







No 3 Circle Square, Manchester

Flood Risk Assessment and Drainage Strategy

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1.0 Introduction

1.1 Project Background

1.1.1 Curtins was appointed by Bruntwood to provide a Flood Risk Assessment (FRA) and Drainage Strategy (DS) for the proposed development of No. 3 Circle Square, Manchester. The site is centred around Grid Reference 384359, 397356.

1.1.2 The FRA provides information on the nature of flood risk at the site, following Government guidance with regards to development and flood risk. The FRA outlines the drainage requirements for the proposed site, with regards to relevant standards, guidance, and good practice.

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 proposals to mitigate any potential risk of flooding determined to be present; and
- Consider foul and surface water drainage proposals to mitigate flood risk from the site.

1.2.3 The Site lies within the Manchester Conurbation Core Critical Drainage Area (as identified in the Manchester, Salford and Trafford Level 2 Hybrid SFRA).

The total site area is approximately 1.04 hectares and following scrutiny of the UK Government Flood Map for Planning it has been identified that the majority of the existing site lies within Flood Zone 1, with the Northern boundary of the site located within Flood Zone 2 indicating that the probability of flooding

from rivers or sea (not taking into account flood defences or climate change) is medium risk. Since the site is in a Critical Drainage Area and within Flood Zone 2, a Flood Risk Assessment is required to support a planning application also taking into consideration the management of surface water run-off.

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 'major' developments.

1.2.5 A Drainage Strategy will therefore be required as part of the Full Planning Application for the development, as the development is considered to be 'major' development by the Town and Country Planning (Development Management Procedure) (England) Order 2015.

1.2.6 This FRA reviews the following information:

- Environment Agency flood maps for rivers and sea flooding.
- UK Government Long Term Flood Risk Information 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.
- Environment Agency Model Data from Manchester Ship Canal 2018 Study.
- United Utilities Public Sewer Records.
- Manchester City Council SuDS Requirements for New Developments.
- Survey Operations CCTV Survey Dated July 2012.
- Subscan Ltd CCTV Survey dated September 2015.
- GPR Survey by Survey Solutions dated October 2015.

1.2.7 It is also worth noting that as the site forms part of the wider Circle Square masterplan and wider infrastructure installed as part of earlier phases has considered this phase within the wider strategy. Therefore, reference will be made to agreements and drainage provision installed within previous phases under the following:

- Phase 1B/1C, Circle Square FRA & Drainage Strategy, ICMA0040/FRA/P1B/C Rev C, dated December 2016; and
- Phase 1B/1C, Circle Square Drainage & SuDS, ICMA0040/FRA/P1B/C Rev C, dated December 2016.
-

1.3 Proposed Development

1.3.1 The proposed Development comprises of a Ground + 14 storey office development with ground floor commercial uses on what was known as Plot 12 of the Circle Square Masterplan. It also includes Symphony Gardens, a landscaped outdoor garden area.

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 has previously been known as Plot 12, but is now being known as, and should be described as, No.3 Circle Square. The Site is currently surrounded by hoarding and is mostly hardstanding and has been used as a construction compound for building works around the masterplan area. There is no vegetation on Site.

2.1.2 The Site is bound by Newman Street (formerly Brancaster Road) to the north, Princess Street to the east, Premier Inn and MSCP, and Mancunian Way to the south and Manchester Technology Centre to the West. Refer to Figure 1 for the site location.

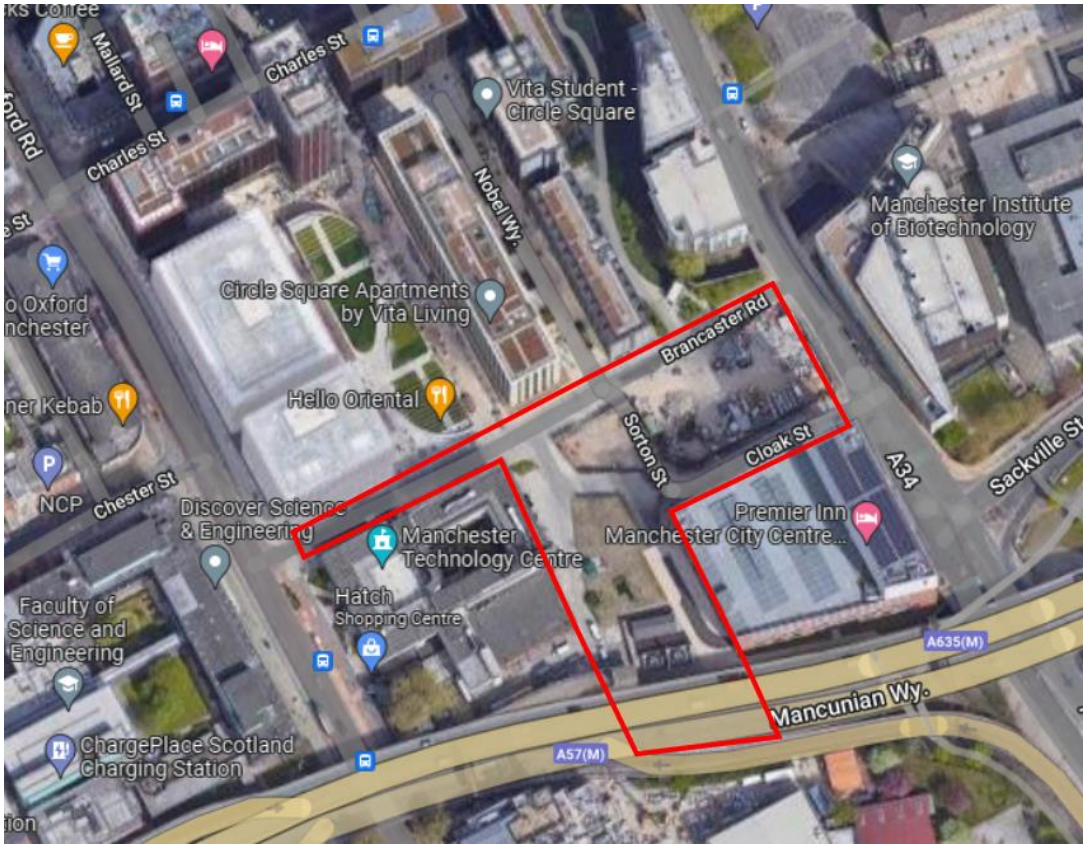


Figure 1: Aerial Photograph (© Google 2021)

2.2 Existing Watercourses and Other Waterbodies

2.2.1 The River Medlock; which is designated as a 'Main River' is located approximately 10m to the north of the site. The river flows in a south to north direction where it becomes culverted below Charles Street. The river generally flows in a western direction further downstream.

2.2.2 There is a lost watercourse approximately 300m north of the application site, which appears to connect to the River Medlock downstream of the site.

2.2.3 The Rochdale Canal is located approximately 360m North-west of the application site.

2.2.4 The Corn Brook is located approximately 550m south of the application site.

2.2.5 The River Irwell is located approximately 1.5km north-west of the application site.

2.3 Existing Drainage

2.3.1 The public sewer records have been obtained for the development site, an extract is shown in Figure 2 and the records are enclosed in *Appendix B*.

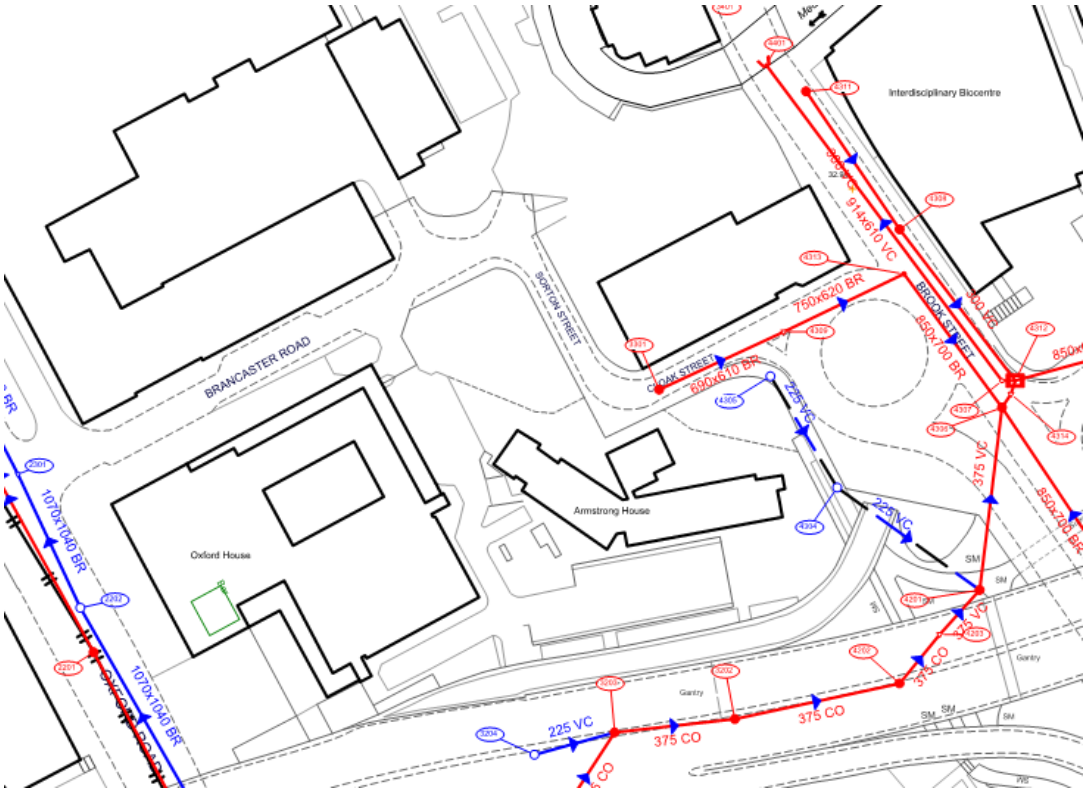


Figure 2: United Utilities Public Sewer Record (extract)

2.3.2 The records indicate that the following public sewers are located within the site:

- There is a combined public sewer noted as a 690x610mm brick sewer and upsizing to a 750x620mm brick sewer within Cloak Street. The sewer flows in a west to east direction and connects to a 850x700 Brick sewer in Brook Street. This section of sewer is to be abandoned, and a S116 agreement is in place with United Utilities. The sewer currently serves the site compound present on the site and will be abandoned once the compound is removed.

2.3.3 The records indicate that the following public sewers are located within the vicinity of the site:

- The sewer from Cloak Street - noted above, flows in a south-east direction, and connects to a Combined Sewer Overflow (CSO), before upsizing to an 850x650mm Brick sewer, flowing in a west to east direction.
- There is a combined public sewer noted as a 300mm clay sewer within Princess Street, to the east of the site. The sewer flows in a north to south direction into Brook Street, where it connects to the sewer overflow noted above.
- The outfall sewer from the CSO flows in a south to direction, running under Brook Street and princess Street to the east of the site, before discharging to the River Medlock to the north of the site.

2.3.4 No further public sewers are observed within or in the vicinity of the proposed site.

2.3.5 There are various existing private sewers within the application site which served the existing BBC buildings. A survey was completed in July 2012 to confirm the approximate locations of existing below ground drainage on site. An additional CCTV survey was carried out in September 2015 to validate the previous survey and identify any additional drainage.

2.3.6 The surveys confirmed the following: -

Foul Drainage

There are various foul water drains surrounding the existing demolished building on site; there appears to be a single private foul drainage network outfall within the development area.

- The previous building located in the proposed development area appears to be served by a foul drainage system which outfalls into the existing combined sewer in Princess Street.

Surface Water Drainage

There are various surface water drains surrounding the existing demolished building on site; there appears to be a single private surface water drainage network outfall within the development area.

- The existing area, which is located adjacent to Princess Street appears to be served by a single surface water drainage system, one of which exist the site to the north, and discharges into the River Medlock. The survey drawings from July 2012 and September 2015 are enclosed in *Appendix C*.

Sine the surveys were undertaken, earlier phase drainage has now been installed and some of the drainage is installed within the redline boundary for this Phase. In summary:

- There is a surface water network within Newman Street, which collects drainage from the MSCP (Plot 14) which is south of this Phase. Allowance was made for the future connection of drainage from this phase. All surface water discharges to the Medlock via a restricted outfall.

- There is a foul water network within the MSCP (Plot 14) site south of this phase. Some of the drainage is located within this Phase boundary and allowance has been made for future connection from this phase.

2.4 Topography

2.4.1 A topographical survey has been carried out on the masterplan site in 2015. The development site, prior to the installation of the site compound; falls in a south-west to north-east direction. The highest point on the site is in the south-western corner at approximately 36.06m AOD within Cloak Street, and the lowest level is in the north-eastern corner at approximately 33.30m AOD.

2.4.2 A retaining wall was noted on the survey, running along the back of the highway. The levels at the base of this wall are approximately 33.58m AOD at the southwest corner of the car park.

2.4.3 A retaining wall was also noted on the survey, running along the eastern boundary of the site, to the northeast corner. The level external to the site, within Princess Street, is approximately 32.75m AOD.

2.4.4 The topographical survey is enclosed in *Appendix D*. It is recommended that a topographical survey is completed post decant of the construction compound and an additional survey is obtained for the extent of works proposed under the Mancunian Way.

2.5 Geology

2.5.1 Made Ground deposits are anticipated to be present. From BGS mapping superficial deposits are indicated as Devensian Till overlying the Chester Pebble Bed Formation.

2.5.2 The site is not located within a 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 2021, 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 (Rivers 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 consent. (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 water-side 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 hostels. • Buildings used for dwelling houses, student halls of 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 Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	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 to a caravan, camping or chalet 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 being partially within Flood Zone 1, and partially within Flood Zone 2.

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 categories:

- Retail, Office and External Public Realm with supporting infrastructure such as substations.

3.3.2 These types of development are classed as 'Less Vulnerable', 'Water Compatible' and 'Essential Infrastructure' development in the Flood Risk Vulnerability Classification, as per Table 2.

3.3.3 The site is partially located within Flood Zone 2, for which all of the above classifications of development is deemed to be appropriate, and neither the sequential nor the exception test is required (refer to the Flood Zone compatibility table in the NPPF technical guidance).

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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 3, taken from the UK Government's Long Term Flood Risk Information.



Figure 3: Long Term Flood Risk Assessment Map – Flood Risk from Rivers or Sea (© Crown Copyright)

4.2.2 Figure 3 shows that the site is mostly located in Flood Zone 1 with the North Boundary located within Flood Zone 2.

4.2.3 Due to the Flood Zone designation identified on the Environment Agency maps, the predicted flood levels were obtained from the Environment Agency to determine the more accurate extents of the Flood Zones.

4.2.4 The Environment Agency data provided refers to the application of updated climate change allowances for peak river flows for catchments across the UK in February 2016, however further updates were released in 2021. Figure 4 demonstrates the climate change allowances released in 2021.

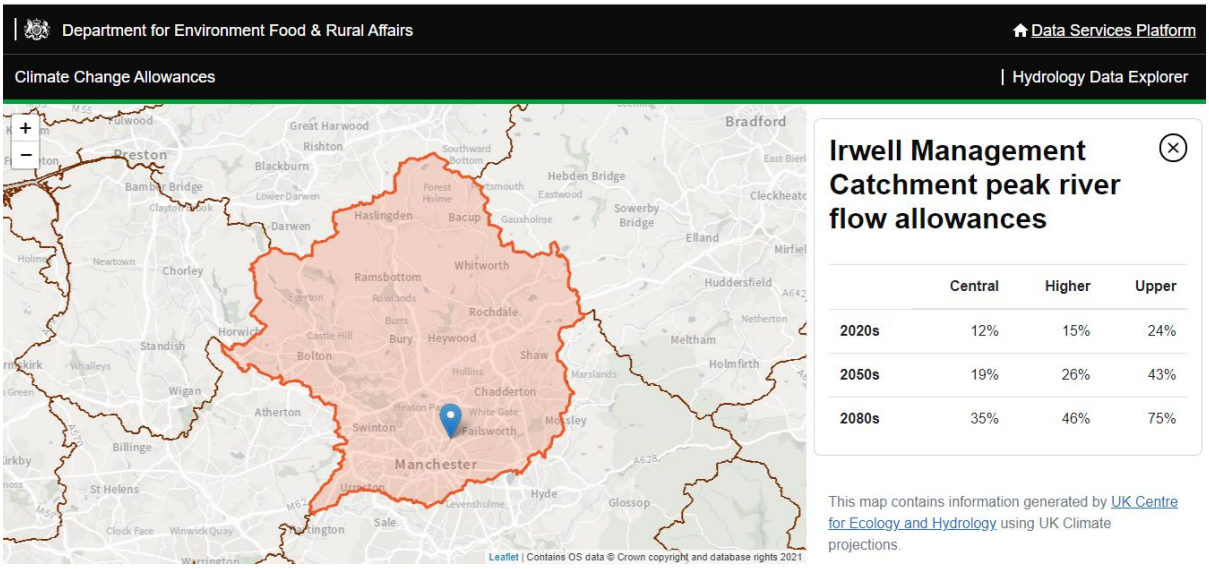


Figure 4 (Extract Environment Agency Climate Change Mapping) Peak River Flow climate change allowances Irwell catchment

4.2.5 Based on the 'Less Vulnerable' land use assuming a design life in excess of 50 years; the central allowance should be assessed; +35%, however the upper end allowance; +75% should also be considered as the residual risk.

4.2.6 Based on the 'Essential Infrastructure' land use assuming a design life in excess of 50 years; the higher allowance should be assessed; +46%, however the upper end allowance; +75% should also be considered as the residual risk.

4.2.7 The Environment Agency current flood data is from the Manchester Ship Canal Study (2018) Refer to Table 4 for the summary of the levels. The Environment Agency Flood Map and Flood Level Data for this Study is enclosed in *Appendix F.*

Map Ref	Node Reference	1 in 100 Year	1 in 100 Year +35%	1 in 100 Year +70%	1 in 1000 Year
2	**Ea013_0251_MEDL01_1481**	32.46	33.44	33.70	33.97

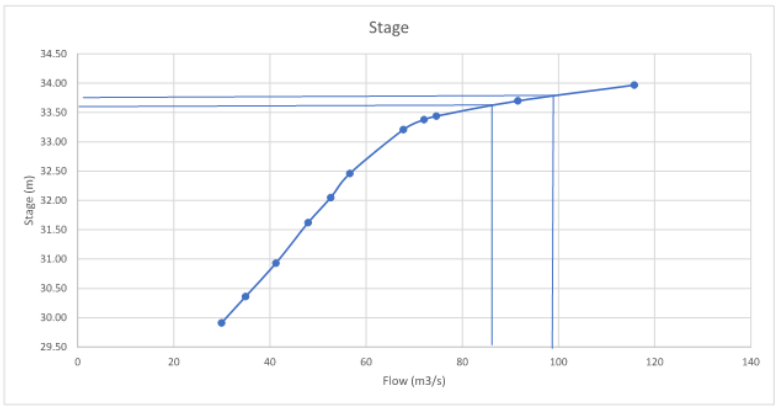
Table 4 Environment Agency Flood Levels

4.2.8 Model measurements are recorded at 4 nodes (labelled 1 through 4) on the Environment Agency Detailed Flood Map provided. The flood levels at node 2 are considered most relevant to the site and the flood levels and flows at this node have been used to estimate the flood levels across the site.

4.2.9 Due to the updates in the climate change requirements, the model does not reflect this information, therefore we have agreed with the Environment Agency and the Lead Local Flood Authority that flood levels for the 1 in 100 year +46% and 1 in 100 year +75% would be estimated based on the data provided to generate a stage vs discharge curve to estimate the levels. Refer to the correspondence enclosed in *Appendix G*.

4.2.10 The stage vs discharge curve is shown in Figure 5.

Flow	Stage
5	29.91
10	34.91
25	41.23
50	47.91
75	52.63
100	56.6
200	67.74
	72.04
	74.59
	91.53
1000	115.75



Approximate estimate from data		
	Flow	Stage
100	56.6	
46%	82.636	33.55
75%	99.05	33.75

Figure 5 Stage vs Discharge Curve to estimate flood levels

4.2.11 The flood level for the 1 in 100 year +46% is estimated as 33.55m AoD and the flood 1 in 100 year +75% is estimated as 33.75m AoD. The overall flood levels are summarised in Table 5.

Map Ref	1 in 100 Year	1 in 100 Year +35%	*1 in 100 Year +46%	1 in 100 Year +70%	*1 in 100 Year +75%	1 in 1000 Year
2	32.46	33.44	33.55	33.70	33.75	33.97

Table 5 Summarised Flood Levels

4.2.12 The Flood Levels have been assessed against the topographical survey and the extent of flooding is shown on the existing flood extents drawing enclosed in *Appendix H*.

4.2.13 It can be seen from the drawing that the flood extents from the planning map are correct when modelled levels are overlaid to the topographical survey. It is also shown that as a result of climate change, flood zone 3a would extend into the site.

4.2.14 The Flood Levels at node 2 have been assessed against the topographical survey and the extent of flooding is shown on the proposed flood extents drawing enclosed in *Appendix H*.

4.2.15 It can be seen from the drawing that:

- The proposed extents of Flood Zone 2 (1 in 1000 Year – 33.97m) extends into the site along the north-east corner. This extends within the building in areas proposed as retail (unit 1) and cycle storage. It is also noted that the tank storage room is at 33.65m, however this area is bound by floor levels at or above 34.10m and therefore overland routes protect this area up to this level.
- The drawing also indicates that the extents of the 1 in 100 year +75% (33.75m) extends into the site within the retail (unit 1) and cycle storage areas.
- The drawing also indicates that the extents of the 1 in 100 year +35% (33.44m) extends into the site within the retail (unit 1).

4.2.16 Based on the above, mitigation measures are therefore proposed in section 5.

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 the largest area that might be flooded if a reservoir were to fail and release the water it holds (see Figure 5). Since this is a prediction of a worst-case scenario, it is very low risk that a reservoir flood would be this large.

4.4.3 The extents of flooding due to reservoir breach in the vicinity of the site is shown in Figure 5. It can be seen that there is the potential for the flood extents to reach the site. Levels of reservoir flooding is not available; however, mitigation measures are proposed in section 5.

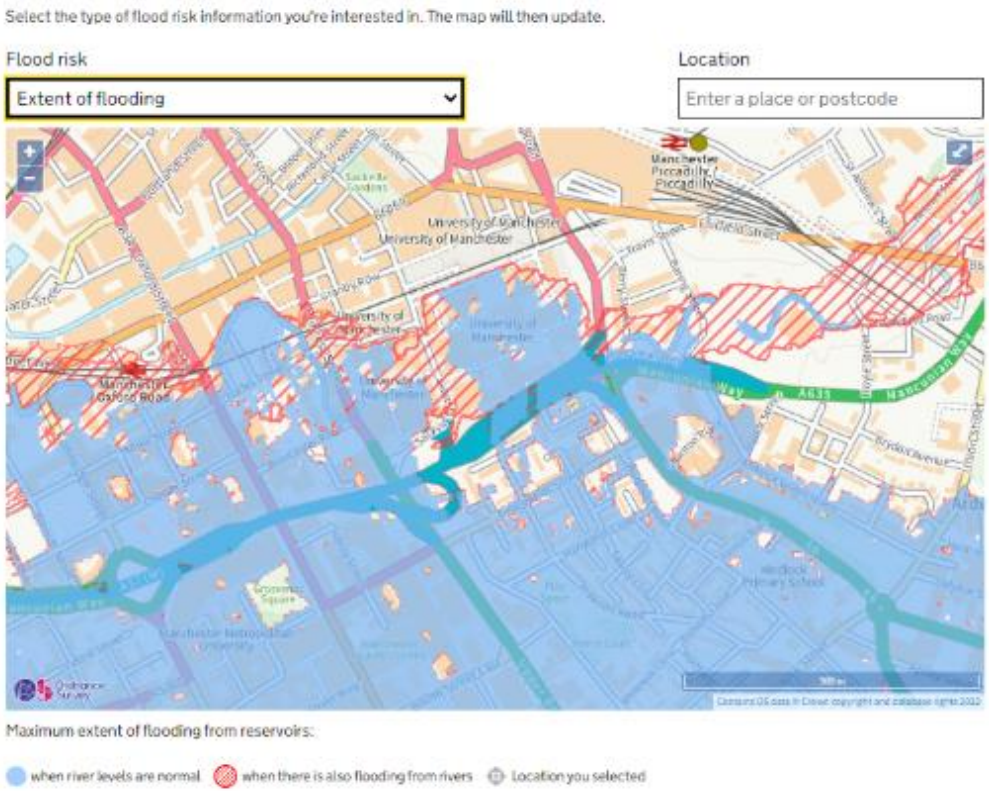


Figure 5: Long Term Flood Risk Assessment Map – Flood Risk from Reservoirs (© Crown Copyright)

4.5 Canal Flooding

4.5.1 The Rochdale Canal is located approximately 360m to the North of the site.

4.5.2 The canals are identified in the 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 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 According to the Manchester, Salford and Trafford SFRA, there are no known reports of groundwater flooding in the Manchester, Trafford and Salford authorities.

4.6.2 The Curtins Phase I Detailed Desk Study report confirms that groundwater was recorded within two boreholes only at depths of 9.40mbgl and 10.20m in BH4 and BH11 respectively during previous on-site investigation works.

4.6.3 The Curtins Site Investigation confirms that Groundwater strikes were recorded during the investigation at 0.65m bgl in WS03, 2.00m bgl, 9.50m bgl in BH01 and 3.10m bgl in BH02. During return visits, monitored levels in WS03 were recorded between 0.47m and 0.95m bgl. BH01 and BH02 were not monitored post investigation due to access limitations. The report confirms that the shallow depths is likely to be perched groundwater within the Made Ground strata.

4.6.4 Given the depth of the groundwater, risk of groundwater flooding is considered **low** risk.

4.7 Public Sewers or Highway Drainage Flooding (Infrastructure Failure)

4.7.1 There is a combined public sewer located within the proposed development site. However, this is to be abandoned/ removed as part of the works. Therefore, this would not pose a risk to the site.

4.7.2 There are also public sewers in the vicinity of the site, located to the east of the site. The cover levels of the sewers in Princess Street are lower than the proposed ground floor levels. Therefore, these are to be considered at low risk of flooding the buildings.

4.7.1 Providing United Utilities and Manchester City Council maintain their drainage assets within and in the vicinity of the site, 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 6 and it can be seen that the site is located mostly in an area classified as being at 'Very Low' risk of flooding from surface water.

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. However, there are specific mitigation measures to mitigate against surface water flooding from outside to the site carpark, which are detailed in chapter 5.

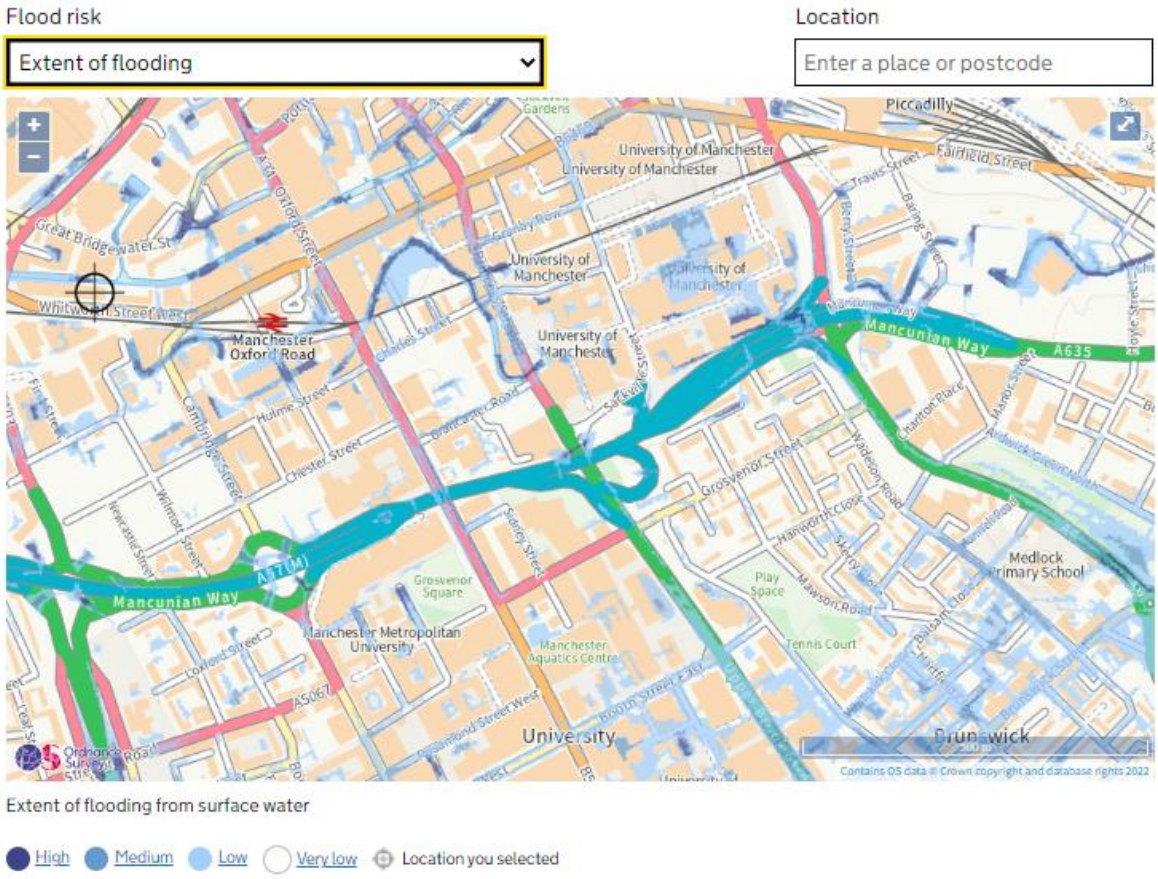


Figure 6: Risk of Flooding from Surface Water - Extent of Flooding

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 proposed 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 Although the development proposals do not indicate a significant change to the impermeable areas on the site, the development has the potential to increase flood risk where additional run-off from proposed roads, paved areas and building roofs are discharged freely into the downstream drainage network. It is therefore encouraged to propose permeable areas, landscaping areas and incorporate sustainable drainage features utilising infiltration or attenuation where possible.

4.9.3 The SFRA places the site within the Manchester Conurbation Core Critical Drainage Area (CDA). CDAs generally have local flooding problems associated with drainage and are particularly sensitive to an increase in the rate of surface water run-off and/or volume from new development. Specific drainage

requirements are necessary in these areas to help reduce local flood risk. The Lead Local Flood Authority (LLFA) usually require that surface water discharge from new developments on brownfield sites must meet a 50% betterment or more, and that this must be calculated from the existing impermeable area of the site / capacity of the existing outfall from the site.

4.9.4 An assessment of the proposed surface flows is carried out within the drainage strategy within section 6 of this report.

4.10 Historical Flooding

4.10.1 Manchester City Council have been contacted to provide details of any historic flooding information / data for the site, and they have confirmed that they do not have record of any historic flooding in this location.

4.10.2 A Pre-Development Enquiry has been submitted to United Utilities, requesting information of any historic public sewer flooding events within the vicinity of the site. No historic flooding has been identified in their response.

4.11 Summary of Flood Risk

4.11.1 From the evidence collated and subsequent negotiations the main types of flooding that may apply to the proposed development site are as follows:

- Fluvial flooding
- Reservoir Flooding
- Surface water flooding to the site; and
- Surface water flooding to the site.

5.0 Mitigation

5.1 Fluvial Flood Mitigation

5.1.1 The site is shown by the Environment Agency Flood Map for Planning to be in the majority, Flood Zone 1 and partially within Flood Zone 2. The effects of climate change on the 1% event would also extend into the building indicating a future flood zone 3 classification.

Flood Compensation

5.1.2 Where development is proposed within areas predicated to be within Flood Zone 3a (flooding during the 1% scenario), development should ensure that the volume of flood water entering the site in the predevelopment state can be provided post-development on a 'like for like', 'level for level' basis (and should be provided within the development site where possible). However, as the site is considered as within Flood Zones 1 and 2, Flood Compensation is not considered necessary.

Floor Levels

5.1.3 Each area has been assessed based on their land use classification, with all areas checked for residual risk during the 1 in 1000-year event:

5.1.4 Based on the 'Less Vulnerable' land use assuming a design life in excess of 50 years; the central allowance should be assessed; +35%, however the upper end allowance; +75% should also be considered as a residual risk.

5.1.5 Based on the 'Essential Infrastructure' land use assuming a design life in excess of 50 years; the higher allowance should be assessed; +46%, however the upper end allowance; +75% should also be considered as a residual risk.

5.1.6 The proposed floor levels have been raised as far a practical based on the contraints of the existing highways – Princess Street and Newman Street.

5.1.7 In Summary the proposals are as follows, and with reference to Figure 7:

Where possible, floor levels have been raised to provide a minimum of 600mm above the 1 in 100 +35% for less vulnerable uses and 1 in 100 year +46% for essentiall infrastructure uses.

<u>Green Areas – Less Vulnerable (+35%)</u>

FFL 35.00

This would be 1.56m above the 100 year +35% flood level and considering the residual risk during the 100 year +75% event, would be 1.25m above the maximum flood level predicted in this event and during the 1 in 1000-year event would be 1.03m above the maximum flood level predicted in this event.

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Pink Areas – Essential Infrastructure (+46%)

FFL 34.30-34.50

This would be 0.75-0.95m above the 100 year +46% flood level and considering the residual risk during the 100 year +75% event, would be 0.55-0.75m above the maximum flood level predicted in this event and during the 1 in 1000-year event would be 0.33-0.53m above the maximum flood level predicted in this event.

The M&E Engineer has confirmed that any major components will be set a minimum of 0.6m above the 100 year +75% level - 34.350m, which would subsequently be above the 1 in 1000-year level.

Purple Areas - Less Vulnerable (+35%)

FFL 33.400m (retail unit 1), 33.50m (cycle store) and 34.00m (retail unit 2)

Retail Unit 2 (34.000m) would be 0.56m above the 100 year +35% flood level and considering the residual risk during the 100 year +75% event, would be 0.25m above the maximum flood level predicted in this event and during the 1 in 1000-year event would be 0.03m above the maximum flood level predicted in this event.

There is a mariginal reduction on the 0.6m minimum protection dues to the complexity in forming a localised 0.04m upstand therefore the client has acknowledged a marginal increase in risk to the building components in this area. This would also need to be addressed in a Flood Emergency Plan which is recommended later in this section.

Retail Unit 1 (33.400m) would be below the 100 year +35% flood level (0.04m) and considering the residual risk during the 100 year +75% event, would be 0.35m below the maximum flood level predicted in this event and during the 1 in 1000-year event would be 0.57m below the maximum flood level predicted in this event. It is acknowleded that this area is above the curent 1 in 100-year level by 0.94m.

The floor levels in this unit are largely fixed by the existing levels along Princess Street. The LLFA has recommended that the following measures be incorporated into the detailed design:

- using flood resistant materials that have low permeability to at least 600mm above the estimated flood level
- making sure any doors, windows or other openings are flood resistant to at least 600mm above the estimated flood level
- using flood resilient materials (for example lime plaster) to at least 600mm above the estimated flood level
- making it easy for water to drain away after flooding such as installing a sump and a pump
- making sure there is access to all spaces to enable drying and cleaning

- ensuring that soil pipes are protected from back-flow such as by using non-return valves

The M&E Engineer has confirmed that any major components will be set a minimum of 600mm above the 100 year +75% level (34.350) which would subsequently be above the 1 in 1000-year level and anything below this level – which is mainly sockets, will be raised as high as practical but will also be RCD Protected in order to trip out in a case of flooding.

This area would also need to be addressed in a Flood Emergency Plan which is recommended later in this section.

Cycle Storage (33.500m) would be above the 100 year +35% flood level (0.06m) and considering the residual risk during the 100 year +75% event, would be 0.25m below the maximum flood level predicted in this event and during the 1 in 1000-year event would be 0.47m below the maximum flood level predicted in this event. It is acknowleded that this area is above the curent 1 in 100-year level by 1.04m.

The floor levels in this area are largely fixed by the existing levels along Princess Street. The LLFA has recommended that the following measures be incorporated into the detailed design:

- using flood resistant materials that have low permeability to at least 600mm above the estimated flood level
- making sure any doors, windows or other openings are flood resistant to at least 600mm above the estimated flood level
- using flood resilient materials (for example lime plaster) to at least 600mm above the estimated flood level
- making it easy for water to drain away after flooding such as installing a sump and a pump
- making sure there is access to all spaces to enable drying and cleaning
- ensuring that soil pipes are protected from back-flow such as by using non-return valves

M&E Engineer has confirmed that any major components will be set a minimum of 600mm above the 100 year +75% level (34.350) which would subsequently be above the 1 in 1000-year level and anything below this level – which is mainly sockets, will be raised as high as practical but will also be RCD Protected in order to trip out in a case of flooding.

This area would also need to be addressed in a Flood Emergency Plan which is recommended later in this section.

<u>Purple Hatched Areas – Less Vulnerable (+35%)</u>

FFL 33.65*

*Plant areas are at 33.65m but protected to its perimeter up to 34.10m.

This would be protected 0.66m above the 100 year +35% flood level and considering the residual risk during the 100 year +75% event, would be 0.35m above the maximum flood level predicted in this event and during the 1 in 1000-year event would be 0.13m above the maximum flood level predicted in this event.

