

LOWER WOODHILL ROAD, BURY

**FLOOD RISK ASSESSMENT
FINAL REPORT V1.1**

January 2021

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Client	Veolia ES (UK) Ltd
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1 INTRODUCTION

1.1 Purpose of Report

Weetwood Services Ltd ('Weetwood') has been instructed by Veolia ES (UK) Ltd to prepare a Flood Risk Assessment (FRA) report to accompany a detailed planning application for the proposed development of a new industrial building at the existing Veolia facility located off Lower Woodhill Road, Bury.

The assessment has been undertaken in accordance with the requirements of the revised National Planning Policy Framework (NPPF) updated on 19 February 2019 and the National Planning Practice Guidance (NPPG) updated on 1 October 2019 so far as is practicable.

This version of the report has been revised to respond to comments raised by the Environment Agency in its consultation response¹, which relates to the detailed planning application (Bury Metropolitan Borough Council planning ref: 66114) submitted for the proposed development.

1.2 Structure of the Report

The report is structured as follows:

Section 1	Introduction and report structure
Section 2	Provides background information relating to the development site, the development proposals, ground conditions, existing site access arrangements and the flood zone designation
Section 3	Presents national and local flood risk planning policy
Section 4	Assesses the potential sources of flooding to the development site
Section 5	Presents flood risk mitigation measures based on the findings of the assessment
Section 6	Presents a summary of key findings and the recommendations

1.3 Relevant Documents

The assessment has been informed by the following documents:

- Bury, Rochdale and Oldham Strategic Flood Risk Assessment (SFRA) Volume II – Level 1, Bury Metropolitan Borough Council, November 2009
- Bury, Rochdale and Oldham SFRA Volume III – Level 2, Bury Metropolitan Borough Council, November 2009
- Bury Council Preliminary Flood Risk Assessment (PFRA), Bury Metropolitan Borough Council, May 2011

¹ Consultation response provided by the Environment Agency dated 2 December 2020 (ref: SO/2020/120679/01-L01)

2 SITE DETAILS AND PROPOSED DEVELOPMENT

2.1 Site Location

The approximately 0.82 hectare (ha) site is located to the south-east of Lower Woodhill Road at Ordnance Survey National Grid Reference SD 798 111, as shown in **Figure 1**.

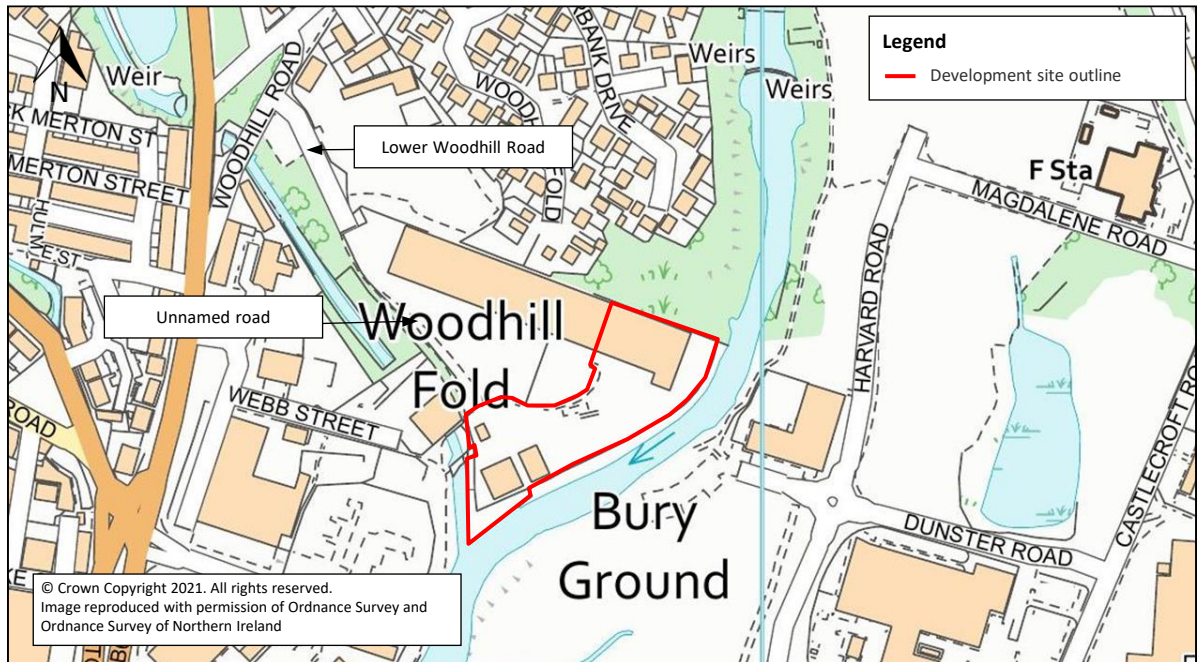


Figure 1: Site Location

2.2 Existing and Proposed Development

The site currently comprises the existing Veolia waste management facility.

The proposed development will comprise the construction of a new unit on-site, which will serve as storage space for waste bales. The waste bales are already stored outside within the area to be developed.

The proposed site layout is provided in **Appendix A**.

The NPPG classifies sites used for non-hazardous waste management as a Less Vulnerable to flood risk.

2.3 Waterbodies in the Vicinity of the Site

The River Irwell is located adjacent to the site's south eastern boundary and flows in a southerly direction.

Woodhill Brook is located adjacent to the site's western boundary and flows in a southerly direction, outfalling into the River Irwell.

Larger rivers and streams are usually designated as 'main river'; other rivers are called 'ordinary watercourses'. The main river map² shows which rivers in England are designated as 'main river'.

² <https://environment.maps.arcgis.com/apps/webappviewer/index.html?id=17cd53dfc524433980cc333726a56386>

The Environment Agency carries out maintenance, improvement and construction work on main rivers to manage flood risk. Lead local flood authorities, district councils and internal drainage boards carry out flood risk management work on ordinary watercourses.

According to the main river map (**Figure 2**) both the River Irwell and Woodhill Brook are classified as 'main river'.

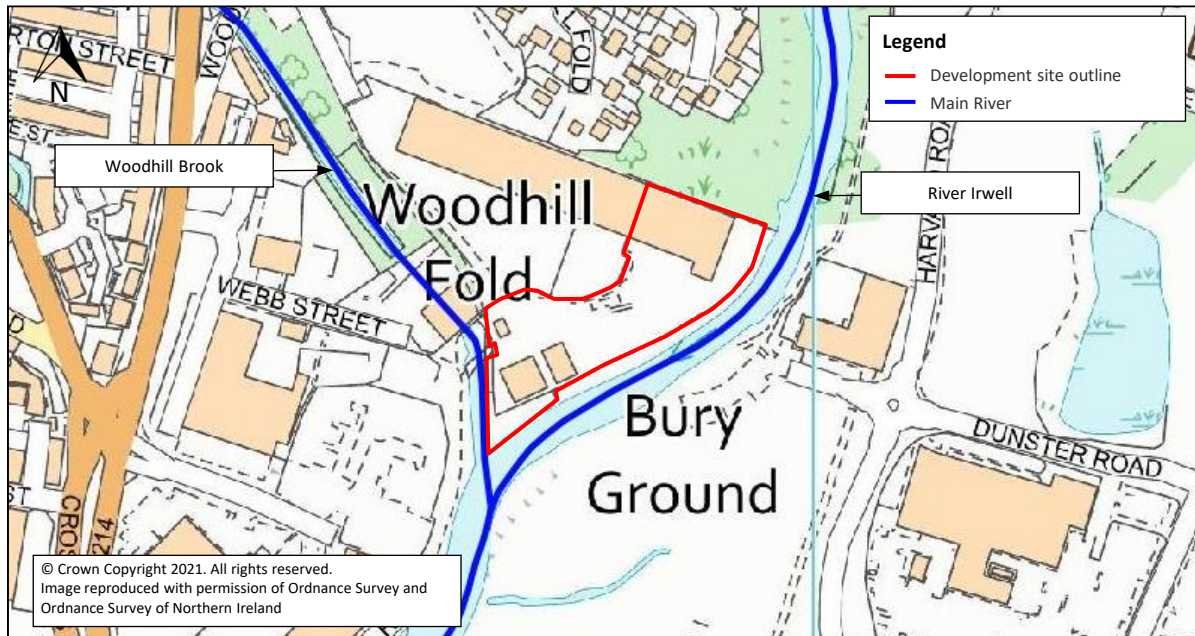


Figure 2: Locations and Designation of Waterbodies

Source: gov.uk website; Accessed: 4 September 2020

2.4 Ground Conditions

According to the Soilscape soils dataset produced by the Cranfield Soil and AgriFood Institute³, soil conditions at the site and within the surrounding area are 'freely draining slightly acid loamy soils'.

British Geological Survey mapping of surface geology⁴ indicates the underlying bedrock formation comprises 'Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone', overlain by 'Alluvium - Clay, Silt, Sand And Gravel' superficial deposits.

