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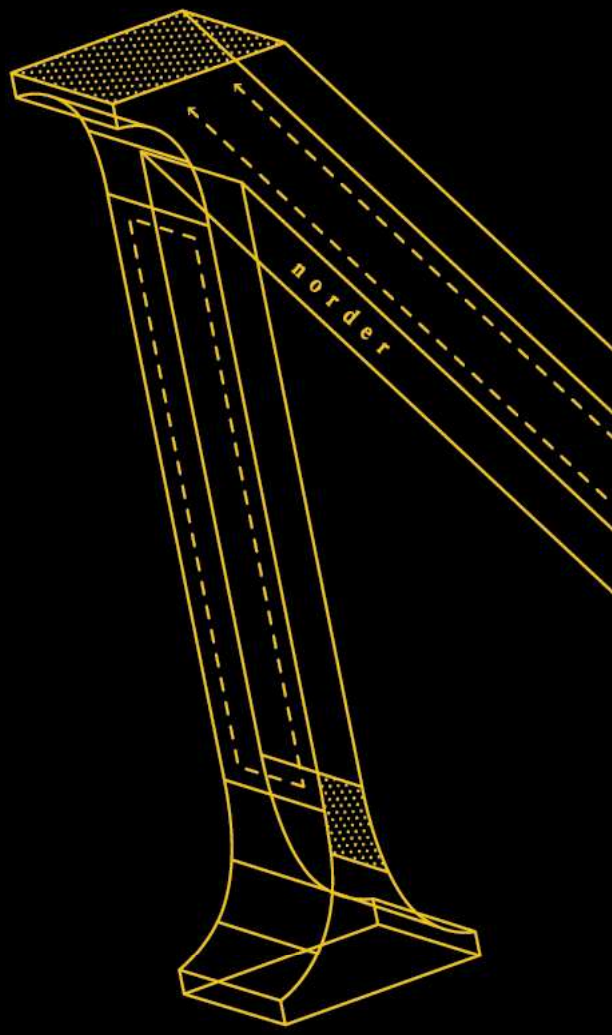
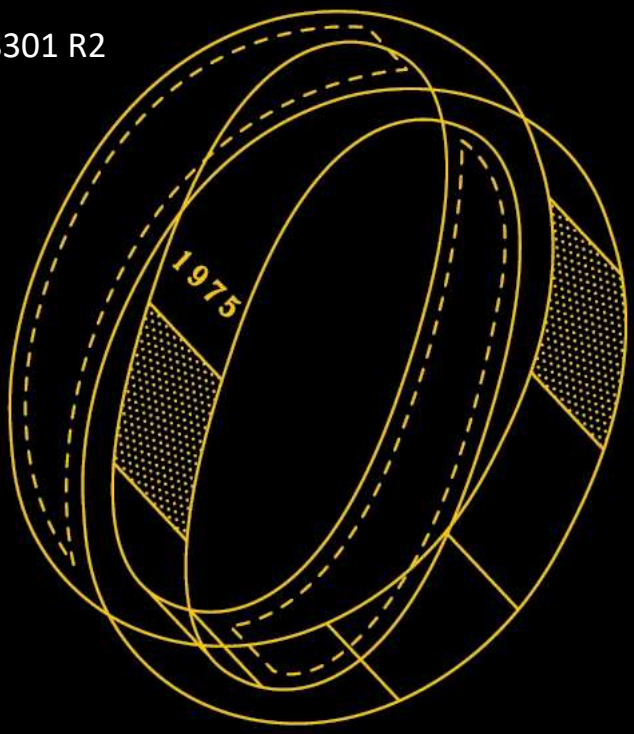
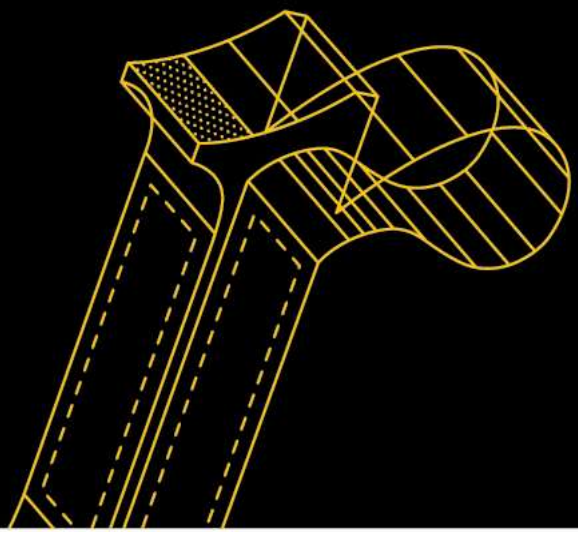


Client:	Heineken
Project Title:	Finished Goods Warehouse Heineken, Manchester
Document Title:	Flood Risk Assessment and Drainage Design Report
Document No.:	8901-NDA-XX-XX-RP-D-8301 R2





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Document Control

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Project Title:	Finished Goods Warehouse				
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Date	Revision	Prepared by	Signature	Checked By	Signature
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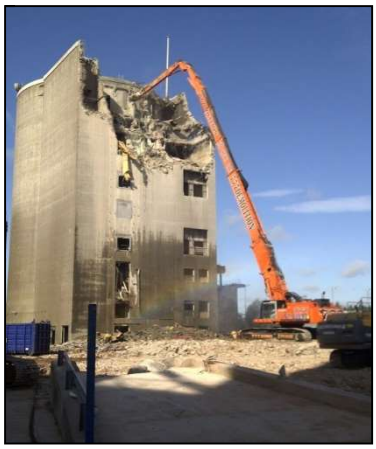


Appendix A – Site Location Plan

Appendix B – Existing Topographical Survey

Appendix C – Proposed Development Layout

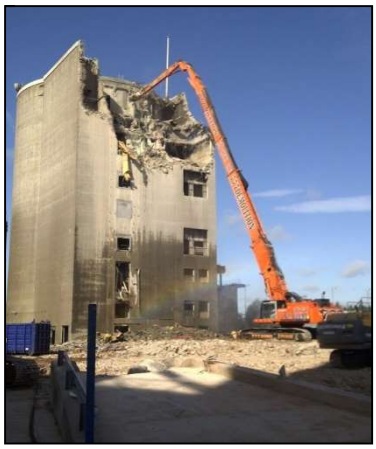
Appendix D – Flood Mapping Information

Appendix E – Sewer and Drainage Records

Appendix F – Emcus Letter Regarding Infiltration

Appendix G – Micro Drainage Print Outs

Appendix H – Drainage Drawings



1 Introduction

This Flood Risk Assessment (FRA) has been produced in accordance with the 2021 National Planning Policy Framework (NPPF) and the associated Technical Guidance (TG), both contained within the 2021 Planning Practice Guidance (PPG).

The FRA has been produced on behalf of Heineken in respect of the proposed new Finished Goods Warehouse at their existing site in Manchester. The building is intended to be a temporary structure.

The comments and opinions contained in this report, including the conclusions and recommendations, are based on the following information:

(i) Existing OS plans.
(ii) Topographical survey of existing levels.
(iii) Government and Environment Agency flood mapping.
(iv) United Utilities sewer record plans.

This report is prepared solely for the use of Heineken and their advisers.

2 Site Information

2.1 Existing Site

The proposed development is located within the existing Heineken Brewery site off Denmark Road, Manchester, M15 6LD. Grid reference 383945 E, 396176 N. A site location plan is attached under Appendix A.

The Heineken brewery is bound by Princess Road to the west with a supermarket and retail park beyond. To the north, the site is bound by Greenheys Lane with a residential area beyond. Charles Halle Road and Denmark Road run adjacent to the eastern boundary with residential housing beyond, along with a primary school and commercial unit. To the south the site is bound by Moss Lane East, with a number of churches and social clubs and commercial units beyond.

The Bridgewater Canal runs approximately 1.75Km to the north west of the site and the River Irwell runs approximately 1.85Km to the north west of the site.

Both vehicular and pedestrian access can be taken into the site via Denmark Road.

The Heineken site is approximately 7.5Ha in area and accommodates the main factory and production buildings along with the main office building. The remainder of the site is used as car parking, lorry parking and storage. The site is covered in impermeable surfacing, being a mixture of concrete and asphalt pavements, with the exception of a relatively small area of landscaping at the site entrance and to some boundaries.

The proposed Finished Goods Warehouse occupies an area of approximately 2655m^2 and is located to the north side of the main Heineken building. The area is currently occupied by a lorry yard which is positively drained to the surface water drainage network. The existing levels in the proposed development area have a general fall from the north, having an approximate level of 33.50m AOD, to the south having a level of approximately 33.30m AOD.

An existing topographical survey plan showing development areas and existing ground levels, is attached under **Appendix B**.

2.2 Proposed Development

The proposed development consists of a new single storey Finished Goods Warehouse building, occupying an area of 2,655m^2. The building is intended to be a temporary structure. The access road and yard areas are to remain in-situ and both vehicular and pedestrian access to the site will continue to be taken from Denmark Road. Both vehicle and pedestrian movements around the site will remain as present.

The development will remain as fully impermeable surfacing. Proposed site layout plans are attached under **Appendix C**.

2.3 Flood Zone Classification

Flood mapping for Rivers and Seas has been obtained from the Environment Agency website and a copy of the Flood Map is attached under **Appendix D**.

The Environment Agency Flood Map for Planning shows that the majority of the proposed development area is located within Flood Zone 3 which has an annual probability of flooding from rivers of 1 in 100 or greater (1% or greater). The south west corner of the proposed development area is located within Flood Zone 2 which has an annual probability of flooding from rivers of between 1 in 100 and 1 in 1000 (0.1% and 1.0%).

There are no allocated flood storage areas within the vicinity of the site area.

Product 4 data has also been supplied by the Environment Agency and this confirms the above flood zones.

The proposed Finished Goods Warehouse is classed as general industry and would therefore be classed as a Less Vulnerable development in accordance with Table 2 : Flood Risk Vulnerability Classification, of the PPG, associated with the NPPF. Table 3 : Flood Risk Vulnerability and Flood Zone Compatibility, of the PPG, associated with the NPPF shows that, an exceptions test is not required for a less vulnerable classification Flood Zone 3a and therefore the proposed development is appropriate within Flood Zone 3a.

3 Possible Sources of Flooding

3.1 Fluvial (Rivers)

Fluvial sources of flooding include the inundation of floodplains from rivers and watercourses, inundation of areas outside the floodplain due to the influence of bridges, embankments and other features which artificially raise water levels, overtopping or breaching of defences, blockages of culverts, flood channels or flood corridors.

The Bridgewater Canal runs approximately 1.75Km to the north west of the site and the River Irwell runs approximately 1,85Km to the north west of the site.

The Environment Agency Flood Map for Planning shows that the majority of the proposed development area is located within Flood Zone 3 which has an annual probability of flooding from rivers of 1 in 100 or greater (1% or greater). The south west corner of the proposed development area is located within Flood Zone 2 which has an annual probability of flooding from rivers of between 1 in 100 and 1 in 1000 (0.1% and 1.0%). There are no allocated flood storage areas within the vicinity of the site area.

Product 4 data has also been supplied by the Environment Agency and this confirms the above flood zones. This data also provides modelled data in the vicinity of the Heineken site, where node location 3 sits closest to the development area. Node 3 shows a flood level of 33.47m AOD for a 1 in 100 year storm event, a flood level of 33.75m AOD for a 1 in 100 year storm event plus 30% climate change and a flood level of 33.79m AOD for a 1 in 100 year storm event plus 35% climate change.

The proposed Finished Goods Warehouse has a finished floor level of 33.55m AOD, to match the adjacent main factory building to facilitate forklift movements between the two buildings. The finished floor level is therefore slightly higher that the modelled 1 in 100 year flood level of 33.47mAOD, indicating that the warehouse will not flood in this storm event.

The warehouse is however considered to be at risk of flooding from an event greater than 1%. As such, it is recommended that flood resilient measures are incorporated into the detailed design process. Refer to Section 4 for floor resilient measure options.

The Finished Goods Warehouse will replace existing concrete service yard and the proposals provide a low percentage amendment to the current site arrangement and it is considered that this will have a negligible effect on the site and surrounding areas, during a flood event.

A copy of the Flood Mapping and Environment Agency correspondence is attached under **Appendix D**.

3.2 Tidal

The area and associated Rivers are not subject to tidal events.

3.3 Surface Water

Flooding from surface water can include sheet run off from adjacent land and surcharged sewers being combined, foul or surface water sewers.

The Government long term flood risk information shows that the whole of the development is located within an area having a low to medium risk of flooding due to surface water. A low risk of flooding means that it has a chance of flooding of between 0.1% and 1% each year and a medium risk of flooding means that it has a chance of flooding between 1% and 3.33% each year. The medium risk areas match the drainage gully lines serving the current lorry yard.

It is noted that the government website providing this information states that it is difficult to predict flooding from surface water as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding.

The Finished Goods Warehouse will replace existing positively drained concrete service yard and the proposals will have a negligible effect on the site and surrounding areas due to risk of flooding from surface water.

The development area is considered to be at a potential risk of flooding from surface water of between 1% and 3.3%, however, the Finished Goods Warehouse is considered as a less vulnerable development and as such, it is recommended that flood resilient measures are incorporated into the detailed design process. Refer to Section 4 for floor resilient measure options.

A copy of the long term flood risk information is attached under **Appendix D**.

3.4 Ground Water

Flooding from groundwater can include the water table rising above ground level after prolonged rainfall, remote from a watercourse, low lying areas underlain by permeable rock (aquifers), seepage directly into properties, and groundwater recovery after pumping has ceased from mining or industry.

There is no evidence of groundwater issues on the site.

3.5 Infrastructure Failure

Flooding from the failure of reservoirs, canals, industrial processes, burst water mains, blocked sewers or failed pumping stations.

United Utilities sewer records show a 2450mm brick combined sewer and a 750mm by 1020mm brick combined sewer run in a westerly direction within the carriageway of Moss Lane East. These sewers are shown to have a depth to invert of approximately 8m and 3.5m respectively.

A 620mm by 860mm brick culvert combined sewer runs in a southerly direction within Princess Road. The sewer records do not provide a depth for the sewer. The sewer connects onto the 2450mm combined sewer indicated above to continue to run in a westerly direction away from the site. A 610mm by 930mm combined sewer runs in a southerly direction within the site and under the site service road to the south. This sewer is shown to have a depth to invert of approximately 3m and runs into the 750mm by 1020mm brick combined sewer indicated above. This sewer also serves the adjacent residential development located to the east of the site.

A 680mm brick combined sewer, shown to increase to a 620mm by 770mm sewer, runs in a northerly direction within the carriageway of Denmark Road, commencing at the site entrance. This sewer is shown to have a depth to invert of approximately 2.25m. This sewer is shown to have a 750mm combined spur running into the site which stops at a dead end.

A 300mm diameter, 560mm by 710mm, and 600mm diameter combined sewers run into the site from the Police Station to its eastern boundary. These sewers are shown to connect to each other and run in a westerly direction, but are shown to end within the site boundary. A 1805mm by 3300mm surface water sewer is shown to run in a southerly direction adjacent to the western side of Denmark Road. The sewer is shown to have a depth to invert of approximately 4m and is shown to end at the site entrance.

As these drainage systems are adopted and owned by United Utilities, it is considered that these systems are likely to be adequately maintained and monitored.

A copy of the sewer records are attached under **Appendix E**.

Two surface water drains, commencing as 150mm diameter and increasing to 300mm diameter, run in an easterly direction within the existing lorry yard picking up the yard drainage. These two systems connect together to run in a southerly direction down the eastern side of the site, then run west to connect onto the United Utilities combined sewer network. These two surface water drains will need to be diverted around the proposed Finished Good Warehouse.

As these private drainage systems are owned and maintained by the brewery as part of their site management system, they are considered to be adequately maintained.

As such, the site is considered not to be at significant risk from infrastructure failure or flooding from existing sewers.

The Government flood mapping for reservoirs shows that the whole site will potentially be affected due to the failure of reservoirs when river levels are normal. It is noted by the Environment Agency that the failure of a reservoir is very unlikely and

that the maps provided reflect a credible worst case scenario for the purposes of emergency planning.

It is therefore recommended that a Flood Emergency Plan is produced for this scenario. Refer to Section 4 for flood resilient measure options.

A copy of the Government flood mapping for reservoirs is attached under **Appendix E**.

3.6 Development Drainage

An increase in formally drained impermeable area could increase flood risk to a wider catchment.

The existing development area which is to accommodate the proposed Finished Goods Warehouse is covered by impermeable concrete surfacing, which is formally drained and discharged into the surrounding site drainage network. Therefore there is no increase in formally drained impermeable area and no increase in flood risk to a wider catchment.

The surface water discharging from the Finished Goods Warehouse will need to be designed in accordance with the NPPF Non-statutory Technical Standards for sustainable drainage systems.

4 Flood Resilience Measures

The provision of flood resilience measures are recommended to be considered in the design and implementation of the Finished Goods Warehouse, along with the production of an emergency plan to facilitate the safe movement of personnel should flooding occur due to the risk of flooding from rivers and the failure of a reservoir.

Flood resilience measures would include:

i) Production and implementation of a Flood Emergency Plan in the event of flooding from rivers.

ii) Production and implementation of a Flood Emergency Plan in the event of flooding from reservoirs.

iii) Sockets, meters and other electrical items to be installed at a height of 1.2m above FFL.

iv) Flooring material to be considered, with use of concrete and tiling, sacrificial flooring, or similar, to allow easier cleaning and return to use.

v) Consideration for internal wall units, furniture etc to be provided in water resistant materials or as sacrificial items.

vi) Flood barrier provision independent or integral, at effected doorways.

5 SW Drainage Design

5.1 Drainage Hierarchy and Principles

The NPPF Non-statutory Technical Standards for sustainable drainage systems, and Part H of the Building Regulations, requires the following order of priority to be considered when designing the surface water drainage for a development :

a) an adequate soakaway or some other adequate infiltration system, or where that is not reasonably practicable,
b) a watercourse, or where that is not reasonably practicable,
c) a surface water sewer, highway drain or another drainage system,
d) a combined sewer.

Discharging Via Infiltration

A Geotechnical and Geo Environmental Investigation Report, reference MJH/J1834/D3/1 and dated November 2019, has been produced by Emcus. The report shows that the site consists of made ground, underlain by clay.

Emcus have subsequently produced a letter reference J1834_LTR_03, confirming that the cohesive natural strata predominantly encountered immediately beneath the site will not be sufficiently permeable to receive water from soakaways. In addition, it is recommended that water from soakaways, permeable pavements etc, is not discharged into the made ground beneath the site.

On this basis, discharge of surface water via infiltration is not considered a viable option for the discharge of the surface water. A copy of the Emcus letter is attached under **Appendix F**.

Discharge to Watercourse

There are no watercourses within the vicinity of the site boundary therefore this is not considered a viable option for the discharge of surface water.

Discharge to Sewer

Due to the surface water discharge from the site not being feasible via infiltration or to a watercourse, it is proposed to discharge the surface water into the existing site surface water drainage system, running in the vicinity of the proposed warehouse, which ultimately discharges into the United Utilities combined sewer network.

5.2 Potential for Sustainable Drainage Systems

A review of the potential SuDs techniques and applications within the proposed development has been undertaken to determine whether each technique could be viable for the site. The items considered potentially viable for the site are shaded green.

Green Roof	The building has a pitched roof and is therefore not suitable for a green roof solution.
Infiltration systems	Infiltration is not feasible due to the site being underlain by clay.
Proprietary Treatment Systems	There are no new proposed access road or car parking areas being constructed on the site.
Filter Strips, Filter Drains and Swales	There is minimal space available on the site to incorporate this feature.
Bio-Retention Systems and Trees	There is limited space to deliver a suitable system and along with high maintenance costs this system is not favourable.
Pervious pavements	There are no new proposed access road or car parking areas being constructed on the site.
Attenuation Storage Tanks	Attenuation storage can be provided under the existing service yard area

Detention Basins	There is insufficient space available on the site to incorporate this feature.
Ponds and Wetlands	There is insufficient space available on the site to incorporate this feature.

5.3 Drainage Design Criteria

The DEFRA Non-statutory Technical Standards for sustainable drainage systems, in conjunction with the NPPF, requires that for developments that were previously developed, the peak run off rate from the development for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should be as close as reasonably practical to the green field runoff for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

The site is located within the Conurbation Core Critical Drainage Area and any development within this area is identified in the Manchester Trafford and Salford Strategic Flood Risk Assessment as requiring a reduction in surface water run off, of at least 50% compared to existing rates.

The area of the Finished Goods Warehouse is 2,655m^2 in area, all of which is located over an existing impermeable concrete service yard. The Finished Goods Warehouse is a temporary building.

The greenfield discharge from the Finished Goods Warehouse area has been calculated using the Micro Drainage Rural Runoff Calculator. The discharge from a 1 in 1 year storm event is calculated as 2.7 l/s and the discharge from a 1 in 100 year storm event is calculated as 4.9 l/s. Qbar is shown as 1.1 l/s rural, 3.2 l/s urban.

The site however is a brownfield site containing existing hard standing under the Finished Goods Warehouse area, measuring 2,655m^2. The discharge rate has been calculated using the Micro Drainage network design package. The discharge from a 1 in 1 year storm event is calculated as 33.2 l/s and the discharge from a 1 in 100 year storm event is calculated as 97.9 l/s.

As the development is located within the Conurbation Core Critical Drainage Area, a reduction in surface water run off, of at least 50% compared to existing rates. As the proposed Finished Goods Warehouse is a temporary structure, a 50% reduction has been applied which results in a proposed surface water discharge strategy with a discharge restricted to 16 l/s and attenuated for a 1 in 100 year storm plus a 40% allowance for climate change.

This provides 50% betterment to the 1 in 1 year discharge from the development area, and an 83% betterment to the 1 in 100 year discharge from the development area. A copy of the Micro Drainage calculations are attached under **Appendix G.**

5.4 Attenuation Volume

The surface water discharge from the proposed building extension is to be restricted to 16 l/s. The excess surface water generated by the proposed flow restriction of 5l/s is to be attenuated to accommodate a 1 in 100 year storm plus a 40% allowance for climate change.

The surface water drainage has been modelled using the Micro Drainage computer programme Network Design. The total contributing area of 2,655m^2 has been included in the model. A vortex control flow restriction has been provided to limit the flow to a maximum of 16 l/s with surface water attenuation provided in a crate tank having a storage volume of 66m^3. This has been simulated and is shown to accommodate a 1 in 100 year storm event plus 40% allowance for climate change and shows the provision is adequate to accommodate the design storm event.

A copy of the Micro Drainage calculations are attached under **Appendix G**. A copy of the Drainage Layout Drawing and Details are attached under **Appendix H**.

5.5 Flow paths and Flood Exceedance Routes

The drainage has been designed to accommodate the surface water generated from a 1 in 100 year storm plus a 40% allowance for climate change. It is unlikely that this design storm event is exceeded and the system floods under these circumstances.

If the proposed drainage facilities were to fail or their capacity exceeded, the excess surface water would flow towards the south of the yard, within the site boundary, thereby maintaining existing flow paths and flood exceedance routes. Flood exceedance routes are shown on the Drainage Layout Drawing, attached under **Appendix H.**

5.6 Off Site Works and Consents

The proposals will be re-using the existing on site drainage network which ultimately connects onto the United Utilities sewer network, therefore no off site construction works will be required.

