

Halton Borough Council Local Plan Site Screening

**Level 2 Strategic Flood Risk
Assessment – Site W32 Screening**

Draft Report

July 2019

www.jbaconsulting.com



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Revision history

Revision Ref/Date	Amendments	Issued to
P01 / July 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 W32 (DALP Sub)

Proposed Site	W32 (DALP Sub)
Site area (ha)	0.51
Existing use	Cleared former boat yard – RMC concrete site
Existing flood risk vulnerability classification	Less vulnerable
Proposed use	Residential
Proposed development flood risk vulnerability classification	More vulnerable
Proposed development impermeable area (ha)	0.43

Flood outlines (current day)

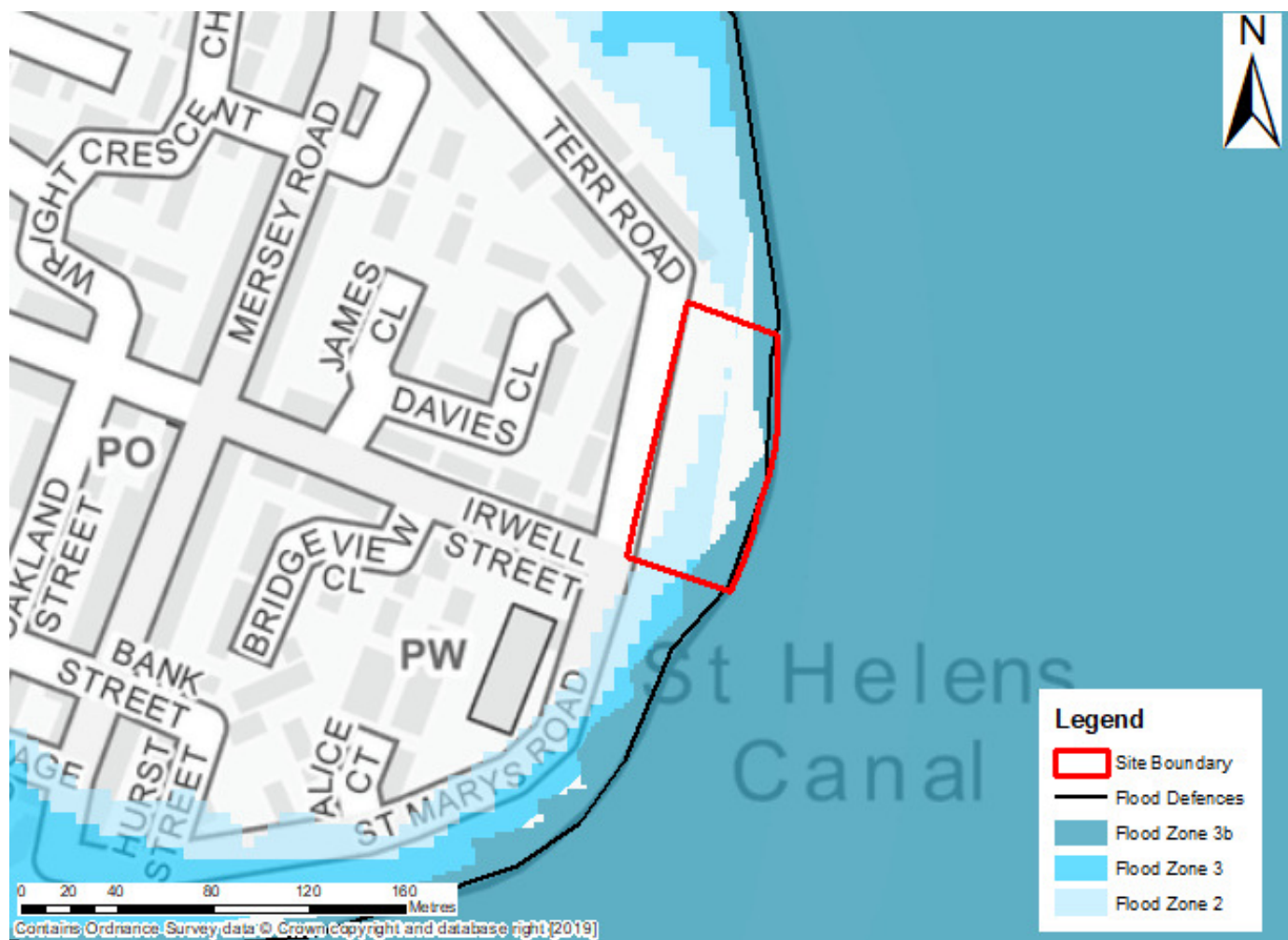


Figure 1-1: Flood Zone Mapping with Flood Defences

Proposed Site

W32 (DALP Sub)

