

# North Yorkshire Council

## Resources and Environment Executive Members

09 August 2024

### Upper Dales Flood Alleviation Scheme

#### Report of the Assistant Director – Highways and Transportation, Parking Services, Street Scene, Parks and Grounds

##### 1.0 PURPOSE OF REPORT

- 1.1 To update the Corporate Director, Environment and the Executive Member for Highways and Transportation on the progress to date concerning the development of the business case to support the Upper Dales Flood Alleviation scheme.
- 1.2 To request approval from the Chief Finance Officer, in consultation with the Deputy Leader and Executive Member for Finance and Resources and the Executive Member for Highways and Transportation for:
- NYC to lead on the future delivery of the scheme.
  - NYC to offer a contribution of £650k over 2024/25 2025/26 and 2026/27
- 1.3 To request approval from the Chief Finance Officer, in consultation with the Deputy Leader and Executive Member for Finance and Resources and the Executive Member for Highways and Transportation for the following;
- i. To submit an application for £873,212 of the available Environment Agency Flood Defence Grant in Aid funding to enable scheme development through 2024/25
  - ii. To submit an application for £582,889 of the available Flood and Coastal Committee Local Levy
  - iii. To support the intention to commission a Feasibility Study for Mount Drive, Leyburn culvert diversion.
  - iv. To support the continuation of work to identify and work towards funding opportunities, should the bids details be unsuccessful.

##### 2.0 BACKGROUND

- 2.1 In July 2019 unprecedented rainfall in the west of the county saw devastating flooding impacts. Richmondshire was hardest hit by the events, which saw approximately 238 individual properties internally flooded, bridges providing vital links to some remote communities destroyed, watercourses obstructed by tonnes of debris and several significant landslips impacting on the highway network.
- 2.2 The investigation focussed on Reeth, Arkengarthdale, Leyburn and Bellerby given these were locations which saw the most significant effects, although the resulting reports acknowledged that flooding was experienced elsewhere. See Appendix A for previous report.
- 2.3 Overall, the locations included in the studies were Reeth and Fremmington, Arkengarthdale, Bellerby, Leyburn, West Witton, Bainbridge, Hawes, and Gayle, Redmire and Spennithorne.
- 2.4 Meetings were arranged with parish councils to make them aware of the content of the reports, as well as a planned week of public engagement, where the local community discussed options with officers in Leyburn and Reeth.

- 2.5 All options were considered with Property Flood Resilience being the preferred option. Please refer to Appendix A for full report.
- 2.6 It should be noted Grinton has been included in the Upper Dales Flood Alleviation scheme.
- 2.7 In April 2024 a Community Engagement Event was delivered in Leyburn, inviting all eligible residents across the Upper Dales to engage with officers within Flood Risk Management, the Resilience and Emergency Team, the Environment Agency and NYC contractors who have delivered Property Flood Resilience measures in the Malton Scheme. Residents were invited to register for the scheme. Following this, further meetings have been arranged and door to door visits for vulnerable residents.
- 2.8 Mount Drive, Leyburn continually experiences flooding. The culvert, which runs beneath properties, does not have the capacity to allow constant flow in high rainfall events, which results in surcharging due to being overwhelmed.

### **3.0 UPPER DALES PROJECT**

- 3.1 The Upper Dales project has been on hold due to the priority of the Malton, Norton, and Old Malton Flood Alleviation scheme with further delays due to the Covid pandemic and issues in obtaining Property Flood Resilience equipment.
- 3.2 In January 2024, an additional Flood Risk Management Project Manager was recruited to deliver the Upper Dales Flood Alleviation Scheme.
- 3.3 Progress to date
- Decision to group all areas together for the Upper Dales project
  - Meetings held with Yorkshire Dales National Park Authority to inform them of our intention to install Property Flood Resilience measures to residents within the park and the importance of working in partnership to deliver the project which would protect properties. Discussions were held regarding planning permission with the decision taken to survey park residents first, apply for planning permission and install PFR (Property Flood Resilience) in other areas during this time.
  - In April 2024, a community engagement event was delivered in Leyburn, inviting all eligible residents across the Upper Dales to engage with officers within Flood Risk Management, the Resilience and Emergency Team, the Environment Agency and NYC contractors who have delivered Property Flood Resilience measures in the Malton Scheme. Residents were invited to register for the scheme. Following this, further meetings have been arranged with door-to-door visits for vulnerable residents.
  - To date 84 properties have registered to the scheme, with area visits planned in the coming weeks.
- 3.3.1 There is a potential option to introduce an overflow pipe which would add capacity in high rainfall events. Riparian owners have been invited to a meeting to discuss this option and agreed, in principle, to a personal contribution to works, a further meeting will be held to discuss the outcome of the feasibility study, if agreed.
- 3.4 The Flood Defence Grant in Aid is the central government fund for managing flood risk in England and provides funding for the Environment Agency (EA) flood risk management studies and strategies along with local authority flood risk and coastal management studies and projects. Following the completion of the Environment agency partnership funding calculators North Yorkshire is eligible for the grant in aid to support the Upper Dales Flood Alleviation scheme, these have been submitted as individual projects. It became apparent on completion of each public fund application there was a risk contingency shortfall which has resulted in the application for Local Levy funding (see Appendix B). Each month, we contribute to the Local Levy fund and are eligible to apply for funding to deliver flood risk projects in the county.

Project title	Council contribution	Grant in Aid	Local Levy
P1. Wensleydale	£97,500	£168,483	£58,017
P2. Leyburn	£107,250	£143,910	£88,940
P3. Leyburn & Redmire	£74,750	£82,185	£100,666
P4. Leyburn 3	£100,750	£115,915	£110,035
P5. West Witton & Spennithorne	£47,618	£103,382	£47,618
P6. Reeth	£70,913	£138,637	£70,913
P7. Upper Dales	£106,700	£120,700	£106,700
<b>Total</b>	<b>£650,000</b>	<b>£873,212</b>	<b>£582,889</b>

3.4.1 We are now able to address the flooding issues in the Upper Dales and seek approval to apply for funding to protect North Yorkshire residents in any future flooding events.

#### **4.0 ALTERNATIVE OPTIONS CONSIDERED**

4.1 All alternative options have been explored. Property flood resilience is the preferred option see Appendix A for full report.

#### **5.0 FINANCIAL IMPLICATIONS**

5.1 The estimated total value of the scheme elements to be delivered by NYC is presently £2.1m. It is however important to stress that the scheme is essentially a package of works and this value is an outline estimate, some elements being subject to third party agreement, and is therefore not definitive at this point in time. The risk of project costs exceeding the estimated value can be managed by prioritising on a risk basis and scalability. If the value of the grant or local levy funding is reduced, again projects will be prioritised and scaled down to be managed within the allocation of £650k from NYC.

5.2 The expected council contribution towards the flood risk management forward programme for the work in the Upper Dales over the next three years is £650k. There is presently £1,477k held in reserves for use towards flood risk management, of which include the allocation of £650k towards the Upper Dales programme of works.

#### **6.0 LEGAL IMPLICATIONS**

6.1 If the applications are successful any Environment Agency Flood Defence Grant terms and Flood and Coastal Committee Local Levy terms will be reviewed by legal services to ensure that they do not present an unacceptable risk for the Council.

#### **7.0 EQUALITIES IMPLICATIONS**

7.1 The scheme benefits all those with protected characteristics by reducing the risk of surface water flooding in the Upper Dales and thereby the associated effects upon businesses, residential properties, the public health of the community living at flood risk and the associated economic growth of the area (see Appendix C).

#### **8.0 CLIMATE CHANGE IMPLICATIONS**

8.1 Flood mitigation offers positive benefits to resilience to future climate change projections. The proposals are anticipated to have a positive impact in response to climate change (see Appendix D).

## 9.0 REASONS FOR RECOMMENDATIONS

- 9.1 Property Flood Resilience is offered to all eligible residents who meet the criteria, the identified properties have either flooded or been identified as high risk of flooding within the Environment Agency guidelines and the scheme will improve living conditions for those flooding has affected. The implementation of PFR (Property Flood Resilience) will offer piece of mind to residents that in adverse weather conditions their properties and themselves are better protected.
- 9.2 It is therefore considered appropriate to continue with the scheme as intended, with regular relevant liaison through the engagement channels established as part of the scheme.

### 10.0 RECOMMENDATION

- 10.1 It is recommended that the Chief Finance Officer, in consultation with the Deputy Leader and Executive Member for Finance and Resources, and the Executive Member for Highways and Transportation:
- i. note the work undertaken by NYC to date towards the business case
  - ii. grant approval for the scheme to be delivered and led by NYC's Flood Risk Management Team
  - iii. authorises the submission of an application for £873,212 of the Environment Agency Flood Defence Grant in Aid funding to enable scheme development during 2024/25 2025/26 2026/27
  - iv. authorises the submission of an application for £582,889 of the Flood and Coastal Committee Local Levy funding to enable scheme development during 2024/25 2025/26 and 2026/27
  - v. note the intention to commission a Feasibility Study for Mount Drive, Leyburn culvert diversion
  - vi. note the intention to continue to explore future funding opportunities to finance the scheme

### APPENDICES:

- Appendix A – Upper Dales Villages Project Update and Preferred Options for Progression Report  
Appendix B – Upper Dales YRCC Local Levy Capital Proforma  
Appendix C – EIA Screening Form  
Appendix D – Climate Change Impact Assessment

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09 August 2024

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**North Yorkshire County Council**

**Business and Environmental Services**

**Executive Members**

**21 January 2022**

**Upper Dales Villages Flood Risk Management Project Update and Preferred Options for Progression**

**Report of the Assistant Director – Highways and Transportation**

**1.0 Purpose Of Report**

- 1.1 To inform the Corporate Director, BES and BES Executive Members of the outcomes of the feasibility studies commissioned, which looked at potential flood mitigation actions in a variety of villages and locations in Wensleydale and Swaledale.
- 1.2 To seek approval to progress development of the preferred options identified from those studies.
- 1.3 To seek approval for expenditure of up to £50k from the Flood Risk Management Base Budget to permit further detailed work in the development of the preferred options over Q4 21/22 and into financial year 22/23.

**2.0 Background to the report**

- 2.1 In July 2019 unprecedented rainfall in the west of the county saw devastating flooding impacts. Richmondshire was hardest hit by the events, which saw approximately 238 individual properties internally flooded, bridges providing vital links to some remote communities destroyed, watercourses obstructed by tonnes of debris and several significant landslips impacting on the highway network.
- 2.2 Given the scale of the flooding and the impacts on the community a formal investigation was undertaken by NYCC in its role as Lead Local Flood Authority (“LLFA”) under Section 19 of the Flood and Water Management Act 2010 (“the 2010 Act”).
- 2.3 The investigation focussed on Reeth, Arkengarthdale, Leyburn and Bellerby given these were locations which saw the most significant effects, although the resulting reports acknowledged that flooding was experienced elsewhere.
- 2.4 The report concluded that all risk management authorities had undertaken their duties appropriately and made a number of recommendations for future work to reduce risk and increase community resilience.
- 2.5 Shortly following the publication of the report in February 2020 an opportunity was secured for work to inform potential future project delivery, in the Upper Dales through the growth fund.
- 2.6 In addition to those locations investigated in the Section 19 report, officers recognise that additional local villages have suffered historic repeat flood incidents that had been previously investigated by NYCC in its role as the LLFA. The locations share a geographic commonality and flood mechanism, being impacted by repeated surface water flooding events. The locations all featured on the NYCC forward plan for delivery of flood prevention works in future years, but the opportunity afforded by the

growth fund bid has permitted this work to be brought forward as one project, with efficiencies likely to be gained from a grouped delivery.

- 2.7 Overall the locations included in the studies were Reeth and Fremmington, Arkengarthdale, Bellerby, Leyburn, West Witton, Bainbridge, Hawes and Gayle, Redmire and Spennithorne.
- 2.8 It should be noted that Grinton was initially scoped out of the flood studies given the relative low number of properties affected by flooding. The main issues in Grinton related to structural damage issues, debris and river channel stability. In the intervening period issues have continued to be raised with respect to channel morphology and the persistent amounts of debris being deposited. A separate study looking at a long term channel management option to be implemented with the parish council is being prepared separately. The management of the gill concerned would be undertaken using existing permissive powers under the 2010 Act.

### **3.0 Feasibility Studies**

- 3.1 Our partner consultant, WSP was commissioned to identify mitigation options for each of the locations, coupled with indicative costings, to permit an evaluation of the cost benefits. This is particularly critical given the relatively low number of properties impacted meaning that more expensive mitigation options would be unlikely to be financially feasible.
- 3.2 The studies did not involve any detailed design but presented outline options, based on the physical geography of the villages, consideration of watercourses and the topography and based on the local understanding of flood mechanisms, observed during flood events.
- 3.3 The scope did not consider certain potential constraints to delivery such as obtaining landowner agreement or cost, although the identification of preferred options following the receipt of the reports has then taken this into consideration. For the preferred options, these factors are intended to be explored during the next phase of the work.
- 3.4 In undertaking the studies, NYCC Officers and consultants undertook site visits with community representatives identified by local parish councils. When consultants had collected all evidence, meetings were arranged with parish councils to present the draft information to them to ensure it was accurate and that the community was kept informed of the work.
- 3.5 Once draft reports arising from the studies were finalised, further meetings were arranged with parish councils to make them aware of the content of the reports, prior to a planned week of public engagement, where the local community will be able to drop in and discuss options with officers at venues in Leyburn and Reeth.
- 3.6 Whilst all options will be presented to the community, it is intended to present preferred options to be progressed, alongside a rationale for those preferences, given that some of the discounted options are unlikely to demonstrate the appropriate cost benefits.
- 3.7 The full reports are available to view by Members on request.

### **4.0 Preferred options**

- 4.1 A full description of all options identified by WSP, alongside officer comment is presented in Appendix 1 of this report.

4.2 NYCC Officers have identified preferred options to be progressed to delivery from the feasibility studies. This is represented in table two below. This selection has been based on the following considerations.

