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ENVIRONMENTAL ASSESSMENT

Flood Risk Assessment

Bury Wastewater Treatment Works,
Crossfield Street,
Bury,
BL9 9SZ

Document Issue Record

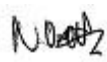
Project: Phase 1 Flood Risk Assessment

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Reference: 5616

Site Location: Bury Wastewater Treatment Works, Crossfield Street, Bury, BL9 9SZ

Proposed Development: It is understood that the development is for the construction a new MCC kiosk. The proposed development is considered a 'Minor Development' under the NPPF.

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1. Summary

- 1.1 Ambiantal Environmental Assessment has been appointed by advance plus to undertake a National Planning Policy Framework (NPPF) compliant Flood Risk Assessment (FRA) for the proposed development at Bury Wastewater Treatment Works, Crossfield Street, Bury, BL9 9SZ.
- 1.2 It is understood that the development is for the construction a new kiosk.
- 1.3 With reference to the Environment Agency (EA) Flood Map for Planning, the proposed development is located within Flood Zone 2.
- 1.4 Analysis within this report has indicated that the 1:100 year event may remain mostly in-channel (with 0.01m of overtopping which could be considered negligible). In addition, climate change calculations indicate that approximately 0.16m and 0.49m of flood water could overtop the linear flood defences at Node 3 in the 1:100 year +CC (30%) and 1:100 year +CC (70%) events respectively.
- 1.5 The risk of fluvial flooding to the proposed development could be considered **moderate**. However, it is important to note that the proposed kiosk is an extension to the existing site use and the change in flood risk post-development could be considered negligible. The developer has proposed to raise the MCC kiosk atop a 1200mm high mezzanine platform which could allow flood water to flow below the footprint and negate and increase in flood risk elsewhere.
- 1.6 The risk of flooding from surface water to the proposed development could be considered **low**. However, the risk of flooding from groundwater could be considered **moderate**.
- 1.7 Following the guidelines contained within the NPPF, and given that:
 - The proposed development is for a new MCC kiosk and is classified as a water compatible development;
 - The proposed development is located in Flood Zone 2;
 - The proposed kiosk could be considered a Minor Development (<250m², extension of existing use);

Following the guidelines contained within the NPPF, the proposed development is considered to be suitable assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.

Development Description	Existing	Proposed
Development Type:	Wastewater Treatment Works	Construction a new MCC kiosk (extension of existing use).
EA Vulnerability Classification:	Essential Infrastructure/ Water Compatible	No change – development is extension of existing use
Ground Floor Level:	N/A	MCC kiosk to be located on land approximately 66.27mAOD to 66.45mAOD (2m LiDAR)
Impermeable Surface Area:	N/A ²	
Surface Water Drainage:	N/A ²	
Site Size:	Land ownership boundary is approximately 25.2ha	Footprint of proposed is approximately 22.4m ²
Risk to Development	Summary	Comment
EA Flood Zone:	2	
Flood Source:	Fluvial	
1:100 Year Flood Level	66.93mAOD	Fluvial flood level from in channel nodes.
1:100 Year Flood Level & Climate Change	67.08mAOD (+30%) 67.41mAOD (+70%)	
1:1000 Year Flood Level	67.79mAOD	
Recorded Flood Events in Area:	Yes	Site is within the flood outline for the flood event that occurred on the 26 th December 2015.
Recorded Flood Events at Site:	Yes	
SFRA Available:	Yes	Bury, Rochdale and Oldham Council SFRA (2009)
Management Measures	Summary	Comment
Ground floor level above extreme flood levels:	No	Development is classed as water compatible development
Safe Access/Egress Route:	Yes	
Flood Resilient Design:	Yes	
Site Drainage Plan:	N/A	
Flood Warning & Evacuation Plan:	Yes	EA Flood Alert and Warning Service
Offsite Impacts	Summary	Comment
Displacement of floodwater:	No	
Increase in surface run-off generation:	Yes	Surface Water Drainage Plan Required
Impact on hydraulic performance of channels:	No	

Table 1 Summary of flood risks, impacts and proposed flood mitigation measures.

N/A¹ not required for this assessment; N/A² data not available.

2. Development Description and Site Area

Proposed Development and Location

- 2.1 The proposed development is located at Bury Wastewater Treatment Works, Crossfield Street, Bury, BL9 9SZ (Figure 1).
- 2.2 It is understood that the development is for the construction a new MCC kiosk.
- 2.3 Based on 2m LiDAR, the topographic levels for the MCC kiosk are between 66.27mAOD and 66.45mAOD.

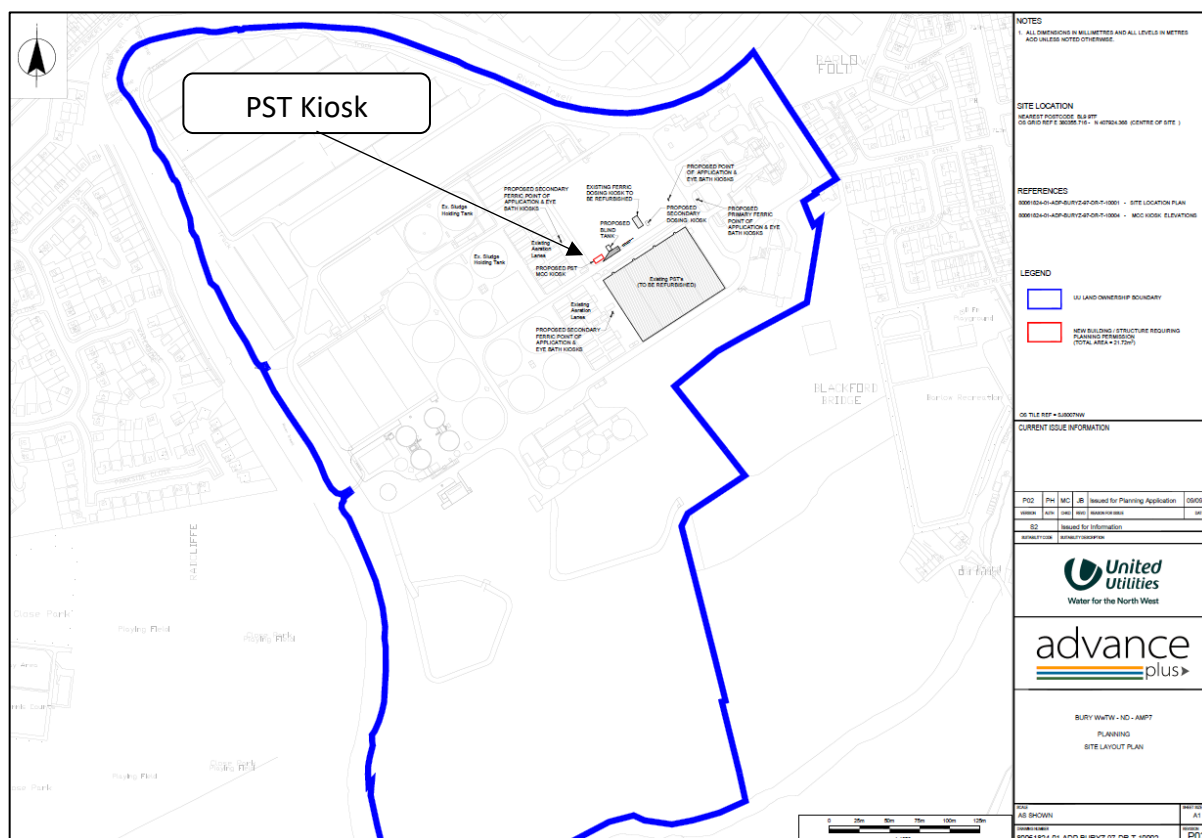


Figure 1 Location Map, identifying the location of the proposed development (Source: OS)

Vulnerability Classification

- 2.4 The EA Flood Map for Planning (Figure 2) demonstrates that the proposed developments lie within Fluvial Flood Zone 2 with a medium probability of between a 1 in 100 (1%) and 1 in 1,000 (0.1%) of river flooding in any year.
- 2.5 Under the principles of the National Planning Policy Framework (NPPF) and Table 2 of the Flood Risk and Coastal Change Planning Policy Guidance (PPG), the existing site is a water treatment works and could be considered 'Water Compatible/Essential Infrastructure'. The proposed development is for extensions and alterations to the existing Wastewater Treatment Works, so there will be no change in flood risk vulnerability on site post-development.
- 2.6 The proposal could be considered a 'Minor Development' under the NPPF, as it is for extensions and alterations to the existing site use and has a total area less than 250m².

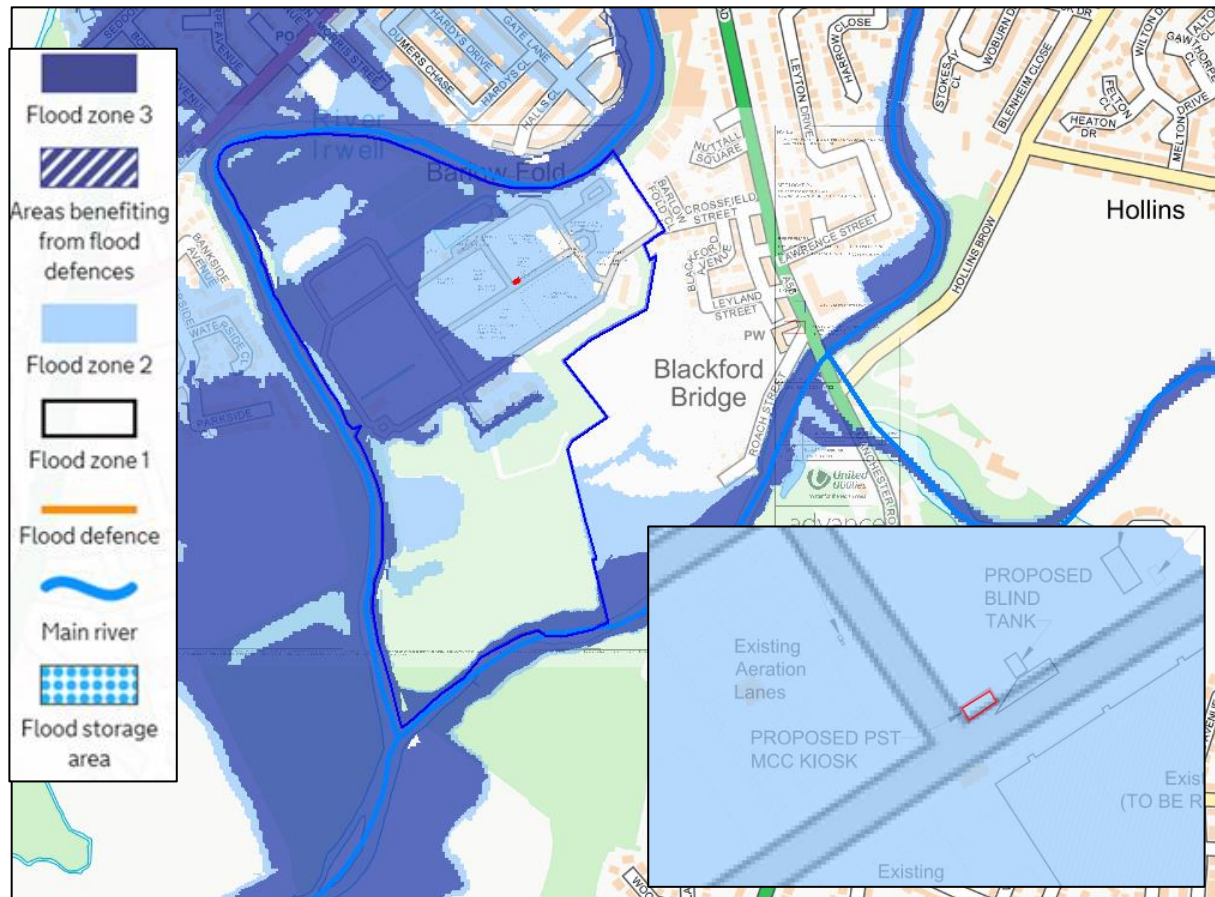


Figure 2 EA Flood Map for Planning (Sources: EA, OS)

Geology

- 2.7 The British Geological Survey (BGS) Geology of Britain Viewer indicates that the bedrock underlying the site is Pennine Middle Coal Measures Formation - Mudstone, Siltstone and Sandstone.
- 2.8 The British Geological Survey (BGS) Geology of Britain Viewer indicates that the superficial deposits underlying the site are River Terrace Deposits - Sand and Gravel.

