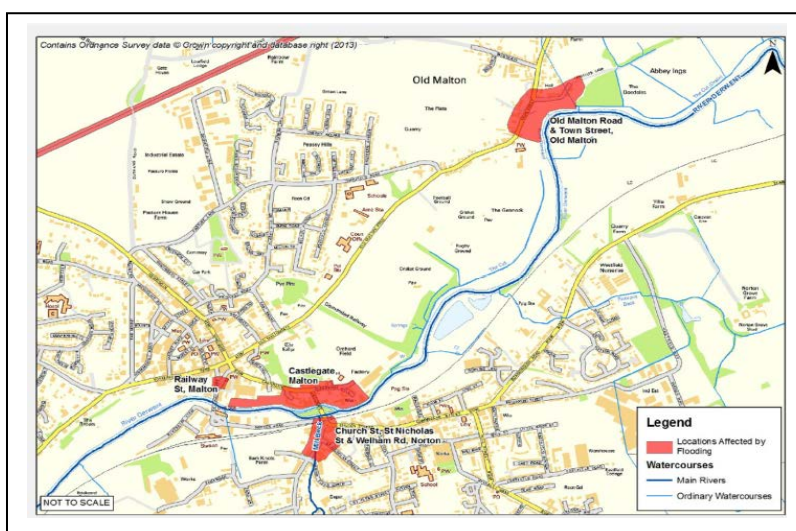


# Malton, Norton and Old Malton; Surface Water Management Project

North Yorkshire County Council (NYCC)  
Business Case (BC)



Aerial Photograph of Malton and Norton (Gazette & Herald, Dec 2015)



High Risk Flooding Areas

Version No: **6**  
Date: **August 2020**

## BUSINESS CASE APPROVAL SHEET

<b>1 Review &amp; Technical Approval</b>			
Project title	Malton, Norton, Old Malton Flood Risk Mitigation		
Authority project reference		EA reference	
Lead authority	No	Date of submission	
Consultant	WSP		
<p>I confirm that this project meets our quality assurance requirements, environmental obligations and Defra investment appraisal conditions, that all internal approvals, including member approval, have been completed and recommend we apply to the Environment Agency for capital grant and local levy in the sum of £</p>			
<b>Job title</b>	<b>Name</b>	<b>Signature</b>	<b>Date</b>
Authority Project Executive			
<p>I have reviewed this document and confirm that it meets the current business case guidelines for local authority and Internal Drainage Board applications.'</p>			
OBC reviewer			
<p>I confirm that the project is ready for assurance and that I have consulted with the Director of Business Finance'</p>			
Area Flood & Coastal Risk Manager			
<b>Assurance sign off</b> - (Tick the appropriate box)			
AFCRM Assurance <input type="checkbox"/> Projects < £500k Or Projects < £1m (if GiA & Levy <£500k)		NPAS Assurance <input type="checkbox"/> Projects £500k - £2m	
<b>Recommendation for approval</b>			<b>Date</b>
AFCRM or NPAS Chair			
Project total as approved (£k)		Version Number	
Project total made up of :	Capital Grant (£k)		
	Levy (£k)		
	Other Contributions (£k)		

<b>2 Project Financial approval</b>				
Financial scheme of approval	Project total	Name	Signature	Date
Area Flood & Coastal Risk Manager	<£100k or <£1m (if GiA & Levy <£100k)			
Director of Business Finance	All projects >£100k			
<b>Plus:</b>				
Area Director	£100k- £1m			
Director of Operations	£1m -£10m			
<b>3 Further approvals (if applicable)</b>				
Date sent (or N/A)			Version number (if different)	
Date approved (or N/A)				
Final Comments				

**For FSoD Coordinator use only:**

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# 1 Executive Summary

The Malton, Norton, Old Malton Flood Management Scheme is a project partnership between North Yorkshire County Council, Ryedale District Council, Environment Agency, York/North Yorkshire/East Riding Enterprise Partnership, Malton/Norton Town Council, and Yorkshire Water, which seeks to address the high level surface and ground water flood risk to Malton, Norton and Old Malton (Ryedale). Without intervention, the risk of flooding within these communities will remain high (at greater than 1 in 10 chance of flooding in any given year).

The proposed plans build on the operational response that has been led by Ryedale District Council in partnership with the EA, YW and NYCC for the past 25 years. The plans have been constantly refined, therefore the confidence in the ability of the partners to deliver the scheme successfully not only during its implementation but beyond when it is operational, is high.

Funding sources have been agreed in principle to cover all costs for the lifetime of the scheme and at this stage of development are summarised below:

Funding Source	Confirmed Funding	2018/2019	2019/2020	2020/2021	Total
North Yorkshire County Council	Yes	£30,000	£70,000	£350,000	Up to £450,000
Ryedale District Council	Yes	£0	£0	£320,000	20% of total project costs up to £320,000
Environment Agency	No	£0	£40,000	£274,846	£314,846
Local Growth Fund	Yes	£0	£0	£500,000	£500,000
<b>Total</b>		<b>£30,000</b>	<b>£110,000</b>	<b>£1,444,846</b>	<b>£1,584,846</b>

Table 1 Total Project Funding by Source

In 2018, WSP completed an initial assessment that confirmed that if the current approach to flood risk management is maintained, 126 residential and 23 commercial properties are at a 1 in 10 chance of flooding in any given year within the target area of Castlegate/Sheepfoot Hill (Malton), St Nicholas Street (Norton) and Malton Road/Lascelles Lane (Old Malton). The surface water management scheme identified, provides estimated whole life cost of £1,619,238 and a benefit cost ratio of 1:20 meaning there is a significant financial incentive to be achieved by implementing the scheme.

## 2 Scheme Summary

### 2.1 Strategic Case

Since the construction of the River Derwent flood defences in 2002, the communities in Malton, Norton and Old Malton have been subject to flooding due to the accumulation of surface water behind the defences as well as being affected by groundwater emergence. This is believed to be due to the fast track nature of the 2002 river defences works, which did not account for surface water and ground water affects. This resulted in a residual risk of flooding to the community from these sources. This has resulted in properties flooding, transport links being disrupted and long periods of temporary pumping taking place during prolonged rain event and elevated river levels. Whilst emergency response plans have been developed for Malton, Norton and Old Malton, the frequency and duration of the responses by flood risk management authorities is considered unsustainable and still results in properties flooding due to insufficient resources and supporting infrastructure hence a more robust system is being sought.

Options to resolve the issue by delivering a higher standard of protection are limited by their cost and feasibility, however over time the emergency response to the incidents has been refined and demonstrated that, if it is swift enough and fully resourced, it can be successful in ameliorating the issues.

This scheme therefore seeks to provide the infrastructure to enable an optimum management response, through the provision of permanent infrastructure that makes pumping quicker.

The options appraisal for the Malton Norton and Old Malton scheme established a set of investment objectives for the project. These are summarised as follows:

1. To identify effective and sustainable flood risk management measures for the community of Malton, Norton and Old Malton
2. To make best use of all potential funding opportunities to deliver flood risk management measures
3. To improve knowledge and understanding of flood risk and management responsibilities within NYCC and amongst partners, stakeholders, communities and the media
4. To provide flood risk management measures that deliver social, economic and environmental benefits
5. To provide a greater role for communities in managing flood risk

The Malton, Norton and Old Malton Flood Management Project has been included in the Environment Agency's Medium Term Plan. It is recognised that the development of the scheme was subject to securing additional funding. As the project has developed and the options have been rationalised, the value of the project has fallen significantly. The anticipated funding required is therefore now agreed in principle, enabling the scheme to progress.



## 2.2 Economic Case

As part of this OBC, a pragmatic economic appraisal for options has been carried out.

### 2.2.1 Options Considered:

#### Initial Long List Options:

A long-list of options was identified as part of initial Business Case (OBC) and can be found in Appendix E of this document.

#### Short List Option Key Findings:

Below are the details of the shortlisted option considered and summarises the results from the economic appraisal.

**Option A** - Do nothing/walk away - flood risk would get worse without an emergency response in place.

Almost certain flooding from drainage systems when Derwent reaches critical level occurring potentially annually meaning the decline of the location would increase and its economic viability would be worsened. **(Option Rejected)**

**Option B** - Do minimum - status quo maintained; flooding managed through a multiagency emergency pumping plan and diverted Ryedale services. The frequency and duration of the response by flood risk management authorities is considered unsustainable and still results in properties flooding due to insufficient resources and a lack of supporting infrastructure. Furthermore, assets may not be available from Yorkshire Water or the EA due to prioritisation in other locations. The current framework is reliant on emergency services, old infrastructure, ad-hoc coupling and positioning of pumps. Whilst flooding has been demonstrated to be reduced and managed via this approach, there is a significant risk presently that flooding will occur if pumping does not commence swiftly enough, hence a more robust system is being sought. **(Option Rejected)**

**Option C** - Delivery of infrastructure to enhance/complement management approach.

This has been demonstrated as affordable but also gives an uplift to the location and a more robust organisational management response to flooding. In essence, it takes the present emergency response, which relies on in-house resource and the available infrastructure and transforms it into a managed response, with the infrastructure required to make this response as efficient as possible.

A contract agreement is due to be awarded by NYCC and RDC, which introduces a more formalised management response through a third party contractor, to ensure that operational staff are always available and that operations are dedicated to the location and not influenced by extraneous factors. **(Preferred Option).**



**Option D - Full Flood Mitigation Measures** - increasing capacity of sewer pumping station/diverting watercourses/permanent pumps in surface water drains. This option would significantly reduce the risk of future flooding in the towns and would remove the requirement for emergency response. The enabling works to the full Yorkshire Water System required to make the sewer pumping capacity viable are estimated by Yorkshire Water to be beyond £20,000,000, making this option unviable. Permanent pumps would reduce the ability to respond elsewhere using the pumping equipment if required. It would also be difficult to find an asset owner, given that there is not an organisation responsible or with the expertise to take this responsibility on.

The diversion of the watercourse has significant risk associated with it given there are connections to it which would also need to be diverted, and this may make the project unviable. Work to undertake additional modelling to deliver this would also be disproportionately costly to the outputs of the project. Even at outline high level preparation it is clear this is a prohibitively expensive option which is likely to be unpopular with some residents who will see the watercourse as a positive amenity.  
**(Option Rejected)**

### 2.2.2 Preferred Way Forward

The “SWOT” and economic analysis for the project has concluded that: Option C satisfies the wider project objectives to a greater extent than a “Do Minimum Scenario,” and Option D.

PV Cost for Approval (Appraisal, Design, and Construction) of Preferred Option C is £1,408,214.

Benefit cost ratio is 1:20

Contributions of £314,846 are required to progress Preferred Option C with an adjusted PF score of 152%

To date the project has attracted £1,093,367, which equates to 78% of the total contributions required to achieve a fully funded scheme.

## 2.3 Commercial Case

Through a change of working delivered in 2017/18, the Procurement service has been given an explicit set of targets to achieve savings across the Council. These savings will be generated through demand management, better purchasing and improved contract management arrangements.

The Procurement and Contract Management Strategy (2018-2022) is contained in the Council's constitution, and can be found in Appendix F.

## 2.4 Financial Case

### 2.4.1 Summary of financial appraisal

The projected project financial summary is presented below.

<b>Expenditure Type</b>	<b>2018/2019</b>	<b>2019/2020</b>	<b>2020/2021</b>	<b>Total</b>
<b>Business case preparation</b>	£30,000	£0	£0	£30,000
<b>Design/permissions/surveys</b>	£0	£77,160	£62,700	£139,860
<b>Pump Infrastructure Construction</b>	£0	£0	£82,949	£82,949
<b>Property Level Resilience</b>	£0	£0	£745,000	£745,000
<b>CCTV</b>	£0	£0	£38,058	£38,058
<b>40% Optimism Bias</b>	£0	£30,864	£371,483	£402,347
<b>Total</b>	<b>£30,000</b>	<b>£108,024</b>	<b>£1,300,190</b>	<b>£1,438,214</b>

**Table 2 Total Project Funding By Expenditure Type**

Ongoing yearly expenditure to maintain the operational contract commitments for the scheme. This will be afforded by NYCC and RDC and part of their ongoing obligation.

<b>Management Operational Contractor Costs (pa)</b>	£0	£0	£20,000/pa	£0
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**Table 3 Ongoing Cost, Post Project**

## 2.4.2 Overall Cost

The current overall costs and impact of the project over its expected lifespan is summarised below.

	Whole-life cash cost	Total Project cost (approval)
Cost up to OBC	£30,000	Exc previous applications
<u>Costs after OBC</u>		
Main Contractor's Preliminaries including access	£11,399	£11,399
Cost of Professional Advice	£8,505	£8,505
Site investigation and survey	£30,740	£30,740
Property Survey works	£98,340	£98,340
Permits, Planning Permission & compensation	£2,275	£2,275
Pump Infrastructure Construction	£96,627	£96,627
Installation of PLR works	£745,000	£745,000
Main Contractor's Construction Risk	£12,980	£12,980
<u>Risk Contingency (See s.12 of the Grant Memorandum)</u>		
Risk or Optimism Bias	£402,347	£402,347
Future cost (construction + maintenance)	£1,438,214 plus £20,000 per annum	N/a
<b>Project total cost</b>	<b>£1,438,214 plus £20,000 per annum</b>	<b>£1,408,214</b>

**Table 4 Summary of Costs over the Project Lifecycle**

## 2.5 Management Case

### 2.5.1 Project Management

The Business and Environmental Services Directorate of North Yorkshire County Council retains accountability for project delivery and operation. The project will be delivered with operational direction from a multi-organisational working group comprising of NYCC, RDC, EA, LEP, Consultants/Contractors and stakeholder representative (elected member). The multi-organisational working group will ensure

that the scheme meets and is focussed on end-user needs and any operational changes will be reported to and managed by this group as business as usual.

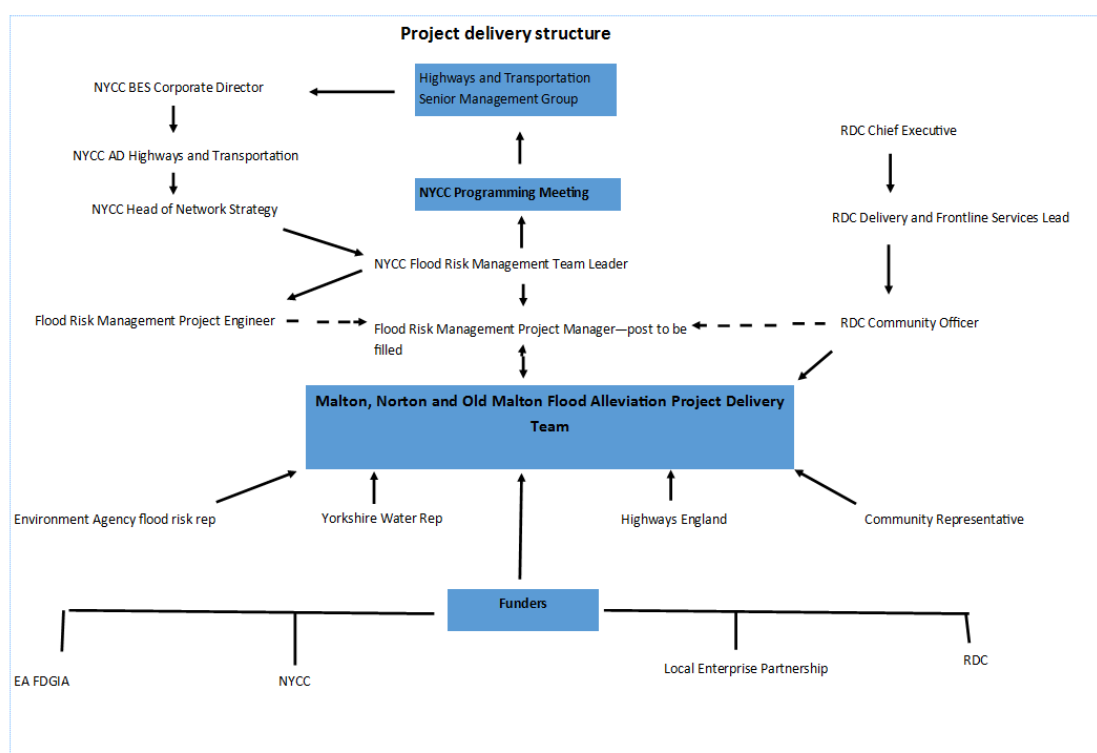


Figure 1 Project Management Framework

Major changes to the scope or costs of all capital projects would be dealt with in liaison with senior officers at Ryedale District Council, but ultimately decisions would be considered and taken at monthly meetings of the Highways and Transportation Heads of Service and are also subject to scrutiny by a Business and Environmental Services Capital Projects Board of senior officers.

