

Site Name: Land between Old Cattle Market and Star Lane

Site ID:	IP54b	Location:	Land between Old Cattle Market and Star Lane	Area (ha):	1.09
Current Use:	Commercial	Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable

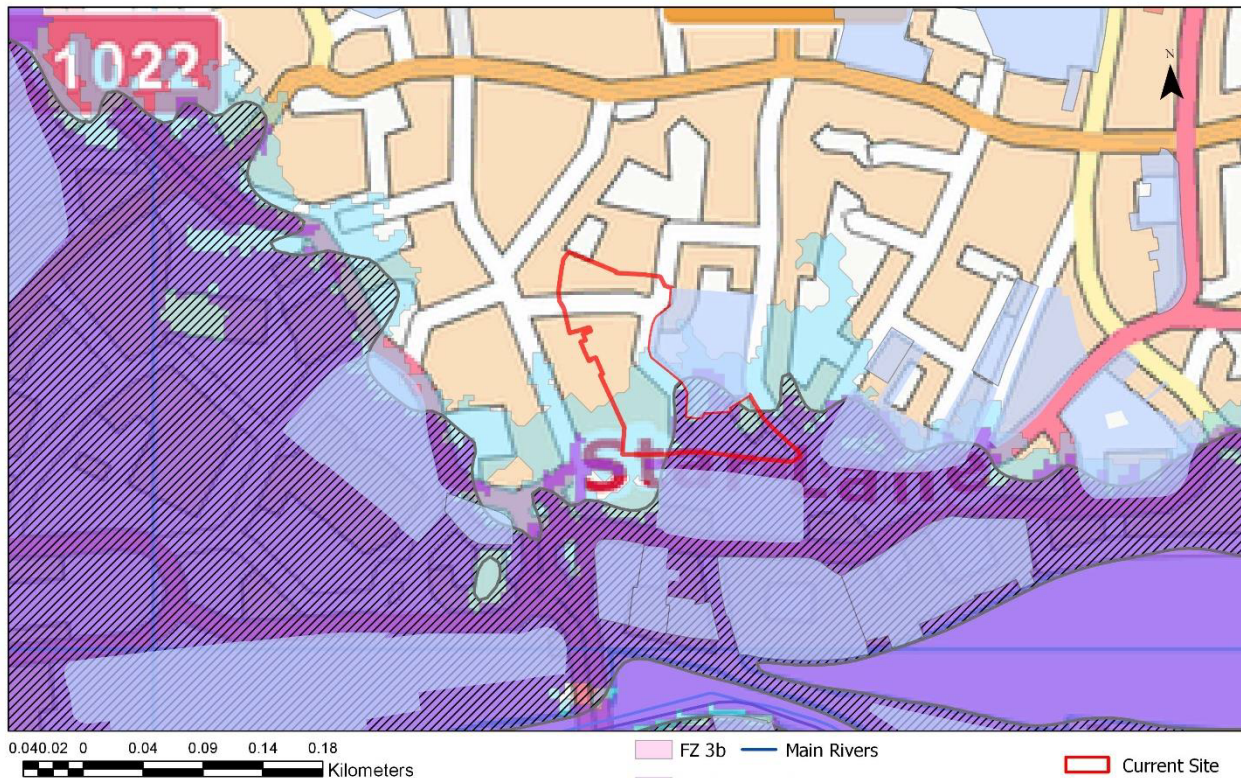
Flood Zones and Historic Records

Flood Zone 1 (<0.1% AEP): 48%	Flood Zone 2 (0.1% AEP): 29%	Flood Zone 3 (1% AEP): 23%	Flood Zone 3b (5% AEP): 0%	Area Benefiting from Defences: 27%
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As it flows through Ipswich, the River Gipping becomes the River Orwell. The south eastern corner of the site is identified as Flood Zone 2 and 3, being medium and high probability of flooding from the Gipping / Orwell, in the absence of flood defences. The remainder of the site (just under half) resides in Flood Zone 1.

The site benefits from the presence of defences; there are embankments and flood defence walls along the edge of the River Orwell channel, and there is a tidal barrier further downstream on the River Orwell.

The Level 1 SFRA Figure 2 shows that this area has historically experienced flooding in 1953 which is recorded on the Environment Agency Historic Flood Map.



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Fluvial Flood Risk – Lower Gipping

The site is not at risk of flooding from the fluvial Lower Gipping during the *design flood* (during either the present day or including for an allowance for climate change into the future). However, in the future, as a result of climate change, the site may be at risk of flooding during the *extreme flood* event. The flood level for the 0.1% AEP event including 25% allowance for climate change in this area is 3.97m AOD.

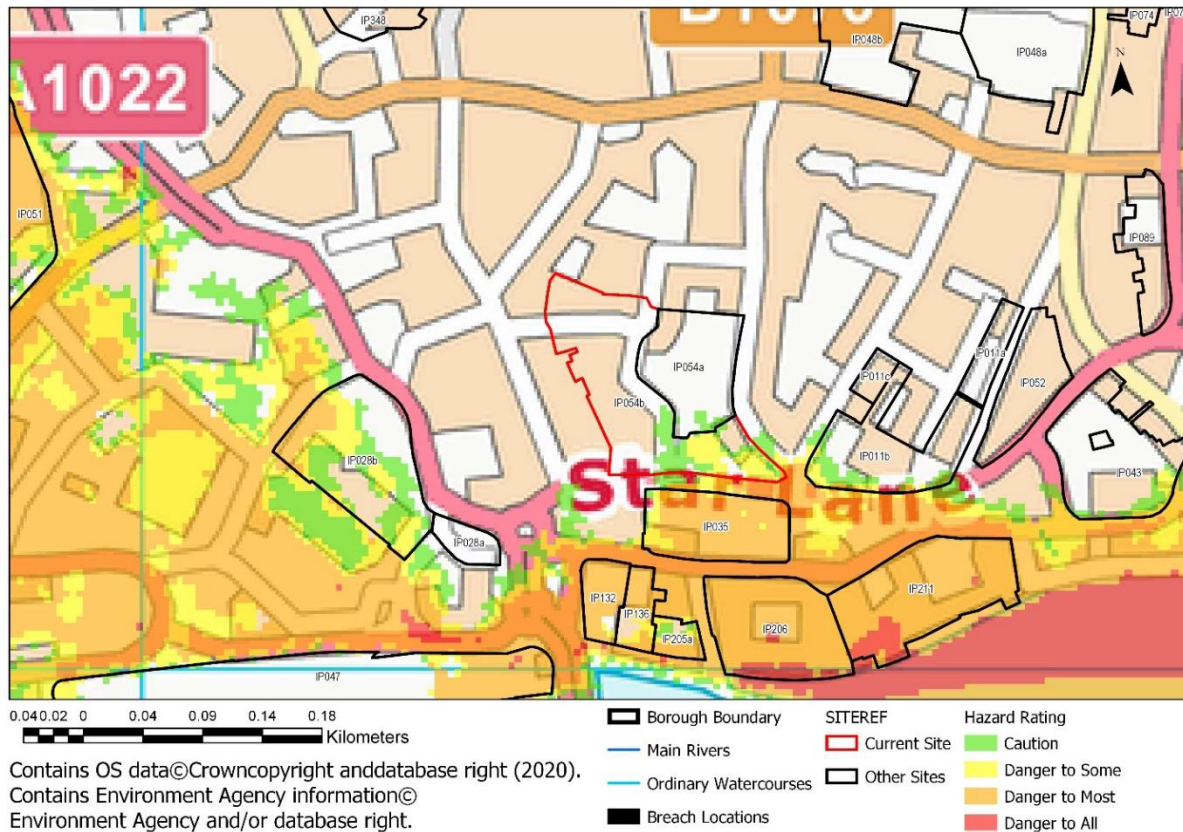
Site Name: Land between Old Cattle Market and Star Lane

Tidal Flood Risk – River Orwell

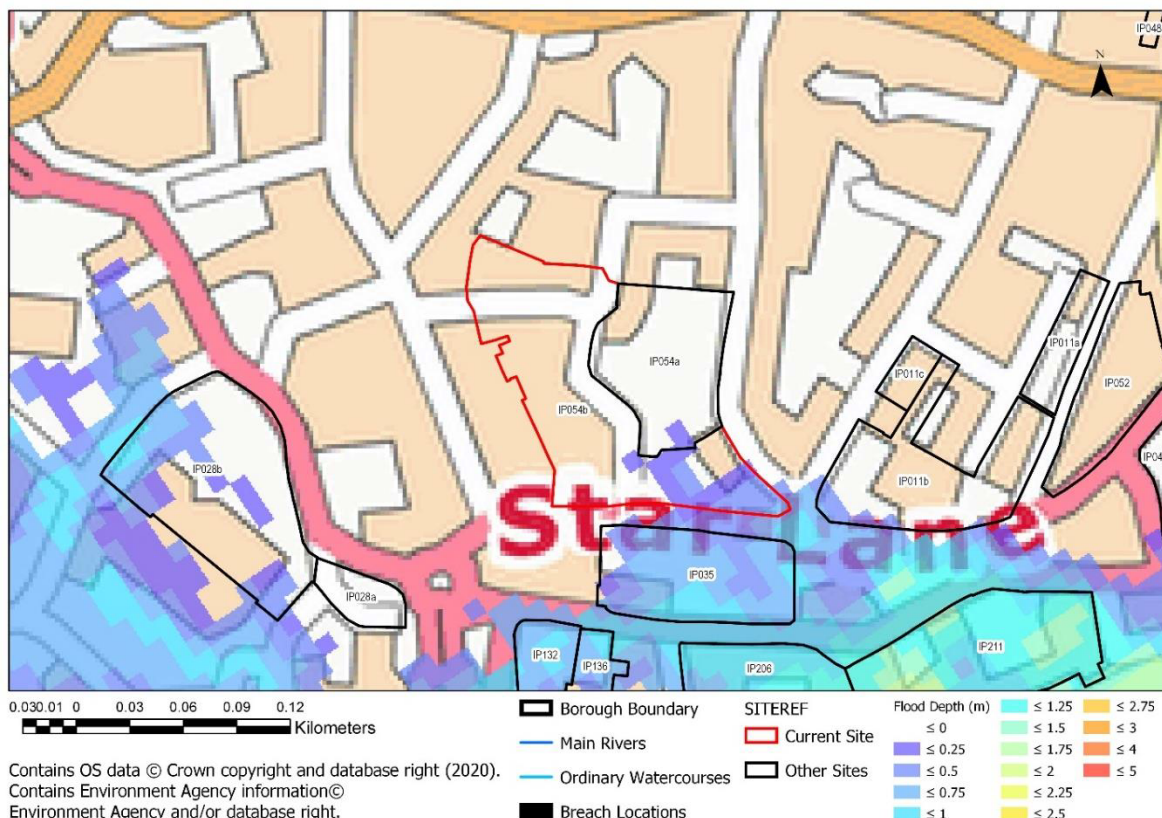
Modelling of the River Orwell shows that the site is protected from flooding during the design event (0.5% AEP event) including an allowance for climate change due to the presence of the IFDMS. The risk of tidal flooding is therefore a residual risk in the event of a failure of the flood defence infrastructure.

A composite hazard map has been created to illustrate residual flood hazard. This assumes that the Ipswich flood barrier is operating as designed and replicates maximum flood hazard should a breach occur at location BR05 and BR07 assuming that the pumping station at IP04 is not working. In this scenario, tidal flood water from the River Orwell reaches the southern tip of the site creating a small area of Moderate hazard (Danger to Some) and Low hazard (Caution). The southern section of the site is shown to flood to depths of up to 0.5m.

Residual Flood Risk –Combined Flood Hazard (0.5% AEP, 2118)



Residual Flood Risk – Combined Flood Depth (0.5% AEP, 2118)

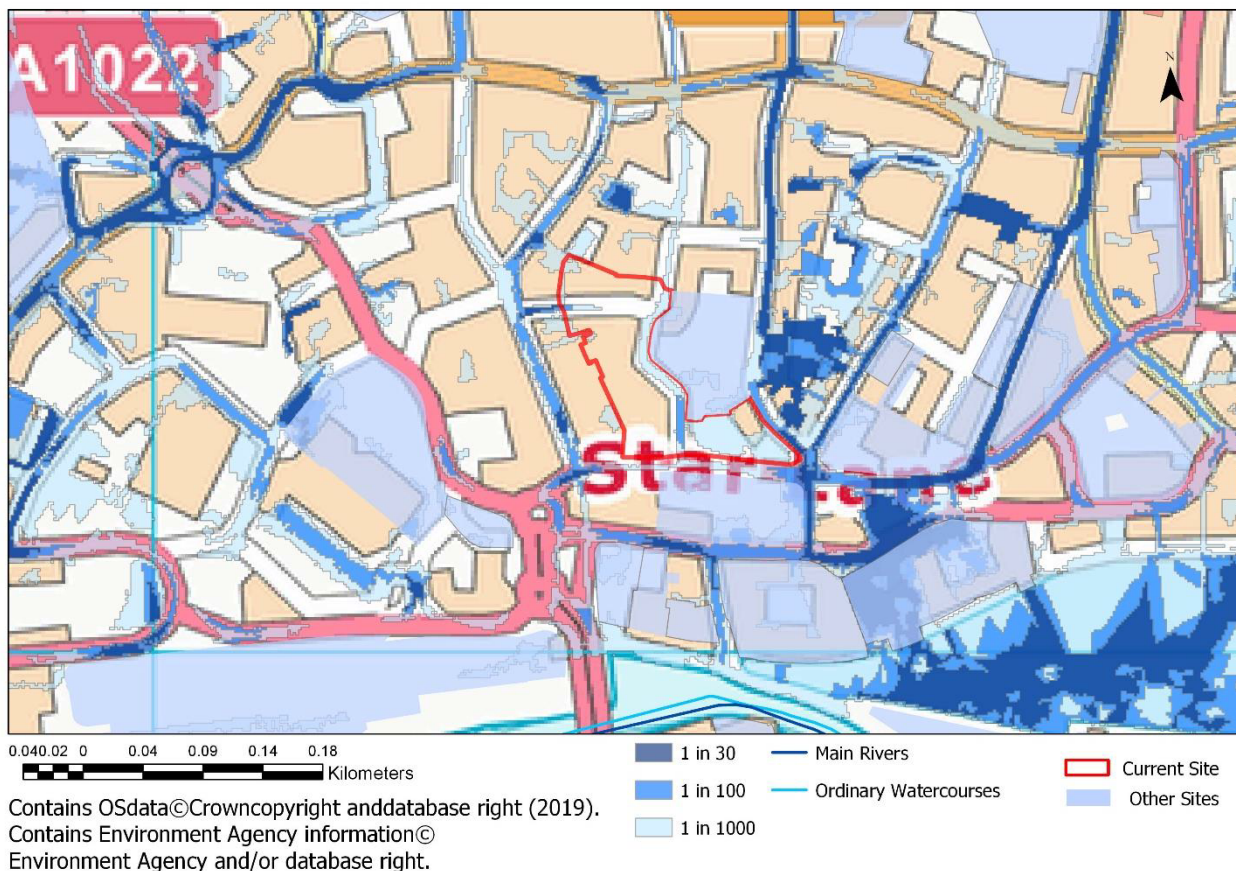


Site Name: Land between Old Cattle Market and Star Lane

Surface Water Flood Risk

Risk of Flooding from Surface Water (RoFSW)

The RoFSW mapping shows that the south-eastern section of the site is susceptible to low risk of flooding from surface water. The surface water flow pathway of low risk arises from Site IP054a and the surrounding roads and flow towards site IP054b.



Groundwater Flood Risk

The AStGWF mapping (Level 1 SFRA Figure 13) shows that the site is located within a 1km square of which 25%-50% is susceptible to groundwater emergence.

The underlying geology in this location is the White Chalk subgroup which is not suitable for infiltration type drainage, regardless of ground water levels. Appendix A Figure 17 shows which areas of Ipswich are likely to have suitable ground for infiltration. The risk of groundwater flooding and possible use of infiltration SUDS in this area should be further investigated and informed by ground investigations.

Other sources

The Environment Agency 'Risk of Flooding from Reservoirs' mapping shows that the site is not at risk.

Site Specific Recommendations

In the future, the site may be at actual risk of flooding from the Lower Gipping during an extreme flood. The site is at residual risk of tidal flooding in the event of a failure of the flood defence infrastructure. The following measures are recommended to manage these risks.

Finished Floor Levels

In relation to the residual risk of tidal flooding, finished floor levels for sleeping accommodation should be set above the maximum breach flood level, which in compartment H is 4 – 4.1m AOD (Figure 7-4).

Access / Egress

In the event of a failure of the tidal flood defences, dry access/egress for the site may be achievable from the northern side of the site along Rose Lane / St Peter's Street. The route along Star Lane is shown to be flooded, at Significant hazard (Danger for Most), and would therefore not offer a dry route.

Safe Refuge

Safe refuge must be provided above the extreme flood level.

With respect to the residual risk of tidal flooding, safe refuge must be provided above the 0.1% AEP flood level including an allowance for climate change over the lifetime of the development (5.7mAOD to 2118). This will also be adequate as a safe place of refuge for the extreme fluvial flood, as the flood level for the 0.1% AEP event including 25% allowance for climate change is 3.97m AOD.

Emergency planning

Site Name: Land between Old Cattle Market and Star Lane

The site is shown to be within the Environment Agency Flood Warning Area for the tidal River Orwell at Ipswich wet dock and waterfront, to upstream of Stoke Bridge; occupants should register to receive the warning service. To manage the residual risk of flooding associated with a failure of the flood defence measures in this area, Flood Response Plans should be prepared by occupants of the site including details of egress routes and place of safe refuge.

Reference to Appendix D provides information on rate of onset and flood duration for compartment H which outlines that flood water could reach a peak within 2 hours of entering the flood compartment and could remain for over 12 hours.

Site Layout and Design

The drainage strategy for the site should be considered early in the site planning process to ensure adequate inclusion of SuDS and adequate provision for the management of surface water, especially given the risk of surface water flooding in the area surrounding the site. SuDS should be considered in accordance with the hierarchy of SuDS (i.e. considering infiltration measures first wherever possible). Attenuation storage is the most likely SuDS for the site.

Additional Information

Flood risk reduction may be possible by reducing peak flow to the local sewer network by providing on site attenuation using SuDS.

The site is slopping and 50% is above 4.5m AOD. Raising lower parts of the site and providing safe access to the north will increase the site safety.

Site Name: Transco, south of Patteson Road

Site ID:	IP098	Location:	Transco, south of Patteson Road	Area (ha):	0.57
Current Use:	Commercial	Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable

Flood Zones and Historic Records

Flood Zone 1 (<0.1% AEP): 0%	Flood Zone 2 (0.1% AEP): 47%	Flood Zone 3 (1% AEP): 53%	Flood Zone 3b (5% AEP): 0%	Area Benefiting from Defences: 80%
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Flood Zones and Flood Defences

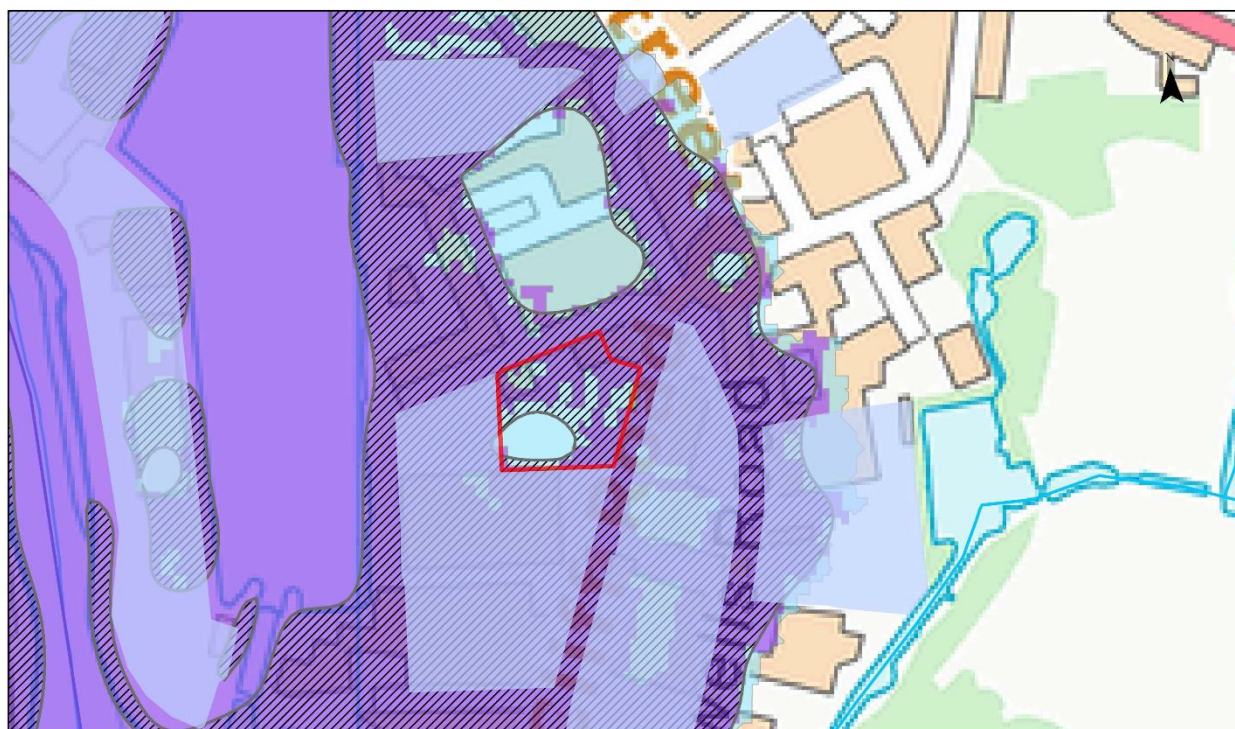
The tidal River Orwell is located approximately 80m to the west of the site. The majority if the site is identified as Flood Zone 3, high probability of flooding, in the absence of flood defences. This area is shown to benefit from the presence of defences; there is a flood defence wall and embankment along the edge of the River Orwell to the west of the site, and there is a tidal barrier further downstream on the River Orwell. The site is therefore at residual risk of tidal flooding, in the event of a failure of these defences.

Climate Change

Modelling of the River Orwell shows that water remains in bank in this location during the 0.5% AEP event including an allowance for climate change i.e. there is no overtopping of defences in this scenario. (These modelled scenarios take account of the presence of defences).

Historic Records

The Level 1 SFRA Figure 2 shows that this site is on the edge of the area that experienced flooding in 1953. Ipswich BC also hold records of flood incidents on Holywells Road adjacent to this location.



0.04 0.02 0 0.04 0.07 0.11 0.14
Kilometers

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Fluvial Flood Risk – Lower Gipping

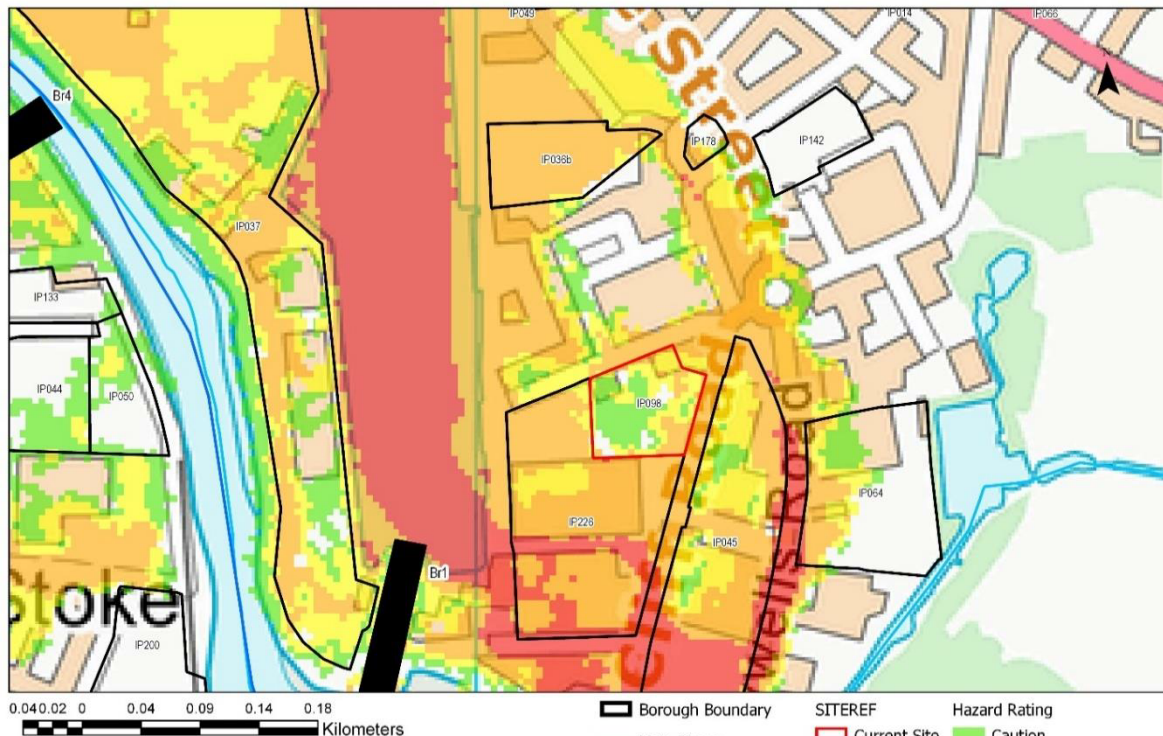
The site is not at risk of flooding from the fluvial Lower Gipping during the *design flood* (during either the present day or including for an allowance for climate change into the future). However, in the future, as a result of climate change, the site may be at risk of flooding during the *extreme flood* event. The flood level for the 0.1% AEP event including 25% allowance for climate change in this area is 3.97m AOD.

Tidal Flood Risk – River Orwell

Modelling of the River Orwell shows that the site is protected from flooding during the design event (0.5% AEP event) including an allowance for climate change due to the presence of the IFDMS. The risk of tidal flooding is therefore a residual risk in the event of a failure of the flood defence infrastructure.

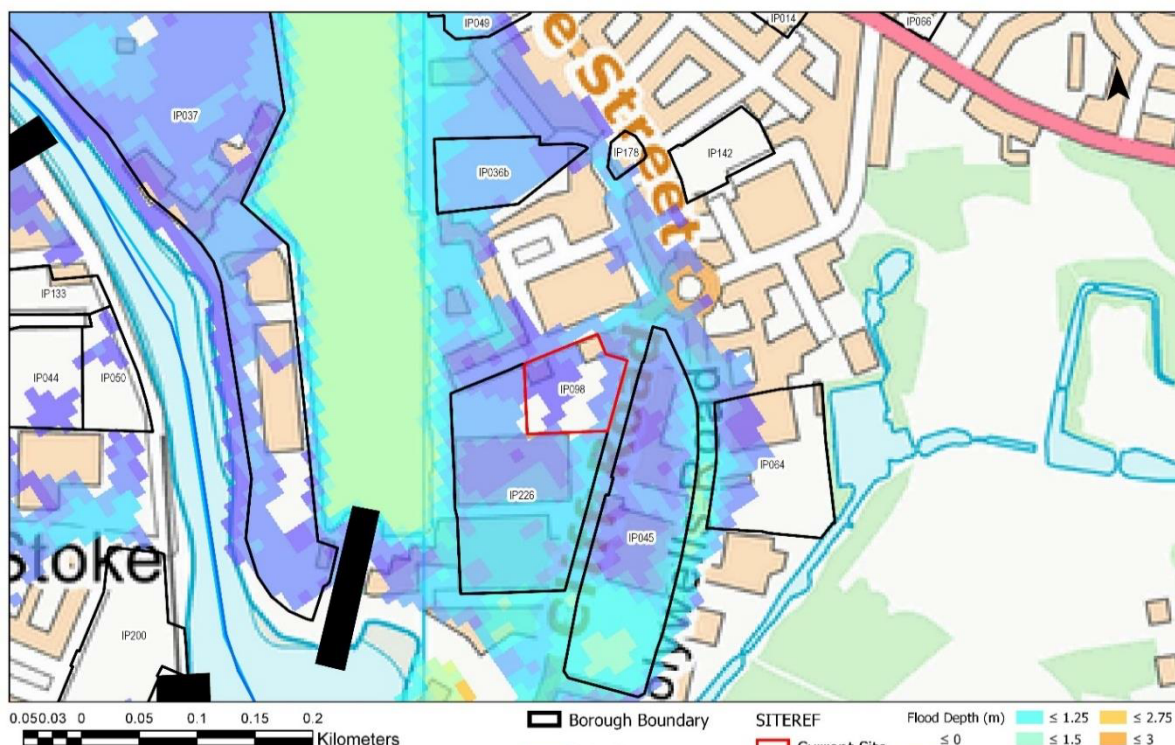
A composite hazard map has been created to illustrate residual flood hazard. This assumes that the Ipswich flood barrier is operating as designed and replicates maximum flood hazard should a breach occur at location BR05 (local to the site) and BR07 assuming that the pumping station at IP04 is not working. Under this scenario, potential hazard ratings on the site are Low – Significant, with flood depths up to 0.75m.

Residual Flood Risk – Combined Flood Hazard (0.5% AEP, 2118)



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Residual Flood Risk – Combined Flood Depth (0.5% AEP, 2118)

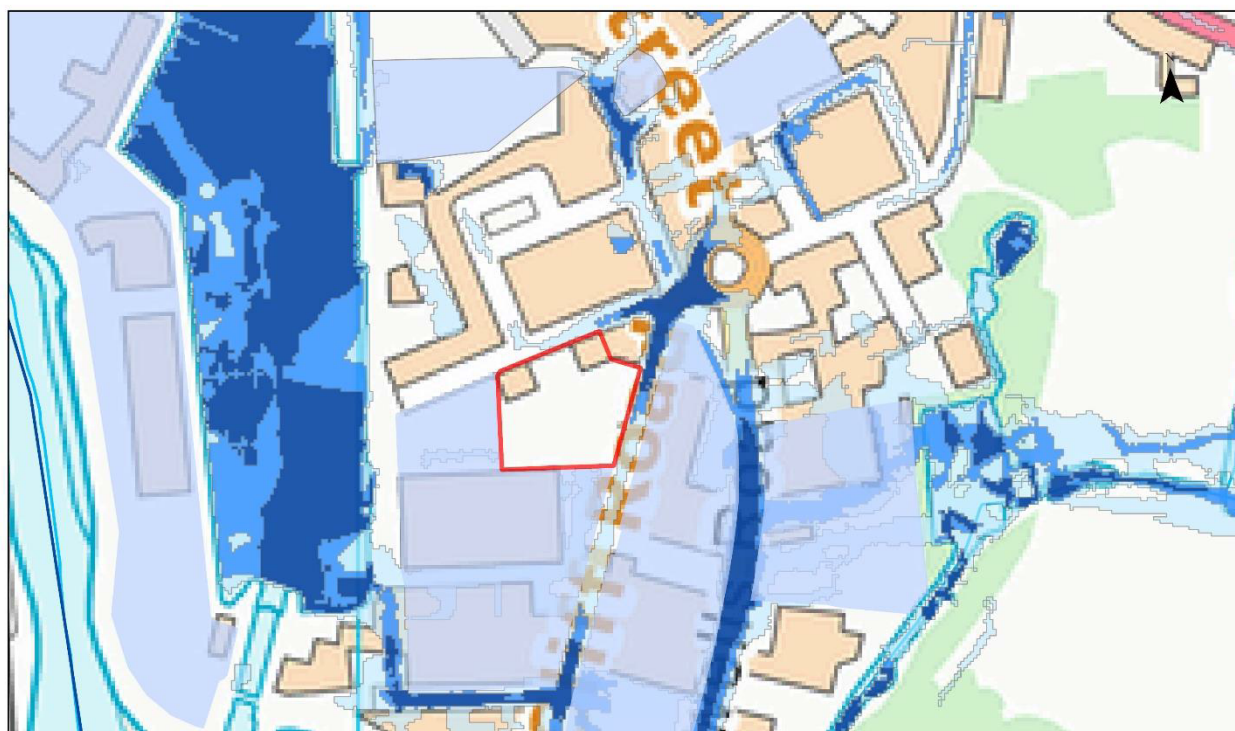


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Site Name: Transco, south of Patteson Road

Surface Water Flood Risk

The RoFSW mapping shows that the site is at low risk of surface water flooding, however, the roads serving the site are susceptible to overland flow and ponding.



0.04 0.02 0 0.04 0.07 0.11 0.14
Kilometers

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1 in 30
1 in 100
1 in 1000
Main Rivers
Ordinary Watercourses

Current Site
Other Sites

Groundwater Flood Risk

The ASGWf mapping (Level 1 SFRA Figure 13) shows that the site is located within a 1km square of which <25% is susceptible to groundwater emergence.