According to the MAGIC website⁵ the 'Alluvium - Clay, Silt, Sand And Gravel' superficial deposits at the site and the underlying 'Pennine Lower Coal Measures Formation - Mudstone, Siltstone And Sandstone' bedrock are classified as a 'Secondary A' aquifer. A Secondary A aquifer is defined by its permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

The site is not shown to be located within a designated groundwater source protection zone.

2.5 Site Levels

A topographic survey of the site has been undertaken by JPP and is provided in **Appendix B**. This information has been utilised to develop a digital terrain model as illustrated in **Figure 3**.

³ www.landis.org.uk/soilscape/

⁴ <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

⁵ <https://magic.defra.gov.uk/MagicMap.aspx>

Site levels are shown to be in the region of 78.11 to 80.95 metres Above Ordnance Datum (m AOD). Ground levels are generally shown to rise towards the western boundary.

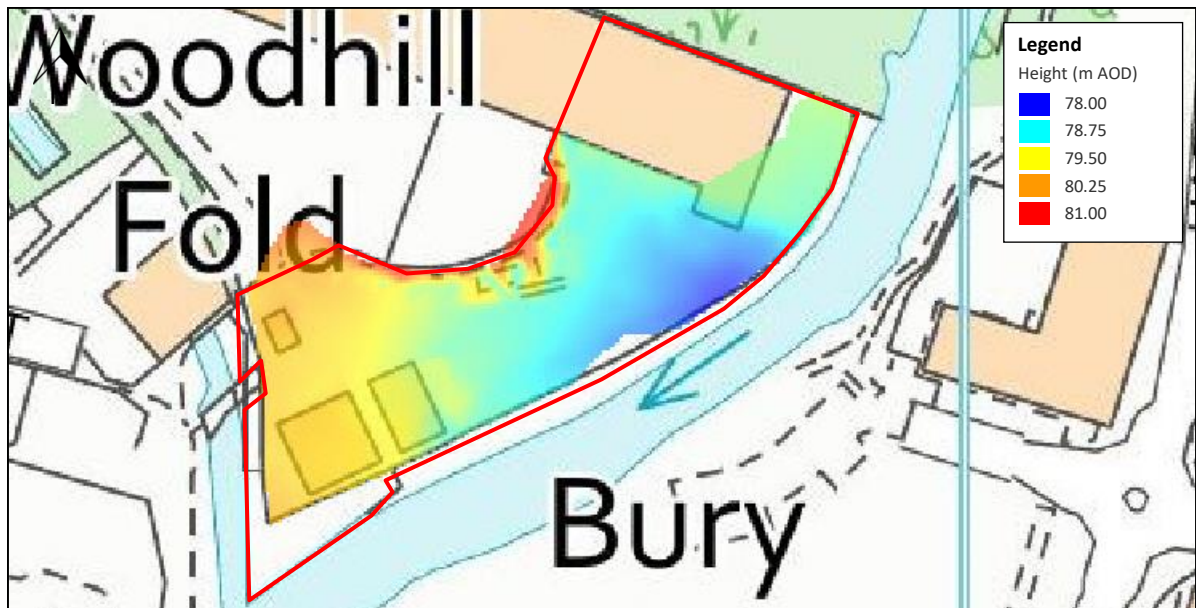


Figure 3: Digital Terrain Model from Topographic Survey

2.6 Access and Egress

Access and egress to the site is provided via an unnamed road, leading to Lower Woodhill Road to the north west of the site (Figure 1).

The topographic survey does not cover the access and egress; therefore, LiDAR data has been utilised. This indicates that levels along the unnamed road are in the region of 80.10 to 83.30 m AOD, rising toward the junction with Lower Woodhill Road. Levels along Lower Woodhill Road are in the region of 82.80 to 85.00 m AOD.

2.7 Flood Zone Designation

Flood zones refer to the probability of river and sea flooding. Table 1 of the NPPG defines flood zones as follows⁶:

- Flood zone 1: Low Probability. Land having a less than 1 in 1,000 annual probability of river or sea flooding
- Flood zone 2: Medium Probability. Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding
- Flood zone 3a: High Probability. Land having a 1 in 100 or greater annual probability of river flooding or a 1 in 200 or greater annual probability of sea flooding
- Flood zone 3b: Functional Floodplain. Land where water has to flow or be stored in times of flood.

The flood zones are shown on the Environment Agency Flood Map for Planning (Rivers and Sea)⁷.

The flood zones shown on the flood map are defined by the predicted extent of flooding during the present day 1 in 100 (non-tidal rivers), 1 in 200 (tidal rivers and sea) and 1 in 1,000 (rivers and sea) annual

⁶ <https://www.gov.uk/guidance/flood-risk-and-coastal-change#flood-zone-and-flood-risk-tables>

⁷ <https://flood-map-for-planning.service.gov.uk/>

exceedance probability (AEP) events. The zones do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding.

Flood zone 3b (functional floodplain) is not separately distinguished on the Flood Map for Planning but is usually identified by local planning authorities in their SFRAs. The boundary of flood zone 3b is normally defined as land that would flood during the present day 1 in 20 AEP event, although definitions may vary particularly in some districts and in urban areas.

Where an area benefits from formal flood defences providing a minimum standard of protection, the defended area may be indicated as an area benefiting from flood defences. However, not all areas are shown as such, and unless specifically indicated, the Flood Map for Planning conservatively shows land at risk of flooding in the absence of flood defences.

The Flood Map for Planning (**Figure 4**) indicates the site to be located in flood zone 3.

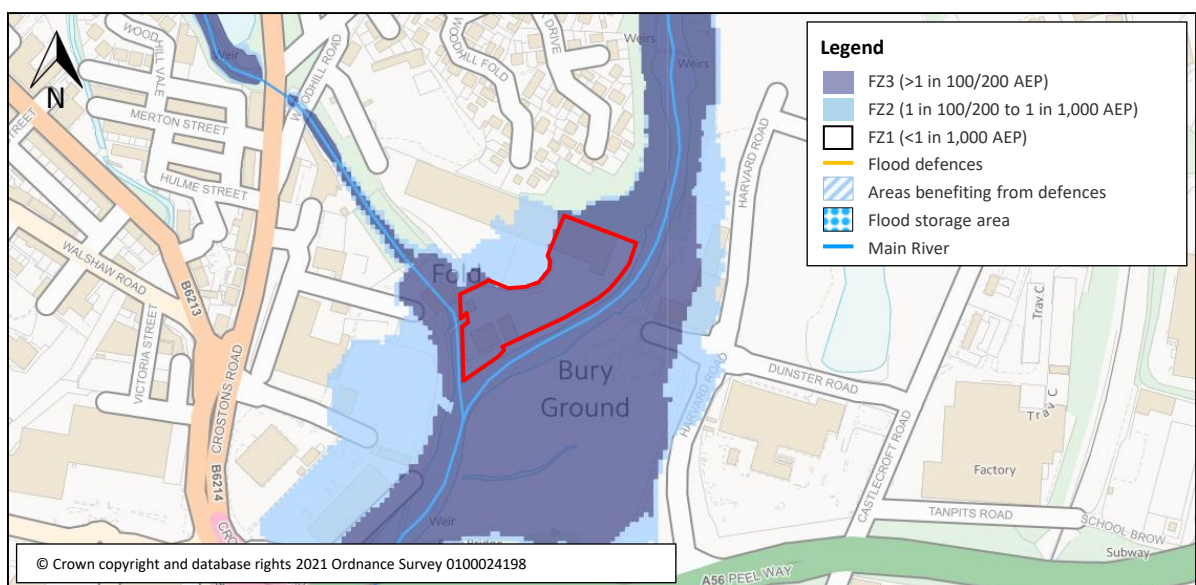


Figure 4: Flood Map for Planning

Source: gov.uk website

3 PLANNING POLICY AND GUIDANCE

3.1 European Union Legislation

The Water Framework Directive (WFD) provides a legal framework for the protection, improvement and sustainable use of inland surface waters, groundwater, transitional waters, and coastal waters across England, and seeks to:

- Prevent deterioration in the status of aquatic ecosystems, protect them and improve the ecological condition of waters
- Achieve at least 'good' status for all waterbodies by 2015
- Promote the sustainable use of water as a natural resource
- Conserve habitats and species that depend directly on water
- Progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and
- Contribute to mitigating the effects of floods and droughts.

The WFD applies to any proposed development which has the potential to impact on a waterbody. Where this is the case, the Environment Agency may require evidence demonstrating that the proposed development does not compromise the aims of the WFD.

3.2 National Planning Policy and Guidance

The NPPF sets out government's planning policies for England and how these are expected to be applied. The NPPF seeks to ensure that flood risk is taken into account at all stages in the planning process and is appropriately addressed.

Footnote 50 of the NPPF states that a site-specific flood risk assessment should be submitted for all development proposed in flood zone 2 and flood zone 3 whilst in flood zone 1, an assessment should accompany all proposals involving: sites of 1 ha or more; land identified as having critical drainage problems or as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

NPPF paragraph 155 states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk but accepts that where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere. The policy of seeking to direct development away from areas at highest risk of flooding is implemented through the application of the sequential test (NPPF paragraph 158).

Paragraph 159 of the NPPF states that if it is not possible for a development to be located in zones with a lower risk of flooding, taking into account wider sustainable development objectives, the exception test may have to be applied.

