

Halton Borough Council Local Plan Site Screening

**Level 2 Strategic Flood Risk
Assessment – Site R7 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 R7 (DALP Sub)

Proposed Site	R7 (DALP Sub)
Site area (ha)	0.54
Existing use	Former docks (cleared)
Existing flood risk vulnerability classification	Water compatible
Proposed use	Residential
Proposed development flood risk vulnerability classification	More vulnerable
Proposed development impermeable area (ha)	0.46

Flood outlines (current day)



Figure 1-1: Flood Zone Mapping with Flood Defences

Proposed Site

R7 (DALP Sub)

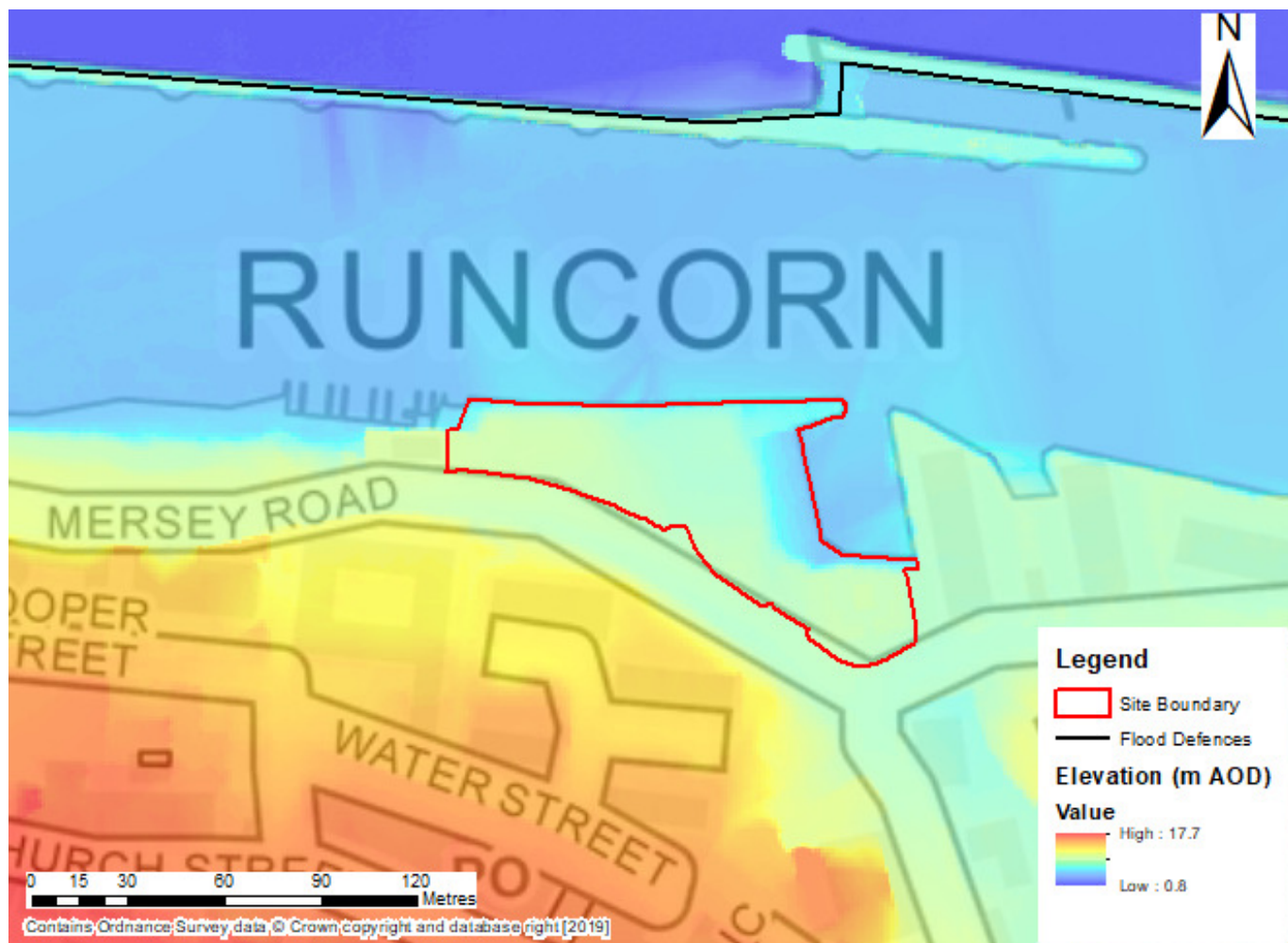


Figure 1-2: Site with 1m LIDAR (elevation data)

- The proposed site is located within an area of relatively low ground adjacent to the Manchester Ship Canal to the north, with the River Mersey also running adjacent to the Ship Canal. Surrounding residential area to the south west of the site sees ground levels rising to approximately 15.5m AOD compared to elevations within the site between 7.5m and 5m AOD.