The underlying geology in this location is the White Chalk subgroup which is not suitable for infiltration type drainage, regardless of ground water levels. Appendix A Figure 17 shows which areas of Ipswich are likely to have suitable ground for infiltration. The risk of groundwater flooding and possible use of infiltration SUDS in this area should be further investigated and informed by ground investigations.

Other sources

The Environment Agency 'Risk of Flooding from Reservoirs' mapping shows that the site is not at risk.

Site Specific Recommendations

In the future, the site may be at actual risk of flooding from the Lower Gipping during an extreme flood. The site is at residual risk of tidal flooding in the event of a failure of the flood defence infrastructure. The following measures are recommended to manage these risks.

Finished Floor Levels

In relation to the residual risk of tidal flooding, finished floor levels for sleeping accommodation should be set above the maximum breach flood level, which in this part of compartment H, close to Breach 05 is 4.1 – 5.3m AOD (Figure 7-4).

Access / Egress

In the event of a failure of the tidal flood defences, access/egress routes along Cliff Road towards Myrtle Road roundabout may have a potential hazard rating of up to Significant ("Danger for most"). Furthermore, depending on the time and location of the failure of the defences, there may not be sufficient time to enable occupants to leave the site prior to a flood event and the safest course of action may be to remain within the development within a safe place refuge.

Safe Refuge

Safe refuge must be provided above the extreme flood level.

With respect to the residual risk of tidal flooding, safe refuge must be provided above the 0.1% AEP flood level including an allowance for climate change over the lifetime of the development (5.7m AOD to 2118). This will also be adequate as a safe place of refuge for the extreme fluvial flood, as the flood level for the 0.1% AEP event including 25% allowance for climate change is 3.97m AOD.

Emergency planning

Site Name: Transco, south of Patteson Road

The site is shown to be within the Environment Agency Flood Warning Area for the tidal River Orwell at Ipswich wet dock and waterfront, to upstream of Stoke Bridge; occupants should register to receive the warning service. To manage the residual risk of flooding associated with a failure of the flood defence measures in this area, Flood Response Plans should be prepared by occupants of the site including details of egress routes and place of safe refuge.

Reference to Appendix D provides information on rate of onset and flood duration for compartment H which outlines that flood water could reach a peak within 2 hours of entering the flood compartment and could remain for over 12 hours.

Site Layout and Design

The drainage strategy for the site should be considered early in the site planning process to ensure adequate inclusion of SuDS and adequate provision for the management of surface water. SuDS should be considered in accordance with the hierarchy of SuDS (i.e. considering infiltration measures first wherever possible).

Site Name: Depot, Beaconsfield Road

Site ID:	IP0105	Location:	Depot, Beaconsfield Road	Area (ha):	0.33
Current Use:	Light industrial	Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable

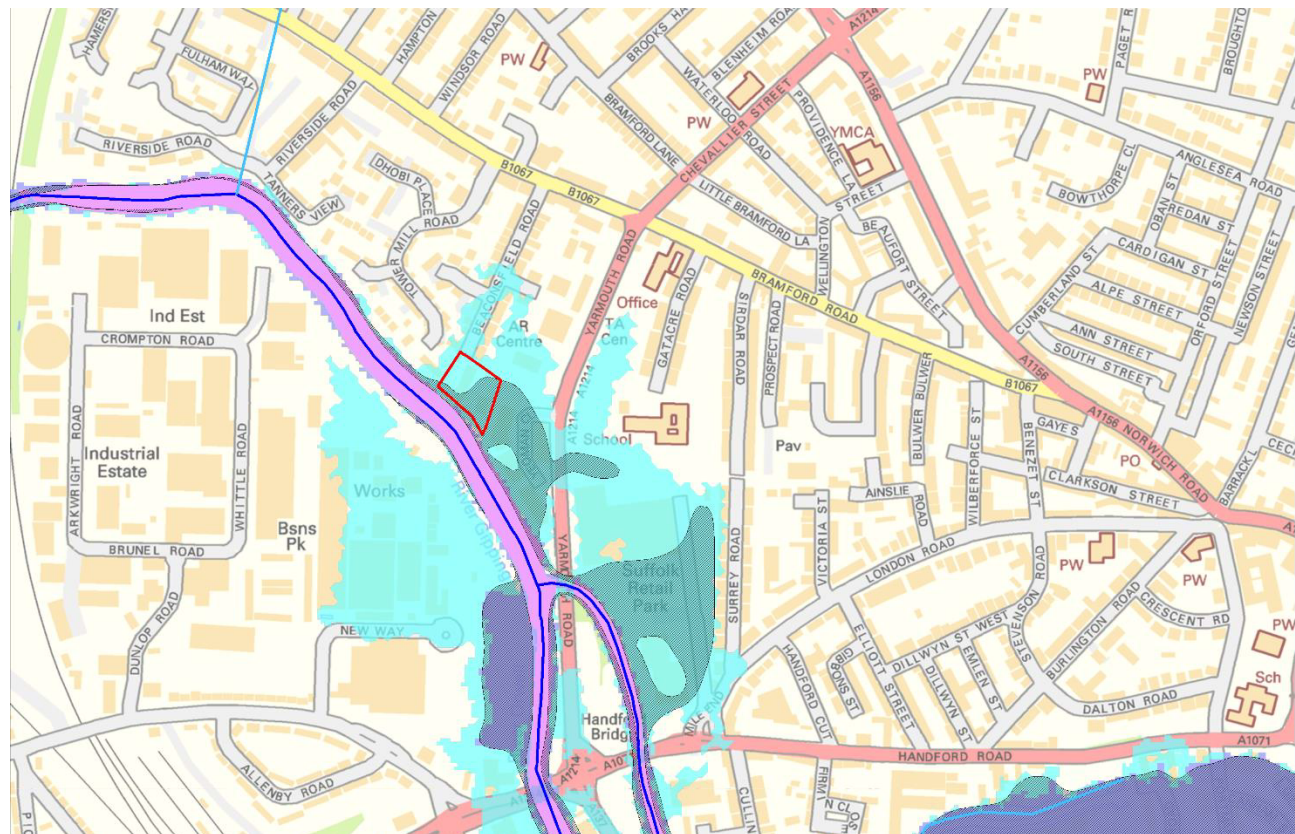
Flood Zones and Historic Flooding

Flood Zone 1 (<0.1% AEP): 0%	Flood Zone 2 (0.1% AEP): 100%	Flood Zone 3 (1% AEP): 0%	Flood Zone 3b (5% AEP): 0%	Area Benefiting from Defences: 56%
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The site is adjacent to the River Gipping is approximately 50m to the southwest of the site. At this location the River Gipping is not tidally influenced.

The site is located within Flood Zone 2, medium probability of flooding. The southern part of the site is shown to benefit from the presence of defences; there is a flood defence wall along the edge of the channel to the east of the site.

The Level 1 SFRA Figure 2 shows that this area has historically experienced flooding in 1939 and 1953 which is recorded on the Environment Agency Historic Flood Map. Ipswich BC also hold records of flood incidents in this location associated with surface water and highway flooding.



0.04 0.02 0 0.04 0.07 0.11 0.14
Kilometers

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- FZ 3b — Main Rivers
- FZ 3 — Ordinary Watercourses
- FZ 2
- Areas Benefiting from Flood Defences
- Current Site
- Other Sites

Site Name: Depot, Beaconsfield Road

Fluvial Flood Risk – Lower Gipping

Modelling of the Lower Gipping (Mott MacDonald September 2020), shows that floodwater remains in bank in this part of Ipswich during the 5% AEP, 1% and 0.1% AEP events. However, in the future there is potential that the risk of flooding from the Lower Gipping could increase as a result of climate change, assuming no alterations are made to the flood defences.

The results of the modelling show that the site does not flood during the fluvial design flood (1% AEP event) including a 65% allowance for climate change. However, there is a risk of flooding during the extreme flood (0.1% AEP event) including 25% allowance for climate change, with flood levels of 4.85m AOD.



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SITE REF
 Site Boundary
 Main River
 Ordinary Watercourse

Hazard Rating: River Gipping 1% AEP incl. 65% climate change
 Low: Caution
 Moderate: Danger to Some
 Significant: Danger to Most
 Extreme: Danger to All



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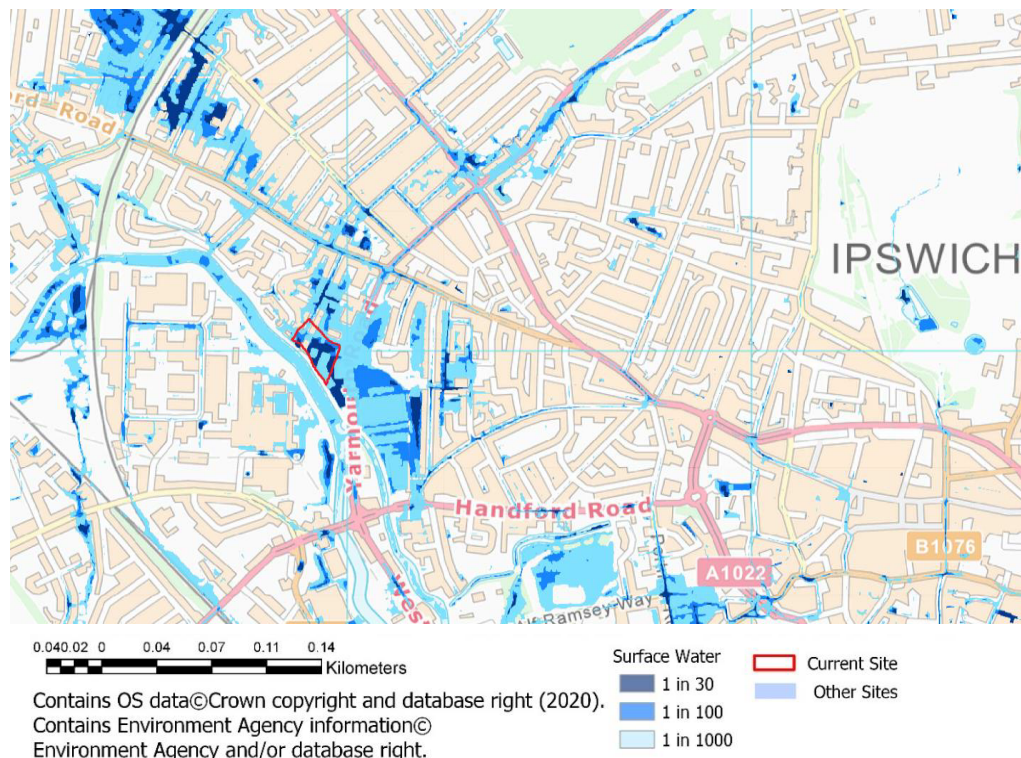
SITE REF
 Site Boundary
 Main River
 Ordinary Watercourse

Maximum Flood Depth (m): River Gipping 1% AEP incl. 65% climate change
 <0.25
 <0.5
 <1
 <1.5
 <2
 <2.5
 <3
 >3

Site Name: Depot, Beaconsfield Road

Surface Water Flood Risk

The site is located within an area at risk of surface water flooding. The roads in the surrounding area are susceptible to overland flow and ponding.



Groundwater Flood Risk

The AStGWF mapping (Level 1 SFRA Figure 13) shows that the site is located within a 1km square of which 25%-50% is susceptible to groundwater emergence. The risk of groundwater flooding in this area should be further investigated during a site investigation survey.

The underlying geology in this location is the White Chalk subgroup which is not suitable for infiltration type drainage, regardless of ground water levels. Appendix A Figure 17 shows which areas of Ipswich are likely to have suitable ground for infiltration. The risk of groundwater flooding and possible use of infiltration SUDS in this area should be further investigated and informed by ground investigations.

Other sources

The Environment Agency 'Risk of Flooding from Reservoirs' mapping shows that the site is not at risk from reservoir flooding.

Site Specific Recommendations

The site is shown to be at actual risk of fluvial flooding from the Lower Gipping in the future as a result of climate change during the extreme flood (0.1% AEP including 25% climate change). The following measures are recommended to manage the actual risk of fluvial flooding in the future.

Safe Refuge

Safe refuge must be provided above the extreme flood level for the River Gipping, which is 4.85m AOD.

Emergency planning

The site is shown to be within the Environment Agency Flood Warning Area for the tidal River Orwell at Ipswich wet dock and waterfront, to upstream of Stoke Bridge; occupants should register to receive the Environment Agency's flood warning service. Given the nature of fluvial flooding and the location of Ipswich at the lower end of the catchment, there is likely to be advanced warning of flooding associated with the River Gipping.

Site Layout and Design

The drainage strategy for the site should be considered early in the site planning process to ensure adequate inclusion of SuDS and adequate provision for the management of surface water during high tide conditions. SuDS should be considered in accordance with the hierarchy of SuDS (i.e. considering infiltration measures first wherever possible). The likely SuDS type for this site is attenuation.

Set-back Distance

All development should be set back 16m from the edge of the River Gipping. The Environment Agency need to be consulted and an Environmental Permit obtained for any works within 16m a Main River.

Site Name: Land east of West End Road

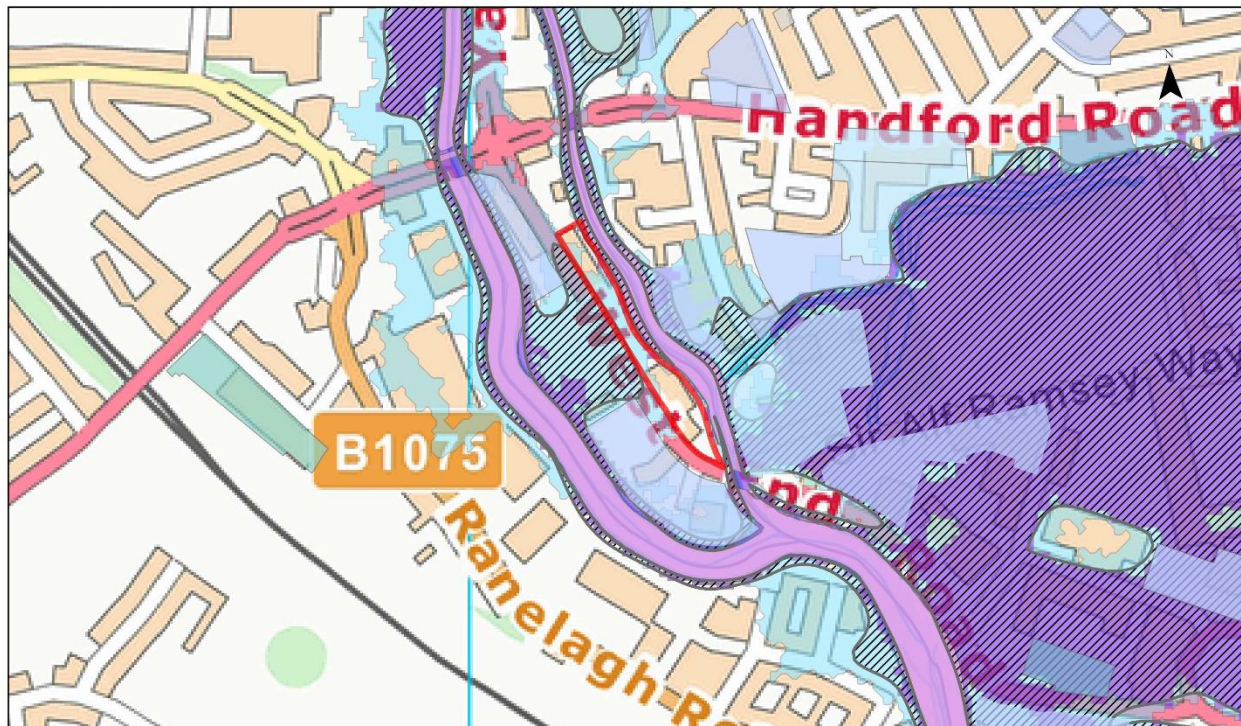
Site ID:	IP119	Location:	Land east of West End Road	Area (ha):	0.61
Current Use:	Commercial	Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable

Flood Zones and Historic Flooding

Flood Zone 1 (<0.1% AEP): 54%	Flood Zone 2 (0.1% AEP): 42%	Flood Zone 3 (1% AEP): 4%	Flood Zone 3b (5% AEP): 0%	Area Benefiting from Defences: 3%
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The site is located adjacent to the River Gipping. The western part of the site (42%) is identified as Flood Zone 2, medium probability of flooding. A small part of the site along the eastern site boundary is located in Flood Zone 3 which is considered to be high probability of flooding, however, this part of the site benefits from flood defences. This part of the site is therefore at residual risk of fluvial flooding.

The Level 1 SFRA Figure 2 shows that this site is on the edge of the area that experienced flooding in 1939. Ipswich BC also hold records of flood incidents on West End Road which is adjacent to the site.



0.06 0.03 0 0.06 0.12 0.18 0.24
Kilometers

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FZ 3b — Main Rivers
FZ 3 — Ordinary Watercourses
FZ 2 — Areas Benefitting from Flood Defences
Current Site
Other Sites

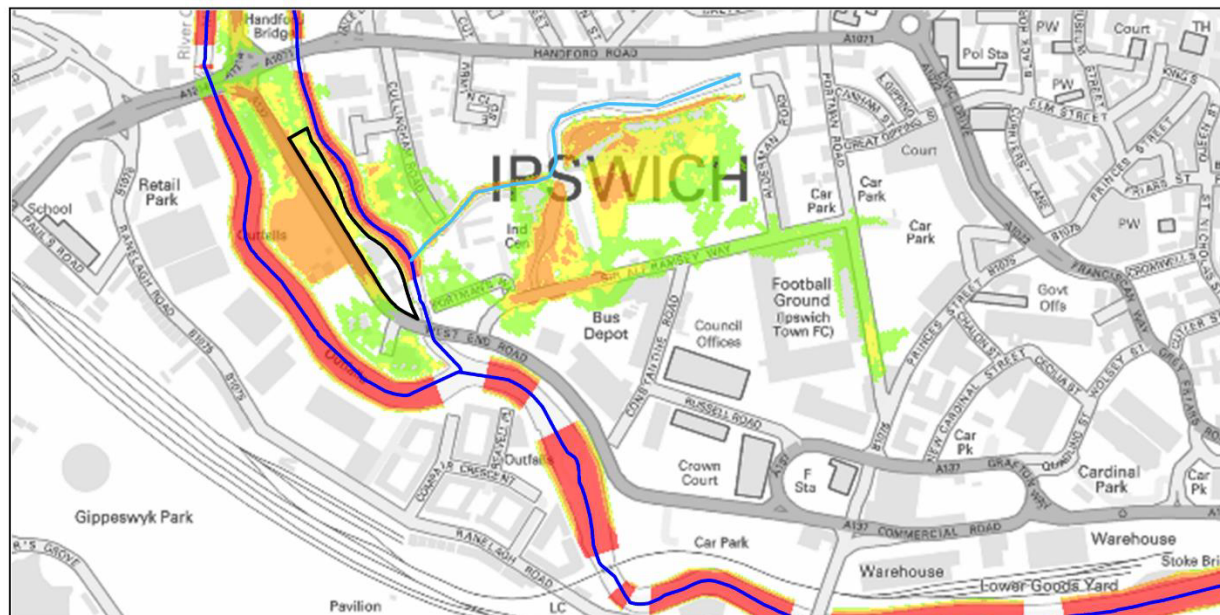
Site Name: Land east of West End Road

Fluvial Flood Risk – Lower Gipping

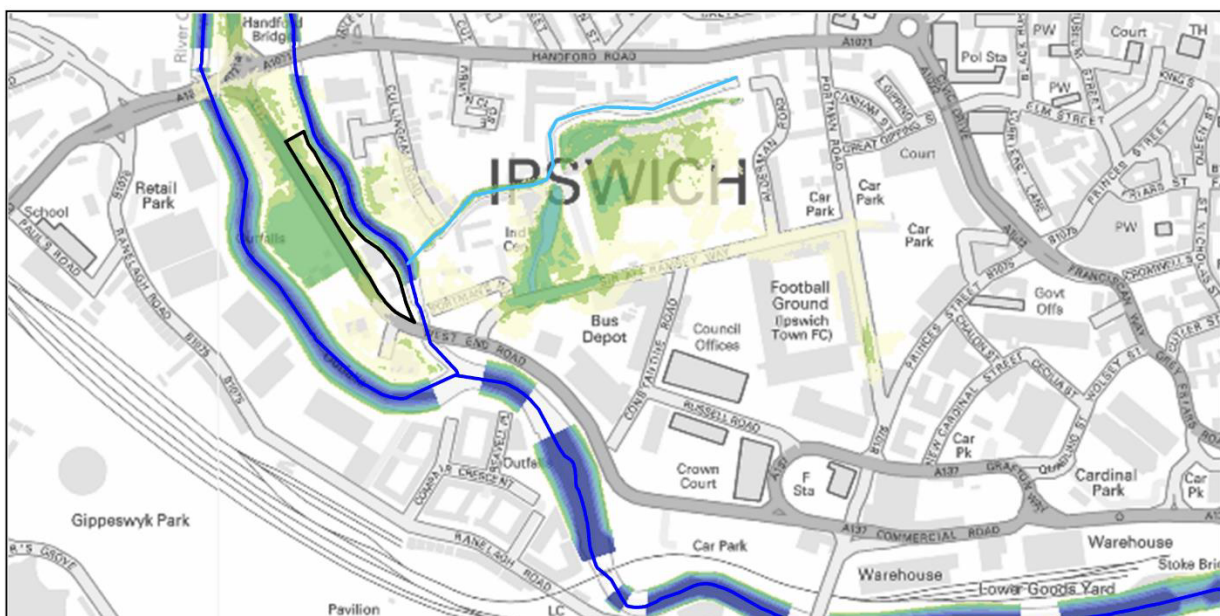
Modelling of the Lower Gipping (Mott MacDonald September 2020), shows that floodwater remains in bank in this part of Ipswich during the 5% AEP, 1% and 0.1% AEP events. However, in the future there is potential that the risk of flooding from the Lower Gipping could increase as a result of climate change, assuming no alterations are made to the flood defences.

In this scenario, there is shown to be a risk of flooding during the 1% AEP design event including a 65% allowance for climate change, with flood levels of 4.82m AOD on the site. The site and adjacent road (West End Road) is shown to flood, with depths of up to 1m and a hazard rating of Moderate – Significant.

The site is also shown to be at risk during the 0.1% AEP extreme flood event including 25% allowance for climate change, with a flood level of 4.97m AOD.



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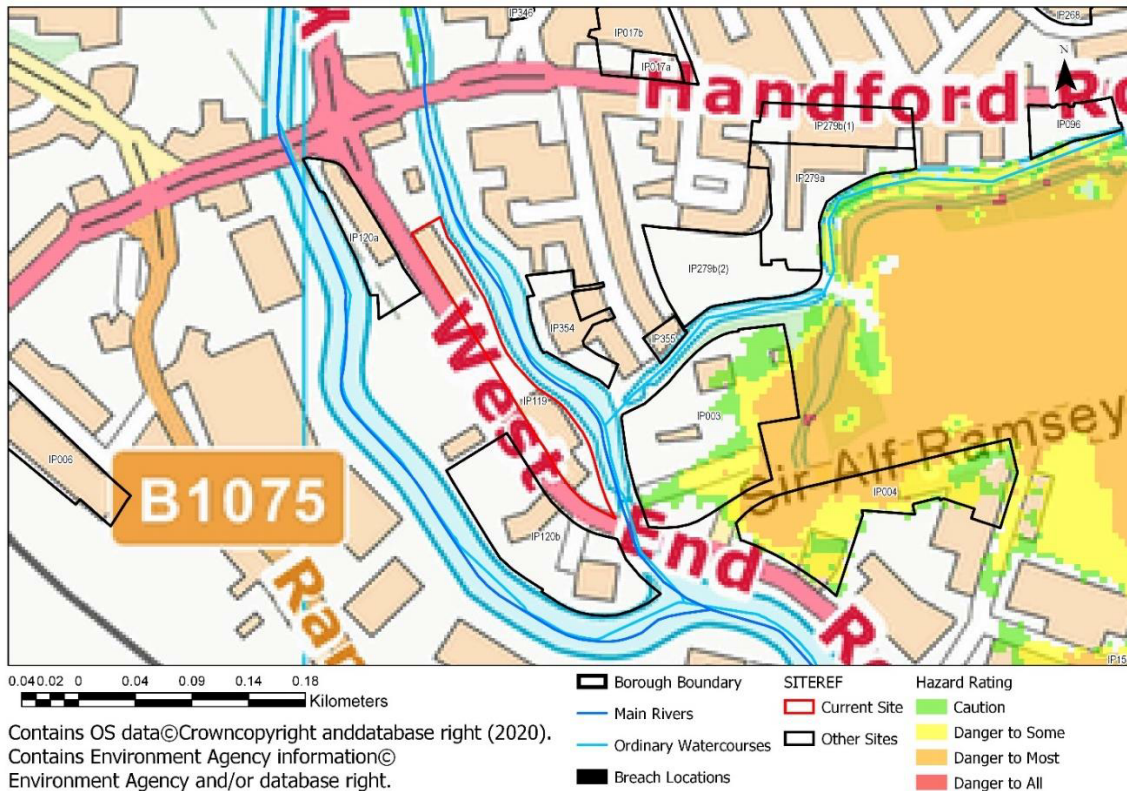
Site Name: Land east of West End Road

Tidal Flood Risk – River Orwell

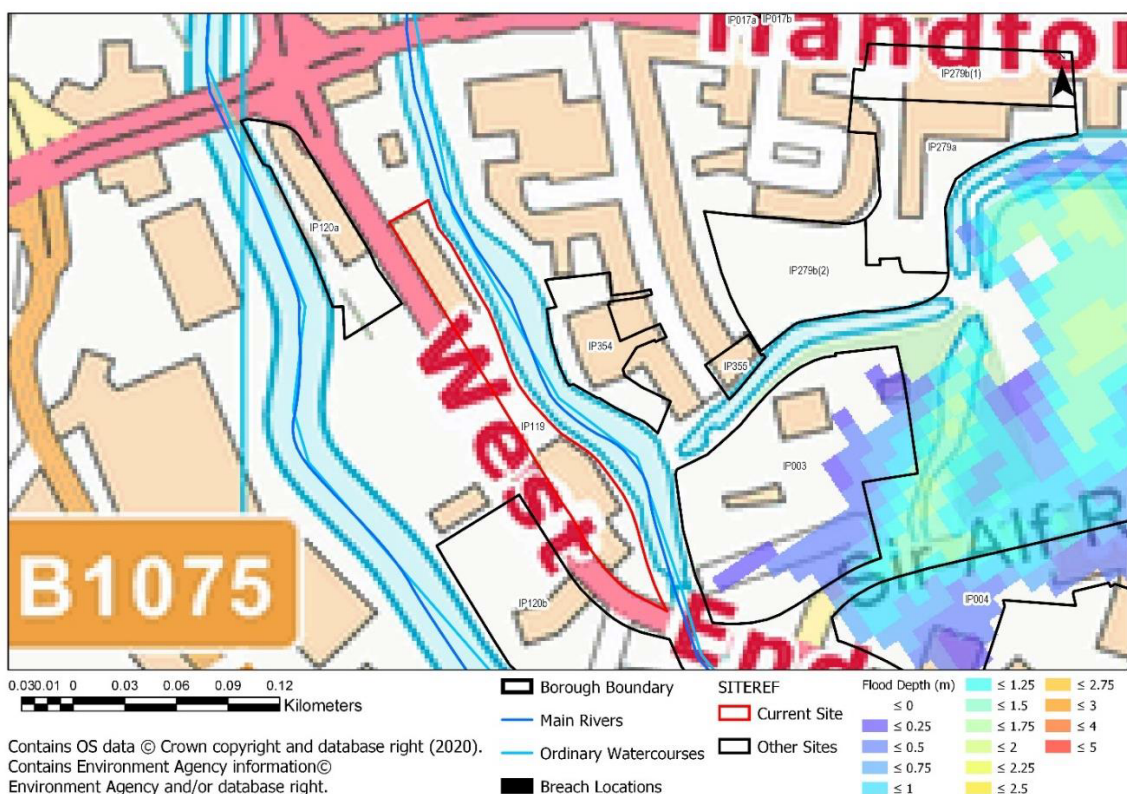
Modelling of the River Orwell shows that the site is protected from flooding during the design flood (0.5% AEP event) including an allowance for climate change due to the presence of the IFDMS. The risk of tidal flooding is therefore a residual risk, i.e. in the event of failure of the flood defence infrastructure.

A composite hazard map has been created to illustrate residual flood hazard. This assumes that the Ipswich flood barrier is operating as designed and replicates maximum flood hazard should a breach occur at location BR05 and BR07 assuming that the pumping station at IP04 is not working. Hazard mapping in this scenario shows that the site is not at risk. This is because the breaches are a reasonable distance to the south.

Residual Flood Risk – Combined Flood Hazard (0.5% AEP, 2118)



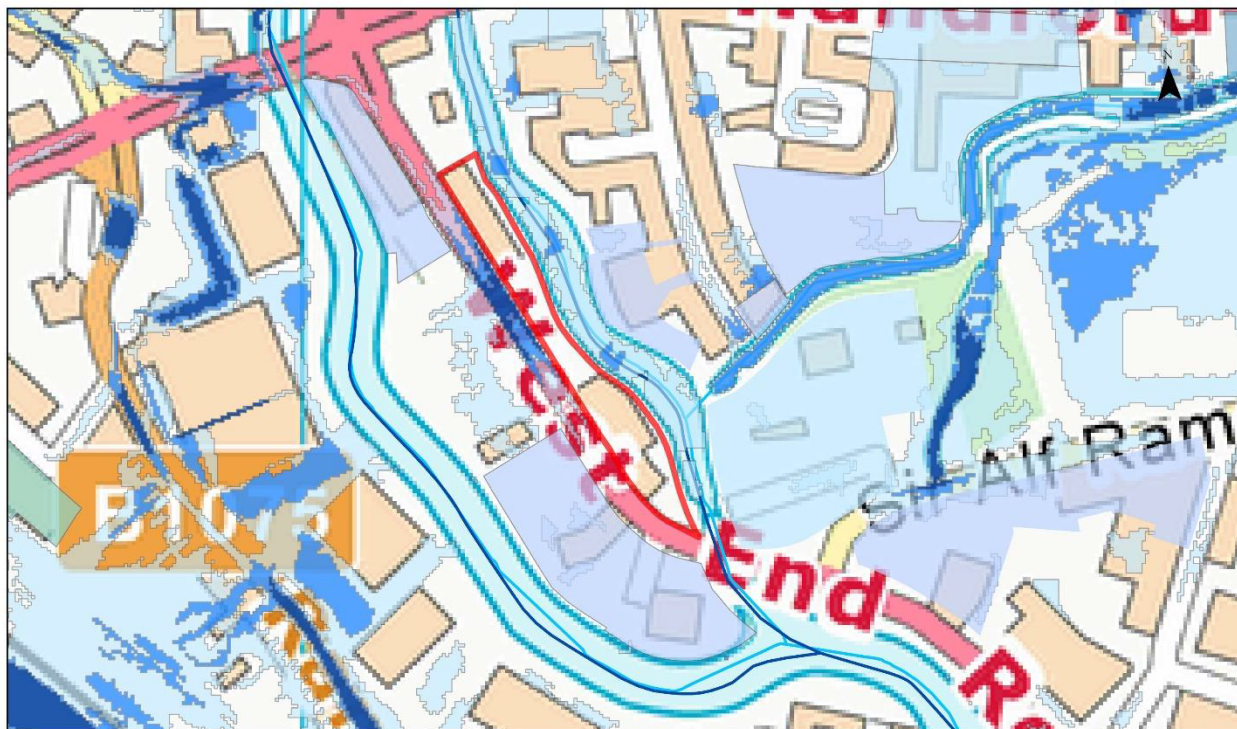
Residual Flood Risk – Combined Flood Depth (0.5% AEP, 2118)



Site Name: Land east of West End Road

Surface Water Flood Risk

The RoFSW mapping shows that the site is not at risk from surface water flooding. However, the surrounding routes are at high risk.



0.04 0.02 0 0.04 0.07 0.11 0.14
Kilometers

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1 in 30 Main Rivers

1 in 100 Ordinary Watercourses

1 in 1000

Current Site

Other Sites

Groundwater Flood Risk

The ASGWf mapping (SFRA Figure 13) shows that the site is located within a 1km square of which 50%-75% is susceptible to groundwater emergence.

The underlying geology in this location is the White Chalk subgroup which is not suitable for infiltration type drainage, regardless of ground water levels. Appendix A Figure 17 shows which areas of Ipswich are likely to have suitable ground for infiltration. The risk of groundwater flooding and possible use of infiltration SUDS in this area should be further investigated and informed by ground investigations.

