
FLOOD RISK ASSESSMENT

Project:

FULL PLANNING APPLICATION FOR THE CONSTRUCTION OF A NEW DWELLING AND DETACHED GARAGE

Proposed Site:

Land to the West of Chapel Road,
Old Leake Commonside
Boston
Lincolnshire
PE22 9PP

Applicant: Mr. & Mrs. S. Mackay

Date: March 2021

Prepared by:

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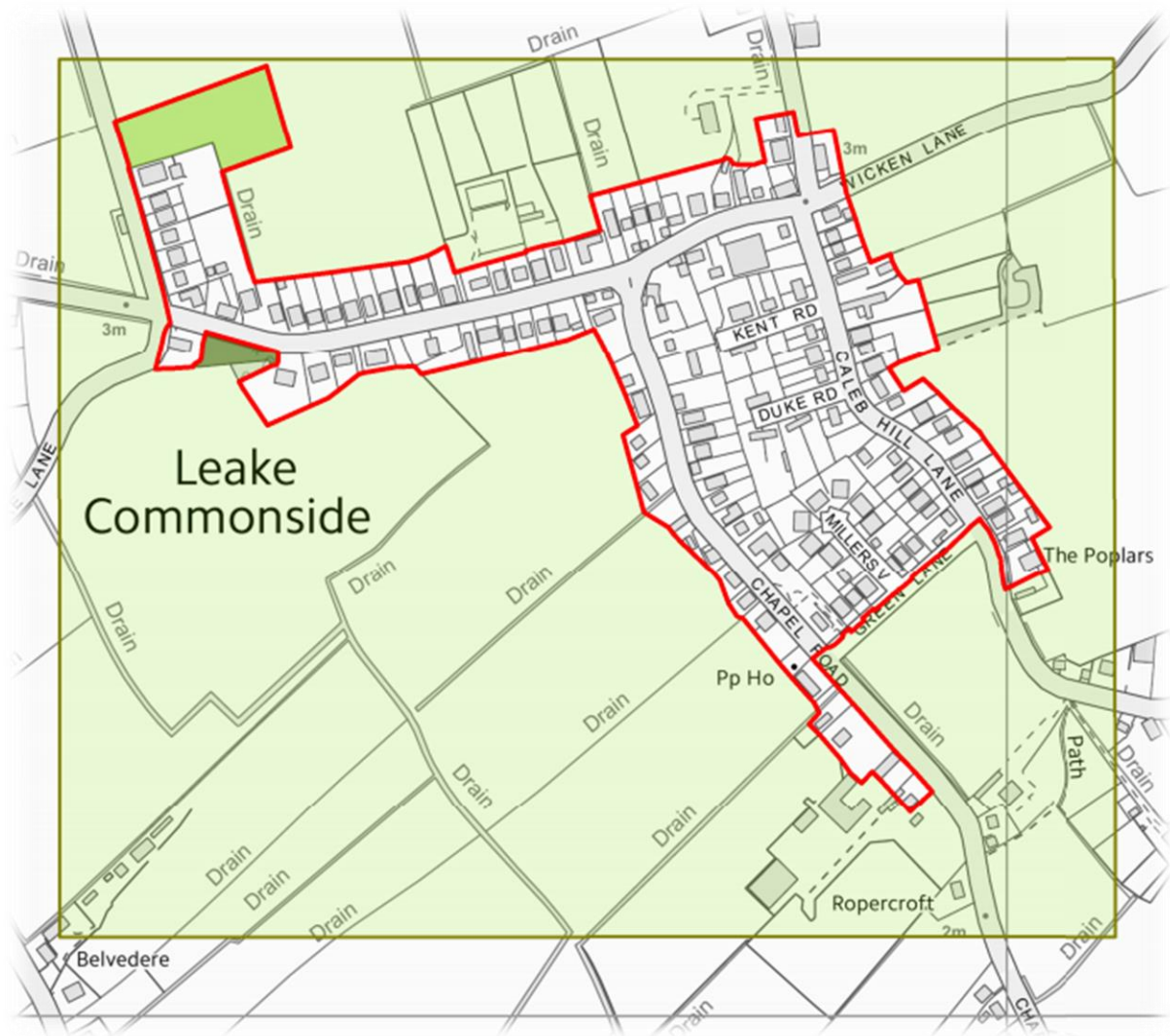


The site obtained outline planning approval under application reference: B/19/0239 for the construction of 2no. dwellings with matters reserved.