3. Sequential Test/Exception Test

- 3.1 Under the NPPF, all new planning applications should undergo a *Sequential Test*. This test should be implemented by local planning authorities with a view to locating particularly vulnerable new developments (e.g. residential, hospitals, mobile homes etc.) outside of the floodplain.
- 3.2 The NPPF *Sequential Test: Flood Risk Vulnerability and Flood Zone 'Compatibility' Table* is reproduced below;

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test Required	✓	✗	Exception Test Required	✓
	Zone 3b <i>Functional Floodplain</i>	Exception Test Required	✓	✗	✗	✗

Table 2 The Sequential Test: Flood Risk Vulnerability and Flood Zone 'Compatibility' Table as specified by NPPF.
 Please note: ✓ means development is appropriate; ✗ means the development should not be permitted.

- 3.3 Using the principles of the Sequential Test outlined above, the proposed development could be considered 'Essential Infrastructure' or 'Water Compatible'. The site is located within Flood Zone 2 (as defined by the EA). Irrespective of whether the proposed development is 'Essential Infrastructure' or 'Water Compatible', both are deemed 'appropriate' development in Flood Zone 2 and would only need to implement the Exception Test when in Flood Zone 3. As the proposed development is for extensions and alterations to the existing facility the location of the proposals are determined by operational requirements.
- 3.4 With regard to the Sequential Test, Paragraph 033 of the Flood Risk and Coastal Change PPG states that:
- When applying the Sequential Test, a pragmatic approach on the availability of alternatives should be taken. For example, in considering planning applications for extensions to existing business premises it might be impractical to suggest that there are more suitable alternative locations for that development elsewhere. For nationally or regionally important infrastructure the area of search to which the Sequential Test could be applied will be wider than the local planning authority boundary.*
- 3.5 As the proposed development is for extensions and alterations to an existing WWTW site, it could be considered impractical to suggest locating the proposed development on another site.
- 3.6 Furthermore, the proposed development and other alterations to the existing site will total less than 250m² and could therefore be considered a 'Minor Development'. Paragraph 164 of the revised NPPF (2019) states:

*"Applications for some **minor developments** and changes of use **should not be subject to the sequential or exception tests** but should still meet the requirements for the site-specific flood risk assessments."*

(Source: NPPF)

- 3.7 Therefore, the proposed development should not be subject to the Sequential Test or the Exception Test.
- 3.8 As the site and proposed development are located within Flood Zone 2, the planning application submitted by the client is required to be accompanied by an FRA which shows the development can be achieved in a sustainable manner, with an overall reduction of flood risk to the site and the surrounding area.

4. Site Flood Hazards

Sources of Flooding

- 4.1 The proposed development is located within Flood Zone 2 (medium risk of flooding) and is considered to be 'Water Compatible' or 'Essential Infrastructure' according to NPPF guidelines. Table 3 summarises the potential sources of flooding to the site:

Source	Description
Fluvial	River Roch and River Irwell
Surface	Very Low Risk
Groundwater	Moderate Risk
Sewer	Unknown

Table 3 Summary of flood sources.

Fluvial

- 4.2 A main river, the River Roch, lies to the east of the development site and a main river, the River Irwell, lies to the north. The Roch flows into the Irwell approximately 630m south of the proposed development.
- 4.3 The EA have proved modelled flood levels for this location. There are six in river nodes, and two 2D nodes.
- 4.4 Due to the location of the 2D nodes, the in-channel levels will be used. The 2D nodes, while within the wider site, are not reflective of the proposed development locations. The locations of the 2D nodes can be found in Appendix II of this report. The closest upstream in-channel node is node 3.
- 4.5 The in-channel defended levels for Node 3 are provided in Table 4 below.

Node	10% (1 in 10 year)	5% (1 in 20 year)	4% (1 in 25 year)	2% (1 in 50 year)	1.33% (1 in 75 year)	1% (1 in 100 year)	0.5% (1 in 200 year)	0.1% (1 in 1000 year)
3	66.06	66.34	66.42	66.64	66.80	66.93	67.11	67.79
Overtops Defences (66.92)	No ✓	No ✓	No ✓	No ✓	No ✓	Yes ✗	Yes ✗	Yes ✗

Table 4 In-channel defended flood levels at Node 3 (Source: EA), all levels in mAOD.

✓ = no overtopping risk, ✗ = overtopping risk

- 4.6 A review of the EA's Spatial Flood Defences dataset indicates that the defences at Node 3 have a crest level of approximately 66.92mAOD. As a result, this would limit the amount of overtopping that would occur. Only 0.01m would overtop in the 1:100-year event while the lesser events would not overtop these

defences based on the crest level of 66.92mAOD. There could be 0.87m of overtopping in the 1:1000 year event and this could affect the proposed development.

- 4.7 No EA climate change data has been provided. In the Product 4, the EA provided reference to local precautionary allowances that should be applied to the 1:100 year flood level in the absence of modelled flow data.
- 4.8 The precautionary allowances state that for a Central increase (normally +30%), 0.15m should be added to the 1:100-year level and for the Upper End (normally +70%), 0.48m should be added to the 1:100-year level.
- 4.9 In the context of this site, this provides calculated in-channel flood levels of 67.08mAOD and 67.41mAOD for the 1:100 year +CC (30%) and 1:100 year +CC (70%) flood events, respectively (Table 5).

Node	1% (1 in 100 year)	1% (1 in 100 year) +30%	1% (1 in 100 year) +70%
3	66.93	66.93+0.15= <u>67.08</u>	66.93+0.48= <u>67.41</u>

Table 5 In-channel calculated climate change flood levels at Node 3 (Source: EA), all levels in mAOD.

- 4.10 The topographic levels for the MCC kiosk are 67.06mAOD to 67.28mAOD. From this the MCC kiosk could flood in the 1:100 year +CC (30% and 70%) events based solely on a level for level comparison.
- 4.11 However, a review of the EA's Spatial Flood Defences dataset indicates that the defences at Node 3 have a crest level of approximately 66.92mAOD. As a result, this would limit the amount of overtopping that would occur. Only 0.01m would overtop in the 1:100-year event, only 0.16m would overtop in the 1:100 year +CC (30%) event, and only 0.49m would overtop in the 1:100 year +CC (70%) event.
- 4.12 To assess the risk of overtopping, reference can be made to Table 4.3 of the DEFRA Flood Risks to People (FD2321/TR2) as shown below.

Distance from defence (m)	Head above crest level (m)			
	0.5	1	2	3
100				
250				
500				
1000				
1500				
2000				
2500				
3000				
3500				
4000				
4500				
5000				

Key:

	Danger for some
	Danger for most
	Danger for all

- 4.13 In the context of the site, the 'head above crest level' is 0.49m in the 1:100 year +CC (70%) event. The MCC kiosk is located approximately 90m from the nearby defences. As such, the overtopping hazard rating for both MCC kiosk in the 1:100 year +CC (70%) event is Danger for Some. The flood depths could not be quantified however.
- 4.14 Breach flood hazards have been considered in Section 6 of this report.

- 4.15 The risk of fluvial flooding to the proposed development could be considered **moderate**. However, it is important to note that the proposed kiosks are extension to the existing site use and the change in flood risk post-development could be considered negligible. The developer has proposed to raise the MCC kiosk atop a 1200mm high mezzanine platform which could allow flood water to flow below the footprint and negate and increase in flood risk elsewhere.

Surface Water (Pluvial)

- 4.16 The Environment Agency Flood Risk from Surface Water website shows the proposed development to be within an area of 'Very Low' risk of flooding from surface water (Figure 3). Areas identified to be at 'Very Low' risk have a less than 0.1% annual risk of flooding from this source.
- 4.17 The risk of flooding from surface water sources can be considered **very low**.

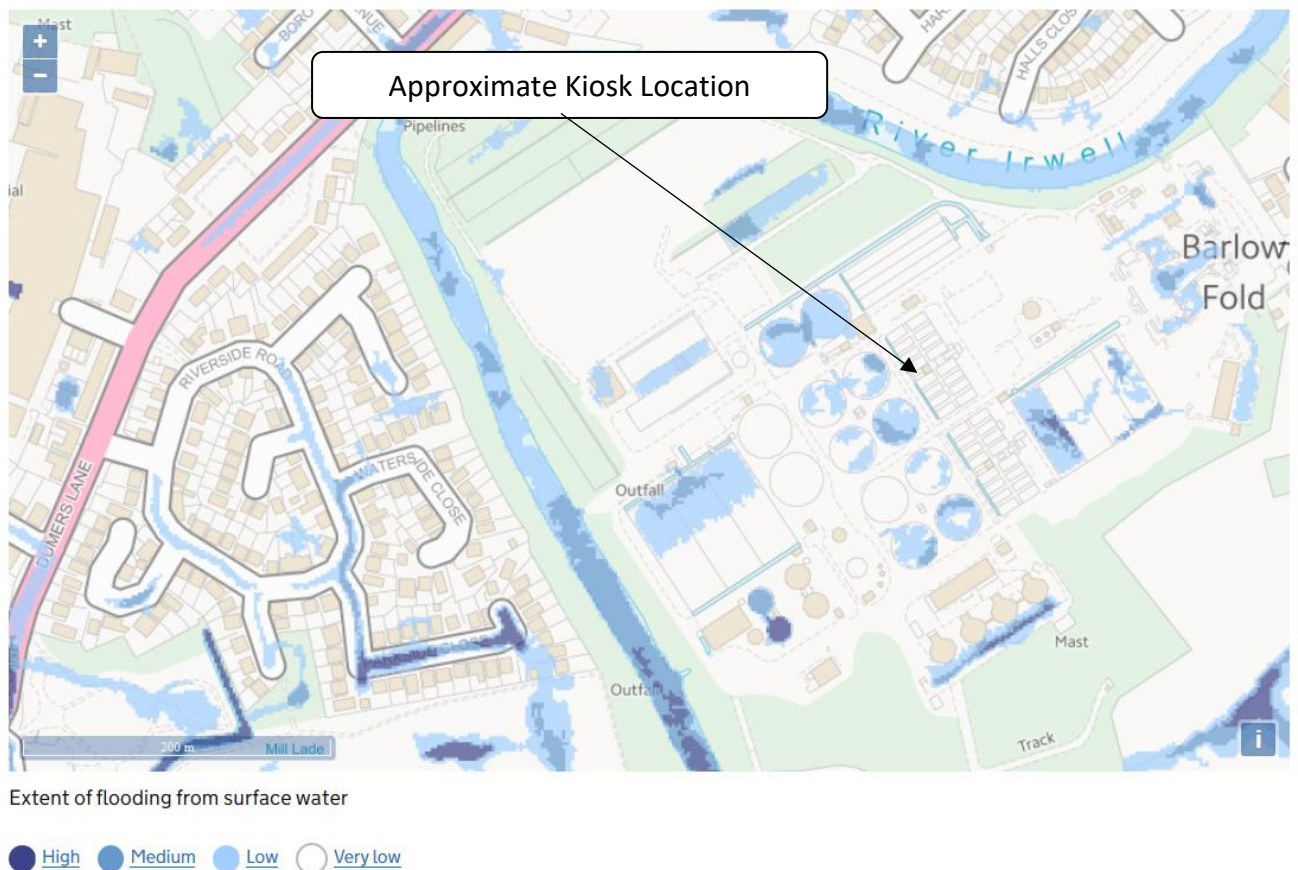


Figure 3 EA Surface Water Flood Risk Map. (Source: EA)