Costs will also be reported directly to the EA on a quarterly basis in relation to its funding.

## 2.6 Recommendations

The Malton, Norton and Old Malton scheme seeks to address the residual surface water and groundwater flood risk, resulting from the construction of the River Derwent's flood defences (2002). Without intervention the level of flood risk will remain very significant (at risk from a 1 in 10-year event and above).

This Business Case report has appraised a number of Flood Risk Management options, and has concluded that **Option C**: Delivery of infrastructure to enhance/complement the existing management strategy, is the preferred way forward

## 3 The Strategic Case

NYCC has investigated the feasibility of implementing a flood management programme of work for Malton, Norton and Old Malton since February 2015. This OBC represents the final deliverables for the flood management appraisal. The purpose of this document is to demonstrate the case for investment in a scheme to deliver strategic measures to manage surface and ground water flooding to residents and businesses, with a view to supporting future economic and social development.

### 3.1 Introduction

Malton, Norton and Old Malton are located on the River Derwent, 16 miles north east of York. All 3 communities, which form a single urban area, have a long history of flooding from the Derwent (see Appendix A), and were particularly badly affected in 1999 and 2000. The Regional Flood Defence Committee requested that the EA fast-track a project to reduce flood risk in the town. This led to the £9m Malton Flood Alleviation Scheme being completed in 2002. The defences comprised a combination of earth embankments (at Old Malton) and floodwalls (through the town centre) to prevent flooding from the river. Pumps were installed at the outfalls of Mill Beck and Priorpot Beck (Internal Drainage Board watercourses that are now Main River).

Since the construction of the Derwent defences, communities have been subject to more frequent albeit lower impact flooding, with repeated incidents occurring due to the accumulation of surface water behind the defences as well as being affected by groundwater emergence. The fast track nature of the 2002 river defence works did not allow surface and ground water to be considered. The remaining residual risk of flooding to the community is from these sources. This has resulted in internal property flooding including from the sewer, transport links being disrupted and long periods of temporary pumping taking place. It is anticipated that the influence of flooding, in relation to associated damages, economic growth and safeguarding residents will be exacerbated, as Climate Change becomes more prevalent in the future.

Significant flooding occurred in Malton, Norton and Old Malton in November 2012, when 20 properties flooded. The area's most significantly affected are as follows:

Location	Highways
<b>Malton</b>	Railway Street
	Wells Lane
	Sheepfoot Hill
	Castlegate ( <b>See Figure 1 Below</b> )
	Chandlers Wharf
<b>Norton</b>	Norton Road
	Church Street ( <b>See Figure 2 Below</b> )
	Welham Road
	St Nicholas Street
<b>Old Malton</b>	Town Street ( <b>See Figure 3 Below</b> )
	Lascelles Lane

Figure 2 Highway Flooding Locations  
In Malton, Norton and Old Malton

- Malton

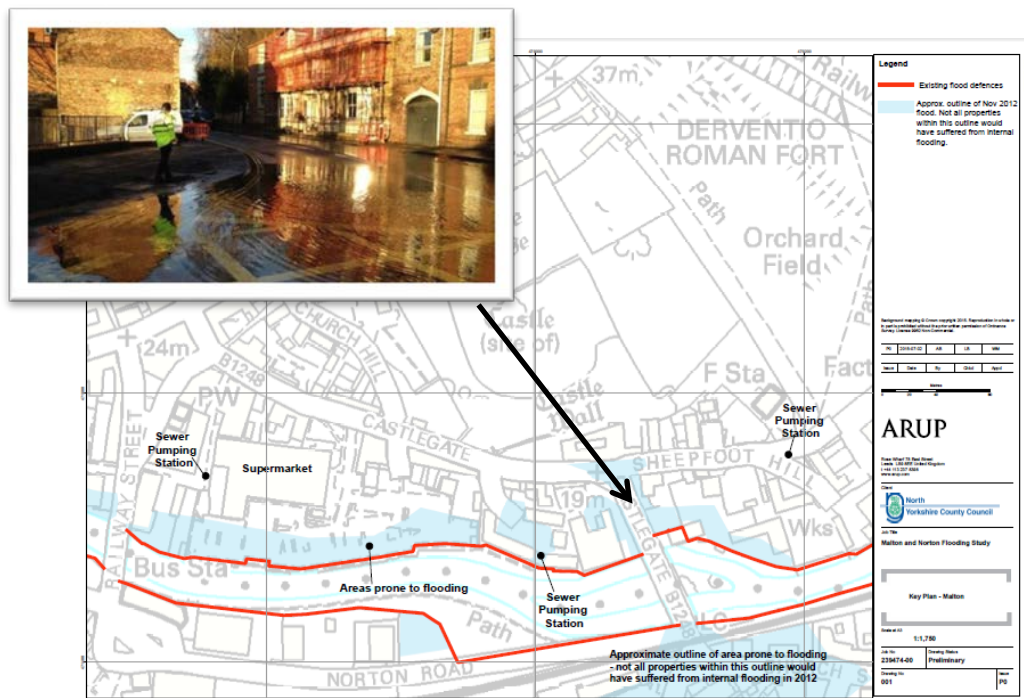


Figure 3: Outline for November 2012 Flooding – Malton

- Norton

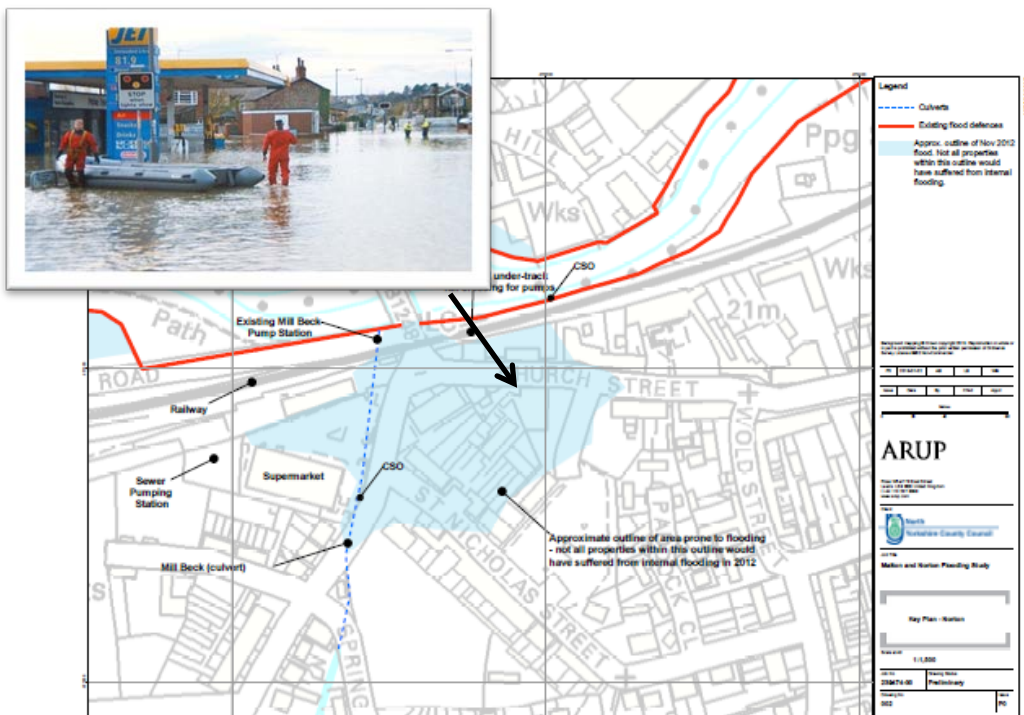


Figure 4: Outline for November 2012 Flooding – Norton (Arup, 2015)



- Old Malton

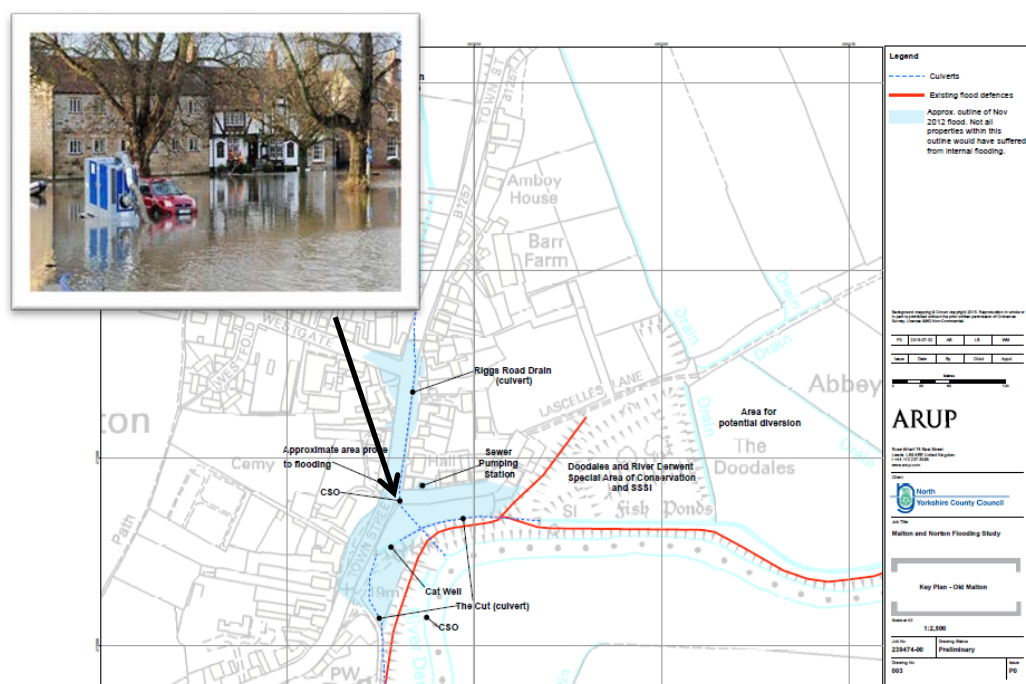


Figure 5: Outline for November 2012 Flooding – Old Malton

## 3.2 Source of Flooding

A desk top analysis investigation (Arup, 2015) categorised the flooding types for each location, with a rating of confidence attributed to each:

Location	Source of flooding						
	Main Rivers	Surface water (on the highway)	Surface water (other source)	Public sewerage systems	Ordinary water-courses	Ground water	Reservoirs
Castlegate and Sheepfoot Hill, Malton							
Railway Street, Malton							
Welham Road, Church Street and St Nicholas Street, Norton							
Old Malton Road, Old Malton							
<b>Confidence in source of flooding:</b>							
	High Confidence						
	Reasonable confidence						
	Evidence collected suggests this could potentially be a source of flooding						
	No evidence on source of flooding available						
	Source of flooding not relevant at this location						

Table 5: Flood Types by Location



In Malton, the primary mechanism was natural elevation of groundwater levels, with some surface water overland flow flooding.

In Norton, the primary mechanism was surface water overland flow and capacity exceedance of the sewer systems, in particular noting the mechanism of penstock closure of the combined sewer overflow to Mill Beck resulting in surcharging near St Nicholas Street.

In Old Malton, the only noted mechanism was ordinary watercourse flooding of the Riggs Road Drain.

### 3.3 Baseline Risk

The maps below (Figures 4-6), illustrate a “Do Nothing” scenario for up until a 1 in 1000-year storm event. The “Do Nothing” assumption is that the River Derwent flood defences remain intact, but the penstocks and flaps protecting drainage systems from ingress by the Derwent fail in the open position. The “Do Nothing” water levels are therefore set by levels from the Derwent.

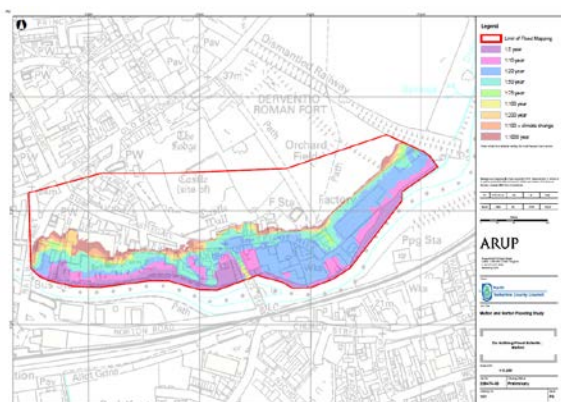


Figure 6: Do Nothing Scenario – Malton

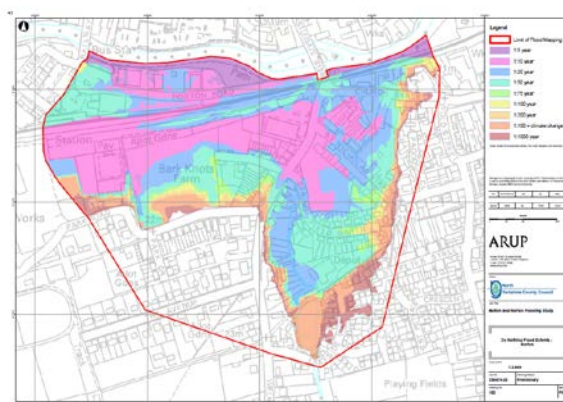


Figure 7: Do Nothing Scenario - Norton

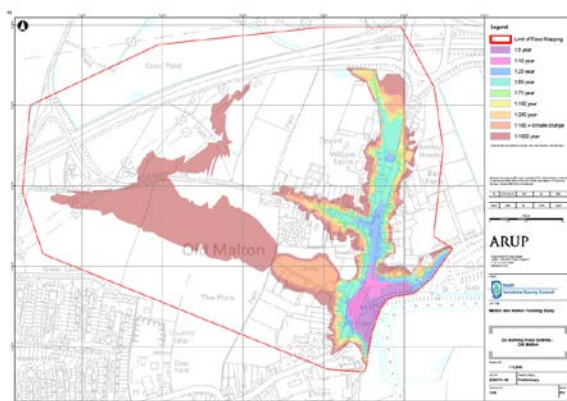


Figure 8: Do Nothing Scenario – Old Malton

### Residential Properties:

The numbers of residential properties at risk of internal flooding for a range of flood events are shown in Table 3 – Residential properties at risk by return period. Values are derived from WSP Economic Business Case Study; Malton, Norton and Old Malton, 2018 (See Appendix B).

The number of residential properties and the depth of flooding are used to assess the economic losses and the financial losses for Malton, Norton and Old Malton. This is assessed over a one-hundred-year appraisal period and presented as a net present value (NPV).

Return Period	2yr	5yr	10yr	25yr	50yr	100yr	200yr	500yr	1000yr
Properties At Risk	2	30	88	140	174	206	217	237	239

**Table 3:** Residential properties at risk by return period

## 3.4 Current Arrangements

### 3.4.1 Emergency Response and Recovery

A Multi-Agency Flood Group was formed after 2012 as a commitment by the relevant risk management authorities to look at ways in which the residual risks might be further reduced and more actively managed.

The group consists of representatives from:

- North Yorkshire County Council (NYCC)
- Environment Agency (EA),
- Ryedale District Council (RDC), and
- Yorkshire Water (YW) Services

### Operational Response

As levels in the River Derwent rise, automatic alerts trigger the Environment Agency to issue alerts and warning to properties at risk, to risk management authorities and to initiate predefined operational responses. Water levels are monitored via telemetry and via manual site observations and as triggers are reached additional actions are implemented as the situation escalates. There is a set command and control structure established which enables North Yorkshire Local Resilience Forum (NYLRF) to come into action to coordinate the response. This response is based on information and actions defined in the Malton Pumping Plan, as agreed by RDC, NYCC, the Environment Agency and Yorkshire Water (see Appendix C).

The Environment Agency operate the riverside defences, RDC provide local support to the community in the form of providing sandbags and monitoring the welfare of residents, Yorkshire Water monitoring the performance of the sewer system and pumping station and NYCC monitor the operation and safety of the road network. This all feeds into the Flooding Advisory Service communications within the North Yorkshire

Local Resilience Forum (NYLRF), and enables decisions to be made about bringing the pumping plan into action.

It is noted that even with the invoking of the plan, in some instances the operation of pumps may require the closure of some highways to discharge flood water to a suitable outlet. The purpose of the plan is to reduce the accumulation of flood water at a location to limit the extent of damage from flooding and to reduce the duration of flooding to allow everyday day life, and in particular traffic flow, to return to normal as soon as possible.