2.1.2 The national grid reference for the site is 539739E 352399N.



2.1.4 Policy 1 of the SELLP, which identifies Leake Commons as an 'Other service centre or settlement', would generally support the redevelopment of the site for housing as



it is located within the settlement boundary of Leake Commonside and will help support the settlement's role as a service centre for the settlement itself, helps sustain existing facilities or helps meet the service needs of other local communities. Development in this settlement will normally be limited to infill.

- 2.1.5 The outline approval for two new dwellings on the application site has established the suitability of it for residential development. It is therefore considered that the principle of residential development on this site for a single detached dwelling and garage would be supported.

2.2 APPLICATION SITE DESCRIPTION

- 2.2.1 The application site area is a previously developed piece of land within the built form along Chapel Road. It is currently vacant with an array of agricultural buildings on it.
- 2.2.2 The site is not in open countryside but rural in nature. It's location within the village is between existing dwellings alongside Chapel Road. There is a mixture of single storey and dormer bungalows and two storey dwellings in the vicinity.

- 2.2.3 The applicant has purchased the land with planning permission along with approximately 7 acres of agricultural land to the south west of the 'residential curtilage'
- 2.2.4 Given the abutment of the site boundaries with two dwellings, the application site is certainly infill and within the developed footprint of the village.
- 2.2.5 The boundaries are well defined to the NW and SE by boundary fences and fronted by Chapel Road to the NE. The land behind is typically bound as agricultural land by surface water drains.
- 2.2.6 A topographical survey has been carried out on the site by the previous applicants. Average levels on the road are 2.3m AOD. Average levels on the site are in the region of approximately 2 – 2.1m AOD.



- 2.2.7 The Decision Notice for the previous approval confirms that finished floor levels for two storey dwellings shall be set no lower than 500mm above existing ground levels which would set finished floor level for the proposed dwelling at approx. 2.5m AOD.