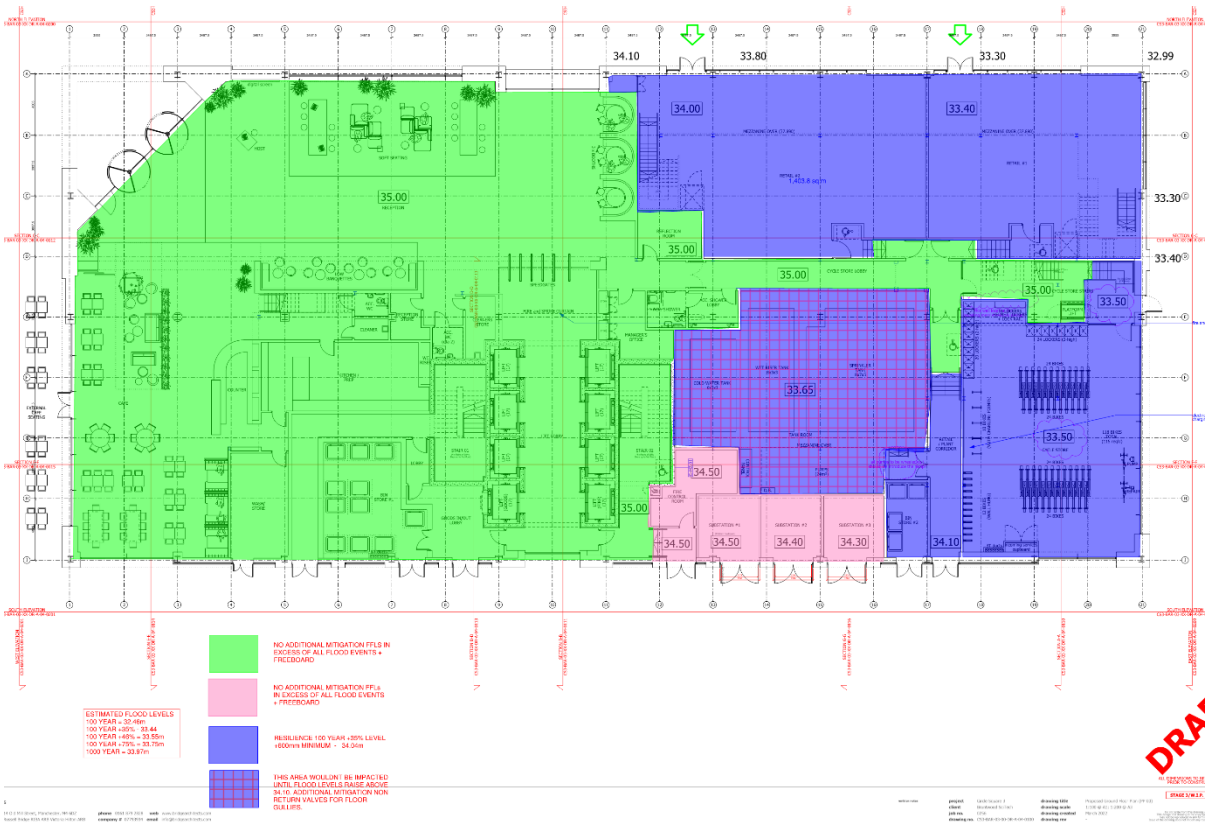


Figure 7: Flood Mitigation Areas

5.1.8 Floor levels and flood resilience has been agreed with the Local Flood Authority. Refer to the corresponce enclosed in *Appendix G.*

5.1.9 It is recommended that a Flood Emergency Plan is prepare prior to occupation of the building to ensure that building occupants are aware of the risks – particularly for the Retail Units 1 and 2 and the Cycle Stoarge users. The emergency plan should include as a minimum; the evacuation procedures, safe refuge locations, evacuation/safe refuge routes, responsible personnel, flood warning codes and emergency services contact details.

5.1.10 During Construction, health and safety measures will be required to ensure the safe working area due to the flood zone classification. It is recommended that a Construction and Environmental Management Plan (CEMP) should include as a minimum; the evacuation procedures, safe refuge locations, evacuation/safe refuge routes, responsible personnel, flood warning codes and emergency services contact details.

5.2 Reservoir Flood Mitigation

5.2.1 The owners of reservoirs that could affect the site are required to have maintenance plans in place to ensure they do not fail. Providing the reservoir owners maintain the reservoirs, the risk of flooding from the reservoir would be low.

5.2.2 The government state that if a reservoir flood event were to occur 'even in the worst case scenario many areas shown as possibly being at risk of reservoir flooding would be expected to receive no more than a few centimetres of flood water' (www.gov.uk/government/news/reservoir-flood-maps-published).

5.2.3 The building occupiers should have an emergency procedure in place for fluvial flood risk, therefore this can also be adopted in the unlikely event that a reservoir fails. In the event of a nearby reservoir flooding the site would be notified by the local authorities, therefore allowing an evacuation plan to be successfully executed.

5.3 Surface Water Flooding to the site Mitigation

5.3.1 The UK Government Long Term Flood Risk Assessment surface water flood maps indicate that the site is at very low risk of surface water flooding.

5.3.2 Therefore, measures outlined in this section are recommended in order to ensure that the risk of surface water flooding to the post-development site shall not be increased.

5.3.3 It is assumed that the surface water drainage outside of the site boundary will be subject to the relevant landowner's regular drainage maintenance schedule.

5.3.4 It is recommended that external ground levels across the site should fall away from the proposed buildings and ensure that the creation of low points are avoided and that the flood water is safely routed away from the buildings on site.

5.3.5 Providing the above measures are implemented the flooding risk to the development site from surface water is therefore considered **low** post development.

5.3.6 A detailed assessment of the proposed surface flows is carried out within the drainage strategy within section 6 of this report.

5.4 Surface Water Flooding from the site Mitigation

5.4.1 Developers are responsible for ensuring that new development does not increase the flood risk elsewhere. 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 from up to the critical 1 in 100-year plus climate change storm event shall be constrained within the areas on site so not to cause damage to buildings, essential services or adjoining developments & services.

5.4.2 In February 2016, the Environment Agency released updated climate change allowances for peak rainfall intensities which should be applied to new developments. Table 6 demonstrates the climate change allowances with central and upper end allowances being considered.

5.4.3 Based on the nature of the development, a lifespan in excess of 60 years is anticipated. Therefore, the potential climate change allowance for 2070-2115 ranges between 20% for the central allowance and 40% for the upper end allowance. As such, an allowance of 40% for climate change on peak rainfall intensity will be included in calculations.

Table 6: (Extract Environment Agency Guidance) Peak Rainfall Intensity Allowance in small and urban catchments

Applies across all of England	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper end	10%	20%	40%
Central	5%	10%	20%

5.4.4 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.

5.4.5 Section 6 reviews the surface water discharge options, and it is proposed that the surface water will connect into the wider masterplan drainage network, which discharges into the River Medlock.

5.4.6 To minimise localised flooding within the site, the drainage design should ensure that gullies, drainage channels and drains are all suitably sized to accommodate peak storm flows. Also, all inlet features should have suitably sized sumps to catch silts and should be subject to a documented routine maintenance and cleansing regime.

5.4.7 Flood water exceedance routes should be identified, both on and off site.

5.4.8 For any sustainable drainage systems employed in the development, an appropriate management and maintenance plan for the sustainable drainage system for the lifetime of the development should be submitted which should include:

- Any arrangements for adoption by an appropriate public body or statutory undertaker, management and maintenance by a Residents' Management Company
- Arrangements concerning appropriate funding mechanisms for its on-going maintenance of all elements of the sustainable drainage system (i.e. inspections, regular maintenance)
- Means of access for maintenance and easements where applicable

5.4.9 Assuming that the proposed drainage system is designed to provide adequate capacity, and that the private and adopted sewers will be maintained by their adopted authority, it can be assumed risk of flood from blockage or overloading is minimal.

5.4.10 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.

6.0 Drainage Strategy

6.1 Existing Drainage

6.1.1 The records indicate that the following public sewers are located within the site:

- There is a combined public sewer noted as a 690x610mm brick sewer and upsizing to a 750x620mm brick sewer within Cloak Street. The sewer flows in a west to east direction and connects to a 850x700 Brick sewer in Brook Street. This section of sewer is to be abandoned, and a S116 agreement is in place with United Utilities. The sewer currently serves the site compound present on the site and will be abandoned once the compound is removed.

6.1.2 The records indicate that the following public sewers are located within the vicinity of the site:

- The sewer from Cloak Street - noted above, flows in a south-east direction, and connects to a Combined Sewer Overflow (CSO), before upsizing to an 850x650mm Brick sewer, flowing in a west to east direction.
- There is a combined public sewer noted as a 300mm clay sewer within Princess Street, to the east of the site. The sewer flows in a north to south direction into Brook Street, where it connects to the sewer overflow noted above.
- The outfall sewer from the CSO flows in a south to direction, running under Brook Street and princess Street to the east of the site, before discharging to the River Medlock to the north of the site.

6.1.3 No further public sewers are observed within or in the vicinity of the proposed site.

6.1.4 There are various existing private sewers within the application site which served the existing BBC buildings. A survey was completed in July 2012 to confirm the approximate locations of existing below ground drainage on site. An additional CCTV survey was carried out in September 2015 to validate the previous survey and identify any additional drainage.

6.1.5 The surveys confirmed the following: -

Foul Drainage

There are various foul water drains surrounding the existing demolished building on site; there appears to be a single private foul drainage network outfall within the development area.

- The previous building located in the proposed development area appears to be served by a foul drainage system which outfalls into the existing combined sewer in Princess Street.

Surface Water Drainage

There are various surface water drains surrounding the existing demolished building on site; there appears to be a single private surface water drainage network outfall within the development area.

- The existing area, which is located adjacent to Princess Street appears to be served by a single surface water drainage system, one of which exist the site to the north, and discharges into the River Medlock. The survey drawings from July 2012 and September 2015 are enclosed in Appendix C. Since the surveys were undertaken, earlier phase drainage has now been installed and some of the drainage is installed within the redline boundary for this Phase. In summary:

- There is a surface water network within Newman Street, which collects drainage from the MSCP (Plot 14) which is south of this Phase. Allowance was made for the future connection of drainage from this phase. All surface water discharges to the Medlock via a restricted outfall.
- There is a foul water network within the MSCP (Plot 14) site south of this phase. Some of the drainage is located within this Phase boundary and allowance has been made for future connection from this phase.

6.1.6 It is recommended that an additional survey is completed in the public sewer to be abandoned including all incoming connections to ensure United Utilities can confirm the sewer is redundant and can be formally abandoned.

6.2 Proposed Foul Water Drainage

6.2.1 A separate foul and surface water system is proposed.

6.2.2 The foul drainage from the development will comprise of downpipes collected by new private foul drains piped network around the proposed buildings which will connect into the existing (newly constructed) wider masterplan foul sewer network within the site; which has been installed as part of the Plot 14 works (south of Plot 12).

6.2.3 The masterplan drainage network conveys the foul drainage to its outfall to the south of Plot 14, where it connects into the public combined sewer at manhole UU Ref 4201.

6.2.4 The proposed internal above ground drainage arrangement is not yet available therefore proposed discharge rates are not confirmed.

6.2.5 A Section 106 Agreement with United Utilities has been agreed as part of the Plot 14 works, which includes an allowance for the proposed CS3 development. Therefore, it is anticipated that no further agreement will be required. A copy of the S106 approval is available in *Appendix J*.

6.2.6 The proposed drainage strategy is enclosed in *Appendix K*.

6.3 Proposed Surface Water Drainage

6.3.1 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.

6.3.2 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

6.3.3 The BGS Geology Report identifies that the superficial deposits under the site are Devensian Glaciofluvial deposits as Sand and Gravel for the majority of the site with Devensian Till as Diamicton for the Eastern area of the site. The bedrock is identified as Northwich Halite Member – Halite Stone and Mudstone.

6.3.4 Made Ground is present on site, recorded to depths of 3.6m bgl.

6.3.5 The site is not located within a Groundwater Source Protection Zone.

6.3.6 Based on the works completed across the wider masterplan, infiltration is not deemed viable and alternative discharge has been setout in principle under earlier phases.

Watercourse

6.3.7 The River Medlock is situated approximately 10m to the north of the site. There is an existing connection into the river adjacent to the boundary with Princess Street. This has been utilised for part of the surface water drainage for earlier phases, and drainage has been laid under Newman Street to provide a connection point. Therefore, a connection to the watercourse is considered possible.

Surface Water Sewer

6.3.8 There are no dedicated surface water public sewers in the vicinity of the site. Also, a watercourse connection is possible. Therefore, the connection to a surface water sewer is not a possible option.

Combined Water sewer

6.3.9 There are various existing combined public sewers within the vicinity of the site. However, a watercourse connection is possible. Therefore, the connection to a surface water sewer is not a possible option.

6.3.10 Table 7 summarises the options for surface water disposal.

Table 7: Surface Water Disposal

Surface Water Disposal	Potential	Description
Infiltration	✗	Based on the works completed across the wider masterplan, infiltration is not deemed viable and alternative discharge has been setout in principle under earlier phases

Watercourse	✓	The nearest watercourse is the River Medlock 10m to the north of the site. A connection to the existing outfall has been provided as part of the earlier works phases.
Surface Water Public Sewer	✗	There are no dedicated surface water public sewers in the vicinity of the site, and a connection to watercourse is possible. Therefore, this is not the preferred discharge.
Combined Public Sewer	✗	A connection to watercourse is possible. Therefore, this is not the preferred discharge..

6.3.11 The surface water drainage for the development is proposed to connect into the wider masterplan drainage network, and discharge via the existing outfall to the River Medlock installed as part of the earlier phase of the masterplan.

6.3.12 Flood Defence Consent is in place with the Environment Agency for the discharge to the Medlock. The Environment Agency Consent is enclosed within *Appendix J*.

6.3.13 The surface water drainage system was installed during the reconstruction and realignment of Newman Street. The drainage model included for the surface water drainage from Plot 14 which has been installed and is operational and included allowance for the adjacent public realm hardstanding and for Plot 12 & and 13 areas – these areas are now all covered under this phase - No.3 Circle Square.

6.3.14 The details of the original strtagey is covered within the Phase 1B/1C FRA and Drainage Strategy (Document Ref. ICMA0040/FRA/P1B/C Rev C) and the Phase 1B & 1C Drainage & SuDs Strategy, (Document Ref. ICMA0040/Drainage and SUD's Rev B). However, the strategy is summarised in the following setions.

6.3.15 The existing flow rates were calculated based on a model of the areas draining to the existing surface water sewer, which dischared into the combined public sewer in Upper Brook Street.

6.3.16 The flow rates were restricted to 50% of the pre-development flow rates with an allowance of 30% climate change for the proposed 100-year event.

6.3.17 The restriction of 50% pre-development flow rates is based on the recommendations within the Manchester Strategic Flood Risk Assessment for brownfield sites within 'Critical Drainage Areas'.

6.3.18 The proposed combined maximum flow rates were therefore restricted to the following rates:

- in 1-year event = 25.0 l/s
- 1 in 30-year event = 58.0 l/s
- 1 in 100-year event = 73.0 l/s (including 30% allowance for climate change).

6.3.19 The flow control has tehrefore been installed to achieve a maximum of the above discharge rates.

6.3.20 At the outset of this phase of development, we reviewed tehe xisting draiange information with the current plans and this confirmed that the proposed phase was large than the original model had allowed for. We therefore assessed the extent of catchemnts in which the system was designed for an in which the allowable discharge rates were agreed under the installed outfall.

6.3.21 The proposed catchment areas have been presented in the Catchment Layout enslosed in *Appendix K.*

6.3.22 Areas A and B were included in the previous assessment; however, areas C and D were not included.

6.3.23 As the existing attenuation tank system installed under the previous phase is now located under the proposed building position under this phase therefore the attenuation tank requires relocating. This offers the opportunity to provide a new larger tank to accommodate the additional areas drainng from Area C, however the outfall discharge rates to the River Medlock will remain as previously agreed – as noted in section 6.3.18.

6.3.24 Drainage from Area D, which is located under the mancunian way has been excluded from the proposed model as this area will remain as draining as existing, mainly due to the area being largely covered, and due to existing ground levels being lower and unlikley to drain by graviy to the new drainage system.

6.3.25 Although the 'As Installed' drainage system has been esigned to accommodate an allowance for 30% climate change, for the current phase, 40% has been included within the design.

6.3.26 The attenuation requirements are provided by: -

- Cellular below ground tanks which provide 317m³ of attenuation and is provided within the public realm space – Symphony Gardens.

6.3.27 Surface water run-off from hard paved areas at risk of contamination should receive water quality treatment. Sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, or used are consider high hazard in terms of contamination. Figure 8 illustrates the pollution hazard indices for different land use classifications from The CIRIA SuDS Manual C753 (2015).

Figure 8: Pollution Hazard Indices for Land Use Classification (Table 26.2 the CIRIA SuDS Manual 2015)

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	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) ie < 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[1]	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[1]	High	0.8[2]	0.8[2]	0.9[2]

6.3.28 Figure 9 illustrates the SuDS Component mitigation indices from The CIRIA SuDS Manual C753 (2015).

Figure 9: Indicative SuDS Mitigation Indices (Table 26.3 the CIRIA SuDS Manual 2015)

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters

	Mitigation indices[1]		
Type of SuDS component	**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	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond[4]	0.7[4]	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 Chapter 14 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/qf7yuj7

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.

6.3.29 The selection of treatment should ensure that the SuDS mitigation component index (Figure 9) exceeds the pollution hazard index (Figure 8). Treatment could be provided using a combination of sustainable methods. Where two stages of treatment are required, the second stage of treatment should account for reduced performance due to lower inflows; therefore 0.7 (mitigation index) should be used

6.3.30 Pollution protection is provided within the drainage system in the form of a filter chamber prior to outfall (Naylor Smart Filter) to provide a stage of treatment. Newman Street drainage was installed under a previous phase and therefore has a two-stage treatment system is in place (filter drains along kerb lines which collects the gully connections). These will be maintained throughout any development in this area.

6.3.31 A second stage of treatment will also be provided along the service road and Cloak Street. This will be provided by filter drains along kerb lines which collects the gully connections (similar to Newman Street).

6.3.32 The proposal for pollution protection should be agreed with Manchester City Council.

6.3.33 The proposed drainage strategy is enclosed in *Appendix K*.

6.3.34 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.

6.4 SuDS Considerations

6.4.1 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:

6.4.2 Systems such as infiltration trenches and soakaways were considered as part of the surface water management strategy however, the ground conditions indicate significant depths of made ground across the site. Therefore, infiltration systems are not considered suitable for the site.

Green/Blue roofs:

6.4.3 Green/Blue roofs were considered for the site however they were not considered viable.

Swales, Wetlands and Attenuation Ponds:

6.4.4 Due to the 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

6.4.5 Permeable paving is limited in frequent loaded areas, however permeable construction is proposed within Symphony Gardens which will drain as if it is a landscaped feature.

Rain Gardens and Drained Soft Landscaping

6.4.6 The tree pits along Newman Street are to accept run-off from the pavement areas along Newman Street and will act as a SuDS feature prior to connection to the drainage system.

SuDS Conclusion

6.4.7 The development will seek to include where possible:

- Soft landscaping SuDS features along Newman Street.
- Localised areas of permeable paving within Symphony Gardens.

6.5 Maintenance

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

6.5.2 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.

6.5.3 A management company may be required for maintenance of attenuation facilities.

Appendix A

Proposed Landscaping Layout

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

Revision	Date	Description	Drawn	Apprvd.
S1-P04	13-06-23	Stage 03 Update	FF	RM
S1-P03	31-05-22	Access to Newman Street & Spill Out	RM	RM
S1-P02	06-05-22	Cloak Street: Levels & overrun accommodated	RM	RM

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Client Bruntwood

Project No 3 Circle Square, Manchester

Drg Title Landscape GA

Created on	Created by	Approved by
15-12-21	CL	LH

Scale	Size	Workstage
1:250	A1	Stage 03

Drg No.	Suitability	Revision
1502a-PLA-XX-XX-DR-L-0001	S1	P04

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Appendix B

United Utilities Public Sewer Records

United Utilites Water PLC
Property Searches
Ground Floor Grasmere House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP
DX 715568 Warrington
Telephone 0870 751 0101
Fax Number 0870 7510102
Property.searches@uuplc.co.uk

Your Ref:
Our Ref: 11/ 849452
Date: 01/02/2012

Realty Estates

25 Rochdale Road
Manchester

M4 4HT

FAO: E KEAST

Dear Sirs

Location: BBC OXFORD STREET MANCHESTER M60 7HB

I acknowledge with thanks your request dated 31/01/12 for information on the location of our services.

Please find enclosed plans showing the approximate position of our apparatus known to be in the vicinity of this site.
I attach General Condition Information sheets, which details contact numbers for additional services (i.e. new supplies, connections, diversions) which we are unable to deal with at this office. In addition you should ensure they are made available to anyone carrying out any works which may affect our apparatus.

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

If you have any queries regarding this matter please telephone us on 0870 7510101.

Yours Faithfully,

S McManus.

Sue McManus
Operations Manager
Property Searches

United Utilities Water PLC
Registered in England & Wales No. 2366678
Registered Office: Haweswater House,
Lingley Mere Business Park, Lingley Green Avenue,
Great Sankey, Warrington, WA5 3LP

TERMS AND CONDITIONS - WASTERWATER & 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) (UUW apparatus) of United Utilities Water PLC ("UUW").

TERMS AND CONDITIONS:

1. 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.

2. 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.

3. In particular, the position and depth of any UUW apparatus shown on the Map are approximate only. UUW strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUW apparatus. The exact location, positions and depths should be obtained by excavation trial holes.

4. 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.

5. The position and depth of UUW 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 ade subsequent to issue and prior to any works being carried out.

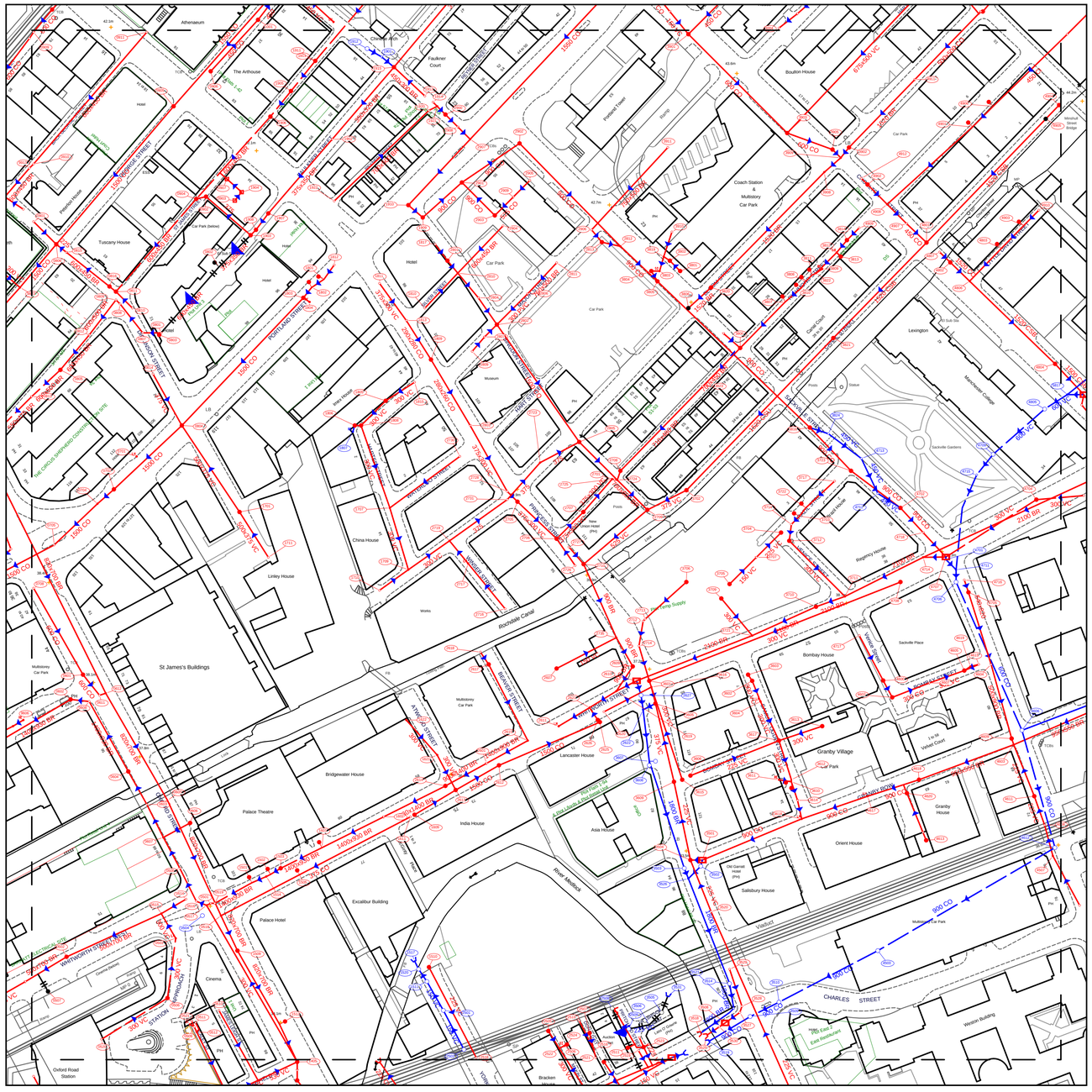
6. This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUW apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.

7. No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUW apparatus by reason of the actual position and/or depths of UUW apparatus being different from those shown on the Map and any information supplied with it.

8. 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.

9. 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 UUW from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

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OS Sheet No: SJ8497NW

Scale 1:1250 Date: 1-Feb-2012

Printed by: Hazel Kay

Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
0501		C	Q		1400	1400	E	BR		2.24
0502	34.06	C	M	30.46	500	700	E	BR		23.32
0503		C	L		300		C	VC		13.89
0504	35.89	S	M							
0505		C	Q		930	1400	E	BR		17
0506	37.62	C	M	33.19	300		C	VC		29.27
0507		C	M							
0509		C	G							2.72
0510		C	G							38.95
0511		F	Q							5.45
0512		F	J							33.96
0513		F	J							2.36
0514		C	G							13.89
0515		C	J		500	700	E	BR		50.57
0516		C	G		1400	930	E	BR		17.89
0517		C	J		1400	930	E	BR		5.39
0518		C	J		820	700	E	BR		18.79
0519		C	G		1400	930	E	BR		2
0520		C	G		300		C	VC		37.74
0521		F	Q							3.11
0601	38.11	C	M	33.52	600		C	CO		12.81
0602	37.86	C	M		1400	930	E	BR		39.45
0603		C	Q		1400	930	E	BR		18.36
0604	37.88	C	M	23.99	1400	930	E	BR		38.95
0605	37.61	C	M	30.65	820	700	E	BR		61.74
0606	37.25	C	M	30.54						14.76
0607		C	J		930	1400	E	BR		17.89
0608		C	G		1400	930	E	BR		9.06
0611		C	G		600		C	CO		3.16
0612		C	J		820	700	E	BR		60.03
0701		C	L							
0702	39.24	C	M	36.45	1500		C	CO		10.63
0704		C	J		1500		C	CO		29
0705		C	G		1500		C	CO		42.94
0708		C	G		600		C	CO		48.37
0801		C	Q		600	450	E			9
0802	41.44	C	M							
0803	40.94	C	M	38.31	600	490	E	BR		1.41
0804	40.05	C	M	33.35	1500		C	CO		45.28
0805	40.39	C	M	37.28	600	500	E	BR		19.1
0806	40.83	C	M	31.31	1500		C	CO		27.4
0807		C	G		600	450	E			17.8
0808		C	G		600	450	E	BR		2.83
0809		C	G		600	500	E	BR		21.4
0810		C	G							11.31
0811		C	M		600	450	E	BR		4.04
0812		C	Q		600	450	E	BR		22.02
0813		C	Q		550	475	E	BR		19.8
0814		C	G		375		C	VC		28.65
0815		F	Q		225		C			6.18
0816		C	M		600	450	E	BR		26.79
0901		C	G							15.56
0902	41.39	C	M	37.64	375		C		54	4.86
0903		C	J				C			5.26
0904	41.33	C	M	37.89	600	450	E	BR		59.55
0905	42.03	C	M	32.95	1500		C	CO	54	87.97
0906	42.19	C	M	39.18	450		C	CO		33.97
0907		C	J				C			4.54
0909		C	G		600		C	CO		3.61
0910		C	G		600	450	E	BR		2.83
0911		C	G		600	450	E	BR		84.39
1501	36.21	C	M		1400	930	E	BR		20.59
1502	36.23	C	M	32.33	1400	930	E	BR		2.24
1503	35.98	C	M	24.42	1400	930	E	BR	-1	5.83
1505	35.86	C	M							
1509	35.27	C	M	29.02	820	700	E	BR	-9	41.26
1510	28.66	C	M	26.19	225		C	VC		49.65
1511	28.79	S	M		150			VC		7.21
1512	34.2	C	M	33.52	820	700	E	BR		20.08
1514		C	J		1400	930	E	BR		7.62
1517		S	F							
1520	28.54	S	M		150			VC		4.47
1601	36.02	C	M		1400	930	E	BR		22.36
1602		C	Q	30.43	1400	930	E	BR		33.54
1609	35.95	C	M	31.14					67	23.32
1611		C	G		375		C	CO		103.77
1621		C	J		300		C	VC		19.24
1622		C	J		300		C	VC		22.67
1701	38.93	C	M		500	375	E	VC		50.48
1707		C	J		300		C	VC		31.32
1709		C	J		300		C	VC		24.41
1710		C	G		300			VC		17.2
1711		C	G		500	375	E	VC		26.08
1801	41.44	C	M	39.39	1500		C	CO	5	7.21
1802	41.36	C	M	37.87	1500		C	CO	2	6.4
1803	41.27	C	M	35.16	1500		C	CO	47	85.59
1804		C	M	39.81					1	3.61
1805	40.73	C	M	37.13	300		C	VC	7	16.97
1806	40.64	C	M		300		C	VC		3
1807		S	R	39.52	300			VC		3.16
1808	40.44	C	M	34.5	300		C	VC		42.38
1809	40.77	C	M	37.08	280	260	R	CO		37.22
1810		C	G							23.35
1811		C	G		375	300	E	VC		22.2
1812		C	G		1500		C	CO		8.6
1813		C	Q		290	280	R	CO		22.47
1815		C	G		300		C	VC		16.64
1817		C	G							10
1901		S	Q	40.35	450	300	E	BR	49	7.81
1902		C	Q	39.65	375	350	E	BR	86	47.51
1903	41.6	C	M	38.99	375		C		21	28.66
1904		C	J				C			9.51
1905		C	M							15.93
1906	42.05	C	M	39.56	600	450	E	BR		53.81
1907	41.72	C	M	39.1	375	350	E	BR	-9	10
1908	41.69	C	M	40.16	375	350	E	BR		3.68
1909	41.97	C	M	35.92	900		C	CO		25.5
1910	42.14	C	M	35.85	900			CO	-132	9.22
1911		C	M							18.8
1912	43.11	S	M	40.52	300	450	R	BR	47	8.06
1913		C	G		450	300	E	BR		20.52
1914		C	G		600	450	E	BR		2.83
1915	43.08	C	M	40.19	350	320	E	BR	85	46.1
1920		C	G		700	500	E	BR		4.47
1921		C	J		480	460	R	BR		5.66
1922		C	G		700	500	E	BR		63.66
2501	29.33	S	M	28.23	150		C	VC		16.12
2502		F	F		225			VC		19.2
2503	29.99	S	M		150		C	VC		21.47
2504		F	Q		150		C	VC		2.83
2505	30.41	C	M	26.68	300		C	VC		9.91
2506		F	O	27.08	150		C	VC		2.66
2507	30.74	C	M	29.07	150		C	VC		8.25
2508	30.84	S	M							
2509	31	S	M							

Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
2511		C	M		225			VC		3.8
2512		F	Q		225		C	VC		4.99
2514		C	J		225		C	VC		5.26
2515		C	G		150			VC		15.65
2516		C	J		150		C	VC		4.12
2518		C	G							
2519		C	G		225		C	VC		9.37
2520		S	G							
2521		C	G							
2522		C	J		300		C	VC		25.6
2523	31.08	C	M	26.7	225		C	VC		9.91
2524	30.71	C	M	27.08	150		C	VC		1.48
2601		C	Q		900	1400	E	BR		22.83
2607	38.54	C	M	33.93	150		C	VC		32.65
2609	37.26	C	M	27.36	900		C	BR		14.42
2610		C	V	34.75	2100			BR		11.04
2610		C	V	34.75	2100			BR	1	7.37
2611		C	L							
2612	36.12	C	M	30.61	1500		C	CO		53.31
2613	36.09	C	M	30.79	1500		C	CO	134	24.19
2614	36.2	C	M	24.84	930	1400	E	BR	-6	33.54
2615		C	J		1400	900	E	BR		22.83
2617		C	M		1400			BR		41.59
2618		C	G							7.21
2619		C	J		900			BR		15.26
2620		C	G		300			VC		25.94
2621		C	J		1500			CO		17.49
2622		S	J		375			VC		25.18
2625		C	M		1500			CO		1.41
2626	37.07	C	M	34.75	1500			CO		7.21
2627	36.77	S	M	29.16	2100			BR		7.07
2701		C	Q		700	800	E	BR		1.35
2705	39.78	C	M		375	300	E	VC		26.17
2706	39.88	C	M	35.55	375	300	E	VC	-35	18.38
2707	40.05	C	M	36.08	375	300	E	VC		21.21
2708	40.43	C	M	32.3	710	450	E	BR		4.71
2709	40.08	C	M	30.38	525		C	VC	17	40.66
2710	39.97	C	M	27.9	900		C	BR		39.03
2712		C	G		300			VC		12.17
2713		C	G		300			VC		1.41
2714		C	G		300			VC		17.72
2716		C	G		300			VC		28.43
2717		C	L	34.44	300			VC		14.21
2719		C	J		375		C			34.41
2723		C	J		375		C			21.47
2724		C	J		780	600	E	BR		20.62
2725		C	J		800	700	E	BR		1.18
2726		C	G		375	300	E	VC		15.81
2727		C	G							10.98
2728		C	G		375	300	E	VC		7.07
2730		C	G		300			VC		42.2
2731		C	G		375		C			24.08
2735		C	J		900		C	BR		16.12
2801	41.73	C	M	36.72	550	800	E	BR		7.81
2802	41.25	C	M	33.93	1500		C	CO		69.63
2803		C	Q		375	300	C	VC		36.72
2804		C	Q		840	540	E	CO		15.81
2805	40.54	C	M		375					26.1
2806		C	Q		300		C	PVC		21.21
2807		C	Q		300		C	PVC		8.49
2809		C	G		350	450	E	BR		9.22
2810		C	J		550	800	E	BR		15.62
2811		C	G		750	500	E	BR		20.52
2812		C	J		900		C	CO		24.76
2813	42.57	C	M		900			CO		9.22
2900	42.71	C	M	37.53	650		C	CO		8.49
2901		C	M		900		C	CO		33.84
2902	42.9	C	M	32.7	900		C	CO		70.01
2903	42.3	C	M	36	900		C	CO		22.63
2904		C	G		600	450	E	BR		31.83
2905		C	G		600	450	E	BR		11.31
2906		C	G		750			BR		7.81
2907		C	J		1550			CO		43.86
2908		C	Q		750		C	CO		8.49
2909		C	Q		525		C	CO		12.73
3501		C	V	27.44	225		C	VC	10	5.79
3501		C	V		610	1000	E	BR		3.09
3502	33.62	S	M	27.5	610	1000	E	BR		8.49
3503	33.74	S	M	28.59	1800		C	BR		5.39
3504	33.74	C	M	26.85	225		C	VC	324	38.83
3505	30.71	S	M							
3506	30.87	S	M							
3507		C	V	27.35	300		C	VC		6.38
3507		C	V		150			VC		10.14
3508		C	V							3.46
3509	32.58	S	M		900		C	CO		23.32
3510	32.5	S	M		900		C	CO		15.65
3514	32.77	S	M	28.13	1800		C	BR		12.17
3518		C	F							
3519		S	F							
3520		C	G		225		C	VC		26.93
3521		S	G		1800		C	BR		20.03
3524		S	F							
3525		O	F							
3526		S	J		1800		C	BR		54.78
3527		C	G							8.75
3528		C	G							3.16
3529		C	G							18.97
3530		O	G							7.21
3531		S	F							
3601	37.2	C	M	26.66	300			VC		3.16
3602	37.42	C	M		300		C	VC		10.77
3603	37.54	C	M	31.7	300		C	VC		3.61
3604		C	L	31.06	300		C	VC	22	21.02
3605	36.78	C	M	26.44	375		C	VC		6.71
3606	35	C	M	33.3	225		C	VC	64	46.24
3607	35.37	S	M		1800		C	BR		54.71
3608	35.33	S	M							2
3609	34.88	C	M	26.73	375		C	VC	135	39.05
3610	35.7	C	M	32.2	300		C	VC	-14	9.49
3611		C	R	32.38	300		C	VC	34	6.08
3612	35.76	C	M	32.42	300		C	VC	5	1
3613	37.24	C	M	32.42	300		C	VC	9	22.14
3614		C	Q	32.89	150		C	VC	-13	9.22
3615		C	M		300		C	VC		47.43
3616		C	J		300		C	VC		8.25
3617	36.36	C	M	30.02	300		C	VC	-8	19.92
3618		C	L	28.05	900		C	CO	88	52.2
3702	39.93	C	M	31	375		C	VC	79	21.26
3703	40.02	C	M	36.47	300			VC		5.66
3704	39.6	C	M							
3705	38.54	C	M	37.1	150		C	VC	21	18.38
3706	38.6	C	M		300			VC		26.91
3707		C	Q	36.21	225		C	VC	19	16.97
3709	38.43	C	M	33.68	300		C	VC		23.43

WASTE WATER SYMBOLOGY

MANHOLE
FOUL · SURFACE · COMBINED · DUAL
SIDE ENTRY MANHOLE
PRIVATE SEWER
ABANDONED SEWER
SITE TERMINATION
T-JUNCTION (SADDLE)
AIRVALVE
LAMP HOLE
CASCADE
OIL INTERCEPTOR
CONTROL KIOSK
PENSTOCK
CONTROL VALVE
RODDING EYE
GULLEY
SOAKAWAY
HATCHBOX
TUMBLING BAY
HEADWALL
UNSPECIFIED
HYDROBRAKE
VALVE
INLET
WASHOUT
GHOST NODE (inc. GN - Rising Main & GN - Dual Function)
EXPEDIENCY NODE (CHANGE OF CHARACTERISTIC)
CATCHPIT
SIDE ENTRY CATCHPIT
CHAMBER
SIDE ENTRY CHAMBER
DROPSHAFT
SIDE ENTRY DROPSHAFT
SHEET EDGE
VENT COLUMN
SEWER OVERFLOW
DISCHARGE POINT (OUTFALL)
TANK
WASTE WATER TREATMENT WORKS
PUMPING STATION
EJECTOR STATION
SLUDGE PUMPING STATION

Note - ALL flow direction arrows are BLUE - colour not significant

NODE TABLE ABBREVIATIONS

MANHOLE FUNCTION

F Foul	T Transition
S Surface	O Overflow
C Combined	U Unspecified

MANHOLE / NODE TYPE

M Manhole	Z Ghost in Rising Main
J Junction	C Cascade
L Lamphole	Y Gulley
H Hatchbox	E Ejector
R Rodding Eye	O Oil Injector
F Outfall	I Inlet
V Combined Sewer Overflow	B Hydrobrake
	T Vent Column
P Pumping Station	X Valve
S Soakaway	U Unspecified
D Dual Function Manhole	Q Expediency Node
	G Ghost (to allow pipe bends)
W Treatment Works	

