

# Project appraisal report

Authority scheme reference

National project number

Authority applying for a grant

Scarborough Borough Council

Scheme name

Filey Flood Alleviation Scheme



Inshore Lifeboat rescuing stranded people in Filey- July 2007

Date (DD/MM/YYYY)

11/06/2016

Version

0.6

[illegible]

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## Approval History sheet

<b>1 Review</b>			
Project title	Filey Flood Alleviation Scheme		
Authority project code		Date of PAR	11/06/2016
Lead authority	Scarborough Borough Council		
Consultant	Royal HaskoningDHV	Version number	0.6
Job title	Name	Signature	Date
Principal Engineer	Steve Vernon	Steve Vernon	01/06/2016
'I have reviewed this document and confirm that this project meets our quality assurance requirements, all of the required environmental obligations and Defra investment appraisal conditions. I confirm that all internal approvals, including member approval, have been completed for this project and recommend we apply to the Environment Agency for a capital grant of £ 2,269k'.			
Authority Project Executive	Stewart Rowe		
'I have reviewed this document and confirm that it meets the current PAR guidelines for local authority and Internal Drainage Board applications.'			
PAR reviewer			
'I confirm that I have consulted with the Director of Business Finance and that we are ready to send the project for assurance.'			
Area Flood Risk Manager			
NPAS Assurance <input type="checkbox"/> Projects <£10m (Tick the appropriate box)		Large project review group (LPRG) <input type="checkbox"/> Projects >£10m	
Recommended for approval (Lead Assurer or NPAB Chair)		Date	Version number
Capital grant of £			
<b>2 Project approval</b>			
Financial Scheme of Delegation (FSOD approval):			
<b>Limit</b>		<b>Approval</b>	
Over £20m		Chief Executive in consultation with Executive Director of Operations and Director of Business Finance	
Up to £20m		Executive Director of Operations and Director of Business Finance	
Up to £10m		Director of Operations and Director of Business Finance	
Up to £1m		Area Manager and Director of Business Finance	
Up to £100k of combined FCERM GiA and Local Levy expenditure (and with a total project value below £1m)		Area FCRM Manager even if the project value is greater than £100k (but less than £1m) including contributions from other parties	
Name		Date	
Name		Date	
Name		Date	
<b>3 Defra approval</b>			
Date sent to Defra (or write N/A)		Version number (if different)	
Date approved by Defra (or write N/A)			
Comments			

# 1 Executive summary

## 1.1 Introduction and background

### Location and background

- 1.1.1 The town of Filey is located in North Yorkshire, approximately 10.5km south of Scarborough on the north-east coast of England. The town has regularly suffered from flooding over the past 30 years, which has been caused by runoff from the surrounding agricultural land in combination with a surface water system within the town itself which is over capacity. Historically, this runoff would have discharged directly to the sea via ravines; however these watercourses have been culverted as the town of Filey has developed.
- 1.1.2 The Filey Brigg Site of Special Scientific Interest (SSSI), located in the north east of Filey town, is designated for its geological and ornithological interest. Filey Town is also surrounded by several locally important ecological designations including five Sites of Importance for Nature Conservation (SINC). There are also several sites around Filey that are not officially designated for their conservation value but are managed to support a range of species and habitats.
- 1.1.3 The main objectives for the scheme (agreed by the project steering group) are:
- To reduce the flood risk from surface water for the community of Filey ; and
  - To slow down overland flows from the surrounding catchment during storm events and control the rate at which flows enter the existing urban drainage system in Filey to reduce the risk of it becoming overwhelmed.

### History of flooding

- 1.1.4 There is a long history of flooding in Filey caused by extreme rainfall events. These rainfall events have resulted in widespread overland flooding; overwhelming of watercourses and drainage systems; localised ground instabilities; and damage to residential and commercial properties and buildings across the town.
- 1.1.5 The most significant flooding occurred in October 2000, August 2002, and July 2007. The 2007 event was the most severe flood event in recent times with the cost of remedial work estimated at approximately £6.4 million; over 80mm of rain fell in just one and half hours, with water reported to be waist deep in places. Significant damage and disruption occurred, including:
- Over 200 homes affected by internal flooding;
  - 8 people had to be rescued from the swimming pool at Filey School;
  - Filey inshore lifeboat was used within the town to rescue people stranded in their homes;
  - Over 30 people had to be evacuated from their homes and an emergency centre was set up in the Evron Centre and Trinity Church;
  - Classrooms, swimming pool, and other buildings were flooded at Filey School, closing it for a short period;
  - Both main roads into Filey (Muston Road and Scarborough Road) were closed at one stage of the flood; and
  - North Yorkshire Fire Service received over 150 calls in five hours seeking help.

## 1.2 Problem

- 1.2.1 The main risk to Filey is from overland flows from the surrounding rural land during extreme rainfall events which overwhelm the drainage ditches, watercourses, and urban drainage network. This is exacerbated by the slopes surrounding the area resulting in a basin like topography for the town.
- 1.2.2 The flooding leads to localised ground instabilities and damage to a large number of residential and non-residential properties. The drainage ditches and tributaries on the outskirts of the town are of inadequate capacity to convey the runoff, which results in the surface water entering the urban area. This then has implications on the urban drainage network, which when overwhelmed in the estates on the edge of Filey results in flooding through the urban drainage network in the rest of the town.

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- 1.2.3 The drainage ditches and watercourses under normal conditions eventually discharge into the urban drainage network, which adds to the problem.

### 1.3 Options considered

- 1.3.1 From a longer list of options, including; temporary and demountable defences; upgrading the existing drainage system and raised flood defences, the short listed Do Something options (listed in Table 0-1) have been assessed against the Do Minimum option rather than the Do Nothing Option. This is because a true Do-Nothing scenario would assume that all maintenance of the existing ditches and urban drainage network would cease. However Yorkshire Water has a statutory duty to maintain the urban drainage network and would not cease the maintenance regime.

**Table 0-1 Short-listed options**

Option		Description
3c	Do- Something – Permanent Defences with Upstream Storage	The principle of this option is to intercept the overland flows through a series of ditches and small embankments before they reach the outskirts of the town and divert them into temporary storage areas. The stored floodwater would then be released into the existing ravines which feed directly into the sea or into the existing urban drainage system. The rate of release would be restricted to a rate at which these existing systems can deal with the surface water without overwhelming them and causing additional flooding.
3d	Do-Something – Permanent Defences with Upstream Storage and Environmental Enhancements	This option builds on Option 3c by integrating a range of additional environmental and community enhancements.

### 1.4 Preferred option

#### Description

- 1.4.1 The preferred option is Option 3c, Do-Something - Permanent Defences with upstream storage and comprises:
- Excavation of four sections of new channel (total length 1680 m) to capture and divert surface water flows heading towards the town from the surrounding agricultural land into the Storage Areas (see below) and existing watercourses;
  - Construction of a series of earth embankments (total length 2230m) to encircle large areas of the town of Filey.
  - Land raising;
  - Construction of three flood water storage areas with capacities of 22,700m<sup>3</sup>, 6,000m<sup>3</sup> and 5,000m<sup>3</sup>; and
  - Installation of six sections of culvert (total length 550m), which would be installed using a cut and cover technique.
- 1.4.2 Option 3c provides the best technical solution as it addresses the flood risk in Filey to a high standard of protection by attenuating flows and releasing water at a controlled rate in order to allow the urban drainage system to function effectively. It also maximises the opportunities for re-using the material excavated from the channels and storage areas and reduces flows in Arndale ravine significantly during a storm event which mitigates the issues with erosion currently being experienced.
- 1.4.3 Option 3c has been developed in direct compliance with the Filey Town Plan, which identifies the need for a flood alleviation scheme and the 'Proposed Submission Scarborough Borough Local Plan' published for public representation on 6 November 2015.

### 1.5 Environmental considerations

- 1.5.1 An Environmental Impact Assessment (EIA) has been undertaken for the preferred option with the findings of the EIA reported within an Environmental Statement (ES). The ES presents the significance of anticipated impacts which have potential to arise during construction and operation of the proposed

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scheme, and identifies mitigation measures which have been identified to avoid or minimise environmental effects throughout the development of the scheme, where appropriate.

- 1.5.2 An Indicative Landscape Plan has been prepared (Appendix F), which visually identifies key environmental opportunities, constraints and proposed mitigation measures.
- 1.5.3 The proposed scheme has received a Letter of Comfort from Natural England (Appendix O), which states that that preferred option is likely to lead to an Environmentally Acceptable Solution.
- 1.5.4 A Water Framework Directive (WFD) compliance assessment has been undertaken for the preferred option. The assessment has concluded that the preferred option is unlikely to result in a deterioration in status of water bodies screened into the assessment.
- 1.5.5 As great crested newts are present at Filey Dams, a Natural England licence will be required for the proposed works. Mitigation will be required and will comprise installation of exclusion fencing, hand searches and pitfall trapping.
- 1.5.6 The proposed scheme will require planning permission from Scarborough Borough Council. The ES has been submitted in support of a planning application for the proposed scheme.
- 1.5.7 Consultation is ongoing with a local interest group, Filey Bird Observatory and Group (FBOG) which has shown a keen interest in managing the environmental aspects of the scheme going forward.
- 1.5.8 Full Planning Permission for the scheme was granted on 21<sup>st</sup> March 2016.

### Benefits

- 1.5.9 The 'do-minimum' damages for the 'baseline' scenario are almost £52m. When taking account of residual damages, the present value benefits of the scheme are £23,863k over a 100 year appraisal period. Damages avoided include residential and commercial properties. Damages also arise from the effects on vehicles and emergency services, evacuation costs, intangible health benefits and school disruption. The scheme also manages the risk of potential loss of life resulting from flooding of bungalows mainly inhabited by the ageing population in Filey. Further information on how the additional benefits have been calculated can be found in the Economic Appraisal Report in Appendix G.

### Costs

- 1.5.10 The project team has adopted a staged approach to delivery of the scheme with clearly defined hold points in order to progressively refine the scheme in order to avoid abortive work and create a lower risk project at delivery stage. This value engineering approach has generated a number of significant efficiencies during the life of the project.
- 1.5.11 Through working together with the various stakeholders to allow re-use of site-won material, efficiencies estimated at more than £1.5 m have been achieved.
- 1.5.12 The capital costs have been developed with an ECI Contractor based on their experience of similar schemes.

**Table 0-2 Project costs (£ thousands)**

	Economic appraisal	Whole-life cash cost	Approval
Costs up to PAR (outline design)	Does not apply – sunk costs	656	
Costs after PAR			
Existing staff costs (SBC)	85	90	90
Further staff costs (SBC)	-	-	-
Consultants' fees	48	50	50
Contractors' fees	-	-	-
Cost consultants' fees	-	-	-

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	Economic appraisal	Whole-life cash cost	Approval
Site investigation and survey	-	-	-
Construction	3,005	3,200	3,200
Environmental mitigation (Watching Brief)	19	20	20
Environmental enhancement	-	-	-
Site supervision	121	129	129
Compensation/Land Purchase	106	110	110
Risk contingency			
95%ile (represents 15% of project FSoD approval)			581
50%ile	207	220	
Inflation	Does not apply	Does not apply	190
Future costs (construction + maintenance)	(PV)	(Cash)	Does not apply
	121	446	
Other			
Contributions			2,101
Total	(1)	(2)	(3)
	<b>£3,712</b>	<b>£4,921</b>	<b>£4,370</b>

## Economic summary and Outcome Measures

1.5.13 The raw Outcome Measure (OM) score for the scheme is 52 %, equivalent to Flood Defence Grant in Aid (FDGiA) Funding of £2,133k (present value).

**Table 0-3 Defra outcome measures and score**

Contributions to outcome measures			
Outcome 1 – Ratio of whole-life benefits to costs			
Present value benefits (£ thousands)			23,863
Present value costs (£ thousands)			4,228
Benefit:cost ratio			5.64
Outcome 2 – Households at reduced risk (number – nr)			
2b – Households moved from very significant or significant risk to moderate or low risk (nr)			167
2c – Proportion of households in 2b that are in the 20% most deprived areas (nr)			
Outcome 3 – Households with reduced risk of erosion (nr)			
3b – Proportion of those in 3 protected from loss within 20 years (nr)			
3c – Proportion of households in 3b that are in the 20% most deprived areas (nr)			
Outcome 4 – Water framework directive			
4a – Hectares of water-dependent habitat created or improved (ha)			
4b – Hectares of intertidal habitat created (ha)			
4c – Kilometres of river protected (km)			
Raw Partnership Funding score (%)			52%
Non-Flood Defence Grant in Aid (FDGiA) contributions towards the scheme's whole-life costs			1,974
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Contributions to outcome measures	
Adjusted Partnership-Funding score (%)	100

### Funding and contributions

1.5.14 The scheme is eligible under the Partnership Funding system for FDGiA grant of £2,133 (present value). Contributions of £339k (present value) to underwrite the 95%ile risk budget have been secured from SBC\* and £ 28k (present value) from Filey Town Council and £1,607k (present value) from the Local Levy Fund to allow the project to proceed.