Other sources

The Environment Agency 'Risk of Flooding from Reservoirs' mapping shows that the site is not at risk.

Site Specific Recommendations

The site is shown to be at actual risk of fluvial flooding from the Lower Gipping in the future as a result of climate change. The following measures are recommended to manage and mitigate the actual risk of fluvial flooding in the future.

Finished Floor Levels

Finished floor levels should be set 300mm above the fluvial design flood level including an allowance for climate change. The flood level on the site for the 1% AEP event including 65% climate change is 4.82m AOD on the site.

Access / Egress

During the fluvial design flood (1% AEP including 65% climate change) the section of West End Road immediately adjacent to the site is shown to be at Significant hazard and therefore does not provide a suitable access/egress route. However, dry access/egress for the site is achievable to the south along West End Road. There may also be potential to design a route into the site layout to the north of the site towards the A1071. The use of a raised riverside pathway in the site design would enable a dry access route for people to be maintained without resulting in significant land take.

Safe Refuge

Safe refuge must be provided above the extreme flood level.

With respect to the residual risk of tidal flooding, safe refuge must be provided above the 0.1% AEP flood level including an allowance for climate change over the lifetime of the development (5.7m AOD to 2118). This will also be adequate as

Site Name: Land east of West End Road

a safe place of refuge for the extreme fluvial flood, as the flood level for the 0.1% AEP event including 25% allowance for climate change is 4.97m AOD.

Emergency planning

The site is shown to be within the Environment Agency Flood Warning Area for the tidal River Orwell at Ipswich wet dock and waterfront, to upstream of Stoke Bridge; occupants should register to receive the Environment Agency's flood warning service. Given the nature of fluvial flooding and the location of Ipswich at the lower end of the catchment, there is likely to be advanced warning of flooding associated with the River Gipping.

To manage the residual risk of flooding associated with a failure of the flood defence measures in this area, Flood Response Plans should be prepared by occupants of the site including details of egress routes and place of safe refuge.

Reference to Appendix D outlines rate of onset and flood duration. This outlines that for flood compartment I, peak flood level could be reached on site within 1 hour from the breach. Flood water could remain within the flood compartment for 24hrs.

Set-back Distance

All development should be set back 16m from the edge of the River Gipping. The Environment Agency need to be consulted and an Environmental Permit obtained for any works within 16m a Main River.

Site Layout and Design

The drainage strategy for the site should be considered early in the site planning process to ensure adequate inclusion of SuDS and adequate provision for the management of surface water during high tide conditions. SuDS should be considered in accordance with the hierarchy of SuDS (i.e. considering infiltration measures first wherever possible). The likely SuDS type for this site is attenuation.

Site Name: Land west of West End Road

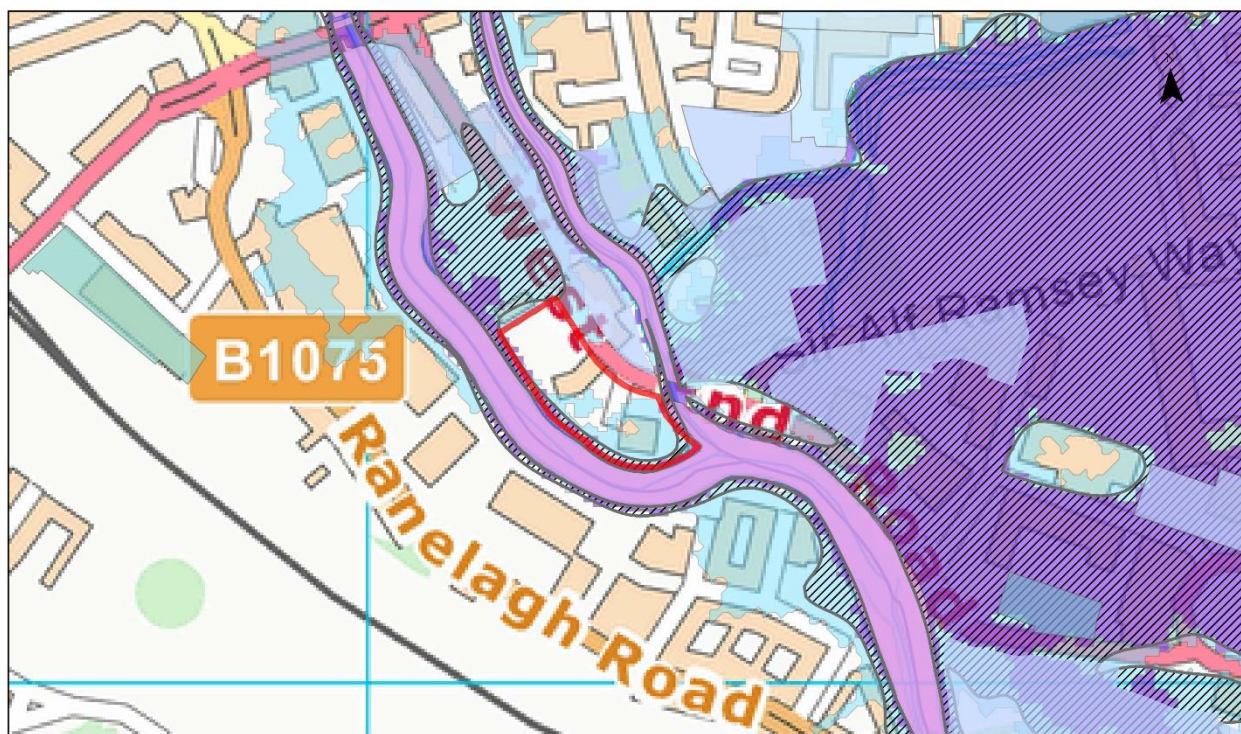
Site ID:	IP120b	Location:	Land west of West End Road	Area (ha):	1.02
Current Use:	Commercial	Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable

Flood Zones and Historic Flooding

Flood Zone 1 (<0.1% AEP): 52%	Flood Zone 2 (0.1% AEP): 39%	Flood Zone 3 (1% AEP): 8%	Flood Zone 3b (5% AEP): 0%	Area Benefiting from Defences: 11%
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The site is located adjacent to the River Gipping close to where the fluvial River Gipping turns into the tidally influenced River Orwell. The majority of the site is identified in Flood Zone 1, low probability of flooding. A small part of the site (8%) is identified in Flood Zone 3, high probability of flooding, in the absence of flood defences. This area is shown to benefit from the presence of defences along the edge of the River Gipping to the south-east of the site, as well as the tidal barrier on the River Orwell further downstream. The site is therefore at residual risk of tidal and/or fluvial flooding, in the event of a failure of these defences. This may require updating once the impact of the new modelling for the River Gipping is known.

The Level 1 SFRA Figure 2 shows that this site is on the edge of the area that experienced flooding in 1939 and 1953. Ipswich BC also hold records of flood incidents on West End Road which is adjacent to the site.



0 0.05 0.1 0.15 0.2
Kilometers

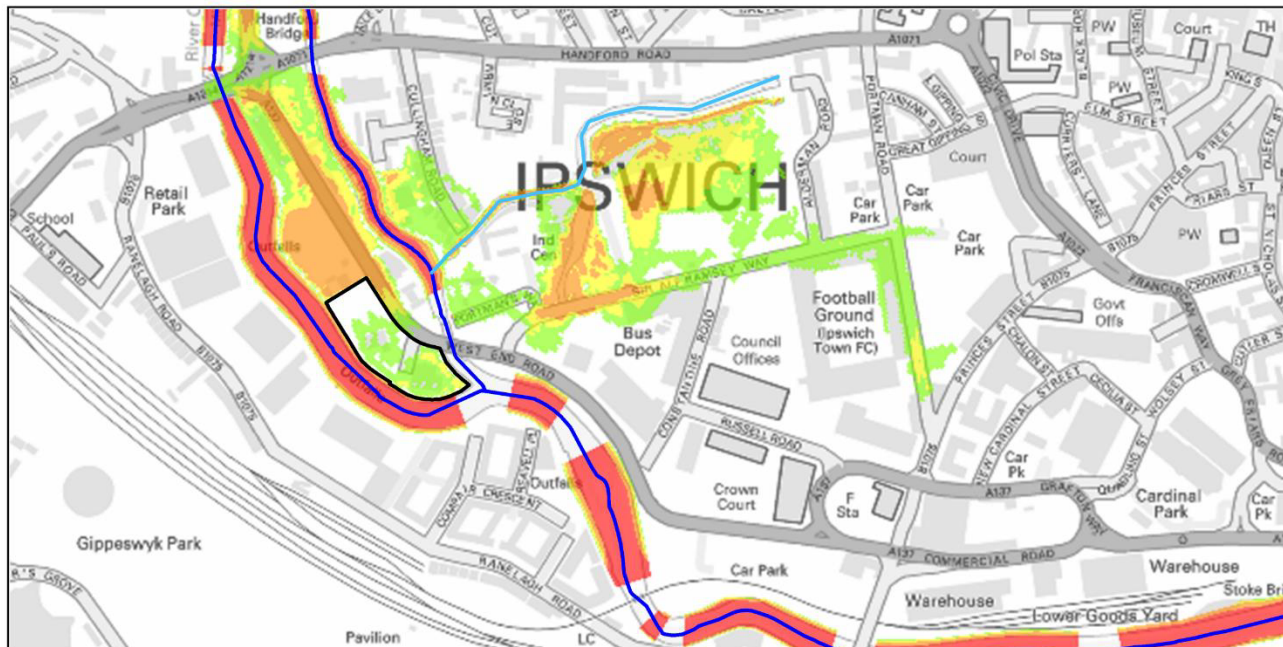
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FZ 3b Main Rivers
FZ 3 Ordinary Watercourses
FZ 2 Areas Benefiting from Flood Defences
Current Site
Other Sites

Site Name: Land west of West End Road

Fluvial Flood Risk – Lower Gipping

Modelling of the Lower Gipping (Mott MacDonald September 2020), shows that floodwater remains in bank in this part of Ipswich during the 5% AEP, 1% and 0.1% AEP events. However, in the future there is potential that the risk of flooding from the Lower Gipping could increase as a result of climate change, assuming no alterations are made to the flood defences. In this scenario, there is shown to be a risk of flooding during the 1% AEP event including a 65% allowance for climate change, with flood levels of 4.75m AOD on the site. The site is shown to flood with depths of up to 0.25m and a hazard rating of Low. The hazard rating for the area to the north including West End Road is Significant, with depths up to 1m. The site is also shown to be at risk during the 0.1% AEP event including 25% allowance for climate change, with a flood level of 4.80m AOD.



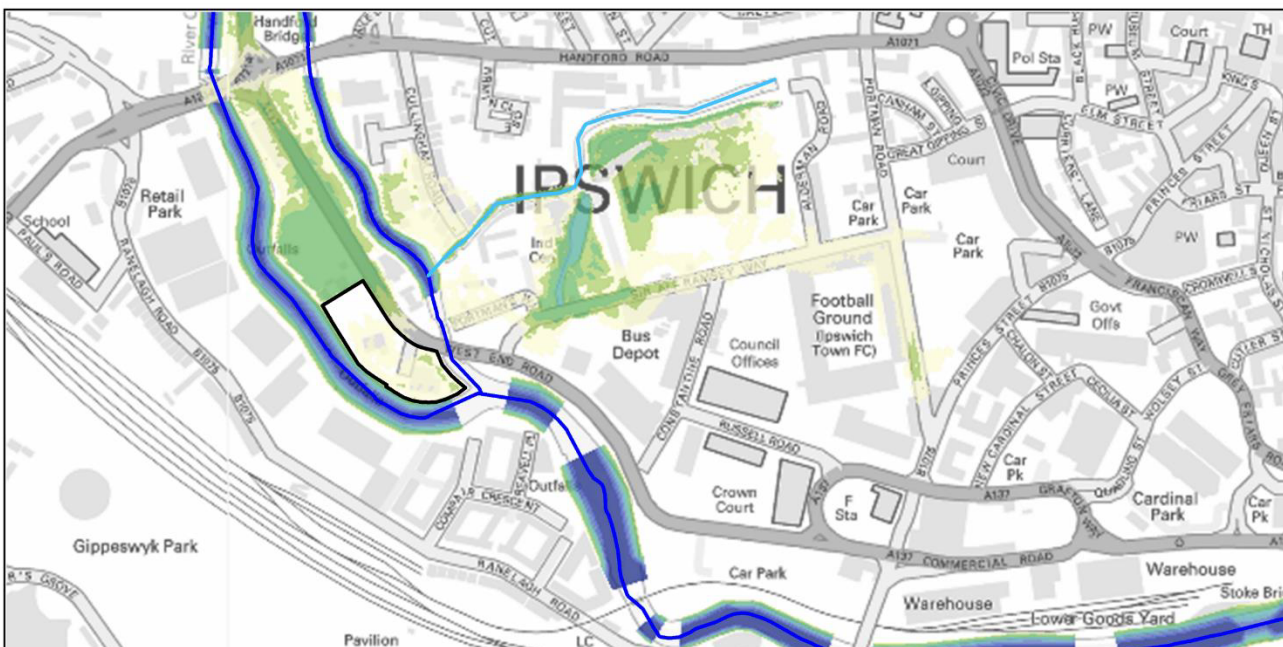
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SITE REF

- Site Boundary
- Main River
- Ordinary Watercourse

Hazard Rating: River Gipping 1% AEP incl. 65% climate change

- Low: Caution
- Moderate: Danger to Some
- Significant: Danger to Most
- Extreme: Danger to All



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SITE REF

- Site Boundary
- Main River
- Ordinary Watercourse

Maximum Flood Depth (m): River Gipping 1% AEP incl. 65% climate change

- <0.25
- <0.5
- <1
- <1.5
- <2
- <2.5
- <3
- >3

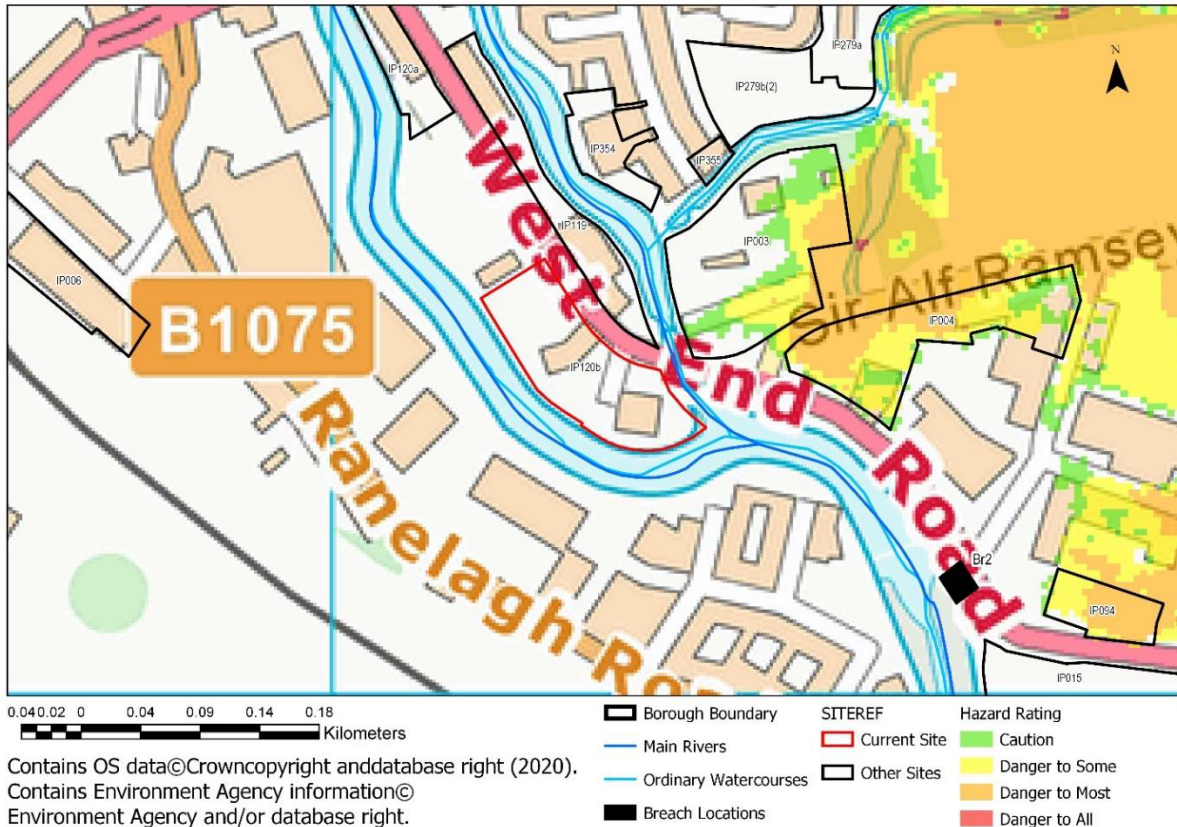
Site Name: Land west of West End Road

Tidal Flood Risk – River Orwell

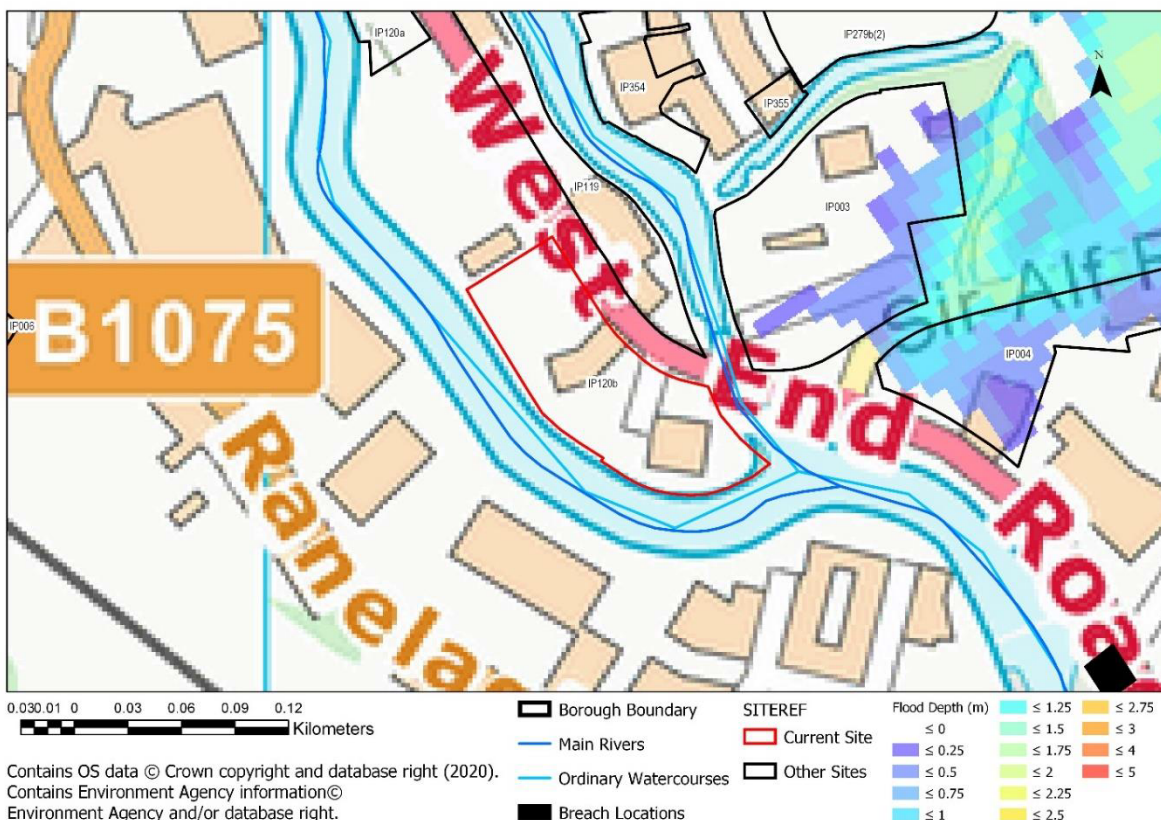
Modelling of the River Orwell shows that the site is protected from flooding during the design flood (0.5% AEP event) including an allowance for climate change due to the presence of the IFDMS. The risk of tidal flooding is therefore a residual risk, i.e. in the event of failure of the flood defence infrastructure.

A composite hazard map has been created to illustrate residual flood hazard. This assumes that the Ipswich flood barrier is operating as designed and replicates maximum flood hazard should a breach occur at location BR05 and BR07 assuming that the pumping station at IP04 is not working. Hazard mapping in this scenario shows that the site is not at risk. This is because the breaches are a reasonable distance to the south.

Residual Flood Risk – Combined Flood Hazard (0.5% AEP, 2118)



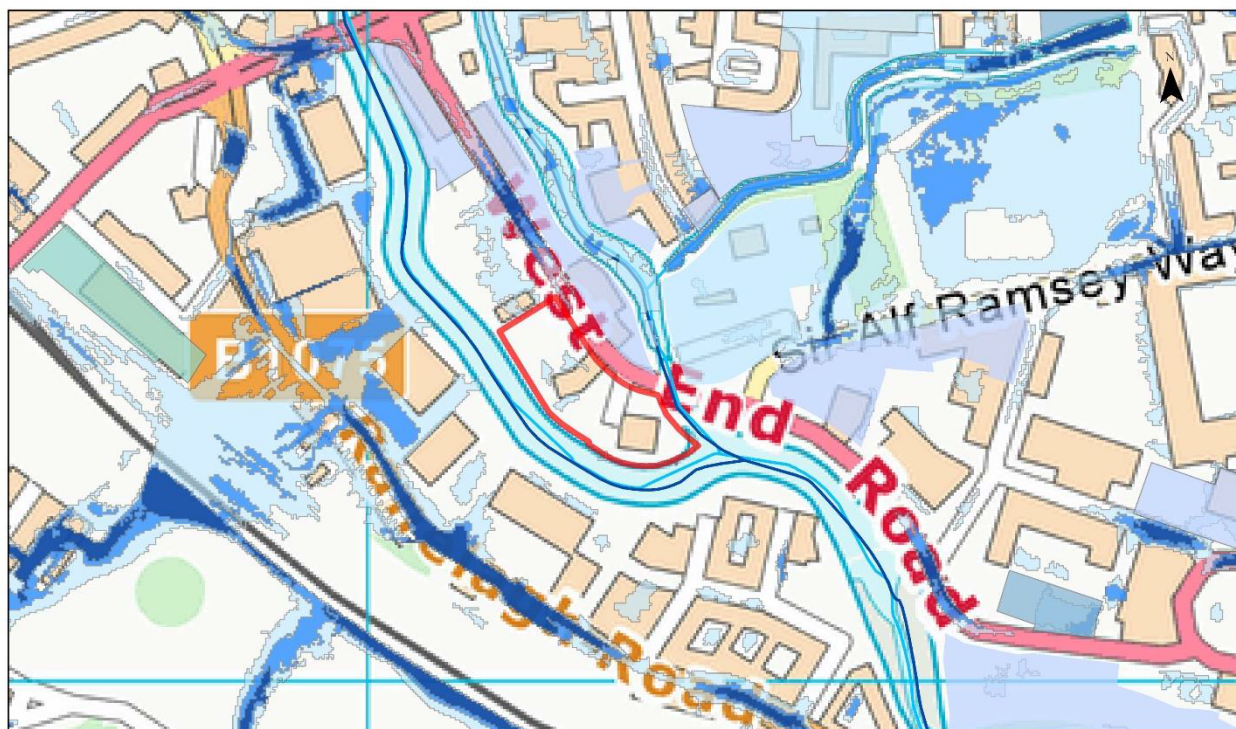
Residual Flood Risk – Combined Flood Depth (0.5% AEP, 2118)



Site Name: Land west of West End Road

Surface Water Flood Risk

The RoFSW mapping shows that West End Road (in this area) is susceptible to overland flow and ponding. Whilst the site itself is shown to have a low risk of surface water flooding, the surrounding routes are at high risk.



0.05 0.1 0.15 0.2 Kilometers

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1 in 30 Main Rivers
1 in 100 Ordinary Watercourses
1 in 1000
Current Site
Other Sites

Groundwater Flood Risk

The AStGWF mapping (Level 1 SFRA Figure 13) shows that the site is located within a 1km square of which 50%-75% is susceptible to groundwater emergence.

The underlying geology in this location is the White Chalk subgroup which is not suitable for infiltration type drainage, regardless of ground water levels. Appendix A Figure 17 shows which areas of Ipswich are likely to have suitable ground for infiltration. The risk of groundwater flooding and possible use of infiltration SUDS in this area should be further investigated and informed by ground investigations.

Other sources

The Environment Agency 'Risk of Flooding from Reservoirs' mapping shows that the site is not at risk.

Site Specific Recommendations

The site is shown to be at actual risk of fluvial flooding from the Lower Gipping in the future as a result of climate change. The following measures are recommended to manage and mitigate the actual risk of fluvial flooding in the future.

Finished Floor Levels

Finished floor levels should be set 300mm above the fluvial design flood level including an allowance for climate change. The flood level on the site for the 1% AEP event including 65% climate change is 4.75m AOD on the site.

Access / Egress

During the fluvial design flood (1% AEP including 65% climate change) the section of West End Road to the north of the site is shown to be at Significant hazard and therefore does not provide a suitable access/egress route. However, dry access/egress for the site is achievable to the south along West End Road. There may also be potential to design a route into the site layout to the north of the site towards the A1071. The use of a raised riverside pathway in the site design would enable a dry access route for people to be maintained without resulting in significant land take.

Safe Refuge

Safe refuge must be provided above the extreme flood level.

With respect to the residual risk of tidal flooding, safe refuge must be provided above the 0.1% AEP flood level including an allowance for climate change over the lifetime of the development (5.7m AOD to 2118). This will also be adequate as

Site Name: Land west of West End Road

a safe place of refuge for the extreme fluvial flood, as the flood level for the 0.1% AEP event including 25% allowance for climate change is 4.80m AOD.

Emergency planning

The site is shown to be within the Environment Agency Flood Warning Area for the tidal River Orwell at Ipswich wet dock and waterfront, to upstream of Stoke Bridge; occupants should register to receive the Environment Agency's flood warning service. Given the nature of fluvial flooding and the location of Ipswich at the lower end of the catchment, there is likely to be advanced warning of flooding associated with the River Gipping.

To manage the residual risk of flooding associated with a failure of the flood defence measures in this area, Flood Response Plans should be prepared by occupants of the site including details of egress routes and place of safe refuge.

Reference to Appendix D outlines rate of onset and flood duration. This outlines that for flood compartment I, peak flood level could be reached on site within 1 hour from the breach. Flood water could remain within the flood compartment for 24hrs.

Set-back Distance

All development should be set back 16m from the edge of the River Gipping. The Environment Agency need to be consulted and an Environmental Permit obtained for any works within 16m a Main River.

Site Layout and Design

The drainage strategy for the site should be considered early in the site planning process to ensure adequate inclusion of SuDS and adequate provision for the management of surface water during high tide conditions. SuDS should be considered in accordance with the hierarchy of SuDS (i.e. considering infiltration measures first wherever possible). The likely SuDS type for this site is attenuation.

Site Name: Bridge Street, Northern Quays (west)

Site ID:	IP132	Location:	Bridge Street, Northern Quays (West)	Area (ha):	0.18
Current Use:	Unknown	Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable

Flood Zones and Historic Records

Flood Zone 1 (<0.1% AEP): 0%	Flood Zone 2 (0.1% AEP): 0%	Flood Zone 3 (1% AEP): 100%	Flood Zone 3b (5% AEP): 0%	Area Benefiting from Defences: 100%
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The tidal River Orwell lies approximately 30m to the south of the site. The site is identified as Flood Zone 3, high probability of flooding, in the absence of flood defences. This area is shown to benefit from the presence of defences.

The Level 1 SFRA Figure 2 shows that this area has historically experienced flooding in 1953. Ipswich BC also hold records of flooding to the north of site where Vernon Street meets Bridge Street, associated with the surface water network being blocked or overwhelmed.



0.04 0.02 0 0.04 0.07 0.11 0.14
Kilometers

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FZ 3b Main Rivers
FZ 3 Ordinary Watercourses
FZ 2
Areas Benefitting from Flood Defences
Current Site
Other Sites

Fluvial Flood Risk – Lower Gipping

The site is not at risk of flooding from the fluvial Lower Gipping during the *design flood* (during either the present day or including for an allowance for climate change into the future). However, in the future, as a result of climate change, the site may be at risk of flooding during the *extreme flood* event. The flood level for the 0.1% AEP event including 25% allowance for climate change in this area is 3.97m AOD.

Site Name: Bridge Street, Northern Quays (west)

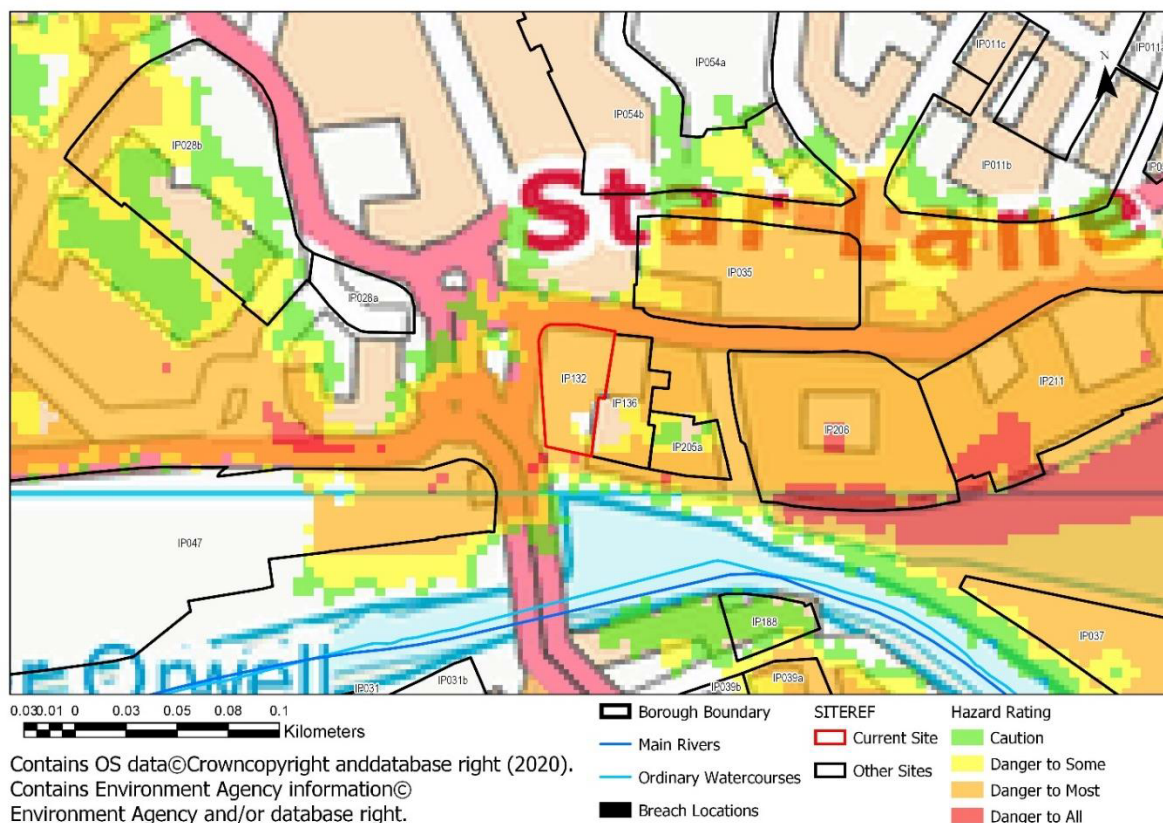
Tidal Flood Risk – River Orwell

Modelling of the River Orwell shows that the site is protected from flooding during the design event (0.5% AEP event) including an allowance for climate change due to the presence of the IFDMS. The risk of tidal flooding is therefore a residual risk in the event of a failure of the flood defence infrastructure.