Groundwater

- 4.18 The British Geological Survey (BGS) Geology of Britain Viewer indicates that the bedrock underlying the site is Pennine Middle Coal Measures Formation - Mudstone, Siltstone and Sandstone (Source: BGS). This formation is considered to be a Secondary 'A' aquifer (Source: EA; Magic Map online resource). A Secondary 'A' aquifer is permeable, supporting water supplies at a local scale and may contribute to base flow of rivers.
- 4.19 The British Geological Survey (BGS) Geology of Britain Viewer indicates that the superficial deposits underlying the site are River Terrace Deposits, 1 - Sand and Gravel. This formation is a Secondary 'A' aquifer (Source: EA; Magic Map online resource). A Secondary 'A' aquifer is permeable, supporting water supplies at a local scale and may contribute to base flow of rivers.

- 4.20 The site is not within an EA groundwater Source Protection Zone.
- 4.21 Bury Borough SFRA states that there are relatively few reported incidents of groundwater flooding in Bury, Rochdale and Oldham. Furthermore, the Environment Agency water resources team consulted in the Greater Manchester sub-regional SFRA and stated that 'the risk posed by groundwater flooding is likely to remain remote within the sub-region.'
- 4.22 The BGS Groundwater Susceptibility dataset indicates that the proposed kiosks are located within an area considered to have potential for groundwater flooding at the surface (Figure 4).
- 4.23 It is recommended that site-specific ground investigations are undertaken prior to detailed design to confirm groundwater levels at the site.
- 4.24 As such, the risk of flooding from groundwater could be considered **moderate**. Any below ground works should be of flood proof design/ construction to negate damage caused by groundwater.

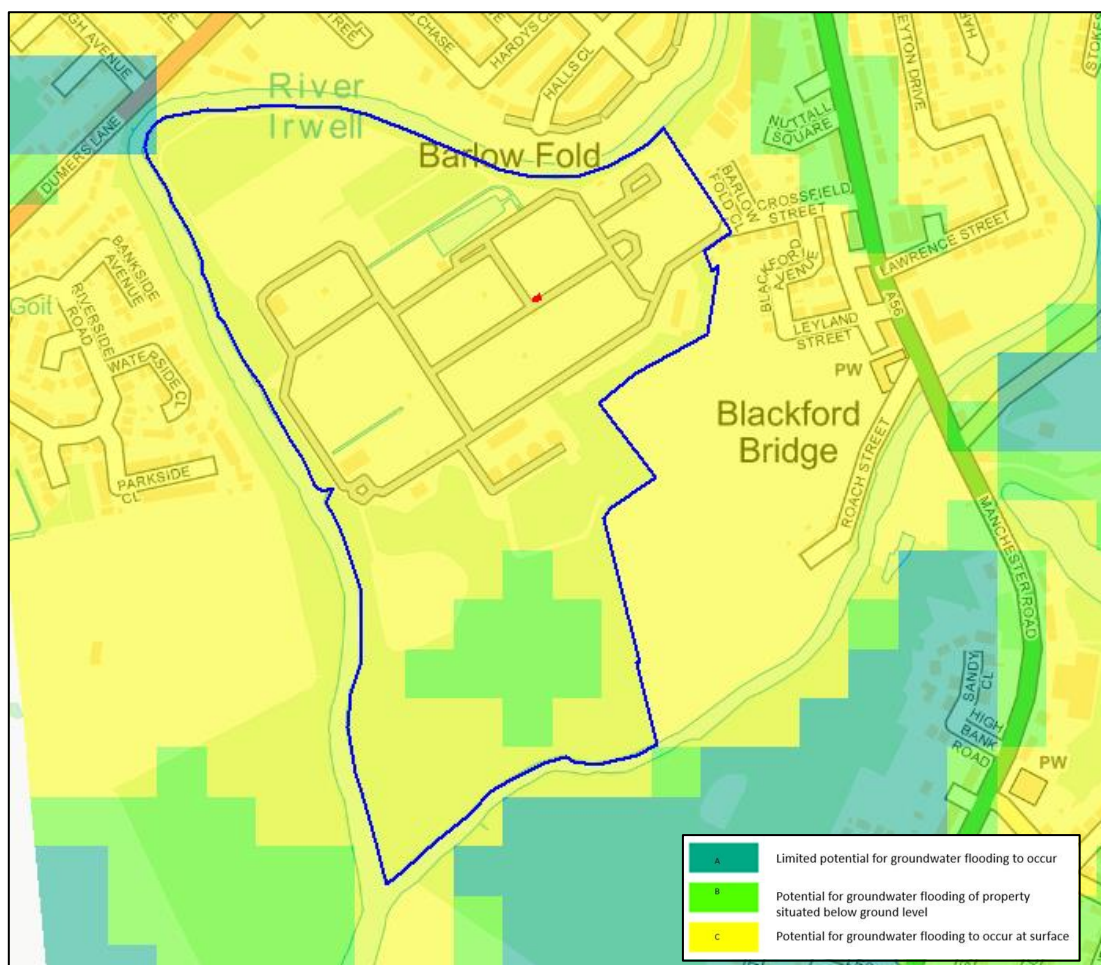


Figure 4 Groundwater Susceptibility (Sources: OS, BGS)

Sewer

- 4.25 The Bury, Rochdale and Oldham Council Level 1 SFRA has used information from the United Utilities DG5 database (2007). The borough of Bury has had a total 51 properties in the area that have recorded sewer flood incidents. Of these, it is not clear whether these are internal or external flooding incidents, or where in the borough these incidents have occurred. SFRA maps have been requested from Bury Council but not provided at the time of writing.
- 4.26 As such, the risk of flooding from sewer sources cannot be fully quantified at the time of writing.

- 4.27 It is understood that the proposed extensions and alterations will offer betterment to the drainage system of Bury WwTW. Therefore, the risk of flooding from sewer sources to the surrounding area could be reduced post-development.

Surface Water Drainage Strategy

- 4.28 It is understood that the development is for the construction a new MCC kiosk.
- 4.29 It is unclear how runoff from the existing onsite structures is drained. However, the runoff from the proposed kiosk should be managed in accordance with national and local policy (restricted to greenfield rates where possible).

Records of Historical Flooding

- 4.30 As part of the product 4 dataset provided by the EA, a map of the recorded flood outline from the flood event that occurred on the 26th December 2015. The development is within the flood outline for this event. The map is shown in figure 5.

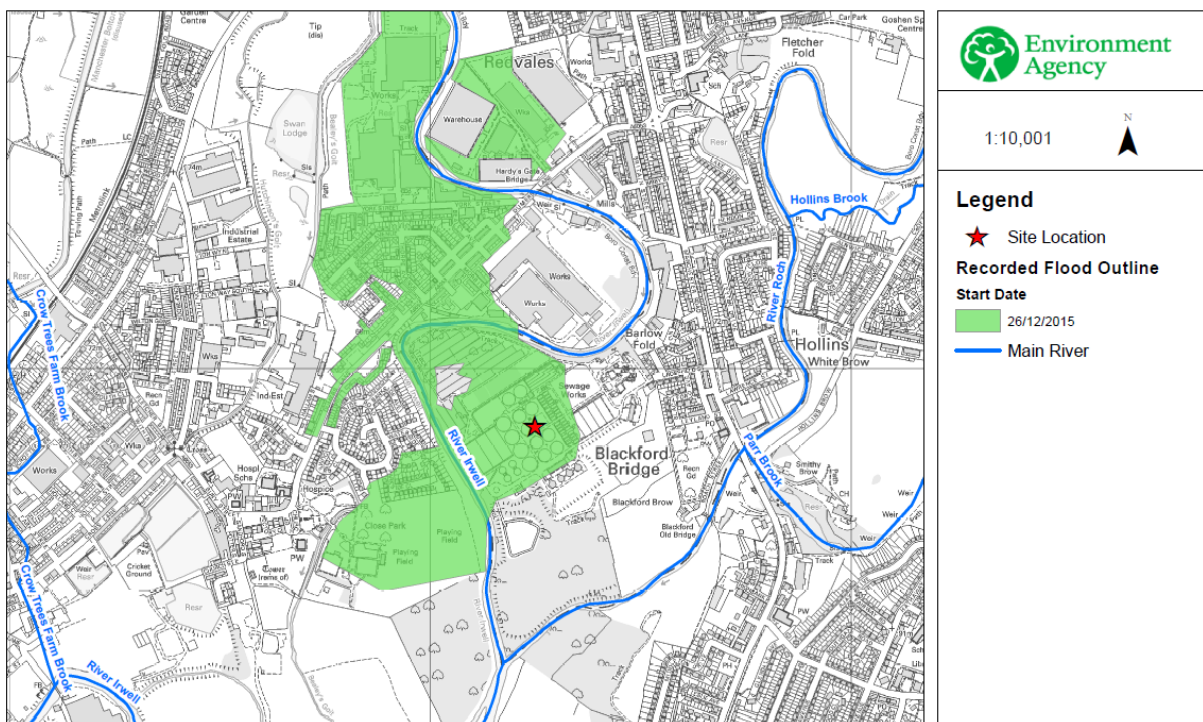


Figure 5 EA Recorded Flood Outline. (Source: EA)

5. Probability of Flooding

Flood Zones

- 5.1 According to the EA Flood Map for Planning, the proposed developments are located within Flood Zone 2 (medium risk of flooding).
- 5.2 The EA Flood Map for Planning has been produced in part using a relatively coarse, national scale flood modelling strategy, and in part by detailed modelling. It is important to note that only the potential floodplain is modelled; **the mitigating effects of any flood defences currently in place are not considered.** For reference, the definition of the NPPF flood risk zones is included below.

Zone	Description
1	Low Probability. This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).
2	Medium Probability. This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year.
3a	High Probability. This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
3b	The Functional Floodplain. This zone comprises land where water has to flow or be stored in times of flood. SFRA's should identify this Flood Zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, or at another probability to be agreed between the LPA and the EA, including water conveyance routes).

Table 6 Definition of the NPPF Flood Zones. (Source: EA)

Climate Change on Site

- 5.3 Climate change is likely to increase the flow in rivers and raise sea levels and storm intensity. The proposed development is likely to be at higher risk of flooding in the future.
- 5.4 The effect of climate change has been considered as part of the fluvial data analysis in Section 4.