*\*Whilst SBC will be continuing to seek contributions from beneficiaries, for the purposes of the PAR, SBC agrees in principle to underwrite the risk contingency, which will be subject to the approval of Full Council should an offer of funding be forthcoming.*

		Approved estimates (£)	Total final spending (£)	Breakdown of final spending (£)
(a)	PAR preparation	656	656	
	Specific to the scheme			656
	Preliminary studies			
(b)	Construction work (fill in as appropriate)	3,200		
	• Authority's own or hired manual labour			
	• Authority's own or hired plant			
	• Materials			
	• Work carried out by contract (list contractors)			
	1 Contractor (TBC)			3,200
	2			
	3			
(c)	Land-purchase payments (including fees) (please specify in part D)	110	110	
(d)	Compensation payments (including fees) (please specify in part D)			
(e)	Existing staff costs totally associated with the project	90		
	• Design			90
	• Authority's project management staff salaries			
(f)	Further staff costs totally associated with the project			
	• Design			
	• Authority's project management staff salaries			
(g)	Professionals' and consultants' fees	199		
(h)	Contingencies	581		
(i)	Other costs (please specify)	190		
	• Inflation			190
	•			
	•			

(j)	Total	5,026	
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(k)	Less deductible contributions received or receivable	
-----	--	--

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	(please specify)	2,101	
	<ul style="list-style-type: none"> <li>Scarborough Borough Council contribution to risk contingency</li> </ul>		361
	<ul style="list-style-type: none"> <li>Filey Town Council contribution</li> </ul>		30
	<ul style="list-style-type: none"> <li>Local Levy Funding</li> </ul>		1,710
(l)	Less cost increases not approved and project items approved but not eligible for a grant		
	(please specify)		
	•		
	•		
	•		
(m)	Net spending (eligible for a grant) (j) – (k) – (l)	2,925	

## Key delivery risks

1.5.15 The key delivery risks and mitigation measures are shown in Table 0-4 below.

**Table 0-4 Risks and mitigation**

Key delivery risk	Mitigation
Variable ground conditions, including contaminated land	<ul style="list-style-type: none"> <li>• Extensive Ground Investigation work undertaken during detailed design stage &amp; structures designed accordingly.</li> <li>• Project designed to avoid areas of known contamination.</li> <li>• Risk item included in the register with costs.</li> </ul>
Additional Landowner requirements	<ul style="list-style-type: none"> <li>• Detailed consultation carried out with landowners during detailed design phase and requirements incorporated into scheme design.</li> <li>• Risk item included in the register with costs</li> </ul>
Objections to Planning Application	<ul style="list-style-type: none"> <li>• None currently outstanding.</li> <li>• Ongoing liaison &amp; briefings with the Planning Department and Councillors.</li> <li>• Extensive ongoing engagement with the public.</li> </ul>
Adverse weather leading to extended construction period	<ul style="list-style-type: none"> <li>• Detailed Time related delay costs developed with an ECI Contractor and robust risk item included in register.</li> </ul>
Unforeseen utilities requiring diversion	<ul style="list-style-type: none"> <li>• Detailed services search carried out during detailed design stage.</li> <li>• Detailed consultation carried out with utilities suppliers &amp; costs for known diversion work obtained.</li> <li>• Risk item, based on costs obtained, included in register.</li> </ul>

## 1.6 Recommendation

1.6.1 It is recommended that technical approval be given to the Filey Flood Alleviation Scheme, for the preferred option, Option 3c Do Something – Permanent Defences with Upstream Storage. It is recommended that financial approval for the preferred option is given for the FDGiA sum of £2,269k (cash value not including sunk costs) which includes a contingency of £220k within the 50%ile confidence limit. The 95%ile risk allowance will be underwritten by Scarborough Borough Council to a total amount of £361k (cash value)\*. Risks which occur within the 50%ile risk budget of £220k will be covered by the FDGiA. Additional risks which occur that exceed this risk budget will then be funded by SBC. Local Levy funding £1,710k (cash value) has been obtained along with a £30k contribution (cash value) from Filey Town Council to allow the scheme to proceed. The total cost of the scheme is £4,370k (cash value).

*\*Whilst SBC will be continuing to seek contributions from beneficiaries, for the purposes of the PAR, SBC agrees in principle to underwrite the risk contingency, which will be subject to the approval of Full Council should an offer of funding be forthcoming.*

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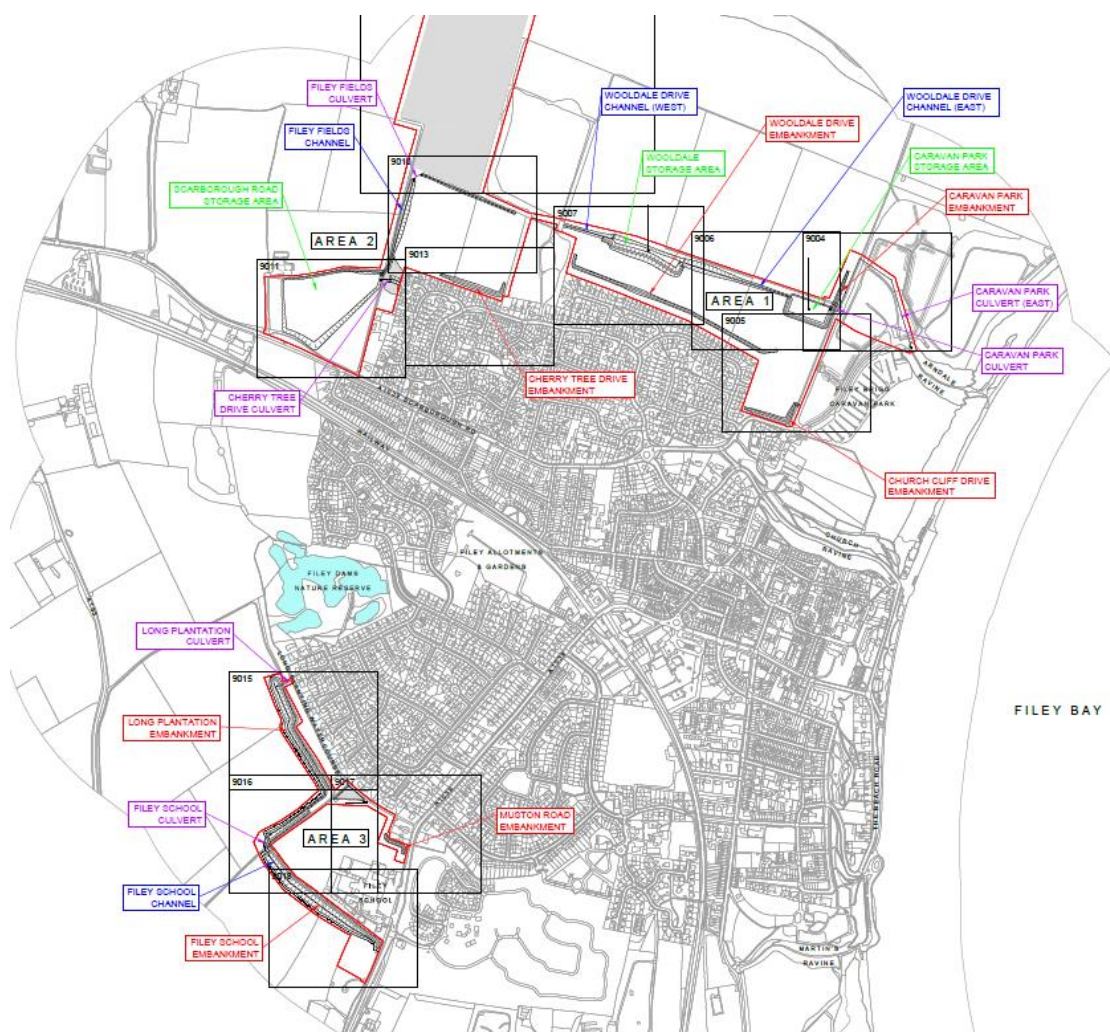
## 1.7 Briefing paper

Risk management authority	Scarborough Borough Council		Project Executive	Stewart Rowe	
Project title	Filey Flood Alleviation Scheme		Code		
Consultant	Royal HaskoningDHV	Contractor	TBC	Cost consultant	TBC
The problem	The main risk to Filey is from overland flows from the surrounding rural land during extreme rainfall events which overwhelm the drainage ditches, watercourses, and urban drainage network. This is exacerbated by the slopes surrounding the area resulting in a basin like topography for the town.				
Assets at risk from flooding	In total across Filey there are 249 residential and 183 non-residential properties currently at risk of flooding in the 1% event (1 in 100 year), this increases to 550 residential and 189 non-residential when the impacts of climate change are taken into account. The only secondary school in the town is at risk, along with main roads, and the railway.				
Existing standard of flood protection	1 in 1 year		Proposed standard of flood protection	1 in 100 year (including an allowance for climate change)	
Description of proposed scheme	The scheme concept is a series of embankments, ditches, and temporary flood storage areas around the edge of the town to catch the overland flows before they reach the town. The flood water will be temporarily stored before being released at a controlled rate into the existing urban drainage system and ravines once the storm has passed.				
Costs (PVc) £ (100-year life including maintenance)	4,228	Benefits (PVb) £	23,863	Average benefit:cost ratio (PVb/PVc)	5.64
NPV	19,635	Incremental benefit:cost ratio	N/A	Whole-life cost £ (cash value)	4,370
Choice of preferred option	The preferred option has been selected as it is the most economically justifiable, technically provides the best solution, and is environmentally acceptable. The preferred option provides a robust standard of protection for overland surface water flooding from the surrounding rural catchment for the town of Filey.				
Total eligible cost of the capital grant applied for	£2,269k (including £190k inflation and £ 220k, 50%ile risk contingency)				
Delivery programme	Planning approval		March 2016		
	Award construction contract		January 2017		
	Start date of construction		January 2017		
	End date of construction		August 2017		
	End of project		August 2018		
Are funds available for the delivery of this project?		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			
External approvals	Planning permission, Natural England letter of support				
Partnership Funding and Outcome Measures	Contributions to Outcome Measures 1-4		OM2, 167 properties better protected against flooding		
	Raw Partnership Funding score Adjusted score		52% 100%		



## 1.8 Key plans

### 1.8.1 Key Plan 1 showing the scheme location & main scheme components



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## 2 Introduction and background

### 2.1 Purpose of this report

- 2.1.1 This Project Appraisal Report (PAR) seeks investment approval for the construction phase of a surface water flood alleviation scheme in Filey, North Yorkshire.
- 2.1.2 This PAR presents the business case for the scheme. The appraisal has been carried out in accordance with the Defra Flood and Coastal Erosion Risk Management Appraisal Guidance and associated Environment Agency procedures and policies.

### 2.2 Background

#### Strategic and legislative framework

- 2.2.1 Filey is covered by the Derwent Catchment Flood Management Plan (CFMP) published in December 2010. The selected policy for Filey is Policy 5; areas of moderate to high flood risk where can generally take further action to reduce flood risk. This was aimed at reducing the risk of flooding from surface water working in partnership with Scarborough Borough Council (SBC). The CFMP also recommended improvements to the Yorkshire Water sewer infrastructure, which have already been carried out.
- 2.2.2 The Filey Flood Alleviation Strategy Study Report was completed in 2011. This was not carried out as a formal Strategic Appraisal Report (StAR) but was completed to inform the selection of a preferred option for a Project Appraisal Report that was submitted in 2012 (see Section 2.2.5). The objectives of the Strategy Study were:
- Assess the various sources of flooding in Filey and identify the interactions between each of these sources;
  - Identify options to address the overall flooding problems;
  - Prepare project economic and environmental appraisals; and
  - Develop a strategic plan to address the short-term to long-term flooding problems.
- 2.2.3 The 2011 Strategy Study recommended a preferred option of 'Permanent soft engineering flood defences without environmental enhancement'

#### Previous studies

- 2.2.4 SBC have undertaken flood investigation studies and ground reinstatement studies in the recent past. These studies include the Filey Town Flood Investigation (Atkins 2004), Long Plantation Watercourse – Filey Flood Alleviation Scheme Phase 2 (Atkins 2004), Northeast Yorkshire Strategic Flood Risk Assessment (Arup, 2010), and Geotechnical Interpretative Report: Filey Flood Damage Reinstatement Works (Mouchel 2008).
- 2.2.5 The findings of these studies were reviewed and incorporated into the 2011 Filey Flood Alleviation Strategy Study Report. The recommendations for the Strategy Study were reported to the Environment Agency as the Filey Ravines Flood Alleviation Scheme Project Appraisal Report in 2012. However as the project still involved several major risks that could have significantly affected the costs and therefore viability of the project it was felt that the level of certainty in the project was not high enough for the project partners to commit to funding the scheme at that time.
- 2.2.6 The PAR produced in 2012 was therefore withdrawn and instead funding was secured to carry out more detailed investigations into the key risks to resolve the uncertainties and ensure the scheme was technically, environmentally, and financially viable. This PAR presents the findings of the more detailed investigations and promotes a viable scheme that the project partners can commit to delivering.
- 2.2.7 The flood risk in Filey is complex and requires a multi-agency approach to resolving it. Yorkshire Water have implemented £3.5 million of improvements to the urban drainage network in Filey since the 2007 flood event. This has included increasing the size of the sewers under Muston Road and the Wharfedale Estate, and installing an underground storm chamber. These works will contribute to the reduction of overall flood risk within Filey. However the urban drainage network remains at risk of being overwhelmed by the surface water coming from the surrounding rural land.

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- 2.2.8 Since the scheme concept was developed in the Filey Flood Alleviation Strategy Study Report there has been a significant housing development approved and under construction in Filey (south-east edge of the town). This is located in an area that was intended to accommodate an embankment in the flood alleviation scheme concept. As part of the planning conditions for the Mill Meadows housing development surface water attenuation features sufficient to hold the 1 in 100 year event (including an allowance for climate change) were required. These have already been constructed and are operating, reducing the flood risk to the south-eastern area of Filey known as Seadale. This has allowed the embankment included in the flood alleviation scheme concept for this area to be omitted from the scheme development.

### Social and political background

- 2.2.9 Filey has an ageing population with an above average proportion of the residents being retired. Based on the Office for National Statistics 2011 census on the ward of Filey the total population was 6,530 individuals. Of this population, 20.9% are retired and 17.7% are in full time employment, this compares with the national averages of 10.0% for retired and 28.3% for full time employed. The ageing population is also reflected by the number of residents aged over 65 which equals 33.1% of the total population in Filey, which is more than double the national average of 15.7%. An ageing population tends to be more vulnerable to flooding, in terms of ability to respond to a flood, impacts on health, and resilience to recover from a flood. The vulnerability of the population is exacerbated by the prevalence of bungalow type homes which are likely to suffer higher damages and require higher rates of evacuation due to the lack of an upper floor.

