

ENVIRONMENT

Tilstone Industrial Limited
Gellings Road
Knowsley
Flood Risk Assessment Addendum Report

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Flood Risk Assessment Addendum Report

Birmingham
Livery Place, 35 Livery Street, Colmore Business District, Birmingham, B3 2PB
T: 0121 233 3322

Cambridge
14-16 High Street, Histon, Cambridge
CB24 9JD
T: 01223 235 173

Leeds
Whitehall Waterfront, 2 Riverside Way, Leeds
LS1 4EH
T: 0113 233 8000

London
11 Borough High Street
London, SE1 9SE
T: 0207 407 3879

Manchester
11 Portland Street, Manchester, M1 3HU
0161 233 4260

Market Harborough
12a Woodcock House, Compass Point Market Harborough, Leicestershire, LE16 9HW
T: 01858 455020

Nottingham
Waterfront House, Station Street, Nottingham NG2 3DQ
T: 0115 924 1100

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P01	28/02/19	S2	Anna Elman BSc (Hons)	Yusuf Lawson BSc (Hons)	Daniel Allum-Rooney BSc (Hons) MSc
P02	08/04/19	S2	Anna Elman BSc (Hons)	Yusuf Lawson BSc (Hons)	Daniel Allum-Rooney BSc (Hons) MSc
P03	07/09/21	S2	Keith Alger BSc (Hons) MSc	Rachel Meredith BSc (Hons) MCIWEM	Rowan Jobling BEng (Hons)

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EXECUTIVE SUMMARY

This Flood Risk Assessment (FRA) has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance. It has been produced on behalf of Tilstone Industrial Limited in respect of a planning application for an industrial development off Gellings Road, Knowsley (the Site) at approximate grid reference: 342135, 396375).

This report demonstrates that the Proposed Development is not at significant flood risk, and simple mitigation measures are recommended to address any residual risk that may remain.

The Site is located entirely within Flood Zone 1, which is defined as land areas with a low probability of river or sea flooding. No ordinary watercourses exist within the Site or surrounding area; however, the Knowsley Brook and Croxteth Brook are located approximately 95m north and 560m south of the Site respectively. Both of these watercourses appear to have been included within the Environment Agency Flood Map for Planning.

All other major sources of flooding such as groundwater, canals, sewers, pluvial and reservoirs have been assessed and deemed to pose low risk to the Site.

To account for residual flood risk, external levels are to be profiled in such a way that any overland flows flow away from the built development and towards drainage points.

Surface water runoff from the Proposed Development will be controlled appropriately and infiltrated to the ground. The local sewerage undertaker has confirmed foul flows from the Proposed Development can drain to the public foul sewer network, which runs through/around the Site at an unrestricted rate, and at any convenient point.

In compliance with the requirements of the NPPF, and subject to the mitigation measures, the Proposed Development could proceed without being subject to significant flood risk. Moreover, the Proposed Development would not increase flood risk to the wider catchment areas as a result of suitable management of surface water runoff discharging from the Site.

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1. INTRODUCTION

- 1.1 This Flood Risk Assessment (FRA) has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance. The FRA has been produced on behalf of Tilstone Industrial Limited (the Client) in respect of a planning application for the Proposed Development of a commercial unit with associated parking and service yard, within an existing industrial area off Gellings Road, Knowsley (the Site).
- 1.2 This FRA is intended to support a full planning application and, as such, the level of detail included is commensurate and subject to the nature of the Proposed Development. Summary information is included as **Table 1.1**.

Table 1.1: Site Summary

Site Name	Gellings Road
Location	Knowsley
NGR (approx.)	342135, 396375
Application Site Area (ha)	0.82 (approximately)
Development Type	Industrial
Flood Zone Classification	Flood Zone 1
NPPF Vulnerability	Less Vulnerable
Environment Agency Office	Greater Manchester, Merseyside and Cheshire
Lead Local Flood Authority	Knowsley Council
Local Planning Authority	Knowsley Council

Sources of Data

- 1.3 The following sources of data have been used in this report:
- Topographical Survey by Survey and Engineering Projects Ltd, reference S16710-T.dwg;
 - Local Authority Surface Water Flood Risk Maps;
 - Knowsley Council Strategic Flood Risk Assessment;
 - Knowsley Council Preliminary Flood Risk Assessment;
 - Ground Investigations undertaken by BWB Consulting (February 2019);
 - United Utilities Sewer Records;

- vii. United Utilities Pre- Development Enquiry; and
- viii. British Geological Survey Drift & Geology Maps.

Existing Site

- 1.4 The Site is considered to be greenfield in nature and is located adjacent to Gellings Road to the east and Randles Road to the South. The B5194 is located to the north of the Site. Commercial land surrounds the Site to the north and east, with a car park located to the south. An existing commercial unit is located immediately to the west.
- 1.5 The M57 is located south of the Site, with Junction 4 located approximately 250m to the west. The Site is located approximately 1.1km west of Knowsley Village, 2.5km south of Kirkby town centre, and 9km northeast of Liverpool City Centre.
- 1.6 The Site location is shown below as **Figure 1.1**.

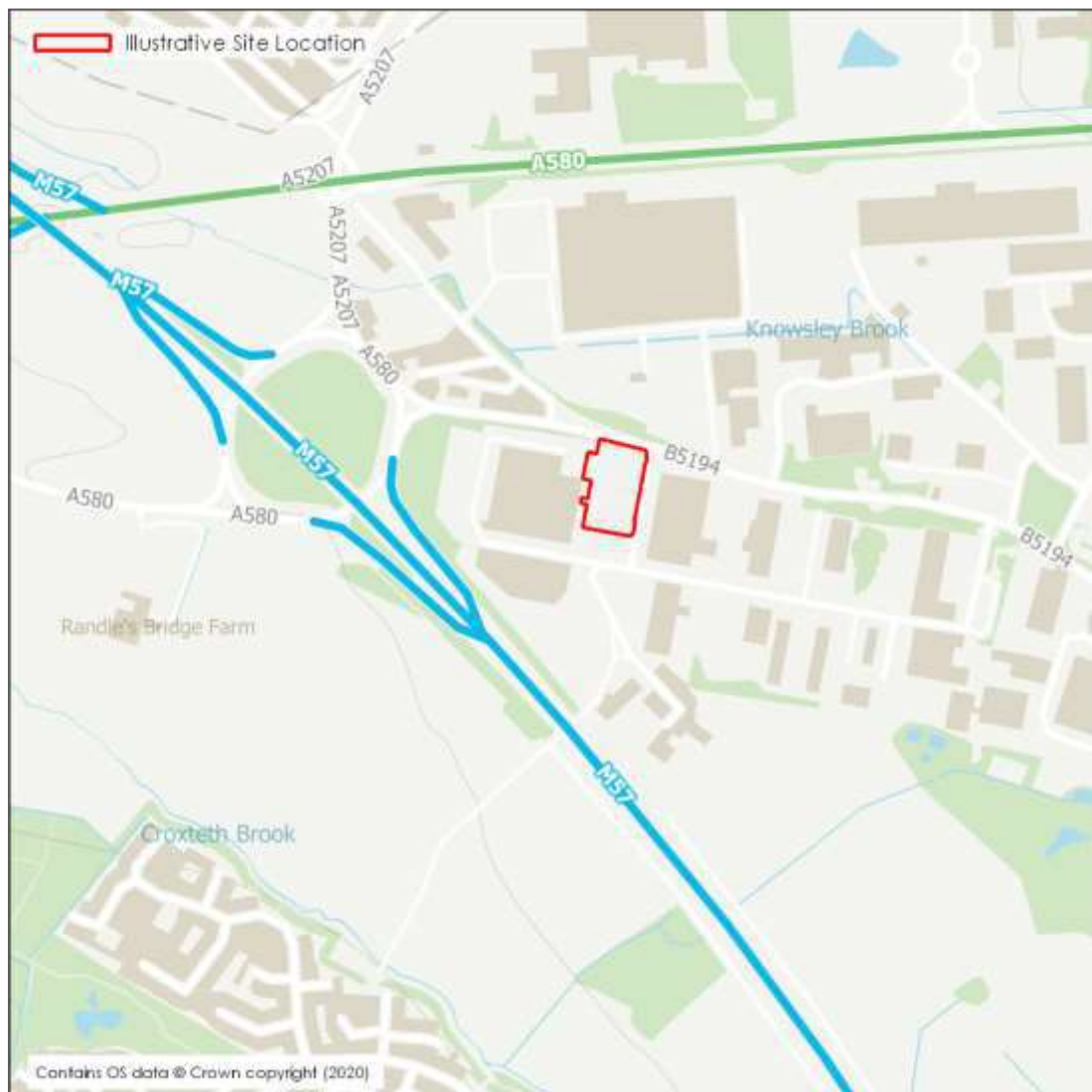


Figure 1.1: Site Location

- 1.7 The topographical survey, **Appendix 1**, shows levels to range from an approximate point of 25.1m Above Ordnance Datum (AOD) in the north-eastern corner to approximately 22.6m AOD along the western boundary of the Site.
- 1.8 The Site is currently undeveloped and assumed to have no positive drainage, as shown by the topographical survey. The underlying geology is Sandstone and, as such, the Site is assumed to drain via a natural process of runoff and infiltration.

Proposed Development

- 1.9 It is proposed that the Site is developed to accommodate an industrial unit (uses B2/B8 with ancillary Class E), comprising a total floor area of circa 3,000m². A service yard and carpark are proposed in the north and south of the Site, respectively. The proposed access and egress routes are from the service yard and carpark to Gellings Road. A proposed layout plan and elevations are included for reference as **Appendix 2**.

2. FLOOD RISK PLANNING POLICY

National Planning Policy Framework

- 2.1 The NPPF¹ sets out the Government's national policies on different aspects of land use planning in England in relation to flood risk. Planning Practice Guidance is also available online².
- 2.2 The Planning Practice Guidance sets out the vulnerability to flooding of different land uses. It encourages development to be located in areas of lower flood risk where possible and stresses the importance of preventing increases in flood risk off site to the wider catchment area.
- 2.3 The Planning Practice Guidance also states that alternative sources of flooding, other than fluvial (river flooding), should be considered when preparing an FRA.
- 2.4 The PPG includes a series of tables that can be found at the following link "<https://www.gov.uk/guidance/flood-risk-and-coastal-change>". The tables included within the PPG are as follows:
- *Table 1: Flood Zones;*
 - *Table 2: Flood risk vulnerability classification; and*
 - *Table 3: Flood risk vulnerability and flood zone 'compatibility'.*
- 2.5 This FRA is written in accordance with the NPPF and the Planning Practice Guidance.

Flood Map for Planning

- 2.6 With particular reference to planning and development, the Flood Map for Planning produced by the Environment Agency (EA) identifies Flood Zones in accordance with Table 1 of the Planning Practice Guidance.
- 2.7 Flood Zone 1 (Low Probability) is defined as land having less than a 1 in 1000 annual probability of river or sea flooding (<0.1% Annual Exceedance Probability).
- 2.8 Flood Zone 2 (Medium Probability) is defined as land having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1% AEP); or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1% AEP).
- 2.9 Flood Zone 3a (High Probability) is defined as land having a 1 in 100 or greater annual probability of river flooding (>1% AEP); or land having a 1 in 200 or greater annual probability of flooding from the sea (>0.5% AEP). This is represented by "Flood Zone 3" on the Flood Map for Planning.