6. Residual Risks

Identification of Residual Risks

6.1 Residual risks are those remaining after applying the sequential approach to the location of development and taking mitigating actions. Examples of residual flood risk include:

- the failure of flood management infrastructure such as a breach of a raised flood defence, blockage of a surface water conveyance system, overtopping of an upstream storage area, or failure of a pumped drainage system;
- failure of a reservoir; or,
- a severe flood event that exceeds a flood management design standard, such as a flood that overtops a raised flood defence, or an intense rainfall event which the drainage system cannot cope with.

Defence Breach

6.2 The site is not in an area which benefits from flood defences according to the EA Flood Map for Planning. However, there are defences along the bank of the River Irwell, which at Node 3, have a crest level of 66.92mAOD.

6.3 No breach data has been provided at the time of writing.

6.4 As such, the method set out in the DEFRA Flood Risks to People (FD2321/TR2) document can be used to ascertain a breach flood risk. This method involves utilising the modelled in-channel flood level above the topography of the site and the distance from the defences to the site. Table 4.4 of the FD2321/TR2 document is provided below.

Distance from breach (m)	Head above floodplain (m)					
	0.5	1	2	3	4	5
100						
250						
500						
1000						
1500						
2000						
2500						
3000						
3500						
4000						
4500						
5000						

Key:

	Danger for some
	Danger for most
	Danger for all

6.5 In the context of the site, the 1:100 year +CC (70%) flood level is 67.41mAOD. The topographic levels for the MCC kiosk are 67.06mAOD to 67.28mAOD. As such, the 1:100 year +CC (70%) flood level is 0.35m above the topography of the MCC kiosk. The MCC kiosk is located approximately 90m from the nearby defences. As such, in line with the above FD2321/TR2 table, the breach hazard to the MCC kiosk in the 1:100 year +CC (70%) event is Danger for Some (head above floodplain = 0.35m, distance from breach = 100m).

6.6 As such, the risk of flooding from defence breach to the MCC kiosk could be considered low. However, it is important to note that the proposed kiosk is an extension to the existing site use and the change in flood risk post-development could be considered negligible.

Reservoir Failure

- 6.7 The EA Risk of Flooding from Reservoir Map (Figure 6) demonstrates the site to be in an area with the potential of reservoir flooding.
- 6.8 In the unlikely event that a reservoir dam fails, a large volume of water would escape at once with little or no warning. The EA predicts that floodwater on site would be greater than 2m deep. According to the EA, there has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs must be inspected and supervised by reservoir panel engineers as detailed by the enforcement authority for the Reservoirs Act 1975 in England. The EA are responsible to ensure that reservoirs are inspected regularly, and essential safety work carried out. As reservoir flooding is unlikely and the modelled flood depths are based on the worst-case scenario, flooding from this source may be considered as a relatively low risk.

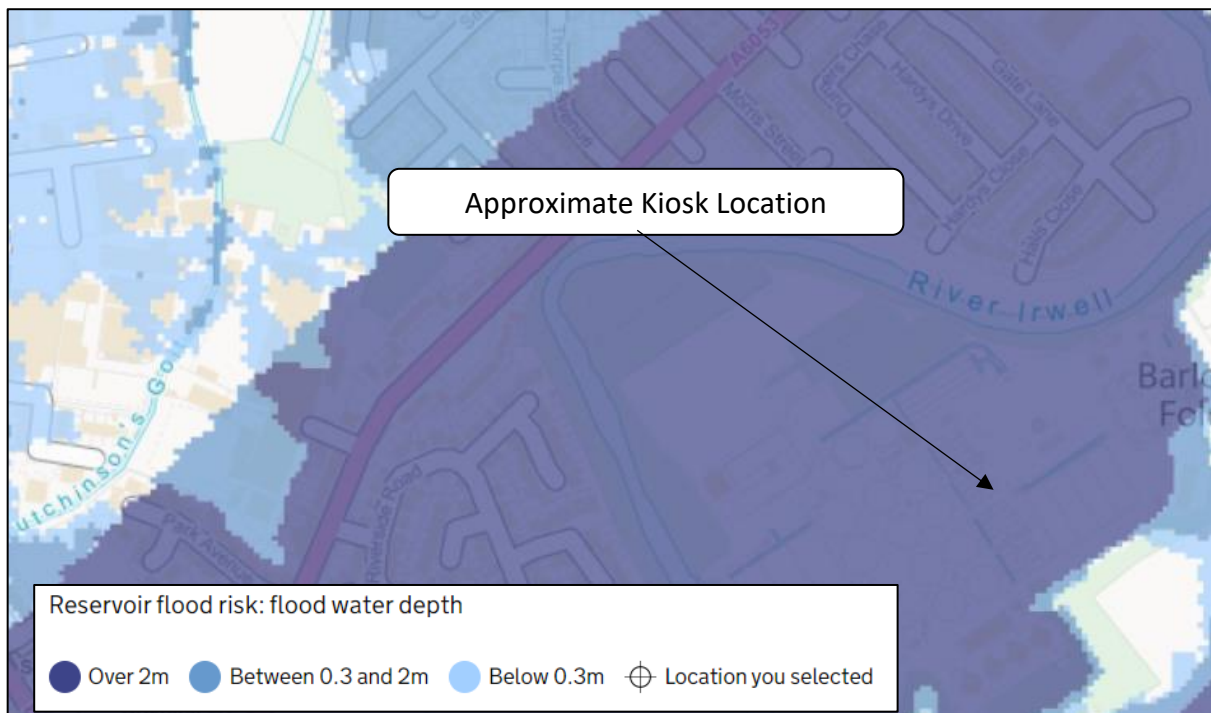


Figure 6 EA Reservoir Flood Map (Source: EA)

Drainage Exceedance

- 6.9 In the event of drainage system failure under extreme rainfall events or blockage, flooding may occur within the site. In the event of the development's drainage system failure, the runoff flow will be dictated by topography on site. Topographic elevations from 2m LiDAR suggest that runoff would be directed towards the north-west of site. The developer has proposed to raise the MCC kiosk atop a 1200mm high mezzanine platform which could also mitigate against overland flows in exceedance events.

7. Flood Risk Management Measures

Flood Risks

- 7.1 It is understood that the development is for the construction a new MCC kiosk.
- 7.2 Analysis within this report has indicated that the 1:100 year event may remain mostly in-channel (with 0.01m of overtopping which could be considered negligible). In addition, climate change calculations indicate that approximately 0.16m and 0.49m of flood water could overtop the linear flood defences at Node 3 in the 1:100 year +CC (30%) and 1:100 year +CC (70%) events respectively.
- 7.3 The risk of fluvial flooding to the proposed development could be considered **moderate**. However, it is important to note that the proposed kiosk is an extension to the existing site use and the change in flood risk post-development could be considered negligible. The developer has proposed to raise the MCC kiosk atop a 1200mm high mezzanine platform which could allow flood water to flow below the footprint and negate and increase in flood risk elsewhere.

Flood Warning Service

- 7.4 The EA operates a 24-hour telephone service on 0345 988 1188 that provides frequently updated flood warnings and associated floodplain information. Further information can be found on www.environment-agency.gov.uk/floodline. Floodline Warnings Direct is a free service operated by the EA that provides flood warnings direct to occupants by telephone, mobile phone, fax or pager.
- 7.5 The proposed development site is located within an EA Flood Warning Service Area. As such, it is recommended that site users sign up to this service.
- 7.6 Upon receipt of a Flood Warning, site users are advised to evacuate the site to a designated place of safe refuge within Flood Zone 1. As the site is an existing operational WwTW it is presumed that an existing flood warning/ contingency plan is in place.
- 7.7 A proposed flood evacuation route is provided in Figure 7 below. It is recommended that upon receipt of a Flood Warning, the site is evacuated and site staff leave the site onto Manchester Road and travel north. A proposed place of safe refuge is suggested at The Parish Church of Saint Peter, Bury (BL9 9QZ).

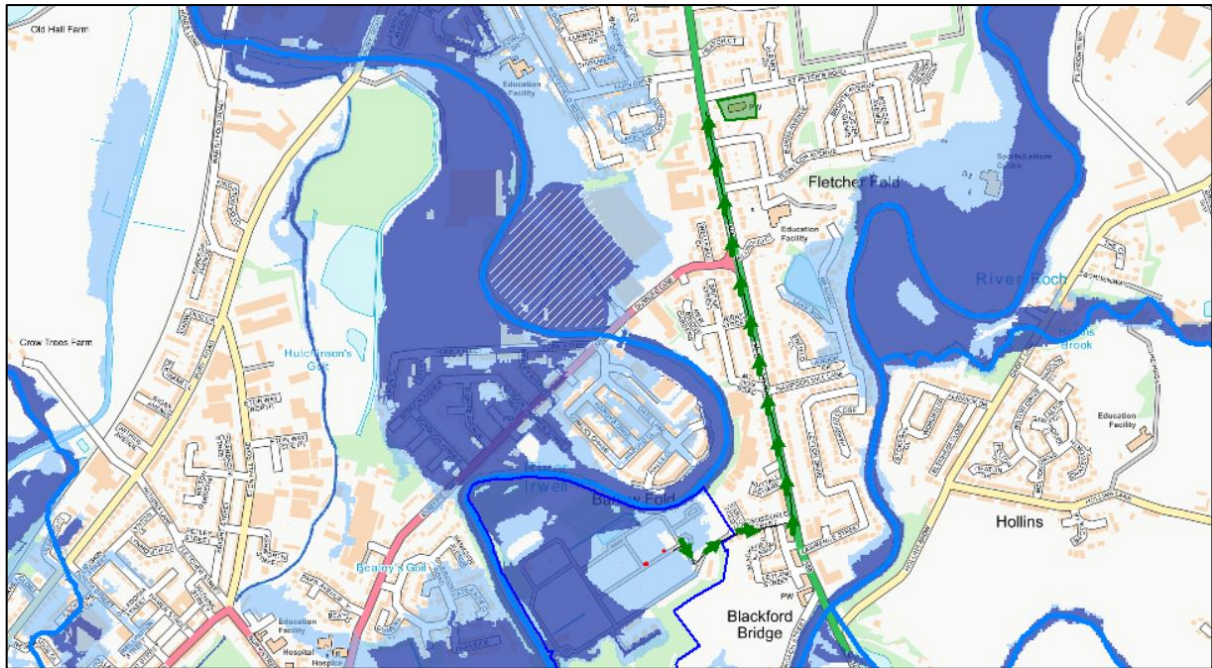


Figure 7 Proposed Evacuation Route

- 7.8 If flood waters along the proposed evacuation route have exceeded 25cm, site users are advised to seek refuge at the upper floors on site, if possible.

8. Off Site Impacts

Flood Water Displacement

- 8.1 It is understood that the development is for the construction a new MCC kiosk.
- 8.2 The developer has proposed to raise the MCC kiosk atop a 1200mm high mezzanine platform which could allow flood water to flow below the footprint and negate and increase in flood risk elsewhere.
- 8.3 However, the proposed kiosk will total approximately 22.4m² and will be an extension of the existing site use – as such, the proposed development could be considered a Minor Development under the NPPF.
- 8.4 Paragraph 047 of the Flood Risk and Coastal Change NPPF states that:

Minor developments are unlikely to raise significant flood risk issues unless:

- *they would have an adverse effect on a watercourse, floodplain or its flood defences;*
- *they would impede access to flood defence and management facilities, or;*
- *where the cumulative impact of such developments would have a significant effect on local flood storage capacity or flood flows.*

- 8.5 Therefore, any displacement of flood water could be considered negligible.