Whilst flooding has been demonstrated to be reduced and managed via this approach, there is a significant risk presently that flooding will occur if pumping does not commence swiftly enough. This may be jeopardised if Yorkshire Water's or the Environment Agency's pump are prioritised to other locations around the region. Furthermore, the frequency and duration of the responses by the authorities is considered unsustainable in relation to manpower allocation and serviceability of the equipment, hence a more robust system is being sought.

### 3.4.2 Highways

NYCC undertook a case study for Malton following the 2012 flooding events across the county. The attached economic appraisal contains a table demonstrating the highways in Malton that were recorded by NYCC as flooding in 2012 (also see Table 1 in section 2.1 of this document).

The effect of flooding to highways limits accessibility for residents, businesses and emergency responders. Main thoroughfares such as Town Street in Old Malton, Castlegate in Malton and Church Street in Norton can become impassable and hence traffic circulation becomes impaired and can result in the need for lengthy detours as it becomes necessary to adopt traffic restrictions and diversions in times of flood. This can leave some parts of the community isolated and vulnerable and can also restrict access for emergency pumping operations or relief efforts being provided to individuals.

Following the 2015 incident, NYCC Highways and Yorkshire Water Infrastructure Services installed an under road/rail track crossing for a permanent duct for pumping, to minimise disruption during events and to allow pumping to continue without the necessity for full closure of Church Street, Norton. The permanent duct under the rail tracks was carried out under a separate FdGiA scheme.

This has been relatively successful, but the ducts and infrastructure on the footpath require additional improvement to minimise the disruption further.

In Old Malton flooding prevents traffic movement along the B1257 between Malton and the A64 roundabout, placing a greater demand on already congested roads in Malton. Flooding on Castlegate and Church Street prevents the flow of traffic across County Bridge between Malton & Norton. In addition, flooding at Sheepfoot Hill

impairs access to homes, businesses and the local Fire Station. The Fire & Rescue service are a key player in responding to flooding in Malton and it is important to sustain their access for them to make their vital contribution as an emergency responder.

Note: The impact of disruption to traffic flow by flooding has been assessed as of part of the calculation of economic and financial damages.

### **3.5 Business Strategies and Policy Practices**

Given the large number of parties involved and the significance of flooding issues in the local area it is important to establish the context and status of Malton Norton and Old Malton in the wide range of strategic plans and documents that are in place. This section sets out some of the plans in place and summarises how the community is recognised as a key location where flooding problems are highlighted for action. This seeks to emphasise not only the large number of organisations that have an interest in flooding at Malton, Norton and Old Malton, but also that so many have set their sights on further activity towards managing the risk of flooding at this location.

#### **3.5.1 Project Partnership Links**

The Malton, Norton and Old Malton Flood Management Scheme have associated links between the following organisations:

**North Yorkshire County Council - Plan for Economic Growth, Enabler 1; Create high quality places, increased housing provision and green infrastructure.**

The project will support the aspirations of North Yorkshire County Council, to deliver vibrant local communities and to support local regeneration projects, ensuring the sustainability and resilience of the County's market towns and the communities they serve.

**York, North Yorkshire and East Riding, Strategic Economic Plan - Priority 4, Successful and Distinctive Places.**

This project will enable a stable rural economy in Ryedale and will create parity in terms of local business resilience, local land values and local prosperity in an area which currently suffers from lack of investment and neglect due to the frequency of local flood events.

**UK Industrial Strategy - Places, to have prosperous communities throughout the UK.**

Malton and Norton are key local service centres in Ryedale District serving a wide rural population. The success of these locations is therefore important to the wider area and this project will deliver increased economic activity in these towns.

## **Ryedale District Economic Action Plan 2016 - 2020 - Successful and Distinctive Places.**

Malton and Norton is the primary market town in Ryedale District and has become successful in developing an identity as Yorkshire's Food Capital. This project will support this work and deliver the District Council's aspirations by addressing a key area of under investment and neglect which links key economic areas in Norton and Malton.

### **3.5.2 National, Regional and Functional Strategies**

#### **North Yorkshire County Council - Local Flood Risk Management Strategy**

The Strategy is a legal document which provides a framework for addressing flood risk across the county. The development, maintenance and implementation of a strategy for the management of Local Flood Risk are statutory duties for the LLFA under the FWMA. The act defines 'Local Flood Risk' as flooding from ordinary water courses, surface water and groundwater. However, NYCC recognised the importance of dealing with flood risk from all sources in a coordinated way, and so their strategy has been developed to reflect this.

#### **North Yorkshire County Council – Resilience and Emergencies Unit – Emergency Plan**

The Resilience and Emergencies Unit (REU) is responsible for planning for a wide variety of potential incidents and emergencies that could affect the population of North Yorkshire.

The REU supports regional and national responses, working with partner agencies in ensuring a co-ordinated effort to minimise disruption. The unit works on behalf of the County Council and six of the seven district councils in the county.

As part of this work, the unit also provides advice to the public, communities and businesses on making themselves more resilient. The officers in the unit are on call at any time to provide immediate assistance to support the emergency services, acting as liaison officers to co-ordinate the local authority response if necessary.

#### **North Yorkshire Local Resilience Forum**

NYLRF is a partnership of local agencies working together to prepare for, respond to and recover from potential major incidents and emergencies via the duties stated in the Civil Contingencies Act 2004 (CCA). The Forum is made up of key responders in the community such as police, fire, utility providers and health, who come together to plan for and respond to the risks in North Yorkshire. They provide information on how to prepare for an emergency, define how local responders work together to help protect individuals, the community and businesses to ensure North Yorkshire is



prepared. They provide immediate information in the event of any emergency via the local media and organisations directly involved.

### **Humber River Basin District Flood Risk Management Plan 2015 – 2021**

The Derwent (Humber) is one of fifteen Management Catchment areas within the Humber river basin district. It describes Malton as amongst the key communities that are at risk of flooding. The plan records the history of flooding at Malton & Norton and highlights impacts of groundwater flooding in 2012 and 2015/16. It describes how the river is groundwater-fed and that river flows are dependent upon levels in main aquifers. It confirms that water levels at Malton and Norton can remain high for several days after heavy rainfall. It concludes that the flood risk is a complex interaction between river, surface water and groundwater. The plan recognises the establishment of the North Yorkshire Flood Risk Partnership. It highlights the research undertaken and the wider range of partners engaged in reducing runoff in areas upstream of Malton and Norton.

### **Derwent Catchment Flood Management Plan (CFMP - Dec 2010)**

CFMPs help us to understand the scale and extent of flooding now and in the future, and set policies for managing flood risk within the catchment. CFMPs should be used to inform planning and decision making by key stakeholders.

### **Yorkshire Water (YW) - Our Blueprint for Yorkshire – The Next 25 Years (Updated Dec 2013)**

YW have commissioned WSP to develop its drainage areas plan for the Malton area. This involves assessing its sewer networks to determine how they operate and identify improvements for inclusion in their future capital works programme. The ongoing study is due to complete later in 2018/2019 and will be useful in determining the improvements needed to address flooding associated with the sewer system.

### **Highways England**

An expression of interest has been made to Highways England for funds to develop a scheme for Old Malton, given that the A64 drainage system connects to Riggs Road Drain, which flows through Old Malton and eventually discharges into the River Derwent. Work continues with Highways England to identify its proportional responsibility for flows in Riggs Road Drain.

### 3.6 Investment Objectives

The options appraisal for the Malton Norton and Old Malton scheme established a set of investment objectives for the project. These are summarised as follows:

1. To identify effective and sustainable flood risk management measures for the community of Malton, Norton and Old Malton
2. To make best use of all potential funding opportunities to deliver flood risk management measures
3. To improve knowledge and understanding of flood risk and management responsibilities within NYCC and amongst partners, stakeholders, communities and the media
4. To provide flood risk management measures that deliver social, economic and environmental benefits
5. To provide a greater role for communities in managing flood risk

### 3.7 Main Benefits

This section describes the main outcomes and benefits associated with the implementation of the potential scope in relation to business needs.

The main outcomes of implementing measures will be a reduction in the risk of flooding. The damage arising due to flooding has been calculated based on the impacts on residential and non-residential properties (including costs of clean up and drying out), evacuation costs, intangible damages, vehicle damages, in addition to allowances for emergency services costs and damage to utilities. Damages associated with risk to life, traffic disruption, rail disruption and loss of business have not been included. However, traffic disruption due to existing emergency pumping arrangements and the impairment of traffic routes during flooding could provide additional benefits.

The benefits associated with each option have been assessed in terms of flood damages avoided, relative to a baseline. This follows the principles of the FCERM-AG with Arup's in house flood damage calculation tool, "Floodlight," used to calculate flood damages in line with the processes set out in the Middlesex University Flood Hazard Research Centre's "Multi-Coloured Manual" (MCM) of 2018.



Satisfying the potential scope for this investment will deliver the following high-level strategic and operational benefits. By investment objectives these are as follows:

Investment objectives	Main benefits criteria by stakeholder group
<b>Investment objective 1:</b> To identify effective and sustainable flood risk management measures	<ul style="list-style-type: none"> <li>• Solutions that deliver economic benefits in £'s to the individual and combined communities of Malton, Norton and Old Malton.</li> <li>• Solutions that will continue to manage risk in short, medium and long term.</li> </ul>
<b>Investment objective 2:</b> To make best use of all potential funding opportunities	<ul style="list-style-type: none"> <li>• Maximise cost benefit ratio to provide best return of funding available</li> <li>• Solutions that maximise the allocation of FDGiA funding.</li> <li>• Identify and explore funding opportunities from a range of stakeholders</li> </ul>
<b>Investment objective 3:</b> To improve knowledge and understanding of flood risk and management responsibilities within NYCC and amongst partners, stakeholders, communities and the media	<ul style="list-style-type: none"> <li>• Clarify the role of the RMA's operating in the community and confirm who is responsible for the management of which assets in this community.</li> <li>• Improve provision of flood warning for all types of flooding.</li> </ul>
<b>Investment objective 4:</b> To provide flood risk management measures that deliver social, economic and environmental benefits	<ul style="list-style-type: none"> <li>• Reduce the threat posed by flooding so that anxiety in the community is reduced.</li> <li>• Enable the location to thrive as a desirable place to live and to visit as a tourist destination.</li> <li>• Conserve and enhance the environmental character of the location</li> </ul>
<b>Investment objective 5:</b> To provide a greater role for communities in managing flood risk	<ul style="list-style-type: none"> <li>• Actively engage the local community to be prepared to respond to the threat of flooding through developing their emergency response plans, improving awareness of what to do when flooding is anticipated and where to get support.</li> </ul>

**Table 6: Main Benefits in Relation to Investment Outcomes**

There are also a number of additional benefits that could be obtained by implementing options that integrate or support environmental enhancements, habitat creation, WFD improvements and chemical water quality improvements. There is also potential to generate ecological enhancements or deliver these through mitigation within the study area.

### 3.8 Main Risks

The main business and service risks associated with the potential scope for this project are shown below, together with their counter measures.

Key Project Risk	Counter Measures
Assessment of Whole life costs / benefits of options changes resulting in options being unviable.	Use QS and ECI to support development of robust cost estimates including quantification of risks to provide cost certainty - optimism bias and risk elements included in calculated outline costs. Some elements of the scheme can be scaled to fit available budget and not risk the fundamental deliverables.
Programme delays - increase or risk register programme cost sum is too low	Develop a programme through to completion of works to record all actions/ tasks required and how these interact to define and establish target dates and key milestones for the project
Consents & permits required – Consents & permits approvals withheld	Liaison with EA and LA's to determine whether consents and permits are required, the issues/concerns to be addressed, and the timescales for determination. As the work seeks to mitigate and improve drainage systems it is unlikely that a well-constructed application would be unsuccessful.
Planning Permission Required/Rejected	This is taken into consideration on the project programme. Early and regular liaison with and involvement of planning officers
Operation & Maintenance requirements not adopted	Formal maintenance agreement between RDC and NYCC is agreed in principle for the infrastructure and is currently being developed.  Maintenance of blue green infrastructure agreed in principle with Malton in Bloom Community rejecting scheme proposals - not accepting property level measures
Community rejecting scheme proposals - not accepting property level measures	Develop a communication strategy for liaison with community, landowners, regulators and partners. Property level resilience is a last measure and the other measures included for delivery should reduce the risk of the requirement of PLP in any case.
Funding gap in overall scheme	Measures prepared with a 40% optimism bias and including consideration of risk. Some measures can

	be scaled up or down to fit budget although it is hoped that scaling back is not required. RFCC not approached for funding project as it was deemed not required.
Future Flooding Occurs	If measures are delivered as intended, this will reduce the risk of future flooding however the scheme does not seek to remove the risk altogether and indeed no flood risk scheme can do so. The measures suggested are the ones most appropriate and tested in terms of offering alleviation in Malton, Norton and Old Malton
Adequate Electrical power supplies for pump stations	This is not a cost beneficial option and temporary pumps will continue to run from generators.
Presence of Services	Estimated costs include an allowance for risk - significant ability to design around presence of utilities and services. Utility plans will be collected prior to onset of detailed design so this could be designed out.
Unknown Geology/Ground Conditions - significant construction costs or abortive design at later stages	Estimated costs include a risk allowance. Most of the measures can be moved to locations where ground conditions will allow. Similar infrastructure (manholes/drains) in all locations where pumping presently is undertaken so risk is low.

**Table 7: Main Risks**

### 3.9 Environmental Risks and Constraints

The River Derwent is recognised for the richness of its environmental character and diversity through its environmental designations. These features need to be conserved and opportunities for their enhancement identified alongside any flood risk management measures implemented. Figure 7 illustrates specific risk areas, with Table 7 providing supplementary details.

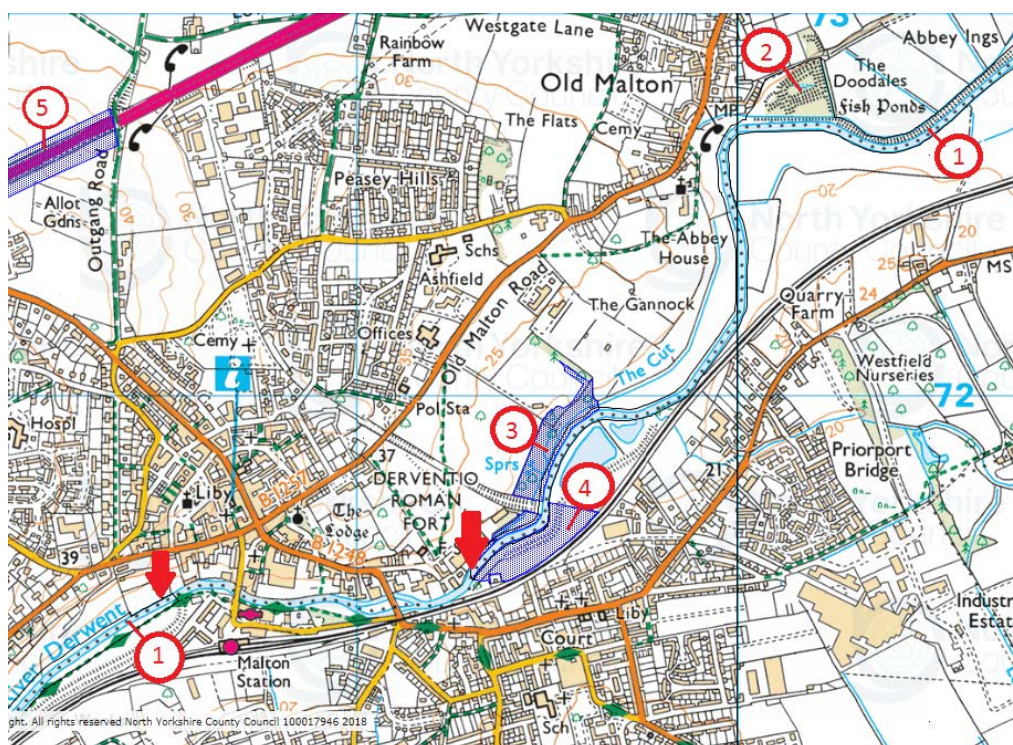


Figure 9: Environmental Risks and constraints  
For Malton, Norton and Old Malton.