#### 4.3 Timescales

The LLFA will seek to prioritise options where schemes can be implemented as quick solutions in a short period. Where option scoring is close, the LLFA would seek to promote the schemes with shorter lead in periods to work on the ground taking place. The options have therefore been considered applying the following weighting (the higher the score the greater the priority):

- 1 = Significant planning and design work and long lead in times 12 months+
- 2 = Medium Term 6+ months
- 3 = Short Term 3+ Months

#### 4.4 Partnership Working

The LLFA will seek to deliver efficiencies and improvements, in particular by working in partnership with other relevant authorities in accordance with its role under the 2010 Act. The LLFA will always seek to align projects with current national and local flood risk management strategies and projects. There are a number of projects that could run compliment or supplement catchment wide projects such as Natural Flood Management works currently undertaken by other partner organisations in both Swaledale and Wensleydale catchments. Where options provide multifunctional benefits to properties, highway users or takes advantage of partnership working, the LLFA will seek to promote these schemes. The following weighting has been applied to account for these factors:

- 1 = Little prospect of working in partnership
- 2 = Work in partnership within council services
- 3 = Work in partnership with other external organisations such as Dales to Vales Rivers Network, the Yorkshire Dales National Park Authority and others.

#### 4.5 Environmental Benefits

The LLFA will seek to promote options that align with NYCC policies and position statements on environmental factors such as climate change, carbon capture, increased biodiversity and habitat creations. The following weighting has therefore been applied to cover this:

- 1 = Little to no environmental benefits
- 2 = Improvements in water quality and habitat creation
- 3 = Significant multifunctional benefits

#### 4.6 Project Resilience

Resilience index: this measures the extent to which each option satisfies the following criteria, which are considered desirable from a long-term resilience perspective;

- Passive – low reliance on energy and operator intervention
- Self-sufficient – not reliant on performance of other systems
- Fail-soft / Fail-safe – won't fail catastrophically nor worsen situation if design standard exceeded / system failure occurs
- Flexible and adaptive – can be adapted to take account of evolving changes in circumstance / climate
- No regrets – won't close off potentially attractive alternatives
- Self-reinforcing – work with, rather than against, natural processes, supporting ecosystem integrity
- Diverse and distributed – not reliant on a single technology / technique in one location.

#### 4.7 This index was scored as follows:

- 3 = 6 or 7 resilience criteria met
- 2 = 4 or 5 resilience criteria met

1 = 2 or 3 resilience criteria met  
 0 = 0 or 1 resilience criteria met

#### 4.8 Potential for further partnership funding opportunities

The LLFA will always seek to align projects with current national and local flood risk management strategies and projects. There are a number of projects that could run compliment or supplement catchment wide projects such as NFM works currently undertaken by other partner organisations in both Swaledale and Wensleydale catchments. The LLFA also prioritise projects which may attract other alternative sources of funding, such as LEP funding secured for the initial stage of the Upper Dales feasibility work. The following weighting is applied:

0 = Negative cost benefit – no funding

1 = Funding from FRM Capital

2 = Funding from one source in addition to FRM capital

3 = Funding from multiple sources.

#### 4.9 Cost Benefit

In order to be promoted as a preferred option and to have any prospect of a successful business case, the scheme must demonstrate value for money. In accordance with the Environment Agency's Partnership Funding calculator, the simple project cost benefit ratio irrespective of any contributions or additional benefits has been used to derive a cost benefit for each option. This can be refined later if a scheme is considered to have marginal cost benefits. A negative cost benefit ratio renders a scheme unviable. Appropriate weighting has been applied to reflect the importance of this element. Depending therefore on the cost benefits ratio of each option a varying score of between -15 and +15 is applied as per the table below.

**Table One Cost Benefit Table**

<b>Project cost benefit x:1</b>	<b>Score</b>
>5	15
4-5	10
2-4	5
1-2	0
<1	-15

- 4.10 Property Flood Protection scores highly in all locations, so is a “do minimum” option in all cases. When further analysis has been undertaken on the options, this will be a potential delivery mechanism, where some of the other options may prove with further work to be unviable.



Table Two Preferred Options List

Option No.	Location	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
<b>Arkengarthdale</b>					
<b>1c</b> - Implement a flood embankment along the north-west of the town to provide a barrier to flows.	A	£51, 200	15	<b>21</b>	Limited protection offered to properties on the left bank of Arkle Beck. Unlikely to align with National Park Authority's heritage and conservation policies etc. Routine vegetation management and minor reinstatement works. Does not align with any highway works. Significantly lower construction cost results in a cost benefit ratio of >5. Limited funding opportunities given that hard engineered solutions do not align with current practices and aspirations.
<b>6</b> - Undertake essential maintenance to clear culvert and implement modern trash screen to prevent future blockage.	C	£7, 800	10	<b>21</b>	Could be delivered at speed to elevate initial flooding issues. Unlikely to conflict with National Park Authority's requirements. Could be implemented as part of highways improvements. Trash screen would be installed on NYCC asset. Could attract highways funding
<b>14</b> - Undertake a series of land use changes/interventions in order to reduce rate of hillslope runoff	A,B,C,D,E	Unknown	Unknown	<b>14</b>	Some maintenance and monitoring required – predominantly by land owners. Aligns with some aspirations of the National Park Authority. In line with national and local strategy. Various funding streams available for NFM
<b>3</b> - Regrade area of Booze Road above the field in the east of the village in order to divert surface water flows along Booze Road into the field.	B	£35, 500	5	<b>12</b>	Significant off highway works which will require National Park planning and significant land owner buy in. Some maintenance responsibilities on NYCC. Does not align with other work streams therefore unlikely to align with other funding opportunities.

Option No.	Location	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
<b>10</b> - A newly excavated collection channel would collect surface water runoff from hillsides and convey flows away from buildings.	E	£87,600	0	<b>6</b>	Significant off highway works which will require securing planning permission and significant land owner buy in. Some maintenance responsibilities on NYCC. Does not align with other work streams therefore unlikely to align? with other funding opportunities. Unlikely to progress due to costs. Very low cost benefit ratio
<b>Total</b>		<b>£182,100</b>	<b>Plus NFM scheme costs tbc</b>		
<b>Bainbridge</b>					
<b>1</b> - Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment – agricultural land upstream of The Crescent.	A	Unknown	0	<b>13</b>	Some maintenance and monitoring required – predominantly by land owners. Aligns with some aspirations of the National Park Authority. In line with national and local strategy. Various funding streams available for NFM
<b>6</b> - Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment – agricultural land upstream of Sycamore Hall.	B	Not Currently known		<b>13</b>	Some maintenance and monitoring required – predominantly by land owners. Aligns with some aspirations of the National Park Authority. In line with national and local strategy. Various funding streams available for NFM
<b>Total</b>		<b>£0</b>	<b>Plus NFM scheme costs tbc</b>		

Option No.	Location	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
<b>Bellerby</b>					
<b>3</b> - Remove old flap/gate style trash screen and implement new fixed trash screen and maintenance platform at A6108 culvert inlet.	A,D	£9,300	<b>15</b>	<b>27</b>	Existing screen is not fit for purpose and is a NYCC maintenance liability. A well designed trash screen will significantly improve the current maintenance liability. Would involve work on adjacent property for fixing points. Protects existing NYCC culvert. Could attract NYCC highways revenue/capital funding. FRM and others may be able to act in a short space of time in order to deliver trash screen
<b>5</b> - Remove wall in garden at Aston House. May also require regrading of road to ensure flows are routed towards the watercourse.	D	£1,600	<b>15</b>	<b>23</b>	Relatively simple intervention. Significant land owner buy in required as it involves removal of a 3 <sup>rd</sup> party wall. Unlikely to attract any funding or align with other NYCC priorities
<b>9</b> - Undertake a series of land use changes/interventions in order to reduce rate of hillslope runoff.	A,C,D,E,F	Currently Not Known	<b>N/A</b>	<b>13</b>	Significant landowner buy in? will be required. Unknown costs involved.
<b>10</b> - Undertake a series of land use changes/interventions in order to reduce rate of hillslope runoff.	B, E	Currently Not Known	<b>N/A</b>	<b>13</b>	Significant landowner buy in? will be required. Unknown costs involved

Option No.	Location	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
1 - 5No. on-line attenuation features located upstream of Bellerby on the alignment of the flow path over the Bellerby Beck culvert.	A,B,C,D,E,F	£253,500	0	12	BPC are currently working with landowners, to progress this option. Whilst the cost benefit appears marginal, the committed land owner buy in and providing the required land, the parish council maintaining the structure for the lifetime of the scheme and additional external funding from the Two Ridings fund, this project provides and attractive proposition and the LLFA will seek to support where it can. Either through officer time of financial support.
<b>Total</b>		<b>£264,400</b>	<b>Plus NFM scheme costs tbc</b>		
<b>Hawes and Gayle</b>					
6 - Removal of railway bridge remains in Gayle Beck to reduce water levels within the watercourse.	B	£40,000	15	26	Buy in from YDNPA will be needed alongside other landowners. Excellent cost benefit ratio
5 - Implement 3 No. floodplain embankments to enhance upstream floodplain.	B	£165,000	15	23	Significant buy in from landowners required. Will need to adhere to Reservoirs Act 1975 as amended by the 2010 Act. Very good cost benefit ratio could attract funding. Whether the cost benefit outweighs the liability of maintaining the structure would need to be explored further.
1 - Implement flow collection channel of approx. 36m to route surface water around property.	A	£3,000	15	21	Significant buy in from landowners required.
8 - Undertake floodplain tree planting.	B	£1,366,000	0	14	Significant buy in from landowners required. Needs to be explored further. Could be linked with other schemes

Option No.	Location	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
9 - Undertake a series of land use changes/interventions across the catchment upstream of Hawes & Gayle (approx. 15km <sup>2</sup> ) in order to reduce rate of hillslope runoff.	B	Not Known		14	Significant buy in from landowners required. Could be linked with other schemes
<b>Total</b>		<b>£1,574,000</b>	<b>Plus NFM scheme costs tbc</b>		
<b>Leyburn</b>					
15 - Review the design of the trash screen at the inlet of the culvert upstream of Bishopdale Close.	D	Unknown	15	24	Review of the trash screen could be undertaken promptly, with any recommendations to improve resilience and maintainability considered a quick win. Good Cost benefit ratio.
17 - Identify opportunities to improve drainage; such as the installation of additional gullies or upsizing of drainage runs.	E	Unknown	5	16	Could be implemented quickly in partnership with LHA. However any additional work will likely have significant cost implications. Work considered to be highway related matters and could be dealt with as BAU. Option therefore discounted.
12 - Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment (Dale Grove)	C	Unknown	0	14	Initial stages could be implemented quickly whilst working with partner organisations to deliver environmental benefits and increase resilience shows this option to align well with other aspirations. Once an understanding of scheme costs is obtained a cost benefit can be derived and option overall option score improved.

Option No.	Location	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
<b>21</b> - Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment – agricultural land north of Dale Grove. land/soil management and revegetation are commended.	F	£74,000	0	<b>14</b>	Initial stages could be implemented quickly whilst working with partner organisations to deliver environmental benefits and increase resilience shows this option to align well with other aspirations. Once an understanding of scheme costs is obtained a cost benefit can be derived and option overall option score improved.
<b>5</b> - Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment (Mount Drive)	A	Not Known	0	<b>13</b>	Initial stages could be implemented quickly whilst working with partner organisations to deliver environmental benefits and increase resilience shows this option to align well with other aspirations. Once an understanding of scheme costs is obtained a cost benefit can be derived and option overall option score improved.
<b>14</b> - Formalisation of area to store flows when the culvert is surcharged – this would be achieved by constructing a 120 m long bund on the south east corner of the playing field of The Wensleydale School.	D	£74,000	5	<b>11</b>	Design and feasibility, along with negotiation with the school is likely to delay implementation. School is part of NYCC estates therefore implementation should be relatively straight forward in terms of land negotiations. Questions regarding the efficiency of such an intervention when here is a significant overland flow noted. May be ineffective if already full. Suggest scheme goes on pipeline of projects to explore further.

Option No.	Location	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
1/7 - Upsize the existing watercourse culvert and drainage system beneath Bellerby Road.	A,B	£130,000	0	6	Cost Benefit Ratio 1.1 is unlikely to attract any external funding. The may ameliorate some of the risk, but does not remove the risk entirely give the risk of blockage or event beyond the design capacity of the culvert. Could be linked with a potential HW Scheme
<b>Total</b>		<b>£278,000</b>	<b>Plus NFM scheme costs tbc</b>		
<b>Redmire</b>					
1 - Undertake a series of land use changes/interventions in order to reduce rate of hillslope runoff.	A, B	Unknown	0	15	The option will need to be explored further with landowners.
<b>Total</b>		<b>£0</b>	<b>Plus NFM scheme costs tbc</b>		
<b>Reeth and Fremmington</b>					
9 - Construct a 17m kerb on the property-side of the highway off Alpine Terrace.	B	£2,400	15	25	Attractive cost benefit ratio. Could be delivered quickly in a short time scale to improve exceedance planning and improved resilience.
17 - Enhancement of existing features in the landscape to produce 3 no. attenuation areas in the Arkle Beck catchment upstream of Reeth and Fremmington.	A,C,D	£155,000	15	23	The option illustrates large attenuation structure, that may have to comply with the Reservoirs Act 1975. Increase risk of breach, which given the catchment characteristics could cause significant risk. No modelling undertaken therefore size of attenuation required no established. Further work required to establish if this option has any merit.