¹ Revised National Planning Policy Framework, Ministry of Housing, Communities & Local Government, July 2021

² Planning Practice Guidance: <https://www.gov.uk/government/collections/planning-practice-guidance>

2.10 Flood Zone 3b (The Functional Floodplain) is defined as land where water has to flow or be stored in times of flood. This is not identified or separately distinguished from Zone 3a on the Flood Map for Planning.

2.11 The Site is shown to be located entirely within Flood Zone 1, as shown in **Figure 2.1**.

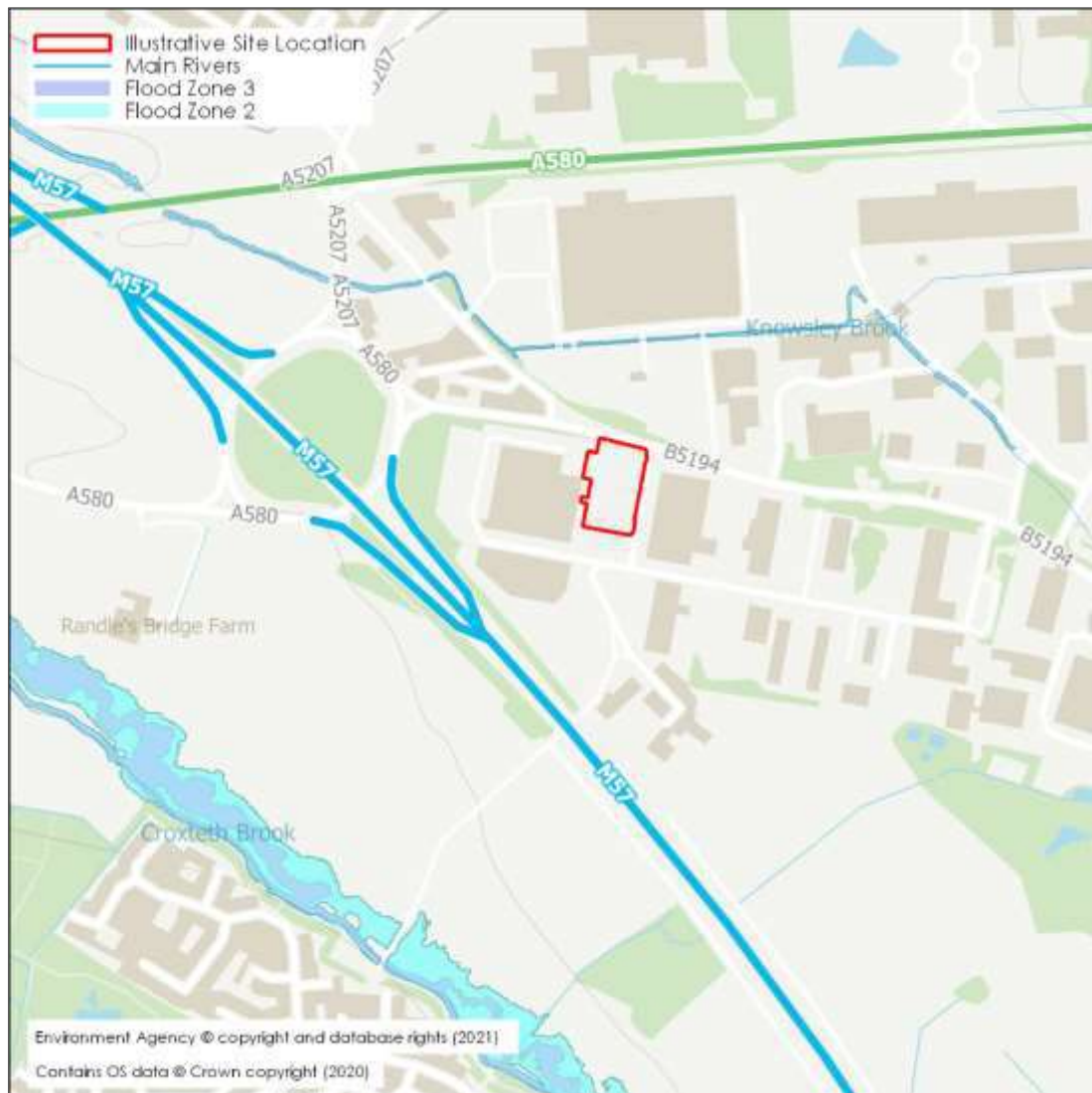


Figure 2.1: Flood Map for Planning

The Design Flood

2.12 The Planning Practice Guidance identifies that new developments should be designed to provide adequate flood risk management, mitigation, and resilience against the 'design flood' for their lifetime.

2.13 This is a flood event of a given annual flood probability, which is generally taken as fluvial (river) flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year), or tidal flooding with a 0.5% annual probability (1 in 200 chance each year), against which the suitability of a Proposed Development is assessed and mitigation measures, if any, are designed.

Climate Change

- 2.14 Predicted future changes in peak river flows caused by climate change are provided by the EA within their online guidance³, with a range of projections applied to regionalised 'Management Catchments', which are sub-catchments of 'River Basin Districts'.
- 2.15 The Site falls within both the 'Alt and Crossens' Management Catchment and the wider North West Basin District. **Table 2.1** identifies the relevant peak river flow allowances for the Alt and Crossens Management Catchment.

Table 2.1: Peak River Flow Allowances associated with the Alt Crossens Management Catchment

Allowance Category	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper End	31%	56%	95%
Higher Central	21%	33%	56%
Central	16%	25%	44%

- 2.16 When determining the appropriate allowance for use in an FRA, the Flood Zone classification, flood risk vulnerability and the anticipated lifespan of the development should be considered. **Table 2.2** provides a matrix summarising the EA's guidance on determining the appropriate allowances.

Table 2.2: Application of the Appropriate Climate Change Allowance

Flood Zone	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
1	Apply the peak river flow allowances to developments and allocations where there are details relating to an increased risk of flooding in the future.				Use none of the allowances
2 or 3a	Use the higher central allowance	Use the central allowance*	Use the central allowance	Use the central allowance	Use the central allowance
3b	Use the higher central allowance	Development should not be permitted	Development should not be permitted	Development should not be permitted	Use the central allowance
* Highly Vulnerable developments should not be permitted in flood zone 3a.					

³ Environment Agency, Flood risk assessments: climate change allowances: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

- 2.17 The Site is located entirely within Flood Zone 1, with no information suggesting the Site will be impacted by climate change in the future. The distance of the Site from watercourses, and the intervening topography, mean fluvial flood risk is not expected to be an issue for the Site now or in the future. An allowance for climate change is therefore not considered to be necessary and will not be covered any further within this document.

Strategic Flood Risk Assessment

- 2.18 A Strategic Flood Risk Assessment (SFRA) is a study carried out by one or more local planning authorities to assess the risk to an area from flooding from all sources, now and in the future.
- 2.19 The Knowsley Council Level 1 SFRA⁴ has been reviewed in the production of this FRA. The SFRA provides information specific to the site location in the form of fluvial, surface water and groundwater flood risk mapping, as well as records of historical flooding. Information from the Level 1 SFRA will be referenced within **Section 3** where applicable.
- 2.20 The Knowsley Council Level 2 SFRA⁵ was produced to facilitate the application of Sequential and Exception Tests to screen allocated development sites. The Site is not referenced within the Level 2 SFRA.

Preliminary Flood Risk Assessment

- 2.21 A Preliminary Flood Risk Assessment (PFRA) is an assessment of floods that have taken place in the past and floods that could take place in the future. It generally considers flooding from surface water runoff, groundwater and ordinary watercourses, and is prepared by the Lead Local Flood Authorities (LLFAs).
- 2.22 The Knowsley Council PFRA⁶ considers flooding from surface water runoff, groundwater, ordinary watercourses and canals. Historical flood mapping from the PFRA is included as **Appendix 3**, however, no historical instances of flooding at the Site are referenced. Information from the PFRA will be referenced within this report, where applicable.

Local Flood Risk Management Strategy

- 2.23 A Local Flood Risk Management Strategy (LFRMS) is prepared by a LLFA to help understand and manage flood risk at a local level.
- 2.24 The LFRMS aims to ensure that the knowledge of local flood risk issues is communicated effectively so that they can be better managed. The LFRMS also aims to promote sustainable development and environmental protection. The Knowsley Council LFRMS⁷ has been reviewed and will be referenced within this report, where applicable.

⁴ Level 1 Strategic Flood Risk Assessment (Atkins, June 2009)

⁵ Level 2 Strategic Flood Risk Assessment (Capita Symonds, October 2012)

⁶ Preliminary Flood Risk Assessment (Knowsley Council, June 2011)

⁷ Local Flood Risk Management Strategy (Knowsley Council, October 2017)

3. POTENTIAL SOURCES OF FLOOD RISK

3.1 Flooding can occur from a variety of sources, or combination of sources, which may be natural or artificial. **Table 3.1** below identifies the potential sources of flood risk to the Site in its current condition, and the impacts which the Proposed Development could have in the wider catchment, prior to mitigation. These are discussed in greater detail in the forthcoming section. The mitigation measures proposed to address flood risk issues and ensure the Proposed Development is appropriate for its location are discussed within **Section 4** of this report.

Table 3.1: Pre-Mitigation Sources of Flood Risk

Flood Source	Potential Risk				Description
	High	Medium	Low	None	
Fluvial			X		The Site is located in Flood Zone 1
			X		There are no ordinary watercourses within the Site or surrounding area.
Coastal				X	The Site is more than 9km from the coast.
Canals			X		The Leeds Liverpool Canal is located approximately 2km northwest of the Site.
Groundwater			X		The Site is shown to fall within an area predicted to be at a low susceptibility to groundwater flooding.
Reservoirs and waterbodies			X		The Site is shown to fall outside of the area at risk of reservoir failure.
Pluvial runoff			X		The Site is shown to be at very low risk of surface water flooding.
Sewers			X		The likely sewer network around the Site may have limited capacity, which could be exceeded in an extreme storm event. However, the topography is such that any exceedance flows would be directed away from the Site.
Effect of Development			X		Development would not result in impedance of surface water flow routes.

Flood Source	Potential Risk				Description
	High	Medium	Low	None	
on Wider Catchment		X			The Proposed Development would increase the area of impermeable surfaces leading to a potential increase in runoff.

Fluvial Flood Risk

- 3.2 Flooding from watercourses occurs when flows exceed the capacity of the channel, or where a restrictive structure is encountered, which leads to water overtopping the banks into the floodplain. This process can be exacerbated when debris is mobilised by high flows and accumulates at structures.