No	Designation	Summary	Vulnerabilities
1	River Derwent Special Area of Conservation (SAC) & Site of Special Scientific Interest (SSSI) [NB omits urban section]	<p>Site of European significance (SAC) for: riverine water-crowfoot vegetation; River Lamprey; Sea Lamprey; Bullhead; &amp; Otter.</p> <p>Site of national importance (SSSI) for: species-rich aquatic flora; rich invertebrate communities including notable mayfly assemblage; diverse assemblage of native fish species; riverine breeding bird assemblage.</p>	<p>European Site Conservation Objectives: <a href="http://publications.naturalengland.org.uk/publication/4824082210095104">http://publications.naturalengland.org.uk/publication/4824082210095104</a></p> <p>Changes in hydrology, geomorphology or water quality (including alkalinity, nutrient loads, organic or chemical pollution); introduction of new or additional constraints on natural fluvial processes; introduction of new or additional barriers between river and floodplain outside built areas; impingement on natural/semi-natural riparian habitats, including removal of riparian trees; obstructions to fish movement. Exceedance of critical loads for air pollutants. Changes in river management (e.g. dredging, weed cutting, removal of woody debris for cosmetic reasons). Spread of invasive non-native species (e.g. Signal Crayfish, Giant Hogweed) and introduction/transfer of pathogens through lax biosecurity. Recreational use of currently undisturbed areas likely to be used by Otters. Erection of barriers to Otter movement between river and tributaries or floodplain wetlands (fences, walls etc.). Fish entrapment in water intakes and outfalls. Damage to off-site habitats which are ecologically connected to river (e.g. tributary streams, floodplain wetlands).</p> <p>Lampreys are migratory fish which use clean gravels, silt or sand for spawning and whose young develop in silt beds; Bullhead is a small fish associated with stony riffles (e.g. below County Bridge); Otters are mainly fish-eating, semi-aquatic mammals use river, riparian and floodplain habitats as well as connecting watercourses, using tall/dense vegetation or wooded areas for resting places.</p>



No	Designation	Summary	Vulnerabilities
2	Doodales fish ponds (part of River Derwent SAC/SPA)	Not referred to specifically in designation documents. Medieval fishponds with woodland, scrub and seasonal wetlands.	Hydrological change (though hydrology may be uncertain); changes in water quality; human disturbance; siltation of standing water habitats; lack of management resulting in over-shading of wetland areas and loss of characteristic species.
3	Lady Spring Wood Site of Importance for Nature Conservation (SINC)	Site of district importance. Riparian woodland with spring-fed pools & ditches.	Hydrological change (including changes to groundwater discharge); changes in water quality; removal of dead/decaying timber; spread of invasive non-native species.
4	Norton Ings Site of Importance for Nature Conservation	De-designated but awaiting review. Wet grassland and swamp with shallow standing water (may be groundwater-fed).	Hydrological change (including changes to groundwater discharge); changes in ground and surface water quality; leakage from pumping station conduits; continuing lack of management leading to scrub invasion; spread of invasive non-native species.
5	Malton bypass cuttings Site of Importance for Nature Conservation	Site of district importance. Limestone flora associated with exposures of calcareous gritstone in A64 cutting.	Air pollution; lack of management leading to scrub invasion; indiscriminate use of herbicides.

Table 8: Environmental Risks and Constraints  
for Malton, Norton and Old Malton

### Additional features/considerations:

The town centre section of the River Derwent does not form part of the SAC/SSSI but any activities affecting this length can be assumed to have a potential impact downstream. The omission of the town centre section is not an indication of lower ecological value and it supports features for which the river upstream and downstream is designated as a SAC and SSSI. It is the only known location in Great Britain for the mayfly *Electrogena affinis*.

On the Malton side of the river, the old railway line supports linear woodland habitat.

Woodland habitat around the Lodge grounds: Ryedale District Council has some ecological survey reports.

The entire length of The Cut supports wetland vegetation and invertebrate communities, including some scarce species. This would be vulnerable to pollution or drastic changes in management.



### 3.10 Archaeological Risks and Constraints

The Malton, Norton and Old Malton are recognised for their historic importance and value, including listed buildings, monuments and conservation areas. These features need to be conserved and opportunities for their enhancement identified alongside any flood risk management measures implemented. Figure 8, 9 and 10 illustrates these specific risk areas, with Table 8 providing supplementary details.

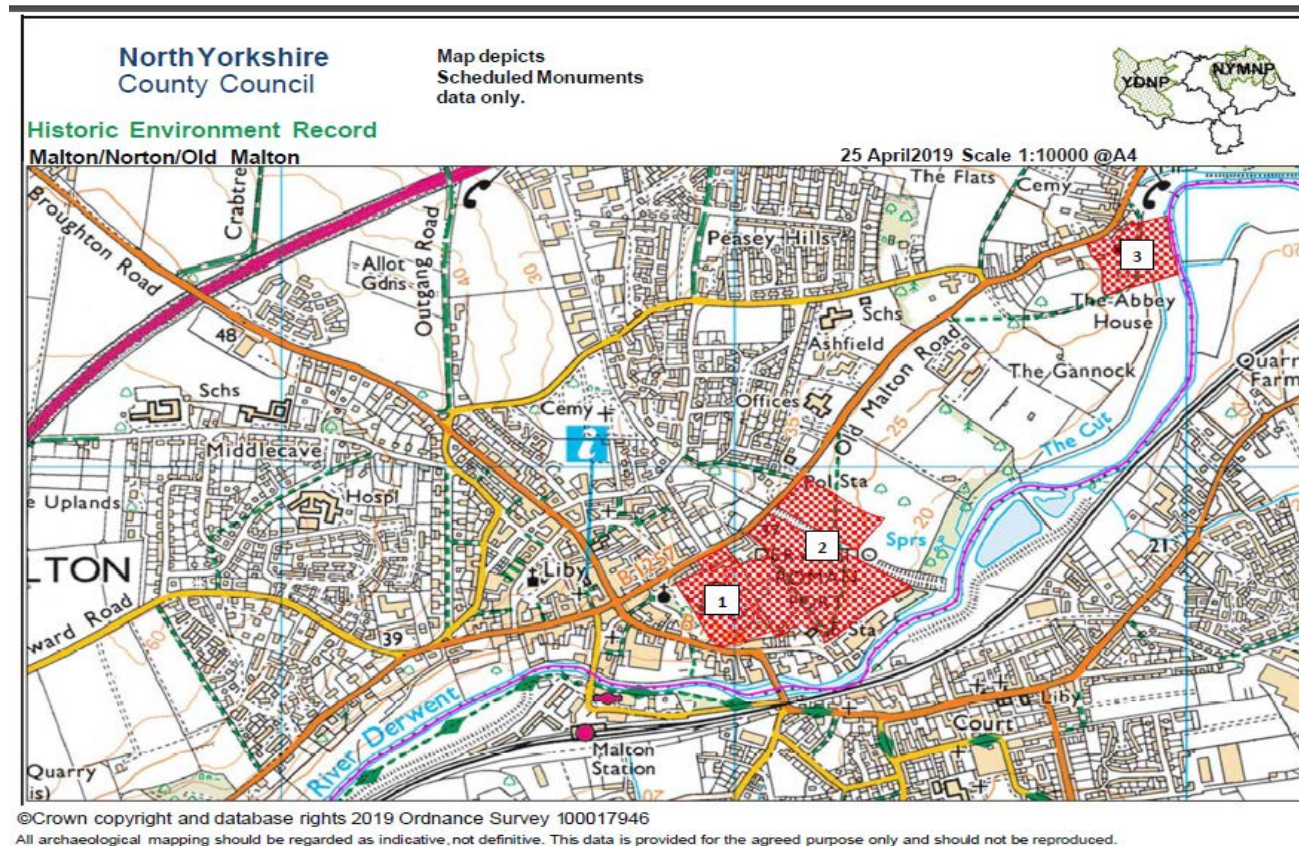


Figure 10: Historic Monuments for Malton, and Old Malton.



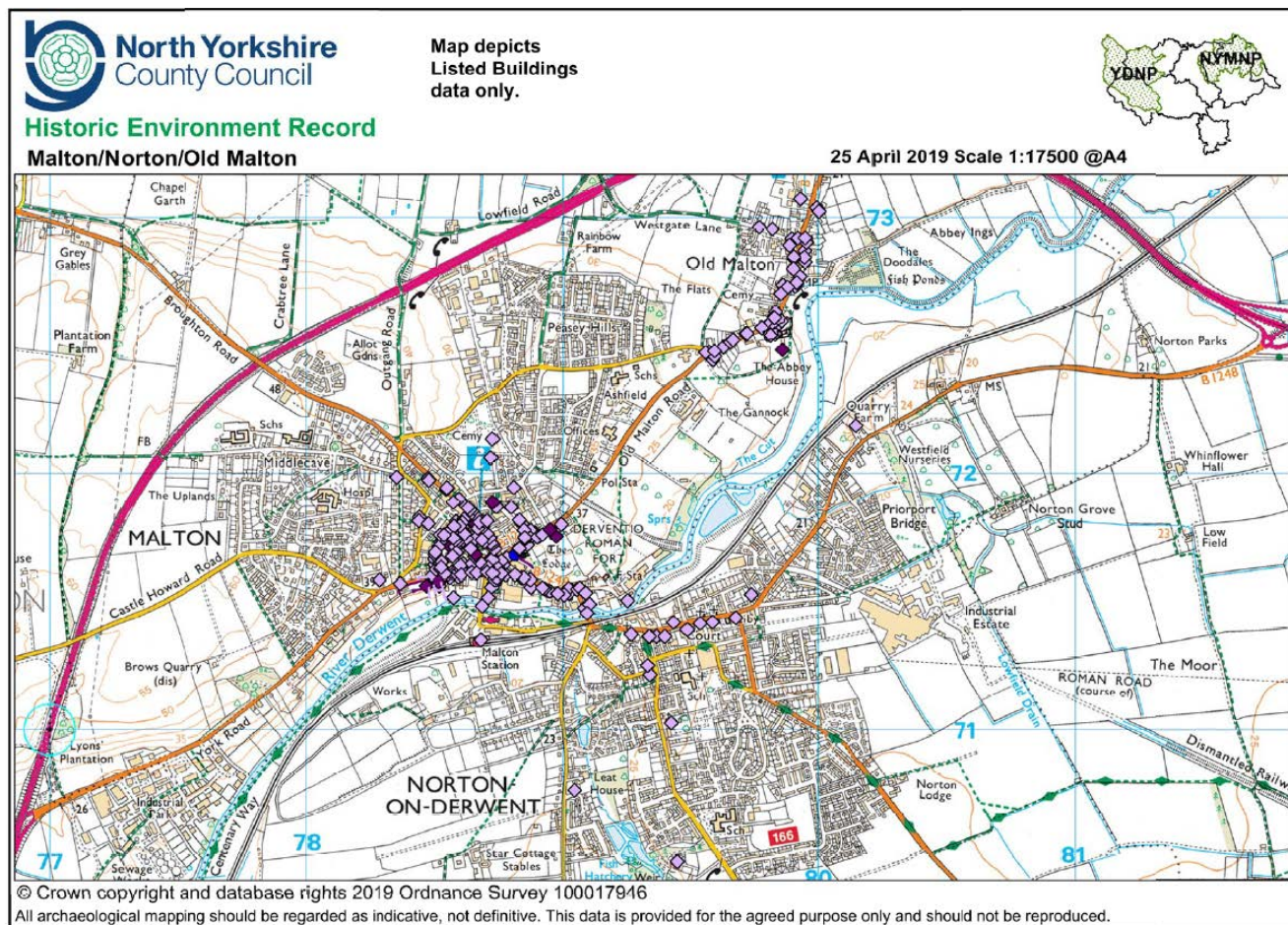


Figure 11: Historic Listed Buildings for Malton, Norton and Old Malton.



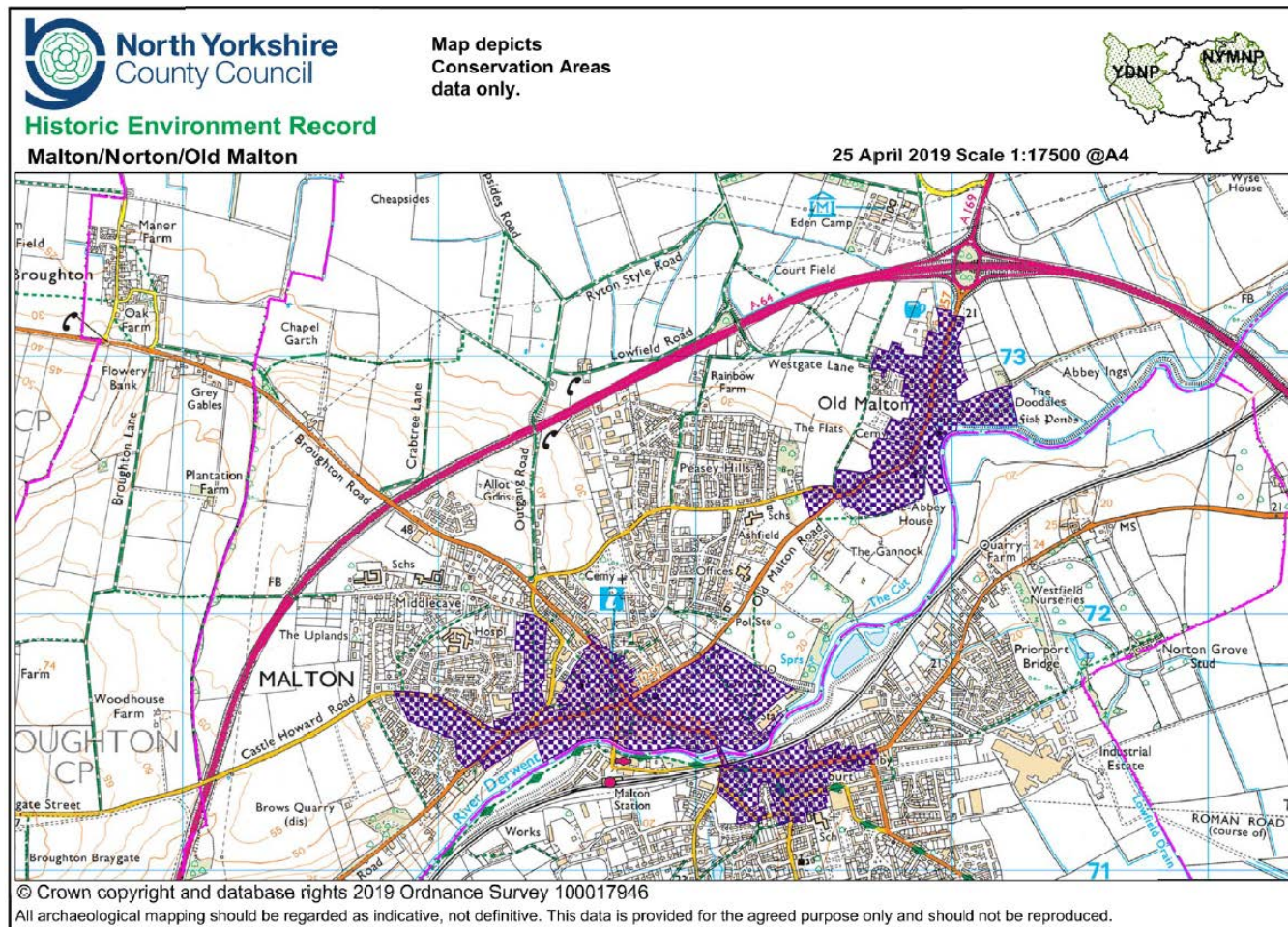


Figure 12: Historic Conservation Area for Malton, Norton and Old Malton.