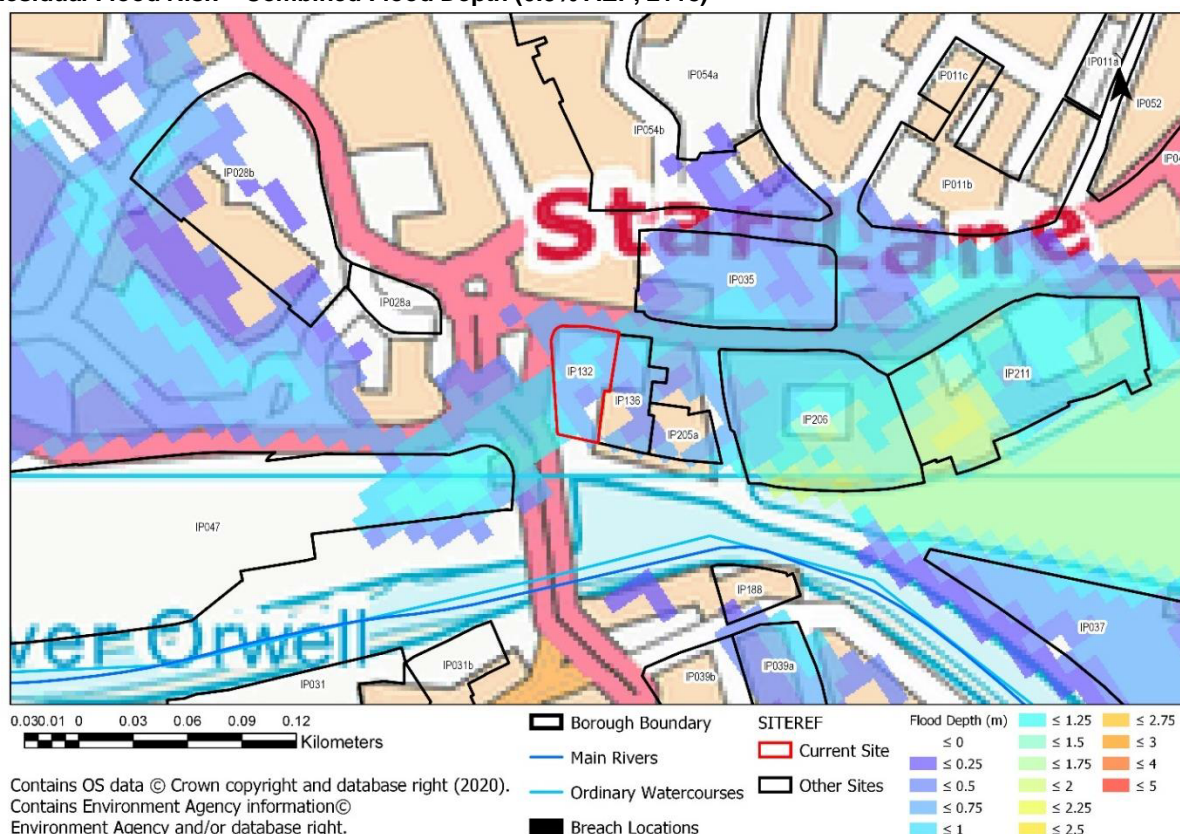
A composite hazard map has been created to illustrate residual flood hazard. This assumes that the Ipswich flood barrier is operating as designed and replicates maximum flood hazard should a breach occur at location BR05 and BR07 assuming that the pumping station at IP04 is not working. In this scenario, the site hazard is danger to most.

The hazard rating on the site is Significant (Danger to Most), with flood depths of up to 1.25m.

Residual Flood Risk – Combined Flood Hazard (0.5% AEP, 2118)



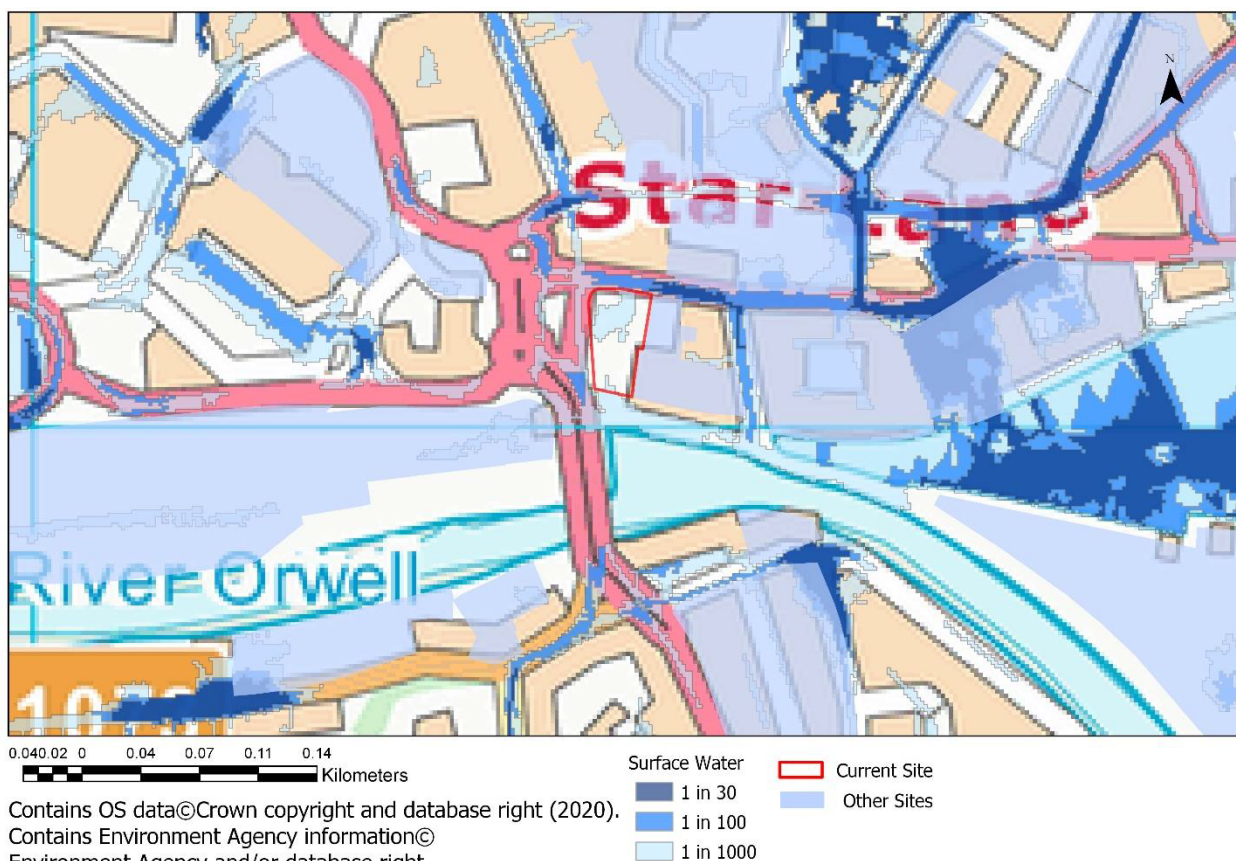
Residual Flood Risk – Combined Flood Depth (0.5% AEP, 2118)



Site Name: Bridge Street, Northern Quays (west)

Surface Water Flood Risk

There is risk of surface water flooding in the north of the site. The rest of the site is shown to be at a low risk of surface water flooding. Areas along the road to the north of the site are susceptible to overland flow and ponding.



Groundwater Flood Risk

The AStGWF mapping (Level 1 SFRA Figure 13) shows that the site is located within a 1km square of which 25%-50% is susceptible to groundwater emergence.

The underlying geology in this location is the White Chalk subgroup which is not suitable for infiltration type drainage, regardless of ground water levels. Appendix A Figure 17 shows which areas of Ipswich are likely to have suitable ground for infiltration. The risk of groundwater flooding and possible use of infiltration SUDS in this area should be further investigated and informed by ground investigations.

Other sources

The Environment Agency 'Risk of Flooding from Reservoirs' mapping shows that the site is not at risk.

Site Specific Recommendations

In the future, the site may be at actual risk of flooding from the Lower Gipping during an extreme flood. The site is at residual risk of tidal flooding in the event of a failure of the flood defence infrastructure. The following measures are recommended to manage these risks.

Finished Floor Levels

In relation to the residual risk of tidal flooding, finished floor levels for sleeping accommodation should be set above the maximum breach flood level, which in compartment H is 4 – 4.1m AOD (Figure 7-4).

Access / Egress

In the event of a failure of the tidal flood defences, the access / egress route along College Street and Star Lane are shown to have a hazard rating of Significant (Danger for Most) and would therefore not offer a safe route. Furthermore, depending on the time and location of the failure of the defences, there may not be sufficient time to enable occupants to leave the site prior to a flood event and the safest course of action may be to remain within the development within a safe place refuge.

Safe Refuge

Safe refuge must be provided above the extreme flood level.

With respect to the residual risk of tidal flooding, safe refuge must be provided above the 0.1% AEP flood level including an allowance for climate change over the lifetime of the development (5.7m AOD to 2118). This will also be adequate as a safe place of refuge for the extreme fluvial flood, as the flood level for the 0.1% AEP event including 25% allowance for climate change is 3.97m AOD.

Site Name: Bridge Street, Northern Quays (west)*Emergency planning*

The site is shown to be within the Environment Agency Flood Warning Area for the tidal River Orwell at Ipswich wet dock and waterfront, to upstream of Stoke Bridge; occupants should register to receive the warning service. To manage the residual risk of flooding associated with a failure of the flood defence measures in this area, Flood Response Plans should be prepared by occupants of the site including details of egress routes and place of safe refuge.

Reference to Appendix D provides information on rate of onset and flood duration for compartment H which outlines that flood water could reach a peak within 2 hours of entering the flood compartment and could remain for over 12 hours.

Set-back Distance

All development should be set back 16m from the edge of the River Orwell. The Environment Agency need to be consulted and an Environmental Permit obtained for any works within 16m a Main River.

Site Layout and Design

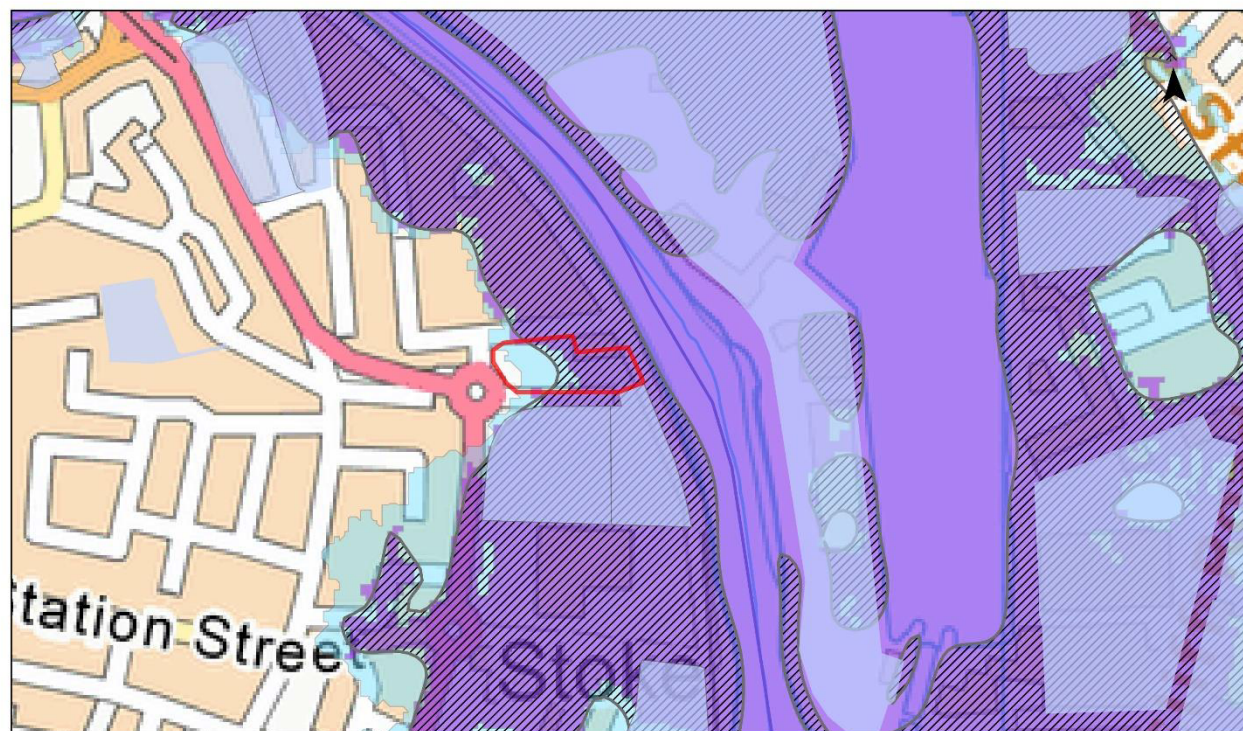
The drainage strategy for the site should be considered early in the site planning process to ensure adequate inclusion of SuDS and adequate provision for the management of surface water, especially given the risk of surface water flooding in the area surrounding the site. SuDS should be considered in accordance with the hierarchy of SuDS (i.e. considering infiltration measures first wherever possible). Attenuation storage is the most likely SuDS for the site.

Site Name: South of Felaw Street					
Site ID:	IP133	Location:	South of Felaw Street	Area (ha):	0.37
Current Use:	Commercial	Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable

Flood Zones and Historic Records				
Flood Zone 1 (<0.1% AEP): 10%	Flood Zone 2 (0.1% AEP): 39%	Flood Zone 3 (1% AEP): 51%	Flood Zone 3b (5%AEP): 0%	Area Benefiting from Defences: 61%

The tidal River Orwell is located approximately 20m to the west of the site. The eastern part of the site (51%) is identified as Flood Zone 3, high probability of flooding, in the absence of flood defences. This area is shown to benefit from the presence of defences; there is a flood defence wall and embankment along the edge of the River Orwell to the east of the site, and there is a tidal barrier further downstream on the River Orwell.

The Level 1 SFRA Figure 2 shows that this site is on the edge of the area that experienced flooding in 1953.



0.04 0.02 0 0.04 0.09 0.14 0.18 Kilometers

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Legend:

- FZ 3b
- FZ 3
- FZ 2
- Main Rivers
- Ordinary Watercourses
- Areas Benefiting from Flood Defences
- Current Site
- Other Sites

Fluvial Flood Risk – Lower Gipping
<p>The site is not at risk of flooding from the fluvial Lower Gipping during the <i>design flood</i> (during either the present day or including for an allowance for climate change into the future). The site is also not at risk of flooding from the fluvial River Gipping during the <i>extreme flood</i> (0.1% AEP event including 25% allowance for climate change).</p>

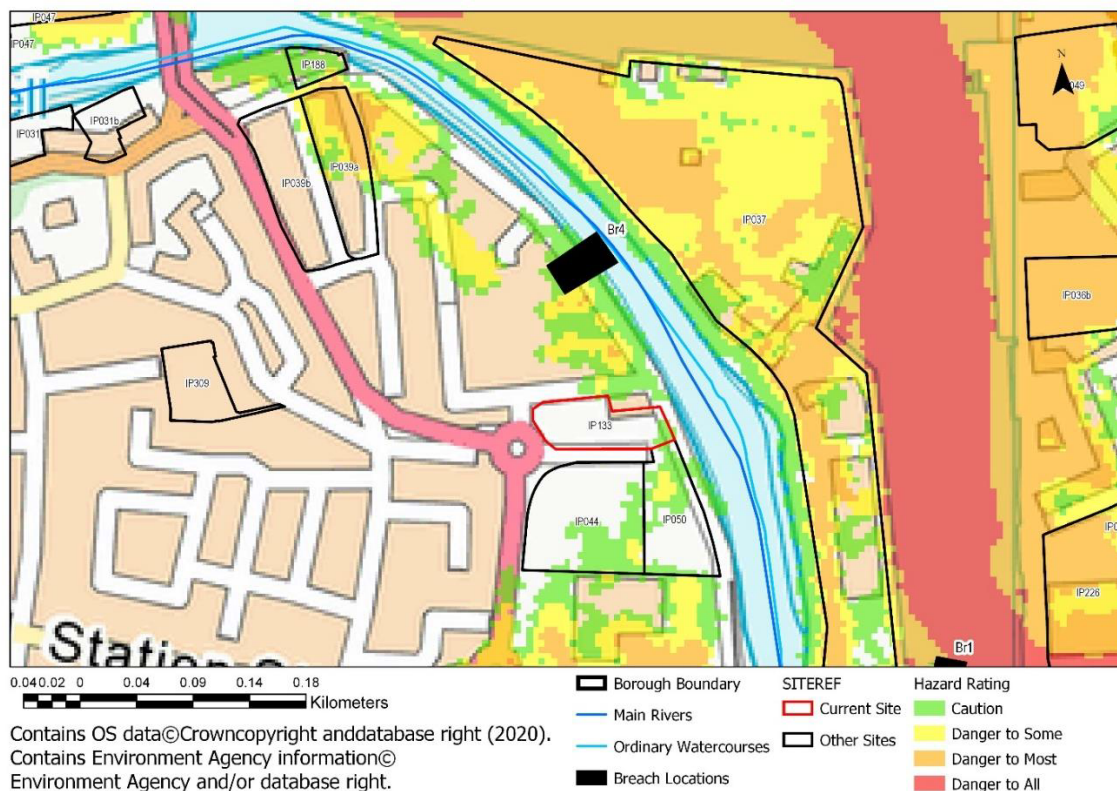
Site Name: South of Felaw Street

Tidal Flood Risk – River Orwell

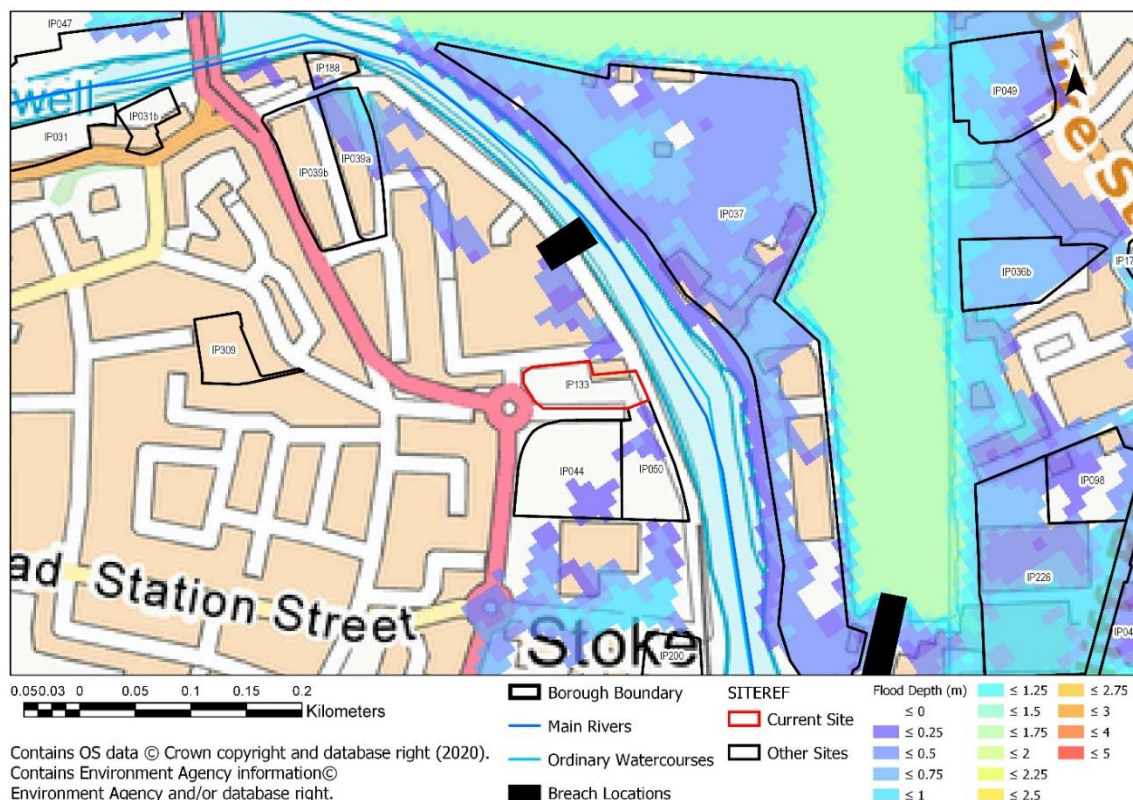
Modelling of the River Orwell shows that the site is protected from flooding during the design event (0.5% AEP event) including an allowance for climate change due to the presence of the IFDMS. The risk of tidal flooding is therefore a residual risk in the event of a failure of the flood defence infrastructure.

A composite hazard map has been created to illustrate residual flood hazard. This assumes that the Ipswich flood barrier is operating as designed and replicates maximum flood hazard should a breach occur at location BR05 and BR07 assuming that the pumping station at IP04 is not working. In this scenario flood water only affects the eastern most extent of the site where a hazard category of Low (Caution) is recorded.

Residual Flood Risk – Combined Flood Hazard (0.5% AEP, 2118)



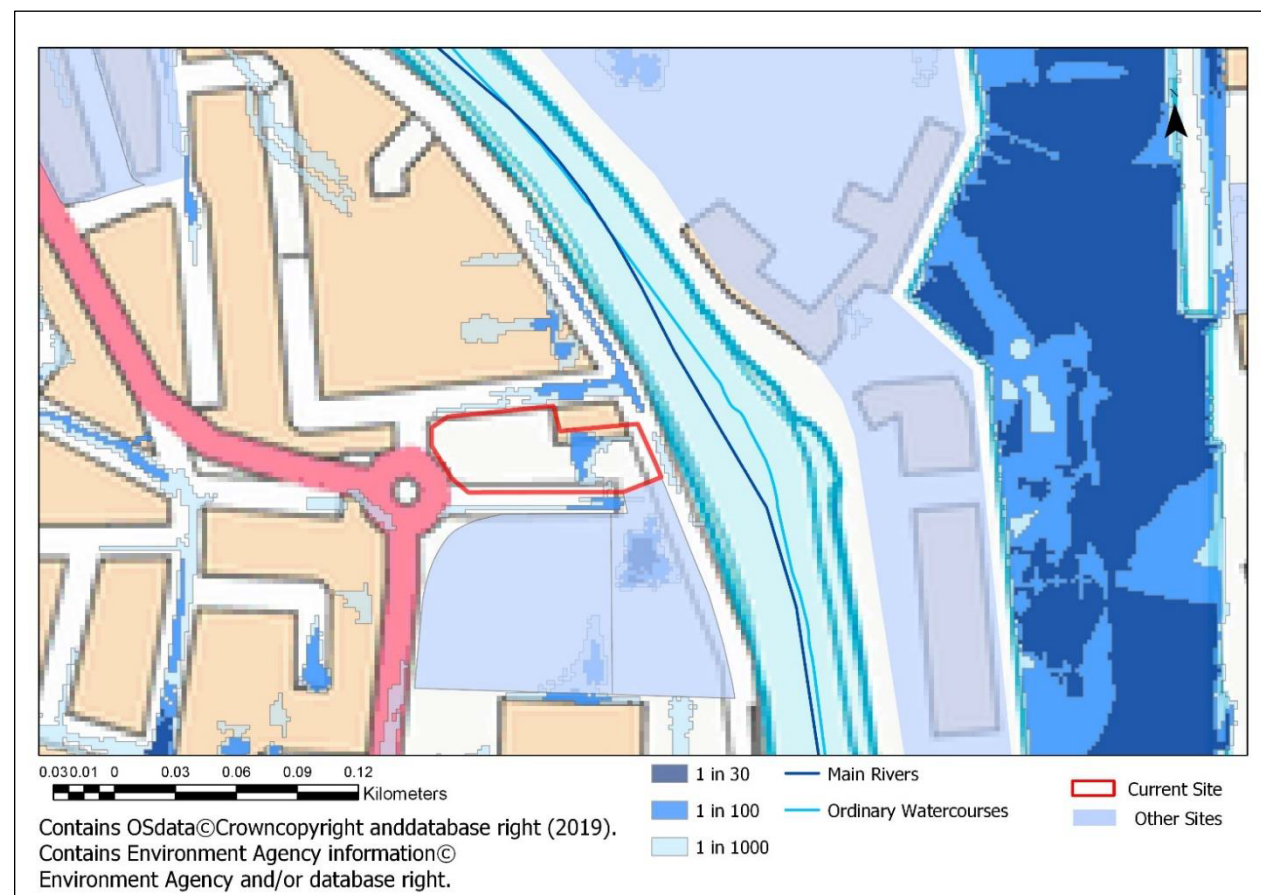
Residual Flood Risk – Combined Flood Depth (0.5% AEP, 2118)



Site Name: South of Felaw Street

Risk of Flooding from Surface Water (RoFSW)

The RoFSW mapping shows a potential flow path crossing the site, being at medium risk.



Groundwater Flood Risk

The AStGWF mapping (Level 1 SFRA Figure 13) shows that the site is located within a 1km square of which 25%-50% is susceptible to groundwater emergence.

The underlying geology in this location is White Chalk subgroup and Lambeth Group. White Chalk subgroup is not suitable for infiltration type drainage, regardless of ground water levels. Appendix A Figure 17 shows which areas of Ipswich are likely to have suitable ground for infiltration. The risk of groundwater flooding and possible use of infiltration SUDS in this area should be further investigated and informed by ground investigations.

Other Sources

The Environment Agency 'Risk of Flooding from Reservoirs' mapping shows that the site is not at risk.

Site Specific Recommendations

The site is at residual risk of tidal flooding in the event of a failure of the flood defence infrastructure. The following measures are recommended to manage these risks.

Finished Floor Levels

In relation to the residual risk of tidal flooding, finished floor levels for sleeping accommodation should be set above the maximum breach flood level, which in compartment C is 3.5m AOD (Figure 7-4).

Access / Egress

In the event of a failure of the tidal flood defences, dry access/egress for the site may be achievable from the western side of the site along Mather Way / Felaw Street onto Vernon Street. The routes that pass westward are within Flood Zone 1 and therefore lead out of the tidal floodplain. However, depending on the time and location of the failure of the defences, there may not be sufficient time to enable occupants to leave the site prior to a flood event and the safest course of action may be to remain within the development within a safe place refuge.

Safe Refuge

Safe refuge must be provided above the extreme flood level.

With respect to the residual risk of tidal flooding, safe refuge must be provided above the 0.1% AEP flood level including an allowance for climate change over the lifetime of the development (5.7m AOD to 2118).

Site Name: South of Felaw Street*Emergency planning*

The site is shown to be within the Environment Agency Flood Warning Area for the tidal River Orwell at Ipswich wet dock and waterfront, to upstream of Stoke Bridge; occupants should register to receive the warning service. To manage the residual risk of flooding associated with a failure of the flood defence measures in this area, Flood Response Plans should be prepared by occupants of the site including details of egress routes and place of safe refuge.

Appendix D of the SFRA outlines that rate of onset to peak at this location (compartment C) is only 1.5 hour and flood water may remain on site for over 21hrs. This shows the importance of inclusion of a place of safe refuge.

Site Layout and Design

The drainage strategy for the site should be considered early in the site planning process to ensure adequate inclusion of SuDS and adequate provision for the management of surface water. SuDS should be considered in accordance with the hierarchy of SuDS (i.e. considering infiltration measures first wherever possible). Attenuation is the most likely SuDS for the site.

Set-back Distance

All development should be set back 16m from the edge of the River Orwell. The Environment Agency need to be consulted and an Environmental Permit obtained for any works within 16m a Main River.

Site Name: Silo, College Street

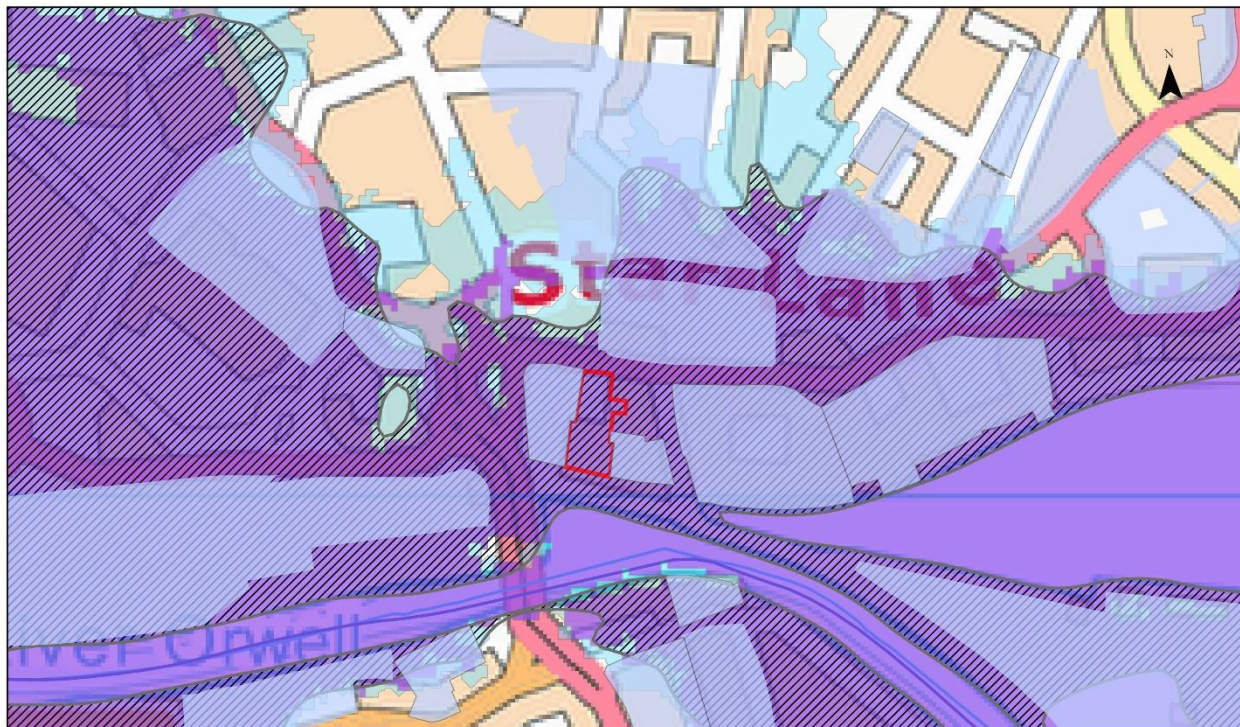
Site ID:	IP136	Location:	Silo, College Street	Area (ha):	0.16
Current Use:	Commercial	Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable

Flood Zones and Historic Records

Flood Zone 1 (<0.1% AEP): 0%	Flood Zone 2 (0.1% AEP): 0%	Flood Zone 3 (1% AEP): 100%	Flood Zone 3b (5% AEP): 0%	Area Benefiting from Defences: 100%
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The tidal River Orwell is located approximately 30m to the south of the site. The site is identified as Flood Zone 3, high probability of flooding, in the absence of flood defences. This area is shown to benefit from the presence of defences; there is a flood defence wall and embankment along the edge of the River Orwell to the south of the site, and there is a tidal barrier further downstream on the River Orwell.

The Level 1 SFRA Figure 2 shows that this site is on the edge of the area that experienced flooding in 1953. The site was also flooded by the 2013 tidal flooding event.



0.04 0.02 0 0.04 0.07 0.11 0.14
Kilometers

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FZ 3b Main Rivers
FZ 3 Ordinary Watercourses
FZ 2 Areas Benefitting from Flood Defences
Current Site
Other Sites

Fluvial Flood Risk – Lower Gipping

The site is not at risk of flooding from the fluvial Lower Gipping during the *design flood* (during either the present day or including for an allowance for climate change into the future). However, in the future, as a result of climate change, the site may be at risk of flooding during the *extreme flood* event. The flood level for the 0.1% AEP event including 25% allowance for climate change in this area is 3.97m AOD.