SEWER SHAPE

C Circular	T Trapezoidal
E Egg	A Arch
O Oval	B Barrel
F Flat Top	H Horseshoe
R Rectangular	U Unspecified
S Square	

SEWER MATERIAL

AC Asbestos Cement	
BR Brick	
CI Cast Iron	
SI Spun (Grey) Iron	
CO Concrete	
CS Concrete Segments (Bolted)	
CS Concrete Segments (Unbolted)	
CC Concrete Box Culvert	
DI Ductile Iron	
GR Glass Reinforced Concrete	
GR Glass Reinforced Plastic	
PS Plastic / Steel Composite	
PV Polyvinyl Chloride	
PE Polyethylene	
RP Reinforced Plastic Matrix	
ST Steel	
VC Vitrified Clay (All Clayware)	
PP Polypropylene	
PF Pitch Fibre	
MA Masonry - In Regular Courses	
MA Masonry - Randomly Coursed	
U Unspecified	

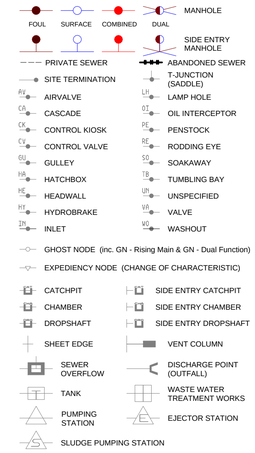
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OS Sheet No: SJ8497NW
Scale 1:1250 Date: 1-Feb-2012
346 Nodes
Sheet 1 of 2

United Utilities
SEWER RECORDS

Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
3710	38.61	C	M	29.6	2100		C	BR		34.01
3711		C	J		2100		C	BR		14.87
3712		C	M		300		C	VC		38.18
3714		C	G		300			VC		8.06
3717		C	G		300			VC		19.1
3721		C	J		2100		C	BR		60.31
3722	40.12	C	M		300			VC		5
3723	40.74	C	M		900		C	CO		30
3800		C	M		700	450	E	BR		26.03
3801	42.26	C	M	41.54					8	7.07
3802	42.35	C	M	40.62	700			BR		3.61
3803		C	S	34.73	960	480	R	BR	100	4
3804	42.27	C	M	34.63	300		C	CO	2	5.83
3805	42.14	C	M	32.25	900		C	CO	142	102.55
3806	41.87	C	M							
3807	41.54	C	M	37.86	700	450	E	BR		31.25
3808	41.73	C	M		700			BR		3.61
3809		C	R	36.68						3.61
3810	41.62	C	M	37.79	700			BR	-152	10.63
3811	41.71	C	M		630			BR		4.24
3812		C	L	36.82	630			BR		14.14
3813	41.88	C	M	41.08					1	2.83
3814	41.93	C	M	36.7	630	490	E	BR	-65	7.81
3816	41.58	C	M	31.53	900		C	CO		29
3816	41.58	C	M	31.53	450		C	VC		9.49
3819		C	J		700	500	E	BR		7.28
3820	20.93	C	M		1520		C	BR		14.87
3821	40.97	C	M	35.59	1520		C	CSU	55	102.67
3822		C	J		630			BR		2.24
3823		C	Q	35.09	710	480	E	BR	21	57.28
3824		S	G		450		C	VC		20
3826		F	Q							10.75
3901	43.89	C	M	38.57	600		C	CO	36	67.88
3902		C	M		1520		C	BR		6.4
3903	43.1	C	M	36.69	600		C	CO	40	23.41
3905	42.91	C	M	36.1	600		C	CO		5.66
3908		C	J		1520		C	BR		78.49
3909		C	J		1520		C	BR		10.63
3910		C	G		700	500	E	BR		12.65
3911		C	G		750	500	E	BR		54.49
4503	32.84	S	M	27.94	900		C	CO	216	54.12
4507		C	J		500	700	E	BR		15.52
4600		C	M		300		C	CO		9.29
4602	38.66	C	M	32.55	300		C	CO	80	19.31
4603		C	J		950	550	E	BR		49.04
4604		C	Q	31.17	500	900	E	BR	26	37.36
4605	38.56	C	M	32.05	300		C	VC		3.61
4606	38.12	S	M	27.75	900		C	CO	348	59.2
4607		C	Q	32.31	300		C	VC	72	18.03
4608		C	Q		225		C	VC		14.87
4609	37.91	C	M		500			BR		3.16
4611	37.31	C	M	30.38	225		C	VC		26.93
4612	36.55	S	M	27.58	900		C	CO	-276	99.48
4613		C	M				C			4.19
4615		C	G		225		C	VC		7.62
4616		F	Q				C			20.51
4617		C	L	28.48	900		C	CO	79	33.84
4618	36.52	C	M		900		C	CO		26.25
4619		C	J		300			VC		4.12
4620		C	M				C			4.37
4701		S	G		300			VC		7.07
4702	39.82	C	M	37.32	900		C	CO	4	16.28
4704	39.49	C	M	34.11	300		C	VC	11	52.02
4705	39.01	C	M	32.58	540	820	E		26	36.69
4706	39.12	S	M	27.98	600		C	CO	343	78.79
4707		C	V	29.39	2100		C	BR		11.05
4707		C	V	29.39	300			VC		1.17
4708		C	M		300		C	VC		131.1
4709		S	M		600			VC		12.81
4711		S	J		600			CO		6
4712		S	G		450		C	VC		13.04
4713		S	G		450		C	VC		18.79
4714		C	J		2100		C	BR		42.49
4715		S	G		600			VC		47.61
4716		C	G							6.32
4717		C	G		300			CO		24.71
4718		C	Q	33.36	520	910	E		4	16.19
4801	42.14	C	M	36.59	1520		C	CSB	65	64.79
4802	41.76	C	M	34.87	1520		C	CO	87	13.07
4803	41.07	C	M	38.7	1520			CO	6	22.15
4804	40.39	C	M	32.52	1500		C	CSB	34	20.41
4805	40.39	S	M	32.75	600		C	VC		33.3
4806		C	J	34.72	1520		C	CSB	42	57.79
4807		C	G		525		C	VC		7.22
4901	43.04	C	M	39.84	700			BR		55.97
4902	42.6	C	M	37.91	690	450	R	BR		13.51
4903	41.07	C	M	38.22	1520			CO	-32	15.48
4904	43.33	C	M	38.54	1520		C	CSB	49	92.76
4905	42.73	C	M							
4906	43.26	C	M	41.95	450			CI	7	14.14
4907		C	Q		450		C	CO		13.32
4908		C	J		700	450	E	BR		13.36
4909		C	G		680	460	E	BR		8.49
4910		C	G							10.52
4911		C	Q		1520		C	BR		45.97
4912		C	G		225		C	VC		4.24

WASTE WATER SYMBOLOGY



Note - ALL flow direction arrows are BLUE - colour not significant

NODE TABLE ABBREVIATIONS

MANHOLE FUNCTION

- F Foul
- S Surface
- C Combined
- T Transition
- O Overflow
- U Unspecified

MANHOLE / NODE TYPE

- M Manhole
- J Junction
- L Lamphole
- H Hatchbox
- R Rodding Eye
- F Outfall
- V Combined Sewer Overflow
- P Pumping Station
- S Soakaway
- D Dual Function Manhole
- W Treatment Works
- Z Ghost in Rising Main
- C Cascade
- Y Gulley
- E Ejector
- O Oil Injector
- I Inlet
- B Hydrobrake
- T Vent Column
- X Valve
- U Unspecified
- Q Expediency Node
- G Ghost (to allow pipe bends)

SEWER SHAPE

- C Circular
- E Egg
- O Oval
- F Flat Top
- R Rectangular
- S Square
- T Trapezoidal
- A Arch
- B Barrel
- H Horseshoe
- U Unspecified

SEWER MATERIAL

- AC Asbestos Cement
- BR Brick
- CI Cast Iron
- SI Spun (Grey) Iron
- CO Concrete
- CS Concrete Segments (Bolted)
- CS Concrete Segments (Unbolted)
- CC Concrete Box Culvert
- DI Ductile Iron
- GR Glass Reinforced Concrete
- GR Glass Reinforced Plastic
- PS Plastic / Steel Composite
- PV Polyvinyl Chloride
- PE Polyethylene
- RP Reinforced Plastic Matrix
- ST Steel
- VC Vitrified Clay (All Clayware)
- PP Polypropylene
- PF Pitch Fibre
- MA Masonry - In Regular Courses
- MA Masonry - Randomly Coursed
- U Unspecified

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United Utilities
SEWER RECORDS



Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
0001	35.96	C	M	33.96	750	440	R	BR	8	14.32
0002	36.08	C	M	30.3	820	500	R	BR		15.23
0002	36.08	C	M	30.12	750	440	R	BR	-77	30.02
0003	35.9	C	M	30.39	900	700	R	BR	46	48.3
0004		C	Q	32.18	750	560	R	BR	8	14.32
0101		C	M		700	580	R	BR		11.18
0102	35.42	C	M	31.8	710	600	E	BR	109	38.01
0103		C	M							
0104	32.41	C	M	28.37	1100	600	E	BR		50.12
0105		C	Q	29.33	1100	600	E	BR	45	47.41
0106		C	Q	13.7	710	500	E	BR	-1	10.3
0201	34.75	C	M	24.93	900	610	E	BR	-4	18.79
0202	34.27	C	M	28.31	580	550	E	BR		24.19
0203	34.37	C	M		970	620	E	BR		34.67
0204		C	G		700	630	E	BR		7.07
0205		C	M		680	600	R	VC		80.23
0206	35.18	C	M	31.08	700	630	E	BR		8.06
0207		C	M		610	550	E	BR		185.65
0208		C	Q	31.45	700	650	E	BR	107	37.59
0209		C	Q	29.65	970	620	E	BR		19.7
0210		C	Q		610	550	E	BR		24.19
0211		C	Q		870	610	E	BR		38.47
0301	31.08	C	M	26.58	300		C	VC	143	75.58
0302	31.5	C	M							
0303		O	F							
0304		C	V		930			BR		1
0304		C	V	26.08	225		C	VC	75	60.57
0305		O	G		930			BR		13.42
0306		C	Q	26.54	930	510	R	BR	102	28.66
0401	31.57	C	M							
0402	30.83	C	M	25.93	300		C	VC		44.55
0403		C	L	26.05	300		C	VC	85	8.49
0404		C	J		300		C	VC		64.13
0405		C	M		530			VC		3.22
0406		C	G		508	381	E	VC		129.29
0407		F	J		530			VC		3.87
1001	36.55	C	M	33.01	680	600	R	VC		73.36
1002		C	M		720	680	R	BR		13
1003		C	J		720			BR		48.76
1004		C	G		400	300				61.72
1005		C	Q		720	620	E	BR		13
1101	36.31	C	M	32.68	610	580	E	BR	1	17.89
1102		C	M		630	580	R	BR		27.29
1103		C	M		940	550	E	BR		44.78
1104		C	M		375		C	CO		14.76
1105		C	Q	14.23	610	600	R	BR		18.36
1106		C	Q	9.64	300		C	VC		28.3
1201		C	L	25.27	225			VC		7.21
1202	34.41	C	M	26.82	910	550	R	BR	102	28.64
1203		C	J		970	630	E	BR		38.47
1204		C	M		940	550	E	BR		82.37
1301		S	Q	26.65	760		C		199	65.76
1302	32.28	C	M	27.34	225		C	VC		55.01
1303	35.2	C	M	25.18	940	630	R	BR		20.12
1401		C	L	28.19	870	590	R	BR	90	26.09
1402		C	V		225		C	CI		17.19
1403	32.74	C	M	29.22	300		C	VC	77	23.77
1404	33.56	C	M	25.34	375		C	VC	-6	5
1405	33.36	C	M	27.12	300		C	VC		87.82
1406	33.31	C	M	25.3	375		C	VC	-583	11.66
1407		S	F							
1408	33.46	C	M	25.25	900	620	R	BR		65.31
1409	33.11	C	M	26.65	225		C	CI		14.56
1409	33.11	C	M	26.58	820	750	R	BR		7.21
1410	33.07	C	M							
1411		C	L		225		C	VC		10
1412		C	L		225		C	VC		4
1413		C	J		530		C	VC		21.02
1414		C	G		940	630	R	BR		18.25
1415		O	F							
1416		F	J		530			VC		9.47
1417		C	Q	28.91	420	310	E	VC	80	24.74
1418		C	Q	26.23	300		C	VC	-4	4
1419		C	Q	25.32	430		C	VC	-570	11.4
2001	36.98	C	M	27.86	880	600	R	BR	-418	12.53
2002	37.05	C	M	27.91	800	630	R	BR		9.85
2003	37.16	C	M		1875		R	BR		88.59
2004		C	J							
2005		C	Q	27.89	830	660	R	BR	-336	13.42
2006		C	Q	32.48	930	590	R	BR	7	33.12
2101	37.14	C	M	28.28	670	560	R	BR		3.16
2101	37.14	C	M	28.5	300		C	CI	1	27.78
2102	37.04	C	M		880	600	R	BR		32.76
2201	36.47	C	M		900	600				78.77
2202	36.37	S	M	26.49	1070	1040	B	BR	-150	33.11
2203		S	Q	26.72	1070	1040	B	BR	245	56.44
2301		S	Q	26.71	860	770	R	BR	-148	32.65
2305	34.81	C	M		920	650	R	BR		11.18
2306	35.22	S	M	27	900	520	R	BR	187	65.3

Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
2307		C	V	27.1	450		C	VC		6.52
2307		C	V		630	620	R	BR		16.89
2308		C	J		900	600		VC		16.27
2310		C	G		870	740	R	BR		71.87
2311		C	G		920	650	R	BR		85.42
2401	30.86	C	M		150			VC		14.42
2402		C	L	28.9	300		C	VC	65	29.16
2403		C	L							
2404	31.57	C	M	27.71	600		C	CO	9	8.94
2405		C	L		300		C	VC		35
2406	31.64	C	M	25.6	300		E	BR		26.47
2408		C	L	26.04	940	630	R	BR		32.65
2409	31.34	C	M	29.14	300		C	VC	134	14.76
2410		C	G		150			VC		11.7
2411	31.13	C	M	29.02	300		C	VC		23.71
2412		C	M		300		E	VC		18.4
2413		C	G		150			VC		5.39
2414		C	G		150			VC		21.02
2415		C	J		150		C	VC		28.62
2416		C	J		300			VC		28.23
2417		C	Q	26.74	450		C	VC	10	9.43
2418		F	J		225			VC		3.71
3000		C	M	33.52	710	640	E	BR		4.11
3000		C	M		900	600	C			223.27
3001	37.38	C	M	32.16	750	610	E	BR		64.14
3002	37.57	C	M	32.44	580	510	F	BR	58	8.06
3003	37.73	C	M		900	600	E	BR		6.17
3004		C	V		975		C	BR		30.95
3005	37.9	C	M		900		U			2.82
3006	37.88	C	M	26.8	1050		C	BR	239	28.65
3007	37.67	C	M	24.65	1950		C	BR		23.29
3008	37.79	C	M	33.52	710	640	E	BR		38.95
3009		F	J		450		C	BR		105.13
3011		C	Q	32.3	700	530	E	BR	62	8
3012		C	Q							
3013		C	Q	26.68	975		C	BR	155	27.85
3101	37.17	C	M							
3102	37.09	S	M	26.95	830	960	R	BR	249	57.31
3103		S	M		1050		C	BR		43.42
3104		S	Q	8.14	830	960	R	BR	-2	42.54
3105		C	Q	34.76	600	580	S	BR	111	41.18
3201	37.53	C	M	34.37	650	610	S	BR	1	15.65
3202	37.24	C	M	32.47	375		C	CO	223	37.85
3203	37.13	C	M	32.68	375		C	CO	136	27.17
3204	37.09	S	M	34.62	225		C	VC	104	18.68
3205		C	M		375		C	CO		23.85
3206		C	Q	15.61	740	540	R	CO		14.76
3301	35.94	C	M	32.9	690	610	R	BR		30.87
3401	32.35	C	M	28.01	225		C	VC		32.89
3402		C	L		225		C	VC		130.27
3402		C	L		225		C	VC		75.5
3403	33.97	C	M	30.36	225		C	VC		12.08
3404		F	J		225			VC		2.26
3406	31.96	C	M	29.48	300		C	VC	102	24.6
4001		C	M		900		C	CO		72.72
4002	38.04	C	M	31.54	530		C	CO		19.72
4003		C	Q	32.22	450		C	CO	90	27.78
4004		C	Q	12.5	530		C	CO		47.51
4005	37.89	C	M	31.85	530		C	CO	101	27.29
4101	38.07	S	M	34.55	840	610	R	BR	31	24.08
4102	37.97	C	M	31.45	525		C	CO		66.04
4103	38.07	C	M	25.12	1875		C	BR	240	91.24
4104	37.94	C	M	35.14	375		C	VC	107	40.71
4105	37.85	S	M							
4106		S	M							
4107		C	G		710	640	E	BR		23.71
4108		S	Q							
4201	32.74	C	M	30.43	375		C	VC	-70	41.3
4202	36.88	C	M	31.52	375		C	CO	203	14.21
4203		C	Q	31.45	375		C	VC	269	13.45
4204		C	Q	27.46	850	700	E	BR	214	57.69
4301	34.88	S	M							
4302	34.88	S	M	32.82	300		C	VC		60.9
4303	34.81	S	M	33.19	150		C	VC	141	15.52
4304	35.71	S	M	32.66	225		C	VC	42	39.41
4305	34.95	S	M	33.18	225		C	VC	57	29.15
4306	34.84	C	M	27.14	850	700	E	BR	-36	3.61
4307		O	G		914	610		VC		88.6
4308	33.26	C	M	27.46	300		C	VC	158	42.77
4309		C	Q		750	620	E	BR		29.97
4310		C	Q	8.97	900	600	U	BR		40.56
4311	32.64	C	M	27.67	300		C	VC	234	37.44
4312		C	V	27.19	850	650	E	BR	2	41.51
4312		C	V	27.29	914	610		VC		2.97
4313		C	J		850	700	E	BR		37.2
4314		C	Q	27.24	850	650	E	BR	-32	3.18
4401		O	F							
4900		F	J		900	600	U			59.22

WASTE WATER SYMBOLOGY

FOUL — SURFACE — COMBINED — DUAL — MANHOLE

SIDE ENTRY MANHOLE

PRIVATE SEWER — ABANDONED SEWER

SITE TERMINATION — T-JUNCTION (SADDLE)

AIRVALVE — LAMP HOLE

CASCADE — OIL INTERCEPTOR

CONTROL KIOSK — PENSTOCK

CONTROL VALVE — RODDING EYE

GULLEY — SOAKAWAY

HATCHBOX — TUMBLING BAY

HEADWALL — UNSPECIFIED

HYDROBRAKE — VALVE

INLET — WASHOUT

GHOST NODE (inc. GN - Rising Main & GN - Dual Function)

EXPEDIENCY NODE (CHANGE OF CHARACTERISTIC)

CATCHPIT — SIDE ENTRY CATCHPIT

CHAMBER — SIDE ENTRY CHAMBER

DROPSHAFT — SIDE ENTRY DROPSHAFT

SHEET EDGE — VENT COLUMN

SEWER OVERFLOW — DISCHARGE POINT (OUTFALL)

TANK — WASTE WATER TREATMENT WORKS

PUMPING STATION — EJECTOR STATION

SLUDGE PUMPING STATION

Note - ALL flow direction arrows are BLUE - colour not significant

NODE TABLE ABBREVIATIONS

MANHOLE FUNCTION

- F Foul
- S Surface
- C Combined
- T Transition
- O Overflow
- U Unspecified

MANHOLE / NODE TYPE

- M Manhole
- J Junction
- L Lamphole
- H Hatchbox
- R Rodding Eye
- F Outfall
- V Combined Sewer Overflow
- P Pumping Station
- S Soakaway
- D Dual Function Manhole
- W Treatment Works
- Z Ghost in Rising Main
- C Cascade
- Y Gulley
- E Ejector
- O Oil Injector
- I Inlet
- B Hydrobrake
- T Vent Column
- X Valve
- U Unspecified
- Q Expediency Node
- G Ghost (to allow pipe bends)

SEWER SHAPE

- C Circular
- E Egg
- O Oval
- F Flat Top
- R Rectangular
- S Square
- T Trapezoidal
- A Arch
- B Barrel
- H Horseshoe
- U Unspecified

SEWER MATERIAL

- AC Asbestos Cement
- BR Brick
- CI Cast Iron
- SI Spun (Grey) Iron
- CO Concrete
- CS Concrete Segments (Bolted)
- CS Concrete Segments (Unbolted)
- CC Concrete Box Culvert
- DI Ductile Iron
- GR Glass Reinforced Concrete
- GR Glass Reinforced Plastic
- PS Plastic / Steel Composite
- PV Polyvinyl Chloride
- PE Polyethylene
- RP Reinforced Plastic Matrix
- ST Steel
- VC Vitrified Clay (All Clayware)
- PP Polypropylene
- PF Pitch Fibre
- MA Masonry - In Regular Courses
- MA Masonry - Randomly Coursed
- U Unspecified

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OS Sheet No: SJ8497SW

Scale 1:1250 Date: 1-Feb-2012

177 Nodes

Sheet 1 of 1

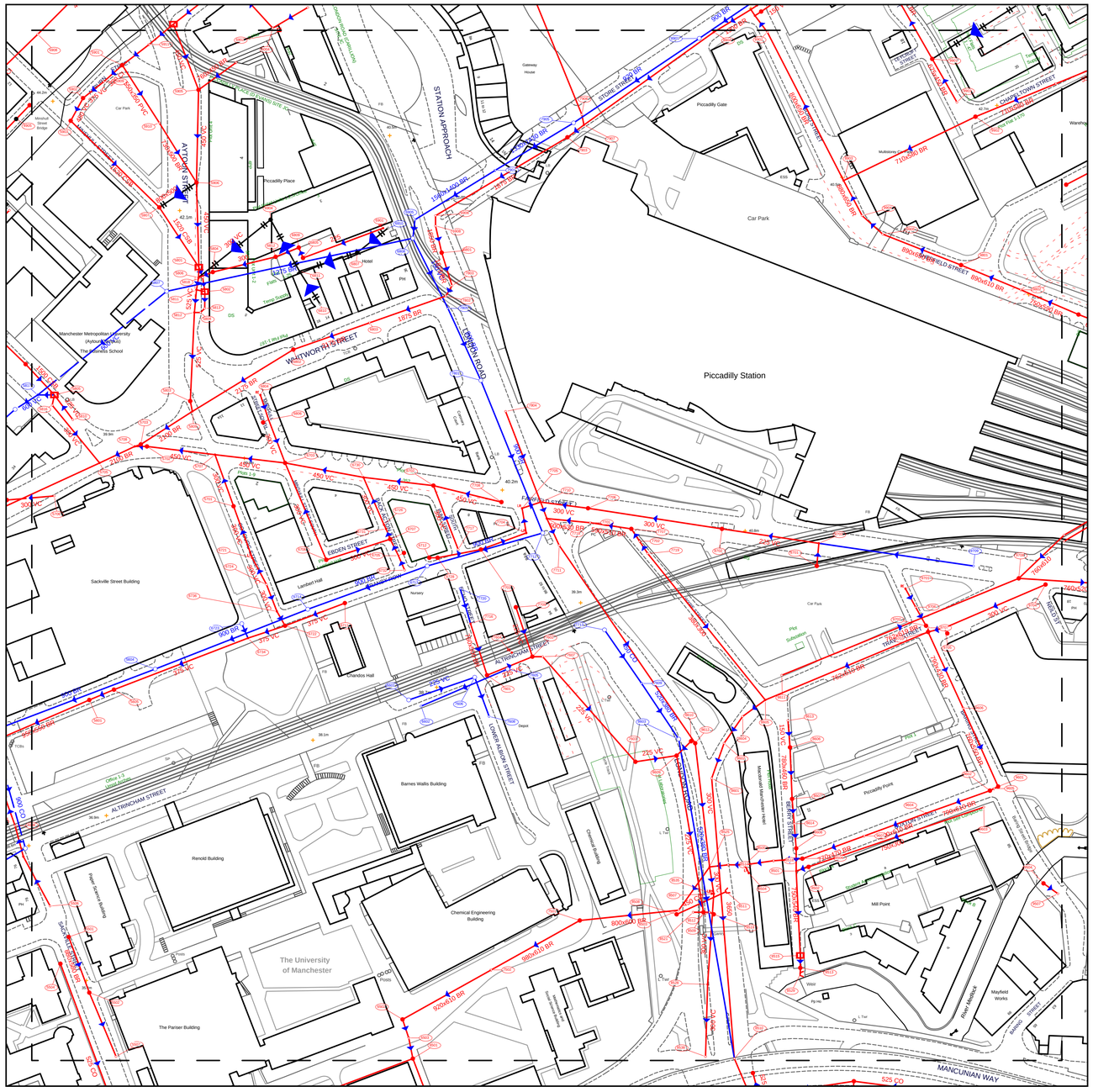
United Utilities

SEWER RECORDS

OS Sheet No: SJ8497SW

Scale 1:1250 Date: 1-Feb-2012

Printed by: Hazel Kay



Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
5501	35.75	C	M	31.79	880	580	E	BR	10	28.79
5502	35.23	C	M	29.02	880			BR		33.62
5504		C	M		525		C	CO		103.46
5506		C	G							27.29
5507		C	G							
5601	38.65	C	M		950	550	E	BR		55.54
5604	40.27	S	M	27.99	900		C	BR	352	84.5
5605	39.89	C	M	35.27	950	550	E	BR		13
5701	39.98	C	M	32.58	300		C	VC		26.57
5702	39.97	C	M	32.34	450			VC		6
5703	39.99	C	M	30.46	2100		C	BR		3.16
5705		C	J		2100		C	BR		110.07
5706		C	G		300		C	VC		23.09
5707		C	J		450		C	VC		33.24
5708		C	J		2100		C	BR		18.79
5801		C	V	32.28	525		C	VC		5
5801		C	V	32.28	1520			CSB		5.33
5802		C	V	32.32	375		C	VC		8.11
5802		C	V	41.1	300		C	CI		4.18
5803	40.47	C	M	31.63	525		C	VC		5.1
5804	33.25	C	M	32.39	300		C		124	7.42
5805		C	V	31.72	300		C	VC		5.11
5805		C	V	40.14	225		C	VC		8.05
5806		C	J		525		C	VC		6.08
5807	41.18	S	M	26.88	600		C	VC		80.24
5808		C	G		525			VC		3
5809		C	J		2100		C	BR		29.68
5810		C	G		225		C	VC		14.97
5811		C	J		525		C	VC		11.05
5812		C	J		525		C	VC		43.05
5813		O	G		375			VC		2.83
5816		C	G		300		C	VC		36.24
5817		S	J		600		C	VC		13.04
5818		O	G		340	380	E	BR		6.97
5901	43.76	C	M	39	320		C	CI	241	12.04
5901	43.76	C	M	39.31	550	350	E	PVC	30	33.29
5902	43.51	C	M	37.55	450		C	VC	45	12.53
5903	43.62	C	M	36.7	1520		C	CSB	118	60.11
5904		F	Q		760	450	E	BR		22.56
5905	43.72	C	M	38.39	450		C	VC	34	45.01
5906	42.37	C	M	37.07	450		C	VC	9	41.02
5907	42.2	C	M	35.78	1520		C	CSB	29	34.75
5908		C	G		450		C	CI		50.21
5909		C	Q	38.95	375		C	VC	320	12.81
5910		C	Q	38.19	730	500	E	BR	30	34.13
5911		C	Q	39.72	500	340	E	PVC	48	16.4
6501		C	M		525		C	CO		36.4
6502	33.79	C	M	27.8	920	630	E	BR		9.49
6503		C	Q		600	500	E	BR		10.2
6601	38.42	S	M	36.88	225		C	VC	113	33.84
6602		S	G							
6702	40.11	C	M	32.69	450		C	VC		34.23
6703	40.03	C	M	36.24	450		C	VC		34.23
6705	40.96	C	M	38.14	300		C	VC	2	8.94
6706	40.88	C	M	33.28	300		C	VC	-17	51.08
6706	40.88	C	M	33.28	300		C	VC	112	32.57
6707	40.67	C	M	32.99	300		C	VC		5.39
6711		C	M		375		C	VC		31.02
6712	41	C	M	38.02					-10	4
6713	40.85	S	M	28.46	900		C	BR	411	61.68
6714	41.23	S	M	28.31	900		C	BR	248	79.48
6721		C	L	32.31	300		C	VC	-98	26.57
6722	41.18	C	M	35.31	375		C	VC		18.97
6723	41.09	S	M	36.07	375		C	VC		7.62
6724		C	G		300		C	VC		14.76
6724		C	G		300		C	VC		13.93
6726		C	J		300		C	VC		25.08
6728	40.96	C	M	38.41					5	21.38
6730		C	J		450		C	VC		38.64
6731		C	J		300		C	VC		2.24
6732		C	G		300		C	VC		7.62
6734		C	J		375		C	VC		69.64
6736		C	J		300		C	VC		8.06
6801	39.58	C	M	31.14	1875		C	BR		16.76
6802	40	C	M	38.08	2175		C	BR		57.45
6803		C	Q		2175		C	BR		39.22
6804		C	R	32.82	300			VC	-4	12.65
6805	33.93	C	M	32.69	300		C		136	5.44
6806	40.2	C	M	36.25	300		C	VC	2247	22.47
6807	33.99	C	M							
6808	39.59	S	M	29.25	150		C	VC	422	38.01
6808	39.59	S	M	29.25	1275		C	BR	52	122.2
6809	33.25	C	M	32.65	300		C		151	12.07
6810		C	G							
6811		C	J							
6812	33.25	C	M	32.57	300		C		174	31.37
6901		F	R		225		C			41.47
6902		C	L							
6904	36.93	C	M							
6905		S	G		1560	1400	E	BR		9.06
6906		C	G		1850		C	BR		5
6908		C	G		1850		C	BR		13.34
6910		S	G							
7501	33.92	C	M	28.07	980	610	E	BR	379	49.24
7502		C	Q	27.94	920	610	E	BR	410	49.24
7601	38.99	C	M	32.68	225		C	VC	19	23.77
7602	39.03	C	M	31.45	225		C	VC		5
7603	37.18	C	M	29.21	225		C	VC	144	20.22
7604		C	R							
7605	38.94	S	M	33.91						45.69
7606	38.91	S	M	36.58	225			VC		20.25
7607		C	G		225		C	VC		68.01
7608		S	G							

Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
7609		S	Q	33.38	520	380	E	BR	35	32.45
7701		C	Q		600	530	E	BR		21.1
7702		C	Q		570	500	F	BR		7.21
7703	40.45	C	M	34.33	300			VC	26	23.41
7704		C	L	33.42	300			VC	-47	12.17
7705		C	L	33.68	300			VC		9.49
7706	40.38	C	M	35.96	300		C	VC		23.19
7707	40.54	C	M	37.69	590	510	F	BR		20.22
7708	40.02	C	M	32.88	450		C	VC	179	33.96
7709	39.81	C	M	35.3	225		C	VC	7	25.3
7710		C	J		300			VC		8.54
7711		C	G		300			VC		116.5
7712	40.01	S	M		900		C	BR		58.24
7713	38.95	S	M	34.32	450		C	CO	34	31.62
7716		C	J		760	500	E	BR		26.25
7717		C	G		300		C	VC		33.24
7718		C	J		600			BR		14.32
7719		C	G		600	530	E	BR		7.21
7719		C	G		380	300	E			91.05
7720		S	G		760	500	E	BR		17.72
7801	39.93	S	M	29	900		C	BR		79.85
7802		C	G		1875		C	BR		39.22
7803		C	G		1875		C	BR		5.83
7804		C	G		300			VC		47.17
7805		S	Q	29.16	900		C	BR	240	38.48
7901		S	Q		1560	1400	E	BR		45.79
7903	38.9	C	M	31.44	1875		C	BR		74.43
7905	38.95	S	M	31.17	1330	1430	E	BR		44.42
7906		C	G		1875		C	BR		5.1
7907		C	J		1875		C	BR		10
8501		C	J		750	540	E	BR		41
8502	36.06	C	M	31.31	750	300				6.32
8503		C	G		800	600	E	BR		48.26
8504		C	L		300		C	VC		4.47
8505	36.03	C	M	28.48	780	600	E	BR		8
8506	36.07	C	M	31.29	760	470	F	BR	10	14.04
8507		C	L	35.09	300		C	VC		44.1
8508	34.72	C	M	28.31	450		C	CO		26.4
8509	35.45	C	M	28.37	930	600	E	BR		5
8510		C	G		3650		C			138
8511		C	F							
8512		C	Q	29.95	930	600	E	BR	2	3
8513	35.32	C	M	30.56	750	450	E	BR		3
8514		C	Q		870	600	E	BR		9.06
8515		C	V	30.62	600		C	CI	151	6.05
8516		C	Q	29.87	790	600	E	BR	10	14.14
8519	35.51	C	M	31.51	300		C	CO	1	2.24
8521		C	G							
8525		C	J		300		C	VC		13.15
8525		C	J		870			BR		25.81
8528		C	J		300		C	VC		35.01
8529		C	F							
8535		C	L							
8538		C	G							
8601		C	G		3650		C			136.44
8602		C	G							18.03
8603	37.44	S	M	32.42	520	380	E	BR		157.33
8604		C	G							15.81
8605		C	J							13.6
8606	38.34	C	M	37.17	780	460	E	BR	6	25.02
8607	37.43	C	M	32.74	740	400	E	BR	20	12.04
8608	36.26	C	M	31.5	740	450	F	BR		11
8609	37.27	C	M	29.05	225		C	VC	203	77.1
8610	37.29	C	M		300		C	VC		9.9
8611		C	G		762	619		BR		124.23
8612	37.1	C	M		300		C	VC		60.41
8613		C	G		150		C	VC		13.04
8614		C	Q	32.15	790	440	F	BR	20	12.04
8701	40.81	C	M	36.62	225			VC		11.05
8702	40.77	C	M	36.51	300		C	VC	120	65.76
8703		C	J		225		C	VC		47.52
8901	38.41	S	M	32.05	920		C	BR	119	73.5
8902		C	G		800	650	E	BR		10
8903		C	J		800	650	E	BR		80.95
8904		C	J		1900			BR		77.42
9504	35.39	C	M	32.18	225		C	VC		8.6
9507		C	G							
9601	37.07	C	M	32.81	225		C	VC	1	2.24
9602	37.01	C	M	28.78	790	610	E	BR		32.89
9603		C	G		750	300				89.81
9604		C	J		800	610	E	BR		31.95
9605		C	Q	30.91	300		C	VC	1	2.24
9606		C	Q	33.52	760	550	F	BR	60	41.63
9607		C	Q		770	470	F	BR		31.95
9701		C	R	34.34	680	650	E	BR	206	10.3
9702	39.84	C	M	34.18	780	510	F	BR	-35	1.41
9703	39.84	C	M	34.21	790	430	F	BR	59	40.72
9703	39.84	C	M		762	610		BR		85.62
9704	40.88	C	M	35.04	300		C	VC	-24	53.31
9705		C	M	33.87	300		C	VC	-14	8.25
9706		C	Q	34.29	700	630	F	BR	172	10.3
9707		C	Q	34.22	740	460	F	BR	-67	2
9708	40.85	C	M	37.49	760	520	E	BR		62.13
9709		S	G		225			VC		75.8
9801	40.8	C	M	36.49	890	650	E	BR		40.85
9802		C	Q	36.97	890	610	E	BR	65	31.38
9901	42.06	C	M	37.53	225		C	BR	16	40.31
9902	42.3	C	M	36.35	710	580	E	BR		71.11
9903		C	G		675	450	C	BR		24.19
9904		C	G		880	650	E	BR		19.24
9905		C	G		880	650	E	BR		13.45
9906		C	Q		710	580	E	BR		42.15

OS Sheet No: SJ8497NE

Scale 1:1250 Date: 1-Feb-2012

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WASTE WATER SYMBOLOGY

MANHOLE (FOUL, SURFACE, COMBINED, DUAL)

SIDE ENTRY MANHOLE

PRIVATE SEWER

ABANDONED SEWER

SITE TERMINATION

T-JUNCTION (SADDLE)

AIRVALVE

LAMP HOLE

CASCADE

OIL INTERCEPTOR

CONTROL KIOSK

PENSTOCK

CONTROL VALVE

RODDING EYE

GULLEY

SOAKAWAY

HATCHBOX

TUMBLING BAY

HEADWALL

UNSPECIFIED

HYDROBRAKE

VALVE

INLET

WASHOUT

GHOST NODE (inc. GN - Rising Main & GN - Dual Function)

EXPEDIENCY NODE (CHANGE OF CHARACTERISTIC)

CATCHPIT

SIDE ENTRY CATCHPIT

CHAMBER

SIDE ENTRY CHAMBER

DROPSHAFT

SIDE ENTRY DROPSHAFT

SHEET EDGE

VENT COLUMN

SEWER OVERFLOW

DISCHARGE POINT (OUTFALL)

TANK

WASTE WATER TREATMENT WORKS

PUMPING STATION

EJECTOR STATION

SLUDGE PUMPING STATION

Note - ALL flow direction arrows are BLUE - colour not significant

NODE TABLE ABBREVIATIONS

MANHOLE FUNCTION

F	Foul	T	Transition
S	Surface	O	Overflow
C	Combined	U	Unspecified

MANHOLE / NODE TYPE

M	Manhole	Z	Ghost in Rising Main
J	Junction	C	Cascade
L	Lamphole	Y	Gulley
H	Hatchbox	E	Ejector
R	Rodding Eye	O	Oil Injector
F	Outfall	I	Inlet
V	Combined Sewer Overflow	B	Hydrobrake
		T	Vent Column
P	Pumping Station	X	Valve
S	Soakaway	U	Unspecified
D	Dual Function Manhole	Q	Expediency Node
		G	Ghost (to allow pipe bends)
W	Treatment Works		

SEWER SHAPE

C	Circular	T	Trapezoidal
E	Egg	A	Arch
O	Oval	B	Barrel
F	Flat Top	H	Horseshoe
R	Rectangular	U	Unspecified
S	Square		

SEWER MATERIAL

AC	Asbestos Cement
BR	Brick
CI	Cast Iron
SI	Spun (Grey) Iron
CO	Concrete
CS	Concrete Segments (Bolted)
CS	Concrete Segments (Unbolted)
CC	Concrete Box Culvert
DI	Ductile Iron
GR	Glass Reinforced Concrete
GR	Glass Reinforced Plastic
PS	Plastic / Steel Composite
PV	Polyvinyl Chloride
PE	Polyethylene
RP	Reinforced Plastic Matrix
ST	Steel
VC	Vitrified Clay (All Clayware)
PP	Polypropylene
PF	Pitch Fibre
MA	Masonry - In Regular Courses
MA	Masonry - Randomly Coursed
U	Unspecified