Generation of Runoff

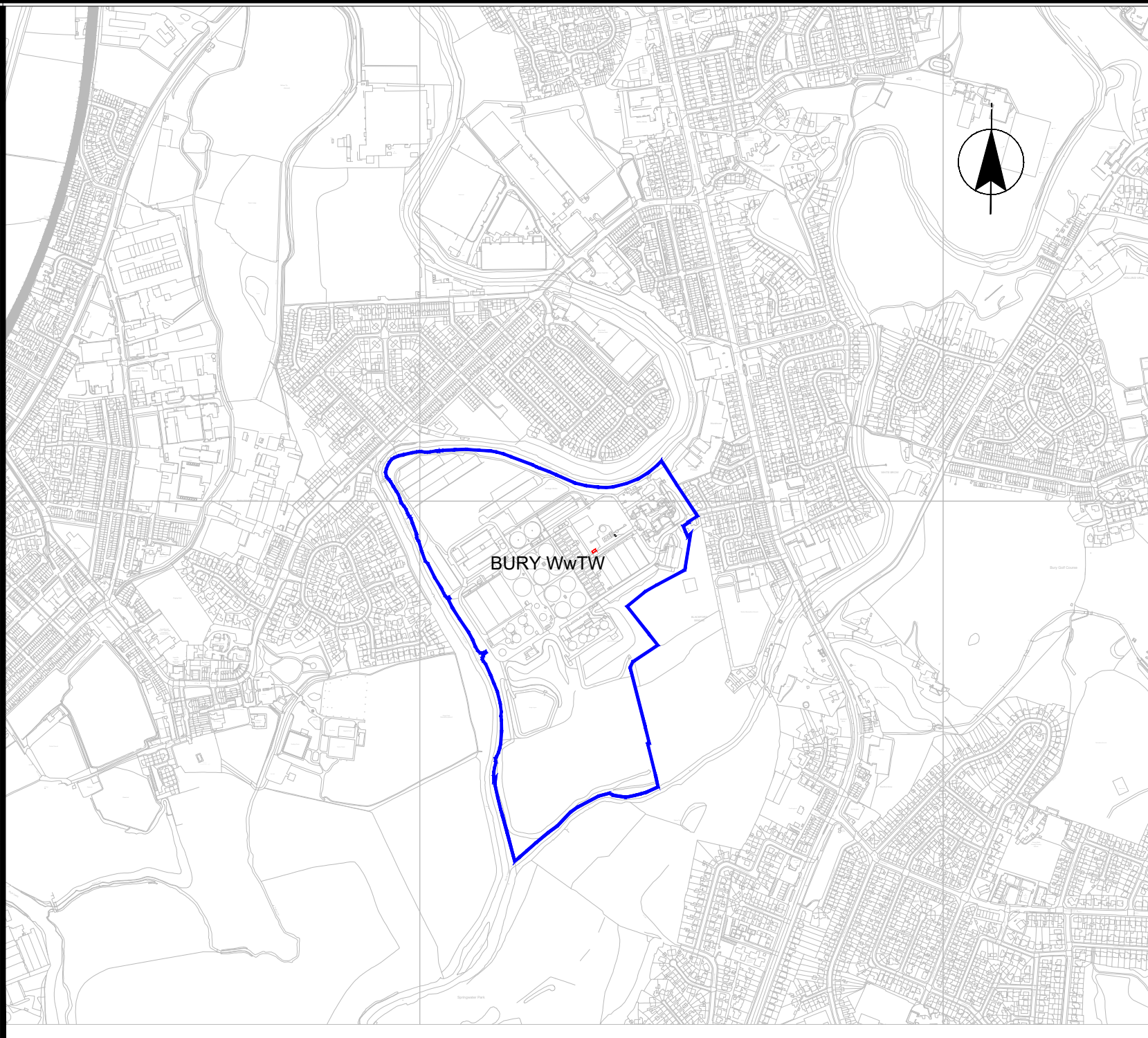
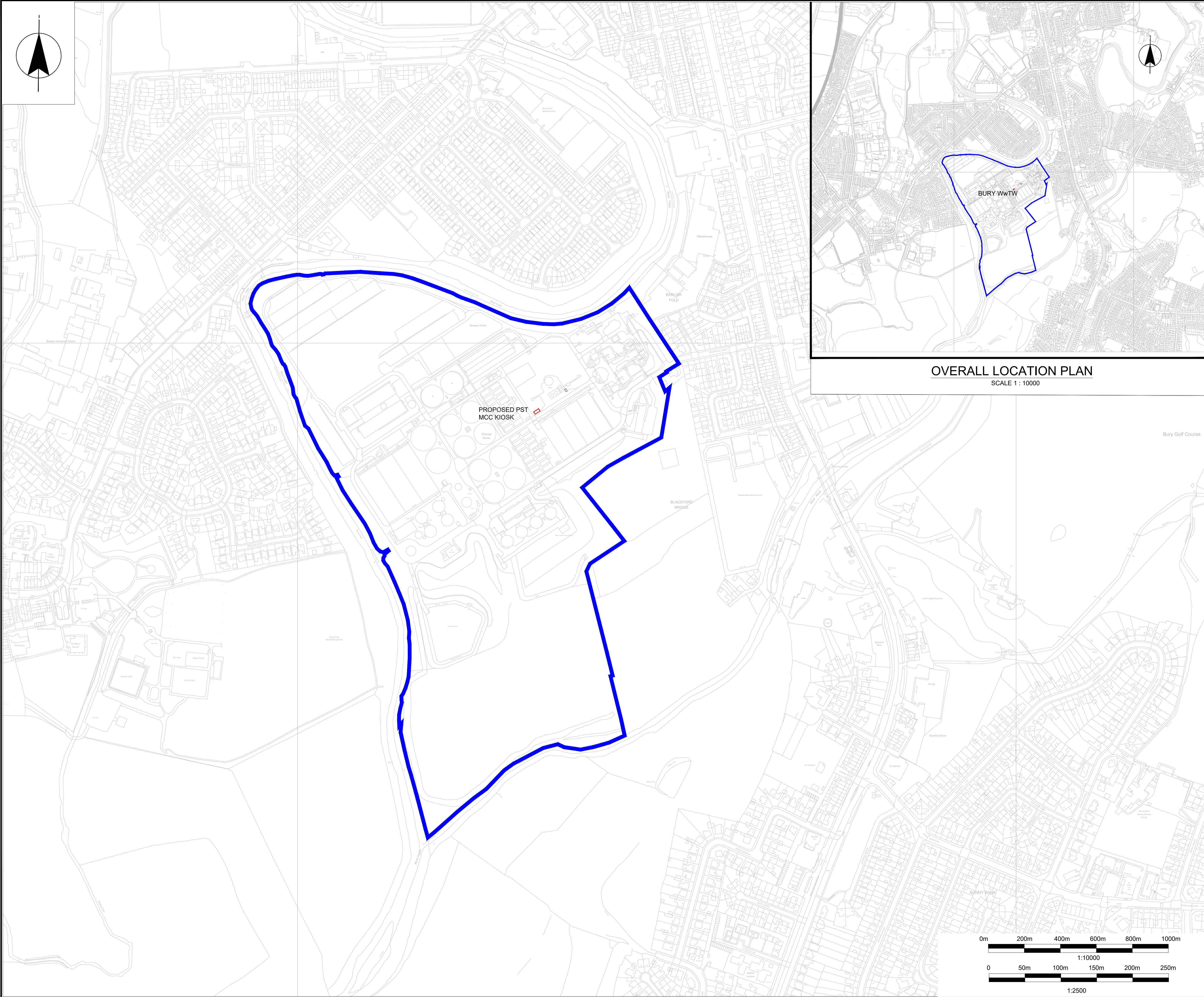
- 8.6 It is understood that the development is for the construction a new MCC kiosk.
- 8.7 The proposed development may affect the surface water runoff from the site. Runoff from the proposed development will be considered as part of a surface water drainage strategy, which is outside the scope of this flood risk assessment and will be produced separately.

9. Conclusion

- 9.1 Ambiantal Environmental Assessment has been appointed by advance plus to undertake a National Planning Policy Framework (NPPF) compliant Flood Risk Assessment (FRA) for the proposed development at Bury Wastewater Treatment Works, Crossfield Street, Bury, BL9 9SZ.
- 9.2 It is understood that the development is for the construction a new kiosk.
- 9.3 With reference to the Environment Agency (EA) Flood Map for Planning, the proposed development is located within Flood Zone 2.
- 9.4 Analysis within this report has indicated that the 1:100 year event may remain mostly in-channel (with 0.01m of overtopping which could be considered negligible). In addition, climate change calculations indicate that approximately 0.16m and 0.49m of flood water could overtop the linear flood defences at Node 3 in the 1:100 year +CC (30%) and 1:100 year +CC (70%) events respectively.
- 9.5 The risk of fluvial flooding to the proposed development could be considered **moderate**. However, it is important to note that the proposed kiosk is an extension to the existing site use and the change in flood risk post-development could be considered negligible. The developer has proposed to raise the MCC kiosk atop a 1200mm high mezzanine platform which could allow flood water to flow below the footprint and negate and increase in flood risk elsewhere.
- 9.6 The risk of flooding from surface water to the proposed development could be considered **low**. However, the risk of flooding from groundwater could be considered **moderate**.
- 9.7 Following the guidelines contained within the NPPF, and given that:
- The proposed development is for a new MCC kiosk and is classified as a water compatible development;
 - The proposed development is located in Flood Zone 2;
 - The proposed kiosk could be considered a Minor Development (<250m², extension of existing use);

Following the guidelines contained within the NPPF, the proposed development is considered to be suitable assuming appropriate mitigation (including adequate warning procedures) can be maintained for the lifetime of the development.

Appendix I - Site Plans



OVERALL LOCATION PLAN
SCALE 1 : 10000

NOTES

1. ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS IN METRES
AOD UNLESS NOTED OTHERWISE.

