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Level 2 Strategic Flood Risk Assessment

Site CA007

Prepared for: Southend-on-Sea City Council

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1 Background

This is a Level 2 Strategic Flood Risk Assessment (SFRA) site screening report for CA007. The content of this Level 2 SFRA site screening report assumes the reader has already consulted the Southend-on-Sea City Council Level 1 SFRA and read the Southend-on-Sea City Council Level 2 SFRA Main Report and is therefore familiar with the terminology used in this report.

1.1 Site details

- Location: Southend Central, Cluster Area 7: Sutton Road
- Site area: 2.3ha
- Existing site use: Brownfield, mix of residential and commercial buildings
- Proposed site use: Mixed use, residential and commercial

1.2 Topography

Figure 1-1 shows the topography of the site represented by the Environment Agency (EA) 1m resolution LiDAR.

There is a difference of approximately 5m between the highest (27.65mAOD) and lowest (22.78mAOD) ground level across the site. In the south of the site, the land slopes downhill from the eastern site boundary to the west / south of the site. The site is mostly flat in the centre and there is a topographic depression in the north of the site.

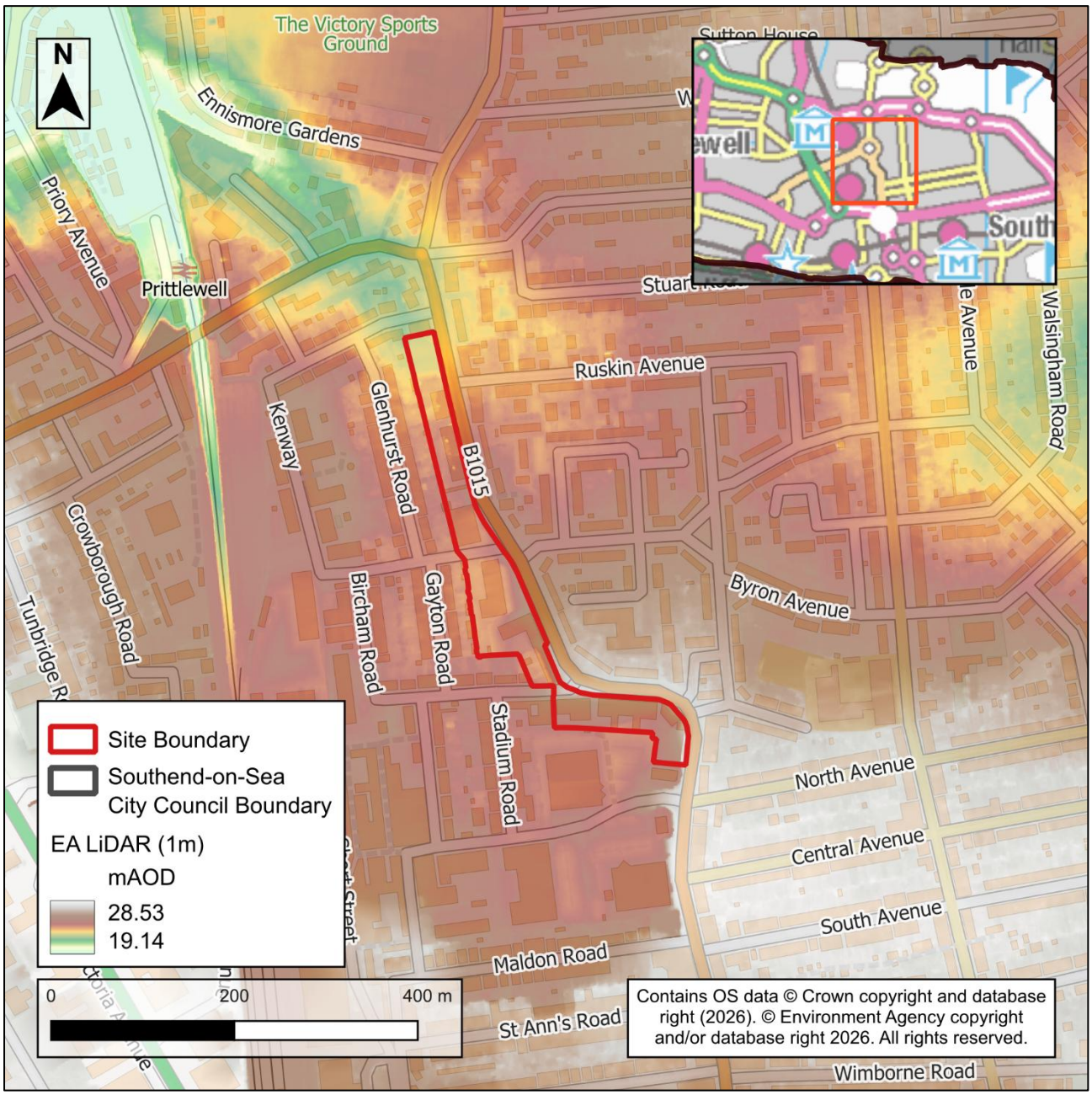


Figure 1-1: Topography of the site.