View SW from public highway





Two storey properties opposite site



Two storey properties opposite site

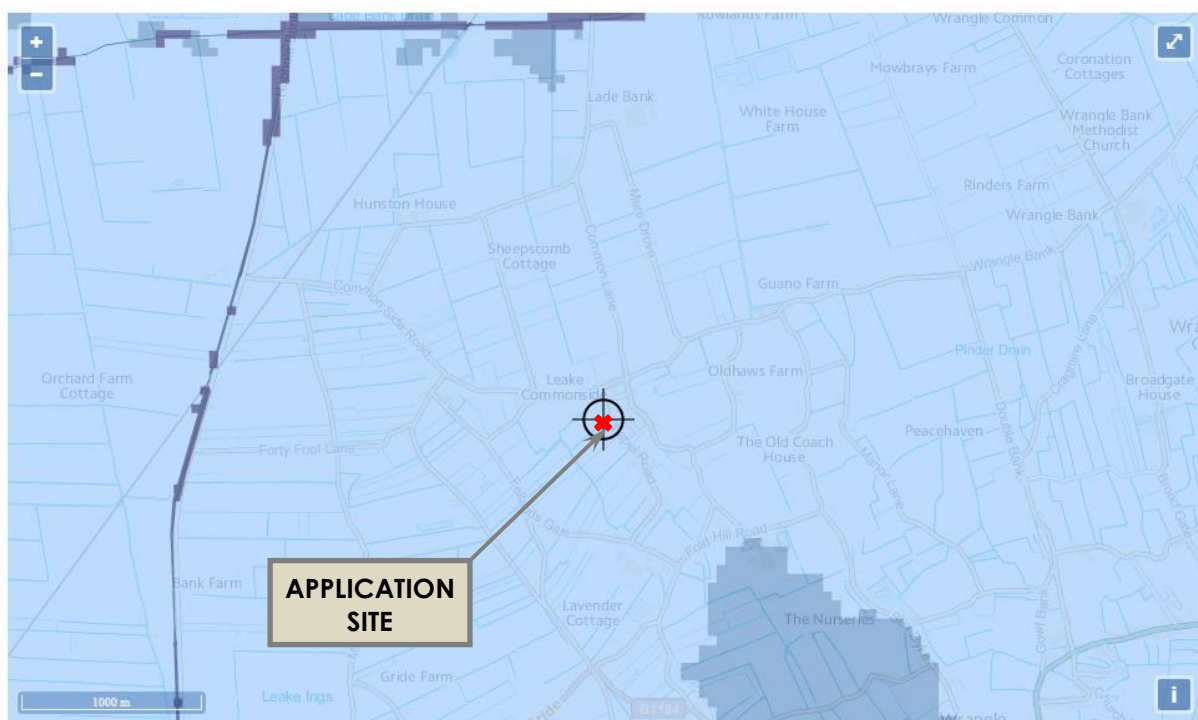
3.0 THE PROPOSAL –

3.0.1 This application seeks approval for the construction of a new two storey detached dwelling and detached Garage

4.0 FLOOD SOURCES & EXISTING DEFENCES

4.0.1 The proposed site is potentially at risk, to a greater or lesser degree, from failure of any of the existing flood alleviation measures in the area.

4.0.2 The Environment Agency's Flood Zone Map shows the whole of the area to be in Flood Zone 3 and the Relative Probability of Flooding shows the majority of the surrounding area to be at a low risk of flooding.



Extent of flooding from rivers or the sea

● High ● Medium ● Low ● Very low ⊕ Location you selected

4.0.3 **Low risk** means that each year this area has a chance of flooding of between 0.1% and 1%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

4.0.4 The extracts below from the NPPF Technical guidance document confirms that in Flood Zone 3 the proposed use is appropriate but should only be permitted in this zone if the Exceptions test is passed. This is covered in a later section.

NPPF Technical Guidance - Table 1 Flood Zones:

<p>Zone 3a - high probability</p> <p>Definition This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.</p> <p>Appropriate uses The water-compatible and less vulnerable uses of land (table 2) are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone.</p> <p>The more vulnerable uses and essential infrastructure should only be permitted in this zone if the Exception Test is passed. Essential infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in times of flood.</p> <p>Flood risk assessment requirements All development proposals in this zone should be accompanied by a flood risk assessment.</p> <p>Policy aims In this zone, developers and local authorities should seek opportunities to:</p> <ul style="list-style-type: none"> • reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems;
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NPPF Technical Guidance - Table 2 Flood Risk Vulnerability Classification:

<p>More vulnerable</p> <ul style="list-style-type: none"> • Hospitals. • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill and sites used for waste management facilities for hazardous waste⁶. • Sites used for holiday or short-let caravans and camping, <i>subject to a specific warning and evacuation plan.</i>⁷

4.1 Tidal Sources:

- 4.1.1 The seas high water mark is approximately 13km to the East. The still water tidal levels for Grand Sluice (closest point to the application site) provided by the EA are as follows on the next page. The level indicated for the Grand Sluice is based on CFB 2018 data for the Boston Barrier site, capped at 5.3mAOD to reflect the use of the barrier.
- 4.1.2 Monitoring of tidal cycles and high tides means that tidal flooding is predictable in advance of a potential flooding event. This early warning would allow for preparations in accordance with the attached Flood Warning and Evacuation Plan to be undertaken if advised by the Environment Agency that flooding is likely to occur.
- 4.1.3 The primary tidal flooding source is the River Witham/Haven, which flows north-south. Grand Sluice is approximately 11km to the South West. Water levels in the Haven are

tidal and are controlled within the area by hard and soft banks constructed at such levels deemed necessary to hold back the highest tides at the current risk levels (i.e. high still water tides).

- 4.1.4 The first 3km through Boston is confined within "hard" defence i.e. concrete walls, sheet piling etc. but downstream the defences are conventional earth banks. There is a history of land reclamation along the Haven which has established successive lines of sea defences since medieval times, each line a little further out towards the Haven.