The need for the exception test will depend on the flood zone of the site and the vulnerability of the development proposed (as set out in NPPG Table 2 and 3).

NPPF paragraph 160 states that application of the exception test for development proposals at the application stage should be informed by a site-specific flood risk assessment. For the test to be passed it should be demonstrated that: the development would provide wider sustainability benefits to the community that outweigh the flood risk; and the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

NPPF Paragraph 161 states that both elements of the exception test should be satisfied for development to be permitted.

3.3 Local Planning Policy and Guidance

3.3.1 Bury Unitary Development Plan, Bury Metropolitan Borough Council, Adopted August 1997

The Bury Unitary Development Plan acts as a guide for the future development or protection of land in the borough and its policies and proposals currently form the basis of the council's decisions on planning applications.

The following policies are relevant in respect of flood risk:

Policy EN5; Flood Protection and Defence

The council will seek to control development in a manner consistent with flood protection and the maintenance of flood defence systems.

Policy EN5/1; New Development and Flood Risk

The council will not permit new development, including the raising of land and the intensification of development, where such development would be at risk of flooding, would be likely to increase the risk of flooding elsewhere, or would adversely affect river flood defence. When assessing proposals against this policy, the following criteria will apply:

- The impact on the floodplain;
- The increase in surface water run-off as a result of the proposal;
- The impact on fluvial flood defences;
- The incorporation of mitigation works.

3.3.2 Bury Local Plan Policy Directions, Bury Metropolitan Borough Council, October 2018

The Bury Local Plan Policy Directions sets out a long-term framework to guide and control future growth and development and help shape the Borough to a period up to 2037.

The following policy is relevant in respect of flood risk:

Policy Direction OP5; Flood Risk Management

It is proposed that the Local Plan should include a policy that seeks to manage flood risk from all sources by ensuring that new development complies with the flood risk management hierarchy and is not subject to unacceptable levels of risk, does not result in increased flood risk elsewhere and, where possible, achieves reductions in flood risk overall.

In addition, it should seek to ensure that all new development proposals minimise the impact of development on surface water run-off, and where possible, seek to reduce it.

3.4 Environmental Permitting and Land Drainage Consent

Under the Environmental Permitting (England and Wales) Regulations 2016 an Environmental Permit for Flood Risk Activities⁸ is required from the Environment Agency for any permanent or temporary works:

- In, over or under a designated main river
- Within 8 m of the top of bank of a designated main river or of the landward toe of a flood defence (16 m if it is a tidal main river or a sea defence).

In addition, any permanent or temporary works within the floodplain of a designated main river may also require an Environmental Permit for Flood Risk Activities. A permit is separate to and in addition to any planning permission granted.

⁸ <https://www.gov.uk/guidance/flood-risk-activities-environmental-permits>

Land drainage consent may be required from the lead local flood authority or drainage board for work to an ordinary watercourse.

Undertaking activities controlled by local byelaws also requires the relevant consent.

4 REVIEW OF FLOOD RISK

4.1 Sequential Test and Exception Test

The proposals are to support the existing use of the site. Therefore, it would be impractical to locate the development elsewhere. As such, the application of the sequential test is not considered necessary in this instance.

The proposed development includes less vulnerable uses in flood zone 3. As such, the exception test need not be applied. Nevertheless, the proposals are still required to meet the requirements for site specific flood risk assessments

4.2 Historical Records of Flooding

The Environment Agency recorded flood outlines database indicates that no historic flood events are known to have impacted the site.

4.3 Fluvial Flood Risk

As discussed in **Section 2.3**, the River Irwell is located adjacent to the sites south eastern boundary and flows in a southerly direction. Woodhill Brook is located adjacent to the sites western boundary and flows in a southerly direction, outfalling to the River Irwell.

The Environment Agency spatial flood defence database indicates that flood defences are present along the banks of the River Irwell and Woodhill Brook (**Figure 5**). These comprise of high ground with crest levels ranging between 76.83 to 82.19 m AOD and 76.38 to 79.39 m AOD for the River Irwell and Woodhill Brook, respectively.

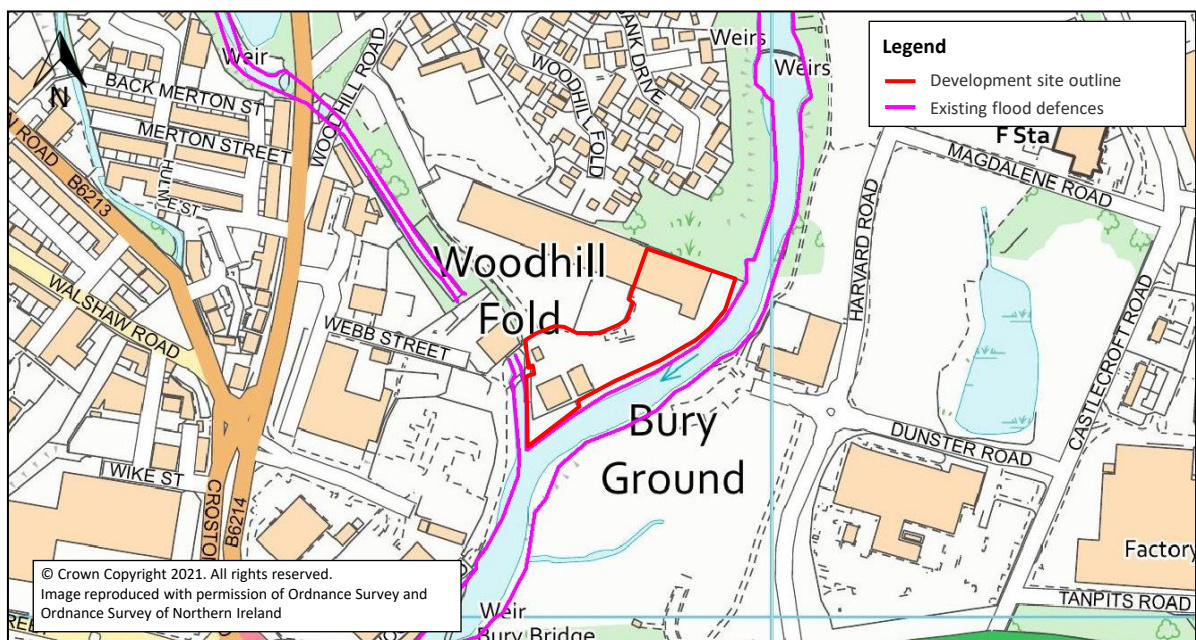


Figure 5: Existing Flood Defences

A 1D-2D Flood Modeller-TUFLOW hydraulic model of the River Irwell was developed by JBA Consulting as part of the Mid Irwell Modelling Study, June 2018. This includes the downstream section of Woodhill Brook, to its confluence with the River Irwell.

This assesses the risk of overtopping (defended scenario) from the River Irwell and Woodhill Brook for the present day 1 in 100 and 1 in 1,000 AEP events and the 1 in 100 plus climate change (35%) AEP event.

Given the sites flood zone 3 classification and the less vulnerable nature of the proposals a 35% increase in peak river flow to account for climate change is considered appropriate (i.e. North West river basin district; high central allowance).

Modelled flood outputs are provided in **Figure 6**.

