Carley Daines and Partners Limited
Consulting Civil and Structural Engineers

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY REPORT

at

GOREBROOK WORKS, LONGSIGHT, MANCHESTER

For

Mr Obyda Gawad






SEPT 2019
19-B-12454

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EXECUTIVE SUMMARY	
Site Parameters	Site Area - 3,000m^2 Present Impermeable Area - 0m^2 Post Development Impermeable Area (estimated) - 1150m^2 Increase in Impermeable Area - 1150m^2 NGR - 393880,416610 Nearest Post Code – OL15 9DL
Flooding	This report has considered flooding from a variety of sources in accordance with NPPF guidelines, and it is believed that the site is not at risk of flooding, nor does the proposed development create a risk of flooding elsewhere.
Surface Water Drainage	The site is presently undeveloped land to the rear Gorebrook Works, Longsight, Manchester. Currently there are no foul water or watercourses on the site. However, there is a surface water sewer which crosses the site in the south east corner. The ground conditions, made ground over drift deposits, consisting of soft to firm clays plus the groundwater table at less than 2m bgl, all indicate that the site would be unfavourable for infiltration/soakaway drainage. Hence, surface water will need to discharge to the nearest watercourse or surface water sewer. The proposed solution is to connect to the existing surface water sewer which crosses the site with a restricted discharge rate of 1.9 l/s, based on the greenfield runoff rate, and provide attenuation, using large below-ground pipes. A predevelopment enquiry has been sent to United Utilities, but a response has not yet been received.
Foul Drainage	Not applicable since there is no foul drainage proposed.

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1.0 INTRODUCTION & INSTRUCTIONS

1.1 Carley Daines & Partners has been commissioned by Mr. Obyda Gadwad to undertake a Flood Risk Assessment for this site in accordance with the requirements of National Planning Policy Framework (NPPF) and the Technical Guidance Document (TGD) to the National Policy Framework dated March 2012.

2.0 EXISTING SITE DESCRIPTION & LOCATION

2.1 The site is located adjacent the rear car park of Gorebrook Works, in Pink Bank Lane, Longsight, Manchester. See location plan in Appendix A. The site forms part of the Gorebrook Works, which is an ex printing works consisting of several one and two storey buildings and warehouses. The development site is an irregular shape plot with an average width of 43m and average length of 73m and has an area of approximately 3,000m^2 (0.30 hectares). It is located at NGR 387572, 395573 and the nearest post code is M12 5GH. The site is presently accessible via Pink Bank Lane.

2.2 The proposed development site is bordered by residential housing on its south side, Gorebrook Works car park on its west side, which includes two existing warehouses and commercial units to its north side separated by Gore Brook. On its east side is a small green space with trees and children's playground area. Further to the north is Belle Vue Speedway and Greyhound Stadium. The site is presently an undeveloped area.

2.3 Currently there are no foul water or watercourses on site. But there is a surface water public sewer which crosses the site in the south east corner. United Utilities Sewer Plans are included in Appendix B.

2.4 The Lead Local Flood Authority (LLFA) is Manchester Metropolitan Borough Council.

2.5 A site specific ground investigation was undertaken in October 2018. It determined the geology to be made ground consisting of general demolition material with soil, sand and ash to a depth of 0.6m to 1.3m. Alluvium consisting of silty clay, firm to stiff to very stiff the greater the depth, to a depth greater than 0.6m. The ground water table in the Alluvium deposits is variable following the varied interface with the Alluvium layer. The made ground, superficial deposits, consist of clays and silts, and the high groundwater table all make the site unfavourable for infiltration/soakaway drainage.

2.6 The site is generally flat with a slightly elevated area in the south. No topographical survey has been undertaken

3.0 PROPOSED DEVELOPMENT

3.1 Detail plans have been made available to us from the client, Mr Obyda Gawad. The proposed development consists of 2 no warehouse units together with drainage and parking infrastructure. Site access will be via Pink Bank Lane. A copy of the proposed site layout is attached in Appendix C.

3.2 Any residential development of this type is classified in Table 2 of the TG below, as within the "More Vulnerable" category in consideration of flood risk.