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OS Sheet No: SJ8497NE
Scale 1:1250 Date: 1-Feb-2012
205 Nodes
Sheet 1 of 1

United Utilities
SEWER RECORDS



Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
0207		C	Q	12.67	900		C	BR		12.21
5001	38.19	C	M	32.1	525		C	CO	218	52.33
5002	38.21	C	M	32.32	525		C	CO	183	40.31
5101	38.54	C	M	28.27	710	690	R	BR		49.2
5102	38.51	S	M	33.18	480		C	CO	-150	3
5103	38.49	S	M	33.99	225		C	VC	26	4.12
5104	38.32	C	M	25.48	1800		C	BR	321	96.18
5105	38.44	C	M	28.42	1000	750	R	BR	647	19.42
5106		C	G		3650		C			18.11
5107		S	Q	33.78	740	560	R	BR	32	24.08
5108	38.19	C	M	31.76	580		C	CO	2	46.14
5109		C	G		3650		C			112.07
5110		S	Q	33.2	300		C	PVC	-100	2
5111		S	Q	33.83	300		C	VC	20	3
5112		C	Q	28.39	1000	750	R	BR	111	20
5113		S	Q	34.2	450		C	VC	48	23.85
5114		C	Q	28.48	750	650	R	BR	460	18.38
5201	38.53	S	M	34.71	660	580	C	BR	44	22.47
5202	37.8	C	M	28.08	225		C	VC	640	6.4
5203	37.86	C	M	27.73	740	710	R	BR	215	57.98
5205	38.42	C	M	35.73	100		C	VC	73	5.1
5206	38.42	C	M	33	740	580	R	BR		7.07
5207		C	M		870	610	E	BR		35.11
5208	36.82	C	M	33.09	600		C	CO	163	83.22
5209		C	J		730	710	R	BR		12.21
5301	35.81	C	M	32.55	600		C	CO		13.76
5302		C	V		900	570	U	BR		7.25
5302		C	V		450		C	CO		1.15
5303		S	M		450		C	CO		41.48
5304		C	M		810	610	E	BR		14.21
5305	35.81	C	M	26.94	650		C	CO		20.12
5306	35.74	S	M	31.66	225		C	VC		19.72
5307		C	M		840	630	E	BR		93.98
5308		C	J		840			BR		25.08
5309		O	G		450		C	CO		5.83
5310		C	Q		930	600	E	BR		14.87
5401	34.99	C	M	28.18	525		C	CO		144.31
5402		S	G							
6001	38.47	C	M	29.35	300		C	BR	81	64.41
6002		C	G		3650		C			21.1
6003		C	G		3650		C			123.31
6101	38.76	C	M	33.58	600		C	CO	228	105.11
6102	38.45	C	M	28.51	900	570	R	BR	637	19.1
6103		C	M		1840		C	BR		25.5
6104		C	G		1800		C	BR		55.01
6105	19.38	C	M		600		C	CO		60.03
6201	38.53	C	M		3650		C			47.01
6202	38.91	C	M	36.32	225		C	VC	142	19.92
6203	38.87	C	M	35.34	720	570	F	BR	65	24.6
6204	38.77	C	M	36.18	225		C	VC	210	60.83
6205	38.81	S	M	35.31	720	610	R	BR	104	29.15
6206	38.83	C	M	36.67	225		C	VC	57	27.73
6207		C	J		1700	2400	R	BR		73.06
6208		S	Q	35.03	570	650	R	BR	101	29.15
6209		C	Q	35.6	660	590	F	BR	120	22.83
6301	37.99	C	M	34.27	720	620	F	BR	-18	28.64
6302	38.11	C	M	34.57	690	600	F	BR	56	5
6303	37.53	C	M		700			BR		31.78
6304		C	Q	34.96	700	630	F	BR	64	25.06
6305		C	Q	35.9	700	610	R	BR		28.18
6306		C	Q	34.48	720	560	F	BR	54	5.39
6401		C	M		650		C	CO		38.29
6402		C	Q		450		C	CO		36.31
7001	38.81	C	M	34.46	600		C	CO		48.01
7002		C	M		225		C	CO		55.22
7003		C	M		600		C	CO		86.09
7101	39.32	C	M	26.19	1830		C	BR		100.02
7102	39.82	C	M	33.77	700	630	F	BR	84	25.06
7105	39.22	C	M	36.47	710	620	U	BR	88	29.07
7201	38.78	C	M	31.9	790	680	R	BR	191	7.62
7202	38.8	C	M	32.81	300		C	VC	175	21.02
7203		C	L	37.24	300		C	VC	13	23.26
7204	39.23	C	M	35.79	750	610	F	BR	122	23.26
7205		C	Q	36.14	720	610	F	BR	87	28.65
7206		C	Q	31.86	770	720	R	BR	168	6.71
7207		C	Q	35.43	225		C	VC	13	23.71
7208		C	Q	31.99	670	610	R	BR	361	18.03
7209		C	Q	37.3	300		C	VC	269	16.12
7301	37.16	S	M	28.37	225		C	VC	75	63.72
7302	37.32	C	M	31.14	760	700	R	BR		30.87
7303	38.5	C	M	31.71	830	750	R	BR	117	32.65
7304	38.72	C	M	31.78	750	760	R	BR	285	8.54
7305		C	Q	31.43	790	690	R	BR	115	32.25

Refno	Cover	Func	Type	Invert	Size.x	Size.y	Shape	Matl	Grad	Length
7306		C	R		760	610	U	BR		36.24
7307		C	Q	31.75	840	720	R	BR	224	8.94
7401	36.86	C	M	35.68	150		C	VC		6.32
7402	35.87	C	M	31.16	720	770	R	BR	45	7.21
7403		C	J		720	730	R	BR		17.89
7404		O	G							
7405		C	V	27.04	600		C	CO		99.67
7405		C	V	30.19	370	600	F	BR		1.33
7406		O	G		370	600	F	BR		5.66
7407		C	Q	31	900	700	F	BR	46	7.3
8001	40.99	C	M	38.32	225		C	VC	27	60.22
8002		C	M		225		C	VC		52.77
8101		C	Q	33.47	640	580	R	BR	76	23.71
8102		C	Q	33.25	860	630	R	BR	18	5.83
8103	39.64	C	M	37.42	225		C	VC	177	42.45
8104	39.76	C	M	33.56	720	500	R	BR	17	5.39
8105	39.44	C	M	35.78	600		C	CO	25	48.8
8201	39.98	C	M	37.58	225		C	VC	31	37.48
8202	39.77	C	M	37.87	225		C	VC	131	36.67
8203	40	C	M	32.93	870	590	R	BR	78	8.6
8204	39.77	C	M	32.72	1002	580	R	BR	72	48.76
8205	39.3	C	M	32.03	900	560	R	BR	437	17.49
8206	39.75	C	M	37.36	225		C	VC	283	17
8207		C	M							
8208		C	Q	32.82	1002	610	R	BR	92	9.22
8301	38.89	C	M	36.16	500	580	E	BR	54	8.06
8302	37.77	C	M		3650		C			300.13
8303	37.44	C	M	34.76	580	580	R	BR		20.81
8304	38.51	C	M	35.76	590	530	R	BR		16.12
8305	37.41	C	M	34	720	570	U	BR	52	16.16
8306	33.82	C	M	32	225		C	VC	-10	42.05
8307		C	G		570	630	R	BR		24.35
8308		C	G		3650		C			19.03
8309		C	G		3650		C			29.07
8310		C	Q	36.01	590	530	R	BR	54	8.6
8311		C	Q		530	480	R	BR		15.81
8312		C	Q	33.69	760	610	U	BR	52	16.16
8313		C	Q		720	580	U	BR		34.89
8401		C	L	32.9	915	610	U	BR		88.64
8402	36.04	S	M	28.86	225		C	VC	145	65.37
8403	35.13	S	M	29.03	225		C	VC	416	66.64
8404	35.09	C	M	30.85	300		C	VC		12.04
8405	35.66	C	M							
8410	34.98	C	M	29.72	525		C	CO	78	46.53
8411	34.81	C	M	29.12	525		C	CO		11.4
8412	35.5	C	M							
8413		C	J		525			CO		82.04
9000		C	M		225		C	VC		17.74
9001	39.64	C	M	37.12	300		C	VC	146	55.32
9003	41.29	C	M	39.22	225		C	VC		30.86
9007	40.75	C	M	39.03	225		C	VC		51.42
9102	39.9	C	M	36.26	600		C	CO		39.41
9103	39.85	C	M	37.69	225		C	VC	82	31.14
9104	39.96	C	M	36.55	375		C	CO	472	23.6
9106	39.97	C	M	38.07	225		C	VC	68	30.48
9107	39.97	C	M	36.68	375		C	CO	358	32.2
9109		C	M		450		C	CO		21.47
9201	40.31	C	M	36.01	600		C	CO	320	73.54
9202	40.36	C	M	37.9	225		C	VC	170	49.19
9203		C	M		1240	610	R	BR		43.28
9204	40.23	C	M	31.86	450		C	BR		26.93
9204	40.23	C	M		1240			BR		8.6
9205	40.91	C	M	26.96	1770		C	BR	325	246.97
9206		C	M		600		C	CO		20
9207		C	Q	27.23	1760		C	BR	144	38.91
9301	39.09	C	M	34.93	300		C	VC		15.62
9303	39.02	C	M							
9304		C	L							
9305	39.36	C	M		300			VC		19.72
9306		C	G		1240			BR		80.6
9307		C	J		580			BR		72.56
9401		C	L	31.9	800	560	R	BR	41	25.3
9402	35.86	C	M	31.62	740	620	F	BR	-21	3
9403		C	Q	32.98	750		C	CO	82	12.37
9404		C	Q	31.76	225		C	VC	-23	3.16
9405		C	Q	33.56	1240	890	E	BR		2.88
9406	37.14	C	M							
9408	35.4	C	M							4.12
9409	34.47	C	M							
9410		C	M		300		C	VC		16.16
9415	35.57	C	M	31.61	900		C	CO	-2	4
9417		C	V		525		C	CO		39.48
9420	37.13	C	M	32.83	750	600	E	BR		48.66

WASTE WATER SYMBOLOGY

- MANHOLE: FOUL, SURFACE, COMBINED, DUAL
- SIDE ENTRY MANHOLE
- PRIVATE SEWER
- ABANDONED SEWER
- SITE TERMINATION
- T-JUNCTION (SADDLE)
- AV AIRVALVE
- LH LAMP HOLE
- CA CASCADE
- OI OIL INTERCEPTOR
- CK CONTROL KIOSK
- PE PENSTOCK
- CV CONTROL VALVE
- RE RODDING EYE
- GU GULLEY
- SO SOAKAWAY
- HA HATCHBOX
- TB TUMBLING BAY
- HE HEADWALL
- UN UNSPECIFIED
- HY HYDROBRAKE
- VA VALVE
- IN INLET
- WO WASHOUT
- GHOST NODE (inc. GN - Rising Main & GN - Dual Function)
- EXPEDIENCY NODE (CHANGE OF CHARACTERISTIC)
- CATCHPIT
- SIDE ENTRY CATCHPIT
- CHAMBER
- SIDE ENTRY CHAMBER
- DROPSHAFT
- SIDE ENTRY DROPSHAFT
- SHEET EDGE
- VENT COLUMN
- SEWER OVERFLOW
- DISCHARGE POINT (OUTFALL)
- TANK
- WASTE WATER TREATMENT WORKS
- PUMPING STATION
- EJECTOR STATION
- SLUDGE PUMPING STATION

Note - ALL flow direction arrows are BLUE - colour not significant

NODE TABLE ABBREVIATIONS

MANHOLE FUNCTION

F Foul
S Surface
C Combined
T Transition
O Overflow
U Unspecified

MANHOLE / NODE TYPE

M Manhole
J Junction
L Lamphole
H Hatchbox
R Rodding Eye
F Outfall
V Combined Sewer Overflow
P Pumping Station
S Soakaway
D Dual Function Manhole
W Treatment Works
Z Ghost in Rising Main
C Cascade
Y Gulley
E Ejector
O Oil Injector
I Inlet
B Hydrobrake
T Vent Column
X Valve
U Unspecified
Q Expediency Node
G Ghost (to allow pipe bends)

SEWER SHAPE

C Circular
E Egg
O Oval
F Flat Top
R Rectangular
S Square
T Trapezoidal
A Arch
B Barrel
H Horseshoe
U Unspecified

SEWER MATERIAL

AC Asbestos Cement
BR Brick
CI Cast Iron
SI Spun (Grey) Iron
CO Concrete
CS Concrete Segments (Bolted)
CS Concrete Segments (Unbolted)
CC Concrete Box Culvert
DI Ductile Iron
GR Glass Reinforced Concrete
GR Glass Reinforced Plastic
PS Plastic / Steel Composite
PV Polyvinyl Chloride
PE Polyethylene
RP Reinforced Plastic Matrix
ST Steel
VC Vitrified Clay (All Clayware)
PP Polypropylene
PF Pitch Fibre
MA Masonry - In Regular Courses
MA Masonry - Randomly Coursed
U Unspecified

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166 Nodes

Sheet 1 of 1

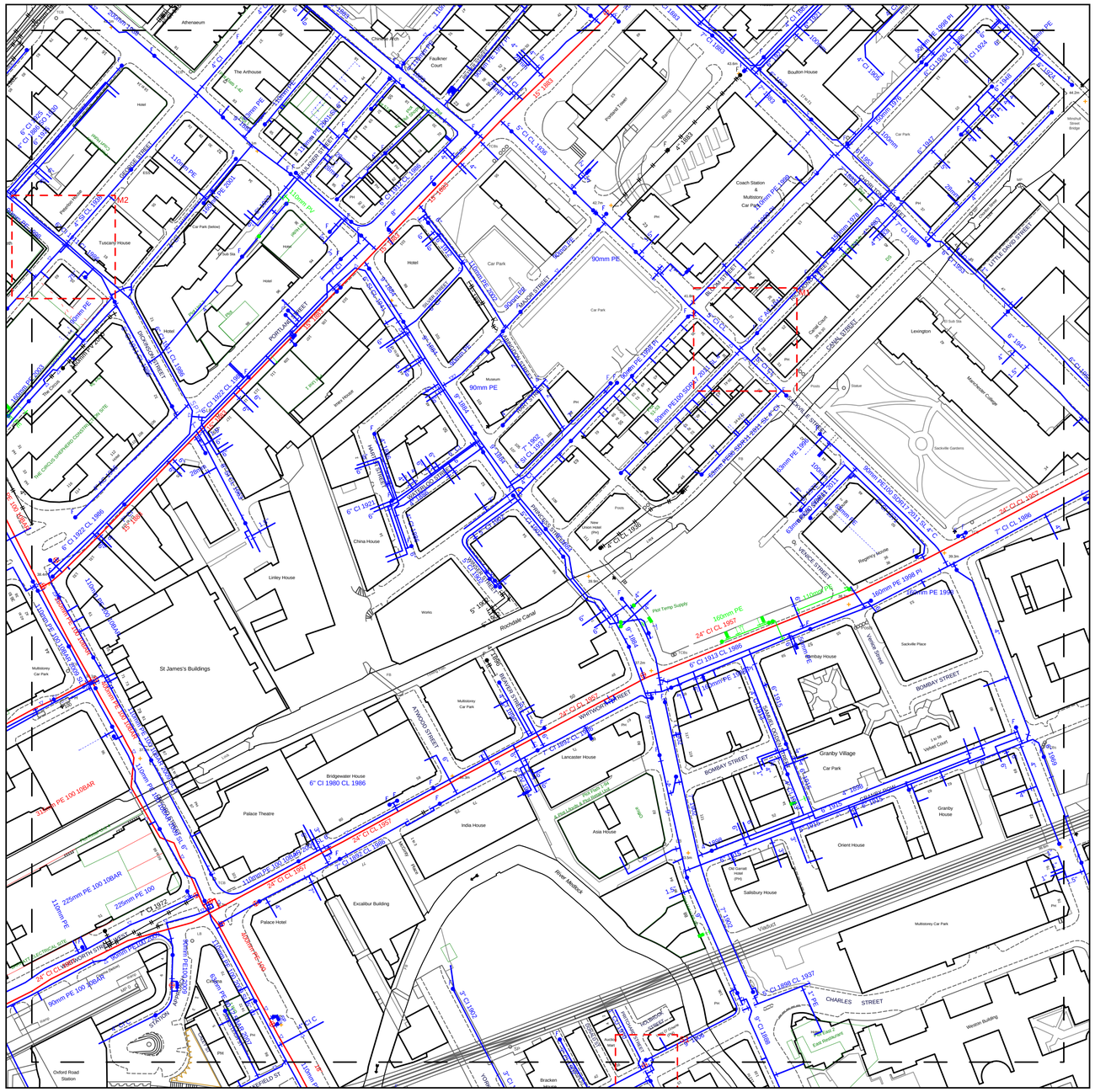
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SEWER RECORDS

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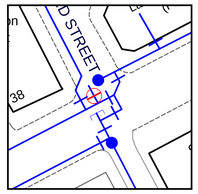


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S1



S2

S3

S4

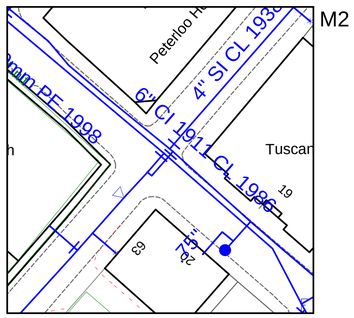
L1

L2

M1



M2



M3

M4

PIPEWORK

- TRUNK MAIN
- DISTRICT MAIN
- NON-POTABLE MAIN
- PROPOSED
- AQUEDUCT
- COMMON PIPE
- PRIVATE PIPE
- ABANDONED

NODES / FURNITURE

END CAP, CLOCKWISE VALVE, ANTI-CLOCKWISE VALVE, SHEET EDGE

AIR VALVE, TREATED WATER SLUICE VALVE, PRESSURE SUSTAINING VALVE, PRESSURE REDUCING VALVE, REFLUX VALVE

CHANGE OF CHARACTERISTIC, ANODE, CHLORINATION POINT, DE-CHLORINATION POINT

BORE HOLE, ABSTRACTION POINT, INLET POINT, BULK SUPPLY POINT

NWW WASHOUT, F FIRE HYDRANT, F/W SHARED HYDRANT, PUMP

SITE TERMINATION, INTERMEDIATE NODE, CONCESSION START, CONCESSION END

METER, METER AND STOPTAP, STOPTAP, MONITOR LOCATION

SP STRAIN POINT, AP ACCESS POINT, HB HATCHBOX, IP INSERT PROBE POINT

RM ROUTE MARKER, SPT SAMPLING POINT, LB LOGGER BOX

PROPERTY TYPES

CONDITION REPORT, PB PIPE BRIDGE, PT PIPE TUNNEL

TS TELEMETRY STATION, PUMPING STATION, PUMP HOUSE

WATER TREATMENT WORKS, PRIVATE TREATMENT WORKS, VH VALVE HOUSE, WATER TOWER

CS CONFINED SPACE, DU DIALYSIS UNIT, SR SERVICE RESERVOIR, SUP RES SUPPLY RESERVOIR

MATERIAL TYPES

AC	ASBESTOS CEMENT	OT	OTHERS
CI	CAST IRON	PB	LEAD
CU	COPPER	PV	uPVC
CO	CONCRETE	SI	SPUN IRON
DI	DUCTILE IRON	ST	STEEL
GI	GALVANISED IRON	UN	UNKNOWN
GR	GREY IRON	PE	POLYETHYLENE

LINING TYPES

CL	CEMENT
TB	TAR OR BITUMEN
ER	EPOXY RESIN

INSERTION TYPES

DD	DIE DRAWN
DR	DIRECTIONAL DRILLING
MO	MOLING
PI	PIPELINE
SL	SLIP LINED

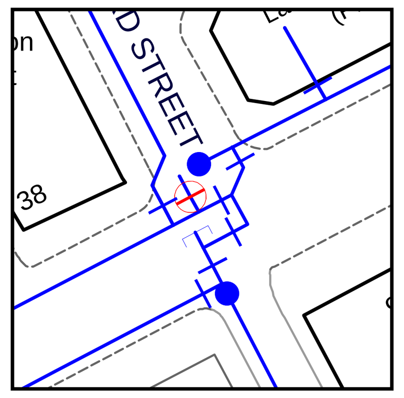
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WATER MAINS RECORDS



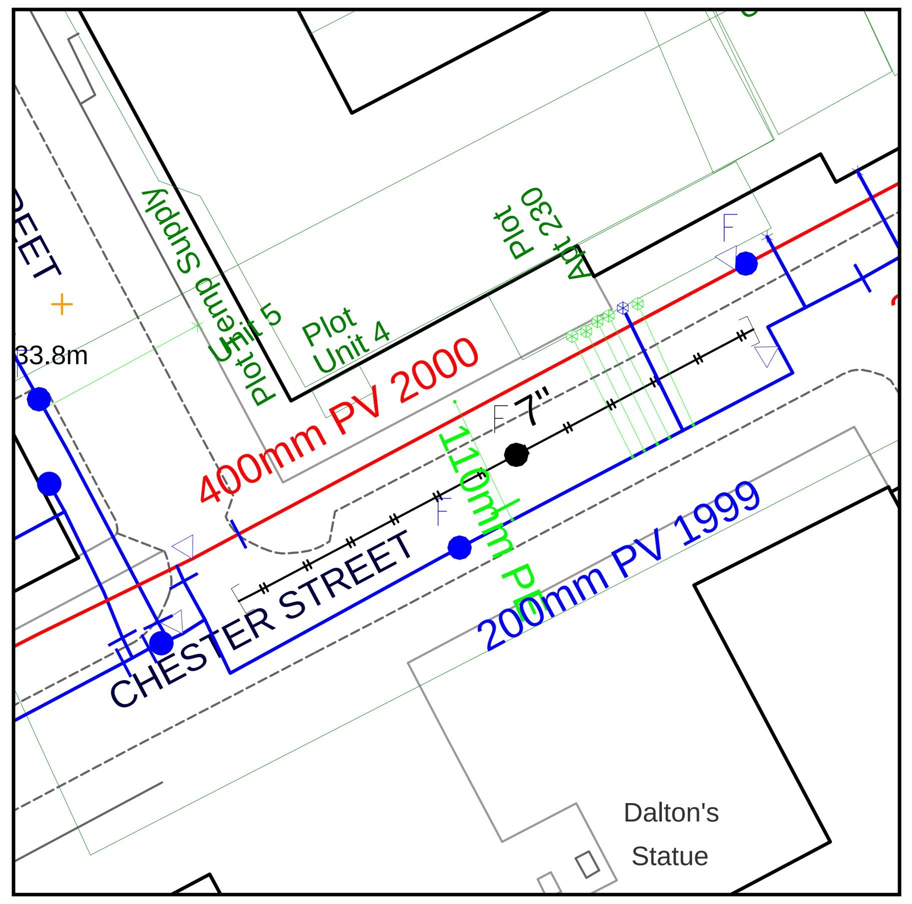


S2

S3

S4

L1



M1

M2

M3

M4

OS Sheet No: SJ8497SW

Scale 1:1250 Date: 1-Feb-2012

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PIPEWORK

TRUNK MAIN
DISTRICT MAIN
NON-POTABLE MAIN
PROPOSED
AQUEDUCT
COMMON PIPE
PRIVATE PIPE
ABANDONED

NODES / FURNITURE

END CAP, CLOCKWISE VALVE, ANTI-CLOCKWISE VALVE, SHEET EDGE
AIR VALVE, TREATED WATER SLUICE VALVE, PRESSURE SUSTAINING VALVE, PRESSURE REDUCING VALVE, REFLUX VALVE
CHANGE OF CHARACTERISTIC, ANODE, CHLORINATION POINT, DE-CHLORINATION POINT
BORE HOLE, ABSTRACTION POINT, INLET POINT, BULK SUPPLY POINT
NWW WASHOUT, F FIRE HYDRANT, F/W SHARED HYDRANT, PUMP
SITE TERMINATION, INTERMEDIATE NODE, CONCESSION START, CONCESSION END
METER, METER AND STOPTAP, STOPTAP, MONITOR LOCATION
SP STRAIN POINT, AP ACCESS POINT, HB HATCHBOX, IP INSERT PROBE POINT
RM ROUTE MARKER, SPT SAMPLING POINT, LB LOGGER BOX

PROPERTY TYPES

CONDITION REPORT, PB PIPE BRIDGE, PT PIPE TUNNEL
TS TELEMETRY STATION, PUMPING STATION, PUMP HOUSE
WATER TREATMENT WORKS, P PRIVATE TREATMENT WORKS, VH VALVE HOUSE, WATER TOWER
CS CONFINED SPACE, DU DIALYSIS UNIT, SR SERVICE RESERVOIR, SUP RES SUPPLY RESERVOIR

MATERIAL TYPES

AC	ASBESTOS CEMENT	OT	OTHERS
CI	CAST IRON	PB	LEAD
CU	COPPER	PV	uPVC
CO	CONCRETE	SI	SPUN IRON
DI	DUCTILE IRON	ST	STEEL
GI	GALVANISED IRON	UN	UNKNOWN
GR	GREY IRON	PE	POLYETHYLENE

LINING TYPES

CL	CEMENT	ER	EPOXY RESIN
TB	TAR OR BITUMEN		

INSERTION TYPES

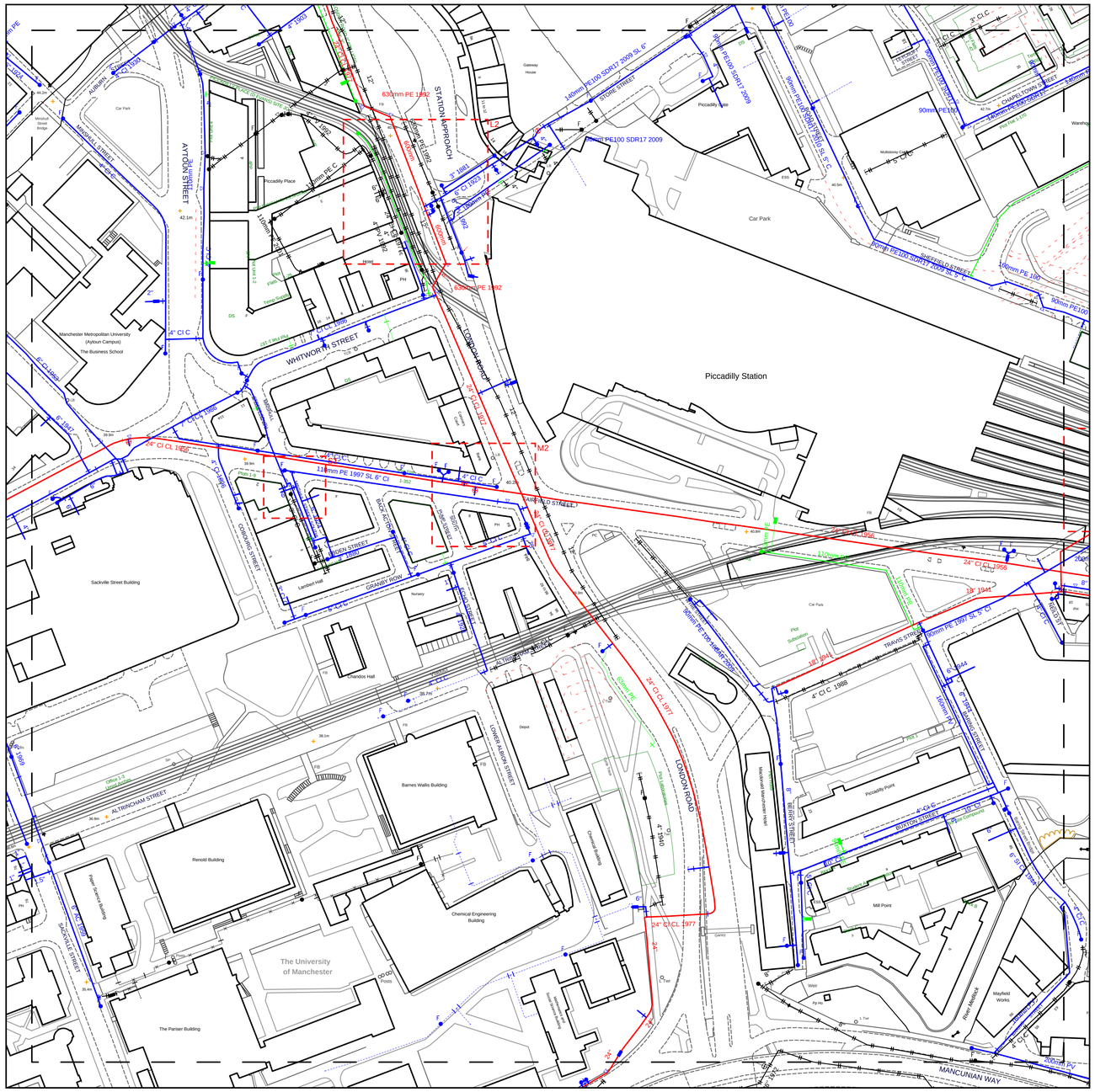
DD	DIE DRAWN	MO	MOLING
DR	DIRECTIONAL DRILLING	PI	PIPELINE
		SL	SLIP LINED

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WATER MAINS RECORDS



OS Sheet No: SJ8497NE

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S1

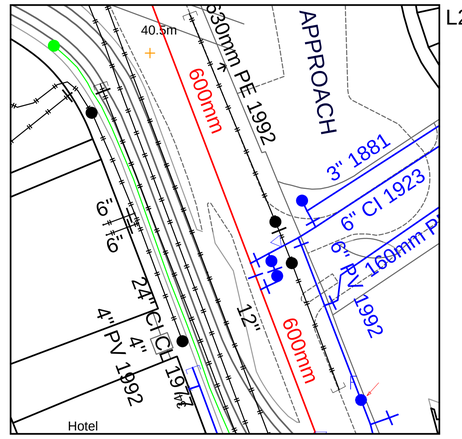
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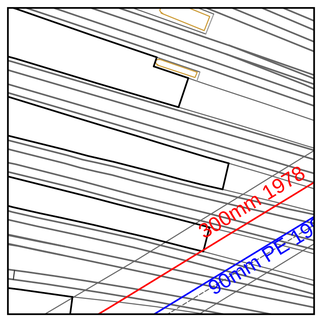
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L1

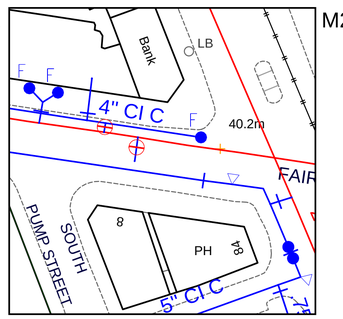
L2



M1



M2



M3

M4

PIPEWORK

- TRUNK MAIN
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MATERIAL TYPES

AC	ASBESTOS CEMENT	OT	OTHERS
CI	CAST IRON	PB	LEAD
CU	COPPER	PV	uPVC
CO	CONCRETE	SI	SPUN IRON
DI	DUCTILE IRON	ST	STEEL
GI	GALVANISED IRON	UN	UNKNOWN
GR	GREY IRON	PE	POLYETHYLENE

LINING TYPES

CL	CEMENT
TB	TAR OR BITUMEN
ER	EPOXY RESIN

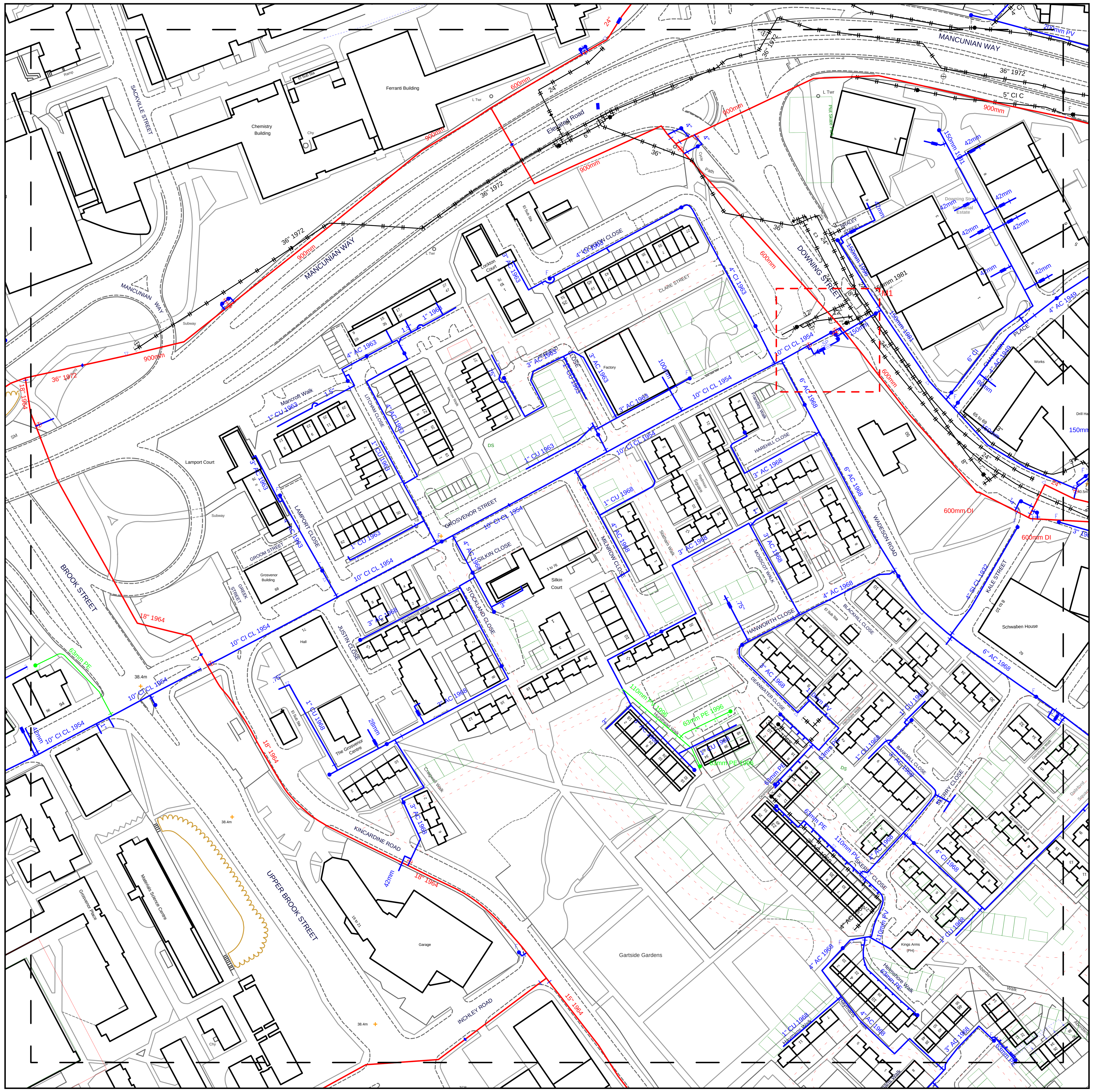
INSERTION TYPES

DD	DIE DRAWN
DR	DIRECTIONAL DRILLING
MO	MOLING
PI	PIPELINE
SL	SLIP LINED

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OS Sheet No: SJ8497NE
Scale 1:1250
Date: 1-Feb-2012

United Utilities
WATER MAINS RECORDS



S1

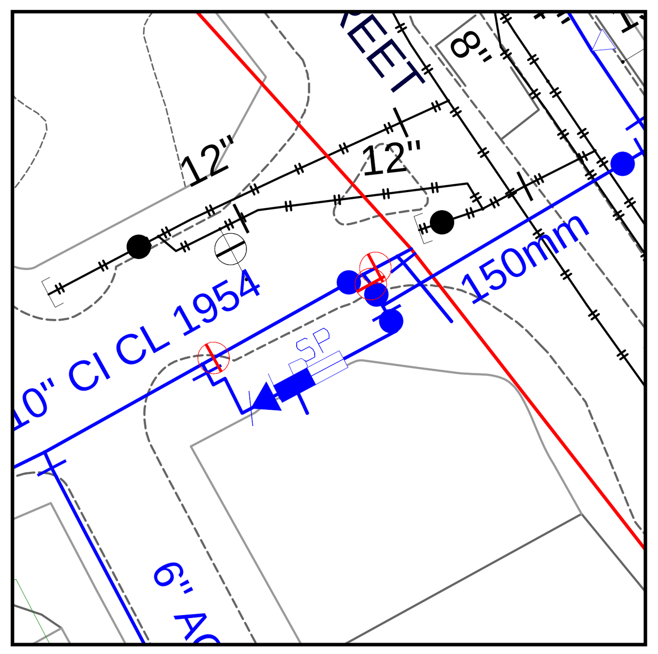
L1

S2

S3

L2

S4



M1

M2

M3

M4

PIPEWORK

TRUNK MAIN	AQUEDUCT
DISTRICT MAIN	COMMON PIPE
NON-POTABLE MAIN	PRIVATE PIPE
PROPOSED	ABANDONED

NODES / FURNITURE

END CAP, CLOCKWISE VALVE, ANTI-CLOCKWISE VALVE, SHEET EDGE
AIR VALVE, TREATED WATER SLUICE VALVE, PRESSURE SUSTAINING VALVE, PRESSURE REDUCING VALVE, REFLUX VALVE
CHANGE OF CHARACTERISTIC, ANODE, CHLORINATION POINT, DE-CHLORINATION POINT
BORE HOLE, ABSTRACTION POINT, INLET POINT, BULK SUPPLY POINT
NWW WASHOUT, F FIRE HYDRANT, F/W SHARED HYDRANT, PUMP
SITE TERMINATION, INTERMEDIATE NODE, CONCESSION START, CONCESSION END
METER, METER AND STOPTAP, STOPTAP, MONITOR LOCATION
SP STRAIN POINT, AP ACCESS POINT, HB HATCHBOX, IP INSERT PROBE POINT
RM ROUTE MARKER, SPT SAMPLING POINT, LB LOGGER BOX

PROPERTY TYPES

CONDITION REPORT, PB PIPE BRIDGE, PT PIPE TUNNEL
TS TELEMETRY STATION, PUMPING STATION, PUMP HOUSE
WATER TREATMENT WORKS, P PRIVATE TREATMENT WORKS, VH VALVE HOUSE, WATER TOWER
CS CONFINED SPACE, DU DIALYSIS UNIT, SR SERVICE RESERVOIR, SUP RES SUPPLY RESERVOIR

MATERIAL TYPES

AC	ASBESTOS CEMENT	OT	OTHERS
CI	CAST IRON	PB	LEAD
CU	COPPER	PV	uPVC
CO	CONCRETE	SI	SPUN IRON
DI	DUCTILE IRON	ST	STEEL
GI	GALVANISED IRON	UN	UNKNOWN
GR	GREY IRON	PE	POLYETHYLENE

LINING TYPES

CL	CEMENT	ER	EPOXY RESIN
TB	TAR OR BITUMEN		

INSERTION TYPES

DD	DIE DRAWN	MO	MOLING
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		SL	SLIP LINED

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OS Sheet No: SJ8497SE

Scale 1:1250 Date: 1-Feb-2012

Printed by: Hazel Kay

OS Sheet No: SJ8497SE
Scale 1:1250
Date: 1-Feb-2012

United Utilities

WATER MAINS RECORDS

Conditions and information regarding wastewater network

These general conditions and precautions apply to the wastewater network of United Utilities.

