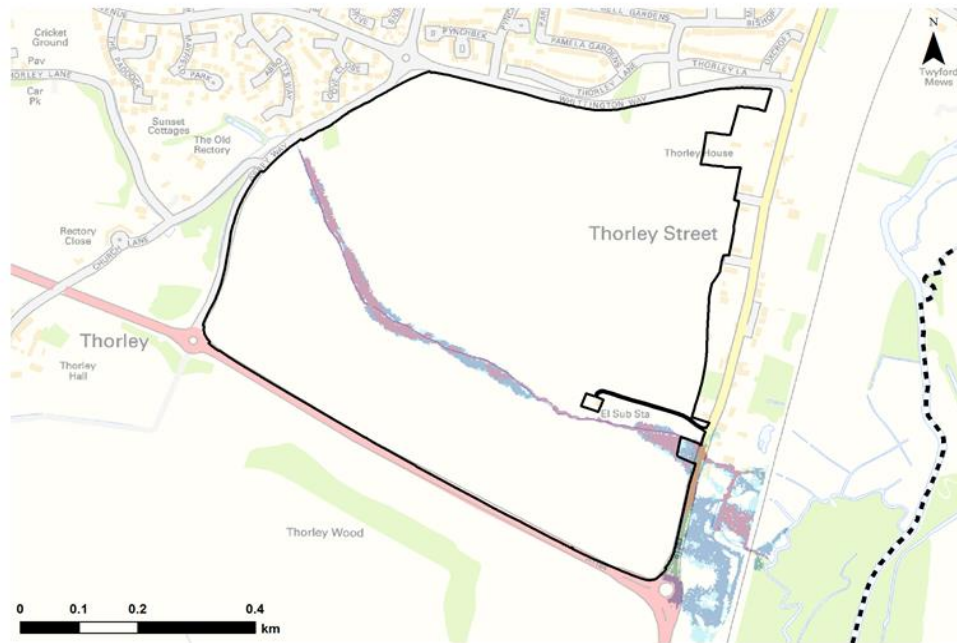



EH1 - BISH7, Bishops Stortford, South, + Employment Land				
OSNGR:	548480,218967	Area: 54.30ha		Greenfield
Flood Zone Coverage:		FZ3b	FZ3a	FZ2
<small>*based on 2D Jflow modelling</small>		2.03%*	2.85%*	3.13%*
Proposed Development Details:				
750 homes, primary and secondary education, 4-5 hectares of employment land and green space				
Exception Test Required?				
Likely, as the flood risk from the unnamed watercourse intersects the site which may constrain where development can be placed.				
The Exception test is needed if:				
"More Vulnerable" and "Essential Infrastructure" development is located in FZ3a and for "Highly Vulnerable" development located in FZ2.				
"Essential Infrastructure" development in FZ3b will also require the Exception Test.				
"Highly Vulnerable" development should not be permitted within FZ3a and FZ3b.				
"More Vulnerable" and "Less Vulnerable" development should not be permitted within FZ3b				
NPPF Guidance:				
<ul style="list-style-type: none"> • For development proposals on sites comprising one hectare or above in Flood Zone 1, the vulnerability of flooding from other sources as well as from river flooding should be considered in a FRA. • The potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off should be considered. • Developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development and through appropriate sustainable drainage techniques. 				
Sources of Flood Risk:				
The primary flood risk to the potential development site is fluvial from the unnamed drain which flows through the centre of the site. Water is mainly confined to the channel and areas immediately adjacent, flood hazard is mainly classed as very low outside of these areas. Factoring in climate change at 25%, 30% and 70% does not significantly affect the area at risk of fluvial flooding. Parts of the site are also shown to be affected by surface water flooding; these areas tend to correspond with the watercourse but also pockets form in the north east.				

Flood Zone Map



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This site was not represented in the Environment Agency's Flood Zones, but OS mapping showed a drain running through the site, therefore 2D generalised modelling using Jflow software has been undertaken to obtain indicative flood extents using the 20-year extent as FZ3b, the 100-year extent as FZ3a, and the 1,000-year extent as FZ2. Developers may need to consider undertaking more detailed hydraulic modelling at the site as part of a site-specific FRA.