No	Designation	Summary	Vulnerabilities
1	Scheduled Monument	Malton Castle: - The scheduled area surrounds a 17 <sup>th</sup> century structure known as The Old Lodge, currently a hotel, and although excluded from the schedule this structure is listed Grade II*. The castle occupies a plateau above the River Derwent. It has significant archaeological potential.	<p>Direct physical impact from any new infrastructure. Scheduled Monument Consent would be required from the Secretary of State (advised by Historic England).</p> <p>Potential impact on setting of any new structures or facilities.</p> <p>Changes in hydrology or water quality could have a negative impact on well-preserved organic archaeological remains such as peats or other water-logged deposits.</p>
2	Scheduled Monument	Derventio Roman Fort and Civilian Settlement: - This occupies the same plateau above the river as Malton Castle and is immediately adjacent. The fort is a standard playing card shape and the earthworks of its ditches and embankments survive to varying degrees around its circuit. The fort has an annexe to the south-east and there is an associated civilian settlement, known as a vicus, to the east of the fort.	<p>Direct physical impact from any new infrastructure. Scheduled Monument Consent would be required from the Secretary of State (advised by Historic England).</p> <p>Potential impact on setting of any new structures or facilities.</p> <p>Changes in hydrology or water quality could have a negative impact on well-preserved organic archaeological remains such as peats or other water-logged deposits.</p>
3	Scheduled Monument	Old Malton Gilbertine Priory: - St. Mary's Church and remains of the Gilbertine Priory lie on the west bank of the Derwent to the south of Old Malton. The priory was established in around 1150AD and is a Scheduled Monument.	<p>Direct physical impact from any new infrastructure. Scheduled Monument Consent would be required from the Secretary of State (advised by Historic England).</p> <p>Potential impact on setting of any new structures or facilities.</p> <p>Changes in hydrology or water quality could have a negative impact on well-preserved organic archaeological remains such as peats or other water-logged deposits.</p> <p>Potential for human remains to be present that would require a Ministry of Justice license for excavation.</p>

No	Designation	Summary	Vulnerabilities
4	Conservation Areas	Malton, Norton and Old Malton Conservation Areas: - These form three separate Conservation Areas designated by Ryedale District Council for their special architectural and historic qualities.	<p>Potential impact on setting of any new structures or facilities.</p> <p>Conservation Area Consent from Ryedale District Council may be required for any works.</p>
5	Listed Buildings	There are over 250 individual listings within Malton, Old Malton and Norton. The majority of are clustered within the town centre at Malton with a more dispersed number along Church Street and Commercial Street in Norton and again concentrated in Old Malton along Town Street and Westgate.	<p>Potential impact on setting of any new structures or facilities.</p> <p>Listed Building Consent from Ryedale District Council may be required for any works on a property by property basis.</p>
6	Undesignated Archaeological remains	Roman Occupation: - Evidence for Roman occupation extends much further than the Scheduled Area of the fort and civilian settlement. Roman enclosures interpreted as an earlier fort have been noted in advance of the injured jockey facility at Old Malton Road and various pockets of Roman activity have also been identified within the town centre at Malton and within the back plots of properties within Old Malton. Roman remains are prolific and extensive to the south of the river at Norton where an industrial town was established with widespread evidence of ceramic manufacture. Evidence of human burials is also common including both cremations and inhumations, particularly along the road-sides.	<p>Direct physical impact on any new infrastructure.</p> <p>Changes in hydrology or water quality could have a negative impact on well-preserved organic archaeological remains such as peats or other water-logged deposits.</p> <p>Potential for human remains to be present that would require a Ministry of Justice license for excavation.</p>

No	Designation	Summary	Vulnerabilities
7	Undesignated Archaeological remains	Malton, Old Malton and Norton have also demonstrated well preserved deposits of the medieval period. In the cases of Malton and Norton these are usually represented by former buildings and their associated burgage plots to the rear (yards etc.). These buildings may be well preserved archaeologically representing high status merchant's premises. Deposits in Old Malton would be expected to be more agricultural in nature with farmsteads sets within their own long, narrow plots of land.	<p>Direct physical impact on any new infrastructure.</p> <p>Changes in hydrology or water quality could have a negative impact on well-preserved organic archaeological remains such as peats or other water-logged deposits.</p>
8	Undesignated Archaeological remains	Medieval fishponds at The Doodales. To the north of the Gilbertine priory are a complex of fishponds (The Doodales). The monks maintained these to provide a year round supply of fish (meat was difficult to obtain during the medieval period in the winter months). The ponds would have functioned as fish storage with separate areas constructed for breeding and cultivation. The ponds would have had their own water management system formed from channels, sluices and leats linking them to the river. The fishponds do not form part of the Scheduled Monument but are of equivalent significance.	<p>Direct physical impact on any new infrastructure.</p> <p>Changes in hydrology or water quality could have a negative impact on well-preserved organic archaeological remains such as peats or other water-logged deposits.</p>

Table 9: Archaeological Risks and Constraints for Malton, Norton and Old Malton



### 3.11 Other Constraints

There are a number of constraints to implementing solution for Malton, Norton and Old Malton. By recognising and exploring these it is possible to assess the degree to which they affect the project. Additional works will be required to investigate and confirm these constraints in order to progress solutions. Better understanding may reveal opportunities. The known constraints are summarised below.

#### 3.11.1 External Funding

Full partnership funding has been agreed for the scheme. LEP funding has been agreed. Conditions that had previously been applied have since been met and now await written confirmation of funding. (See Appendix D for details of previous conditions applied).

#### 3.11.2 Funding Allocation - MTP

The scheme is currently identified within the Environment Agency's MTP. Failure to deliver the benefits of the scheme within the specified time constraints may lead to funding being withdrawn.

#### 3.11.3 Pollution

The impacts of contamination by sewer water are more challenging to quantify and are not conventionally included in the appraisal of flood management schemes. Pollution from sewerage systems is an issue for the water company Yorkshire Water.

#### 3.11.4 Partner Objectives

Partner organisations may need their outcomes to be achieved alongside delivering scheme objectives. The need to manage surface and groundwater flooding will form part of the partnership working arrangement with the LEP (Local Enterprise Partnership). Yorkshire Water are also protective of their systems and have other interests in the area.

#### 3.11.5 Contaminated Land

Contamination with heavy metals, asbestos, ash fill, sulphates, hydrocarbons (PCB's, PAH) and solvents is always a possibility when working on or near railways, which will be an issue in Norton. Careful consideration will also need to be given to avoiding utilities, as well as former land uses, in areas where new infrastructure is proposed.

#### 3.11.6 Highways Approval

Currently Highways Authority involvement it is not required, however we will monitor this through the risk register and will consult with Highways should it become necessary.

#### 3.11.7 High Groundwater Levels

The unknown characteristics of the groundwater in Malton and Norton could impact on the effectiveness of technical options being proposed. North Yorkshire County



Council identified the necessity to undertake this hydro-geological assessment of the groundwater conditions near Castle Gardens, in Malton.

The objective of the study was to be able to update the hydrogeological study undertaken by Arup considering new/most recent local groundwater level monitoring data, to confirm relationship between groundwater levels and emergence of groundwater in the Castlegate area.

An assessment of Broughton borehole has identified potential trigger levels to inform early warning or mitigation actions. This information correlates with readings taken at Sundella borehole. Groundwater Flooding in Malton (2019) determined, from previous events, that should the Broughton borehole record 20.00mAOD then there is an 89% chance of flooding. A suggested early warning trigger for Broughton was recommended at 19.5mAOD.

### 3.12 Dependencies

The key project dependencies are:

- **Planning permission** – it is likely that some of the environmental and technical options will need planning permission, which will need to be carefully managed during initial and ongoing consultations. Planning permission is required for the chosen option, with applications made for individual pump locations.
- **Stakeholder / Partner / Public agreement** – in order to secure partnership funding, the Sponsor Group, Flood Group and stakeholders will need to be satisfied that the preferred option delivers the agreed benefits as detailed in later collaborative agreements with the partners /stakeholders. Public consultees will need to be generally in agreement and satisfied that any option has no significant impacts as a result of the project. A public stakeholder event has been held, giving the opportunity for residents to engage with the project. Furthermore, property level resilience has been promoted via letters, leaflets and door to door engagement programme which has been well received so far.
- **Environmental Permit** – Environment Agency staff will need adequate time to review the proposals and agree the methodology, so that it does not impact flood risk in line with the new permitting regulations. Bespoke permit applications are currently being prepared for submission for all pump locations. Initial consultations have taken place with FCRM Officer which haven't highlighted any concerns.

## 4 The Economic Case

### 4.1 Introduction

In accordance with the Capital Investment Manual and requirements of HM Treasury's Green Book (A Guide to Investment Appraisal in the Public Sector), this section of the BC documents the wide range of options that have been considered in response to the potential scope identified within the Strategic Case.

The purpose of the Malton, Norton and Old Malton Flood Management Scheme BC (Economic Case chapter) is to identify the spending option which optimises Value for Money (VFM) through a rationalised options appraisal.

### 4.2 Initial Long List Options

A long-list of options, methodology used and assumptions were identified as part of Outline Business Case (WSP, 2018: See Appendix E for extract).

From the long list analysis appraisal, it was possible to develop a short list of four options for each of the location. The four options are defined below and summarised in Table 9:

- **Option A:** Under this purely theoretical scenario, all spending on activities and infrastructure to reduce flood risk would cease. This allows the benefits afforded by existing spending to be identified and is the baseline required for appraising schemes in line with national guidance.
- **Option B:** Do Minimum option represents the existing situation or status quo scenario for each location.

This option would involve continuing with all existing measures to reduce flood risk, including awareness raising, flood forecasting and warning, development control, community support, emergency pumping (where possible) and maintenance of all existing land drainage, urban drainage and flood defence systems.

- **Option C:** Improve local flood warning procedures and telemetry; offer property level protection to affected properties; retro-fit sustainable drainage - enhancing the street scene and reducing the volume of water entering the combined sewer; construct permanent pumping chambers - in which to deploy the temporary pumps; control of Surface/Ground Water Flow paths on Castlegate/Sheepfoot Hill (Malton) and capital improvements to Riggs Road Drain.
- **Option D:** Improve local flood warning procedures and telemetry; construct permanent pumping chambers - in which to deploy the temporary pumps; control of Surface/Ground Water Flowpaths on Castlegate/Sheepfoot Hill (Malton); divert Riggs Road Drain; formalise defences at the sewer pumping station – Norton and install permanent land drainage pumps.

Options	A	B	C	D
Do nothing - Walk away	✓			
Do Minimum - sustain existing level of Support		✓		
Local Property Level Protection			✓	
Improve Local Flood Warning Procedures and Telemetry			✓	✓
Construct Permanent Infrastructure for Temporary Pumps			✓	✓
Control of Surface/Ground Water Flowpaths, Castlegate/ Sheepfoot Hill			✓	✓
Capital improvements to Riggs Road Drain, Old Malton			✓	
Diverting Riggs Road Drain				✓
Formalisation of defence at sewer pumping station - Norton				✓
Permanent land drainage pumps				✓

Table 10: Short Listed Options

The short-list of options presented within the Outline Business Case have been taken forward for full appraisal in the BC and are presented in Table 11 and 12.

### 4.3 Short List Options (Refined)

The short listed option has been assessed in accordance with “SWOT” appraisal methodology, where internal factors are classified as Strengths and Weaknesses, and external factors are considered Opportunities or Threats.

This has been carried out to identify specific issues, trends and forces that can influence the achievement of the project objectives.

Through the options appraisal, a weighted ranking has been established in Table 10. Option C is the optimal outcome, and will be adopted as the projects core strategy, pending further investigation.

Option	SWOT Ranking	Description	Outcome
<b>A</b>	1	Do nothing - walk away	This would reduce present level of support and increase the risk of flooding
<b>B</b>	2	Do minimum	Flooding is controlled by ad-hoc emergency plan as presently undertaken.
<b>C</b>	4	Do Something - Management Option	Emergency plan is bolstered through maintenance agreement/third party contract - infrastructure provided to quicken the response, including, permanent ducts for temporary pumps..
<b>D</b>	3	Do Something - Full mitigation	Permanent pumps, diversion of drains

Table 11: "SWOT" Assessment

Table 11 provides details of the shortlist options considered and summarises the associated benefits, limitations, threats and opportunities for each one. The table below should be read in conjunction with Table 9, which follows the options listing format. Where options have commonalities, these will be assessed conjointly to save duplication i.e. Options C/D.

Option	Description	Strengths/Weaknesses	Opportunities/Threat
A	Do Nothing - walk away	<p><b>Strength:</b> Under this purely theoretical scenario, all spending on activities and infrastructure to reduce flood risk would cease. This allows the benefits afforded by existing spending to be identified and is the baseline required for appraising schemes in line with national guidance.</p> <p><b>Weakness:</b> This would see the situation get worse.</p>	<p><b>Opportunities:</b> N/A</p> <p><b>Threat:</b> This would see the viability of the location decrease. The damages and economic impact of this are demonstrated in the economic analysis report undertaken by WSP which clearly show this is not a strong option</p>
B	Do Minimum – Maintain existing levels of support	<p><b>Strength:</b> The existing level of support, i.e. providing an emergency response responding to trigger levels in the River Derwent, has proven to offer a good level of protection, through the operation of the pumping plan</p> <p><b>Weakness:</b> At present the response is based upon the “best endeavours” of the risk management authorities and is subject to the availability of operational staff. As the response has been developed over time, there is no formal maintenance or replacement schedule for the apparatus.</p> <p>Experience has taught that the speed of the response is vital, as any delay causes the risk to properties to heighten.</p>	<p><b>Opportunities:</b> Given that a “solution” to the drainage issues is unaffordable, the additional options centre around building on this "do minimum" response, ensuring the response is as swift as possible, and the measures considered have all been identified following operation of the pumping plan as items which would ensure that response commences rapidly enough to enable internal flooding to be avoided – and to provide resilience in case of failure.</p> <p><b>Threat:</b> If this option was to be pursued it would leave the response subject to operational risk from the apparatus presently used, to the available resource to deliver the plan. Without additional infrastructure and a management plan, the risk of flooding remains and without improvement of the aesthetic in the location there would be no physical change to the status quo.</p>

Option	Description	Strengths/Weaknesses	Opportunities/Threat
C	Local Property Level Protection	<p><b>Strength:</b> The provision of bespoke property level resilience measures to those residential and business premises at greatest risk will ensure that there is a last line of defence if for water levels do rise and cause a threat to property.</p> <p><b>Weakness:</b> PLR is not an ideal solution to flooding issues and clearly options which seek to remedy the problems are the first to be explored and progressed or in this case discounted. In the case of Malton, Norton and Old Malton, permanent solutions are very complicated and costly and involve large alterations to the wider drainage system across an area significantly larger than the area impacted. As a consequence, the options to bolster and improve the emergency response are really the only options left. As this does not altogether remove the risk, it is considered that PLR will add reassurance, over time will increase confidence in the adaptability of the location and will improve the locations viability.</p>	<p><b>Opportunities:</b> This also gives opportunity to engage with residents and businesses and to reassure that life can continue as normal with minimal disruption when the levels in the River Derwent rise.</p> <p><b>Threat:</b> PLR can be ineffective if measures are not put in place quickly enough. This option would require rigorous training and engagement to ensure that gates/barriers were put in place following a warning. PLR can be a visual indication of flood risk, and may dissuade buyers from purchasing properties which have flood barriers or other PLR in place. For this reason, the measures will only be offered to those properties at greatest risk, identified by historic incidents and local operational knowledge. In these cases, it is considered that PLR will be of benefit and over time, as the measures prove to be successful will be encouraging for investors.</p>



Option	Description	Strengths/Weaknesses	Opportunities/Threat
C	Capital improvements to Riggs Road Drain, Old Malton	<p><b>Strength:</b> In 2017 a comprehensive drainage study was undertaken in Old Malton which demonstrated improvements that could be made to the performance of the culverted watercourse, which outfalls into the River Derwent</p> <p><b>Weakness:</b> This will not divert the flow of the watercourse through the village however it will ensure that it is running at its optimum capacity.</p>	<p><b>Opportunities:</b> There are additional connections to Riggs Road Drain- this option means that the risk of unconsidered enabling work associated with its diversion is minimised.</p> <p><b>Threat:</b> NYCC has powers under the land drainage act to undertake work to third party systems to reduce flood risk - threat to this approach is minimal. Chance that an event will breach the capacity of the drain - this is present scenario - management plan should allow water to be pumped quickly when an alert is received.</p>
C/D	Improve Local Flood Warning Procedures and Telemetry	<p><b>Strength:</b> It has been identified that improved locational specific telemetry and monitoring devices – e.g. CCTV cameras to look at the level of water at County Bridge, markers and gauges for monitoring levels in drains would also enable an accurate and quicker emergency response.</p> <p><b>Weakness:</b> The success of this measure relies on the location being effectively monitored and does not offer a tangible "solution" to the flood risk issues - however there is no affordable solution available, and therefore any measure that can support and bolster the operational response is going to have a positive impact upon the future viability of the location.</p>	<p><b>Opportunities:</b> This will also enable monitoring of the location remotely and will save operational time in site visits etc. There is a potential opportunity to engage actively with the flood alleviation group and local residents and businesses, which will increase community preparedness and also involve and empower those affected in the response. It would also enable residents and businesses to be more prepared and put any property level protection measures in place.</p> <p><b>Threat:</b> Risk of failure of CCTV - would need contingency and ability to monitor from local offices/depots if required</p>