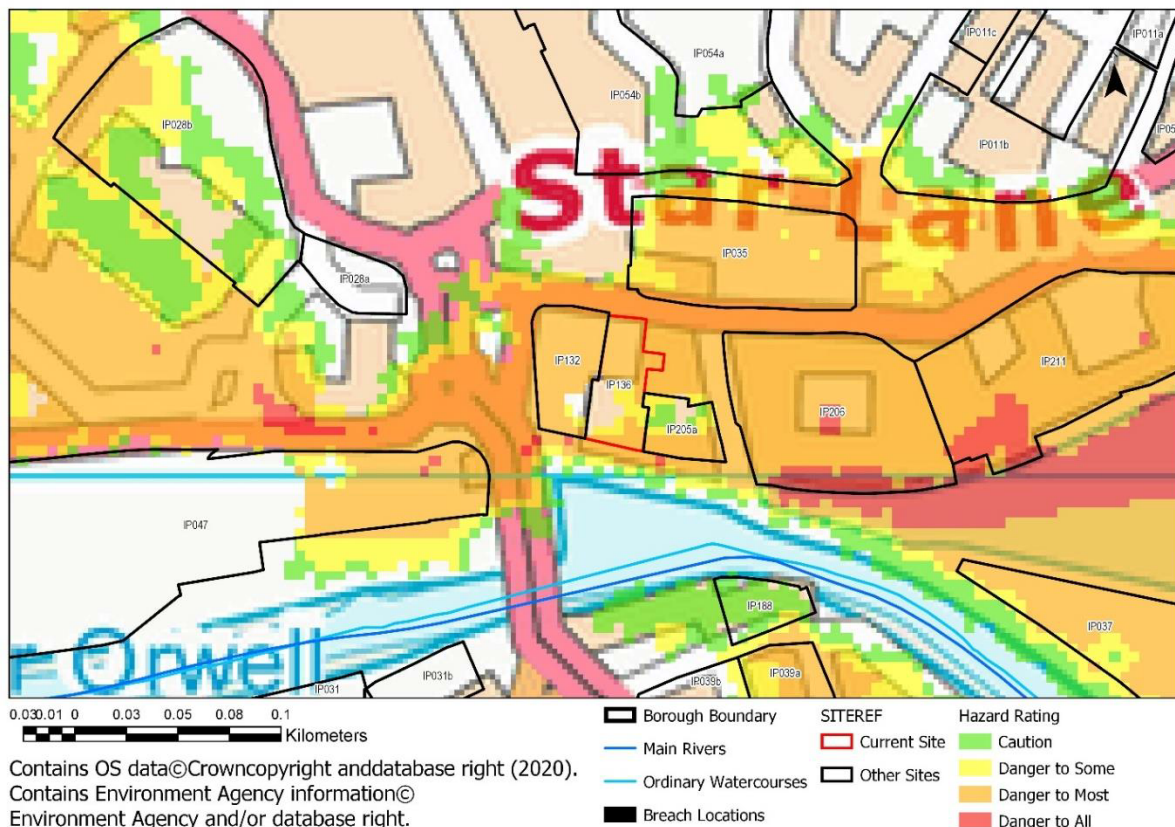
Site Name: Silo, College Street

Tidal Flood Risk – River Orwell

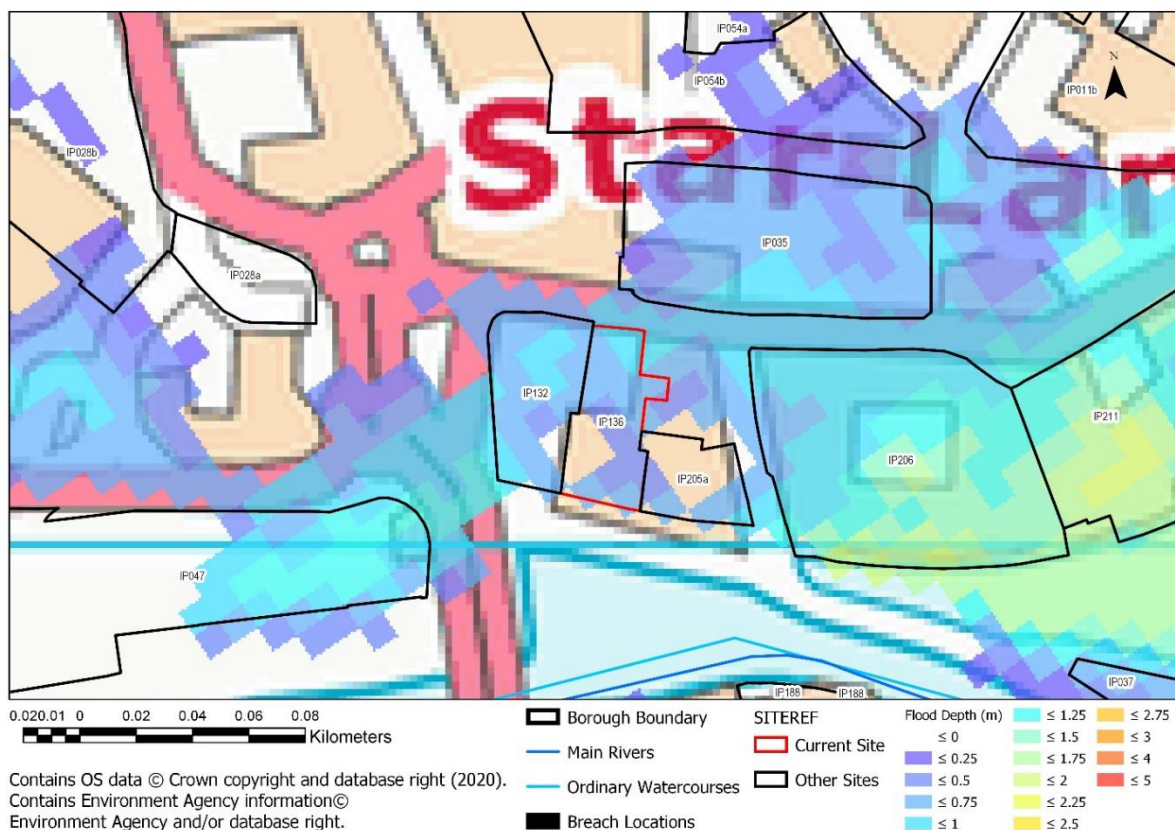
Modelling of the River Orwell shows that the site is protected from flooding during the design event (0.5% AEP event) including an allowance for climate change due to the presence of the IFDMS. The risk of tidal flooding is therefore a residual risk in the event of a failure of the flood defence infrastructure.

A composite hazard map has been created to illustrate residual flood hazard. This assumes that the Ipswich flood barrier is operating as designed and replicates maximum flood hazard should a breach occur at location BR05 and BR07 assuming that the pumping station at IP04 is not working. Under this scenario, the hazard rating on the site is Moderate (danger to some) and Significant (danger to most) and flood depths are up to 1m.

Residual Flood Risk – Combined Flood Hazard (0.5% AEP, 2118)



Residual Flood Risk – Combined Flood Depth (0.5% AEP, 2118)



Site Name: Silo, College Street

Surface Water Flood Risk

The RoFSW mapping shows that the roads in this area are susceptible to overland flow and ponding. Whilst the site itself is shown to have a low risk of surface water flooding, the surrounding routes are at medium risk.



0.03 0.01 0 0.03 0.05 0.08 0.1
Kilometers

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1 in 30 Main Rivers
1 in 100 Ordinary Watercourses
1 in 1000
Current Site
Other Sites

Groundwater Flood Risk

The ASrGWf mapping (Level 1 SFRA Figure 13) shows that the site is located within a 1km square of which 25%-50% is susceptible to groundwater emergence.

The underlying geology in this location is the White Chalk subgroup which is not suitable for infiltration type drainage, regardless of ground water levels. Appendix A Figure 17 shows which areas of Ipswich are likely to have suitable ground for infiltration. The risk of groundwater flooding and possible use of infiltration SUDS in this area should be further investigated and informed by ground investigations.

Other sources

The Environment Agency 'Risk of Flooding from Reservoirs' mapping shows that the site is not at risk.

Site Specific Recommendations

In the future, the site may be at actual risk of flooding from the Lower Gipping during an extreme flood. The site is at residual risk of tidal flooding in the event of a failure of the flood defence infrastructure. The following measures are recommended to manage these risks.

Finished Floor Levels

In relation to the residual risk of tidal flooding, finished floor levels for sleeping accommodation should be set above the maximum breach flood level, which in compartment H is 4 – 4.1m AOD (Figure 7-4).

Access / Egress

In the event of a failure of the tidal flood defences, dry access/egress for the site may not be achievable along Star Lane from the northern side of the site. Furthermore, depending on the time and location of the failure of the defences, there may not be sufficient time to enable occupants to leave the site prior to a flood event and the safest course of action may be to remain within the development within a safe place refuge.

Safe Refuge

Safe refuge must be provided above the extreme flood level.

With respect to the residual risk of tidal flooding, safe refuge must be provided above the 0.1% AEP flood level including an allowance for climate change over the lifetime of the development (5.7m AOD to 2118). This will also be adequate as a safe place of refuge for the extreme fluvial flood, as the flood level for the 0.1% AEP event including 25% allowance for climate change is 3.97m AOD.

Emergency planning

Site Name: Silo, College Street

The site is shown to be within the Environment Agency Flood Warning Area for the tidal River Orwell at Ipswich wet dock and waterfront, to upstream of Stoke Bridge; occupants should register to receive the warning service. To manage the residual risk of flooding associated with a failure of the flood defence measures in this area, Flood Response Plans should be prepared by occupants of the site including details of egress routes and place of safe refuge.

Reference to Appendix D provides information on rate of onset and flood duration for compartment H which outlines that flood water could reach a peak within 2 hours of entering the flood compartment and could remain for over 12 hours.

Site Layout and Design

The drainage strategy for the site should be considered early in the site planning process to ensure adequate inclusion of SuDS and adequate provision for the management of surface water, especially given the risk of surface water flooding in the area surrounding the site. SuDS should be considered in accordance with the hierarchy of SuDS (i.e. considering infiltration measures first wherever possible). Attenuation is the most likely SuDS to be used on the site.

Set-back Distance

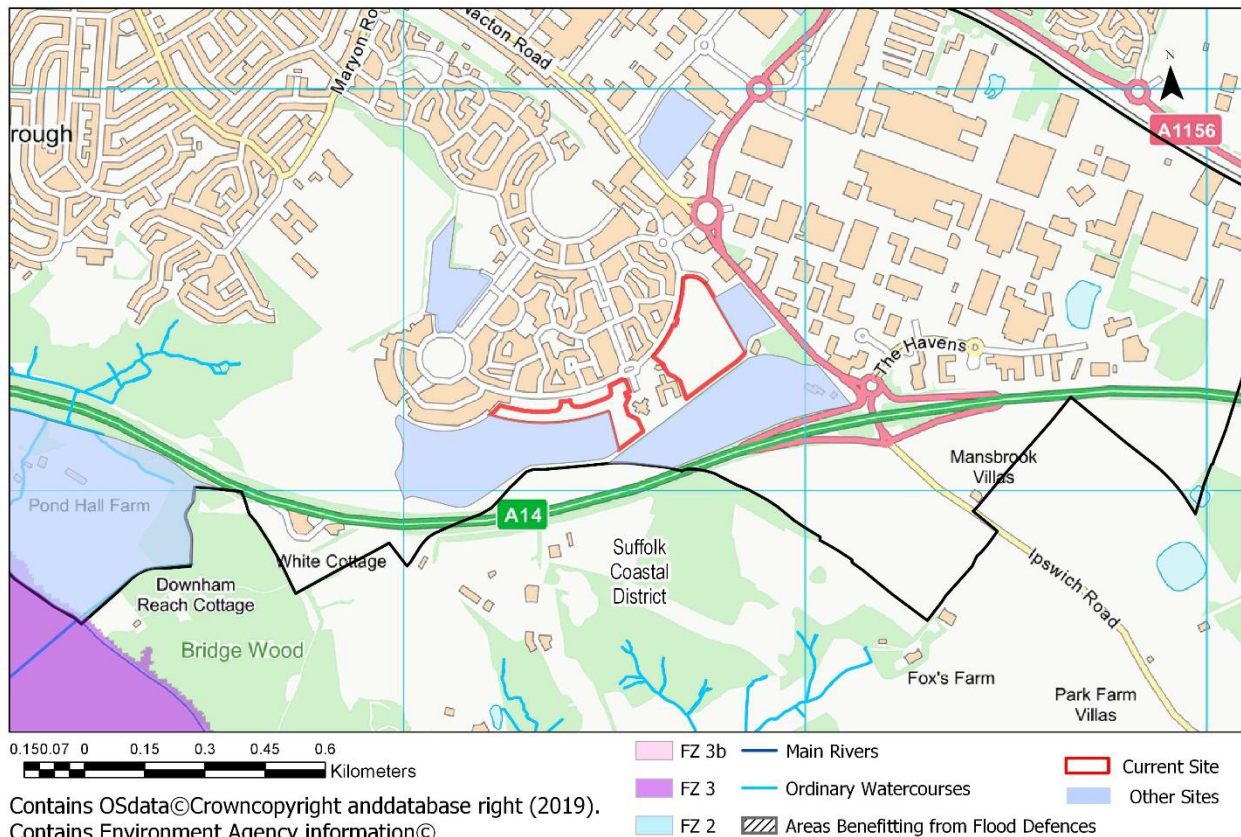
All development should be set back 16m from the edge of the River Orwell. The Environment Agency need to be consulted and an Environmental Permit obtained for any works within 16m a Main River.

Additional Information

Raising the site and College Street or providing safe access to the south will help increase the safety of the site with respect to the residual tidal flood risk.

Site Name: Ravenswood					
Site ID:	IP150d IP150e	Location:	Ravenswood	Area (ha):	Site IP150d – 1.73 Site IP150e – 3.61
Current Use:	Open land	Proposed Use:	Residential	Vulnerability:	More Vulnerable
Flood Zones					
Flood Zone 1 (<0.1% AEP): 100%	Flood Zone 2 (0.1% AEP): 0%	Flood Zone 3 (1% AEP): 0%	Flood Zone 3b (5% AEP): 0%	Area Benefiting from Defences: 0%	

The sites are identified as Flood Zone 1, low probability of flooding from rivers.



Tidal and Fluvial Flood Risk

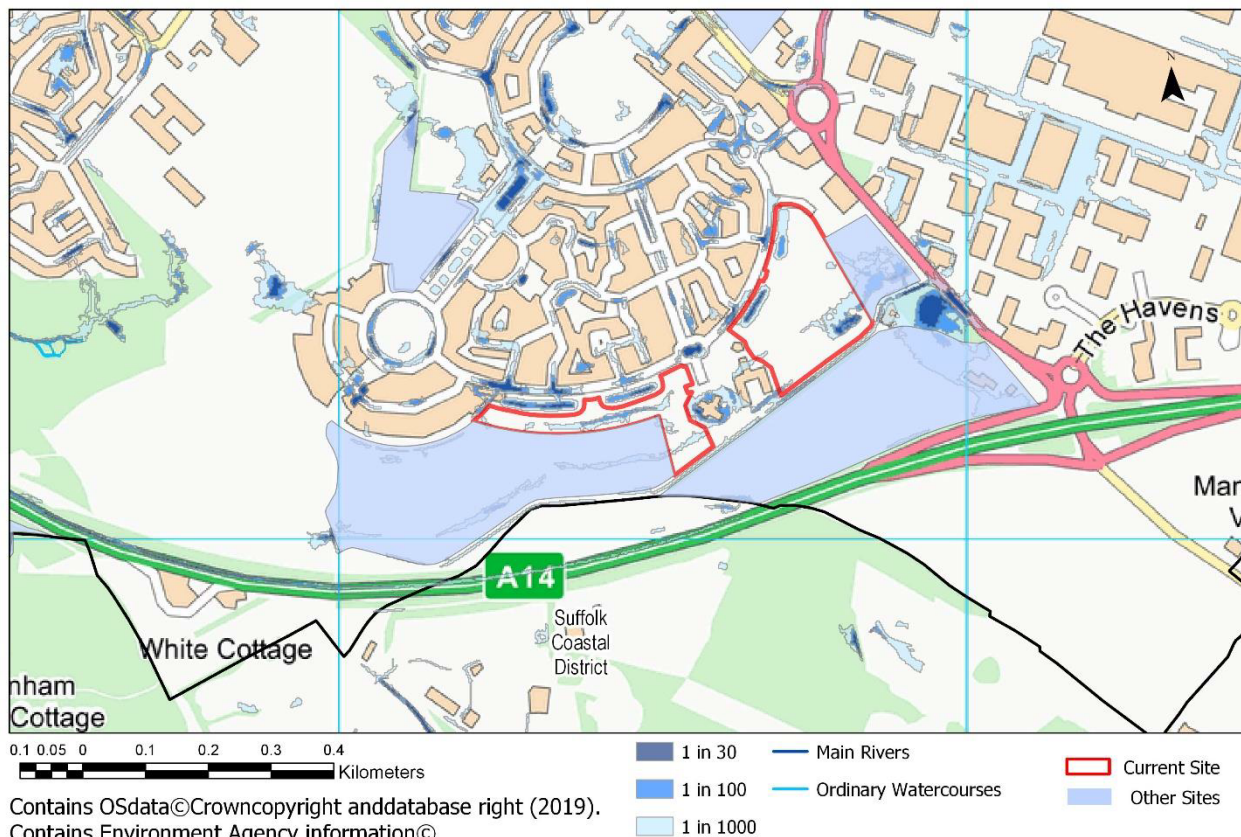
The site is in Flood Zone 1, there is no risk from fluvial or tidal sources, therefore a flood hazard and flood depth map have not been included.

Surface Water Flood Risk

Risk of Flooding from Surface Water (RoFSW)

The RoFSW mapping shows that the roads in this area are susceptible to overland flow and ponding.

Sites IP150d is shown to have a medium risk of surface water flooding. Site IP150e is shown to have high risk of surface water flooding.



Groundwater Flood Risk

The AStGWF mapping (Level 1 SFRA Figure 13) shows that the site is located within a 1km square not considered to be at risk of groundwater flooding.

The underlying geology in this location is Neogene to Quaternary Rocks which may be permeable and suitable for infiltration techniques within SuDS.

Site Specific Recommendations

Site Layout and Design

The most likely source of flooding to impact the site is surface water flooding and potentially flooding from sewers.

The areas of surface water flooding shown in the mapping above to the north of Site IP0150d are existing swale features for the effective management of surface water for the existing development. These have been excluded from the site allocation.

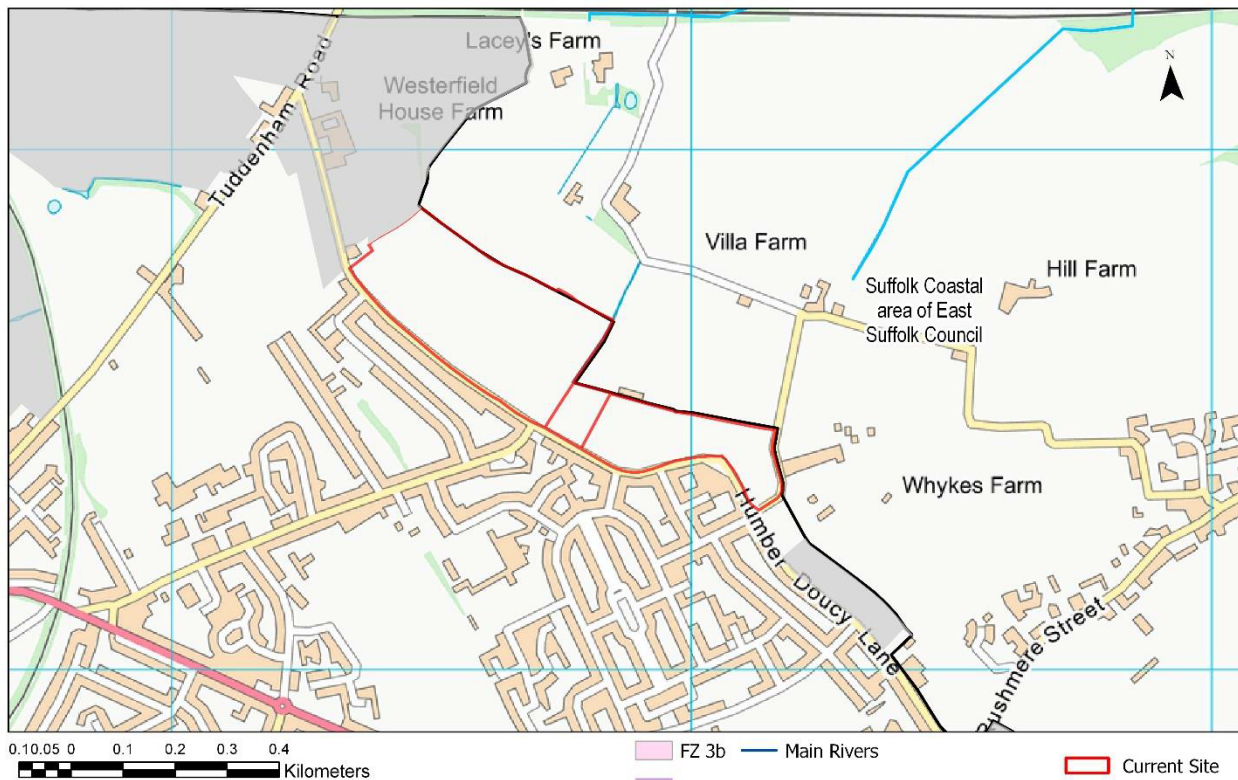
The drainage strategy for the site should be considered early in the site planning process to ensure adequate inclusion of SuDS and adequate provision for the management of surface water, especially given the risk of surface water flooding in the area surrounding the site. Infiltration is the most likely SuDS for the site. SuDS should be considered in accordance with the hierarchy of SuDS (i.e. considering infiltration measures first wherever possible).

Site Name: Humber Doucy Lane

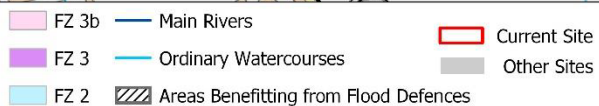
Site ID:	IP184a, b, c	Location:	Humber Doucy Lane	Area (ha):	Site IP184a – 10.15 Site IP184b – 0.84 Site IP184c – 4.01
Current Use:	Agricultural land and sports pitch	Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable
Flood Zones					
Flood Zone 1 (<0.1% AEP): 100%	Flood Zone 2 (0.1% AEP): 0%	Flood Zone 3 (1% AEP): 0%	Flood Zone 3b (5% AEP): 0%	Area Benefiting from Defences: 0%	

The sites are identified as Flood Zone 1, low probability of flooding from rivers and sea.

The closest mapped watercourses are a drain to the north east of the site, that flows northwards to join the River Fynn, and a drain approximately 1.5km west of the site which forms part of the Gipping catchment.



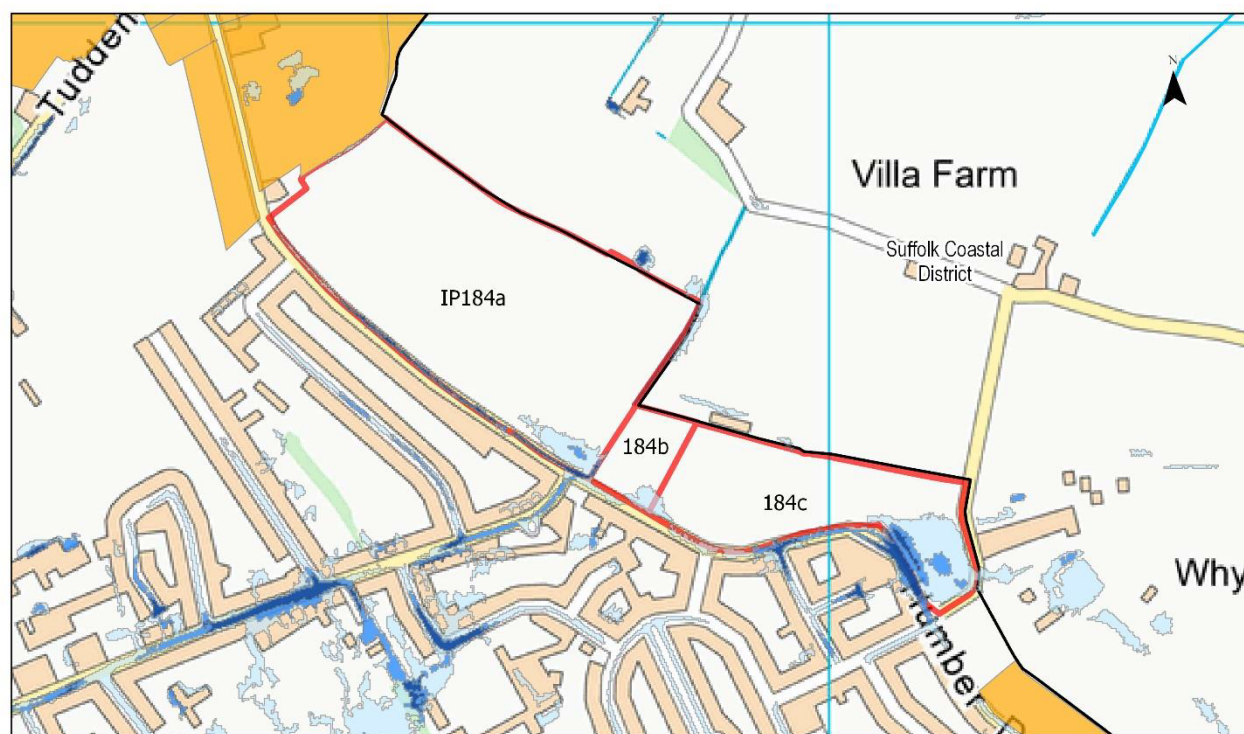
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**Surface Water Flood Risk****Risk of Flooding from Surface Water (RoFSW)**

The RoFSW mapping shows that the roads in this area are susceptible to overland flow and ponding.

- Site IP184a is shown to have a medium risk of surface water flooding.
- Site IP184b is shown to have low risk of surface water flooding.
- Site IP184c is shown to have high risk of surface water flooding.

The percentage of the sites affected by SW flood risk is low and with careful site mitigation sustainable development should be possible at this location, in terms of surface water flood risk.



0.07 0.04 0 0.07 0.14 0.21 0.28
Kilometers

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1 in 30 Main Rivers
1 in 100 Ordinary Watercourses
1 in 1000

Current Site
Other Sites

Groundwater Flood Risk

The ASGW mapping (SFRA Figure 13) shows part of Site IP184a is located within a 1km square of which 25%-50% is susceptible to groundwater emergence. Sites IP184b and IP184c are not considered to be susceptible to groundwater flooding.

The underlying geology in at Site IP184a is Neogene to Quaternary Rocks and the Thames Group. Infiltration to be further investigated during a site investigation.

Other sources

The Environment Agency 'Risk of Flooding from Reservoirs' mapping shows that the site is not at risk.

Site Specific Recommendations

Site Layout and Design

The drainage strategy for the site should be considered early in the site planning process to ensure adequate inclusion of SuDS and adequate provision for the management of surface water, especially given the risk of surface water flooding in the area surrounding the site. SuDS should be considered in accordance with the hierarchy of SuDS (i.e. considering infiltration measures first wherever possible).

Site Name: Websters saleyard site, Dock Street

Site ID:	IP188	Location:	Websters saleyard site, Dock Street	Area (ha):	0.10
Current Use:	Commercial	Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable

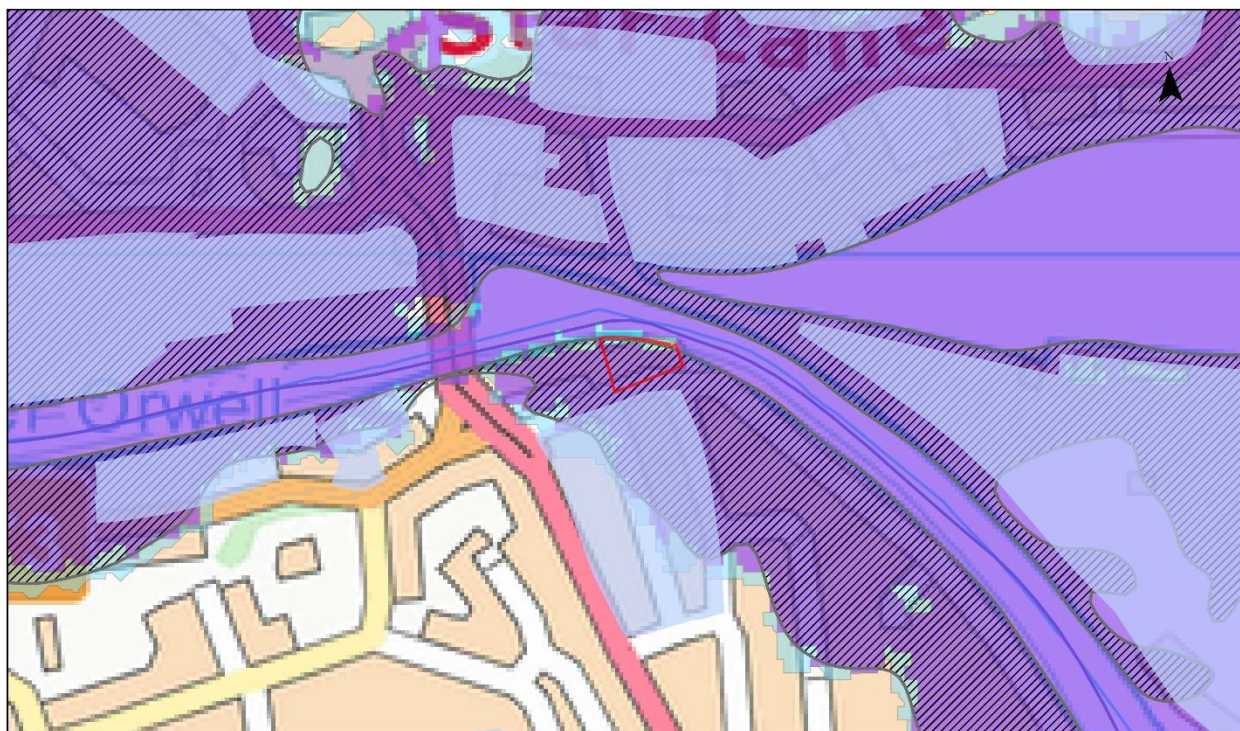
Flood Zones and Historic Records

Flood Zone 1 (<0.1% AEP): 0%	Flood Zone 2 (0.1% AEP): 17%	Flood Zone 3 (1% AEP): 83%	Flood Zone 3b (5%AEP): 0%	Area Benefiting from Defences: 94%
--	---	---	--	---

The tidal River Orwell flows south east just to north east of the site.

The majority of the site is identified as Flood Zone 3, high probability of flooding from the tidal River Orwell, in the absence of flood defences. The site is shown to benefit from the presence of defences; there is a flood defence wall along the edge of the channel to the west of the site, and there is a tidal barrier further downstream on the River Orwell.

The Level 1 SFRA Figure 2 shows that this area has historically experienced flooding in 1953. Ipswich BC also hold records of flooding to the north of site where Vernon Street meets Bridge Street, associated with the surface water network being blocked or overwhelmed.



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Kilometers

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FZ 3b Main Rivers
FZ 3 Ordinary Watercourses
FZ 2 Areas Benefitting from Flood Defences
Current Site
Other Sites

Fluvial Flood Risk – Lower Gipping

The site is not at risk of flooding from the fluvial Lower Gipping during the *design flood* (during either the present day or including for an allowance for climate change into the future). The site is also not at risk of flooding from the fluvial River Gipping during the *extreme flood* (0.1% AEP event including 25% allowance for climate change).