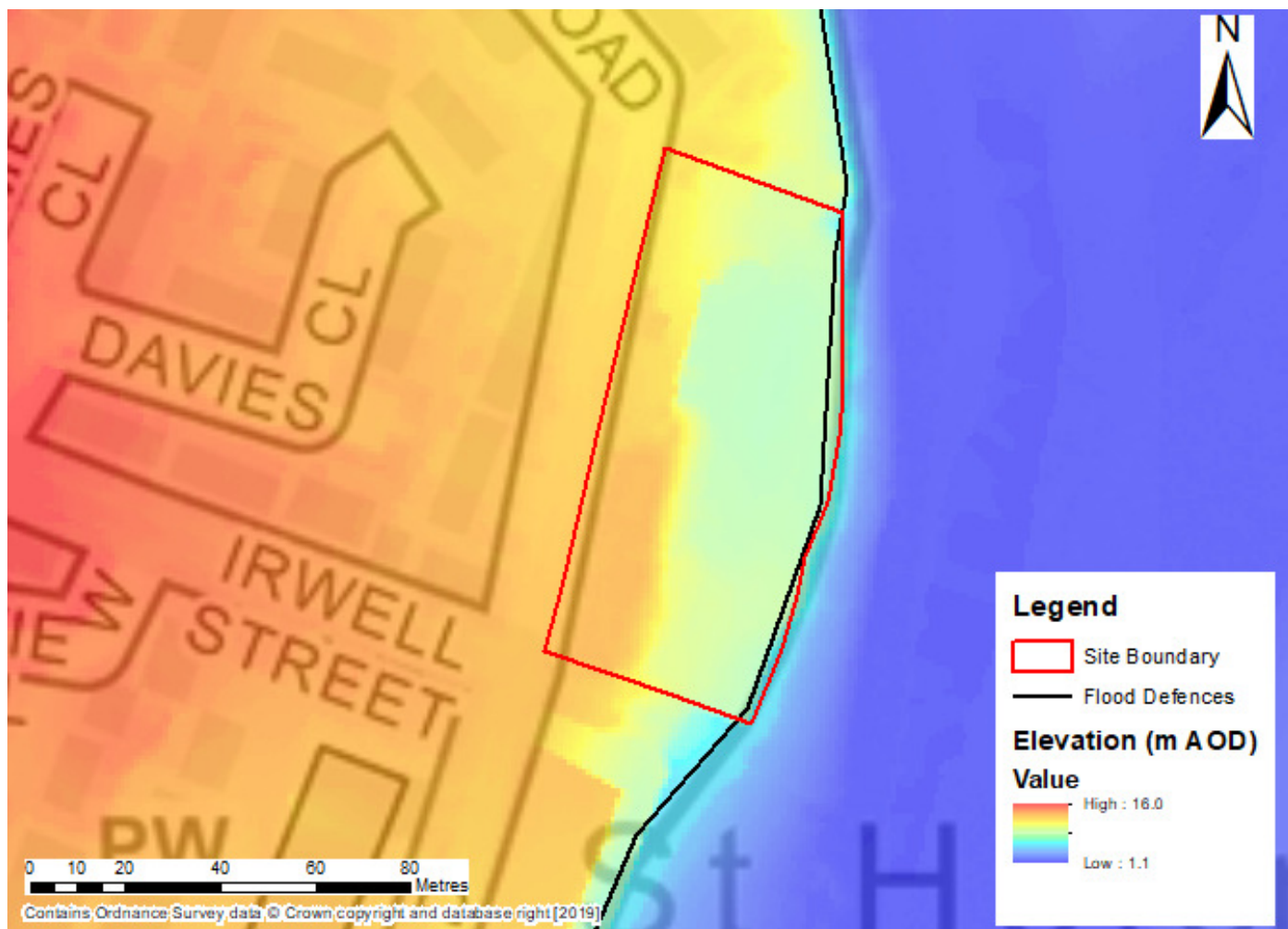


Figure 1-2: Site with 1m LIDAR (elevation data)

- The west side of the site has an approximate elevation level of 11.5m AOD with the elevation dropping down to 8m AOD on the eastern side of the site.
- Immediately to the east of the site boundary, is the St Helen's Canal where the elevation drops significantly to approximately 1.5m AOD.