Main Rivers

- 3.3 EA Flood Mapping shows the Site, including the access and egress routes to Gellings Road, to be located entirely within Flood Zone 1 (Low Probability).
- 3.4 The closest EA Main River is the Knowsley Brook, located approximately 115m north of the Site. The Flood Zones associated with the Knowsley Brook are shown to be contained within its channel. The EA Light Detection and Aerial Ranging (LiDAR) data shows the Site is elevated above the left bank of the Knowsley Brook with separating intervening topography raised up to 4m above the left bank. The watercourse has two branches, the southern branch (Mill Brook) and the northern branch. Both branches meet at Ainsworth Lane. The locations of the watercourses are shown within **Figure 3.1**.
- 3.5 The Croxteth Brook, also a designated Main River, is located approximately 600m to the south of the Site. Flood Zones 2 and 3 associated with this watercourse are located approximately 550m and 580m south-west of the Site, respectively. According to the EA LiDAR data, the Site is raised at least 4m above the right bank of the Croxteth Brook.
- 3.6 A review of the Flood Map for planning shows both the Knowsley Brook and the Croxteth Brook to benefit from natural flood defences (high ground) which provide flood defence up to the 1 in 50-year and 1 in 100-year flood events respectively.
- 3.7 Flooding of the Knowsley Brook is mentioned within the SFRA where the Knowsley Brook and the Kirkby Brook converge at the River Alt, approximately 2.25km north-west of the Site.
- 3.8 The SFRA identifies sections of the Knowsley Brook to have an increased residual risk of flooding as a result of blockages due to sections of the river being culverted. Mapping within the SFRA, included as **Appendix 4**, identifies a culvert approximately 355m to the north-east of the Site. An extract of the mapping is shown in **Figure 3.1**.

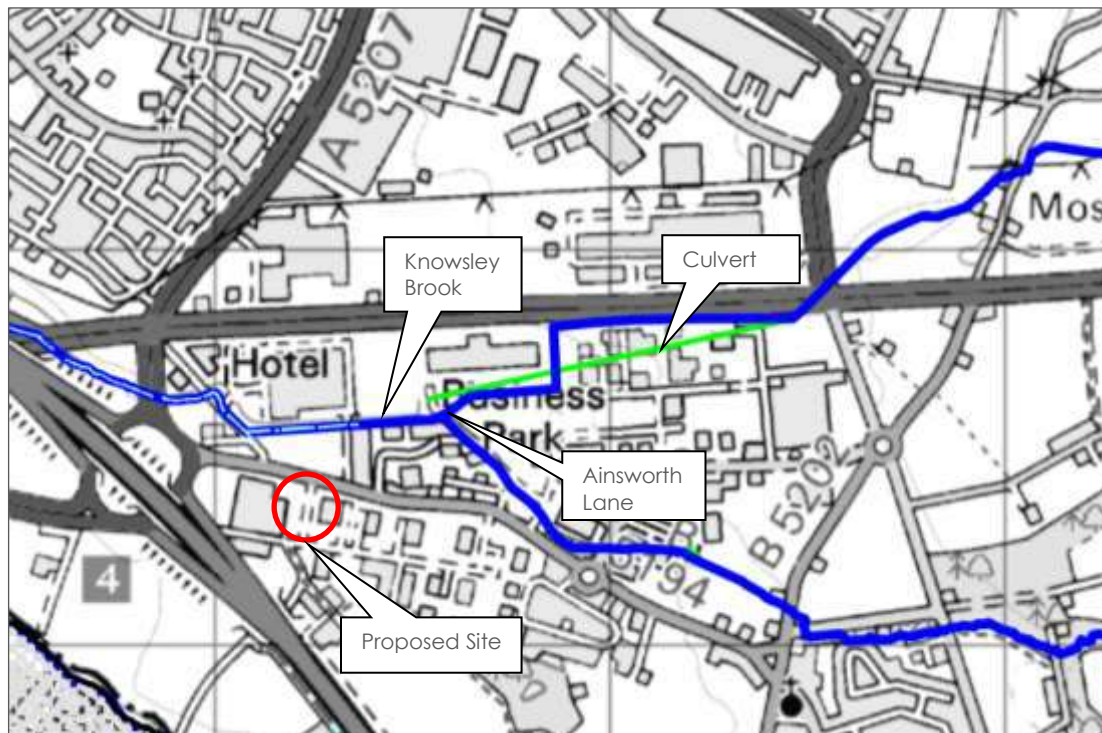


Figure 3.1: Culvert Associated with the Knowsley Brook (Extracted from Knowsley Level 1 SFRA)

- 3.9 The culvert is assumed to be an overflow route. Although the direction of flow is unknown, it is likely that the culvert flows in a south-west direction and then outfalls into the sewer in Ainsworth Lane.
- 3.10 Culverted watercourses and drains increase the residual risk of flooding due to blockages. However, the distance from the culverts to the Site is such that in the event of a culvert becoming blocked, the Proposed Development is expected to remain unaffected.

Ordinary Watercourses

- 3.11 There are no ordinary watercourses within the Site. There are a number of ordinary watercourses approximately 2km south from the Site, however the M57 acts as a topographical barrier.
- 3.12 Due to its location within Flood Zone 1, and distance from both Main Rivers and ordinary watercourses, the Proposed Development is considered to be at a low risk of flooding from fluvial sources.

Flood Risk from Canals

- 3.13 The Canal and River Trust (CRT) generally maintains canal levels using reservoirs, feeders and boreholes and manages water levels by transferring it within the canal system.

- 3.14 Water in a canal is typically maintained at predetermined levels by control weirs. When rainfall or other water enters the canal, the water level rises and flows out over the weir. If the level continues rising, it will reach the level of the storm weirs. The control weirs and storm weirs are normally designed to take the water that legally enters the canal under normal conditions. However, it is possible for unexpected water to enter the canal or for the weirs to become obstructed. In such instances the increased water levels could result in water overtopping the towpath and flowing onto the surrounding land.
- 3.15 Flooding can also occur where a canal is impounded above surrounding ground levels and the retaining structure fails.
- 3.16 The closest canal to the Site is the Leeds Liverpool Canal, approximately 2km north-west of the Site.
- 3.17 Canals are regularly inspected and maintained, reducing the risk of flooding. Furthermore, the intervening topography and distance are such that flood risk from this source is considered low.

Groundwater Flood Risk

- 3.18 Groundwater flooding occurs when the water table rises above ground elevations. It is most likely to happen in low lying areas underlain by permeable geology. This may be regional scale chalk or sandstone aquifers, or localised deposits of sands and gravels underlain by less permeable strata such as that in a river valley.
- 3.19 British Geological Survey (BGS) mapping identifies the underlying bedrock geology to be Sandstone, with an associated 'Principal' bedrock aquifer, defined by the EA to be layers of rock or drift deposits that have high intergranular and/or fracture permeability, which means they usually provide a high level of water storage.
- 3.20 The underlying superficial deposits are identified by BGS mapping as Sand to the south of the Site, with an associated superficial 'Secondary A' aquifer, designated by the EA to be permeable layers capable of supporting water supplies at a local rather than strategic scale. The northern portion of the Site is not expected to be underlain by any superficial deposits.
- 3.21 BGS borehole data collected in 1976 and 1996, approximately 200m to the north and 100m to the south of the Site reached depths of 36.6m and 2m, respectively. Both were dry on the day of excavation.
- 3.22 Ground investigations were undertaken by BWB Consulting in February 2019, the trial pit logs of which are included as **Appendix 5**. Two of the three trial pits struck water at 2.4m below ground level (bgl) and 2.45m bgl, with both experiencing slight seepage at 2.4mbgl. One trial pit was dry on the day of excavation up to the excavated depth of 2.5m bgl.
- 3.23 The Site is included within PFRA Groundwater Flood Risk Mapping, which is included as **Appendix 6**. This mapping shows the Site to fall within an area predicted to be at a low susceptibility to groundwater flooding.

- 3.24 From the available information, the Site is considered to be at low risk of groundwater flooding.

Flood Risk from Reservoirs and Large Waterbodies

- 3.25 Flooding can occur from large waterbodies or reservoirs if they are impounded above the surrounding ground levels or are used to retain water in times of flooding. Although unlikely, reservoirs and large waterbodies could overtop or breach, leading to rapid inundation of the downstream floodplain.
- 3.26 To help identify this risk, reservoir failure flood risk mapping has been prepared. This shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. The map displays a worst case scenario and is only intended as a guide.
- 3.27 **Figure 3.2** shows the Site to be 350m outside of a reservoir breach inundation zone for the White Man's Dam.

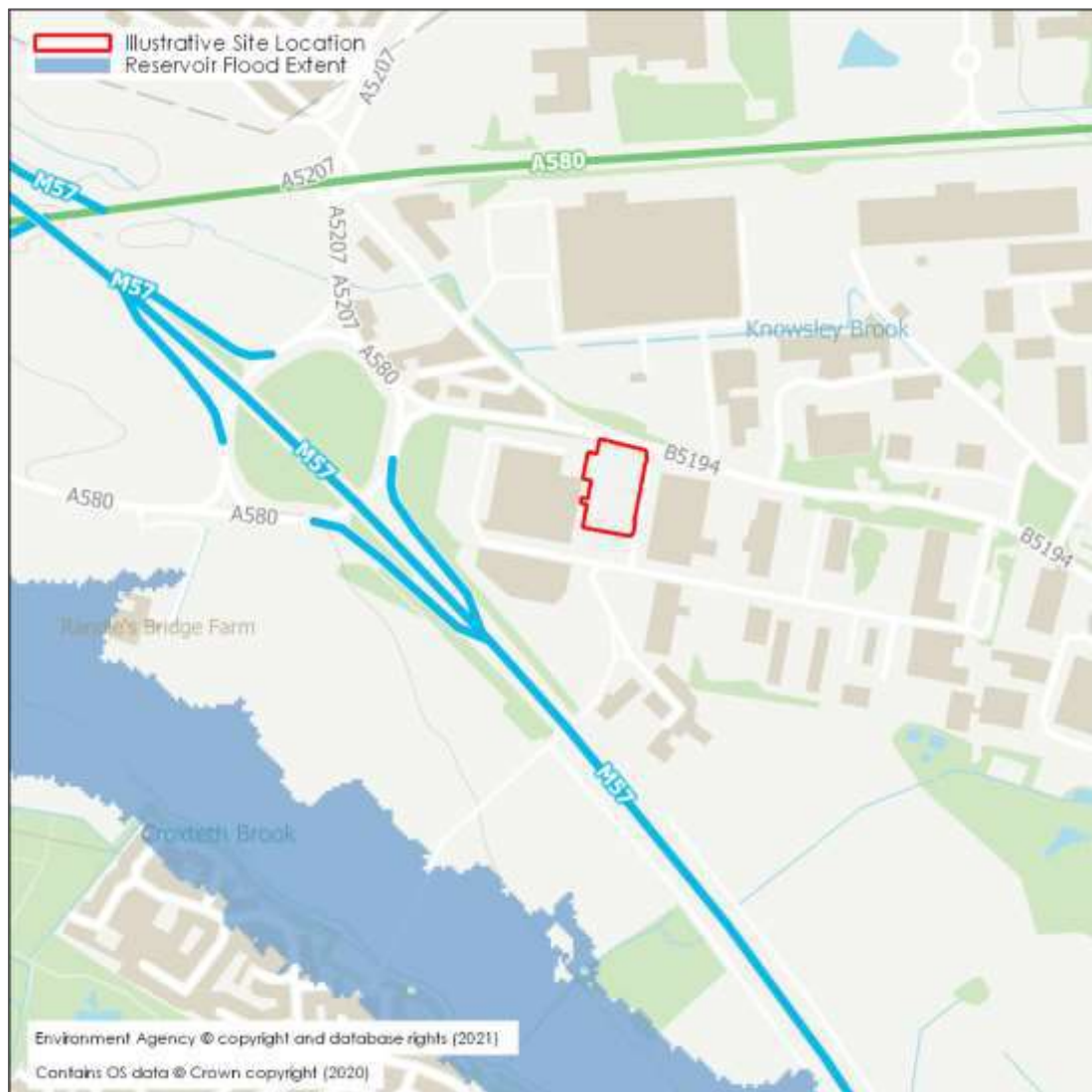


Figure 3.2: Environment Agency Reservoir Breach Mapping

- 3.28 The reservoir is operated and maintained by the Earl of Derby's Estate who have ultimate responsibility for the safety of their reservoir assets. Their responsibilities include regular safety inspections, any necessary design or repairs undertaken where required and an annual statement produced on the operation and maintenance regime.
- 3.29 Based on the safety legislation in place and the maintenance and repair responsibilities of the Earl of Derby's Estate, the actual probability of a significant failure is considered to be low. Therefore, the risk of flooding at the Site from this source is also considered to be low.