2018 Coastal Flood Boundary Extreme Sea Levels

CFB REF	LOCATION	EASTING	NORTHING	ANNUAL CHANCE (1 IN X) OF TIDE LEVEL IN METRES ODN																				
				1			10			50			100			200			300			1000		
				Confidence Bound			Confidence Bound			Confidence Bound			Confidence Bound			Confidence Bound			Confidence Bound			Confidence Bound		
				2.5%	50%	97.5%	2.5%	50%	97.5%	2.5%	50%	97.5%	2.5%	50%	97.5%	2.5%	50%	97.5%	2.5%	50%	97.5%	2.5%	50%	97.5%
3888	Immingham	520440	417625	4.16	4.17	4.19	4.50	4.53	4.62	4.73	4.80	5.00	4.83	4.93	5.19	4.93	5.06	5.41	4.98	5.14	5.55	5.15	5.38	6.01
3890	Haborough Marsh	522100	416512	4.14	4.15	4.17	4.48	4.51	4.60	4.70	4.77	4.97	4.80	4.90	5.16	4.90	5.03	5.38	4.94	5.10	5.51	5.11	5.34	5.97
3898	Grimsby	529295	413162	3.98	3.99	4.01	4.31	4.34	4.43	4.53	4.60	4.80	4.61	4.71	4.97	4.71	4.84	5.19	4.74	4.90	5.31	4.88	5.11	5.74
3906	Buck Beck	534709	407369	3.87	3.88	3.90	4.19	4.23	4.31	4.41	4.50	4.68	4.50	4.61	4.86	4.61	4.75	5.10	4.64	4.82	5.22	4.80	5.05	5.66
3910	Tetney	538035	405537	3.85	3.86	3.89	4.17	4.22	4.30	4.40	4.50	4.67	4.49	4.61	4.86	4.60	4.75	5.10	4.63	4.82	5.21	4.80	5.06	5.66
3918	Donna Nook	544641	401997	3.82	3.83	3.86	4.14	4.19	4.27	4.38	4.48	4.65	4.47	4.60	4.85	4.58	4.74	5.10	4.63	4.82	5.22	4.81	5.08	5.68
3928	Saltfleet	549131	393360	3.78	3.79	3.82	4.11	4.16	4.26	4.36	4.46	4.64	4.47	4.59	4.86	4.57	4.74	5.11	4.63	4.83	5.25	4.83	5.11	5.74
3942	Boygriff	555131	380860	3.72	3.74	3.77	4.06	4.11	4.22	4.33	4.43	4.65	4.43	4.57	4.87	4.56	4.73	5.13	4.62	4.83	5.28	4.85	5.15	5.82
3968	Gibraltar Point	557652	356181	4.16	4.17	4.20	4.51	4.56	4.67	4.76	4.85	5.08	4.85	4.97	5.27	4.94	5.10	5.49	4.99	5.18	5.63	5.14	5.41	6.09
3992_14	Hobhole	535990	340116	4.96	4.97	5.01	5.40	5.44	5.56	5.66	5.76	5.98	5.78	5.90	6.20	5.88	6.04	6.44	5.92	6.11	6.57	6.03	6.31	6.99
	Grand Sluice*	532366	344510	4.93	4.94	4.98	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
3992_9	Boston Barrier	532754	342852	4.93	4.94	4.98	5.41	5.45	5.57	5.73	5.83	6.05	5.85	5.97	6.27	5.93	6.09	6.49	5.94	6.13	6.59	5.98	6.26	6.94
3992_5	Fosdyke Bridge	531886	332234	4.87	4.88	4.92	5.31	5.35	5.47	5.58	5.68	5.90	5.71	5.83	6.13	5.82	5.98	6.38	5.87	6.06	6.52	6.01	6.29	6.97
4008	West Lighthouse	550094	329971	4.87	4.88	4.91	5.21	5.26	5.37	5.46	5.56	5.78	5.56	5.68	5.98	5.66	5.82	6.21	5.71	5.90	6.35	5.86	6.14	6.81
-	Marsh Road	525988	324065	-	5.04	-	-	5.44	-	-	5.73	-	-	5.85	-	-	5.98	-	-	-	-	-	-	-
-	Wisbech	546110	309940	-	4.83	-	-	5.25	-	-	5.53	-	-	5.66	-	-	5.78	-	-	-	-	-	-	-
-	Dog-in-a-Doublet	527200	299287	-	3.67	-	-	4.00	-	-	4.22	-	-	4.32	-	-	4.42	-	-	-	-	-	-	-