1.3 Geology and soils

Geology at the site consists of:

- Bedrock - London Clay Formation comprised of clay, silt and sand.
- Superficial - River Terrace Deposits comprised of sand and gravel.

Soils at the site consist of freely draining slightly acid loamy soils.

The likely impact of the geology and soils on drainage within the site is discussed within Section 5.

2 Sources of flood risk

2.1 Location of site within the catchment

The site is located in the catchment of Prittle Brook, a tributary of the tidal River Roach, within the lower reaches of the Crouch and Roach Operational Catchment. Prittle Brook flows in a northeasterly direction approximately 700m northwest of the site. This watercourse originates approximately 7km northwest of the site in West Wood in the north of Hadleigh, situated within Castle Point Borough. The Prittle Brook converges with the River Roach approximately 3km north of the site. Upstream of the site, the catchment is predominantly urban and comprises much of central Southend. The downstream end of the catchment is comprised of more rural landcover.

2.2 Existing drainage features

Online mapping shows no existing drainage features within the site, however, based on its brownfield land use there is likely to be existing drainage infrastructure present within the site.

2.3 Fluvial and tidal

The site is not shown to be at risk of fluvial or tidal flooding in present day or climate change scenarios based on available national and local modelling.

2.4 Surface water

2.4.1 Available data

The EA's FMfP Surface Water Spatial Planning Dataset, released in May 2026, has been used within this assessment to inform the extent and depth of the present day and future surface water risk. Climate change outputs are available for the 3.3%, 1%, and 0.1% AEP events with the Upper End climate change allowance for the 2070s epoch.

The Risk of Flooding from Surface Water (RoFSW) map has been used within this assessment to inform the velocity and hazard of the present day surface water risk. There is currently no available velocity or hazard information to use to assess future surface water risk.

Descriptions refer to the maximum depth, velocity, and hazard values experienced in each area of the site within a given event.

2.4.2 Present day

Figure 2-1 shows the surface water flood risk at the site.

The main area of surface water risk in the site is in the centre of the site, where a significant area of ponding forms. There are also a couple of small areas of ponding across the site. As shown in Table 2-1, the areas of ponding increase in size from the 3.3% to the 1% AEP event and again for the 0.1% AEP event to cover 35% of the site area. The size of the main area of ponding in the centre of the site increases in size significantly northwards during the 0.1% AEP event.

Figure 2-2 shows the depth, velocity, and hazard across the site in each event. Flood depths in the 3.3% AEP event remain below 0.3m. This is also true of most of the flood depths during the 1% AEP event. In the 0.1% AEP event, a large area of the ponding in the centre of the site has depths between 0.3m and 0.6m. Although the maximum velocities at the site exceed 0.5m/s during the 3.3% and 1% AEP events and 0.25m/s during the 0.1% AEP event, this is small areas, mostly where Vale Avenue runs through the centre of the site. The majority of the flooding is shown to remain below 0.25m/s in all AEP events. Only a small area of flooding in the centre of the site is shown to be a 'Danger for Most' during the 0.1% AEP event.

Table 2-1: Present day surface water flood risk based on the EA's FMfP Surface Water Spatial Planning dataset (extent, depth) and RoFSW dataset (velocity, hazard).

Event	3.3% AEP	1% AEP	0.1% AEP
Percentage of site at risk* (%)	11	19	35
Maximum depth (m)	0.15 - 0.30	0.30 - 0.60	0.30 - 0.60
Maximum velocity (m/s)	0.25 - 0.50	0.50 - 1.00	0.50 - 1.00
Maximum hazard classification	Very Low Hazard	Danger for Some	Danger for Most

** The percentage surface water extents quoted show the percentage of the site at surface water risk from that particular event, including the percentage of the site at flood risk at a higher risk zone (e.g. the 1% AEP includes the 3.3% AEP percentage).*