Although there will be an overall reduction of surface water being discharged into the United Utilities sewer network via the existing connection, a S106 application is to be submitted for the proposed indirect connection onto the United Utilities sewer network.

5.7 Management and Maintenance

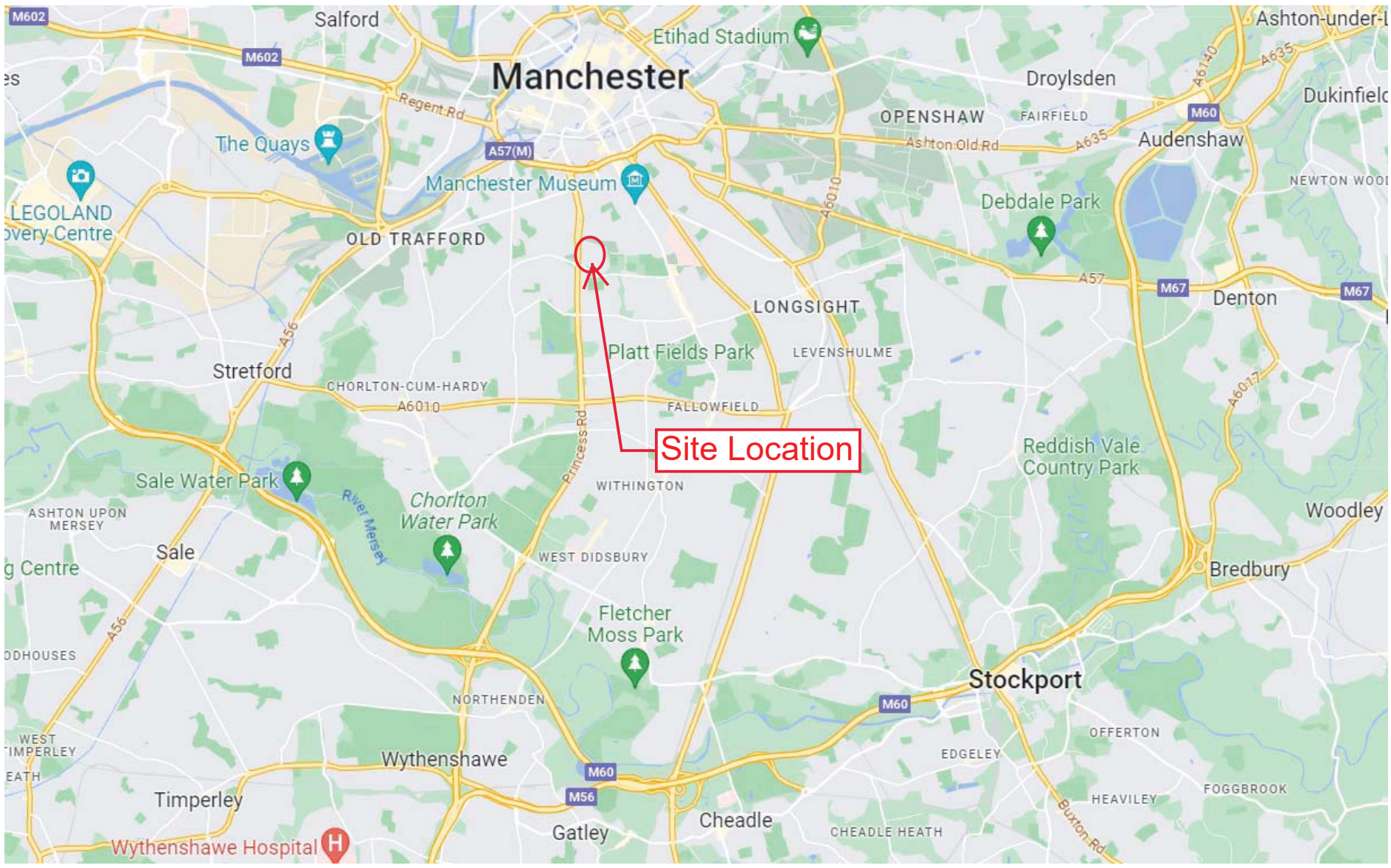
The management and maintenance regime for the drainage systems will be undertaken by the site owner/occupier under a Maintenance and Management Plan.

The Maintenance and Management Plan is provided as a separate document.

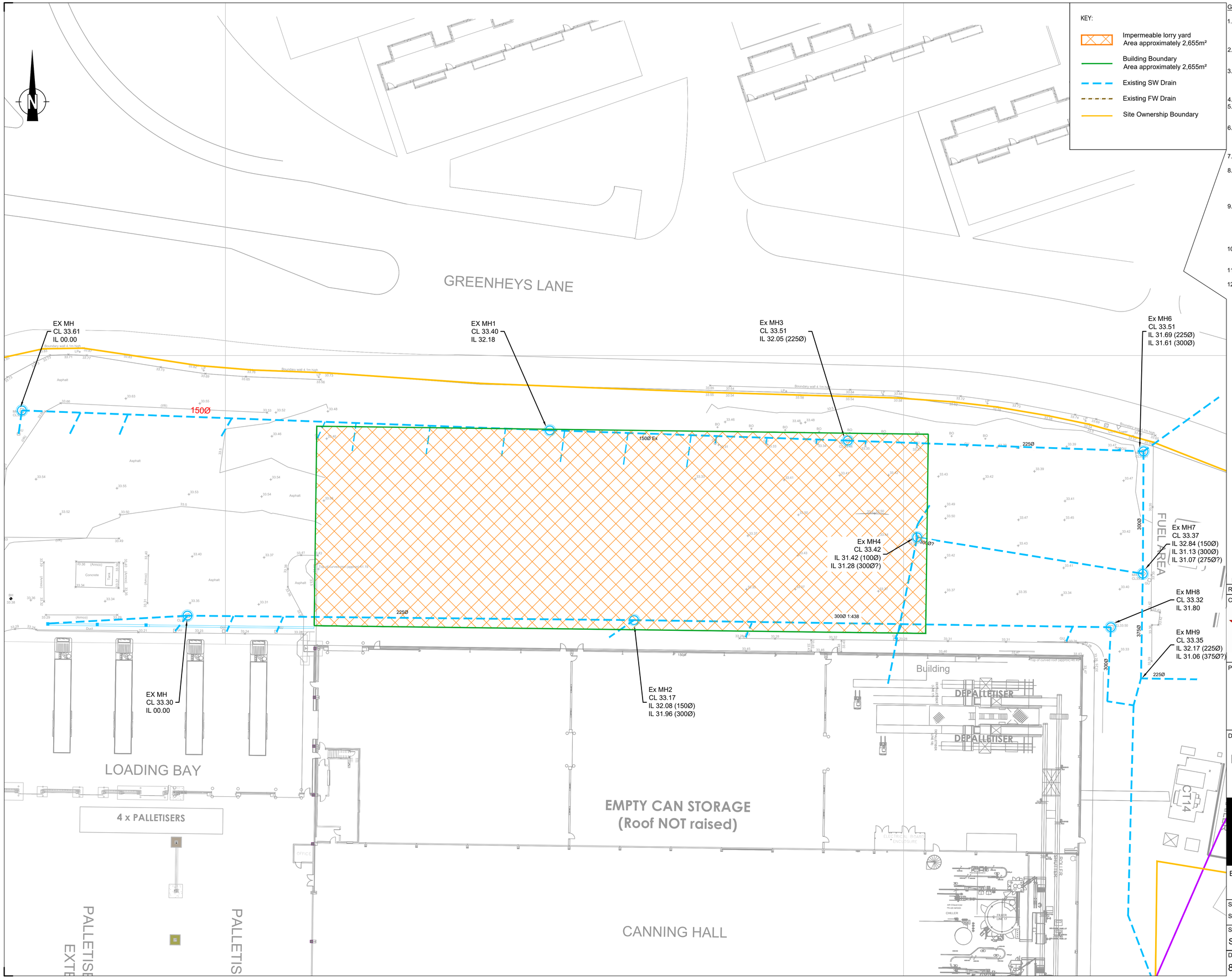
Appendix A – Site Location Plan

Finished Goods Warehouse
Heineken Brewery, Manchester

Site Location Plan



Appendix B – Existing Topographical Survey



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7. Temporary works associated with the construction of the project shall be the responsibility of the Principal Contractor.
8. Where any temporary works or scaffolding are required the Principal Contractor shall appoint a competent and suitably experienced Temporary Works Coordinator (TWC). Refer to BS 5975 for guidance on temporary works and the role of a TWC.
9. Calculations and drawings of all Contractor designed structural items associated with NDA's design responsibilities shall be submitted to the Engineer for comment at least 10 days prior to manufacture. Any comments made by NDA do not absolve the Contractor of his design responsibilities.
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11. The contractor is to work within any planning restriction including working hours, noise levels etc.
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P01	23/06/23	For information	AF	ML

CLIENT

HEINEKEN

PROJECT

Manchester Brewery
Finished Goods Warehouse

DRAWING TITLE

Existing Topographical Survey and Hard Standing Areas

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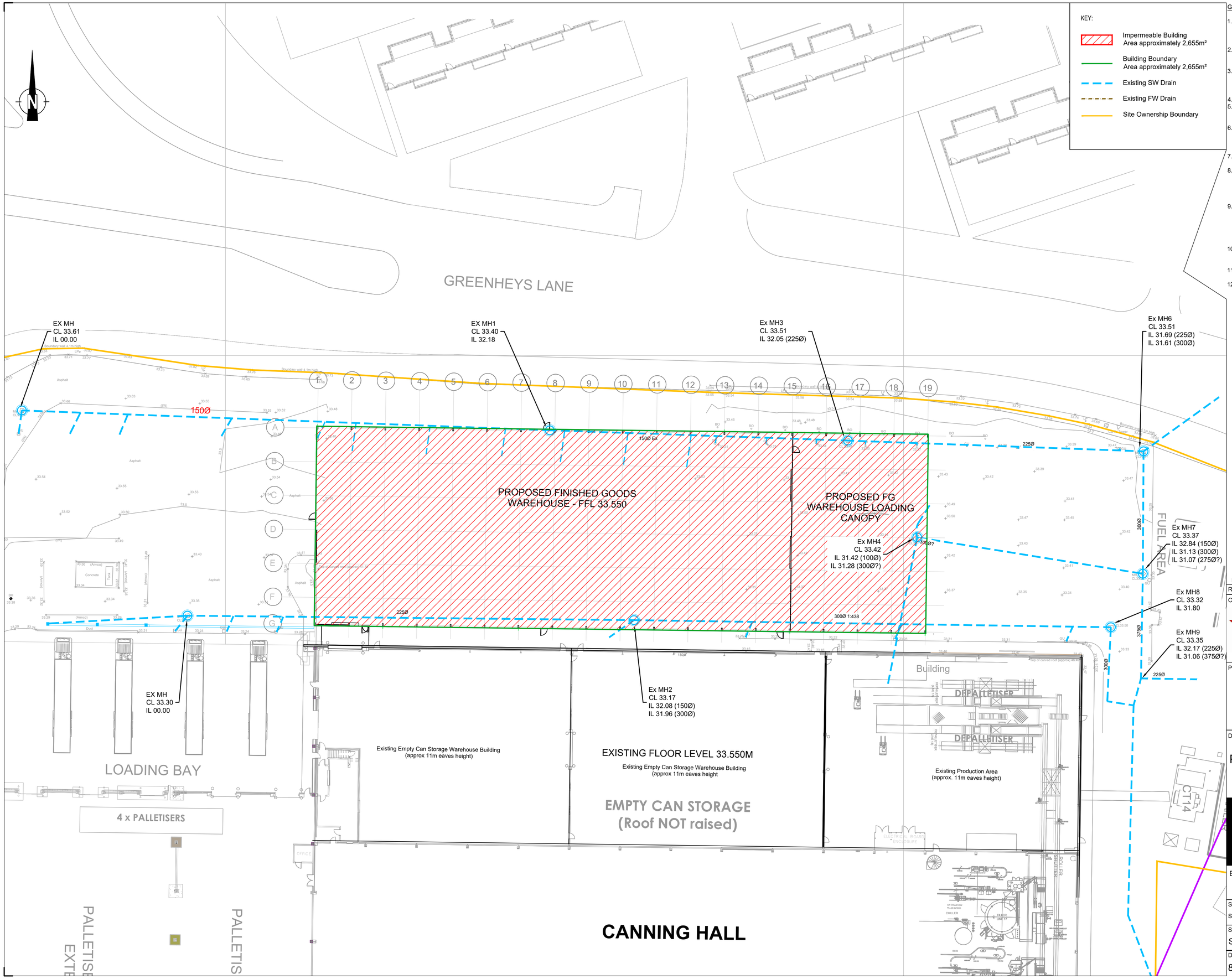
SCALE	SHEET SIZE	NDA REF
Scale 1 : 250	A1	8901

SUITABILITY

S2 - Suitable for Information

DRAWING NO.	REV
8901-NDA-XX-XX-DR-C-1011	P01

Appendix C – Proposed Development Layout



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REV	DATE	AMENDMENT	DRW	CHK
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CLIENT

HEINEKEN

PROJECT

Manchester Brewery
Finished Goods Warehouse

DRAWING TITLE

Proposed Development Layout and Hard Standing Area

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Scale 1 : 250	A1	8901

SUITABILITY

S2 - Suitable for Information

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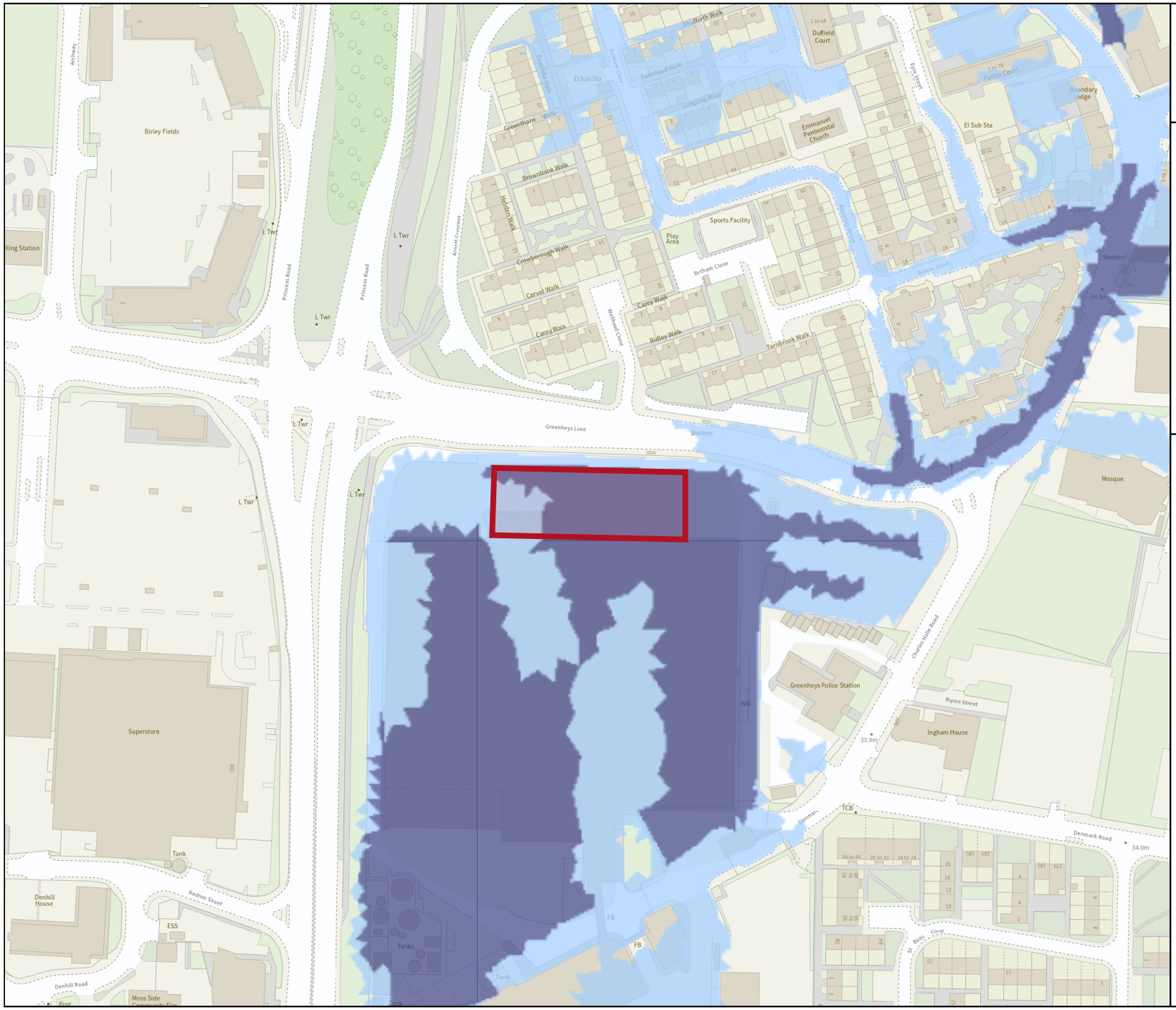
Appendix D – Flood Mapping Information



Environment Agency

Flood map for planning

Your reference
Heineken, Man

Location (easting/northing)
383957/396173

Scale
1:2500

Created
10 May 2023 9:48

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

0 20 40 60m

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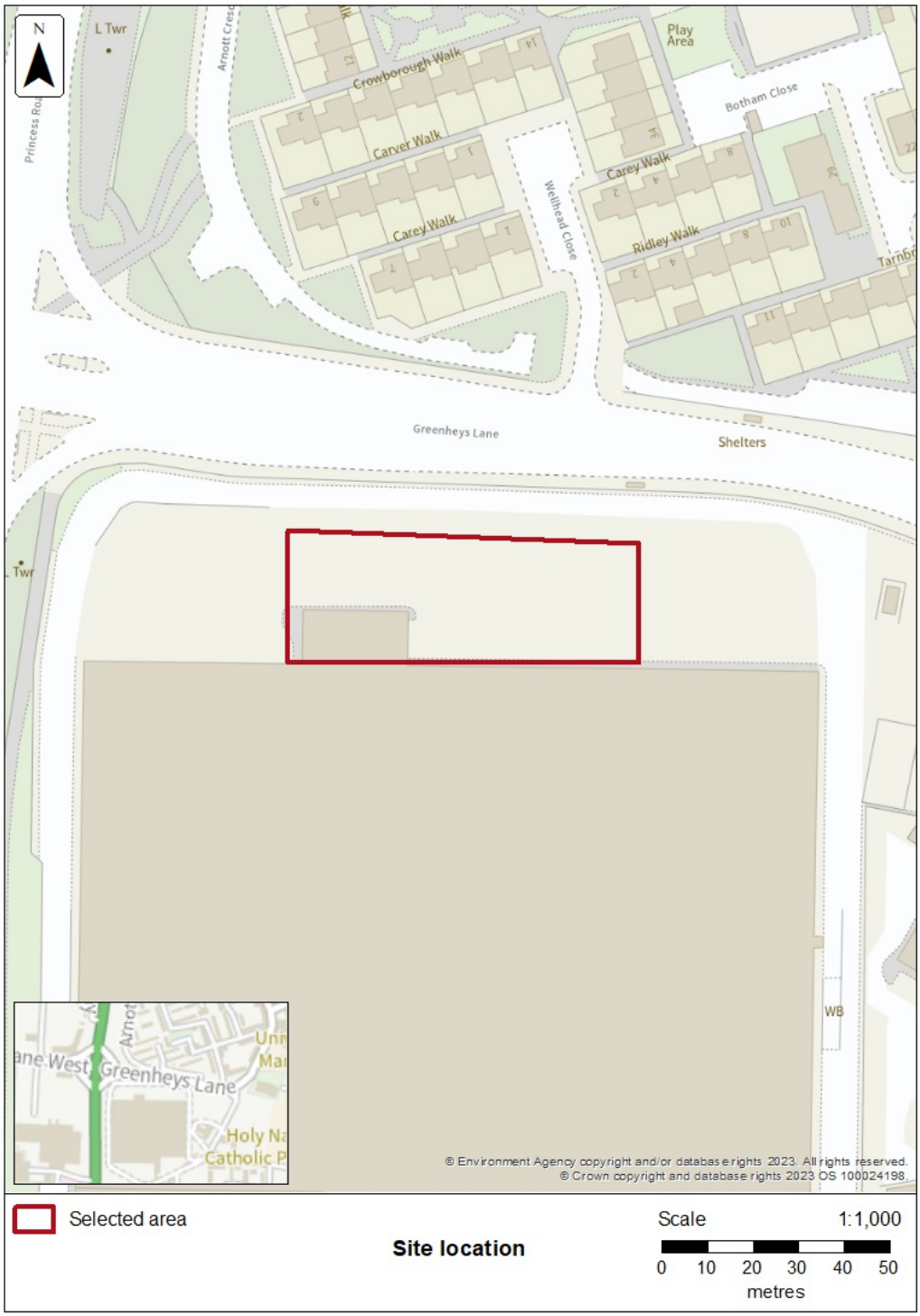
Flood risk assessment data

Location of site: 383947 / 396171 (shown as easting and northing coordinates)
Document created on: 30 August 2023
This information was previously known as a product 4.
Customer reference number: U1CDCCYUFGHP

Map showing the location that flood risk assessment data has been requested for.



How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

> **We recommend that you work with a flood risk consultant to get your flood risk assessment.**

Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- modelled data
- climate change modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Information that's unavailable

This document **does not** contain:

- historic flooding
- flood defences and attributes

We do not have historic flooding data for this location.

Please note that:

- flooding may have occurred that we do not have records for
- flooding can come from a range of different sources
- we can only supply flood risk data relating to floodng from rivers or the sea

You can contact your Lead Local Flood Authority or Internal Drainage Board to see if they

have other relevant local flood information. Please note that some areas do not have an Internal Drainage Board.

We aren't able to display flood defence locations and attributes as there are no formal flood defences in the area of interest.

Surface water and other sources of flooding

Use the long term flood risk service to find out about the risk of flooding from:

- surface water
- ordinary watercourses
- reservoirs

For information about sewer flooding, contact the relevant water company for the area.