Please ensure that a copy of these conditions is passed to your representative and contractor on site.

1. United Utilities provides the approximate locations of its sewers according to its records. These records are not necessarily accurate or complete nor do they normally show the positions of every sewer culvert or drain, private connections from properties to the public sewers or the particulars of any private system. No person or company shall be relieved from liability for any damage caused by reason of the actual positions and/or depths being different from those indicated. The records do indicate the position of the nearest known public sewer from which the likely length of private connections can be estimated together with the need for any off site drainage rights or easements.

2. Special requirements relative to our sewers may be indicated. United Utilities employees or its contractors will visit any site at reasonable notice to assist in the location of its underground sewers and advise any precautions that may be required to obviate any damage. To arrange a visit or for further information regarding new supplies, connections, diversions, costing, or any notification required under these General Conditions, please call us on **0845 746 2200**.

3. Where public sewers are within a site which is to be developed and do not take any drainage from outside the area, they are from an operational viewpoint redundant. The developer must identify all redundant sewers affected by the development and apply to United Utilities in writing for these sewers to be formally closed. The developer shall bear all related costs of the physical abandonment work.

4. Public sewers within the site that are still live outside the area, will be subject to a "Restricted Building zone". This would normally be a surface area equivalent to the depth of the sewer measured from the centre line of the sewer on either side. No construction will be permitted within that zone. The developer should also note that deep and wide rooted trees must not be planted in close proximity to live sewers. Access to public sewers must be maintained at all times and no interference to manholes will be permitted during construction work.

5. Where there is a public sewer along the line of a proposed development/building, arrangements shall be made by the developer at his cost to divert the sewer around the development. Where this is not possible and as a last resort, a "Building Over Agreement" will need to be completed under section 18 of the Building Act 1984. The developer shall design building foundations to ensure that no additional loading is transferred to the sewer and submit such details both to the Local Authority's Building Control Officer and to United Utilities for approval/acceptance. United Utilities on a rechargeable basis would normally undertake all aspects of design work associated with the diversion of any part of the operational wastewater network.

6. Where there is a non-main river watercourse/culvert passing through the site, the landowner has the responsibility of a riparian owner for the watercourse/culvert and is responsible for the maintenance of the fabric of the culvert and for all works involved in maintaining the unrestricted flow through it. Building over the watercourse/culvert is not recommended. The developer must contact the local authority before any works are carried out on the watercourse/culvert. Where it is necessary to discharge surface water from the site into the watercourse/culvert the developer shall make an assessment of the available capacity of the watercourse/culvert (based on a 1 in 50 year event) and ensure that the additional flow to be discharged into the watercourse/culvert will not cause any flooding. In appropriate cases, flooding may be prevented by on-site storage. The developer shall submit the relevant details required to substantiate his development proposals. Details of any outfall proposed shall also be submitted to the Environment Agency, PO Box 12, Richard Fairclough House, Knutsford Road, Warrington, Cheshire, WA4 1HT for their approval.

7. Where there is a main river watercourse/culvert passing through the site, the developer shall submit all proposals affecting the river to the Environment Agency at the address stated in paragraph 6 for approval/acceptance.

8. Your attention is drawn also to the following:

- **Private drains or sewers which may be within the site.** United Utilities has no duty to keep records of private drains and sewers, and there are no comprehensive records kept elsewhere. Local Authority Building Control Officers may have records of recent developments and they or the developer may be able to provide information in this respect.

- **Applications to make connections to the public sewer.** The developer must write to United Utilities requesting an application form that must be duly completed and returned. No works on the public sewer shall be carried out until a letter of consent is received from United Utilities.

- **Sewers for adoption.** If an agreement for the adoption of sewers under Section 104 of the Water Industry Act 1991 is being contemplated, a submission in accordance with "Sewers for Adoption", Fifth Edition, published by the Water Research Centre (2001) Plc, Henley Road, Medmenham, PO Box 16, Marlow, Buckinghamshire, SL7 2HD will be required, taking into consideration any departures from the general guide stipulated by United Utilities.

- **Further consultation with United Utilities.** Developers wishing to seek advice or clarification regarding sewer record information provided should contact United Utilities to arrange an appointment. A consultation fee may be charged, details of which will be made available at the time of making an appointment.

9. Combined sewers, foul sewers, surface water sewers, and pumped mains. These are shown separately in a range of colours or markings to distinguish them on our drawings, which are extracts from the statutory regional sewer map. A legend and key is provided on each extract for general use, although not all types of sewer will be shown on every extract.

   Combined sewers shown coloured red carry both surface water and foul sewage, especially in areas where there is no separate surface water sewerage system.

   Foul sewers coloured brown may also carry surface water and there may be no separate surface water system indicated in the immediate area. Both combined and foul sewers carry wastewater to our treatment works before it can safely be returned to the environment.

   Surface water sewers coloured blue on our drawings are intended only to carry uncontaminated surface water (e.g. rainfall from roofs, etc) and they usually discharge into local watercourses. It is important for the protection of the environment and water quality that only uncontaminated surface water is connected to the surface water sewers. Improper connections to surface water sewers from sink wastes, washing machines and other domestic use of water can cause significant pollution of watercourses.

   Pumped mains, rising mains and sludge mains will all be subject to pumping pressures and are neither suitable nor available for making new connections.

   Highway drains, when included, show as blue and black dashed lines. Highway drains are not assets belonging to United Utilities and are the responsibility of local authorities.

10. For information regarding future proposals for construction of company apparatus please write to United Utilities, PO Box 453, Warrington, WA5 3QN.

11. For information regarding easements, deeds, grants or wayleaves please write to United Utilities Property Solutions, Coniston Buildings, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington WA5 3UU (**Tel: 01925 463 654**).

United Utilities Water PLC
Haweswater House, Lingley Mere Business Park,
Lingley Green Avenue, Great Sankey, Warrington WA5 3LP
www.unitedutilities.com

Registered in England and Wales Registered Number 2366678

Conditions and information regarding water distribution apparatus

These general conditions and precautions apply to the water distribution system of United Utilities.

Please ensure that a copy of these conditions is passed to your representative and contractor on site.

1. United Utilities provides approximate locations of its water mains or apparatus according to its records. These records are not necessarily accurate or complete nor do they normally show the positions of private service pipes from the mains to properties. Where service pipes are shown, a blue broken line indicates their approximate position. No person or company shall be relieved from liability for any damage caused by reason of the actual positions and/or depths being different from those indicated.

2. Special requirements relative to our apparatus may be indicated. United Utilities employees will visit any site at reasonable notice to assist in the location of its underground water apparatus and advise any precautions that may be required to obviate any damage. To arrange a visit or for further information regarding new supplies, connections, diversions, costing, future proposals for construction of company apparatus or any notification required under these General Conditions, please telephone us on **0845 746 2200** or write to United Utilities, PO Box 453, Warrington, WA5 3QN.

3. In order to achieve safe working conditions adjacent to any water apparatus the following should be observed;

   (a) All water apparatus should be located by hand digging prior to the use of mechanical excavation.

   (b) During construction work where heavy plant may have to cross the line of a water main, and the main is not under a carriageway of adequate standard of construction, crossing points should be suitably reinforced with sleepers, steel plates or a specially constructed reinforced concrete raft as necessary. These crossing points should be clearly indicated and crossing the line of the water main at other places should be prevented. United Utilities employees will advise on the type of reinforcement necessary. This is particularly important on agricultural or open land, where tilling or erosion may have significantly reduced the original cover.

   (c) No explosive should be used within 32 metres of any United Utilities apparatus without prior consultation with United Utilities.

   (d) Where it is proposed to carry out piling within 15 metres of any water main United Utilities should be consulted so that the affected main may be surveyed.

4. During any excavation, it is important that measures should be taken to ensure continued support for any water main:

   (a) Where excavation of trenches adjacent to any water main is likely to affect its support, the main must be supported to the satisfaction of United Utilities.

   (b) Where a trench is excavated crossing or parallel to the line of a water main, the backfill should be adequately compacted to prevent any settlement which could subsequently cause damage to the main. In special cases it may be necessary to provide permanent support to a main which has been exposed over the length of the excavation before back-filling and reinstatement is carried out. No back-filled concrete should contact the main.

5. No other apparatus should be laid over and along the line of a water main irrespective of clearance. A minimum clearance of 450 millimetres should be allowed between any plant being installed and an existing main, to facilitate maintenance and repair, whether the adjacent plant is parallel to or crossing the main. No manhole, chamber, or other obstruction should be built over or around a water main.

6. Where a water main is coated with special wrapping and the wrapping is damaged, even to a minor extent, United Utilities must be notified, and the excavation must be left open for ready access so that repairs can be made. In case of any material damage to the main itself causing leakage, or weakening of the mechanical strength of the pipe, the person or body responsible should immediately notify United Utilities in order that the necessary remedial work can be carried out. The full cost of the necessary remedial work will be charged to the person or body responsible for the damage.

7. If you propose to change existing levels over water mains you will need to inform us. We will need specific locations to be identified together with precise details as to the scale of the proposed changes to existing ground levels. Changes to existing levels may require the diversion of our apparatus at your cost. However, in certain circumstances we may wish to leave our apparatus where it is. On these occasions you will usually be required to protect our apparatus by means of a concrete raft and either raise or lower any surface boxes affected.

8. Under no circumstances should our surface boxes be either buried or left in a situation where they are raised above finished ground levels. You should re-use and re-set any surface boxes affected by your works into the new surface so that they align over the water apparatus below. You will be responsible for the cost of repairing any damage to our apparatus as a result of your works.

9. Where proposals involve resurfacing, you must notify United Utilities if your excavation will be greater than 750mm in the highway and 300mm in a footpath, verge or other location.

10. For information regarding easements, deeds, grants, licences or wayleaves, please write to United Utilities Property Solutions, Coniston Buildings, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington WA5 3UU (**Tel: 01925 463 654**).

Tree planting restrictions over water mains

a) Poplar and willow trees have extensive root systems and should not be planted within 10 metres of any water main.

b) The following trees and those of a similar size, whether they are deciduous or evergreen, should not be be planted within six metres of any water main:

- Ash, beech, birch, elm, horse chestnut, lime, oak, sycamore;
- Apple trees and pear trees;
- Most conifers.

c) United Utilities requires access to the route of its mains at all times to inspect for leaks and carry out surveys. We recommend that no shrubs or bushes which might obstruct or interfere with our access should be planted within one metre of the centre line of any water main.

d) There may be instances when both United Utilities and the landowner will wish to plant shrubs or bushes close to the water main for screening or other purposes. The following shallow rooting shrubs would be suitable for this purpose:

- Blackthorn, broom, cotoneaster, elder;
- Hazel, laurel, privet, quickthorn, snowberry;
- Most ornamental flowering shrubs.

e) In areas where soft fruit is grown, blackcurrant, raspberries and gooseberries may be planted close to the main, provided that a path is left clear for inspection access and surveys. United Utilities can give additional advice where required in particular circumstances.

United Utilities Water PLC
Haweswater House, Lingley Mere Business Park,
Lingley Green Avenue, Great Sankey, Warrington WA5 3LP
www.unitedutilities.com

Registered in England and Wales Registered Number 2366678

Appendix C

Drainage Survey dated July 2012

Drainage Survey dated September 2015



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Note:
All levels relate to Existing Site Datum.
Orientation to Existing Site Grid.

Survey Control Markers established for Mapping purposes only and should not be used for Construction without the written approval of Survey Operations Ltd.

Survey Operations Dwg 12E126 surveyed 20/06/12 and added to Survey Operations Dwg 12E128.

SURVEY STATIONS

Name	Easting	Northing	Height
SS1	521.55	470.34	31.87
SS3	438.26	468.50	31.89
SS4	382.79	438.54	33.18
SS2	500.00	500.00	31.26
SS9	531.71	432.32	32.76
SS7	536.04	367.07	35.43
SS6	449.29	334.10	35.73
CW1	542.88	381.42	34.54
CW2	628.13	356.68	34.28
CW3	607.19	431.62	32.56
CW4	558.08	536.86	32.57
SI1	458.15	296.62	36.49
SI2	424.89	356.34	35.40
SI3	405.77	451.27	32.43
SI4	418.55	457.92	32.20
SI5	475.76	487.22	31.30
SI6	488.10	494.05	31.30

STANDARD REFERENCE & ABBREVIATIONS

(AR)........Assumed Route
AV..........Air Valve
B/W.........Barbed Wire
BB..........Belisha Beacon
BH..........Borehole
BL..........Bed Level
BS..........Bus Stop
BT Box......British Telecom Box
BT..........British Telecom IC
BW..........Brick Wall
Bar.........Barrier
Bol.........Bollard
C/B.........Close Boarded
C/I.........Corrugated Iron
C/P.........Chestnut Paling
CB..........Control Box
CCTV........Closed Circuit TV
CD..........Cable Duct
CH/L........Chain Link
CL..........Cover Level
CM..........Cable Marker
COL.........Column
CONC........Concrete
CP..........Catch Pit
CTV.........Cable Television
CW..........Concrete Block Wall
Chy.........Chimney
Cul.........Culvert
D.C.........Drainage Channel
DP..........Down Pipe
DR..........Drain
ECP.........Electricity Cable Pit
EIC.........Electricity Inspection Cover
EJ..........Expansion Joint
EJB.........Electricity Junction Box
EL SUB STN..Electricity Sub Station
EL..........Eaves Level
ELB.........Electricity Box
EP..........Electricity Pole
ER..........Earth Rod
ETL.........Electricity Transmission Line
F/B.........Flower Bed
FFL.........Finished Floor Level
FH..........Fire Hydrant
FL..........Floor Level
FP..........Flagpole
G*.*........Girth (of tree)
G...........Gulley
GP..........Guide Post
GSV.........Gas Stop Valve
HSE.........Housing
HV..........High Voltage
Ht..........Height
I/R.........Iron Railing
IC..........Inspection Cover
IL..........Invert Level
KO..........Kerb Outlet
LB..........Letter Box
LP..........Lamp Post
MG..........Multi-Girth
MH..........Manhole
MKR.........Marker
MP,MS.......Mile Post or Stone
NP..........Street Name Plate
O/H.........Overhead
O/P.........Open Paling
OSBM........Ordnance Survey Bench Mark
P/C.........Post & Chain
P/R.........Post & Rail
P/W.........Post & Wire
PAV.........Paving
PB..........Pillar Box
PC..........Pedestrian Crossing
PP..........Petrol Pump
PT..........Post or Pillar
RE..........Rodding Eye
RS..........Road Sign
RTW.........Retaining Wall
RWP.........Rain Water Pipe
SAP.........Sapling
SL..........Sump Level
SP..........Sign Post
SV..........Stop Valve (unspecified)
SVP.........Soil Vent Pipe
SW..........Stone Wall
SoL.........Soffit Level
TB..........Traffic Bollard
TBM.........Temporary Bench Mark
TCB.........Telephone Call Box
TFR.........Taken From Records
TIE.........Anchor Point (Masts/Poles)
TL..........Traffic Light
TLB.........Traffic Light Control Box
TM..........Ticket Machine
TMC.........Tarmac
TP..........Telecommunications Pole
TPIT........Trial Pit
U/C.........Under Construction
U/G.........Underground
UTL.........Unable to Lift (MH,IC etc)
VDP.........Vehicle Detector Pad
VP..........Vent Pipe
W/M.........Wire Mesh
WL..........Water Level
WM..........Water Meter
WO..........Wash Out
WST.........Water Stop Tap (domestic)
WSV.........Water Stop Valve (mains)

UNID — UNIDENTIFED FEATURE
SW — STORM WATER SEWERS
FW — FOUL WATER SEWERS
FW / SW — CONNECTIVITY BETWEEN CHAMBERS FROM CCTV REPORT
COVER POSITION FROM CCTV REPORT - NOT SURVEYED ON TOPOGRAPHICAL SURVEY.

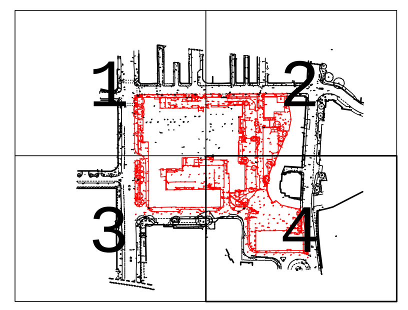
UNIDENTIFIED - A buried feature or utility that has been located, but we are unable to state what it is.

UNPROVEN - The assumed location of a reported feature or utility, usually taken from records, but not found during the utility trace (due to various conditions).

CAUTION - Electric pot ended cables, even when they are live, are unable to be detected or traced.

UNDERGROUND UTILITIES SERVICES DISCLAIMER

Where indicated, no allowance has been made for sub-surface entry into manholes, other chambers or confined spaces below ground level. Therefore any details relating to depths, sizes etc, are taken from the surface and as such will be approximate.



SHEET LAYOUT

Survey OPERATIONS
Smith Street, Skelmersdale, Lancs. WN8 8LN
Tel: 01695 725662 Fax: 01695 51816
Email: mail@survops.co.uk - www.survops.co.uk

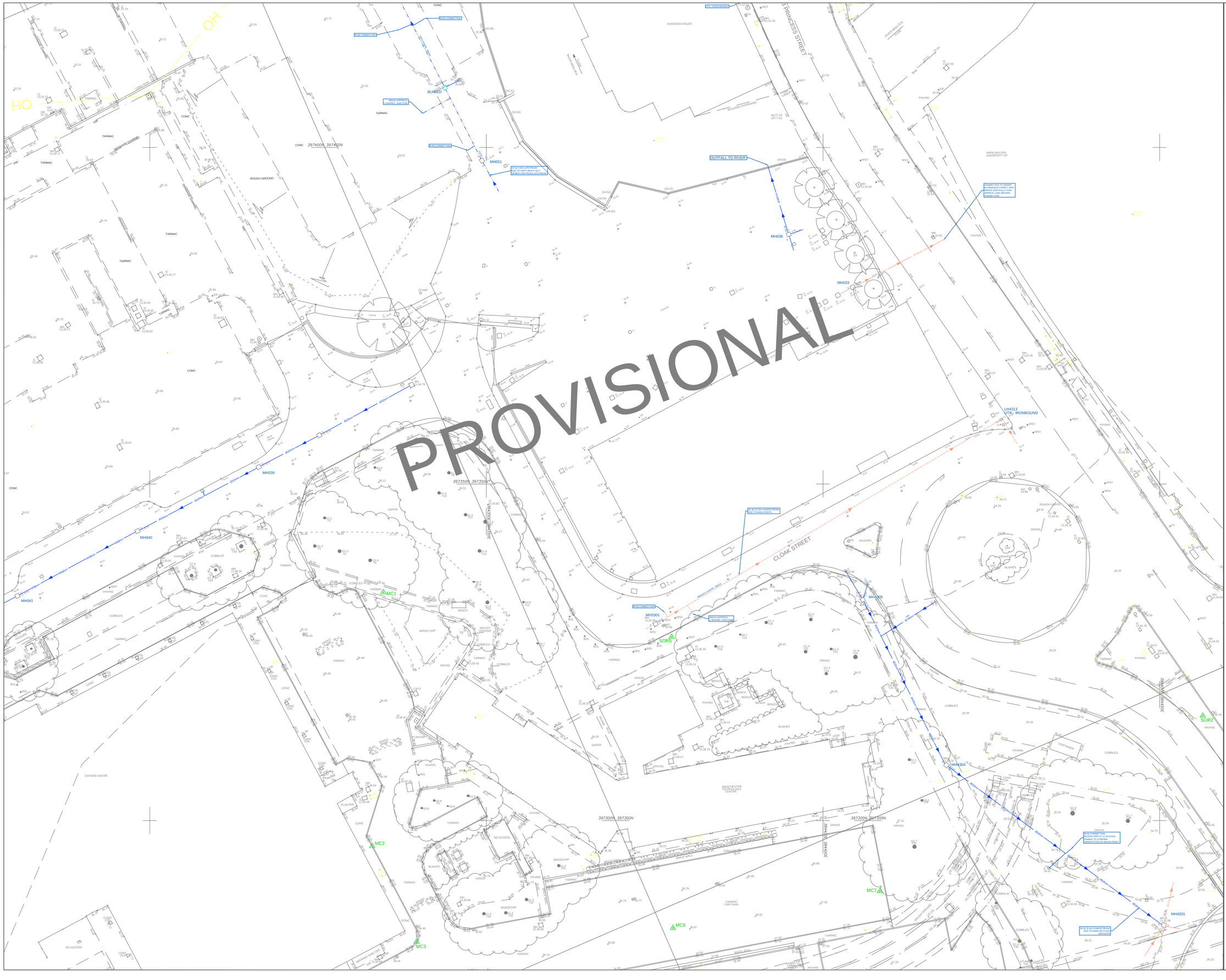
UKAS QUALITY MANAGEMENT ISO 9001 | UKAS ENVIRONMENTAL MANAGEMENT ISO 14001 | UKAS MANAGEMENT SYSTEMS OHSAS 18001

Client
Realty Estates Limited

Drawing Title
Drainage Survey of Land at:
BBC Site Oxford Road
Manchester
Sheet 4 of 4

Scale(s)	1:200	Surveyor	MB
Date	JUL 12	Drawn	MP
Job Number	12E126	Checked	SG

Sheet Size & Drg Number & Revision
A0 12E126/004



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Topographical Survey Key

AV Air Valve		DG Drain/Gully	
FH Fire Hydrant		KO Kerb Outlet	
ST Stop Tap		TP Telegraph Pole	
TAP Tap		T Telecoms Cover	
WM Water Meter		BUS Bus Stop	
SV Stop Valve		CCTV Camera	
WO Wash Out		BOL O Bollard	
WV Water Valve		MAIL Post Box	
BM Bench Mark		THR Threshold Level	
Light		COL Column	
LP Lamp Post		C Cable TV Cover	
TL Traffic Light		C Cable TV Supply	
EP Electricity Pole		SIGN Sign	
ER Earth Rod		TS Traffic Signals Cover	
Borehole		E Electric Cover	
Trial Pit		G Gas Valve	
MH Circular Manhole		RE Rodding Eye	
MH Square Manhole		M Marker Post	
MH Triangular Manhole		IC Inspection Cover	

CL Cover Level		PØ1m 1m Diameter Pipe	
IL Invert Level		RWPØ 0.15m 150Ø Rain Water Pipe	
U/S Underside/Soffit		SVPØ 0.15m 150Ø Soil Vent Pipe	
TOF Top Of Fence		UTR Unable To Raise	
TOH Top Of Hedge		UTL Unable To Locate	
TOW Top Of Wall		UTS Unable To Survey	

Sub Surface Key

BT	BT Cable
CATV	CATV Cable
COM	Coms Cable
COM	Coms/Power
TS	Traffic Signal Cable
E	Electric Cable
LV	Electric LV/Cable
HV HV	Electric HV/Cable
GAS	Gas Pipe
?	Unidentified Service
WM	Water Main
Ø150mm	Foul Sewer
Ø150mm	Combined Sewer
Ø150mm	Private Sewer
Ø150mm	Pumped Sewer
Ø150mm	Surface Sewer
Ø150mm	Rising Main
TE	Trade Effluent
GPR	GPR Anomaly
	Service Duct

D2.1 Depth (m)
D1.1 Unable To Trace
EOT End of Trace / Signal Lost
S/A Drainage Survey Abandoned

Disclaimer

Service details have been added to a previous survey unless otherwise stated. All services shown on this plan have been surveyed using approved detectors and the connections between manholes, if not traced, are assumed to be direct.

Should the background, or topographical, information for the survey area be based on an Ordnance Survey tile we are not liable for any loss that may arise due to a lack of accuracy in that digital data.

Location accuracy is determined by referring to manufacturer's guidelines for the equipment used. In ideal conditions the accuracies for the underground utilities located and mapped are +/-10% of the depth. Whilst this technique has proven to be successful, it is not 100% reliable and is affected by ground conditions. The depths obtained are for the centre of the conductor and do not necessarily the depth to a duct or pipe.

Although all reasonable effort is made during site detection, the completeness of the underground services information cannot be guaranteed. An electric current will flow along the path of least resistance. This means that when a current is induced into a feature it will 'jump' to adjacent features if they offer a better conducting pathway. It is possible, therefore, that features that are detected by this survey may not be the ones that are shown on the drawings. The exact identification of apparatus cannot be assumed to be totally accurate. It should be noted that the technique is limited to detecting features that either generate an electromagnetic field, such as power cables, or around which an electromagnetic field can be induced, such as some water pipes and some communications cables, and it cannot therefore be guaranteed to reveal the exact routes of all buried services or to detect their presence.

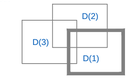
Service information can also be shown on the drawings taken from statutory undertakers record plans. This information is shown for the sake of completeness and Subscan UDS Ltd can take no responsibility for the positional accuracy of such information as this may be digitised directly from service plans provided. Information shown as stat plan information may duplicate traced routes but may be offset due to the inaccuracy of the service records from which the information has been digitised.

Site Specific Notes

1. Drawing to be read in conjunction with Subscan CCTV report V0001666_CCTV and associated video footage

2. Drawing to be read in conjunction with United Utilities sewer records and previous drainage survey undertaken by Survey Operations

Layout



Approximate Direction of North

GRID & DATUM

Drainage information overlaid onto previous topographical survey 15E146 provided by Curtins.

REV	DATE	DRAWN	DESCRIPTION	CHECKED
–	–	–	–	–

SUBSCAN
www.subscan.com Tel: 0844 499 5220

CLIENT: Curtins

SITE: Project Satellite
Oxford Road, Manchester

DRAWING TITLE: CCTV Drainage Survey

DRAWING REF (LAYOUT TAB): V0001666_D(1)	SCALE@A1: 1/250
PROJECT REF: V0001666	REV: Ø

SURVEYED	AM	DRAWN	RJ
CHECKED	AM	DATE	10/09/15

Appendix D

Topographical Survey

GPR Survey



UTILITIES & UNDERGROUND INVESTIGATIONS

ABBREVIATIONS & SYMBOLS

1D 5C	1 Duct 5 Cables	CPC	Circ Plastic Chamber	EOT	End Of Trace
Ø	Diameter	CrL	Crown Level	IBD	Internal Backdrop
AR	Assumed Route	DCr	Depth To Crown	IL	Invert Level
BL	Base Level	DI	Depth To Invert	RBC	Rectangular Brick Chamber
CB	Concrete Benching	DS	Depth To Surcharge	RCC	Rectangular Conc Chamber
CBC	Circular Brick Chamber	DTB	Depth To Base	SL	Silt Level
CCC	Circular Conc Chamber	DTW	Depth To Water	SuL	Surcharge Level
CL	Cover Level	DTS	Depth To Silt	UTC	Unable To CCTV
				UTL	Unable To Lift
				UTT	Unable To Trace
				TFR	Taken From Records
				EBD	External Backdrop

- BT — BT CABLE(S)
- O/BT — OVERHEAD BT CABLE(S)
- COM — COMMUNICATIONS CABLE(S)
- CTV — CABLE TV CABLE(S)
- E — ELECTRIC CABLE(S)
- O/E — OVERHEAD ELECTRIC CABLE(S)
- FO — FIBREOPTIC CABLE(S)
- GM — GAS MAIN
- GS — GAS SERVICE
- GPR — GROUND PENETRATING RADAR (GPR) TRACE
- HW — HOT WATER PIPE
- LC — LIGHTING CIRCUIT
- SEC — SECURITY CABLING
- UIT — UNIDENTIFIED TRACE
- WM — WATER MAIN
- WS — WATER SERVICE
- COMBINED SEWER
- FOUL SEWER
- RISING MAIN
- SURFACE WATER SEWER
- UTILITIES INVESTIGATION EXTENTS

MH CL 48.93 — UTILITIES COMMENT BOX

WM 0.61 — DEPTH TO SERVICE

DRAWING NOTES

All below ground details shown have been identified from above ground without excavation. Survey Solution use electro-magnetic and/or ground penetrating radar (GPR) methods to investigate for underground utilities, services and features. Results using these methods are not infallible and we recommend trial excavations are carried out to confirm any identifications, positions and depths.

Any areas on the drawing where services or features have not been shown are not necessarily clear of services or features but are an indication that no items have been identified during our investigations. All reasonable care and normal good practice should still be employed during design and construction processes.

Certain types of services such as plastic or concrete pipes, some conduit and ducting where direct access can not be achieved for tracing may not be shown and alternative locating methods should be used.

Survey Solutions has used all reasonable care to research available service records but the completeness or use of the service records supplied to or by Survey Solutions cannot be guaranteed. Therefore Survey Solutions cannot be held responsible for any features annotated as 'taken from records' (TFR).

Depths obtained using electro-magnetic or GPR are effected by ground conditions and should be treated as indicative only. Electro-magnetic depths to utilities and services are generally taken to the centre of a feature, GPR depths to the top of a feature and drainage depth shown to inverts, unless otherwise indicated.

Drainage pipe sizes will be obtained without entering the camber and therefore should be treated as approximate. Pipe dimensions which have not been obtained visually will be taken from records when available.

All services, drainage and utilities routes are assumed straight between access points, unless otherwise stated. The numbers of cables in runs will not be shown unless specifically requested. All services are below ground unless indicated.

Services, utilities and features may not have been surveyed if obstructed or not reasonably visible or accessible at the time of survey.

Survey Solutions accept no responsibility for the completeness or accuracy of either the topographical survey or base mapping on this project.

All critical dimensions and measurements should be checked and verified with any errors or discrepancies notified to Survey Solutions immediately. The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.

The contractor must check and verify all site and building dimensions, levels, utilities and drainage details and connections prior to commencing work.

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Do not scale from this drawing.

AVAILABILITY OF UTILITY RECORD DRAWINGS

UTILITY	AVAILABILITY	UTILITY	AVAILABILITY	UTILITY	AVAILABILITY
SEWER	SITE	BT	PUBLIC	OIL PIPES	NO
WATER MAIN	SITE	CABLE TV	SITE	OTHERS	NO
GAS MAIN	PUBLIC	ELECTRICITY	SITE		

REV	DESCRIPTION	DRAWN	APPR	DATE
A	UTILITIES AND DRAINAGE INFORMATION ADDED	LMP/JTM	RAG	26/02/16

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LAND SURVEYING BUILDING SURVEYING UNDERGROUND SURVEYING

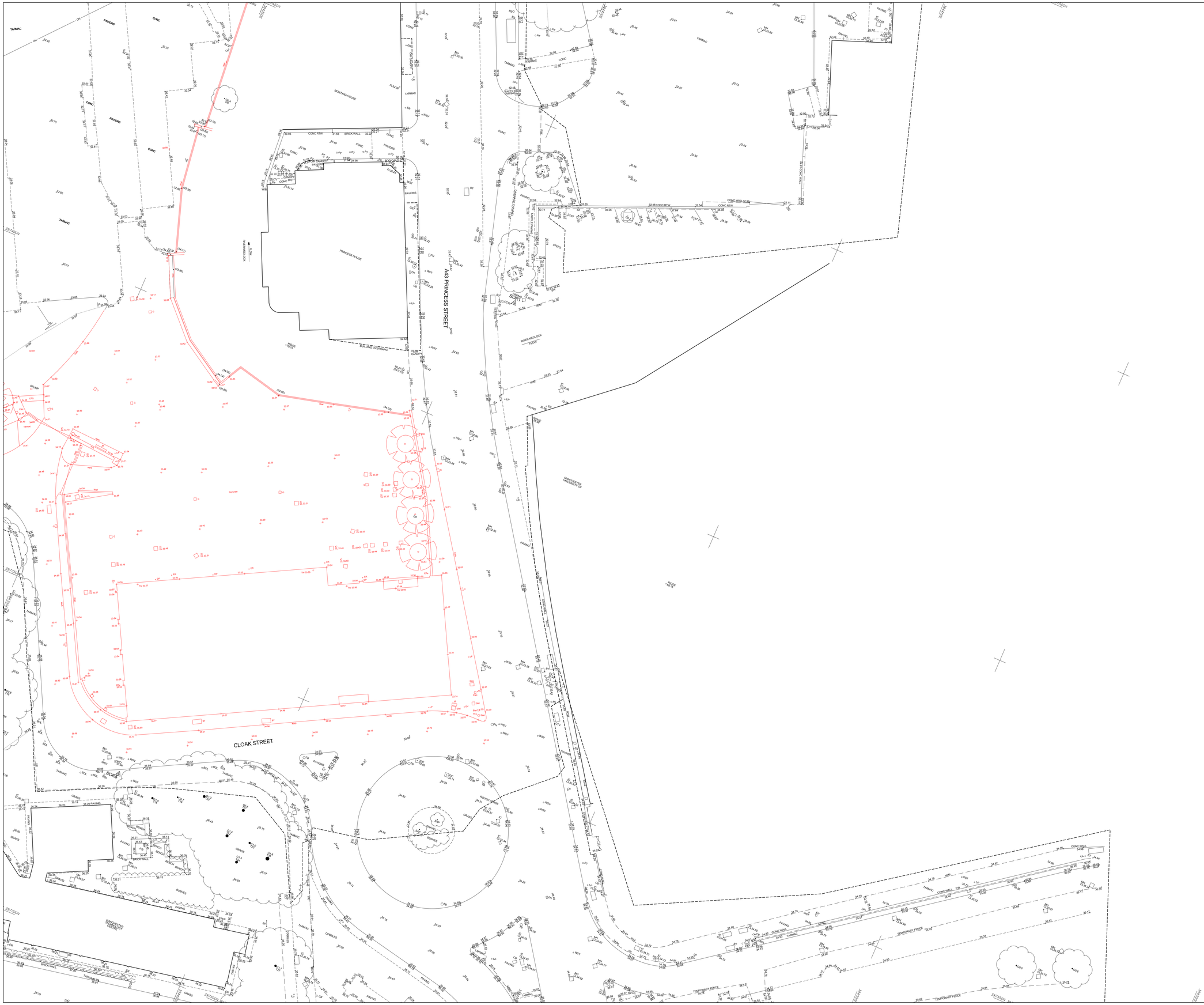
PROJECT TITLE
FORMER BBC SITE, OXFORD ROAD, MANCHESTER, M60 7HB.

DRAWING DETAIL
UTILITIES AND DRAINAGE INVESTIGATION
SHEET 1 OF 2

CLIENT				SCALE
CRE8 MANAGEMENT LTD				1:250
SURVEYOR	SURVEY DATE	CHECKED BY	APPROVED BY	DWG STATUS
DWR/SRF/DCB	21/09/2015	JTM	RAG	FINAL
DRAWING NUMBER			REVISION	ISSUE DATE
16581UG-01			A	OCT 2015

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Original Sheet Size A0H



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Note:

The survey is plotted on a plane local Grid. Orientation to National Grid.

All levels relate to Ordnance Datum, achieved using the OS National GPS Network.

Survey Control Markers established for Mapping purposes only and should not be used for Construction without the written approval of Survey Operations Ltd.

Area within bold dashed line surveyed July 2015 and added to Survey Operations drawing 12E128.

Existing drawing supplied by client shown in red.

Levels in parenthesis indicate top of walls/ underside of bridge.