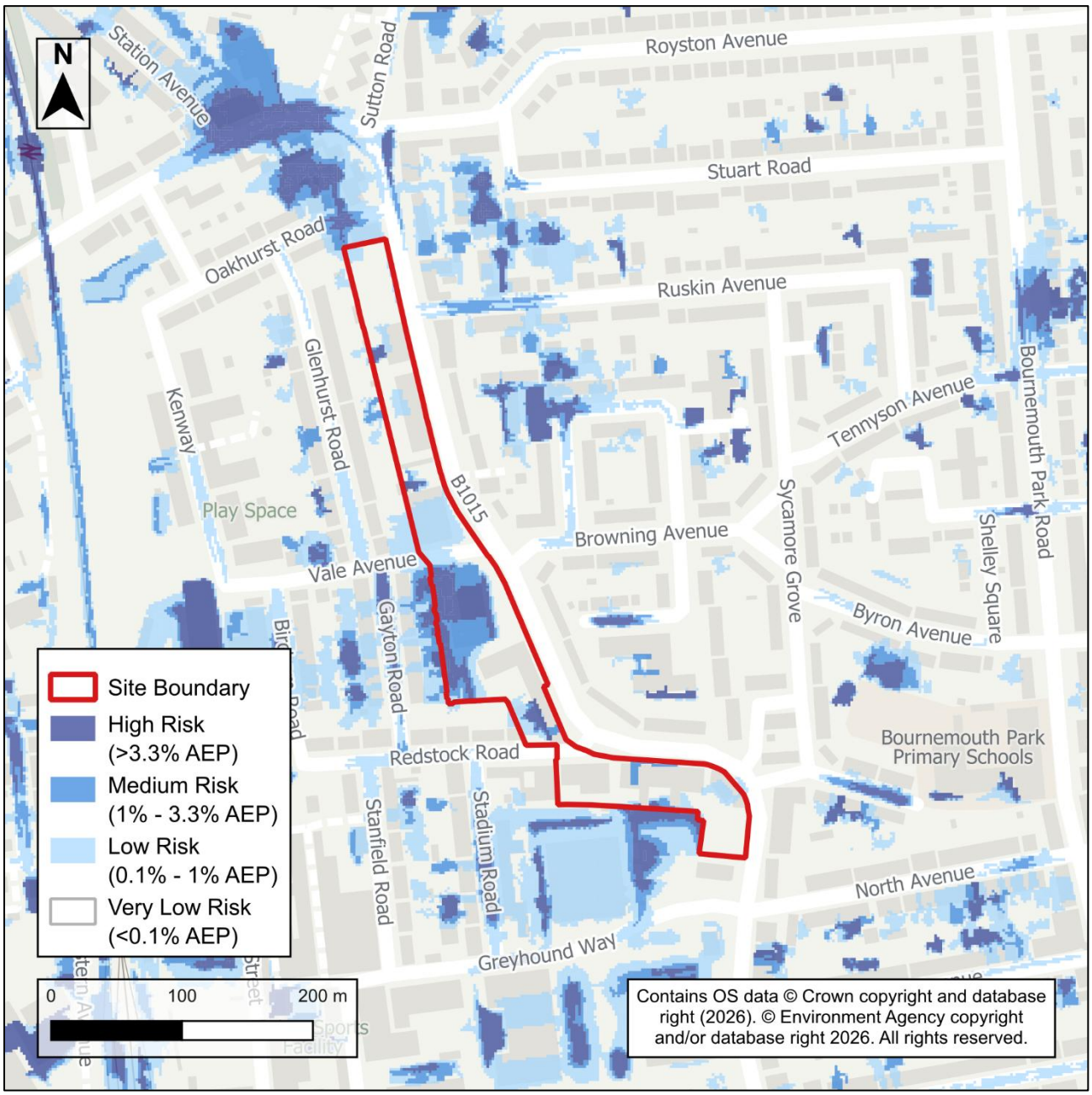


Figure 2-1: Present day surface water risk, based on the EA FMfP Surface Water Spatial Planning dataset.