- 4.1.5 The hard defences have been subject to a rolling programme of improvement by the Environment Agency and its predecessor the NRA since 1978 when in January that year a 35m section of unreinforced brick wall between St Botolph's churchyard and the river collapsed. Temporary repairs were carried out and the temporary works and the remains of the old wall were removed and replaced with a permanent reinforced concrete wall and these defences are now unlikely to fail by breaching.
- 4.1.6 Information from the Environment Agency indicates that the defences upstream from Grand Sluice are satisfactory and provide protection to above the 1 in 100 year flood level. That said, there is a marginal low spot North East of the site adjacent to the former Beesons warehouse, which has a history of overtopping (when levels reached 3.9m O.D.N. and 4.0m O.D.N. in 1978 and 1977 respectively). This low point is situated on the opposite bank of the Witham to the proposed site. Defences are generally set higher at around 4.3m O.D.N.

- 4.1.7 Recent flooding during a tidal surge in 2013 had some severe consequences for many parts of the town centre but floodwater did not encroach upon the proposed application site. Floodwater generally flowed to areas SE of the site where gates at sluice bridge held back levels on the south side.
- 4.1.8 The current primary flood defences are considered to provide protection against at least a 1 in 200 year event. This will be enhanced through the Boston Tidal Barrier.
- 4.1.9 The existing defences will withstand a 1 in 100 year predicted peak tide level 5.96m AOD with 50mm freeboard. It is very unlikely that a breach will occur immediately downstream of The Grand Sluice, due to the high ground at circa 6.0m AOD. Some overtopping would occur from a 1 in 200 year tide of 6.10m AOD. This would result in sheets of water weiring over the floodwalls and flowing inland in a westerly direction following the natural contours of the ground.
- 4.1.10 Tidal flooding occurs when an exceptionally high tide, almost always accompanied by a storm tide surge, overtops and/or breaches the tidal defences along a coastline or tidal estuary.

4.2 Fluvial Sources:

- 4.2.1 The nearest potential source of fluvial/tidal flooding is represented by an unnamed watercourse / open channel drain to the north of the site. This forms part of a wider catchment of open drains that ultimately flow to Hobhole Drain approx. 2.3km to the west, and on to The Wash via The Haven river.
- 4.2.2 The open channel drain and Hobhole Drain are classed as ordinary watercourses, with The Haven classified as a 'Main River'. The location of The Wash approx. 7.0 km to the south of the site has a tidal influence to these downstream watercourses.
- 4.2.3 The site lies within the administrative area of the Witham Fourth District Internal Drainage Board. The Board has modelled the catchment for the Hobhole Drain and the 1 in 100 year flood level (including climate change) in the Drain is 0.77m AOD which is well below the bank top.
- 4.2.4 The Hobhole Drain was excavated through the silt ridge. The Drain's channel is deeply incised along its entire length and there is an exceptional amount of freeboard between water level and bank top as indicated by the existing site survey provided with this application package.
- 4.2.5 Any flooding that did occur from the Hobhole Drain would most likely be shallow, localised and probably result in no more than waterlogging as the water would naturally drain to lower areas of the site and surroundings.

- 4.2.6 The few small IDB drains and riparian ditches that flow in the surrounding area and to the site perimeter and the larger drains into which they discharge pass only through agricultural land on their way to their outfalls into the Hobhole Drain or the Wash. Runoff from new development thus poses no direct flood risk to existing property in the vicinity.

4.3 Flooding from Groundwater:

- 4.3.1 There is no history of flooding from surface water on the site. The government flood map does however indicate a low risk of flooding from surface water.



- 4.3.3 The proposed driveway would be in decorative compacted gravel finish and the new access in a similar permeable surface material such as Grasscrete or gravel to limit the area of impermeable ground created by areas of hardstanding.
- 4.3.4 There are surface water drains to the North, West and South which will assist greatly in maintaining the effective drainage of the site.