Table 2: Flood Risk Vulnerability Classification

Essential Infrastructure • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines
Highly Vulnerable • Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use[3]. • Installations requiring hazardous substances consent[4]. Where there is a demonstratable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as "essential infrastructure")[5].
More Vulnerable • Hospitals • Residential institutions such as residential care homes, children's homes, social services homes, prison & hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste[6]. • Sites used for holiday or short-let caravans and camping, *subject to a specific warning and evacuation plan.*
Less Vulnerable • Police, ambulance and fire stations which are *not* required to be operational during flooding. • Buildings used for shops, financial, professional and other services, restaurants and cafes, hot food takeaways, offices, general industry, storage and distribution, non-residential institutions not included in "more vulnerable" and assembly & leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do *not* need to remain operational during times of flood. • Sewage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place.)

[3] For any proposal involving a change of use of land to a caravan, camping or chalet site, or to a mobile home site or park home site, the Sequential and Exception Tests should be applied.

[4] See Circular 04/00: *Planning controls for hazardous substances (*paragraph 18*) at:* www.communities.gov.uk/publications/planningandbuilding/circular/planningcontrols

[5] In considering any development proposal for such an installation, local planning authorities should have regard to planning policy on pollution in the National Planning Policy Framework.

[6] For definition, see *Planning for Sustainable Waste Management: Companion Guide to Planning Policy Statement 10 at* www.communities.govluk/publications/planningandbuilding/planningsustainable
See footnote 3.

Water-compatible development

- Flood control infrastructure.
- Water transmission infrastructure and pumping stations.
- Sand and gravel working.
- Docks, marinas and wharves.
- Navigation facilities.
- Ministry of Defence installations.
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.
- Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.

Essential ancillary sleeping or residential accommodation for staff required by uses in this category *subject to a specific warning and evacuation plan.*

Notes to Table 2:

a. This classification is based partly on Department for Environment, Food and Rural Affairs and Environment Agency research on *Flood Risks to People (FD2321/TR2)* and also on the need of some uses to keep functioning during flooding.

b. Buildings that combine a mixture of uses should be placed in to the higher of the relevant classes of flood risk sensitivity. Developments that allow uses to be distributed over the site may fall within several classes of flood risk sensitivity.

c. The impact of a flood on the particularly uses identified within this flood risk vulnerability classification will vary within each vulnerability class. Therefore, the flood risk management infrastructure and other risk mitigation measures needed to ensure the development is safe may differ between uses within a particular vulnerability classification.

3.3 Table 3 of TG below confirms the anticipated development type is compatible with a location within Flood Zone 1 & 2.

Table 3: Flood Risk Vulnerability & Flood Zone "Compatibility"

Flood risk vulnerability classification (see Table 2)		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	×	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	×	×	×

Key: ✓Development is appropriate
× Development should not be permitted.

Notes to Table 3:

This table does not show:

a. The application of the Sequential Test which guides development to Flood Zone 1 first, then Zone 2, and then Zone 3;

b. Flood risk assessment requirements; or

c. the policy aims for each flood zone.

4.0 EFFECTS OF CLIMATE CHANGE

4.1 According to paragraphs 11-15 of TG, it is anticipated that Climate Change will bring about an increase in rainfall intensities in the future. Reference should be made to Table 5 below.

Table 5: Recommended national precautionary sensitivity ranges for peak rainfall intensities, peak river flows, offshore wind speeds and wave heights

Parameter	1990 to 2025	2025 to2055	2055 to 2085	2085 to 2115
Peak rainfall intensity	*+5%*	*+10%*	+20%	*+30%*
Peak river flow	*+10%*	+20%		
Offshore wind speed	*+5%*		*+10%*	
Extreme wave height				

With an estimated design life not exceeding 100 years for residential development, any necessary on-site designs for drainage, soakaways or other suitable disposal methods limiting surface water flows will incorporate rainfall intensities that have been increased by 40% to take account of the effects of climate change up to the year 2119.