SITE LOCATION

NEAREST POSTCODE: BL9 9TF
OS GRID REF E 380355.716 - N 407924.368 (CENTRE OF SITE)

REFERENCES

- 80061824-01-ADP-BURYZ-97-DR-T-10002 - SITE LAYOUT PLAN
80061824-01-ADP-BURYZ-97-DR-T-10004 - MCC KIOSK ELEVATIONS

LEGEND

-  UU LAND OWNERSHIP BOUNDARY
-  NEW BUILDING / STRUCTURE REQUIRING
PLANNING PERMISSION
(TOTAL AREA = 21.72m²)

OS TILE REF = SJ8007NW

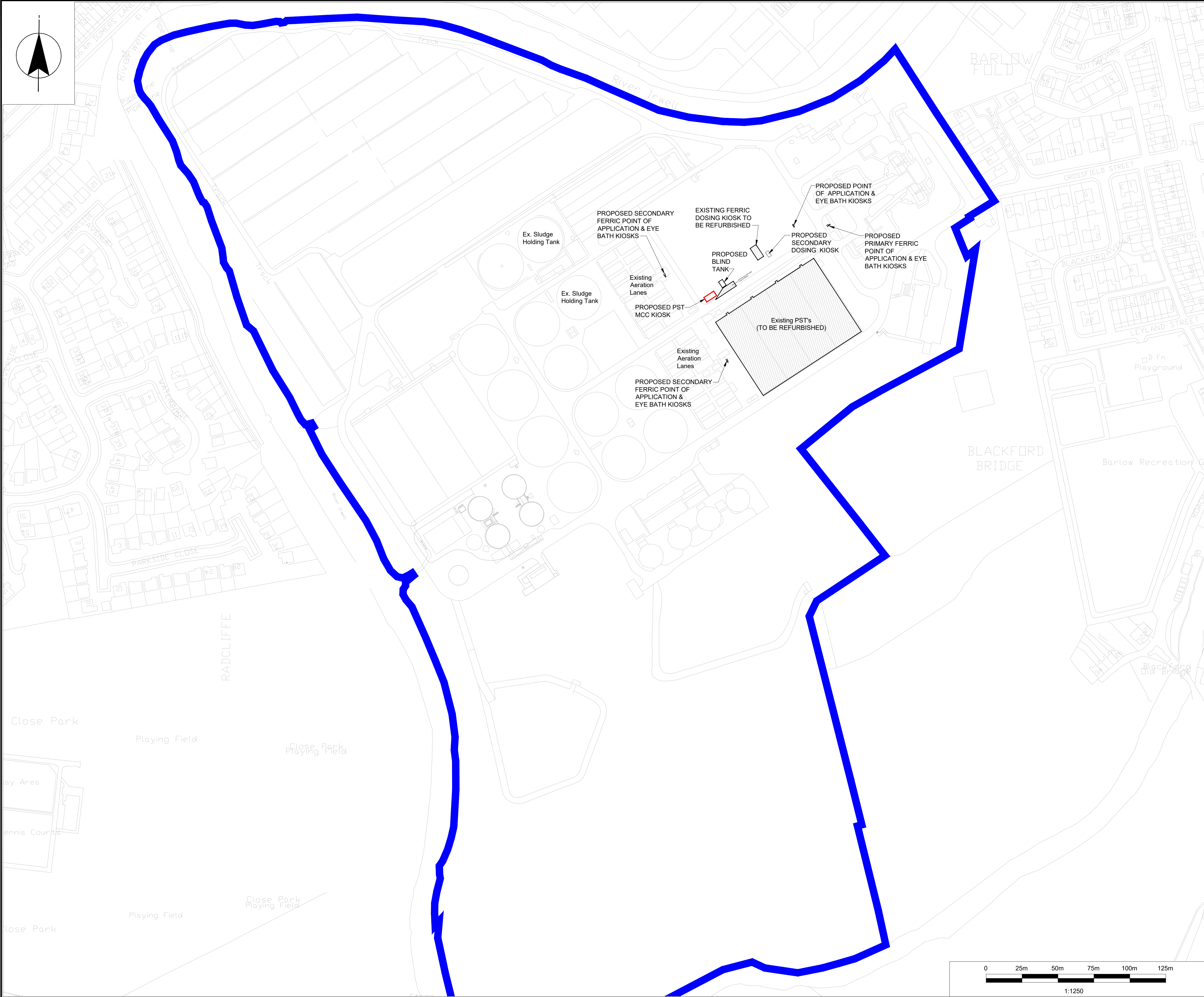
CURRENT ISSUE INFORMATION

P02	PH	MC	JB	Issued for Planning Application	09/09/20
VERSION	AUTH	CHKD	REVD	REASON FOR ISSUE	DATE
S2		Issued for Information			
SUITABILITY CODE		SUITABILITY DESCRIPTION			



BURY WwTW - ND - AMP7
PLANNING
SITE LOCATION PLAN

SCALE AS SHOWN	SHEET SIZE A1
DRAWING NUMBER 80061824-01-ADP-BURYZ-97-DR-T-10001	REVISION P02



NOTES

1. ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS IN METRES
AOD UNLESS NOTED OTHERWISE.

SITE LOCATION

NEAREST POSTCODE: BL9 9TF
OS GRID REF E 380355.716 - N 407924.368 (CENTRE OF SITE)

REFERENCES

80061824-01-ADP-BURYZ-97-DR-T-10001 - SITE LOCATION PLAN
80061824-01-ADP-BURYZ-97-DR-T-10004 - MCC KIOSK ELEVATIONS

LEGEND

UU LAND OWNERSHIP BOUNDARY

NEW BUILDING / STRUCTURE REQUIRING
PLANNING PERMISSION
(TOTAL AREA = 21.72m²)

OS TILE REF = SJ8007NW

CURRENT ISSUE INFORMATION

P02	PH	MC	JB	Issued for Planning Application	09/09/20
VERSION	AUTH	CHKD	REVD	REASON FOR ISSUE	DATE
S2		Issued for Information			
SUITABILITY CODE		SUITABILITY DESCRIPTION			