About the models used

Model name: Corn Brook 2017
Scenario(s): No defences exist fluvial, no defences exist climate change fluvial
Date: 31 December 2017

This model contains the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occuring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 3.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

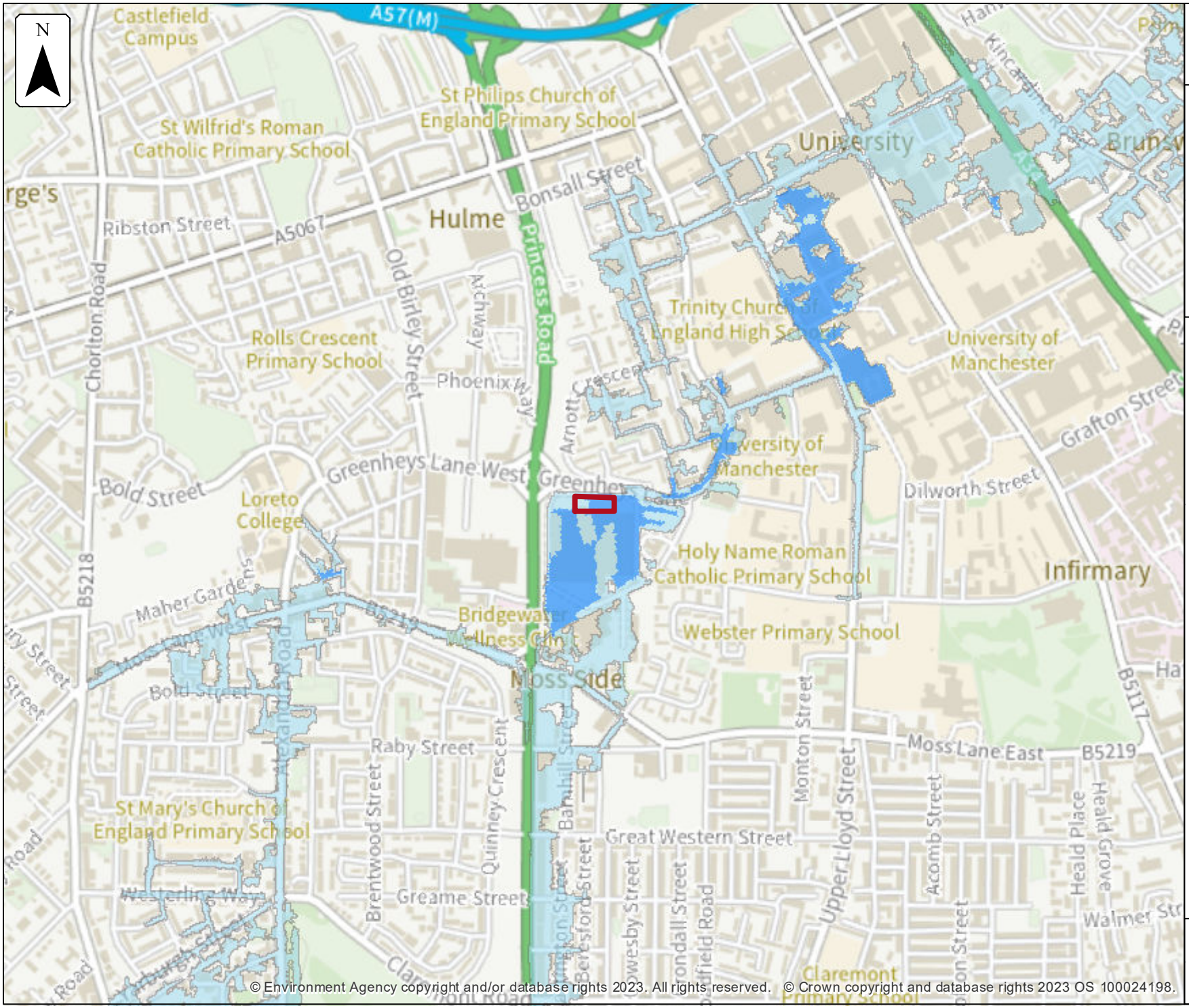
Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change

This data is updated on a quarterly basis as better data becomes available.



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Environment Agency

Flood map for planning

Location (easting/northing)
383947/396171

Scale
1:10,000

Created
30 Aug 2023

Selected area
Flood zone 3
Flood zone 2

0 100 200 300 400 500
metres

Modelled data

This section provides details of different scenarios we have modelled and includes the following (where available):

- outline maps showing the area at risk from flooding in different modelled scenarios
- modelled node point map(s) showing the points used to get the data to model the scenarios and table(s) providing details of the flood risk for different return periods
- map(s) showing the approximate water levels for the return period with the largest flood extent for a scenario and table(s) of sample points providing details of the flood risk for different return periods

Climate change

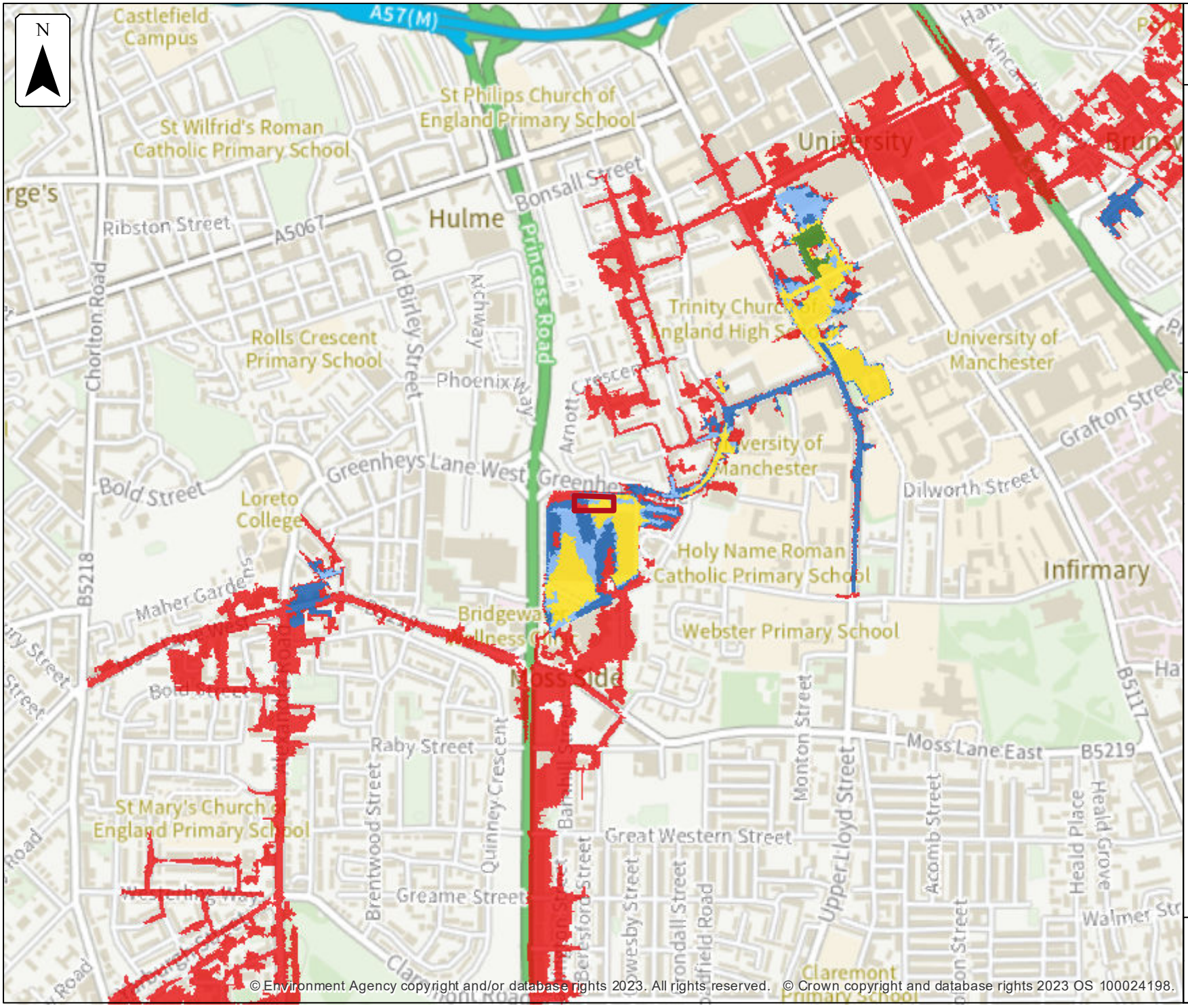
The climate change data included in the models may not include the latest flood risk assessment climate change allowances. Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

Modelled scenarios

The following scenarios are included:

- No defences exist modelled fluvial: risk of flooding from rivers where there are no flood defences
- No defences exist climate change modelled fluvial: risk of flooding from rivers where there are no flood defences, including estimated impact of climate change



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Environment Agency

No defences exist modelled fluvial extent

Location (easting/northing)
383947/396171

Scale
1:10,000

Created
30 Aug 2023

Model name
Corn Brook 2017

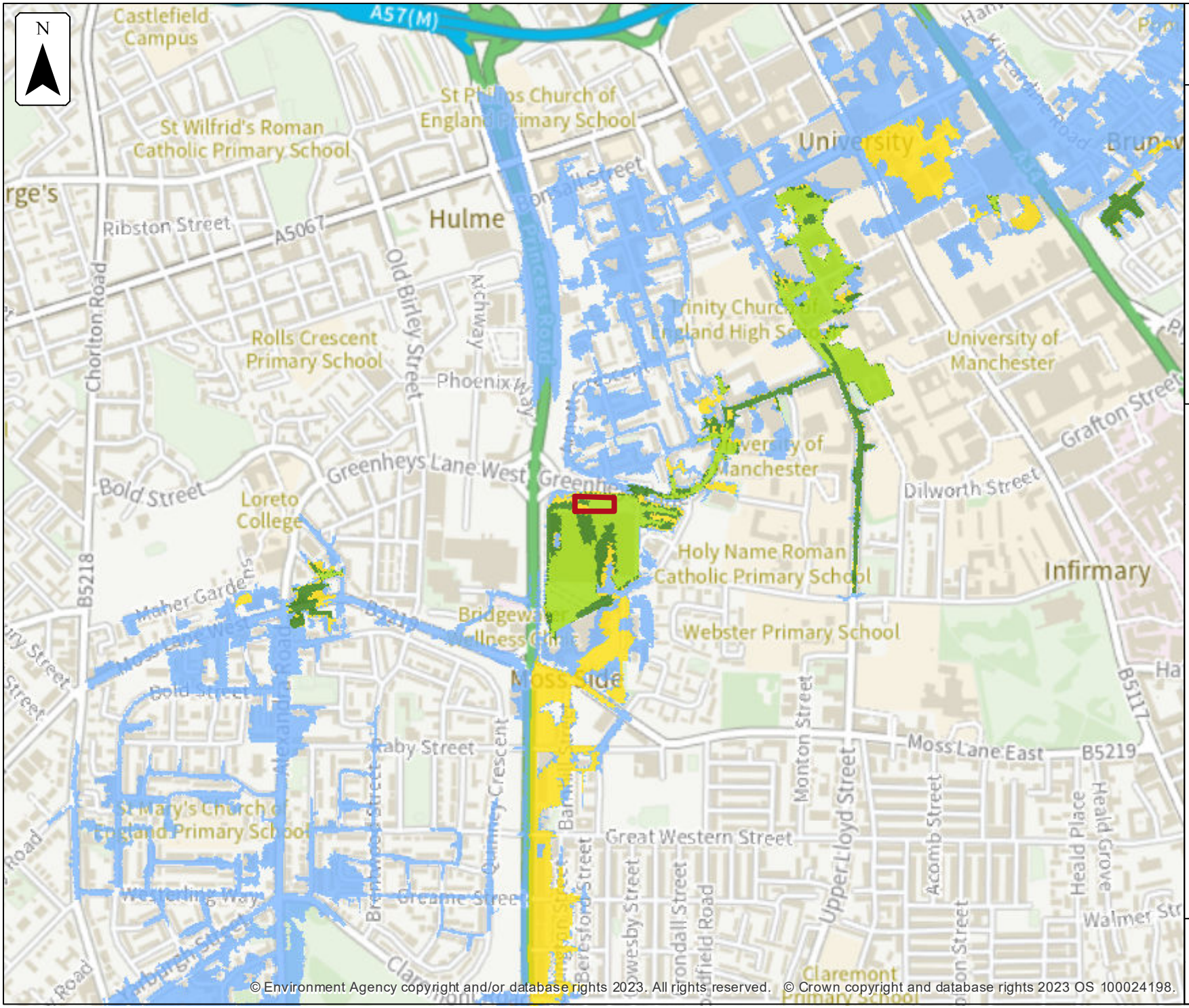
Selected area

Modelled flood extent

- 2% AEP
- 1.33% AEP
- 1% AEP
- 0.5% AEP
- 0.1% AEP

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



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Environment Agency

No defences exist climate change modelled fluvial extent

Location (easting/northing)
383947/396171

Scale
1:10,000

Created
30 Aug 2023

Model name
Corn Brook 2017

Selected area

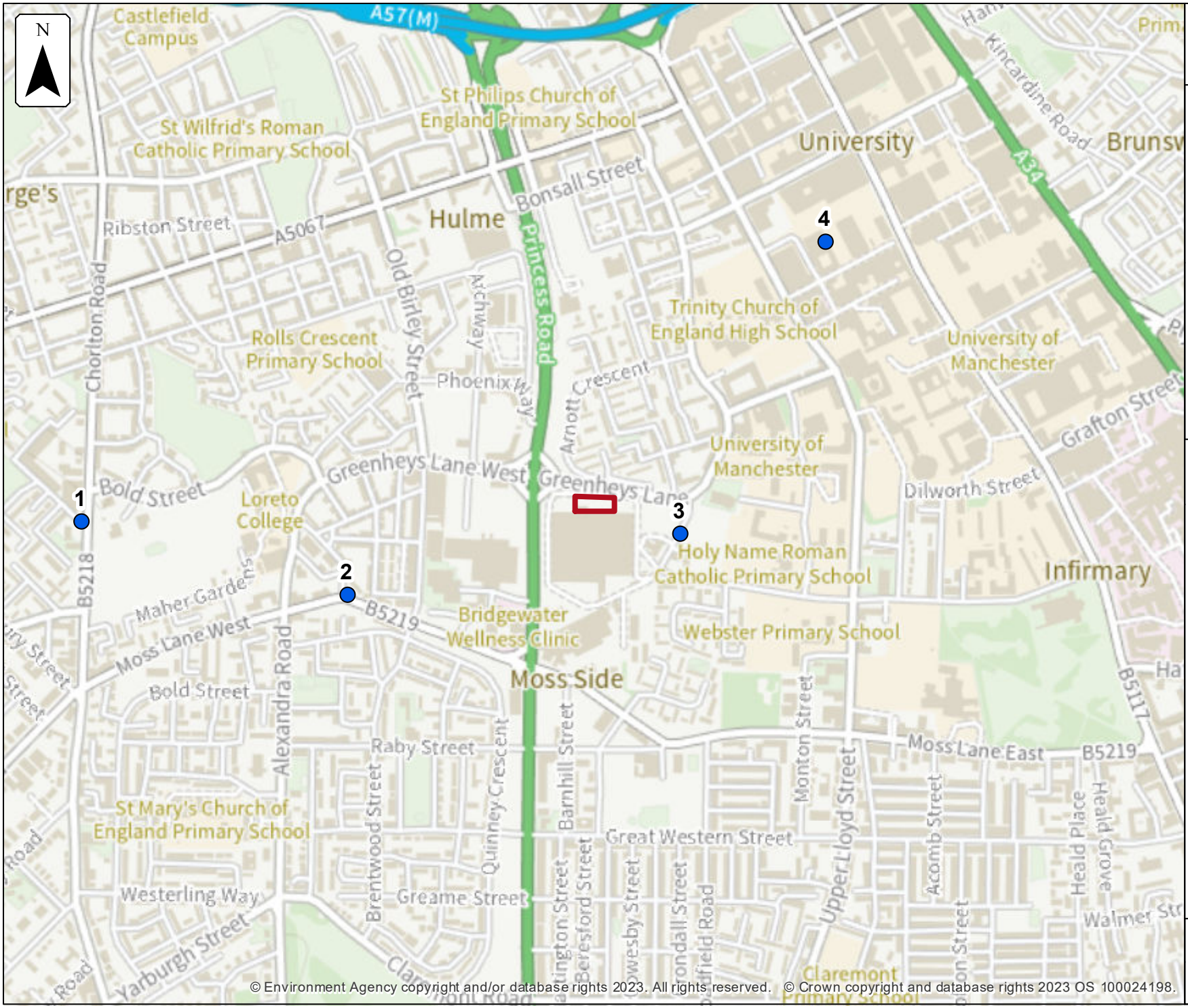
Main river

Modelled flood extent

- 1.0% AEP (+30%)
- 1.0% AEP (+35%)
- 1.0% AEP (+70%)
- 0.1% AEP (+30%)

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



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Environment Agency

No defences exist modelled fluvial node locations

Location (easting/northing)
383947/396171

Scale
1:10,000

Created
30 Aug 2023

Model name
Corn Brook 2017

Selected area

Modelled location

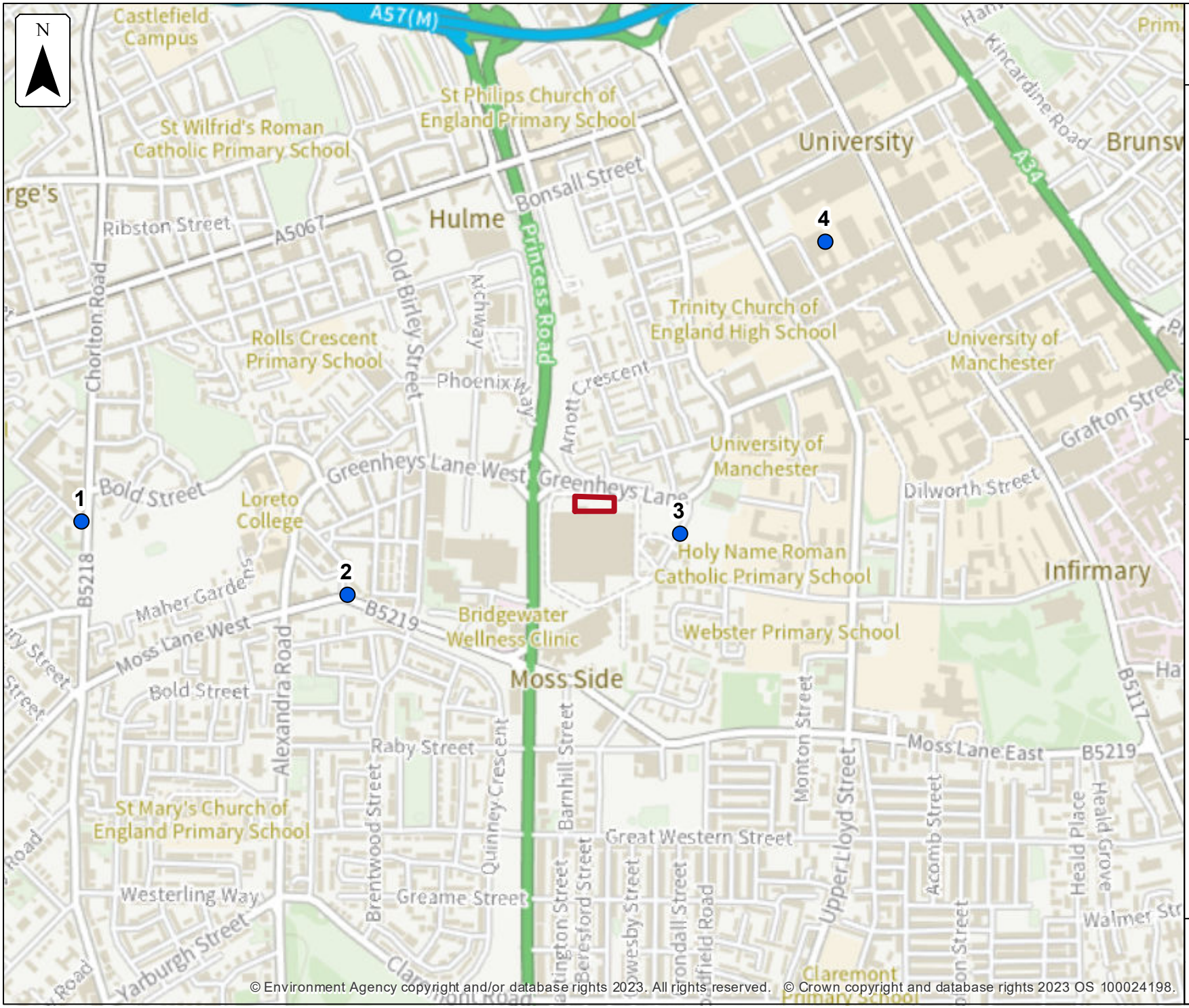
0 100 200 300 400 500
metres

Modelled node locations data

No defences exist

Label	Modelled location ID	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	952451	382950	396136	29.55	0.53	29.95	1.13	30.07	1.46	30.16	1.72	30.47	2.47	31.73	5.10
2	952452	383467	395993	30.90	0.49	31.93	1.03	32.43	1.32	32.58	1.57	32.84	2.24	33.28	4.60
3	952465	384116	396112	32.44	0.39	32.77	0.81	33.26	1.03	33.47	1.21	33.83	1.70	34.34	3.47
4	952467	384400	396681	35.44	0.57	36.89	1.20	37.13	1.56	37.27	1.84	37.41	2.65	37.66	5.49

Data in this table comes from the Corn Brook 2017 model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



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Environment Agency

No defences exist climate change modelled fluvial node locations

Location (easting/northing)
383947/396171

Scale
1:10,000

Created
30 Aug 2023

Model name
Corn Brook 2017

Selected area

Modelled location

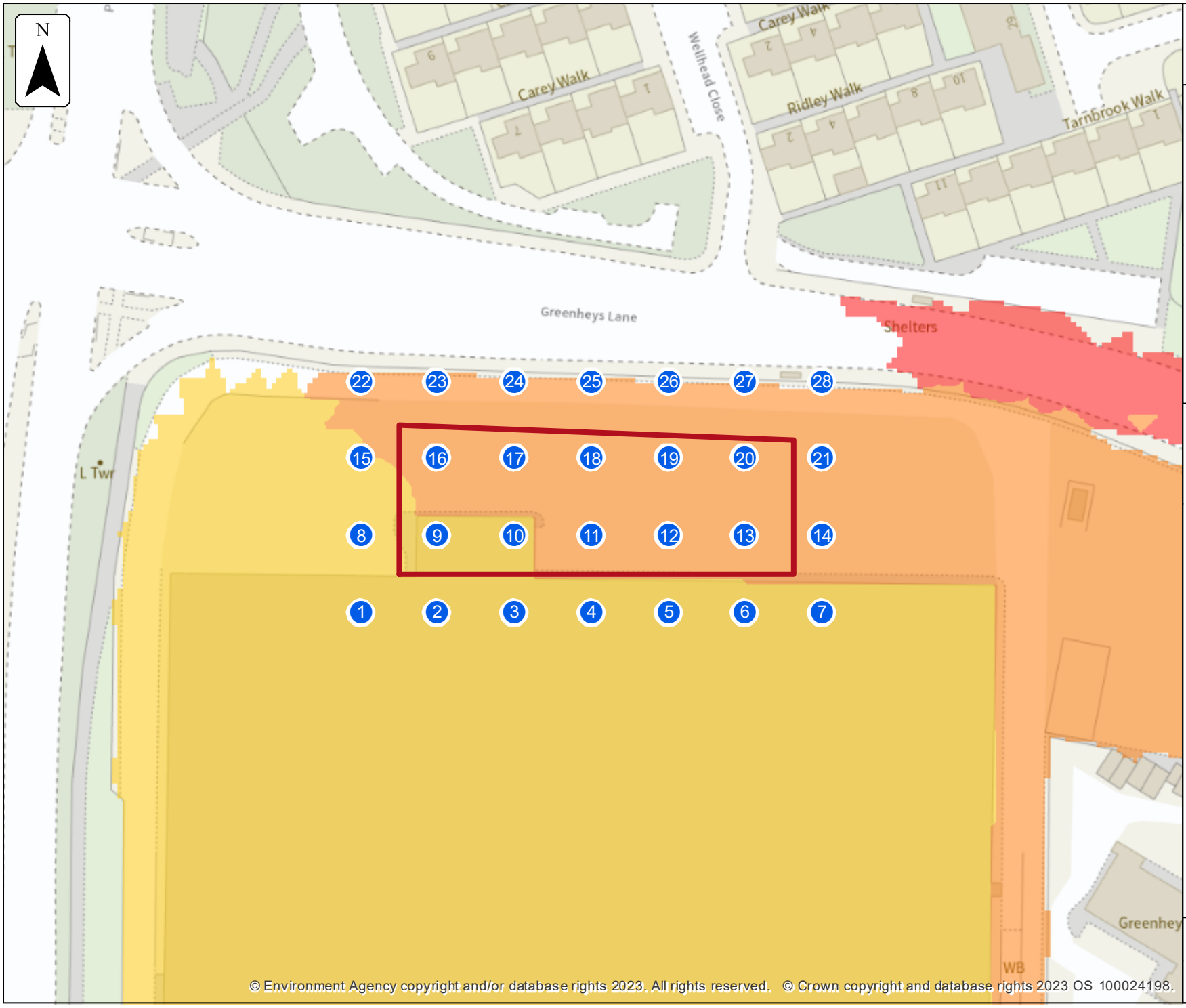
0 100 200 300 400 500
metres

Modelled node locations data

No defences exist climate change

Label	Modelled location ID	Easting	Northing	1.0% AEP (+30%)		1.0% AEP (+35%)		1.0% AEP (+70%)		0.1% AEP (+30%)	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	952451	382950	396136	30.34	2.24	30.39	2.33	30.82	2.93	31.99	6.63
2	952452	383467	395993	32.78	2.03	32.81	2.11	32.99	2.66	33.39	5.98
3	952465	384116	396112	33.75	1.57	33.79	1.63	34.02	2.05	34.46	4.51
4	952467	384400	396681	37.38	2.40	37.39	2.49	37.47	3.13	37.77	7.13

