

Halton Borough Council Local Plan Site Screening

**Level 2 Strategic Flood Risk
Assessment – Site W11 Screening**

Draft Report

June 2019

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Revision history

Revision Ref/Date	Amendments	Issued to
P01 / June 2019	N/A	Alasdair Cross

Contract

This report describes work commissioned by Anne Moyers, on behalf of Halton Borough Council, by an email dated 3 May 2019. Hannah Bishop, Joseph Landells-Molloy and Mike Williamson of JBA Consulting carried out this work.

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1 W11 (DALP Sub)

Proposed Site	W11 (DALP Sub)
Site area (ha)	13.28
Existing use	Mixed use
Existing flood risk vulnerability classification	More vulnerable
Proposed use	Residential
Proposed development flood risk vulnerability classification	More vulnerable
Proposed development impermeable area (ha)	11.29

Flood outlines (current day)

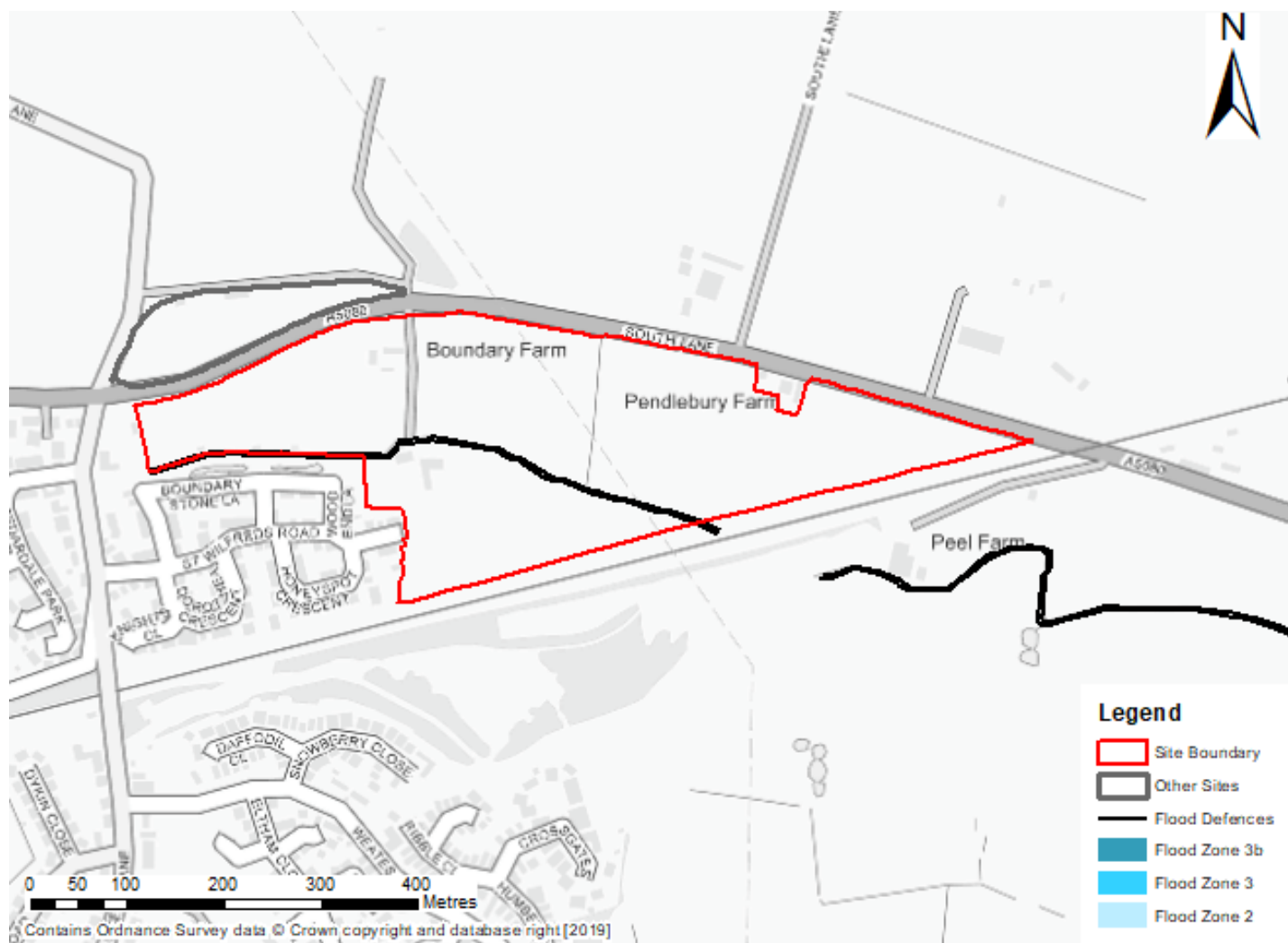


Figure 1-1: Site boundary with Flood Defences (no flood zone mapping immediately close to the site)

Proposed Site

W11 (DALP Sub)

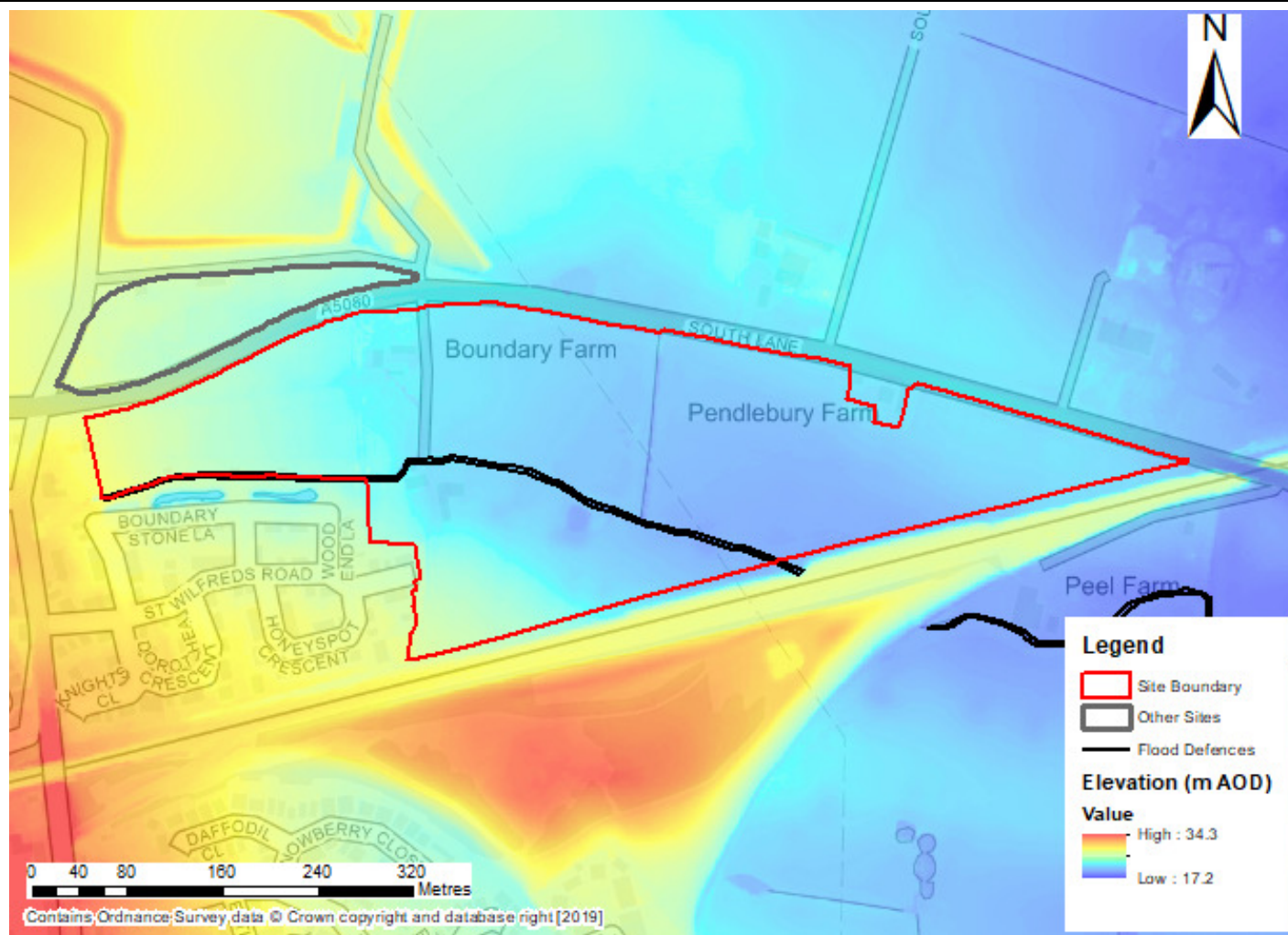


Figure 1-2: Site with 1m LIDAR (elevation data)

