

King's Lynn and West Norfolk Borough Strategic Flood Risk Assessment Level 2 Community Level Guidance Tables

Completed by	JBA consulting
Date	March 2019
Author	Freyja Scarborough
Reviewer / Sign-off	Hannah Coogan
Version Number	Version 3.0

Level 2 Community Level Guidance Tables

Community details	Community	Downham Market			
	Flood Risk Summary	Highest risk flooding mechanism	Surface Water		
		Most likely source of flooding	Surface Water		
Sources of flood risk	Existing drainage features	<ul style="list-style-type: none"> The River Great Ouse and Fenland tributary runs along the western boundary of the community, with a small area of the community in between these two watercourses. There are multiple drains, surrounding the community in all directions, the main concentration of which appear to be on the western side of the community. There are several small areas of open watercourse between culverts within the community, mainly concentrated in the north-western corner. 			
	Fluvial	Minor encroachment from Flood Zone 3b in the western section of the community.			
	Tidal	Minor encroachment from Flood Zone 3a in the western section of the community.			
	Surface Water	Impact from 3.3% AEP event and above.			
	Residual Risk	<ul style="list-style-type: none"> Risk from reservoir breach from Denver Black Bank Flood Storage Area and Denver Middle Drove. Fluvial breach risk from the Fenland tributary in the western area of the community. Tidal breach risk from the Tidal Great Ouse. 			
	IDB watercourse present?	<ul style="list-style-type: none"> Stoke Ferry Internal Drainage Board (IDB) IDB drains to the north-west and south-west of the community 			
	Flood history	<ul style="list-style-type: none"> The Environment Agency have no recorded flood outlines. Norfolk County Council flood investigations show that in Summer 2014 3 properties were affected in Downham Market. There are records of sewer flooding in this community from March 2009. 			
Flood risk management infrastructure	Defences	Defence Type	Flooding Type	Standard of Protection	Condition
		Embankment (x4)	Tidal	100	3 (Fair)
		Wall	Tidal	100	3 (Fair)
		Embankment	Fluvial	0	2 (Good)
		Embankment (x2)	Tidal	100	2 (Good)
		Embankment	Fluvial	100	2 (Good)
		These defences are located just outside of the community boundary, to the west and protect the western area of the community.			
Opportunities for sustainable	Asset management	The Stow Fen 1950's pumping station replacement is a capital scheme located close to Downham Market.			

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development	Capital investment policy and regeneration	No current schemes identified for this community.	
	Higher level policy	<ul style="list-style-type: none"> The community is within the Great Ouse Catchment Flood Management Plan, sub-area 10, the Fens. Within this sub-area the current flood risk is appropriately managed. However, the risk is expected to significantly rise in the future with impacts from climate change. Downham Market is designated as low-lying fenland in the hinterland of the Wash Shoreline Management Plan (SMP) 2, is protected by defences along the wash and is therefore relevant to the SMP. The policy within this area (PDZ1) is to maintain the current defences into the future, considering an 'envelope of potential developments' for all future scenarios. CFMP/ SMP policies set the high level and strategic direction for flood risk and coastal change management. There is no guarantee that funding will be available from national, regional or local sources to implement the policy. More detailed strategy and scheme work considers funding needs and availability at a community level. 	
Emergency planning	Flood warning	The western area of the community is covered by the 'Tidal River Great Ouse east bank breach at Downham Market' Flood Warning Area and the 'Tidal river from Denver to south of King's Lynn Flood Alert Area.	
	Access and egress	<ul style="list-style-type: none"> During a tidal flooding event, access to or egress from Downham Market will not be possible via the western side of the A1122 from the 0.5% AEP event and above. Access and egress may be limited from the western community during all fluvial events. Local access and egress may be limited during all surface water events, a high percentage of roads will be significantly affected by flooding, limiting access and egress routes in higher AEP surface water events. 	
Climate Change	Implications for the community	<ul style="list-style-type: none"> Minor additional impacts from fluvial climate change scenarios in the western area of the community. Significant increase in flooding from surface water in the whole community due to climate change. Climate change modelling does not show any impact to the defended tidal scenario (which assumes no breach occurs). However, it may have a significant impact on the frequency and severity of storm surges which have not been modelled for the SFRA. 	
Requirements for drainage	Broad scale assessment of	Bedrock Geology	Central – sand Western and Eastern – mudstone