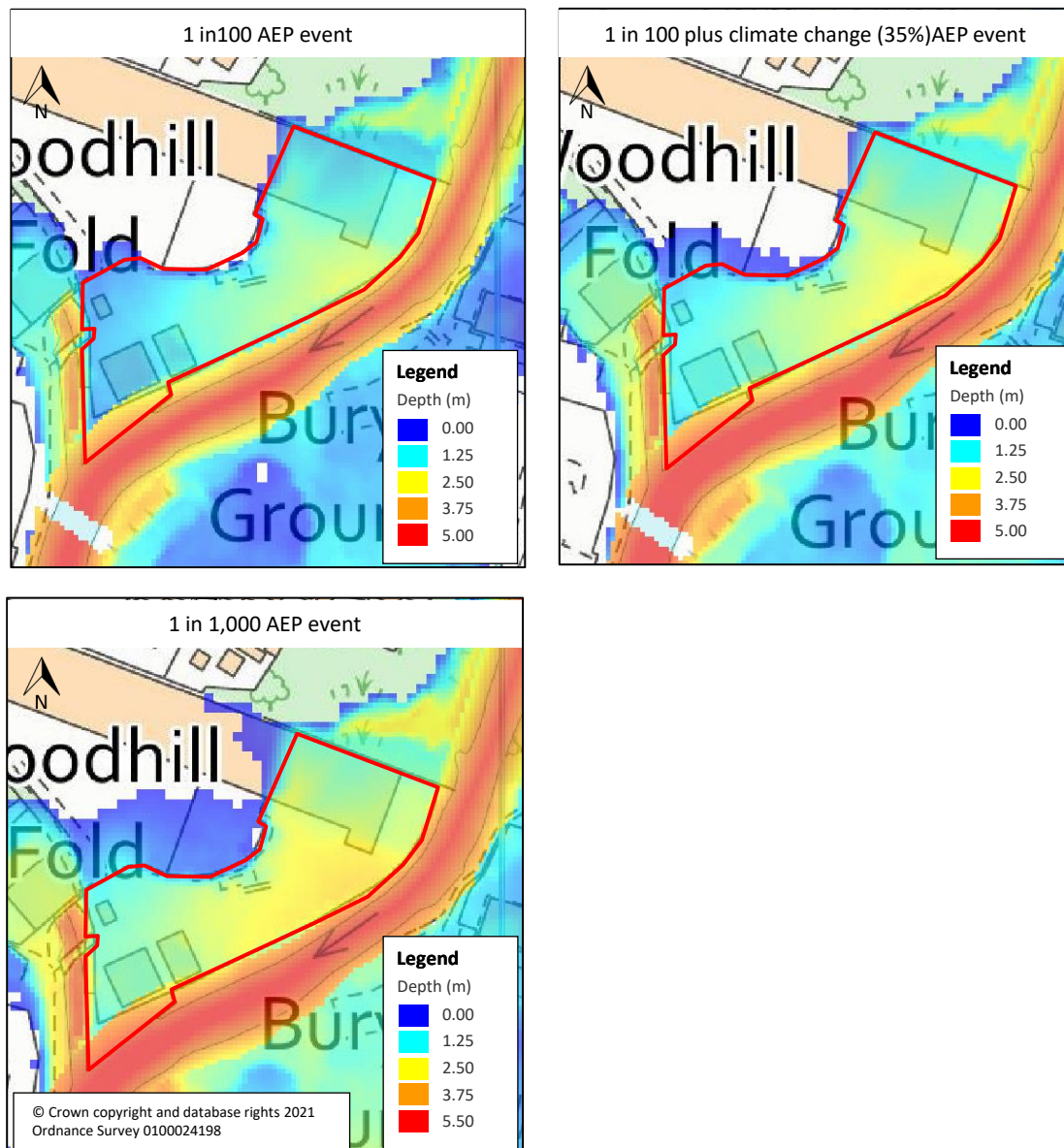


Figure 6: River Irwell and Woodhill Brook Modelled Flood Outputs – Overtopping (Defended)

Source: Mid Irwell Modelling Study, JBA Consulting, June 2018

Table 1 summarises the maximum level, depth and velocity of floodwaters expected at the wider Veolia site and that within the proposed developable area during the aforementioned overtopping (defended) scenarios.

Table 1: Site Flood Information (Baseline) – Overtopping (Defended)

AEP Event	Max Level (m AOD)	Max Depth (m)		Max Velocity (m/s)	
		Highest	Mean	Highest	Mean
Site Wide					
Present day 1 in 100	80.56	4.35	1.50	2.31	0.37
1 in 100 plus climate change (35%)	81.11	4.92	1.94	2.77	0.63
Present day 1 in 1,000	81.36	5.15	2.13	2.85	0.70
Proposed Developable Area					
Present day 1 in 100	80.45	2.10	1.87	0.65	0.36
1 in 100 plus climate change (35%)	80.96	2.56	2.38	1.03	0.80
Present day 1 in 1,000	81.17	2.76	2.60	1.16	0.89

The modelled outputs indicate that Lower Woodhill Road would remain flood free in up to the 1 in 1,000 AEP event. The unnamed access road is also expected to remain dry during the 1 in 100 AEP event. Some flooding of this road may be expected during the 1 in 100 plus climate change (35%) and 1 in 1,000 AEP events, with maximum flood depths of 1.34 and 1.56 m respectively; however, this would only be expected over a short section of approximately 40 m beyond which dry access is provided.

A breach of the existing flood defences has not been assessed as part of the aforementioned study. However, as a conservative approach the 'undefended' modelled outputs have been assessed for the present day 1 in 100 and 1 in 1,000 AEP events and the 1 in 100 plus climate change (35%) AEP event. It should be noted that this scenario assumes that all flood defences are removed, which is a wholly unrealistic event and as such may overestimate actual flood risk during a breach scenario.

Modelled flood outputs are provided in **Figure 7**.

Table 2 summarises the maximum level, depth and velocity of floodwaters expected at the wider Veolia site and that within the proposed developable area during the aforementioned undefended scenarios.

Table 2: Site Flood Information (Baseline) - Undefended

AEP Event	Max Level (m AOD)	Max Depth (m)		Max Velocity (m/s)	
		Highest	Mean	Highest	Mean
Site Wide					
Present day 1 in 100	80.59	4.32	1.52	2.35	0.37
1 in 100 plus climate change (35%)	81.11	4.87	1.94	2.77	0.64
Present day 1 in 1,000	81.37	5.10	2.14	2.86	0.72
Proposed Developable Area					
Present day 1 in 100	80.48	2.13	2.02	0.66	0.37
1 in 100 plus climate change (35%)	80.96	2.56	2.52	1.03	0.80
Present day 1 in 1,000	81.18	2.77	2.75	1.16	0.90

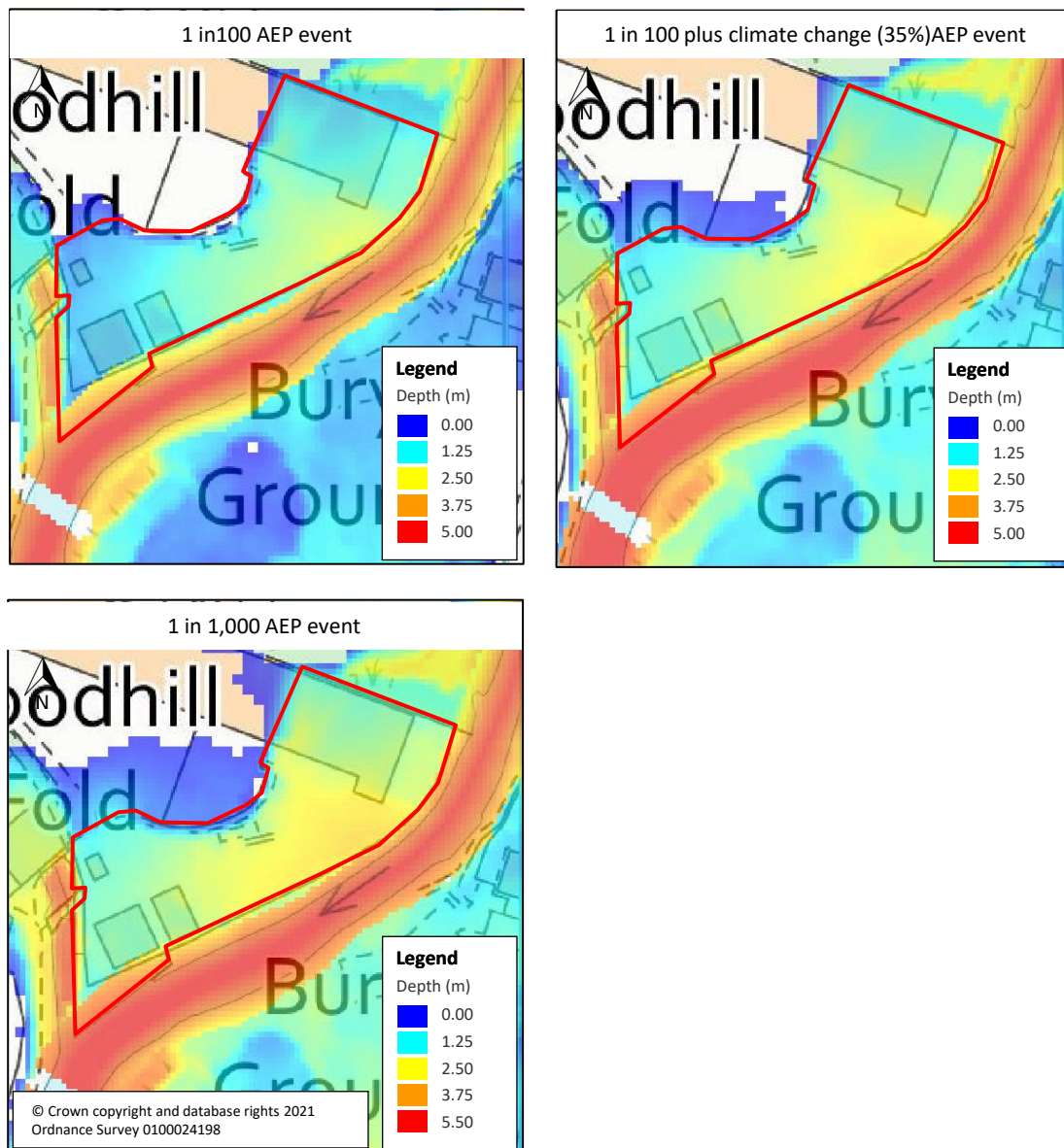


Figure 7: River Irwell Modelled Flood Outputs - Undefended

Source: Mid Irwell Modelling Study, JBA Consulting, June 2018

Comparison of the model outputs for the overtopping (defended) and undefended scenarios indicates that there is minimal difference in the level, depth and velocity of floodwater expected at the site. This implies that the existing flood defences have minimal impact and as such it may be reasonable to conclude that breach does not pose a risk to the proposed development.