Pluvial Flood Risk

- 3.30 Pluvial flooding can occur during prolonged or intense storm events when the infiltration potential of soils, or the capacity of drainage infrastructure is overwhelmed leading to the accumulation of surface water and the generation of overland flow routes.
- 3.31 Risk of flooding from surface water mapping has been prepared. This shows the potential flooding which could occur when rainwater does not drain away through the normal drainage systems, or soak into the ground but lies on or flows over the ground instead. An extract from the mapping is included as **Figure 3.3**.

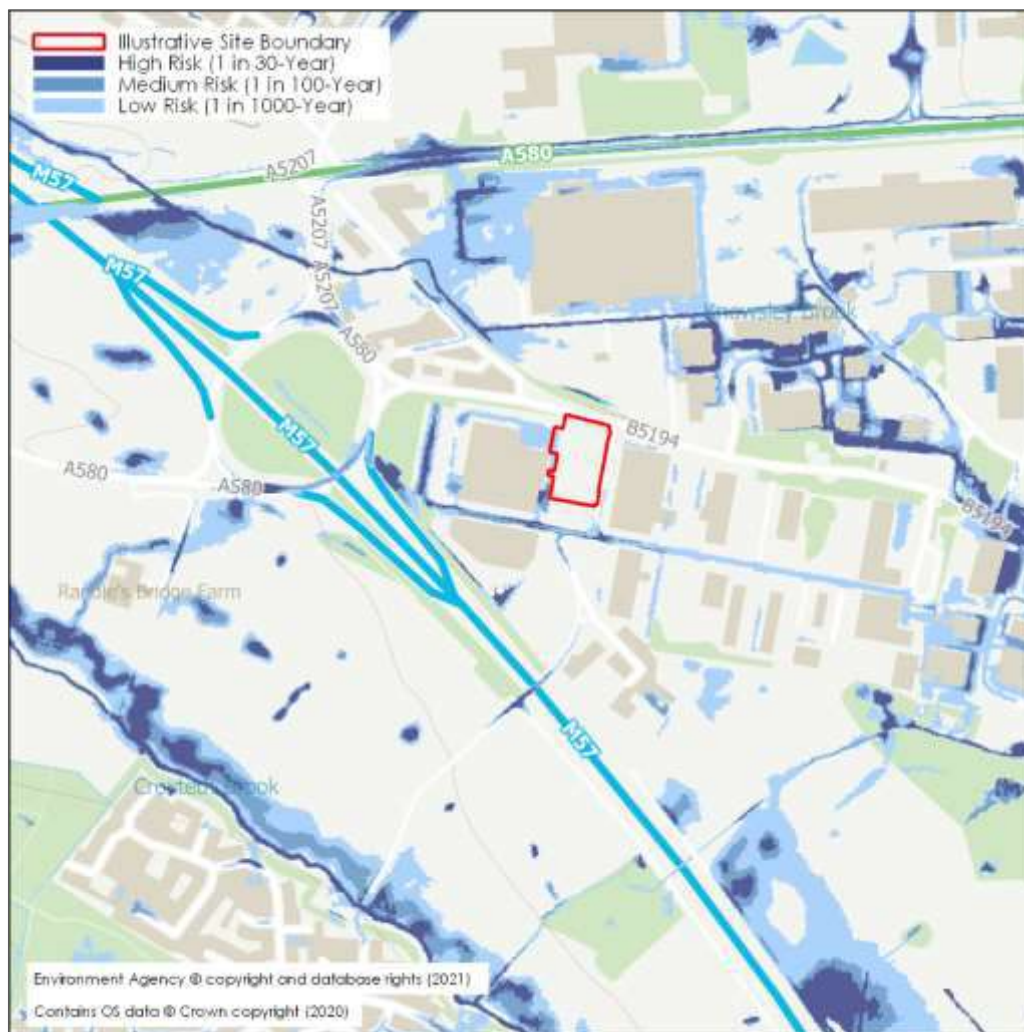


Figure 3.3: Surface Water Flood Map

- 3.32 The Site and proposed access routes from Gellings Road are shown to have a very low susceptibility to surface water flooding. Randles Road to the south of the Site is shown to have a low to medium susceptibility.
- 3.33 The SFRA Surface Water Flood Mapping, included as **Appendix 7**, identifies the Site to have no recorded incidents of surface water flooding, according to Knowsley Council records.
- 3.34 The overall risk posed by the pluvial source is considered low. Simple mitigation against the residual risk is outlined within **Section 4** to address any residual risk that may remain.

Flood Risk from Sewers

- 3.35 Sewer flooding can occur when the capacity of the infrastructure is exceeded by excessive flows, or as a result of a reduction in capacity due to collapse or blockage, or if the downstream system becomes surcharged. This can lead to the sewers flooding onto the surrounding ground via manholes and gullies, which can generate overland flows.

- 3.36 The sewerage undertaker for the area is United Utilities. The sewer asset records for the area are included as **Appendix 8** and an extract is included as **Figure 3.4**. The records show the Site to be bound by a foul sewer and surface water sewer to the south, east and north. The sewers have an approximate cover to invert level depth of at least 2.9m.

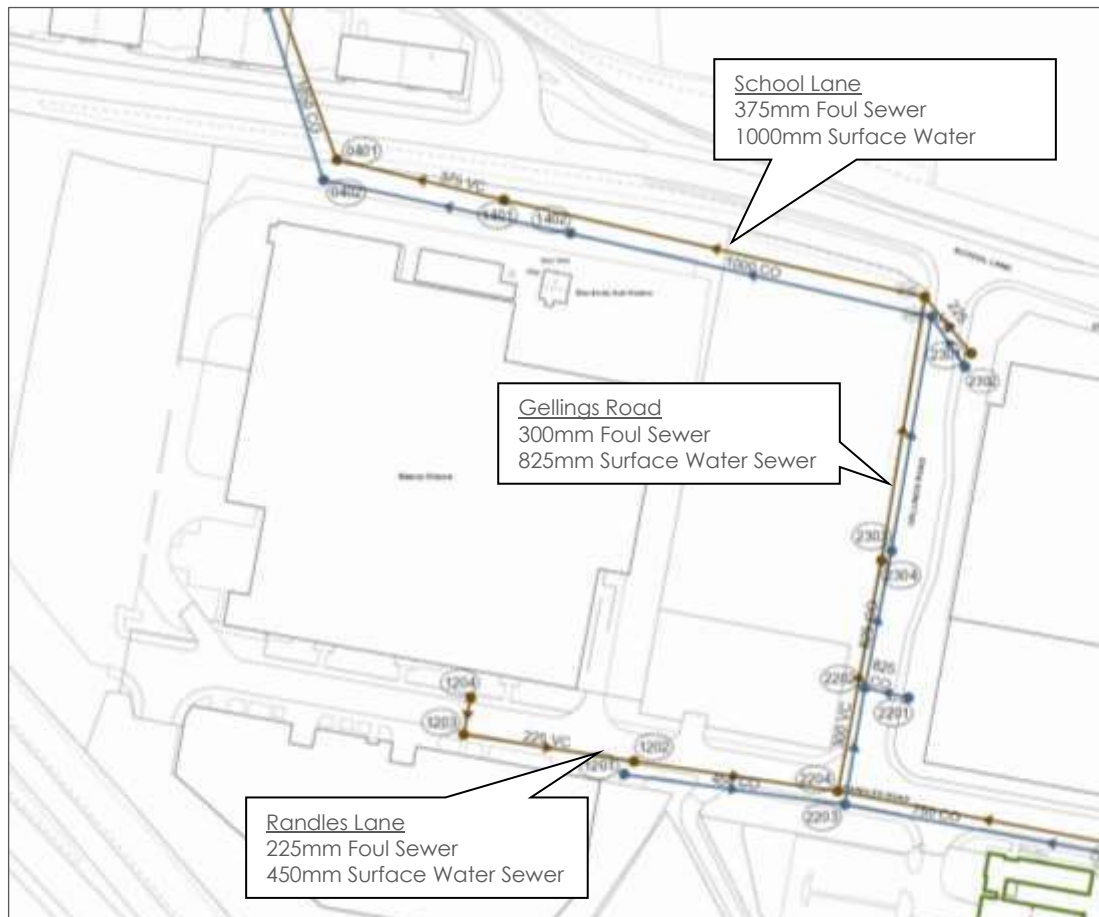


Figure 3.4: Extract of Sewer Asset Mapping for the Site

- 3.37 The diameter (shown in **Figure 3.4**) and depth of the sewers is such that sewer exceedance is unlikely. However, if exceedance were to occur, the flows would likely be routed away from the Site via the road network. Therefore, from current available information the Site is considered at a low risk from this source. Simple mitigation measures will be identified in **Section 4** to address any residual risk that may remain.

Effect of Development on Wider Catchment

Development Land Use/Drainage Considerations

- 3.38 The Proposed Development would result in an increase in impermeable surfaces that will likely increase the surface water runoff generated by the Site. Therefore, a surface water drainage strategy (reference: GRK-BWB-ZZ-XX-RP-CD-0001_SDS) has been prepared to manage surface water runoff within the Site.

4. FLOOD RISK MITIGATION

- 4.1 **Section 3** has identified the sources of flooding which could potentially pose a risk to the Site and the Proposed Development. This section of the FRA sets out the mitigation measures which are to be incorporated within the Proposed Development to address and reduce the risk of flooding to within acceptable levels.

Development Arrangement

- 4.2 A sequential approach to the layout has been adopted, placing the built development in areas of the Site at lowest risk of flooding.
- 4.3 To provide further mitigation of any residual risks, ground levels should be profiled to encourage pluvial runoff and overland flows away from the built development and towards the nearest drainage point.

Surface Water Drainage

- 4.4 To mitigate the potential impact on the current runoff regime, it is proposed to incorporate surface water attenuation and storage as part of the Proposed Development.
- 4.5 Further information on the drainage approach is provided within the accompanying Sustainable Drainage Statement (reference **GRK-BWB-ZZ-XX-RP-CD-0001_SDS**).
- 4.6 In brief, the Proposed Development would continue to infiltrate surface water to the ground.
- 4.7 The Proposed Development should be designed with exceedance in mind, with the road network used to convey excess overland flows towards the infiltration features.

Foul Water Drainage

- 4.8 It is proposed to drain used water from the Proposed Development separately to surface water.
- 4.9 Further information on the drainage approach is provided within the accompanying Sustainable Drainage Statement (reference **GRK-BWB-ZZ-XX-RP-CD-0001_SDS**).

5. CONCLUSIONS AND RECOMMENDATIONS

- 5.1 This FRA has been prepared in accordance with requirements set out in the NPPF and the associated Planning Practice Guidance. The FRA has been produced on behalf of Tilstone Industrial Limited in respect of a planning application for an industrial development off Gellings Road, Knowsley.
- 5.2 This FRA is intended to support a full planning application and, as such, the level of detail included is commensurate and subject to the nature of the Proposed Development.
- 5.3 This report demonstrates that the Proposed Development would not be at significant flood risk, and simple mitigation measures are recommended to address any residual risks. The identified risks and mitigation measures are summarised within **Table 5.1**.