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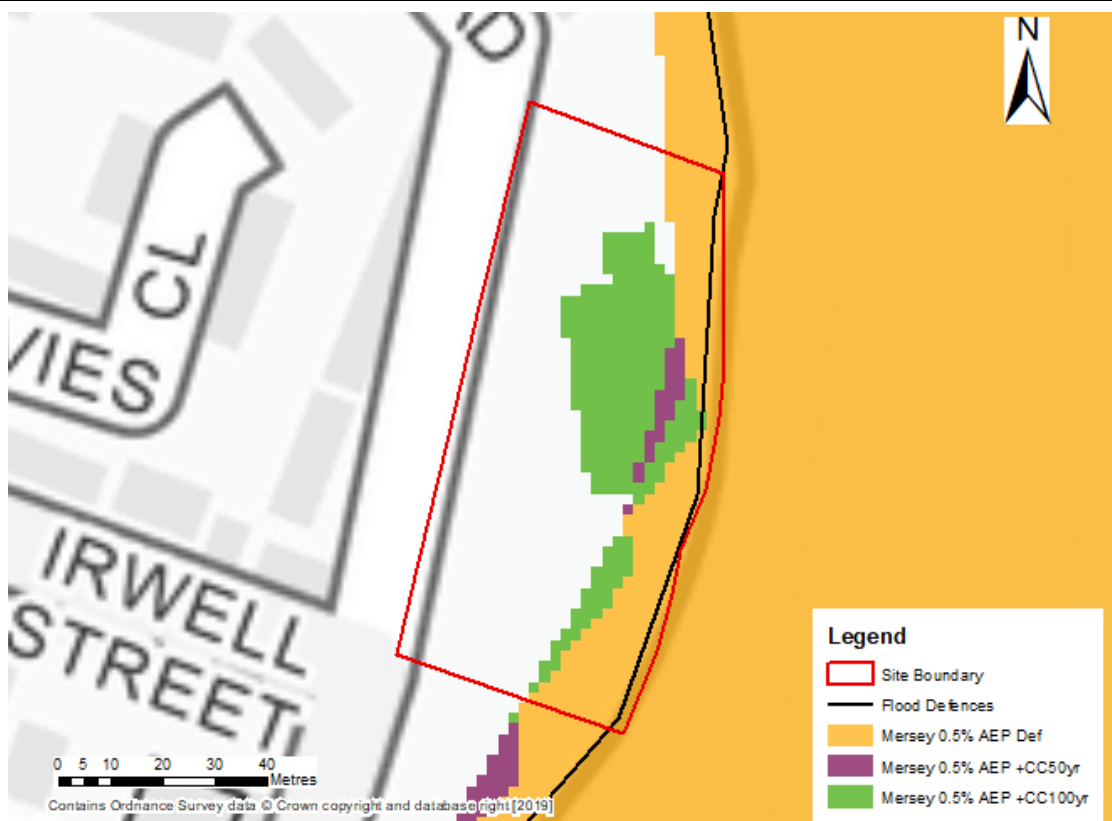
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Observations

- This site may find it difficult to pass the Exception Test at the FRA stage, given the risk from fluvial and tidal flooding. The effects of climate change further restrict possible development in that it may not be possible to make the site safe for its lifetime, which is considered to be 100 years for residential.
- 21% of the site lies within the functional floodplain, this area should not be developed.
- It appears that Flood Zones 3 and 2 have been trimmed or cut in error across the centre of the site. This is noticeable from Figure 1-1. It is therefore likely that Flood Zone 3a covers a larger area of the site than calculated below. This is backed up by the fact that the

Proposed Site		W32 (DALP Sub)	
modelled 0.5% AEP defended (from the Mersey Estuary 2016 model) outline covers over 20% of the site - Tidal/fluviat flooding and surface water are the greatest risks to the site. 21% of the site (on the eastern edge next to the watercourse) lies within the present day 0.5% AEP outline of the Mersey Estuary 2016 model. - Approximately 10% of the total site area is at risk of surface water flooding in the 1% AEP event to a maximum depth of 0.30-0.60m (see Figure 1-4). The extent of surface water flooding in the 3.33% and 1% AEP events is limited to a localised depression. - Safe access and egress are achievable via Terrace Road based on the 1% AEP outline.			
Flood Source: Fluvial/Tidal			
	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
Flood Zones (%)	20.20	0.54	20.94
Tidal: Depth (m)	1.19	1.10	Not available
Tidal: Hazard	Significant	Significant	Not available
Modelled Tidal Flood Risk and Climate Change	 Figure 1-3: Defended tidal outlines, from the Mersey Estuary 2016 model, for the present day 0.5% AEP, future risk 0.5% AEP with 50yr (2065) and 100yr (2115) climate change increases The eastern edge of the site experiences tidal flooding for a 0.5% AEP event with the coverage increasing for climate change.		
Historic Flooding	The site lies outside of any Environment Agency historic flood outlines.		