- To the west of the site, the elevation is approximately 23m AOD with the elevation slightly dropping towards the east of the site to approximately 20m AOD. Outside of the site to the west, the residential area has increased elevation of around 29m AOD with an additional area of high elevation located on the other side of the railway lines.

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Observations

- It should be possible for this site to pass the Exception Test at the FRA stage, assuming the advice provided in this Level 2 assessment is followed, though residential yields will undoubtedly be reduced. The main issues are with the on-site watercourses, which must be modelled in consultation with the EA (as Main River), and with surface water flow paths, which must be integrated within the site design. No development can take place within 8 m of the Main River on-site. This buffer zone is recommended by the EA for maintenance access.
- The risk classification of the site does not change; it remains as more vulnerable according to the NPPF.

Proposed Site	W11(DALP Sub)		
- The entirety of the site is located within Flood Zone 1 with no risk from fluvial modelled outlines. - No tidal flood risk is shown from the updated tidal modelling. - The flood defences indicated in Figure 1-1 are situated on a Main River (Barrows Green Brook), this does not appear on the Environment Agency (fluvial) mapping but is likely to be reflected in the surface water flood outlines, however, the surface water outline may not include any culverts (condition unknown) that could mitigate residual risk. - There is a risk of failure of the existing flood defences (condition of defences is unknown) which may result in rapid inundation of the site. Flood risk needs to be supported by more detailed information in this instance as part of a site-specific FRA. - Approximately 14% of the total site area is at risk of surface water flooding in the 1% AEP event to a maximum depth of 0.90-1.20m (see Figure 1-3), if this area is adapted or reprofiled, significant areas of the site may become available for development. - The extent of flooding in the 3.33% AEP outline indicates that surface water runoff drains to a series of drainage ditches within the site and ponds behind the raised railway embankment along the southern bound of the site. - It is noted that no seepage evaluation has been undertaken at the raised railway line. This may impact surface water flood extents and will need to be considered as part of a detailed FRA. Whilst some ponding will occur, seepage through the railway embankment may reduce the predicted surface water extents. - Safe access and egress are achievable via South Lane to the east of the site based on the 1% AEP outline, however, access roads and development should avoid the 1% AEP outline.			
Flood Source: Fluvial/Tidal			
	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
Flood Zones (%)	0.00	0.00	0.00
Tidal: Depth (m)	N/A	N/A	N/A
Tidal: Hazard	N/A	N/A	N/A
Modelled Flood Risk and Climate Change	The site lies outside any modelled flood risk from fluvial and/or tidal sources.		
Historic Flooding	The site lies outside of any Environment Agency historic flood outlines.		
Defences	There are areas of high ground running along Barrows Green Brook that runs through the central and southern areas of the site which have been assessed at condition grade 3 (Table 1.1 Condition Assessment Manual¹).		
Flood Warning Area (FWA)	The site is not located within any current EA FWA.		

¹https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291126/scho0509bqat-e-e.pdf

Proposed Site		W11 (DALP Sub)
Mitigation options & site suitability	• The entirety of the site lies within Flood Zone 1, outside fluvial or tidal modelled risk outlines. This is because the on-site Main River, Barrows Green Brook, has not been modelled by the EA. • The on-site watercourses, including Barrows Green Brook, must be modelled as part of the FRA to assess possible fluvial risk, in consultation with the EA. • Site design must integrate the watercourses into the site layout, accounting for the 8m access buffer strip, which will inevitably reduce residential yields. • The FRA should include emergency planning procedures with particular consideration to safety around the on-site watercourses in a residential area.	
Flood source: Groundwater		
Flood risk: groundwater	• Data unavailable. Residual risk from groundwater must be assessed as part of the FRA.	
Flood Source: Infrastructure Failure – Reservoirs		
Flood risk: reservoirs	• The site is at no risk from reservoir inundation according to the EA’s Reservoir Flood Map (RFM).	
Flood Source: Infrastructure Failure – Canals		
Flood risk: canal	• Data unavailable. Residual risk from canals (if applicable) must be assessed as part of the FRA	
Flood Source: Surface Water		
Surface Water Flood Risk to Proposed Development Site		