Table 5.1: Summary of Flood Risk Assessment

Flood Source	Risk & Proposed Mitigation Measures
Fluvial, Pluvial, Groundwater and Sewers	Low residual risks are posed by these sources. External levels are to be profiled in such a way that any overland flows flow away from the built development and towards drainage points.
Impact of the Proposed Development	Surface water runoff from the Proposed Development will be controlled appropriately and infiltrated to the ground. The local sewerage undertaker has confirmed foul flows from the Proposed Development can drain to the public foul sewer network, which runs through/around the Site at an unrestricted rate, and at any convenient point.
This summary should be read in conjunction with BWB's full report. It reflects an assessment of the Site based on information received by BWB at the time of production.	

- 5.4 In compliance with the requirements of the NPPF, and subject to the mitigation measures proposed, the Proposed Development could proceed without being subject to significant flood risk. Moreover, the Proposed Development would not increase flood risk to the wider catchment area as a result of suitable management of surface water runoff discharging from the Site.

APPENDICES

Appendix 1: Topographical Survey



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1. 01493 72863 F. 01493 72556 W. www.surveyandengineering.co.uk

PLAN GRD NORTH

Reference: S14710-2.dwg

LEGEND

1	1:100000	1:100000	1:100000
2	1:50000	1:50000	1:50000
3	1:25000	1:25000	1:25000
4	1:10000	1:10000	1:10000
5	1:5000	1:5000	1:5000
6	1:2500	1:2500	1:2500
7	1:1000	1:1000	1:1000
8	1:500	1:500	1:500
9	1:250	1:250	1:250
10	1:100	1:100	1:100
11	1:50	1:50	1:50
12	1:25	1:25	1:25
13	1:10	1:10	1:10
14	1:5	1:5	1:5
15	1:1	1:1	1:1
16	1:0.5	1:0.5	1:0.5
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18	1:0.125	1:0.125	1:0.125
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Appendix 2: Proposed Site Layout

General Notes

Do not scale from this drawing. Only work to written dimensions.

All site dimensions shall be verified by the Contractor on site prior to commencing any works.

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Site Area - 0.82Ha
(2.03acres)

P3	General amendments	18/08/21		
P1	Red line boundary & fence line amended, building height increased, office elevations amended and bris soleils added, sub station added and general amendments	11/08/21		
P0	First Issue	20/07/21		
Rev.	Description	Date	ISS	APP

Scale 1 : 500 @ A2

Status

Drawn By JB

Checked By BB

Date 05/07/21

Client:

Tilstone Managing Warehouse REIT PLC
Gellings Road
Knowsley

Sheet Name:

Proposed Site Plan

Project No. Orig. Zone Level Type Role Cls. Dwg No. Rev
19008-FRA-01-00-A-DR -90-1001 P3

fletcher|rae

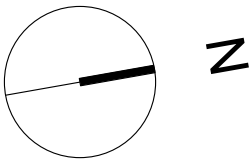
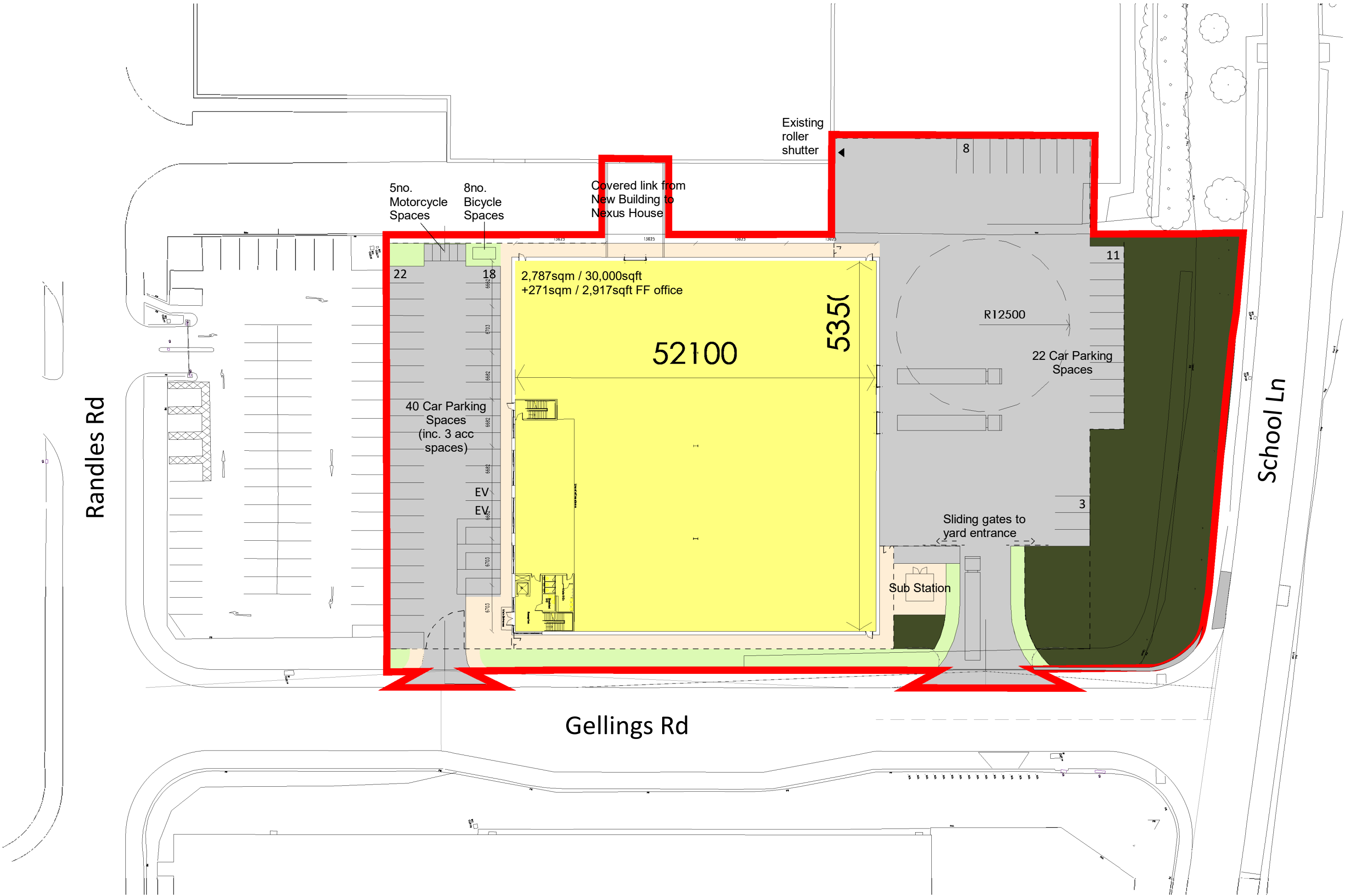
Architects | Master Planners | Designers

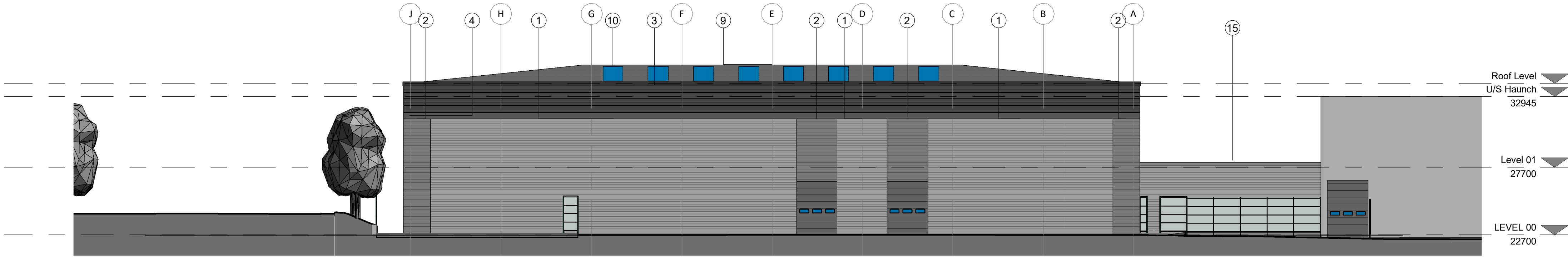
Hill Quays, 5 Jordan Street, Manchester, M15 4PY

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f +44 (0) 161 242 1141
w www.fletcher-rae.com
e info@fletcher-rae.com