### Location and designations

- 2.2.10 The Filey catchment encompasses the urban development of the town and the surrounding agricultural fields. The catchment covers an area of approximately 7.35 km<sup>2</sup>. The town is surrounded by hills on the northern and southern sides resulting in a basin-like topography of the town. The town itself has an undulating topography with elevations ranging from 52m (above Ordnance Survey Datum (AOD) near Filey School to 20m along the cliff line running parallel to the coast.
- 2.2.11 The town of Filey does not lie within the boundary of a European site, Ramsar site or nationally designated site for nature conservation. Filey is located approximately 6.5km to the north of the Flamborough Head Special Area of Conservation (SAC). There are no other fully designated European or Ramsar sites within a 20km radius of Filey.
- 2.2.12 In July 2013, Natural England submitted a report to the Secretary of State for Environment, Food and Rural Affairs setting out proposals to extend the existing Flamborough Head and Bempton Cliffs Special Protection Area (SPA), to ensure that the breeding seabirds of the SPA are protected by its boundary and list of classified features. The Secretary of State gave Natural England approval to carry out a formal public consultation on the proposed changes, which was undertaken between January and April 2014. The proposed site has been renamed the Flamborough and Filey Coast potential SPA (pSPA). The pSPA includes a proposed terrestrial extension running from the cliffs at Filey Brigg to Cunstone Nab in the west. This is being considered to incorporate important breeding seabird colonies that currently fall outside the existing SPA. In addition, marine extensions out to 2km from the existing SPA are proposed, due to the importance of these waters to breeding seabirds. It is also proposed to revise the landward boundary of the Flamborough Head SAC to ensure that coastal change does not result in the interest features of these sites being unprotected in the future.
- 2.2.13 The Filey Brigg Site of Special Scientific Interest (SSSI), located in the north east of Filey town, is designated for its geological and ornithological interest. During the winter months, the intertidal areas and rocky shoreline of the SSSI support purple sandpiper, *Calidris maritima*, in nationally significant numbers.
- 2.2.14 Filey beach is a designated bathing water area under the Bathing Waters Directive (76/160/EC). The designated bathing water area is 850m in length with a gentle slope. Results from water quality assessments under the Bathing Waters Directive undertaken in 2015 show that the water is of 'Good' quality (i.e. pollution effects are small or rare).
- 2.2.15 The Filey North river waterbody flows underneath the town of Filey and into the North Sea; this small waterbody has been subsumed within the nearby Yorkshire North coastal waterbody (i.e. the Filey North river waterbody is no longer classified as a river waterbody under the Water Framework

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Directive (WFD)). The northern part of the town is underlain by the Derwent Vale of Pickering Corallian Limestone groundwater body.

2.2.16 Filey Town is also surrounded by several locally important ecological designations including five Sites of Importance for Nature Conservation (SINC) which are listed in Table 0-5.

**Table 0-5 Summary of SINCs in Filey**

Site Name	Location	Summary
Coastal Cliffs North of Filey (TA18-02)	Cliffs on the north coast of Filey	High vertical rocky coastal cliffs supporting two large colonies of nesting kittiwakes <i>Rissa tridactyla</i> and smaller numbers of nesting fulmars <i>Fulmarus glacialis</i> , cormorants <i>Phalacrocorax carbo</i> and auks. Vegetation on the steep slopes above is a mixture of rank neutral grassland and more species
Filey Dams (TA18-01)	To the west of Filey	The ponds have well vegetated marshy margins and aquatic vegetation. This site is known to have Great Crested Newts <i>Triturus cristatus</i> , Water Voles <i>Arvicola amphibius</i> and is used by several bird species
Long Plantation (TA18-03)	Adjacent to Filey Dams	Area of woodland extending along a drainage ditch. Several tree species with some rank grassland at the northern edge.
Muston Bottoms (TA08-03)	West of Filey, north of Muston	Consists of Fen Peat and Peat Soils in the form of hay meadows lying along the Hertford Main Drain.
Primrose Valley & Eller Howe Cliffs (TA17-05)	South coast of Filey starting by Martine Ravine	Contains a number of BAP habitats for grassland, woodland and cliff.

2.2.17 There are also several sites around Filey that are not officially designated for their conservation value but are managed to support a range of species and habitats. The sites are listed in Table 0-6.

**Table 0-6 Summary of locally designated nature conservaton sites in Filey**

Site Name	Location	Summary
Parish Wood	North of Filey, next to Old Tip Nature Reserve.	Historically this site was used initially as an allotment and then in 1935 the Council began using the site for tipping rubbish, with part of the land being used as a coal depot. Since 1996, the field has been planted with a range of tree species which include English oak, sessile oak, ash, beech and small-leaved lime with birch, rowan, cherry and field maple mixed in.
Old Tip Nature Reserve	North of Filey, next to Parish Wood.	In 2001 this site was purchased as an extension to the Parish Wood. Also part of the old landfill site, the prime objective was to create wintering grounds for seed eaters, with secondary consideration providing nest sites for farmland species.
East Lea	West of Filey, adjacent to the Filey Dams.	This area was created after money became available to extend the Filey Dams. Located to the north west of the dams, East Lea contains a pond which is full throughout the year and is used by a range of birds. Great crested newts <i>Triturus cristatus</i> and water vole <i>Arvicola amphibius</i> are also thought to use the site
Totem Pole Field	North of the Filey country park, near Filey Brigg.	The site is largely grazed field with interlinking hedges connecting to an area of scrub known as 'Top Scrub' which lies adjacent to the northern edge of the County Park. At present that area is being managed in an attempt to attract the Grey Partridge <i>Perdix perdix</i> with suitable roosting areas available.

### History of flooding or coastal erosion

2.2.18 There is a long history of flooding in Filey caused by extreme rainfall events. These rainfall events have resulted in widespread overland flooding; overwhelming of watercourses and drainage systems;

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localised ground instabilities; and damage to residential and commercial properties and buildings across the town.

2.2.19 There are records of properties flooding from 1985 onwards. The most significant flooding occurred in October 2000, August 2002, and July 2007. The total cost of repair works during the 2002 flooding event was estimated at approximately £3.0 million while the cost of remedial work following the 2007 flooding event was estimated at approximately £6.4 million.

2.2.20 The 2007 event was the most severe flood event in recent times; over 80mm of rain fell in just one and half hours, with water reported to be waist deep in places. Significant damage and disruption occurred, including:

- 8 people had to be rescued from the swimming pool at Filey School;
- Filey inshore lifeboat was used within the town to rescue people stranded in their homes;
- Over 30 people had to be evacuated from their homes and an emergency centre was set up in the Evron Centre and Trinity Church;
- Classrooms, swimming pool, and other buildings were flooded at Filey School, closing it for a short period;
- Both main roads into Filey (Muston Road and Scarborough Road) were closed at one stage of the flood;
- North Yorkshire Fire Service received over 150 calls in five hours seeking help;
- Over 200 homes were affected by internal flooding; and
- The cost of the remedial work after the event was estimated at approximately £6.4million.

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## **2.3 Current approach to flood risk management**

### **Measures to manage the probability of flood risk**

2.3.1 There are currently no formal flood risk management assets in place in Filey.

### **Measures to manage the consequences of flood risk**

2.3.2 SBC have a stock of sandbags stored in Filey which can be issued to members of the public when needed.

2.3.3 Due to the nature of the flood risk being predominantly surface water triggered by extreme rainfall events it is difficult to forecast flooding in Filey, and there is currently no formal flood warning service in place.

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### 3 Problem definition and objectives

#### 3.1 Outline of the problem

- 3.1.1 The main risk to Filey is from overland flows from the surrounding rural land during extreme rainfall events which overwhelm the drainage ditches, watercourses, and urban drainage network. This is exacerbated by the slopes surrounding the area resulting in a basin like topography for the town.
- 3.1.2 The flooding leads to localised ground instabilities and damage to a large number of residential and non-residential properties. In the 2007 event over 200 properties were flooded internally. The repair works following the 2002 event totalled £3.0 million while the cost of remedial work following the 2007 flooding event was estimated at approximately £6.4 million.
- 3.1.3 The drainage ditches and tributaries on the outskirts of the town are of inadequate capacity to convey the runoff, which results in the surface water entering the urban area. This then has implications on the urban drainage network, which when overwhelmed in the estates on the edge of Filey results in flooding through the urban drainage network in the rest of the town.
- 3.1.4 The drainage ditches and watercourses under normal conditions eventually discharge into the urban drainage network, which adds to the problem.
- 3.1.5 Filey has expanded considerably through increased residential development and there is potential for further future expansion. This will further increase the pressure on the urban drainage network and potentially increase the number of properties at risk of flooding.
- 3.1.6 Filey has a high proportion of retired and elderly residents, often living in bungalows. Filey's main industry is tourism, with a large number of hotels and guest houses located in and around the flood risk areas. These two factors make emergency response to flooding, in particular the need for evacuation, a more complex issue than in other areas which experience flooding.

#### 3.2 Consequences of doing nothing

- 3.2.1 Under the 'Do Nothing' scenario the flood risk for Filey would continue, with properties remaining at risk. A true Do Nothing scenario would mean that no maintenance of existing systems including the urban drainage network would be carried out. This would result in silting up and blockages of the system, eventually resulting in their failure. This would dramatically increase the flood risk for Filey over time. However, Yorkshire Water have a statutory duty to maintain the urban drainage network and would not cease the maintenance regime. This option is therefore not realistic and not appropriate to use as the baseline against which to assess the other options, and has been discounted. The Do Minimum option is a more appropriate baseline to reflect the likely situation should a flood alleviation scheme not go ahead.
- 3.2.2 Extensive detailed modelling has been undertaken which confirms the potential for flooding and the flood extents have been confirmed by local residents as part of the continuing public consultation process. As there are no formal flood defences to protect against run-off, properties are susceptible to inundation everytime there is a rainfall event. This is evidenced by the proliferation of make shift private defences (low earth bunds & sandbags etc) erected to protect gardens and properties.
- 3.2.3 The impacts of climate change would result in the flood risk becoming worse over time with increased severity of rainfall events resulting in more frequent and larger surface water flooding events. The number of properties at risk and the frequency and extent to which they flood would increase. The number of properties at risk in the present day and with the impacts in climate change in 2085 are shown in the table below.

**Table 3-1 Properties at Risk**

Return Period	Present Day			Climate Change 2085		
	Residential	Non-Residential	Total	Residential	Non-Residential	Total
1	49	37	86	49	37	86
5	55	90	145	61	95	156



10	61	95	156	130	104	234
30	130	104	234	184	119	303
50	184	119	303	249	183	432
100	249	183	432	550	189	739

- 3.2.4 Should the baseline situation continue then it is likely that areas of the town would become unsustainable due to the frequency of the flood risk. Filey has an above average vulnerable population and which would be adversely affected should the flood risk continue. There is likely to be significant impacts on; the health and well being of the community through stress and repeated flooding; along with impacts on schools, transport links and tourism which is a key industry for the town.

### 3.3 Strategic issues

- 3.3.1 Due to the topography of the town there is no significant coastal flood risk. The town is built up the side of the cliffs with the majority at the top of the cliffs. There are very few properties at a low level on the seafront. The coastal flood risk is being assessed as part of the review of the Filey and Cayton Bays Coastal Defence Strategies, which is currently being undertaken. The tide has limited impact on the fluvial flows due to the steepness of the ravines which they flow through the town in to the seafront. The surface water flows mainly end up in the urban drainage network, with some entering into the ravines, and therefore there is no real interaction with tidal flooding. There is therefore no significant strategic link between the different sources of flooding.
- 3.3.2 The flood risk in Filey is complex and requires a multi-agency approach to resolving it. Yorkshire Water have already implemented £3.5 million of improvements to the urban drainage network in Filey since the 2007 flood event. These works will contribute to the reduction of overall flood risk within Filey. However the urban drainage network remains at risk of being overwhelmed by the surface water coming from the surrounding rural land. The flood alleviation scheme will reduce the surface water from the areas surrounding the town reaching the urban drainage network, significantly improving the situation. However, the urban drainage network will remain the primary means for dealing with the surface water generated within the urban area of the town itself (inside the defences of the flood alleviation scheme). As the urban drainage network is designed to a lower standard than the flood alleviation scheme, typically up to a 1 in 30 year flow, then there is still potential for some flooding to occur within the town itself. This residual risk of flooding will need to be communicated to the community to ensure understanding of how the scheme works and the remaining risks.
- 3.3.3 The flood alleviation scheme is designed to work with the current levels of development in Filey and the existing urban drainage network. The 'Proposed Submission Scarborough Borough Local Plan' published for public representation on 6 November 2015 allocates areas that could potentially be developed for housing in the future. Future developments will require strict planning conditions for dealing with surface water and drainage in order to ensure that they do not impact on the effectiveness of the scheme. The planning conditions for the Mill Meadows development which is currently under construction have set a suitable precedent for this, with the requirement to store surface water up to the 1 in 100 year event (including an allowance for climate change) with a restricted outflow from the site to the Yorkshire Water system.

### 3.4 Key constraints

- 3.4.1 The key environmental constraints associated with the implementation of a flood alleviation scheme within Filey comprise the following:
- Presence of nationally and internationally sites designated for nature conservation along the coastline, including the Flamborough Head SAC, the proposed Flamborough and Filey Coast pSPA and Filey Brigg SSSI.
  - Filey and the surrounding areas also contain a number of locally designated sites for nature conservation, including SINCs and Local Wildlife Sites. These sites are not afforded statutory protection but are a material consideration in planning applications due to their local importance.