4.4 Flood Risk from Surface Water

The Flood Risk from Surface Water map (**Figure 8**) indicates that the site is predominantly at 'low' risk of surface water flooding, with intermittent areas along the southern boundary shown to be at 'medium' to 'high' risk.

The site access and egress route is generally shown to be at 'very low' risk, with small areas along the southern section of the unnamed road and Lower Woodhill Road shown to be at 'low' risk.

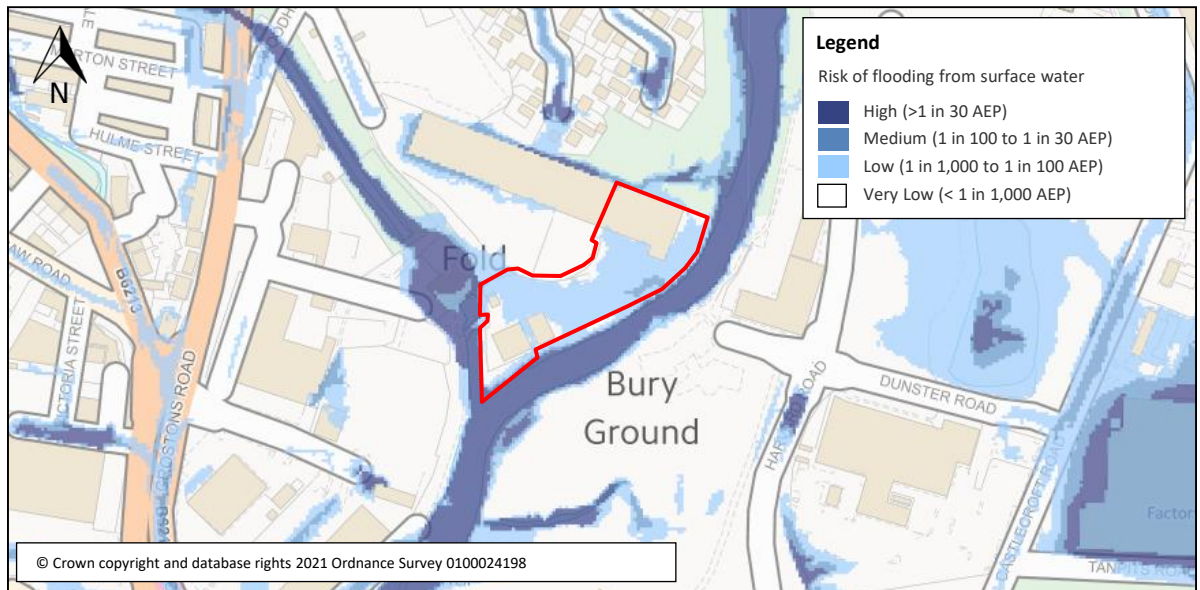


Figure 8: Flood Risk from Surface Water

Source: gov.uk website

Potential depths and velocities for the site and access routes during the 'low', 'medium' and 'high' risk surface water flooding events are provided in **Figure 9** and **Figure 10**. Depths on-site are generally shown to remain below 0.9 m, with velocities expected over 0.25 m/s. Whilst, depths along the access route are expected to remain below 0.3 m, with velocities expected over 0.25 m/s.

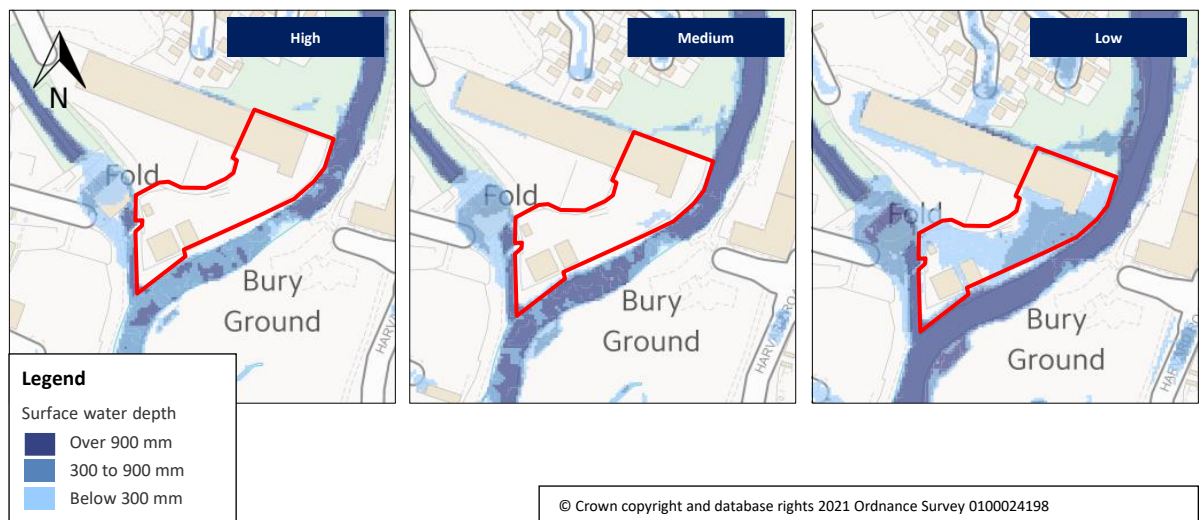


Figure 9: Flood Risk from Surface Water - Depth

Source: gov.uk website

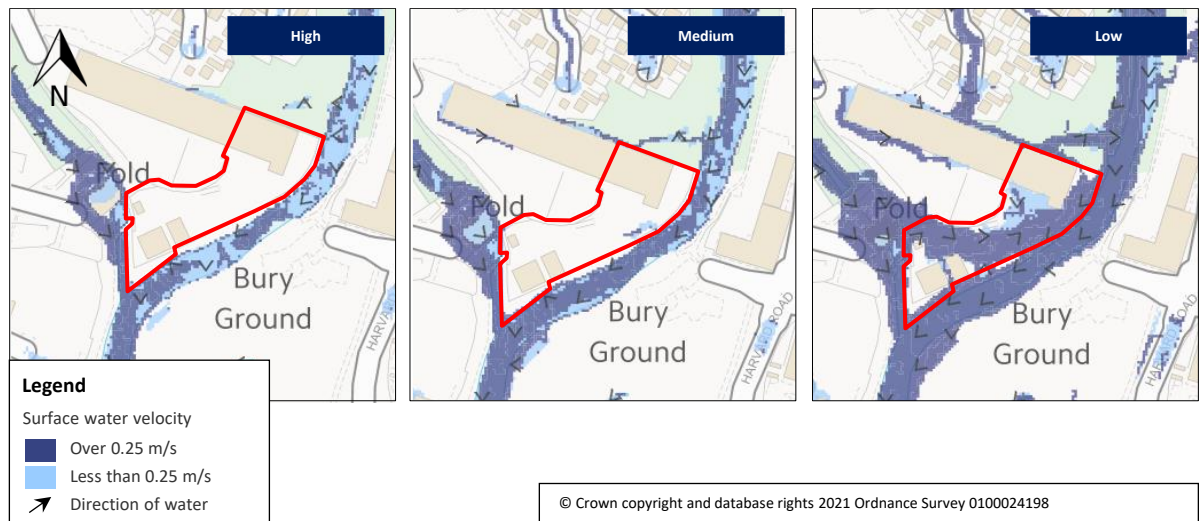


Figure 10: Flood Risk from Surface Water - Velocity
Source: gov.uk website

4.5 Flood Risk from Reservoirs, Canals and Other Artificial Sources

The Flood Risk from Reservoirs map (**Figure 11**) indicates that the site is at risk of flooding primarily associated with Ashworth Moor Reservoir located approximately 5.3 kilometre (km) north east of the site. However, all large reservoirs are regularly inspected by reservoir panel engineers with essential safety work carried out as required. As detailed on the gov.uk website, reservoir flooding is therefore extremely unlikely to occur.

There are no canals or other impounded waterbodies within the vicinity of the site.