- | | | | | | |
|---|----------------------------|---|---------------|--|--------------|
|  | Potential Site Allocations |  | Flood Zone 3b |  | Flood Zone 2 |
|  | Council boundary |  | Flood Zone 3a | | |

Climate Change Map

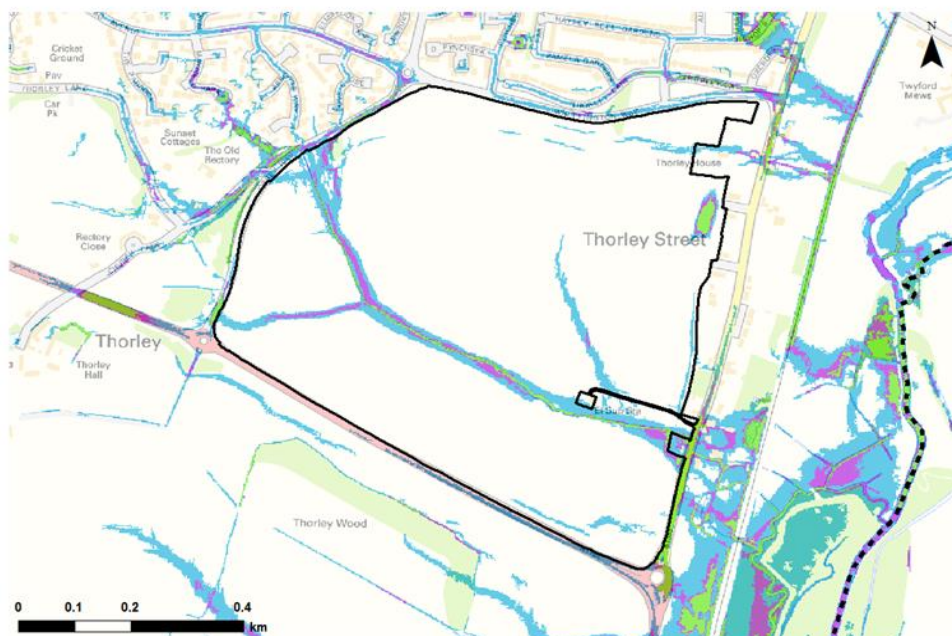


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Climate change was modelled for the 2080s epoch, applying the following climate change factors to the 100-year flow: 25%, 35% and 70%. The map above shows the 100-year + 70% climate change scenario, therefore representing a 'worst case'.

- Potential Site Allocations
- Flood Zone 3 with Climate Change
- Council boundary

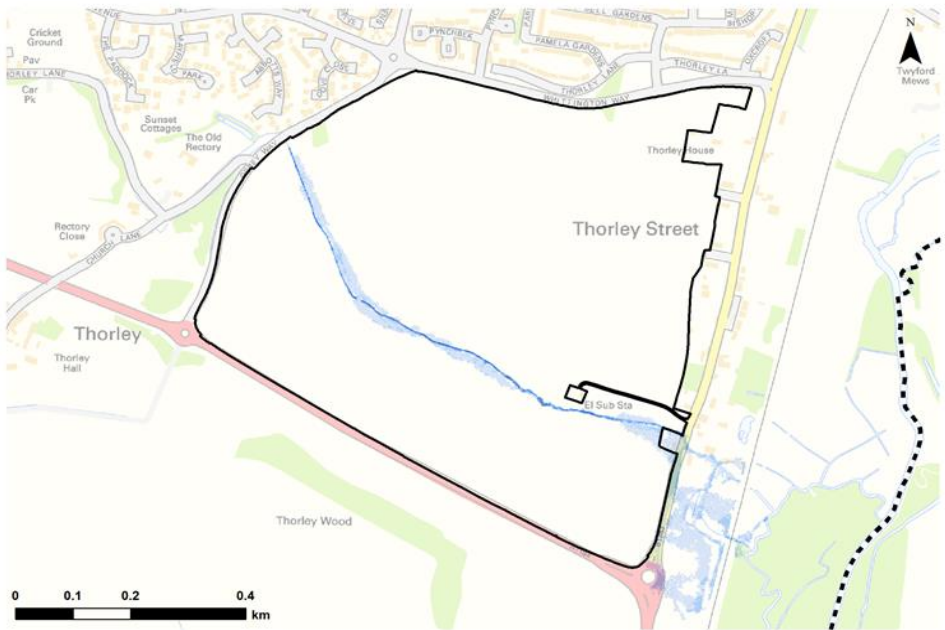
Surface Water Map



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- Potential Site Allocations
- uFMfSW* 30-year Extent
- uFMfSW* 100-year Extent
- uFMfSW* 1,000-year Extent
- Council boundary