4.4 Flooding from Sewers:

- 4.4.1 Although localised flooding from sewers could occur there is therefore nothing to indicate that flooding from sewers is a problem in the area concerned, nor that the proposal would create potential for flooding from sewers in the locality

4.4.2 Foul water will discharge into the main sewers.

4.5 Climate Change

4.5.1 The NPPF requires consideration of the effects of climate change on the flood risk at the proposed site. The predicted increase of rainfall intensities from 5% by 2025 to 30% by 2115 means that surface run-off may increase. However, given the level and potential improvement of existing defences, this predicted increase should not significantly increase the flood risk at the site.

4.5.2 It is likely that the Environment Agency and Internal Drainage Board would continue to monitor and make improvements to prevent an increase in the occurrence of flooding in response to these predicted effects of climate change.

5.0 THE RISKS

5.1 The Environment Agency's Hazard Mapping affects the proposed site. The Hazard Mapping shows the consequences should a breach or overtopping of existing sea defences occur. The results show the likely flood depths, velocities and overall hazard to the proposed site. The minimum mitigation measures required for proposals can be informed by the flood depths.

5.2 If tidal surges were extreme enough to cause there to be a significant rise in high tide level above the existing flood defence levels, there would be some overtopping or potentially a breach. The site was not affected by the tidal surge flooding event of 2013 which is a good indicator that the site is well protected from the nearest source of any real threat to the East (the Hobhole Drain), based on an actual extreme event.

5.3 Given the generally level nature of the site and the distance and obstacles between the proposed site and the North Sea, we would suggest that the risk and inherent damage caused at the site would be minimal if breached tidal water or from overtopping ever did become a major threat.

5.4 Likewise overtopping of the Hobhole Drain would only result in localised flooding to a relatively shallow depth due to the extent of permeable catchment areas beyond the site and general topography.

5.5 Floodwater from overtopping or breaching should be reasonably predictable. Nevertheless, by the time waters levels had risen sufficiently to cause a breach or overtopping, the evacuation plan (Appendix A) would have been employed and if necessary, the site evacuated. The plan should be held within the dwelling so that all occupants are aware of the correct procedures to follow.

- 5.6 There is some conflicting information regarding proposed finished floor levels required for the new development. The following points 5.3 – 5.6 below have been extracted from the planning officer's report for the previous approved application and we therefore consider that the same reasoning and approach will be followed through for this current application.
- 5.7 “.... The EA's flood depth maps show that the application site is in an area identified as a 'danger for most' and that predicted flood depths using the 200-year predictions are likely to be 0.25-0.5 metres.... “
- 5.8 “.... The EA matrix therefore requires finished floor levels to be set a minimum 0.5 metres above the existing ground level of the site along with flood resilient construction techniques used up to a height of 300mm. For single storey dwellings the minimum finished floor level should be set at a minimum of 1.0 metre above existing ground levels.... “
- 5.9 “.... The proposal is therefore considered acceptable subject to a condition being imposed relating to flood resilient construction techniques being used up to a height of 300mm and FFLs set 0.5 metres above existing ground levels. The imposing of this condition would ensure that the scheme accords with Policy 4 of the SELLP..... “
- 5.10 “.... It should be noted that the previously submitted flood risk assessment recommends finished floor levels to be set a minimum of 1.0m above existing ground levels and flood resilient construction techniques to a height of 600mm. However, this is above the levels recommended by the EA within their new matrix data and to ensure the development assimilates better with the surrounding development the minimum requirements relating to FFLs and flood resilient construction techniques should be imposed specifically with the condition relating to flood risk.... “
- 5.11 For continuity, consistency with the previous planning approval (B/19/0239) and to accord with the relevant EA data and recommendations relating to development of the application site, we propose to raise the finished floor levels of the proposed two storey dwelling at least **500mm above existing ground levels to 2.5m AOD.**

6.0 SEQUENTIAL & EXCEPTIONS TEST

- 6.1 The fact that the application site already has planning permission for the construction of 2no. new dwellings, leads to the assumption that both tests for the application site have been passed.