SURVEY STATIONS

Name	Easting	Northing	Height
SCP1	384405.83	397421.68	32.57
SCP2	384406.40	397315.17	32.34
SCP3	384484.46	397256.50	37.33
SCP4	384438.03	397260.53	36.43
SCP5	384377.50	397327.28	36.15
SCP6	384257.66	397241.42	36.71
SCP7	384290.23	397173.44	36.88
SCP8	384327.79	397227.66	36.86
SCP9	384372.74	397223.96	37.66
SC3	384236.54	397456.89	31.89
SS4	384181.37	397426.36	33.18
SS6	384248.92	397322.60	35.73
G4	384216.94	397446.11	32.20
MC1	384333.24	397286.19	36.60
MC2	384333.04	397286.19	36.60
MC3	384339.62	397281.99	36.55
MC4	384318.35	397266.02	36.58
MC5	384351.23	397248.29	37.18
MC6	384377.71	397284.04	36.85
MC7	384408.43	397289.51	37.19
MC8	384429.00	397259.71	37.62
MC9	384379.20	397226.17	37.69

STANDARD REFERENCE & ABBREVIATIONS

(AR).....Assumed Route
AB.....Air Brick
AV.....Air Valve
B/W.....Barbed Wire
BAR.....Barrier
BB.....Bellaha Beacon
BH.....Borehole
BL.....Bed Level
BOL.....Bollard
BS.....Bus Stop
BT Box.....British Telecom Box
BT.....British Telecom IC
BRTW.....Brick Retaining Wall
BW.....Brick Wall
C/B.....Close Boarded
C/I.....Corrugated Iron
C/P.....Chestnut Paling
CB.....Control Box
CBW.....Concrete Block Wall
CCTV.....Closed Circuit TV
CD.....Cable Duct
CEL.....Cellar Light
CH/L.....Chain Link
CHY.....Chimney
CL.....Cover Level
CM.....Cable Marker
COL.....Column
CONC.....Concrete
CP.....Catch Pit
CRTW.....Concrete Retaining Wall
CTV.....Cable Television
CUL.....Culvert
CW.....Concrete Block Wall
DC.....Drainage Channel
DPC.....Damp Proof Course
DR.....Drain
DSW.....Dry Stone Wall
EDP.....Electricity Cable Pit
EIC.....Electricity Inspection Cover
EJ.....Expansion Joint
EJB.....Electricity Junction Box
EL SUB STN..Electricity Sub Station
EL.....Eaves Level
ELB.....Electricity Box
EP.....Electricity Pole
ER.....Earth Rod
ETL.....Electricity Transmission Line
FB.....Flower Bed
FH.....Fire Hydrant
FL.....Floor Level
FP.....Flagpole
GP/T.....Girth (of tree)
G.....Gulley
GAB.....Gabion
GP.....Gas Inlet Pipe
GMKR.....Gas Marker
GST.....Gas Stop Tap (Domestic)
GSV.....Gas Stop Valve (Mains)
HSE.....Housing
HT.....Height
HV.....High Voltage
I/R.....Iron Railing
IC.....Inspection Cover
IL.....Invert Level
IP.....Inlet Pipe
KO.....Kerb Outlet
LB.....Letter Box
LP.....Lamp Post
MG.....Multi-Grib
MH.....Manhole
MKR.....Marker
MP.....Mooring Point
NP.....Street Name Plate
O/H.....Overhead
O/P.....Open Paling
OE.....Overhead Electric Wire
OP.....Outfall Pipe
OSBM.....Ordnance Survey Bench Mark
OT.....Overhead Telecom Wire
P/C.....Post & Chain
P/R.....Post & Rail
P/W.....Post & Wire
PAV.....Paving
PB.....Pillar Box
PC.....Pedestrian Crossing
PP.....Petrol Pump
PT.....Post or Pillar
RE.....Rodding Eye
RS.....Road Sign
RTW.....Retaining Wall
RWP.....Rain Water Pipe
SAP.....Sapling
SL.....Sump Level
SoL.....Soffit Level
SP.....Sign Post
SPL.....Springing Level
SRTW.....Stone Retaining Wall
SV.....Stop Valve (unspecified)
SVP.....Soil Vent Pipe
SW.....Stone Wall
TAC.....Tactile Paving
TB.....Traffic Bollard
TBM.....Temporary Bench Mark
TCB.....Telephone Cell Box
TPR.....Taken From Records
TC.....Anchor Point (Waste/Poles)
TL.....Traffic Light
TLB.....Traffic Light Control Box
TM.....Ticket Machine
TMC.....Tarmac
TP.....Telecommunications Pole
TRT.....Trial Pit
TS.....Trash Screen
U/C.....Under Construction
U/G.....Underground
U/S.....Unable to Lift (MUC etc)
UTS.....Unable to Survey
VDP.....Vehicle Detector Pod
VP.....Vent Pipe
W/M.....Wire Mesh
WL.....Water Level
WM.....Water Meter
WO.....Wash Out
WP.....Waste Pipe
WST.....Water Stop Tap (Domestic)
WSV.....Water Stop Valve (mains)

5	6
3	4
1	2

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Email: mail@survops.co.uk – www.survops.co.uk

Client
CRE8 Management Limited

Drawing Title
Topographical Survey of Land at:
Former BBC, Oxford Road
Manchester
Sheet 4 Of 6

Scale(s)	1:200	Surveyor	DP
Date	JULY 15	Drawn	DIF
Job Number	15E146	Checked	TP/MG

Sheet Size & Drg Number & Revision
A0 15E146/004

Appendix E

Environment Agency Flood Map for Planning

Flood map for planning

Your reference	Location (easting/northing)	Created
CS3	**384385/397348**	**0 May 2022 8:31**

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 that 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)

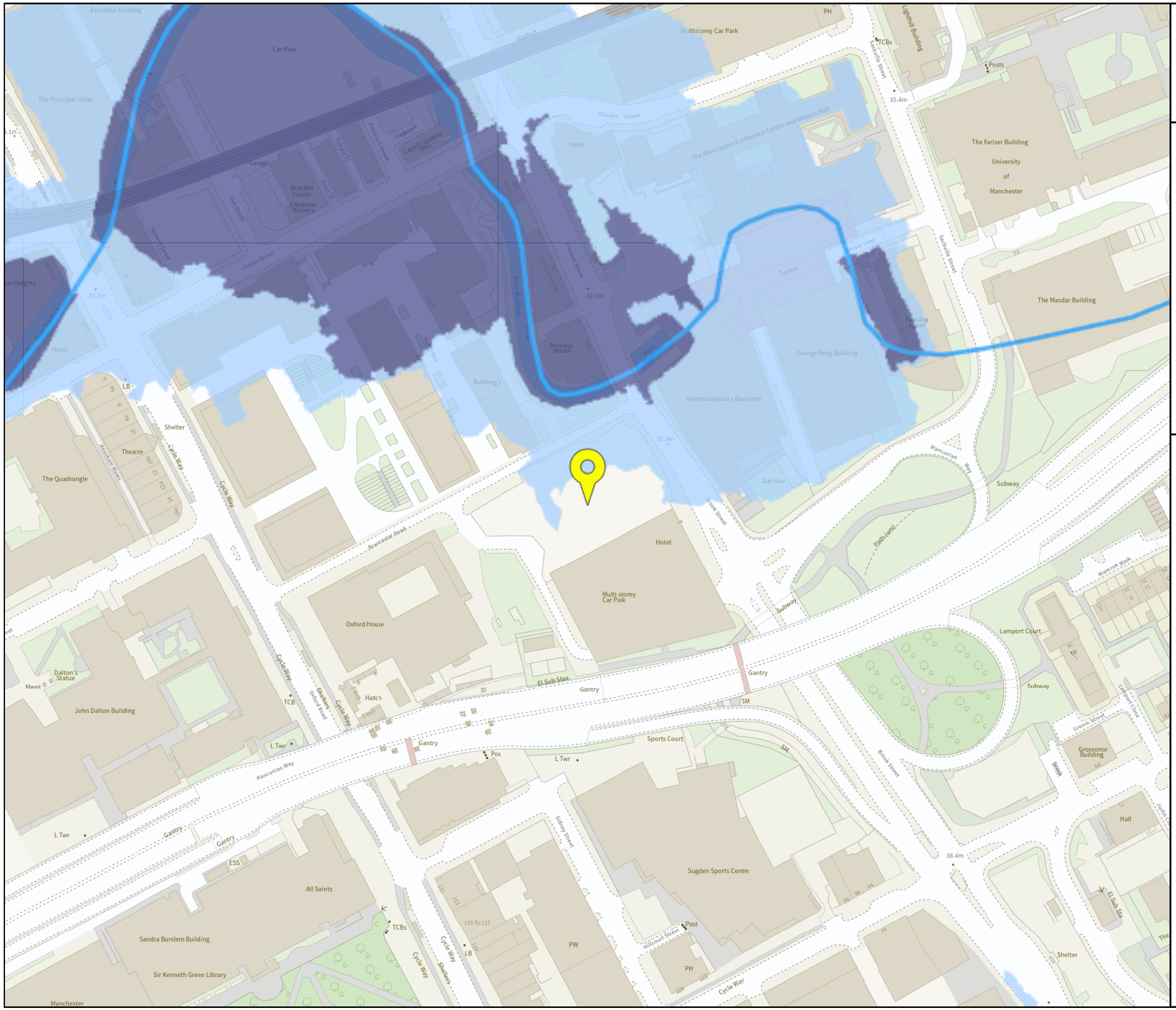
Notes

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 2021 OS 100024198. https://flood-map-for-planning.service.gov.uk/os-terms



Environment Agency

Flood map for planning

Your reference
CS3

Location (easting/northing)
384385/397348

Scale
1:2500

Created
0 May 2022 8:31

- Selected point
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Water storage area

0 20 40 60m

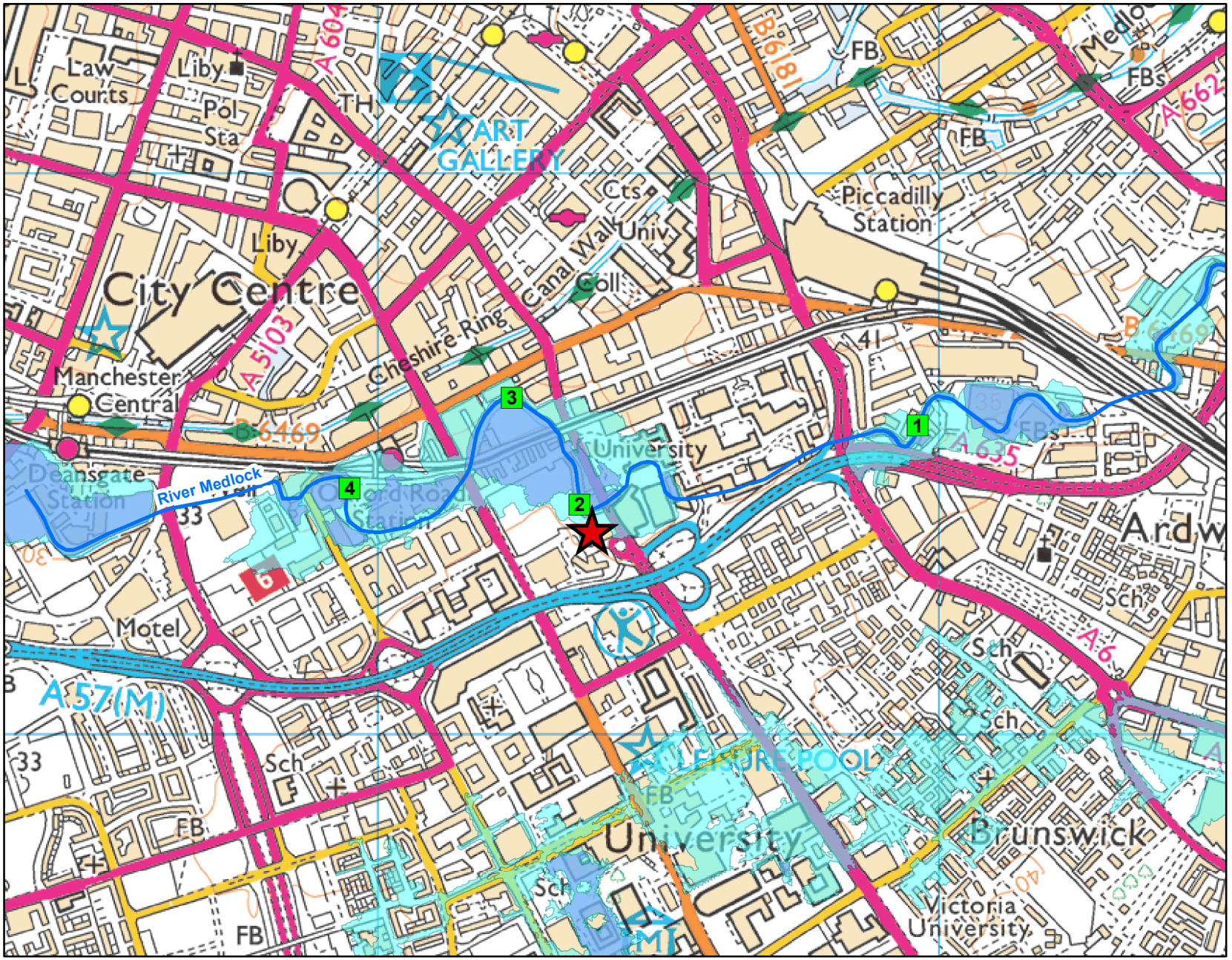
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Appendix F

Environment Agency Flood Levels

Environment Agency Flood Mapping

Detailed Flood Map centred on Brancaster Road, Manchester, M1 7EF. Created on 25/11/2021 [GMMC2239591AB]



Environment Agency

1:10,001

N

Legend

- Site Location
- Model Measurements
- Main River
- Flood Zone 3
- Flood Zone 2

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Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

					Normal Operation (All gates open)											All Latchford Gates closed		Latchford Gate C closed
Map Reference	Model Node Reference	Easting	Northing	Data	20 % AEP (1 in 5 year)	10 % AEP (1 in 10 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% Increase flow	1 % AEP (1 in 100 year) + 35% Increase flow	1 % AEP (1 in 100 year) + 70% Increase flow	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)	1 % AEP (1 in 100 year)	0.1 % AEP (1 in 1000 year)	1 % AEP (1 in 100 year)
1	ea013_0251_MEDL01_2230	384966	397555	Modelled Water Level (m aodN)	32.31	32.49	32.71	32.92	33.25	33.62	34.68	34.79	35.34	34.43	35.54	33.62	35.54	33.62
				Modelled Flow (cumecs)	29.59	34.53	40.80	47.40	52.08	56.00	71.24	73.75	103.60	67.02	113.34	56.00	126.48	56.00
2	ea013_0251_MEDL01_1481	384361	397417	Modelled Water Level (m aodN)	29.91	30.36	30.93	31.62	32.05	32.46	33.38	33.44	33.70	33.21	33.97	32.46	33.97	32.46
				Modelled Flow (cumecs)	29.91	34.91	41.23	47.91	52.63	56.60	72.04	74.59	91.53	67.74	115.75	56.60	115.75	56.60
3	ea013_0251_MEDL01_1240	384242	397599	Modelled Water Level (m aodN)	29.73	30.17	30.77	31.44	31.95	32.39	33.33	33.39	33.65	33.16	33.87	32.39	33.87	32.39
				Modelled Flow (cumecs)	30.74	35.89	42.39	49.27	54.10	58.19	74.10	76.73	95.45	69.63	118.74	58.19	118.74	58.19
4	ea013_0251_MEDL01_0749	383950	397444	Modelled Water Level (m aodN)	29.07	29.28	29.53	29.78	29.94	30.08	30.58	30.66	31.24	30.44	31.58	30.08	31.58	30.08
				Modelled Flow (cumecs)	31.53	36.82	43.49	50.55	55.50	59.70	76.05	78.75	99.10	71.42	121.21	59.70	121.21	59.70

Model data taken from Manchester Ship Canal 2018

AEP - Annual Exceedence Probability

m aodN - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes: For the Manchester Ship Canal Models, we provide the following three scenarios:

1. Model run is representative of present conditions and all gates are operational as per the agreed automated protocol. Maximum gate opening height is set to 2.4m. This run is the same as used in the flood map products. (Normal Operation - All Gates Open)
2. Model run is representative of all three Latchford Gates closed - removal of operational rules at all three sluice gates at Latchford Locks (All Latchford Gates closed)
3. Model run is representative of a single Latchford Gate closed - failure of single operational sluice gate at Latchford Locks fixed closed (Latchford Gate C closed)

*Climate Change Scenario - 30%, 35% and 70% increases in flow calculated for the 2080's (2070 - 2115). Please see https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances for more information regarding the new climate change guidance. The location of the site and the type (vulnerability) of development determine the climate change allowances to consider in any flood risk assessment.

Appendx G

Environment Agency Correspondence

LLFA Correspondence

Chloé Grimsley

From: Chloé Grimsley
Sent: 08 December 2021 11:26
To: Davies, Andy
Cc: Holden, Sharon
Subject: RE: 211104/DM06 Plot 12, Circle Square (Former BBC) Oxford Road, Manchester

Hi Andy,

Thanks for your assistance on this, we will generate the stage discharge curve and agree the flood levels with MCC.

Kind Regards,
Chloé

Chloé Grimsley Principal Engineer
Curtins
T. 0161 236 2394 | chloe.grimsley@curtins.com

From: Davies, Andy <Andy.Davies1@environment-agency.gov.uk>
Sent: 08 December 2021 11:12
To: Chloé Grimsley <Chloe.Grimsley@curtins.com>
Cc: Holden, Sharon <sharon.holden@environment-agency.gov.uk>
Subject: RE: 211104/DM06 Plot 12, Circle Square (Former BBC) Oxford Road, Manchester

Morning Chloé,

I hope that this email finds you and the wider Curtin's team well.

Having spoken to our flood risk team they have recommended consideration of using a stage/discharge approach for determining the higher allowances i.e. using the existing modelled flood and flow data to construct a stage-discharge rating curve, which can be used to interpolate a flood level based on the required peak flow allowance which can then be applied to the 'design flood' flow.

As identified in our correspondence below the proposed development would be subject to our Flood Risk Standing Advice (FRSA) and therefore assessment and commentary, for this aspect, of the development will not be provided by the EA. I would assume, in this instance, assessment and determination will be undertaken by the Lead Local Flood Authority (LLFA) / Manchester City Council (MCC); once you have determined a suitable approach for assessment of climate change I would advise making contact with the LLFA / MCC to seek agreement / confirmation of suitable approach. The recommendation of potential flood risk assessment approach detailed should not be considered to be formal instruction by the EA.

Kind regards,

Andy

Andy Davies
Project Manager, Sustainable Places Team | Greater Manchester, Merseyside, Cheshire
Environment Agency | Richard Fairclough House, Knutsford Road, Latchford, Warrington WA4 1HT
Email: SPPlanning.RFH@environment-agency.gov.uk
Mobile: **0739 379 8325**
Pronouns: he/him/his

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- NHS.UK/coronavirus
- GOV.UK/coronavirus

Environment Agency

From: Chloé Grimsley <Chloe.Grimsley@curtins.com>
Sent: 06 December 2021 17:14
To: Davies, Andy <Andy.Davies1@environment-agency.gov.uk>
Cc: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>
Subject: RE: 211104/DM06 Plot 12, Circle Square (Former BBC) Oxford Road, Manchester

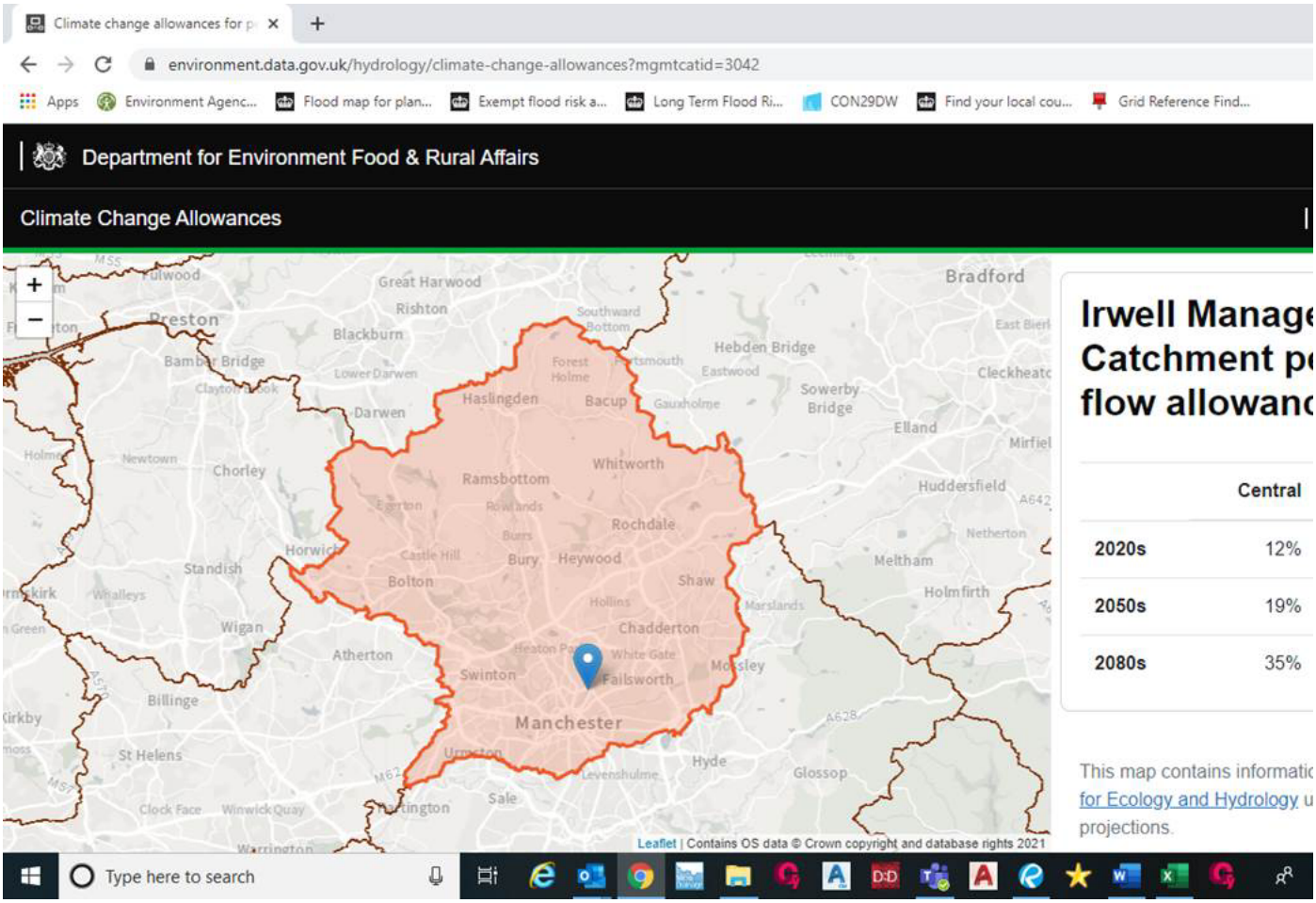
Hi Andy,

Thank you for your response below.

The proposed development is likely to contain 'Less Vulnerable' and 'More Vulnerable' development types therefore we will follow the FRSA.

In terms of setting out minimum floor levels and given how we are fixed along boundaries to levels, we have obtained the latest flood level data as the previous FRA was based on the Medlock 2009 study.

The Irwell 2018 Study data has been provided, however the current climate change allowances that should be considered are 35%, 46% and 75% but the data provided is based on 35% and 70%



Please could you advise whether we can interpolate for 46% and extrapolate for 75% to assess the level of protection anticipated?

Kind Regards,
Chloé

Chloé Grimsley Principal Engineer
Curtins
T. 0161 236 2394 | chloe.grimsley@curtins.com

From: Davies, Andy <Andy.Davies1@environment-agency.gov.uk>
Sent: 05 November 2021 10:06
To: Chloé Grimsley <Chloe.Grimsley@curtins.com>
Cc: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>
Subject: RE: 211104/DM06 Plot 12, Circle Square (Former BBC) Oxford Road, Manchester

Good morning Chloé,

I hope that you are well.

Having done a quick check of the development site location (NGR: SJ 84392 97363) I have been able to confirm that the site is situated primarily with Flood Zone 1 with partial Flood Zone 2 incursion for north-eastern extent of the site. Unless a 'high vulnerability' end use is propose, then for the flood risk aspect of this proposal (and assuming new standalone application is lodge), the development would be subject to our Standard Flood Risk Advice (FRSA) which can be viewed via: https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications#when-to-follow-standing-advice

Our FRSA replaces the need for direct consultation with the EA by the local planning authority for this aspect of development. We recommend that you view our standing advice in full before submitting the required information as part of your planning application. The Local Planning Authority (LPA) will then be responsible for determining whether

flood risk has been considered in line with our FRSA recommendations. I.e. the LPA will be responsible for making the determination as to whether flood risk has been suitability assessed and mitigated / addressed.

In the context of the above , in relation to your question regarding climate change allowances, we have previously advised LPA's that any new development application validated after the 20th June (release date of the latest peak river flow climate change guidance) that these should be assess against latest figures available and not utilise previous "old guidance" percentages unless exceptional circumstances apply. In line with this, I advise that you ask this question to Manchester City Council prior to formally submitting a planning application for the development site in question.

Kind regards,

Andy

Andy Davies
Project Manager, Sustainable Places Team | Greater Manchester, Merseyside, Cheshire
Environment Agency | Richard Fairclough House, Knutsford Road, Latchford, Warrington WA4 1HT
Email: SPPlanning.RFH@environment-agency.gov.uk
Mobile: **0739 379 8325**
Pronouns: he/him/his





From: GMMC Info Requests
Sent: 05 November 2021 08:29
To: SPPlanning.RFH <SPPlanning.RFH@environment-agency.gov.uk>
Subject: FW: 211104/DM06 Plot 12, Circle Square (Former BBC) Oxford Road, Manchester

Dear Planning,

Is this one for you to advise on? I have already logged a previous enquiry form the customer requesting the flood level data for the site. I'm waiting for PSO to send me the data.

Can you let me know if this one is for you?

Many thanks,

Anne

From: Enquiries, Unit
Sent: 04 November 2021 13:42
To: 'Chloé Grimsley' <Chloe.Grimsley@curtins.com>
Subject: 211104/DM06 Plot 12, Circle Square (Former BBC) Oxford Road, Manchester

Hi Chloe

I have passed your e-mail to the local customer team who will deal with your request.

The Freedom of Information Act and Environmental Information Regulations state that a public authority must respond to requests for information within 20 working days.

You can find more information about our service commitment by clicking on the link below:

https://www.gov.uk/government/publications/environment-agency-customer-service-commitment

You can contact our customer team directly on the contact details below, or call the National Customer Contact Centre on 03708 506506 who will transfer you to the area team.

Please quote your enquiry reference 211104/DM06 in any correspondence with us regarding this matter.

Customers and Engagement
Environment Agency
Greater Manchester, Merseyside and Cheshire Area
Richard Fairclough House
Knutsford Road
Latchford
Warrington
WA4 1HT

Kind regards,

Dominic Murphy

National Customer Contact Centre
Environment Agency

Operations
Regulation
Monitoring
Customer

☎ Tel: 03708 506 506
Web Site: www.gov.uk/environment-agency

Click an icon to keep in touch with us:-



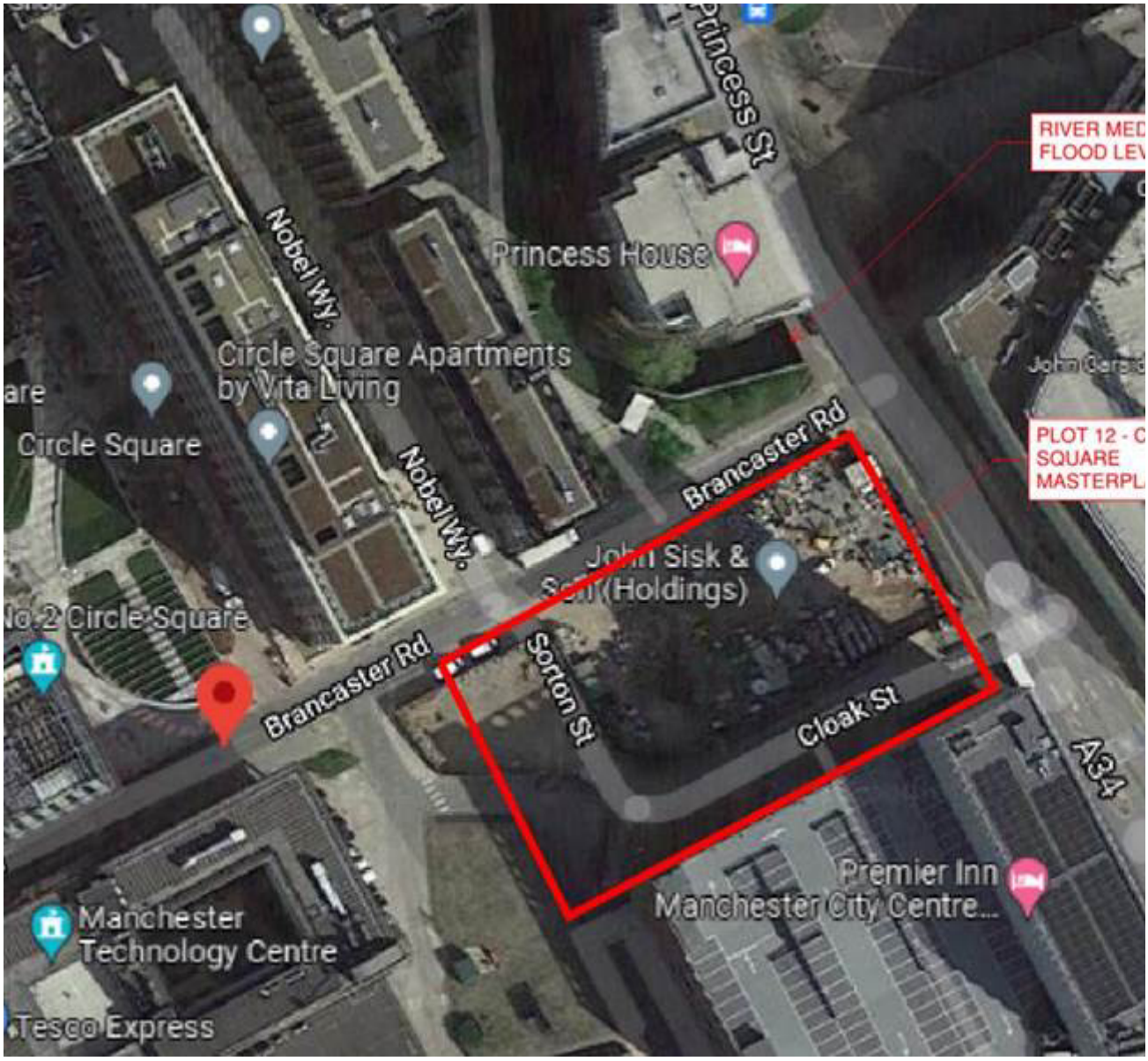


From: Chloé Grimsley [mailto:Chloe.Grimsley@curtins.com]
Sent: 03 November 2021 14:28
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Subject: 211104/DM06 Plot 12, Circle Square (Former BBC) Oxford Road, Manchester
Importance: High

Dear Sir/Madam,

We are currently reviewing flood data for the next phase of the Circle Square Masterplan, located off Oxford Road – adjacent to Princess Street and Brancaster Road, Manchester.

The nearest Postcode is M60 7HB and the site location is shown below.



The plot forms part of the wider masterplan which has been developed over the last 4 years, and as such was broadly assessed as part of a wider FRA.
The previous FRA is was for the Phase 1B portion of the site, which included plots to the north and plots to the south, however the proposals for this plot will now be submitted for planning as a new standalone development.

The previous FRA for the wider plots was completed in 2016 and updated in 2017 to acknowledge the updated climate change allowances from 20% to 35/70% however the EA confirmed use of the 20% plus freeboard as a baseline, as proposals were based on an approved masterplan. The proposed floor levels were set a minimum of 300mm/600mm above the 100 year +20%cc flood levels and the updated FRA included the increased flood levels to note the reduction in freeboard.

Please could you confirm if the new planning application can reference the flood levels agreed at the time of the previous FRA or if we now need to complete a new assessment based on the current flood data? The plot will be bound by levels based on the surrounding infrastructure installed – the plot adjoins Princess Street to the east, the newly developed MSCP (Plot 14 of the masterplan) to the south, existing buildings to the west and Brancaster Road – as installed under Phase 1 of the masterplan to the north.

We have requested updated flood levels including the most up to date climate change allowances for The Irwell Catchment (35%, 46% and 75%) so we can advise how this impacts on the proposed floor levels.

If you require any further information, please let me know.

Kind Regards,
Chloé

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Chloé Grimsley

From: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Sent: 04 May 2022 16:29
To: Chloé Grimsley
Subject: RE: Plot 12, Circle Square Masterplan, Manchester

Hi Chloe,

Thanks for confirming.

On the basis that raising the FFL (34.10) an additional 50mm is not feasible (as per the reasons you have stated below), we would consider the proposed floor levels along with the proposed additional flood mitigation/resilience measures to be appropriate.

Thanks,

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
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M60 2LA

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From: Chloé Grimsley <Chloe.Grimsley@curtins.com>
Sent: 04 May 2022 13:18
To: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Subject: RE: Plot 12, Circle Square Masterplan, Manchester

Hi Oliver,

We have reviewed the levels and this is currently tieing into the slope to Princess street at 1:30 so would steepen this access further. We have also got the 150mm step heights internally so by lifting this up it wouldn't course to tie into the 35.00 FFL.

At present we have 660mm above the 100 year +35% level – please can you confirm this would be acceptable?

Kind Regards,
Chloé

Chloé Grimsley Principal Engineer
Curtins
T. 0161 236 2394 | chloe.grimsley@curtins.com

From: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Sent: 26 April 2022 16:29
To: Chloé Grimsley <Chloe.Grimsley@curtins.com>
Subject: RE: Plot 12, Circle Square Masterplan, Manchester

Hi Chloe,

Thanks for sending over the below as clarification.

The below proposed floor levels all seem appropriate to me, provided that appropriate flood mitigation/resilience measures are included up to the required level (as mentioned below).

One final point, just to ensure that the EA standing guidance is followed as close as reasonably possible, is there any opportunity to raise the floor levels which are currently set at 34.10 to 34.15, to ensure that there is a 600mm freeboard above the 100 year plus 46% CC? I know this is very small change in level, but just want to try and push for the 600mm freeboard in order to provide further protection to the tank storage areas.

Thanks,

Oliver

Oliver Timmins
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From: Chloé Grimsley <Chloe.Grimsley@curtins.com>
Sent: 19 April 2022 06:33
To: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Subject: RE: Plot 12, Circle Square Masterplan, Manchester

Good Morning Oliver,

Just to summarise/confirm the proposals we will be including in the FRA submission based on our below email trail and our subsequent discussions:

We are proposing to have minimum floor levels where possible at:
Less vulnerable areas – 100 year +35%cc plus 600mm freeboard.
Essential Infrastructure – 100 year +46%cc plus 600mm freeboard.

Where floor levels do not achieve the above (less vulnerable areas only) resilience measures will be provided to the above level. This is with the exception of Retail unit 2, which has a FFL of 34.000 and therefore achieves 560mm freeboard.
We have explored the highest protection level and acknowledge that this area would be at a slightly increased risk of damage (40mm below recommended freeboard).
A Flood Emergency Plan will be recommended within the FRA for completion prior to occupation to ensure that all occupants within risk areas are informed about flood risk and they are managed to safety.

I have attached a sketch showing the current layout with FFLs which highlights the current protection for each area. Please note, the Tank storage area is noted as FFL of 33.65, however the room is protected by the surrounding room levels – minimum of 34.10, which therefore has a freeboard protection of 660mm in the 100 year +35%cc event.

If you have any further comments, please can you let me know.

Kind Regards,
Chloé

Chloé Grimsley Principal Engineer
Curtins
T. 0161 236 2394 | chloe.grimsley@curtins.com

From: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Sent: 10 March 2022 13:02
To: Chloé Grimsley <Chloe.Grimsley@curtins.com>
Subject: RE: Plot 12, Circle Square Masterplan, Manchester

Hi Chloe,

I am good thank you, I hope you are as well.

Yes, generally we find the below strategy for the finished floor levels and extra flood mitigation/resilience measures acceptable. However, one further thing to add is that I would recommend that for the blue areas which is below the 100 year +35% flood level by 290mm that the following additional measures are considered (as set out by the EA standing advice):

- using flood resistant materials that have low permeability to at least 600mm above the estimated flood level
- making sure any doors, windows or other openings are flood resistant to at least 600mm above the estimated flood level
- using flood resilient materials (for example lime plaster) to at least 600mm above the estimated flood level
- making it easy for water to drain away after flooding such as installing a sump and a pump
- making sure there is access to all spaces to enable drying and cleaning
- ensuring that soil pipes are protected from back-flow such as by using non-return valves

I would also recommend putting the revised scheme forward to the Environment Agency (if not already done so) to ensure they have no concerns.

Any further queries let me know.

Thanks,

Oliver

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

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Highways
Growth & Development and Neighbourhoods Directorate

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M60 2LA

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From: Chloé Grimsley <Chloe.Grimsley@curtins.com>
Sent: 02 March 2022 14:44
To: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Subject: RE: Plot 12, Circle Square Masterplan, Manchester

Good Afternoon Oliver,

I hope you're well?

In response to your email below, we have derived the climate change factors based on the EA guidance.

Using peak river flow allowances for flood risk assessments

Use the flood risk vulnerability classification to classify the vulnerability of your development.

Assess both the central and higher central allowances for strategic flood risk assessments.

In flood zones 2 or 3a for:

- essential infrastructure – use the higher central allowance
- highly vulnerable – use central allowance (development should not be permitted in flood zone 3a)
- more vulnerable – use the central allowance
- less vulnerable – use the central allowance
- water compatible – use the central allowance

In flood zone 3b for:

- essential infrastructure – use the higher central allowance
- highly vulnerable – development should not be permitted
- more vulnerable – development should not be permitted
- less vulnerable – development should not be permitted
- water compatible – use the central allowance

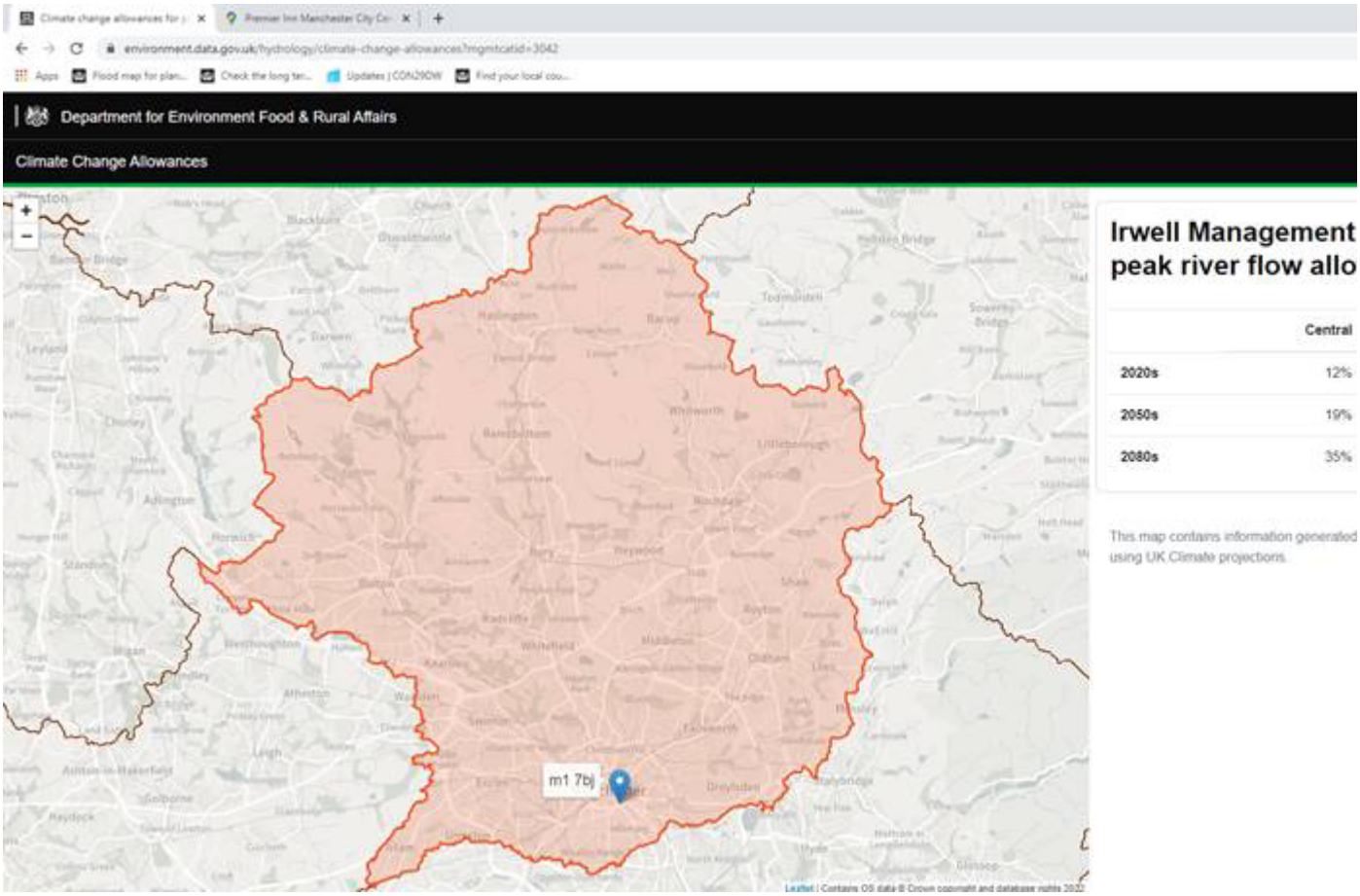
Apply the peak river flow allowances to developments and allocations where the strategic flood risk assessment shows an increased risk of flooding in the future. This includes locations that are currently in flood zone 1, but might be in flood zone 2 or 3 in the future.

