the southern boundary of the site.
- 2.2.3 The Ashton Canal is located approximately 500m further to the south of the site.
- 2.2.4 The nearest main watercourse is the River Irk and is approximately 1000m to the North.
- 2.2.5 The historic maps indicate that the site was previously occupied by the Bengal Canal Arm across the central area of the site. Records suggest this was infilled by the 1950's and no longer present on site.

2.3 Existing Drainage

- 2.3.1 The United Utilities public sewer records have been obtained for the site and surrounding area and confirm that there are no public sewers located within the site boundary.
- 2.3.2 The United Utilities sewer records are enclosed in *Appendix B*.
- 2.3.3 The records indicate that the following public sewers are located within the vicinity of the site:
- There is a 300mm x 406mm combined sewer within Jersey Street to the south of the site, the sewer appears to flow in a south-westerly direction.
 - There is a 225mm combined sewer, which increases to 300mm, within Naval Street to the north of the site, the sewer appears to flow in a south-westerly direction.
 - There is a 508mm x 762mm combined sewer (unrecorded size) within Radium Street to the west of the site, the sewer appears to flow in a north-westerly direction where it connects to the combined sewer to in Naval Street to the north of the site (at manhole UU reference 0711) which flows in a south-westerly direction.
 - There are two 470mm x 600mm combined sewers in Poland Street to the east of the site, one running in a north westerly direction and the second running in a south easterly direction.
- 2.3.4 There are various sewers in the wider vicinity of the site, however they are not considered of direct relevance to the development works.
- 2.3.5 A CCTV survey of the site was carried out by Survey and Engineering Projects in August 2022. The survey identified existing foul water, surface water and combined water drainage running across the centre of the site in a south easterly direction into Jersey Street. It appears that this drainage connects into the 404mm x 300mm combined sewer in Jersey Street. There are a number of areas that have yet to be surveyed due to access constraints, especially around the existing building in the southwest corner of the site. Refer to Section 5.1 for further details.
- 2.3.6 The CCTV Drainage Survey is enclosed in *Appendix C*.

2.4 Topography

- 2.4.1 A Topographical Survey has been completed at the site and is enclosed in *Appendix D*.
- 2.4.2 The Survey was completed in February 2021 by Malcolm Hughes Land Surveyors.
- 2.4.3 The topographical survey confirms that the ground levels are typically flat across the site, falling from 51.0mAOD in the northeast of the site to 49.5mAOD in the south west of the site.

Geology

- 2.4.4 The British Geological Survey (BGS) map confirms that the superficial deposits are listed as Till, Devensian – Diamicton.
- 2.4.5 The bedrock geology is described as Manchester Marls Formation – Mudstone.
- 2.4.6 Reviewing a local BGS borehole has indicated the strata to encompass mainly clay. Made Ground is expected on the surface due to the developed nature of the site.
- 2.4.7 A site investigation undertaken by E3P identified the strata to comprise made ground to circa 2.5m underlain by stiff clay. Bedrock was identified at 13m BGL. Contamination testing identified elevated concentrations of a variety of metals, PAH, TPH and asbestos.
- 2.4.8 The site is not located within a Groundwater Source Protection Zone.

3.0 Development and Flood Risk

3.1 National Planning Policy Framework (NPPF) and Planning Practice Guidance

- 3.1.1 In July 2022, the Department of Communities and Local Government published the National Planning Policy Framework document (NPPF) and the Planning Practice Guidance was published in March 2014 and updated in August 2021, which provides guidance on how flood risk should be assessed during the planning and development process.

Table 1: (Extract from Planning Practice Guidance) Flood Zone Classifications

These Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's Flood Map for Planning (River and Sea @), available on the Environment Agency's web site, as indicated in the table below.

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map - all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Table 2: (Extract from Planning Practice Guidance) Flood Risk Vulnerability Classification

Essential Infrastructure • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations, and water treatment works that need to remain operational in times of flood. • Wind turbines. Highly Vulnerable • Police and ambulance stations, fire stations and command centres, telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances (except where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or waterside locations, or need to be located in other high flood risk areas; in these instances the facilities should be classified as 'Essential Infrastructure'). More Vulnerable • Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hospitals. • Buildings used for dwelling houses, student halls or residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
--

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.

Water-Compatible Development

- Flood control infrastructure.
- Water transmission infrastructure and pumping stations.
- Sewage transmission infrastructure and pumping stations.
- Sand and gravel working.
- Docks, marinas and wharves.
- Navigation facilities.
- Ministry of Defence defence installations.
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.
- Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.
- Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

Table 3: (Extract from Planning Practice Guidance) Flood Risk Vulnerability and Flood Zone Compatibility

Flood Zone	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 †	✓	Exception Test required	✓	✓
Zone 3b ‡	Exception Test required ‡	✓	✓	✓	✓

Key:

- ✓ Development is appropriate
- ✗ Development should not be permitted

Notes to Table 3:

- This table does not show the application of the Sequential Test which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3, nor does it reflect the need to avoid flood risk from sources other than rivers and the sea.
- The Sequential and Exception Tests do not need to be applied to minor developments and changes of use, except for a change of use that involves: ramming or rafting site, or to a mobile home or park home site.
- Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

‡ In Flood Zone 3b functional floodplain essential infrastructure that has to be there and has passed the Exception Test, and water compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

3.2 Site Specific NPPF Flood Risk Categorisation

- 3.2.1 To assess the NPPF flood risk classification for the site, the first step was to inspect the UK Government web based 'Flood Map for Planning' which is used to inform planning of a site's Flood Zone(s) and the probability of flooding from rivers or sea (not taking into account the presence of flood defences or climate change). However, the web based 'Long Term Flood Risk Assessment for Locations in England' should also be used to identify the long-term flood risks from rivers and seas, surface water and reservoirs.
- 3.2.2 The Flood Map for Planning report is enclosed in *Appendix E*, and it can be seen that the site is classified as entirely within Flood Zone 1.
- 3.2.3 Further site-specific review of the flood risk to the site is provided in section 4.

3.3 Site Specific Flood Zone Compatibility

- 3.3.1 The proposals for the development site are likely to fall within the following category:
- Buildings used for Dwellings houses.
- 3.3.2 Dwellings are classed as 'More Vulnerable' development in the Flood Risk Vulnerability Classification (Table 2).
- 3.3.3 The site is located within Flood Zone 1 for which a 'More Vulnerable' development is deemed to be appropriate. Therefore, the development does not trigger the requirement for a sequential test/exception test (refer to the Flood Zone compatibility table in the NPPF technical guidance).

4.0 Hydrological Assessment

4.1 Sources of Flood Risk

- 4.1.1 This study assesses 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 requirements.

4.2 Fluvial Flooding (Rivers and Streams)

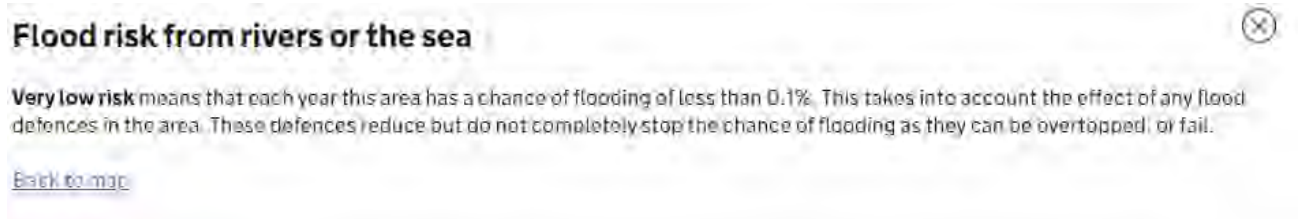
- 4.2.1 Flooding to the site from rivers and sea is indicated below in Figure 2, taken from the UK Government's Long-Term Flood Risk Information.

Figure 2 - Long Term Flood Risk Assessment Map – Flood Risk from Rivers or Sea (© Crown Copyright)



- 4.2.2 It can be seen that the entire site sits in an area of very low risk from fluvial and river flooding (Figure 3 for definition). Therefore, the proposed site is considered to be at very low risk from fluvial flooding.

Figure 3 - Long Term Flood Risk Assessment (Detailed Information) – Flood Risk from Rivers or Sea (© Crown Copyright)



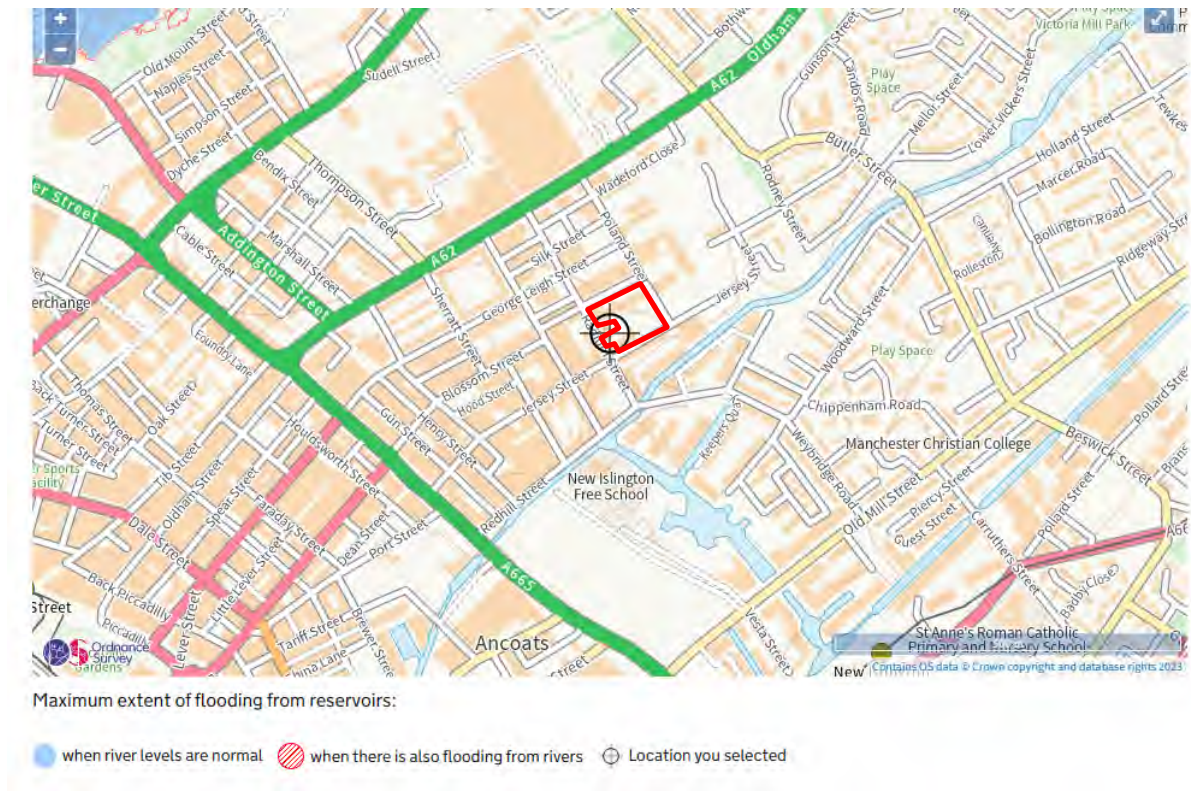
4.3 Tidal Flooding (Coastal or Estuarine)

- 4.3.1 There is currently no flood risk identified on the Environment Agency flood maps for the site and it is therefore regarded to be at low risk from tidal flooding.

4.4 Reservoir Flooding

- 4.4.1 Reservoir flooding is extremely unlikely to happen and there has been no loss of life in the UK from reservoir flooding since 1925. The Environment Agency is the enforcement authority and ensures that reservoirs are inspected regularly, and essential safety work is carried out.
- 4.4.2 The Long-Term Flood Risk Assessment (Flood Risk from Reservoirs) map shows that the site is not at risk of flooding from reservoirs (Figure 4).

Figure 4 - Long Term Flood Risk Assessment Map – Flood Risk from Reservoirs (© Crown Copy Right)



4.5 Canal Flooding

- 4.5.1 The nearest canal to the site is the Rochdale Canal located 60m from the southern site boundary.
- 4.5.2 The canals are identified in the Manchester SFRA as not generally posing a direct flood risk as they are a controlled water body. Therefore, the residual risk of canal flooding is usually associated with lower probability events such as overtopping and/or the breaching of embankments.
- 4.5.3 The Canal Flood Mapping within the Manchester SFRA indicates that the site is not located within a Canal Overtopping Hazard Zone or Canal Breach Zone.
- 4.5.4 Given the above information, it is considered that there is low risk of canal flooding to the site.

4.6 Groundwater Flooding

- 4.6.1 There is no mention of significant groundwater issues in the surrounding area in the Manchester SFRA or through the consultation from the LLFA.
- 4.6.2 The site is shown to be within an area of medium to low risk of groundwater flooding according to the groundwater flooding map shown within the Governments online 'Magic' maps website.

- 4.6.3 As indicated in the Phase 2 Site Investigation report, ground water has been encountered between 0.7m and 2.2m BgL in boreholes carried out for the site investigation and linked to perched water from the now infilled historic canal passing through the site.
- 4.6.4 There are no basements proposed within the development.
- 4.6.5 Based on the current information and that the proposed building will be elevated above existing levels, it can be considered that the site is at a low risk of groundwater flooding.

4.7 Public Sewers or Highway Drainage Flooding (Infrastructure Failure)

- 4.7.1 There is onsite drainage installed which connects to the United Utilities network in Jersey Street.
- 4.7.2 United Utilities maps show that there are no public sewer located within the development site, however sewers are in proximity to the site. Sewer defects encountered during the survey will be reported to United Utilities.
- 4.7.3 There are no records of and highway drainage in the vicinity of the site, however gullies within the adjacent highway are present and assumed to connect to the public sewer system.
- 4.7.4 Providing United Utilities and Manchester City Council maintain their drainage assets within the vicinity of the site, if any, the risk of flooding to the proposed development site from public sewers or highway drainage is considered as low.