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- Habitat which is suitable to support protected species have been identified within the study area, including badger, bats and great crested newt. In addition, great crested newts have been recorded at Filey Dams.
- The Filey Dams (Old Tip) landfill site is located on the northern outskirts of the town.
- The rural area surrounding the town is mainly agricultural, much of which is arable with some areas of grazing. As the flood alleviation scheme would be located outside of the town there is potential for impacts on land use and farming, both temporarily during construction and permanently.
- The Proposed Submission Scarborough Borough Local Plan identifies proposed housing allocation areas within the town and on the outskirts of the town.
- Recreational activities within Filey include walking along the Yorkshire Wolds Way (National Trail) and public rights of way (footpath number 30.8/1/1 and 30.8/12/1). The Yorkshire Wolds Way and both public rights of way have potential to be impacted by flood alleviation works.
- There are a significant number of residential properties which could be both directly and indirectly affected by construction works for the flood alleviation scheme.
- Filey beach is a designated bathing water under the Bathing Waters Directive.
- Filey is located adjacent to the Yorkshire North coastal waterbody. The (former) Filey North river waterbody flows underneath Filey and into the coastal waterbody. The northern part of the town is underlain by the Derwent Vale of Pickering Corallian Limestone waterbody.

### 3.5 Objectives

3.5.1 The main objectives for the scheme are:

- a) To reduce the flood risk from surface water for the community of Filey.
- b) To slow down overland flows from the surrounding catchment during storm events and control the rate at which flows enter the existing urban drainage system in Filey to reduce the risk of it becoming overwhelmed.

3.5.2 These objectives have been agreed by the project steering group.

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## 4 Options for managing flood risk

### 4.1 Potential FCERM measures

4.1.1 There is a large range of potential FCRM measures which could be adopted as part of the various options to protect Filey from future flooding, such as:

- Adoption of a flood warning system;
- Creation of hard defences to divert or contain flood waters;
- Improvements of the existing systems; and
- Incorporating soft engineering techniques and working with the environment to provide flood storage areas and enhance the natural environment with wetlands etc.

4.1.2 The options described in Sections 4 and 5 have been taken from the original PAR reported to the Environment Agency in 2012 (see Section 2.2.5).

### 4.2 Long list of options

4.2.1 A range of flood alleviation options were discussed during the initial optioneering exercise as part of the Filey Flood Alleviation Strategy Study. The options ranged from maintenance of existing systems, through to temporary and permanent engineering solutions. In all, eight options were considered to address the flood risk in Filey:

- Option 1: Do Nothing – cease the current upkeep of the drainage systems;
- Option 2a: Do Minimum (maintenance) – continue to maintain the existing systems at their current design standards;
- Option 2b: Do Minimum (temporary and demountable flood defences) – establish a flood warning system and provide temporary defences throughout Filey;
- Option 3a: Do Something – upgrade the existing drainage system to accommodate more severe flows;
- Option 3b: Do Something (raised flood defences) – hard engineering solutions around Filey to prevent the run-off from adjacent fields inundating the drainage network;
- Option 3c: Do Something (permanent defences with upstream storage) – to slow the flood waters reaching Filey and control the rate at which they are dispersed into the existing drainage network; and
- Option 3d: Do Something (upstream storage flood defences with environmental enhancement) – similar to option 3c but also provides additional benefit to the natural environment.

### 4.3 Options rejected at preliminary stage

#### Option 1: Do Nothing

4.3.1 A true Do Nothing scenario would assume that all maintenance of the existing ditches and urban drainage network would cease resulting in silting up and blockages of the system, eventually resulting in their failure. This would increase the flood risk for Filey over time. However, Yorkshire Water have a statutory duty to maintain the urban drainage network and would not cease the maintenance regime. This option is therefore not realistic and not appropriate to use as the baseline against which to assess the other options, and has been discounted. The Do Minimum option is a more appropriate baseline to reflect the likely situation should a flood alleviation scheme not go ahead.

#### Option 2b: Do Minimum – Temporary and Demountable Defences

4.3.2 A pre-feasibility study for using temporary and demountable defences for flood protection in Filey was undertaken as part of the Filey Flood Alleviation Strategy Study. A variety of different temporary and demountable defence types were considered against a range of selection criteria. The pre-feasibility study recommended a combination of vent guards and flood guards for individual properties, an aquadam along the Long Plantation watercourse, and a Redi-Rock modular wall to the north of Filey.

4.3.3 However as temporary and demountable defences can only be used effectively where there is sufficient flood warning and forecasting this option is not suitable for Filey. At present there is no flood warning system in place at Filey, this means that storm events leading to flooding can occur without

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warning making it difficult to mobilise resources to implement the temporary and demountable defences.

- 4.3.4 During the 2007 flood event despite the torrential rain in Filey, there was no rainfall in Scarborough at the same time, and therefore the SBC officers were not aware of any problems until reports of flooding starting coming in from Filey. By the time officers were able to mobilise to Filey the storm had all but subsided.

### Option 3a: Do Something - Upgrade existing drainage systems

- 4.3.5 There are currently widely acknowledged limitations with the existing drainage system within Filey. Due to limited capacity within the existing urban drainage network the surface water storm run-off from the area surrounding Filey can exacerbate surface water flooding within the developed areas. Option 3a would involve replacing the entire drainage system in Filey and cause severe localised disruption to the town for a considerable amount of time.
- 4.3.6 It is anticipated that an upgrade of the entire drainage system would be extremely expensive. A scheme to install additional capacity in the drainage system along Muston Road, including an underground storm chamber in the park adjacent to Clarence Drive, has recently been constructed by Yorkshire Water. This cost in excess of £2 million. Based on discussions held with Yorkshire Water during the Filey Flood Alleviation Strategy Study it is anticipated that to upgrade the entire existing Filey drainage system would be in excess of £10 million and could disrupt Filey for up to 5 years.
- 4.3.7 Given that the baseline damages are approximately £52 million, this option is unlikely to be economically justifiable and receive funding. In addition there are uncertainties as to how much the standard of the drainage system could be improved by. It may not be technically possible to increase the standard to a 1 in 100 year event in all locations as the standard of the system will be limited to the level of the element with the least capacity in the system. There are likely to be constraints from existing infrastructure, other utilities, and topography which will all affect the technical feasibility of upgrading the existing drainage system across Filey.

### Option 3b: Do Something – Raised Flood Defences

- 4.3.8 Constructing a physical barrier using a wall as a defence around the perimeter of the town would segregate the urban drainage network in Filey from the surface water flows arising in the areas surrounding the town. The proposed option would comprise flood defences constructed in concrete and steel.
- 4.3.9 The introduction of any such hard engineering construction proposals in a 'green' area would immediately have a visual impact. The likely environmental impact is likely to require significant environmental mitigation which could be costly.
- 4.3.10 The main potential impacts of this option would include, but not be limited to:
- Visual intrusion of a hard engineering solution in an essentially 'green' area, which would conflict with the current agricultural landscape at the edge of the town;
  - Environmental impact;
  - High carbon impact (concrete walls);
  - Disruptive for the town due to construction in urban areas and increased traffic movements due to the large quantity of materials which would need importing (concrete and steel);
  - Potentially more costly due to the quantities of materials which would need importing and the uncertainties associated with fluctuations in the price of steel;
  - Automated or mechanically operated elements, such as flood gates, may be required which increase the uncertainty of the flood risk protection as they have to be operated correctly and in sufficient time for the scheme to function as a whole. In addition they require greater levels of inspection and maintenance;
  - Long term maintenance of raised hard defences can be costly; and
  - Raised hard defences are often not considered a sustainable solution and at the end of their design life will require careful demolition and disposal of the materials, which can be costly.

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4.3.11 Stakeholder discussions during the Filey Flood Alleviation Strategy Study (including the Filey Flood Working Group and public consultation) have determined that there would be negligible support for implementing this option. This is mainly due to the potential visual intrusion, and that the option is likely to have a more detrimental social impact for Filey.

4.3.12 As such this option, whilst potentially technically viable, was not taken forward due to the wide range of potential impacts, high cost uncertainties, and public opposition and therefore very unlikely to attract the necessary partnership funding.

## 4.4 Options short-listed for appraisal

### Option 2a: Do Minimum - Maintenance

4.4.1 The Do Minimum option has been taken forward as the baseline option against which the other options will be assessed. This option will maintain the status quo, with the existing levels of flood risk continuing. The urban drainage network would continue to be maintained by Yorkshire Water and operate at its current capacity. The issues of overland flows from the surrounding rural areas overwhelming the existing drainage network would continue.

### Option 3c: Do Something – Permanent Defences with Upstream Storage

4.4.2 The principle of this option is to intercept the overland flows through a series of ditches and small embankments before they reach the outskirts of the town and divert them into temporary storage areas. The stored floodwater would then be released into the existing ravines which feed directly into the sea or into the existing urban drainage system. The rate of release would be restricted to a rate at which these existing systems can deal with the surface water without overwhelming them and causing additional flooding.

4.4.3 Although the principle is similar to Option 3b: Do Something (raised flood defences), which was rejected at the long list stage, this option includes temporary storage areas and restricted connections back into the existing drainage systems. It also proposes softer engineering with ditches, excavated storage areas, and small embankments, rather than hard concrete and steel structures, and will therefore blend into the landscape much better, significantly reducing the potential visual impact. The softer engineering techniques also negate some of the issues with importing materials and fluctuations in material prices which Option 3b has.

### Option 3d: Do Something – Permanent Defences with Upstream Storage and Environmental Enhancements

4.4.4 This option builds on Option 3c by integrating a range of additional environmental and community enhancements, which are based on the following general principles:

- Utilise designed maintenance strips as the foundation for an enhanced footpath network around Filey, improving local access to nature and links to the wider footpath network i.e. the Yorkshire Wolds Way and Cleveland Way;
- Improve opportunities for education and learning for the local community and schools through interpretation of local flora and fauna, and opportunities for outdoor teaching; and
- Improve the quality of existing habitats and exploit opportunities for new habitat creation to improve biodiversity within Filey.

4.4.5 This option will be more expensive than Option 3c due to the cost of the environmental enhancements and will not provide any additional flood risk management benefits, it will therefore have a weaker economic case than Option 3c. The target SoP set in the objectives for the scheme is a 1% annual probability of flooding, including an allowance for climate change. This option has therefore only been assessed for the target SoP.

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## 5 Options appraisal and comparison

### 5.1 Technical issues

#### Start Option 2a: Do Minimum - Maintenance

- 5.1.1 The Do Minimum option has been taken forward as the baseline option against which the other options will be assessed. This option will maintain the status quo, with the existing levels of flood risk continuing. The urban drainage network would continue to be maintained by Yorkshire Water and operate at its current capacity.
- 5.1.2 The issues of overland flows from the surrounding rural areas overwhelming the existing drainage network would continue. The impacts of climate change would increase the overland flows and also the surface water within the town, resulting in increased flooding for Filey.

#### Option 3c: Do Something – Permanent Defences with Upstream Storage

- 5.1.3 This option consists of a series of embankments and channels on the outskirts of Filey to intercept the overland flows and divert them into holding areas before releasing them into the existing ravines (which feed directly into the sea) or into the existing urban drainage system. The rate of release would be restricted to a rate at which these existing systems can deal with the surface water without overwhelming them and causing additional flooding.
- 5.1.4 All efforts will be made to reuse materials excavated from the channels and storage areas in the building of the embankments to reduce waste and avoid having to import materials to site.
- 5.1.5 Working on the outskirts of the town reduces disruption to the town itself.

#### Option 3d: Do Something – Permanent Defences with Upstream Storage and Environmental Enhancements

- 5.1.6 This option builds on Option 3c by integrating a range of additional environmental and community enhancements. The flood defence components of the scheme would be the same as for Option 3c and therefore technically there are no advantages to this option.
- 5.1.7 This option will be more expensive than Option 3c due to the cost of the environmental enhancements and will not provide any additional flood risk management benefits, it will therefore have a weaker economic case than Option 3c.

### 5.2 Environmental assessment

- 5.2.1 An Environmental Impact Assessment (EIA) has been undertaken to determine the potential environmental impacts associated with the proposed scheme (Option 3c). The findings from the EIA process have been used to inform the findings in Table 5-1. Reference to the Environmental Statement (ES) should be made for further detail regarding potential environmental impacts and proposed mitigation measures.
- 5.2.2 The ES includes a section which presents the findings of a WFD compliance assessment. The assessment demonstrated that the proposed activities associated with the scheme are unlikely to affect the current status or potential of the Yorkshire North coastal water body or the Derwent Vale of Pickering Corallian Limestone groundwater body.
- 5.2.3 The ES also presents the findings of the Habitats Regulations Assessment (HRA) undertaken for the proposed scheme. A HRA Screening Report was submitted to Natural England during June 2014, which concluded that the proposed scheme would not result in a likely significant effect on any European sites. Natural England confirmed during July 2014 that it was in agreement with the conclusions of the HRA Screening Report, and as such the scheme has been screened out of further consideration under the Habitats Regulations.