5.0 PROBABILITY OF FLOODING

5.1 It is a requirement of the National Planning Policy Framework that flooding from all possible sources should be considered. Accordingly, consideration must be given to the possibility of flooding from the following sources:

- rivers & watercourses
- sewers
- sea
- overland flows
- ground water
- reservoirs, canals & artificial sources

Consideration must also be given to the possibility of transferring flooding to other locations off site. Data source used in this section is the Envirocheck Screening Report which is included in the Site-Specific Flood Data in Appendix D. In consideration of the above possible flood sources, the assessed risks are as follows:

5.2 Flooding from Rivers/Watercourses

There are no watercourses on site. The nearest watercourse is an open brook (Gore Brook) just to north and east of the site, along its boundary. The brook discharges into Chorlton Brook which eventually merges with the River Mersey. Reference to the Environment Agency online flood map shows that the site is in Flood Zone 1, a low probability of flooding. Accordingly, the risk of flooding from the river or the local watercourse can be assessed as ZERO.

5.3 Flooding from the Sea

The site is approximately 55km from the nearest coastline, the Irish Sea, and is at an average level of approximately 53.0m AOD. The risk of flooding from the sea is therefore assessed as ZERO.

5.4 Flooding from Land

There are no obvious overland paths of flood water, nor is there any known history of flooding in the area. Flooding from land is therefore assessed as NEGLIGIBLE.

5.5 Flooding from Ground Water

The groundwater table is variable in the Alluvium deposits with a general flow direction to the east, which follows the natural topography towards the Gore Brook. There is no potential for ground water flooding of property situated below ground level. The risk is assessed as ZERO.

5.6 Flooding from Sewers

Sewers in the area appear to have ample size and capacity and are remote from the site. This risk is therefore assessed as VERY LOW.

5.7 Flooding from Reservoirs, Canals & Artificial Sources

The Lower and Upper Garton Reservoirs are located 2km to the east. Due to the distance and low probability of the reservoir flooding, the risk to the site is assessed as NEGLIGIBLE. There are no other artificial water resources within influencing distance of the site.

5.8 Flooding from Elsewhere

This flood risk assessment also requires consideration to be given to the possibility of flooding being caused elsewhere. A properly designed and maintained site drainage system will meet the requirements of the sewerage provider, in that the pipelines will not flood at the critical 30 year rainfall event. Furthermore, NPPF guidelines require that all exceedence flows either infiltrate into the ground or are safely contained on site within underground storage areas such that there will be no risk of flooding of vulnerable or critical areas on site or other nearby areas. There is a increase in permeable area on site, due to the proposed development. It is proposed to mitigate any potential flooding by appropriate attenuation to run-off rates indicated above. The risk, therefore, of transferring flooding from elsewhere is VERY LOW.

6.0 SURFACE WATER DRAINAGE STRATEGY

6.1 It is the Environment Agency, United Utilities, Building Regulations and Local Flood Authority policy for all surface water systems for development sites to be designed using Sustainable Drainage Systems (SuDs) wherever possible.

6.2 Rainfall intensities, see profiles in Appendix E, are as indicated in the table below.

	YR 2	YR 30	YR 100	YR 100 + 40%
Rainfall Intensity mm/hr	23.6	44.9	58.6	82.0

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With an existing drained impermeable area of 3000 m^2 the runoff from the existing rainfall events is presently as follows:

	YR 2	YR 30	YR 100
Peak Run-Off Litres/sec	20.0	37.4	48.8

Future run-off, post-development, with an impermeable area on site of 1,150m^2 , peak run-off rates are predicted to be as follows:

	YR 2	YR 30	YR 100	YR 100 + 40% CC
Peak Run-Off Litres/sec	7.5	14.3	18.7	26.2

However, as it a requirement to reduce surface water run-off post-development by 50% of that pre-existing, future run-off rates should be restricted to the following:

	YR 2	YR 30	YR 100	YR 100 + 40% CC
Peak Run-Off Litres/sec	10.0	18.7	24.4	17.4

6.3 The above strategy is based on proving that the current site does discharge to the local watercourse. Since this is difficult to prove, the default stance is to use the greenfield runoff rate as the maximum discharge rate for the site (1.9 l/s), see Greenfield Runoff Estimation in Appendix F. This rate will effectively act as a restriction during large storm events, so attenuation will be required on site, particularly to deal with flows resulting from the 1 in 100 year storm return scenario plus 40% climate change

6.4 A preliminary assessment of the storage volume has been determined at between 63 to 91m^3 . For Preliminary Storage Volume Estimation details see Appendix G.