Proposed Site		W32 (DALP Sub)
Defences		On the eastern edge of the site, there is an area of high ground that lies on the edge of the St Helen's Canal. These informal defences are at condition grade 2 with a design standard of 5 (Table 1.1 Condition Assessment Manual 2012¹).
Flood Warning Area (FWA)		The site is not located within any current EA FWA.
Mitigation options & site suitability		This site may find it difficult to pass the Exception Test at the FRA stage, given the risk from fluvial and tidal flooding. The effects of climate change further restrict possible development in that it may not be possible to make the site safe for its lifetime, which is considered to be 100 years for residential. The boundary of the site should potentially be redrawn, so the functional floodplain lies outside the site or incorporated as a blue/green corridor Using the sequential approach, development should be directed to areas of Flood Zone 1. Where proposed development yields are not met in Flood Zone 1 then Flood Zone 2 should be prioritised ahead of Flood Zone 3. If it is not possible to avoid Flood Zone 3 then it is likely development will not be permitted. As such any future development should be directed to the western section of the site. Modelling shows that safe and dry access/egress routes are present during tidal flood events, including for climate change. The Mersey Estuary 2016 model does not include fluvial modelling, only tidal. Flood Zones 2 and 3 on and around the site are from fluvial sources. The EA should advise on whether the fluvial element of the Mersey Estuary should be remodelled at the FRA stage. The EA should advise on the state of the Flood Map at the site which appears to have been trimmed across this area of land in error.
Flood source: Groundwater		
Flood risk: groundwater		Data unavailable. Risk from groundwater must be assessed as part of the FRA.
Flood Source: Infrastructure Failure – Reservoirs		
Flood risk: reservoirs		The site is not at any risk from reservoir inundation according to the EA's Reservoir Flood Map (RFM).

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

Flood Source: Infrastructure Failure – Canals

Flood risk: canal

- The site lies on the boundary of the St Helens Canal; however, data was unavailable. An FRA should take this data into account if available.