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**Table 5-1 Key environmental effects, mitigation and opportunities**

Key positive effects	Key negative effects	Mitigation or enhancement opportunity			
Option 1: Do Nothing					
As noted above, a true Do Nothing scenario would assume that all maintenance of the existing ditches and urban drainage network would cease resulting in silting up and blockages of the system, eventually resulting in their failure. This would increase the flood risk for Filey over time. However, Yorkshire Water have a statutory duty to maintain the urban drainage network and would not cease the maintenance regime. This option is therefore not realistic and not appropriate to use as the baseline against which to assess the other options, and has been discounted. The Do Minimum option is a more appropriate baseline to reflect the likely situation should a flood alleviation scheme not go ahead.					
Option 2a: Do Minimum – maintenance					
Limited disruption to people, property, ecology and land use within Filey.	This option does not represent a long term flood protection measure for Filey.	None identified			
	The issues of overland flooding from the surrounding rural areas which overwhelm the current drainage system would continue.				
	No potential for environmental enhancements associated with this option.				
Option 3c: Do Something – Permanent defences with upstream storage					
Potential for enhancement of ecological diversity through seeding and re-vegetation of embankments, creation of additional terrestrial and temporary aquatic habitats.	Disturbance to bats during tree removal.	Re-assessment of any trees with bat roosting potential prior to felling.			
	Disturbance to great crested newts during construction.	One way exclusion fencing, trapping and relocation of great crested newts around the working area within 250m of Filey Dams.			
	Loss of approximately 240m and 250m <sup>2</sup> of hedgerow and woodland habitat respectively.	Replacement of any hedgerow and woodland habitat lost. Minimising the construction footprint.			
	Disturbance to breeding birds during construction phase.	Removal of vegetation outside of the breeding bird season. Any vegetation which would be removed would be replaced with native species.			
	Construction noise and vibration to residential receptors and temporarily reduced air quality.	A conventional approach to good construction noise and air quality management would be adopted through the implementation of a CEMP.			
	Temporary reduction in land use during construction (43ha) and permanent reduction in land use during operation (approximately 11.5ha) within the footprint of earth bunds, storage areas and channels.	Minimising the scheme footprint where possible. Consulting with land owners.			
	Potential disturbance to unknown heritage assets during construction.	Archaeological monitoring (watching brief) of all ground intrusive works.			
	Reduction in views from designated sites, designated landscape and high	In the long term established mitigation planting would fully remediate initial			
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Key positive effects	Key negative effects	Mitigation or enhancement opportunity
	sensitivity receptors.	minor losses of hedgerow and woodland.
	Disturbance to users of national trails and public rights of way, as well as the national trail and footpaths themselves as they fall within the construction footprint.	Phased temporary closures and diversions of the affected sections of footpath.
	Potential reductions in water quality within the adjacent bathing water and Yorkshire North coastal waterbody during construction works (transport of construction materials or suspended sediments into the coastal waterbody).	Adherence to Environment Agency pollution prevention measures. Ensuring the storage areas and drainage channels are only linked to each other (and the coastal waterbody) when the works are mostly complete; this would allow suspended sediments to largely settle out within the drainage channels and storage areas, minimising the risk of transport to the coastal waterbody.
Option 3d: Do Something – Permanent defences with upstream storage and environmental enhancements		
As Option 3c, with environmental benefits arising from the proposed environmental enhancements.	As Option 3c.	As Option 3c.

### 5.3 Social and community effects

- 5.3.1 The Filey Dams Nature Reserve, located within the western section of the town, and the coastal frontage and beach itself at Filey are also likely to attract a number of visitors to the area. The Yorkshire Wildlife Trust considers that there is a strong business case for investigating Yorkshire's nature tourism assets and their potential for increasing local incomes. The Trust is in the process of developing nature tourism, through the creation of the Yorkshire Nature Triangle. The 'Nature Triangle' is bounded by the east coast from Filey Brigg to Spurn Point, by North Cave, the Wolds and the River Hull catchment to the west, and by the Humber estuary to the south. The Nature Tourism Triangle project is showing how tourism income could help revitalise Yorkshire's coastal and inland economy.
- 5.3.2 There is potential for Option 3c to enhance the nature tourism value of Filey during the operational phase, which would be in direct accordance with the aims of the Nature Tourism Triangle Project and could result in socio-economic benefits to the town. It should be noted however that the storage areas would only be in use during and immediately after flood events and therefore the potential for these areas to contribute to the Nature Tourism Triangle Project would be limited.

### 5.4 Option costs

- 5.4.1 The options described in Sections 4 and 5 have been taken from the original PAR reported to the Environment Agency in 2012 (see Section 2.2.5). The costs for these options have also been taken from the 2012 PAR to provide a fair comparison.
- 5.4.2 The cost estimates for the Filey Ravines FAS were developed using recent previous experience on similar flooding projects by three separate groups of professionals in order to provide a benchmarking exercise.
- 5.4.3 The Do Minimum costs are based on undertaking regular maintenance every two years, increasing by 20% of the previous spend every two years for the next 50 years (after which they remain constant) to ensure the status quo is maintained. An additional annual inspection cost has also been included to inform the two yearly maintenance strategy.
- 5.4.4 Subsequently, the costs for Option 3c have been further developed using construction cost estimates provided by the ECI Contractor. Environmental mitigation costs have been included for Great Crested Newts and Water Voles, and ecological and archaeological watching briefs. Compensation allowance for landowners affected by the footprint of the works has also been included. The maintenance costs

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have been developed following discussions with drainage boards on the cost of their drainage channel maintenance. The maintenance costs include annual condition inspections and surveys of all elements of the scheme (drainage channels, embankments and culverts), regular maintenance activities (e.g. grass cutting), and minor repair works to ensure the assets reach their design life expectations (e.g. repairs to erosion damage from weathering, livestock and pedestrians on embankments).

- 5.4.5 The costs for Option 3d replicate those in Option 3c. However an additional £500,000 has been included for environmental enhancements that will add to the existing tourism and quality of life for existing residents.

**Table 5-2 Summary of options – present-value costs (£ thousands)**

	<b>Option 2a:</b> Do Minimum	<b>Option 3c:</b> Do Something – Permanent Defences with Upstream Storage	<b>Option 3d:</b> Do Something – Permanent Defences with Upstream Storage and Environmental Enhancements
Existing staff costs		10	10
Further staff costs		5	5
Consultants' fees		220	220
Contractors' fees		0	0
Cost consultants' fees		6	6
Site investigation and survey		75	75
Construction		2,064	2,064
Environmental mitigation		147	147
Environmental enhancement		0	467
Site supervision		104	104
Compensation		896	896
Risk contingency (50%)		1,433	1,619
Other		45	45
<b>Subtotal</b>		5,015	5,668
Future costs (construction and maintenance)	4,322	147	147
<b>Total present-value cost</b>	4,322	5,162	5,815

## 5.5 Benefits of options (damages avoided)

- 5.5.1 The flood damages have been calculated using the Multi Coloured Manual (MCM) and the Green Book (HM Treasury, 2003). These documents have been used in combination with the Defra FCRM appraisal guidance and Supplementary Guidance Notes. The detailed economic analysis and methodologies can be found in Appendix G. Figures in the Multi Coloured Manual have been updated to 4th Quarter 2015 using the Consumer Price Index. Damages have been calculated for a 100 year appraisal period and discount rates starting at 3.5% and reducing to 2.5% have been applied.
- 5.5.2 Climate change has been included within the analysis. The appraisal takes climate change into account as a step-change increase with present day values used for years 0 to 24, 2055 climate change values used for years 25 to 54, and 2085 climate change values used for years 55 to 99.
- 5.5.3 Damages have been calculated for properties, vehicles, emergency services, evacuation costs, intangible health benefits, school disruption, and risk to life.

- 5.5.4 The properties at risk of flooding in Filey have been identified from the hydraulic modelling of the 'baseline' situation for the present day, and for 2055 and 2085 taking into account the impacts of climate change. The town of Filey has been split into two floodcells; Floodcell 1 to the west which covers the area of the town which will directly benefit from a flood alleviation scheme, and Floodcell 2 to the east which covers the area of the town which may indirectly benefit from a flood alleviation scheme. In total across Filey there are 249 residential and 183 non-residential properties currently at risk of flooding in the 1% event (1 in 100 year), this increases to 550 residential and 189 non-residential when the impacts of climate change are taken into account.
- 5.5.5 There are approximately 80 properties in Filey which have benefitted from property level protection (PLP) measures funded by the British Red Cross following the 2007 floods. These properties are located across Filey within both floodcells, and were provided with flood barriers for doors and airbricks. The impact of the PLP measures is not included within the hydraulic modelling however the impact has been taken into account following the methodology set out in the MCM. The PLP measures are assumed to be effective up to a flood depth of 0.6m but to take into account their effectiveness the damages are reduced by 75% rather than removed altogether.
- 5.5.6 Both the main roads into Filey, the A1039 Scarborough Road and Muston Road, are at risk of surface water flooding. The railway line (which runs from Scarborough to Hull, via Bridlington) is also at risk of surface water flooding. Although the Filey Flood Alleviation Scheme will reduce the amount of surface water flooding to these key transport routes in some locations, it will not completely resolve the flooding along their entire lengths through Filey. Transport would therefore continue to be disrupted, and has not been quantified for this economic appraisal.
- 5.5.7 The largest contributor to the 'baseline' damages is the direct property damages contributing 47% to the total damages across the whole Filey. Risk to life and intangible health damages are also significant contributors to the damages at 22% and 13% respectively. The remaining categories contribute relatively small proportions to the damages. The present value damages for the 'baseline' scenario are **£51.9million**.

**Table 5-3 Summary of present-value damages (PVd) and benefits (PVb) (£ thousands)**

	Damage (PVd)	Damage avoided	Benefits (PVb)	Key non-monetarised benefits
Option 2a: Do Minimum (Baseline)	51,910	-	-	-
Option 3c: Do Something - Permanent Defences with Upstream Storage	28,047	23,047	23,047	
Option 3d: Do Something - Permanent Defences with Upstream Storage and environmental enhancements	28,047	23,047	23,047	Environmental enhancements will add to the existing tourism and quality of life for existing residents.

- 5.5.8 The 'with scheme' scenario has also been modelled, with the results used to calculate the residual damages which will occur once the scheme is completed, in order to calculate the benefits of the scheme. The modelling has been carried out for the same return periods and climate change scenarios as for the 'baseline' scenario to allow direct comparisons to be made.
- 5.5.9 Due to the nature of the flood risk the proposed Filey Flood Alleviation Scheme will not solve all the flooding issues. The scheme is aimed at controlling the overland flow of surface water from the surrounding rural catchment, which currently overwhelms the urban drainage system and contributes a significant proportion of flood risk within the town. On completion of the flood alleviation scheme there will still be a significant residual risk within the town from surface water flooding. This is due to the limited capacity of the urban drainage network which is not designed to cope with the same surface water events that the flood alleviation scheme will be; the scheme is designed to a 1 in 100 year standard of protection (including an allowance for climate change), while urban drainage tends to be designed to a maximum of 1 in 30 years. The flood alleviation scheme is designed to deal with surface water from the surrounding rural catchment, but not the urban catchment of the town itself. Therefore any severe rainfall events across the town could still result in surface water flooding issues due to water falling within the town itself. Consequently the modelling of the 'with scheme' scenario identifies significant residual damages for Filey. The economic appraisal for the flood alleviation scheme

therefore only takes the benefits as the difference between the residual damages and the 'baseline' scenario.

- 5.5.10 The works which form the flood alleviation scheme are located around the edge of Floodcell 1 and it therefore directly benefits from the scheme through controlling the overland flows which currently flow from the surrounding rural areas and through the residential areas of Filey. Although Floodcell 2 does not directly benefit from the flood alleviation scheme in the same way that Floodcell 1 does, it still indirectly benefits. By controlling the overland flows into the town the urban drainage system is placed under less pressure and is able to better cope with the surface water within the town, and therefore there is some reduction in the flood risk for properties in Floodcell 2, however to a much lesser extent than in Floodcell 1.

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## 6 Selection and details of the preferred option

### 6.1 Selecting the preferred option

- 6.1.1 From an economic perspective, Option 3c is considered the best option to protect Filey from extreme flood events, it has the highest benefit-cost ratio (BCR) at 4.46. Although Option 3d provides the same benefits and standard of protection as Option 3c it has higher costs due to the inclusion of the environmental enhancements.
- 6.1.2 Although the environmental enhancements would provide additional unmonetised benefits they would require funding outside of the FDGiA process. As the project requires external contributions the most cost effective solution is preferred by all parties contributing to the funding of the scheme. However selection of Option 3c does not preclude the environmental enhancements being carried out should any funding opportunities arise.
- 6.1.3 Option 3c provides the best technical solution as it addresses the flood risk in Filey to a high standard of protection by attenuating flows and releasing water at a controlled rate in order to allow the urban drainage system to function effectively.
- 6.1.4 Option 3c maximises the opportunities for re-using the material excavated from the channels and storage areas and also reduces flows in Arndale ravine significantly during a storm event which mitigates the issues with erosion currently being experienced.
- 6.1.5 Option 3c has been developed in direct compliance with the Filey Town Plan, which identifies the need for a flood alleviation scheme and the 'Proposed Submission Scarborough Borough Local Plan' published for public representation on 6 November 2015.
- 6.1.6 Consultation has taken place with all of the landowners affected and agreements will be put into place with each landowner regarding any loss of agricultural land resulting from the works.

**Table 6-1 Benefit:cost assessment**

Option	PV costs (£ thousands)	PV benefits (£ thousands)	Average benefit:cost ratio (BCR)	Incremental benefit:cost ratio (BCR)
Option 2a: Do Minimum	4,322	-	-	-
Option 3c: Do Something - Permanent Defences with Upstream Storage	5,162	23,047	4.46	n/a as both options provide same SoP17
Option 3d: Do Something - Permanent Defences with Upstream Storage and environmental enhancements	5,815	23,047	3.96	

### 6.2 Sensitivity testing

- 6.2.1 The economic appraisal has been carried out including climate change allowances. A sensitivity test has been carried out assuming no climate change; instead the present day annual average damages are applied throughout the entire 100 year appraisal period. The scheme benefits for the whole of Filey (Floodcell 1 and Floodcell 2) fall by 15% to £20.2million. This is not significant enough to affect the economic justification for the scheme. The BCR for the preferred Option 3c would fall from 4.46 to 3.92; the scheme remains economically justifiable.
- 6.2.2 A range of standards of protection (SoP) have been considered for the preferred Option 3c to ensure the most economically efficient SoP is selected. The SoP considered are 2%, 1% and 0.5% annual probability of flooding (1 in 50, 1 in 100, and 1 in 200 years) including an allowance for climate change. The scheme concept is the same for each of the SoP considered, the main differences being the height of embankments and size of ditches required, and the volume of water needed to be held in the temporary storage areas. The target SoP set in the objectives for the scheme is a 1% annual probability of flooding, including an allowance for climate change.
- 6.2.3 It is important to note that the vast majority of the flood damages which contribute to the AAD curve for Filey are due to the smaller more frequent flood events. The steepness of the AAD curves clearly highlight the limited influence the larger return periods have over the total damages. Therefore the

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changes to the SoP of the scheme between 1 in 50 and 1 in 200 year will have only a limited impact on the total benefits for the scheme.

