Stevenage BC Options Long List

Long List of Options

SBC2 - Bragbury Lane

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	Reduced maintenance in this hotspot would relate to decreased operational activities along the Stevenage Brook in the north. There are no culverts to pose increased flood risk. However, if maintenance were to cease, vegetation and other debris is likely to increase within the channel, reducing the channel capacity and conveyance. This would potentially increase the chance of channel exceedance.	N/A	Yes – for economic appraisal
Do minimum	Do minimum	Continue with current operational and maintenance activities	Continued maintenance will ensure no deterioration in operation of the Stevenage Brook and existing assets. However, this option will not provide any betterment to the existing scenario and the standard of protection (SoP) will remain as per the existing.	3	Yes – for economic appraisal
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
Option 1	Allocation of Land within Local Planning	Long term designation of land, placing more vulnerable land uses away from at-risk areas.	Land 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	Recommending restrictions on surface water	As the LLFA for the area, Hertfordshire County Council advise the LPA on the suitability of surface	2	No

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	new developments	outflows from new developments within the catchment (to greenfield runoff rates)	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. At present there are no plans to develop the area upstream of the main area of risk.		
Option 3	Natural Flood Management (NFM)	Natural flood management techniques (i.e. soil management, slowing water movement through catchment by use of planting, etc)	Long term effectiveness of this option would be difficult to prove. The two large runoff paths (which flow towards the Railway bridge over Bragbury Lane) are both located in large rural fields. Within these areas, there are opportunities to slow down the flow and limit the volumes reaching Bragbury Lane (whereby flooding has been recorded). Although this could be considered as a complementary interim measure, it cannot be relied upon as primary method of strategic flood defense scheme.	4	No
Option 4	Property flood resilience	Protection to individual properties (e.g. via air brick covers, door guards etc.).	Along Bragbury Lane whereby flood incidents have been reported, modelling predicts flood depths to be below 0.15m, and so PFR is likely to be a viable option. 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 west of Bragbury Lane, near the railway bridge	Incorporate flood defence wall / embankment	A large flow path originates from Knebworth, south of Bragbury End. This flow path is obstructed by the railway embankment, whereby the water accumulates, and some flows onto Bragbury Lane. An obstruction here would prevent water flowing onto the road. However initial model testing indicates that flooding still occurs along Bragbury Lane as a result of the flow path from the south east. It may therefore be advisable to consider the	2	No

Long list option	Option measure	Description	Option considerations	Viability Score (1 – Low viability, 5 – High viability)	Take Forward to short list?
			two flow paths together rather than separately.		
Option 6	Flood wall / earth bund east of Bragbury Lane, near the railway bridge	Incorporate flood defence wall / embankment	Incorporating an obstruction on the east of the railway bridge would prevent the large flow path becoming siphoned under the railway bridge. Initial model testing of this obstruction shows significant reduction in the depth of water that flows along Bragbury Lane. However, modelled depths against the wall accumulate to greater than 2m, and a wall of this height would not be an ideal solution. Alternative options should be considered to limit volumes in the upper reaches of the flow path to reduce the required height of the obstruction.	3	Yes
Option 7	Attenuation Basins	Excavation of basins that intersect flow paths and limit downstream volumes	Areas of attenuation would be particularly valuable within the rural areas, either side of Bragbury Lane, whereby there are two large flow paths. The flow path east of the road has a greater impact upon the flood risk. The volume produced by the flow path is very high, and so the basin would require a large volume to have a notable impact. A series of basins could be considered in place of one large body. This option would provide some environmental enhancement. Land ownership would need to be considered as this would potentially impact upon the current land use.	3	No
Option 8	Gullies along Bragbury Lane	Excavation of gullies along Bragbury Lane to manage flow paths	Flow paths along Bragbury Lane, into Bragbury End, contribute to the flood risk. Installation of additional gullies could be used to slow flow paths and limit the volume that ponds on the road surface. Maintaining the natural verges on both sides of the road would limit the environmental impacts. Drainage of these gullies would require consideration, however there is potentially capacity in the network.	2	No
Option 9	Limit flow path along Bragbury Lane	Installation of ‘speed bumps’ along Bragbury Lane to	Incorporating obstructions along the road would slow down the flow path	2	No

Long list option	Option measure	Description	Option considerations	Viability Score (1 – Low viability, 5 – High viability)	Take Forward to short list?
		temporarily obstruct flows	and temporarily store water (on the road surface).		
Option 10	Increased conveyance and temporary storage of runoff within the highway	Increased kerb height (or lowering of road) along Bragbury Lane	Increasing the kerb height, or lowering the road surface, would increase the potential to convey flows within the highway away from at risk properties and provide capacity for temporarily storing water within the highway network. Maintaining access to property, along where kerbs are raised, would require consideration.	2	No
Option 11	Improved flow path channel	Increasing the capacity of the channel associated with the flow path	Satellite imagery of the field on the eastern side of Bragbury Lane appears to show that there is a slight depression associated with the flow path. Adapting this area to provide a more formal channel would increase the capacity for the flow path. Around the centre of the field, the existing line of vegetation provides an ideal area for additional storage. If the channel were to be more defined, there is then the opportunity for incorporation of leaky dams which would control flow volumes and speed downstream.	3	Yes