Water for the North West

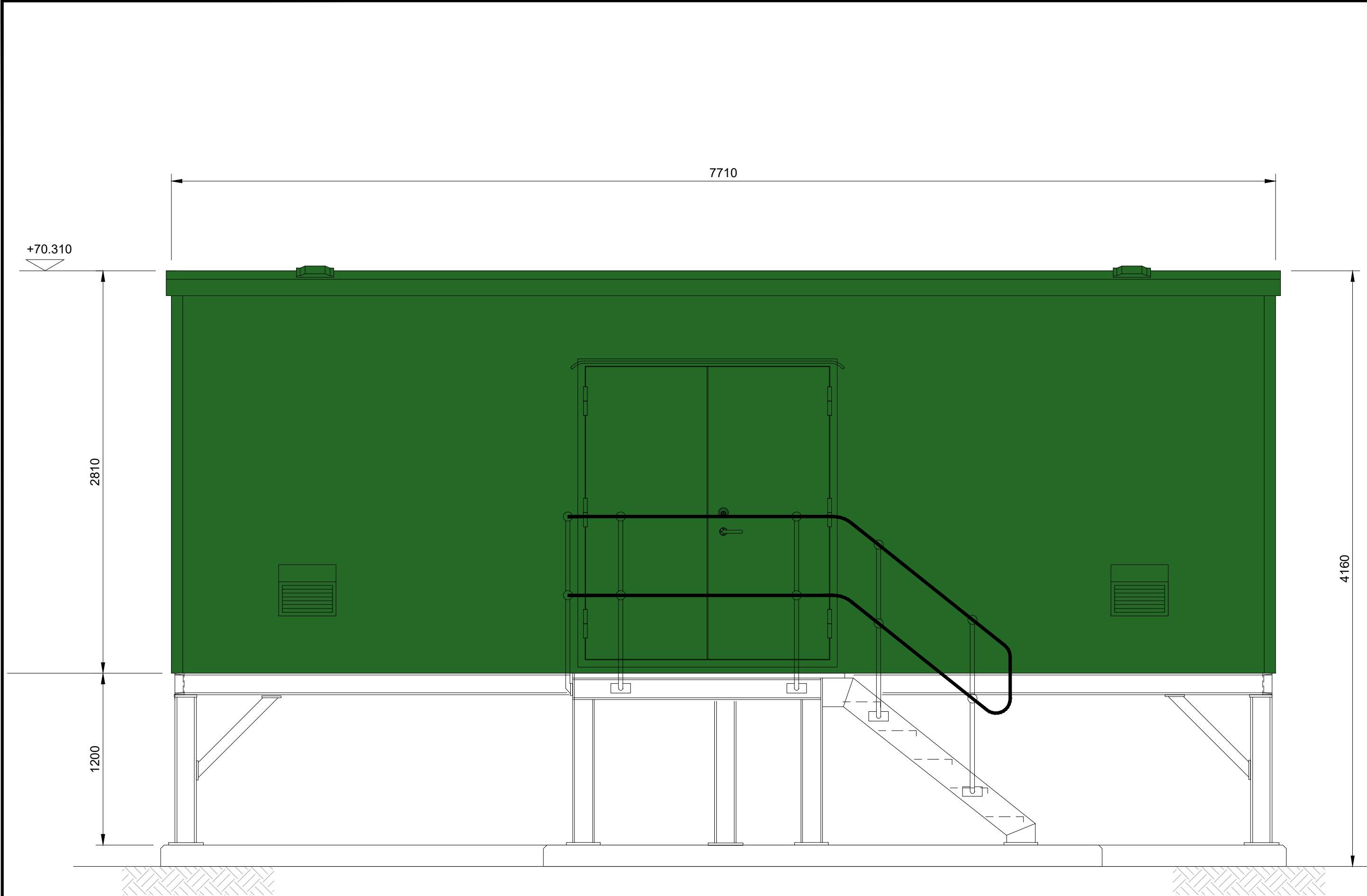
BURY WwTW - ND - AMP7

PLANNING

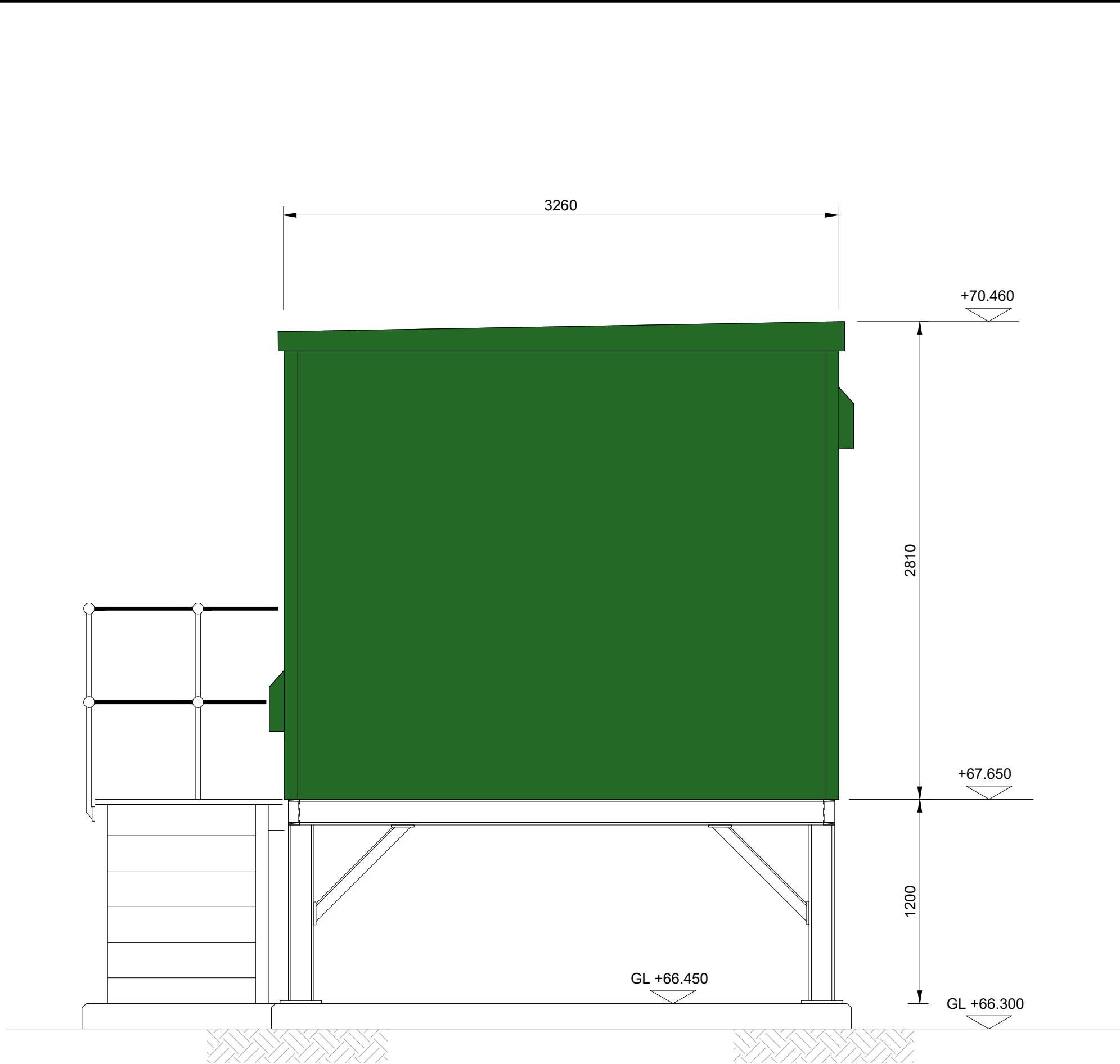
SITE LAYOUT PLAN

SCALE AS SHOWN	SHEET SIZE A1
DRAWING NUMBER 80061824-01-ADP-BURYZ-97-DR-T-10002	REVISION P02

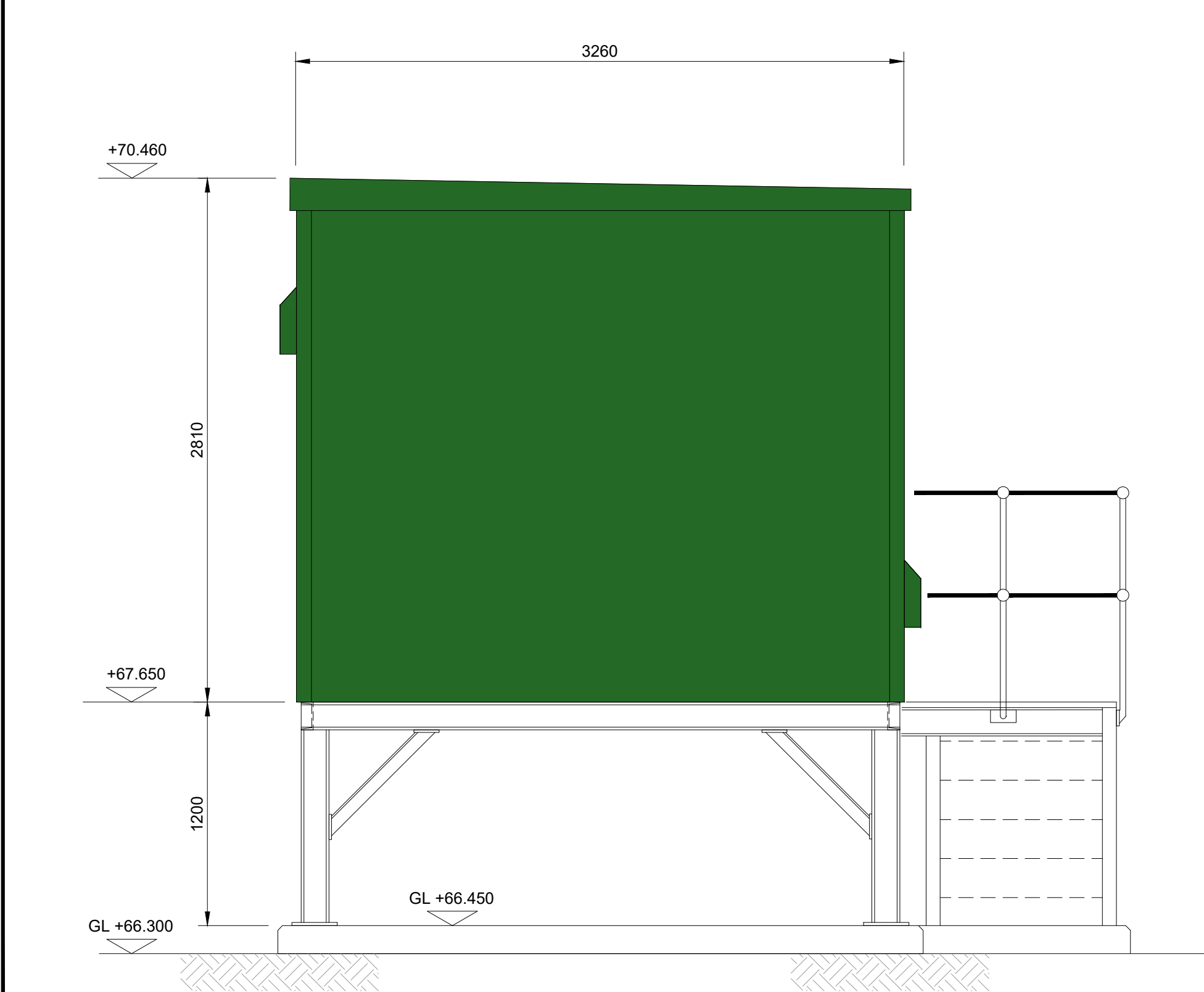
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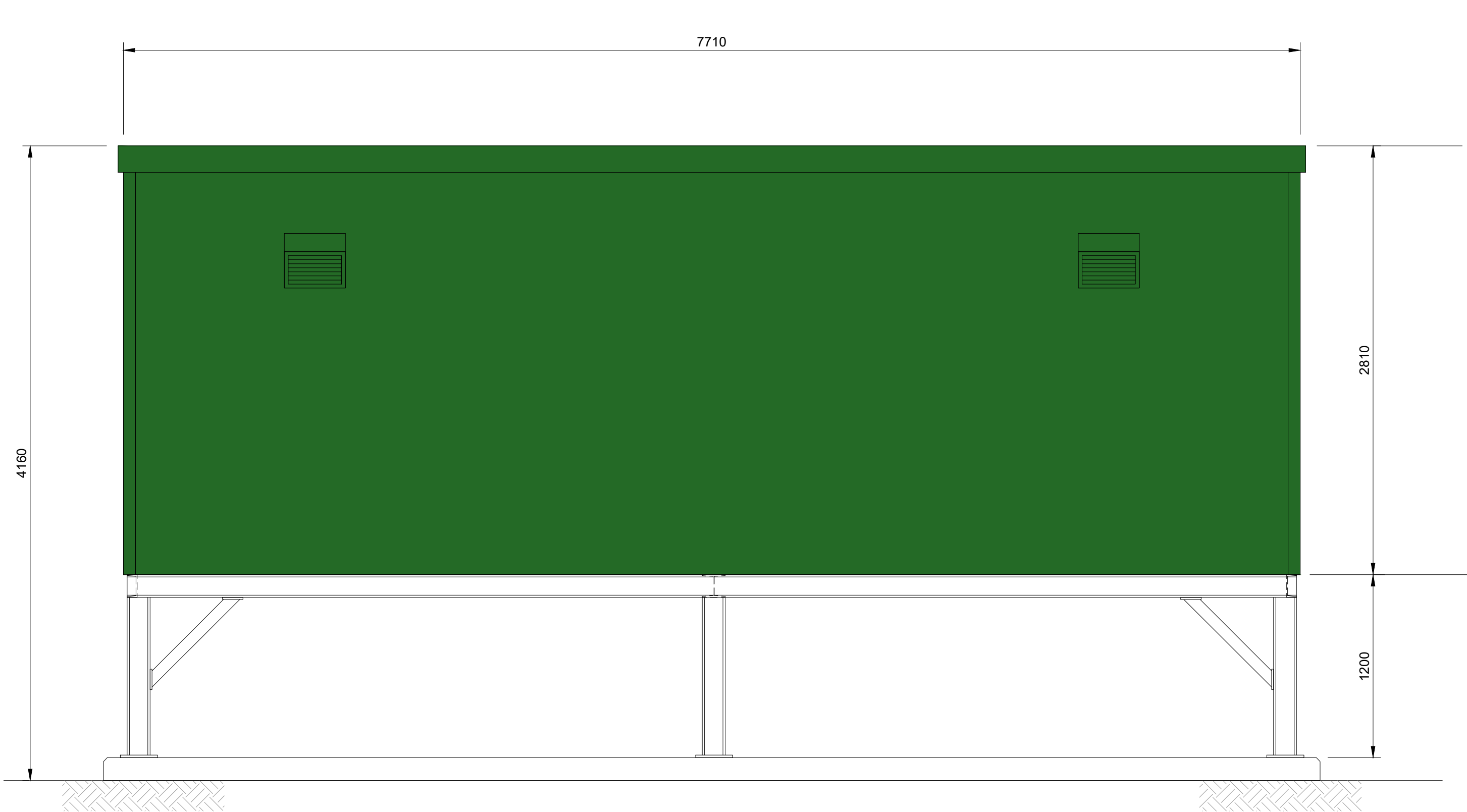
EAST ELEVATION



NORTH ELEVATION



SOUTH ELEVATION



WEST ELEVATION

NOTES

1. ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS IN METRES UNLESS SHOWN OTHERWISE
2. KIOSK TO BE GRP, EXTERNAL COLOUR - HOLLY GREEN (BS4800 14C39) / MATT.
3. PLATFORM, STAIRS AND HANDRAILING TO BE FACTORY FINISHED GALVANISED MILD STEEL

REFERENCES

- 80061824-01-ADP-BURYZ-97-DR-T-10001 - SITE LOCATION PLAN
80061824-01-ADP-BURYZ-97-DR-T-10002 - SITE LAYOUT PLAN

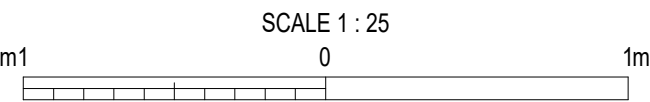
CURRENT ISSUE INFORMATION

P02	PH	MC	JB	Issued for Planning Application	09/09/20
VERSION	AUTH	CHKD	REVD	REASON FOR ISSUE	DATE
S2		Issued for Information			
SUITABILITY CODE		SUITABILITY DESCRIPTION			