4.8 Surface Water Flooding to the site

- 4.8.1 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 with flooding occurring, principally from manholes and gullies. Surcharging sewers can result in overland flows which if originating at a higher elevation than a development site can potentially pose a flood risk.
- 4.8.2 From the UK Government's Flood Risk from Surface Water (extent of flooding) map;
- Where a site is located in a dark blue shaded zone, this indicates that the site is at high risk of flooding, where flooding occurs as a result of rainfall with a greater than 1 in 30 (3.3%) chance in any given year.
 - Where a site is located in a mid-blue shaded zone, this indicates that the site is at medium risk of flooding, where flooding occurs as a result of rainfall of between 1 in 100 (1%) and 1 in 30 (3.3%) chance in any given year.
 - Where a site is located in a light blue shaded zone, this indicates that the site is at low risk of flooding, where flooding occurs as a result of rainfall of between 1 in 1000 (0.1%) and 1 in 100 (1%) chance in any given year.

- Where a site is located in a clear (unshaded) area; this indicates that the site is at very low risk of flooding, where flooding occurs as a result of rainfall with less than 1 in 1000 (0.1%) chance in any given year.

4.8.3 The extent of flooding to the site from surface water is indicated in Figure 5 and it can be seen that the majority of the site is identified as being at a 'very low' risk of flooding from surface water. A small 'low risk' area is shown in the south west of the site and adjacent to the northerly boundary. Jersey Street to the south and Naval Street to the north are classed as 'low risk'.

4.8.4 Considering the above information, the risk of surface water flooding to the site is considered low. The area around the site is also generally identified as being at very low risk from surface water flooding. Therefore, the usual mechanisms by which surface water could pose a risk to the site (i.e. overland flow) are restricted. There appears to be a shallow flow route along Jersey Street to the south of the site in a south westerly direction. As Jersey Street is at a lower level than the development site the risk of this flooding impacting the site is low.

Figure 5 - Risk of Flooding from Surface Water - Extent of Flooding



4.9 Surface Water Flooding from the site

- 4.9.1 Developers are responsible for ensuring that new development does not increase the flood risk elsewhere. Where new development is proposed, the new surface water drainage network shall be designed to not flood for the critical 1 in 30-year storm event and flood water generated up to the critical 1 in 100-year plus climate change storm event shall be constrained within areas on site so as not to cause damage to buildings, essential services or adjoining developments and services.
- 4.9.2 As part of the development, a positive drainage network has been designed and will be installed to mitigate the risk from surface water flooding to the building and the surrounding site.
- 4.9.3 An assessment of the proposed surface flows is carried out within the drainage strategy in Section 6 of this report.
- 4.9.4 Overall, the surface water flooding from the site to surrounding areas is considered very low.

4.10 Historical Flooding

- 4.10.1 No historic records of flooding for the site were received at the time of writing this report.

4.11 Summary of Flood Risk

- 4.11.1 From the evidence collated and subsequent negotiations the site can be found to be at **very low risk** of flooding from all sources at present. The installation of a positive drainage network will mitigate any flood risk associated with increasing the impermeable area.

5.0 Drainage Strategy

5.1 Existing Drainage

- 5.1.1 The United Utilities public sewer records have been obtained for the site and surrounding area and confirm that there are no public sewers located within the site boundary.
- 5.1.2 The United Utilities sewer records are enclosed in *Appendix B*.
- 5.1.3 The records indicate that the following public sewers are located within the vicinity of the site:
- There is a 300mm x 406mm combined sewer within Jersey Street to the south of the site, the sewer appears to flow in a south-westerly direction.
 - There is a 225mm combined sewer, which increases to 300mm, within Naval Street to the north of the site, the sewer appears to flow in a south-westerly direction.
 - There is a 508mm x 762mm combined sewer (unrecorded size) within Radium Street to the west of the site, the sewer appears to flow in a north-westerly direction where it connects to the combined sewer to in Naval Street to the north of the site (at manhole UU reference 0711) which flows in a south-westerly direction.
 - There are two 470mm x 600mm combined sewers in Poland Street to the east of the site, one running in a north westerly direction and the second running in a south easterly direction.
- 5.1.4 There are various sewers in the wider vicinity of the site, however they are not considered of direct relevance to the development works.
- 5.1.5 A CCTV survey of the site was carried out by Survey and Engineering Projects in August 2022. The survey identified existing foul water, surface water and combined water drainage running across the centre of the site in a south easterly direction into Jersey Street. It appears that this drainage connects into the 404mm x 300mm combined sewer in Jersey Street.
- 5.1.6 Further survey works will be required around the existing building in the south west corner of the site to ascertain its current outfall route and that it does not pass into the site boundary. Where existing drainage from this building is present within the development site, additional drainage may need to be installed to ensure that the building remains to be drained. Any new system would be separate to the proposed development drainage.
- 5.1.7 The CCTV Drainage Survey is enclosed in *Appendix C*.

5.2 Proposed Foul Water Drainage

- 5.2.1 The proposed drainage has been designed as a separate foul and surface water drainage system.

- 5.2.2 The foul water is proposed to discharge to the 300mm x 406mm combined water sewer located to the south of the proposed site, along Jersey Street.
- 5.2.3 It is proposed that foul drainage connection is made via a new manhole onto the sewer in Jersey Street. However, it is recommended that the condition of this sewer, level and position is confirmed with United Utilities.
- 5.2.4 At this moment, the detailed design for the foul drainage is to be determined. This peak flow rate requires confirming by others once the final internal layouts and number of appliances are confirmed.
- 5.2.5 United Utilities have confirmed in their pre-development response that their preferred point of discharge for foul water flows would be to the 300mm x 406mm combined public sewer, to the south of the site, along Jersey Street and can be discharged at an unrestricted rate. Refer to the United Utilities correspondence enclosed in *Appendix F*.
- 5.2.6 It is assumed the site will remain under one ownership and therefore the drainage system will remain private within the development boundary.
- 5.2.7 The connection to the public sewer network will be subject to a Section 106 Agreement with United Utilities.
- 5.2.8 The proposed Drainage Layout is enclosed in *Appendix G*.

5.3 Proposed Surface Water Drainage

- 5.3.1 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.
- 5.3.2 In May 2022, the Environment Agency released updated climate change allowances for peak rainfall intensities which should be applied to new developments. Rather than nationwide allowances, each area will have its own peak rainfall allowances. In the case of the Ancoats area, this is the Irwell Management Catchment peak rainfall allowances. Table 4 demonstrates the climate change allowances with central and upper end allowances being considered.

Table 4: (Extract Environment Agency Guidance) Peak Rainfall Intensity Allowance in small and urban catchments

Irwell Management Catchment peak rainfall allowances		
3.3% annual exceedance rainfall event		
Epoch	Central allowance	Upper end allowance
2050s	25%	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 to 2060 and use the 2070s epoch for development with a lifetime between 2061 and 2125		

- 5.3.3 Based on the nature of the development, a lifespan in excess of 100 years is anticipated. Therefore, the potential climate change allowance for the 2070's ranges between 30% for the central allowance and 45% for the upper end allowance. As such, an allowance of 45% for climate change on peak rainfall intensity will be included in calculations.
- 5.3.4 In following the standard hierarchy of drainage solutions, consideration should firstly be given to the discharge of surface water runoff by sustainable methods such as infiltration.

Infiltration

- 5.3.5 The ground conditions comprise of highly contaminated made ground overlaying firm to stiff clay, therefore due to the limiting permeability of the clay, and risk of contamination migration, infiltration is not suitable. As part of the site investigation, falling head permeability testing has been completed utilising the monitoring well installations. This assessment confirms that the material does not have sufficient permeability characteristic to support an infiltrating drainage system.

Watercourse

The nearest watercourse is the Rochdale Canal which is located approximately 60m to the south of the site. A new connection to the watercourse is not considered feasible as it would have to pass-through third-party land.

Surface Water Sewer

- 5.3.6 There are no surface water sewers in the vicinity of the site. There are no identifiable surface water pipes in the highway – either adopted by the Highway Authority or United Utilities.

Combined Water sewer

- 5.3.7 There is a 300mm x 406mm combined sewer located on Jersey street, immediately to the south of the site. Following the drainage hierarchy, the site is proposed to drain to this asset as agreed with United Utilities. This is subject to the approval of the evidence listed above and the discharge is limited to flows no greater than 14l/s.
- 5.3.8 Table 5 summarises the options for surface water disposal.

Table 5: Surface Water Disposal

Surface Water Disposal	Potential	Description
Infiltration	X	It is assumed that the site will not be suitable for infiltration SuDS.
Watercourse	X	The Rochdale Canal is located approximately 60m south of the site. A new connection to the watercourse is not considered a viable option as it would have to pass through third-party land.
Surface Water Public Sewer	X	There are no surface water sewers in the vicinity of the site.
Combined Public Sewer	✓	There are various combined water sewers in the vicinity of the site. It is therefore proposed to connect to the existing combined sewer located on Jersey Street.

- 5.3.9 Details of the existing drainage indicate that surface water from the existing building footprint is positively draining to the existing public combined sewer in Jersey Street.
- 5.3.10 United Utilities have agreed that based on a positive drained area of 0.2ha using the Wallingford Modified rational method, applying a constant rainfall rate of 50mm/hour, the anticipated flows from the existing site are 27.8l/s.
- 5.3.11 Taking the existing flows generated and applying a 50% reduction in flows in line with existing planning policies, the proposed discharge rate for the redeveloped site is 14l/s.
- 5.3.12 Refer to *Appendix F* for LLFA/United Utilities correspondence to date.
- 5.3.13 Attenuation volumes have been calculated at c.240m³ for the 100-year event with 45% climate change discharging a maximum of 14l/s.
- 5.3.14 Refer to *Appendix G* for the Drainage GA plan and *Appendix H* for the proposed drainage calculations.
- 5.3.15 It is anticipated that the necessary attenuation volumes are to be attenuated within an on-site below ground geocellular attenuation tank. However, additional capacity is proposed to be incorporated through the use of additional localised SuDS features within the soft landscape – tree pits and permeable reinforced gravel areas.
- 5.3.16 It is proposed that all sewers within the site boundary will remain private and therefore where sewers remain private, connection to the public sewer network will be subject to a Section 106 Agreement with United Utilities.

- 5.3.17 The final design of the drainage networks shall be in accordance with the legislation set by the Environment Agency, Manchester City Council and United Utilities.
- 5.3.18 This proposed drainage strategy is subject to change following further survey works on the existing drainage within the site boundary. Receipt of further surveys are not expected prior to submission of the planning application therefore, a condition requiring confirmation of a detailed drainage strategy will be required.

5.4 Sustainable Drainage Systems and Green Infrastructure

- 5.4.1 Surface water run-off from hard paved areas at risk of contamination should receive water quality treatment. Access roads and pedestrian footways are considered as a low hazard in terms of contamination. Figure 6 illustrates the pollution hazard indices for different land use classifications from The CIRIA SuDS Manual C753 (2015).

Figure 6: Pollution Hazard indices for land use classification (Table 26.2 the CIRIA SuDS manual 2015)

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.1	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul-de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) (e = 300 traffic movements/day)	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured, industrial sites, trunk roads and motorways	High	0.8 ²	0.8 ²	0.8 ²

5.4.2 Figure 7 illustrates the SuDS Component mitigation indices from The CIRIA SuDS Manual C753 (2015)

Figure 7: Indicative SuDS mitigation indices (Table 26.3 the CIRIA SuDS manual 2015)

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters			
Type of SuDS component	Mitigation indices ¹		
	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4 ²	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.6	0.6	0.6
Permeable pavement	0.7	0.6	0.7
Detention basin	0.6	0.6	0.6
Pond ³	0.7 ³	0.7	0.5
Wetland	0.8 ⁴	0.8	0.8
Proprietary treatment systems ^{5,6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Notes:

1. SuDS components only deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters.
2. Filter drains can remove coarse sediments, but their use for this purpose will have significant implications with respect to maintenance requirements, and this should be taken into account in the design and Maintenance Plan.
3. Ponds and wetlands can remove coarse sediments, but their use for this purpose will have significant implications with respect to the maintenance requirements and amenity value of the system. Sediment should normally be removed upstream, unless they are specifically designed to retain sediment in a separate part of the component. Where it cannot easily migrate to the main body of water.
4. Where a wetland is not specifically designed to provide significantly enhanced treatment, it should be considered as having the same mitigation indices as a pond.
5. See CIRIAH 111 for approaches to demonstrate product performance. A British Water/Environment Agency assessment code of practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at <http://tinyurl.com/qf7yu7>
6. SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. SEPA (2014) also provides a flowchart with a summary of checks on suitability of a proprietary system.

5.4.3 The selection of treatment should ensure that the SuDS mitigation component index (Figure 7) exceeds the pollution hazard index (Figure 6).

5.4.4 In accordance with the National Planning Policy Framework (NPPF) a sustainable drainage system (SuDS) should be provided unless demonstrated to be inappropriate. The following options have been considered for the site:

Infiltration Systems:

5.4.5 Systems such as infiltration trenches and soakaways were considered as part of the surface water management strategy however, the ground conditions and the results of the falling head permeability testing indicate limiting permeability of the underlying clay. Therefore, infiltration systems are not considered suitable for the site.

Green/Blue roofs:

- 5.4.6 Green/Blue roofs were considered for the site however, found not viable due to all available roof area being utilised for Photovoltaic (PV) panels and other M&E equipment.

Swales, Wetlands and Attenuation Ponds:

- 5.4.7 Due to the small nature of the site and the limited space available, pre-treatment steps and retention systems such as swales, wetlands and ponds are not considered suitable for the site due to their space requirements.

Permeable Paving

- 5.4.8 There may be a possibility to introduce permeable paved areas within the clay paving within the residents' gardens, the extent and location will be subject to further co-ordination with the Landscape Architect. However, at present all areas are currently proposed to drain to the tree pits, soft landscape and reinforced gravel areas.