Table 1: Viability scoring criteria

Assessment Criteria		Do Minimum	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10	Option 11
Construction & Maintenance	Disruption for construction and maintenance are minimised	5	5	5	4	3	3	3	4	2	1	1	3
Design Capabilities	Number of properties protected from flooding by surface water runoff	0	0	0	4	2	0	4	2	2	2	3	3
	Level of additional environmental benefit provided	0	0	1	5	1	0	1	3	1	1	1	3
Health & Safety	Risk to maintenace operatives is minimised	5	5	3	4	4	3	3	2	2	2	2	3
Public Acceptability	Overall acceptability of the scheme to the public	3	3	3	3	4	3	3	3	3	2	2	4
Natural Environment & Visual Amenity	No adverse ecological effect on flora and fauna	5	5	1	5	4	4	4	4	4	4	4	4
	Scheme minimises visual impact on surrounding area	5	3	1	5	4	4	4	3	3	2	3	4
Climate Change Adaptation	Design can be easily adapted to accommodate climate change impacts	0	1	1	2	3	1	2	2	1	1	1	2
Cost	Low capital investment required	5	5	5	3	3	3	3	4	3	2	2	2
	Low maintenance costs	5	5	3	3	4	3	3	2	2	3	3	3
	Total (out of 50)	**33**	**32**	**23**	**38**	**32**	**24**	**30**	**29**	**23**	**20**	**22**	**31**
	Total (out of 5)	**3**	**3**	**2**	**4**	**3**	**2**	**3**	**3**	**2**	**2**	**2**	**3**

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 6 – Flood bund on the east side of Bragbury Lane, incorporated with the railway embankment**
- **Option 11 – Improved flow path channel**
- 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 Bragbury End 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 a 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.		
Properties at Risk from Flooding in Baseline Do-minimum Scenario			
Very Significant Risk (>5% AEP)	Significant Risk (Between 5% and 1.3% AEP)	Moderate Risk (Between 1.3% and 0.5% AEP)	Low Risk (< 0.5% AEP)
Number of Residential Properties at Risk from Flooding			
13	8	9	11
Number of Non-Residential Properties at Risk from Flooding			
0	0	0	0

Option 4 – Property Level Protection

Summary Description of Option
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.

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. • Higher risk of failure than other options.

Summary of Option Viability and Deliverability
PFR remains a viable option but should be considered as an alternative should no other capital scheme be viable. Deliverability will be subject to the outcomes of a PFR survey and resident consultations.

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

Option 6 – Flood bund on the east side of Bragbury Lane, incorporated with the railway embankment

Summary Description of Option
1. Construction of a raised bund along the eastern side of the Bragbury Lane to limit the amount of flow that can reach the road. 2. Connection of the bund to the railway embankment.

Summary Advantages of Option

- Reduces flow entering the downstream surface water sewer network.
- Direct intervention to limit the volume of water reaching the road.
- Little impact upon the natural environment.
- 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.

Summary Disadvantages of Option

- Relatively high capital costs.
- Residual risk of overtopping or failure.
- No amenity benefits.
- Construction materials will be required from off-site.
- Land ownership and land-take will require consideration.

Summary of Option Viability and Deliverability

The land on the east of Bragbury Lane appears to currently be arable land and therefore it would be a viable option to build the bund as the land is in a developable state. However, discussion with the landowner would be required as this will result in some land loss of the field. This option should be considered alongside Option 7 (Attenuation Basins) which aims to hold some of the water upstream to limit the required bund height.

Option 11 – Improved flow path channel

Summary Description of Option

1. Enhanced capacity of the channel associated with the flow path.
2. Storage areas along the channel to reduce volumes reaching downstream.
3. Incorporation of leaky dams along the channel to limit flow velocity.

Summary Advantages of Option

- Opportunities for environmental and aesthetic enhancement, visual amenity and / or habitat creation.
- Construction / operation works do not affect individual properties.
- Overground storage features are easier to maintain than underground structures due to their accessibility and visually apparent blockages/ degradation, etc. that require attention.

Summary Disadvantages of Option

- Relatively high capital costs.
- Excavations required thus risk from potentially high groundwater levels / ground stability / contamination and existing utilities in the area.
- Loss of land for the landowner.
- Maintenance and upkeep required to ensure no loss of volume as a result of in-washing of sediment or vegetation growth.

Summary of Option Viability and Deliverability

Channel enhancement within the field is a viable option dependent upon discussion with the landowner. The channel (and potential additional storage areas) will directly limiting the height of the bund required downstream to be effective (Option 6).