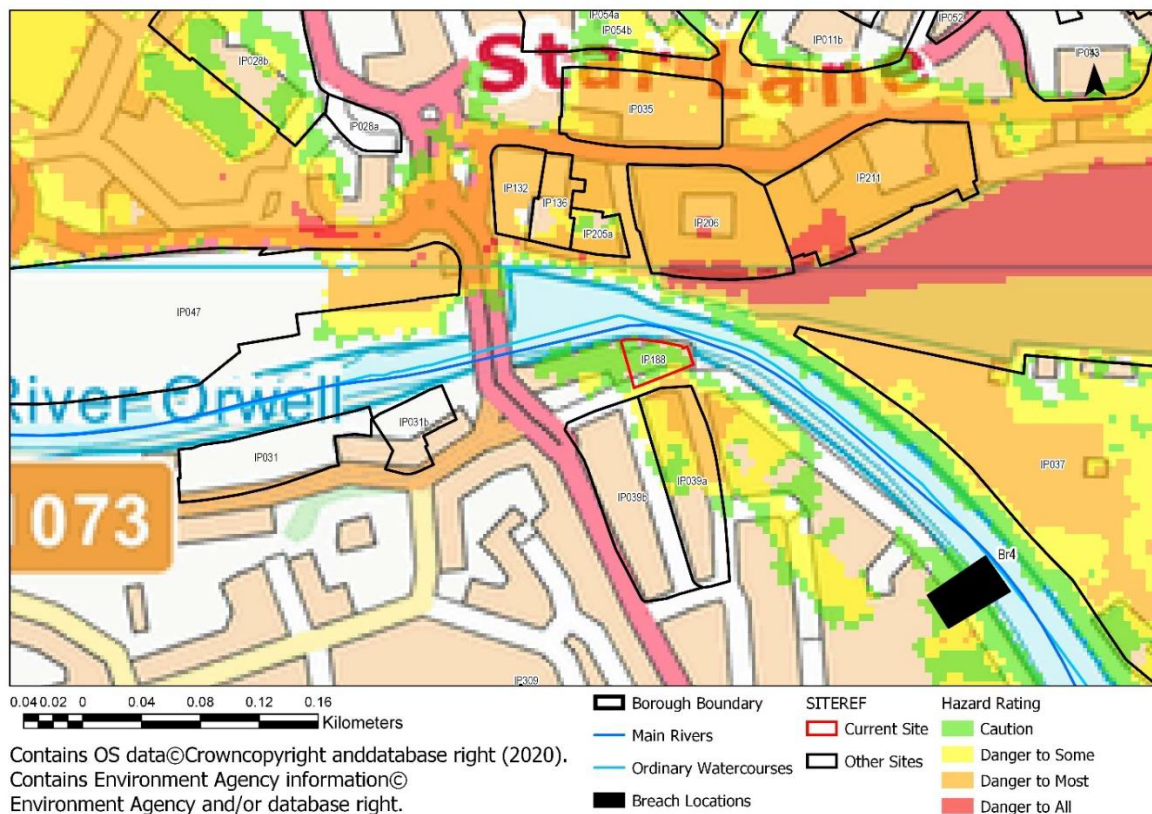
Site Name: Websters saleyard site, Dock Street

Tidal Flood Risk – River Orwell

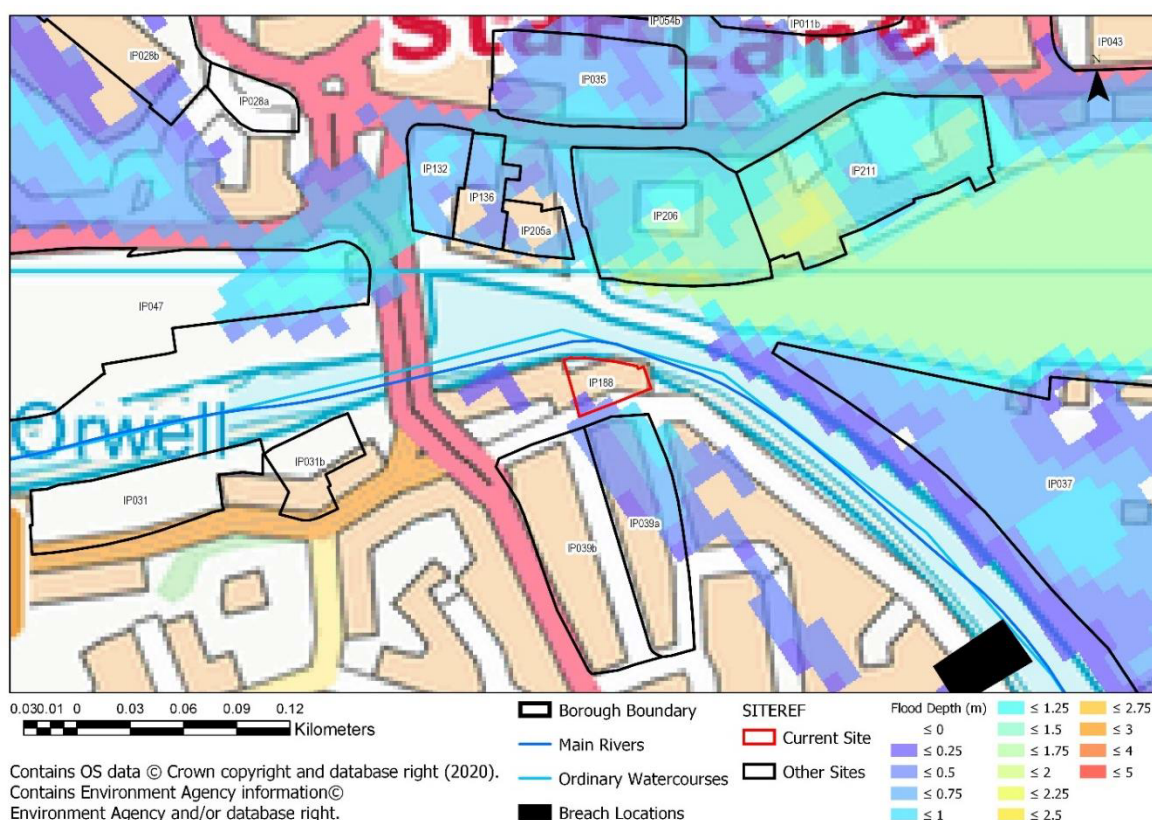
Modelling of the River Orwell shows that the site is protected from flooding during the design event (0.5% AEP event) including an allowance for climate change due to the presence of the IFDMS. The risk of tidal flooding is therefore a residual risk in the event of a failure of the flood defence infrastructure.

A composite hazard map has been created to illustrate residual flood hazard. This assumes that the Ipswich flood barrier is operating as designed and replicates maximum flood hazard should a breach occur at location BR05 and BR07 assuming that the pumping station at IP04 is not working. In this scenario the hazard rating across the site is predominantly Low (Caution), corresponding to flood depths of up to 0.25m.

Residual Flood Risk – Combined Flood Hazard (0.5% AEP, 2118)



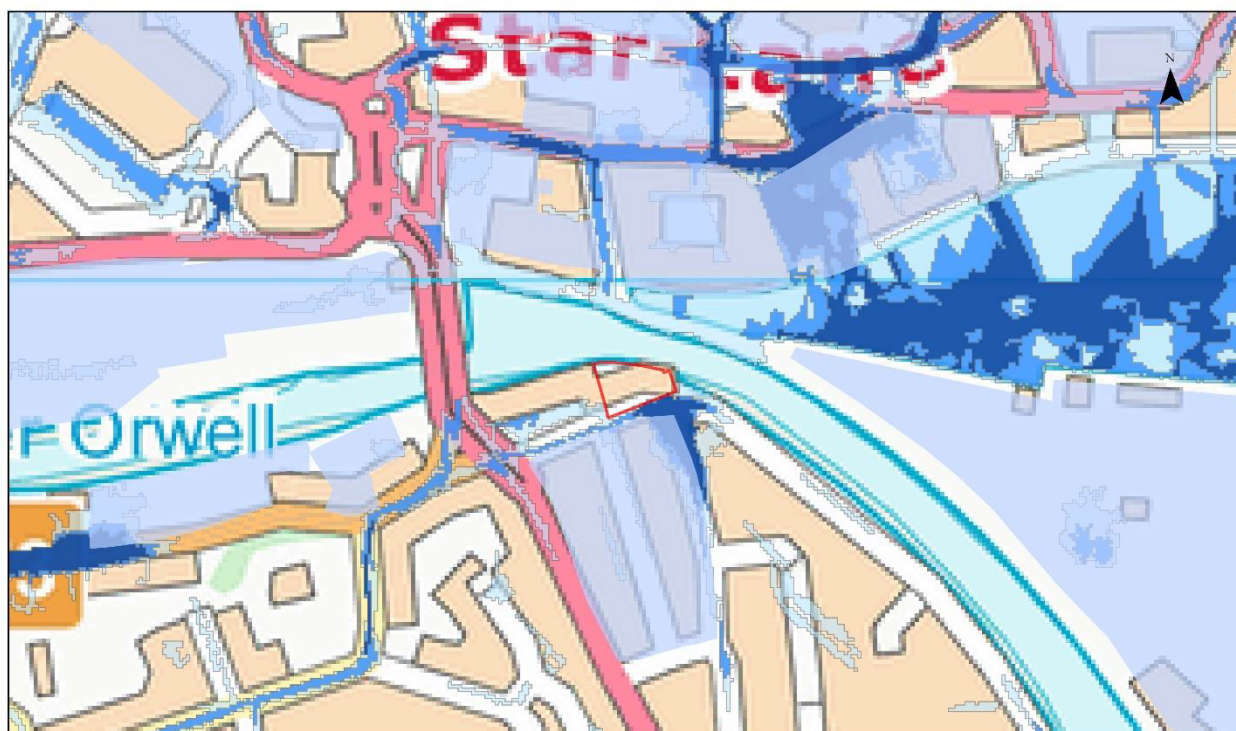
Residual Flood Risk – Combined Flood Depth (0.5% AEP, 2118)



Site Name: Websters saleyard site, Dock Street

Surface Water Flood Risk

Although the site is shown to be at low risk from surface water flooding, there are areas to the south of the site that are susceptible to ponding and overland flow.



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Kilometers

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Surface Water
1 in 30
1 in 100
1 in 1000

Current Site
Other Sites

Groundwater Flood Risk

The AStGWF mapping (Level 1 SFRA Figure 13) shows that the site is located within a 1km square of which 25%-50% is susceptible to groundwater emergence.

The underlying geology in this location is the White Chalk subgroup which is not suitable for infiltration type drainage, regardless of ground water levels. Appendix A Figure 17 shows which areas of Ipswich are likely to have suitable ground for infiltration. The risk of groundwater flooding and possible use of infiltration SUDS in this area should be further investigated and informed by ground investigations.

Other sources

The Environment Agency 'Risk of Flooding from Reservoirs' mapping shows that the site is not at risk from this source.

Site Specific Recommendations

The site is at residual risk of tidal flooding in the event of a failure of the flood defence infrastructure. The following measures are recommended to manage these risks.

Finished Floor Levels

In relation to the residual risk of tidal flooding, finished floor levels for sleeping accommodation should be set above the maximum breach flood level, which in compartment C is 3.5m AOD (Figure 7-4).

Access / Egress

In the event of a failure of the tidal flood defences, part of the access/egress routes away from the site along Stoke Quay may have a potential hazard rating of up Low to Moderate ("Danger for some"). Furthermore, depending on the time and location of the failure of the defences, there may not be sufficient time to enable occupants to leave the site prior to a flood event and the safest course of action may be to remain within the development within a safe place refuge.

Safe Refuge

Safe refuge must be provided above the extreme flood level.

With respect to the residual risk of tidal flooding, safe refuge must be provided above the 0.1% AEP flood level including an allowance for climate change over the lifetime of the development (5.7m AOD to 2118).

Emergency planning

The site is shown to be within the Environment Agency Flood Warning Area for the tidal River Orwell at Ipswich wet dock and waterfront, to upstream of Stoke Bridge; occupants should register to receive the warning service. To manage the

Site Name: Websters saleyard site, Dock Street

residual risk of flooding associated with a failure of the flood defence measures in this area, Flood Response Plans should be prepared by occupants of the site including details of egress routes and place of safe refuge.

Appendix D of the SFRA outlines that rate of onset to peak at this location (compartment C) is only 1.5 hour and flood water may remain on site for over 21hrs. This shows the importance of inclusion of a place of safe refuge.

Set-back Distance

All development should be set back 16m from the edge of the River Orwell. The Environment Agency need to be consulted and an Environmental Permit obtained for any works within 16m of a Main River.

Site Layout and Design

The drainage strategy for the site should be considered early in the site planning process to consider the current risk of surface water flooding particularly in the northern part of the site, to ensure adequate inclusion of SuDS and adequate provision for the management of surface water during high tide conditions. SuDS should be considered in accordance with the hierarchy of SuDS (i.e. considering infiltration measures first wherever possible).

Additional Information

Raising the site and providing high level access via site 38 or raising Dock Street will increase the safety of the site.

Site Name: Helena Road

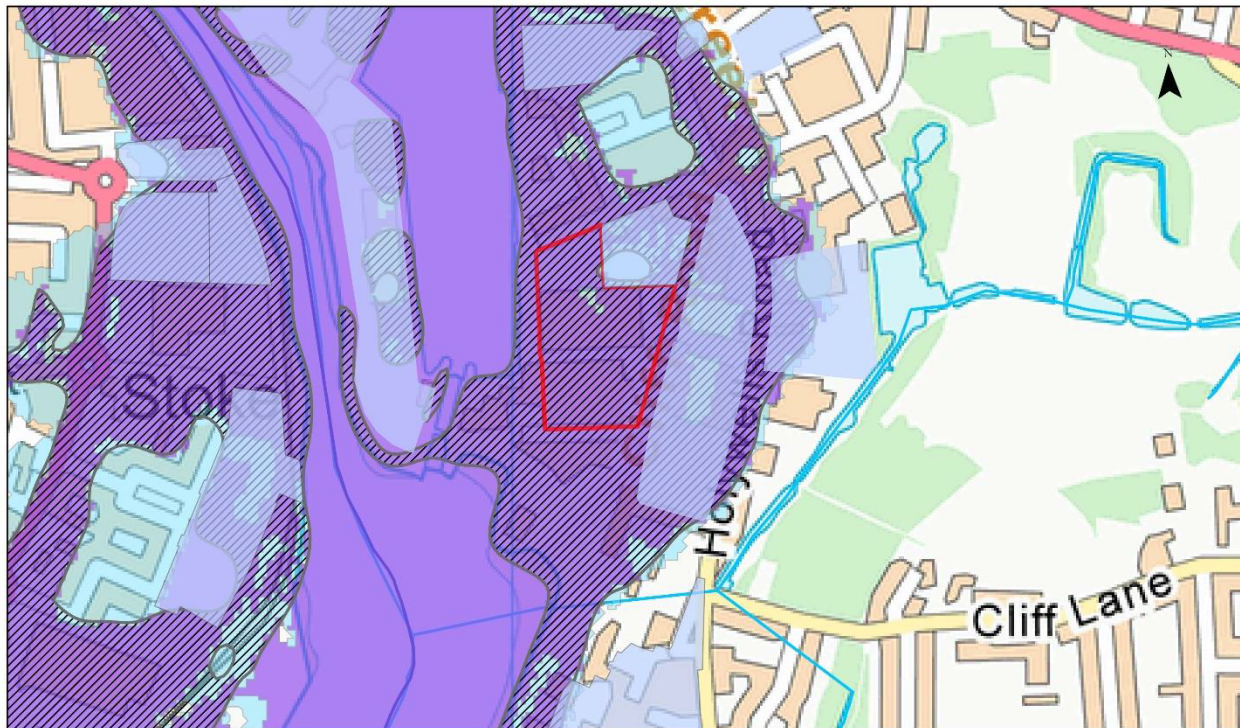
Site ID:	IP226	Location:	Helena Road	Area (ha):	1.85
Current Use:	Commercial	Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable

Flood Zones and Historic Records

Flood Zone 1 (<0.1% AEP): 0%	Flood Zone 2 (0.1% AEP): 2%	Flood Zone 3 (1% AEP): 98%	Flood Zone 3b (5%AEP): 0%	Area Benefiting from Defences: 100%
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This site is located approximately 20m to the east of the Wet Dock and 200m to the east of the tidal River Orwell. The majority of the site is identified as Flood Zone 3, high probability of flooding, in the absence of flood defences. This area is shown to benefit from the presence of defences; there are flood defence walls and embankments along the edge of the River Orwell, and there is a tidal barrier further downstream on the River Orwell.

The Level 1 SFRA Figure 2 shows that this site is on the edge of the area that experienced flooding in 1953. Ipswich BC also hold records of road and pavement flooding near to this location on Holywells Road.



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Kilometers

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FZ 3b — Main Rivers
FZ 3 — Ordinary Watercourses
FZ 2 — Current Site
Other Sites
Areas Benefitting from Flood Defences

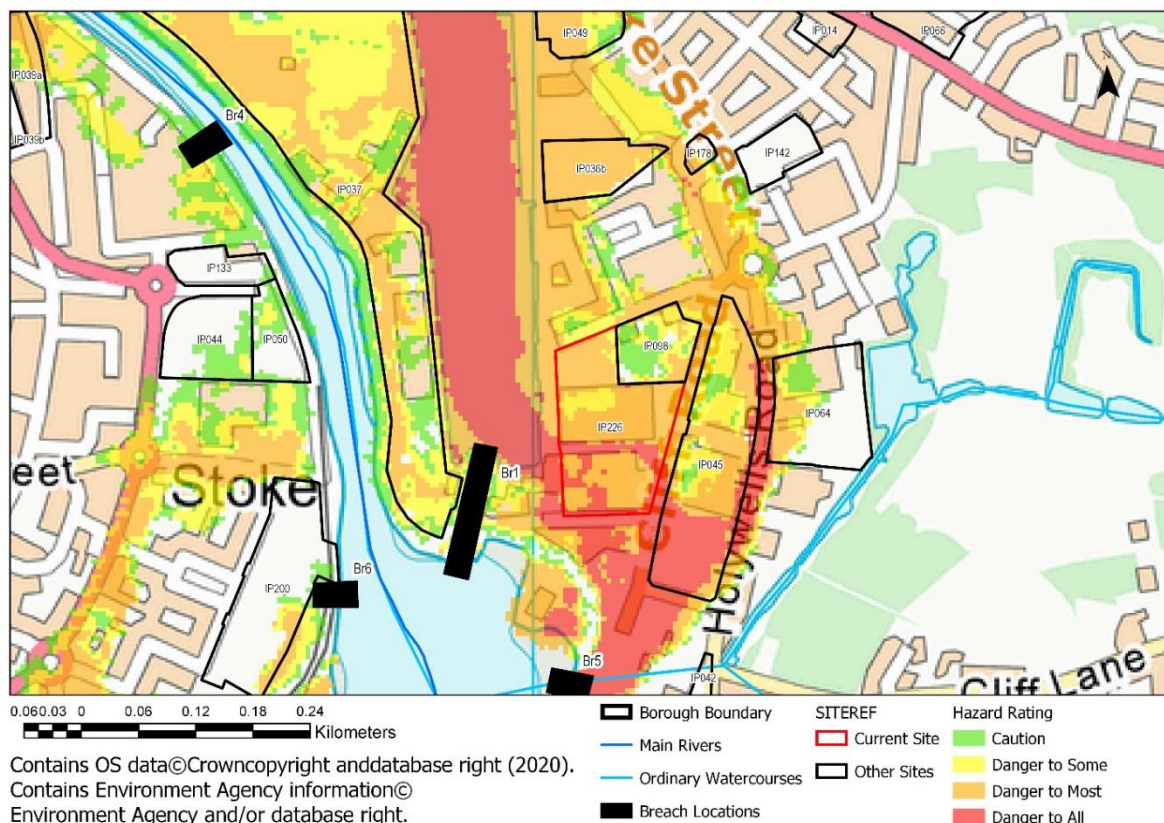
Fluvial Flood Risk – Lower Gipping

The site is not at risk of flooding from the fluvial Lower Gipping during the *design flood* (during either the present day or including for an allowance for climate change into the future). However, in the future, as a result of climate change, the site may be at risk of flooding during the *extreme flood* event. The flood level for the 0.1% AEP event including 25% allowance for climate change in this area is 3.97m AOD.

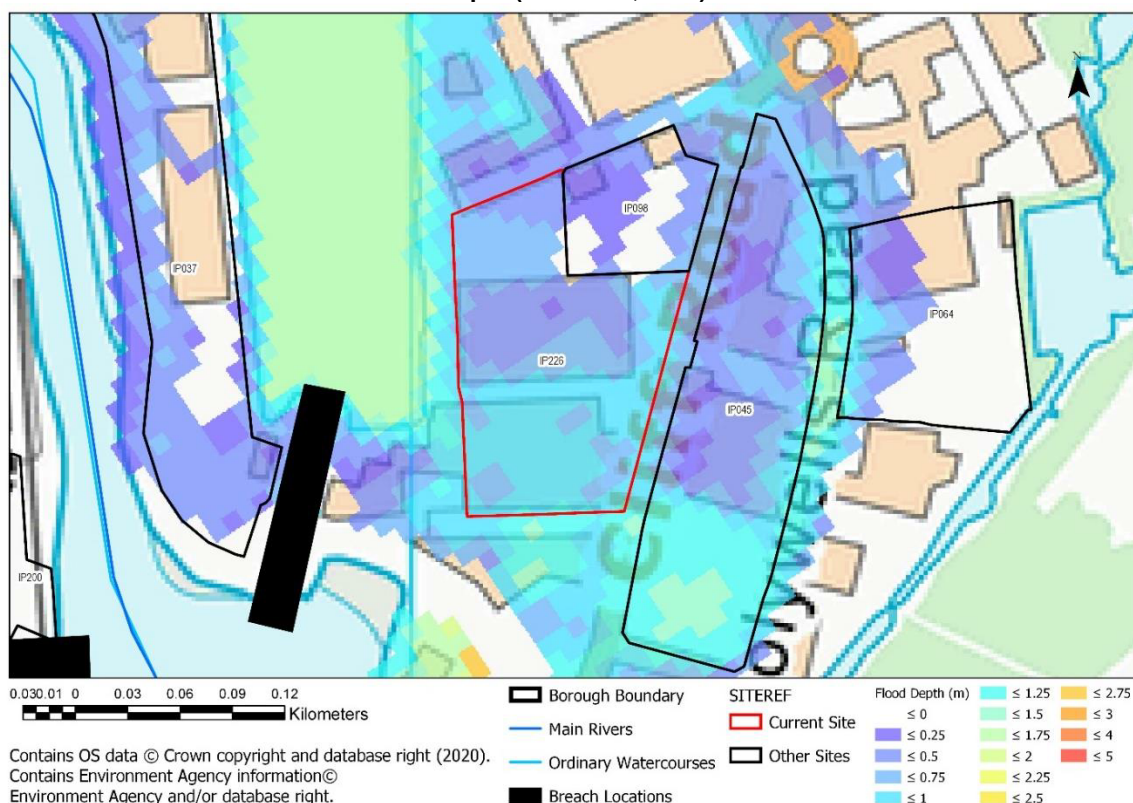
Tidal Flood Risk – River Orwell

A composite hazard map has been created to illustrate residual flood hazard. This assumes that the Ipswich flood barrier is operating as designed and replicates maximum flood hazard should a breach occur at location BR05 and BR07 assuming that the pumping station at IP04 is not working. Under this scenario, the southern half of the site is modelled to flood to depths of approximately 1m, corresponding to a hazard rating of Extreme (Danger to All), reducing in the north to Significant (Danger to Most) and Moderate (Danger to Some).

Residual Flood Risk – Combined Flood Hazard (0.5% AEP, 2118)

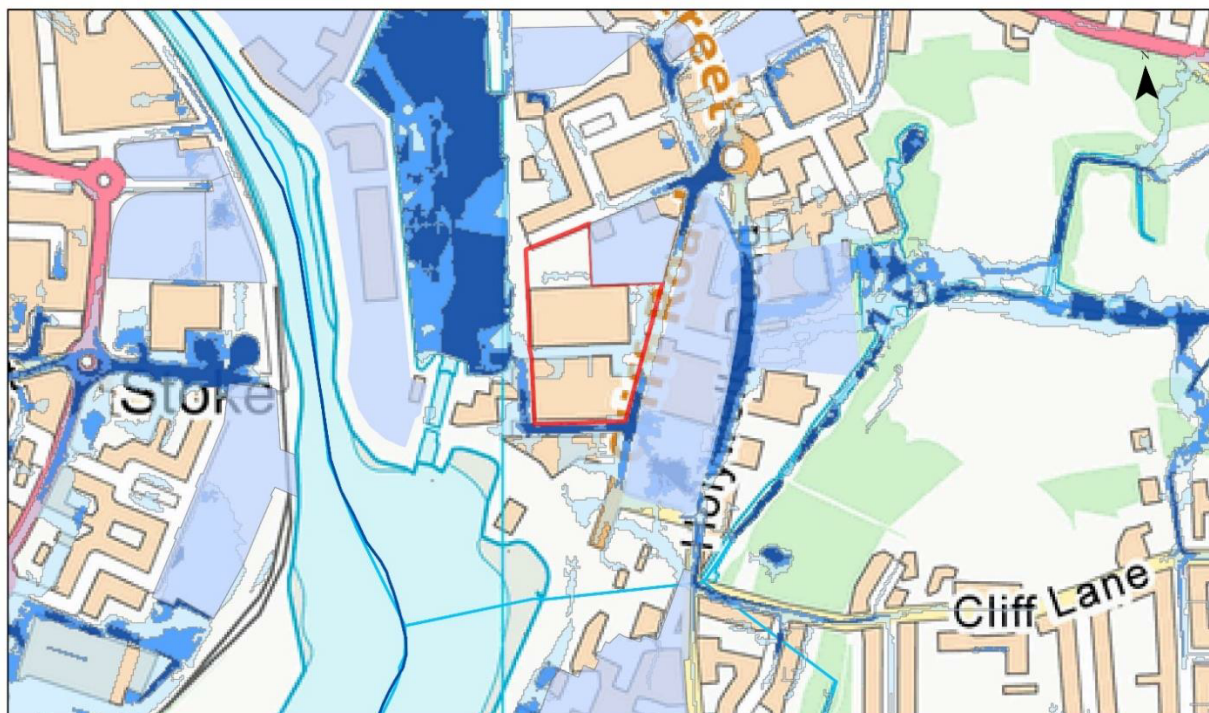


Residual Flood Risk – Combined Flood Depth (0.5% AEP, 2118)



Surface Water Flood Risk

The RoFSW mapping shows that the roads in this area are susceptible to overland flow and ponding. Whilst the site itself is shown to have a low risk of surface water flooding, the surrounding routes are at high risk.



0.060.03 0 0.06 0.12 0.18 0.24
Kilometers

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1 in 30 Main Rivers
1 in 100 Ordinary Watercourses
1 in 1000
Current Site
Other Sites

Groundwater Flood Risk

The ASGWf mapping (Level 1 SFRA Figure 13) shows that the site is located within a 1km square of which <25% is susceptible to groundwater emergence.

The underlying geology in this location is the White Chalk subgroup which is not suitable for infiltration type drainage, regardless of ground water levels. Appendix A Figure 17 shows which areas of Ipswich are likely to have suitable ground for infiltration. The risk of groundwater flooding and possible use of infiltration SUDS in this area should be further investigated and informed by ground investigations.

Other sources

The Environment Agency 'Risk of Flooding from Reservoirs' mapping shows that the site is not at risk.

Site Specific Recommendations

In the future, the site may be at actual risk of flooding from the Lower Gipping during an extreme flood. The site is at residual risk of tidal flooding in the event of a failure of the flood defence infrastructure. The following measures are recommended to manage these risks.

Finished Floor Levels

In relation to the residual risk of tidal flooding, finished floor levels for sleeping accommodation should be set above the maximum breach flood level, which in this part of compartment H, close to Breach 05 is 4.1 – 5.3m AOD (Figure 7-4).

Access / Egress

In the event of a failure of the tidal flood defences, access/egress routes along Cliff Road towards the Myrtle Road roundabout and along Patteson Road may have a potential hazard rating of up to Significant ("Danger for most") and Extreme ("Danger for all"). Furthermore, depending on the time and location of the failure of the defences, there may not be sufficient time to enable occupants to leave the site prior to a flood event and the safest course of action may be to remain within the development within a safe place refuge.

Safe Refuge

Safe refuge must be provided above the extreme flood level.

With respect to the residual risk of tidal flooding, safe refuge must be provided above the 0.1% AEP flood level including an allowance for climate change over the lifetime of the development (5.7m AOD to 2118). This will also be adequate as

Site Name: Helena Road

a safe place of refuge for the extreme fluvial flood, as the flood level for the 0.1% AEP event including 25% allowance for climate change is 3.97m AOD.

Emergency planning

The site is shown to be within the Environment Agency Flood Warning Area for the tidal River Orwell at Ipswich wet dock and waterfront, to upstream of Stoke Bridge; occupants should register to receive the warning service. To manage the residual risk of flooding associated with a failure of the flood defence measures in this area, Flood Response Plans should be prepared by occupants of the site including details of egress routes and place of safe refuge.

Reference to Appendix D provides information on rate of onset and flood duration for compartment H which outlines that flood water could reach a peak within 2 hours of entering the flood compartment and could remain for over 12 hours.

Site Layout and Design

The drainage strategy for the site should be considered early in the site planning process to ensure adequate inclusion of SuDS and adequate provision for the management of surface water. SuDS should be considered in accordance with the hierarchy of SuDS (i.e. considering infiltration measures first wherever possible).

Site Name: South of former BT office, Bibb Way

Site ID:	IP0279b(2)	Location:	South of former BT office, Bibb Way	Area (ha):	0.62
Current Use:	Offices	Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable

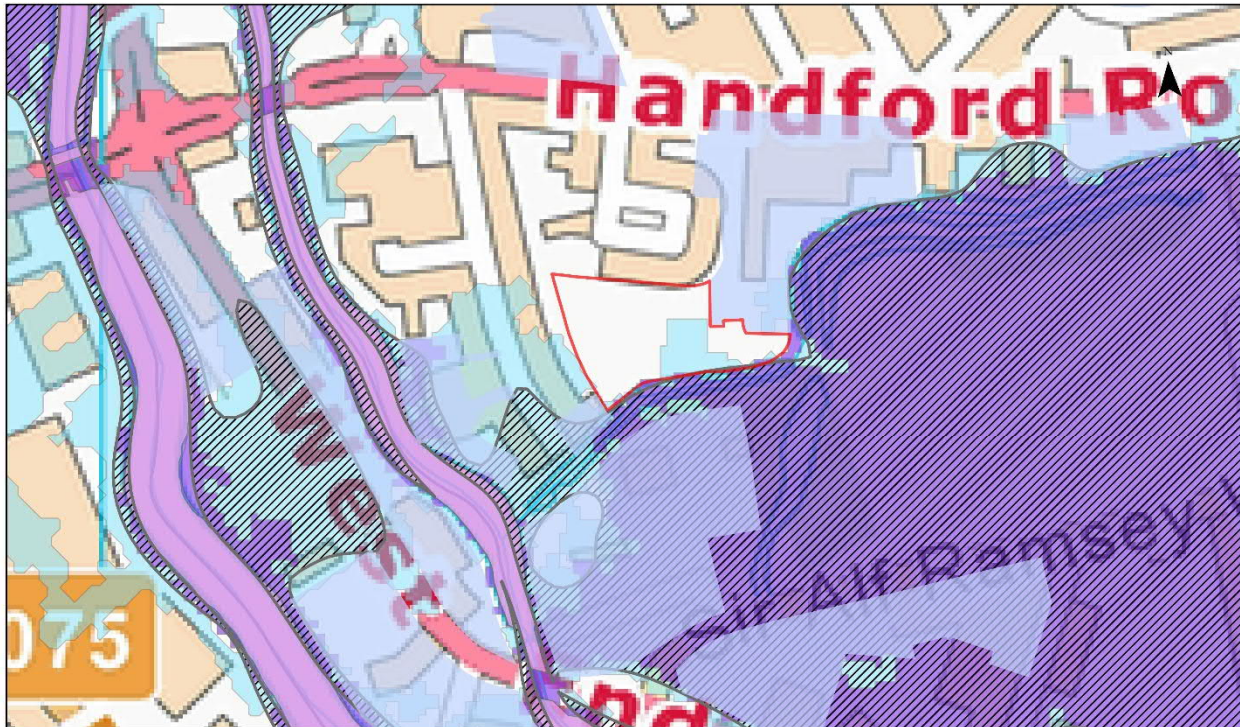
Flood Zones and Historic Flooding

Flood Zone 1 (<0.1% AEP): 82%	Flood Zone 2 (0.1% AEP): 18%	Flood Zone 3 (1% AEP): 2%	Flood Zone 3b (5% AEP): 0%	Area Benefiting from Defences: 1%
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As it flows through Ipswich, the River Gipping becomes the River Orwell. A channel of the River Gipping / Orwell flows approximately 90m to the southwest of the site. At this location the River Gipping / Orwell is tidally influenced. A channel of the Alderman Canal flows along the southern edge of the Site, described further in Sections 3.6 and 5.7 of the Main SFRA.

A small section of the centre of the site is located in Flood Zone 2 – undefended, the rest of the site is located in Flood Zone 1. This may require updating once the impact of the new modelling for the River Gipping is known.

The Level 1 SFRA Figure 2 shows that this site is on the edge of the area that experienced flooding in 1939.

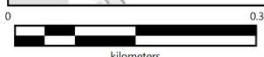
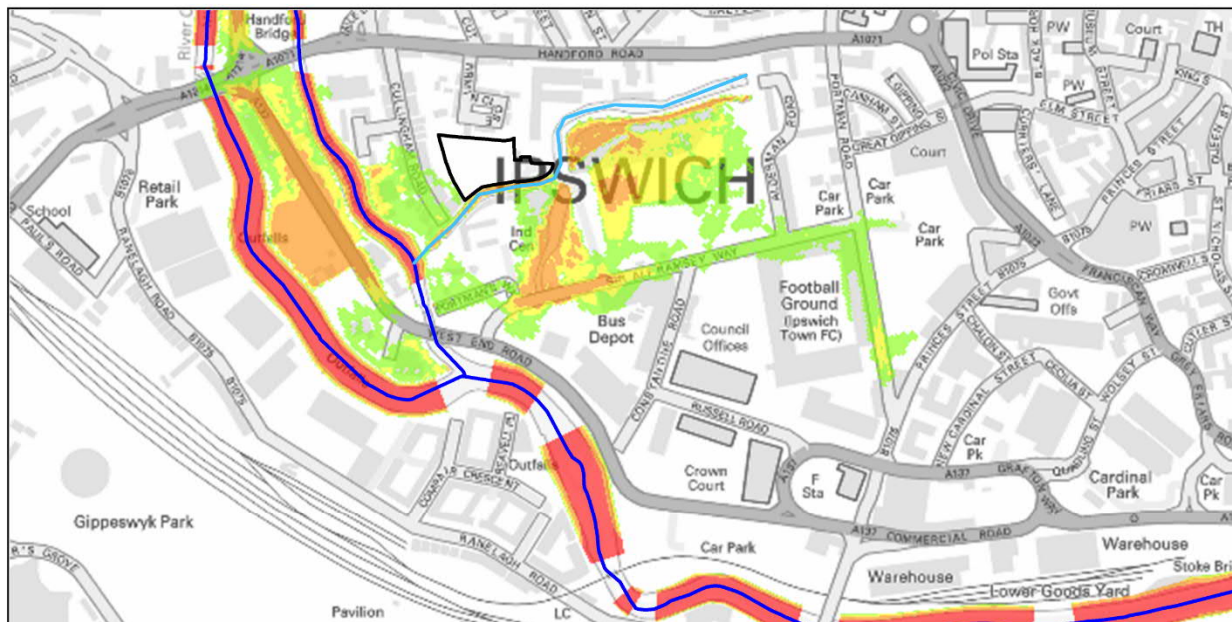


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Site Name: South of former BT office, Bibb Way

Fluvial Flood Risk – Lower Gipping

Modelling of the Lower Gipping (Mott MacDonald September 2020), shows that floodwater remains in bank in this part of Ipswich during the 5% AEP, 1% and 0.1% AEP events. However, in the future there is potential that the risk of flooding from the Lower Gipping could increase as a result of climate change, assuming no alterations are made to the flood defences. In this scenario, land to the south and west of the site along Bibb Way and Cullingham Road are shown to be at risk during the 1% AEP event including a 65% allowance for climate change, with flood levels of 3.9m AOD and Low - Significant hazard rating. The area to the west and south of the site is also shown to be at risk during the 0.1% AEP event including 25% allowance for climate change, with flood levels of 4.6m AOD.