Option No.	Location	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
<b>1</b> - Construction of a bund approximately 85 m in length along a current flow path to divert surface water flow.	A	£23,500	15	<b>22</b>	A medium timescale for implementation that could provide robust mitigation. Little opportunity for partnership working or provide environmental benefits, limited resilience as an engineered structure. Very good cost benefit ratio.
<b>3</b> - The installation of a drainage feature (i.e. grid) to collect surface water flow down Mill Lane.	A	£42,000	15	<b>21</b>	A medium timescale for implementation that could provide robust mitigation. Little opportunity for partnership working or provide environmental benefits, limited resilience as an engineered structure. Very good cost benefit ratio.
<b>13</b> - The construction of 2 no. bunds adjacent to the left bank of Arkle Beck at locations where Arkle Beck is reported to overtop.	D	£174,000	10	<b>16</b>	Medium timescale with a good cost benefit ratio. Does not align with environmental and resilience objectives. Residual risk of breach. Good cost benefit ratio. Scheme could be considered for further economics and design considerations.
<b>4</b> - Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment (Mill Lane)	A	Unknown	0	<b>15</b>	Can be implemented in a short space of time with opportunities to with NFM delivery partners to provide flood risk and environmental benefits. Could explore various funding mechanisms.
<b>15</b> - Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological	D	Unknown	0	<b>15</b>	Some maintenance and monitoring required – predominantly by land owners. Aligns with some aspirations of the National Park Authority. In line with national and local strategy. Various funding streams available for NFM



Option No.	Location	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
catchment, Fremington					
<b>8</b> - Regrade a length of the highway along Silver Street to divert flow into agricultural land adjacent to it.	B	£126,000	0	<b>9</b>	Option considered as part of collaboration between National Parks and NYCC highways. Collaboration could see the project improve its cost benefit ratio through benefits in kind.
<b>Total</b>		<b>£522,900</b>	<b>Plus NFM scheme costs tbc</b>		
<b>Spennithorne</b>					
<b>2</b> - Replace the trash screen with a modern style screen with maintenance platform. The new trash screen would be designed to a modern standard with a reduced risk of blockage and increased ease of maintaining	A	£4,000	15	<b>26</b>	Existing screen is not fit for purpose and is a NYCC maintenance liability. A well designed trash screen will significantly improve the current maintenance liability. Would involve work on adjacent property for fixing points. Protects existing NYCC culvert. Could attract NYCC highways revenue/capital funding. FRM and others may be able to act in a short space of time in order to deliver trash screen
<b>4</b> - Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment (Spennithorne).	A	Unknown		<b>14</b>	Option is less intrusive than option 3. There may be scope to work with the land owners and partner organisations. The project provides increased resilience and potential environmental benefits. There could be a number of funding sources available.

Option No.	Location	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
<b>Total</b>		<b>£4,000</b>	<b>Plus NFM scheme costs tbc</b>		
<b>West Witton</b>					
7 - Replace pond trash screen with modern standard.	C	£3,800	15	24	Existing screen is not fit for purpose and is a maintenance liability. A well designed trash screen will significantly improve the current maintenance liability. Excellent cost benefit ratio
2 - Regrade area of land to slope from north-east down to south-west on the upstream side of the Mill Pond wall.	A	£7,000	15	23	Relatively minor intervention that would direct water away from the barn. Would require land owner permission and would be preferable to option 3.
3 - Waterproofing treatment applied along south-west wall of Pondsides Barn	A	£6,400	15	23	Could be offered as part of PLP scheme.
1 - Increase current pond inlet.	A	£2,600	15	22	Relatively simple intervention. Would need to be implemented with other measures to ensure the outlet of the pond is not inundated.
9 - Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment. (West Witton)	A,B,C	Unknown	0	13	Can be implemented in a short space of time with opportunities to with NFM delivery partners to provide flood risk and environmental benefits. Could explore various funding mechanisms.
<b>Total</b>		<b>£19,800</b>	<b>Plus NFM scheme tbc</b>		
<b>Grand Total</b>		<b>£2,845,200</b>	<b>Plus 12 NFM Schemes that have not yet been apportioned a cost</b>		

## 5.0 Next steps

- 5.1 The team will be available in Leyburn and Reeth at various times during the week commencing 31 January 2022 so that those impacted can discuss the preferred options directly with officers. Property Flood Resilience (PFR) demonstration kit has also been offered by the contractor contracted by NYCC to deliver the Malton, Norton and Old Malton scheme which will provide a positive engagement tool for demonstrating resilience opportunities.
- 5.2 Landowner engagement is also a critical next stage, to ensure there is buy-in for any identified measures for progression and to engage those individuals and organisations in the process. Whilst not in the scope of the feasibility studies, an element of this has already happened naturally, with site visits having been delivered with the MOD above Bellerby and with input through parish councils from relevant interested landowners in the preparation of the feasibility studies. The next stage will be to build on these established links and look to move towards detailed design for schemes with the appropriate landowner consent in place.
- 5.3 In the majority of the villages, a Property Flood Resilience (PFR) measure is identified for progression. There are other flood risk projects across the county at a similar status requiring delivery, in the lower Aire and Rye villages. If these measures become the option in any location the PFR could be procured on a county-wide contract, to enable efficiency in delivery and potentially cost savings on the bulk purchase of resilience products such as flood barriers.
- 5.4 Other options will require more technical analysis and design and business case development. There is an indicative £400k allocated in the FRM capital budget, taken from the annual base budget and accumulated reserves, to be spent over the next three years to permit the delivery and development of this project. This will permit external funding opportunities to be explored. Likely sources of funding are Flood Defence Grant in Aid (FDGIA), the Regional Flood and Coastal Committee levy pot and any potential local contributions. It is intended to utilise £50k of this allocation to develop the preferred options further prior to commencing work on business cases.
- 5.5 Officers will work as part of this iterative process of business case preparation/project development during the next financial year. During conversations with interested parties and during the build-up of designs for more technical options, the direction may be forced to change. Similarly, it may become clear that an appropriate level of funding cannot be achieved to permit delivery. Any proposed significant changes in direction will be brought for a decision of the Corporate Director, BES, in consultation with BES Executive Members. Business case submission to any third party funders will also require Corporate Director Sign off as per County Council policy.

## 6.0 Equalities implications

- 6.1 Consideration has been given to the potential for any adverse equalities impacts arising from the recommendations of this report. A completed Equalities Impact Assessment screening form is included in Appendix 2.
- 6.2 It is the view of officers that the recommendations included in this report do not have any adverse impacts on any of the protected characteristics identified in the Equalities Act 2010 or NYCC's additional agreed characteristics. However, it is worth noting that fully developed schemes will require a full Equalities Impact Assessment.

## 7.0 Financial implications

- 7.1 The estimated cost of all the measures in the preferred options table, excluding natural flood management, is £2,845,200. The next phase of the work will see the preferred options rationalised and the cost estimates for the measures refined and funding sources identified.
- 7.2 There is £400k in total indicatively allocated in the flood risk management forward programme to the work in the Upper Dales over the next three years. This is not an indication of full scheme costs but is a projection of an appropriate level of contribution from the authority towards the works, based on the number of properties likely to benefit from the schemes and the growth opportunities the work may provide.
- 7.3 The FRM base budget permits approximately £200k per year to be allocated to FRM projects, with the county-wide programme profile requires draw from the flood risk reserve each year to permit the anticipated delivery. There is presently £1.37m in the flood risk reserve.
- 7.4 As schemes progress, where required, third party funding would be sourced for any projects which were not affordable within the NYCC indicative contribution. NYCC Officers have successfully applied for funding over the past few years from funders including the LEP, EA, RFCC, DEFRA and also from other Risk Management Authority partners to enable scheme delivery.

## 8.0 Legal implications

- 8.1 In accordance with its statutory duties within the Flood and Water Management Act 2010 and the Flood Risk Regulations 2009, NYCC as LLFA is required to prepare and maintain a strategy for local flood risk management. It must also investigate significant local flooding incidents and publish the results, and also maintain a register of flood risk assets.
- 8.2 As LLFA, North Yorkshire County Council has permissive powers under Section 14A of the Land Drainage Act 1991 to undertake work to mitigate surface water flooding or groundwater flooding if the work is considered desirable having regard to the local flood risk management strategy. Section 14 of the 1991 Act gives the LLFA drainage board powers for works carried out in pursuance of a scheme under section 18 for drainage of small areas.
- 8.3 The LLFA also has permissive powers under Section 25 of the 1991 Act to require works to maintain the free passage of flow on ordinary watercourses in accordance with Section 23(8) in relation to a watercourse in an area outside an internal drainage district.
- 8.4 Under the County Council's Constitution, the Corporate Director BES has delegated powers to exercise all functions of the Council as Lead Local Flood Authority under the Flood and Water Management Act 2010 and the Land Drainage Act 1991, including (but not limited to) the granting (or otherwise) of land drainage consents for ordinary watercourses.
- 8.5 This report seeks to progress scheme development in the Upper Dales, in locations already identified as a high priority to NYCC in which to exercise these powers. The affordance of a priority to "high risk locations" is detailed in the NY Flood Risk Management Strategy. It is acknowledged that further legal implications may arise at the planning and implementation stages.

8.6 Proper consideration as outlined in section 6 is being given to equalities issues that are pertinent to these plans

## 9.0 Climate Change Implications

9.1 A Climate Change Impact Assessment is included as Appendix 3 of this report. No significant impacts are anticipated resulting from the report, however flood mitigation offers positive benefits to resilience to future climate change projections and can offer secondary water quality and environmental benefits if delivered sympathetically. Overall then, the proposals are therefore anticipated to have a positive impact in response to climate change.

## 10.0 Recommendations

- 10.1 It is recommended that the BES Corporate Director, in consultation with the BES Executive Member for Access:
- i. Note the outcomes of the Upper Dales feasibility studies
  - ii. Approve the progression of the work towards the preferred options identified in this report arising from the studies described and incurring the associated indicative expenditure from the FRM budget.
  - iii. Approve expenditure of up to £50k from the Flood Risk Management Base Budget to permit further detailed work in the development of the preferred options over Q4 21/22 and into financial year 22/23.

BARRIE MASON  
Assistant Director Highways and Transportation

Author of Report: E Mellalieu, M Jones

Background Documents:  
NY Flood Risk Strategy  
Upper Dales Section 19 Report  
Upper Dales Feasibility Reports

## Critical Analysis of Options

To be read in conjunction with the Upper Dales Feasibility Reports 2021

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environment I Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
<b>Arkengarthdale</b>											
1c	Implement a flood embankment along the north-west of the town to provide a barrier to flows. This will effectively 'cut off' the flow path from the north, routing flows into Arkle Beck to the West. It is assumed a back drainage system would not be required for this option.	A	1	1	1	1	2	£51,200	15	21	Limited protection offered to properties on the left bank of Arkle Beck. Unlikely to align with National Parks heritage and conservation policies etc. Routine vegetation management and minor reinstatement works. Does not align with any highway works Significantly lower construction cost results in a cost benefit ratio of >5. Limited funding opportunities given that hard engineered solutions do not align with current practices and aspirations.
6	Undertake essential maintenance to clear culvert and implement modern trash screen to prevent future blockage.	C	2	3	1	3	2	£7,800	10	21	Could be delivered at speed to elevate initial flooding issues Unlikely to conflict with National Parks requirements. Could be implemented as part of highways improvements. Trash screen would be installed on NYCC asset. Could attract highways funding
2	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	A	3	2	1	3	2	£70,315	5	16	PLP will be offered as part of county wide programme. Homeowner buy in required. There may be some issues with some PLP measures in the National Parks conservation areas. External funding could be pursued.
4	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	B	3	2	1	3	2	£24,180	5	16	PLP will be offered as part of county wide programme. Homeowner buy in required. There may be some issues with some PLP measures in the National Parks conservation areas. External funding could be pursued.

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environmental Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
7	The installation measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks	C	3	2	1	3	2	£18, 140	5	16	PLP will be offered as part of county wide programme. Homeowner buy in required. There may be some issues with some PLP measures in the National Parks conservation areas. External funding could be pursued.
9	The installation measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	D	3	2	1	3	2	£30, 225	5	16	PLP will be offered as part of county wide programme. Homeowner buy in required. There may be some issues with some PLP measures in the National Parks conservation areas. External funding could be pursued.
12	The installation measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	E	3	2	1	3	2	£36, 270	5	16	PLP will be offered as part of county wide programme. Homeowner buy in required. There may be some issues with some PLP measures in the National Parks conservation areas. External funding could be pursued.
14	Undertake a series of land use changes/interventions in order to reduce rate of hillslope runoff. Interventions may include tree planting, leaky dams, removal of formal land drainage, limiting sediment transport. Aim to infill a number of drains or 'grips' in the upper catchment to slow runoff/discharges to Arkle Beck. Undertake peatland restoration where erosion and degradation of natural peatland has occurred	A,B,C ,D,E	2	3	3	3	3	<u>Unknown</u>	<u>Unknown</u>	14	Some maintenance and monitoring required – predominantly by land owners. Aligns with some aspirations of the national park. In line with national and local strategy. Various funding streams available for NFM

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environment I Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
3	Regrade area of Booze Road above the field in the east of the village in order to divert surface water flows along Booze Road into the field. At the south-west boundary of the field a newly excavated collection channel would collect surface water flows and route water to the southeast, around the village. The proposed collection channel as outlined discharges to the field at the southeast of the village. However, alternative discharges, such as to Arkle Beck, SuDS pond or soakaway, should be examined.	B	1	1	2	2	1	£35,500	5	12	Significant off highway works which will require national Parks planning and significant land owner buy in. Some maintenance responsibilities on the County Council. Does not align with other work streams therefore unlikely to align with other funding opportunities.
10	A newly excavated collection channel would collect surface water runoff from hillsides and convey flows away from buildings. Pipe outfalls would take water from the collection channel and discharge to Arkle Beck.	E	2	1	1	1	1	£87,600	0	6	Significant off highway works which will require national Parks planning and significant land owner buy in. Some maintenance responsibilities on the County Council. Does not align with other work streams therefore unlikely to align with other funding opportunities. Unlikely to progress due to costs. Very low cost benefit ratio
1b	Implement a flood wall along the north-west of the town to provide a barrier to flows. This will effectively 'cut off' the flow path from the north, routing flows into Arkle Beck to the West. It is assumed a back drainage system would not be required for this option.	A	1	1	1	1	1	£255,300	0	5	Marginal cost benefit ratio of 1.09. Regular inspections required to ensure defence is still fit for purpose. Frequent inspection and clearance of back drainage system to ensure effective operation. County Council would require access in perpetuity to the structure. Significant buy in from landowners required including possible land owner compensation. Unlikely to align with National Parks heritage and conservation policies etc. Will not attract funding from partner organisation with. Negative cost benefit



Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environmental Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
5	Replace the culvert under the road to accommodate a higher flow rate. Investigate influence of Arkle Beck on the culvert outlet and if necessary, raise the culvert outlet to maintain free flowing conditions when water levels in Arkle Beck are high.	C	2	3	1	1	0	£56, 000	-15	-8	Negative cost benefit ratio
8	Replace the culvert under the highway with a culvert of equivalent or increased capacity.	D	2	3	1	1	0	£99, 000	-15	-8	Negative cost benefit ratio
1	Implement a flood wall along the north-west and south-west of the village to provide a barrier to flows. This will effectively 'cut off' the flow path from the north, routing flows into Arkle Beck to the West. Protection would be afforded to properties at risk of flooding from Arkle Beck. A back drainage system would be required to provide drainage for surface water runoff flowing into the village from the north-east. The section of wall at the west of the village would need to be constructed in residential gardens, which may not be acceptable for residents.	A	1	1	1	1	0	£1, 454, 500	-15	-11	Negative cost benefit. Regular inspections required to ensure defence is still fit for purpose. Frequent inspection and clearance of back drainage system to ensure effective operation. County Council would require access in perpetuity to the structure. Significant buy in from landowners required including possible land owner compensation. Unlikely to align with National Parks heritage and conservation policies etc. Does not align with any highway works. Will not attract funding from partner organisation with.
11	Implement a flood wall along the bank of Arkle Beck to protect against fluvial flooding. A back drainage system would be required to provide drainage for surface water runoff flowing into the village from the north-east.	E	1	1	1	1	0	£430, 000	-15	-11	Costings and maintenance render this option untenable

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environmental Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
13	Implement floodplain embankments in two areas of existing floodplain upstream of Whaw. The embankments provide impediments to floodplain flow, increasing water levels within the floodplain, thus increasing floodplain storage. Increasing floodplain storage means water is released more gradually from the floodplain back to the downstream watercourse channel, reducing peak flows in the watercourse.	A,B,C ,D,E	1	1	1	1	0	£605, 000	-15	- 11	Significant landowner buy in needed. Maintenance requirements would be high. Negative cost benefit ratio
Bainbridge											
7	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	B	3	2	1	3	2	£15,900	15	26	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
3	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	A	3	2	1	3	2	£24,180	5	16	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environmenta l Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
1	Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment – agricultural land upstream of The Crescent. A range of measures can be considered, but given assumed land use and watercourse character, land/soil management and revegetation are recommended.	A	2	3	3	3	2	Unknown	0	13	Significant buy in from landowners required.
6	Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment – agricultural land upstream of Sycamore Hall. A range of measures can be considered, but given assumed land use and watercourse character, land/soil management and revegetation are recommended.	B	2	3	3	3	2	Not Currently known		13	Significant buy in from landowners required.
9	Investigate the culvert under the boundary wall to the south of Sycamore Hall to potentially upsize or install trash screen.	B	2	1	1	2	1	£19,800	5	12	Could be added to capital projects
8	Diversion channel in the field upstream of Sycamore Hall to divert surface water toward the River Bain. Total length of approx. 300m with a 40m cascading style channel over the steep section towards the river.	B	1	1	1	1	1	£104,200	0	5	Significant buy in from landowners required. Unknown capacity of current network. Issues with changing the character and landscape. Off highway works. Unlikely to attract additional funding with very low cost benefit

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environmental Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
2	No. attenuation areas. 3 No. earth embankments constructed at field boundaries to store water during intense rainfall events. Culverts under embankments proposed as flow controls, though alternative methods of flow control should be reviewed.	A	1	1	2	1	0	£233,900	-15	-10	Unknown geology of the area, option would need to adhere to the Reservoirs Act 1975. Negative cost benefit ratio would not attract any funding.
4	Regarding/landscaping of gardens around the properties along Bainbridge Haws to divert flow toward a new culvert to the east.	A	1	1	1	2	0	£106,900	-15	-10	Significant buy in from landowners required. Unknown capacity of current network. Issues with changing the character and landscape. Off highway works. Unlikely to attract additional funding with negative cost benefit
5	Replace current culvert with 2 No. open channel sections and 2 No. shorter culvert sections as follows: 140m open channel through the field south of the A684, a 75m culvert beneath the A684 draining to a 70m open channel to the rear of properties along Bainbridge Haws and a 90m culvert beneath the residential gardens and road to discharge to River Bain.	A	1	1	1	1	0	£354,200	-15	-11	Significant buy in from landowners required. Unknown capacity of current network
<b>Bellerby</b>											
3	Remove old flap/gate style trash screen and implement new fixed trash screen and maintenance platform at A6108 culvert inlet. New headwall is assumed to be required to facilitate construction of trash screen	A,D	3	3	1	3	2	£9,300	15	27	Existing screen is not fit for purpose and is a NYCC maintenance liability. A well designed trash screen will significantly improve the current maintenance liability. Would involve work on adjacent property for fixing points. Protects existing NYCC culvert. Could attract NYCC highways revenue/capital funding. FRM and others may be able to act in a short space of time in order to deliver trash screen

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environmental Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
5	Remove wall in garden at Aston House. May also require regrading of road to ensure flows are routed towards the watercourse and away from buildings.	D	3	1	1	2	1	£1,600	15	23	Relatively simple intervention. Significant land owner buy in required as it involves removal of a 3 <sup>rd</sup> party wall. Unlikely to attract any funding or aligns with other NYCC priorities
11	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	A	3	2	1	3	2	£33,250	5	16	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
12	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	B	3	2	1	3	2	£72,550	5	16	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
14	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	D	3	2	1	3	2	£12,090	5	16	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
15	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	E	3	2	1	3	2	£24,180	5	16	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environmental Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
6	Regrade land at residential properties to prevent flow from reaching property thresholds. 2 No. Areas outlined to protect properties at a total of 235m2.	D	3	1	1	2	1	£16,150	5	13	Requires significant land owner buy in as work within residential boundary. No future maintenance liabilities as the works aim to improve flow paths through re-grading of land. Cannot be linked to a highway scheme and unlikely to attract external funding with a low costs benefit score
9	Undertake a series of land use changes/interventions in order to reduce rate of hillslope runoff. Interventions may include tree planting, leaky debris dams, removal of formal land drainage, and limiting sediment transport.	A,C,D,E,F	2	3	3	3	2	Currently Not Known	N/A	13	Significant landowner will be required. Unknown costs involved.
10	Undertake a series of land use changes/interventions in order to reduce rate of hillslope runoff. Interventions may include tree planting, leaky debris dams, removal of formal land drainage, and limiting sediment transport.	B, E	2	3	3	3	2	Currently Not Known	N/A	13	Significant landowner will be required. Unknown costs involved
1	5No. on-line attenuation features located upstream of Bellerby on the alignment of the flow path over the Bellerby Beck culvert. Attenuation would be achieved by implementing earth embankments with a flow control feature, such as a culvert / weir, along the flow path described in order to hold back high flows during a flood event.	A,B,C,D,E,F	2	3	2	3	2	£253,500	0	12	BPC are currently working with landowners, to progress this option. Whilst the cost benefit appears marginal, the committed land owner buy in and providing the required land, the parish council maintaining the structure for the lifetime of the scheme and additional external funding from the Two Ridings fund, this project provides and attractive proposition and the LLFA will seek to support where it can. Either through officer time of financial support.
2	Channel diversion of Bellerby Beck, from upstream of Heron Tree Close, discharging to the open channel south of Moor Road, West of Bellerby Road.	A,C,F	2	1	2	1	1	£118,00	5	12	There would be a requirement on either NYCC or the land owner to maintain the diversion channel in perpetuity. Potential loss of farmland may impede land owner buy in. Off highway works therefore does not align with any highway schemes.

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environment I Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
8	Regrade Runs Bank at the bend in the road to divert surface flows to the unnamed watercourse at east of Bellerby. Alternatively topographical changes could be focussed on diverting surface water flows through the field to the east of Bellerby, eventually discharging to Bellerby Beck at the south-east of the village.	E	3	3	1	2	2	£48,000	0	11	Could be linked with a potential HW Safety Scheme
13	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	C	3	2	1	3	2	£48,360	0	11	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
16	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	F	3	2	1	3	2	£36,270	0	11	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
4	Implementation of flood defence around properties. Will require a channel diversion to move the watercourse out of the residential gardens at Bellerby Beck	F	3	1	1	1	0	£482,000	-15	-9	Significant maintenance liability and negative cost benefit ratio
7	Implementation of 2 No. Subsurface drainage gulley's to convey water from the road surface to the Bellerby Beck	D	2	2	1	1	0	£42,000	-15	-9	Could be linked with a potential HW Scheme. Additional highways maintenance of drainage system, but not insurmountable. Negative Cost Benefit Ratio

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environment I Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
	culvert which routes under the Olde Wynd.										
<b>Hawes and Gayle</b>											
6	Removal of railway bridge remains in Gayle Beck to reduce water levels within the watercourse.	B	3	1	3	2	2	£40,000	15	26	Buy in from Np will be needed alongside other landowners. Excellent cost benefit ratio
7	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	B	3	2	1	3	2	£244,600	15	26	PLP will be offered as part of county wide programme. Homeowner buy in required. There may be some issues with some PLP measures in the National Parks conservation areas. External funding could be pursued.
5	Implement 3 No. floodplain embankments to enhance upstream floodplain. 600mm dia. culvert used as flow control at Embankment 2. No flow control at other embankments. Drystone wall removal along embankment footprint.	B	1	1	2	1	3	£165,000	15	23	Significant buy in from landowners required. Will need to adhere to Reservoirs Act 1975. Very good cost benefit ratio could attract funding. Whether the cost benefit outweighs the liability of maintaining the structure would need to be explored further.
1	Implement flow collection channel of approx. 36m to route surface water around property.	A	2	1	1	1	1	£3,000	15	21	Significant buy in from landowners required.
3	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks	A	3	2	1	3	2	£6,000	10	21	PLP will be offered as part of county wide programme. Homeowner buy in required. There may be some issues with some PLP measures in the National Parks conservation areas. External funding could be pursued.



Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environment I Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
11	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks	C	3	2	1	3	2	£6,000	5	16	PLP will be offered as part of county wide programme. Homeowner buy in required. There may be some issues with some PLP measures in the National Parks conservation areas. External funding could be pursued.
8	Undertake floodplain tree planting in an area of approx. 0.14km <sup>2</sup> in the upstream part of the catchment.	B	3	3	3	3	2	£1,366,000	0	14	Significant buy in from landowners required. Needs to be explored further. Could be linked with other schemes
9	Undertake a series of land use changes/interventions across the catchment upstream of Hawes & Gayle (approx. 15km <sup>2</sup> ) in order to reduce rate of hillslope runoff. Interventions may include tree planting, leaky debris dams, removal of formal land drainage, and limiting sediment transport.	B	3	3	3	3	2	Not Known		14	Significant buy in from landowners required. Could be linked with other schemes
4	Implement traditional flood wall of approx. 120m length along Gayle Beck left bank/west side. Proposed wall would replace existing drystone wall. Back drainage system required.	B	1	1	1	1	1	£341,000	5	10	Discussion required with landowner (Richmond DC) with regards to ongoing maintenance. National Parks planning will be required.
10	Replace existing culvert with a larger culvert, with a single bore area along its length.	C	2	2	1	1	0	£229,100	-15	-9	Landowner buy in needed. Negative cost benefit ratio
2	Install new pipe to route water around the property along the line of an existing flow path and discharge to the field at the north. A flow diversion channel may be	A	1	1	1	1	0	£75,000	-15	-11	Significant buy in from landowners required. Negative cost benefit ratio

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environment I Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
	necessary to formalise this and increase its effectiveness.										
<b>Leyburn</b>											
6	The installation of measures that protect specific properties directly from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	A	3	2	1	3	2	£35,440	15	<b>26</b>	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
15	Review the design of the trash screen at the inlet of the culvert upstream of Bishopdale Close. If required, redesign the trash screen to make it less vulnerable to blockages.	D	2	1	1	3	2	Unknown	15	<b>24</b>	Review of the trash screen could be undertaken promptly, with any recommendations to improve resilience and maintainability considered a quick win. Good Cost benefit ratio.
9	The installation of measures that protect specific properties directly from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	B	3	2	1	3	2	£17,720	10	<b>21</b>	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environmental Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
16	The installation of measures that protect specific properties directly from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	D	3	2	1	3	2	£62,020	10	21	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
22	The installation of measures that protect specific properties directly from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	F	3	2	1	3	2	£35,440	10	21	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
17	Identify opportunities to improve drainage; such as the installation of additional gullies or upsizing of drainage runs.	E	3	2	1	1	2	Unknown	5	14	Could be implemented quickly in partnership with LHA. However any additional work will likely have significant cost implications. Work considered to be highway related matters and could be dealt with as BAU. Option therefore discounted.
18	The installation of measures that protect specific properties directly from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	E	3	2	1	3	2	£74,000	5	16	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environmental Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
12	Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment – agricultural land north of Dale Grove.	C	2	3	3	3	3	Unknown	0	14	Initial stages could be implemented quickly whilst working with partner organisations to deliver environmental benefits and increase resilience shows this option to align well with other aspirations. Once an understanding of scheme costs is obtained a cost benefit can be derived and option overall option score improved.
21	Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment – agricultural land north of Dale Grove. A range of measures can be considered, but given assumed land use and watercourse character, land/soil management and revegetation are commended.	F	2	3	3	3	3	£74,000	0	14	Initial stages could be implemented quickly whilst working with partner organisations to deliver environmental benefits and increase resilience shows this option to align well with other aspirations. Once an understanding of scheme costs is obtained a cost benefit can be derived and option overall option score improved.
5	Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment – agricultural land upstream of Mount Drive.	A	2	3	3	3	2	Not Known	0	13	Initial stages could be implemented quickly whilst working with partner organisations to deliver environmental benefits and increase resilience shows this option to align well with other aspirations. Once an understanding of scheme costs is obtained a cost benefit can be derived and option overall option score improved.
4	Attenuation area to be created by excavation of agricultural land on the right bank of the watercourse upstream of 60 Mount Drive.	A	2	1	2	1	1	£109,000	5	12	This option offers very low cost benefits and would require extensive negotiation with land owners. The option is unlikely progress further due to maintenance liability

