Hertsmere Options Long List

Long List of Options

HBC6 - Bushey (including Moatfield Road, Spring cross, Vale Road, Hayden Road and Homefield Road)

Long list option	Option measure	Description	Option considerations	Viability Score (1 – Low viability, 5 – High viability)	Take Forward to short list?
Do nothing	Do nothing	All operational and maintenance activities cease	A reduction in maintenance of watercourses can lead to blockages of culverts and sewers and reduction in channel capacity which in turn could lead to further flooding. Within this hotspot, the Waterfields Way Ditch is largely culverted downstream of Attenborough Fields. This culvert also has a screen at the inlet, and so without maintenance is likely to become blocked. Whereby the channel is open, lack of maintenance would result in loss of channel capacity and reduced channel conveyance.	N/A	Yes
Do minimum	Do minimum	Continue with current operational and maintenance activities	Continued maintenance of Waterfields Way Ditch will ensure no deterioration in operation of the watercourse and the existing assets. However, this option will not provide any betterment to the existing scenario and will remain as per the existing situation.	3	Yes
Do more	Do more	Increased maintenance regime	Increased maintenance of culverts and sewers to include more regular jetting and better channel maintenance. This option would further reduce risks of blockage and localised flooding but would not fundamentally increase conveyance capacity and standard of protection to properties going forward. Furthermore, the dominant source of flood risk within this hotspot is surface water, and so increased maintenance of watercourses and associated structures would not have a significant impact upon the number of reported incidents in the area.	N/A	No

Long list option	Option measure	Description	Option considerations	Viability Score (1 – Low viability, 5 – High viability)	Take Forward to short list?
Option 1	Allocation of Land within Local Planning	Long term designation of land, placing more vulnerable land uses away from at-risk areas.	Land re-designation involves altering land uses in at risk areas. Consequently, less vulnerable land-uses (e.g. recreation space, car parks etc.) are placed within the areas that have a higher chance of being flooded. However, the properties at risk are within a well-established town community and so it is not feasible to re-designate the land use.	3	No
Option 2	Flow restrictions on outflows from new developments	Recommending restrictions on surface water outflows from new developments within the catchment (to greenfield runoff rates)	As the LLFA for the area, Hertfordshire County Council advise the LPA on the suitability of surface water drainage plans for new developments. The LPA can then lower runoff rates of a planned site, if justifiable through the Local Plan or SFRA. However, the current national and local standards do not require reducing flows from developments below greenfield rates. The guidance would need to be changed to allow imposing stricter requirements. This wouldn't however constitute a stand-alone flood mitigation option.	2	No
Option 3	Natural Flood Management (NFM)	Natural flood management techniques (i.e. soil management, slowing water movement through catchment by use of planting, etc)	Within this hotspot, there are several areas of greenfield land which provide opportunities to implement natural management techniques. Within Attenborough Fields, options such as leaky dams could limit flows associated with the dominant flow path. In the north, a large flow path originates in an open field, whereby woodland would slow overland flows. Long term effectiveness of these options would be difficult to prove and, although this could be considered as a complementary interim measure, it cannot be relied upon as primary method of flood defense scheme.	4	No

Long list option	Option measure	Description	Option considerations	Viability Score (1 – Low viability, 5 – High viability)	Take Forward to short list?
Option 4	Property flood resilience	Protection to individual properties (e.g. via air brick covers, door guards etc.)	The flood depths shown to occur, within the modelling, around the at-risk areas vary, and so PRF may not be a suitable option in all places (assuming no other actions are taken to reduce flood depths). Based upon EA guidance, PFR should only protect against flood depths up to 0.6m; beyond this the structural integrity of a property is at risk. PFR should be considered only where more holistic flood risk mitigation measures, which address the source of flooding, are not possible.	3	Yes
Option 5	Flood wall / earth bund within Attenborough Fields	Incorporate flood defence wall / embankment in the north of King George Recreation Ground	The dominant flow path within the site flows through Attenborough Fields. Adding an obstruction within the grounds reduces the extent and depths of this flow path downstream, beyond the culvert at Cross Road. Depth of flooding along Brick Kiln Lane (whereby property has previously flooded) decreases significantly with the addition of the obstruction. To be viable, options of drainage would be required for use during time of flood. This land is owned by HCC.	4	Yes
Option 6	Flood wall / earth bund in the east of the site beyond Grange Road	Incorporate flood defence wall / embankment	Construction of a flood wall or embankment to obstruct the flow path moving west. It is believed that the modelling over-emphasizes the true impact of this flow path. However, modeling shows that adding the obstruction does significantly reduce the flow path volumes. Despite this, at Aldenham Road whereby there are recorded flood events, there is little impact upon flood depths. Options to drain the area, at a time of flood, would be required in order for the scheme to be viable.	3	No
Option 7	Attenuation Basin	Incorporate an additional basin	The flow path through Attenborough Fields adds	3	No