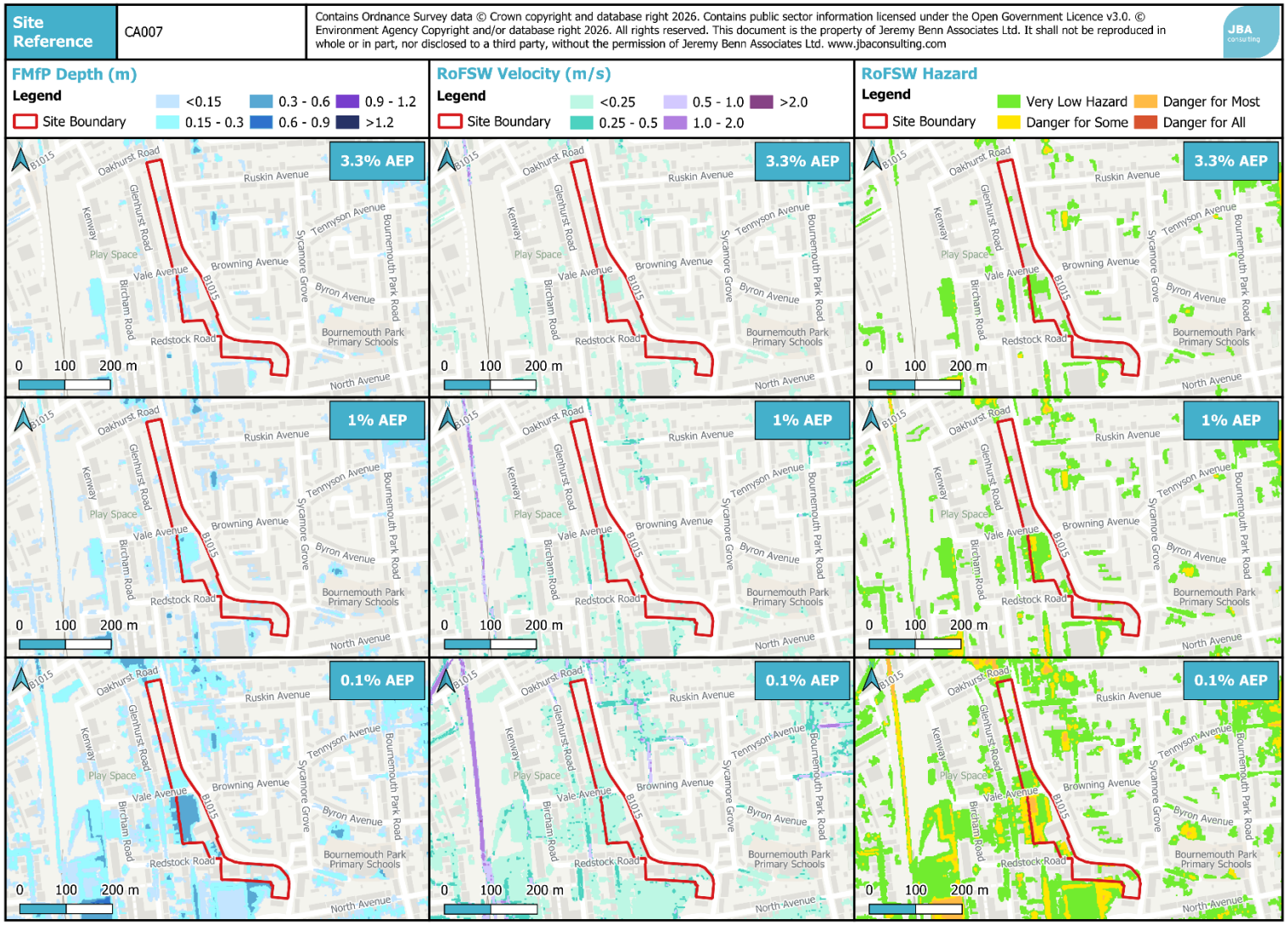


Figure 2-2: Present day surface water depth, velocity, and hazard for the 3.3%, 1%, and 0.1% AEP events.

2.4.3 Climate change - 2070s Upper End

The surface water climate change extents and depths are shown in Figure 2-3.

The area at risk in the 3.3% AEP climate change event increases in size compared to the present day event, particularly in the west of the site. Maximum flood depths are expected to exceed 0.30m, however this is only in a small area in the west of the site.

There is also a new area of ponding present in the south of the site. The 1% AEP climate change event closely resembles that of the 0.1% AEP present day event. A much larger area in the west of the site is expected to exceed 0.30m in depth.

The 0.1% AEP climate change event shows more extensive flooding in the north and south of the site compared to the present day event. Depths are expected to exceed 0.60m in the west of the site.

Table 2-2: Comparison of surface water flood risk between the present day and climate change scenarios based on the EA's FMfP Surface Water Spatial Planning.

Event	1% AEP	1% AEP plus 2070s Upper End Climate Change
Percentage of sites at risk* (%)	19	31
Maximum depth (m)	0.30 to 0.60	0.30 to 0.60