Rain Gardens and Drained Soft Landscaping

- 5.4.9 It is currently proposed to drain some of the external terraced areas to the soft landscaping which will require positive under drainage. Further co-ordination of the detail and capacity is required with the Landscape Architect, this will also be in conjunction with any proposals to incorporate permeable paving.

Other SuDS Considerations:

- 5.4.10 The amount of hard surfacing proposed has been minimised with areas of soft landscape being introduced across the scheme.

SuDS Conclusion

- 5.4.11 The development is proposing potential options to include drained soft landscaping, tree pits and reinforced gravel (permeable) and where possible introduce permeable paving.
- 5.4.12 The surface water discharge will be controlled by a flow control chamber, restricting the maximum flow to 14l/s for storm events up to and including the 1 in 100 year + 45% climate change event. A below ground attenuation tank will be utilised to deliver the controlled surface water discharge.
- 5.4.13 The proposed Drainage Layout is enclosed in *Appendix G*.

6.0 Maintenance

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 proprietary 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.

Where sewers and SuDS features are offered for adoption, the adopting authority will have their own maintenance strategy in place.

The surface water network has been designed to accommodate the 1 in 100-year storm rainfall event plus an allowance for climate change particular to the requirements of the site. 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 generally being attenuated on site and within SuDS features there will be a period of time after storm events where the network is still partially or fully surcharged and is draining down. Where this surcharging is still present after 48hrs appropriate action should be taken as noted in this section.

6.1 Components

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

- Pipes
- Gullies
- Attenuation Tank
- Flow Control Unit

The maintenance strategy should be implemented to ensure the drainage network is cleaned regularly and the routine maintenance and cleansing regime should be documented.

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

Maintenance of the drainage network will be the responsibility of an on-site facilities management team.

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.

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.

During the winter months, drainage features such as gullies and 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 filter drains and the upstream/downstream chambers.

6.2 Inspection, Manhole and Catchpit 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.

6.3 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 the Curtins 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 discharge rate. They are intended to be dry except for during rainfall events. These have been designed to be self-cleaning where possible for smaller diameter pipes, and for larger diameters the risk is reduced due to the overall pipe size.

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 be draining correctly thus exposing the development to a greater level of flood risk.

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.

6.4 Gullies

Channels and gullies should be inspected and cleaned in accordance with the manufacturer's details. Channel units can be cleaned through the use of a 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 are allowed to 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.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Initial Inspection.	Half yearly and after large storms.
Regular maintenance\ inspection	Litter and debris removal	Monthly or as required.
	Check and remove large vegetation growth near gully gratings.	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.
6.4.1 Remedial Action	Inspect sumps and outlet pipes and rod through poorly performing channels and outlets as initial remediation.	As required.

6.5 Attenuation Tanks

The attenuation tanks are currently specified as geocellular units, which are wrapped in a geotextile blanket.

The geocellular units and geotextile are proprietary products and therefore manufacturer's recommendations should also be taken in to consideration.

Access for maintenance should be provided by an access shaft located on the tank and from the manhole chambers downstream of the tank.

Regular inspection and maintenance are important for the effective operation of attenuation tanks as designed. As the feature is buried, a regular inspection regime is very important to ensure the correction functionality of the surface water drainage network.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Inspect inlets, outlets and overflows for blockages, and clear if required. If faults persist jetting and CCTV survey may be required.	Monthly and after large storms.
Regular maintenance\ inspection	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
	Debris removal from catchment surface (where may cause risks to performance).	Monthly
	Remove sediment from pre-treatment structures.	Annually (or as required after heavy rainfall events)
Remedial Actions	Repair/rehabilitation of inlets, outlets and overflows.	As required.

6.6 Flow Control Units

Maintenance should be carried out in accordance with the supplier's guidelines.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required).	Inspect inlets for blockages, and clear if required. If faults persist jetting and CCTV survey may be required.	Monthly and after large storms.
Regular maintenance\ inspection	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
	Debris removal from catchment surface (where may cause risks to performance).	Monthly
	Remove sediment from pre-treatment structures and flow control chambers.	Annually (or as required after heavy rainfall events)
Remedial Actions	Repair/rehabilitation of inlets.	As required.

Appendix A

Proposed Site Layout

- 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.

KEY

Planning Application Boundary

Hardworks

Clay Paving 1
- Product: Waverhamberger Aves UWF Tumbled
- Colour: Dark Grey
- Size: W: 50 X L: 200 X D: 65 Mm
- Laid: Stretcher
- Supplier: Hardscapes Ltd

Clay Paving 2
- Product: Waverhamberger Superior UWF Tumbled
- Colour: Varned (warm orange/red)
- Size: W: 50 X L: 200 X D: 65 Mm
- Laid: Stretcher
- Supplier: Hardscapes Ltd

Large Format Concrete Slabs
- Product: Double Excel
- Finish: Brushed
- Colour: Grey (grey)
- Size: W: 1995 X L: 1995 X D: 140 Mm
- Laid: Stair Blend
- Other: With Metal Edges
- Supplier: Hardscapes Ltd

Corduroy Tactile Paving
- Material: Granite
- Colour: Grey
- Size: W: 400 X L: 400 X D: 65 Mm
- Supplier: Hardscapes Ltd

Reinforced Gravel
- Product: Heritage QuartzGravel / ECCOGravel40
- Colour: Natural Quartz Colour / white
- Size: 14 Mm / 60 Mm
- Supplier: tbc

Resin Bound Gravel
- Product: Standard Sterling
- Colour: Natural aggregate - light grey colour
- Size: 6 mm
- Supplier: Soudal

Tarmac Paving
- resurfacing in School Court
- new PCC kerbs required

Steps
- Material: Sandstone with
- White Granite Contrasting Nosing
- Colour: tbc
- Size: W: 400 X L: 100 X H: 150 Mm Steps
W: 50 X L: 900 X H: 50 Mm Nosing

Seating Wall 01
- Material: Pigmented Concrete
- Colour: Anthracite Grey
- Size: tbc W: 1200 X L: 1310 X H: 600 Mm

Seating Wall 02
- Material: Sandstone
- Colour: Mid grey
- Size: W: 600 X L: 900 X D: 450 Mm

Wall 03
- Material: Sandstone
- Colour: Mid grey
- Size: W: 250 X H: 350 X L: Varies

Reclaimed Paver Setts / Old Canal Stones
- Material: Sandstone / Granite
- Size: tbc

Steel Edge
- Material: Mild Steel
- Product: Primly ExcelEdge Urban
- Size: W: 6 X D: 150 Mm X L: Varies
- Finish: Untreated

Softworks
- Product: tbc Bag System Bollard 64 013 R3
- Colour: Graphite
- Size: W: 220 X L: 220 X H: 1140 Mm
- Other: with all needed accessories,
- Supplier: tbc

Tree - Proposed Standard
- Size: 20/25

Tree - Proposed Multistem
- Product: tbc
- Colour: tbc
- Size: tbc
- Other: with all needed accessories
- Supplier: tbc

Mixed Planting
- 80 mm Mulch
- 450mm Topsoil
- 5.1 Pits
- 7 Plants / m²

Hedge Planting - Evergreen
- 80 mm Mulch
- 450 mm Topsoil
- 5.1 Pits
- 7 Plants / m²

Pots with Plants

Furniture

Coffee Table and Chairs

Dining Table and Chairs

Timber Seating

Timber Seating - with Steel Legs

Handrail

Proposed Fence

Bespoke Proposed Gate

Artwork - Ironworks theme

Iron frames / pergolas

Sail Shade

Outdoor projection facility/screen

Water/Irrigation Point

Pop Up Power Point

External Power Socket Recessed into Sitting Wall

Lighting Column

Lighting Bollard

Tree Uplighter

Wall-mounted Lighter

P-08 02/06/23 S4 - Residential garden - layout VS RM

P-07 14/04/23 S4 - Residential garden - new layout VS RM

P-06 07/03/23 S4 - Amendments in the key VS RM

P-05 24/02/23 S4 - Residential garden - dining area VS RM

Revision Date Description Drawn Apprval

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Client Manchester Life

Project Phoenix Ironworks

Drq Title General Arrangement
A2 Landscape

Created on 01/06/23 Created by VS Approved by RM

Scale 1:200 Size A2 Workstage Stage 3 Status Stage Approval

Drq No. 3059-PLA-00-GF-DR-L-0001 Suitability S4 Revision P-08

Appendix B

United Utilities Sewer Records

Curtins Consulting Ltd

**51-55
Tithebarn Street,
Liverpool,
L2 2SB**

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: CSMA 601 076740 Ancoats Plot B
Our Ref: UUPS-ORD-175968
Date: 23/07/2020**

Dear Sirs

Location: EASY EQUIPMENT LTD 66 JERSEY STREET, MANCHESTER, M4 6JW

I acknowledge with thanks your request dated 21/07/2020 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

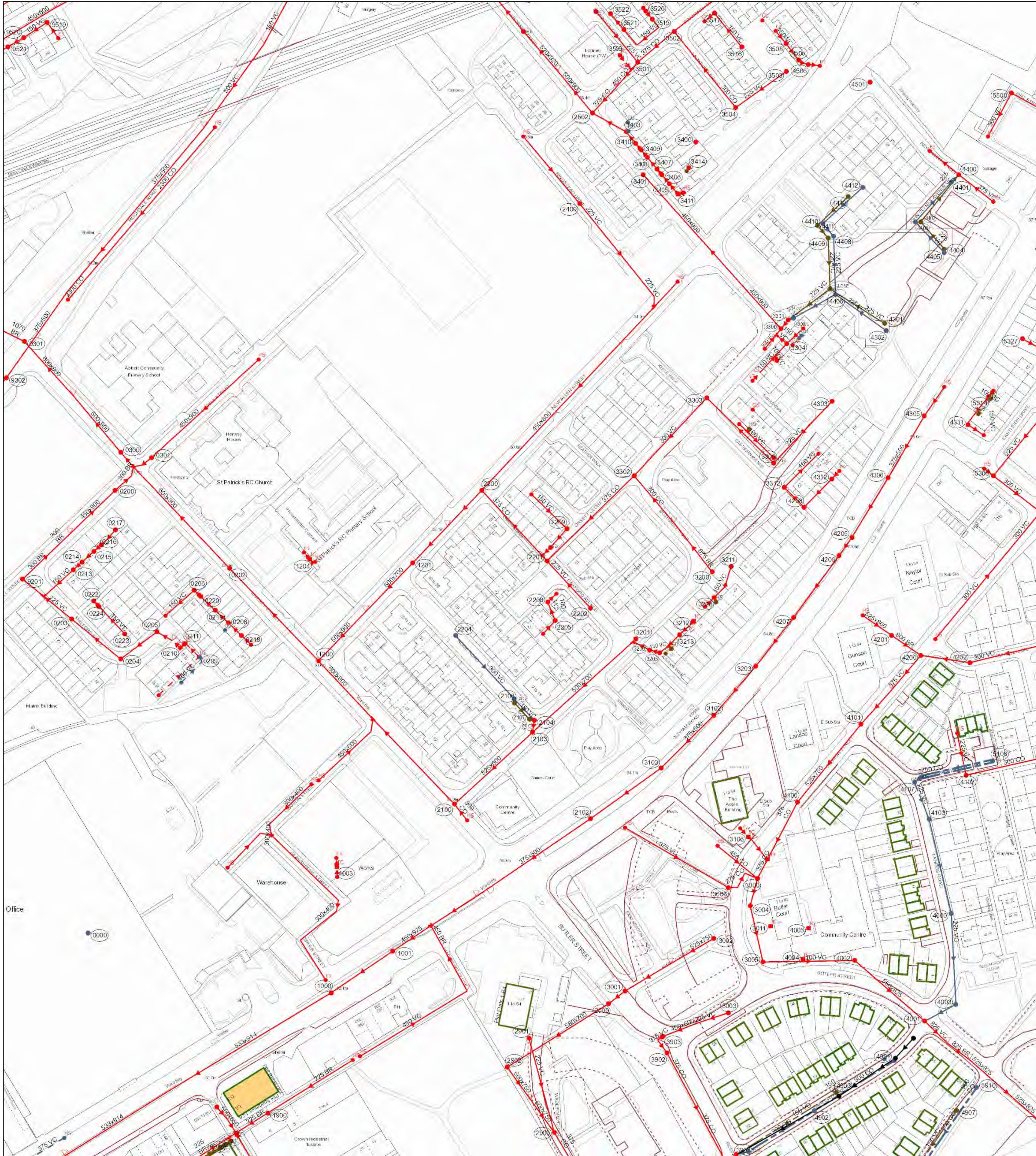
These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus)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