Proposed Site

W11 (DALP Sub)

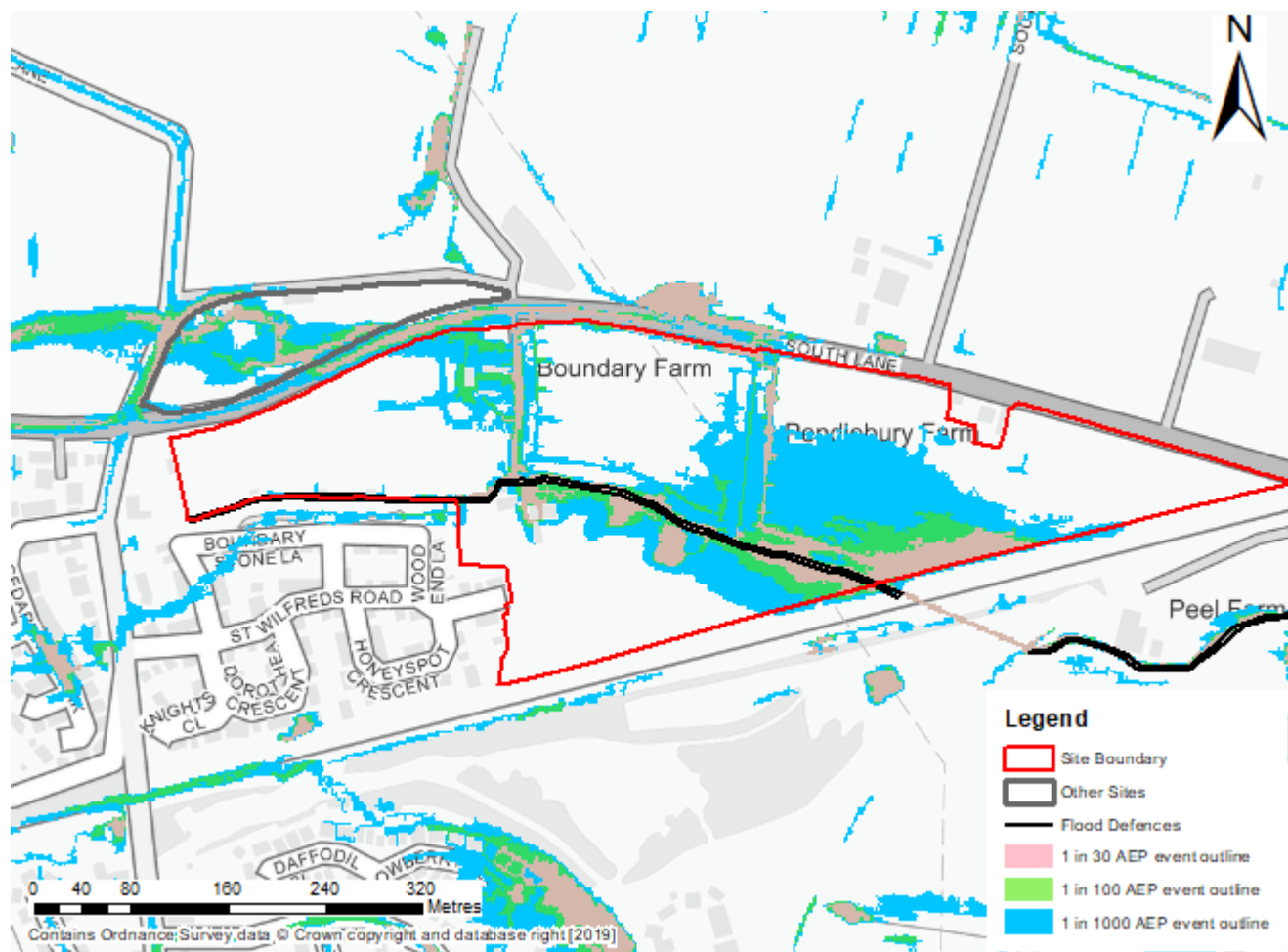


Figure 1-3: Surface Water Flood Risk to the site

Existing development risk of flooding from surface water (%)	High Risk (3.33% AEP outline)	Medium Risk (1% AEP outline)	Low Risk (0.1% AEP outline)
	7.61	14.41	37.04
Surface water flooding depths	Max: 0.90-1.20m	Max: 0.90-1.20m	Max: >1.20m
Surface water hazards	Max: Significant Mean: Moderate	Max: Significant Mean: Moderate	Max: Significant Mean: Significant
Climate change	The current day 0.1% AEP outline provides an indication of the likely increase in extent of the more frequent events.		
Surface water: flood risk to development site	- Approximately 14% of the total site area is at risk of surface water flooding in the 1% AEP event to a maximum depth of 0.90-1.20m. - The extent of flooding in the 3.33% AEP outline indicates that surface water runoff drains to a series of drainage ditches within the site and		

Proposed Site		W11 (DALP Sub)				
	ponds behind the raised railway embankment along the southern bound of the site. - No seepage evaluation has been undertaken at the raised railway line. This may impact surface water flood extents and will need to be considered as part of a detailed FRA. Whilst some ponding will occur, seepage through the railway embankment may reduce the predicted surface water extents. - The main access route via South Lane (to the east of the site only) is at low risk of surface water flooding in the 1% AEP event.					
Surface water: mitigation options & site suitability	Development should avoid the 1% AEP outline – approximately 14% of the total site area; this is largely associated with a series of drainage ditches within the site. Surface water runoff currently drains to a series of drainage ditches that extend through the site, therefore, redevelopment of the site may significantly change the behaviour of surface water. If the site is adapted or reprofiled to manage or divert flood risk, significant areas of the site may become available for development. Safe access and egress are achievable via South Lane to the east of the site based on the 