Data in this table comes from the Corn Brook 2017 model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



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Environment Agency

No defences exist modelled fluvial extent and height

Location (easting/northing)
383947/396171

Scale
1:1,000

Created
30 Aug 2023

Model name
Corn Brook 2017

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 33.0
- 33.0 - 33.125
- 33.125 - 33.25
- 33.25 - 33.375
- 33.375 - 33.5
- 33.5 - 33.625
- 33.625 - 33.75
- 33.75 - 33.875
- 33.875 - 34.0

This map shows the 0.1% AEP height data

0 10 20 30 40
metres

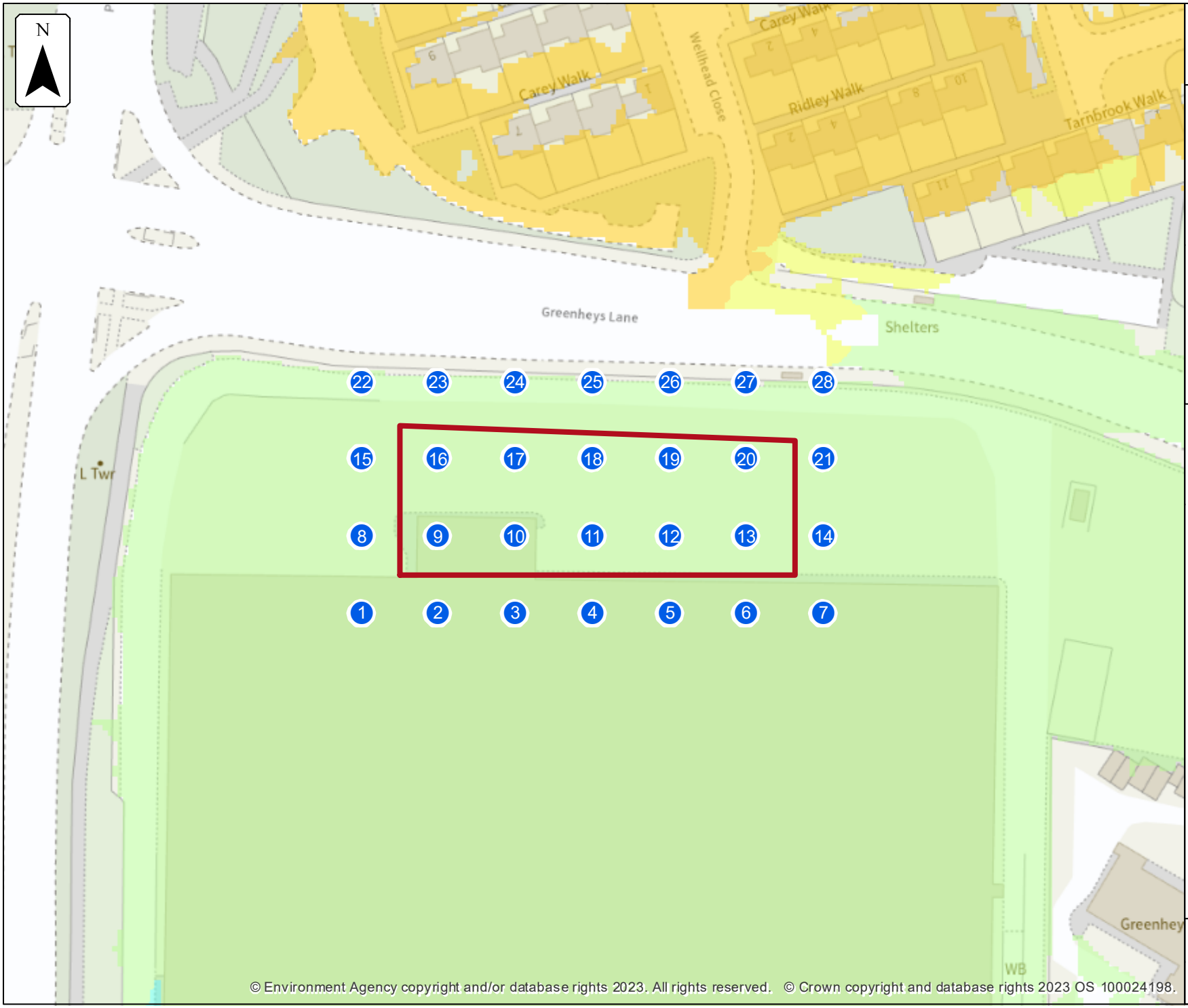
Sample point data

No defences exist

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
1	383902	396150			NoData	NoData	NoData	NoData	0.14	33.40	0.31	33.57	0.48	33.74
2	383917	396150			NoData	NoData	NoData	NoData	NoData	NoData	0.19	33.57	0.33	33.71
3	383932	396150			NoData	NoData	NoData	NoData	0.11	33.45	0.22	33.57	0.36	33.71
4	383947	396150			NoData	NoData	0.13	33.43	0.15	33.45	0.27	33.57	0.41	33.71
5	383962	396150			NoData	NoData	0.13	33.43	0.15	33.45	0.27	33.57	0.41	33.71
6	383977	396150			NoData	NoData	0.11	33.44	0.14	33.46	0.24	33.57	0.38	33.71
7	383992	396150			NoData	NoData	0.15	33.44	0.18	33.46	0.28	33.57	0.43	33.71
8	383902	396165			NoData	NoData	NoData	NoData	NoData	NoData	0.26	33.57	0.44	33.74
9	383917	396165			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.11	33.71
10	383932	396165			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.22	33.71
11	383947	396165			NoData	NoData	0.15	33.49	0.17	33.54	0.27	33.61	0.43	33.78
12	383962	396165			NoData	NoData	0.14	33.49	0.18	33.54	0.28	33.62	0.45	33.78
13	383977	396165			NoData	NoData	0.16	33.49	0.20	33.54	0.28	33.62	0.45	33.78
14	383992	396165			NoData	NoData	0.19	33.49	0.22	33.54	0.32	33.62	0.49	33.79
15	383902	396180			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.23	33.75
16	383917	396180			NoData	NoData	NoData	NoData	NoData	NoData	0.10	33.60	0.26	33.76

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
17	383932	396180			NoData	NoData	NoData	NoData	NoData	NoData	0.17	33.61	0.33	33.77
18	383947	396180			NoData	NoData	NoData	NoData	0.14	33.54	0.22	33.61	0.38	33.78
19	383962	396180			NoData	NoData	0.13	33.49	0.17	33.54	0.25	33.62	0.41	33.78
20	383977	396180			NoData	NoData	NoData	NoData	0.13	33.54	0.21	33.62	0.38	33.78
21	383992	396180			NoData	NoData	NoData	NoData	0.12	33.54	0.20	33.62	0.37	33.79
22	383902	396195			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.19	33.76
23	383917	396195			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.24	33.76
24	383932	396195			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.22	33.77
25	383947	396195			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.22	33.78
26	383962	396195			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
27	383977	396195			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
28	383992	396195			NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Data in this table comes from the Corn Brook 2017 model.
Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.



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Environment Agency

No defences exist climate change modelled fluvial extent and height

Location (easting/northing)
383947/396171

Scale
1:1,000

Created
30 Aug 2023

Model name
Corn Brook 2017

Selected area

Main river

Modelled 2D grid
Water level in mAOD

- 0 - 33.0
- 33.0 - 33.25
- 33.25 - 33.5
- 33.5 - 33.75
- 33.75 - 34.0
- 34.0 - 34.25
- 34.25 - 34.5
- 34.5 - 34.75
- 34.75 - 35.0

This map shows the 0.1% AEP +30% height data

0 10 20 30 40
metres

Sample point data

No defences exist climate change

Label	Easting	Northing	1% AEP (+30%)		1% AEP (+35%)		1% AEP (+70%)		0.1% AEP (+30%)	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height
1	383902	396150	0.28	33.54	0.29	33.55	0.37	33.63	0.57	33.83
2	383917	396150	0.16	33.54	0.18	33.56	0.24	33.62	0.40	33.77
3	383932	396150	0.19	33.54	0.21	33.56	0.27	33.62	0.43	33.78
4	383947	396150	0.24	33.54	0.26	33.56	0.32	33.62	0.48	33.78
5	383962	396150	0.25	33.54	0.26	33.56	0.32	33.62	0.48	33.77
6	383977	396150	0.21	33.54	0.23	33.56	0.29	33.62	0.45	33.78
7	383992	396150	0.26	33.54	0.27	33.56	0.33	33.62	0.49	33.78
8	383902	396165	0.23	33.54	0.25	33.55	0.33	33.63	0.52	33.82
9	383917	396165	NoData	NoData	NoData	NoData	NoData	NoData	0.17	33.78
10	383932	396165	NoData	NoData	NoData	NoData	0.13	33.62	0.28	33.77
11	383947	396165	0.24	33.59	0.26	33.60	0.32	33.67	0.50	33.87
12	383962	396165	0.26	33.59	0.27	33.60	0.34	33.67	0.51	33.87
13	383977	396165	0.26	33.59	0.27	33.60	0.34	33.67	0.54	33.87
14	383992	396165	0.29	33.59	0.31	33.61	0.37	33.67	0.58	33.88
15	383902	396180	NoData	NoData	NoData	NoData	0.13	33.64	0.32	33.83
16	383917	396180	NoData	NoData	NoData	NoData	0.15	33.65	0.34	33.84

Label	Easting	Northing	1% AEP (+30%)		1% AEP (+35%)		1% AEP (+70%)		0.1% AEP (+30%)	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height
17	383932	396180	0.15	33.58	0.16	33.60	0.22	33.66	0.44	33.85
18	383947	396180	0.19	33.59	0.21	33.60	0.27	33.67	0.47	33.86
19	383962	396180	0.22	33.59	0.24	33.60	0.30	33.67	0.50	33.87
20	383977	396180	0.18	33.59	0.20	33.60	0.26	33.67	0.46	33.87
21	383992	396180	0.17	33.59	0.19	33.61	0.25	33.67	0.46	33.88
22	383902	396195	NoData	NoData	NoData	NoData	NoData	NoData	0.27	33.84
23	383917	396195	NoData	NoData	NoData	NoData	0.13	33.65	0.32	33.84
24	383932	396195	NoData	NoData	NoData	NoData	0.11	33.66	0.31	33.86
25	383947	396195	NoData	NoData	NoData	NoData	0.11	33.67	NoData	NoData
26	383962	396195	NoData	NoData	NoData	NoData	NoData	NoData	0.14	33.87
27	383977	396195	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
28	383992	396195	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Data in this table comes from the Corn Brook 2017 model.
Height values are shown in mAOD, and depth values are shown in metres.
Any blank cells show where a particular scenario has not been modelled for this location.
Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

Find out more about flood risk activity permits

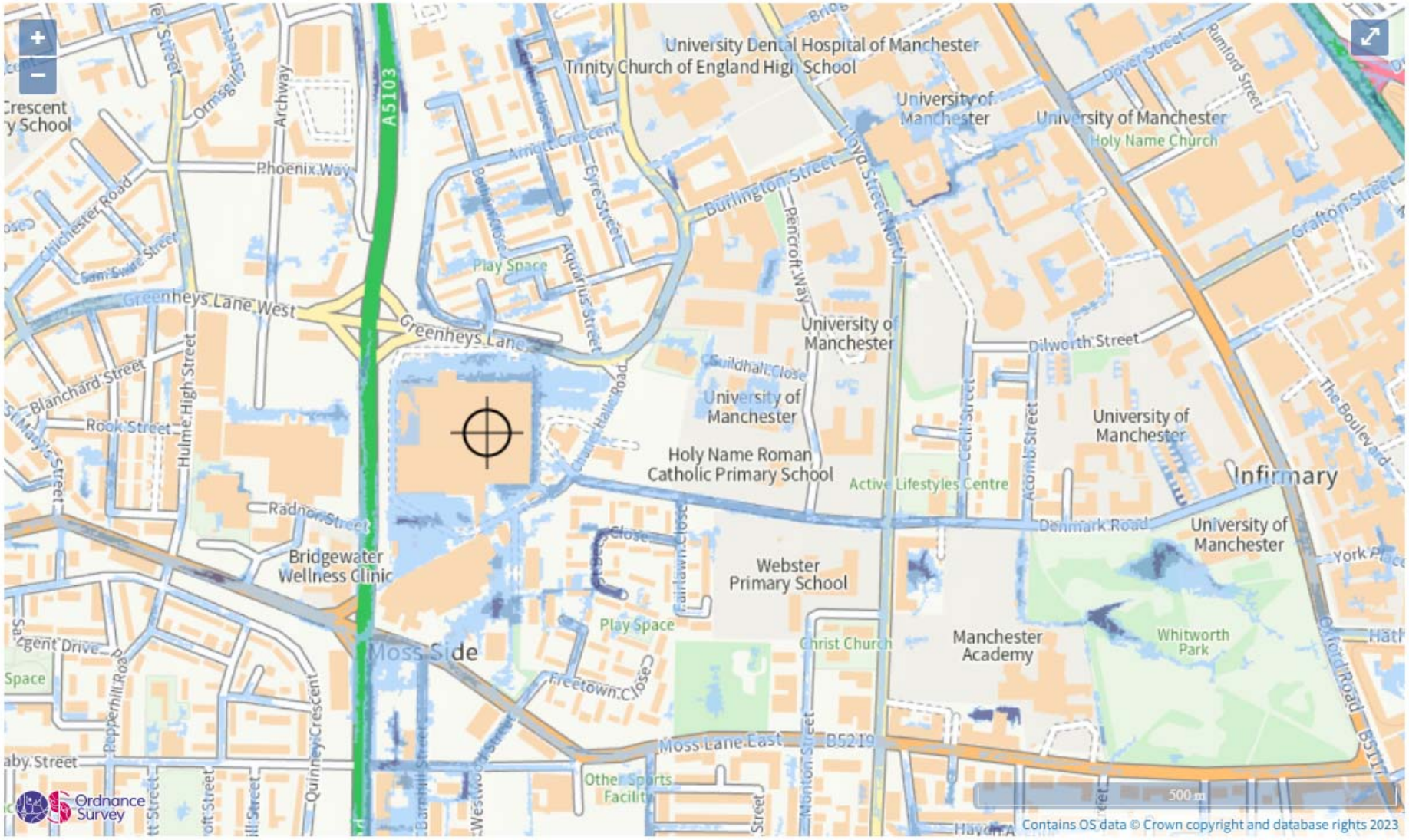
Help and advice

Contact the Greater Manchester Merseyside and Cheshire Environment Agency team at inforequests.gmmc@environment-agency.gov.uk for:

- more information about getting a product 5, 6, 7 or 8
- general help and advice about the site you're requesting data for