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Observations

- The site could pass the Exception Test if the recommendations provided in this Level 2 assessment were followed. An FRA should be undertaken to review the 2019 Manchester Ship Canal model if and when it is made available by the Environment Agency.
- The proposed vulnerability of the site will change from water compatible to more vulnerable according to the NPPF.
- The site appears to be brownfield land that has been cleared of development.
- Over 70% of the site is within Flood Zone 1 and is, therefore, suitable for development.

Proposed Site

R7 (DALP Sub)

- 18% of the site is located within fluvial Flood Zone 3a; residential development would not be permitted in this area as it is highly vulnerable.
- The north and north eastern edge of the site is completely bounded by the Manchester Ship Canal with the River Mersey running to the north of the Ship Canal.
- Flood defences run along the River Mersey edge that meets the MSC consisting of walls with condition grade of 3 (Table 1.1 Condition Assessment Manual¹).
- Approximately 15% of the total site area is at risk of surface water flooding in the 1% AEP event to a maximum depth greater than 1.20m (see **Error! Reference source not found.**), however, this is associated with the adjacent Manchester Ship Canal.
- The main access route via Mersey Road is inundated with floodwaters based on the 3.33% and 1% AEP surface water flood outlines.

Flood Source: Fluvial/Tidal

	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
Flood Zones (%)	10.59	18.16	0.00
Tidal: Depth (m)	Not available	Not available	Not available
Tidal: Hazard	Not available	Not available	Not available