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environment I Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
13	The installation of measures that protect specific properties directly from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	C	3	2	1	3	2	£101,890		11	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
14	Formalisation of area to store flows when the culvert is surcharged – this would be achieved by constructing a 120 m long bund on the south east corner of the playing field of The Wensleydale School. Stored flow would be discharged from the attenuation area into the existing watercourse culvert at a controlled rate via a 150 mm dia. pipe.	D	1	1	2	1	1	£74,000	5	11	Design and feasibility, along with negotiation with the school is likely to delay implementation. School is part of NYCC estates therefore implementation should be relatively straight forward in terms of land negotiations. Questions regarding the efficiency of such an intervention when here is a significant overland flow noted. May be ineffective if already full. Suggest scheme goes on pipeline of projects to explore further.
1/7	Upsize the existing watercourse culvert and drainage system beneath Bellerby Road. Assume culverts are upsized to 1 m dia. circular culvert. It would run 46 m from the western edge of Bellerby Road, under the highway, to its outfall into the existing watercourse	A,B	1	2	1	1	1	£130,000	0	6	Cost Benefit Ratio 1.1 is unlikely to attract any external funding. The may ameliorate some of the risk, but does not remove the risk entirely give the risk of blockage or event beyond the design capacity of the culvert. Could be linked with a potential HW Scheme

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environmental Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
10	The excavation of a new drainage channel running 260 m east to west along the northern edge of Dale Grove that collects flows from the surrounding agricultural land. Flows that are collected in the drainage channel will run via a new 600 mm dia. culvert running 123 m down Bellerby Road and discharge into the existing watercourse downstream of Bellerby Road	C	1	1	2	1	1	£165,000	0	6	Any drainage channel will have finite capacity and will require regular maintenance. Maintenance responsibilities would need to be agreed with land owner. Additional surface water being directed down Bellerby Road could result in increased risk. Low cost benefit ratio does not make the scheme attractive to external funders.
11	The construction of a bund spanning the length of Dale Grove and situated in an agricultural field to the north. The assumed dimensions of the bund would be 00 m in length with an average height of 1 m. Surface water from the fields would be held behind the bund and be cut-off from the affected properties on Dale Grove. It may be appropriate to combine elements of this intervention with Option 10 depending on the results of further investigation.	C	1	1	1	1	1	£90,000	0	5	Option intended to complement Option 10 - With an already limited cost benefit ratio for option 10, the addition of this option would make the scheme financially unviable. Installation of a bund increases the residual risk of breach. As such the bund would need to be inspected periodically and "topped up" (due to settlement) or repaired if it has been overtopped. Scheme scores low across the board. Option discounted.
3	Increase crest level of existing stone channel wall at 60 Mount Drive and tie into suitable feature to provide continuous defence.	A	2	1	1	1	1	£173,000	-15	-9	A negative cost benefit ratio confirms that this solution is not financially viable. The option is unlikely to ameliorate the risk as water may continue to flow from the north of mount drive. Option Discounted

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environmenta l Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
20	Construct 3 no. flow attenuation areas in agricultural land upstream of the culvert inlet on Riseber Lane. As a notional design, excess flows are assumed to be attenuated by an embankment and discharged into a watercourse culvert at a controlled rate via a 150 mm dia. pipe. Three examples of the flow attenuation areas have been provided based on a high-level interpretation of the topography	F	1	2	2	1	0	£272,000	-15	-9	Negative Cost Benefit Ratio
2/8	Construction of a new culvert that bypasses the undersized drainage system. It would run from the small section of open watercourse to the west of Mount Drive to Bellerby Road. From here it would run southwards down Bellerby Road and discharge at the outfall of the existing culvert. It is assumed to be a circular 1 m dia. culvert of 196 m length.	A, B	1	2	1	1	0	£464,000	-15	-10	A negative cost benefit ratio confirms that this solution is not financially viable. Further difficulties could be encountered given the space constraints of working between residential properties, garages and within gardens. Option Discounted
19	Replace 3 no. impermeable, mainly asphalted areas with permeable paving or equivalent SuDS feature. The proposed locations are: - Grove Square 1 (1,400 m2), - Grove Square 2 (265 m2), and - Harmby Road Carpark (3100 m2).	F	1	1	1	1	0	£74,000	-15	-11	Negative Cost Benefit Ratio
<b>Redmire</b>											

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environmental Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
2	The installation of measures that protect specific properties directly from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	A	3	2	1	3	2	£12,080	10	21	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
4	The installation of measures that protect specific properties directly from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	B	3	2	1	3	2	£30,225	5	16	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
1	Undertake a series of land use changes/interventions in order to reduce rate of hillslope runoff. Interventions may include tree planting, removal of formal land drainage, leaky debris dams and limiting sediment transport.	A, B	3	3	3	3	3	Unknown	0	15	The option will need to be explored further with landowners.
3	Installation of a new drainage line along the unnamed road leading to the 5 properties around the former Kings Arms pub in the south of Redmire. The new drainage line should be sited along the existing surface gully to remove water from the road surface.	B	2	2	1	1	0	£112,400	-15	-9	Negative Cost benefit ratio
<b>Reeth and Fremmington</b>											



Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environment I Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
5	The installation of measures that protect specific properties directly from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	A	3	2	1	3	2	£35,440	15	26	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
10	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	B	3	2	1	3	2	£33,220	15	26	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
16	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	D	3	2	1	3	2	£68,660	15	26	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
9	Construct a 17m kerb on the property-side of the highway off Alpine Terrace. A standard kerb height has been assumed to be sufficient across 17 m.	B	3	2	1	2	2	£2,400	15	25	Attractive cost benefit ratio. Could be delivered quickly in a short time scale to improve exceedance planning and improved resilience.
17	Enhancement of existing features in the landscape to produce 3 no. attenuation areas in the Arkle Beck catchment upstream of Reeth and Fremington.	A,C,D	2	2	2	1	1	£155,000	15	23	The option illustrates large attenuation structure that may have to comply with the reservoirs act. Increase risk of breach, which given the catchment characteristics could cause significant risk. No modelling undertaken therefore size of attenuation required no established. Further work required to establish if this option has any merit.

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environment I Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
1	Construction of a bund approximately 85 m in length along a current flow path to divert surface water flow around the Holiday Cottages and adjacent properties and into Arkle Beck	A	2	1	1	2	1	£23,500	15	22	A medium timescale for implementation that could provide robust mitigation. Little opportunity for partnership working or provide environmental benefits, limited resilience as an engineered structure. Very good cost benefit ratio.
3	The installation of a drainage feature (i.e. grid) to collect surface water flow down Mill Lane. Collected flow would be discharged to Arkle Beck via a sealed pipe approximately 300 mm dia. and 35 m in length.	A	2	1	1	1	1	£42,000	15	21	A medium timescale for implementation that could provide robust mitigation. Little opportunity for partnership working or provide environmental benefits, limited resilience as an engineered structure. Very good cost benefit ratio.
12	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	C	3	2	1	3	2	£13,290	10	21	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
14	Attenuation area to be created by excavation of agricultural land on the right bank of the watercourse upstream of Fremmington.	D	2	1	1	1	1	£75,000	15	21	Whilst it has an excellent cost benefit ratio, feedback from the parish council and engineering judgment has established that this option would have finite capacity and would not be effective against the high velocity nature of the flooding experienced here. It would be full in minutes with no additional protection afforded. Option Discounted
13	The construction of 2 no. bunds adjacent to the left bank of Arkle Beck at locations where Arkle Beck is reported to overtop.	D	2	1	1	1	1	£174,000	10	16	Medium timescale with a good cost benefit ratio. Does not align with environmental and resilience objectives. Residual risk of breach. Good cost benefit ratio. Scheme could be considered for further economics and design considerations.

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environmenta l Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
4	Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment – agricultural land upstream of Mill Lane. A range of measures can be considered, but given assumed land use and watercourse character, land/soil management and revegetation are recommended	A	3	3	3	3	3	Unknown	0	15	Can be implemented in a short space of time with opportunities to with NFM delivery partners to provide flood risk and environmental benefits. Could explore various funding mechanisms.
15	Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment – agricultural land upstream of Fremington. A range of measures can be considered, but given assumed land use and watercourse character, land/soil management and revegetation are recommended.	D	3	3	3	3	3	Unknown	0	15	Some maintenance and monitoring required – predominantly by land owners. Aligns with some aspirations of the national park. In line with national and local strategy. Various funding streams available for NFM
8	Regrade a length of the highway along Silver Street to divert flow into agricultural land adjacent to it. A channel approximately 400 m in length would be excavated in agricultural land to collect flows and discharge them to the River Swale. It is proposed that the drainage channel would be excavated along existing field boundaries to minimise disruption to landowners.	B	2	3	1	2	1	£126,000	0	9	Option considered as part of collaboration between National Parks and NYCC highways. Collaboration could see the project improve its cost benefit ratio through benefits in kind.

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environmental Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
6	The replacement of 2 no. impermeable surfaces with permeable paving or equivalent SuDS features upstream of Alpine Terrace. These two locations are currently cobbled and are used for car parking.	B	2	1	1	1	0	£187,000	-15	-10	Negative cost benefit ratio. Unlikely to gain approval from National Parks for change of surface. Parish Council consultation suggested the same. Option Discounted
2	The implementation of a flood wall around the Holiday Cottages and properties on Mill Lane that are adjacent to Arkle Beck. The flood wall is assumed to be approximately 200 m in length and 1.5 m in height. It is intended to tie into suitable features to provide continuous defence. Back drainage would be required, as there are clear surface water flow paths from the northwest. At this stage, back drainage has not been included within the design or cost estimates.	A	1	1	1	1	0	£958,000	-15	-11	Negative Cost Benefit ratio. Option Discounted
7	Diversion of flow from the existing highways drainage system to an underground storage area with approximate total capacity of 260 m3. under the village green.	B	1	1	1	1	0	£230,000	-15	-11	Negative cost benefit ratio. Attenuation would have a finite capacity and would not provide a resilient solution. Does not align with other environmental benefits etc. Option Discounted.
11	The implementation of a flood wall around the property on the B6270 that is immediately adjacent to Arkle Beck. The flood wall is assumed to be approximately 95 m in length and 1.5 m in height. It is intended to tie into suitable	C	1	1	1	1	0	£320,000	-15	-11	Negative Cost benefit ratio. Scheme does not align with environmental, resilience and funding opportunities. Option discounted.

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environmental Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
	features to provide continuous defence.										
<b>Spennithorne</b>											
2	Replace the trash screen with a modern style screen with maintenance platform. The new trash screen would be designed to a modern standard with a reduced risk of blockage and increased ease of maintaining	A	3	2	1	3	2	£4,000	15	<b>26</b>	Existing screen is not fit for purpose and is a NYCC maintenance liability. A well designed trash screen will significantly improve the current maintenance liability. Would involve work on adjacent property for fixing points. Protects existing NYCC culvert. Could attract NYCC highways revenue/capital funding. FRM and others may be able to act in a short space of time in order to deliver trash screen
5	The installation of measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	A	3	2	1	3	2	£49,950	15	<b>26</b>	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
4	Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment – agricultural land upstream of Spennithorne.	A	3	3	3	3	2	Unknown		<b>14</b>	Option is less intrusive than option 3. There may be scope to work with the land owners and partner organisations. The project provides increased resilience and potential environmental benefits. There could be a number of funding sources available.

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environment I Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
1	Remove the complex, three-part culvert, and replace with a single barrel, precast concrete box culvert under main street. The cost estimates have been made based on a culvert dimension of 1800mm x 1000mm, which is roughly equivalent to the largest part of the existing culvert.	A	1	2	1	2	1	£182,000	0	7	Relatively low cost benefit ratio which will struggle to obtain external funding. Option provide improves culvert hydraulics and provides improved resilience against risk of blockage, collage and long terms maintenance. Suggest option is put on pipeline of project seeking future funding, but is not currently a preferred option.
3	Implement a series of floodplain embankments in existing floodplain areas in the upper Spennithorne Beck catchment	A	1	2	2	1	0	£263,200	0	6	Relatively low cost benefit ratio which will struggle to obtain external funding. Would require significant buy in from landowners. High quality arable land upstream - buy in or compensation costs would be high. Alto introduces the risk of breach and high maintenance liabilities. Option Discounted.

**West Witton**

8	The installation protection measures that protect properties from flooding. A notional 'premium' installation per residential property (as per 2015 EA guidance) includes two flood-proof doors, two airbrick covers and external wall render/bricks.	A,B,C	3	2	1	3	2	£33,240	15	26	PLP will be offered as part of county wide programme. Homeowner buy in required. External funding could be pursued
7	Replace pond trash screen with modern standard with small maintenance deck.	C	3	1	1	3	1	£3,800	15	24	Existing screen is not fit for purpose and is a maintenance liability. A well designed trash screen will significantly improve the current maintenance liability. Excellent cost benefit ratio
2	Regrade area of land to slope from north-east down to south-west on the upstream side of the Mill Pond wall.	A	3	1	1	2	1	£7,000	15	23	Relatively minor intervention that would direct water away from the barn. Would require land owner permission and would be preferable to option 3.