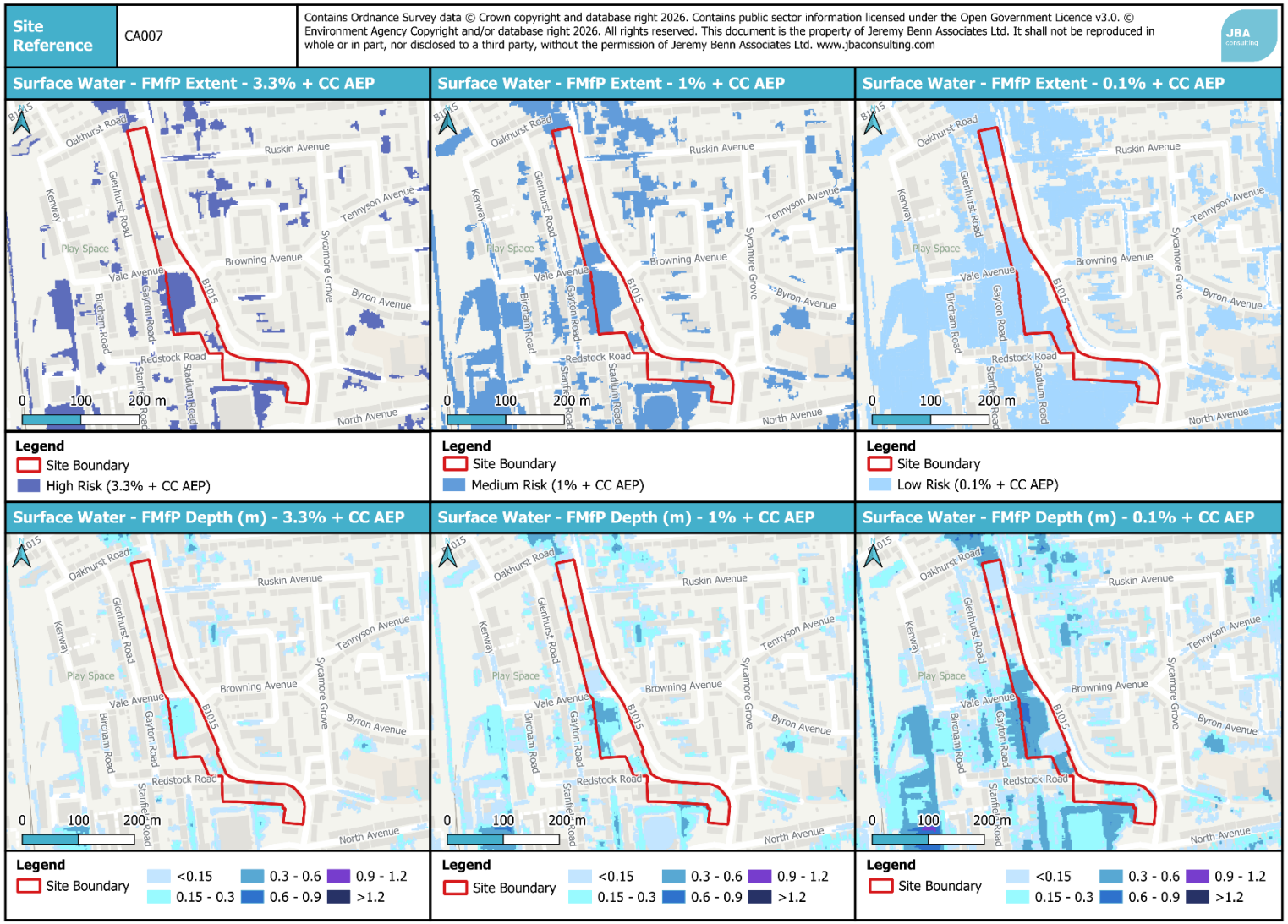


Figure 2-3: Surface water extents and depths for the 3.3%, 1%, and 0.1% AEP climate change events.

2.5 Groundwater

The JBA Groundwater Emergence Map, mapped in Figure 2-4, shows that part of the site in the east of the site has a negligible risk from groundwater flooding due to the nature of the local geological deposits.

The west of the site is shown to have groundwater levels between 0.5m and 5m below the ground surface. Here there is a risk of flooding to subsurface assets, but surface manifestation of groundwater is unlikely.

This assessment does not negate the requirement that an appropriate assessment of the groundwater regime should be carried out at the site-specific Flood Risk Assessment (FRA) stage.