Heineken, Manchester

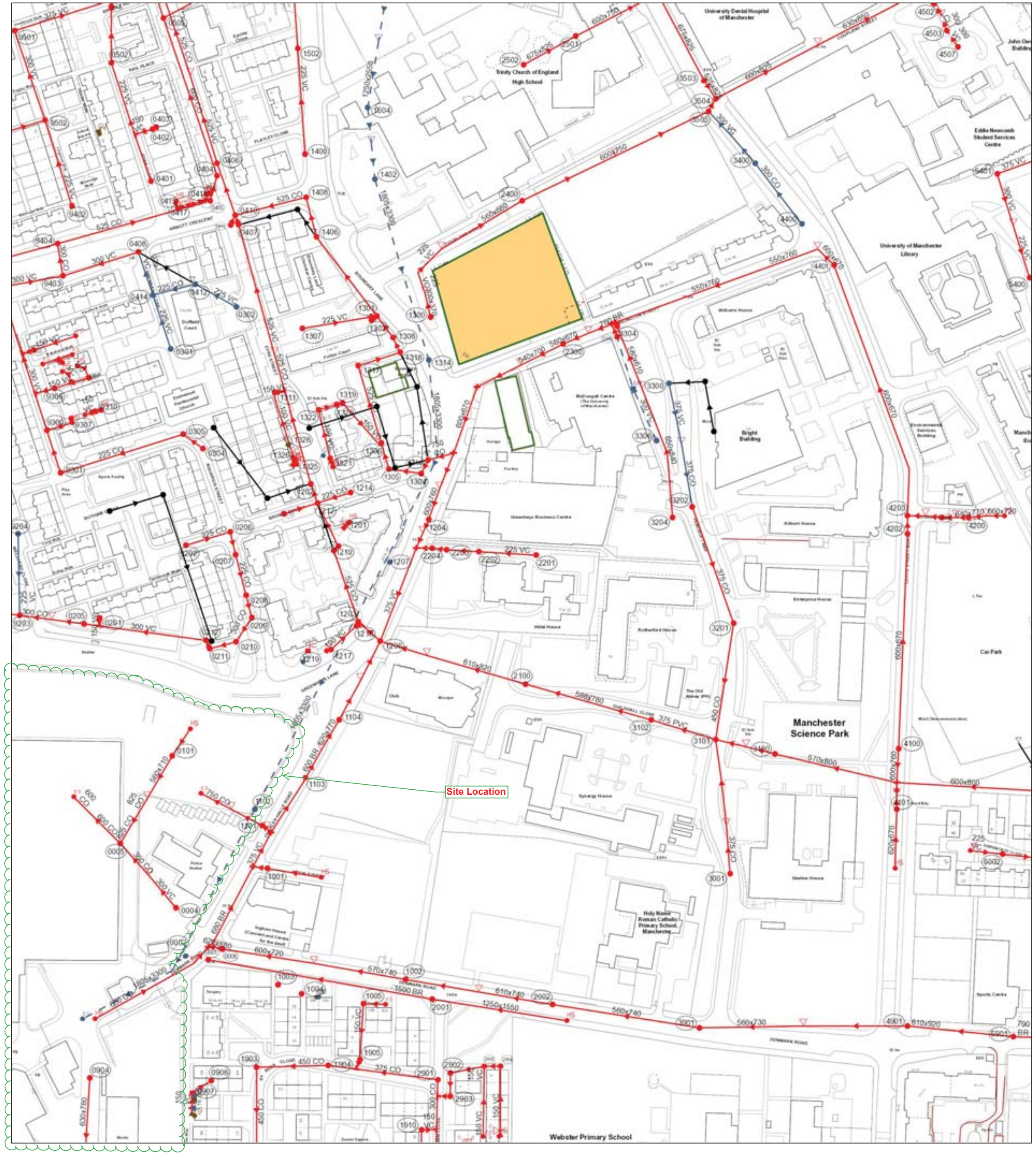
Flood Risk From Surface Water



Extent of flooding from surface water

High Medium Low Very low Location you selected

Appendix E – Sewer and Drainage Records



The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
9300	33.89	CO	31.06	300			VC	84.15765	1 in 221
9300	33.89	CO	31.06	300			VC	84.15765	1 in 221
2300	34.52	CO	31.36	540			BR	26.83282	
1904	33.75	CO	31.08	450			CO	40.0125	1 in 667
1904	33.75	CO	31.08	450			CO	40.0125	1 in 667
1311		CO		150			VC	5.613017	
3306	34.36	SW	31.86	300			VC	62.14495	1 in 2.16306823
0412		SW	0	225			CO	24.49753	
4101	34.85	CO	32.79	570			BR	8	
2904		CO		150			VC	9.103977	
2904		CO		150			VC	9.103977	
1318		CO	0	525			CO	9.329441	
1307	34.55	CO	32.49	225			VC	38.48635	
4507		CO		300			VC	10.81665	1 in
9203	33.58	CO	30.64	300			CO	39.48372	1 in 146
9203	33.58	CO	30.64	300			CO	39.48372	1 in 146
1310	34.35	CO	0	525			CO	8.401802	
0302	34.71	SW	32.55	225			VC	26.08914	
0201		CO		150			VC	4.584419	
0201		CO		150			VC	4.584419	
2905		CO		150			VC	19.19699	
2905		CO		150			VC	19.19699	
0002	33.39	SW	29.49	1805			BR	12.52996	
0002	33.39	SW	29.49	1805			BR	12.52996	
0004	33.33	CO	31.09	300			VC	23.43075	1 in 167
0004	33.33	CO	31.09	300			VC	23.43075	1 in 167
9406		CO	0	525			CO	68.41052	
1905		CO		150			VC	5.883502	
1905		CO		150			VC	5.883502	
3305	34.74	CO	31.59	300			VC	7.615773	
0403	34.45	CO	32.6	150			VC	2.236068	
1202	34.62	CO	28.38	525			CO	74.79561	1 in 187
2100	34.69	CO	31.67	610			BR	57.28001	
1322		CO		100			VC	10.4655	
0101	33.37	CO	30.42	560			BR	27.78489	
1304		CO	0	525			CO	18.29312	
1502	35.16	CO	32.52	225			VC	55.14526	1 in 110
2501	35.99	CO	31.63	600			BR	69.77106	1 in 137
4100	34.88	CO	32.38	600			BR	19.0263	
4202	34.9	CO	0	600			BR	10	
1218		CO		100			VC	2.871551	
0006	33.69	CO	31.01	620			BR	4.123106	
0006	33.69	CO	31.01	620			BR	4.123106	
1301	34.82	CO	29.83	525			CO	55.51118	
4503	35.49	CO	31.03	300			CI	8.544003	1 in 0.32217208
1002	33.59	CO	30.96	570			BR	51.78803	
1002	33.59	CO	30.96	570			BR	51.78803	
9405	33.95	CO	30.68	300			VC	35.43739	1 in 31
0405	34.66	CO	29.03	600			CO	14.56022	1 in 112
2201	34.69	CO	33.34	225			VC	32.06244	1 in 92
3202	34.84	CO	32.84	375			CO	68.94926	1 in 255
4201	35.28	CO	33.17	580			BR	9.055386	
1217		CO		100			VC	19.53001	
3400	35.33	SW	31.86	300			CO	19.84943	1 in 496
0212		CO	31.19	300			VC	68.47559	1 in 196
1308	34.88	CO	29.89	525			CO	14.99078	1 in 300
0304		CO	0	225			CO	13.64062	
9301		CO	0	225			CO	24.8776	
9301		CO	0	225			CO	24.8776	
1321		CO		100			VC	27.93064	
1314	34.68	SW	32.22	1805			BR	116.8409	1 in 142
1319		CO		150			VC	31.71608	
1302	34.71	CO	32.22	225			VC	1.893954	
0404	34.63	CO	28.83	600			CO	92.97311	1 in 664
9501	34.57	CO	31.72	375			VC	56.61272	1 in 354
9501	34.57	CO	31.72	375			VC	56.61272	1 in 354
1402	34.95	SW	32.6	1805			BR	105.3613	1 in 301
2001	33.6	CO	31.19	1500			BR	126.9212	1 in 409
2001	33.6	CO	31.19	1500			BR	126.9212	1 in 409
0505	34.62	CO	28.6	600			CO	36.68787	
0205	33.91	CO	30.83	300			VC	18.14314	1 in 202
0205	33.91	CO	30.83	300			VC	18.14314	1 in 202
0408	34.5	CO	32.06	300			VC	44.12879	1 in 18
0502	34.38	CO	31.92	225			VC	4.175835	
0502	34.38	CO	31.92	225			VC	4.175835	
0310		CO		150			VC	6.431989	
0310		CO		150			VC	6.431989	
1213		CO	0	225			CO	19.66908	
3102	34.23	CO	31.97	580			PVC	36.40055	1 in 260
1903	34.05	CO	30.98	450			CO	49	1 in 129
1903	34.05	CO	30.98	450			CO	49	1 in 129
4203		CO	0	600			BR	147.51	
2400	34.87	CO	31.41	600			BR	57.69749	
1317		CO	0	525			CO	24.55967	
1300	34.61	CO	32.72	300			VC	13.34166	
2502	36.06	CO	32.11	675			BR	33.12099	1 in 70
1101	33.63	CO	30.5	760			BR	19.23538	
2204	33.91	CO	32.1	225			VC	9	
5901	35.24	CO	0	610			BR	59.3043	
5901	35.24	CO	0	610			BR	59.3043	
1207	34.3	SW	31.38	1805			BR	159.2388	
3304	34.59	CO	31.43	570			BR	1	
9404	34.57	CO	29.23	525			CO	88.32327	1 in 552
9404	34.57	CO	29.23	525			CO	88.32327	1 in 552
3100	34.74	CO	32	570			BR	16.49242	
3101	34.34	CO	32.07	375			PVC	37.64306	1 in 753
0207		CO	0	225			CO	23.49258	
0411		CO	0	225			CO	6.070935	
2002	33.85	CO	31.2	610			BR	41.59327	1 in 347
2002	33.85	CO	31.2	610			BR	41.59327	1 in 347
5002	35.54	CO	33.53	225			VC	27.16615	1 in 60
4401	35.03	CO	0	600			BR	12.72792	
0410		CO	27.55	525			VC	30.8407	1 in 88
2901	34	CO	31.3	375			CO	61.52235	1 in 293
2901	34	CO	31.3	375			CO	61.52235	1 in 293
1406		CO	0	525			CO	22.91475	
0202		CO	0	225			CO	25.82646	
0210		CO	0	300			CO	14.98547	
3204	34.72	CO	0	650			BR	74.7512	
0301	34.32	SW	32.36	225			VC	31.77663	
2202	34.41	CO	32.98	225			VC	18.02776	1 in 106
3001	34.73	CO	32.78	375			CO	27.07397	
1102	33.71	SW	29.81	1805			BR	88.54942	1 in 277
2903		CO		150			VC	7.130569	
2903		CO		150			VC	7.130569	
4100	34.88	CO	32.42	600			BR	120.1041	
0209		CO	0	300			CO	16.21131	
3504	35.94	CO	31.49	600			BR	64.41273	1 in 3
0904	33.12	CO	30.47	630			BR	65.12296	1 in 93
0904	33.12	CO	30.47	630			BR	65.12296	1 in 93
0904	33.12	CO	30.47	630			BR	65.12296	1 in 93
0904	33.12	CO	30.47	630			BR	65.12296	1 in 93
1001	33.84	CO	31.11	375			VC	8.062258	
1408		CO	0	525			CO	40.72867	
1005	34.11	CO		150			VC	30.99465	
1005	34.11	CO		150			VC	30.99465	
5401	35.95	CO	0	300			VC	30.36445	
0206		CO	0	225			CO	13.06314	
1306		CO	0	525			CO	44.96155	
2801	34.06	CO	31.9	300			CO	88.02273	1 in 166
0208		CO	0	300			CO	12.80492	
1400	35.02	CO	33.05	225			VC	59.13544	1 in 114
9204	33.5	SW	31.75	225			VC	45.58971	1 in 106
9204	33.5	SW	31.75	225			VC	45.58971	1 in 106
0305		CO	0	225			CO	71.65667	
4200	35.48	CO	33.2	640			BR	7	
1103	34.01	CO	31.76	600			BR	20.59126	1 in 48
0907		CO		150			VC	12.78049	
0907		CO		150			VC	12.78049	
3901	34.38	CO	31.83	560			BR	83.02409	1 in 134
3901	34.38	CO	31.83	560			BR	83.02409	1 in 134
1210		CO	0	525			CO	3.370402	
0005	33.37	CO	30.34	600			CO	36.76955	
0005	33.37	CO	30.34	600			CO	36.76955	
1214		CO	0	225			CO	19.29815	
0414		SW	0	225			VC	25.30584	
3201	35.23	CO	32.53	450			CO	65.76473	1 in 274
3503	35.93	CO	31.72	525			BR	15.26434	1 in 85
2203	34.04	CO	32.79	225			VC	8.062258	1 in 73
1211		CO	0	525			CO	26.89218	
0406	34.63	CO	27.12	525			VC	51.24451	1 in 214
0211		CO	0	300			CO	5.099236	
3300	35.43	SW	33.13	375			VC	34.71311	1 in 248
1910		CO		150			VC	8.482361	
1910		CO		150			VC	8.482361	
0407	34.72	CO	27.55	525			VC	5.622344	1 in 16
4400	35.1	SW	32.15	300			CO	42.80187	1 in 195
9502	35.5	CO	32.9	300			VC	52.81099	1 in 46
9502	35.5	CO	32.9	300			VC	52.81099	1 in 46
4502		CO		300			VC	5	1 in
9402	34.61	CO	32.01	225			VC	50.28917	
9402	34.61	CO	32.01	225			VC	50.28917	
0502	34.38	CO		225			VC	30.82417	
0502	34.38	CO		225			VC	30.82417	
0307		CO		150			VC	19.86122	
0307		CO		150			VC	19.86122	
1504		SW		1250			CO	20.09975	
1206	33.73	CO	28.86	525			CO	16.43794	1 in 103
3505	35.92	CO	31.52	600			BR	8.062258	
1104	34.19	CO	30.92	620			BR	25.05993	1 in 29
1203	34.28	CO	28.68	525			CO	42.07213	1 in 162
1320		CO		100			VC	3.466408	
1305		CO	0	525			CO	15.21912	
2902		CO		150			VC	12.9578	
2902		CO		150			VC	12.9578	
9403	34.6	CO	29.54	300			CO	18.24829	1 in 304
9403	34.6	CO	29.54	300			CO	18.24829	1 in 304
1212		CO	28.68	525			CO	11.41796	1 in 44
4901	34.96	CO	32.28	610			BR	58	1 in 264
4901	34.96	CO	32.28	610			BR	58	1 in 264
1204	34.08	CO	31.33	600			BR	8.6015	
9306		CO		150			VC	11.38232	
9306		CO		150			VC	11.38232	
9305		CO		150			VC	6.805898	
9305		CO		150			VC	6.805898	
0402	34.39	CO	32.72	150			VC	10.44031	
0401	34.42	CO	32.33	225			VC	69.57311	1 in 183

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:
red - combined blue - surface water
brown - foul purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO Foul
SW Surface Water
CO Combined
OV Overflow

SEWER SHAPE

CI Circular
TR Trapezoidal
EG Egg
AR Arch
OV Oval
BA Barrel
FT Flat Top
HO HorseShoe
RE Rectangular
UN Unspecified
SQ Square

SEWER MATERIAL

AC Asbestos Cement
BR Brick
PE Polyethylene
RP Reinforced Plastic Matrix
CO Concrete
CSB Concrete Segment Bolted
CSU Concrete Segment Unbolted
CC Concrete Box Culverted
PSC Plastic / Steel Composite
GRC Glass Reinforced Plastic
DI Ductile Iron
PVC Polyvinyl Chloride
CI Cast Iron
SI Spun Iron
ST Steel
VC Vitrified Clay
PP Polypropylene
PF Pitch Fibre
MAC Masonry, Coursed
MAR Masonry, Random
U Unspecified

Address or Site Reference:

Heineken Manchester Denmark Road,

OS sheet Number: SJ8496SW
Scale: 1:1250 **Date:** 28/12/2018
Nodes: 187
Sheet: 1 of 4

Printed by: Property Searches

SEWER RECORDS

United Utilities
helping life flow smoothly

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
1904	33.75	CO	31.08	450			CO	40.0125	1 in 667
1904	33.75	CO	31.08	450			CO	40.0125	1 in 667
1603	33.56	CO	31.21	300			VC	9.219544	1 in 8
2403	33.67	CO	31.47	225			VC	23.88	1 in 65
1809		CO		150			VC	33.45214	
1704		CO	0	2350			BR	132.3868	
1801	33.74	CO	31.92	300			VC	15.23155	1 in 109
2404	33.8	CO	30.04	300			VC	29.00091	1 in 78
2503	33.98	CO	30.72	300			VC	31	1 in 56
0701	32.67	CO	29.58	450			VC	7.615773	1 in 95
0701	32.67	CO	29.58	450			VC	7.615773	1 in 95
2601	33.97	CO	32.09	300			VC	52	1 in 57
1604	33.67	CO	31.44	300			VC	21	1 in 140
4401	34.42	CO	32.5	300			VC	30.0164	
3414		CO		150			VC	6.914376	
2904		CO		150			VC	9.103977	
2904		CO		150			VC	9.103977	
4403	34.46	CO	32.54	300			VC	16	1 in 1600
1406	33.35	CO	31.63	225			VC	44	1 in 133
2505	33.93	CO	29.33	610			BR	46.11	1 in 231
3410	34.2	SW	31.5	450			CO	28.9256	1 in 289
4802	34.97	CO	31.65	760			BR	69.06519	
1702	33.86	CO	31.59	375			CO	81.59657	1 in 185
2905		CO		150			VC	19.19699	
2905		CO		150			VC	19.19699	
0702	32.96	CO	31.34	300			CO	32.06244	1 in 267
0002	33.39	SW	29.49	1805			BR	12.52996	
0002	33.39	SW	29.49	1805			BR	12.52996	
0004	33.33	CO	31.09	300			VC	23.43075	1 in 167
0004	33.33	CO	31.09	300			VC	23.43075	1 in 167
1905		CO		150			VC	5.883502	
1905		CO		150			VC	5.883502	
5408	34.54	CO	32.68	225			VC	18.02776	1 in 38
4505	34.79	CO	31.38	600			BR	55.03635	1 in 393
0703	33.29	CO	29.8	750			BR	104.2945	1 in 316
4702	34.9	CO	31.05	620			BR	18	
9502	32.95	CO	27.18	780			BR	47.01064	1 in 392
9502	32.95	CO	27.18	780			BR	47.01064	1 in 392
0812		CO		150			VC	6.762316	
3502	34.28	CO	31.02	300			VC	30.01666	1 in 33
1505	33.64	CO	31.38	300			VC	19	1 in 90
0502	33.19	CO	27.31	770			BR	41	1 in 342
0502	33.19	CO	27.31	770			BR	41	1 in 342
1607	33.52	CO	30.02	750			BR	24.73863	1 in 112
9702	32.65	CO	24.58	2450			BR	191.4129	
9702	32.65	CO	24.58	2450			BR	191.4129	
1506	33.66	CO	28.87	650			BR	17.02939	1 in 29
1606	33.56	CO	31.25	300			VC	12.80625	1 in 8
1509	33.48	CO	31.33	300			VC	32.06244	1 in 75
0408	33.12	CO	30.05	300			VC	47	1 in 92
0901	33.49	CO	30.54	525			CO	20.02498	1 in 54
4603	34.55	CO	31.68	620			BR	24.18677	1 in 173
0601	34.39	CO	0	450			VC	100.005	
1605	33.66	CO	32.48	225			VC	11.04536	1 in 22
9406	32.8	CO	29.16	300			VC	29.06888	1 in 88
9406	32.8	CO	29.16	300			VC	29.06888	1 in 88
3601	34.4	CO	33.08	300			VC	16	1 in 76
1703	33.46	CO	29.88	750			BR	40.80441	
2503	33.98	CO	32.45	225			VC	99.0202	1 in 89
2601	33.97	CO	32.03	300			VC	56	1 in 100
2804		CO		150			VC	8.983191	
2504	33.74	CO	29.12	610			BR	22	1 in 157
0006	33.69	CO	31.01	620			BR	4.123106	
0006	33.69	CO	31.01	620			BR	4.123106	
0802	33.59	CO	30.56	450			CO	15	1 in 42
3504	34.3	CO	29.79	610			BR	40.0125	1 in 235
1605	33.66	CO	31.59	300			VC	20.02498	1 in 80
1002	33.59	CO	30.96	570			BR	51.78803	
1002	33.59	CO	30.96	570			BR	51.78803	
3501	34.26	CO	32.22	300			VC	42	1 in 36
2410	33.83	CO	31.3	225			VC	6.527803	1 in 16
0419		CO		150			VC	2.455992	
1608	33.53	CO	31.72	300			VC	23.02173	1 in 209
0414	33.11	CO	31.31	225			VC	42.0119	1 in 114
1607	33.52	CO	0	1050			BR	9	
5601	34.94	CO	32.72	300			VC	26.01922	1 in 79
1902	33.59	CO	30.59	525			CO	39	1 in 1950
1507	33.66	CO	28.96	580			BR	14	1 in 700
0903	32.87	CO	29.7	640			BR	16	1 in 114
0903	32.87	CO	29.7	640			BR	16	1 in 114
1609	33.55	CO	31.44	300			VC	25.07987	1 in 836
2912		CO		100			VC	9.880688	
0803	33.21	CO	30.64	450			CO	36.79674	1 in 613
4404	34.66	CO	31.73	610			BR	84.58587	1 in 352
5602	35.02	CO	32.37	300			VC	32.00007	1 in 80
2411	33.9	CO	0	300			VC	28.03206	
2402	33.68	CO	30.99	300			VC	29.01724	1 in 33
1502	33.63	CO	28.27	750			BR	51.0392	1 in 72
2001	33.6	CO	31.19	1500			BR	126.9212	1 in 409
2001	33.6	CO	31.19	1500			BR	126.9212	1 in 409
1912		CO		150			VC	15.80875	
3405	34.4	SW	33.1	450			CO	15.03977	1 in 150
2802		CO		150			VC	17.954	
0902	33.54	CO	30.02	675			CO	59.03389	1 in 281
0801	33.15	CO	31.07	450			CO	65.45992	1 in 168
1903	34.05	CO	30.98	450			CO	49	1 in 129
1903	34.05	CO	30.98	450			CO	49	1 in 129
0409	33.19	CO	29.48	300			VC	31.06445	1 in 124
3511		CO		150			VC	10.41061	
1405	33.46	CO	31.9	225			VC	17	1 in 27
2702	33.87	CO	30.28	750			BR	92.5743	1 in 231
9404	32.69	CO	0	300			VC	46	
9404	32.69	CO	0	300			VC	46	
5901	35.24	CO	0	610			BR	59.3043	
5901	35.24	CO	0	610			BR	59.3043	
2409	33.98	SW		0			VC	0.5136748	
2506	34.03	CO	29.49	610			BR	28.90696	1 in 222
2605	34.06	CO	31.65	300			VC	55	1 in 61
2603	33.98	CO	32.61	300			VC	45.01111	1 in 82
1404	33.28	CO	31.94	225			VC	18.02776	1 in 18
5649		CO		150			VC	25.8446	
1501	33.44	CO	27.55	750			BR	44.01136	1 in 400
4701	34.75	CO	25.38	2250			BR	186.0968	1 in 600
1601	33.55	CO	29.32	375			VC	45.04442	1 in 94
2408	33.77	CO	32.15	225			VC	45.01111	1 in 71
1804		CO		150			VC	11.75836	
4604	34.83	CO	31.24	600			BR	54.03703	1 in 284
1604	33.67	CO	32.32	225			VC	11.04536	1 in 38
4506	34.69	CO	31.54	600			BR	55.08176	1 in 367
1901	33.64	CO	30.9	300			CO	38.58756	1 in 148
0914		CO		150			VC	13.72601	
2501	33.75	CO	31.99	300			VC	49.0102	1 in 82
3801	34.69	CO	31.46	630			BR	73.33485	1 in 188
1602	33.51	CO	29.82	375			VC	49.0408	1 in 104
2509		FO		100			VC	12.46258	
2002	33.85	CO	31.2	610			BR	41.59327	1 in 347
2002	33.85	CO	31.2	610			BR	41.59327	1 in 347
1701	33.57	CO	30.37	375			VC	44.04543	1 in 83
4402	34.47	CO	32.34	300			VC	24.08319	
4503	34.51	CO	32.24	375			VC	26.30589	1 in 114
1802		CO		150			VC	11.37314	
2901	34	CO	31.3	375			CO	61.52235	1 in 293
2901	34	CO	31.3	375			CO	61.52235	1 in 293
5704		CO		150			VC	6.716328	
1906		CO		150			VC	8.924909	
9703	32.78	CO	29.45	750			BR	107.4151	1 in 250
9703	32.78	CO	29.45	750			BR	107.4151	1 in 250
4502	34.43	CO	32	375			VC	25.17936	1 in 180
4602	34.67	CO	31.52	620			BR	44.40721	
1504	33.54	CO	31.16	300			VC	10.63015	1 in 5
1102	33.71	SW	29.81	1805			BR	88.54942	1 in 277
2402	33.68	CO	32.31	225			VC	23	1 in 28
2903		CO		150			VC	7.130569	
2903		CO		150			VC	7.130569	
1402	33.36	CO	31.27	225			VC	22	1 in 122
3413		CO		150			VC	23.13009	
3505	34.54	CO	30.08	610			BR	46	1 in 192
3702	34.46	CO	30.61	740			BR	106	1 in 366
2602	34.15	CO	32.58	300			VC	46.01087	1 in 87
3406	34.47	SW	33	450			CO	28.47027	1 in 190
0904	33.12	CO	30.47	630			BR	65.12296	1 in 93
0904	33.12	CO	30.47	630			BR	65.12296	1 in 93
0904	33.12	CO	30.47	630			BR	65.12296	1 in 93
0904	33.12	CO	30.47	630			BR	65.12296	1 in 93
5701	35.24	CO	31.95	300			VC	2	
4501	34.42	CO	31.82	620			BR	26.1725	1 in 238
1005	34.11	CO		150			VC	30.99465	
1005	34.11	CO		150			VC	30.99465	
4504	34.56	CO	31.58	610			BR	18.78283	
1505	33.64	CO	32.17	225			VC	21.0238	1 in 26
2801	34.06	CO	31.9	300			CO	88.02273	1 in 166
3408	34.35	SW	31.6	450			CO	30.27752	1 in 303
3602	34.38	CO	32.86	300			VC	68.0294	1 in 110
3701	34.41	CO	31.37	300			VC	9.055386	
2602	34.15	CO	0	300			VC	60.07495	
0907		CO		150			VC	12.78049	
0907		CO		150			VC	12.78049	
3901	34.38	CO	31.83	560			BR	83.02409	1 in 134
3901	34.38	CO	31.83	560			BR	83.02409	1 in 134
3404	34.5	SW	33.4	225			VC	12.46715	1 in 42
1403	33.25	CO	29.85	300			VC	47.01064	1 in 142
4801	35.4	SW	33.48	225			VC	75.10659	1 in 82
2701	33.93	CO	31.1	300			VC	7.071068	
0807		CO		150			VC	9.093446	
3601	34.4	CO	31.8	300			VC	39.20459	1 in 101
1910		CO		150			VC	8.482361	
1910		CO		150			VC	8.482361	
2604	33.83	CO	32.06	300			VC	48	1 in 109
3503	34.12	CO	29.6	610			BR	16	1 in 178
5407	34.55	CO	32.2	225			VC	7	1 in 8
3409	34.32	FO	32	150			VC	42.41223	1 in 109
1408	33.53	CO	31.21	225			VC	25	1 in 147
3407	34.48	SW	33.47	150			VC	10.29763	1 in 28
0806		CO		150			VC	2.52601	
1401	33.33	CO	29.52	300			VC	30.01666	1 in 167
4601	34.85	CO	0	620			BR	27.45906	
4504	34.56	CO	30.3	610			BR	38.98711	1 in 217
4507	34.67	CO	30.57	525			CO	60.73476	1 in 190
2412	34.06	FO	31.61	150			VC	20.2857	1 in 65
0813		CO		150			VC	40.64032	
2502	33.94	CO	32.5	300			VC	45.01111	1 in 96
0804	32.76	CO	29.44	610			BR	23.08679	
0804	32.76	CO	29.44	610			BR	23.08679	
2405	33.84	CO	30.42	300			VC	24.02213	1 in 69
5406	34.57	CO	31.33	225			VC	8	1 in 53
1810		CO		150			VC	19.52302	
2703	33.83	CO	25.07	2250			BR	140.4279	
1803		CO		150			VC	17.74538	
3411		CO		150			VC	9.08364	
1503	33.56	CO	28.84	375			VC	47.01064	1 in 85
2902		CO		150			VC	12.9578	

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
0410	33.22	CO	30.92	225			VC	24.02082	1 in 240
4901	34.96	CO	32.28	610			BR	58	1 in 264
4901	34.96	CO	32.28	610			BR	58	1 in 264
0501	33.16	CO	27.29	720			BR	4	1 in 200
0501	33.16	CO	27.29	720			BR	4	1 in 200
0406	33	CO	29.3	300			VC	30.12929	1 in 274
0406	33	CO	29.3	300			VC	30.12929	1 in 274
0503	33.29	CO	27.44	750			BR	48	1 in 400
3607		CO		225			VC	72.28702	
0405	32.91	CO	30.25	300			VC	44.89475	1 in 47
0405	32.91	CO	30.25	300			VC	44.89475	1 in 47
3512		CO		150			VC	18.64203	
0411	32.97	CO	31.43	225			VC	44.76205	1 in 132
3510		CO		150			VC	17.02699	
0407	33.06	CO	31.09	225			VC	22.65167	1 in 57

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:
red - combined | blue - surface water
brown - foul | purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

FO Foul
SW Surface Water
CO Combined
OV Overflow

SEWER SHAPE

CI Circular | TR Trapezoidal
EG Egg | AR Arch
OV Oval | BA Barrel
FT Flat Top | HO HorseShoe
RE Rectangular | UN Unspecified
SQ Square

SEWER MATERIAL

AC Asbestos Cement
BR Brick
PE Polyethylene
RP Reinforced Plastic Matrix
CO Concrete
CSB Concrete Segment Bolted
CSU Concrete Segment Unbolted
CC Concrete Box Culverted
PSC Plastic / Steel Composite
GRC Glass Reinforced Plastic
DI Ductile Iron
PVC Polyvinyl Chloride
CI Cast Iron
SI Spun Iron
ST Steel
VC Vitrified Clay
PP Polypropylene
PF Pitch Fibre
MAC Masonry, Coursed
MAR Masonry, Random
U Unspecified