To ensure the safety of people using the development when designing safe access, escape routes and places of refuge, use the central allowance for all development types except for essential infrastructure. Use the higher central

The site is for commercial use, therefore considered 'Less Vulnerable', however for the plant areas – substation etc this would be considered 'Essential Infrastructure'.
On this basis, the Irwell Catchment peak river flow allowances are:

Higher Central +46%
Central +35%

We therefore assessed all areas based on worst case of +46%, however I have now assessed each area based on vulnerability and the increase allowances to suit this (+35% and 46%).
The previous FRAs for the wider masterplan, we were advised by the EA to also acknowledge the impact of the upper central values and confirm the reduced freeboard/increase in water levels.
We have therefore included the +75% in the assessment.



In terms of the stage vs discharge curve, the flow from the 100-year event has been increased by 46% and 75% respectively and then using the stage/discharge curve plotted using the model information provided. We then read the level associated with the increased flow rate at the node. Please see attached updated curve showing the lines drawn on the graph to show the process.

I have updated plan with the latest landscape plan showing up to date FFLs. This confirms:

Blue Areas – Less Vulnerable (+35%)

FFL 33.150

This would be below the 100 year +35% flood level by 290mm and considering worst case 100 year +75% event, would be below the water level by 1.6m.

We have looked at options to raise the FFL, however the constraints to the perimeter of this area dictate this level. Based on your comments below, the FFL is 690mm above the 1 in 100-year flood level and additional mitigation proposed includes preparation of a flood emergency plan pre-occupation including signing up to warnings and directing people to safe refuge areas.

The M&E Engineer has confirmed that any major components will be set a minimum of 600mm above the 100 year +75% level (34.350) which would subsequently be above the 1 in 1000-year level, and anything below this level – which is mainly sockets, will be raised as high as practical but will also be RCD Protected in order to trip out in a case of flooding.

Purple Areas - Less Vulnerable (+35%)

FFL 33.75m

This would be 310mm above the 100 year +35% flood level and considering worst case 100 year +75% event, would be at the same level as the maximum flood level predicted in this event.

We have looked at options to raise the FFL, however the constraints to the perimeter of this area dictate this level. Based on your comments below, the FFL is 1290mm above the 1 in 100-year flood level and additional mitigation proposed includes preparation of a flood emergency plan pre-occupation including signing up to warnings and directing people to safe refuge areas.

The M&E Engineer has confirmed that any major components will be set a minimum of 600mm above the 100 year +75% level (34.350) which would subsequently be above the 1 in 1000-year level and anything below this level – which is mainly sockets, will be raised as high as practical but will also be RCD Protected in order to trip out in a case of flooding.

Orange Areas – Less Vulnerable (+35%)
FFL 34.10m*
***Plant areas are at 33.65m but protected to its perimeter up to 34.10m.**
This would be 660mm above the 100 year +35% flood level and considering worst case 100 year +75% event, would be 350mm above the maximum flood level predicted in this event.
We have looked at options to raise the FFL, however the constraints to the perimeter of this area dictate this level.
Based on your comments below, the FFL is 1640mm above the 1 in 100-year flood level and additional mitigation proposed includes preparation of a flood emergency plan pre-occupation including signing up to warnings and directing people to safe refuge areas.
The M&E Engineer has confirmed that any major components will be set a minimum of 600mm above the 100 year +75% level (34.350) which would subsequently be above the 1 in 1000-year level.

Pink Areas – Essential Infrastructure (+46%)
FFL 34.30-34.50
This would be 750-950mm above the 100 year +46% flood level and considering worst case 100 year +75% event, would be 550-750mm above the maximum flood level predicted in this event.
We have looked at options to raise the FFL, however the constraints to the perimeter of this area dictate this level.
The M&E Engineer has confirmed that any major components will be set a minimum of 600mm above the 100 year +75% level (34.350) which would subsequently be above the 1 in 1000-year level.

Green Areas – Less Vulnerable (+35%)
FFL 35.00
This would be 1450mm above the 100 year +46% flood level and considering worst case 100 year +75% event, would be 1250mm above the maximum flood level predicted in this event.
The M&E Engineer has confirmed that any major components will be set a minimum of 600mm above the 100 year +75% level (34.350) which would subsequently be above the 1 in 1000-year level.

Please could you confirm if the above is acceptable?

Kind Regards,
Chloé

Chloé Grimsley Principal Engineer
Curtins
T. 0161 236 2394 | chloe.grimsley@curtins.com

From: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Sent: 04 February 2022 12:19
To: Chloé Grimsley <Chloe.Grimsley@curtins.com>
Subject: RE: Plot 12, Circle Square Masterplan, Manchester

Morning Chloe,

Thanks for the email.

In terms of the stage discharge curve, would you be able to provide some further calculations/clarifications in terms of how the CC 46% and 75% for the 100 year event have been calculated.
Such as, clearly marking on the discharge curve the intersect of flow and flood level for CC 46% and 75% respectively (including more figures on the x-axis). In addition it would be good to see a break down for the calculations for how percentage increases were identified (such as how a 11% and 5% increase in flow rates), for both 46% and 75% CC

period based on the EA data. I also note that some of the FFL in the attached masterplan layout do not correlate with the proposed FFL's mentioned below (this also includes the level of freeboard), could this be updated?

In terms of the level of freeboard which is required above the appropriate flood level, we would recommend developers follow the below guidance, which is in line with FRSA:

- All essential infrastructure (such as substations) and more and highly vulnerable developments should be positioned a minimum of 600mm above the 1 in 100 year (+75%CC) flood level event, to provide appropriate mitigation to assist in maintaining the safe functionality of the site across the lifetime of the development.
- For areas classed as 'less vulnerable' we would still encourage developers to work towards achieving the 600mm freeboard above the 1 in 100 year (+75%) flood event (or as close as reasonably practical), and look at the possibility of having stepped (or ramped access) to buildings. However if that cannot be achieved due to site constraints, then we would expect these areas to be a minimum of 600mm above the predicted flood level for the 1 in 100 year event and we would expect to see extra flood resistance and resilient measures as identified within the FRSA if flood water is predicted to enter the development during the 1 in 100 year (plus climate change) flood events.
- We would also encourage all sockets to be positioned suitably above the 1 in 1000 year.

Let me know if you have any queries regarding the above.

Thanks,

Oliver

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

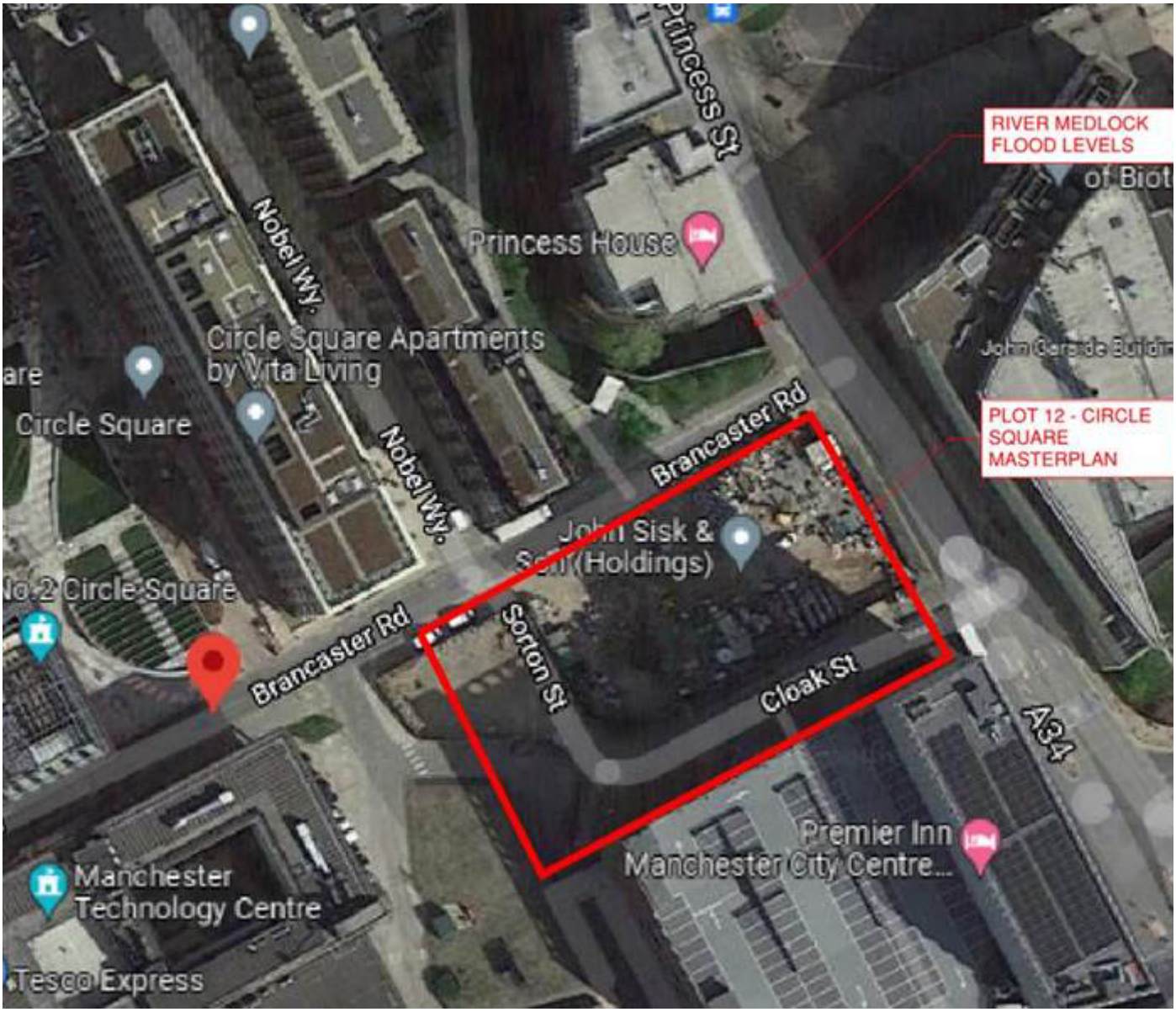
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Web: http://www.manchester.gov.uk

From: Chloé Grimsley <Chloe.Grimsley@curtins.com>
Sent: 26 January 2022 17:16
To: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Subject: Plot 12, Circle Square Masterplan, Manchester
Importance: High

Good Afternoon Sir/Madam,

We are currently supporting the developer for the next phase of the Circle Square Masterplan – Plot 12. Please see location on the masterplan below:



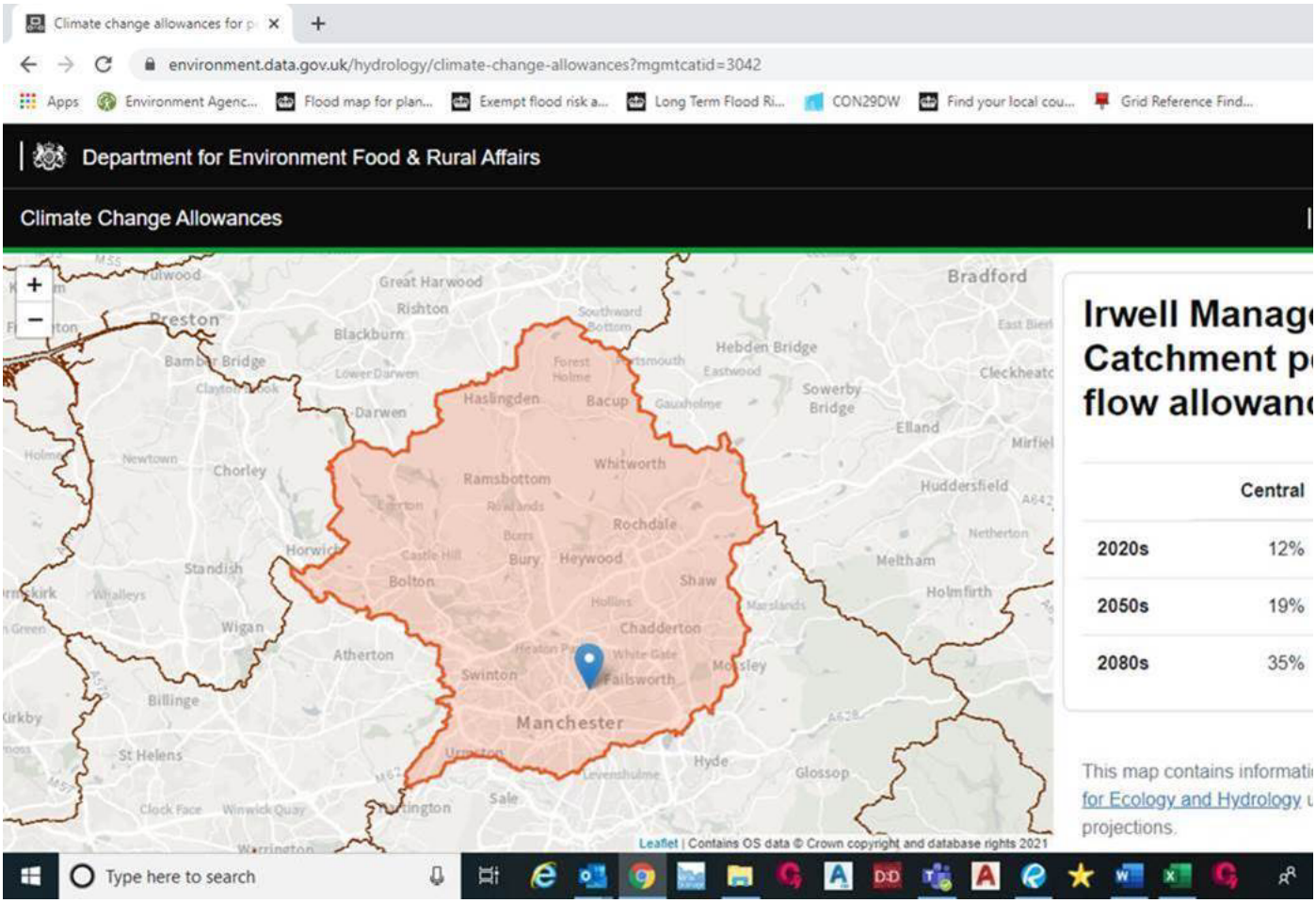
The site is located within an area classified as within Flood Zone 2 and therefore we are currently preparing the FRA to support the planning application for the development.
The site proposals are of commercial use – 14 storeys.

The wider masterplan earlier phases (Plot 10 and 11 under Phase 1A, Plots 2-9 and Plot 14 under Phase 1B/C) were covered under separate FRAs, therefore we are proposing to prepare a FRA supporting this plot as a standalone document, however the Drainage was largely covered under the infrastructure already installed along Brancaster Road and Plot 14 MSCP works and we propose to summarise the infrastructure supporting this plot within the report.

Under the previous FRAs, the flood data at the time was obtained from the Environment Agency, therefore we have obtained the most current information acknowledging the most recent updates to the climate change allowances released in June 2021. The Environment Agency have advised that current climate change allowances are not included in their model and that we can create a stage vs discharge curve from the data provided to determine the updated climate change levels, but they have advised that this along with protection should be agreed with Manchester LLFA as the site is within Flood Zone 2. Please see attached correspondence for information.

We have therefore summarised our approach:

Environment Agency Flood Level Data is attached – Node 2 is relevant to the site.



Based on the above, development should assess the development for the 100-year, 100 year +46%, 100 year +75% and the 1000-year scenarios.

We have therefore generated the stage discharge curves from the EA Data, which confirms that approximate flood levels adjacent to the site are:
100 year +46% - 33.550m AoD
100 year +75% - 33.750m AoD
The 1 in 1000 year modelled level is 33.970 m AoD.

Stage vs discharge curves excel file attached.

Based on the above flood levels, we have therefore assessed the proposed layout and floor levels and confirm that the majority of ground floor areas will be above the flood levels for up to the 1 in 1000-year event, however the units which tie into Princess Street are restricted by existing levels along the back of footpath.

In summary:

Green areas have approximately 1.03m of freeboard above the 1 in 1000 year level.
Pink areas have approximately 0.53m of freeboard above the 1 in 1000 year level.

However,

Purple areas have approximately 0.22m of freeboard above the 1 in 1000-year level but no freeboard during 100 year +75% event and 0.2m below the 100 year +46% event flood level. The 100 year level is 32.46m so the area would be protected up to this event.

Blue areas are below the flood level in the 100 year +46% by 0.47m, 100 year +75% by 0.6m and 1000 year by 0.87m. The 100-year level is 32.46m so the area would be protected up to this event.

The purple areas are for cycle storage and plant space; therefore, we propose to mitigate the risk by:

- Selecting materials that can be protected or easily replaced.
- Raising sockets, electrical or sensitive equipment >0.6m above the 100 year +46% level (minimum 34.150m).
- Providing flood emergency plan for use of areas during predicted flood events.

The bleu area is for retail space; therefore, we propose to mitigate the risk by:

- Selecting materials that can be protected or easily replaced (fit out will be tenant related).
- Raising sockets, electrical or sensitive equipment >0.6m above the 100 year +46% level (minimum 34.150m).
- Providing flood emergency plan for use of areas during predicted flood events.

Please could you review and advise if the calculated levels are suitable for use in our assessment and if the mitigation proposals would be acceptable given the constraints of existing levels and infrastructure.

Kind Regards,
Chloé

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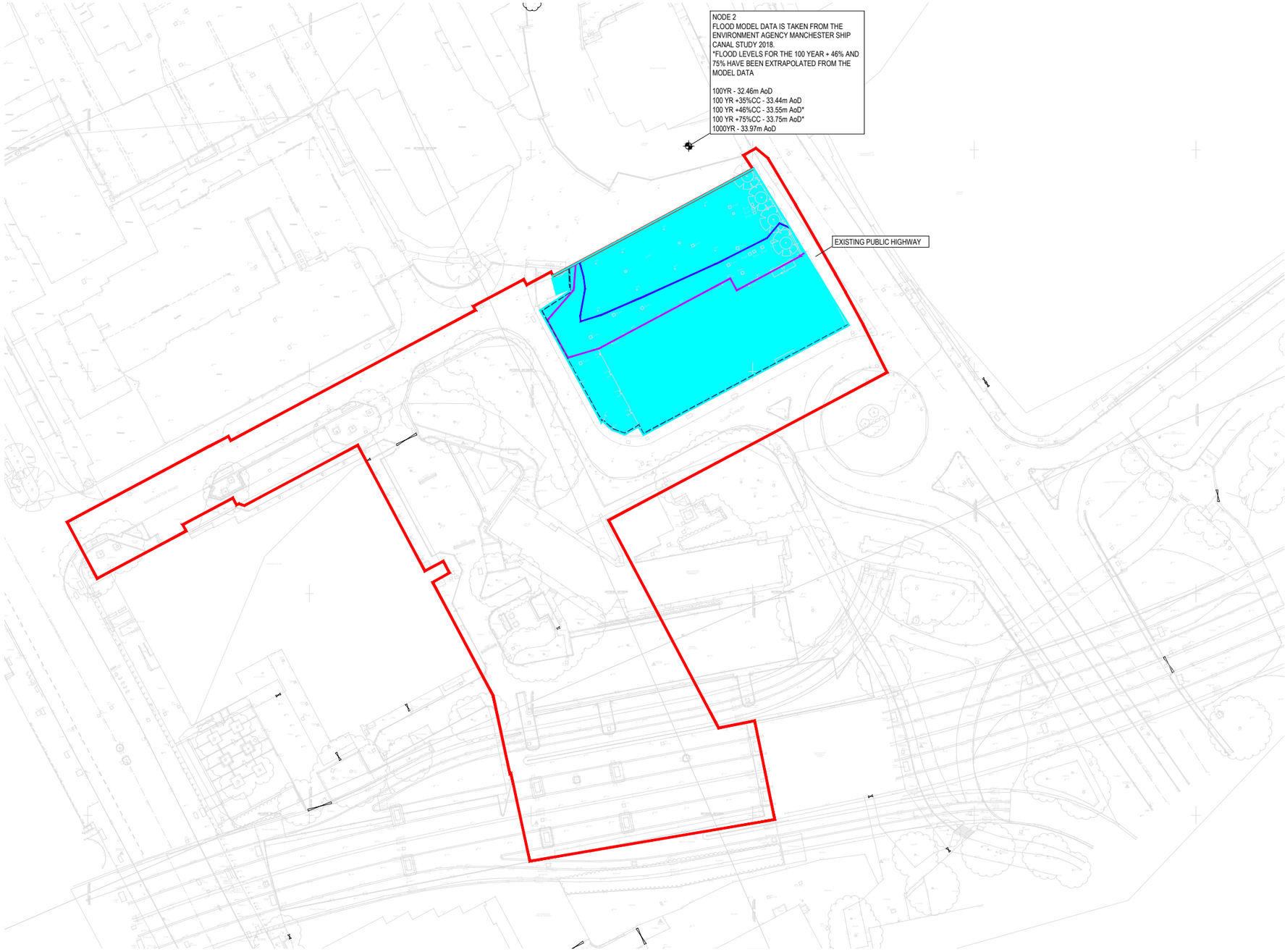
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Appendix H

Existing Flood Extents

Proposed Flood Extents



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3. ALL LEVELS ARE IN METRES ABOVE ORDNANCE DATUM UNLESS NOTED OTHERWISE.
4.
5. THIS DRAWING IS BASED ON TOPOGRAPHICAL SURVEY 15E146/004 BY SURVEY OPERATIONS RECEIVED AUGUST 2015
6. FLOOD MODEL DATA IS TAKEN FROM THE ENVIRONMENT AGENCY MANCHESTER SHIP CANAL STUDY 2018. *FLOOD LEVELS FOR THE 100 YEAR + 46% AND 75% HAVE BEEN EXTRAPOLATED FROM THE MODEL DATA.

KEY

- FLOOD ZONE 3A = 100YR - 32.46m AoD NOT WITHIN BOUNDARY
- 100 YR +35%CC - 33.44m AoD
- 100 YR +46%CC - 33.55m AoD*
- 100 YR +75%CC - 33.75m AoD*
- FLOOD ZONE 2 = 1000YR - 33.97m AoD
- PLANNING BOUNDARY TAKEN FROM LANDSCAPE ARCHITECTS PLAN 1502a-PLA-XX-XX-DR-L-0002

Rev:	Description:	Date:	By:	Chkd:
P01	ISSUED FOR PLANNING	13.05.22	CG	CG

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Status: STAGE 2

Project: N0 3 CIRCLE SQUARE

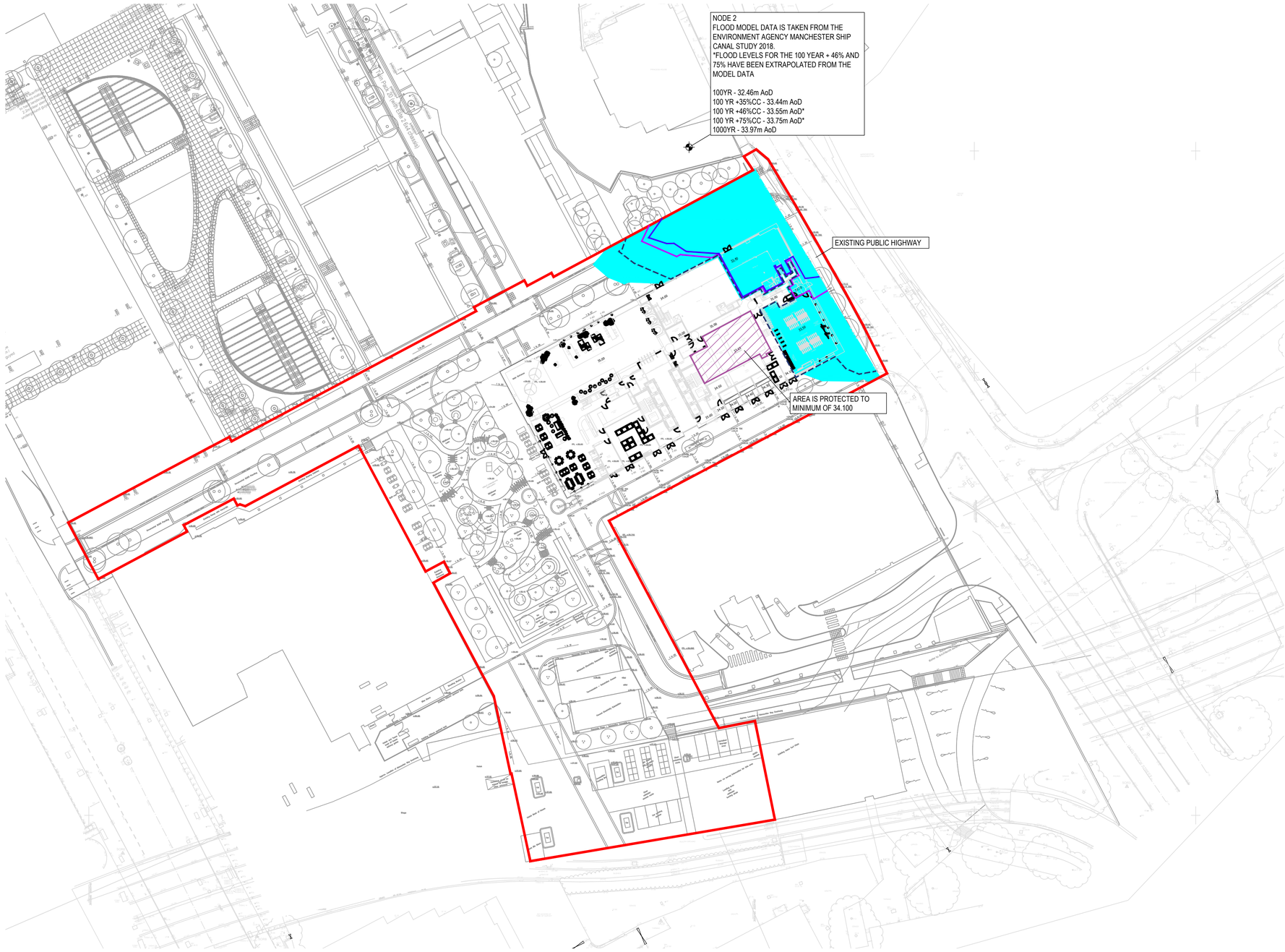
Drg Title: EXISTING FLOOD ZONE EXTENTS

Drawn By	Designed By	Checked By
ATL	ATL	CG
	Date: 03.02.22	Scales @ A1: 1:500

Project No - Originator - Function - Spatial - Form - Discipline - Number: CS3 - CUR - 03 - XX - DR - C - 9210

Revision: P01

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5. FLOOD MODEL DATA IS TAKEN FROM THE ENVIRONMENT AGENCY MANCHESTER SHIP CANAL STUDY 2018. *FLOOD LEVELS FOR THE 100 YEAR + 46% AND 75% HAVE BEEN EXTRAPOLATED FROM THE MODEL DATA.

KEY

- FLOOD ZONE 3A = 100YR - 32.46m AoD NOT WITHIN BOUNDARY
- 100 YR +35%CC - 33.44m AoD
- 100 YR +46%CC - 33.55m AoD*
- 100 YR +75%CC - 33.75m AoD*
- FLOOD ZONE 2 = 1000YR - 33.97m AoD
- PLANNING BOUNDARY TAKEN FROM LANDSCAPE ARCHITECTS PLAN 1502a-PLA-XX-XX-DR-L-0002

Rev:	Description:	Date:	By:	Chkd:
P01	ISSUED FOR PLANNING	13.05.22	CG	CG

curtins
Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
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Civils & Structures • Transport Planning • Environmental • Infrastructure • Geotechnical • Conservation & Heritage • Principal Designer
Birmingham • Bristol • Cambridge • Cardiff • Douglas • Dublin • Edinburgh • Glasgow • Kendal • Leeds • Liverpool • London • Manchester • Nottingham

Status: STAGE 2

Project: N0 3 CIRCLE SQUARE

Drg Title: PROPOSED FLOOD ZONE EXTENTS

Drawn By	Designed By	Checked By
ATL	ATL	CG
	Date: 03.02.22	Scales @ A1: 1:500

Project No - Originator - Function - Spatial - Form - Discipline - Number	Revision
CS3 - CUR - 03 - XX - DR - C - 9211	P01

\\manfs02\Projects\080001 - 081000\080355 - Circle Square Building 3\Q4-Production\4A-Models-Drawings\C:\ACAD\52\

Appendix J

United Utilities Section 106 Consent (Foul)

Environment Agency Flood Permit (Surface Water)

S106 Part 1 'Application to connect to a public sewer' Approval Notice

United Utilities Reference Number:	**EC4436**
Applicant details	
Applicant name	**Simon Chesworth**
Applicant address *(including postcode)*	**Bruntwood Circle Square 14 Limited** **C/O Bruntwood Ltd** **Albert Square** **Manchester** **M2 6LW**
Applicant email	**Simon.chesworth@bruntwood.co.uk and Andy Losty <Andy.Losty@curtins.com>**
Site details: The site / property which is proposed for connection to the public sewer	
	Plot 1, Circle Square, Upper Brook Street, Manchester, M1

APPROVED

Your application for connection to the public sewer has been approved, to be made via a new connection:

To a private drain	☒	You may appoint your contractor and advise your appointed building control body (who should inspect the work). United Utilities should be advised when this work is complete.
Direct to the public sewer	☐	**Further action required** You may now appoint an appropriately qualified contractor. Your appointed contractor is responsible for obtaining authorisation to work on a public sewer. (The S106 Part 2 application form **'Request for permission to work on a public sewer'** is available on our website; unitedutilities.com).

Mode of connection approved	**Other - please see comments box**					
Sewer connection type	Foul	☒	Surface water	☐	Combined	☐

This approval is valid for 12 months from the date below.
This approval does not grant access to third party land, permission should be sought if required between applicant and land owner
If the new connection renders access unsafe or is otherwise detrimental to the manhole or sewer, a new/upgraded manhole will be requested.

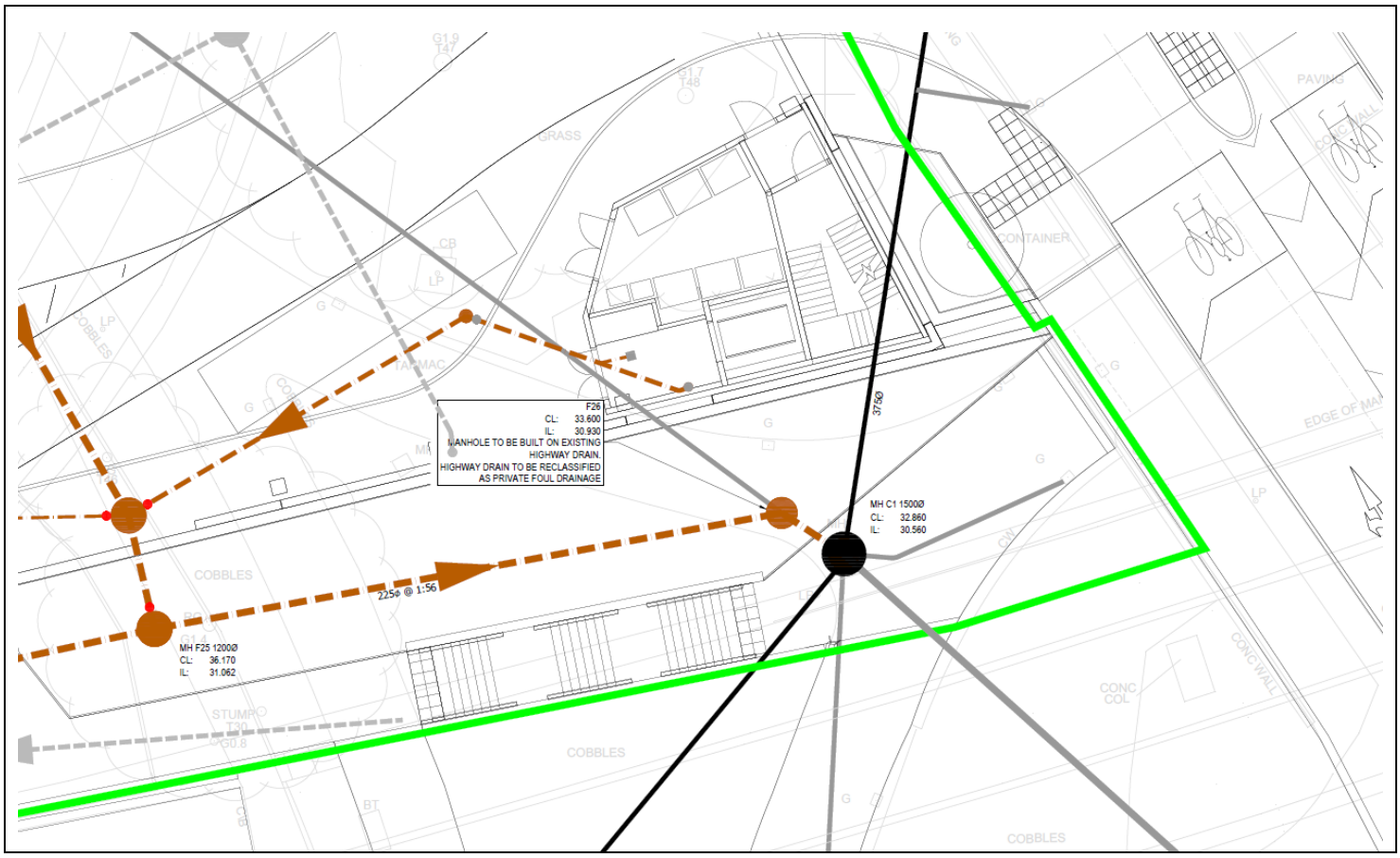
Comments

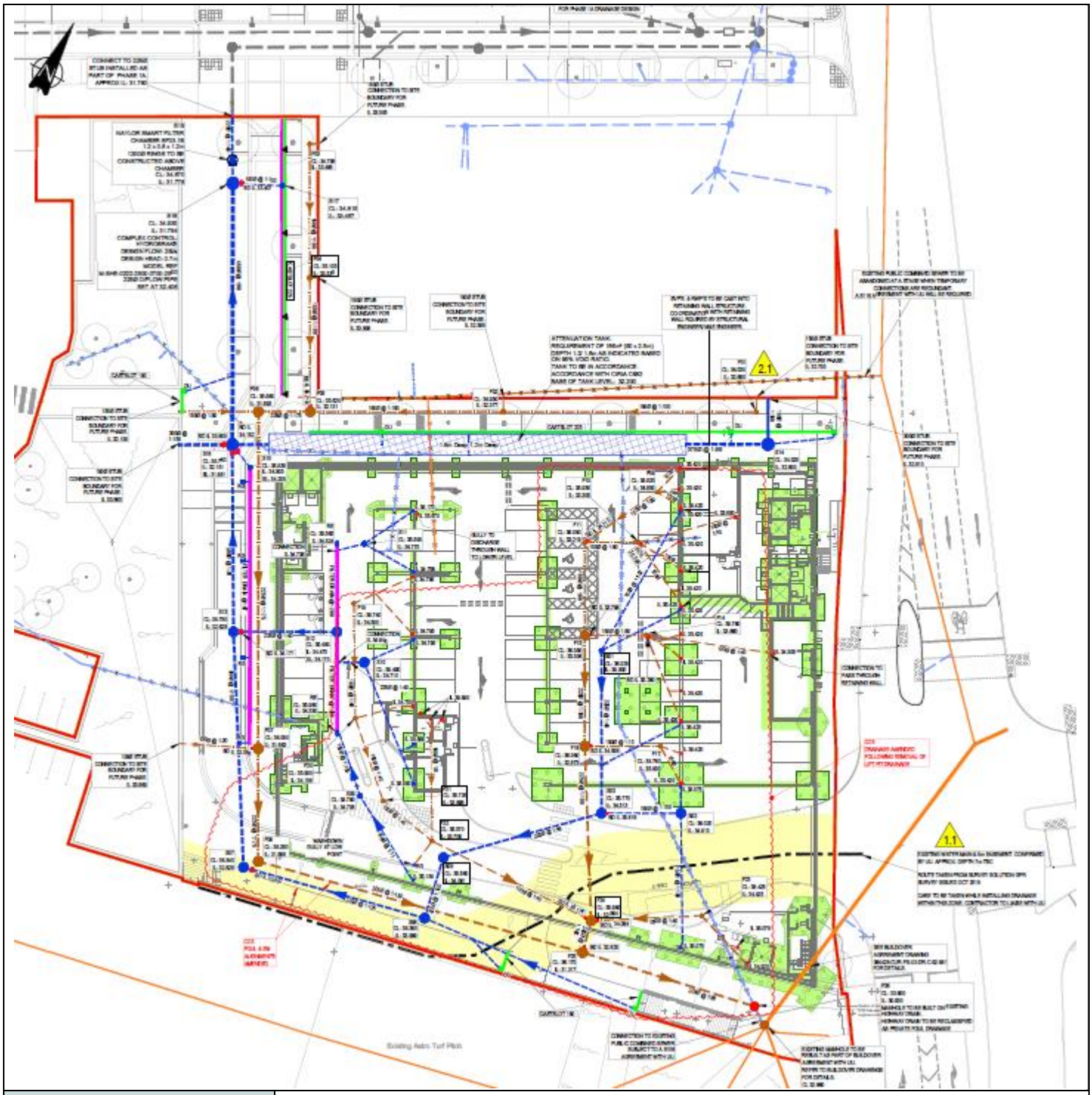
Approval granted for the 225mm Foul only connection via the utilisation of a private drain within the site boundary that shows to communicates with the 375mm Combined sewer that crosses the site through to Brook Street (as per your revised drawing below 064428-CUR-00-00-DR-C-92-530-P02)

Surface water to watercourse

Based on the information supplied by Andy Losty 05/10/19 that the private highway drain which is located in the land, the ownership of this has been transferred and the section of re-used drain only takes foul drainage

Please note, if you are proposing to connect to an existing, unchartered drain or sewer then it is the developers responsibility to confirm that it communicates with the Public Sewer
Connections may be made to private lateral drains or to existing neighbouring drain. A part 1 approval does not give permission to access third party land. The applicant must seek permission from the relevant land owner.