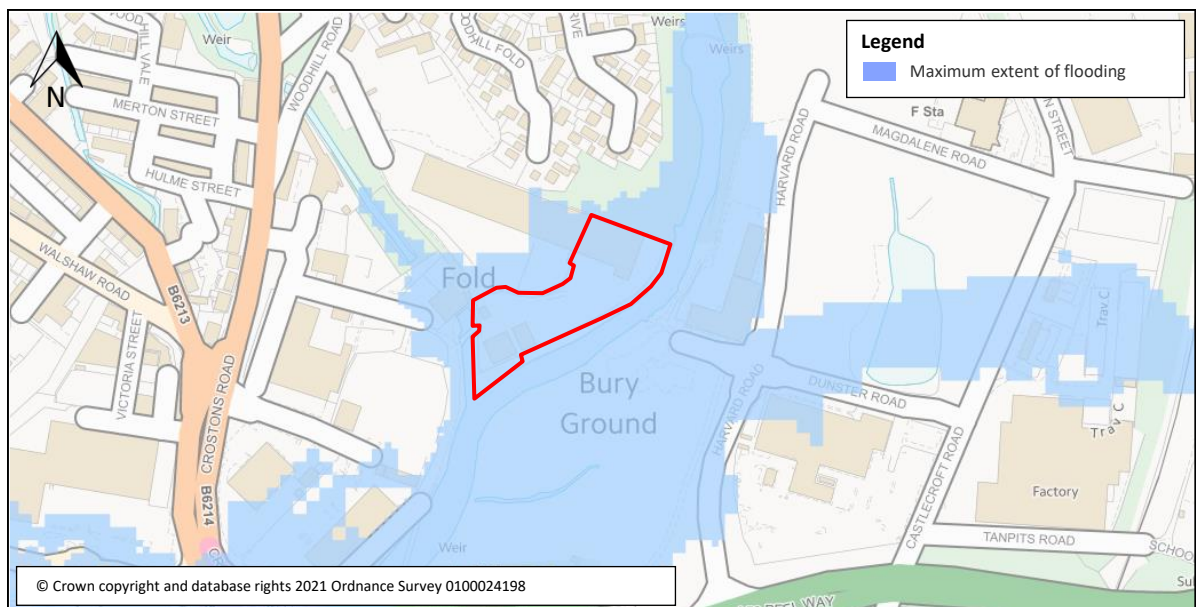


Figure 11: Flood Risk from Reservoirs
Source: gov.uk website

4.6 Flood Risk from Groundwater

As detailed in **Section 2.4** ground conditions at the site are described as freely draining slightly acid loamy soils. There may therefore be the propensity for some groundwater flooding.

According to the British Geological Survey Groundwater Flooding Hazard map (**Figure 12**), the site has a 'moderate' susceptibility to groundwater flooding.

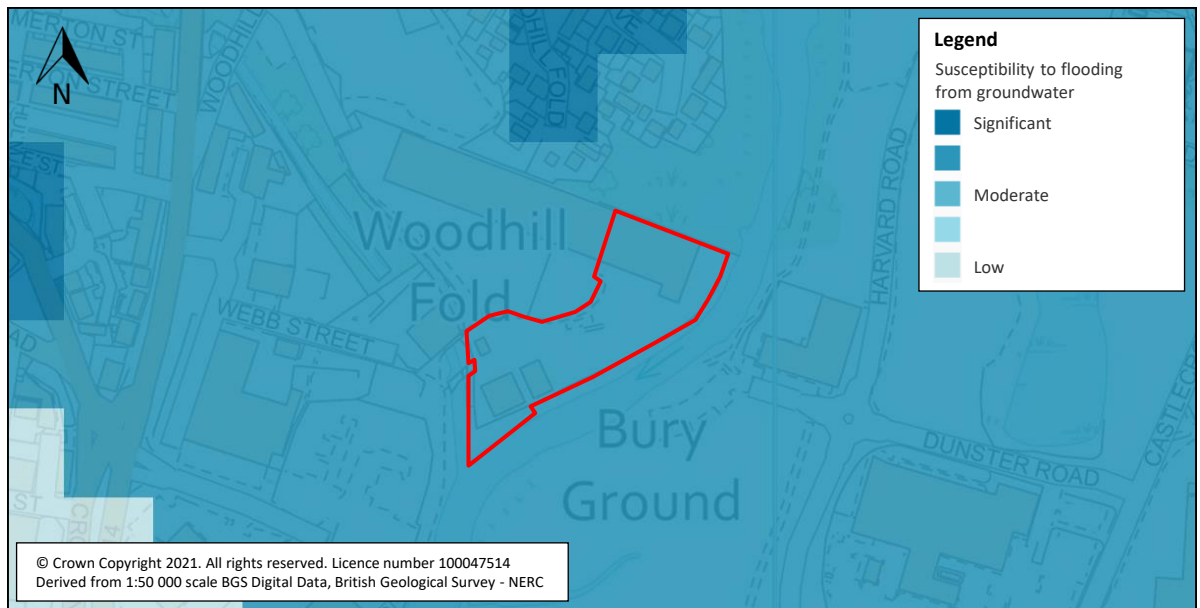


Figure 12: Groundwater Flooding Hazard Map
Source: Findmaps

5 FLOOD RISK MITIGATION MEASURES

The risk of flooding to the proposed development from the River Irwell, Woodhill Brook and any residual risk of surface water and groundwater flooding will be mitigated, so far as is practicable, through the implementation of the measures proposed within the following section of this report.

5.1 Finished Floor Levels

Given the nature of the proposed waste bale storage unit supporting the existing use of the site and the associated operational/access requirements for the unit, it is understood that it will not be feasible to raise the finished floor level above the 1 in 100 plus climate change (35%) AEP fluvial flood level.

Recognising the above, a 'water entry strategy' will be utilised.

5.2 Flood Resilient Construction

Flood resilient construction techniques will be incorporated into the design of the building to a level of 81.26 m AOD (i.e. providing a 300 mm freeboard above the 1 in 100 plus climate change (35%) AEP fluvial flood level), in line with government guidance⁹. These include design features and finish materials to reduce the damage in the unlikely event of the development being inundated.

5.3 Flood Risk Elsewhere

Any proposal to modify ground levels should demonstrate that there is no increase in flood risk to the development itself, or to any existing buildings which are known to, or are likely to flood.

Developers must ensure there will be no loss of flood flow or flood storage capacity for floods up to the severity of the 1 in 100 AEP fluvial event. Whilst not specified by the NPPF, the Environment Agency generally recommends that this should be the case over the lifetime of development (i.e. should take into account climate change).

The proposals will not alter existing ground levels at the site. The proposed industrial building will be designed with an open front and with a 150 mm 'gap' at the base of the sides and rear of the building. These features will facilitate the 'water entry strategy' and help to assist with the free-flow of flood waters. It should be noted that the existing area that will accommodate the proposed unit is already used to store waste bales and will already impact on overland flows.

Due to the nature of the proposals and the design of the proposed industrial building, the impact on flood risk elsewhere is unlikely to be significant.

5.4 Watercourse Maintenance

From the top of bank of a designated 'main river', an 8 m easement should typically be provided for inspection and maintenance purposes (see **Section 3.4**) of a watercourse. However, it is understood¹⁰ that a 2.2 m high palisade fence separates the site and the top of bank of the River Irwell. Therefore, it is not feasible to currently maintain the River Irwell from within the site.

Within the Environment Agency consultation response dated 2 December 2020¹, additional information was requested regarding the position of the proposed industrial building in relation to the River Irwell, a designated 'main river', given that '*sufficient easement must be available to be able to inspect the river bank*'. The concern appears to be that the building may be too close to the site boundary that would

⁹ Improving the Flood Performance of New Buildings: Flood Resilient Construction. Dept for Communities and Local Government. May 2007.

¹⁰ Email from Veolia to Weetwood dated 18 January 2021

prevent visual inspection of the river bank, which is the responsibility of the landowner to ensure its condition is reasonable.

Based on **Appendix A**, an easement of 1.2 m will be provided between the proposed industrial building and the existing palisade boundary fence. This is considered sufficient for pedestrian access to visually inspect the River Irwell.

5.5 Access and Egress

Access and egress is gained via an unnamed road, leading to Lower Woodhill Road to the north west of the site.

No flooding of Lower Woodhill Road is expected from the River Irwell and Woodhill Brook in up to the 1 in 1,000 AEP event. The unnamed access road is also expected to remain dry during the 1 in 100 AEP event. Some flooding of this road may be expected during the 1 in 100 plus climate change (35%) AEP event to maximum depths of 1.34 m; however, this would only be expected over a short section of approximately 40 m beyond which dry access is provided.

The Flood Risk from Surface Water map indicates that the access and egress route is generally shown to be at 'very low' risk, with small areas along the southern section of the unnamed road and Lower Woodhill Road shown to be at 'low' risk of flooding from this source.

5.6 Flood Plan

It is recommended that a Flood Plan is prepared for the proposed development in consultation with Bury Metropolitan Borough Council emergency planning team. This may also be implemented for the existing facility, thus providing betterment.

The objectives of the plan would be to reduce the risk to property and life by ensuring that all employees are aware of the potential risk of flooding and the procedures that should be implemented in the event that flooding is expected or has occurred.

This would be achieved by:

- Setting out the measures that would need to be taken if flooding is forecast, during flooding and following an 'all-clear' notification;
- Summarising the roles and responsibilities for flood response and management; and
- Describing how flood warnings are issued, flood warning codes and what they mean, and other sources of flood information

The site is included in an Environment Agency flood alert and warning area. This provides the opportunity for the relevant response procedures set out in the Flood Plan to be invoked in response to receipt of a flood warning from the Environment Agency.

6 SUMMARY AND RECOMMENDATIONS

This report has been prepared on behalf of Veolia ES (UK) Ltd and relates to the proposed development of a new industrial building at the existing Veolia facility off Lower Woodhill Road, Bury.

According to the Flood Map for Planning the proposed development site is located within the 1 in 100 AEP flood outline and is therefore defined by the NPPF as being situated within flood zone 3.

Given that the proposals are to support the existing use of the site it would be impractical to locate the development elsewhere. As such, the application of the sequential test is not considered necessary in this instance. The proposed development includes less vulnerable uses in flood zone 3. As such, the exception test need not be applied.