Address or Site Reference:

Heineken Manchester Denmark Road,

OS sheet Number: SJ8495NW
Scale: 1:1250 **Date:** 28/12/2018
Nodes: 216
Sheet: 2 of 4

Printed by: Property Searches

SEWER RECORDS

United Utilities — helping life flow smoothly

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
9300	33.89	CO	31.06	300			VC	84.15765	1 in 221
9300	33.89	CO	31.06	300			VC	84.15765	1 in 221
5126		CO		100			VC	3.896781	
4116	33.13	FO	29.09	150			PVC	51.64494	1 in 143
5108	33.31	SW	29.96	225			PVC	7.395914	1 in 4
5203	32.2	FO	27.88	225			PVC	3.233918	1 in 18
4101		FO		100			PE	1.72915	
4009		CO		100			VC	2.219719	
4009		CO		100			VC	2.219719	
7901	33.14	CO	31.3	300			CO	63.32456	
7901	33.14	CO	31.3	300			CO	63.32456	
5131		FO		225			VC	12.52563	
5905	31.86	CO	28.14	750			BR	27.51363	1 in 172
5905	31.86	CO	28.14	750			BR	27.51363	1 in 172
5506	33.52	CO	29.46	300			VC	29.52965	1 in 128
4206	32.11	CO	27.7	825			CO	17.39212	1 in 79
4118		CO		100			VC	2.377321	
6400	32.87	CO	28.83	375			VC	107.6827	1 in 135
5004		CO		150			VC	56.50772	
5004		CO		150			VC	56.50772	
9404	34.57	CO	29.23	525			CO	88.32327	1 in 552
9404	34.57	CO	29.23	525			CO	88.32327	1 in 552
5118	32.48	FO	29.27	150			PVC	48.81601	1 in 125
9203	33.58	CO	30.64	300			CO	39.48372	1 in 146
9203	33.58	CO	30.64	300			CO	39.48372	1 in 146
5311		CO		100			VC	43.47447	
4404		CO		150			VC	13.13227	
5111	32.39	SW	29.3	525			CO	9.398947	1 in 11
0201		CO		150			VC	4.584419	
0201		CO		150			VC	4.584419	
4117		CO		100			VC	5.947394	
5205	32.34	SW	30.94	225			VC	64.64909	1 in 104
4110	33.18	SW	29.24	450			CO	46.16934	1 in 45
9302	33.67	CO	29.79	375			CO	52.46904	1 in 119
9406		CO	0	525			CO	68.41052	
6108	33.59	SW	31.44	300			CO	44.99481	1 in 40
5002	32.02	FO	29.62	150			PVC	47.75172	1 in 149
5002	32.02	FO	29.62	150			PVC	47.75172	1 in 149
4414		CO		150			VC	40.67259	
5909	31.77	SW	30.62	225			PVC	59.28751	1 in 34
5909	31.77	SW	30.62	225			PVC	59.28751	1 in 34
5210		SW		225			VC	2.91744	
9202	33.5	CO	30.3	375			CO	27.21922	1 in 340
4111	32.24	SW	30.19	225			PVC	40.81996	1 in 23
6401	33.11	CO	29.7	450			CO	32.95517	1 in 150
6201	33.5	FO	32.3	150			VC	33.01572	1 in 67
5120	33.07	SW	30.32	450			CO	40.30547	1 in 112
5105		FO		225			VC	41.10695	
4907	34.77	CO	30.62	750			BR	34.78505	
4907	34.77	CO	30.62	750			BR	34.78505	
5109	32.59	SW	28.32	750			CO	25.36038	1 in 231
5124	33.25	FO	29.15	150			VC	15.46426	1 in 37
0904	33.12	CO	30.47	630			BR	65.12296	1 in 93
0904	33.12	CO	30.47	630			BR	65.12296	1 in 93
0904	33.12	CO	30.47	630			BR	65.12296	1 in 93
0904	33.12	CO	30.47	630			BR	65.12296	1 in 93
5304		CO		150			VC	4.57439	
5129		CO		100			VC	11.23012	
5123	33.15	FO	30.53	150			VC	13.72597	1 in 10
5307		FO		100			VC	8.293975	
5003	32	FO	29.65	150			PVC	5.041429	1 in 168
5003	32	FO	29.65	150			PVC	5.041429	1 in 168
5400	33.24	CO	28.95	450			CO	49.20366	1 in 107
5001	32	SW	28.9	375			CO	48.30943	1 in 103
5001	32	SW	28.9	375			CO	48.30943	1 in 103
5115	32.86	FO	28.88	150			PVC	7.196327	1 in 48
5117	32.55	FO	28.12	225			PVC	36.52824	1 in 152
5116	33.33	FO	28.73	225			PVC	36.12643	1 in 59
5119	32.41	FO	29.3	150			PVC	5.994414	1 in 200
9303	34.19	CO	29.35	375			CO	34.48188	
5904	31.84	CO	24.08	2300			BR	68.35203	
5904	31.84	CO	24.08	2300			BR	68.35203	
5107	32.9	SW	28.21	750			CO	39.66611	1 in 220
6503	33.83	CO	31.5	300			VC	65.21564	1 in 119
9204	33.5	SW	31.75	225			VC	45.58971	1 in 106
9204	33.5	SW	31.75	225			VC	45.58971	1 in 106
4401	32.64	CO	28.8	300			CO	6.082763	1 in 38
4004	32.63	SW	30.09	1390				37.21559	1 in 930
4004	32.63	SW	30.09	1390				37.21559	1 in 930
9405	33.95	CO	30.68	300			VC	35.43739	1 in 31
0305		CO	0	225			CO	71.65667	
5209		CO		100			VC	4.874965	
9201	33.84	CO	30.06	375			CO	56.32051	1 in 225
9503		CO	0	225			VC	36.67424	
0005	33.37	CO	30.34	600			CO	36.76955	
0005	33.37	CO	30.34	600			CO	36.76955	
4403		CO		150			VC	5.477767	
9400	33.94	CO	32.14	225			VC	45.54119	
5005		CO		150			VC	14.35202	
5005		CO		150			VC	14.35202	
5505	33.49	CO	29.64	300			VC	30.36445	1 in 179
0212		CO	31.19	300			VC	68.47559	1 in 196
5507	33.48	CO	29.89	600			BR	15.55635	1 in 141
5112	32.71	SW	30.65	150			PVC	28.95062	1 in 50
9401	34.22	CO	32.28	300			CO	25.30202	1 in 74
9301		CO	0	225			CO	24.8776	
9301		CO	0	225			CO	24.8776	
6901	31.9	CO	28.21	750			BR	26.92582	1 in 898
9504		CO	0	225			VC	21	
5122	33.07	FO	31.69	150			VC	13.1704	1 in 11
5106		FO		225			VC	15.19221	
5103		SW		225			VC	3.418721	
5125		CO		100			VC	5.126684	
4108	33.18	SW	29.29	225			CO	14.68633	1 in 294
4402	32.84	CO		525			CO	9.164681	
5110	32.4	SW	28.43	750			CO	36.22233	1 in 329
5300	32.97	CO	28.32	600			CO	73.44656	
6911		SW		150			VC	11.82275	
6911		SW		150			VC	11.82275	
5201	31.84	CO	27.85	600			BR	27.284	
9501	34.57	CO	31.72	375			VC	56.61272	1 in 354
9501	34.57	CO	31.72	375			VC	56.61272	1 in 354
9502	35.5	CO	32.9	300			VC	52.81099	1 in 46
9502	35.5	CO	32.9	300			VC	52.81099	1 in 46
6905	33.24	CO	25.95	375			CO	53.33854	1 in 184
6905	33.24	CO	25.95	375			CO	53.33854	1 in 184
9402	34.61	CO	32.01	225			VC	50.28917	
9402	34.61	CO	32.01	225			VC	50.28917	
0502	34.38	CO		225			VC	30.82417	
0502	34.38	CO		225			VC	30.82417	
0307		CO		150			VC	19.86122	
0307		CO		150			VC	19.86122	
0205	33.91	CO	30.83	300			VC	18.14314	1 in 202
0205	33.91	CO	30.83	300			VC	18.14314	1 in 202
4410		CO		525			CO	27.63242	
5102		FO		225			VC	6.230514	
0408	34.5	CO	32.06	300			VC	44.12879	1 in 18
4115	32.12	FO	29.99	150			PVC	60.50107	1 in 88
5308		CO		100			VC	4.055799	
0502	34.38	CO	31.92	225			VC	4.175835	
0502	34.38	CO	31.92	225			VC	4.175835	
0310		CO		150			VC	6.431989	
0310		CO		150			VC	6.431989	
5121	33.06	FO	31.81	150			VC	14.91219	1 in 124
5114		SW	0	525			CO	29.04193	
5207		CO		100			VC	13.94522	
5403	32.41	CO	29.25	525			CO	74.33035	
5903	31.79	CO	27.82	750			BR	22.84732	
5903	31.79	CO	27.82	750			BR	22.84732	
5113	32.76	SW	30.07	225			PVC	31.44276	
5202	32.5	SW	28.03	750			CO	37.01732	1 in 112
5301	32.93	CO	28.33	720			BR	72.91776	1 in 228
5910		CO		150			VC	15.24798	
5910		CO		150			VC	15.24798	
5204	32.57	CO	0	600			BR	24.04636	
5208		CO		100			VC	5.945171	
9403	34.6	CO	29.54	300			CO	18.24829	1 in 304
9403	34.6	CO	29.54	300			CO	18.24829	1 in 304
5402	32.11	CO	29.21	300			VC	54.48853	1 in 156
9200	33.64	CO	30.22	375			CO	27.89265	1 in 174
9306		CO		150			VC	11.38232	
9306		CO		150			VC	11.38232	
9305		CO		150			VC	6.805898	
9305		CO		150			VC	6.805898	
0402	34.39	CO	32.72	150			VC	10.44031	
5514		CO	0	3600			CO	312.8489	
0401	34.42	CO	32.33	225			VC	69.57311	1 in 183

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:
red - combined, blue - surface water, brown - foul, purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

- FO Foul
- SW Surface Water
- CO Combined
- OV Overflow

SEWER SHAPE

- CI Circular
- TR Trapezoidal
- EG Egg
- AR Arch
- OV Oval
- BA Barrel
- FT Flat Top
- HO HorseShoe
- RE Rectangular
- UN Unspecified
- SQ Square

SEWER MATERIAL

- AC Asbestos Cement
- BR Brick
- PE Polyethylene
- RP Reinforced Plastic Matrix
- CO Concrete
- CSB Concrete Segment Bolted
- CSU Concrete Segment Unbolted
- CC Concrete Box Culverted
- PSC Plastic / Steel Composite
- GRC Glass Reinforced Plastic
- DI Ductile Iron
- PVC Polyvinyl Chloride
- CI Cast Iron
- SI Spun Iron
- ST Steel
- VC Vitrified Clay
- PP Polypropylene
- PF Pitch Fibre
- MAC Masonry, Coursed
- MAR Masonry, Random
- U Unspecified

Address or Site Reference:

Heineken Manchester Denmark Road,

OS sheet Number: SJ8396SE
Scale: 1:1250 **Date:** 28/12/2018
Nodes: 157
Sheet: 3 of 4

Printed by: Property Searches

SEWER RECORDS

United Utilities
helping life flow smoothly

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Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad
5507		SW		0			UN	30.52526	
5501	31.16	CO	28.69	450			CO	20.02498	1 in 222
8602	32.5	CO	29.53	450			VC	86.01688	1 in 307
7901	33.14	CO	31.3	300			CO	63.32456	
7901	33.14	CO	31.3	300			CO	63.32456	
1704		CO	0	2350			BR	132.3868	
5905	31.86	CO	28.14	750			BR	27.51363	1 in 172
5905	31.86	CO	28.14	750			BR	27.51363	1 in 172
5406	31.01	CO	28.83	300			CO	21.37756	1 in 107
0701	32.67	CO	29.58	450			VC	7.615773	1 in 95
0701	32.67	CO	29.58	450			VC	7.615773	1 in 95
6601	31.88	CO	29.23	375			CO	24.02082	1 in 96
6804	32.02	CO	29.48	225			VC	40.31129	1 in 115
5809		CO		150			VC	12.36351	
5402	31.13	CO	28.23	300			CO	31	1 in 45
8504	32.26	CO	26.61	770			BR	152	1 in 724
5801	31.87	CO	29.21	450			VC	39.62323	1 in 209
0703	33.29	CO	29.8	750			BR	104.2945	1 in 316
5909	31.77	SW	30.62	225			PVC	59.28751	1 in 34
5909	31.77	SW	30.62	225			PVC	59.28751	1 in 34
9502	32.95	CO	27.18	780			BR	47.01064	1 in 392
9502	32.95	CO	27.18	780			BR	47.01064	1 in 392
5504	31.07	CO	28.39	525			CO	16.03122	1 in 200
6410		CO		150			VC	5.034476	
0502	33.19	CO	27.31	770			BR	41	1 in 342
0502	33.19	CO	27.31	770			BR	41	1 in 342
9503	32.82	CO	30.78	150			VC	17.11724	1 in 342
9702	32.65	CO	24.58	2450			BR	191.4129	
9702	32.65	CO	24.58	2450			BR	191.4129	
5603	31.32	CO	28.85	375			CO	61.0082	1 in 678
4907	34.77	CO	30.62	750			BR	34.78505	
4907	34.77	CO	30.62	750			BR	34.78505	
5405	31.28	CO	29.26	300			CO	39.01282	1 in 91
0601	34.39	CO	0	450			VC	100.005	
7703	32.18	CO	30.29	225			VC	64.00781	1 in 123
9406	32.8	CO	29.16	300			VC	29.06888	1 in 88
9406	32.8	CO	29.16	300			VC	29.06888	1 in 88
8420		CO		150			VC	4.654624	
7704	32.24	CO	30.43	225			VC	25.01999	1 in 417
6605		SW		0			UN	78.24797	
5502	31.1	CO	28.57	450			CO	31.01612	1 in 222
5505	30.98	CO	28.58	375			CO	26.07681	1 in 201
5001	32	SW	28.9	375			CO	48.30943	1 in 103
5001	32	SW	28.9	375			CO	48.30943	1 in 103
7701	32.3	CO	29.61	375			CO	73.1642	1 in 261
7601	32.29	CO	26.24	750			BR	51.0098	1 in 850
5904	31.84	CO	24.08	2300			BR	68.35203	
5904	31.84	CO	24.08	2300			BR	68.35203	
5509		CO		100			VC	7.645934	
9802	32.6	CO	29.02	750			BR	89.21229	
5408		CO		150			VC	15.31035	
6701	32	CO	29.77	300			CO	50	1 in 294
5813		CO		150			VC	6.236243	
8702	32.41	CO	29.22	450			VC	10.91868	1 in 364
7602	32.25	CO	30.1	225			VC	30	1 in 88
6702	31.86	CO	29.46	450			CO	30.01666	1 in 131
5802	31.73	CO	29.69	375			CO	28.28427	1 in 257
6506	31.61	CO	28.61	525			CO	1.415386	
7603	32.19	CO	29.67	300			CO	55.44366	1 in 163
0903	32.87	CO	29.7	640			BR	16	1 in 114
0903	32.87	CO	29.7	640			BR	16	1 in 114
5604		SW		0			UN	96.56183	
5506	31.28	CO	28.3	650			BR	56.00893	1 in 5601
7502	31.98	CO	29.21	375			CO	30.14963	1 in 151
8401	32.44	CO	28.36	300			VC	31.01612	1 in 155
6905	33.24	CO	25.95	375			CO	53.33854	1 in 184
6905	33.24	CO	25.95	375			CO	53.33854	1 in 184
7501	32.03	CO	29.31	375			CO	26.1725	1 in 327
9613		CO		150			VC	3.109478	
5818		FO		100			VC	10.63747	
0902	33.54	CO	30.02	675			CO	59.03389	1 in 281
6404		CO		150			VC	20.06742	
8803	33.03	CO	0	960			BR	30.06659	
9501	32.77	CO	27.02	800			BR	47.01064	1 in 672
6604	32	CO	26.07	750			BR	133.015	1 in 739
6904	32.04	CO	25.61	375			VC	2.236068	1 in 0
9603	32.7	CO	29.65	450			VC	8.602325	
8603	32.47	CO	0	770			BR	178.0112	
6801	31.97	CO	30.08	300			VC	24.35159	1 in 162
9404	32.69	CO	0	300			VC	46	
9404	32.69	CO	0	300			VC	46	
5503	31.2	CO	29.42	225			VC	22.02271	1 in 37
5901	31.94	CO	28.78	525			CO	48.6621	1 in 374
4009		CO		100			VC	2.219719	
4009		CO		100			VC	2.219719	
6504	31.75	CO	29.95	300			CO	52.23983	1 in 80
6506	31.61	CO	28.61	525			CO	29.65327	
5004		CO		150			VC	56.50772	
5004		CO		150			VC	56.50772	
8511		SW		150			VC	11.21139	
9608		CO	0	150			VC	32.04481	
5601	31.4	CO	25.88	760			BR	121.0372	1 in 1009
6703	32.01	CO	29.61	300			CO	31.06445	1 in 444
5404	31	CO	29.11	225			VC	13.0384	1 in 93
6403	31.56	CO	28.94	300			CO	30.01666	1 in 42
7803		CO	0	300			BR	29.73214	
5902	32.03	CO	29.46	375			VC	31.01612	1 in 310
6802	32	CO	29.24	375			CO	56.85947	1 in 284
5602	31.33	CO	29.39	225			VC	44.01136	1 in 116
5002	32.02	FO	29.62	150			PVC	47.75172	1 in 149
5002	32.02	FO	29.62	150			PVC	47.75172	1 in 149
9505	32.85	CO	30.16	450			VC	33.09029	1 in 174
9703	32.78	CO	29.45	750			BR	107.4151	1 in 250
9703	32.78	CO	29.45	750			BR	107.4151	1 in 250
6803	32.08	CO	28.99	450			CO	43.01163	1 in 860
5819		FO		100			VC	3.003354	
8501	32.54	CO	26.92	760			BR	58	1 in 527
9418		CO		225			VC	17.05126	
9801	32.89	CO	0	620			BR	63.97656	
9504	32.94	CO	30.67	225			VC	3.605551	1 in 0
8503	32.63	CO	30.25	375			VC	28	1 in 140
8802	32.72	CO	0	1070			BR	4.472136	
0904	33.12	CO	30.47	630			BR	65.12296	1 in 93
0904	33.12	CO	30.47	630			BR	65.12296	1 in 93
0904	33.12	CO	30.47	630			BR	65.12296	1 in 93
0904	33.12	CO	30.47	630			BR	65.12296	1 in 93
9506	32.8	CO	30.83	450			VC	56.00893	1 in 86
8404	32.35	CO	0	300			VC	45.04442	
9417		CO		225			VC	22.31138	
5003	32	FO	29.65	150			PVC	5.041429	1 in 168
5003	32	FO	29.65	150			PVC	5.041429	1 in 168
7702	32.23	CO	29.63	300			CO	43	
6506	31.61	CO		525			CO	52.92583	
7403	31.84	CO	29.73	300			CO	73.02739	1 in 128
8409		CO		150			VC	62.29316	
8703	32.43	CO	29.16	450			VC	40.64325	
6903	32.1	CO	23.57	3050			BR	4.123106	
6902	32.2	CO	28.34	750			BR	53.75872	1 in 489
4004	32.63	SW	30.09	1390				37.21559	1 in 930
4004	32.63	SW	30.09	1390				37.21559	1 in 930
7802	32.38	CO	28.55	750			BR	25.63201	
9602	32.79	CO	29.97	450			VC	66.00758	1 in 213
9610		CO	0	150			VC	7.681959	
6603	32.17	CO	26.15	750			BR	40	1 in 667
6501		SW		0			UN	63.53532	
9405	32.47	CO	0	300			VC	50	
5005		CO		150			VC	14.35202	
5005		CO		150			VC	14.35202	
6901	31.9	CO	28.21	750			BR	26.92582	1 in 898
5803	31.7	CO	29.96	300			VC	6	1 in 50
7801	32.51	CO	29.33	375			CO	69.28925	1 in 277
6808		SW		100			VC	9.059731	
9407	32.62	CO	0	300			VC	30.01666	
6911		SW		150			VC	11.82275	
6911		SW		150			VC	11.82275	
6602	31.66	CO	29.72	225			VC	38.01316	1 in 112
9509		CO		100			VC	8.559363	
5413		CO		150			VC	6.39105	
6402		CO		150			VC	23.23719	
5701	31.69	CO	29.59	300			VC	59	1 in 268
0804	32.76	CO	29.44	610			BR	23.08679	
0804	32.76	CO	29.44	610			BR	23.08679	
5510		CO		100			VC	16.92827	
5903	31.79	CO	27.82	750			BR	22.84732	
5903	31.79	CO	27.82	750			BR	22.84732	
5910		CO		150			VC	15.24798	
5910		CO		150			VC	15.24798	
7503	31.92	CO	28.95	525			CO	66.01768	1 in 600
6505	31.66	CO	28.83	525			CO	78.01305	1 in 390
8802	32.72	CO	28.6	720			BR	14.86607	1 in 743
9510		CO		100			VC	3.380162	
5808		CO		150			VC	5.549957	
7402	31.87	CO	30.09	225			VC	33.06055	1 in 92
4606		CO		150			VC	33.65176	
0501	33.16	CO	27.29	720			BR	4	1 in 200
0501	33.16	CO	27.29	720			BR	4	1 in 200
0406	33	CO	29.3	300			VC	30.12929	1 in 274
0406	33	CO	29.3	300			VC	30.12929	1 in 274
9512		CO		150			VC	9.126645	
0503	33.29	CO	27.44	750			BR	48	1 in 400
0407	33.06	CO	31.09	225			VC	22.65167	1 in 57
0405	32.91	CO	30.25	300			VC	44.89475	1 in 47
0405	32.91	CO	30.25	300			VC	44.89475	1 in 47

Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	Grad

LEGEND

Abandoned | Foul | Surface Water | Combined

- Public Sewer
- Private Sewer
- Section 104
- Rising Main
- Sludge Main
- Overflow
- Water Course
- Highway Drain

All point assets follow the standard colour convention:
red - combined, blue - surface water, brown - foul, purple - overflow

- Manhole
- Head of System
- Extent of Survey
- Rodding Eye
- Inlet
- Discharge Point
- Vortex
- Penstock
- Washout Chamber
- Valve
- Air Valve
- Non Return Valve
- Soakaway
- Gully
- Cascade
- Flow Meter
- Hatch Box
- Oil Interceptor
- Summit
- Drop Shaft
- Orifice Plate
- Side Entry Manhole
- Outfall
- Screen Chamber
- Inspection Chamber
- Bifurcation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Vortex Chamber
- Penstock Chamber
- Network Storage Tank
- Sewer Overflow
- Ww Treatment Works
- Ww Pumping Station
- Septic Tank
- Control Kiosk
- Change of Characteristic

MANHOLE FUNCTION

- FO Foul
- SW Surface Water
- CO Combined
- OV Overflow

SEWER SHAPE

- CI Circular
- TR Trapezoidal
- EG Egg
- AR Arch
- OV Oval
- BA Barrel
- FT Flat Top
- HO HorseShoe
- RE Rectangular
- UN Unspecified
- SQ Square