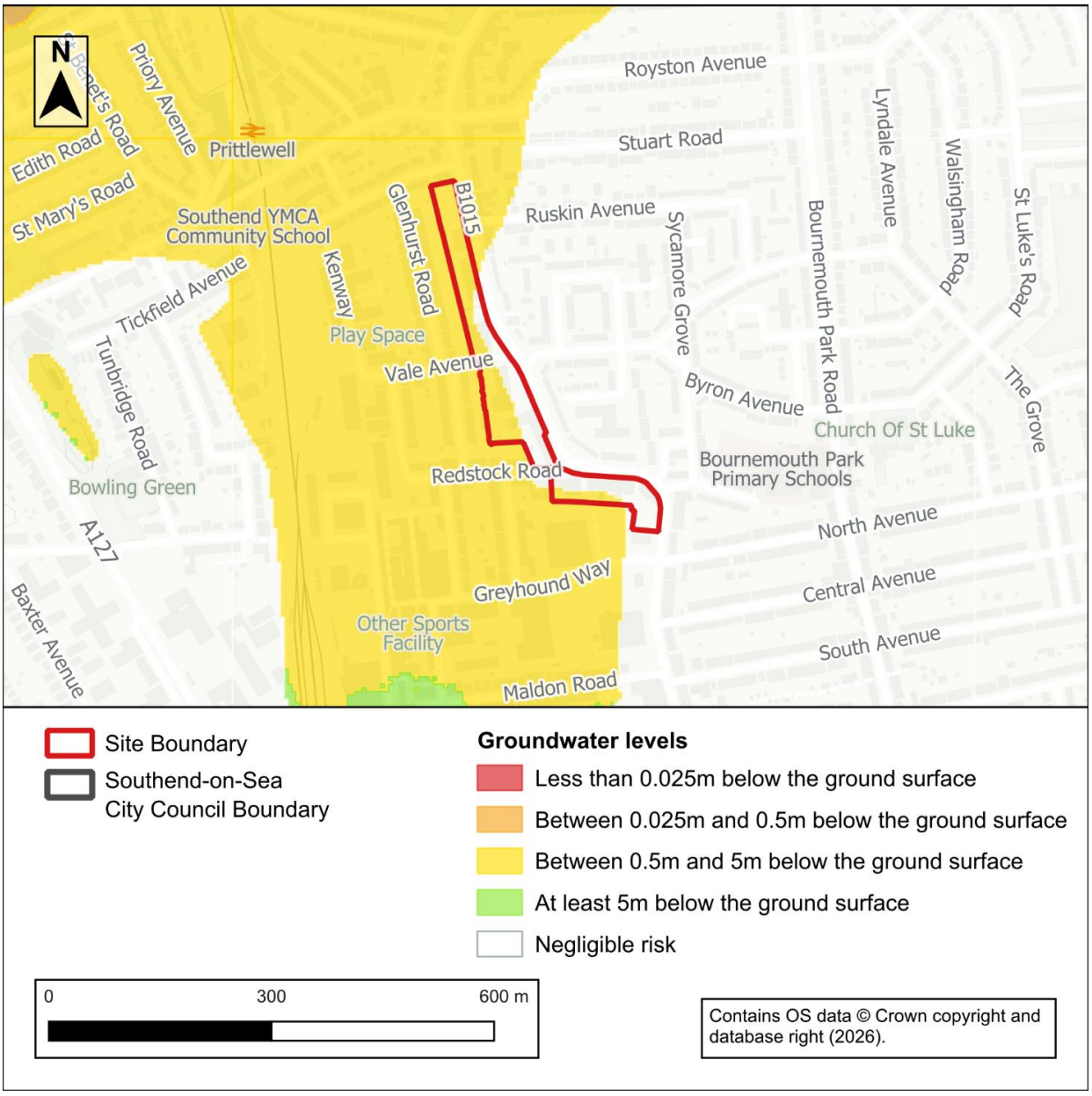


Figure 2-4: Predicted groundwater levels across the site in a 1% AEP groundwater flood event, based on the JBA Groundwater Emergence Map.

2.6 Sewers

Anglian Water provided a redacted GDPR compliant version of their DG5 dataset for the study area, which identifies internal and external historic sewer flooding records between 2022 and 2026.

There are no recorded incidents in or within close proximity to the site.

The available data should always be supplemented by direct consultation with Anglian Water to ascertain if there is any site-specific risk from a public sewer. This is because sewer flood risk information is not publicly available and would need to be considered on a site-specific basis.

2.7 Flood history

The EA's Historic Flood Map shows no records of flooding at the site.

Data provided by the Essex County Fire and Rescue Service shows one incident of external flooding in the south of the site.

3 Flood risk management infrastructure

3.1 Defences

The EA AIMS dataset shows that the site is not protected by any formal flood defences.

3.2 Residual risk

There is no residual risk to the site from flood risk management structures.

4 Emergency planning

4.1 Flood warnings and alerts

The site is not located in an EA Flood Warning or Flood Alert Area.

4.2 Access and escape

Safe access and escape will need to be demonstrated in the 1% AEP plus climate change surface water event and the 0.5% AEP plus climate change tidal event. Site drainage proposals should address the requirements for access routes, avoid impeding surface water flows and preserve the storage of surface water to avoid exacerbation of flood risk elsewhere on the site and in the wider catchment.