7.0 RECOMMENDATIONS

Given the potential for flooding on the site and the classification of use it would be prudent to adopt a precautionary approach regarding the proposed development

to minimise structural damage and to safeguard human life. Such aspects can be addressed by implementing:

- Raise finished floor level of the new proposed dwelling 0.5m above ground to 2.5m AOD
- Demountable flood barriers to a height of 600mm above finished floor levels shall be fitted on all external doorways.
- Flood resilient construction techniques shall be incorporated to a minimum height of 300mm above predicted flood depth including:
 - all service ducting to be routed at high level, where practical.
 - installation of electrical and service fittings (including boilers, consumer units and meters) at least 1m above finished floor level, where practical
 - avoiding the use of timber wall and ground floor constructions (including avoiding absorbent insulation products below FFL)
 - consideration of moisture resistant coatings to lower level walls to repel floodwater
- fit flood proofing covers to low level air bricks to limit infiltration of floodwater to sub floor void.
- fit non return valves to drains and water inlet pipes
- Provision of a Flood Kit to include items such as important documents and contact numbers, torches and batteries, first aid kits, bottled water, blankets etc.
- an effective surface water drainage system including limiting impermeable surfaces and consideration of permeable paving, water retention systems etc.
- commitment to the production of an Emergency Plan outlining the procedures to be followed in the event of a flooding event.
- this will include instructions for the owner on how to register with the Environment Agency's Automated flood warning system (contact 01522 – 785877).

8.0 CONCLUSIONS




8.1 According to information sought from the Strategic Flood Risk Assessment, the Environment Agency and Internal Drainage Board, the standard of tidal and fluvial defences appropriate to the proposed site will provide adequate protection against flooding both now and for the lifetime of the development.

8.2 We are reassured by the fact that the appropriate organisations will continue to monitor, maintain and improve the existing drainage network in the prevention of flooding in response to the predicted effects of climate change. Such organisations have a responsibility to inform the public if these circumstances change.

- 8.3 Although the site has been classified as being a high flood risk area, it has a relatively low risk of flooding from tidal and fluvial sources due to the location, topography and standards of defence. The site is not within a functional flood plain of the coast or a main river.
- 8.4 However, the location is to be acknowledged and, although of very remote probability, it must never be ruled out that flooding, even of a scale greater than envisaged by this FRA, could occur.

Flood Warning & Evacuation Plan (FWEP)

- The occupants will sign up to the Environment Agency's free Warnings Direct System (contact 01522 – 785877). Flooding from tidal events is predictable and if a flooding event is imminent the EA would advise the owner accordingly.
- Upon the designated telephone number receiving the warning that the site is at risk of flooding, the assigned person will inform occupants of the situation within the shortest time possible.
- Visitors and occupants should familiarise themselves with the site and surroundings and take note of the proposed evacuation plan. Ensure that the owner has a contact mobile number for emergency contact.
- There are four stages of warning which will be issued by the Environment Agency:

	Status
	Severe Flood Warning Severe flooding. Danger to life.
	Flood Warning Flooding is expected. Immediate action required
	Flood Alert Flooding is possible. Be prepared.
	Warning no longer in force Flood warnings and flood alerts that have been removed in the last 24 hours

- **Flood Alert** – flooding is possible, be prepared. The owner should be prepared to act on their flood plan by preparing a flood kit of essential items.

- **Flood Warning** – Flooding is expected. Immediate action required. People, pets and valuables will be moved to a safe place of refuge at first floor level. Gas, electricity and water supplies will be turned off and flood protection equipment (demountable barriers, sandbags etc.) put in place as required.
- If the '**Severe Flood Warning**' is issued the site should not be occupied as there is likely to be threat to life. If for any reason, the site is occupied during a severe flood warning it will be evacuated to safe ground as recommended by the appropriate authority who will direct the evacuation towards Council operated centres outside the floodplain.

When evacuation has taken place regular contact will be made with the Environment Agency flood control centre to ensure that all current information is available to those affected. (EA Floodline – 0845 988 1188)

- **Warning No Longer In Force** – No further flooding is expected in the area. Upon receipt of the all clear message from the Environment Agency or the Police, the local area may re-open and a visual inspection of the site conditions carried out to determine whether it safe to return to the site.

General advice given by the EA is that property owners should still be careful as flood water may still be around for several days. If flooding has occurred on site the appropriate measures should be taken to make the site safe to return.