SEWER MATERIAL

- AC Asbestos Cement
- BR Brick
- PE Polyethylene
- RP Reinforced Plastic Matrix
- CO Concrete
- CSB Concrete Segment Bolted
- CSU Concrete Segment Unbolted
- CC Concrete Box Culverted
- PSC Plastic / Steel Composite
- GRC Glass Reinforced Plastic
- DI Ductile Iron
- PVC Polyvinyl Chloride
- CI Cast Iron
- SI Spun Iron
- ST Steel
- VC Vitrified Clay
- PP Polypropylene
- PF Pitch Fibre
- MAC Masonry, Coursed
- MAR Masonry, Random
- U Unspecified

Address or Site Reference:

Heineken Manchester Denmark Road,

OS sheet Number: SJ8395NE
Scale: 1:1250 **Date:** 28/12/2018
Nodes: 173
Sheet: 4 of 4

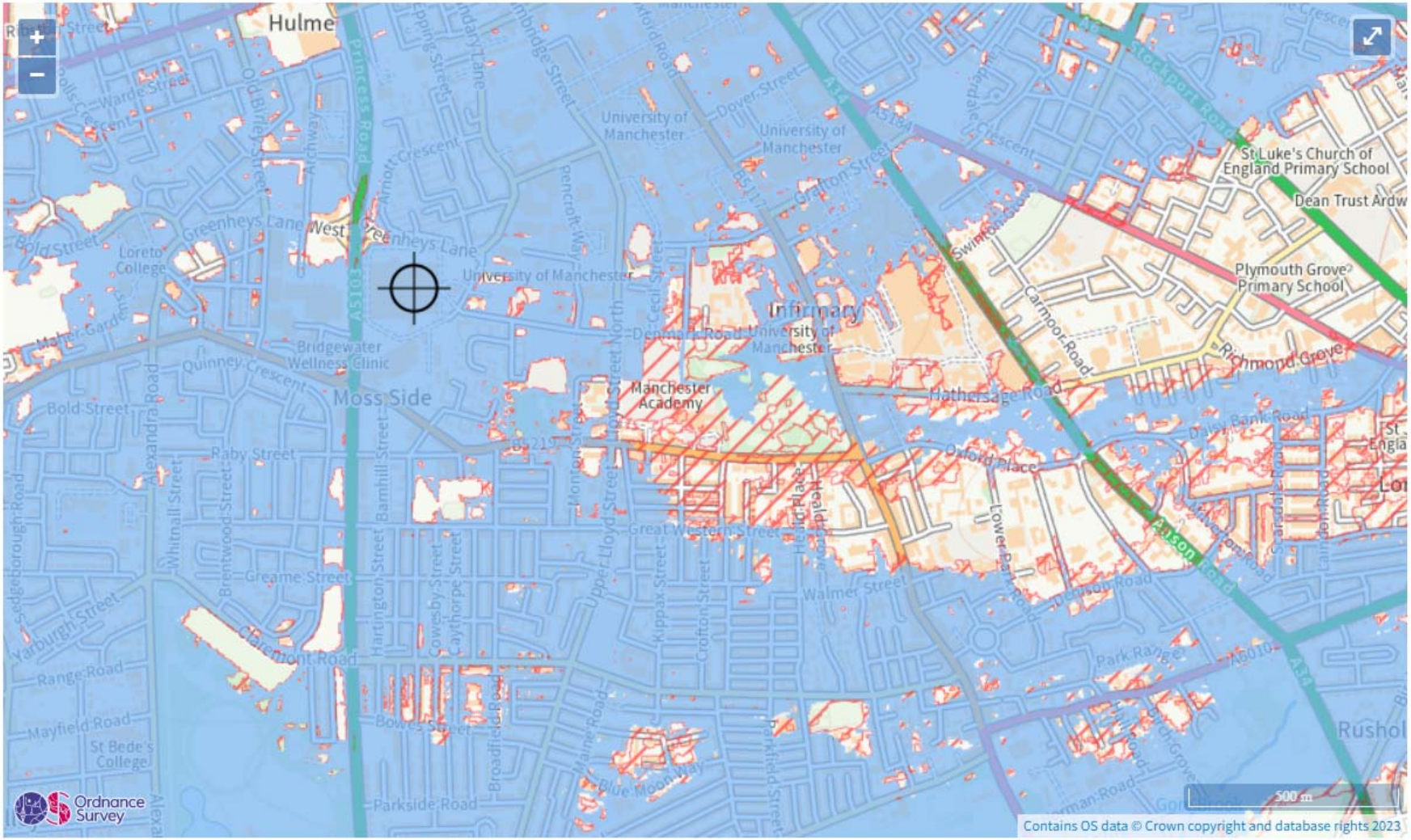
Printed by: Property Searches

SEWER RECORDS

United Utilities — helping life flow smoothly

Heineken, Manchester

Flood Risk From Reservoirs



Maximum extent of flooding from reservoirs:

when river levels are normal | when there is also flooding from rivers | Location you selected

Appendix F – Emcus Letter Regarding Infiltration

14 June 2023

J1834_LTR_03

geotechnical & geo-environmental
Emcus Limited, 1E Campbell Street, Belper, Derbyshire
tel: 01773 850365 email: advice@emcus.co.uk web: www.emcus.co.uk

Norder Design Associates,
Beech Lawn,
Green Lane,
Belper,
Derbyshire,
DE56 1BY

For the attention of: Anne Fox

Dear Sirs,

Can Intake and Warehouse, Royal Brewery, Manchester

Further to the issue of our geotechnical & geo-environmental investigation report for the above site, (report reference MJH/J1834/D3/1, November 2019), it is considered that the cohesive natural strata predominantly encountered immediately beneath the site will not be sufficiently permeable to receive water from soakaways. Furthermore, it is recommended that water from soakaways, permeable pavements etc., is not discharged into the Made Ground beneath the site.

Yours faithfully
For & on behalf of Emcus Limited

Marcus Hanford
Technical Director
mhanford@emcus.co.uk

Appendix G – Micro Drainage Print Outs

IH 124 Mean Annual Flood

Input

Return Period (years)	1	Soil	0.300
Area (ha)	0.265	Urban	0.750
SAAR (mm)	848	Region Number	Region 10

Results	**l/s**
QBAR Rural	1.1
QBAR Urban	3.2
Q1 year	2.7
Q1 year	2.7
Q2 years	3.2
Q5 years	3.9
Q10 years	4.2
Q20 years	4.4
Q25 years	4.5
Q30 years	4.6
Q50 years	4.7
Q100 years	4.9
Q200 years	5.3
Q250 years	5.4
Q1000 years	6.0

Warning: It is unusual to use the IH124 method with an area < 50ha. The Interim Code of Practice recommends that the IH124 method is applied with 50ha and the resulting discharge is linearly interpolated for the required area. The ICP SUDS tab will do this automatically.

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.360	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	200	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	10.000	0.050	200.0	0.265	5.00	0.0	0.600	o	375	Pipe/Conduit	
1.001	10.000	0.050	200.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	46.30	5.13	31.300	0.265	0.0	0.0	0.0	1.28	141.1	33.2
1.001	45.80	5.26	31.250	0.265	0.0	0.0	0.0	1.28	141.1	33.2

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.360	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	200	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	10.000	0.050	200.0	0.265	5.00	0.0	0.600	o	375	Pipe/Conduit	
1.001	10.000	0.050	200.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	136.40	5.13	31.300	0.265	0.0	0.0	0.0	1.28	141.1	97.9
1.001	135.16	5.26	31.250	0.265	0.0	0.0	0.0	1.28	141.1	97.9

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.300	Add Flow / Climate Change (%)	0
Ratio R	0.346	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	200	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.176	4-8	0.150

Total Area Contributing (ha) = 0.326

Total Pipe Volume (m³) = 16.606

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	35.325	0.177	199.6	0.080	4.00	0.0	0.600	o	300	Pipe/Conduit	
1.001	57.091	0.228	250.4	0.112	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	19.823	0.079	250.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.000	82.626	0.331	249.6	0.134	4.00	0.0	0.600	o	300	Pipe/Conduit	
2.001	11.977	0.273	43.8	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	62.01	4.53	31.980	0.080	0.0	0.0	0.0	1.11	78.4	13.4
1.001	57.40	5.49	31.803	0.192	0.0	0.0	0.0	0.99	69.9	29.8
1.002	55.99	5.83	31.575	0.192	0.0	0.0	0.0	0.99	70.0	29.8
2.000	57.86	5.39	32.100	0.134	0.0	0.0	0.0	0.99	70.0	21.0
2.001	57.49	5.47	31.769	0.134	0.0	0.0	0.0	2.38	168.3	21.0

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.003	15.055	0.060	250.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	13.030	0.306	42.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	54.97	6.08	31.496	0.326	0.0	0.0	0.0	0.99	70.0	48.5
1.004	54.62	6.17	31.435	0.326	0.0	0.0	0.0	2.42	170.8	48.5

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: 9, DS/PN: 1.004, Volume (m³): 3.2

Unit Reference	MD-SHE-0169-1600-1750-1600
Design Head (m)	1.750
Design Flow (l/s)	16.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	169
Invert Level (m)	31.435
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	1.750	16.0
Flush-Flo™	0.511	15.9
Kick-Flo®	1.085	12.7
Mean Flow over Head Range	-	13.9

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

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	6.0	1.200	13.4	3.000	20.6	7.000	31.0
0.200	13.8	1.400	14.4	3.500	22.2	7.500	32.1
0.300	15.1	1.600	15.3	4.000	23.7	8.000	33.1
0.400	15.7	1.800	16.2	4.500	25.1	8.500	34.1
0.500	15.9	2.000	17.0	5.000	26.4	9.000	35.0
0.600	15.8	2.200	17.8	5.500	27.6	9.500	35.9
0.800	15.3	2.400	18.6	6.000	28.8		
1.000	13.9	2.600	19.3	6.500	29.9		

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Storage Structures for Storm

Tank or Pond Manhole: 9, DS/PN: 1.004

Invert Level (m) 31.435

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	66.0	1.000	66.0	1.001	0.0

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.346
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.300 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	1	+0%					32.055
1.001	2	15 Winter	1	+0%					31.921
1.002	3	15 Winter	1	+0%					31.706
2.000	5	15 Winter	1	+0%					32.203
2.001	6	15 Winter	1	+0%					31.838
1.003	8	15 Winter	1	+0%					31.662
1.004	9	30 Winter	1	+0%					31.625

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.225	0.000	0.14			10.2	OK	
1.001	2	-0.182	0.000	0.31			20.5	OK	
1.002	3	-0.169	0.000	0.33			20.0	OK	
2.000	5	-0.197	0.000	0.23			15.7	OK	
2.001	6	-0.231	0.000	0.12			15.7	OK	
1.003	8	-0.134	0.000	0.58			34.3	OK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	9	-0.110	0.000	0.10			13.6	OK	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.346
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.300 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 30
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	30	+0%					32.102
1.001	2	15 Winter	30	+0%					32.027
1.002	3	60 Winter	30	+0%	30/15 Summer				31.967
2.000	5	15 Winter	30	+0%					32.273
2.001	6	60 Winter	30	+0%					31.962
1.003	8	60 Winter	30	+0%	30/15 Summer				31.957
1.004	9	60 Winter	30	+0%	30/15 Summer				31.942

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.178	0.000	0.35			25.0	OK	
1.001	2	-0.076	0.000	0.83			55.3	OK	
1.002	3	0.092	0.000	0.41			25.1	SURCHARGED	
2.000	5	-0.127	0.000	0.57			38.5	OK	
2.001	6	-0.107	0.000	0.16			21.2	OK	
1.003	8	0.161	0.000	0.73			43.0	SURCHARGED	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	9	0.206	0.000	0.11			15.9	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.346
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.300 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 100
Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	100	+0%					32.209
1.001	2	60 Winter	100	+0%	100/15 Summer				32.178
1.002	3	60 Winter	100	+0%	100/15 Summer				32.162
2.000	5	15 Winter	100	+0%					32.306
2.001	6	60 Winter	100	+0%	100/30 Winter				32.158
1.003	8	60 Winter	100	+0%	100/15 Summer				32.153
1.004	9	60 Winter	100	+0%	100/15 Summer				32.139

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.071	0.000	0.43			31.1	OK	
1.001	2	0.075	0.000	0.59			39.1	SURCHARGED	
1.002	3	0.287	0.000	0.52			31.5	SURCHARGED	
2.000	5	-0.094	0.000	0.74			49.7	OK	
2.001	6	0.089	0.000	0.19			25.4	SURCHARGED	
1.003	8	0.357	0.000	0.90			52.9	SURCHARGED	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	9	0.403	0.000	0.11			15.9	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.346
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.300 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 100
Climate Change (%) 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	60 Winter	100	+40%	100/15 Summer				33.245
1.001	2	60 Winter	100	+40%	100/15 Summer				33.239
1.002	3	60 Winter	100	+40%	100/15 Summer				33.224
2.000	5	60 Winter	100	+40%	100/15 Summer				33.232
2.001	6	60 Winter	100	+40%	100/15 Summer				33.219
1.003	8	60 Winter	100	+40%	100/15 Summer				33.214
1.004	9	60 Winter	100	+40%	100/15 Summer				33.199

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.965	0.000	0.30			21.8	FLOOD RISK	
1.001	2	1.136	0.000	0.74			49.2	FLOOD RISK	
1.002	3	1.349	0.000	0.79			48.1	FLOOD RISK	
2.000	5	0.832	0.000	0.58			39.0	FLOOD RISK	
2.001	6	1.150	0.000	0.22			28.8	FLOOD RISK	
1.003	8	1.418	0.000	1.24			73.0	FLOOD RISK	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.004	9	1.463	0.000	0.12			16.0	FLOOD RISK	

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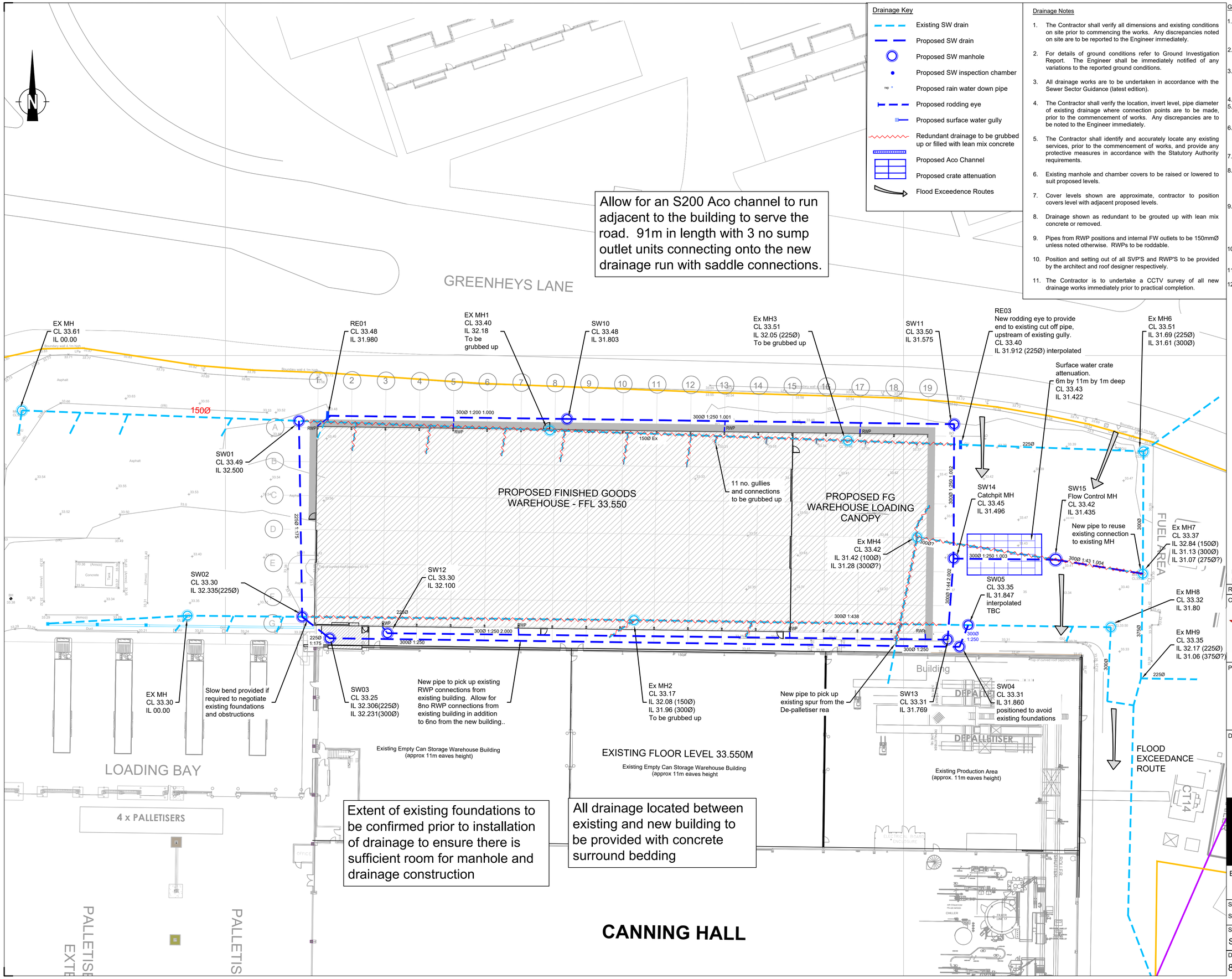
Appendix H – Drainage Drawings



Drainage Key

- Existing SW drain
- Proposed SW drain
- Proposed SW manhole
- Proposed SW inspection chamber
- Proposed rain water down pipe
- Proposed rodding eye
- Proposed surface water gully
- Redundant drainage to be grubbed up or filled with lean mix concrete
- Proposed Aco Channel
- Proposed crate attenuation
- Flood Exceedence Routes

Drainage Notes

1. The Contractor shall verify all dimensions and existing conditions on site prior to commencing the works. Any discrepancies noted on site are to be reported to the Engineer immediately.
2. For details of ground conditions refer to Ground Investigation Report. The Engineer shall be immediately notified of any variations to the reported ground conditions.
3. All drainage works are to be undertaken in accordance with the Sewer Sector Guidance (latest edition).
4. The Contractor shall verify the location, invert level, pipe diameter of existing drainage where connection points are to be made, prior to the commencement of works. Any discrepancies are to be noted to the Engineer immediately.
5. The Contractor shall identify and accurately locate any existing services, prior to the commencement of works, and provide any protective measures in accordance with the Statutory Authority requirements.
6. Existing manhole and chamber covers to be raised or lowered to suit proposed levels.
7. Cover levels shown are approximate, contractor to position covers level with adjacent proposed levels.
8. Drainage shown as redundant to be grouted up with lean mix concrete or removed.
9. Pipes from RWP positions and internal FW outlets to be 150mmØ unless noted otherwise. RWPs to be roddable.
10. Position and setting out of all SVP'S and RWP'S to be provided by the architect and roof designer respectively.
11. The Contractor is to undertake a CCTV survey of all new drainage works immediately prior to practical completion.

General Notes:

1. The drawings, design and all information contained therein are the sole copyright of Norder Design Associates (NDA) and reproduction in any form is forbidden unless permission is obtained in writing.
2. This drawing is to be read in conjunction with all other relevant Architects, Engineers and specialists drawings, details and specifications.
3. Conflicting information shown on the NDA drawings or discrepancies between the information given by NDA and that provided by others must be referred to NDA before work proceeds.
4. Dimensions must not be scaled from this drawing.
5. Dimensions marked 'dimension to be site checked' are subject to confirmation by site measurement before construction proceeds.
6. Subcontractor surveys, such as for the purposes of steelwork installation, take precedence over 'site dimensions' indicated on this drawing. All surveys should ensure an accurate fit of components.
7. Temporary works associated with the construction of the project shall be the responsibility of the Principal Contractor.
8. Where any temporary works or scaffolding are required the Principal Contractor shall appoint a competent and suitably experienced Temporary Works Coordinator (TWC). Refer to BS 5975 for guidance on temporary works and the role of a TWC.
9. Calculations and drawings of all Contractor designed structural items associated with NDA's design responsibilities shall be submitted to the Engineer for comment at least 10 days prior to manufacture. Any comments made by NDA do not absolve the Contractor of his design responsibilities.
10. Contractor to refer to the Health and Safety File for identification of hazards, including the existence of underground and overhead utilities.
11. The contractor is to work within any planning restriction including working hours, noise levels etc.
12. Design and drawing information is based on the MSE topographical survey drawing number NDA3789-1 Heineken Manchester. NDA does not accept any liability for any inaccuracies this information may contain.

REV	DATE	AMENDMENT	DRW	CHK
P02	23/06/23	For approval	AF	ML
P01	04/05/23	DRAFT For Tender	AF	ML

CLIENT

HEINEKEN

PROJECT

Manchester Brewery
Finished Goods Warehouse

DRAWING TITLE

Drainage Layout

Norder
Engineers. Architects. Innovators.

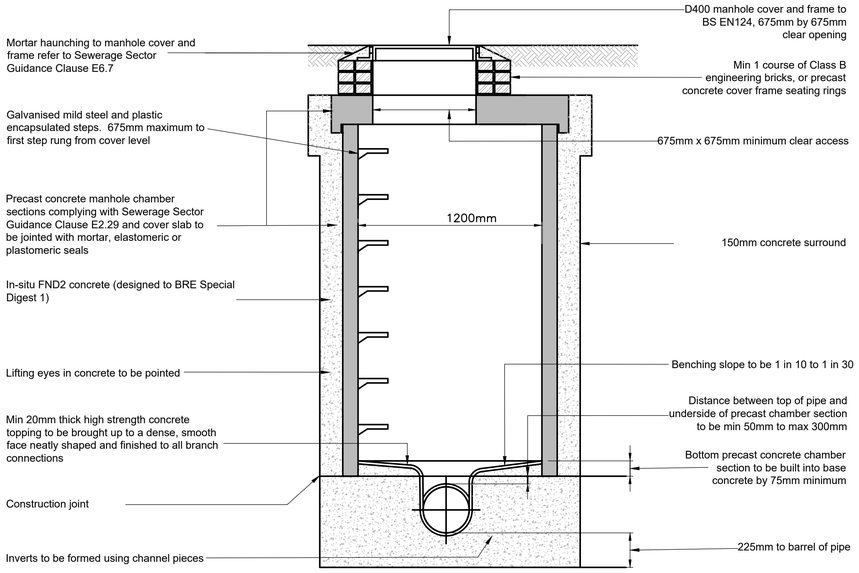
Beech Lawn, Green Lane, Belper, Derby DE56 1BY
Tel: 01773 824414
E-mail: enquiries@norder.co.uk

SCALE	SHEET SIZE	NDA REF
Scale 1 : 250	A1	8901

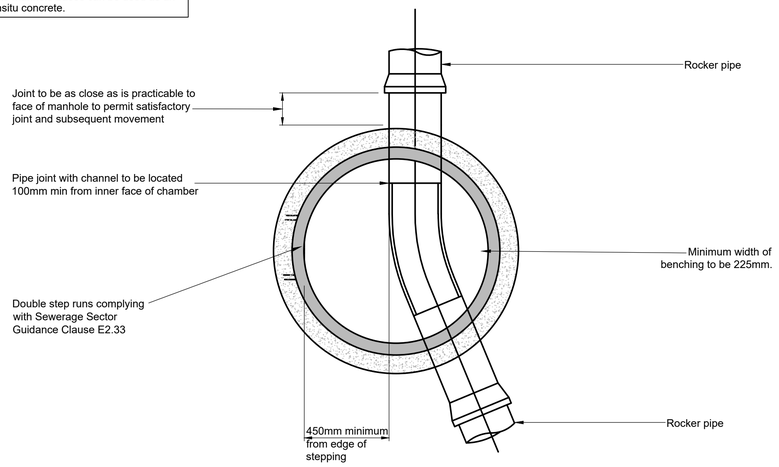
SUITABILITY

S2 - Suitable for Information

DRAWING NO.	REV
8901-NDA-XX-XX-DR-C-1201	P02

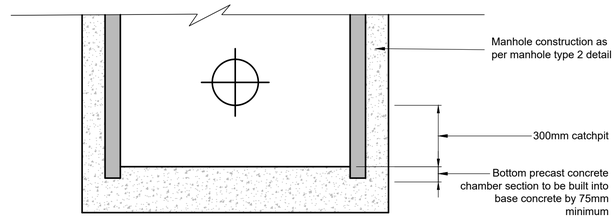


Precast concrete manhole bases can be used as an alternative to insitu concrete.