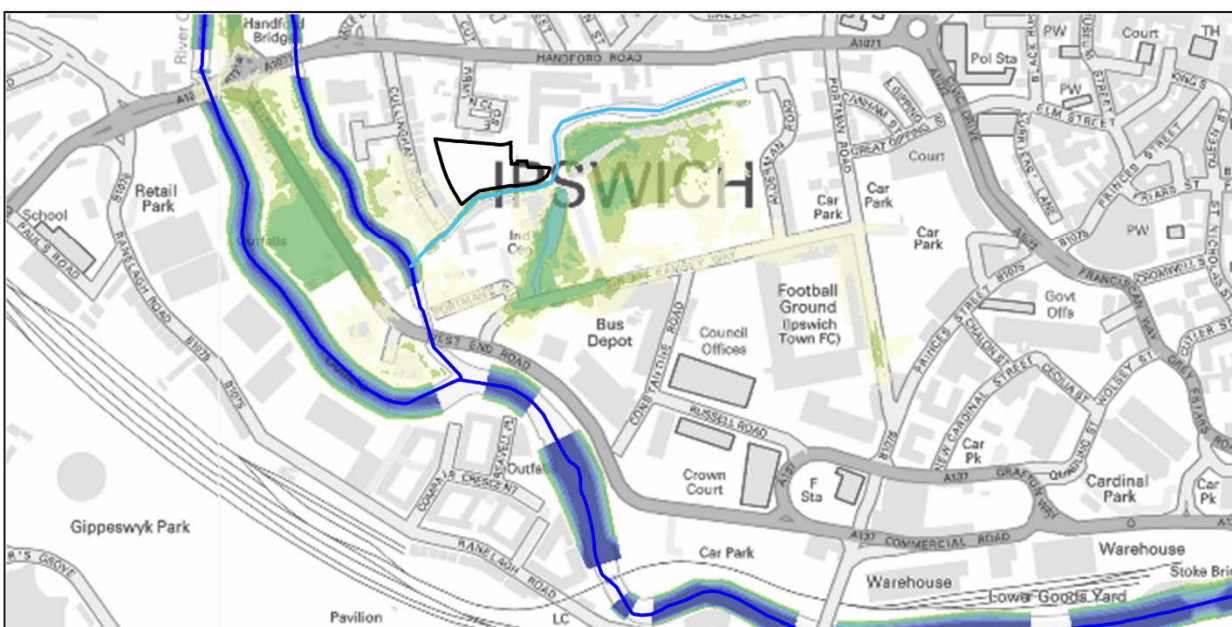
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SITE REF

- Site Boundary
- Main River
- Ordinary Watercourse

Hazard Rating: River Gipping 1% AEP incl. 65% climate change

- Low: Caution
- Moderate: Danger to Some
- Significant: Danger to Most
- Extreme: Danger to All



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SITE REF

- Site Boundary
- Main River
- Ordinary Watercourse

Maximum Flood Depth (m): River Gipping 1% AEP incl. 65% climate change

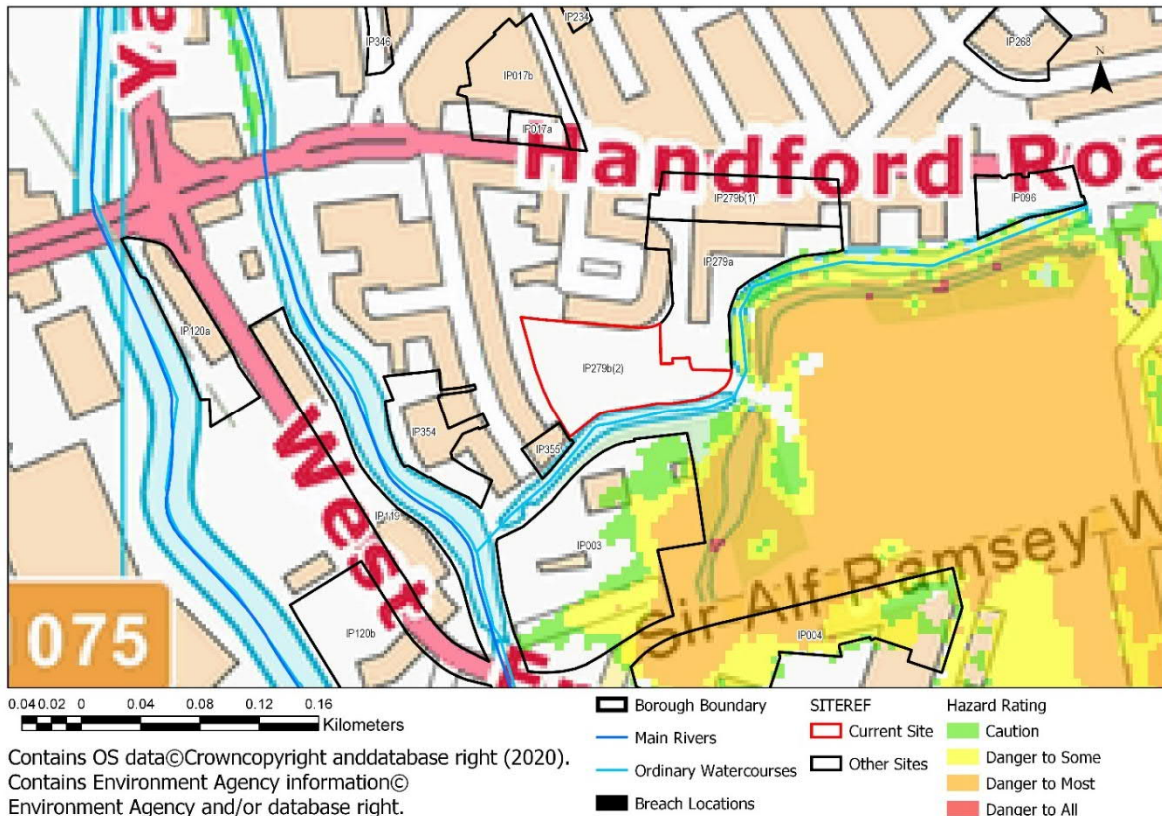
- <0.25
- <0.5
- <1
- <1.5
- <2
- <2.5
- <3
- >3

Site Name: South of former BT office, Bibb Way

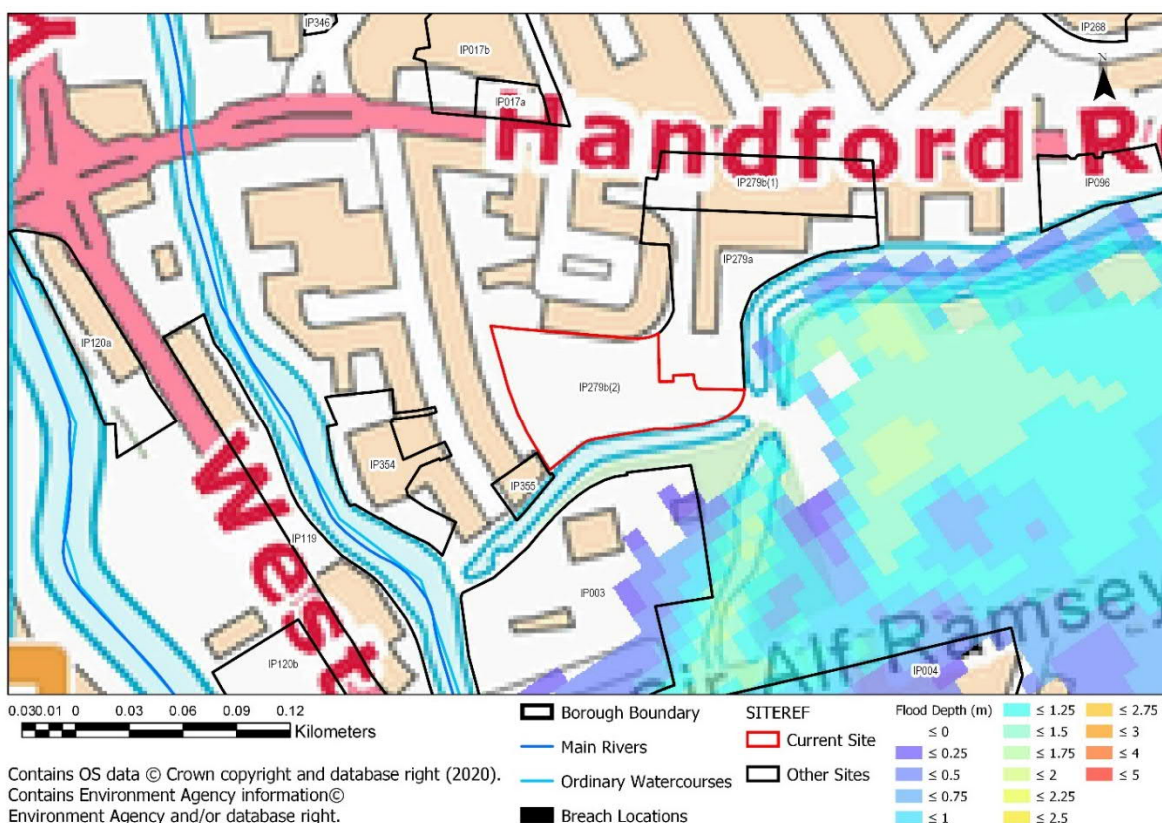
Tidal Flood Risk – River Orwell

Modelling of the River Orwell shows that the site is protected from flooding during the design flood (0.5% AEP event) including an allowance for climate change due to the presence of the IFDMS. The risk of tidal flooding is therefore a residual risk, i.e. in the event of failure of the flood defence infrastructure. A composite hazard map has been created to illustrate residual flood hazard. This assumes that the Ipswich flood barrier is operating as designed and replicates maximum flood hazard should a breach occur at location BR05 and BR07 assuming that the pumping station at IP04 is not working. Under this scenario, flood water does not extend as far north as the site.

Residual Flood Risk – Combined Flood Hazard (0.5% AEP, 2118)



Residual Flood Risk – Combined Flood Depth (0.5% AEP, 2118)

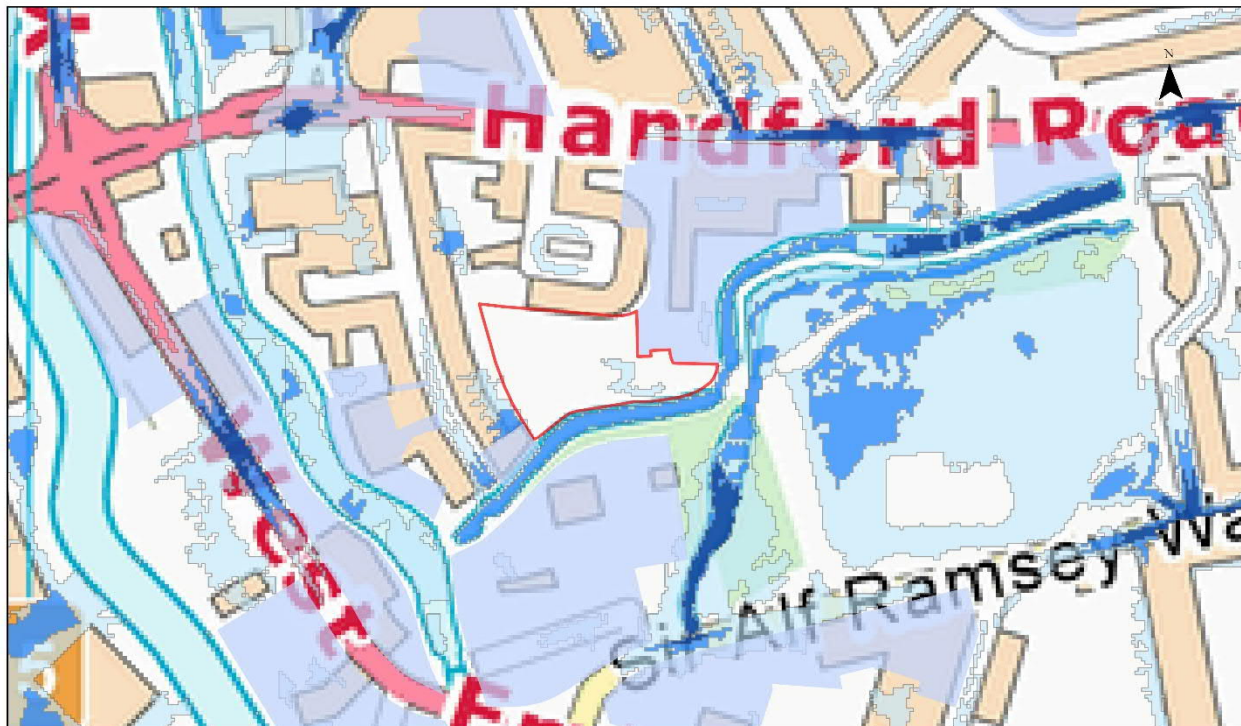


Site Name: South of former BT office, Bibb Way

Surface Water Flood Risk

Risk of Flooding from Surface Water

The risk of surface water flooding to the site is low, with a small area affected in the east. There is a higher risk of surface water flooding along the surrounding roads which are susceptible to ponding and overland flow.



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Groundwater Flood Risk

The AStGWF mapping (Level 1 SFRA Figure 13) shows that the site is located within a 1km square of which 50%-75% is susceptible to groundwater emergence.

The underlying geology in this location is the White Chalk subgroup which is not suitable for infiltration type drainage, regardless of ground water levels. Appendix A Figure 17 shows which areas of Ipswich are likely to have suitable ground for infiltration. The risk of groundwater flooding and possible use of infiltration SUDS in this area should be further investigated and informed by ground investigations.

Other sources

The Environment Agency 'Risk of Flooding from Reservoirs' mapping shows that the site is not at risk.

Site Specific Recommendations

The area surrounding the site is shown to be at actual risk of fluvial flooding from the Lower Gipping in the future as a result of climate change and at residual risk of tidal flooding in the event of a failure of the flood defence infrastructure. The following measures are recommended to mitigate the actual risk of fluvial flooding in the future, and to manage the residual risk of tidal flooding.

Finished Floor Levels

Finished floor levels should be set 300mm above the fluvial design flood level including an allowance for climate change. The flood level for areas near the site for the 1% AEP event including 65% climate change is 3.9m AOD.

In relation to the residual risk of tidal flooding, finished floor levels for sleeping accommodation should be set above the maximum breach flood level, which in compartment J is 3.61 – 3.7m AOD (Figure 7-4).

Access / Egress

During the fluvial design flood (1% AEP including 65% climate change) dry access/egress for the site is achievable to the north towards Handford Road.

In the event of a failure of the tidal flood defences, floodwater is not shown to extend as far as the site, and dry access/egress for the site would be achievable to the north of the site, towards Handford Road.

Site Name: South of former BT office, Bibb Way*Safe Refuge*

Safe refuge must be provided above the extreme flood level.

With respect to the residual risk of tidal flooding, safe refuge must be provided above the 0.1% AEP flood level including an allowance for climate change over the lifetime of the development (5.7m AOD to 2118). This will also be adequate as a safe place of refuge for the extreme fluvial flood, as the flood level for the 0.1% AEP event including 25% allowance for climate change is 4.6m AOD.

Emergency planning

The site is shown to be within the Environment Agency Flood Warning Area for the tidal River Orwell at Ipswich wet dock and waterfront, to upstream of Stoke Bridge; occupants should register to receive the Environment Agency's flood warning service. Given the nature of fluvial flooding and the location of Ipswich at the lower end of the catchment, there is likely to be advanced warning of flooding associated with the River Gipping.

To manage the residual risk of flooding associated with a failure of the flood defence measures in this area, Flood Response Plans should be prepared by occupants of the site including details of egress routes and place of safe refuge.

Reference to Appendix D outlines rate of onset and flood duration. This outlines that for flood compartment J, peak flood level could be reached on site within 2 hours from the breach. Flood water could remain within the flood compartment for 15hrs.

Site Layout and Design

The drainage strategy for the site should be considered early in the site planning process to ensure adequate inclusion of SuDS and adequate provision for the management of surface water during high tide conditions. SuDS should be considered in accordance with the hierarchy of SuDS (i.e. considering infiltration measures first wherever possible). The likely SuDS type for this site is attenuation.

Set-back Distance

All development should be set back from the edge of watercourses. The Environment Agency need to be consulted and an Environmental Permit obtained for any works within 16m a Main River. Consent needs to be obtained from Suffolk County Council (in their capacity as the LLFA) for any works that may affect flow within the Ordinary Watercourse to the south of the site.

Additional Information

It should be noted that while the Environment Agency mapping does not place the site in a high risk flood zone, there is channel of the Alderman Canal located along the southern boundary of the site. A simple assessment of the residual risk of a failure of the embankment has been carried out and is reported in Section 5.7 of the Main SFRA. The potential risk from this source to this site needs to be fully understood as part of a site-specific flood risk assessment.

Site Name: 72 (Old Boatyard) Cullingham Road IP1 2EG

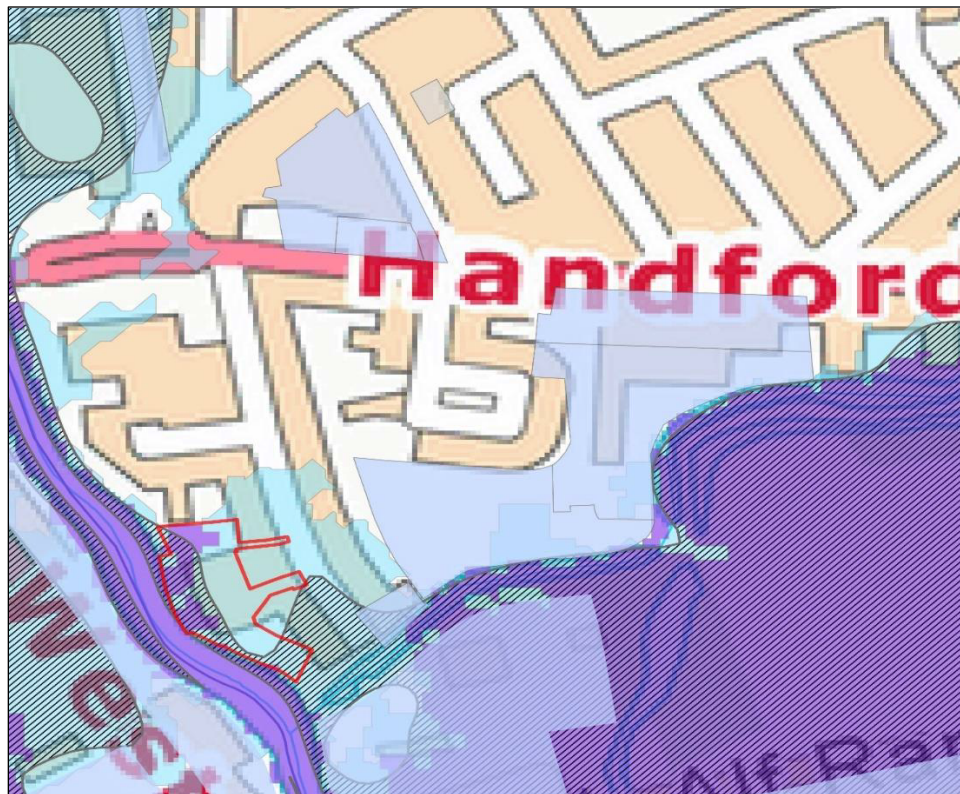
Site ID:	IP354	Location:	72 (Old Boatyard) Cullingham Road IP1 2EG	Area (ha):	0.34
Current Use:	Commercial	Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable

Flood Zones and Historic Flooding

Flood Zone 1 (<0.1% AEP): 0%	Flood Zone 2 (0.1% AEP): 74%	Flood Zone 3 (1% AEP): 26%	Flood Zone 3b (5% AEP): 0%	Area Benefiting from Defences: 45%
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As it flows through Ipswich, the River Gipping becomes the River Orwell. A channel of the River Gipping / Orwell flows south along the western edge of the site and joins with another main channel of the River Orwell. At this location the River Gipping / Orwell is tidally influenced. Most of the site is identified as Flood Zone 3, high probability of flooding, in the absence of flood defences. The site is shown to benefit from the presence of defences; there is a flood defence wall along the edge of the channel to the west of the site, and there is a tidal barrier further downstream on the River Orwell. The site is therefore at residual risk of fluvial or tidal flooding, in the event of a failure of these defences. This may require updating once the impact of the new modelling for the River Gipping is known.

The Level 1 SFRA Figure 2 shows that this site is on the edge of the area that experienced flooding in 1939.



0.04 0.02 0 0.04 0.07 0.11 0.14
Kilometers

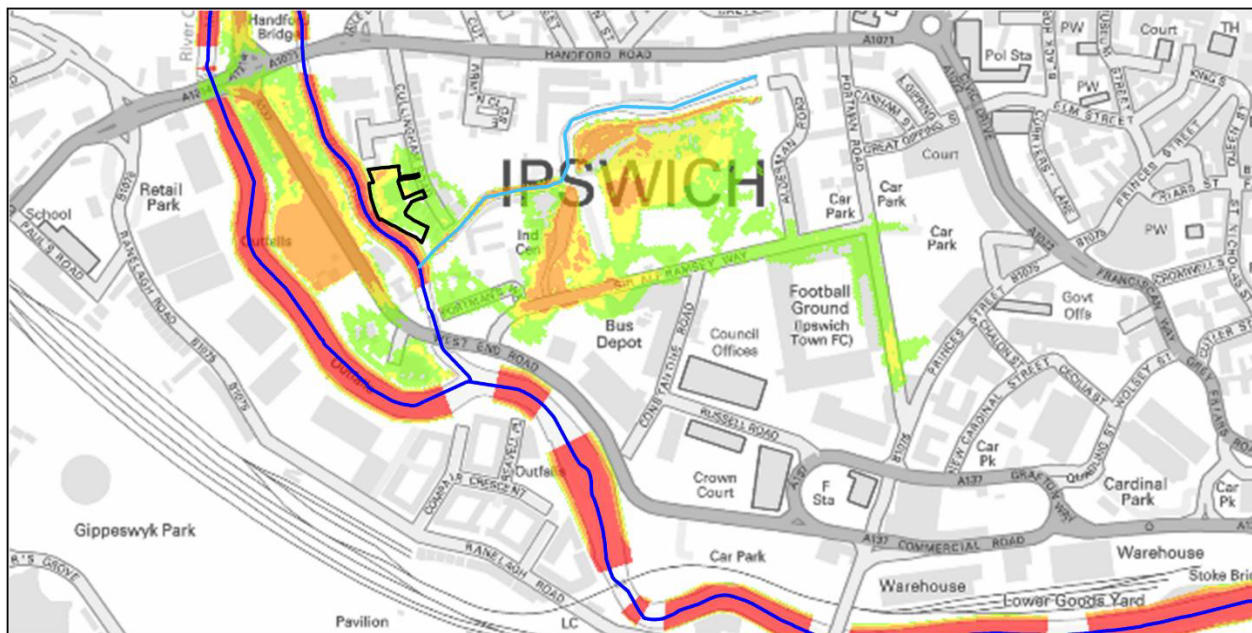
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- FZ 3b — Main Rivers
- FZ 3 — Ordinary Watercourses
- FZ 2 — Areas Benefiting from Flood Defences
- Current Site
- Other Sites

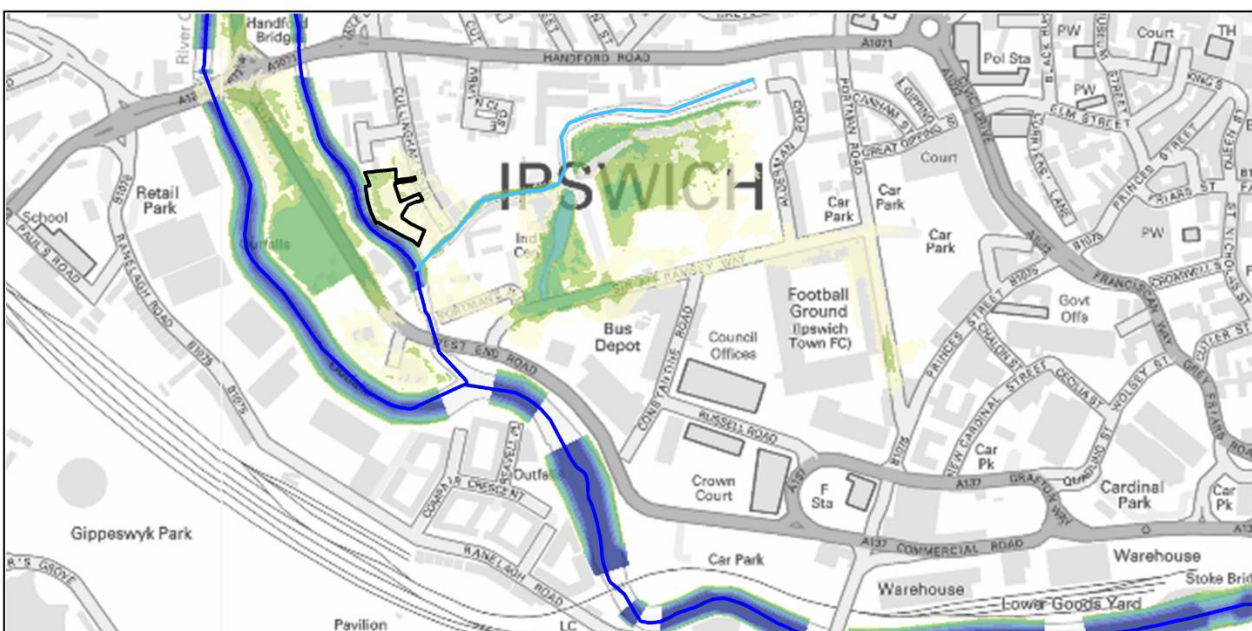
Site Name: 72 (Old Boatyard) Cullingham Road IP1 2EG

Fluvial Flood Risk – Lower Gipping

Modelling of the Lower Gipping (Mott MacDonald September 2020), shows that floodwater remains in bank in this part of Ipswich during the 5% AEP, 1% and 0.1% AEP events. However, in the future there is potential that the risk of flooding from the Lower Gipping could increase as a result of climate change, assuming no alterations are made to the flood defences. In this scenario, the site is shown to be at risk during the 1% AEP event including a 65% allowance for climate change, with flood levels of 4.47m AOD and Low - Significant hazard rating. The site is also shown to be at risk during the 0.1% AEP event including 25% allowance for climate change, with flood levels of 4.7 – 4.95m AOD.



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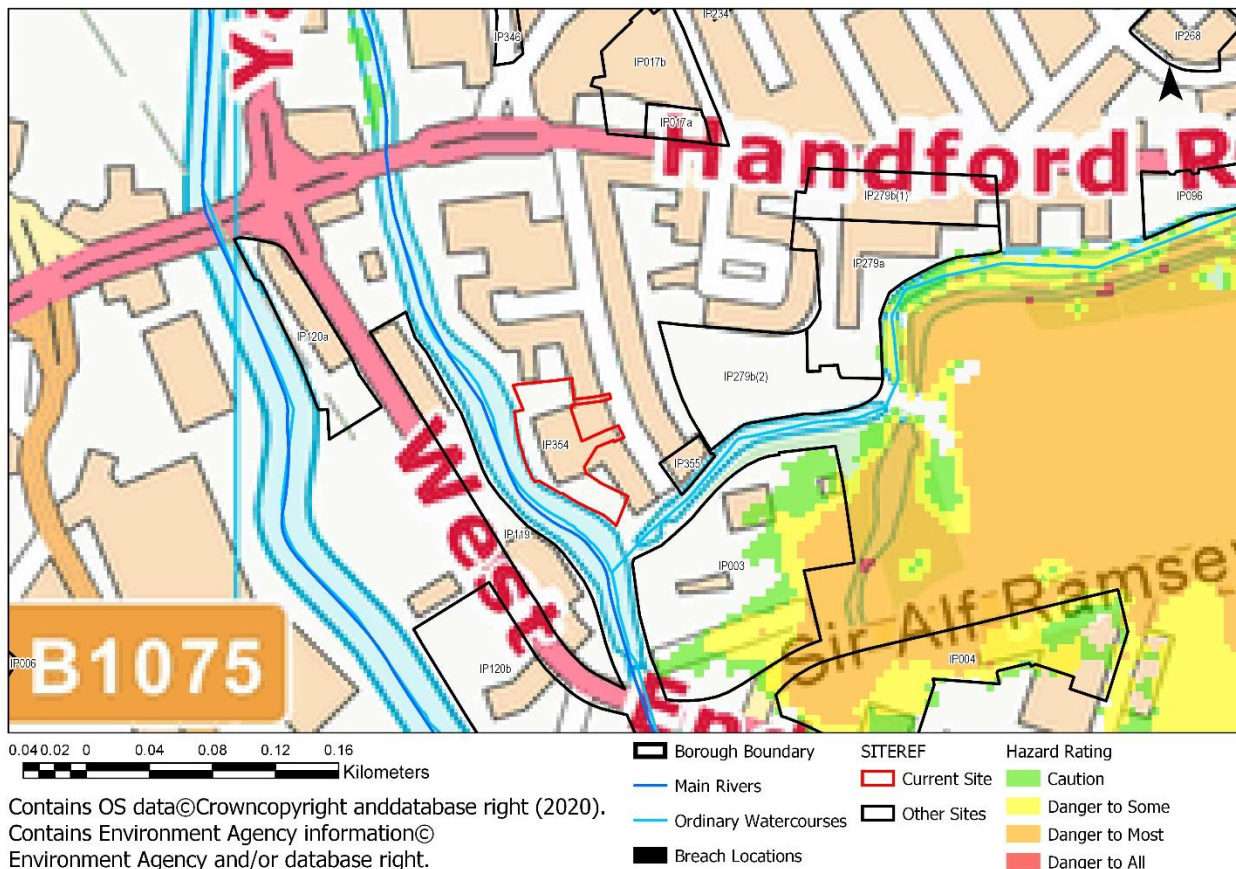
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Tidal Flood Risk – River Orwell

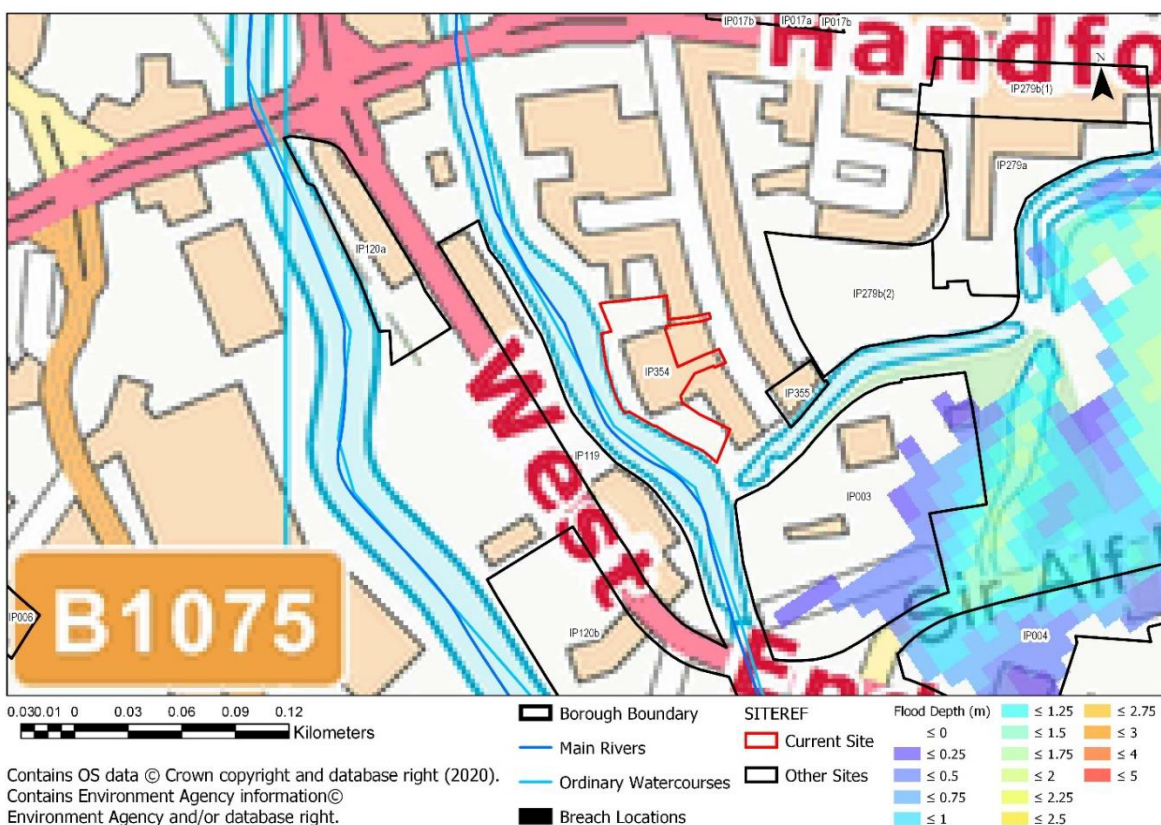
This site is protected by the IFDMS and is at residual risk of flooding in the event of failure or exceedance of flood defences. A composite hazard map has been created to illustrate residual flood hazard. This assumes that the Ipswich flood barrier is operating as designed and replicates maximum flood hazard should a breach occur at location BR05 and BR07 assuming that the pumping station at IP04 is not working.