1% AEP outline, however, access roads and development should avoid the 1% AEP outline. Surface water runoff should be fully attenuated to the greenfield runoff rate, and as such, ensure that there is no increase in surface water flood risk elsewhere. The required volumes of attenuation have been calculated below. The site is greenfield and therefore, infiltration SuDS may be feasible (subject to Ground Investigation) where existing low-lying areas that are currently showing localised ponding may be utilised for attenuation.					
Indicative Surface Water Flood Risk from Proposed Development (for Proposed Site in its Entirety)						
Proposed Development limiting runoff rate: Greenfield – FEH Statistical		Qbar: 91.35 l/s Q30: 155.29 l/s Q100: 190 l/s				
Design flood event (inc CC)	Critical storm duration (Hrs)	Inflow volume (m³)	Outflow volume (m³)	Attenuation required (m³)	Time to empty assuming no infiltration (Hrs)	Total storage required: Area (ha) and % of site area
3.33% AEP Rainfall + 20%	3	5120	1174	3946	10.1	0.263 ha 1.981 %

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3.33% AEP Rainfall + 40%	3.75	6289	1467	4822	12.3	0.321 ha 2.421 %
1% AEP Rainfall + 20%	3.5	7194	1676	5519 (1573 exceedance storage)	11.5	0.368 ha 2.771 %
1% AEP Rainfall + 40%	4	8651	1915	6736 (1914 exceedance storage)	14	0.449 ha 3.382 %
Climate change	Application of the central (20%) and upper band (40%) potential change anticipated for climate change in the table above shows the estimated attenuation volumes for the 1% AEP and 3.33% AEP rainfall events.					
Surface water: flood risk impacts from development site & mitigation	- As part of this Level 2 Screening we have included calculations to provide an estimated land take if a pond with an assumed depth of 1.5m was included as part of the development. - Attenuation volumes are presented for the critical storm duration for the 1 in 30-year events with exceedance flows quantified up to the 1 in 100-year event. To prevent development worsening flood risk elsewhere, surface water runoff must be managed on site.					

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