Option	Description	Strengths/Weaknesses	Opportunities/Threat
C/D	<b>Construct Permanent Infrastructure for Temporary Pumps</b>	<p><b>Strength:</b> At the time of writing estimates demonstrate this to be the most cost beneficial solution for improving the pumping arrangements. It would permit the speed of the coupling of pumps to be quickened, which has proven vital to the prevention of internal property flooding. Given there is no other viable cost beneficial option available to improve the capacity of the drainage this is the obvious answer.</p> <p><b>Weakness:</b> This is not a physical solution to the issues and this measure does assume and require an emergency response to rising water levels in the River Derwent.</p>	<p><b>Opportunities:</b> This option also retains the ability for pumps to be used flexibly and for items to be deployed in the locations that will be most beneficial to any unexpected circumstances.</p> <p><b>Threat:</b> As this option seeks to bolster the emergency response rather than provide a solution or increased capacity to the drainage issues, there is still a residual risk of flooding if the response is not swift enough or if there is a breakdown in operation. To ameliorate this risk, NYCC and RDC are entering into a combined management contract, with third party services procured to ensure that the operational response is efficient and guaranteed.</p>
C/D	<b>Control of Surface/Ground Water Flowpaths, Castlegate/ Sheepfoot Hill</b>	<p><b>Strength:</b> This measure would be complimentary to the project and it is not expected that this will significantly alter levels although there would clearly be some effect.</p> <p><b>Weakness:</b> The emergence of groundwater is in very close proximity to properties and physical constraints in the location make this option difficult to deliver.</p>	<p><b>Opportunities:</b> There is an opportunity to combine the channelling with PLR and use raised floors and property improvement to permit groundwater to convey through the properties at Castlegate. This would be an effective and unobtrusive solution and would mean that derelict properties in the row could be confidently invested in. This is also an area where short term lettings are commonplace and if the water could be permitted to flow without meaning that properties had to be vacated this would add reassurance. Properties are of historical importance and could be very attractive, the attraction of investment into this specific location is considered important to the wider feel of the corridor between Malton and Norton.</p> <p><b>Threat:</b> Archaeological/listed building constraints - previous similar PLR work delivered by NYCC has been achieved with the permission of the Planning Authority.</p>

Option	Description	Strengths/Weaknesses	Opportunities/Threat
D	Diverting Riggs Road Drain	<p><b>Strength:</b> This concerns the issues in Old Malton. This is the ideal option for Old Malton</p> <p><b>Weakness:</b> The costs are beyond the affordability of the scheme – Recent events have demonstrated that the rapid onset of the pumping plan prevents the requirement for road closure and internal property flooding in Old Malton, and it is consequently considered that the formalisation of the pumping plan and the provision of infrastructure to quicken and improve the response is the most cost beneficial and practical solution.</p>	<p><b>Opportunities:</b> N/A</p> <p><b>Threat:</b> This would present issues with downstream connections to Riggs Road Drain, which may result in this option being unfeasible.</p>
D	Formalisation of defence at sewer pumping station - Norton	<p><b>Strength:</b> Previously, a sandbag wall has been created at Malton/Norton SPS to protect overland flows from breaching the SPS compound. The pumping station asset is raised and does not have a history of being flooded out. However, the sandbags have been placed in the compound previously by the council to stop flows flooding through the compound towards Lidl Car Park. As the asset does not have a history of flooding, this option would not directly benefit the pumping station.</p> <p><b>Weakness:</b> N/A</p>	<p><b>Opportunities:</b> N/A</p> <p><b>Threat:</b> N/A</p>

Option	Description	Strengths/Weaknesses	Opportunities/Threat
D	Permanent Land Drainage Pumps	<p><b>Strength:</b> This would mean that the infrastructure for pumping was in situ and the operation of an emergency plan would not be required.</p> <p><b>Weakness:</b> At the time of writing estimates demonstrate this to be the lesser cost beneficial solution for improving the pumping arrangements. This may be subject to amendment as the scheme costs develop. This would give no operational flexibility in the placing of the pumps in future. This would require an organisation to be identified to maintain and be responsible for the equipment. There is no one organisation with a duty to do this and the pumps would therefore be difficult to house and accommodate within the principal duties of the authorities leading on this project.</p>	<p><b>Opportunities:</b> N/A</p> <p><b>Threat:</b> Reduced Flexibility, significantly reduced affordability both in delivery and in future maintenance.</p>

Table 12: Shortlist options (Refined)

## 4.4 Economic Appraisal Approach

In 2018, NYCC commissioned WSP to undertake economic analysis of the present situation in the market towns, in order to demonstrate the economic benefits.

An update of the economic appraisal for Malton, Norton and Old Malton has been undertaken as part of this. This has taken account of changes in the MCM guidance 2018 which has been published since the analysis reported by Arup in October 2015. This has shown that for the Do Minimum case, that the net present value of economic damages is £24M over a 100-year appraisal period. Compared with the Arup assessment, this represents an increase of £4.8M.

In consideration of wider economic benefits, these have been assessed in terms of financial damages and gross value added.

Financial damages have been derived using MCM guidance 2018. This has shown that for the Do Minimum case, that the net present value of financial damages is £28M over a 100-year appraisal period. Compared with the economic appraisal, this illustrates that the financial losses exceed the calculated economic losses. This illustrates that there is a local impact of £3.9M.

In consideration of wider benefits on local income, a light touch approach has been adopted in accordance with the Frontier Toolkit. This has taken account of the businesses and their numbers of employees in the areas at risk of flooding in Malton, Norton and Old Malton. This has shown that the potential gross value added in Malton is £589k.

Other wider economic impacts have been considered, but have not been subject to monetary evaluation of benefits. These include: the aesthetic character and heritage of the built environment, the potential for development, tourism and the opportunity to enhance the natural environment.

Malton has successfully marketed itself as a food/tourism destination, therefore the poor condition of the corridor is undoubtedly detracting from the potential of the town overall; impeding its ability to spread the benefits throughout the town.

The WSP economic appraisal has confirmed that the baseline economic case for flood risk management intervention is strong as the value of benefits has increased by £4.8m for the Do Minimum case.

Considering the wider economic case and the impact to the local community, it has been shown that the financial impacts to Malton are greater than the economic impacts. Financial loss assessment has found there to be a further £3.9M in damages over economic damages when considering wider impacts to the community. In terms of gross value added it can be suggested that keeping existing businesses and jobs in the areas affected by flooding has an additional benefit of £589k.

It is important to note however that the financial damages are critical to the stimulation of growth in this location, and that the aspiration of this work is to unlock the presently untapped potential of the area and creating economic opportunities, the financial losses are only the principle risk to those looking to invest in the area.

The NPV of financial and economic damage are illustrated in Table 13:

Description	Location	Economic damages 2018	Financial damages 2018	Difference
Direct damages	Malton	£1,626,051	£1,997,507	£371,456
	Norton	£13,598,290	£15,504,428	£1,906,138
	Old Malton	£8,852,618	£10,529,863	£1,677,245
Indirect damages - Road closures	All areas	£460,221	£460,221	£0
Indirect damages - Vehicles	All Areas	£286,561	£286,561	£0
	<b>TOTAL</b>	<b>£24,086,959</b>	<b>£28,031,561</b>	<b>£3,944,839</b>

Table 13: NPV Damages for “Do Minimum Scenario

Table 12 shows that the analysis of financial damage is greater than the economic damage. Furthermore, it appears that the revisions to MCM guidance, the use of financial loss datasets and the revision of property valuations to current market values, generated the NPV of the Do Minimum financial benefits of £28M. Hence the financial benefits exceed the economic benefits by £3.9M, which reflects a 16 % increase.

To date the project has attracted £ 1,093,367, which equates to 78% of the total contributions required to achieve a fully funded scheme. The LEP has afforded the project £500K, which reflects their support and confidence in the scheme.

#### 4.4.1 Climate Change

Climate change has been taken into account in accordance with EA guidance on Flood Risk and Coastal Change by applying uplift estimates on peak flows for basins within England and Wales. The uplift factors relate to the ‘2020s’, ‘2050s’ and ‘2080s’ taking into account the statistical probability of occurrence Upper end (90<sup>th</sup> Percentile), Higher Central (70<sup>th</sup> Percentile) and Central (50<sup>th</sup> Percentile). The uplift factors were taken for the River Derwent (part of the Humber Catchment).



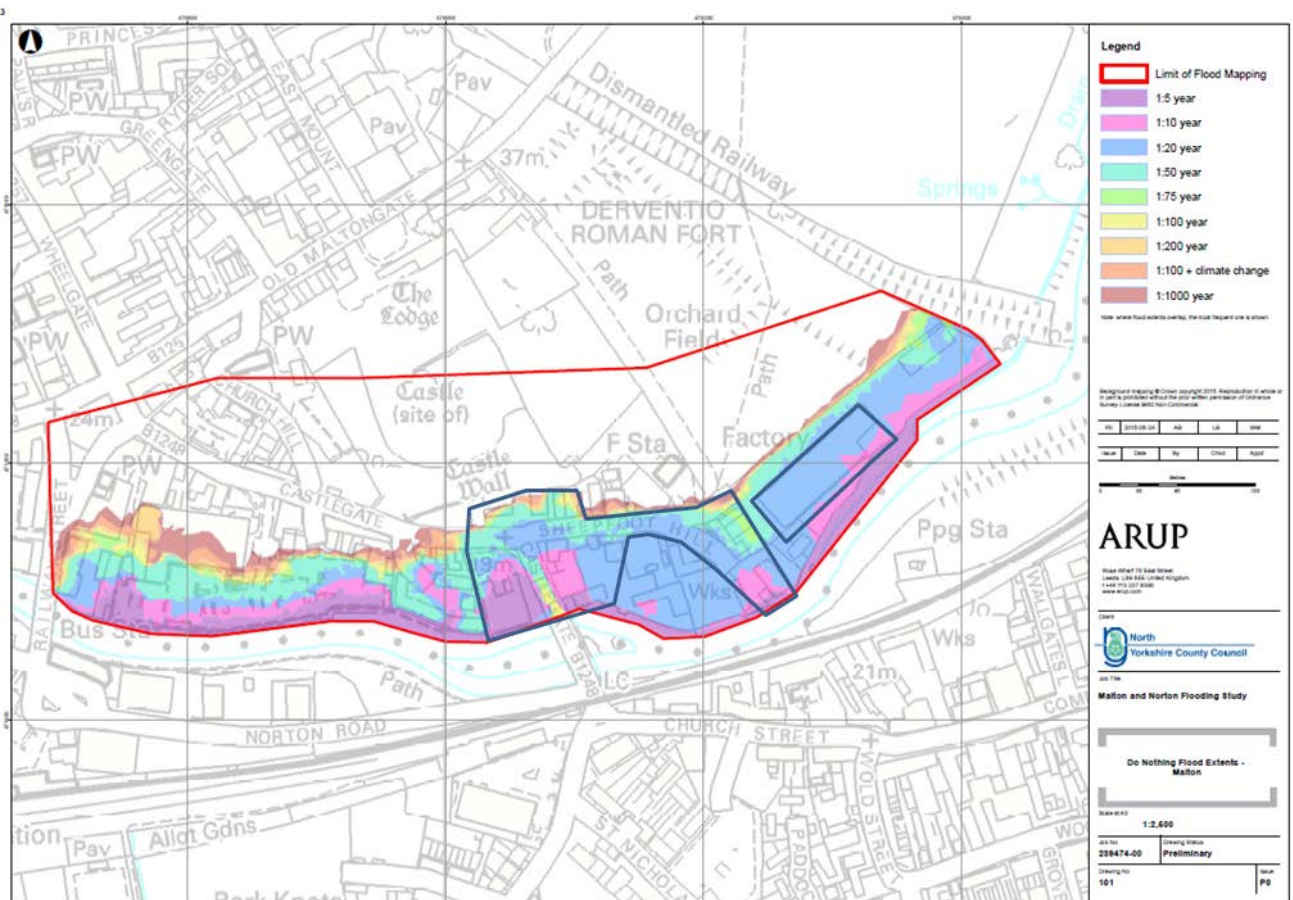
Climate change has been applied to the economic benefit sheets by generating a peak flow vs return period logarithmic curve. Then, a 20%, 30% and 50% peak flow uplift scenario (EA Upper Climate Change Horizon has been used as the scheme falls within Flood Zone 2 and 3) has been applied for climate change with associated peak flow vs return period curves. For instance, a 100-year flow now would effectively become a 20-year flow after a 40% climate change increase had occurred. The climate change return periods are therefore converted to their respective probabilities which are used for generating the present value (PV) damages. Each epoch's Average Annual Damage is discounted with its relative proportional PV factor and then the damage for all epochs is effectively summed; taking care to apply capping appropriately.

## 4.5 Benefits

Benefits to properties have been designated based on the Local Authority's familiarity with flooding incidents and modelled flood risk maps, depicted in the ARUP report (2015); see Section 8.1 of this document for extract details. Outlined below in Table 14 and figures 13-15, are the catchment areas for the number of high risk property types for each locality:

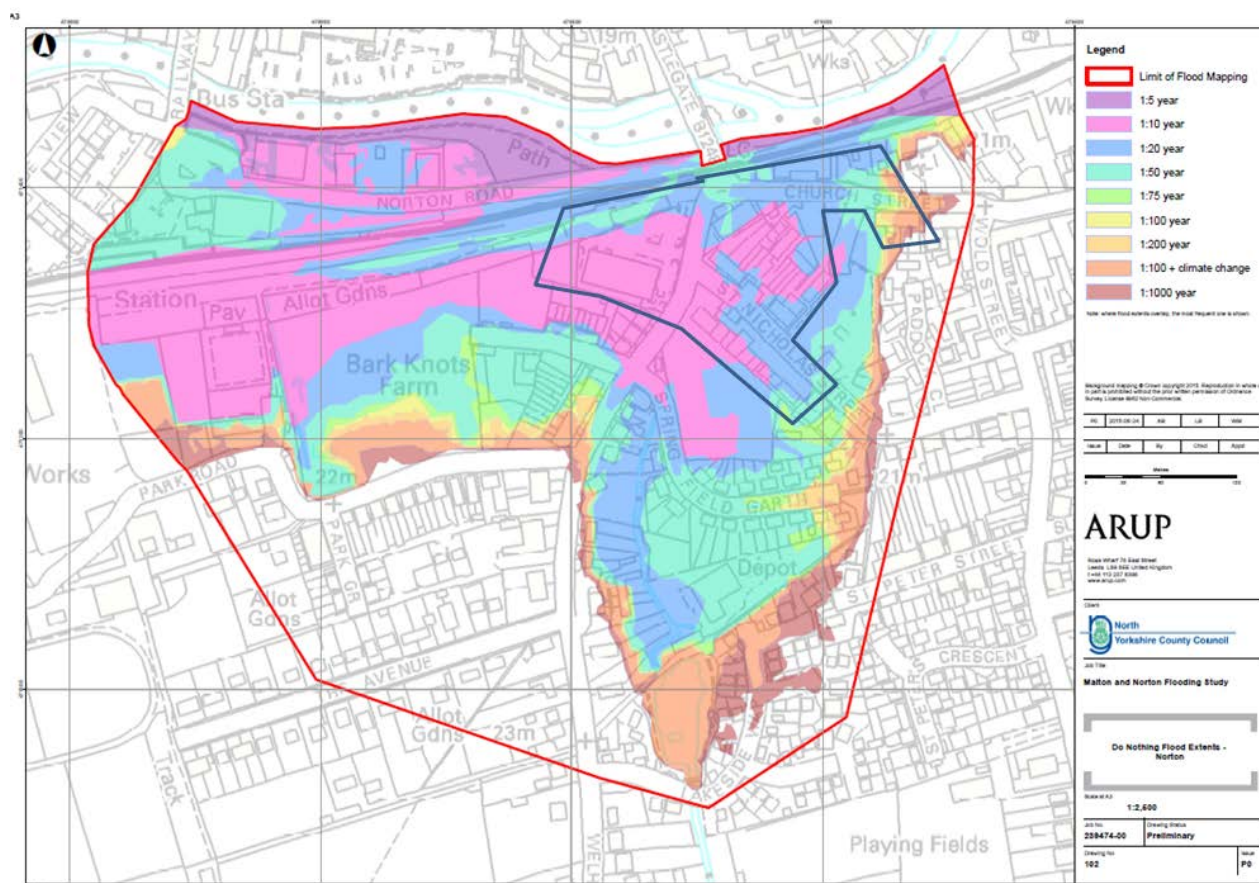
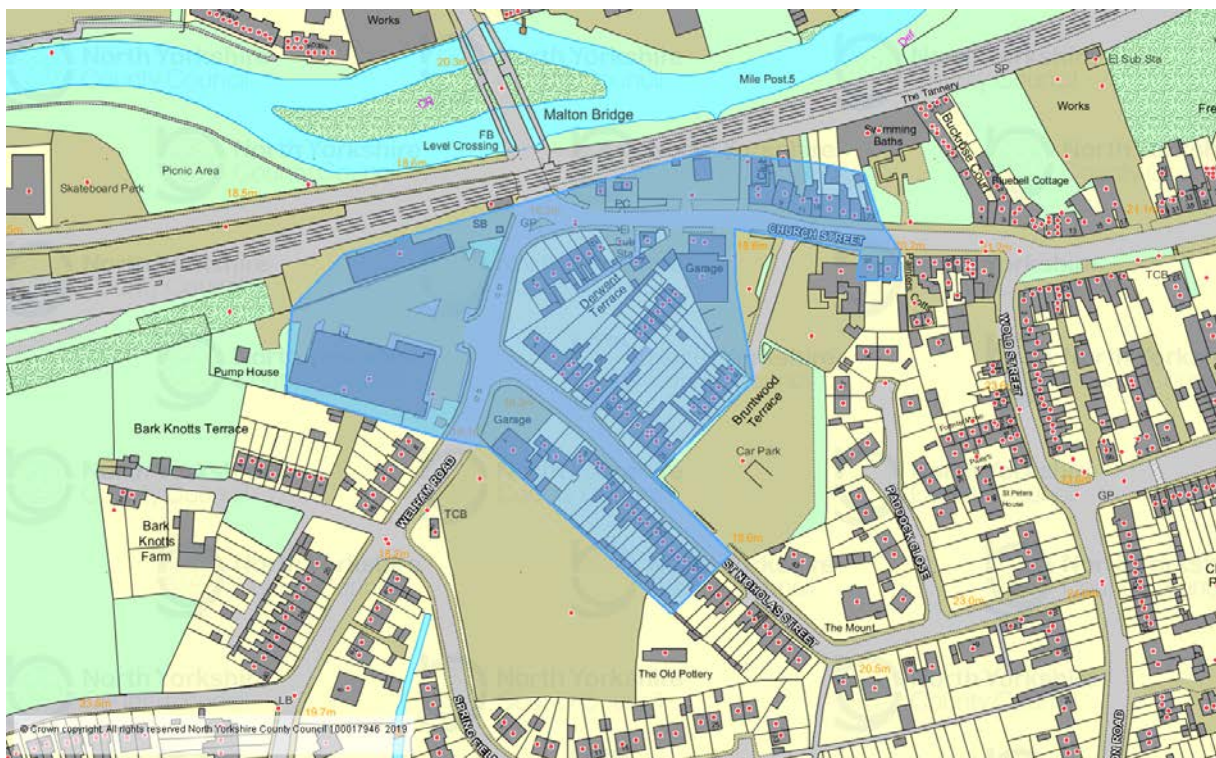
Location	Residential	Other Property Types	Total
Malton	37	6	43
Norton	54	11	65
Old Malton	35	6	41
<b>Total</b>	<b>126</b>	<b>23</b>	<b>149</b>