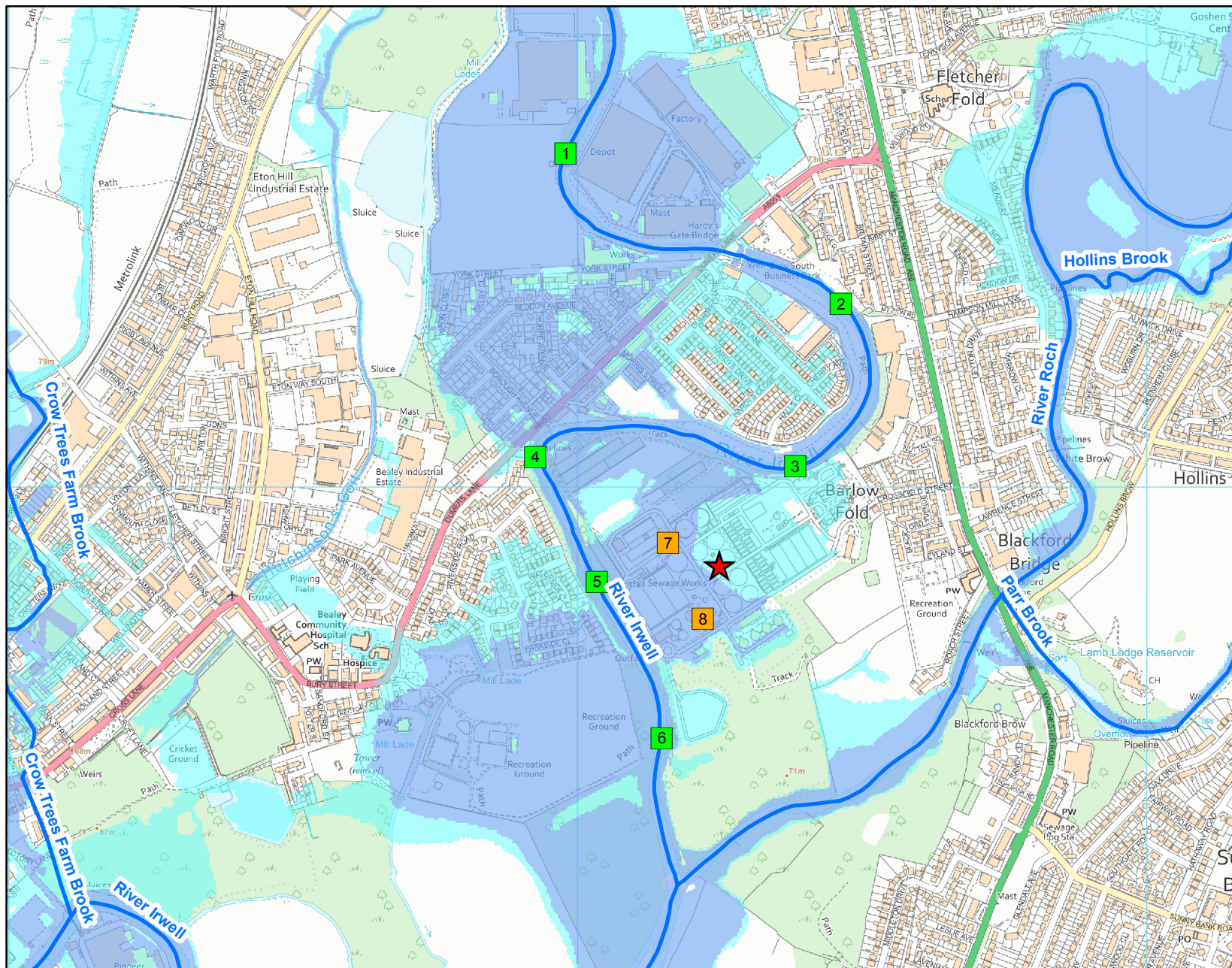
BURY WwTW - ND - AMP7
PLANNING
MCC KIOSK
ELEVATIONS

SCALE 1:25	SHEET SIZE A1
DRAWING NUMBER 80061824-01-ADP-BURYZ-97-DR-T-10004	REVISION P02



Appendix II - EA Data

Detailed Flood Map centred on Crossfield Street, Bury, BL9 9SZ. Created on 25/08/2020 [GMM179021AB]



1:10,001



Legend

- ★ Site Location
- Model Measurements
- 2D Level
- Flood Zone 3
- Flood Zone 2
- Main River

Map Reference	Model Node Reference	Easting	Northing	Date	Undisturbed								Disturbed							
					1.0 % AEP (1 in 10 year)	1 % AEP (1 in 20 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)	1.0 % AEP (1 in 10 year)	1 % AEP (1 in 20 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)
1	RWVED4_A011	379981	40890	Modelled Water Level (m aodH)	87.42	87.74	87.85	88.28	88.43	88.54	88.78	89.52	87.48	87.81	87.85	88.31	88.47	88.59	88.83	89.63
				Modelled Flow (cumecs)	175.19	186.18	197.18	214.18	222.47	234.18	244.18	268.97	176.88	206.97	214.88	231.88	235.98	244.88	268.93	311.26
2	RWVED4_1985	380471	40822	Modelled Water Level (m aodH)	85.29	86.56	86.86	86.87	87.61	87.88	87.78	88.59	86.87	88.88	88.88	87.82	87.12	87.29	87.85	87.85
				Modelled Flow (cumecs)	176.81	203.01	212.88	234.63	247.82	257.05	273.38	338.01	178.81	208.72	214.88	238.63	247.18	259.78	275.63	353.87
3	RWVED4_3031	380389	40837	Modelled Water Level (m aodH)	86.04	86.32	86.41	86.63	86.78	86.87	87.01	87.61	86.06	86.34	86.42	86.64	86.80	86.93	87.11	87.79
				Modelled Flow (cumecs)	176.86	202.91	212.42	234.43	248.81	257.08	273.88	352.17	176.88	208.51	214.32	238.77	250.48	260.78	280.61	487.17
4	RWVED4_2520	379926	40855	Modelled Water Level (m aodH)	85.15	85.44	85.53	85.83	85.94	86.18	86.47	87.45	85.16	85.47	85.55	85.88	86.05	86.23	86.58	87.47
				Modelled Flow (cumecs)	176.78	201.81	210.41	228.19	238.84	244.32	251.88	284.01	176.80	204.73	211.72	230.71	240.78	249.51	258.08	270.63
5	RWVED4_1276	380032	40788	Modelled Water Level (m aodH)	84.71	84.88	85.08	85.31	85.50	85.63	85.84	87.09	84.71	85.00	85.08	85.33	85.53	85.70	86.01	87.04
				Modelled Flow (cumecs)	176.77	201.80	211.20	237.23	254.69	265.77	278.78	374.85	176.78	205.15	212.78	240.52	257.78	271.02	290.81	488.28
6	RWVED4_1374	380140	47563	Modelled Water Level (m aodH)	84.48	84.83	85.03	85.21	85.41	85.55	85.86	87.14	84.48	84.85	84.94	85.20	85.43	85.60	85.89	87.38
				Modelled Flow (cumecs)	153.10	182.96	188.49	178.28	181.48	200.42	217.85	328.55	154.74	182.76	188.35	188.87	184.73	207.29	226.94	297.47

Map Reference	Model Node Reference	Easting	Northing	Date	Undisturbed			Disturbed		
					1.0 % AEP (1 in 10 year)	1 % AEP (1 in 20 year)	0.1 % AEP (1 in 1000 year)	1.0 % AEP (1 in 10 year)	1 % AEP (1 in 20 year)	0.1 % AEP (1 in 1000 year)
7	20 Level	380156	407812	Modelled Water Level (m aodH)	85.27	85.64	85.85	85.68		85.85
				Modelled Water Level (m aodH)				85.70	85.78	85.40

Model data taken from Ratcliffe & Reubens 2016 Study

AEP - Annual Exceedance Probability

m aodH - metres above ordnance datum Newlyn

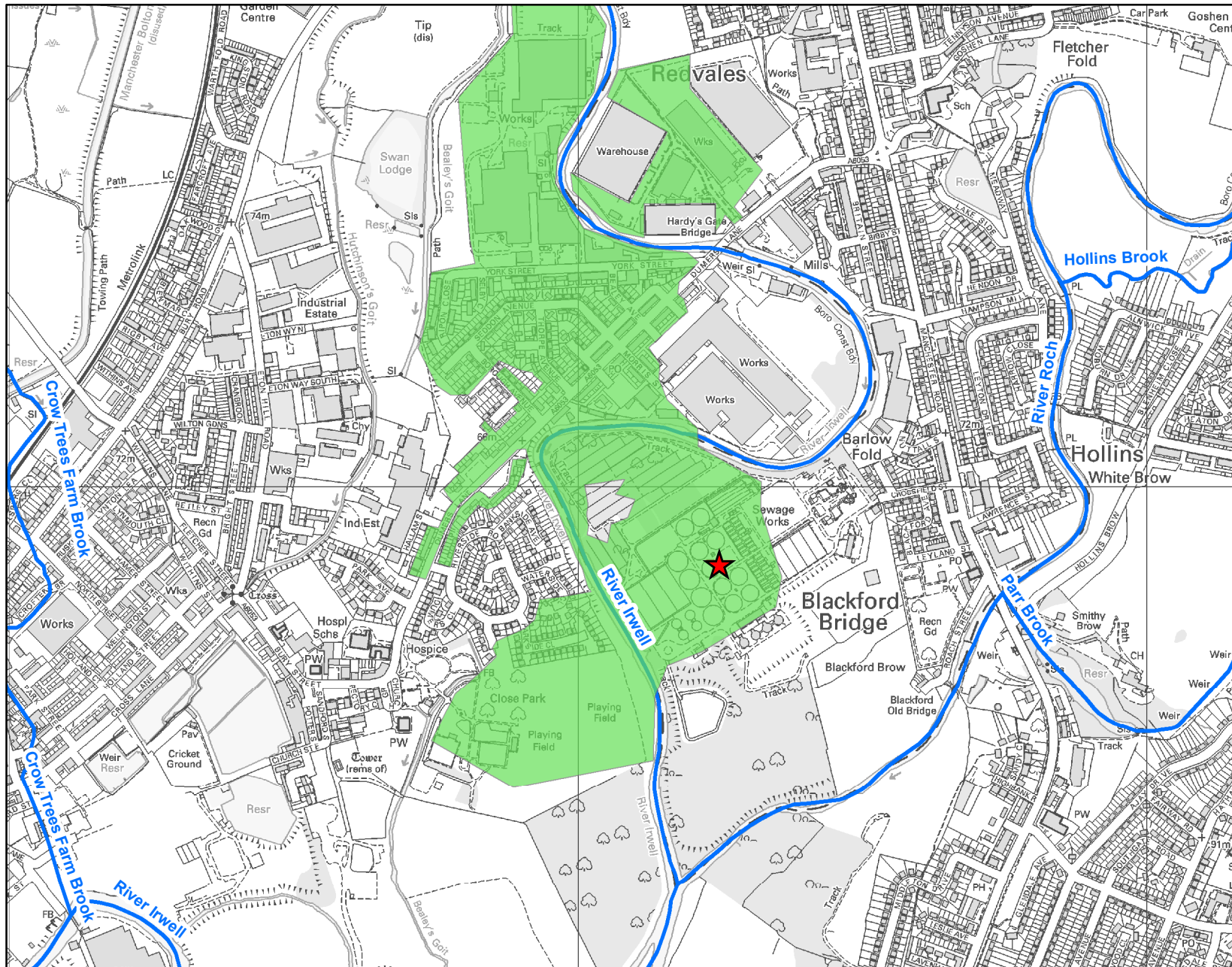
cumecs - cubic metres per second

Notes:

Climate Change Scenarios - We do not hold climate change measurements at this location. For further guidance on climate change within the GMAC area please see the attachment 'Flood risk assessments: Climate change allowances'. Particularly section 3, table B which shows the Local precautionary allowances for potential climate change impacts.

Recorded Flood Outlines					
Flood Event Code	Name	Start Date	End Date	Source of Flooding	Cause of Flooding
56757	Ratcliffe and Reubens	26/12/2015	27/12/2015	Main River	Channel capacity exceeded (no vessel defences)

Recorded Flood Outline Map centred on Crossfield Street, Bury, BL9 9SZ. Created on 25/08/2020 [GMM179021AB]



1:10,001



Legend

★ Site Location

Recorded Flood Outline

Start Date

26/12/2015

— Main River