Modelled Tidal
Flood Risk and
Climate
Change

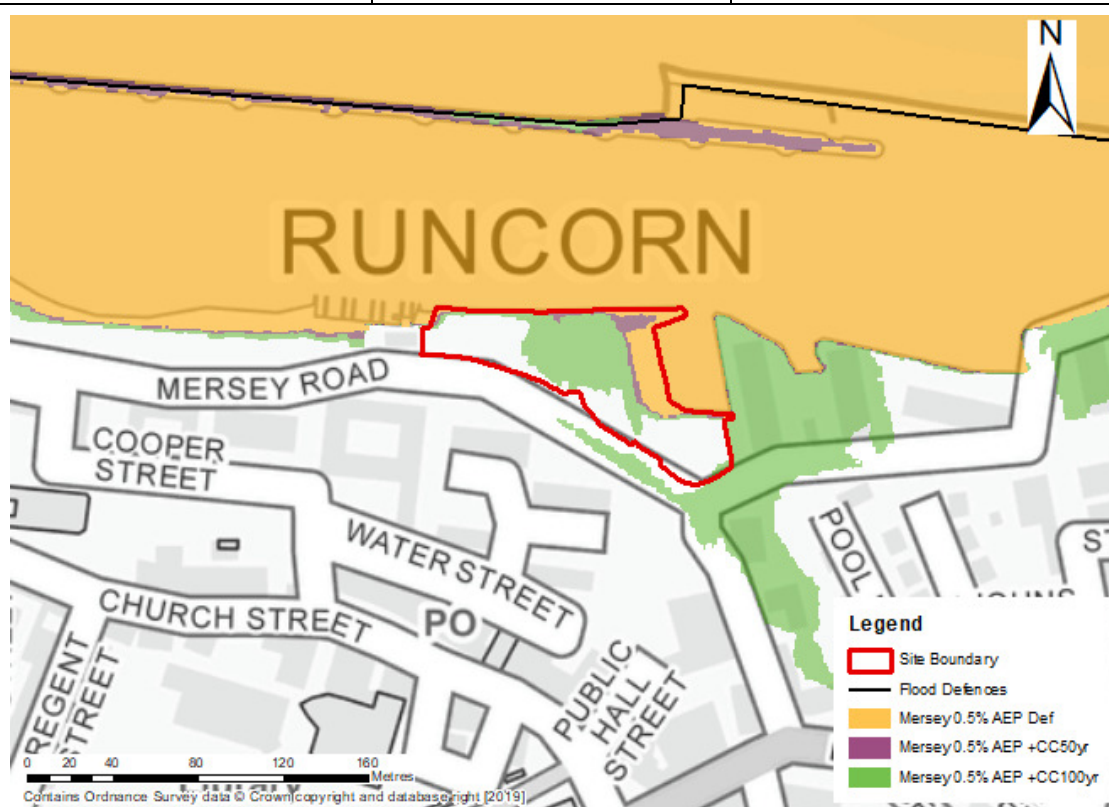


Figure 1-3: Defended tidal outlines, from the Mersey Estuary 2016 model, for the present day 0.5% AEP, future risk 0.5% AEP with 50yr (2065) and 100yr (2115) climate change increases

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

Proposed Site		R7 (DALP Sub)
	- The present day 0.5% AEP and with 50yr climate change uplift outlines only impact the east of the site with the 100yr uplift outline inundating a large part of the central area of the site. - There are no depth or hazard grids available from the Mersey Estuary 2016 model that cover the site.	
Historic Flooding	The site lies outside of any Environment Agency historic flood outlines.	
Defences	There is a fluvial/tidal wall that runs between the Manchester Ship Canal and the River Mersey that has been assessed at condition grade 3 (Table 1.1 Condition Assessment Manual²). However, it is shown to be of minimal benefit to this site.	
Accounting for Defences – EA Risk of Flooding from Rivers and the Sea map	 Figure 1-4: Risk of Flooding from Rivers and the Sea (defended) The RoFRS mapping accounts for defences in place and subsequent risks, here the risk to the east of the site is classified as 'medium risk', meaning the chance of flooding is <1% AEP design event.	
Flood Warning Area (FWA)	The site is not located within any current EA FWA.	
Mitigation options & site suitability	The site would be able to pass the Exception Test if the recommendations in this Level 2 assessment are followed. An FRA would be needed to review the 2019 MSC model	

²https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291126/scho0509bqat-e-e.pdf

Proposed Site		R7 (DALP Sub)
		outputs if made available by the EA as the flood zones in this location may be subject to change. - Over 70% of the site is currently located within Flood Zone 1 with development being permitted in this area. 18% of the site is located within Flood Zone 3a; residential or any more vulnerable development should not be permitted in this area. - The FRA should include emergency planning procedures.
Flood source: Groundwater		
Flood risk: groundwater		Data unavailable. Possible risk from groundwater must be assessed as part of the FRA.
Flood Source: Infrastructure Failure – Reservoirs		
Flood risk: reservoirs		There is no risk of reservoir inundation to the site according to the EA's Reservoir Flood Map (RFM).
Flood Source: Infrastructure Failure – Canals		
Flood risk: canal		The site is located on the boundary of the Manchester Ship Canal although the data for the latest MSC model is, at the time of writing, unavailable. This is due for release at some stage in 2019 and the FRA should assess the outputs from this updated model.