Option No.	Description	Location	Timescales	Partnership Working Opportunities	Environmental Benefits	Project Resilience	Funding Opportunities	Approx. Scheme costs	Cost Benefit	Option Score	Engineer Input
3	Waterproofing treatment applied along south-west wall of Pondside Barn. Approx. Length of wall = 13.5m Assumed area of wall to be waterproofed = 27m <sup>2</sup>	A	3	1	1	2	1	£6,400	15	23	Could be offered as part of PLP scheme.
1	Increase current pond inlet. Implement 1m x 1m square orifice/inlet through wall with screen (for livestock).	A	3	1	1	1	1	£2,600	15	22	Relatively simple intervention. Would need to be implemented with other measures to ensure the outlet of the pond is not inundated.
9	Introduction of natural process to slow the flow and/or reduce runoff in the headwaters of the hydrological catchment – agricultural land to the south of West Witton.	A,B,C	2	3	3	3	2	Unknown	0	13	Can be implemented in a short space of time with opportunities to with NFM delivery partners to provide flood risk and environmental benefits. Could explore various funding mechanisms.
4b	Excavate new watercourse channel along path shown on plan (Appendix B). Watercourse would be culverted under Mill Pond wall and pedestrian area, discharging to pond.	A,B	1	1	2	1	1	£19,500	5	11	Would require significant landowner buy in in respect of land take and future maintenance responsibilities. Does not align with other objectives.
6	Implement surface water collection channel at north end of village green and installation of 4. drainage pipes under A684.	C	1	2	1	2	1	£78,000	0	7	Significant expenditure for little return as illustrated by the low cost benefit score. Potential partnership scheme with LHA and improved resilience of road network, but funding may be difficult to achieve. Suggest option put on pipeline of project seeking investment.
5	Drop current village green level to provide attenuation of overtopping flow. Discharge pipe in north east corner to allow water to be conveyed under the road to the watercourse channel downstream.	C	1	2	1	1	1	£61,000	0	6	It was confirmed during Parish consultations that the green used to be a mill pond, and this option would be reverting the old green to its previous state, therefore not insurmountable. However, given the amount of flow passing through any such intervention would be inundated. Option discounted unless used in conjunction with other options.
4a	Replace existing culvert (consisting of concrete lined channel and slab soffit) with modern culvert.	A,B	1	1	1	1	0	£525,000	-15	-11	Negative cost benefit. Significant technical challenges and does not align with environmental and resilience objectives.

<p><b>Initial equality impact assessment screening form</b> (As of October 2015 this form replaces 'Record of decision not to carry out an EIA')</p> <p><b>This form records an equality screening process to determine the relevance of equality to a proposal, and a decision whether or not a full EIA would be appropriate or proportionate.</b></p>			
<b>Directorate</b>	Business and Environmental Services		
<b>Service area</b>	Highways and Transportation		
<b>Proposal being screened</b>	Approval of development of preferred options in the Upper Dales villages arising from feasibility studies undertaken during 2021		
<b>Officer(s) carrying out screening</b>	Emily Mellalieu, Stephen Lilgert		
<b>What are you proposing to do?</b>	Progress work on preferred flood risk mitigation options identified as part of a feasibility study covering various Upper Dales villages with a view to enabling delivery of future NYCC schemes		
<b>Why are you proposing this? What are the desired outcomes?</b>	Upper Dales villages are identified as a high priority in the NYCC flood risk management programme. The work will see the risk in communities mitigated, increasing community resilience and reducing the detrimental impacts of future flood events.		
<b>Does the proposal involve a significant commitment or removal of resources? Please give details.</b>	There is £400k of NYCC expenditure indicatively attached to the proposal. The next phase seeks to utilise £50k of this towards development of preferred options towards a business case. £400k is not representative of the full scheme costs, but it will permit project development and contribution towards any measures identified.		
<p><b>Impact on people with any of the following protected characteristics as defined by the Equality Act 2010, or NYCC's additional agreed characteristic</b> As part of this assessment, please consider the following questions:</p> <ul style="list-style-type: none"> <li>• To what extent is this service used by particular groups of people with protected characteristics?</li> <li>• Does the proposal relate to functions that previous consultation has identified as important?</li> <li>• Do different groups have different needs or experiences in the area the proposal relates to?</li> </ul> <p><b>If for any characteristic it is considered that there is likely to be a significant adverse impact or you have ticked 'Don't know/no info available', then a full EIA should be carried out where this is proportionate. You are advised to speak to your <a href="#">Equality rep</a> for advice if you are in any doubt.</b></p>			
<b>Protected characteristic</b>	<b>Yes</b>	<b>No</b>	<b>Don't know/No info available</b>
Age		No	
Disability		No	
Sex (Gender)		No	
Race		No	
Sexual orientation		No	



Gender reassignment		No	
Religion or belief		No	
Pregnancy or maternity		No	
Marriage or civil partnership		No	
<b>NYCC additional characteristic</b>			
People in rural areas		No	
People on a low income		No	
Carer (unpaid family or friend)		No	
<b>Does the proposal relate to an area where there are known inequalities/probable impacts</b> (e.g. disabled people's access to public transport)? Please give details.	No.		
<b>Will the proposal have a significant effect on how other organisations operate?</b> (e.g. partners, funding criteria, etc.). <b>Do any of these organisations support people with protected characteristics?</b> Please explain why you have reached this conclusion.	No		
<b>Decision (Please tick one option)</b>	EIA not relevant or proportionate:	X	Continue to full EIA:
<b>Reason for decision</b>	The work relates to a geographical area, any action which may arise from the option development relates to the physical geography of the location and its associated flood risk, rather than being a decision which may be assessed differently or would have different implications depending on any protected characteristics an individual may have. Given the project addresses risk in dispersed rural communities it is likely to have a positive impact on this characteristic.		
<b>Signed (Assistant Director or equivalent)</b>	Barrie Mason		
<b>Date</b>	11 January 2022		



## Climate change impact assessment

The purpose of this assessment is to help us understand the likely impacts of our decisions on the environment of North Yorkshire and on our aspiration to achieve net carbon neutrality by 2030, or as close to that date as possible. The intention is to mitigate negative effects and identify projects which will have positive effects.

This document should be completed in consultation with the supporting guidance. The final document will be published as part of the decision making process and should be written in Plain English.

If you have any additional queries which are not covered by the guidance please email [climatechange@northyorks.gov.uk](mailto:climatechange@northyorks.gov.uk)

**Please note: You may not need to undertake this assessment if your proposal will be subject to any of the following:**

Planning Permission  
Environmental Impact Assessment  
Strategic Environmental Assessment

However, you will still need to summarise your findings in in the summary section of the form below.

Please contact [climatechange@northyorks.gov.uk](mailto:climatechange@northyorks.gov.uk) for advice.

<b>Title of proposal</b>	<b>Upper Dales flood mitigation- preferred options</b>
<b>Brief description of proposal</b>	<b>Progression of preferred options</b>
<b>Directorate</b>	<b>BES</b>
<b>Service area</b>	<b>Network Strategy</b>
<b>Lead officer</b>	<b>Emily Mellalieu</b>
<b>Names and roles of other people involved in carrying out the impact assessment</b>	<b>E Mellalieu</b>
<b>Date impact assessment started</b>	<b>22/12/2021</b>

**Options appraisal**

Were any other options considered in trying to achieve the aim of this project? If so, please give brief details and explain why alternative options were not progressed.

**Other options to be considered would be to do nothing. Given the impacts of flooding on the locations and the opportunity to further develop the findings of the initial Section 19 Flood investigation Report, this option was discounted.**

**What impact will this proposal have on council budgets? Will it be cost neutral, have increased cost or reduce costs?**

Please explain briefly why this will be the result, detailing estimated savings or costs where this is possible.

There is £400k indicatively allocated to this project from the Flood Risk Management Base Budget and Reserve. The next stage of this project seeks to utilise £50k of this towards developing the preferred options indicated towards business case.

<p>How will this proposal impact on the environment?</p> <p><b>N.B. There may be short term negative impact and longer term positive impact. Please include all potential impacts over the lifetime of a project and provide an explanation.</b></p>	<p><b>Positive impact</b> (Place a X in the box)</p>	<p><b>No impact</b> (Place a X in the box)</p>	<p><b>Negative impact</b> (Place a X in the box)</p>	<p>Explain why will it have this effect and over what timescale?</p> <p>Where possible/relevant please include:</p> <ul style="list-style-type: none"> <li>• Changes over and above business as usual</li> <li>• Evidence or measurement of effect</li> <li>• Figures for CO<sub>2</sub>e</li> <li>• Links to relevant documents</li> </ul>	<p>Explain how you plan to mitigate any negative impacts.</p>	<p>Explain how you plan to improve any positive outcomes as far as possible.</p>	
<p>Minimise <b>greenhouse gas emissions</b> e.g. reducing emissions from travel, increasing energy efficiencies etc.</p>	Emissions from travel		X		<p>This work will see no change to business as usual. The results of the work address flood risk and as such are likely to have a positive impact in response to climate change.</p>		
	Emissions from construction		X		As above		
	Emissions from running of buildings		X		As above		
	Other		X		As above		
<p>Minimise <b>waste</b>: Reduce, reuse, recycle and compost e.g. reducing use of single use plastic</p>		X		As above			
<p>Reduce <b>water</b> consumption</p>		X		As above			

<p>How will this proposal impact on the environment?</p> <p><b>N.B. There may be short term negative impact and longer term positive impact. Please include all potential impacts over the lifetime of a project and provide an explanation.</b></p>	<p><b>Positive impact</b> (Place a X in the box)</p>	<p><b>No impact</b> (Place a X in the box)</p>	<p><b>Negative impact</b> (Place a X in the box)</p>	<p>Explain why will it have this effect and over what timescale?</p> <p>Where possible/relevant please include:</p> <ul style="list-style-type: none"> <li>• Changes over and above business as usual</li> <li>• Evidence or measurement of effect</li> <li>• Figures for CO<sub>2</sub>e</li> <li>• Links to relevant documents</li> </ul>	<p>Explain how you plan to mitigate any negative impacts.</p>	<p>Explain how you plan to improve any positive outcomes as far as possible.</p>
<p>Minimise <b>pollution</b> (including air, land, water, light and noise)</p>		<p>X</p>				
<p>Ensure <b>resilience</b> to the effects of climate change e.g. reducing flood risk, mitigating effects of drier, hotter summers</p>	<p>X</p>			<p>The project works towards the delivery of flood mitigation. Resilience is key to the NY flood risk strategy and options to progress are in line with this.</p>		<p>Working with communities through the delivery to ensure risks are known and understood which increases their resilience in flood events.</p>
<p>Enhance <b>conservation</b> and wildlife</p>	<p>X</p>			<p>Preferred Options include Natural Flood Management Measures. This has the potential to have wider benefits to conservation and wildlife beyond simply flood management.</p>		<p>Working with partners including the Dales to Vales Rivers Network to achieve mutual benefits through the project.</p>

<p>How will this proposal impact on the environment?</p> <p><b>N.B. There may be short term negative impact and longer term positive impact. Please include all potential impacts over the lifetime of a project and provide an explanation.</b></p>	<p><b>Positive impact</b> (Place a X in the box)</p>	<p><b>No impact</b> (Place a X in the box)</p>	<p><b>Negative impact</b> (Place a X in the box)</p>	<p>Explain why will it have this effect and over what timescale?</p> <p>Where possible/relevant please include:</p> <ul style="list-style-type: none"> <li>• Changes over and above business as usual</li> <li>• Evidence or measurement of effect</li> <li>• Figures for CO<sub>2</sub>e</li> <li>• Links to relevant documents</li> </ul>	<p>Explain how you plan to mitigate any negative impacts.</p>	<p>Explain how you plan to improve any positive outcomes as far as possible.</p>
<p>Safeguard the distinctive characteristics, features and special qualities of <b>North Yorkshire's landscape</b></p>		X		<p>The resulting work if the bid is successful would have the potential to positively enhance distinctive characteristics, features and qualities of NY's landscape</p>		
<p>Other (please state below)</p>		X		<p>As above there are potential positive effects if the bid should be successful.</p>		

**Are there any recognised good practice environmental standards in relation to this proposal?** If so, please detail how this proposal meets those standards.

n/a

**Summary** Summarise the findings of your impact assessment, including impacts, the recommendation in relation to addressing impacts, including any legal advice, and next steps. This summary should be used as part of the report to the decision maker.

No impacts are anticipated from the development of this work. Any delivery resulting from the project development is likely to have a positive impact in response to climate change.

**Sign off section**

This climate change impact assessment was completed by:

<b>Name</b>	<b>Emily Mellalieu</b>
<b>Job title</b>	<b>Development Management Team Leader</b>
<b>Service area</b>	<b>H&amp;T -Network Strategy</b>
<b>Directorate</b>	<b>BES</b>
<b>Signature</b>	<b>E Mellalieu</b>
<b>Completion date</b>	<b>4/1/2020</b>

**Authorised by relevant Assistant Director (signature): Barrie Mason**

**Date: 11 January 2022**



# North Yorkshire Council – Upper Dales Flood Alleviation Scheme

## CAPITAL PROJECT PROFORMA

This proforma is intended for levy requests that will fund capital projects to tackle flood and coastal risk (e.g. hard river defences, sea walls, pumping stations).

**Please refer to guidance before completing this proforma**

### EXECUTIVE SUMMARY AND ASSESSMENT METHODOLOGY RESULTS

#### **Executive Summary**

*Provide a brief summary of the project here and describe why the Levy is being requested. Aim to keep this to around 200 words for the summary that is presented to YRFCC.*

In July 2019 unprecedented rainfall in the west of the county of North Yorkshire saw devastating flooding impacts. Richmondshire was hardest hit by the events, which saw approximately 238 individual properties internally flooded, bridges providing vital links to some remote communities destroyed, watercourses obstructed by tonnes of debris and several significant landslips impacting on the highway network. The cause was surface water mainly due to the topography of the locations resulting in flash flooding with very little warning to the locations effected.

Given the scale of the flooding and the impacts on the community a section 19 investigation was undertaken focussing on Reeth and Fremmington, Arkengarthdale, Bellerby, Leyburn, West Witton, Bainbridge, Hawes and Gayle, Redmire and Spennithorne. Officers recognised that local villages have suffered historic repeat flood incidents that have been previously investigated by North Yorkshire Council in its role as LLFA.

Following this, WSP was commissioned to identify mitigation options for each of the locations, coupled with indicative costings, to permit an evaluation of the cost benefits. WSP findings were analysed with Property Flood Resilience being the preferred option which would benefit all properties in all locations, along with the consideration of some localised drainage modifications.

Approximately 40% of the estimated costs are shown to be eligible for grant in aid funding. NYC have allocated 30% of the costs. The Local Levy request will be utilised to fund the remaining funding gap to enable approval of the project and ensure the PFR offer can be provided to those who need it. Funding can be returned to the Levy pot if not needed.