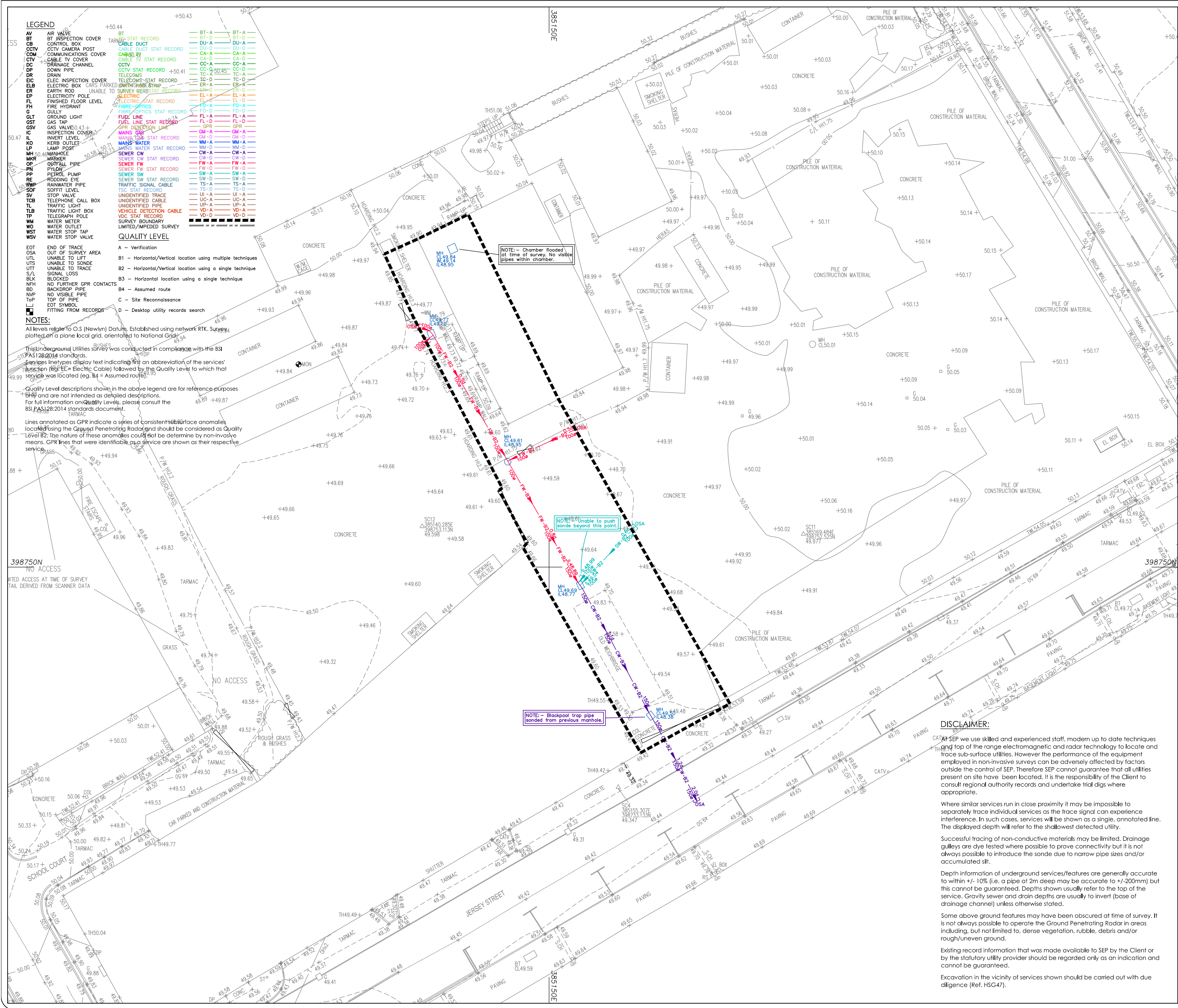
Reho	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
5503	46.87	CO	42.38	150	0	470	BR	25.6125	
5502	46.87	CO	42.38	150	0	470	BR	25.6125	
7501	49.11	CO	46.05	800	0	0	CO	39.62233	1 in 63
7500	49.11	CO	46.05	800	0	0	CO	39.62233	1 in 63
4900	47.35	CO	44.45	300	0	0	CO	25.6125	
8701	50.48	BR	44.21	370	0	0	BR	40.49691	
8701	50.48	BR	44.21	370	0	0	BR	40.49691	
8700	50.39	VC	44.1	375	0	0	VC	15.26434	
8700	50.39	VC	44.1	375	0	0	VC	15.26434	
7801	50.39	BR	44.1	375	0	0	BR	40.49691	
7702	46.05	CO	45.51	225	0	0	VC	11.7047	1 in 53
7511	08.06	CO	0	150	0	0	BR	9.831849	
0806	50.9	CO	0	457	0	0	BR	3	
4814	48.14	CO	0	150	0	0	CO	3.446394	
5603	48.37	CO	44.54	300	0	0	VC	36.06938	1 in 157
6438	48.37	VC	2.552328	150	0	0	VC	12.80625	1 in 31
5504	47.87	CO	43.53	225	0	0	VC	41.7732	1 in 127
7603	48.02	CO	45.4	600	0	0	BR	5	
8604	50.02	CO	46.14	600	0	0	BR	5	
7708	49.34	CO	46.06	375	0	0	VC	54.67175	
8605	50.01	BR	46.04	540	0	0	VC	7.830952	
6712	50.01	CO	45.51	150	0	0	VC	3.294112	
8409	48.05	CO	43.55	600	0	0	VC	1.990938	
8619	48.05	CO	43.55	600	0	0	VC	1.990938	
4904	49.62	CO	0	939	0	0	CO	3.692551	
7505	45.27	BR	44.2	450	0	0	BR	12.34159	
8806	50.14	CO	45.8	470	0	0	BR	37.59889	
7705	46.08	CO	44.25	580	0	0	BR	20.15401	1 in 671
5407	47.9	CO	42.82	150	0	0	VC	5	1 in 10
6906	51.13	CO	46.28	480	0	0	BR	3.162278	
6908	50.97	CO	45.74	500	0	0	BR	1.414214	
8511	48.05	CO	43.55	600	0	0	VC	13.19972	
4506	48.05	CO	43.55	600	0	0	VC	8.793868	
6790	48.5	CO	45.02	450	0	0	CO	9.894995	1 in 76
6501	50.16	BR	21.47091	600	0	0	BR	21.47091	1 in 41
9602	50.73	CO	44.29	600	0	0	VC	24.56975	
7701	49.51	CO	45.28	580	0	0	BR	11.6919	1 in 42
8421	48.05	CO	43.55	600	0	0	VC	4.41288	
4802	49.38	CO	38.55	700	0	0	BR	34.5545	1 in 42
6606	48.54	CO	45.57	300	0	0	VC	26.24881	
7504	49.34	CO	46.74	600	0	0	CO	62.09069	
7503	49.43	CO	46.12	600	0	0	CO	21.26029	1 in 59
6702	48.11	VC	45.88	225	0	0	VC	75.39276	1 in 55
9503	50.2	CO	46.84	300	0	0	VC	7.285383	
4913	48.05	CO	43.55	600	0	0	VC	9.818071	
4905	49.07	CO	0	500	0	0	BR	28.30447	
7600	49.17	CO	41.85	1550	0	0	CO	59.86997	1 in 143
4510	48.05	CO	43.55	600	0	0	VC	4.654072	
6601	48.38	CO	44.89	300	0	0	VC	11.40175	
7706	46.08	BR	44.23	580	0	0	VC	12.52096	
4418	46.88	CO	40	450	0	0	VC	23.00855	1 in 66
8613	48.05	CO	43.55	600	0	0	VC	2.493739	
9002	51.15	CO	49.25	225	0	0	BR	59.6825	1 in 63
7591	49.36	VC	46.18	300	0	0	VC	12.54159	1 in 67
7901	51.21	CO	44.19	525	0	0	VC	36.31802	
7520	48.39	CO	44.37	600	0	0	VC	6.488805	
7607	48.39	CO	44.37	600	0	0	VC	6.488805	
7500	48.39	CO	44.37	600	0	0	VC	6.488805	
6704	47.34	CO	0	300	0	0	VC	47.59609	
8701	50.19	BR	33.91515	450	0	0	VC	31.38471	
7707	49.31	CO	45.35	410	0	0	VC	82.4942	1 in 60
8704	49.67	CO	47.29	225	0	0	VC	33.30155	1 in 17
6905	51.09	CO	47.29	225	0	0	VC	13.11641	
6607	48.38	CO	45.23	280	0	0	CO	5.530952	
5007	49.99	CO	46.28	450	0	0	VC	3.695551	
8710	48.05	CO	43.55	600	0	0	VC	27.20284	
8801	50.67	CO	45.02	600	0	0	BR	19.54943	
8800	50.13	CO	45.8	480	0	0	BR	53.7122	1 in 117
8702	50.32	CO	46.23	450	0	0	BR	84.0925	1 in 142
7403	48.97	CO	45.08	600	0	0	BR	21.0238	1 in 68
5508	48.05	CO	43.55	600	0	0	VC	81.47779	1 in 94
6903	51.34	CO	0	300	0	0	VC	3.695551	
6619	48.05	CO	43.55	600	0	0	VC	12.54159	
6605	48.82	CO	41.46	570	0	0	BR	23.02173	
6707	48.05	CO	43.55	600	0	0	VC	10	
6709	48.05	CO	43.55	600	0	0	VC	10	
7703	49.64	CO	47.47	225	0	0	VC	16.12452	1 in 39
6423	48.05	CO	43.55	600	0	0	VC	2.281807	
8804	50.42	CO	42.69	500	0	0	BR	42.69	1 in 73
5902	46.08	BR	44.23	580	0	0	VC	44.69701	
7523	48.05	CO	43.55	600	0	0	VC	1.906444	
0710	50.48	BR	45.94	600	0	0	VC	15.24757	
0710	50.48	BR	45.94	600	0	0	VC	15.24757	
8901	51.21	CO	43.83	480	0	0	BR	62.26556	
8901	51.21	CO	43.83	480	0	0	BR	62.26556	
5616	47.81	CO	42.57	375	0	0	VC	45.80393	1 in 64
9603	50.48	CO	45.94	600	0	0	VC	5.703055	
5001	48.51	CO	45.07	500	0	0	BR	37.01351	
8600	49.59	CO	44.7136	450	0	0	VC	4.472136	
6923	51.34	CO	44.19	525	0	0	VC	1.325038	
6902	51.34	CO	44.7136	300	0	0	VC	4.472136	
5705	49.07	CO	45.68	500	0	0	BR	22.02271	1 in 50
5717	46.79	CO	45.05	225	0	0	VC	7.304463	
6503	48.05	CO	43.55	600	0	0	VC	96.22277	1 in 85
9402	50.14	CO	46.35	300	0	0	VC	21.26029	1 in 106
6701	49.6	BR	41.41	570	0	0	BR	16.40122	
8802	48.05	CO	43.55	600	0	0	VC	3.695551	
5503	46.87	CO	42.38	150	0	0	BR	15.27941	
4508	46.78	CO	42.02	500	0	0	BR	2	
8703	50.25	CO	44.57	460	0	0	BR	42.84182	1 in 88
7704	49.59	CO	44.69	580	0	0	VC	21.53331	1 in 50
6443	48.05	CO	43.55	600	0	0	VC	3.530862	
9401	50.56	CO	45.66	800	0	0	VC	4.24954	
8601	50.23	CO	46.44	560	0	0	BR	28.3196	1 in 73
8705	49.84	CO	45.55	500	0	0	BR	45.55085	1 in 95
4601	48.05	CO	43.55	600	0	0	VC	4.379509	
6705	48.05	CO	43.55	600	0	0	VC	23.80885	
5619	48.05	CO	43.55	600	0	0	VC	10.83087	1 in 181
5707	48.8	CO	44.79	300	0	0	VC	42.46109	1 in 185
6803	50.54	BR	42.63	550	0	0	BR	17.50449	
8607	50.34	CO	44.8	580	0	0	BR	19.76989	1 in 64
6437	48.05	CO	43.55	600	0	0	VC	3.929997	
5409	47.78	CO	41.5	600	0	0	BR	36.23534	
8608	48.05	CO	43.55	600	0	0	VC	31.37068	
8504	50.01	CO	45.46	460	0	0	BR	39.62233	
9302	48.05	CO	0	2362	0	0	BR	592.1557	
0701	50.45	CO	46.42	375	0	0	CO	15.13275	1 in 151
0701	50.45	CO	46.42	375	0	0	CO	15.13275	1 in 151
6611	48.05	CO	43.55	600	0	0	VC	14.14214	1 in 54
6601	51.35	CO	46.31	500	0	0	BR	25	
8604	48.05	CO	43.55	600	0	0	VC	15.6205	1 in 50
6802	50.6	CO	44.83	500	0	0	BR	7.21102	1 in 7
6408	48.56	CO	46.78	300	0	0	VC	42.44957	1 in 28
1000	53.1	CO	46.27	533	0	0	VC	172.3675	
1000	53.1	CO	46.27	533	0	0	VC	172.3675	
5808	48.05	CO	43.55	600	0	0	VC	5.148893	
8403	51.38	CO	0	100	0	0	VC	14.14214	
6003	51.38	BR	48.22	550	0	0	BR	55.80233	1 in 21
5505	47.64	CO	41.83	375	0	0	VC	65.29931	1 in 73
4424	48.05	CO	43.55	600	0	0	VC	5.415914	
9616	48.05	CO	43.55	600	0	0	VC	5.469758	
4815	47.79	CO	0	150	0	0	VC	6.191207	
5613	47.79	CO	43.87	450	0	0	VC	40.36087	1 in 73
9614	51.19	CO	46.93	300	0	0	VC	8.592719	
6904	48.05	CO	43.55	600	0	0	VC	3.162278	
4425	47.85	CO	41.82	300	0	0	VC	2.719787	1 in 75
5408	47.85	CO	46.01807	450	0	0	BR	137.4513	1 in 170
6803	46.67	CO	41.26	700	0	0	VC	1.414214	
5507	47.68	CO	43.85	150	0	0	BR	6.571556	
5703	46.49	CO	46.43	670	0	0	VC	7.367078	
5709	48.05	CO	43.55	600	0	0	VC	7.432798	
8411	48.05	CO	43.55	600	0	0	VC	29.87541	
5615	47.28	CO	43.68	150	0	0	VC	6.243378	
5501	47.2	CO	43.67	100	0	0	VC	6.493124	
8740	48.05	CO	43.55	600	0	0	VC	8.18884	
8400	49.89	CO							