Flood Source: Surface Water

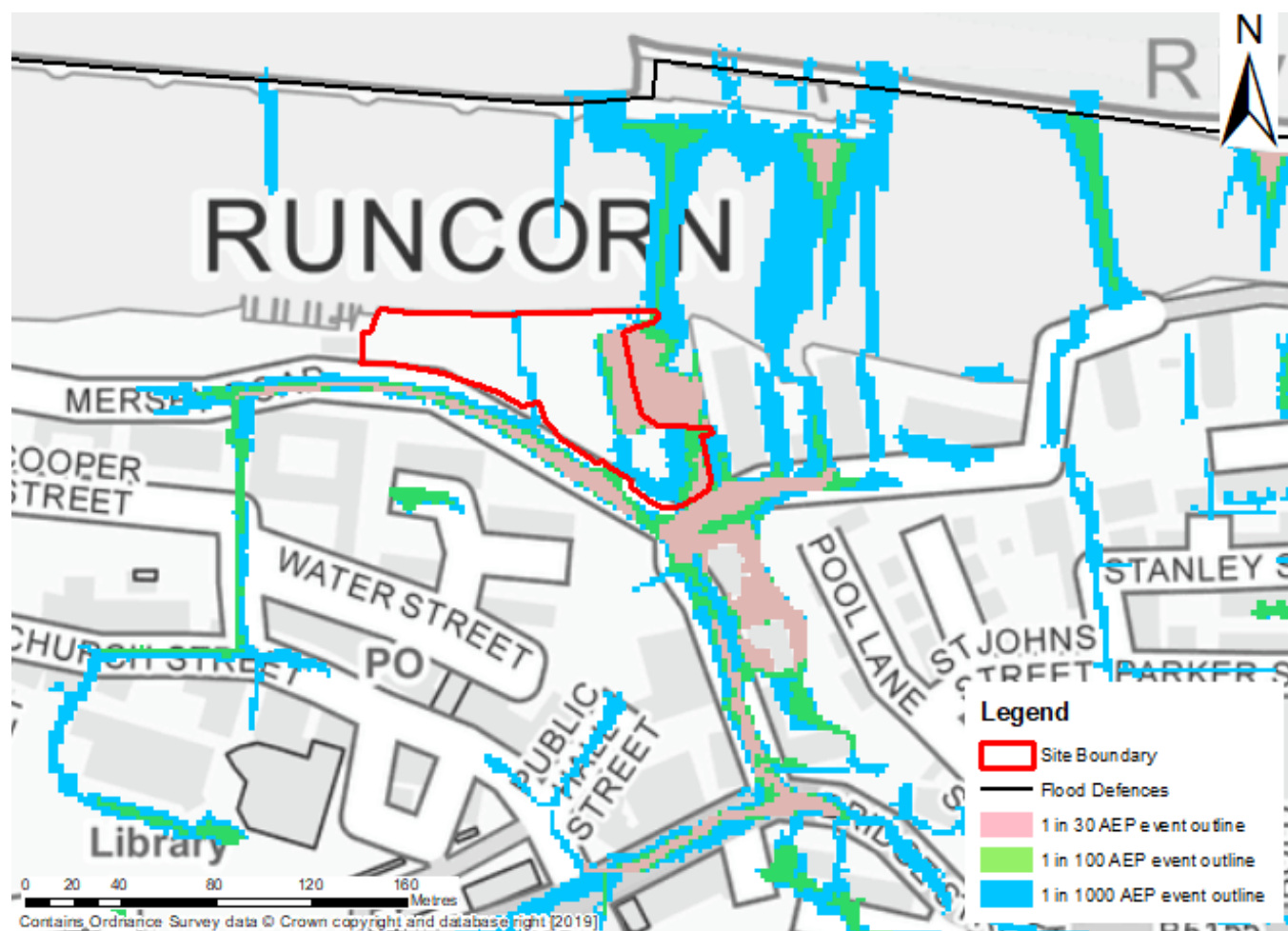


Figure 1-5: Surface Water Flood Risk to Proposed Development Site

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)
	9.86	15.00	28.82
Surface water flooding depths	Max: 0.90-1.20m	Max: >1.20m	Max: >1.20m
Surface water hazards	Max: Significant Mean: Significant	Max: Significant Mean: Significant	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 15% of the total site area is at risk of surface water flooding in the 1% AEP event to a maximum depth greater than 1.20m, however, this is associated with the adjacent Manchester Ship Canal and may therefore be considered residual risk. - The extent of flooding in the 3.33% and 1% AEP events is largely associated with the adjacent Manchester Ship Canal.		

	The main access route via Mersey Road is inundated with floodwaters based on the 3.33% and 1% AEP outlines.
Surface water: mitigation options & site suitability	This site could pass the Exception Test if the recommendations in this Level 2 assessment are followed. The FRA should investigate the site layout, design and SuDS together with plans for safe access and egress during a flood. Development should avoid the 1% AEP outline – approximately 15% of the total site area. Safe access and egress are not considered to be achievable via Mersey Road based on the 1% AEP outline, alternative access/egress should be proposed, though this might not be possible given the Ship Canal to the north and the wet dock area to the east. 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 appears to be brownfield therefore infiltration SuDS may not be feasible (subject to ground investigation and contaminated land assessment). Attenuation measures should avoid Flood Zone 3 (approximately 18% of the site). 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 developments³.

³ Rainfall runoff management for developments - GOV.UK

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: 5.1 l/s Q100: 6.24 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%	4	223	51	171	13.3	0.011 ha 2.111 %
3.33% AEP Rainfall + 40%	4.75	270	61	209	16.2	0.014 ha 2.580 %
1% AEP Rainfall + 20%	4.25	308	67	241 (70 exceedance storage)	15.3	0.016 ha 2.975 %
1% AEP Rainfall + 40%	5	372	79	293 (84 exceedance storage)	18.6	0.020 ha 3.617 %
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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