**Table 14: Number of Properties at Risk**



**Figure 13: Malton Property Catchment**





### Figure 14: Norton Property Catchment



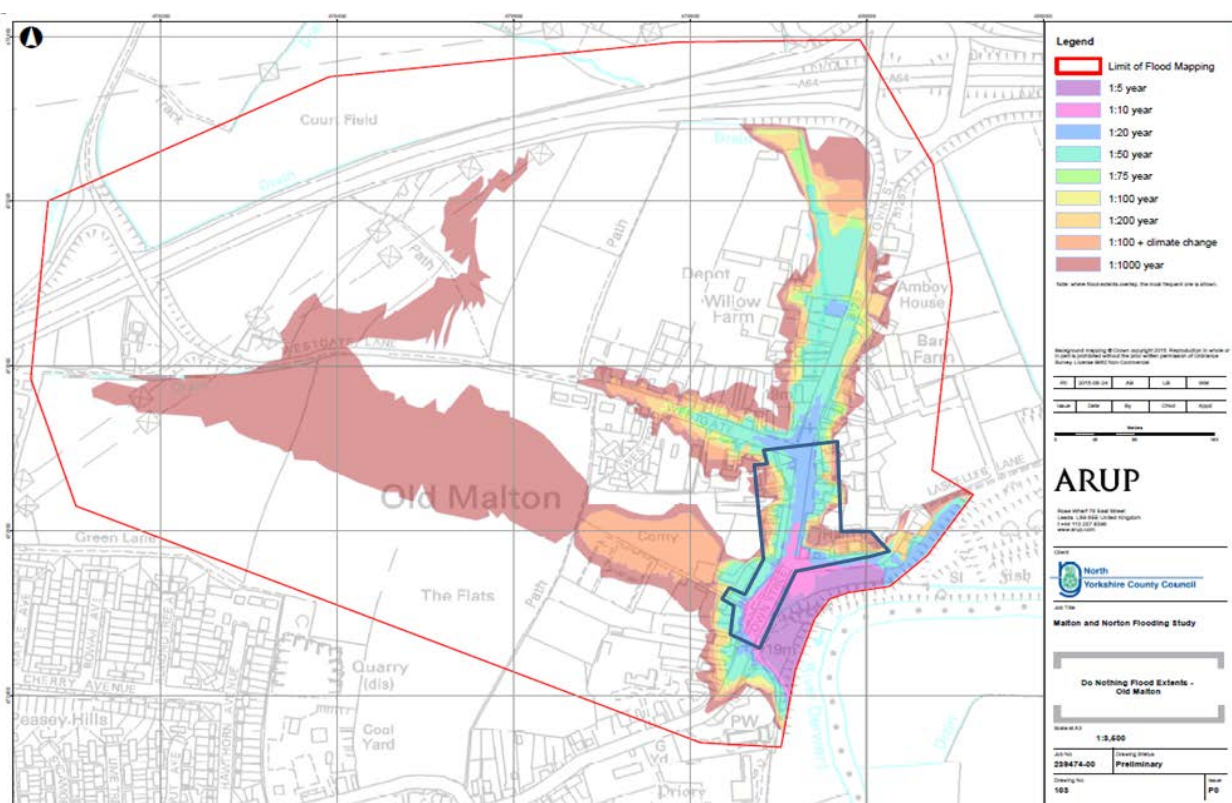
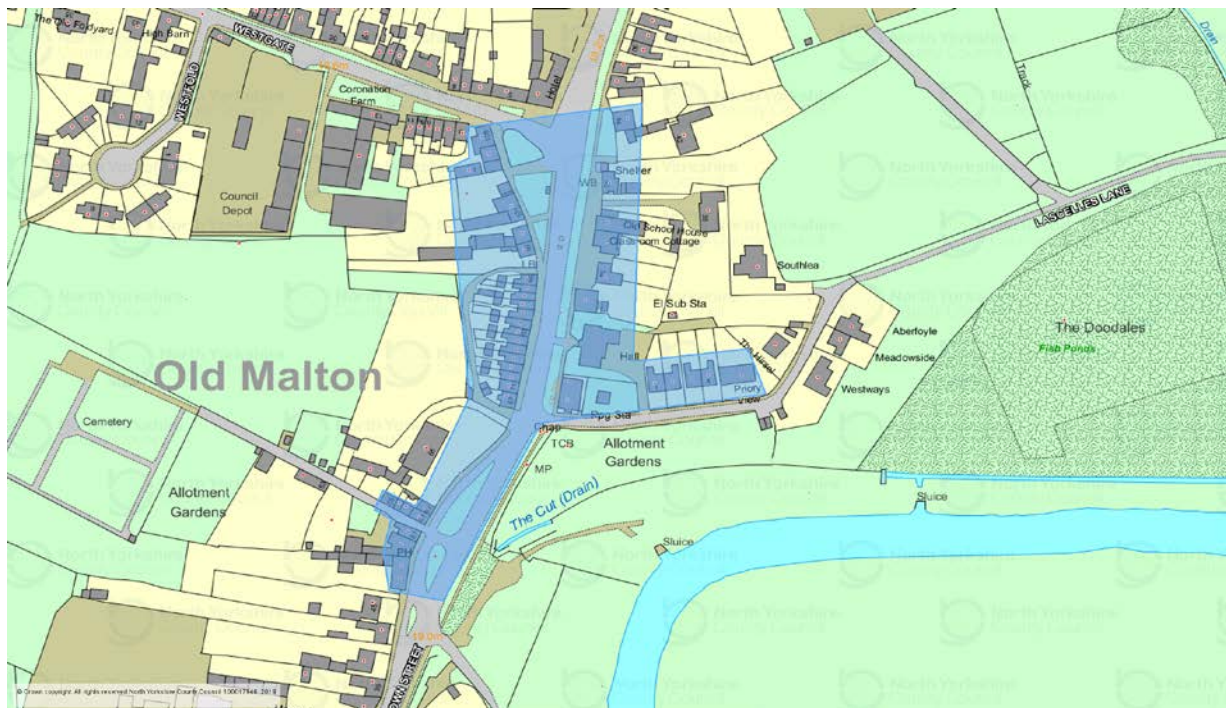


Figure 15: Old Malton Property Catchment

The principle benefits and beneficiaries for the Malton, Norton and Old Malton are identified in Table 15 below:

Item	Benefit	Beneficiaries
1	A reduction in property damages following a flood event	Immediately affected business owners and residents
2	Raised confidence that investment in their property is viable and will not be subject to future flood damage	Immediately affected business owners and residents
3	An improvement in property prices from a raised confidence in the viability of the area	Immediately affected business owners and residents
4	An improvement in the wider aesthetic of the area.	Immediately affected business owners and residents
5	A reduction in requirement for full road closure and reduced travel disruption	Immediately affected business owners, residents and commuters/visitors.
6	Additional business growth opportunities due to the improved wider appearance of the town	Immediately affected business owners and residents
7	Provision of infrastructure to facilitate a more robust emergency response	Immediately affected business owners and residents

**Table 15: Principle Benefits**

Additional benefits have been calculated using financial and economic damages obtained from the Multi- Coloured Manual (2018) and include, but are not limited to:

- Direct Damages (Malton, Norton, Old Malton);
- Indirect Damages - Road Closures;
- Indirect Damages - Vehicles;

Emergency Services costs, evacuation and temporary accommodation costs have already been accounted for in damages.

It should be noted that details of the 'Wider Economic Benefits' (i.e. Tourism, etc.), can be also be found in Appendix B.

## 4.6 Critical success factors

The critical success factors (CSF) for the Malton, Norton and Old Malton project have been identified in Table 16:

Item	CSF	Measurement Criteria
A	Delivery of infrastructure to enable more efficient emergency response	Future monitoring of the success of the measures through wash-up meetings following events
B	Delivery of improved telemetry	Future monitoring of the success of the measures through wash-up meetings following events
C	Reduction in volume of surface water entering the combined sewer system	Assessed through the modelling associated with the detailed designs of the schemes as they progress
D	Reduction in flood events affecting internal property during critical river level rises	Assessed over time through monitoring of the success of the measures following events where the Derwent rises to its critical level.
E	Steady increase in land value and property value over time indicating increased confidence in the viability of location	Long term aspiration, would only come with time and increased confidence, assessed through future monitoring of house prices in comparison to the Ryedale average at 2 year, 5 year and 10 years following scheme delivery.
F	Secondary associated gradual improvements to aesthetics in the area	Assessed through successful delivery of the measures and community feedback
G	Stimulation of local economy	Measurable through number of additional jobs created in next 10 years in location and/or associated with location
H	Increase in business activity in the immediate vicinity	Assessed in the long term, in terms of numbers of new businesses attracted to the location compared to baseline.

Table 16: Critical Success Factors

## 4.7 Costing Estimation

The Present Value whole life cost with a 40% Optimism Bias (in line with HM Treasury Greenbook guidance), in addition to scheme construction and maintenance costs is outlined in Table 17 below.



	Malton			Norton			Old Malton		
Options	B	C	D	B	C	D	B	C	D
Total Construction/ Intervention Cost	94,000	26,700	387,100	247,000	9,907	47,000	81,000	42,960	398,500
<b>Estimated Cost of Work</b>	160,400	306,768	649,360	407,850	349,033	122,850	143,550	270,489	657,600
Optimism Bias at 40%	64,160	133,387	295,612	199,008	143,576	96,964	57,420	125,379	310,864
PV Maintenance Costs	N/A	105,512	89,670	89,670	N/A	119,560	N/A	105,512	119,560
<b>PV Whole Life Cost</b>	<b>224,560</b>	<b>572,367</b>	<b>944,972</b>	<b>606,858</b>	<b>502,516</b>	<b>219,814</b>	<b>200,970</b>	<b>544,340</b>	<b>968,464</b>

Table 17: Capital Cash Costs for Options B, C and D (£)

## 4.8 Preferred Option

Based on systematic analysis in section 5.2.2., the preferred option is **Option C**.

**Option A** - Do nothing/walk away - flood risk would get worse, as an emergency response presently in place.

Almost certain flooding from drainage systems when Derwent reaches critical level occurring potentially annually meaning the decline of the location would increase and its economic viability would be worsened. **(Option Rejected)**

**Option B** - Do minimum - status quo maintained; flooding managed through a multiagency emergency pumping plan and diverted Ryedale services. The frequency and duration of the response by flood risk management authorities is considered unsustainable and still results in properties flooding due to insufficient resources and a lack of supporting infrastructure. Furthermore, assets may not be available from Yorkshire Water or the EA due to prioritisation in other locations. The current framework is reliant on emergency services, old infrastructure, ad-hoc coupling and positioning of pumps. Whilst flooding has been demonstrated to be reduced and managed via this approach, there is a significant risk presently that flooding will occur if pumping does not commence swiftly enough, hence a more robust system is being sought. **(Option Rejected)**

**Option C** - Delivery of infrastructure to enhance/complement management approach. This has been demonstrated as affordable but also gives an uplift to the location and a more robust organisational management response to flooding. In essence, it takes the present emergency response, which relies on in-house resource and the available infrastructure and transforms it into a managed response, with the infrastructure required to make this response as swift as possible.

A contract agreement is due to be awarded by NYCC and RDC, which introduces a more formalised management response through a third party contractor, to ensure that operational staff are always available and that operations are dedicated to the location and not influenced by extraneous factors. **(Preferred Option)**.

**Option D** - Full Flood Mitigation Measures - increasing capacity of sewer pumping station/diverting watercourses/permanent pumps in surface water drains. This option would significantly reduce the risk of future flooding in the towns and would remove the requirement for emergency response. The enabling works to the full Yorkshire Water System required to make the sewer pumping capacity viable are estimated by Yorkshire Water to be beyond £20,000,000 making this option unviable. Permanent pumps would reduce the ability to respond elsewhere using the pumping equipment if required. It would also be difficult to find an asset owner, given that there is not an organisation responsible or with the expertise to take this responsibility on.

The diversion of the watercourse has significant risk associated with it given there are connections to it which would also need to be diverted, and this may make the project

unviable. It is also a prohibitively expensive option and is likely to be unpopular with some residents who will see the watercourse as a positive amenity. **(Option Rejected)**

## 4.9 Present Value – Based on Option C

Earlier work in developing the project assessed a range of options for each of the three main locations where flood alleviation works will take place, Malton, Old Malton and Norton. This analysis produced a cost benefit ratio of 1:3.8. Since then the costs have been revised such that the BCR is now as follows:

- Total costs of scheme: **£1,408,214**
- Total calculated economic and financial impact: **£28,031,561**
- Benefit Cost Ratio - **1: 20**

Cost overruns are provided by calculating an optimism bias and risk factor into the preparation of the estimates.

## 4.10 Sensitivity Analysis

Due to early critical analysis, eliminating options B and D, there is only one viable choice - Option C. It is therefore deemed unnecessary to undertake a sensitivity analysis of combined schemes to evaluate optimal benefit cost ratios.

# 5 The Commercial Case

## 5.1 Introduction and Procurement Strategy

Through a change of working delivered in 2017/18, the Procurement service has been given an explicit set of targets to achieve savings across the Council. These savings will be generated through demand management, better purchasing and improved contract management arrangements.

The Procurement and Contract Management Strategy (2018-2022) is contained in the Council's constitution, and can be found in Appendix F.