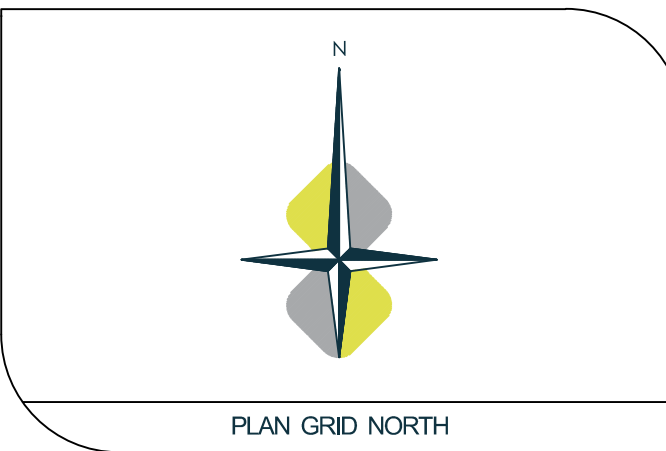
Reho	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
0213	150	CO	50.87	225			VC	21.8503	1 in 10
3304	150	CO	50.87	225			VC	7.571001	1 in 10
0203	53.35	CO	50.87	225			VC	34.82815	1 in 10
2208	150	CO	50.87	225			VC	6.878755	1 in 10
4302	56.7	SW	54.9	225			VC	34.4093	1 in 51
2103	BR	CO	50.86	525			BR	58.66952	1 in 81
4002	53.53	CO	50.73	550			VC	51.05408	
4002	53.53	CO	50.73	550			VC	51.05408	
3301	56.13	CO	53.3	225			VC	6.403124	
3003	53.81	CO	49.48	375			VC	15.52417	
3203	0	CO	49.48	375			VC	35.4603	
4901	52.31	SW	47.82	800			CO	52.0643	1 in 400
4901	52.31	SW	47.82	800			CO	52.0643	1 in 400
4300	56.11	SW	53.53	300			VC	3.162278	
4903	51.8	FO	46.44	150			VC	65.12257	1 in 125
4903	51.8	FO	46.44	150			VC	65.12257	1 in 125
4303	55.77	CO	53.62	225			VC	46.60047	1 in 90
4506	0	CO	53.62	225			VC	6.323258	
4103	53.55	SW	51.86	225			VC	53.33643	1 in 92
4001	0	CO	51.86	225			VC	17.77393	
4001	0	CO	51.86	225			VC	17.77393	
2903	57.69	BR	47.38	500			BR	26.42534	1 in 129
4206	0	CO	47.38	500			VC	12.20956	
3508	0	CO	47.38	500			VC	12.15387	
5108	54.15	SW	52.18	750			CO	40.59557	1 in 406
2102	0	CO	52.18	750			CO	76.27592	
2903	51.28	CO	47.68	375			CO	62.76842	
2903	51.28	CO	47.68	375			CO	62.76842	
4411	56.85	FO	54.39	225			VC	11.54142	1 in 154
2209	0	CO	54.39	225			VC	9.219544	
3503	56.43	CO	54.28	225			VC	13.80414	1 in 191
3503	56.43	CO	54.28	225			VC	13.80414	1 in 191
3300	56.11	CO	52.05	450			BR	34.4093	1 in 80
4406	56.38	SW	54.22	300			VC	114.0219	1 in 35
4200	54.69	CO	51.47	375			VC	26.41969	1 in 38
4404	57.68	FO	55.28	225			VC	24.83949	1 in 65
3102	0	CO	55.28	225			VC	19.84943	1 in 68
5306	55.89	CO	51.75	300			BR	32.80244	1 in 82
4201	54.98	CO	51.72	800			BR	19.41649	1 in 78
1001	53.21	CO	46.38	450			BR	41.04875	1 in 373
1001	53.21	CO	46.38	450			BR	41.04875	1 in 373
0202	53.23	CO	47.19	600			BR	77.10393	
1200	53.07	CO	48.58	600			VC	70.72482	1 in 51
3208	0	CO	48.58	600			VC	20.51593	
0903	51.19	CO	49.17	225			BR	29.18145	1 in 224
3519	0	CO	49.17	225			VC	32.25584	
2902	51.78	CO	49.93	600			BR	22.2036	1 in 19
2902	51.78	CO	49.93	600			BR	22.2036	1 in 19
4202	54.92	CO	51.6	300			VC	27.29469	1 in 210
5500	57.38	CO	54.32	300			VC	27.29469	
3001	52.04	CO	49.22	580			BR	11.40175	
3001	52.04	CO	49.22	580			BR	11.40175	
3501	56.02	CO	53.18	450			CO	18.43916	1 in 13
6201	53.13	CO	47.48	300			BR	36.06938	1 in 82
0303	0	CO	47.48	300			VC	11.50214	
4207	53.32	CO	46.51	375			CO	34.20526	
3005	0	CO	46.51	375			VC	50.6484	
3005	0	CO	46.51	375			VC	50.6484	
4402	57.37	FO	54.99	225			VC	33.42155	
4410	56.78	SW	54.86	225			VC	9.219544	1 in 307
3504	56.58	CO	54.01	300			CO	54.03703	1 in 139
2204	0	CO	54.01	300			VC	47.54259	
0910	0	CO	54.01	300			VC	2.288455	
0910	0	CO	54.01	300			VC	2.288455	
3200	54.11	BR	51.29	100			BR	34.20526	1 in 76
3200	54.11	BR	51.29	100			BR	34.20526	1 in 76
3520	0	CO	51.29	100			VC	5.737083	
2205	0	CO	51.29	100			VC	11.01871	
4407	56.54	FO	54.03	225			VC	28.0007	1 in 57
3907	50.94	CO	47.51	150			VC	7.043519	1 in 101
3907	50.94	CO	47.51	150			VC	7.043519	1 in 101
4209	0	CO	47.51	150			VC	42.2019	
3517	0	CO	47.51	150			VC	7.043519	1 in 101
3906	50.94	SW	47.58	150			VC	6.950301	1 in 99
3906	50.94	SW	47.58	150			VC	6.950301	1 in 99
5106	54.15	SW	52.18	750			CO	40.59152	1 in 406
0203	53.43	CO	46.59	300			BR	17.14091	
2210	0	CO	46.59	300			VC	6.384964	
3303	0	CO	46.59	300			VC	58.72919	
0205	53.23	CO	51.79	225			VC	25	1 in 69
4907	51.83	FO	46.84	150			VC	45.97432	1 in 81
4907	51.83	FO	46.84	150			VC	45.97432	1 in 81
0913	0	CO	46.84	150			GRC	3.722282	
0913	0	CO	46.84	150			GRC	3.722282	
4400	57.72	CO	53.35	375			VC	20.01553	
2000	52.34	CO	49.31	580			BR	66.03786	1 in 86
2000	52.34	CO	49.31	580			BR	66.03786	1 in 86
4100	53.7	CO	50.03	375			CO	47.41308	1 in 69
1208	0	CO	50.03	375			VC	11.02601	
4403	57.39	SW	55.45	225			CO	48.01041	
3103	0	CO	55.45	225			VC	29.72114	1 in 69
0917	0	CO	55.45	225			GRC	7.842798	
0917	0	CO	55.45	225			GRC	7.842798	
0916	0	CO	55.45	225			GRC	6.636525	
0916	0	CO	55.45	225			GRC	6.636525	
4902	51.55	SW	47.69	900			CO	2.766462	1 in 150
4902	51.55	SW	47.69	900			CO	2.766462	1 in 150
5910	52.09	SW	48.74	900			CO	42.84325	1 in 428
5910	52.09	SW	48.74	900			CO	42.84325	1 in 428
5910	52.09	SW	48.74	900			CO	60.39719	1 in 403
0206	0	CO	48.74	900			VC	4.931631	
4401	57.67	SW	55.02	400			VC	5.695854	
1204	0	CO	55.02	400			VC	8.52102	
1201	52.8	CO	48.89	500			BR	37.48333	1 in 234
3903	51.55	CO	48.78	375			VC	3.805551	1 in 15
3903	51.55	CO	48.78	375			VC	3.805551	1 in 15
4000	53.11	SW	51.38	225			VC	50.30959	1 in 15
4000	53.11	SW	51.38	225			VC	50.30959	1 in 15
2501	56.21	CO	53.86	225			VC	36.25334	1 in 77
0905	51.32	CO	48.82	470			BR	2.037535	
0905	51.32	CO	48.82	470			BR	2.037535	
0215	0	CO	48.82	470			VC	8.782789	
4505	0	CO	48.82	470			VC	6.153465	
4305	0	CO	48.82	470			VC	39.44617	
3006	0	CO	48.82	470			VC	21.60025	
0912	0	CO	48.82	470			GRC	3.318789	
0912	0	CO	48.82	470			GRC	3.318789	
4405	55.23	SW	53.31	225			VC	23.34524	
0300	53.4	CO	49.896	500			BR	40.45986	1 in 1379
2200	53.11	CO	48.92	450			BR	27.58623	
2202	53.86	CO	0	225			VC	35.36381	
0216	0	CO	0	225			VC	5.270839	
4003	53.87	SW	55.25	225			VC	19.44336	
4003	53.87	SW	55.25	225			VC	19.44336	
9301	53.6	CO	44.64	1070			BR	87.20665	
4306	0	CO	44.64	1070			VC	16.29923	
4107	53.57	SW	52.06	225			VC	21.85461	1 in 219
2502	55.91	CO	49.04	800			CO	29.53287	1 in 90
4106	53.67	SW	0	225			VC	0.278681	
4413	57.1	FO	54.64	225			VC	23.34524	1 in 93
3521	0	CO	54.64	225			VC	11.38956	
3004	0	CO	54.64	225			VC	31.7805	
4306	0	CO	54.64	225			VC	38.59756	
4408	56.82	SW	54.83	225			VC	32.01562	1 in 52
0214	0	CO	54.83	225			VC	6.519656	
4101	54.18	CO	50.71	525			BR	55.44366	1 in 82
4412	57.42	SW	55.25	225			VC	29.72114	1 in 76
4301	56.08	FO	54.5	225			VC	35.51056	1 in 76
0208	0	CO	54.5	225			VC	10.04528	
3902	51.78	CO	49.32	375			CO	69.17107	1 in 37
3902	51.78	CO	49.32	375			CO	69.17107	1 in 37
2901	51.78	CO	49.32	375			VC	53.85165	
2901	51.78	CO	49.32	375			VC	53.85165	
4409	56.83	FO	54.53	225			VC	28.01785	
0900	51.43	CO	48.76	500			BR	8.219544	
0900	51.43	CO	48.76	500			BR	8.219544	
2201	53.61	CO	50	375			CO	53.07575	1 in 49
3002	52.82	CO	49.92	525			BR	27.78489	1 in 79
3002	52.82	CO	49.92	525			BR	27.78489	1 in 79
3002	53.67	CO	50.38	375			CO	67.17886	1 in 177
3003	52.01	CO	49.01	225			VC	18.97367	1 in 190
3003	52.01	CO	49.01	225			VC	18.97367	1 in 190
3305	56.15	CO	53.1						

Appendix C

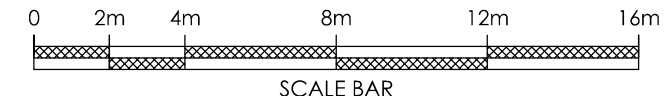
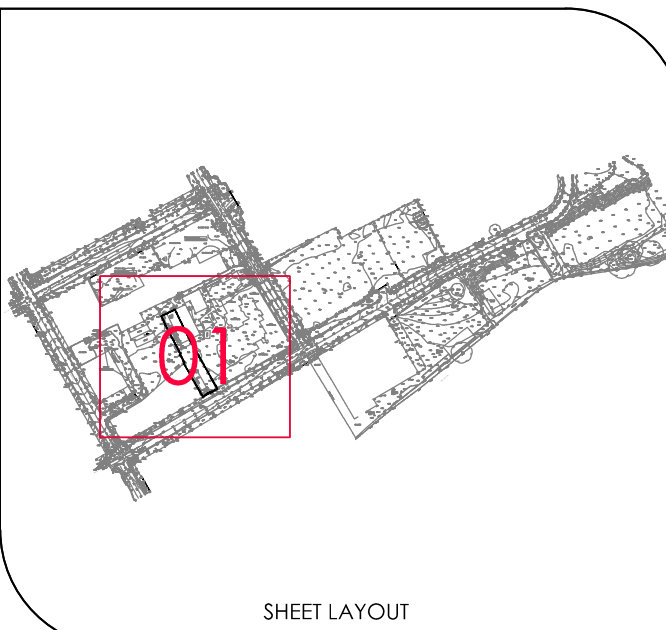
CCTV Drainage Survey



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File Name: S23736-U.dwg



REV	DATE	DESCRIPTION



Client
Manchester Life Development Company Limited
Unit 5
Royal Mill
17 Redhill Street
Manchester
M4 5BA

Project Title
Utility Survey of Land at:
Manchester Life
Ancoats
Manchester
Greater Manchester
M4 6AY

Surveyed B.Squires	Drawn D.Shipton	Checked B.Squires
Scale 1:200	Date Aug 22	Drawing Ref. S23736-U
No. 01	Size A2	Rev —

Appendix D

Topographical Survey



Survey Notes
Grid: Local plane metric related to National Grid
Levels: OS datum from GNSS positioning converted using the National Geoid Model OSGM15

Topographical Survey Legend

[illegible]

Sheet Index

SHEET 1

SHEET 2

Rev.	Date	Description
A	26/08/2020	Survey extended.
B	15/02/2021	Survey extended.

MANCHESTER LIFE STRATEGIC DEVELOPMENT COMPANY LTD
UNIT 5, ROYAL MILL, 17 REDHILL STREET
MANCHESTER M4 5BA

Project

MANCHESTER LIFE BACK OF ANCOATS

Drawing Title	TOPOGRAPHICAL SURVEY SHEET 1
---------------	---------------------------------

Drawn By ER	22/11/19	Survey Date NOV 2019
Checked by EAD	06/12/19	Scale 1:200@A0
Drawing No 56777_01_01		Revision B

Appendix E

Environment Agency Flood Map for Planning

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
385141/398771

Created
5 Mar 2023 19:43

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
385141/398771

Scale
1:2500

Created
5 Mar 2023 19:43

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area

0 20 40 60m



Appendix F

United Utilities Correspondence

Manchester LLFA Correspondence

Chloé Grimsley

From: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Sent: 25 August 2022 11:09
To: Charlie Smith
Subject: RE: 080866 - Manchester Life Plot A

Good Morning Charlie,

In principle we accept the below calculations based on the fact that infiltration is not feasible and that the calculations are in line with the MCC Local Flood Risk Management Strategy.

