Three Rivers Options Long List

Long List of Options

TRDC2b – South Oxhey

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	Reducing maintenance could lead to blockages of culverts and sewers and reduction in channel capacity which in turn could lead to further flooding.	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 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. However, increased clearing of the gully network should be considered to increase capacity for surface water flooding.	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 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 largely spread across the area, and	2	No

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			so it is not feasible to re-designate the land use.		
Option 2	Runoff control measures	Measures to alleviate surface water runoff volumes	Flow restriction measures along Harrogate Road should be considered to limit the numbers of properties which have reported flood incidents. These would include options such as speed bumps which would divert and/or slow the flow path.	2	No
Option 3	Flow restrictions on outflows from new developments	Determining restrictions on surface water outflows from new developments within the catchment (below 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 4	Retrofitting of SuDS into built-up areas	Disconnect direct runoff from existing roofs and roads from public sewers and route it via SuDS before re-connecting to public sewers.	Re-routing of surface water into rain gardens, with raised verges in places, would result in increased storage and divert water away from property driveways and entrances. Retrofitting requires extensive construction works and there can be spatial constraints for the incorporation of SuDS. Opportunities for SuDS are found in several places across the hotspot. Along Ashridge Drive and Burnley Close, there are several properties within he modelled flood extents, and reported flood incidents. Along these (and other surrounding roads including Barnhurst Path and Hindhead Green), the existing small areas of green space could be utilized	4	Yes

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			to intercept and temporarily store water. Seacroft Gardens also has multiple recorded flood incidents which could be mitigated through the use of SuDS. There are areas of green space whereby the flowpath could be diverted and water could be stored. Also, a flow path through Pond Wood also affects the street. Within the woodland, a basin could be constructed to capture some of the flow before it reaches the street. Swales may also be suitable along the grassy areas adjacent to Prestwick Road. These could slow the flow path which adds to the downstream flood risk.		
Option 5	Natural Flood Management Techniques in woodland areas		In the north west of the hotspot, there is a small ditch which flows through the area of woodland. The watercourse is then culverted below Dumfries Close. Similarly, there are several ditches through Oxhey Wood (in the south west of the hotspot). . Leaky dams could be used within the channel to slow down the flow of water, which would reduce the downstream flood risk. Otherwise, small bunds could also be constructed to intercept flow. Alternatively, detention areas could be connected to the channels to store excess volumes of water.	3	Yes
Option 6	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, are typically low and so installation of property flood resilience may 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.	3	Yes

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			The properties that have reported previous flooding incidents are typically at risk from flooding of shallow depths. Across the hotspot, reported incidents are typically widespread, and often isolated. The exception to this is along Seacroft Gardens and Northwick Road, whereby there is a cluster of properties flooding. Flooding here is predicted to be below 0.15m during a 1 in 75-year flood event and so assuming all properties adopt the PFR, it is likely to be a viable option here. However, option should be used within conjunction with other proposed mitigation methods which will reduce flood depths and there the depths of flood occurring.		
Option 7	Upsize existing sewers	Larger sewers would have greater capacity to carry the flow.	Within the hotspot, there are several areas whereby the upsizing of sewers would potentially reduce flood risk a result of the increased system capacity. For example, whereby Northwick Road meets Prestwick Road there is manhole exceedance as a result of many pipes forming a junction here. 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. 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

Table 1: Viability scoring criteria

Assessment Criteria		Do Minimum	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
Construction & Maintenance	Disruption for construction and maintenance are minimised	5	2	4	5	4	4	3	1
Design Capabilities	Number of properties protected from flooding by surface water runoff	0	2	2	0	3	3	2	3
	Level of additional environmental benefit provided	0	1	1	3	5	3	1	1
Health & Safety	Risk to maintenance operatives is minimised	5	2	2	3	3	3	4	2
Public Acceptability	Overall acceptability of the scheme to the public	3	3	3	3	4	4	4	3
Natural Environment & Visual Amenity	No adverse ecological effect on flora and fauna	5	3	2	1	5	5	4	1
	Scheme minimises visual impact on surrounding area	5	1	2	1	5	5	4	3
Climate Change Adaptation	Design can be easily adapted to accommodate climate change impacts	0	1	1	1	1	1	3	1
Cost	Low capital investment required	5	2	3	3	3	3	3	1
	Low maintenance costs	5	2	2	2	3	3	4	3
	Total (out of 50)	**33**	**19**	**22**	**22**	**36**	**34**	**32**	**19**
	Viability Score (out of 5)	**3**	**2**	**2**	**2**	**4**	**3**	**3**	**2**

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 4 – Retrofitting of SuDS**
- **Option 5 – Natural flood management in woodland areas**
- **Option 6 – Property flood resilience**

  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.		
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			
349	87	879	890
Number of Non-Residential Properties at Risk from Flooding			
6	1	4	24

Option 4 – Retrofitting of SuDS

Summary Description of Option

1. Utilisation of small areas of green space within the built up as areas of storage.
2. There are many grassed spaces between roads and pavements which could be used to intercept flow paths along the highway.
3. Whereby extended parcels of grass are present, swales could be excavated to both store and convey water.

Summary Advantages of Option

- Reduces flow entering the downstream surface water sewer network.
- Combination of small-scale actions, less reliance on one action.
- Area-wide management scheme.

Summary Disadvantages of Option

- Increased maintenance may be required, as a result of additional greenspaces, dependent upon existing regime. Retrofitting of SuDS may result in a loss of amenity space.

Summary of Option Viability and Deliverability

Across the entire study area, there have been several incidents of flooding reported. This area should be approached as a ‘risk area’ and managed as a whole to result in overall reduction of surface water. The area is highly developed with small areas of green space scattered across the area. The options within this management scheme are viable, however will only have a notable impact when combined to have an overall effect.

Option 5 – Natural flood management in woodland areas

Summary Description of Option
1. Management of drains which flow through woodland in the west before becoming culverted. 2. Actions to limit the volume of flow and the speed of flow through the woodland such be considered. Leaky dams could be installed along each drain to hold back some of the water.

Summary Advantages of Option
• Upstream management to address a source of flood risk. • Works with the natural environment so has little environmental degradation. • Relatively low cost to implement. • Construction does not impact upon any individual properties.

Summary Disadvantages of Option
• The benefits of natural flood management are difficult to quantify.

Summary of Option Viability and Deliverability
The overall effectiveness of NFM techniques is difficult to quantify, however limiting the flow paths which exist through the woodlands is likely to reduce downstream risk. This is a viable and easily delivered option that requires relatively little engineering and results in little disruption.

Option 6 – 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 is required to ensure full potential of protection is achieved.

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.