7.0 FOUL WATER DRAINAGE STRATEGY

7.1 There is no requirement to provide foul water sewers for the new warehouses.

8.0 FLOOD RISK MANAGEMENT MEASURES

8.1 In the event of extreme emergency, the local authority and other emergency services have contingency plans for dealing with consequences of flooding.

8.2 Setting finished floor levels of the buildings at least 150mm above surrounding external ground, and shedding surface water away from the buildings, will avoid the risk of damage to buildings and contents from overland flood flows around the site.

8.3 The design of surface water drainage should ensure that there are no uncontrolled off-site overland flood flows created by the proposed development. Where possible, site surfaces should be modelled so that flood flows generated on site from events beyond the stipulated drainage design criteria will flow to, and be contained on site within landscaped or paved areas such that there is no increased risk of flooding to buildings and other vulnerable areas. Such flood flows should not be allowed to flow from the site onto adjoining / adjacent property or highways.

8.5 Home owners and landlords will be responsible for the maintenance of private drainage systems on site to ensure satisfactory performance. United Utilities will be responsible for the maintenance of any public sewers on the site.

8.6 Any flood flows onto the site from adjoining property will either be regained on site safely or be encouraged to pass across the site such that there is no increased risk of flooding to buildings and other vulnerable areas.

9.0 OFF-SITE IMPACTS

9.1 Proposed on-site drainage will be designed and constructed in accordance with Part H of The Building Regulations, Sewers for Adoption, and any additional requirements of United Utilities, Bolton Council, and the Environment Agency, as appropriate.

9.2 All on-site roofs and pavings are to drain into the design surface water drainage system, thereby ensuring there will be no off-site flood flows generated by the development.

9.3 The risk of flood flows entering and leaving the site will remain after development. The risk will be reduced as far as possible because the drainage designs will be such that there will be no flooding during all rainfall events up to and including the critical 30 year storm, and no overland flows from the critical 100 year storm.

9.4 By implementation of the flood procedures and by careful design of the flood protection measures as described above, all residual flood-related risks will be minimised as far as possible after the development has been completed.

10.0 UNITED UTILITIES CONSULTATION RESPONSE

10.1 United Utilities have been sent a predevelopment enquiry. No response has been received during the writing of this report. When a response is received this report will be updated.

11.0 RESIDUAL RISKS

11.1 This Flood Risk Assessment, prepared in accordance with NPPF Guidelines, demonstrates that the risk of on-site flooding from all sources as a result of the proposed development can generally be regarded as being zero to negligible.

11.2 Careful design of the future drainage system, together with the introduction of a significant proportion of soft landscaping, suggests that any risks of flooding are likely to be minimised.

11.3 Furthermore, it is believed that the risk of transferring flooding elsewhere is negligible and on-site attenuation will reduce this to a level no greater than that which currently exists.

11.4 Accordingly, and not withstanding any other planning issues, it is not considered that the proposed development has any adverse effects on the current site, or the surrounding area in respect of flooding. Providing the advice contained within the Flood Risk Assessment is implemented, there are no adverse residual risks to either the development or the surrounding area.

SIGNED (electronically)