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control and impact mitigation	possible SuDS	Most likely source of flooding		Surface Water
		Superficial Geology	Western – clay, silt, sand, gravel and peat Eastern – diamicton	
		Soil Type	Freely draining	
		Groundwater Source Protection Zone	No	
		Historic Landfill Site	Small area at north-western boundary	
		<ul style="list-style-type: none"> • Areas Susceptible to Groundwater Flooding data is not available for this community, as such the potential of broadscale assessment is limited and the suitability of SuDS will need to be determined by on-site investigations. • Source control techniques are likely to be suitable for this community. • Infiltration techniques will be suitable providing there are areas of the site not at high or medium ground water flood risk. • Detention features may be feasible providing site slopes are <5% at the location of the detention feature. If the site has groundwater issues, then a liner will be required. • Filtration systems are probably suitable providing site slopes are <5% and the depth to the water table is >1m. If the site has groundwater issues, then a liner will be required. • All forms of conveyance features are likely to be suitable. Where slopes are >5%, features should follow contours or utilise check dams to slow flows. 		
NPPF and planning implications	Existing Local Considerations	<ul style="list-style-type: none"> • Downham Market is in an area benefiting from defences from both fluvial and tidal sources. Developers should liaise with the Environment Agency and consider whether a financial contribution towards the long-term maintenance and/ or upgrade of the defences would be appropriate to help safeguard against increasing flood risk over the lifetime of the development. • Downham Market was one of four settlements in King's Lynn and West Norfolk Borough Council selected for surface water modelling in the Surface Water Management Plan, Stage 2. • The Borough Council's Local Plan says that Downham Market has been allocated 390 new houses and 15 hectares of employment land over the plan period to 2026. • High degrees of flood risk in the western side of Downham Market restrict urban expansion. Thus, development is predominately planned around the eastern side of the town. • Downham Market Town Council will soon be completing their neighbourhood plan. 		

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	Requirements and guidance for site-specific Flood Risk Assessment	<ul style="list-style-type: none"> • Early consultation with Downham Group IDB depending on site location and impact from IDB drains. • Ensure safe access and egress in a flood events, especially in the western area of the community. • Detailed hydraulic modelling will need to consider any drains within and surrounding the community that are likely to affect the site to assess fluvial flood risk in the community (including IDB drains). Hydraulic modelling should also seek to understand the impact of residual risk from culvert blockage to any proposed site. • Consider the impact of a tidal or fluvial breach by sequentially placing the highest vulnerability part of the development in the areas of lowest flood risk, applying the Councils Flood Risk Design Guidance and creating a site-specific emergency plan for flood events. • The Flood Risk Assessment should address all forms of flood risk impacting this community (tidal, fluvial, pluvial). • Consider the impacts of climate change, especially on the extent of surface water flooding in the community. 		
			Tidal and Coastal	Fluvial
		0.5% AEP and Breach	5% AEP and Breach	3.3% AEP
	Conclusions and recommendations	<ul style="list-style-type: none"> • The main area of the community has limited impact from flooding and is mainly within Flood Zone 1. • There are more concerns about flooding in the western section of the community and along the western boundary of the main community area therefore it is recommended new development is concentrated in the eastern area of the community. • Consider mitigation for surface water flooding depending on site location. • Consider contributions to the ongoing maintenance of the tidal and fluvial defences protecting the community. • Ensure safe access and egress in a flood event, especially in the western area of the community. • Consider the impacts of tidal and fluvial breaches. • Early consultation with Downham Group IDB is recommended. 		
Mapping Information				

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Flood Zones		<ul style="list-style-type: none"> Flood Zone 3b is comprised of Environment Agency supplied outlines from the fluvial Fenland, 2016 model and the tidal Wash, 2018 model. Flood Zone 3a is comprised of Environment Agency supplied outlines from the tidal Wash, 2018 model and from Environment Agency Flood Zones 3 containing fluvial and tidal model outlines. <p>Flood Zone 2 is comprised of Environment Agency supplied outlines from the tidal Wash, 2018 model and from Environment Agency Flood Zones 2 containing fluvial and tidal model outlines.</p>	