The River Irwell is located adjacent to the sites south eastern boundary. Woodhill Brook is located adjacent to the sites western boundary and outfalls to the River Irwell. The Mid Irwell Modelling Study, June 2018, indicates that flooding of the site may be expected from these sources, with flood levels of 80.45 and 80.96 m AOD expected within the proposed developable area during the 1 in 100 and 1 in 100 plus climate change (35%) AEP events, respectively.

The Flood Risk from Surface Water map indicates that the site is predominantly at 'low' risk with intermittent areas along the southern boundary at a 'medium' to 'high' risk of flooding from this source.

The Flood Risk from Reservoirs map indicates that the site is at risk of flooding primarily associated with Ashworth Moor Reservoir located approximately 5.3 km north-east of the site. However, as detailed on the gov.uk website, reservoir flooding is extremely unlikely to occur due to the regular inspections that are undertaken.

There are no canals or other impounded waterbodies within the vicinity of the site.

There may be a 'moderate' susceptibility to groundwater flooding at the site.

This report has demonstrated that the proposed development may be completed subject to the following:

- A 'water entry strategy' to be utilised and the latest best practice flood resilient construction techniques to be incorporated into the design of the building to a level of 81.26 m AOD
- Flood Plan to be developed in consultation with Bury Metropolitan Borough Council

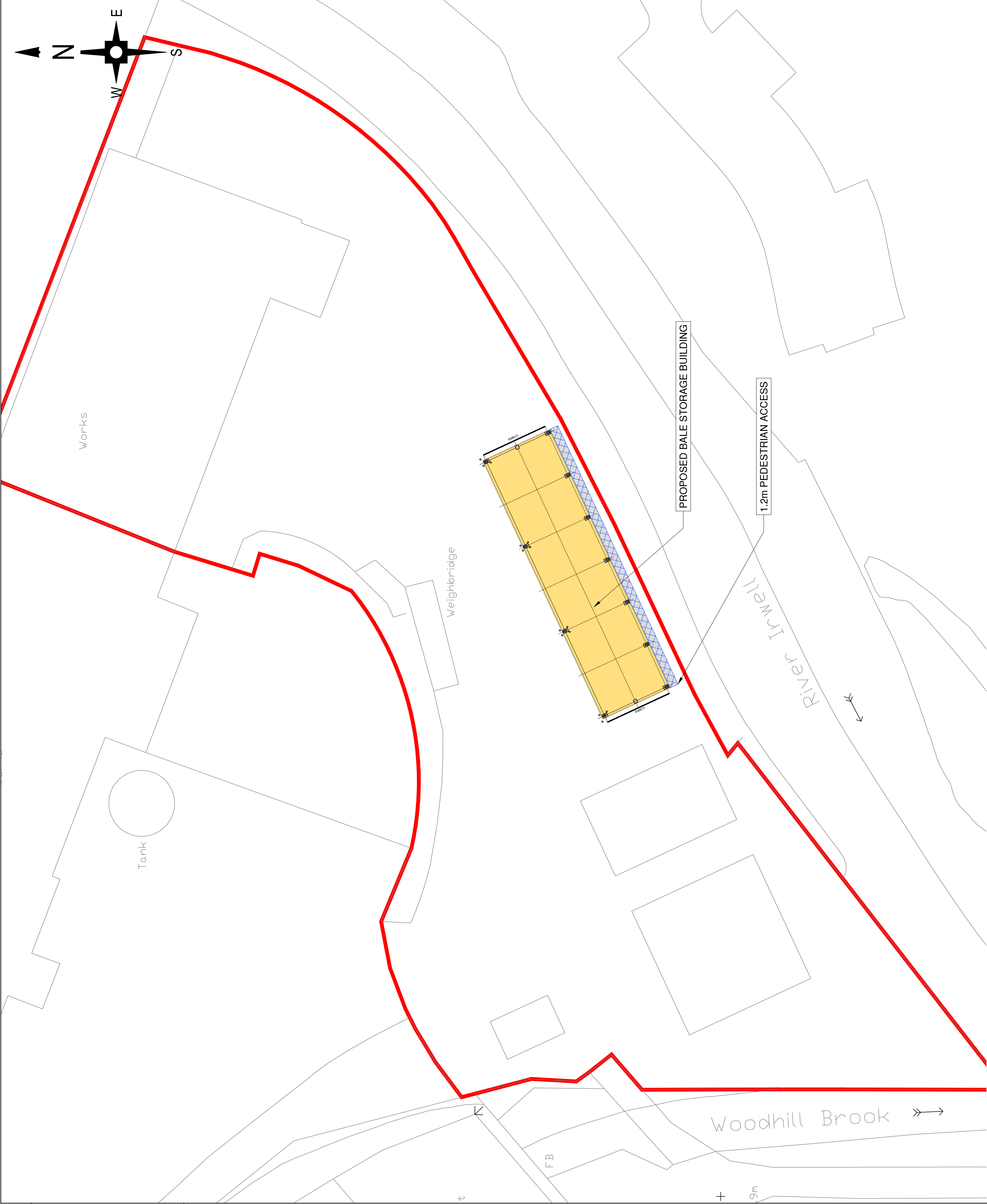
Due to the nature of the proposals and the design of the proposed industrial building, the impact on flood risk elsewhere is unlikely to be significant.

Sufficient room for pedestrian access around the building has been provided to allow for visual inspections of the River Irwell bank.

No flooding of Lower Woodhill Road is expected from the River Irwell and Woodhill Brook in up to the 1 in 1,000 AEP event. The unnamed access road is also expected to remain dry during the 1 in 100 AEP event. Some flooding of this road may be expected during the 1 in 100 plus climate change (35%) AEP event to maximum depths of 1.34 m; however, this would only be expected over a short section of approximately 40 m beyond which dry access is provided. The access and egress route is generally shown to be at 'very low' risk of surface water flooding.

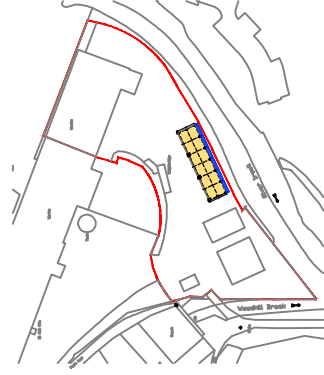
APPENDIX A

Development Proposals



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SITE LOCATION PLAN



SITE BOUNDARY

Rev	Description of revision	Drawn	Chkd	App	Date



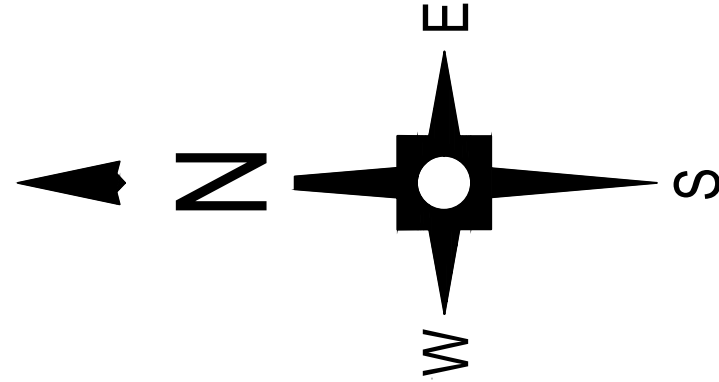
Technical Direction,
8th Floor, 210 Pentonville Road, London. N1 9JY
Tel: 0207 812 5185

Project LOWER WOODHILL ROAD
BURY
BL81AA

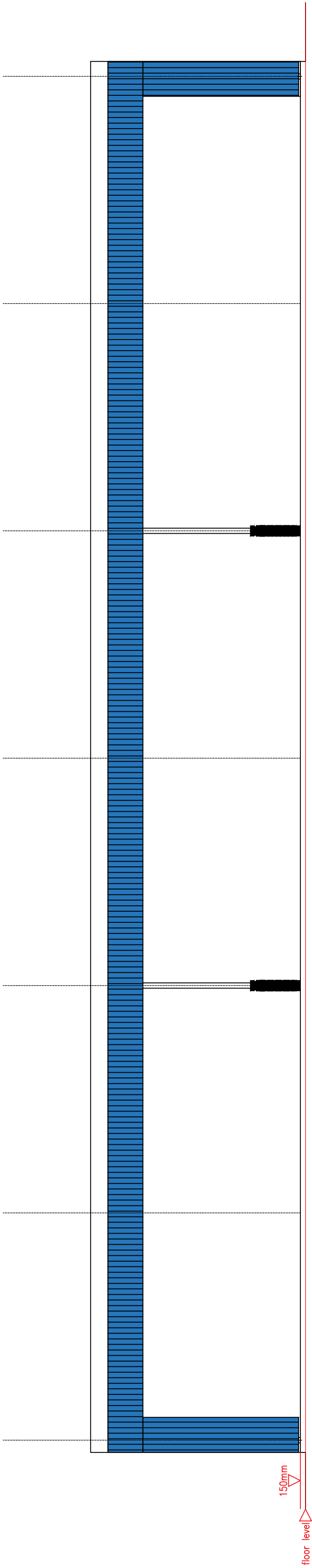
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LAYOUT