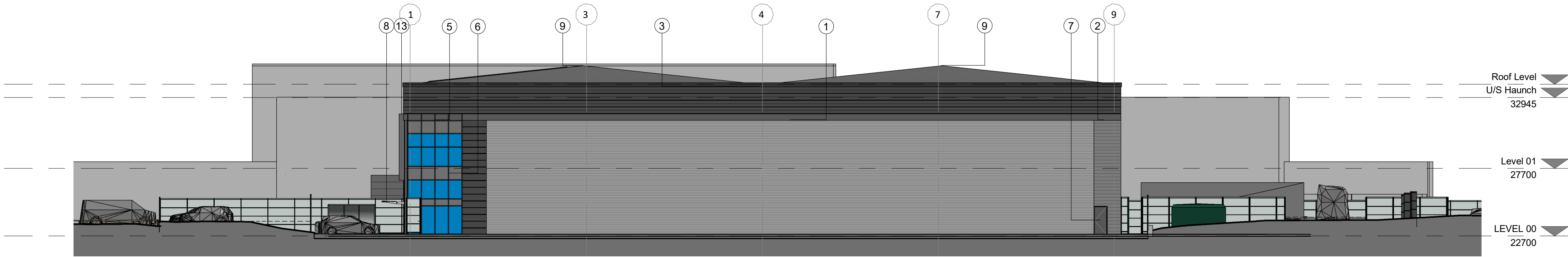
Proposed Site Plan

1 : 500

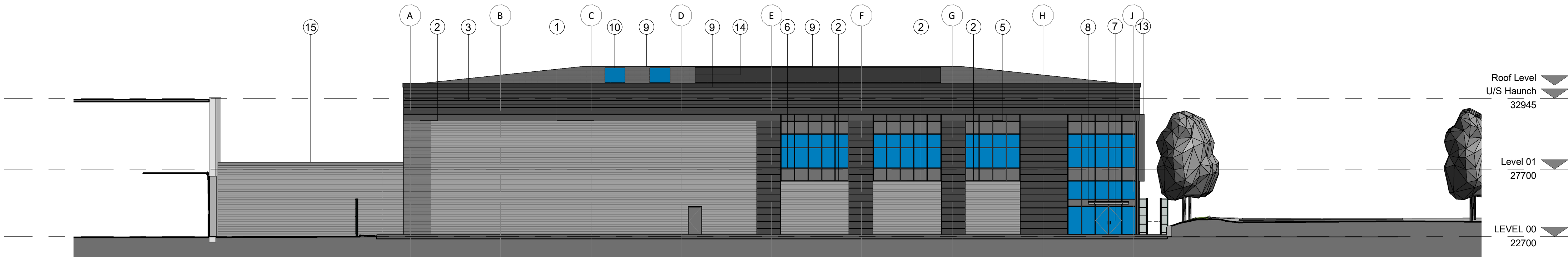




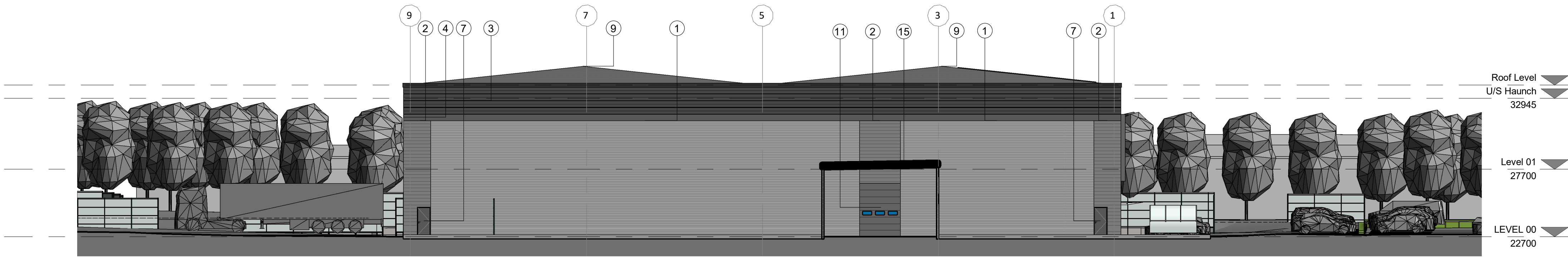
Proposed North Elevation
1 : 200



Proposed East Elevation
1 : 200



Proposed South Elevation
1 : 200



Proposed West Elevation
1 : 200

Materials Key

1 - Horizontal trapezoidal cladding with colour matching flashings.
Colour - Light Grey, with preformed corners and Colour matching flashings.

2 - Horizontal trapezoidal cladding with colour matching flashings.
Colour - Mid Grey, with preformed corners and Colour matching flashings.

3 - Flat 500mm panel horizontal microrib cladding with shadow gaps and colour matched flashings.
Colour - Dark Grey

4 - Flat 500mm panel horizontal microrib cladding with shadow gaps and colour matched flashings.
Colour - Mid Grey

5 - PPC aluminium curtain walling / glazing system with double glazed units.
Colour - Frames in Dark Grey

6 - PPC aluminium cladding blanking panel within curtain walling.
Colour - Dark Grey

7 - Steel faced personnel / fire escape door to match colour of the surrounding cladding.
Colour - to match adjacent cladding. Internal face of door in white to match liner panel.

8 - Glazed Canopy to Office Entrance

9 - Composite kingspan roofing system KS1000RW with 15% rooflights. Fascia colour to match cladding below.

10 - Kingspan Trapezoidal Roof Lights.
Colour - Frames in Dark Grey

11 - Assa Abloy OH1042 Sectional Insulated Level Access Shutter Doors with 3 vision panels.
Colour - Dark Grey with Dark Grey frames

12 - Aluminium capping to parapet
Colour - Dark Grey

13 - Bris soleils formed as fins projecting from mullions

14 - Area designated for Photovoltaic panels

15 - Covered link to Nexus House - Light grey trapezoidal cladding to elevations. Kingspan composite monopitch roof.

General Notes

Do not scale from this drawing. Only work to written dimensions.

All site dimensions shall be verified by the Contractor on site prior to commencing any works.

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P3	General amendments	18/08/21		
P1	Red line boundary & fence line amended, building height increased, office elevations amended and bris soleils added, sub station added and general amendments	11/08/21		
P0	First Issue	20/07/21	ISS	APP
Rev.	Description	Date	ISS	APP
Scale	As indicated			
Status	@ A1			
Drawn By	JB			
Checked By	BB			
Date	05/07/21			
Client:				

Tilstone Managing Warehouse REIT
PLC
Gellings Road
Knowsley

Sheet Name:
Proposed Elevations

Project No. Orig. Zone Level Type Role CIs Dwg No. Rev
19008-FRA-01-XX-A-DR-20-1004 P3
fletcher|rae
Architects | Master Planners | Designers
Hill Quays, 5 Jordan Street, Manchester, M15 4PY

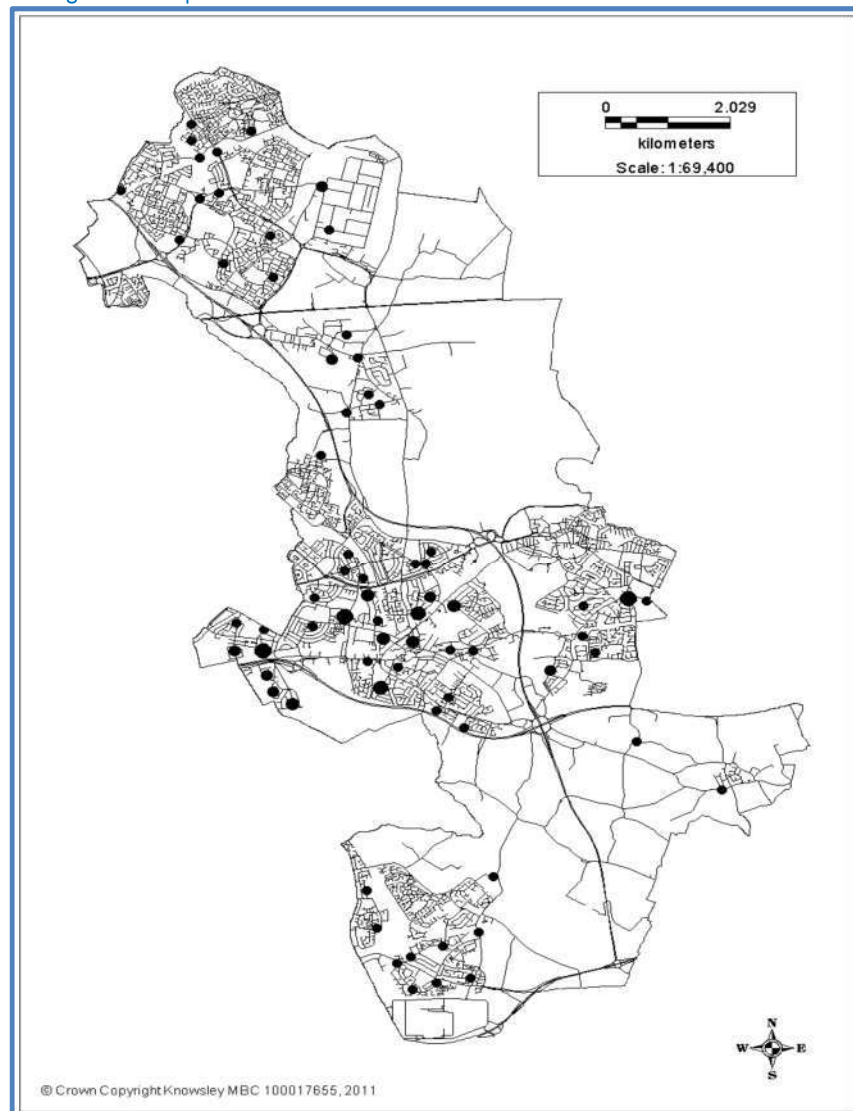
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f +44 (0) 161 242 1141
w www.fletcher-rae.com
e info@fletcher-rae.com

Appendix 3: Historical Flood Mapping

4. FLOOD RISK IN THE PAST

The PFRA requires significant historic flood events to be recorded and reported to Europe through this report. There has been no formal guidance on what 'significant' means in terms of historic local flooding; Defra has left it to LLFAs to determine their own definition. For the recording of past local flood risk, the "indicative flood risk" criteria of 200 people in a 1km grid square was reduced to 20 people (or approximately 8 houses) in a 1km grid. To ensure a consistent Merseyside approach, this method for establishing past local flood risk was discussed at the Merseyside Drainage Group meeting on 17th January 2011 and on 21st February 2011 adopted across the region as the accepted way forward.

Figure 4-1: Spatial Distribution of Past Surface Water Flood Locations.



The flooding record data collected does not have enough detail included to allow full assessment of the impact and consequences on the residents of the properties flooded. The limited available evidence suggests that none of the past flooding events are considered to be significant, with associated harmful consequences. As such, none have been recorded in Annex 1 of the PFRA spreadsheet. An estimated 1% rainfall event (an event that has a 1 in 100 chance of happening in any one year) occurred on 20 July 2011 and the records from both United Utilities and Knowsley only show internal flooding to 12 residential properties and 3 non-residential properties (shops). It should be noted that these flooded properties are dispersed throughout the borough and do not form any significant cluster.

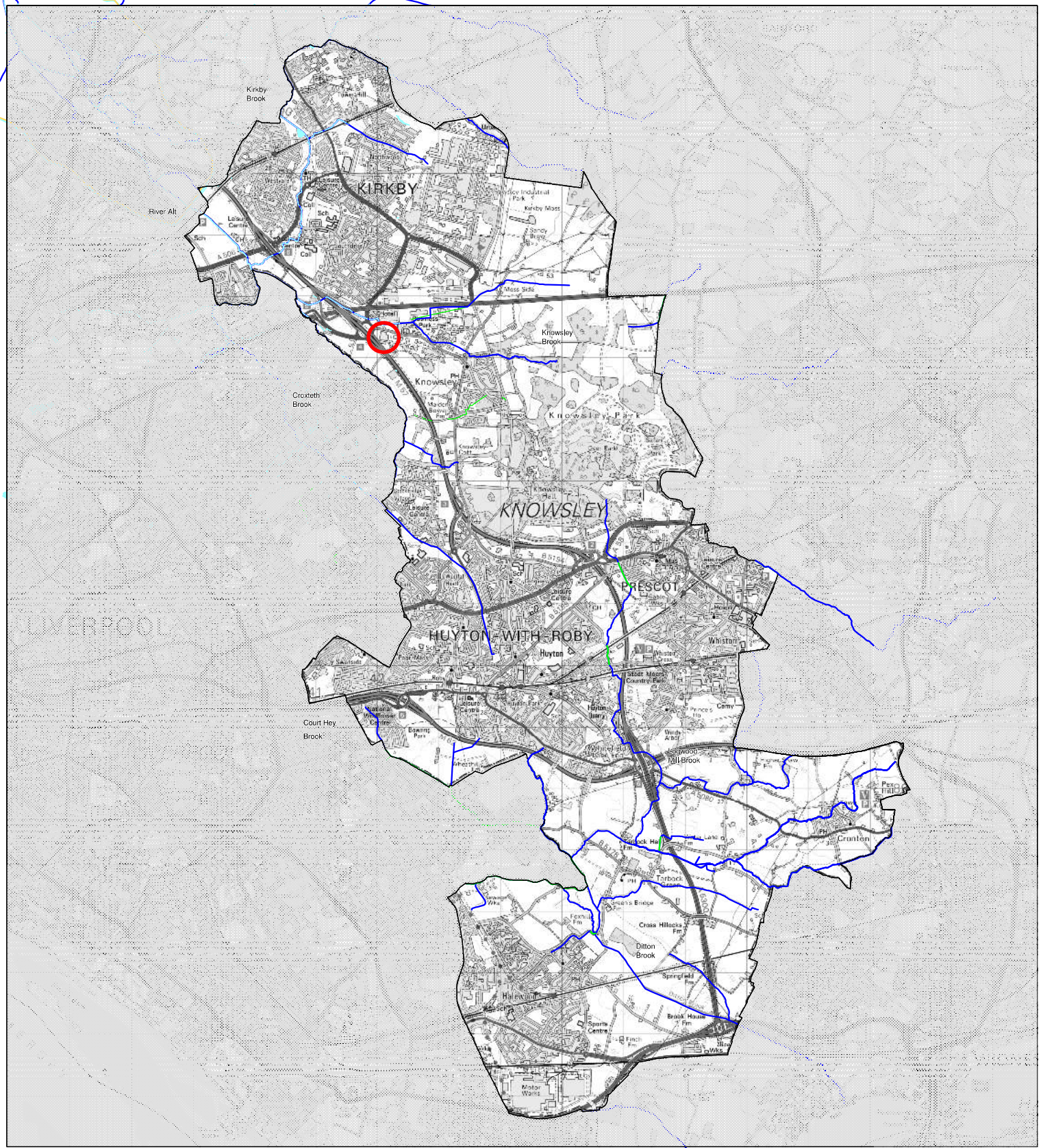
Data provided by United Utilities covering recorded surface water flooding incidents from 2008 to date was reviewed and Table 4-1 shows the location of surface water and combined sewers that have been identified to be hydraulically inadequate.