However, as the proposed outfall is to the United Utilities network, we would request that you seek confirmation from them that they approve of the below calculations before we can formally agree the proposed discharge rates.

Kind Regards,

Oliver

Oliver Timmins
Engineer (Flood Risk Management)
Mobile: 07814082200
Email: oliver.timmins@manchester.gov.uk

Lead Local Flood Authority
Highways
Growth & Development and Neighbourhoods Directorate
Manchester City Council
PO Box 532 Town Hall
Manchester
M60 2LA

Web: <http://www.manchester.gov.uk>

From: Charlie Smith <Charlie.Smith@curtins.com>
Sent: 12 August 2022 15:15
To: Oliver Timmins <oliver.timmins@manchester.gov.uk>
Cc: Chloé Grimsley <Chloe.Grimmsley@curtins.com>
Subject: 080866 - Manchester Life Plot A

Good afternoon,

We are currently producing a drainage strategy for a site located off Jersey Street, Ancoats, Manchester M4 6BD (NGR – X:385138, Y:398775)

The scheme is to redevelop existing warehouse buildings and associated storage yard. The buildings are to be demolished and the area to be redeveloped for residential and commercial end use.

Infiltration testing has been undertaken and due to a naturally high water level infiltration has been proven as not feasible.

The site not located within close proximity to any watercourses.

Following SuDs hierarchy the next option is to discharge surface water flows to the public SW sewer. Reviewing United Utilities Sewer maps there are no SW Sewers within close proximity to the site.

The only option is to discharge to the existing public combined sewer located within Jersey Street.

Following a CCTV survey of the site, it is evident that surface water is positively draining to the existing public combined sewer in Jersey Street.

We have calculated existing flows from the site (0.62ha) using the Wallingford Modified rational method and the results are below;

1:1 year rainfall event = 24.6l/s
1:30 year rainfall event = 63.4l/s
1:100 year rainfall event = 80.7l/s

Taking the existing flows generated from the full site, less the existing building to remain and applying a 50% reduction in flows in line with existing planning policies, the proposed discharge rate for the redeveloped areas are as follows;

1:1 year rainfall event $4.4/2$ (50%) = 12.3 l/s
1:30 year rainfall event $11.3/2$ (50%) = 31.7 l/s
1:100 year rainfall event $14.3/2$ (50%) = 40.4 l/s

In order to achieve the above flow restrictions, a flow control device would be located within the last chamber prior to discharging to the public CO sewer. We propose to discharge SW at a maximum rate of 40.4l/s.

Flows in excess of these rates will be stored on site using appropriate SuDs features.

Foul water flows are assumed to connect via a new connections into the public sewer within Jersey Street.

If you have any questions please do not hesitate to get in contact.

Kind Regards,

Charlie Smith
Civil Engineer
T. 0161 236 2394
charlie.smith@curtins.com

Merchant Exchange
17-19 Whitworth Street West
Manchester M1 5WG



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Chloé Grimsley

From: wastewaterdeveloperservices@uuplc.co.uk
Sent: 25 August 2022 13:45
To: Charlie Smith
Cc: Chloé Grimsley
Subject: RE: 080866 - Manchester Life Plot A - UU Ref. 02665143

Good afternoon Charlie,

Pre Development Enquiry for: Manchester Life Plot A UU Reference Number : 02665143

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.

If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 6723 723 or refer to the link below:

<https://www.unitedutilities.com/builders-developers/working-near-our-assets/>

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

Our preferred point of discharge would be to the 300*406mm public combined sewer within Jersey Street located to the South of your proposed development at an unrestricted rate.

If you are able to identify an alternative, more suitable point of discharge, we request that you contact us at your earliest convenience so that we can assess suitability.

Please ensure all proposed manhole chambers cover levels and finished floor levels are higher than the receiving public sewer.

Surface Water

All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.

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

This is outlined as follows, in order of priority:

1. **into the ground (infiltration);**
2. **to a surface waterbody;**
3. **to a surface water sewer or highway drain;**

4. to a combined sewer.

For guidance, The [North West SuDS Pro-Forma](#) provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.

The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).

The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration

Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.

A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.

Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:

<https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs>

If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:

<https://www.gov.uk/government/publications/groundwater-protection-position-statements>

Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Waterbody

United Utilities acknowledge that the nearest watercourse is a significant distance off-site.

Highway Drainage

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you investigate the possibility of draining surface water to the highway drain where this ultimately discharges to a watercourse, by contacting the relevant Highway Authority.

Public Sewer

In accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted, as outlined in the North West SuDS pro-forma.

Once evidence is provided as outlined above, United Utilities will consider a connection to the 300*406mm public combined sewer within Jersey Street located South of the proposed site at a pass-forward flow to be agreed upon

by the Lead Local Flood Authority.

We have noted that you have provided brownfield calculations. Unfortunately, we don't agree with the impermeable area estimation, according to the provided existing drainage details, it shows that the existing parking area and hard standing area are not positively drained to the public sewer.

We have calculated the building footprint is draining to our network which is the positive drainage area = 0.2ha. Using the Wallingford Procedure Methodology Calculation = $2.78 \times \text{CiA} = 2.78 \times 1 \times 50 \times 0.2 = 27.8 \text{ l/s}$, after 50% betterment it became 14l/s.

And as such United Utilities request that any agreed rate does not exceed 14l/s (anticipated QBar rate from the site impermeable areas only).

As a Water Company, we have no obligation to accept highway drainage into our public sewer network. However, should your proposals include runoff from highways, we would request that consideration is given to SuDS components that deliver source control are incorporated within the design of the scheme to reduce the volume and frequency of discharges of these flows to the public sewer.

Levels

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Land drainage / Overland flows / track drainage

United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the public sewerage network under any circumstances

Existing Wastewater Assets Crossing the Site

We have reviewed our records and can confirm that there does not appear to be any charted public sewers located within the boundary of proposed development. However, due to the accuracy of the records and the public sewer transfer legislation in 2011, not all public sewers are shown on our records so we would ask that you proceed with caution and carry out your own site investigation works. If any uncharted sewers are identified while carrying out your works we would ask that you contact United Utilities at the earliest opportunity so that we can offer guidance and update our records.

Existing Water Assets Crossing the Site

It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address: DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/>

Connection Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:

<https://www.unitedutilities.com/builders-developers/wastewater-services/sewer-connections/sewer-connection/>

We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.

Many thanks and kind regards,



Mohammed Aljafarawi (He/Him)

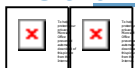
Developer Engineer
Developer Services & Metering
Customer Services

M: 07950474499

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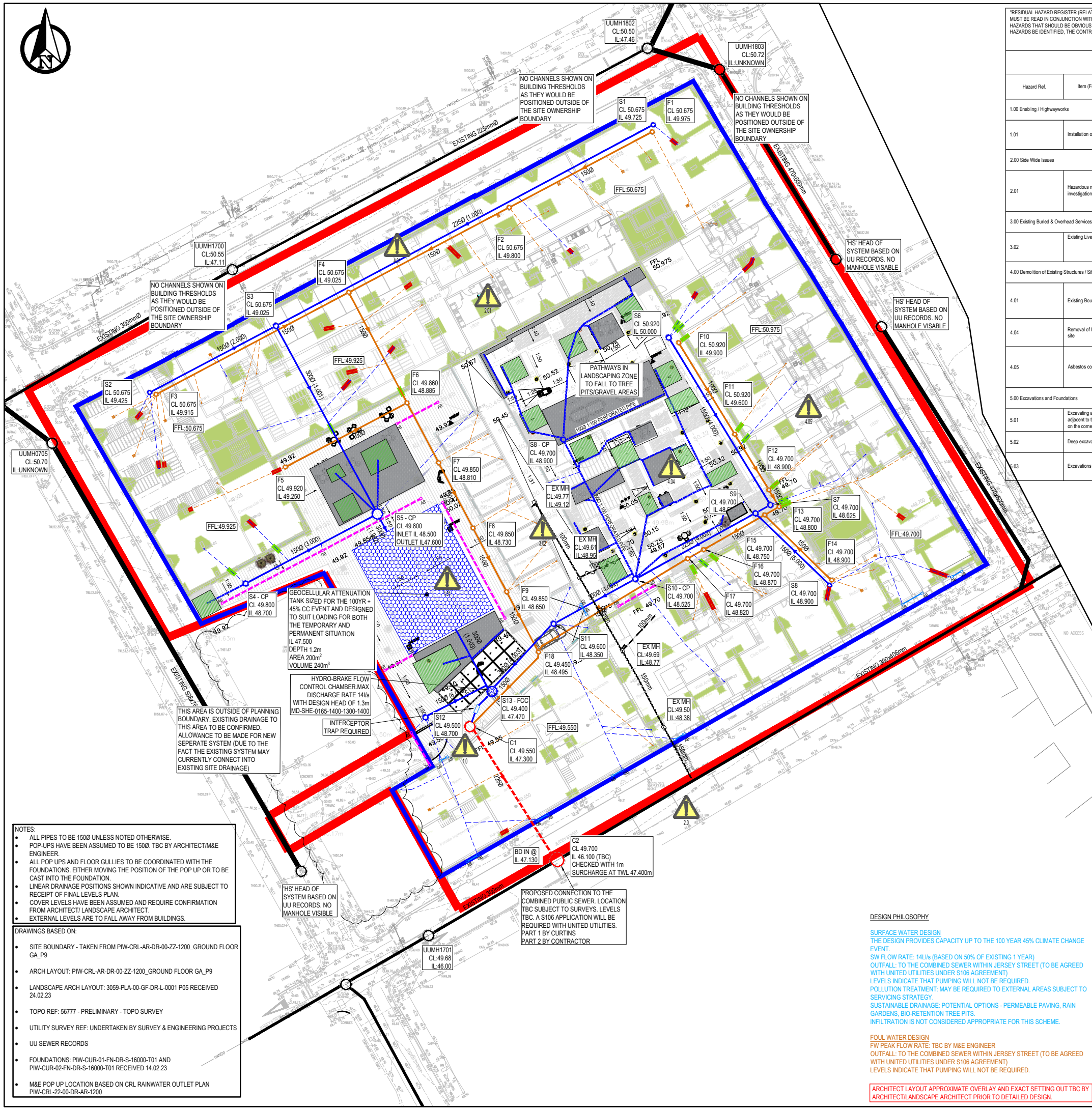
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Appendix G

Drainage Strategy Plan



- NOTES:**
- ALL PIPES TO BE 1500 UNLESS NOTED OTHERWISE.
 - POP-UPS HAVE BEEN ASSUMED TO BE 1500. TBC BY ARCHITECT/M&E ENGINEER.
 - ALL POP UPS AND FLOOR GULLIES TO BE COORDINATED WITH THE FOUNDATIONS. EITHER MOVING THE POSITION OF THE POP UP OR TO BE CAST INTO THE FOUNDATION.
 - LINEAR DRAINAGE POSITIONS SHOWN INDICATIVE AND ARE SUBJECT TO RECEIPT OF FINAL LEVELS PLAN.
 - COVER LEVELS HAVE BEEN ASSUMED AND REQUIRE CONFIRMATION FROM ARCHITECT/ LANDSCAPE ARCHITECT.
 - EXTERNAL LEVELS ARE TO FALL AWAY FROM BUILDINGS.
- DRAWINGS BASED ON:**
- SITE BOUNDARY - TAKEN FROM PIW-CRL-AR-DR-00-ZZ-1200_GROUND FLOOR GA_P9
 - ARCH LAYOUT: PIW-CRL-AR-DR-00-ZZ-1200_GROUND FLOOR GA_P9
 - LANDSCAPE ARCH LAYOUT: 3059-PLA-00-GF-DR-L-0001 P05 RECEIVED 24.02.23
 - TOPO REF: 56777 - PRELIMINARY - TOPO SURVEY
 - UTILITY SURVEY REF: UNDERTAKEN BY SURVEY & ENGINEERING PROJECTS
 - UU SEWER RECORDS
 - FOUNDATIONS: PIW-CUR-01-FN-DR-S-16000-T01 AND PIW-CUR-02-FN-DR-S-16000-T01 RECEIVED 14.02.23
 - M&E POP UP LOCATION BASED ON CRL RAINWATER OUTLET PLAN PIW-CRL-22-00-DR-AR-1200

HAZARD REGISTER			
Hazard Ref.	Item (Feature, Element or Activity)	Potential Hazard Identified	Action (Information to Assist Control)
1.00 Enabling / Highwayworks			
1.01	Installation of below ground attenuation tank	Risk to construction workers and equipment working in deep excavations	Tank is located within the courtyard to allow for battered excavations.
2.00 Side Wide Issues			
2.01	Hazardous materials identified in site investigation	Risk to construction workers via inhalation or ingest.	Contractor to ensure hazardous materials are appropriately identified and removed under the appropriate waste management strategy. Contact between hazardous ground and site staff visitors should be avoided.
3.00 Existing Buried & Overhead Services			
3.02	Existing Live Services	Existing Live Services - particularly if services are to be retained through development.	Carry out additional surveys and investigations to locate and protect the services in co-ordination with Services Engineer/Statutory Undertakers.
4.00 Demolition of Existing Structures / Site Clearance			
4.01	Existing Boundary Walls	Excessive Loading/Collapse during site strip and construction works.	Demolition contractor to provide detailed demolition method statement. Survey to be undertaken to establish existing construction Contractors Method Statement to consider sequencing of works.
4.04	Removal of large areas of handstanding on site	Conditions under slabs unknown. Potential for buried services/ trenches/ voids/ buried obstructions etc.	Service clearances should be undertaken in any areas previously inaccessible
4.05	Asbestos containing materials	Asbestos findings have been recorded in the phase 2 Site Investigation	Contractor to ensure hazardous materials are appropriately identified and removed under the appropriate waste management strategy. Contact between hazardous ground and site staff visitors should be avoided.
5.00 Excavations and Foundations			
5.01	Excavating and foundation construction adjacent to the existing two storey structure on the corner of Radium and Jersey Street	Risk of undermining existing structure	Trial pits to be undertaken to establish full extent of existing foundations.
5.02	Deep excavations >3m deep	Excavation Stability	Sequencing of works to be considered and appropriate retention and protection.
6.03	Excavations adjacent to existing highways	Potential undermining of substructure	Survey clearances of pavements to be undertaken.