- 6.2.4 The estimated benefits for the different SoP have been compared with estimated costs to support selection of the preferred SoP. The costs have been estimated assuming increases/decreases in volume of storage required, channel capacity, and embankment heights as appropriate. These costs have been estimated prior to the final design development of the preferred option and therefore will differ slightly from the final costs reported for the preferred option in Section 6.3.
- 6.2.5 The economic assessment of the different SoP considered shows that the option with the highest benefit-cost ratio (BCR) is the 1 in 100 year SoP (including an allowance for climate change), with a robust BCR of 5.11. This option also has the highest net present value (NPV). The incremental benefit-cost ratio (iBCR) also supports selection of the 1 in 100 year SoP (including an allowance for climate change) as the preferred option. The iBCR between the 1 in 50 and 1 in 100 SoP is robust at 9.29, however the iBCR is less than 1 for the 1 in 200 year SoP and therefore there is no justification for considering a higher SoP.

**Table 6-2 Incremental benefit:cost assessment**

Option	PV costs (£ thousands)	PV benefits (£ thousands)	Average benefit:cost ratio (BCR)	Incremental benefit:cost ratio (BCR)	Option for incremental calculation
Option 3c: 1 in 50year SoP (including climate change)	4,295	20,363	4.74	-	-
Option 3c: 1 in 100year SoP (including climate change)	4,672	23,863	5.11	9.29	1 in 50year SoP
Option 3c: 1 in 200year SoP (including climate change)	5,361	23,920	4.46	0.08	1 in 100year SoP

- 6.2.6 The detail of the sensitivity testing and the methodologies used can be found in Appendix G.

### 6.3 Details of the preferred option

#### Technical aspects

- 6.3.1 The preferred option is Option 3c, Permanent Defences with upstream storage involves the excavation of four sections of new channel to capture surface water flows heading towards the town from the surrounding agricultural land. The new channels would be trapezoidal, with an overall depth ranging from 0.5m to 3.0m. The channel bed would be 1m in width, with the channel itself ranging from 5m to 21m wide (including side slopes at a gradient of 1 in 4). Filey Fields Channel and Wooldale Drive Channel (both east and west) (illustrated on Key Plan 1) would divert surface water runoff into the Scarborough Road, Wooldale and Caravan Park Storage Areas; whilst Filey School Channel would be used to divert surface water runoff into the Long Plantation Watercourse (discussed below).
- 6.3.2 The Filey School Channel is connected to Long Plantation Watercourse via a 300mm diameter pipe. This pipe restricts the maximum flow into Long Plantation Watercourse and therefore retains water in the new channel and behind the embankment for a period of time so that the existing watercourse remains within bank up to a 1 in 100 yr flood event.
- 6.3.3 The preferred scheme would involve the construction of three flood water storage areas (Scarborough Road, Wooldale and Caravan Park Storage Areas). The required attenuation capacity of the storage areas has been calculated for a 1 in 100 year storm event, based on the duration of the 2007 event.
- 6.3.4 The outflow from the Scarborough Rd storage area is restricted by use of a hydrobrake to a maximum flow of 100 l/s. Water from the Scarborough Rd storage area flows into the existing Yorkshire Water system at this restricted rate as agreed with Yorkshire Water. Without the flood scheme in place the water from the agricultural land enters the Yorkshire Water system in a 1 in 100 yr event at a much greater rate.
- 6.3.5 The Wooldale storage area drains eastwards towards the Caravan Park storage area via an open channel. A v-notch weir controls the outflow from the Wooldale storage area into the open channel.

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The water from the Caravan Park storage area drains eastwards into a culvert which crosses beneath the Caravan Park emerging at the top of the existing Arndale Ravine. There were concerns raised that draining these storage areas into the ravine might exacerbate the existing erosion of the Ravine. Modelling has shown that much of the water that will be directed through the storage areas with the scheme in place makes its way to the ravine overland through the caravan park without the scheme in place. At the upstream entrance to the culvert from the Caravan Park storage area a hydrobrake restricts the maximum flow to 50 l/s. This limits the rate of water flow into the Ravine. At the 100 yr event this reduces the flow at the top of the Ravine from 11.5m<sup>3</sup>/s without the scheme to 3m<sup>3</sup>/s with the scheme.

- 6.3.6 A key target of the scheme design has been to try and balance the cut and fill required. This is key from an environmental point of view to maximise reuse and minimise waste but also from a cost perspective as the cost of waste disposal can be high. Ground investigations have found that the material to be excavated from channels and storage areas throughout the site is suitable for use in construction of the embankments required. The amount of material required for construction of the embankments however is much less than the total amount to be excavated. A number of options for disposal of any excess material have been considered including disposal at inert landfill. A use for excess material on site to regrade agricultural land has been identified and this is currently the preferred option. It is possible that other opportunities for reuse or disposal of the excess material may arise between now and the scheme's construction that offer greater environmental or economic benefits. Any alternative proposals would be subject to planning approval.

**Table 6-3 Summary of design criteria for proposed flood water storage areas**

Storage Area	Capacity (m <sup>3</sup> )	Plan area (m <sup>2</sup> )	Average depth (mbgl*)
Scarborough Road	22,750	29,000	0.8
Wooldale	6,000	4,000	1.5
Caravan Park	5,000	5,000	1.0

\* metres below ground level

- 6.3.7 The preferred scheme also involves the installation of six sections of culvert, which would be installed using a cut and cover technique. Culverts would be installed in the following locations:
- Filey School Culvert to provide a crossing point for the public footpath which currently would be intercepted by Filey School Channel (30m long and 300mm diameter culvert);
  - Long Plantation Culvert through the bund which separates Filey School Channel from the Long Plantation Watercourse (in order for controlled discharge of surface water into the Long Plantation Watercourse);
  - Cherry Tree Drive Culvert between Scarborough Road Storage Area and an existing ditch (30m long and 300mm diameter culvert);
  - Filey Fields Culvert to provide a crossing point for users of the footpath which intercepts the route of Filey Fields Channel and also to provide vehicular access across Filey Fields Channel (900mm diameter culvert);
  - Caravan Park Culvert (east) between the Caravan Park Storage Area and the existing ravine (415m long and 300mm diameter); and,
  - Caravan Park Culvert beneath the existing access track to the north of the Caravan Park Storage Area which drains water from the field to the north.

## Environmental aspects

- 6.3.8 This section provides an overview of the potential key environmental effects that could arise as a result of the implementation of the preferred option and describes measures that have been identified to avoid or mitigate these effects throughout the development of the scheme, where appropriate. Key issues arising from the scheme are set out in the following paragraphs of this section.

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- 6.3.9 The EIA identified a number of impacts that could arise during the construction and operation phase of the proposed scheme. These impacts include, but are not limited to the following.
- 6.3.10 Impacts to protected species during construction are considered to be of negligible significance at worst. Mitigation measures, in the form of one way exclusion fencing, trapping and relocation of great crested newts around the working area within 250m of Filey Dams, and transport of any newts back into Filey Dams have been built into the proposed scheme. During operation, the proposed channels, bunds and storage areas would provide additional foraging habitat for badger, and additional terrestrial and (temporary) aquatic habitat for great crested newts.
- 6.3.11 The use of machinery and construction materials has potential to lead to accidental leaks and spills which may affect the quality of existing waterbodies and bathing waters. The majority of works would involve construction of new watercourses and storage areas which would be completed away from existing watercourses and only linked into existing waterbodies when the works are largely complete. Potential impacts from leaks, spills or transport of suspended sediments on existing waterbodies are therefore considered to be temporary and of low magnitude.
- 6.3.12 By following best practice guidance and implementing the mitigation measures presented in the ES (including use of personal protective equipment (PPE) and adherence to current best practice during construction works, including storage of construction materials away from watercourses), the potential impacts of the proposed scheme on hydrology, hydrogeology, human health and soil quality are predicted to be of negligible significance at worst.
- 6.3.13 Impacts to birds during the construction phase are limited to indirect disturbance to birds using locally designated sites for nature conservation (noise, visual and lighting disturbance) , and disturbance to breeding birds during vegetation clearance. It was considered that birds using locally designated sites would likely be accustomed to noise and visual disturbance from ongoing agricultural practices. Vegetation clearance works would be undertaken outside of the breeding bird season (which is typically between March and August) (or alternatively vegetation would be surveyed for bird nests prior to clearance works commencing) in order to mitigate the potential impact to breeding birds. Any vegetation removed during construction would be replaced with native species to ensure no net loss of breeding bird habitat.
- 6.3.14 No construction works would be undertaken at night, and any construction lighting would be directed away from woodland edge and trees. Lighting would be kept to a minimum and placed on movement sensors to avoid unnecessary light pollution. Such measures would minimise the potential for construction related lighting disturbance to birds.
- 6.3.15 The noise and vibration assessment identified that there is potential for minor to major adverse noise impacts at certain receptors during the construction of the scheme (pre-mitigation). A worst case moderate adverse significance impact was predicted with regard to construction phase vibration. With the implementation of conventional good practice noise and vibration mitigation measures, it is anticipated that noise and vibration impacts would reduce to negligible significance and minor adverse significance respectively.
- 6.3.16 An assessment was undertaken which considered the potential for the proposed scheme to impact on local air quality at identified receptor locations. The scope of the air quality assessment was limited to the potential impact of dust emissions during the construction phase. Site specific best practice dust mitigation measures are recommended (e.g. wheel washing) during the construction phase; such measures would result in impacts which are of negligible significance.
- 6.3.17 The proposed scheme would result in the direct, temporary loss of farmland during the construction phase, in order to provide a safe working area for construction workers. Following completion of the construction phase, the restrictions on existing land use would be lifted and farming activities could recommence (within a reduced footprint due to the presence of the embankments, drainage channels and storage areas). Whether farming activities do actually recommence would be dependent on the outcome of ongoing discussions between Scarborough Borough Council and land owners. In order to mitigate this impact, the working area would be minimised, the ongoing consultation with landowners would continue up to and throughout the construction phase and vehicle movements will be restricted to specific routes following field boundaries where possible. With the implementation of mitigation measures, the residual impact is considered to be of minor adverse significance.

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- 6.3.18 The major benefit of the proposed scheme is the anticipated long term reduction in surface water flood risk to people and property within Filey. An impact of major beneficial significance is anticipated with regard to reduced flood risk to people and property.
- 6.3.19 The impact assessment has identified minor adverse, permanent effects relating to known buried heritage assets within the site boundary, and archaeological watching brief has been recommended by way of mitigation. This will not reduce the level of physical harm to the known buried assets; however, the mitigation measures recommended will record the loss of these assets, which is an accepted industry standard for dealing with archaeological remains as part of development.
- 6.3.20 During construction, the assessment of effects has identified a minor adverse impact to the settings of the Grade I listed Saint Oswald's Church, the Grade II listed farm buildings west of Church Cliff Farm and Church Cliff Farmhouse and Filey Conservation Area. Following mitigation, the residual effect upon these heritage assets would be negligible.
- 6.3.21 This assessment has identified landscape and visual effects of the proposed scheme during construction and operational stages. Construction stage effects have been identified as incurring the most significant landscape and visual impacts. Effects relate to views of plant and machinery (primarily excavators and dump trucks), disturbed and excavated ground, stockpiles, site cabins and other temporary facilities. During operational stages there would be no significant landscape or visual effects.
- 6.3.22 The construction phase of the proposed scheme is anticipated to last for eight months, generating a peak workforce of 25 employees which represents less than 1% of the total employment within Filey. The anticipated change in employment as a result of the proposed scheme is considered to be negligible.
- 6.3.23 The proposed scheme would result in direct disturbance to users of the Yorkshire Wolds Way as well as the public right of way adjacent to Scarborough Road Storage Area. There is also potential for direct disturbance to the England Coast Path, if implemented prior to construction of the proposed scheme. The proposed scheme would involve phased temporary closures and diversions of the affected sections of footpath within the proposed construction footprint, only for the duration of the construction works which directly impact upon the footpaths. A permanent diversion of a section of footpath adjacent to Scarborough Road Storage Area and a section of the Yorkshire Wolds Way adjacent to Filey School would be required to allow continued use of these paths during the operation phase. A worst case minor adverse impact is predicted with regard to direct disturbance to users of footpaths.
- 6.3.24 The WFD assessment demonstrated that the proposed activities associated with the scheme are unlikely to affect the current status or potential of the surface water bodies (comprising the Yorkshire North coastal waterbody and the Cycle 1 Filey North river waterbody) or the Derwent Vale of Pickering Corallian Limestone groundwater body.

### Local political considerations

- 6.3.25 Option 3c has been developed in direct compliance with the Filey Town Plan, which identifies the need for a flood alleviation scheme and the 'Proposed Submission Scarborough Borough Local Plan' published for public representation on 6 November 2015.