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		along the watercourse which flows through Attenborough Fields	significant volume to the flood extent downstream. Utilising an attenuation basin to limit flows downstream could be an option. The flow path through Attenborough fields has significant volumes, and so a pond would have to be large to have any notable impact. This would provide environmental enhancement. Consideration would be required to the current land use of the open space. Health and safety considerations are required when excavating pond areas due to the risk of deep water bodies.		
Option 8	Upsize existing sewers along Aldenham Road	Larger sewers would have greater capacity to carry the flow	Upsizing sewers in built-up area would have to take into account land ownership and existing utilities in the public roads. Incorporation of large diameter sewers unlikely to be viable. Flooding in the area around the junction of Aldenham Road and Vale Road appears to occur as a result of exceeding manholes as flooding continues to occur when all other flow routes are blocked. No scope for environmental enhancement. Maintenance of underground structures is also more difficult due to lack of visual signs of potential issues, like blockages and structural faults. Furthermore, jetting of pipework can sometimes lead to dislodging blockages from one location to another increasing flood risk.	2	No
Option 9	Retrofitting of SuDS	Disconnect direct runoff from existing roofs and roads from public sewers and route it via SuDS before re-	Increasing the area of permeable surface around existing development will increase infiltration lowering the risk of flooding from surface water.	4	Yes

Long list option	Option measure	Description	Option considerations	Viability Score (1 – Low viability, 5 – High viability)	Take Forward to short list?
		connecting to public sewers.	At the junction between Aldenham Road and Three Valleys Way, the large Permission Homes is shown to be affected by deep areas of surface water ponding. SuDS features here such as rain gardens would remove some of this water from the surface. Alternatively, permeable paving would allow for infiltration. At the junction between London Road and Haydon Road, there is green space which provides opportunity to store water. This would limit the volumes of water that moved from London Road, to Haydon Road, which then consequently impacts upon properties along Brick Kiln Close.		
Option 10	Highway management of surface water	Increased conveyance and temporary storage in the highway and/or methods of slowing flow	Surface water flow paths along Merry Hill Road contribute to the volumes of water entering Attenborough Fields. Methods to slow or reduce the flows here would restrict the volumes requiring management downstream.	2	No

Table 1: Viability scoring criteria

Assessment Criteria	Assessment criteria description	Do Minimum	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10
Construction & Maintenance	Disruption for construction and maintenance are minimised	5	5	5	5	3	4	4	3	1	4	5
Design Capabilities	Number of properties protected from flooding by surface water runoff	0	0	0	3	2	4	2	2	4	3	2
Design Capabilities	Level of additional environmental benefit provided	0	0	1	5	1	1	1	3	1	5	1
Health & Safety	Risk to maintenance operatives is minimised	5	5	3	4	4	4	4	2	2	3	2
Public Acceptability	Overall acceptability of the scheme to the public	3	3	3	5	4	5	5	4	3	4	3
Natural Environment & Visual Amenity	No adverse ecological effect on flora and fauna	5	5	1	5	4	5	5	5	1	5	1
Natural Environment & Visual Amenity	Scheme minimises visual impact on surrounding area	5	3	1	5	4	5	5	5	5	5	3
Climate Change Adaptation	Design can be easily adapted to accommodate climate change impacts	0	1	1	2	3	2	2	1	1	1	1
Cost	Low capital investment required	5	5	5	3	3	3	3	4	1	3	3
Cost	Low maintenance costs	5	5	3	3	4	3	3	2	3	3	3
	Total (out of 50)	**33**	**32**	**23**	**40**	**32**	**36**	**34**	**31**	**22**	**36**	**24**
	Viability Score (out of 5)	**3**	**3**	**2**	**4**	**3**	**4**	**3**	**3**	**2**	**4**	**2**
Scoring Criteria	0 = Does Not Meet Criteria											
Please Note: All options are ranked comparatively	5 = Fully Meets Criteria											

Short list of Options taken forward:

- **Do nothing**
- **Do minimum**
- **Option 4 – Property flood resilience**
- **Option 5 – Flood wall / earth bund within Attenborough Fields**
- **Option 9 – Retrofitting of SuDS**
- Note: Options 1 and 2 relate to wider LLFA and LPA policy recommendation and therefore have not been taken forward for further investigation at this time.

Do-nothing Option Data

Summary Description of Option
No active intervention within the study area. No maintenance of watercourses / sewers undertaken. All assets approaching the end of their life allowed to fail.

Summary Advantages of Option
No costs incurred.

Summary Disadvantages of Option
Channel capacities will be reduced due to vegetation and debris. The risk of blockage of culverts and sewers will increase due to accumulated debris / sediment. The existing measures would cease to protect properties to the current standard. Overall flood risk would be expected to increase, and additional properties could be put at flood risk.

Summary of Option Viability and Deliverability
The Do-nothing scenario is not viable in a well-developed area like South Oxhey and should not be considered further. This option is however taken to the short list as it forms the comparative case in the economic analysis.

Do-minimum Baseline Option Data

Summary Description of Option
Existing maintenance regime to continue and existing assets to be repaired as required to ensure the current standard of protection is maintained. This scenario still poses flood risk to number of properties in the area. This will not prevent future increases in flood risk as a result of climate change.

Summary Advantages of Option
• Affordable (No capital spend). • Maintains the existing situation.