Table 4-1 – Location of surface water flooding incidents due to lack of capacity in the sewer. *Source: United Utilities, 2011*

Date flooding reported	Location	Sewer Type	Chance of rainfall happening in any year	Consequence	No of properties affected
11/05/2008	Huyton	Surface Water	1 in 20	External Flooding	3
11/05/2008	Huyton	Surface Water	1 in 20	Internal Flooding	3
10/07/2008	Huyton	Combined Sewer	Not known	Cellar Flooding	1
29/07/2008	Huyton	Combined Sewer	Not known	Cellar Flooding	1
29/07/2008	Roby	Combined Sewer	Not known	External Flooding	1
05/09/2008	Huyton	Surface Water	Not known	Highway Flooding	1
06/09/2008	Huyton	Combined Sewer	Not known	Highway Flooding	1
20/07/2010	Roby	Combined Sewer	Not known	External Flooding	5
20/07/2010	Roby	Surface Water	1 in 20	Internal Flooding	3
20/07/2010	Roby	Surface Water	1 in 20	External Flooding	2
20/07/2010	Roby	Surface Water	1 in 20	Highway Flooding	1
03/10/2010	Whiston	Surface Water	Not known	External Flooding	6

The records of all existing past flooding locations will be retained within the “Confirm” database and used to support the local flood risk management strategy.

Appendix 4: SFRA Culvert Mapping



Legend:



Knowsley Boundary



Water Bodies



River Centrelines



Canals



Culverts

SCALE: NTS

Project Title:

Knowsley and Sefton Strategic Flood Risk Assessment

Figure Title:

Watercourses in the Borough Areas
Knowsley

Document Ref:

5074164/62/DG/002

Figure Ref:

A1



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ATKINS

Appendix 5: BWB Trial Pit Logs

TRIAL PIT LOG

Scale: 1:25

Sheet 1 of 1

LOCATION ID: SA01

Hole Type: TP

Project Name: Gellings Road, Knowsley

Project Number: MCA2031

Client: Savills UK Ltd

Plant: JCB 3CX

Start & End Date: 13/02/2019

2.20

0.70

Pit Dimensions (m)

180

Degrees

Stability: Slight collapse below 2.0mbgl.

Ground Level (m AOD): 21.92

Eastings & Northings: 341976E 396332N

Engineer: SH

Checker: PT

Groundwater

Strike

Strike Details

Backfill

Level (m AOD)

Thickn ess

Description

Legend

Depth (m bgl)

2.4m

bgl

0.40m

21.52

Grass over dark greyish brown silty organic SAND with frequent rootlets. Occasional inclusions of metal cans, plastic, ceramic fragments and timber. (Made Ground)

0.40

0.80m

20.72

Dark grey becoming greyish brown slightly organic slightly gravelly slightly clayey SAND. Gravel is sub-angular coarse sandstone. (Shirdley Hill Sand Formation)

1.20

0.35m

20.37

Yellowish brown SAND. (Shirdley Hill Sand Formation)

1.55

0.20m

20.17

Dark brown and black amorphous PEAT. (Shirdley Hill Sand Formation)

1.75

0.15m

20.02

Yellowish brown SAND. (Shirdley Hill Sand Formation)

1.90

0.60m

19.42

Light grey slightly gravelly clayey SAND with frequent pockets of grey clay. Gravel is coarse rounded sandstone. (Shirdley Hill Sand Formation)

2.50

Hole Terminated at 2.50m bgl.

Type

From (m)

To (m)

Type

Depth (m)

Result

Remarks

Reason for Termination: Terminated at target depth.

Groundwater Notes: Arisings damp below 2.00mbgl. Slight seepage at 2.40mbgl.

Other Remarks: 1. No olfactory or visual evidence of contamination. 2. Trial pit constructed for BRE 365 Soakaway Testing.

Samples:

Groundwater Strikes:

In-Situ Tests:

B - Bulk

D - Disturbed

ES - Environmental Sample

Groundwater Strike

Resting

Groundwater Level

HSV - Hand Shear Vane Test

PID - Photo Ionisation Detector Test

BWB Consulting Ltd

Waterfront House

Station Street

Nottingham

NG2 3DQ

Web:

bwbconsulting.com

E: nottingham

@bwbconsulting.com

P: 0115 9241100

BWB

CONSULTANCY | ENVIRONMENT

INFRASTRUCTURE | BUILDINGS

TRIAL PIT LOG	Scale: 1:25	Sheet 1 of 1
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Sheet 1 of 1

LOCATION ID: SA02	Project Name: Gellings Road, Knowsley		2.10 0.70 Pit Dimensions (m) 180 Degrees	
	Project Number: MCA2031			
	Client: Savills UK Ltd			
	Hole Type: TP	Plant: JCB 3CX	Start & End Date: 13/02/2019	Stability: Trial pit stable throughout excavation.
Ground Level (m AOD): 23.30		Eastings & Northings: 342236E 396352N	Engineer: SH	Checker: PT

Groundwater						Strata		Samples			In-Situ Tests		
Strike	Strike Details	Backfill	Level (m AOD)	Thickn ess	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
					Grass over dark greyish brown slightly silty slightly organic gravelly SAND with frequent rootlets. Gravel is medium sub-rounded quartzite. (Topsoil) Yellowish brown SAND. (Shirdley Hill Sand Formation) Dark brown and black amorphous PEAT. (Shirdley Hill Sand Formation) Yellowish brown SAND. (Shirdley Hill Sand Formation) Grey mottled orangish brown slightly gravelly sandy CLAY with a low cobble content. Gravel is fine to medium rounded sandstone and quartzite. Cobbles are sub-angular strong sandstone. (Shirdley Hill Sand Formation) Extremely weathered SANDSTONE arising as a light orange mottled white gravelly SAND. Gravel is medium and coarse sub-angular moderately strong sandstone. (Chester Formation) Hole Terminated at 2.50m bgl.								

Remarks		Legend		
Reason for Termination: Terminated at target depth.		Samples: B - Bulk D - Disturbed ES - Environmental Sample	Groundwater Strikes:  Groundwater Strike  Resting Groundwater Level	In-Situ Tests: HSV - Hand Shear Vane Test PID - Photo Ionisation Detector Test
Groundwater Notes: No groundwater encountered				
Other Remarks: 1. No olfactory or visual evidence of contamination. 2. Trial pit constructed for BRE 365 Soakaway Testing.		BWB Consulting Ltd Waterfront House Station Street Nottingham NG2 3DQ	Web: bwbconsulting.com E: nottingham@bwbconsulting.com P: 0115 9241100	 CONSULTANCY ENVIRONMENT INFRASTRUCTURE BUILDINGS

TRIAL PIT LOG

Scale: 1:25

Sheet 1 of 1

Sheet 1 of 1

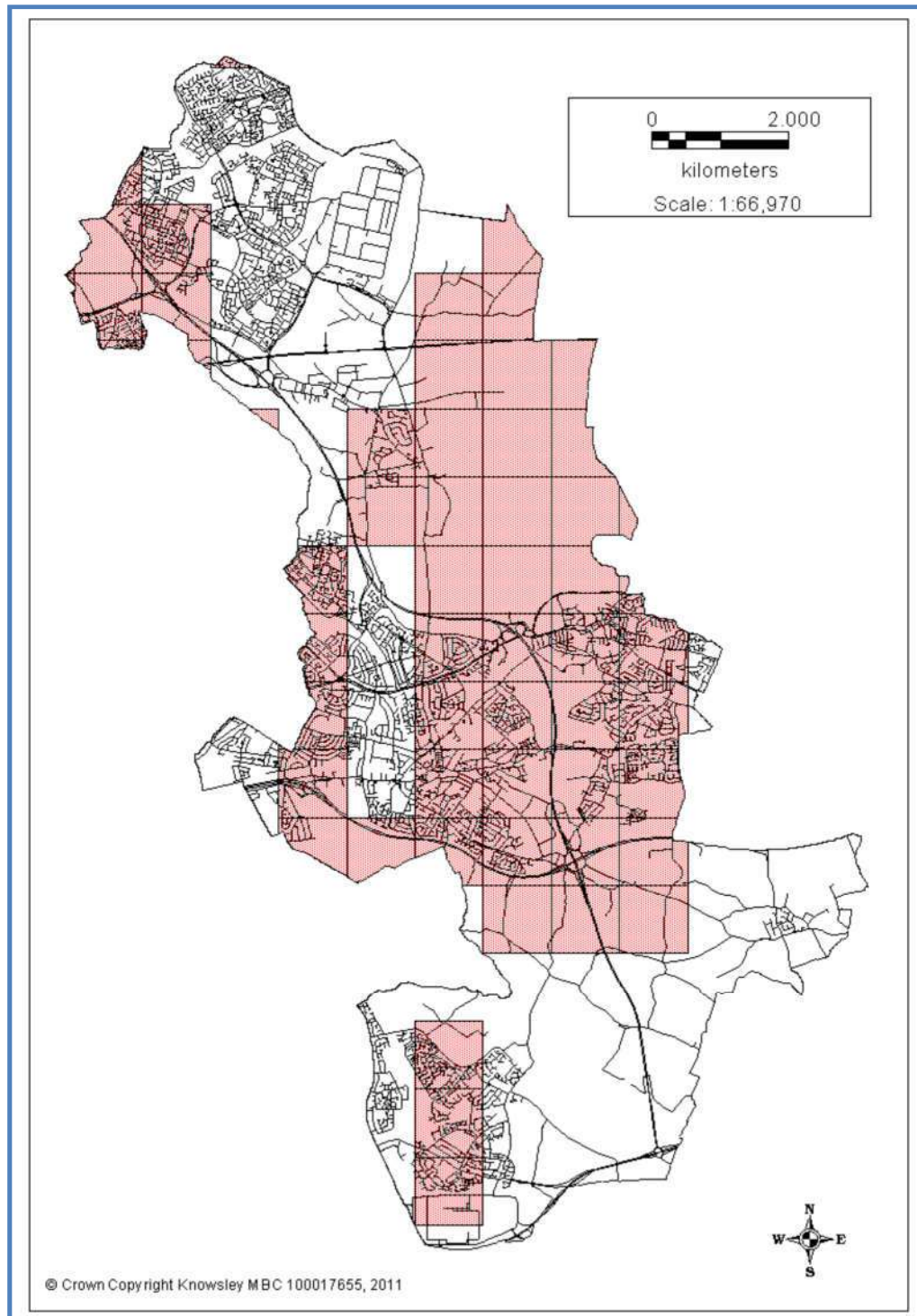
LOCATION ID: SA03	Project Name: Gellings Road, Knowsley		1.90 0.70 Pit Dimensions (m) 180 Degrees	
	Project Number: MCA2031			
	Client: Savills UK Ltd			
	Hole Type: TP	Plant: JCB 3CX	Start & End Date: 13/02/2019	Stability: Slight collapse below 2.20mbgl.
Ground Level (m AOD): 23.10		Eastings & Northings: 342226E 396309N	Engineer: SH	Checker: PT