### Costs for the preferred option

**Table 6-4 Project costs for preferred option (£ thousands)**

Costs		Cost for economic appraisal (PV)	Whole-life cash cost	Capital grant approval project cost
<b>Costs up to PAR: (not including costs of approved study)</b>				
Existing staff costs (Mouchel)		Sunk costs	210	
Existing Staff Costs (SBC)			100	
Further staff costs (SBC)		Sunk costs	-	
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Costs	Cost for economic appraisal (PV)	Whole-life cash cost	Capital grant approval project cost
Site investigation and survey	Sunk costs	24	
Consultants' fees (RHDHV)	Sunk costs	302	
Contractors' fees	Sunk costs	-	
Land Agents' fees	Sunk costs	20	
<b>Subtotal</b>	Sunk costs	656	
<b>PAR to construction:</b>			
Existing staff costs (SBC)	27	30	30
Further staff costs (SBC)	-	-	-
Site investigation and survey	-	-	-
Consultants' fees (RHDHV)	48	50	50
Contractors' fees	-	-	-
Cost consultants' fees	-	-	-
Other costs			
<b>Subtotal</b>	<b>75</b>	<b>80</b>	<b>80</b>
<b>Construction:</b>			
Construction costs	3,005	3,200	3,200
Inflation allowance for 24 months			190
Environmental enhancement	-	-	-
Environmental mitigation (Ecological & Archaeological Watching Brief)	19	20	20
Existing staff costs (SBC)	58	60	60
Further staff costs (SBC)	-	-	-
Consultants' fees	-	-	-
Site supervision (RHDHV)	121	129	129
Cost consultants' fees	-	-	-
Compensation			
Other costs (Land Purchase)	106	110	110
<b>Subtotal</b>	<b>3,309</b>	<b>3,519</b>	<b>3,709</b>
<b>Future costs:</b>			
Maintenance	121	446	
Future construction	-	-	
<b>Risk contingency:</b>			
Monte Carlo 95% or similar			581
Monte Carlo 50% or similar	207	220	
<b>Contributions</b>			391
<b>Total</b>	<b>3,712</b>	<b>4,921</b>	<b>3,979</b> (2,269 FDGiA and 1,710 Local Levy)

- 6.3.26 An ECI contractor was appointed to provide input at the design stage on construction methodology, programme and to provide a cost estimate based on the current drawings.
- 6.3.27 A number of different options were considered for disposal of material not required in construction of the embankments however through consultation with landowners an on site use for the material was identified in the form of regrading of agricultural land and this is the current preferred option. It is possible that other options for this material could become available before the scheme begins construction.
- 6.3.28 Detailed hydraulic modelling has been carried out to help refine the scheme design and confirm the effect of the scheme on flood risk.
- 6.3.29 The maintenance costs have been based on information provided by a number of Drainage Boards on the actual maintenance costs they incur on an annual basis. The maintenance that is required for the scheme includes regular activities on an annual basis, such as inspections and grass cutting, and less frequent activities such as erosion repairs.
- 6.3.30 The project team has adopted a staged approach to delivery of the scheme with clearly defined hold points in order to progressively refine the scheme in order to avoid abortive work and create a lower risk project at delivery stage. This value engineering approach has generated a number of significant efficiencies during the life of the project, some of which are highlighted in the table below:

Description	Outcome	Efficiency Value
1. Working together with local landowners	<ul style="list-style-type: none"> <li>Identification of areas where excavated material can be spread for land regrading / engineering for drainage purposes leading to reduction of amount of material required to be disposed to landfill.</li> </ul>	Circa £100k
2. Working together with local landowners	<ul style="list-style-type: none"> <li>Identification of options for future land use leading to reduction in area of land purchase required in order to implement the scheme.</li> </ul>	Circa £400k
3. Incorporation of Muston Road development	<ul style="list-style-type: none"> <li>Reduction in construction costs through incorporating 3<sup>rd</sup> party development into the scheme design</li> </ul>	Circa £180k
4. Development of a detailed project risk register	<ul style="list-style-type: none"> <li>Better definition &amp; management of the financial risks to the project; and</li> <li>Development of a realistic risk contingency</li> </ul>	Reduction in original risk budget of circa £1m.
5. Appointment of an ECI Contractor	<ul style="list-style-type: none"> <li>Advice on buildability issues;</li> <li>Accurate cost estimate for the scheme at the end of design development;</li> <li>Realistic construction programme; and</li> <li>Inputs to assist with consents and licencing such as advising on preferred access routes, compound locations, construction plant and methods etc.</li> </ul>	Circa £300k (assumed 10% of construction costs)
6. Detailed investigation into the re-use of excavated material on site and compliance with the CL:AIRE code of practice	<ul style="list-style-type: none"> <li>Application of waste hierarchy;</li> <li>Assessment of suitability of excavated material for re-use; and</li> <li>Identification of beneficial uses for the material on site in order to reduce costs</li> </ul>	Included in 1 above.

	associated with disposal to landfill.	
7. Working together with Yorkshire Water	<ul style="list-style-type: none"> <li>Maximisation of the discharge into the existing drainage system in order to minimise the size of the storage areas required.</li> </ul>	Circa £100-£200k
8. Detailed review of implications of the Reservoirs Act 1975	<ul style="list-style-type: none"> <li>Configuration of the storage areas and embankments so that they fall outside the Reservoirs Act 1975.</li> </ul>	Circa £250k (inspection costs only over 100 year scheme life)
9. Detailed geotechnical investigation	<ul style="list-style-type: none"> <li>Development of earthworks specification to allow re-use of on-site won material.</li> <li>Identification of contaminated areas allowing the adaption of the outline design to avoid the need for expensive disposal of contaminated material and remediation costs</li> </ul>	Circa £100k
10. Creation of a mainly passive scheme	<ul style="list-style-type: none"> <li>Reduction of future operation &amp; maintenance costs.</li> </ul>	Circa £100-£200k over 100 year design life
	Total Efficiency Value	Circa £1.5-£1.7m plus reduction in original risk budget of circa £1m.

### Contributions and funding

- 6.3.31 The scheme is eligible under the Partnership Funding system for FDGiA grant of £2,133k present value (£2,269 cash value).
- 6.3.32 Contributions of £339k present value (£361k cash value) for the 95%ile risk budget have been secured from SBC to allow the project to proceed. This contribution is for the 95%ile risk allowance and is not towards the design and construction costs of the scheme which can be covered by the FDGiA. A further contribution of £28k present value (£30k cash value) has been secured from Filey Town Council.
- 6.3.33 The contribution of £361k (cash value) towards the risk contingency is being funded by SBC\*. Risks which occur within the 50%ile risk budget of £220k will be covered by the FDGiA. Additional risks which occur that exceed this risk budget will then be funded by SBC.
- \*Whilst SBC will be continuing to seek contributions from beneficiaries, for the purposes of the PAR, SBC agrees in principle to underwrite the risk contingency, which will be subject to the approval of Full Council should an offer of funding be forthcoming.
- 6.3.34 The intention is that the scheme would be financed using FDGiA grant funding in the first instance, followed by local levy funding and finally the contributions.
- 6.3.35 SBC would initially be responsible for the on-going maintenance of the scheme, and would need to fund the estimated £446k PV cost over the 100 year appraisal period.

## Outcome Measures and Partnership Funding Score

6.3.36 The outcome measure delivery and contributions is shown in Table 6-5 as calculated using the FDGiA Partnership Funding Calculator for 2015/16 (see Appendix A). This table shows the outcome measures for the scheme to be delivered in 2017.

6.3.37 The raw OM score for the scheme is 52%, equivalent to FDGiA funding of £2,133k (present value). A contribution of £1.974k (present value) is required to achieve an adjusted OM score of 100%.

**Table 6-5 Outcome Measure contributions and prioritisation score**

Outcome Measure (OM)	2013/14	2014/15	2015/16	2016/17	2017/18	Future years	Total
OM2 Households at reduced risk (number – nr)							
OM2b – Households moved from very significant or significant risk to moderate or low (nr)					167		167
OM2c – Proportion of households in 2b that are in the 20% most-deprived areas (nr)							
OM3 – Households with reduced risk of erosion (nr)							
OM3b – Proportion of those in 3 protected from loss within 20 years (nr)							
OM3c – Proportion of households in 3b that are in the 20% most-deprived areas (nr)							
OM4a – Hectares of water-dependent habitat created or improved (ha)							
OM4b – Hectares of intertidal habitat created (ha)							
OM4c – Kilometres of river protected (km)							
OM1 – Economics							
Whole-life present value benefits (£ thousands)						23,863	23,863
Whole-life present value costs (£ thousands)							
Benefit:cost ratio						5.64	5.64
Raw Partnership-Funding score (%)						52 %	52%
Non-FCERM grant in aid contributions towards the scheme whole-life costs (£ thousands)						1,974	1,974
Adjusted Partnership-Funding score (%)						100	100

## 7 Putting the project in place

### 7.1 Project planning

#### Phasing and approach

- 7.1.1 The objective of the delivery programme is to implement the scheme in a single earthworks season commencing in early spring 2017.
- 7.1.2 Planning permission, landowner agreements and environmental consents and licenses will need to be in place for the main construction phase to start.
- 7.1.3 SBC are preparing and executing landowner agreements.

#### Programme and spend profile

- 7.1.4 The programme developed by the project team for the design and construction stages is provided in Appendix J.
- 7.1.5 The programme has been developed in order to avoid the nesting bird season and maximise the work around Filey School during school holiday periods where possible.

**Table 7-1 Key dates**

Activity	Date (DD/MM/YYYY)
Planning permission received	21/03/2016
Work started on site	13/01/2017
Work substantially completed by	25/8/2017

**Table 7-2 Annualised spend profile (£ thousands)**

	2015/16	2016/17	2017/18	2018/19	2019/2020	Future years	Total
Existing staff costs		30	60				90
Further staff costs							
Fees		50	129				179
Construction		533	2,667				3,200
Environmental mitigation			20				20
Environmental enhancement							
Compensation		-					-
Other (land purchase)		110					110
Risk contingency (95% risk)		116	465				581
Inflation (at 2.5% p.a)	-	21	169				190
Less costs not eligible for grant		-	-				-
<b>Total</b>		<b>860</b>	<b>3,510</b>				<b>4,370</b>
FDGiA		<b>447</b>	<b>1,822</b>				<b>2,269</b>
Local Levy		<b>337</b>	<b>1,373</b>				<b>1,710</b>
Contributions (SBC)		<b>71</b>	<b>290</b>				<b>361</b>
Contributions (Filey)		<b>6</b>	<b>24</b>				<b>30</b>

Notes: Fees include Site Supervision & Land Agent  
 Figures include inflation at 2.5% per annum

Title	Filey Flood Alleviation Scheme					
No.		Status	0.6	Issue Date	11/06/2016	Page 36



## 7.2 Procurement Strategy

- 7.2.1 Scarborough Borough Council will procure the construction work under a NEC PSC Option A contract using the YORcivil Contractors Framework. Royal HaskoningDHV has been appointed to provide design & site supervision under a NEC professional services contract (Option A) under the YORconsult framework. The main parties are detailed in Table 7-3.

**Table 7-3 Procurement strategy**

Party	Contact	Contract Type	Role
Scarborough Borough Council	Stewart Rowe		Client / Operating Authority
TBC	TBC	NEC PSC Option C	Principal Contractor
Royal HaskoningDHV	Steve Vernon	NEC PSC Option A	Principal Designer, ECC PM, Site Supervisor and Environmental Clerk of Works

## 7.3 Delivery risks

### High-level risk register

- 7.3.1 A risk register has been developed by the Project Team throughout the design stage and is included in Appendix K. Details of the key delivery phase project risks are highlighted in Table 7-4.
- 7.3.2 The Project Team has adopted a stage approach to developing the project with a series of hold points. At the end of each stage we have reviewed where we are & identified any risks + potential cost escalations which could make the scheme unaffordable.

**Table 7-4 High-level risk schedule and mitigation**

Key project risk	Adopted mitigation measure
Variable ground conditions, including contaminated land	<ul style="list-style-type: none"> <li>Extensive Ground Investigation work undertaken during detailed design stage &amp; structures designed accordingly.</li> <li>Project designed to avoid areas of known contamination.</li> <li>Risk item included in the register with costs.</li> </ul>
Additional Landowner requirements	<ul style="list-style-type: none"> <li>Detailed consultation carried out with landowners during detailed design phase and requirements incorporated into scheme design.</li> <li>Risk item included in the register with costs</li> </ul>
Objections to Planning Application	<ul style="list-style-type: none"> <li>None currently outstanding.</li> <li>Ongoing liaison &amp; briefings with the Planning Department and Councillors.</li> <li>Extensive ongoing engagement with the public.</li> </ul>
Adverse weather leading to extended construction period	<ul style="list-style-type: none"> <li>Detailed Time related delay costs developed with ECI Contractor and robust risk item included in register.</li> </ul>
Unforeseen utilities requiring diversion	<ul style="list-style-type: none"> <li>Detailed services search carried out during detailed design stage.</li> <li>Detailed consultation carried out with utilities suppliers &amp; costs for known diversion work obtained.</li> <li>Risk item, based on costs obtained, included in register.</li> </ul>

**Safety plan**

7.3.3 The key parties under the CDM Regulations are established within the procurement strategy for the project and are shown in Table 7-5.

**Table 7-5 CDM Regulations – Key Parties**

Role	Party
Client	Scarborough Borough Council
Principal Contractor	TBC
Designer	Royal HaskoningDHV
Principal Designer	Royal HaskoningDHV

# Flood risk management scheme – application for grant funding

Risk management authority (RMA)



Please read through this form and the guidance notes that came with it. Please write clearly in the answer spaces.

Please send a signed copy of this form (unless it already forms part of the project appraisal report (PAR)) to the Area Flood and Coastal Risk Manager for approval.

Their contact details are on previous letters we have sent you.

- Our general conditions for grants are set out in our grant memorandum. The grant process does not make or form part of the contract between you and us.