Summary Disadvantages of Option
• Does not provide any reduction in flood risk. • Potential for maintenance requirements (and costs) to increase over time.

Summary of Option Viability and Deliverability
This option is viable and can be delivered but offers no betterment to the existing scenario and will still result in an increased flood risk in the future due to climate change.

Standard of Protection Provided by Option

Based on the integrated surface water modelling of the area the level of protection offered by the current arrangement is less than a 1 in 5-year standard.

Number of Residential Properties at Risk from Flooding in Baseline Do-minimum Scenario Very Significant Risk (>5% AEP)	**Number of Residential Properties at Risk from Flooding in Baseline Do-minimum Scenario** Significant Risk (Between 5% and 1.3% AEP)	**Number of Residential Properties at Risk from Flooding in Baseline Do-minimum Scenario** Moderate Risk (Between 1.3% and 0.5% AEP)	**Number of Residential Properties at Risk from Flooding in Baseline Do-minimum Scenario** Low Risk (< 0.5% AEP)
126	40	11	64
Number of Non-Residential Properties at Risk from Flooding in Baseline Do-minimum Scenario Very Significant Risk (>5% AEP)	**Number of Non-Residential Properties at Risk from Flooding in Baseline Do-minimum Scenario** Significant Risk (Between 5% and 1.3% AEP)	**Number of Non-Residential Properties at Risk from Flooding in Baseline Do-minimum Scenario** Moderate Risk (Between 1.3% and 0.5% AEP)	**Number of Non-Residential Properties at Risk from Flooding in Baseline Do-minimum Scenario** Low Risk (< 0.5% AEP)
0	1	0	0

Option 4 – Property Flood Resilience

Summary Description of Option
Passive Property Flood Resilience measures including flood doors, self-closing air bricks, etc. to be offered to all residential properties at risk of 1 in 75-year flooding.

Summary Advantages of Option
• No land take. • Work areas limited to individual properties thus limited risk of difficult ground conditions, utility clashes, access constraints etc.

Summary Disadvantages of Option
• Does not address causes of flooding. • Some properties may not be suitable/ property owners may not want such measures. • Adoption by all properties within allocated area may be required to ensure full potential of this option is achieved.

Summary of Option Viability and Deliverability
PFR remains a viable standalone option particularly for smaller groups of affected properties and may also be considered as an alternative or complimentary to other capital schemes. Deliverability will be subject to the outcomes of a PFR survey and resident consultations. PFR is likely to be an option to consider along Brick Kiln Close whereby previous flood incidents have been reported. This should be considered after the construction of the bund in Option 5, as without this, the flood depths expected exceed what is suitable for the use of PFR.

Standard of Protection Provided by Option	1 in 75-year to all affected properties.

Option 5 – Flood wall / earth bund within Attenborough Fields

Summary Description of Option

1. Construction of a wall / bund in the west of Attenborough Fields to intercept the flow path moving in a westerly direction.
2. Prevent the large volumes of water, associated with the flow path, passing through the culvert which also results in overtopping.

Summary Advantages of Option

- Reduces flow entering the downstream surface water sewer network.
- Significantly reduces the flood depths along Haydon Road and Brick Kiln Close whereby there have previously been flood incidents.
- Has little impact on the existing space.
- Construction / operation works do not affect individual properties.
- Can provide a good standard of protection.

Summary Disadvantages of Option

- Bund may be overtopped in higher return period events.
- Flooding of Attenborough fields will occur during storm event. Will result in temporary loss of amenity space.
- Suitable methods of discharge will be required to drain water which accumulates against the bund.
- Maintenance of bund will be required.

Summary of Option Viability and Deliverability

The flow path through Attenborough Fields poses significant flood risk to areas beyond the culvert at Cross Road. Restricting this flow ahead of the culvert limits the amount of flow that passes the culvert. This is a viable option but, in terms of delivery, the main constraints concern land ownership and maintaining the current footpath through the fields.

Option 9 – Retrofitting of SuDS

Summary Description of Option

1. Utilising the current greenspace that exists at the junction between London Road and Haydon Road as a storage area for surface water.
2. This area would intercept the flow path that exists from London Road and flows onto Haydon Road, impacting properties within Brick Kiln Close.

Summary Advantages of Option

- Opportunities for environmental and aesthetic enhancement, visual amenity and / or habitat creation.
- Will provide protection for the primary school as a well as the properties in the Homefield Road area.
- Construction / operation works do not affect individual properties.
- Visual reassurance to the local residents that they are protected against flooding.
- Overground storage features are easier to maintain than underground structures due to their accessibility and visually apparent blockages/ degradation, etc. that require attention.
- Potential additional biodiversity and amenity benefits.

Summary Disadvantages of Option

- Increased maintenance may be required, as a result of additional greenspaces, dependent upon existing regime. Drainage of area during time of flood requires consideration.

- Retrofitting of SuDS may result in a loss of amenity space.

Summary of Option Viability and Deliverability
Storage areas are an effective method of reducing flood risk downstream through the retention of flood waters. This option is viable based upon the landowners allowing adoption of the land. Creating the storage areas will not require a significant land change and therefore is a relatively easily achieved option.