Flood Source: Surface Water

Surface Water Flood Risk to Proposed Development Site

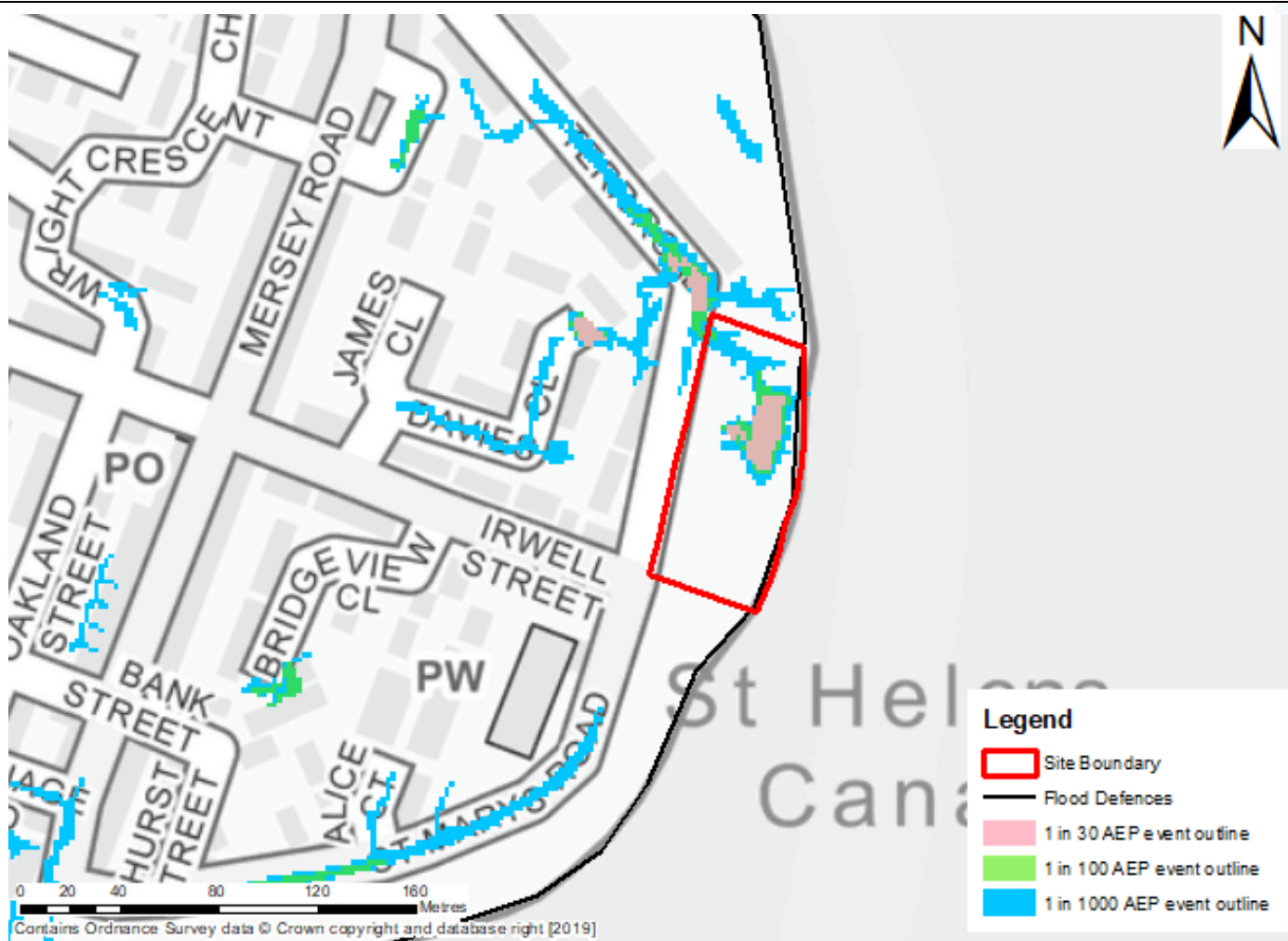


Figure 1-4: Surface Water Flood Risk to the site

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)
	6.89	10.39	19.35
Surface water flooding depths	Max: 0.15-0.30m	Max: 0.30-0.60m	Max: 0.30-0.60m
Surface water hazards	Max: Moderate Mean: Low	Max: Moderate Mean: Low	Max: Moderate Mean: Low

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 10% of the total site area is at risk of surface water flooding in the 1% AEP event to a maximum depth of 0.30-0.60m. - The extent of flooding in the 3.33% and 1% AEP events is limited to a localised depression. - The main access route via Terrace Road is at low risk of surface water flooding in the 1% AEP event.
Surface water: mitigation options & site suitability	It should be possible for the 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 and maybe even unviable. An FRA should assess layout, design, SuDS, and a drainage strategy. Development should avoid the 1% AEP outline – approximately 15% of the total site area. Safe access and egress are achievable via Terrace Road based on 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. However, the site is located adjacent to the Mersey Estuary and therefore, uncontrolled discharge may be permitted owing to its tidal influence. The site is previously developed and therefore, infiltration SuDS may not be feasible (subject to Ground Investigation and contaminated land assessment). Existing low-lying areas that are currently showing localised ponding may be utilised for attenuation. Attenuation measures should avoid Flood Zone 3 (approximately 30% of the site, or more given the trimming of the flood zones. EA should advise). The minimum discharge rate for the site has been set at 5l/s/ha to provide a practical limit below which it is not reasonable to limit flows based on Rainfall runoff management for developments.

Indicative Surface Water Flood Risk from Proposed Development (for Proposed Site in its Entirety)

Proposed Development limiting runoff rate: Greenfield – FEH Statistical		Qbar: 5 l/s Q30: 5 l/s Q100: 5.17 l/s				
Design flood event (inc CC)	Critical storm duration (Hrs)	Inflow volume (m ³)	Outflow volume (m ³)	Attenuation required (m ³)	Time to empty assuming no infiltration (Hrs)	Total storage required: Area (ha) and % of site area
3.33% AEP Rainfall + 20%	3.75	205	47	158	12.5	0.011 ha 2.065 %
3.33% AEP Rainfall + 40%	4.5	249	57	193	15.2	0.013 ha 2.523 %
1% AEP Rainfall + 20%	4.75	294	62	233 (75 exceedance storage)	17.8	0.016 ha 3.046 %
1% AEP Rainfall + 40%	5.5	354	72	283 (90 exceedance storage)	21.6	0.019 ha 3.699 %
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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