4.2.1 Potential access

The site can be accessed via Sutton Road (B1015), which travels along the eastern boundary of the site. The site can also be accessed via Vale Avenue and Redstock Road, both of which run through the site and continue west.

4.2.2 Fluvial and tidal

The site and surrounding roads are not shown to be at fluvial or tidal risk. Therefore, access and escape remain unimpeded.

4.2.3 Surface water

Access and escape via Sutton Road (B1015) are unlikely to be impacted during the 1% AEP climate change event. There are some areas of ponding to the northeast of the site but depths are shown to remain below 0.30m so unlikely to impede access and escape.

Access and escape continuing west away from the site along East Street (B1015) is likely to be impeded with surface water ponding exceeding 0.30m, but access continuing south or along Sutton Road (B1015) to the north is likely to remain possible.

Access and escape via Vale Avenue and Redstock Road are also unlikely to be impacted, however there is some shallow flooding (below 0.30m in depth) predicted along both roads.

Further assessment of access and escape, including an assessment of velocity and hazard, will be required within a site-specific FRA.

4.3 Dry islands

The site is not located on a dry island.

5 Requirements for drainage control and impact mitigation

5.1 Broadscale assessment of possible SuDS

Surface water at the site should be discharged in accordance with the drainage hierarchy as set out in the National standards for SuDS (gov.uk). SuDS that provide opportunities to deliver multiple benefits including volume control, water quality, amenity, and biodiversity should be prioritised. SuDS proposals should be discussed with relevant stakeholders (Local Planning Authority (LPA), Lead Local Flood Authority (LLFA), and the EA) at an early stage to understand possible constraints.

Surface water discharge rates should not exceed pre-development discharge rates for the site and should be designed to be as close to greenfield runoff rates as reasonably practical in consultation with the LLFA.

Opportunities to incorporate source control techniques such as green roofs, permeable surfaces and rainwater harvesting must be considered in the design of the site.

The following factors should be considered when assessing whether infiltration is suitable at the site:

- Groundwater levels are indicated to be between 0.5 and 5m below ground level in the west of the site, and there is a risk of flooding to subsurface assets and below ground development such as basements. Groundwater monitoring is recommended to determine the seasonal variability of groundwater levels, as this may affect the design of the surface water drainage system.
- BGS data indicates that the underlying geology is clay, silt and sand which is likely to have highly variable permeability. his should be confirmed through infiltration testing. Off-site discharge in accordance with the SuDS hierarchy may be required to discharge surface water runoff from the site.
- The site is not located within a Groundwater Source Protection Zone and there are no restrictions over the use of infiltration techniques with regard to groundwater quality.
- The site is not located within a historic landfill site.

If it is proposed to discharge runoff to a sewer system, the condition and capacity or the receiving asset should be confirmed through surveys and the discharge rate agreed with the asset owner.

5.2 Opportunities for wider sustainability benefits and integrated flood risk management

The following are opportunities for wider sustainability benefits and integrated flood risk management at the site:

- It may be possible to reduce site runoff by maximising the permeable surfaces on site using a combination of permeable surfacing and soft landscaping techniques.
- Opportunities to incorporate filtration techniques such as filter strips, filter drains and bioretention areas must be considered.

6 NPPF and planning implications

6.1 Exception Test requirements

The Local Planning Authority will need to confirm that the Sequential Test has been carried out in line with national guidelines. The Sequential Test will need to be passed before the Exception Test is applied.

The NPPF classifies mixed use development as 'More Vulnerable'.

The Exception Test is not required for this site because the entire site is located within Flood Zone 1 of the EA's FMfP.

6.2 Requirements and guidance for site-specific Flood Risk Assessment

At the planning application stage, a site-specific FRA will be required as the proposed development site is:

- greater than one hectare
- at risk of surface water flooding

All sources of flooding should be considered as part of a site-specific FRA.

Consultation with the LPA, LLFA, Anglian Water, and the EA should be undertaken at an early stage.

Any FRA should be carried out in line with latest guidance including the National Planning Policy Framework (NPPF), Flood Risk and Coastal Change Planning Practice Guidance (PPG), and Southend-on-Sea City Council Local Plan Policies.

The development should be designed with mitigation measures in place where required.

6.3 Guidance for site design and making development safe

The risk from surface water flow routes should be quantified as part of a site-specific FRA, including a drainage strategy, so runoff magnitudes from the development are not increased by development across any surface water flow routes. A drainage strategy should help inform site layout and design to ensure runoff rates are as close as possible to pre-development greenfield rates, with areas of surface water ponding used as open space and SuDS or water compatible/essential infrastructure uses only.

Arrangements for safe access and escape will need to be provided for the 1% AEP surface event with an appropriate allowance for climate change, considering depth, velocity, and hazard. Design and access arrangements will need to incorporate measures, so development and occupants are safe.