**Project stage:** Pre-initial assessment/viability study

<b>Levy requested for current bid:</b> 582,889	<b>Total Levy requested for project:</b> 582,889
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<b>Estimated total project cost:</b> 2.1m	<b>Partnership financial contribution:</b> 1.5m
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Essential criteria	Rating	Summary
Delivers flood risk benefits for one or more sources of flooding / coastal erosion	No. of houses:	196
	No. of other properties:	4
	Non-property rating:	Moderate
		<i>Summary of S2 to explain non-property rating.</i> Household figures quoted are the OM2A total. Non-residential properties benefitting from reduced flood risk are 4 community pubs, The Red Lion Inn at Langthwaite, The Bridge Inn in Grinton, Wensleydale Heiffer at West Witton and Dales Bike at Fremington. Additional benefits to non-residential properties include resilience - the ability to continue with business as usual following clean up and to remain as hub to the communities they serve as most villages of the dales do not have access to amenities or services.





Represents value for money and is cost-beneficial	Significant	<p><i>Summary of E1.</i></p> <p>Yes the Benefit to cost ratios meets the criteria of the PF Funding submissions for the GiA grants.</p>
<b>Added value criteria</b>		
Offers wider benefits to the communities in terms of environmental or recreational improvements	None	<p><i>Summary of E2.</i></p> <p>Property Flood Resilience will not provide these.</p>
Levers in additional investment for projects from other funding sources	Moderate	<p><i>Summary of F1.</i></p> <p>28% (£528,889k) of Levy requested for the project, 41% (£873,212k) GiA funding request submitted, and 31% (£650k) of North Yorkshire Council funding secured.</p>
Opportunities for shared learning, including process of delivery and methods	Significant	<p><i>Summary of M2.</i></p> <p>Positive results from previous projects mapped to the Upper Dales Project. Meetings held with Stakeholders identifying potential issues and solutions prior to engaging with residents. Stakeholders attended the Community Engagement Event in April 2024.</p>
<b>Confidence flags</b> <i>Insert red, amber or green rating and provide evidence</i>		
Confidence in cost estimates	Green	<p><i>Summary from E1.</i></p> <p>Scheme options costed with evidence that 20% to 30% risk contingency has been factored in. Costs have been identified</p>
Confidence in benefit estimates	Green	<p><i>Summary from E1.</i></p> <p>Estimated costs have been calculated using the high level economic analysis.</p>
Actively engages communities	Green	<p><i>Summary from M3.</i></p> <p>Following the Section 19 and Feasibility reports by WSP, North Yorkshire Officers engaged with all parish councils to discuss the findings. Week long meetings were set up in locations so those impacted could discuss the preferred options directly with officers, using PFR demonstration kit which provided positive engagement. A designated Project Manager has been recruited to lead on the project with a Community Engagement day including officers from the Flood Risk Management Team, the Resilience and Emergency Team, The Environment Agency, Yorkshire Dales National</p>



		Park Officers and NYC contractors who have delivered the PFR scheme elsewhere in the county. Door to door conversations are help with other meetings help in community halls. Community Engagement will continue throughout the project.
Confidence in other required contributions	Amber	<i>Summary from F1.</i> Contributions from North Yorkshire Council are confirmed and not time restricted, funding requests for Grant in Aid have been submitted and awaiting outcome.
<b>Other drivers</b> <i>Click in the box if this applies and explain why</i>		
Potential for reputational damage	<input checked="" type="checkbox"/>	There has been no progress on delivery of a capital scheme in this catchment since the recommendation in 2021. The perceived lack of action by RMAs is likely to increase if the scheme cannot be supported.
Decision on Levy needed at this Committee round	<input checked="" type="checkbox"/>	The project is to be submitted shortly to North Yorkshire Executive Committee round to align with financial approval timescales.
<b>Please confirm</b>		
Your EA Area FCRM has agreed to support this submission for Local Levy funding	<input checked="" type="checkbox"/>	



## Why should the Committee support this project? (Strategic case)

### **S1. Describe why the project is required/ what are the objectives?**

*What is the current situation in the project location and the problem to be solved?*

*Include details of the history of flooding / coastal erosion, and any impacts. Explain how this fits in with existing strategic plans.*

The project covers Whaw, Langthwaite, Reeth, Fremington, Grinton, West Witton, Bainbridge, Hawes, Gayle, and Wensleydale areas: Bellerby, Leyburn, West Witton, Redmire and Spennithorne

The Upper Dales, which include Wensleydale, are a series of valleys, or dales, in the Pennines, they are mostly located in North Yorkshire but extend into Cumbria and Lancashire. The landscape consists of sheltered glacial valleys, separated by exposed moorland and the area experiences very changeable weather.

Flooding in the Upper Dales is predominantly caused by the landscape made up of high steep valleys. With high volumes of rainfall, this results in flash flooding with very little warning.

The most significant flooding event in the Upper Dales occurred in July 2019, some areas had previously experienced flooding in 1986, 2009, and 2012, with some continually flooding to this day due to increased frequency and high volumes of rainfall. Following the devastation of the 2019 floods, many residents moved to short term accommodation whilst their properties and businesses were renovated which for some took many months.

WSP Consultants were commissioned to investigate flooding within the Upper Dales area, their findings identified the following probabilities:

- P1. Wensleydale Project: 22 at significant risk. 8 at intermediate risk
- P2. Leyburn 1 Project: 26 at intermediate risk. 7 at moderate risk
- P3. Leyburn & Redmire Project: 6 at significant risk. 17 at moderate risk.
- P4. Leyburn 3 Project: 15 at intermediate risk. 16 at moderate risk
- P5. West Witton & Spennithorne Project: 12 at significant risk. 5 at intermediate risk. 3 at moderate risk
- P6. Reeth Project: 26 at intermediate risk. 5 at moderate risk
- P7. Upper Dales Project: 16 at intermediate risk. 16 at moderate risk.

The project is required for the following reasons:

- Floods are the highest risk in the Upper Dales. Villages in the dales are rural and mostly occupied by vulnerable elderly residents who have lived there all their lives. With the increase of rainfall residents feel vulnerable to the ever changing elements and live in fear of flooding as well as rising renovation costs and high insurances. The future of these communities relies on ensuring increased resilience and adaptation, the implementation of Property Resilience measures will mitigate this risk.
- Access to communities in Swaledale and Arkengarthdale are by winding, hilly and often single track roads. The nearest Emergency Services is over 5 miles away, which is unmanned and often at capacity during such flooding events. Response time is estimated to be 30 minutes in good conditions and 45 minutes in extreme conditions if access is clear. PFR will enable residents to protect themselves and their properties in future flooding.
- Bellerby is surrounded by low lying hills, moorland is located to the North and the west of the village. There are 2 becks which run through the village, Bellerby beck rises from a spring half way up Moor road. Mill Beck which is diverted from Bellerby Beck, flows levada style through the higher part of the village across the green to unite with Bellerby Beck in Mill Lane. The village has experienced severe surface water flooding events across its history, with the most recent floods occurred during October 2012, and June 2019. The flood of 2012 occurred due to a months worth of rain falling over a 24 hour period resulting of flooding in some properties up to 3 feet. Surface water continues to run through the village in heavy rainfalls.
- Bainbridge and Leyburn flood experiences surface water flooding from agricultural land



This investment is required to provide safety and piece of mind to the residents of the Upper Dales and without Property Flood Resilience intervention and with the anticipated increase in frequency of extreme weather events due to climate change, the risk of internal flooding in the project area will increase.

**S2. What are the benefits to be delivered for us and others?**

*Provide details of the benefits that this project will deliver, including properties and non-property infrastructure to benefit and what these are based on (as the receptors to benefit may be more than the OM2s or 3s associated with the project).*

The primary benefit resulting from this scheme will be to increase property resilience throughout the Upper Dales, Redmire and Leyburn areas through the offer of Property Flood Resilience measures.

The following were identified in the WSP consultations North Yorkshire Council commissioned.

Residential beneficiaries include:

- 196 properties

Key non-residential beneficiaries include:

- The Bridge Inn - Grinton
- Wensleydale Heiffer – West Witton
- Dales Bike Centre & Café - Fremington
- Red Lion Inn – Langthwaite

Additional benefits to non-residential properties include resilience - the ability to continue with business as usual following clean up. The non-residential beneficiaries are situated in rural locations which act as community hubs as there are no local amenities/services which are readily available in larger towns and cities. These hubs are really a lifeline for residents, in extreme weather conditions they may be cut off from other locations and the nearest facilities may be up to 16 miles away.

Please provide details below of what is at risk and / or will benefit from the project:

<b>Flood/coastal erosion receptors</b>	<b>At risk</b>	<b>To benefit</b>
Number of residential properties	196	196
Number of non-residential properties	4	4
Description of non-property receptors / other infrastructure to benefit	0	0

**S3. Explain why the Levy is being requested.**



*Which part of the project is the Levy going to fund?*

*What would be the impact if the Levy was not approved? Why make this investment now?*

High level economic analysis has identified a maximum GiA eligibility of £873,212. NYC has earmarked a contribution of £650K. A further £582,889 is needed to ensure the PFR measures can be offered to all those that need it. Without Local Levy it is highly likely that not all the community will be offered increased resilience.

The Levy covers a proportion of the risk contingency element of the scheme. Hence Local Levy will not need to be drawn down in full if the total project risk contingency is not required and can be released back to the YRFCC.

**Why should the Committee invest in this project? (Economic case)**

**E1. Is the project value for money?**

*What options and methods have been / will be considered (for the project as a whole)?*

*Please indicate how the costs and benefits have currently been calculated and how risk has been taken into account for each option.*

Options to be investigated are likely to be limited to:

- Do nothing
- Do minimum
- Do Property Flood Resilience Measures – with the possibility of some drainage survey.

The preferred option will deliver 200 properties better protected against flood risk at the end of the appraisal period.

Estimated cost breakdown is:

- Appraisal Costs – £207,600
- Design and Construction – £1,500,000 plus £398,000 risk contingency
- Total Costs for approval - £2,106,101
- No future costs involved.

Benefit to cost ration for individual project GiA submissions

- P1. Wensleydale 2.8
- P2. Leyburn 2.9
- P3. Leyburn & Redmire 2.7
- P4. Leyburn 3 2.8
- P5. West Witton & Spennithorne 2.8
- P6. Reeth 3.0
- P7. Upper Dales 2.9

Benefit to cost ratio (or range of benefit to cost ratios):

**E2. What wider environmental / recreational benefits does / is the project likely to provide?**



*Does the project offer/allow for any wider environmental or recreational benefits? This could be in the form of new public open spaces or parks, better access to water etc.*

*Any carbon-saving or biodiversity net gain benefits?*

The project does not provide any wider environmental/recreation benefits.



**How will the project be funded? (Financial case)**

**F1. Is the project affordable?**

*Is the required funding to deliver the project\* available and supported? Have potential partners been identified? Who are they, have they been approached for contribution(s) and what is the status of negotiations? Are there any conditions placed on funding or constraints on any of the funding sources (including FCERM GiA)? How will post-construction costs be funded?*

North Yorkshire Council has earmarked £650,000 to the project.

An application for FCERM GiA for £873,212 has been submitted and awaiting outcome.

Also looking into additional funding opportunities through the York and North Yorkshire Combined Authority.

There will be no requirement for post-construction costs as once PFR is implemented in each property the responsibility for maintenance lies with the property owner.

	Prior yrs	2024/25	2025/26	2026/27	2027/28	2028/29	Future Yrs
New / Additional Local Levy request (£k)		582,889					
Local Levy already allocated (£k)		0					
Partnership contributions secured to date (£k)		650,000					
FCERM GiA allocated (£k)							
Total funding identified above							
Estimated Total Project Cost (£k) for delivery*		£2.1m	Indicative Raw Partnership Funding score (%)				31%
Total Cost of Current Phase (£k)		£2.1m	Indicative Adjusted Partnership Funding score if Levy approved (%)				70%
Total Levy required towards current phase (£k)		£582,889	Likely maximum FCERM GiA eligibility for delivery* (£k)				873,212

\*delivery = appraisal, design and construction

**F2. Explain your confidence in delivering to the funding profile requested**

*There is an expectation that the profile of Levy being requested is deliverable. Please explain how you will achieve this.*

NYC has successfully delivered schemes in Malton, Norton and Old Malton, best practice has been mapped across to the Upper Dales Project to ensure the project is delivered.

The profile has been split across investment periods in line with the latest delivery programme. This is to ensure the programme is realistic and deliverable.


**F3. Has your organisation made a financial contribution (or in kind) to the project proposed?**

*If yes, can you provide details? If not, can you offer an explanation as to why?*

Yes North Yorkshire Council has allocated £650,000 to the scheme

**How will the project be delivered? (Management case)**
**M1. What are some of the key risks involved in the delivery of the project?**

*Summarise how the project will be delivered, taking account of key risks and how these will be managed and mitigated.*

Day to day management will be undertaken by an experienced Flood Risk Management Project Manager. The Project Manager will be responsible for procuring contractors via the EA Framework, arranging contractual agreements and over seeing works.

Previous delivery of FCERM projects by the Council includes the governance and management of funding from sources including FCERM GiA, Local Levey, Local Growth Funding from North Yorkshire LEP, Ryedale District Council and European Regional Development Funding.

Risks:

- Funding – if GiA and Local Levy contributions are unable to be secured through the OBC this poses a risk to the delivery of the scheme. A robust OBC submission (and Local Ley proforma) aim to mitigate this risk.
- Public Concerns – Possible challenge to the choice of preferred scheme. Additional consultations may be required. Early consultations to gauge views of residents and Stakeholders have been held and will continue throughout the project.
- Permissions & Consents - 77 properties sit within the Yorkshire Dales National Park, planning permission will be required for these properties also to include those listed as Grade 11 buildings. To ensure the project is delivered within the timeframe, it has been decided to survey these properties first, recommendations sent to the YDNPA with any issues discussed and resolved with Project Manager, Watertight (EA Lot 2 designated PFR installer). Planning permission to be raised as bulk rather than individual to ensure agreement is completed within a timely matter. Locations outside of the National Park will have their installations first.