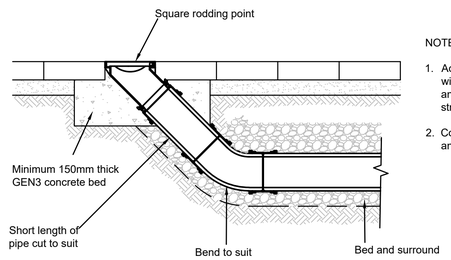
Typical Manhole Detail

Scale 1:20



Catchpit Manhole Base

Scale 1:20



NOTES: RODDING EYE

1. Access shall be installed with proprietary frames and covers of suitable strength to suit location.
2. Covers shall be set to level and fall of finished surface.

Rodding Eye Detail

Scale 1:10

Drainage Notes

1. All drainage works to be undertaken in accordance with the Sewerage Sector Guidance (latest edition).
2. All private drainage works are to be undertaken in accordance with the current British Standards and Building Regulations.
3. Highway construction materials and workmanship shall be in accordance with the Specification for Highway Works.
4. The Principal Contractor shall be responsible for checking the existing line, invert level and pipe diameter of the existing connection points for both the foul and surface water systems, prior to undertaking installation of any new drainage works. Any deviation to the levels and positions indicated on the drawing should be brought to the immediate attention of the Engineer.
5. Private pipes up to and including 300mm diameter to be PVC-U to BSEN 1401, PE to BSEN 122666-1 or clay ware to BSEN295 Class 160. Private pipes over 300mm diameter to be concrete to BS5911 Class M.
6. All polypropylene inspection chambers shall be in accordance with BS7158.
7. All pipe runs to be laid with flexible joints.
8. Connections to be made by purpose made junctions as far as practicable, or using pipe bends to be turned in direction of flow.
9. Design Sulphate Class DS-1 concrete mixes are to be used (all in accordance with BS8500). The concrete mix has been selected for BS8500 Class AC-1.
10. All precast concrete products (ie pipes, manholes rings etc.) shall be of suitable concrete mix to cater for Class 2 Sulphates.
11. All pipes entering and exiting manholes are to be connected with pipe soffits level unless noted otherwise.
12. Pre-formed channels are to be used in manholes where applicable.
13. First flexible joint in pipes adjacent to a manhole shall be a maximum of 600mm from inside face of manhole, connecting to a rocker pipe.
14. The length of the rocker pipe to be 600mm for pipes between 150mm and 600mm diameter, 1000mm long for pipes between 675mm and 750mm diameter and 1250mm long for pipes 825mm diameter and over.
15. Manhole covers and frames to be in accordance with the Sewerage Sector Guidance (latest edition), Adoptable frames to be 150mm deep. Frame strengths to be D400 in trafficked areas and B125 in footway and verge areas.
16. Granolithic concrete benching to be steel trowelled to a dense smooth face neatly shaped and finished to all branch connections.
17. The first manhole upstream from the connection to the connection to the existing drainage should be fitted with a screen in order to prevent debris entering the existing sewer/drain. The screen should not be removed until immediately prior to the occupation of the premises to be served by the sewer.
18. Internal inspection chambers, manholes and access fittings to be provided with lockable double sealed manhole cover and frames grade D44 to BSEN 124.
19. Road gully connections to be 150mm diameter laid at a minimum gradient of 1:150 unless noted otherwise.
20. All drainage works within the zone of influence of trees are to be constructed in accordance with the NHBC standards and tree preservation offices requirements.
21. All SVP'S and RWP'S to have a vertical rodding access positioned above ground level.
22. Position and setting out of all SVP'S and RWP'S to be provided by the architect.
23. All drains to be tested prior to backfilling, and upon completion of surfacing. All drains to be inspected by CCTV immediately prior to practical completion and at the end of the maintenance period.

General Notes:

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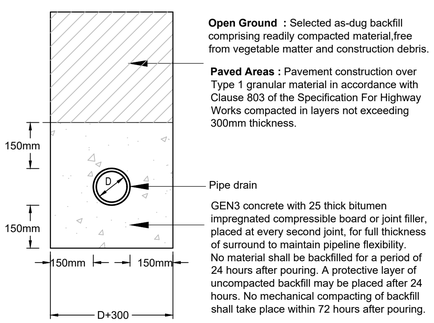
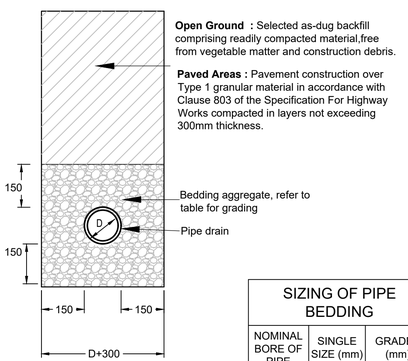
5. Dimensions marked 'dimension to be site checked' are subject to confirmation by site measurement before construction proceeds.
6. Subcontractor surveys, such as for the purposes of steelwork installation, take precedence over 'site dimensions' indicated on this drawing. All surveys should ensure an accurate fit of components.
7. Temporary works associated with the construction of the project shall be the responsibility of the Principal Contractor.
8. Where any temporary works or scaffolding are required the Principal Contractor shall appoint a competent and suitably experienced Temporary Works Coordinator (TWC). Refer to BS 5975 for guidance on temporary works and the role of a TWC.
9. Calculations and drawings of all Contractor designed structural items associated with NDA's design responsibilities shall be submitted to the Engineer for comment at least 10 days prior to manufacture. Any comments made by NDA do not absolve the Contractor of his design responsibilities.
10. Contractor to refer to the Health and Safety File for identification of hazards, including the existence of underground and overhead utilities.
11. The contractor is to work within any planning restriction including working hours, noise levels etc.
12. Design and drawing information is based on the MSE topographical survey drawing number NDA4034-1-Cramlington. NDA does not accept any liability for any inaccuracies this information may contain.



Type Z Bedding

Depth to soffit <1.2m in trafficked areas
Depth to soffit <0.9 in pedestrian areas



Type S Bedding

Depth to soffit >1.2m in trafficked areas
Depth to soffit <0.9 in pedestrian areas

SIZING OF PIPE BEDDING

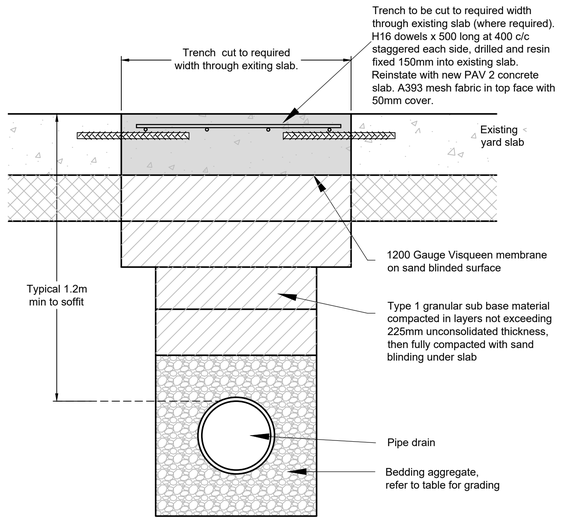
NOMINAL BORE OF PIPE	SINGLE SIZE (mm)	GRADED (mm)
>100 to 150	10 or 14	14 to 5
>150 - 300	10,14 or 20	14 to 5 or 20 to 5
>300 - 550	14 to 20	14 to 5 or 20 to 5
>550	14, 20 or 40	14 to 5 or 20 to 5 or 40 to 5

Pipe Bedding Details

Scale 1:10

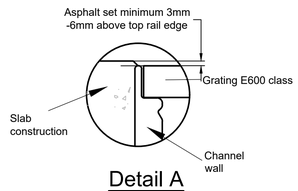
NOTES: PIPE BEDDING / TRENCHES

1. Trench excavation and pipe bedding shall comply with the requirements of Sewers For Adoption.
2. Prior to any excavation the position of all underground services shall be established by utility company plans and marked onsite using detection equipment and hand dug trial pits.
3. Trenches shall be excavated and supported as and when necessary.
4. To ensure uniform support along the run all hard or soft spots, that may cause differential settlement, shall be removed and replaced with tamped selected as-dug backfill or Type 1 granular material.
5. The finished trench base shall be true to line and gradient.
6. Trench bases shall be free of standing water and have minimal disturbance by foot traffic to reduce damage to the formation.
7. Immediately following the excavation of the trench, the pipes shall be laid and jointed on the pipe bed. Pipes shall be laid so that each one is in contact with the bed throughout the length of its barrel.
8. Trenches shall be backfilled as soon as possible to prevent injury by falls, where trenches are left open they shall be appropriately secured by barriers to prevent access into the excavation. Backfilling shall be undertaken in such manner to prevent uneven loading or damage to the pipe. Filling material shall be deposited in layers not exceeding 225 unconsolidated thickness, and then compacted to form a stable backfill. Where the excavations have been supported and the supports are to be removed, these where practicable, shall be withdrawn progressively as backfilling proceeds. The progressive withdrawal shall be done in such a manner as to minimise the danger of collapse and all voids formed behind the supports shall be carefully filled and compacted to prevent depressions forming in the final surface.
9. Lever type chain cutters should be used on 100 & 150mmØ pipes with 225mmØ cut by either a double screw type chain cutter or masonry saw. cut ends shall be trimmed with a pipe trimmer / emery stone.

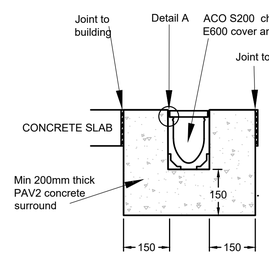


Pipe Bedding Under Existing External Concrete Slab

Scale 1:10



Detail A



Aco Channel Detail - S200

Scale 1:10

REV	DATE	AMENDMENT	DRW	CHK
P01	04/05/23	DRAFT For Tender	AF	ML

CLIENT

HEINEKEN

PROJECT

Manchester Brewery
Finished Goods Warehouse

DRAWING TITLE

Drainage Details
Sheet 1 of 2

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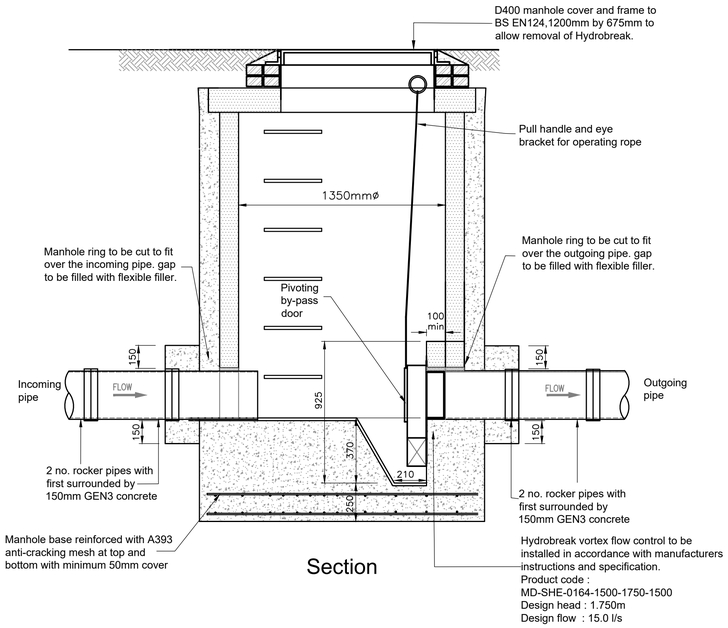
SCALE	SHEET SIZE	NDA REF
As shown	A1	8901

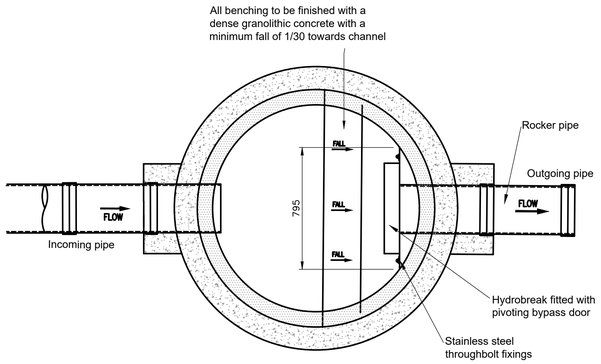
SUITABILITY

S2 - Suitable for Information

DRAWING NO.	REV
8901-NDA-XX-XX-DR-C-1202	P01



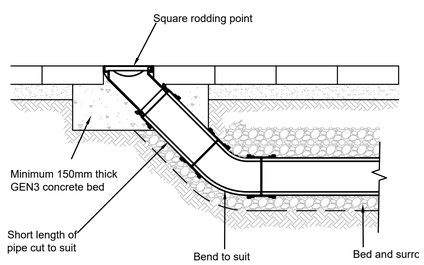
Section



Plan

Flow Control Manhole

Scale 1:20

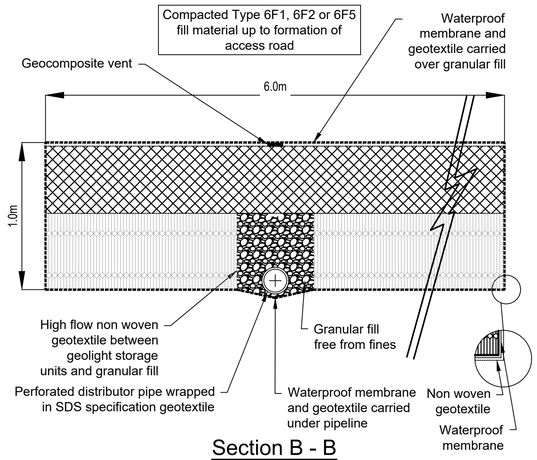


Rodding Eye Detail

Scale 1:10

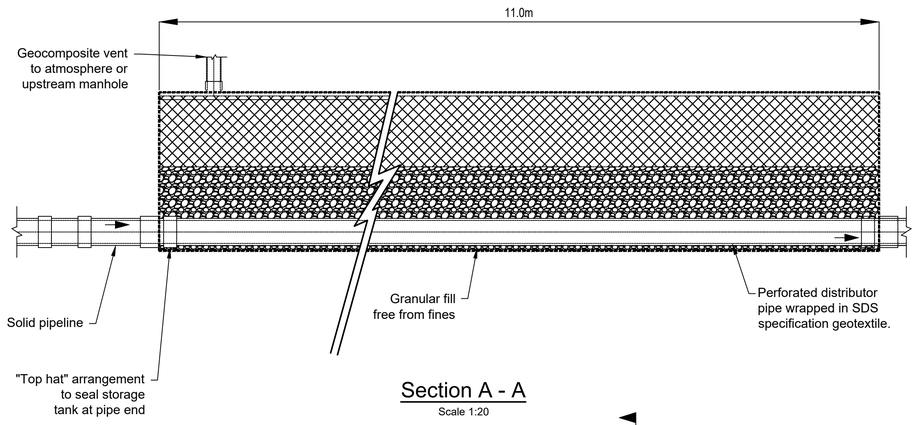
Attenuation Crate Notes

1. All installation works and specifications to be undertaken in acordance with SDS GEOlight requirements.



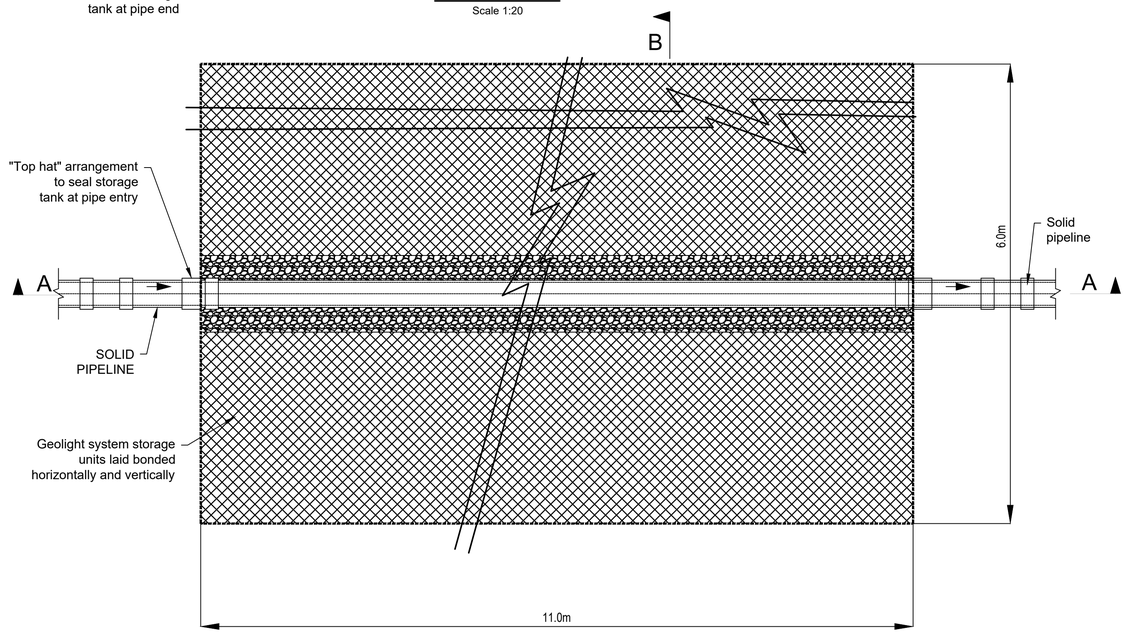
Section B - B

Scale 1:20



Section A - A

Scale 1:20



SDS Geolight Surface Water Attenuation Crates

Scale 1:20

Drainage Notes

1. All drainage works to be undertaken in accordance with the Sewerage Sector Guidance (latest edition).
2. All private drainage works are to be undertaken in accordance with the current British Standards and Building Regulations.
3. Highway construction materials and workmanship shall be in accordance with the Specification for Highway Works.
4. The Principal Contractor shall be responsible for checking the existing line, invert level and pipe diameter of the existing connection points for both the foul and surface water systems, prior to undertaking installation of any new drainage works. Any deviation to the levels and positions indicated on the drawing should be brought to the immediate attention of the Engineer.
5. Private pipes up to and including 300mm diameter to be PVC-U to BSEN 1401, PE to BSEN 122666-1 or clay ware to BSEN295 Class 160. Private pipes over 300mm diameter to be concrete to BS5911 Class M.
6. All polypropylene inspection chambers shall be in accordance with BS7158.
7. All pipe runs to be laid with flexible joints.
8. Connections to be made by purpose made junctions as far as practicable, or using pipe bends to be turned in direction of flow.
9. Design Sulphate Class DS-1 concrete mixes are to be used (all in accordance with BS8500). The concrete mix has been selected for BS8500 Class AC-1.
10. All precast concrete products (ie pipes, manholes rings etc.) shall be of suitable concrete mix to cater for Class 2 Sulphates.
11. All pipes entering and exiting manholes are to be connected with pipe soffits level unless noted otherwise.
12. Pre-formed channels are to be used in manholes where applicable.
13. First flexible joint in pipes adjacent to a manhole shall be a maximum of 600mm from inside face of manhole, connecting to a rocker pipe.
14. The length of the rocker pipe to be 600mm for pipes between 150mm and 600mm diameter, 1000mm long for pipes between 675mm and 750mm diameter and 1250mm long for pipes 825mm diameter and over.
15. Manhole covers and frames to be in accordance with the Sewerage Sector Guidance (latest edition), Adoptable frames to be 150mm deep. Frame strengths to be D400 in trafficked areas and B125 in footway and verge areas.
16. Granolithic concrete benching to be steel trowelled to a dense smooth face neatly shaped and finished to all branch connections.
17. The first manhole upstream from the connection to the connection to the existing drainage should be fitted with a screen in order to prevent debris entering the existing sewer/drain. The screen should not be removed until immediately prior to the occupation of the premises to be served by the sewer.
18. Internal inspection chambers, manholes and access fittings to be provided with lockable double sealed manhole cover and frames grade D44 to BSEN 124.
19. Road gully connections to be 150mm diameter laid at a minimum gradient of 1:150 unless noted otherwise.
20. All drainage works within the zone of influence of trees are to be constructed in accordance with the NHBC standards and tree preservation offices requirements.
21. All SVP'S and RWP'S to have a vertical rodding access positioned above ground level.
22. Position and setting out of all SVP'S and RWP'S to be provided by the architect and roof designer respectively.
23. All drains to be tested prior to backfilling, and upon completion of surfacing. All drains to be inspected by CCTV immediately prior to practical completion and at the end of the maintenance period.

General Notes:

1. The drawings, design and all information contained therein are the sole copyright of Norder Design Associates (NDA) and reproduction in any form is forbidden unless permission is obtained in writing.
2. This drawing is to be read in conjunction with all other relevant Architects, Engineers and specialists drawings, details and specifications.
3. Conflicting information shown on the NDA drawings or discrepancies between the information given by NDA and that provided by others must be referred to NDA before work proceeds.
4. Dimensions must not be scaled from this drawing.
5. Dimensions marked 'dimension to be site checked' are subject to confirmation by site measurement before construction proceeds.
6. Subcontractor surveys, such as for the purposes of steelwork installation, take precedence over 'site dimensions' indicated on this drawing. All surveys should ensure an accurate fit of components.
7. Temporary works associated with the construction of the project shall be the responsibility of the Principal Contractor.
8. Where any temporary works or scaffolding are required the Principal Contractor shall appoint a competent and suitably experienced Temporary Works Coordinator (TWC). Refer to BS 5975 for guidance on temporary works and the role of a TWC.
9. Calculations and drawings of all Contractor designed structural items associated with NDA's design responsibilities shall be submitted to the Engineer for comment at least 10 days prior to manufacture. Any comments made by NDA do not absolve the Contractor of his design responsibilities.
10. Contractor to refer to the Health and Safety File for identification of hazards, including the existence of underground and overhead utilities.
11. The contractor is to work within any planning restriction including working hours, noise levels etc.
12. Design and drawing information is based on the MSE topographical survey drawing number NDA4034-1-Cramlington. NDA does not accept any liability for any inaccuracies this information may contain.

REV	DATE	AMENDMENT	DRW	CHK
P01	04/05/23	DRAFT For Tender	AF	ML

CLIENT

HEINEKEN

PROJECT

Manchester Brewery
Finished Goods Warehouse

DRAWING TITLE

Drainage Details
Sheet 2 of 2

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SCALE	SHEET SIZE	NDA REF
As shown	A1	8901

SUITABILITY

S2 - Suitable for Information

DRAWING NO.	REV
8901-NDA-XX-XX-DR-C-1203	P01