Under this scenario, flood water does not enter the site and there is no flood hazard outlined.

Residual Flood risk – Combined Flood Hazard (0.5% AEP, 2118)



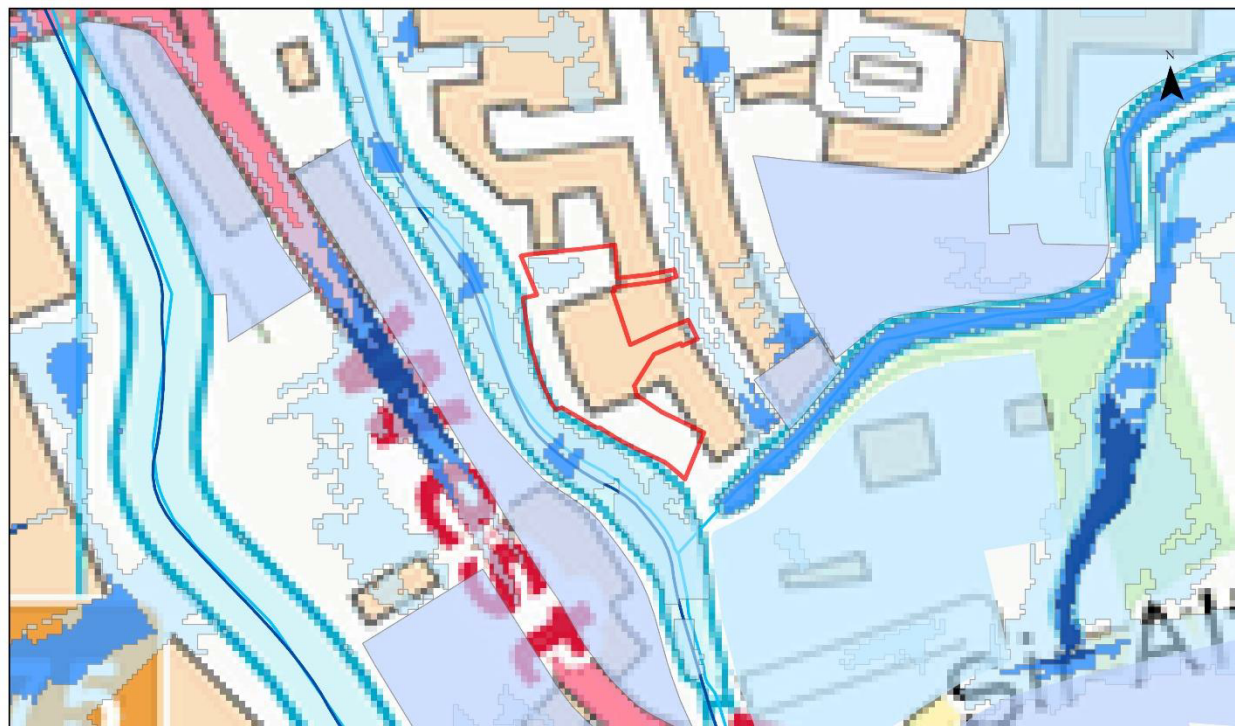
Residual Flood risk – Combined Flood Depth (0.5% AEP, 2118)



Surface Water Flood Risk

Risk of Flooding from Surface Water (RoFSW)

The RoFSW mapping shows that the roads in this area are susceptible to overland flow and ponding. Whilst the site itself is shown to have a low risk of surface water flooding, the surrounding routes are at high risk.



0.03 0.01 0 0.03 0.05 0.08 0.1
Kilometers

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1 in 30
1 in 100
1 in 1000
Main Rivers
Ordinary Watercourses

Current Site
Other Sites

Groundwater Flood Risk

The ASStGWf mapping (Level 1 SFRA Figure 13) shows that the site is located within a 1km square of which 50%-75% is susceptible to groundwater emergence.

The underlying geology in this location is White Chalk subgroup and Lambeth Group. White Chalk subgroup is not suitable for infiltration type drainage, regardless of ground water levels. Appendix A Figure 17 shows which areas of Ipswich are likely to have suitable ground for infiltration. The risk of groundwater flooding and possible use of infiltration SUDS in this area should be further investigated and informed by ground investigations.

Other sources

The Environment Agency 'Risk of Flooding from Reservoirs' mapping shows that the site is not at risk.

Site Specific Recommendations

The site is shown to be at actual risk of fluvial flooding from the Lower Gipping in the future as a result of climate change, and at residual risk of tidal flooding in the event of a failure of the flood defence infrastructure. The following measures are recommended to mitigate the actual risk of fluvial flooding in the future, and to manage the residual risk of tidal flooding.

Finished Floor Levels

Finished floor levels should be set 300mm above the fluvial design flood level including an allowance for climate change. The flood level on the site for the 1% AEP event including 65% climate change is 4.47m AOD.

In relation to the residual risk of tidal flooding, finished floor levels for sleeping accommodation should be set above the maximum breach flood level, which in compartment J is 3.61 – 3.7m AOD (Figure 7-4).

Access / Egress

During the fluvial design flood (1% AEP including 65% climate change) access/egress for the site is achievable along Cullingham Road at Low hazard rating.

Safe Refuge

Safe refuge must be provided above the extreme flood level.

Site Name: 72 (Old Boatyard) Cullingham Road IP1 2EG

With respect to the residual risk of tidal flooding, safe refuge must be provided above the 0.1% AEP flood level including an allowance for climate change over the lifetime of the development (5.7mAOD to 2118). This will also be adequate as a safe place of refuge for the extreme fluvial flood, as the flood level for the 0.1% AEP event including 25% allowance for climate change is 4.7 – 4.95m AOD.

Emergency planning

The site is shown to be within the Environment Agency Flood Warning Area for the tidal River Orwell at Ipswich wet dock and waterfront, to upstream of Stoke Bridge; occupants should register to receive the Environment Agency's flood warning service. Given the nature of fluvial flooding and the location of Ipswich at the lower end of the catchment, there is likely to be advanced warning of flooding associated with the River Gipping.

To manage the residual risk of flooding associated with a failure of the flood defence measures in this area, Flood Response Plans should be prepared by occupants of the site including details of egress routes and place of safe refuge.

Reference to Appendix D outlines rate of onset and flood duration. This outlines that for flood compartment J, peak flood level could be reached on site within 2 hours from the breach. Flood water could remain within the flood compartment for 15hrs.

Site Layout and Design

The drainage strategy for the site should be considered early in the site planning process to ensure adequate inclusion of SuDS and adequate provision for the management of surface water during high tide conditions. SuDS should be considered in accordance with the hierarchy of SuDS (i.e. considering infiltration measures first wherever possible). The likely SuDS type for this site is attenuation.

Set-back Distance

All development should be set back 16m from the edge of the River Gipping. The Environment Agency need to be consulted and an Environmental Permit obtained for any works within 16m a Main River.

Site Name: 77-79 Cullingham Road

Site ID:	IP0355	Location:	77-79 Cullingham Road	Area (ha):	0.06
Current Use:	Light industrial	Proposed Use:	Residential	Vulnerability Classification:	More Vulnerable

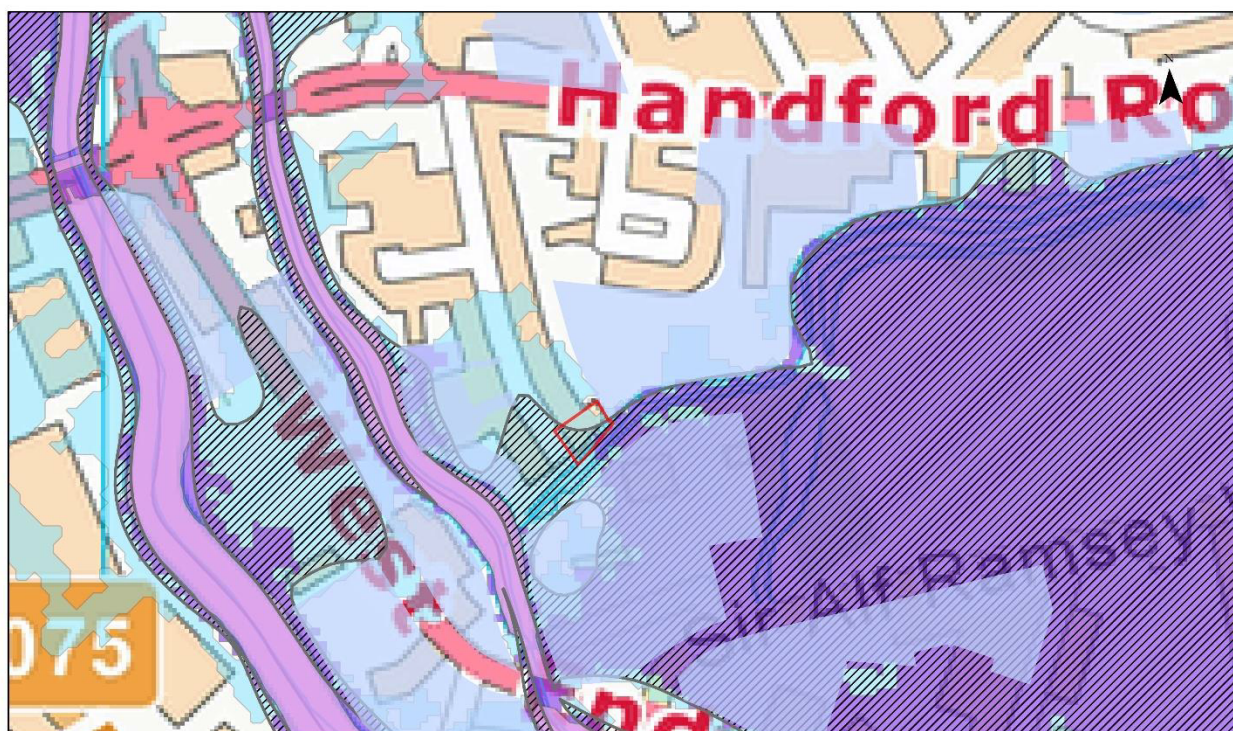
Flood Zones and Historic Flooding

Flood Zone 1 (<0.1% AEP): 0%	Flood Zone 2 (0.1% AEP): 90%	Flood Zone 3 (1% AEP): 4%	Flood Zone 3b (5% AEP): 0%	Area Benefiting from Defences: 62%
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As it flows through Ipswich, the River Gipping becomes the River Orwell. The River Gipping is approximately 50m to the southwest of the site. At this location the River Gipping / Orwell is tidally influenced.

The site is located within Flood Zone 2, medium probability of flooding. The south eastern section of the site is shown to benefit from the presence of defences; there is a flood defence wall along the edge of the channel to the west of the site, and there is a tidal barrier further downstream on the River Orwell. The site is therefore at residual risk of fluvial or tidal flooding, in the event of a failure of these defences. This may require updating once the impact of the new modelling for the River Gipping is known.

The Level 1 SFRA Figure 2 shows that this area has historically experienced flooding in 1939 and 1953 which is recorded on the Environment Agency Historic Flood Map. Ipswich BC also hold records of flood incidents in this location associated with surface water and highway flooding.



0.04 0.02 0 0.04 0.07 0.11 0.14
Kilometers

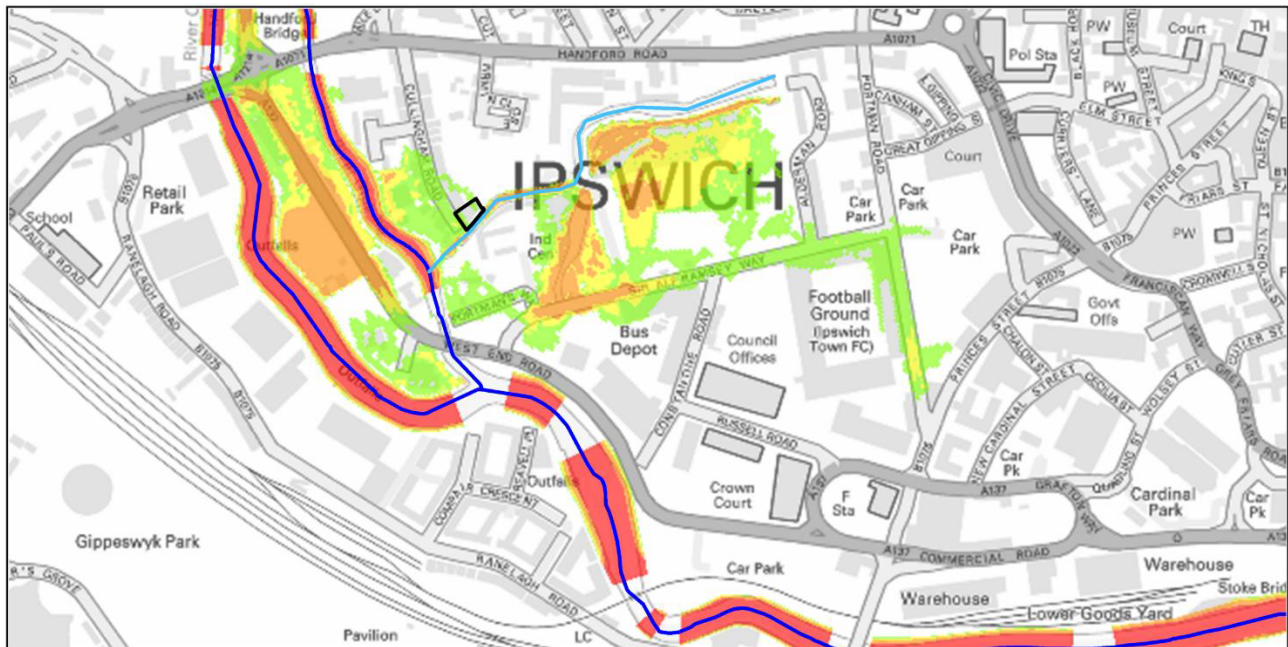
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FZ 3b Main Rivers
FZ 3 Ordinary Watercourses
FZ 2 Areas Benefitting from Flood Defences
Current Site
Other Sites

Site Name: 77-79 Cullingham Road

Fluvial Flood Risk – Lower Gipping

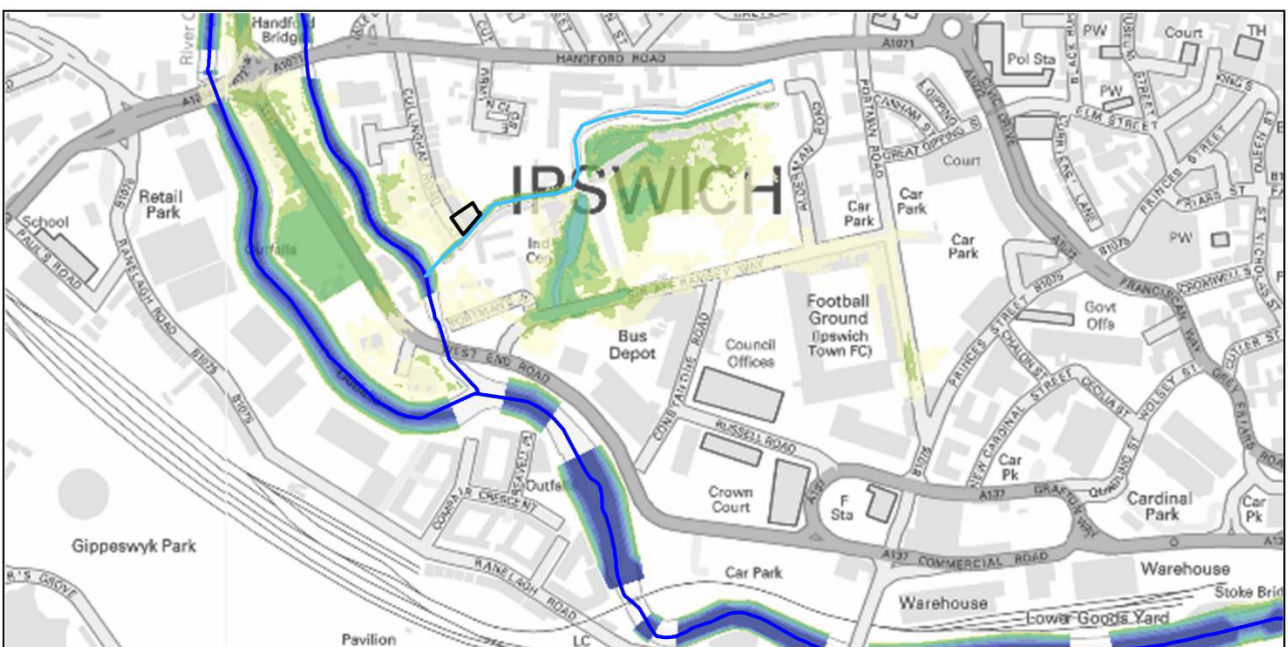
Modelling of the Lower Gipping (Mott MacDonald September 2020), shows that floodwater remains in bank in this part of Ipswich during the 5% AEP, 1% and 0.1% AEP events. However, in the future there is potential that the risk of flooding from the Lower Gipping could increase as a result of climate change, assuming no alterations are made to the flood defences. In this scenario, the site is shown to be at risk during the 1% AEP event including a 65% allowance for climate change, with flood levels of 4.16m AOD and Low - Significant hazard rating. The site is also shown to be at risk during the 0.1% AEP event including 25% allowance for climate change, with flood levels of 4.49m AOD.



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SITE REF
 Site Boundary
 Main River
 Ordinary Watercourse

Hazard Rating: River Gipping 1% AEP incl. 65% climate change
 Low: Cautious
 Moderate: Danger to Some
 Significant: Danger to Most
 Extreme: Danger to All



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SITE REF
 Site Boundary
 Main River
 Ordinary Watercourse

Maximum Flood Depth (m): River Gipping 1% AEP incl. 65% climate change
 <0.25
 <0.5
 <1
 <1.5
 <2
 <2.5
 <3
 >3

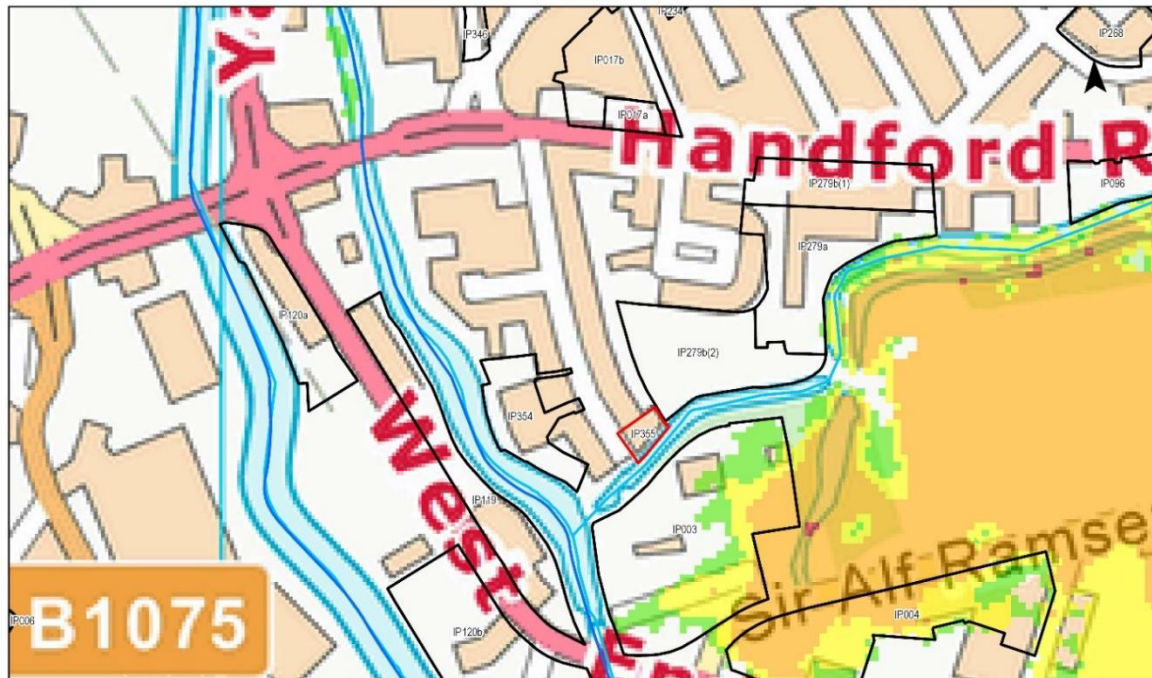
Site Name: 77-79 Cullingham Road

Tidal Flood Risk – River Orwell

This site is protected by the IFDMS and is at residual risk of flooding in the event of failure or exceedance of flood defences. A composite hazard map has been created to illustrate residual flood hazard. This assumes that the Ipswich flood barrier is operating as designed and replicates maximum flood hazard should a breach occur at location BR05 and BR07 assuming that the pumping station at IP04 is not working.

Under this scenario, the site is not shown to be affected by flood hazard. This may be because the presence of a channel to the south of the site is preventing water from the breaches outlined above from propagating across the flood cell to the site.

Residual Flood Risk – Combined Flood Hazard (0.5% AEP, 2118)



0.04 0.02 0 0.04 0.08 0.12 0.16 Kilometers

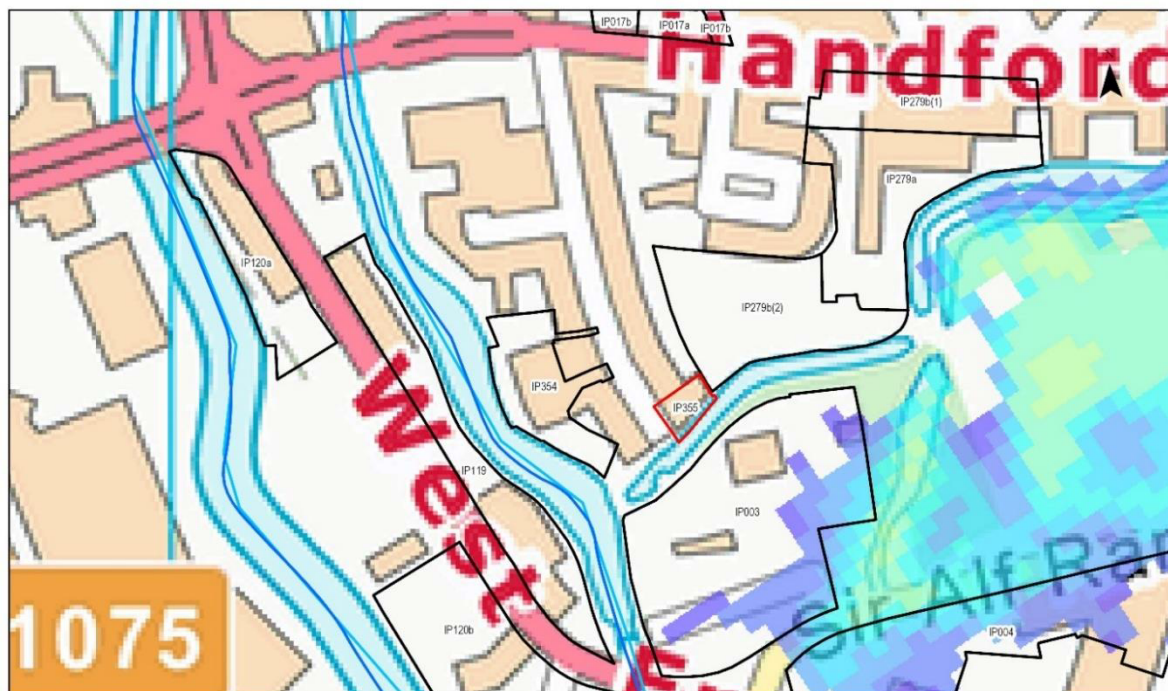
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Borough Boundary
Main Rivers
Ordinary Watercourses
Breach Locations

SITEREF
Current Site
Other Sites

Hazard Rating
Cautious
Danger to Some
Danger to Most
Danger to All

Residual Flood Risk – Combined Flood Depth (0.5% AEP, 2118)



0.030 0.01 0 0.03 0.06 0.09 0.12 Kilometers

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Borough Boundary
Main Rivers
Ordinary Watercourses
Breach Locations

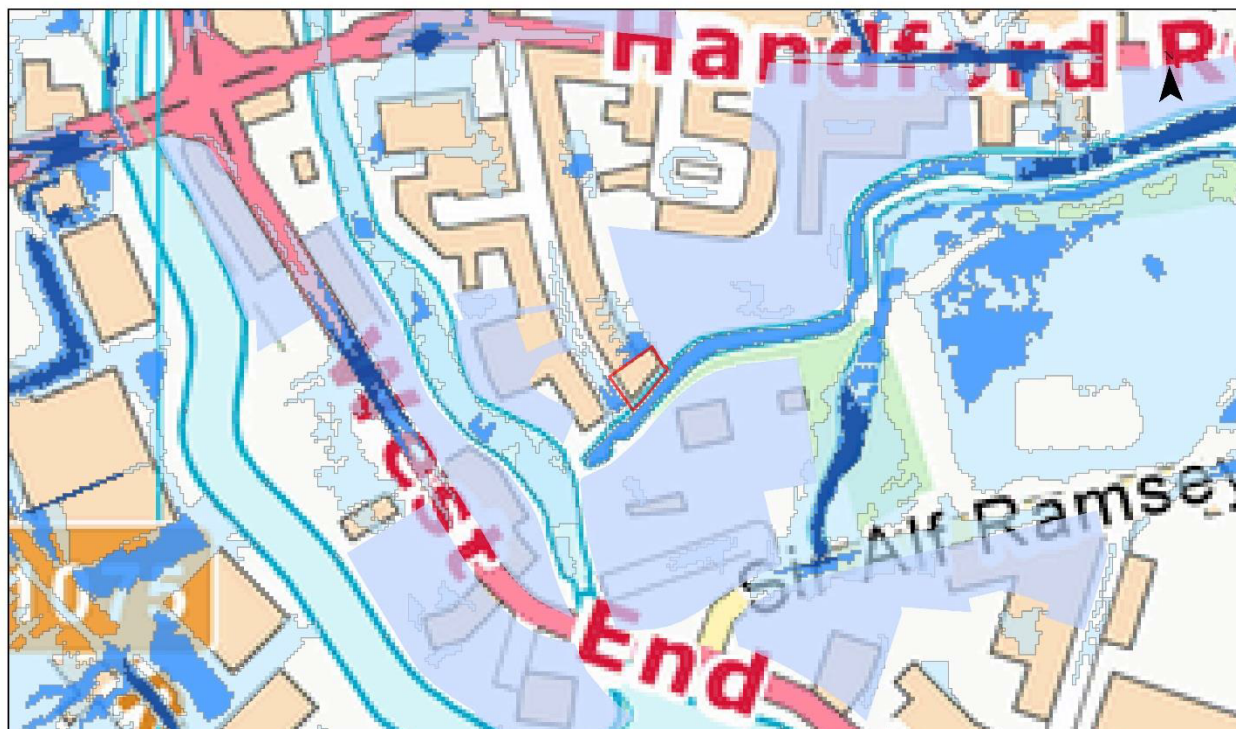
SITEREF
Current Site
Other Sites

Flood Depth (m)
≤ 0
≤ 0.25
≤ 0.5
≤ 0.75
≤ 1
≤ 1.25
≤ 1.5
≤ 1.75
≤ 2
≤ 2.25
≤ 2.5
≤ 2.75
≤ 3
≤ 4
≤ 5

Site Name: 77-79 Cullingham Road

Surface Water Flood Risk

The site has a risk of surface water flooding to the south west where the road lies. The roads in the surrounding area are susceptible to overland flow and ponding. There are also areas above the northern site boundary that are at risk of ponding.



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Groundwater Flood Risk

The AStGWF mapping (Level 1 SFRA Figure 13) shows that the site is located within a 1km square of which 50%-75% is susceptible to groundwater emergence. The risk of groundwater flooding in this area should be further investigated during a site investigation survey.

The underlying geology in this location is the White Chalk subgroup which is not suitable for infiltration type drainage, regardless of ground water levels. Appendix A Figure 17 shows which areas of Ipswich are likely to have suitable ground for infiltration. The risk of groundwater flooding and possible use of infiltration SUDS in this area should be further investigated and informed by ground investigations.

Other sources

The Environment Agency 'Risk of Flooding from Reservoirs' mapping shows that the site is not at risk from reservoir flooding.

Site Specific Recommendations

The site is shown to be at actual risk of fluvial flooding from the Lower Gipping in the future as a result of climate change, and at residual risk of tidal flooding in the event of a failure of the flood defence infrastructure. The following measures are recommended to mitigate the actual risk of fluvial flooding in the future, and to manage the residual risk of tidal flooding.

Finished Floor Levels

Finished floor levels should be set 300mm above the fluvial design flood level including an allowance for climate change. The flood level on the site for the 1% AEP event including 65% climate change is 4.16m AOD.

In relation to the residual risk of tidal flooding, finished floor levels for sleeping accommodation should be set above the maximum breach flood level, which in compartment J is 3.61 – 3.7m AOD (Figure 7-4).

Access / Egress

During the fluvial design flood (1% AEP including 65% climate change) access/egress for the site is achievable along Cullingham Road at Low hazard rating.

Safe Refuge

Safe refuge must be provided above the extreme flood level.

Site Name: 77-79 Cullingham Road

With respect to the residual risk of tidal flooding, safe refuge must be provided above the 0.1% AEP flood level including an allowance for climate change over the lifetime of the development (5.7mAOD to 2118). This will also be adequate as a safe place of refuge for the extreme fluvial flood, as the flood level for the 0.1% AEP event including 25% allowance for climate change is 4.49m AOD.

Emergency planning

The site is shown to be within the Environment Agency Flood Warning Area for the tidal River Orwell at Ipswich wet dock and waterfront, to upstream of Stoke Bridge; occupants should register to receive the Environment Agency's flood warning service. Given the nature of fluvial flooding and the location of Ipswich at the lower end of the catchment, there is likely to be advanced warning of flooding associated with the River Gipping.

To manage the residual risk of flooding associated with a failure of the flood defence measures in this area, Flood Response Plans should be prepared by occupants of the site including details of egress routes and place of safe refuge.

Reference to Appendix D outlines rate of onset and flood duration. This outlines that for flood compartment J, peak flood level could be reached on site within 2 hours from the breach. Flood water could remain within the flood compartment for 15hrs.

Site Layout and Design

The drainage strategy for the site should be considered early in the site planning process to ensure adequate inclusion of SuDS and adequate provision for the management of surface water during high tide conditions. SuDS should be considered in accordance with the hierarchy of SuDS (i.e. considering infiltration measures first wherever possible). The likely SuDS type for this site is attenuation.

Set-back Distance

All development should be set back from the edge of watercourses. The Environment Agency need to be consulted and an Environmental Permit obtained for any works within 16m a Main River. Consent needs to be obtained from Suffolk County Council (in their capacity as the LLFA) for any works that may affect flow within the Ordinary Watercourse to the south of the site.