Relationship building has already started with Stakeholders and Residents and will be maintained throughout the project, issues resolved as they arised and a project end feedback session planned.

**M2. How will lessons learned from the project be shared, including delivery process and methods?**

*What previous projects have you learned from? What is the potential for collaborative working, including with other stakeholders?*

Previous projects have included the recent Malton, Norton and Old Malton scheme, what worked well in those areas have been mapped across to the Upper Dales scheme, these are:

- informing County Councillors of the intention to deliver the Upper Dales Flood Alleviation Scheme
- liaising with the Yorkshire Dales National Park Authority on the intention to deliver the scheme to properties within the National Park, and the importance of the scheme and discussing the risks should planning not agreed to the works.
- organising Community Engagement event and the advertisement of the event and working with Parish Clerks to advertise events and further locations visits via their social media streams
- inviting Contractors from the previous Malton project to discuss PFR with residents of the Upper Dales, Heritage Officers to discuss planning permissions, Resilience and Emergency Team Officer to discuss flooding





in the area and any other extreme events , NYC Civil Engineers to discuss flooding and consultant recommendations and the preferred option of PFR.

- Environmental Agency Officer to discuss their area of expertise
- Hire of the Flood Mobile to physically inform residents of PFR measures

Regular update meetings are planned with County Councillors

Monthly FCERM meetings held to discuss progress to date on projects.

Weekly update meetings with Contractors & site visits.

### M3. How will you publicise the work being done?

*Describe the level of community engagement involved with the project.*

- A Community Engagement Event was delivered on the 26<sup>th</sup> April in Leyburn, this involved our Lot 2 partners, Watertight, JBA, EA and various emergency response services.
- Meeting held with the Yorkshire Dales National Park Authority to discuss the project empathising the importance of the project and the effect of flooding within the National Park and to work with us to achieve the outcome
- Scheme registration meetings held in key halls within locations. Door to door engagement with residents.
- Regular update meetings with Couty and Parish Councillors
- Use of Parish Clerks to advertise events, location visits via their social media platforms
- Use of Parish Clerks to contact property owners to contact Project Manager to discuss the scheme
- Use of NYC Communications team to advertise progress of the scheme

## **ADDITIONAL QUESTIONS FOR COMPLEX PROJECTS (Complete if Levy request is above £100k or requested to do so by Programme Team.)**

### 1. Is the project achievable?

*How will the project be managed and delivered? Have roles, responsibilities and key stages been drawn up?*

*How will success be evaluated?*

Yes, North Yorkshire Council will be the lead RMA for this scheme, property resilience will be undertaken by a specially recruited experienced Project Manager within the Flood Risk Management Team.

Project plan drawn up to ensure tasks and dates are complied with – this is ongoing

Project delivered in line with EA Framework.

Success will be evaluated by the successful completion of the scheme by location ensuring tests have been completed and residents are aware on how the property flood resilience measures work.

Ensuring a robust “after sales” service is set up for home owners should any issues arise following implementation of PFR measures.

### 2. Who else has a financial interest in the project?



List any interested individuals or parties and, if relevant, how they have agreed to support the project (e.g. financially/in kind). Details of financial contributions should be added into section F1 and do not need to be repeated here.

See section F1 for details.

### 3. What benefits is the project likely to provide to the local or regional economy?

*Does the project offer any benefits to the local or regional economy? For example, this could be by protecting existing businesses and/ or roads leading to local amenities or creating new employment opportunities.*

Identified non-residential businesses within the locations also act as community hubs, they will benefit from PFR ensuring they get back to business as quickly as possible following clean up and continue to provide this vital service within the rural communities who have no local amenities. They will also benefit economically.

Primarily benefits are limited as the PFR offer is likely only to be to residents in the area.

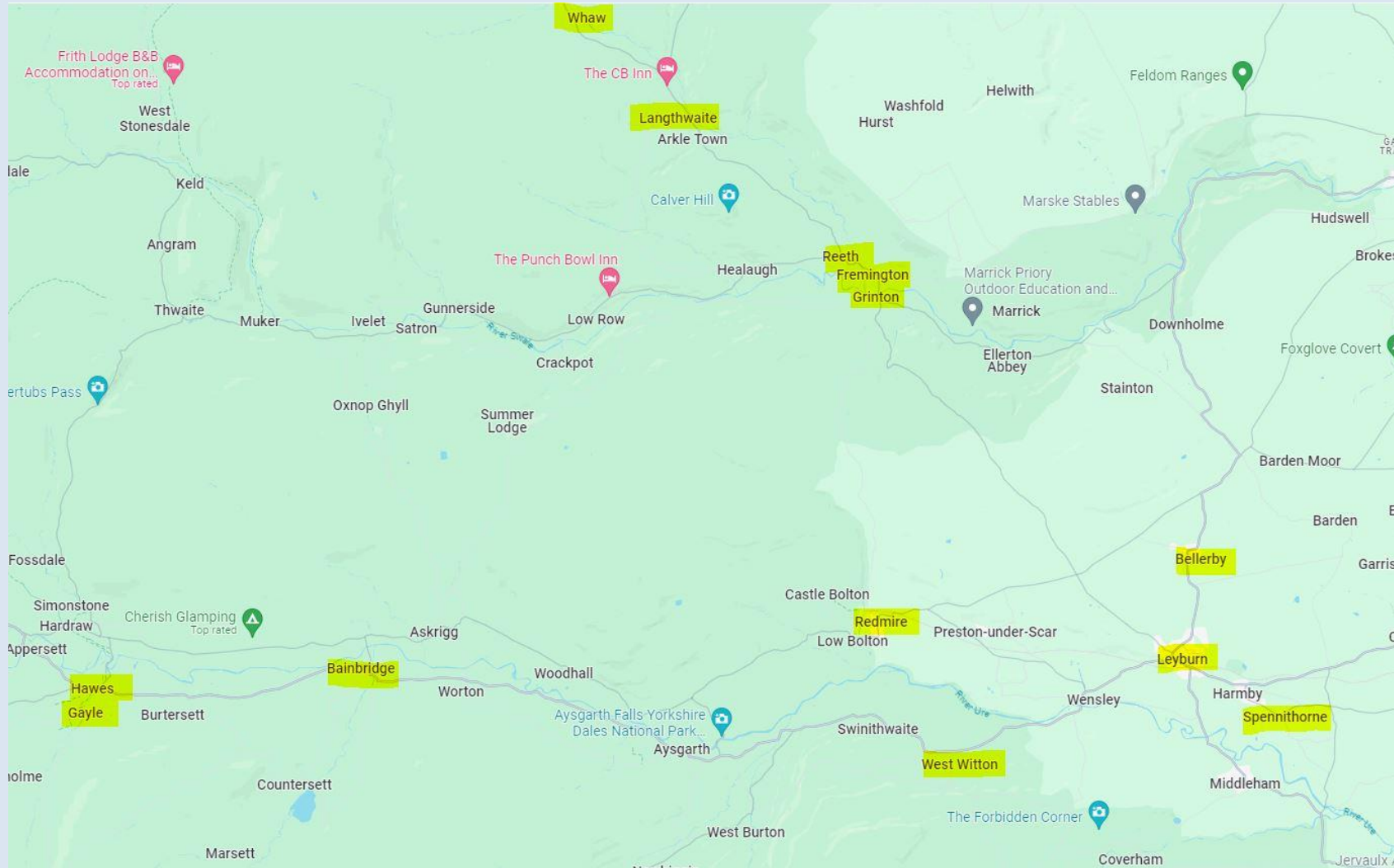
### 4. Any other information that you would like to provide that could support the bid?

It is vital Local Levy funding will be granted to ensure the vulnerable residents of the Upper Dales are protected against unpredictable flash flooding they have previously experienced.



### Project Location Map

*Ensure map displays OS license and contains a key to explain any markings on the map.*



<b>Initial equality impact assessment screening form</b>			
This form records an equality screening process to determine the relevance of equality to a proposal, and a decision whether or not a full EIA would be appropriate or proportionate.			
<b>Directorate</b>	Environment		
<b>Service area</b>	Highways – Flood Risk Management		
<b>Proposal being screened</b>	Upper Dales Flood Alleviation Scheme		
<b>Officer(s) carrying out screening</b>	Trish Gourley		
<b>What are you proposing to do?</b>	Implement Property Flood Resilience to at risk properties to Reeth and Fremmington, Arkengarthdale, Grinton, Bellerby, Leyburn, West Witton, Bainbridge, Hawes, and Gayle, Redmire and Spennithorne		
<b>Why are you proposing this? What are the desired outcomes?</b>	Properties have experienced flooding or have been identified as high risk of flooding.		
<b>Does the proposal involve a significant commitment or removal of resources? Please give details.</b>	Yes, the project will run for 2 to 3 years and will have a positive impact.		
<b>Impact on people with any of the following protected characteristics as defined by the Equality Act 2010, or NYC's additional agreed characteristics</b>			
As part of this assessment, please consider the following questions:			
<ul style="list-style-type: none"> <li>To what extent is this service used by particular groups of people with protected characteristics?</li> <li>Does the proposal relate to functions that previous consultation has identified as important?</li> <li>Do different groups have different needs or experiences in the area the proposal relates to?</li> </ul>			
<b>If for any characteristic it is considered that there is likely to be an adverse impact or you have ticked 'Don't know/no info available', then a full EIA should be carried out where this is proportionate. You are advised to speak to your directorate representative for advice if you are in any doubt.</b>			
Protected characteristic	Potential for adverse impact		Don't know/No info available
	Yes	No	
Age		No – positive impact	
Disability		No – positive impact	
Sex		No – positive impact	
Race		No – positive impact	
Sexual orientation		No – positive impact	
Gender reassignment		No – positive impact	

Religion or belief		No – positive impact	
Pregnancy or maternity		No – positive impact	
Marriage or civil partnership		No – positive impact	
People in rural areas		No – positive impact	
People on a low income		No – positive impact	
Carer (unpaid family or friend)		No – positive impact	
Are from the Armed Forces Community		No – positive impact	
<b>Does the proposal relate to an area where there are known inequalities/probable impacts</b> (for example, disabled people's access to public transport)? Please give details.	No		
<b>Will the proposal have a significant effect on how other organisations operate?</b> (for example, partners, funding criteria, etc.). <b>Do any of these organisations support people with protected characteristics?</b> Please explain why you have reached this conclusion.	No		
<b>Decision (Please tick one option)</b>	EIA not relevant or proportionate:	<input checked="" type="checkbox"/>	Continue to full EIA:
<b>Reason for decision</b>	* The scheme benefits all those with protected characteristics by reducing the risk of surface water flooding in the Upper Dales and thereby the associated effects upon businesses, residential properties, the public health of the community living at flood risk and the associated economic growth of the area.		
<b>Signed (Assistant Director or equivalent)</b>	Barrie Mason		
<b>Date</b>	26/07/2024		

### Initial Climate Change Impact Assessment (Form created August 2021)

The intention of this document is to help the council to gain an initial understanding of the impact of a project or decision on the environment. This document should be completed in consultation with the supporting guidance. Dependent on this initial assessment you may need to go on to complete a full Climate Change Impact Assessment. The final document will be published as part of the decision-making process. If you have any additional queries, which are not covered by the guidance please email [climatechange@northyorks.gov.uk](mailto:climatechange@northyorks.gov.uk)

<b>Title of proposal</b>	<b>Upper Dales Flood Alleviation Scheme</b>
<b>Brief description of proposal</b>	<p><b>Implement Property Flood Resilience to properties who have experienced flooding or identified as high-risk to Reeth and Fremmington, Arkengarthdale, Grinton, Bellerby, Leyburn, West Witton, Bainbridge, Hawes, and Gayle, Redmire and Spennithorne.</b></p> <p><b>Properties within the Yorkshire Dales National Park will require planning permission. Outside of the park there are two grade listed building who will also require planning permission.</b></p> <p><b>This initial climate change impact assessment is for other locations.</b></p>
<b>Directorate</b>	<b>Environment</b>
<b>Service area</b>	<b>Highways – Flood Risk Management</b>
<b>Lead officer</b>	<b>Trish Gourley</b>
<b>Names and roles of other people involved in carrying out the impact assessment</b>	<b>John Ward-Campbell</b>

The chart below contains the main environmental factors to consider in your initial assessment – choose the appropriate option from the drop-down list for each one.

Remember to think about the following;

- Travel
- Construction
- Data storage
- Use of buildings
- Change of land use
- Opportunities for recycling and reuse

Environmental factor to consider	For the council	For the county	Overall
Greenhouse gas emissions	No effect on emissions	No Effect on emissions	No effect on emissions
Waste	No effect on waste	No effect on waste	No effect on waste
Water use	No effect on water usage	No effect on water usage	No effect on water usage
Pollution (air, land, water, noise, light)	No effect on pollution	No effect on pollution	No effect on pollution
Resilience to adverse weather/climate events (flooding, drought etc)	Increases resilience	Increases resilience	Increases resilience
Ecological effects (biodiversity, loss of habitat etc)	No effect on ecology	No effect on ecology	No effect on ecology
Heritage and landscape	No effect on heritage and landscape	No effect on heritage and landscape	No effect on heritage and landscape

If any of these factors are likely to result in a negative or positive environmental impact then a full climate change impact assessment will be required. It is important that we capture information about both positive and negative impacts to aid the council in calculating its carbon footprint and environmental impact.

<b>Decision (Please tick one option)</b>	Full CCIA not relevant or proportionate:		Continue to full CCIA:	
<b>Reason for decision</b>	<p>*PFR will have a positive impact on properties with resilience to flooding which may result in reduced waste and potential increase of greenhouse emissions.</p> <p>*Waste from the implementation of PFR is one off and limited. Any waste will be removed by the contractor overseen by a North Yorkshire Council Project Manager.</p> <p>*Construction for Property Flood Resilience is one off and limited with no effect on greenhouse emissions and pollution.</p>			
<b>Signed (Assistant Director or equivalent)</b>	Barrie Mason			
<b>Date</b>	26/07/2024			