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Checked				
Approved				

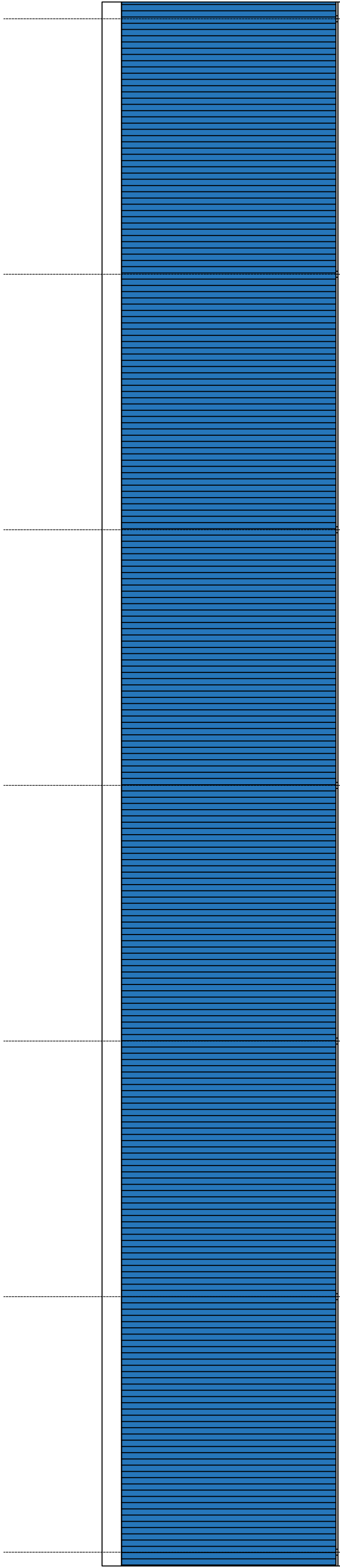
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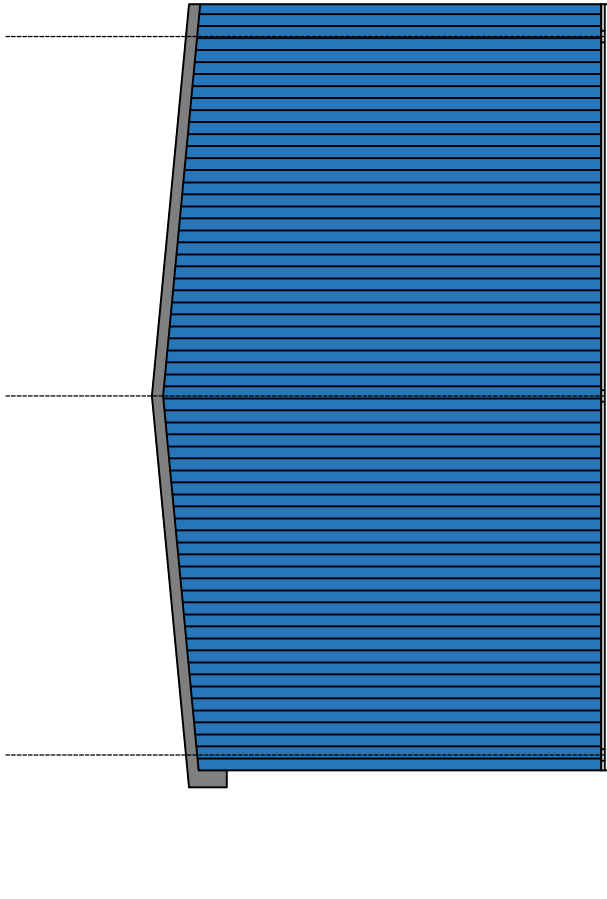
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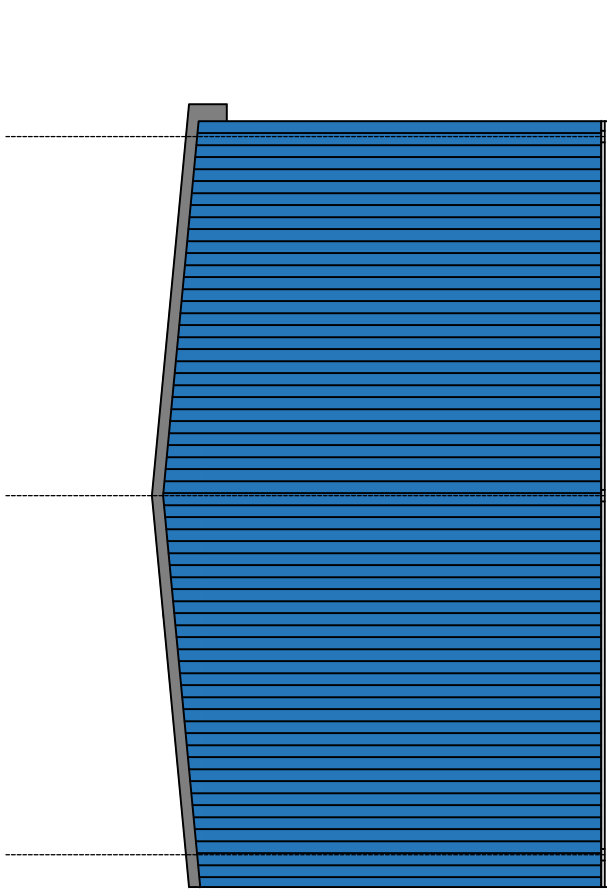
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WEST



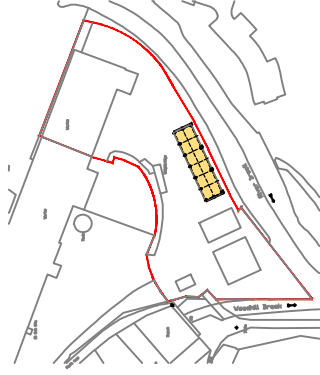
EAST



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SITE LOCATION PLAN



SITE BOUNDARY

A 150MM UPSTAND AND DRAIN DETAIL ADDED

Rev	Description of revision	Drawn	Chkd	App	Date
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Technical Direction,
8th Floor, 210 Pentonville Road, London, N1 9JY
Tel: 0207 812 5185

Project LOWER WOODHILL ROAD
BURY
BL81AA

Title PROPOSED BALE STORAGE
ELEVATIONS

Initials	Date	Scale	Sheet size
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Checked			
Approved			
Job No.	BURY		

APPENDIX B

Topographic Survey

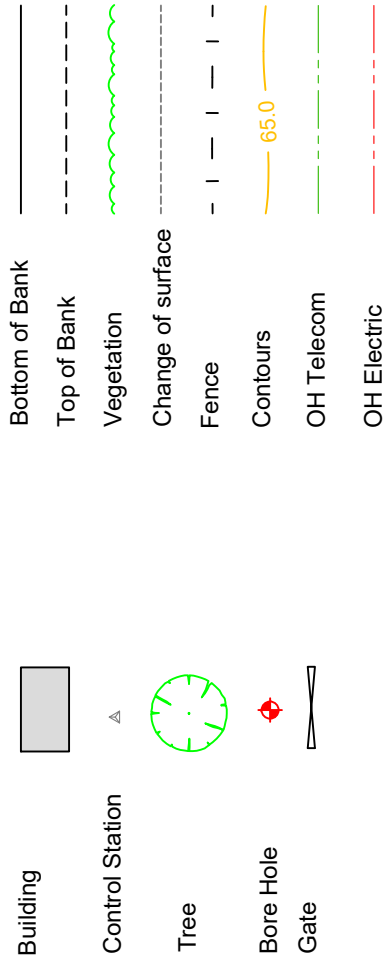


Grid and levels have been aligned with OS National Grid OSG836 (15). All dimensions and levels are in metres unless noted otherwise.

This plan should only be used for its original purpose. JPP accepts no responsibility if supplied to any other party than the original client.

STATION	EASTING	NORTHING	HEIGHT
J1	379854.180	411198.552	79.739
J2	379921.129	411186.157	78.425

AV	Al Valve	FW	Flood Light	PR	Post & Rail Fence
BV	Bolt Valve	FW	Flood Water	PW	Post & Wire Fence
BH	Borehole	FL	Gully	RE	Road Sign
BL	Bed Level	GV	Gas Valve	nwp	Rainwater Pipe
BT	Butt Cover	HC	Height	swp	Roofing Pipe
CB	Cable Box	IL	Inspection Chamber	SW	Soft & Vort Pipe
C/B	Cables Boarded Fence	IR	Iron Railing	SW	Surface Water
CL	Chain Link Fence	ko	Kerb Outlet	TL	Traffic Light
CL	Column	kr	Lamp Post	TP	Telegraph Pole
Col	Column	MH	Manhole	TP	Top of wall
El	Elsc	Mkr	Marker Post	ut	Unable to Lift
ER	Earth Road	Mk	Market Post	wp	Went Pipe
FE	Fence Pole	MR	Motor Road	WM	Water Meter
FF	Fire Hydrant	Post	Post Box	WM	Water Meter
FL	Floor Level	Po	Post	wO	Wash Out



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Flood Consequences Assessments
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Foul Water Drainage
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