K S Corrigan

K S Corrigan BSc

CARLEY DAINES & PARTNERS

APPENDIX A

LOCATION PLAN

APPENDIX B

UNITED UTILITIES SEWER RECORDS

APPENDIX C

PROPOSED SITE PLAN

APPENDIX D

SITE SPECIFIC FLOOD DATA

APPENDIX E

RAINFALL INTENSITIES

APPENDIX F

GREENFIELD RUNOFF ESTIMATION

APPENDIX G

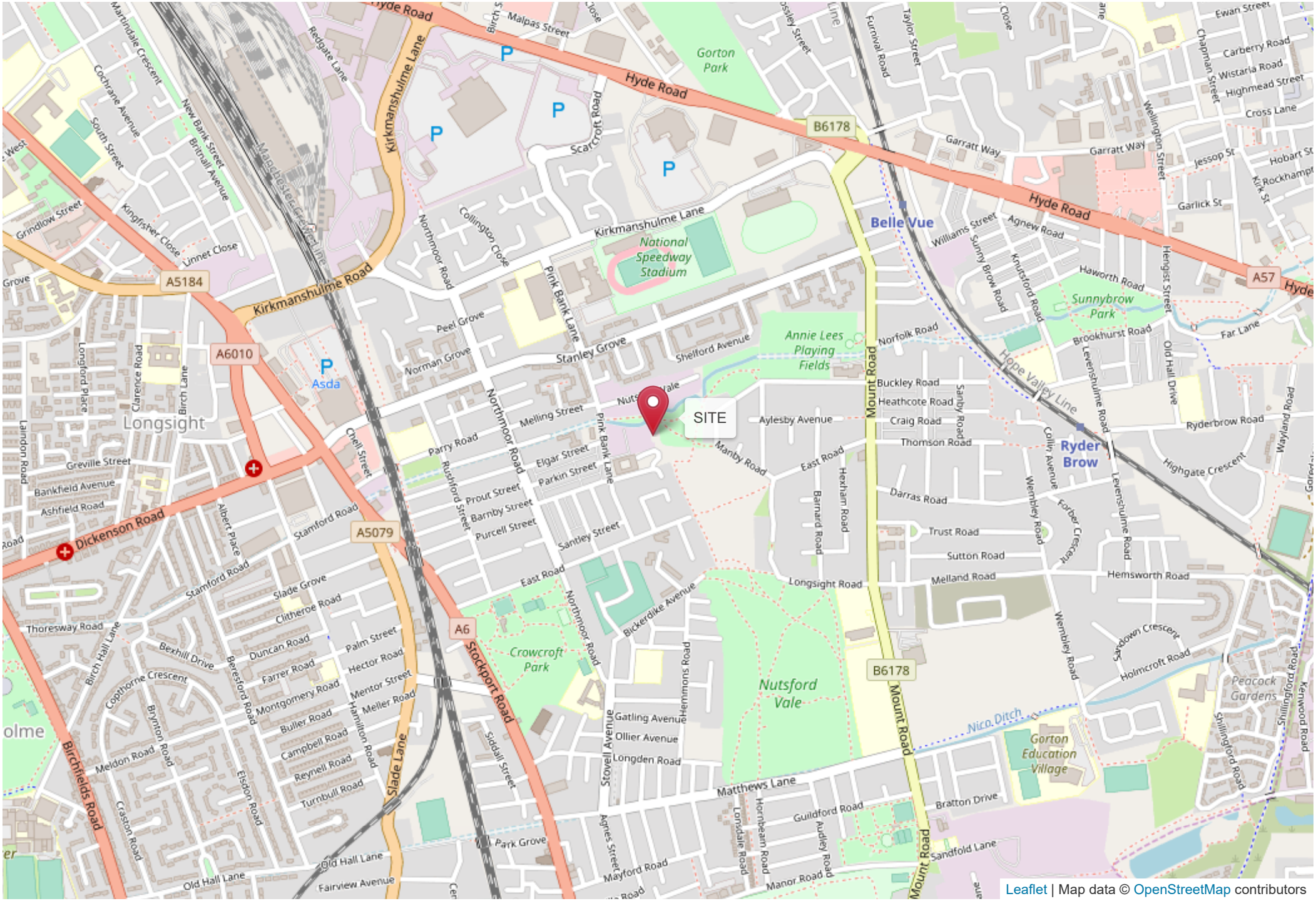
PRELIMINARY STORAGE VOLUME ESTIMATE

APPENDIX H

UNITED UTILITIES CONSULTATION RESPONSE

APPENDIX J

PROPOSED DRAINAGE LAYOUT


SITE
Hyde Road
B6178
A57
A5184
Kirkmanshulme Road
A6010
A5079
A6
Dickenson Road
Stockport Road
Mount Road
Belle Vue
Longsight
Ryder Brow
Gorton Park
National Speedway Stadium
Annie Lees Playing Fields
Sunnybrow Park
Crowcroft Park
Nutsford Vale
Gorton Education Village
Peacock Gardens
Asda
Hope Valley Line
Nico Ditch
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