Provisions for safe access and escape should not impact on surface water flow routes or contribute to loss of floodplain storage. Consideration should be given to the siting of access points with respect to areas of surface water flood risk.

7 Conclusions

Summary of the key areas of flood risk across the site:

- **Surface water:** The main area of surface water risk in the site is in the centre of the site, where a significant area of ponding is located. There are also a couple of small areas of ponding across the site. The site is shown to be very susceptible to climate change.
- **Groundwater:** The JBA Groundwater Emergence Map shows that the west of the site is shown to have groundwater levels between 0.5m and 5m below the ground surface.

The following points should be considered in development of this site:

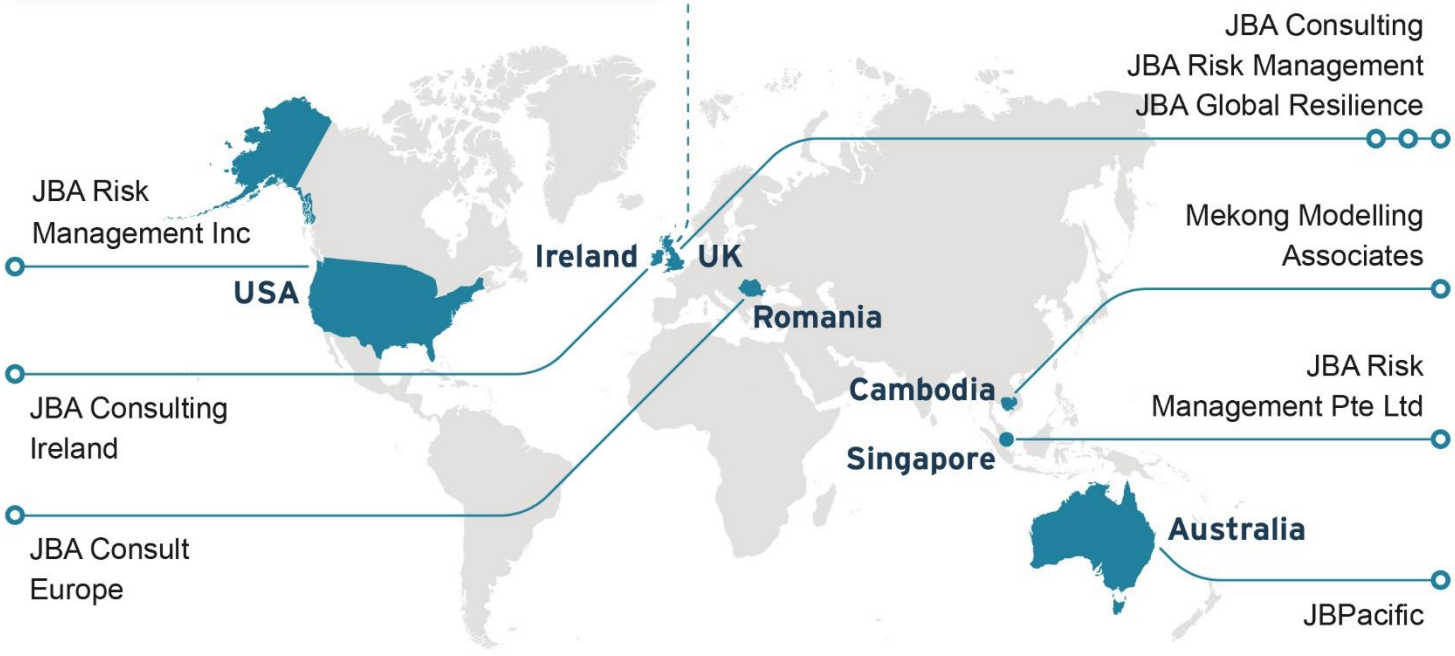
- The Exception Test is not required for this site because the entire site is not shown to be at fluvial risk within the EA's FMfP.
- A site-specific FRA should be undertaken, which assesses all sources of flood risk. This may require detailed surface water modelling.
- Safe access and escape routes should be demonstrated in the 1% AEP plus climate change surface water event. This initial assessment has shown that access and escape will likely be possible, but the impact of the shallow flooding on the potential escape/access routes should be investigated further.
- A carefully considered and integrated flood resilient and sustainable drainage design should be put forward, including a site-specific Surface Water Drainage Strategy, and SuDS maintenance and management plan and supported by detailed modelling.
- Anglian Water should be consulted at an early stage on drainage proposals for the site to identify any potential constraints or existing sewer flooding issues that may not have been identified through this high level assessment.

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