Three Rivers Options Long List

Long List of Options

TRDC9 - Oxhey

Long list option	Option measure	Description	Option considerations	Viability Score (1 – High viability, 5 – Low viability)	Take Forward to short list?
Do nothing	Do nothing	All operational and maintenance activities cease	Reducing maintenance could lead to blockages of sewers and reduction in system capacity which in turn could lead to further flooding. Blockage of gullies would result in excess surface water within the highway during even low-order events.	N/A	Yes
Do minimum	Do minimum	Continue with current operational and maintenance activities	Continued maintenance will ensure no deterioration in operation of 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 clearing This option would further reduce risks of blockage and localised flooding but would not fundamentally increase the standard of protection to properties going forward.	N/A	No
Option 1	Catchment Management	Increased storage of water in the upstream reaches of the catchment to limit downstream flood risk	The main flood risk is from fluvial sources. Involvement of the EA is advised to assess the next steps that should be considered. For this hotspot, it is advised that efforts are made to store water upstream. The upper reaches of the Hartsbourne are within a wooded area and so there are ideal spaces to limit the flows here.	3	Yes
Option 2	Retrofitting of SuDS	Disconnect direct runoff from existing roofs and roads from public sewers and route it via SuDS before re-connecting	The retrofitting of SuDS would be difficult in this area as a result of the extensive urbanized space. However, the implementation of SuDS could alleviate the flow path that is responsible for the reported flood incidents along Raglan Gardens and Brookdene	3	No

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		to public sewers	Avenue. Along Raglan Gardens, the pavements are relatively wide allowing for the construction of rain gardens. These would provide interception storage for the flow path. Along Brookdene Avenue, there are already some areas of greenspace which could be utilized. Although there are opportunities for SuDS, space is very limited.		
Option 3	Property flood resilience	Protection to individual properties (e.g. via air brick covers, door guards etc.)	Property flood resilience is only a viable option whereby flood depths are relatively shallow. Flood incidents have been previously reported along Brookdene Avenue and along Raglan Gardens and PFR could applied to affected properties Modelling shows that the flood depths here are low (below x0.15m during a 1 in 75-year event) and property flood resilience would be possible to limit the impact of overland flows.	3	Yes
Option 4	Increased storage and conveyance within the highway	Increased capacity within the highway to store surface water flow paths	Increased capacity can be achieved through the lowering of the road surface or increased kerb height. In several places across the hotspot, flow paths accumulate to depths to exceed road storage. Most notably, this occurs along Raglan Gardens and Brookdene Road where there have been reported incidents. However, although this option could directly intercept flow paths that are responsible for previous flooding, consideration to property access is required.	2	No
Option 5	Disconnection of surface water from network	Capture of water before it reaches the surface water network	Within the hotspot, several manholes are predicted to flood, resulting in surface water flow paths within the highway. For example, manholes are predicted to exceed along	3	Yes

Long list option	Option measure	Description	Option considerations	Viability Score (1 – High viability, 5 – Low viability)	Take Forward to short list?
			Oaklands Avenue, and this water then flows onto Raglan Gardens and Brookdene Avenue whereby there have been reported flood incidents. If runoff from properties (i.e. roofs) were to be captured, it would reduce the possibility of manhole exceedance occurring.		

Table 1: Viability scoring criteria

Assessment Criteria		Do Minimum	Option 1	Option 2	Option 3	Option 4	Option 5
Construction & Maintenance	Disruption for construction and maintenance are minimised	5	3	4	3	2	4
Design Capabilities	Number of properties protected from flooding by surface water runoff	0	2	3	2	2	3
	Level of additional environmental benefit provided	0	3	4	1	1	1
Health & Safety	Risk to maintenance operatives is minimised	5	2	3	4	2	3
Public Acceptability	Overall acceptability of the scheme to the public	3	4	4	4	2	4
Natural Environment & Visual Amenity	No adverse ecological effect on flora and fauna	5	4	4	4	2	4
	Scheme minimises visual impact on surrounding area	5	4	4	4	2	3
Climate Change Adaptation	Design can be easily adapted to accommodate climate change impacts	0	1	1	3	1	2
Cost	Low capital investment required	5	2	3	3	3	4
	Low maintenance costs	5	2	2	4	3	2
	Total (out of 50)	**33**	**27**	**32**	**32**	**20**	**30**
	Viability Score (out of 5)	**3**	**3**	**3**	**3**	**2**	**3**

Scoring Criteria *Please Note: All options are ranked comparatively*	0 = Does Not Meet Criteria 5 = Fully Meets Criteria

Short list of Options taken forward:

- **Do nothing**
- **Do minimum**
- **Option 1 – Catchment management**
- **Option 3 – Property flood resilience**
- **Option 5 – Disconnection of surface water from network**
- 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 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.		
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			
15	3	104	111
Number of Commercial Properties at Risk from Flooding			
0	0	6	1

Option 1 – Catchment management

Summary Description of Option
Within this hotspot, the main source of flood risk is fluvial from the Hartsbourne. To address this source of flood risk, methods of upstream management should be considered. This can be achieved in several ways, with NFM techniques often being the preferred method. Overall the aim is to reduce and slow the flows that enter the watercourse upstream.

Summary Advantages of Option
• No impact upon individual properties. • Directly addresses the source of flood risk. • No environmental degradation as a result (based on using NFM techniques).

Summary Disadvantages of Option
• Difficult to quantify the benefits of NFM. • May not be as effective during higher order events.

Summary of Option Viability and Deliverability
Catchment management is a viable option as it directly addresses the issue of flood risk and the upstream catchment here is still in a natural state and therefore there is opportunity to implement actions.

Option 3 – 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.

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

Option 5 – Disconnection of surface water

Summary Description of Option
This involves limiting the volumes of water that enter the surface water sewer system from urban development such as buildings. As a result of the disconnection, there is greater capacity in the system for volumes generated directly by rainfall. Actions can include capturing runoff from roofs through the use of storage water butts.

Summary Advantages of Option
• Reduces flow entering the downstream surface water sewer network. • Direct intervention to limit the volume of water entering sewer system and therefore limits manhole exceedance. • 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 low capital costs. • Will not protect against higher order events. • Areas will require upkeep and maintenance to ensure continued efficiency.

Summary of Option Viability and Deliverability
This option is viable as it is relatively cheap and, if implemented across the hotspot, can have a notable impact. The deliverability of this option is largely reliant upon the willingness of individual residents to cooperate by allowing options such as water butts to be within their properties.