F26
CL: 33.600
IL: 30.930
MANHOLE TO BE BUILT ON EXISTING
HIGHWAY DRAIN.
HIGHWAY DRAIN TO BE RECLASSIFIED
AS PRIVATE FOUL DRAINAGE
MH C1 1500Ø
CL: 32.860
IL: 30.560
MH F25 1200Ø
CL: 36.170
IL: 31.062
225ø @ 1:56
375ø
GRASS
TARMAC
COBBLES
CONTAINER
PAVING
CONC WALL
CONC COL
EDGE OF MA
STUMP
T30
G0.8
BT
CB
LP



Development Support Technician	**Lynne Berry**
Contact number	**07881034558**
Date	**09/10/2018**

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

Our ref: NW_South_2016_528

Date: 17 February 2016

FAO Chloe Grimsley

Dear Sirs,

ENVIRONMENT AGENCY FLOOD DEFENCE CONSENT APPLICATION
REF NO: NW_South_2016_528

New surface water outfall into the river and other works within 8 metres easement at Oxford Road/Charles Street Manchester

Thank you for your application for Flood Defence Consent we received on 23 December 2015.

I am pleased to confirm that your proposals are acceptable to us. I enclose Consent Number NW_South_2016_528 issued under Water Resources Act 1991 and associated byelaws.

Please notify us of the proposed starting date of the works no less than seven days before commencement by emailing PSOWarrington@environment-agency.gov.uk quoting reference number NW_South_2016_528.

Written permissions must be obtained from all third parties affected by the proposed works.

Please note the conditions of our approval. If you believe that any conditions imposed are unreasonable then you have a right of appeal to an independent arbitrator or Government Minister as appropriate.

Finally, please note that this consent does not absolve you from the need to obtain any other consents, licences or permissions which may be required in law prior to you commencing the work. You are solely responsible for ensuring that your designs meet all applicable standards and are fully compliant with current legislative requirements.

Yours faithfully

P. Costello

Peter Costello
Team Leader Partnership and Strategic Overview

Please ask for Sandrine Thomas
Direct dial 02030 250 985

Email: PSOWarrington@environment-agency.gov.uk
www.gov.uk/environment-agency

RIGHTS OF APPEAL

WATER RESOURCES ACT 1991 -SECTION 110 (4)

If any question arises under this section whether any consent or approval is unreasonably withheld or whether any condition imposed is reasonable, the question shall-

(a) if the parties agree to arbitration, be referred to a single arbitrator appointed by agreement between the parties or, in default of agreement, by the President of the Institution of Civil Engineers; and

(b) if the parties do not agree to arbitration, be referred to and determined by the Ministers or the Secretary of State, according to whether the determination falls to be made in relation to England or Wales.

The most likely source of arbitrators can be found on the following links

- the ICE http://www.ice.org.uk/ and http://www.ice.org.uk/About-ICE/What-we-do/Dispute-resolution
- the Chartered Institute of Arbitrators (CIArb) http://www.ciarb.org/about/ or
- the Chartered Institution of Water and Environmental Management (CIWEM) http://www.ciwem.org/ .

Customer services line: 03708 506506
Email: PSOWarrington@environment-agency.gov.uk
www.gov.uk/environment-agency

Flood Defence Consent

Water Resources Act 1991 and associated byelaws

Oxford Property Trading Ltd
City Tower
Piccadilly Plazza
Manchester
M1 4BT

Consent applying to outfall and works within 8 m easement at
Oxford Road/Charles Street
Manchester

Consent number
NW_South_2016_528

Effective from
17 February 2016

Environment Agency Greater Manchester and Cheshire & Merseyside
Tel: 02030 250 985

Disclaimer

The Environment Agency does not accept any responsibility for the design and construction of the works referred hereto and any liability for any loss or damage which may arise out of their design, construction, maintenance or use.

Our approval is given solely on river morphology, flow, ecology, and other land drainage criteria. It should not be regarded by the applicant as in any way approving the design and soundness of the proposed structure, other than in relation to its impact on flows in the watercourse and its flood plain

This Consent does not free you from the need to obtain other licences, consents, approvals (including bye-law consents) or permissions (including planning permission) which may be required in law or in order to comply with any duties or responsibilities for conservation or protection of the environment. You should ensure that the works are carried out in a proper manner so as not to adversely affect the watercourse. A copy of the Special Requirements issued by the Environment Agency is available upon request. Work should be completed as quickly as possible once started.

The works shall be carried out at your own risk and responsibility. We accept no responsibility for any loss or damage howsoever caused arising from the carrying out or construction of the works. We may occasionally make observations on health and safety aspects of the work, however this should not be taken in any way whatsoever to imply that we have a role in ensuring site safety, nor that we have approved any contractors plans.

Land ownership is not a material consideration in determining this consent. Where you are not the owner of the land (including riverbeds and other water bodies) referred to in this consent, you must obtain suitable permission from the landowner prior to the commencement of works. This Consent does not confer any rights of entry or rights over property.

If you undertake works in contravention of Section 109 of the Water Resources Act, 1991 (Restriction on erection of structures in, over or under main river), or of the terms of this consent, we may remove, alter or pull down the works and recover from you the expenses incurred in doing so.

The responsibility to ascertain the location of any services, which may be affected by the proposed works, lies solely with the Applicant/Agent.

The contents of this consent must be brought to the attention of your contractor.

If you believe that conditions have been unreasonably imposed then you have a right of appeal.

Consent

Water Resources Act 1991 and associated byelaws

Flood Defence Consent

Control of works affecting watercourses and/or flood defences

Consent number **NW_South_2016_528**

To **Oxford Property Trading Ltd**
City Tower
Piccadilly Plazza
Manchester
M1 4BT

The Environment Agency, in exercise of its powers under Water Resources Act 1991 and associated byelaws and subject to the conditions overleaf, hereby grants its consent in relation to the works or operations described in this Consent.

Watercourse: Medlock

Location: Oxford Road/Charles Street Manchester

NGR: 384234, 397406

Description of works: New outfall from Flood Compensation Zone, Landscaping, Paving and SuD's features, localised 5m pinchpoint within 8m of the River wall and Localised lowering of the River Wall at the Rain Garden.

As detailed on plans and sections:

- External works layout MA1347-60-00-01 Rev A
- External works layout MA1347-60-00-02 Rev A
- Drainage layout MA1347-70-00-01 Rev B
- Flood Compensation and undercroft drainage zone MA1347-70-00-06
- Landscape proposals PL1502-P1A-001 Issue 00
- Medlock walk cross section PL1502-1A-201 Issue 00
- Medlock walk cross section PL1502-1A-202 Issue 00
- Proposed drainage details Phase 1A MA1347-70-10-04 Rev A
- Proposed drainage details Phase 1A MA1347-70-10-05 Rev A

The Agency does not accept any responsibility for the design and construction of the works referred hereto and any liability for any loss or damage which may arise out of their design, construction, maintenance or use.
This Consent shall come into effect on **17 February 2016**

Signed on behalf of the Environment Agency

P. Costello

Peter Costello
Partnerships and Strategic Overview Team Leader

Date of signing

17/02/2016

Conditions

This consent is granted subject to the following conditions:

1.1 General

1.1.1 All reasonable care should be taken to ensure that the watercourse is kept free of foreign matter and floating debris during the construction period and on completion.

1.1.2 Works should be carried out in such a way as to ensure minimum obstruction to flows in the watercourse at all times.

1.1.3 These works should be carried out in such a way as to minimise disturbance to the existing banks and bed of the watercourse.

1.1.4 On completion of the works all debris and surplus material shall be removed from the banks of the watercourse. The bed and banks of the watercourse which have been disturbed by the works, shall be reinstated to the satisfaction of the Area Flood Risk Manager.

1.1.5 The integrity of the flood defences should be maintained at all times.

1.2 Timing

1.2.1 The Works referred to in this Consent shall be commenced within one year of the date of issue, otherwise a further application for Consent must be made. The works shall be completed within two years of the date of commencement unless such date is extended with the prior written agreement of the Agency.

1.2.2 At least 7 working days' prior written notice of commencement of the works and written notification of completion must be given to the Environment Agency. Please email PSOWarrington@environment-agency.gov.uk stating your consent reference

1.3 Temporary works

1.3.1 There shall be no stock piling or storing of materials within the channel.

1.3.2 There shall be no stock piling or storing of materials in the floodplain unless in broken heaps parallel to the direction of flood flow.

1.4 Site Specific

1.4.1 Under no circumstances must there be a reduction in the existing cross sectional area of the existing channel.

1.4.2 All invasive works should adhere to the existing knotweed code of practice guidance document (https://www.gov.uk/government/publications/japanese-knotweed-managing-on-development-sites). Any proposed herbicide spraying near the river will need consent from the Agency (refer to webpage https://www.gov.uk/government/publications/application-to-use-herbicides-in-or-near-water) for advice.

Other information

This Note does not form part of the Certificate of Authorisation.

Pollution Prevention

You are reminded that it is an offence under Regulation 38 of The Environmental Permitting (England and Wales) Regulations 2010 to cause or knowingly permit a water discharge activity or ground water activity.Care must be taken to ensure that neither the watercourse nor groundwater becomes polluted, particularly by, for example diesel fuel, petrol and oil from machinery. All fuels, oils and chemicals must be stored securely and any large containers left on site must be bunded. Care should also be taken when filling machinery to ensure that diesel/petrol/oil is not spilt on the ground. Spillages must not be washed away, but absorbed by some medium and then removed from site to a suitable licensed waste facility. Any such incidents must be reported to the Environment Agency immediately (Emergency Tel No 0800 807060). Copies of the Environment Agency's Pollution Prevention Guidelines (PPG5) and (PPG6) are either attached for your information or if not available upon request.

Disturbance of bed and bank material in watercourses should be minimised, including when carrying out excavations. An appropriate silt control system should also be considered if material is likely to be disturbed. In-river vehicle tracking should be kept to an absolute minimum.

Any waste generated in the course of the works must be disposed of in accordance with the provision of the Environmental Protection Act 1990. Persons carrying waste are required by law to register with the Environment Agency as a Waste Carrier (subject to certain exceptions). The deposit, keeping, treating or disposal of waste should only take place at premises licensed by the Environment Agency to receive the waste (subject to certain exceptions and exemptions). When you give waste to someone else, details of the transfer of waste should be described on a document called a Duty of Care Transfer Note.

If the waste contains any properties that are hazardous to health or the environment, the waste will be classed as 'Hazardous Waste' as defined in the Hazardous Waste Regulations 2005. These Regulations place specific requirements on the producer and carrier of such waste. Further information can be found on the Agency's website (www.gov.uk/environment-agency) or by contacting the National Customer Contact Centre on 03708 506506.

The activity of importing waste into the site for use as part of the construction process, for example hardcore, must be registered by Environment Agency as an exempt activity under the Waste Management Licensing Regulations 1994.

Flood Risk Management

The structure(s) must be removed immediately, for any reason, at the request of the Area Flood Risk Manager.

You must ensure that any structure is clear and free of rubbish, silt and debris at all times. Regular inspections of the structure should also be carried out and the appropriate maintenance work undertaken.

Fisheries

You are strongly advised to inform the appropriate Angling Association/Interests of your proposals (where applicable), before commencing work, since the issue of a Flood Defence Consent by this Agency will not protect you from any claim for nuisance or damage which may be attributed to your works.

The free passage of fish must be maintained at all times, unless otherwise agreed in advance with the Agency.

Under the terms of the Salmon and Freshwater Fisheries Act 1975, it is an offence to cause or knowingly permit to flow, or put, into any waters containing fish, any liquid or solid matter to such an extent as to cause the water to be poisonous or injurious to fish or the spawning grounds, spawn or food of fish.

Biodiversity

Natural environments such as watercourses are important as habitats in their own right and for the plants and animals they support .There are several Acts and Regulations that ensure these special features are protected and you should be aware of and comply with this legislation. A list of relevant legislation can be found in our working method guidance.

The list of species and actions below are not exhaustive and the applicant should consult the relevant legislation regarding other concerns.

A licence for works affecting protected species may be required from Natural England. You should consult their standing advice for more information on this.

Otters and their places of rest are protected. Otters are widespread and significant tree works or works to the banks have the risk of disturbing otters and damaging their Holts. You should make an assessment of the risk to otters and where required a survey should be undertaken by a suitably qualified ecologist. Note otters sometimes lie up in drains/small watercourses so wherever possible drain entrances should be kept clear.

Bats and their habitats are protected. Bats are often found in structures and trees on or adjacent to watercourses. If your works are likely to affect structures such as bridges, walls, culverts or buildings you must consider impacts on bats. An appropriate assessment of risk and, where required a survey should be undertaken by a suitably qualified ecologist.

Water voles and their habitat are protected. If water voles are present on your site you need to consider the impacts of your work on them and an

appropriate assessment of risk and where required survey should be undertaken by a suitably qualified ecologist.

Native Crayfish are protected. When undertaking works where native crayfish are present you need to consider the impacts of your works and an appropriate assessment of risk and where required survey should be undertaken by a suitably qualified ecologist.

Vegetation

No bankside vegetation within 7m of the watercourse is to be removed unless strictly necessary. In such cases, trees/shrubs should be limbed or coppiced, and the root base to be left intact. Scrub vegetation as possible should be retained, as this provides valuable wildlife habitat.

Trees should be protected from the works in accordance with British Standard 5837, “Trees in relation to construction”, and contractors' working areas shall be clearly marked out and boundaries adhered to.

Any bankside trees or vegetation damaged or removed during the works should be replaced with native species of local provenance appropriate to the local habitat.

Birds

Breeding birds and their nests are protected under the Wildlife and Countryside Act 1981. If your work is taking place within or close to the main bird breeding season (1st March to 31st July) you should consider the impacts of your works and an appropriate assessment of risk should be undertaken.

Invasive Non-native species

The Wildlife and Countryside Act makes it an offence to cause certain species to spread in the wild. If these species are present on your site you need to have a plan for how you will manage them and any waste containing them during your work.

Bio security

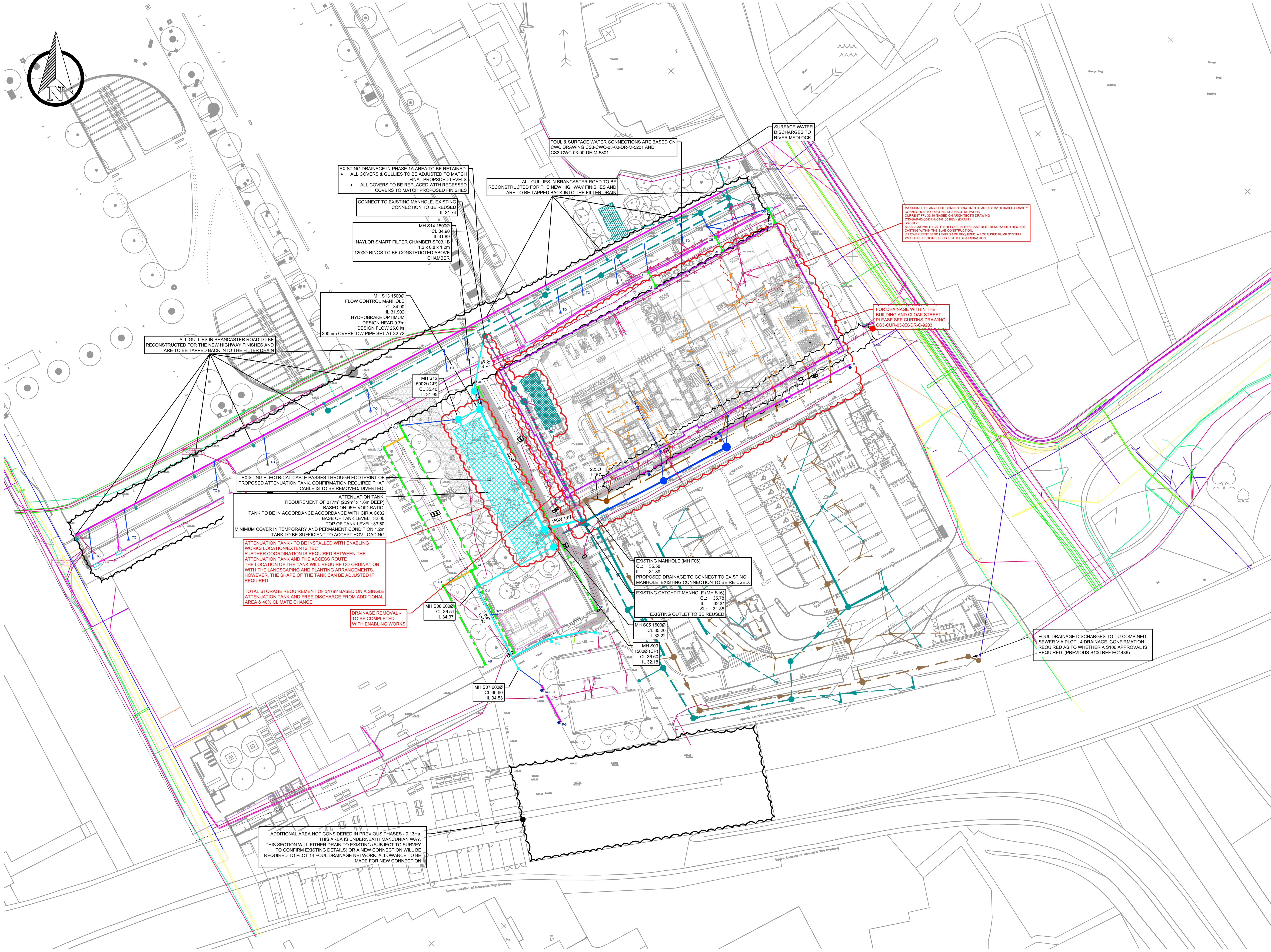
When travelling or working between watercourses there is a high risk of transferring problem species or diseases between watercourses.

This can be avoided by following the advice of the ‘check, clean, dry’ campaign. Simple measures such as checking for and cleaning mud and bits of vegetation from boots, equipment and machines and allowing them to dry (ideally in sunlight) can prevent the spread of problem species.

Appendix K

Proposed Drainage Strategy

Proposed Catchment Areas



SURFACE WATER DRAINAGE

THE SURFACE WATER DRAINAGE CONNECTS INTO THE WIDER MASTERPLAN NETWORK. THE MASTERPLAN NETWORK DISCHARGES TO THE RIVER MEDLOCK.

THE MASTERPLAN NETWORK IS SUBJECT TO A RESTRICTED DISCHARGE TO THE RIVER MEDLOCK.
THE ALLOWABLE MAXIMUM FLOW RATES FOR THE TOTAL SITE ARE APPROXIMATELY:
- 25 l/s FOR THE 1 IN 1 YEAR EVENT
- 58 l/s FOR THE 1 IN 30 YEAR EVENT
- 74 l/s FOR THE 1 IN 100 YEAR EVENT (CURRENT PROPOSAL INCLUDES A 40% ALLOWANCE FOR CLIMATE CHANGE).

NOTE: AS INSTALLED DRAINAGE IS DESIGNED WITH 30% CC CAPACITY, AND ALL NEW DRAINAGE SHOULD ACCOMMODATE 40% CC.

PROPOSED FLOW RATES:
ALLOWABLE DISCHARGE RATES FOR THE HAVE MASTERPLAN DRAINAGE HAVE BEEN CALCULATED BASED ON BROWNFIELD RUNOFF CALCULATIONS. THE ALLOWABLE DISCHARGE RATES HAVE BEEN AGREED AS PART OF PREVIOUS PLANNING APPROVALS.

REFER TO DRAWING 080355-CUR-XX-XX-DR-C-92001 FOR THE PROPOSED CATCHMENT AREAS:

AREA A
AREA IS APPROXIMATELY 0.24Ha. THE FLOW RATES BELOW ARE THE RATES ACHIEVED AND DO NOT EXCEED THE ABOVE ALLOWABLE FLOW RATES:
- 22 L/S FOR THE 1 IN 1 YEAR EVENT
- 23 L/S FOR THE 1 IN 30 YEAR EVENT
- 67 L/S FOR THE 1 IN 100 YEAR EVENT (INCLUDING 30% ALLOWANCE FOR CLIMATE CHANGE)

AREAS B&C
AREA IS APPROXIMATELY 0.99 Ha.THE ALLOWABLE MAXIMUM FLOW RATES FOR THE PLOT SITE ARE APPROXIMATELY:
- 25 l/s FOR THE 1 IN 1 YEAR EVENT
- 58 l/s FOR THE 1 IN 30 YEAR EVENT
- 73 l/s FOR THE 1 IN 100 YEAR EVENT (CURRENT PROPOSAL INCLUDES A 40% ALLOWANCE FOR CLIMATE CHANGE).

ATTENUATION REQUIREMENTS:

AREA A:
THE CELLULAR ATTENUATION WAS INSTALLED AS PART OF THE PHASE 1A WORKS AND NO CHANGES ARE PROPOSED.

AREAS B&C:
THE CELLULAR ATTENUATION THAT HAS BEEN INSTALLED FOR THE PLOT 14 WORKS WILL REQUIRE REMOVAL AS IT NOW FALLS WITHIN THE PROPOSED BUILDING FOOTPRINT.
THE ATTENUATION REQUIREMENT FOR THE ENW SUBSTATION DOES NOT APPEAR TO HAVE BEEN INSTALLED BASED ON A SITE WALKOVER.

THE ATTENUATION FOR THIS AREA WILL BE PROVIDED AS SHOWN ON THE PLAN, SUBJECT TO CO-ORDINATION WITH LANDSCAPING & FUTURE PLOT REQUIREMENTS.

THE TOTAL ATTENUATION REQUIREMENT HAS BEEN ESTIMATED AS 317m³

SUSTAINABLE DRAINAGE

DETAILS OF SUSTAINABLE DRAINAGE SYSTEMS IS TO BE CO-ORDINATED WITH THE LANDSCAPE ARCHITECT AND AGREED WITH THE LLFA.

FOUL WATER DESIGN
FW PEAK FLOW RATES FOR THE PROPOSED SITE HAVE BEEN TAKEN FROM CWC DRAWING CS3-CWC-03-00-DR-M-5201.

THE FOUL DRAINAGE CONNECTS TO THE AS CONSTRUCTED PLOT 14 FOUL DRAINAGE, WHICH DISCHARGES TO A PUBLIC COMBINED SEWER.

THE CONNECTION HAS BEEN APPROVED (S106 REF EC4436). THIS APPLICATION INCLUDED AN ALLOWANCE OF 552 DUs FOR THE PROPOSED BUILDING.

CONFIRMATION IS REQUIRED FROM UU AS TO WHETHER A NEW S106 APPLICATION IS REQUIRED.

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
4. FOR GENERAL NOTES REFER TO DRAWING SA-CUR-XX-00-DR-C-92502.
5. FURTHER CO-ORDINATION REQUIRED BETWEEN EXTERNAL SERVICES AND THE PROPOSED DRAINAGE.

KEY:

PLANNING BOUNDARY TAKEN FROM LANDSCAPE ARCHITECTS PLAN 1502a-PLA-XX-XX-DR-L-0002
PROPOSED BUILDING EXTENTS

EXISTING DRAINAGE
AS CONSTRUCTED SW DRAINAGE
AS CONSTRUCTED FOUL DRAINAGE
PRE-DEVELOPMENT DRAINAGE (ASSUMED ABANDONED - TBC)
DRAINAGE TO BE ABANDONED/ REMOVED
EXISTING OXFORD HOUSE ACCESS

PROPOSED ENABLING WORKS DRAINAGE
PROPOSED SW DRAINAGE
PROPOSED CELLULAR ATTENUATION STORAGE

PROPOSED DRAINAGE
PROPOSED SW DRAINAGE
PROPOSED FOUL DRAINAGE
PROPOSED LINEAR DRAINAGE CHANNEL GATIC CASTSLOT TREADSAFE 225
PROPOSED THOAT LESS LINEAR DRAINAGE CHANNEL GATIC CASTSLOT TREADSAFE 225
ROAD GULLY
PROPOSED FILTER DRAIN

Rev:	Description:	Date:	By:	Chkd:
P05	STAGE 3 ISSUE	17.06.22	CS	CG
P04	STAGE 3 DRAFT ISSUE	27.05.22	CS	CG
P03	ISSUED FOR TENDER	18.03.22	ATL	CG
P02	NOTE REGARDING EXISTING SEWER TO BE ABANDONED ADDED	09.02.22	ATL	CG
P01	STAGE 2 ISSUE	03.02.22	ATL	CG

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Civils & Structures • Transport Planning • Environmental • Infrastructure • Geotechnical • Conservation & Heritage • Principal Designer
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DRAWING BASED ON:

ARCHITECT'S LAYOUTS
- CS3-CWC-03-00-DR-M-5201

LANDSCAPE ARCHITECT'S LAYOUT
- 1502a-PLA-XX-XX-DR-L-0001 REV P02 LANDSCAPE GA

PROPOSED SERVICES
- MARKED UP SKETCH OF CSE-CWC-03-EX-DR-ME-9002 RECEIVED 11.03.20 (INDICATIVE DRAINAGE POP-UPS & FLOWS)
- CSE-CWC-03-EX-DR-ME-9003 REV P1 (DRAFT) PROPOSED ELECTRICAL SERVICES PLAN

PROPOSED STRUCTURAL INFORMATION.
- CS3-CUR-03-FN-DR-S-1600 REV P03 FOUNDATION GA
- CS3-CUR-03-GF-DR-S-2000 REV P04 GROUND FLOOR GA

PHASE 1A DRAINAGE LAYOUT
- MA1347-70-00-01 C11

PLOT 14 DRAINAGE LAYOUT
- 064428-CUR-FS-XX-DR-C-92500 F01

TOPOGRAPHICAL SURVEY
- 15E146/004 BY SURVEY OPERATIONS RECEIVED AUGUST 2015

THIS DRAWING HAS BEEN PROVIDED TO SHOW THE OVERALL DRAINAGE STRATEGY. REFER TO DRAWING CS3-CUR-03-XX-DR-C-9202 FOR DETAILS OF THE DRAINAGE ENABLING WORKS.

DESIGN RISKS:
ALL NOTES HIGHLIGHTED IN RED REFER TO DESIGN RISKS THAT HAVE BEEN NOTED DUE TO THE REVISED BUILDING PROPOSALS.

THE PROPOSALS SHOWN ARE TENDER ISSUE FRO THE ENABLING WORKS ONLY, AND ARE SUBJECT TO CO-ORDINATION AT DETAILED DESIGN PHASE.

Status: STAGE 3

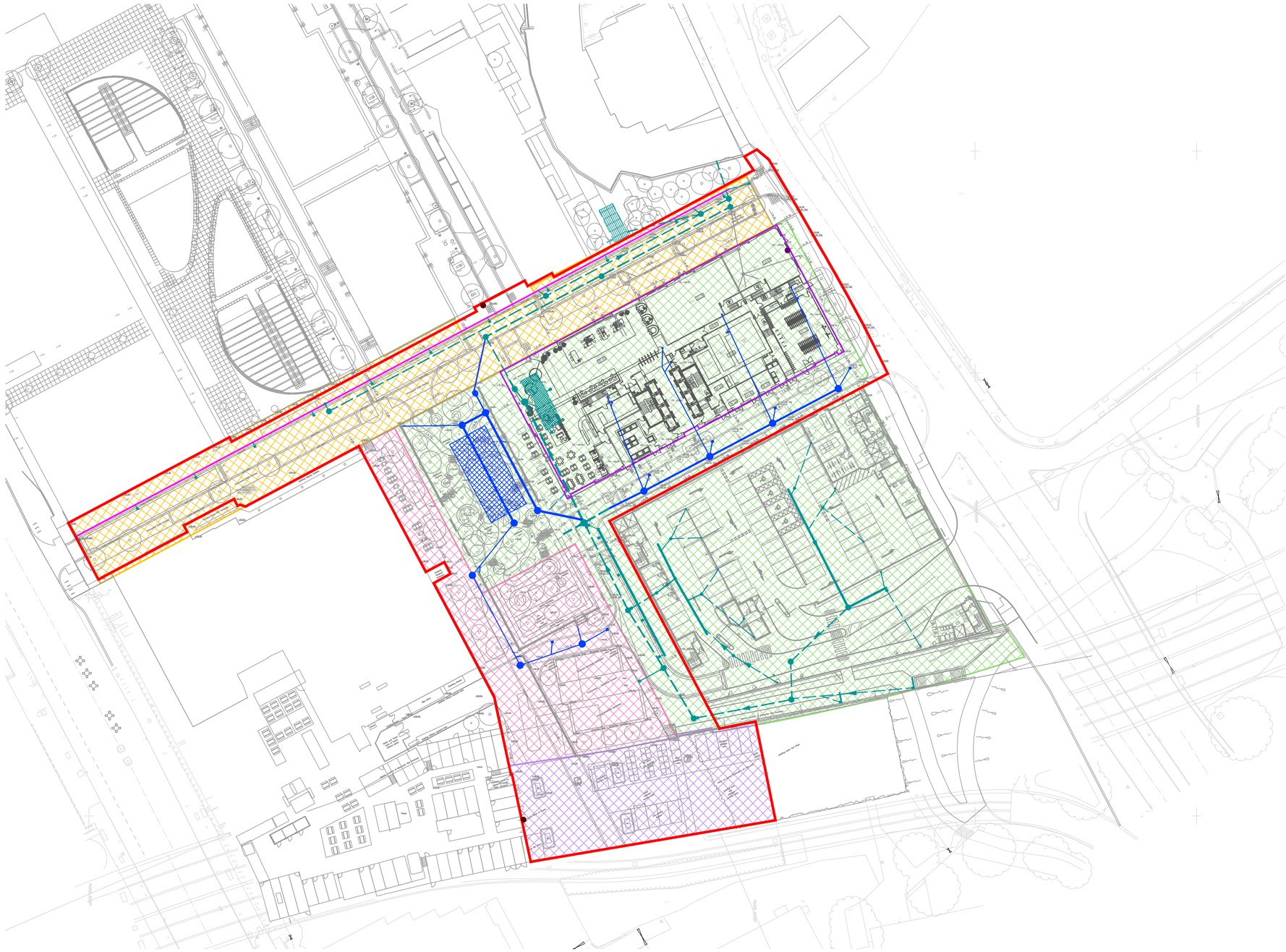
Project: N0 3 CIRCLE SQUARE

Drg Title: PROPOSED DRAINAGE STRATEGY

Drawn By	Designed By	Checked By
ATL	ATL	CG
	Date: 03.02.22	Scales @ A1: 1:500

Project No - Originator - Function - Spatial - Form - Discipline - Number	Revision
CS3 - CUR - 03 - XX - DR - C - 9200	P05

\\mafs02\Projects\080001 - 081000\080355 - Circle Square Building 3\Q4-Production\4A-Models-Drawings\C\CAD\92\



OUTFALL NOTES

THE ALLOWABLE DISCHARGE RATES HAVE BEEN AGREED WITH PLANNING BASED ON THE FOLLOWING PLANNING APPROVALS:
- (PHASE 1A) COVERS AREA A
- (PHASE 1B) COVERS AREA B
- (ENW SUBSTATION) COVERS AREA C

AREAS A,B & C DISCHARGE TO THE RIVER MEDLOCK AS SHOWN.
THE DISCHARGE RATES THAT HAVE BEEN PREVIOUSLY AGREED WITH MCC AS PART OF THE ABOVE PLANNING APPROVALS ARE TO BE RETAINED FOR THE PROPOSED WORKS.

IT SHOULD BE NOTED THAT THE 1 IN 100-YEAR DRAINAGE DESIGN SHOULD BE MODELLED WITH A 40% CLIMATE CHANGE ALLOWANCE IN LINE WITH CURRENT REQUIREMENTS. (THIS WAS 30% FOR THE PREVIOUS APPLICATIONS). AS A RESULT OF THIS, THE TOTAL VOLUME OF ATTENUATION WILL INCREASE, AND SOME AREAS ON THE EXISTING NETWORK MAY SHOW FIRST FLOOD POINTS - THESE WILL NEED TO BE DIFFERENTIATED WITH THE APPROVING AUTHORITY

AREA A

AREA IS APPROXIMATELY 0.24Ha. THE FLOW RATES BELOW ARE THE RATES ACHIEVED AND DO NOT EXCEED THE ABOVE ALLOWABLE FLOW RATES:
- 22 L/S FOR THE 1 IN 1 YEAR EVENT
- 23 L/S FOR THE 1 IN 30 YEAR EVENT
- 67 L/S FOR THE 1 IN 100 YEAR EVENT (INCLUDING 30% ALLOWANCE FOR CLIMATE CHANGE)

AREA B

AREA IS APPROXIMATELY 0.99 Ha.THE ALLOWABLE MAXIMUM FLOW RATES FOR THE PLOT SITE ARE APPROXIMATELY:
- 25 l/s FOR THE 1 IN 1 YEAR EVENT
- 58 l/s FOR THE 1 IN 30 YEAR EVENT
- • 73 l/s FOR THE 1 IN 100 YEAR EVENT (CURRENT PROPOSAL INCLUDES A 40% ALLOWANCE FOR CLIMATE CHANGE).

AREA C

THE PROPOSED SITE AREA IS APPROXIMATELY 0.28 HA,WHICH INCLUDING A PORTION OF AREA B. THE ADDITIONAL DRAINAGE AREA IS APPROXIMATELY 0.13 Ha
THIS DRAINAGE FORMED AN ADDITIONAL AREA TO THE PHASE 1B DRAINAGE, BUT THE ALLOWABLE DISCHARGE RATES FOR AREA B ARE STILL CURRENT.

AREA D

THE PROPOSED SITE AREA IS APPROXIMATELY 0.86 HA, AND HAS NOT BEEN CONSIDERED WITHIN ANY PREVIOUS APPLICATIONS.

THIS AREA IS SITUATED UNDER THE MANCUNIAN WAY OVERPASS, AND IT IS ASSUMED AT THIS STAGE THAT THE EXISTING DRAINAGE IS TO BE RETAINED.

THEREFORE, THIS AREA HAS BEEN OMITTED FROM CALCULATIONS AT THIS STAGE.

THIS IS SUBJECT TO CONFIRMATION OF THE EXISTING DRAINAGE.

KEY:

- PLANNING BOUNDARY TAKEN FROM LANDSCAPE ARCHITECTS PLAN 1502a-PLA-XX-XX-DR-L-0002
- PROPOSED BUILDING FOOTPRINT
- PROPOSED SURFACE WATER DRAINAGE
- CONSTRUCTED SURFACE WATER DRAINAGE FROM PREVIOUS PHASES
- PRE-DEVELOPMENT DRAINAGE (ASSUMED ABANDONED)

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF DESIGN.
3. ALL EXISTING SEWERS, CONNECTIONS, PIPE SIZES AND INVERT LEVELS TO BE CONFIRMED BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS TO ENSURE CONNECTIVITY. ANY VARIANCE FROM THE INFORMATION SHOWN SHOULD BE REPORTED TO THE ENGINEER FOR REVIEW.
4. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
5. ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.
6. WHERE EXISTING DRAINAGE IS BEING USED, ALLOWANCES SHOULD BE MADE TO REMEDIATE THIS DRAINAGE IN LINE WITH AVAILABLE CCTV SURVEY INFORMATION. IF NO SURVEY IS AVAILABLE, IT IS ADVISED TO OBTAIN ONE PRIOR TO COMMENCEMENT OF WORKS.
7. ALL EXISTING SERVICES TO BE LOCATED PRIOR TO COMMENCEMENT OF ANY DRAINAGE WORKS, AND WHERE NECESSARY PROTECTION OR DIVERSIONS TO BE UNDERTAKEN TO AVOID CONFLICT WITH THE PROPOSED WORK.
8. ALL RAINWATER AND FOUL POP UPS LOCATIONS ARE INDICATIVE ONLY AND TO BE CONFIRMED BY THE ARCHITECT AND M&E ENGINEER.
9. GREASE TRAPS SHOULD BE PROVIDED ABOVE GROUND WITHIN AN ENZYME TREATMENT SYSTEM, BY APPROPRIATE SPECIALIST DESIGNER. WHERE A BELOW GROUND GREASE TREATMENT SYSTEM IS REQUIRED. IT IS TO BE CONFIRMED AS TO WHETHER A GREAE TRAP IS REQUIRED.
10. THE DESIGN IS BASED ON A GRAVITY RAINWATER SYSTEM. IF A SIPHONIC SYSTEM IS PROPOSED, THIS WILL REQUIRE CHNAGES TO THE DRAINAGE DESIGN. A BREAKDOWN OF INFORMATION REQUIRED WILL BE SUPPLIED IN THIS CASE.
11. .OUTFALL CONNECTION(S) SUBJECT TO AGREEMENT WITH THE APPROVING AUTHORITY.

REFER TO DRAWING 080355-CUR-XX-XX-DR-C-92000 FOR PROPOSED DRAINAGE LAYOUT

DRAWING BASED ON:

ARCHITECT'S LAYOUTS
0256-CS3-BAR-03-00-DR-A-05-0120-WIP
0256-CS3-BAR-03-ZZ-DR-A-05-0122-WIP
0256-CS3-BAR-03-MZ-DR-A-05-0121-WIP
0256-CS3-BAR-03-14-DR-A-05-0123-WIP

LANDSCAPE ARCHITECT'S LAYOUT
1502a-PLA-XX-XX-DR-L-0001
1502a-PLA-XX-XX-DR-L-0002

PHASE 1A DRAINAGE LAYOUT
MA1347-70-00-01 C11

PLOT 14 DRAINAGE LAYOUT
064428-CUR-FS-XX-DR-C-92500 F01
TOPOGRAPHICAL SURVEY
15E146/004 BY SURVEY OPERATIONS RECEIVED AUGUST 2015

Rev:	Description:	Date:	By:	Chkd:
P01	STAGE 2 ISSUE	03.02.22	ATL	CG

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Status: STAGE 2

Project: N0 3 CIRCLE SQUARE

Drg Title: PROPOSED CATCHMENT AREAS

Drawn By	Designed By	Checked By
ATL	ATL	CG
	Date: 03.02.22	Scales @ A1: 1:500

Project No - Originator - Function - Spatial - Form - Discipline - Number	Revision
CS3 - CUR - 03 - XX - DR - C - 9201	P01

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