Depth Map

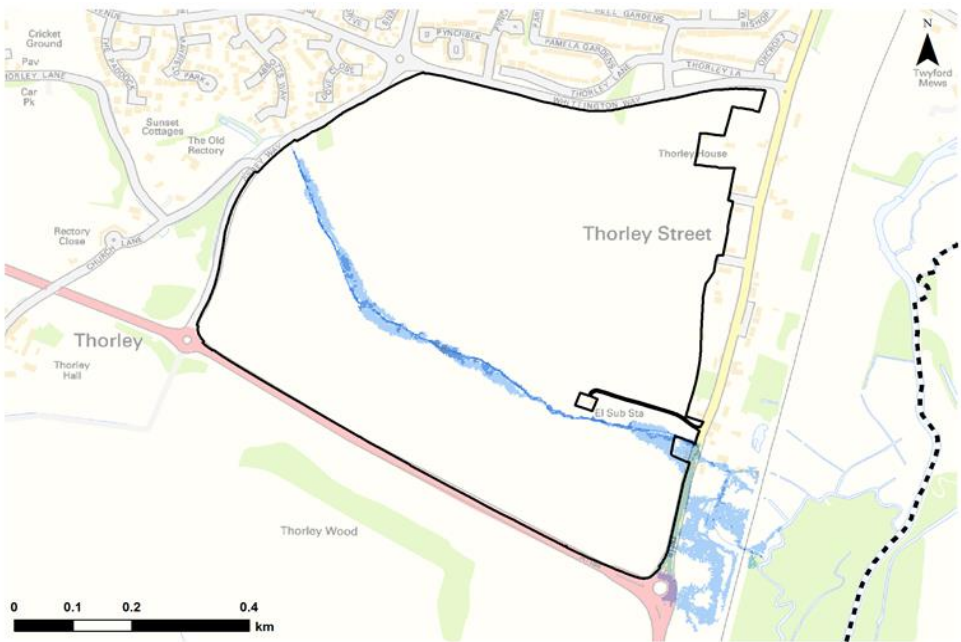


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This depth map is an output from Jflow 2D generalised modelling, and represents the 100-year event

Potential Site Allocations	Depth (m)	0.50 - 1.00	2.00 - 2.50	3.50 - 4.00
Council boundary	0 - 0.10	1.00 - 1.50	2.50 - 3.00	>4.00
	0.10 - 0.50	1.50 - 2.00	3.00 - 3.50	

Velocity Map

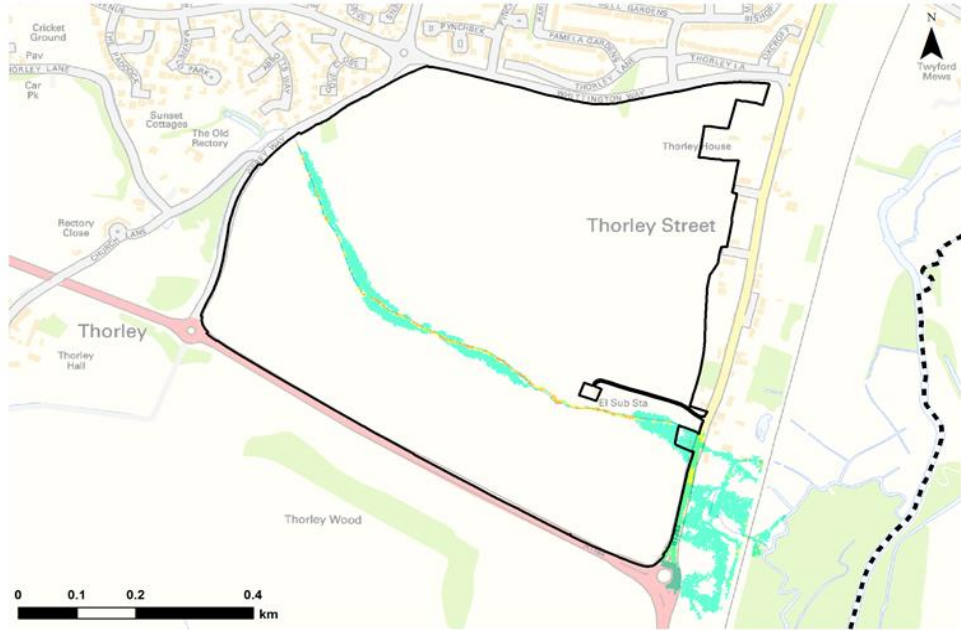


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This velocity map is an output from Jflow 2D generalised modelling, and represents the 100-year event

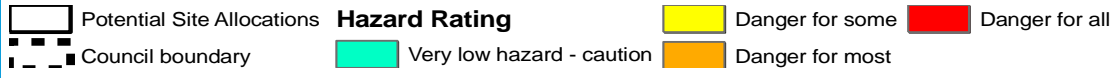
Potential Site Allocations	Velocity (m/s)	0.2 - 0.5	1.0 - 2.0
Council boundary	0 - 0.2	0.5 - 1.0	> 2.0

Hazard Map



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This hazard map is an output from Jflow 2D generalised modelling, and represents the 100-year event