KEY:

- PLANNING BOUNDARY (TAKEN FROM 3059-PLA-00-GF-DR-L-0001)
- OWNERSHIP BOUNDARY (TAKEN FROM MCC PLAN RECEIVED 12.02.23)
- EXISTING COMBINED PUBLIC SEWER
- PROPOSED PRIVATE COMBINED DRAIN
- PROPOSED PRIVATE FOUL DRAIN
- PROPOSED PRIVATE SURFACE DRAIN
- PROPOSED LAND DRAINAGE FOR GRAVEL AREAS AND TREE PITS
- PROPOSED ATTENUATION SYSTEM (TYPE TO BE CONFIRMED)
- PROPOSED FLOW CONTROL CHAMBER
- PROPOSED PRIVATE FOUL MANHOLE OR PPIC (REFER TO SCHEDULE)
- PROPOSED PRIVATE SURFACE MANHOLE OR PPIC (REFER TO SCHEDULE)
- PROPOSED OUTLET CONNECTIONS
- PROPOSED RWP AND CONNECTION
- PROPOSED FOUL POPUP AND CONNECTION
- PROPOSED FACADE / THRESHOLD DRAIN & ACCESS/ OUTLET BOX (TYPE TBC)
- PROPOSED SLOT DRAIN & ACCESS/OUTLET BOX (TYPE TBC)
- TREE PIT EXTENTS - TBC BY LANDSCAPE ARCHITECT. OUTLETS SHOWN INDICATIVELY
- REINFORCED GRAVEL EXTENTS - TBC BY LANDSCAPE ARCHITECT OUTLET SHOWN INDICATIVELY
- EXISTING DRAINAGE TO BE ABANDONED
- DRAINAGE TO PASS OVER FOUNDATIONS
- DRAINAGE TO PASS THROUGH FOUNDATIONS

DESIGN PHILOSOPHY

SURFACE WATER DESIGN
THE DESIGN PROVIDES CAPACITY UP TO THE 100 YEAR 45% CLIMATE CHANGE EVENT.
SW FLOW RATE: 14L/s (BASED ON 50% OF EXISTING 1 YEAR)
OUTFALL: TO THE COMBINED SEWER WITHIN JERSEY STREET (TO BE AGREED WITH UNITED UTILITIES UNDER S106 AGREEMENT)
LEVELS INDICATE THAT PUMPING WILL NOT BE REQUIRED.
POLLUTION TREATMENT: MAY BE REQUIRED TO EXTERNAL AREAS SUBJECT TO SERVICING STRATEGY
SUSTAINABLE DRAINAGE: POTENTIAL OPTIONS - PERMEABLE PAVING, RAIN GARDENS, BIO-RETENTION TREE PITS.
INFILTRATION IS NOT CONSIDERED APPROPRIATE FOR THIS SCHEME.

FOUL WATER DESIGN
FW PEAK FLOW RATE: TBC BY M&E ENGINEER
OUTFALL: TO THE COMBINED SEWER WITHIN JERSEY STREET (TO BE AGREED WITH UNITED UTILITIES UNDER S106 AGREEMENT)
LEVELS INDICATE THAT PUMPING WILL NOT BE REQUIRED.

ARCHITECT LAYOUT APPROXIMATE OVERLAY AND EXACT SETTING OUT TBC BY ARCHITECT/LANDSCAPE ARCHITECT PRIOR TO DETAILED DESIGN.

GENERAL NOTES:

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
- DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF DESIGN.
- THIS DRAWING HAS BEEN BASED ON STAGE 3 DESIGN TEAM INFORMATION AND IS SUBJECT TO CHANGE.
- THE DRAINAGE LAYOUT SHOULD BE READ IN CONJUNCTION WITH THE DRAINAGE NOTES DRAWING. REFER TO DRAINAGE NOTES DRAWING PIW-CUR-XX-XX-DR-C-92530.

MANCHESTER LIFE PLOT A

DRAINAGE LAYOUT

curtins
Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
0161 235 2394
manchester@curtins.com
www.curtins.com

TENDER

MANCHESTER LIFE PLOT A

DRAINAGE LAYOUT

Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	27.02.23	PG	PG	CG
Scale:	1:250			
Project No:	Originator:	Volume:	Level:	Type:
PIW - CUR - XX - - - DR - C - 92001 - P02				

Appendix H

Proposed Surface Water Calculations

Curtins Consulting Ltd		Page 3
.	Phoenix Works	
.	Ancoats, Manchester	
.	SW Network V1 02.03.23	
Date 01/03/2023	Designed by grimsley_c	
File PHOENIX IRONWORKS SURFA...	Checked by	
Innovyze	Network 2019.1	

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	50.675	0.950	Open Manhole	450	1.000	49.725	225				
S2	50.675	1.250	Open Manhole	450	2.000	49.425	150				
S3	50.675	1.650	Open Manhole	1200	1.001	49.025	300	1.000	49.125	225	25
								2.000	49.175	150	
S4	49.800	0.900	Open Manhole	450	3.000	48.900	150				
S5	49.800	1.300	Open Manhole	1200	1.002	48.500	300	1.001	48.770	300	270
								3.000	48.650	150	
TANK	49.400	1.900	Open Manhole	1200	1.003	47.500	300	1.002	48.470	300	970
S6	50.920	0.920	Open Manhole	450	4.000	50.000	150				
S7	49.700	1.075	Open Manhole	600	4.001	48.625	225	4.000	48.700	150	
S8	49.700	0.800	Open Manhole	450	5.000	48.900	150				
S9	49.700	1.175	Open Manhole	600	4.002	48.525	225	4.001	48.525	225	
								5.000	48.625	150	25
S10	50.500	1.150	Open Manhole	450	6.000	49.350	150				
S11	49.620	1.320	Open Manhole	600	4.003	48.300	300	4.002	48.375	225	
								6.000	48.450	150	
S12	49.600	1.400	Open Manhole	600	4.004	48.200	300	4.003	48.200	300	
S13	49.500	0.800	Open Manhole	450	7.000	48.700	150				
S14	49.400	1.930	Open Manhole	1500	1.004	47.470	300	1.003	47.470	300	
								4.004	48.050	300	580
								7.000	48.600	150	980
UU SEWER	49.700	2.280	Open Manhole	0		OUTFALL		1.004	47.420	300	

No coordinates have been specified, layout information cannot be produced.

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	S1	50.675	49.725	0.725	Open Manhole	450
2.000	o	150	S2	50.675	49.425	1.100	Open Manhole	450
1.001	o	300	S3	50.675	49.025	1.350	Open Manhole	1200
3.000	o	150	S4	49.800	48.900	0.750	Open Manhole	450
1.002	o	300	S5	49.800	48.500	1.000	Open Manhole	1200
1.003	o	300	TANK	49.400	47.500	1.600	Open Manhole	1200
4.000	o	150	S6	50.920	50.000	0.770	Open Manhole	450
4.001	o	225	S7	49.700	48.625	0.850	Open Manhole	600
5.000	o	150	S8	49.700	48.900	0.650	Open Manhole	450
4.002	o	225	S9	49.700	48.525	0.950	Open Manhole	600
6.000	o	150	S10	50.500	49.350	1.000	Open Manhole	450
4.003	o	300	S11	49.620	48.300	1.020	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	55.000	91.7	S3	50.675	49.125	1.325	Open Manhole	1200
2.000	18.000	72.0	S3	50.675	49.175	1.350	Open Manhole	1200
1.001	27.000	105.9	S5	49.800	48.770	0.730	Open Manhole	1200
3.000	19.000	76.0	S5	49.800	48.650	1.000	Open Manhole	1200
1.002	4.500	150.0	TANK	49.400	48.470	0.630	Open Manhole	1200
1.003	5.000	166.7	S14	49.400	47.470	1.630	Open Manhole	1500
4.000	25.000	19.2	S7	49.700	48.700	0.850	Open Manhole	600
4.001	2.000	20.0	S9	49.700	48.525	0.950	Open Manhole	600
5.000	13.000	47.3	S9	49.700	48.625	0.925	Open Manhole	600
4.002	17.000	113.3	S11	49.620	48.375	1.020	Open Manhole	600
6.000	22.000	24.4	S11	49.620	48.450	1.020	Open Manhole	600
4.003	12.000	120.0	S12	49.600	48.200	1.100	Open Manhole	600

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
4.004	o	300	S12	49.600	48.200	1.100	Open Manhole	600
7.000	o	150	S13	49.500	48.700	0.650	Open Manhole	450
1.004	o	300	S14	49.400	47.470	1.630	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
4.004	11.000	73.3	S14	49.400	48.050	1.050	Open Manhole	1500
7.000	9.000	90.0	S14	49.400	48.600	0.650	Open Manhole	1500
1.004	6.000	120.0	UU SEWER	49.700	47.420	1.980	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.056	0.056	0.056
2.000	-	-	100	0.052	0.052	0.052
1.001	-	-	100	0.055	0.055	0.055
3.000	-	-	100	0.060	0.060	0.060
1.002	-	-	100	0.020	0.020	0.020
1.003	-	-	100	0.035	0.035	0.035
4.000	-	-	100	0.052	0.052	0.052
4.001	-	-	100	0.040	0.040	0.040
5.000	-	-	100	0.035	0.035	0.035
4.002	-	-	100	0.029	0.029	0.029
6.000	-	-	100	0.030	0.030	0.030
4.003	-	-	100	0.010	0.010	0.010
4.004	-	-	100	0.024	0.024	0.024
7.000	-	-	100	0.028	0.028	0.028
1.004	-	-	100	0.044	0.044	0.044
				Total	Total	Total
				0.570	0.570	0.570

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004	UU SEWER	49.700	47.420	46.100	0	0