- We will not pay a grant for work you begin without our approval. We do not pay a grant for the cost of maintenance.

## Contents

Part A Scheme details  
Part B Certificate of the authority  
Part C The Data Protection Act 1998  
Part D Declaration  
Part E Contact us

## Part A Scheme details

### A1 Name and address of your authority

Name

Scarborough Borough Council

Address

Town Hall

St. Nicholas

Scarborough

North Yorkshire

Postcode YO11 2HG

### A2 National project number (medium-term plan reference number)

### A3 Name of the scheme and its location

Name

Filey Flood Alleviation Scheme

Location

Filey

## Part A Scheme details, continued

### A4 Is this a private scheme to be carried out on a main river not maintained by an Internal Drainage Board or local authority?

Yes ☐ Please give details below

No ☒

### A5 If you've answered no in question A4, how is the project being funded?

Type	Amount (£ thousands)	Percentage (%)
Flood Defence Grant in Aid (FCERM GiA)	2,269	50
Local levy	1,710	40
Own revenue	361	10
External contribution	30	–
Total contribution	391	10

## Part A Scheme details, continued

If external contribution, please give details.

Scarborough Borough Council

## Internal Drainage Boards only

If funded by a loan:

Over what period do you need the loan?

Have you enclosed a formal application for a loan approval from Defra?

Yes ☐No ☐

## A6 Estimated project costs (taken from your PAR) and grant applied for (not including maintenance)

		Project costs (£ thousands)	Grant applied for (include local levy) (£ thousands)
(a)	Preliminary investigations		
(b)	Instrumentation and machinery		
(c)	Construction work	3,200	3,170
(d)	Land purchase	110	110
(e)	Compensation	–	–
(f)	Staff salaries and costs	90	90
(g)	Professionals' and consultants' fees	199	199
(h)	Other costs	Inflation	190
(i)	Contingencies	95%ile risk allowance	220
(j)		Total estimated costs	4,370
(k)		Total grant applied for	3,979

Note: the total grant applied for (box k) should be equal to the amount of the FCERM GiA plus the local levy contribution in table A5.

(Contingency funds are noted for management purposes – see section 12 of the grant memorandum.)

## A7 Other information, such as the latest partnership funding score percentage (this is often more than 100%)

PF Score = 100 %

## A8 Who will the work be done by?

Direct labour ☐Contract ☒Both ☐

Please give details of who is doing the work.

Scarborough Borough Council will procure the construction work under a NEC PSC Option C contract using the YORcivil Contractors Framework. Royal HaskoningDHV has been appointed to provide design & site supervision under a NEC professional services contract (Option A) under the YORconsult framework.

## Part C The Data Protection Act 1998

We, the Environment Agency, will process the information you provide so that we can deal with your application, make sure you keep to the conditions of the licence, permit or registration, and process renewals.

We may also process or release the information to:

- offer you documents or services relating to environmental matters;
- consult the public, public organisations and other organisations (for example, the Health and Safety Executive, local authorities, the emergency services, the Department for Environment, Food and Rural Affairs) on environmental issues;
- carry out research and development work on environmental issues;
- provide information from the public register to anyone who asks;
- prevent anyone from breaking environmental law, investigate cases where environmental law may have been broken, and take any action that is needed;
- assess whether customers are satisfied with our service, and to improve our service; and
- respond to requests for information under the Freedom of Information Act 2000 and the Environmental Information Regulations 2004 (if the Data Protection Act allows).

We may pass the information on to our agents or representatives to do these things for us.

## Part D Declaration

D1 I have met the responsibilities set out in the following regulations.

SI 1999 number 1783 Land Drainage Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999, as amended to date.

☐

D2 I confirm the following:

This application is for the scheme set out in the project appraisal report (PAR)

dated (DD/MM/YYYY)

05/04/2016

☐

This application is made to the Environment Agency, for grant funding under the Flood Management Act 2010.

☐

I accept the conditions set out in the grant memorandum.

I also accept that the Environment Agency do not accept legal liability or agree to take on any of the risk management authority's obligations.

☐

I have attached all necessary supporting documents to this form and we meet the conditions of the grant memorandum.

☐

Our board or cabinet have agreed the work will start on date (DD/MM/YYYY)

☐

As far as I know, the details that I have given on this form are true and complete.

☐

## Part D Declaration, continued

Warning

If you make a false or inaccurate statement you may lose your entitlement to grant funding.

Chief Executive Officer's signature

Date (DD/MM/YYYY)

Name

Title (Mr, Mrs, Miss, Other)

First name

Last name

Job title

Contact numbers, including the area code

Phone

Fax

Mobile

Email

Contact name (for queries)

Phone number

## Part E Contact us

If you need help filling in this form, please contact the person who sent you it or contact us as shown below.

Grant Administration Team  
Environment Agency  
Manley House  
Kestrel Way  
Exeter  
EX2 7LQ

Telephone: 01392 352300

Email: [laidbfinance@environment-agency.gov.uk](mailto:laidbfinance@environment-agency.gov.uk)

Website: [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)

Please tell us if you need information in a different language or format (for example, in large print) so we can keep in touch with you more easily.



**For Environment Agency use only**

Note for AFCRM: Please send this FCERM2, together with the PAR, to the grant administration team for approval, if there is not an FCERM2 already included in the PAR.

This scheme, with a total estimated cost of  
£ \_\_\_\_\_ (box (j), section A6),  
is approved on behalf of the Environment Agency for grant  
funding of

£ \_\_\_\_\_ (box (k), section A6)

Name of Area Flood and Coastal Risk Manager

\_\_\_\_\_

Job title

\_\_\_\_\_

Signature

\_\_\_\_\_

Date (DD/MM/YYYY)

\_\_\_\_\_

Name of chair of Project Approval Board or Large Project  
Review Group

\_\_\_\_\_

Signature

\_\_\_\_\_

Date (DD/MM/YYYY)

\_\_\_\_\_



## Appendix A Project report information sheet

### A.1 General Details

Authority project ref (as in medium term plan)			
Project name (60 characters max.)	Filey Flood Alleviation Scheme		
Name of authority	Scarborough Borough Council		
Defra reference (if known)			
Name	Mr	Stewart	Rowe
Is the project to carry out emergency work?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Strategy plan reference			
River basin management plan			
System asset management plan			
Shoreline management plan			
Project type (list below)	Stand alone project		
Shoreline management study/ preliminary study/ strategy plan/prelim. works to strategy/ project within strategy/stand-alone project/			
Strategy implementation/sustain sos. coast protection/sea defence/tidal flood defence/non-tidal flood defence/flood warning			
Tidal/flood warning - fluvial/special			

### A.2 Contract details

Estimated start date of works or study (DDMMYY)	February 2017	
Estimated time work or study will take to complete*	6 months	*In months
Contract type*	Framework	(*Direct labour, framework, non framework, design/construct )

### A.3 Costs

	Application (£000's)
PAR preparation	-
Capital grant for Environment Agency approval	2,269
Total whole-life costs (cash)	4,370

For breakdown of costs see Table in Section 5.4

### A.4 Contributions

Own resources	
Windfall contributions	
Deductible contributions	
Loans	
European regional development fund (ERDF) Grant	
Other items not included	

### A.5 Location (to be completed for all projects)

EA region or area of project site (all projects)	Yorkshire	
Name of watercourse (fluvial projects only)		
District council Area of project (all projects)	Scarborough Borough Council	
Grid Reference (all projects)	TA106814	(OS Grid reference of typical mid point of project in form ST064055)

**A.6 Description**

Specific town/district to benefit from the project

Filey

Brief project description, including essential elements of the project or study (240 characters maximum)

The scheme concept is a series of embankments, ditches, and temporary flood storage areas around the edge of the town to catch the overland flows before they reach the town. The flood water will be temporarily stored before being released at a controlled rate into the existing urban drainage system and ravines once the storm has passed.

**A.7 Details**

Design standard (chance per year)

1 in 100

years

Existing standard of protection (chance per year)

1 in 1

years

Design life of project

100

years

Fluvial design flow (fluvial projects only)

m<sup>3</sup>/s

Tidal design level (coastal and tidal projects only)

m

Length of river bank or shoreline improved

m

Number of groynes (coastal projects only)

Total length of groynes\* (coastal projects only)

m

Is it a beach management project?

☐ Yes ☒ No

Is it a water level management project?

☐ Yes ☒ No

Defence type (embankment, walls, storage etc)

Embankments, storage, channels

\*Note this should be the total length of all groynes added together (ignore any river training groynes)

**A.8 Further agreements**

Maintenance agreements

☐ Does not apply☐ Received☐ Awaiting

EA region permission

☐ Does not apply☐ Received☐ Awaiting

Non-statutory objectors

☐ Yes ☐ No

(For coastal schemes fill in form CPA1 and CPA2)

Date objections cleared (DDMMYY)

Other agreements

☐ Does not apply☐ Received☐ Awaiting**A.9 Environmental considerations**

Natural England letter (or equivalent)

Natural England Letter

☐ Does not apply☒ Received☐ Awaiting

Date received (DDMMYY)

030716

**A.10 Sites of international importance**

Answer 'Yes' if the project is within, next to or could affect the designated site

Special protection area (SPA)

☐ Yes☒ No

Special area of conservation (SAC)

☐ Yes☒ No

Ramsar site

☐ Yes☒ No

World Heritage Site

☐ Yes☒ No

Other (for example, biosphere reserve)

☐ Yes☒ No**A.11 Sites of national importance**

Answer 'Yes' if the project is within, next to or could affect the designated site

Environmentally sensitive areas (ESA)

☐ Yes☒ No

Site of special scientific interest (SSSI)

☐ Yes☒ No

## Project appraisal report

National or regional landscape designation	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
National park or the broads	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
National nature reserve	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Areas of Outstanding Natural Beauty (AONB), Restoring Sustainable Abstraction (RSA), Regional Screening Coordinator (RSC)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Scheduled ancient monument	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Other designated heritage sites	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No

### A.12 Other environmental considerations

Listed structure consent	<input checked="" type="checkbox"/> Does not apply	<input type="checkbox"/> Received	<input type="checkbox"/> Awaited
Has a water level management plan been prepared?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Does the project need a Food and Environmental Protection Act (FEPA) licence?	<input checked="" type="checkbox"/> Does not apply	<input type="checkbox"/> Received	<input type="checkbox"/> Awaited

### A.13 Compatibility with other plans

Shoreline management plan	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Does not apply
River basin management plan	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Does not apply
Catchment flood management plan	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Does not apply
Water level management plan	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Does not apply

### A.14 SEA or environmental impact assessment

Strategic environmental assessment (SEA)	<input type="checkbox"/> Statutory required	<input type="checkbox"/> Voluntary	<input checked="" type="checkbox"/> Does not apply
Environmental impact assessment (EIA)	<input type="checkbox"/> Yes (schedule 1)	<input checked="" type="checkbox"/> Yes (schedule 2)	<input type="checkbox"/> Does not apply
SEA or EIA status	<input type="checkbox"/> Scoping report prepared	<input type="checkbox"/> Draft	<input type="checkbox"/> Draft advertised
			<input checked="" type="checkbox"/> Final
Other agreements			
	<input type="checkbox"/> Does not apply	<input type="checkbox"/> Received	<input type="checkbox"/> Awaited
	<input type="checkbox"/> Does not apply	<input type="checkbox"/> Received	<input type="checkbox"/> Awaited
	<input type="checkbox"/> Does not apply	<input type="checkbox"/> Received	<input type="checkbox"/> Awaited
	<input type="checkbox"/> Does not apply	<input type="checkbox"/> Received	<input type="checkbox"/> Awaited
	<input type="checkbox"/> Does not apply	<input type="checkbox"/> Received	<input type="checkbox"/> Awaited
	<input type="checkbox"/> Does not apply	<input type="checkbox"/> Received	<input type="checkbox"/> Awaited
	<input type="checkbox"/> Does not apply	<input type="checkbox"/> Received	<input type="checkbox"/> Awaited
	<input type="checkbox"/> Does not apply	<input type="checkbox"/> Received	<input type="checkbox"/> Awaited

### A.15 Benefit Type

#### Local Authorities only;

For projects done under the Coast Protection Act 1949 please separately identify:

FRM = Benefits from reduction of asset flooding risk, or

CERM = Benefits from reduction of asset erosion risk.

Benefit type (list below)

DEF

**DEF:** reduces risk (contributes to Defra SDA 27); **CM:** capital maintenance; **FW:** improves flood warning; **ST:** study; **OTH:** other projects

**A.16 Land area**

Total land area to benefit	187	Ha
Present use of land	FRM	CERM
Agricultural		Ha
Developed	187	Ha
Environmental or amenity		Ha
Scheduled for development		Ha

**A.17 Property and infrastructure protected**

Residential	FRM	CERM	
Number of properties	371		
Value	504,414k		£ thousands
Commercial or industrial	97		
Value	45,219k		£ thousands
Critical infrastructure			
Value			£ thousands
Key civic sites			
Value			£ thousands
Other (description below)			
Value			£ thousands
Description			

**A.18 Costs and benefits**

Present value of total project whole life costs (see note)	4,228	£ thousands
(include all costs, including those not eligible for a grant)		
Will the project meet the statutory requirement?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	FRM	CERM
Present value of residential benefits	5,871	£ thousands
Present value of commercial and industrial benefits	5,343	£ thousands
Present value of public infrastructure benefits	4,224	£ thousands
Present value of agricultural benefits		£ thousands
Present value of environmental and amenity benefits	8,514	£ thousands
Present value of total benefits (FRM and CERM)	23,863	£ thousands
Net present value	19,635	£ thousands
Benefit : cost ratio	5.64	
Base date for estimate (DDMMYY)	November 2015	

## Partnership Funding calculator

## **Appendix B    List of reports produced**