SuDS & the development site:		
SuDS Type	Suitability	Comments
Source Control		Most source control techniques are likely to be suitable.
Infiltration		Infiltration may be suitable. Mapping suggests a medium risk of groundwater flooding and underlying soils may be permeable. Further site investigation should be carried out to assess potential for drainage by infiltration. If infiltration is suitable it should be avoided in areas where the depth to the water table is <1m. Additionally, proposed SuDS should be discussed with relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible constraints given that the site is located with a Source Protection Zone.
Detention		This option may be feasible provided site slopes are < 5% at the location of the detention feature. If the site has groundwater issues, a liner may be required.
Filtration		This feature is probably suitable provided site slopes are <5% and the depth to the water table is >1m. If the site has groundwater issues, a liner will be required.
Conveyance		All forms of conveyance are likely to be suitable. Where the slopes are >5% features should follow contours or utilise check dams to slow flows. If the site has groundwater issues, a liner will be required.
<p>The site is not designated by the Environment Agency as previously being a landfill site.</p> <p>The site is located with a Source Protection Zone. As such infiltration techniques should only be used where there are suitable levels of treatment although it is possible that infiltration may not be permitted. Proposed SuDS should be discussed with relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible constraints.</p> <p>Drainage strategies should demonstrate that an appropriate number of treatment stages have been delivered. This depends on the factors such as the type of development, primary source of runoff and likelihood of contamination. Guidance should be sought from LLFA and other guidance documents such as the CIRIA SuDS Manual (C753).</p>		
<p>Flood Defences: There are no flood defences at this site.</p>		
<p>Flood Warning: There are currently no flood warning areas or flood alerts covering this site.</p>		
<p>Access & Egress: Access and egress to the site can be achieved via a number of roads around the majority of the site boundary. Many of these routes are impacted by surface water, with the B1383 impacted by fluvial flooding, shown in Flood Zone3b of the indicative Flood Zones. Consideration should be given to the safest route to and from the site in times of flood to ensure safe access and egress can be achieved at all times. Fluvial flood risk divides the site into two; it is important that development on both sides of the watercourse have safe access and egress in times of flooding.</p>		
<p>Climate Change: Climate change mapping indicates the following impacts for the future:</p> <ul style="list-style-type: none"> • Increased storm intensities. • The increase in Flood Zone 3a outline with differing climate change allowances is minimal • The floodplain of the unnamed drain appears to be fairly constrained within this area; with the 70% climate change allowance being similar to Flood Zone 2. It may, however, increase the depth, velocity and hazard of flooding in the area affected. • Climate change may also increase the extent, depth and frequency of surface water flooding. 		

Implications for Development:

- Use of the Sequential approach to development means, given the size of the site, development can be placed away from the Flood Zones, with the area affected by the Flood Zones left undeveloped.
- Access and egress routes are at risk from both fluvial and surface water flooding; in order to pass the Exception Test, development will need to ensure that safe access and egress can be provided for the lifetime of the development.
- Development should also ensure that there is no increase in flood risk that may exacerbate flooding to access/ egress routes
- Broadscale assessment of suitable SuDS has indicated a number of different types may be possible; given the size of the site, the type of SuDS system used is less likely to be limited by the amount of land available for development.
- The site is not covered by the Environment Agency's Flood Warning Service. However, if development is placed outside of the Flood Zones, then access to a Flood Warning would not be required.
- The site is not known to benefit from any flood defences. Given the size and location of the site, it is possible the site could be used to implement strategic solutions to alleviate flood risk in the urban areas downstream; development should consider the feasibility of including any green corridors or strategic flood risk solutions, depending on the land available.

Guidance for Developers:

- At the planning application stage, a site-specific Flood Risk Assessment will be required if any development is located within Flood Zones 2 or 3 or greater than 1ha in size. Other sources of flooding should also be considered.
- Consultation with the Local Authority and the Environment Agency should be undertaken at an early stage, to determine requirements for a FRA and to establish an approach to consider climate change in line with latest guidance.
- The peak flows of the unnamed watercourse should be considered when considering drainage.
- Resilience measures will be required if buildings are situated in the flood risk area.
- Safe access and egress will need to be demonstrated; currently some access and egress routes are affected by surface water flooding and fluvial flooding from a 20-year event.
- Assessment for surface water runoff should include allowance for climate change effects.
- New or re-development should adopt exemplar source control SuDS techniques to reduce the risk of frequent low impact flooding due to post-development runoff.
- New development must seek opportunities to reduce overall level of flood risk at the site, for example by:
 - o Reducing volume and rate of runoff
 - o Relocating development to zones with lower flood risk
 - o Creating space for flooding.
 - o Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development and consider using Flood Zones 2 and 3 as public open space.
- Onsite attenuation schemes would need to be tested against the hydrographs for any unnamed watercourses to ensure flows are not exacerbated downstream within the catchment.
- Developers may need to undertake more detailed hydraulic modelling of the unnamed watercourse to confirm flood risk at the site. The Jflow outputs present an indication of flood risk in the absence of Environment Agency Flood Zones; however, this does not incorporate channel/ structure topographic survey and assumes a channel capacity of QMED.