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<u>Online Controls for Storm</u> <u>Hydro-Brake® Optimum Manhole: S14, DS/PN: 1.004, Volume (m³): 4.5</u> <table><tr><td>Unit Reference</td><td>MD-SHE-0165-1400-1300-1400</td></tr><tr><td>Design Head (m)</td><td>1.300</td></tr><tr><td>Design Flow (l/s)</td><td>14.0</td></tr><tr><td>Flush-Flo™</td><td>Calculated</td></tr><tr><td>Objective</td><td>Minimise upstream storage</td></tr><tr><td>Application</td><td>Surface</td></tr><tr><td>Sump Available</td><td>Yes</td></tr><tr><td>Diameter (mm)</td><td>165</td></tr><tr><td>Invert Level (m)</td><td>47.470</td></tr><tr><td>Minimum Outlet Pipe Diameter (mm)</td><td>225</td></tr><tr><td>Suggested Manhole Diameter (mm)</td><td>1500</td></tr></table> <table><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr><tr><td>Design Point (Calculated)</td><td>1.300</td><td>14.0</td></tr><tr><td>Flush-Flo™</td><td>0.387</td><td>14.0</td></tr><tr><td>Kick-Flo®</td><td>0.850</td><td>11.5</td></tr><tr><td>Mean Flow over Head Range</td><td>-</td><td>12.1</td></tr></table> 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 <table><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr><tr><td>0.100</td><td>5.9</td><td>1.200</td><td>13.5</td><td>3.000</td><td>20.8</td><td>7.000</td><td>31.3</td></tr><tr><td>0.200</td><td>13.0</td><td>1.400</td><td>14.5</td><td>3.500</td><td>22.4</td><td>7.500</td><td>32.4</td></tr><tr><td>0.300</td><td>13.8</td><td>1.600</td><td>15.4</td><td>4.000</td><td>23.9</td><td>8.000</td><td>33.4</td></tr><tr><td>0.400</td><td>14.0</td><td>1.800</td><td>16.3</td><td>4.500</td><td>25.3</td><td>8.500</td><td>34.4</td></tr><tr><td>0.500</td><td>13.8</td><td>2.000</td><td>17.2</td><td>5.000</td><td>26.6</td><td>9.000</td><td>35.3</td></tr><tr><td>0.600</td><td>13.6</td><td>2.200</td><td>18.0</td><td>5.500</td><td>27.9</td><td>9.500</td><td>36.3</td></tr><tr><td>0.800</td><td>12.2</td><td>2.400</td><td>18.7</td><td>6.000</td><td>29.1</td><td></td><td></td></tr><tr><td>1.000</td><td>12.4</td><td>2.600</td><td>19.5</td><td>6.500</td><td>30.2</td><td></td><td></td></tr></table>			Unit Reference	MD-SHE-0165-1400-1300-1400	Design Head (m)	1.300	Design Flow (l/s)	14.0	Flush-Flo™	Calculated	Objective	Minimise upstream storage	Application	Surface	Sump Available	Yes	Diameter (mm)	165	Invert Level (m)	47.470	Minimum Outlet Pipe Diameter (mm)	225	Suggested Manhole Diameter (mm)	1500	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.300	14.0	Flush-Flo™	0.387	14.0	Kick-Flo®	0.850	11.5	Mean Flow over Head Range	-	12.1	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	5.9	1.200	13.5	3.000	20.8	7.000	31.3	0.200	13.0	1.400	14.5	3.500	22.4	7.500	32.4	0.300	13.8	1.600	15.4	4.000	23.9	8.000	33.4	0.400	14.0	1.800	16.3	4.500	25.3	8.500	34.4	0.500	13.8	2.000	17.2	5.000	26.6	9.000	35.3	0.600	13.6	2.200	18.0	5.500	27.9	9.500	36.3	0.800	12.2	2.400	18.7	6.000	29.1			1.000	12.4	2.600	19.5	6.500	30.2		
Unit Reference	MD-SHE-0165-1400-1300-1400																																																																																																														
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<u>Storage Structures for Storm</u> <u>Cellular Storage Manhole: TANK, DS/PN: 1.003</u> Invert Level (m) 47.500 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>200.0</td><td>200.0</td><td>5.200</td><td>0.0</td><td>267.9</td></tr><tr><td>0.400</td><td>200.0</td><td>222.6</td><td>5.600</td><td>0.0</td><td>267.9</td></tr><tr><td>0.800</td><td>200.0</td><td>245.3</td><td>6.000</td><td>0.0</td><td>267.9</td></tr><tr><td>1.200</td><td>200.0</td><td>267.9</td><td>6.400</td><td>0.0</td><td>267.9</td></tr><tr><td>1.201</td><td>0.0</td><td>267.9</td><td>6.800</td><td>0.0</td><td>267.9</td></tr><tr><td>2.000</td><td>0.0</td><td>267.9</td><td>7.200</td><td>0.0</td><td>267.9</td></tr><tr><td>2.400</td><td>0.0</td><td>267.9</td><td>7.600</td><td>0.0</td><td>267.9</td></tr><tr><td>2.800</td><td>0.0</td><td>267.9</td><td>8.000</td><td>0.0</td><td>267.9</td></tr><tr><td>3.200</td><td>0.0</td><td>267.9</td><td>8.400</td><td>0.0</td><td>267.9</td></tr><tr><td>3.600</td><td>0.0</td><td>267.9</td><td>8.800</td><td>0.0</td><td>267.9</td></tr><tr><td>4.000</td><td>0.0</td><td>267.9</td><td>9.200</td><td>0.0</td><td>267.9</td></tr><tr><td>4.400</td><td>0.0</td><td>267.9</td><td>9.600</td><td>0.0</td><td>267.9</td></tr><tr><td>4.800</td><td>0.0</td><td>267.9</td><td>10.000</td><td>0.0</td><td>267.9</td></tr></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	200.0	200.0	5.200	0.0	267.9	0.400	200.0	222.6	5.600	0.0	267.9	0.800	200.0	245.3	6.000	0.0	267.9	1.200	200.0	267.9	6.400	0.0	267.9	1.201	0.0	267.9	6.800	0.0	267.9	2.000	0.0	267.9	7.200	0.0	267.9	2.400	0.0	267.9	7.600	0.0	267.9	2.800	0.0	267.9	8.000	0.0	267.9	3.200	0.0	267.9	8.400	0.0	267.9	3.600	0.0	267.9	8.800	0.0	267.9	4.000	0.0	267.9	9.200	0.0	267.9	4.400	0.0	267.9	9.600	0.0	267.9	4.800	0.0	267.9	10.000	0.0	267.9
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)																																																																																	
0.000	200.0	200.0	5.200	0.0	267.9																																																																																	
0.400	200.0	222.6	5.600	0.0	267.9																																																																																	
0.800	200.0	245.3	6.000	0.0	267.9																																																																																	
1.200	200.0	267.9	6.400	0.0	267.9																																																																																	
1.201	0.0	267.9	6.800	0.0	267.9																																																																																	
2.000	0.0	267.9	7.200	0.0	267.9																																																																																	
2.400	0.0	267.9	7.600	0.0	267.9																																																																																	
2.800	0.0	267.9	8.000	0.0	267.9																																																																																	
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3.600	0.0	267.9	8.800	0.0	267.9																																																																																	
4.000	0.0	267.9	9.200	0.0	267.9																																																																																	
4.400	0.0	267.9	9.600	0.0	267.9																																																																																	
4.800	0.0	267.9	10.000	0.0	267.9																																																																																	
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File PHOENIX IRONWORKS SURFA...				Checked by					
Innovyze				Network 2019.1					
Summary of Critical Results by Maximum Level (Rank 1) for Storm									
Simulation Criteria									
Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000									
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000									
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800									
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000									
Foul Sewage per hectare (l/s) 0.000									
Number of Input Hydrographs 0 Number of Storage Structures 1									
Number of Online Controls 1 Number of Time/Area Diagrams 0									
Number of Offline Controls 0 Number of Real Time Controls 0									
Synthetic Rainfall Details									
Rainfall Model FSR Ratio R 0.358									
Region England and Wales Cv (Summer) 0.750									
M5-60 (mm) 18.000 Cv (Winter) 0.840									
Margin for Flood Risk Warning (mm) 300.0									
Analysis Timestep 2.5 Second Increment (Extended)									
DTS Status OFF									
DVD Status ON									
Inertia Status ON									
Profile(s) Summer and Winter									
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440									
Return Period(s) (years) 1									
Climate Change (%) 0									
Water Level									
US/MH Return Climate First (X) First (Y) First (Z) Overflow Level									
PN Name Storm Period Change Surcharge Flood Overflow Act. (m)									
1.000 S1 15 Winter 1 +0% 49.780									
2.000 S2 15 Winter 1 +0% 49.485									
1.001 S3 15 Winter 1 +0% 49.116									
3.000 S4 15 Winter 1 +0% 48.966									
1.002 S5 15 Winter 1 +0% 48.651									
1.003 TANK 120 Winter 1 +0% 47.643									
4.000 S6 15 Winter 1 +0% 50.042									
4.001 S7 15 Winter 1 +0% 48.700									
5.000 S8 15 Winter 1 +0% 48.944									
4.002 S9 15 Winter 1 +0% 48.627									
6.000 S10 15 Winter 1 +0% 49.383									
4.003 S11 15 Winter 1 +0% 48.411									
4.004 S12 15 Winter 1 +0% 48.305									
7.000 S13 15 Winter 1 +0% 48.747									
1.004 S14 15 Winter 1 +0% 1/15 Summer 47.795									
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Ancoats, Manchester
SW Network V1 02.03.23
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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Pipe	Status	Level Exceeded
	Name	Depth (m)	Volume (m³)			Flow (l/s)		
1.000	S1	-0.135	0.000	0.33		17.2		OK
2.000	S2	-0.045	0.000	0.84		16.4		OK
1.001	S3	-0.145	0.000	0.52		50.4		OK
3.000	S4	0.032	0.000	0.94		18.0	SURCHARGED	
1.002	S5	0.046	0.000	1.27		73.9	SURCHARGED	
1.003	TANK	0.180	0.000	0.25		14.4	SURCHARGED	
4.000	S6	-0.082	0.000	0.42		16.4		OK
4.001	S7	0.029	0.000	0.63		28.2	SURCHARGED	
5.000	S8	-0.078	0.000	0.47		11.0		OK
4.002	S9	0.029	0.000	1.08		47.0	SURCHARGED	
6.000	S10	-0.097	0.000	0.28		9.5		OK
4.003	S11	-0.103	0.000	0.75		59.1		OK
4.004	S12	-0.116	0.000	0.68		66.2		OK
7.000	S13	-0.072	0.000	0.54		8.8		OK
1.004	S14	0.209	0.000	0.23		14.0	SURCHARGED	

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Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004	UU SEWER	49.700	47.420	46.100	0	0

Datum (m) 46.100 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
60	1.300	300	1.300	540	1.300	780	1.300	1020	1.300	1260	1.300
120	1.300	360	1.300	600	1.300	840	1.300	1080	1.300	1320	1.300
180	1.300	420	1.300	660	1.300	900	1.300	1140	1.300	1380	1.300
240	1.300	480	1.300	720	1.300	960	1.300	1200	1.300	1440	1.300

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<u>Online Controls for Storm</u> <u>Hydro-Brake® Optimum Manhole: S14, DS/PN: 1.004, Volume (m³): 4.5</u> <table><tr><td>Unit Reference</td><td>MD-SHE-0165-1400-1300-1400</td></tr><tr><td>Design Head (m)</td><td>1.300</td></tr><tr><td>Design Flow (l/s)</td><td>14.0</td></tr><tr><td>Flush-Flo™</td><td>Calculated</td></tr><tr><td>Objective</td><td>Minimise upstream storage</td></tr><tr><td>Application</td><td>Surface</td></tr><tr><td>Sump Available</td><td>Yes</td></tr><tr><td>Diameter (mm)</td><td>165</td></tr><tr><td>Invert Level (m)</td><td>47.470</td></tr><tr><td>Minimum Outlet Pipe Diameter (mm)</td><td>225</td></tr><tr><td>Suggested Manhole Diameter (mm)</td><td>1500</td></tr></table> <table><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr><tr><td>Design Point (Calculated)</td><td>1.300</td><td>14.0</td></tr><tr><td>Flush-Flo™</td><td>0.387</td><td>14.0</td></tr><tr><td>Kick-Flo®</td><td>0.850</td><td>11.5</td></tr><tr><td>Mean Flow over Head Range</td><td>-</td><td>12.1</td></tr></table> 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 <table><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr><tr><td>0.100</td><td>5.9</td><td>1.200</td><td>13.5</td><td>3.000</td><td>20.8</td><td>7.000</td><td>31.3</td></tr><tr><td>0.200</td><td>13.0</td><td>1.400</td><td>14.5</td><td>3.500</td><td>22.4</td><td>7.500</td><td>32.4</td></tr><tr><td>0.300</td><td>13.8</td><td>1.600</td><td>15.4</td><td>4.000</td><td>23.9</td><td>8.000</td><td>33.4</td></tr><tr><td>0.400</td><td>14.0</td><td>1.800</td><td>16.3</td><td>4.500</td><td>25.3</td><td>8.500</td><td>34.4</td></tr><tr><td>0.500</td><td>13.8</td><td>2.000</td><td>17.2</td><td>5.000</td><td>26.6</td><td>9.000</td><td>35.3</td></tr><tr><td>0.600</td><td>13.6</td><td>2.200</td><td>18.0</td><td>5.500</td><td>27.9</td><td>9.500</td><td>36.3</td></tr><tr><td>0.800</td><td>12.2</td><td>2.400</td><td>18.7</td><td>6.000</td><td>29.1</td><td></td><td></td></tr><tr><td>1.000</td><td>12.4</td><td>2.600</td><td>19.5</td><td>6.500</td><td>30.2</td><td></td><td></td></tr></table>			Unit Reference	MD-SHE-0165-1400-1300-1400	Design Head (m)	1.300	Design Flow (l/s)	14.0	Flush-Flo™	Calculated	Objective	Minimise upstream storage	Application	Surface	Sump Available	Yes	Diameter (mm)	165	Invert Level (m)	47.470	Minimum Outlet Pipe Diameter (mm)	225	Suggested Manhole Diameter (mm)	1500	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.300	14.0	Flush-Flo™	0.387	14.0	Kick-Flo®	0.850	11.5	Mean Flow over Head Range	-	12.1	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	5.9	1.200	13.5	3.000	20.8	7.000	31.3	0.200	13.0	1.400	14.5	3.500	22.4	7.500	32.4	0.300	13.8	1.600	15.4	4.000	23.9	8.000	33.4	0.400	14.0	1.800	16.3	4.500	25.3	8.500	34.4	0.500	13.8	2.000	17.2	5.000	26.6	9.000	35.3	0.600	13.6	2.200	18.0	5.500	27.9	9.500	36.3	0.800	12.2	2.400	18.7	6.000	29.1			1.000	12.4	2.600	19.5	6.500	30.2		
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Storage Structures for Storm

Cellular Storage Manhole: TANK, DS/PN: 1.003

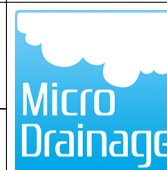
Invert Level (m) 47.500 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	200.0	200.0	5.200	0.0	267.9
0.400	200.0	222.6	5.600	0.0	267.9
0.800	200.0	245.3	6.000	0.0	267.9
1.200	200.0	267.9	6.400	0.0	267.9
1.201	0.0	267.9	6.800	0.0	267.9
2.000	0.0	267.9	7.200	0.0	267.9
2.400	0.0	267.9	7.600	0.0	267.9
2.800	0.0	267.9	8.000	0.0	267.9
3.200	0.0	267.9	8.400	0.0	267.9
3.600	0.0	267.9	8.800	0.0	267.9
4.000	0.0	267.9	9.200	0.0	267.9
4.400	0.0	267.9	9.600	0.0	267.9
4.800	0.0	267.9	10.000	0.0	267.9

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Phoenix Works
Ancoats, Manchester
SW Network V1 02.03.23
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Date	01/03/2023
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Network 2019.1

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.358
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	100
Climate Change (%)	45

									Water
	US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow
PN	Name	Storm	Period	Change		Surcharge	Flood	Overflow	Act.
1.000	S1	15 Winter	100	+45%					49.855
2.000	S2	15 Winter	100	+45%	100/15	Summer			49.929
1.001	S3	15 Winter	100	+45%					49.275
3.000	S4	15 Winter	100	+45%	100/15	Summer			49.752
1.002	S5	15 Winter	100	+45%	100/15	Summer			49.043
1.003	TANK	180 Winter	100	+45%	100/15	Summer			48.676
4.000	S6	15 Winter	100	+45%	100/15	Summer			50.169
4.001	S7	15 Winter	100	+45%	100/15	Summer			49.469
5.000	S8	15 Winter	100	+45%	100/15	Summer			49.519
4.002	S9	15 Winter	100	+45%	100/15	Summer			49.340
6.000	S10	15 Winter	100	+45%					49.427
4.003	S11	15 Winter	100	+45%	100/15	Summer			48.760
4.004	S12	180 Winter	100	+45%	100/15	Summer			48.681
7.000	S13	15 Summer	100	+45%					48.837
1.004	S14	180 Winter	100	+45%	100/15	Summer			48.679

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