Groundwater		Strata						Samples			In-Situ Tests			
Strike	Strike Details	Backfill	Level (m AOD)	Thickn ess	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result	
▼ 2.45m bgl			22.80	0.30m	Grass over dark greyish brown slightly silty slightly organic slightly gravelly SAND with frequent rootlets. Gravel is medium sub-rounded quartzite.		0.30							
				(Topsoil)										
			22.65	0.15m	Dark brown silty SAND. (Shirdley Hill Sand Formation)		0.45							
				0.40m	Dark orangish brown slightly clayey SAND. (Shirdley Hill Sand Formation)									
			22.25		0.75m	Yellowish brown SAND. (Shirdley Hill Sand Formation)								
				21.50		0.40m								Dark brown and black amorphous PEAT. (Shirdley Hill Sand Formation)
			21.10		0.10m		Yellowish brown SAND. (Shirdley Hill Sand Formation)							
				21.00		0.45m	Grey mottled orangish brown slightly gravelly clayey SAND with occasional bands of sandy clay. Gravel is rounded fine to medium quartzite and sandstone. (Shirdley Hill Sand Formation)							
			20.55		Hole Terminated at 2.55m bgl.									

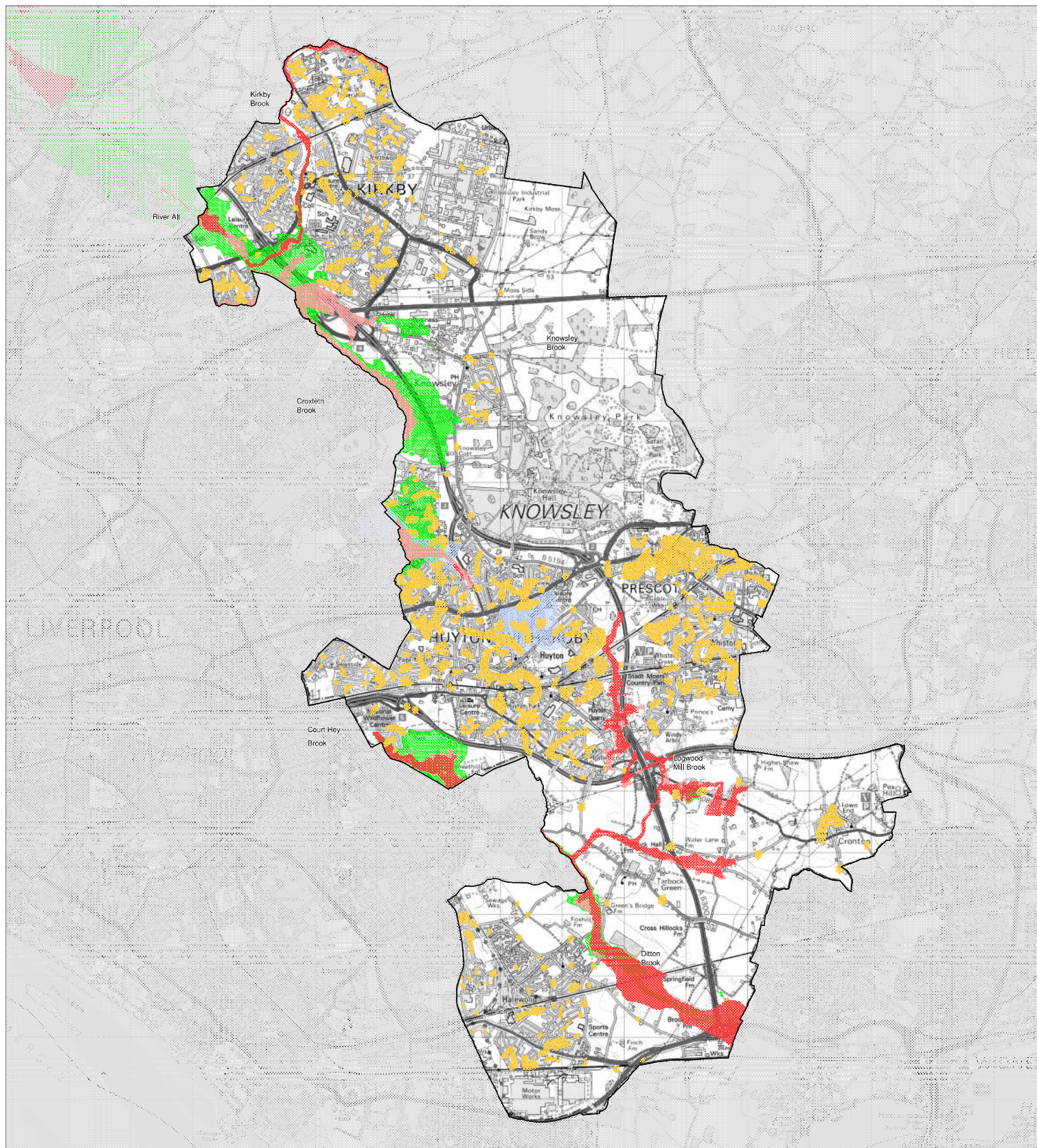
Remarks		Legend		
Reason for Termination: Terminated at target depth.		Samples: B - Bulk D - Disturbed ES - Environmental Sample		
Groundwater Notes: Arisings damp below 2.40mbgl. Slight seepage at 2.45mbgl.		Groundwater Strikes:  Groundwater Vane Test  Resting  Groundwater Level		
Other Remarks: 1. No olfactory or visual evidence of contamination. 2. Trial pit constructed for BRE 365 Soakaway Testing.		In-Situ Tests: HSV - Hand Shear Vane Test PID - Photo Ionisation Detector Test		
		BWB Consulting Ltd Waterfront House Station Street Nottingham NG2 3DQ Web: bwbconsulting.com E: nottingham@bwbconsulting.com P: 0115 9241100 		

Appendix 6: Groundwater Flood Risk Mapping

Figure 5-1 – Areas Susceptible to Ground Water Flooding



Appendix 7: SFRA Surface Water Mapping



Legend:



Knowsley Boundary



Surface Water Flooding Indicated From Council Records
- Medium Risk



Flood Zone 3b - High Risk



High Frequency Internal DG5 Surface Water Flooding
- Medium Risk



Flood Zone 3a - High Risk



Potential Groundwater Flooding
- Low Risk



Flood Zone 2 - High Risk

SCALE: NTS

Project Title:

Knowsley and Sefton Strategic Flood Risk Assessment

Figure Title:

Combined Risk Matrix Map
Knowsley

Document Ref:

5074164/DG/002

Figure Ref:

J1



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ATKINS

Appendix 8: Sewer Records

BWB Consulting Ltd

**5th Floor, Waterfront House
Station Street,
Nottingham,
NG23DQ**

FAO:

How to contact us:

**United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP**

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

**Your Ref: MCA2031 - Gellings Road
Our Ref: UUPS-ORD-84497
Date: 12/02/2019**

Dear Sirs

Location: BOMAC ELECTRIC LTD RANGLES ROAD, KNOWSLEY BUSINESS PARK, PRESCOT, L34 9HX

I acknowledge with thanks your request dated 11/02/2019 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

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

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



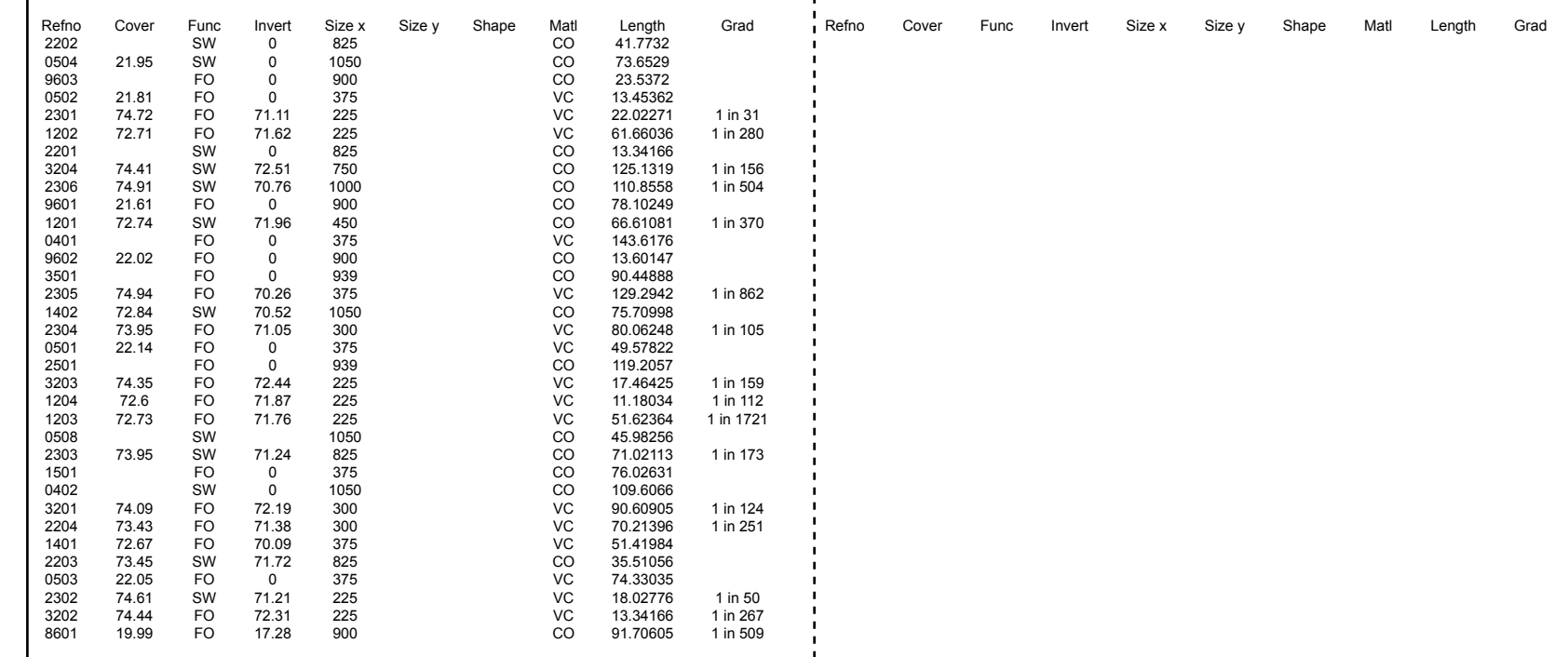
Karen McCormack
Property Searches Manager

TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

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

TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.



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

FO	Foul
SW	Surface Water
CO	Combined
OV	Overflow

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

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

Scale: 1:1250 **Date:** 12/02/2019

Sheet: 1 of 1

Printed by: Property Searches

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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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