## 5.2 Key Contractual Terms & Risk Allocation

Detailed Design Consultant and Principle Contractor: Design and build arrangement with WSP consultants in accordance with NYCC's existing framework.

# 6 Financial Case

## 6.1 Financial Summary

As part of this BC, the project programme presented in the OBC (WSP, 2018) has been updated in line with the delivery requirements of the recommended preferred Option (Option 4). Supporting works carried out by WSP consultants can be found in appendix B and E.

	Whole-life cash cost	Total Project cost (approval)
Cost up to OBC	£30,000	Exc previous applications
<u>Costs after OBC</u>		
Main Contractor's Preliminaries including access	£11,399	£11,399
Cost of Professional Advice	£8,505	£8,505
Site investigation and survey	£30,740	£30,740
Property Survey works	£98,340	£98,340
Permits, Planning Permission & compensation	£2,275	£2,275
Pump Infrastructure Construction	£96,627	£96,627
Installation of PLR works	£745,000	£745,000
Main Contractor's Construction Risk	£12,980	£12,980
<u>Risk Contingency (See s.12 of the Grant Memorandum)</u>		
Risk or Optimism Bias	£402,347	£402,347
Future cost (construction + maintenance)	£1,438,214 plus £20,000 per annum	N/a
<b>Project total cost</b>	£1,438,214 plus £20,000 per annum	£1,408,214

Table 18: Preferred Option Financial Summary

## 6.2 Funding Sources

The results of the economic appraisal have been used to assess funding arrangements to determine the eligible FDGiA funding for any scheme.

With 78% contributions secured for Option C (see Table 19), the Partnership Funding (PF) Calculator for this option has been used to determine the level of funding required to achieve an adjusted score of 152%. This will allow for the project team to understand the level of external contributions required.

Funding Contributors	Contributions
Environment Agency	£314,846
LEP	£500,000
Ryedale District Council	20% of total project costs up to £320,000
NYCC	Up to £450,000
<b>Total</b>	<b>Up to £1,584,846</b>

Table 19: Confirmed Funding Allocation

Note: Although the Local Enterprise Partnership have confirmed contribution up to £500k, this will be subject to conditions and time constraints.

The PF calculation demonstrates that the project would be eligible for FDGiA funding contribution, with an Adjusted Score of 152%.

	Raw Score	Contributions Required	Adjusted Score	Eligible Up Front FDGiA
<b>Option C - for a 100 year</b>	49%	£1,080,865	152%	£314,846

Table 20: PF Calculator Results



### 6.3 Previous and Potential Funding Bids

As defined in Table 21, other funding sources have either been submitted or will be in accordance with **Investment objective 2**.

Funding Contributors	Description
Highways England	Highways England has indicated that a proportionate contribution could be made for the works in Old Malton, proportionate to its contribution to the drainage system from the A64. Due to project delivery constraints it has been deemed too time consuming to progress the application for this funding option.
Yorkshire Water	Yorkshire Water is exploring the potential to deliver a sister project, installing and retro fitting sustainable drainage system into the school in Norton.
European Structural and Investment Funds - ESIF	In January 2018 an unsuccessful bid was made to a national ESIF call for the shortfall in the projects funding.
Regional Flood and Coastal Committee - RFCC	RFCC not yet approached for funding project. If there is concern at any stage that costs overrun a bid will be made for the shortfall. It is not felt proportionate nor necessary at this stage given that the scheme has time constraints with other contributions.

Table 21: Previous and Potential Funding Bids

If funding is not secured, the Councils will seek to utilise its own contributions to bolster the current response, however this would not raise the standard of the emergency response in the way envisaged and would not provide measures that would serve as aesthetic improvement and a physical demonstration of the works.

## 7 Management Case

### 7.1 Project Management

#### **Working Group**

Whilst NYCC is the lead partner in this project, it has long since been recognised that flood mitigation solutions are best achieved through the adoption of a partnership approach. NYCC as LLFA, and RDC as emergency response coordinator are therefore working closely together to deliver a range of measures to assist in the response and to make it more robust and maintainable in the future.

The project will be delivered and controlled with operational directive from a multi-organisational working group, comprising of NYCC, RDC, EA, Consultants/Contractors and stakeholder representatives (elected member). Any operational changes will be reported to and managed by this group as business as usual.

During the detailed design phase project specific risk assessments will be completed. Strategies and project risks will be reviewed on a monthly basis and mitigation strategies developed to deal with these risks. Inevitably on a project of this nature there will be a number of risks where the mitigation alone will not resolve this. A risk register will be maintained throughout the life of the project. In planning the construction phase of the project a monetary value will be assigned to the identifiable risks in order to establish contingency.

The project will be evaluated throughout the design and construction phase to ensure the scheme is delivered as per the key milestones and to the required standard by the Lead Local Flood Authority.

Costs will also be reported directly to the EA, including FDGiA claimed, on a quarterly basis in relation to its funding.

The project will continue to be monitored through the management response activities and by the flood risk management team for the years following the project.

#### **Project Board**

The progress of the work will be internally monitored by monthly programme meetings, which are reported to BES senior management team.

Major changes to the scope or costs of all capital projects will be dealt with in liaison with senior officers at Ryedale District Council, but ultimately decisions would be considered and taken at monthly meetings of the Highways and Transportation Heads of Service and are also subject to scrutiny by a Business and Environmental Services Capital Projects Board of senior officers.

The Project Board is the main decision making board and its purpose is to drive the project forward and deliver the outcomes and benefits within the tolerances set by the Project Sponsor. The Project Board will have the following responsibilities:

- Resolving strategic and directional issues, which need the input and agreement of senior stakeholders to ensure progress on the project;
- Ensuring the project delivers within the agreed parameter (cost; organisational impact; expected/actual benefits realisation etc.);
- Defining an acceptable risk profile and risk thresholds for the project; &
- Providing assurance through the project lifecycle.

## 7.2 Project structure and governance

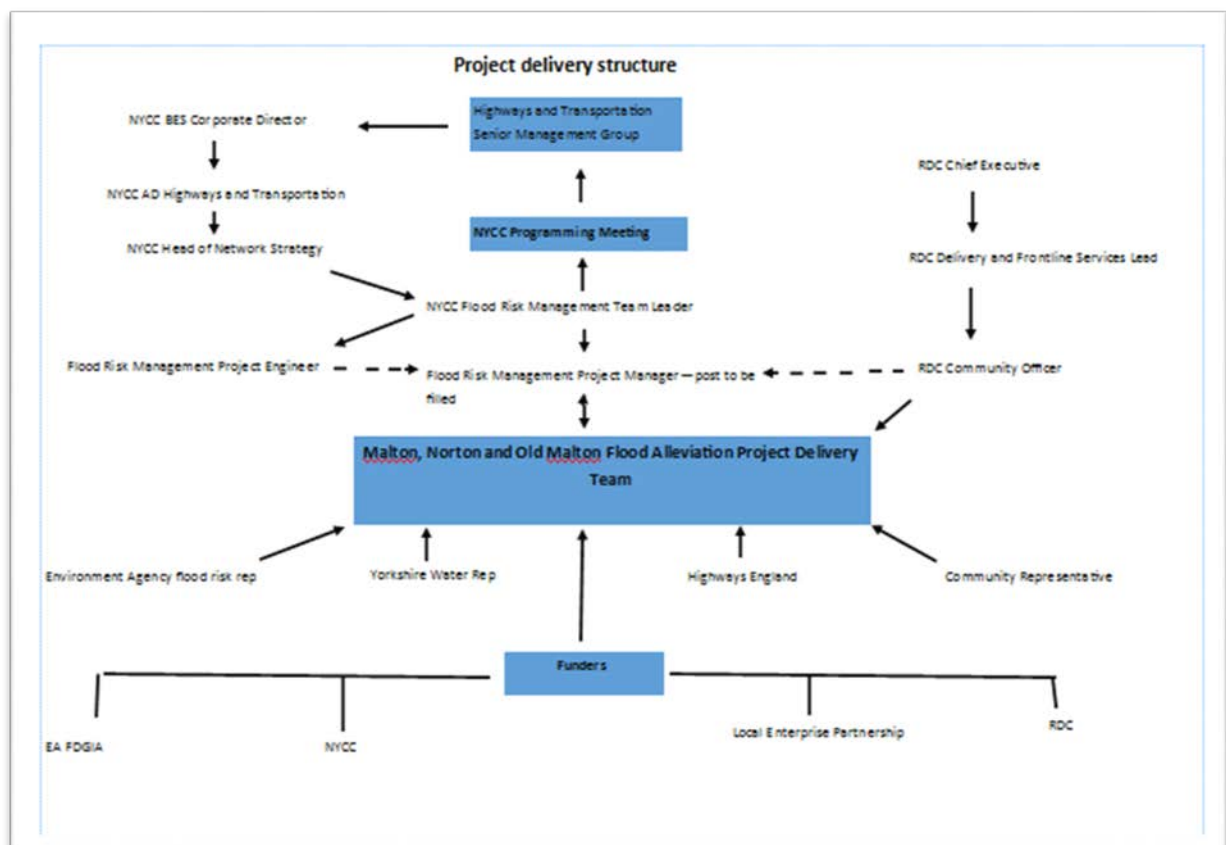


Figure 16: Project Structure and Governance

### 7.3 Outline Project Roles and Responsibilities

The delivery of the project will be managed by the Business and Environmental Service Directorate of NYCC.

Day to day management will be led by the relevant members of the Highway and Transportation Heads of Service Team, most prominently:

- Barrie Mason (Assistant Director)
- Allan McVeigh (Head of Network Strategy)

The project lead and daily management of the scheme will be undertaken by Emily Mellalieu (Flood Risk Management Team Leader).

Beckie Bennett (RDC) - Delivery and Frontline Services Lead; will be responsible for coordinating emergency flood response activities (include 3<sup>rd</sup> party contractors) and deploying operational resources.

The project will be managed as part of the overall flood risk management programme which is reported to Heads of Service. However, funding from the LGF will be accounted for separately and progress on delivery also reported separately.

A fixed term project manager role has been created to oversee the design and construction phase of the project and undertake community engagement required. This post will be managed by NYCC but jointly funded by RDC and NYCC.

## 7.4 Project Schedule

The project plan or programme is a living document. The programme will be re-visited as the project progresses. Key current milestones are listed in Table 22, below.

Month	Pumping /Drainage Infrastructure	Property Level Resilience	Raingarden
Q3/Q4 18/19	Development and submission of EA FDGIA full business case by NYCC Officers		
1st week December 18	Meeting with term consultants re commissioning detailed design for 1st phase infrastructure improvements		
1 <sup>st</sup> week Jan 19	submission of scope to client for consideration including any ground condition survey required		
January 19	Scope signed		
1st week Feb	Design work commences		
February 18/19	–Development of detailed designs for pumping infrastructure		
	Ground water study and identification of detailed trigger levels to inform channel design at Castlegate		
1st April 2019	Appointment of fixed term dedicated Project Officer for 1 year of project		
April 19	Preparation of high level community information regarding concept of the scheme		
May 19		Community engagement event(s) held and first formal approach made to individual property owners	
		Grant information and t & c's published (based on previous schemes)	
June 19	Negotiation and liaison with landowners	Grant scheme launched – onus on collaboration between neighbours	

Month	Pumping /Drainage Infrastructure	Property Level Resilience	Raingarden
July 19	Old Malton drainage study completed and used to list recommendations of Maintenance schedule for Riggs Road Drain and the Cut.	Grant applications reviewed and authorised by PM	
August 19		Phase 1 Pilot Scheme- 13 properties identified	
September 19		Community Engagement event	
October 19		Pilot Phase reports distributed	Scope Received <b>Postponed for future project</b>
November 19	Provisional Detailed designs complete with cost estimation.  Designs reviewed by involved stakeholders		
December 19		Phase 2 Launched Community Engagement	
January 20	Detailed designs finalised Progress tender for sub-contracting construction works	Procurement of consultant	
February 20	Planning permission and EA Permits sought		
March 20- June 20			
July 20	Planning permission approved	Scheme rolled out across entire area Community Engagement including press release, letters, leaflets and door to door engagement	
August 20		Property surveys commence	



September 20	Construction of pumping infrastructure CCTV and marker boards installed in key locations	Installation of property level resilience works commence	
October 20			
November 20	Infrastructure measures all complete		
December 20	Infrastructure measures all complete	Property Surveys complete	
March 21		Installation of property level resilience works completed	

Table 22: Project Plan and Forecast

## 7.5 Communications and Stakeholder engagement

A dedicated Project Officer has been appointed (April 2019) to lead on communications and stakeholder engagement.

Community engagement and enhancement is pivotal to the projects. An event was held in September 2019 with ongoing engagement undertaken by officer at individual level with regards to property level protection - local councillors are engaged and in support for this measure.

## 7.6 Change Management

Major changes to the scope or costs of all capital projects would be dealt with in liaison with senior officers at Ryedale District Council, but ultimately decisions would be considered and taken at monthly meetings of the Highways and Transportation Heads of Service and are also subject to scrutiny by a Business and Environmental Services Capital Projects Board of senior officers. Their involvement will help to implement change within the business and keep the project focused on their requirements.

## 7.7 Benefits Realisation

A benefits realisation plan covering what benefits can be achieved, has been completed as part of this OBC. Benefits will continue to be measured and reported throughout the next stages of the project.

## 7.8 Risk Management

The risk management process will have the following objectives:

- Identify and manage risks to the delivery of the appraisal package contract such that the outcomes are achieved as efficiently as possible;
- Identify and actively manage potential show stoppers as early as possible such that abortive work is avoided.
- Identify and take steps to manage significant risks to the future implementation of the preferred way forward. This may include undertaking site investigations to gain an understanding of the risks, the mitigation required and the costs associated with different aspects.
- Clearly document residual risks to support the business plan submissions.
- Set a risk budget for approval that is realistic for the levels of project risk involved.

## 7.9 Contract Management

Contract management will be the responsibility of the Project Manager who will liaise throughout the project with procurement and commercial teams on a regular basis to manage suppliers against the contracts.

## 7.10 Contingency Plans

Each aspect of the project can be developed independently, reducing the need for contingency planning should one aspect of the project become jeopardised. If one of the project element does not get (or is delayed) approval, the project team will review the situation and assess the merits of delaying any work using the SWOT appraisal methodology, assessing for benefits, limitations, threats and opportunities.

## 8 Reference

1. **Online** - Malton, Norton and Old Malton Flood Study Final Report, ARUP, Reference – 9P7C-JXSERY, October 2015.
2. **Online** - Local Flood Risk Management Strategy, NYCC, October 2014.
3. **Appendix A** - Malton, Norton, Old Malton; History of Flooding 1866-2015, ARUP, 2015
4. **Appendix B** - WSP Economic Business Case Study; Malton, Norton and Old Malton, 2018
5. **Appendix C** – Pumping Plan.
6. **Appendix D** – LEP Conditions.
7. **Appendix E** – Outline Business Case, Malton, Norton and Old Malton Flood Risk Reduction, Reference; 6240831-001, Dated March 2018.
8. **Appendix F** - Procurement and Contract Management Strategy
9. **Appendix G**- Groundwater Flooding in Malton

**Reference:**

1. ITV News, Investigation in North Yorkshire flooding, <https://www.itv.com/news/calendar/2012-12-12/investigation-in-north-yorkshire-flooding/>, December 2012.
2. WSP, Outline Business Case, Malton, Norton and Old Malton Flood Risk Reduction, Ref: 6240831-001, March 2018.
3. Online - Ryedale on the Net, Malton Floods 29th November 2012, <http://www.ryedale.co.uk/ryedale/malton/Floods2012.html>
4. Online - North Yorkshire County Council probe into flooding in Malton and Norton, York Press, <https://www.yorkpress.co.uk/news/10102447.council-probe-into-malton-and-norton-flooding/>, December 2012.
5. Online - Campaigners express anger at flooding in Malton and Norton, Gazette & Herald, <https://www.gazetteherald.co.uk/news/14171847.floods-its-time-they-took-action-to-stop-this-happening-again/>, December 2015
6. Online - Google Maps, <https://www.google.co.uk/maps/place/Malton/@54.1355657,-0.7938333,15z/data=!4m13!1m7!3m6!1s0x4878d2d074da7983:0x1d9398ebc9f25614!2sMalton!3b1!8m2!3d54.136836!4d-0.797897!3m4!1s0x4878d2d074da7983:0x1d9398ebc9f25614!8m2!3d54.136836!4d-0.797897!5m1!1e1>, January 2019
7. Online - North Yorkshire Local Transport Plan 2016-2045, Environmental and Business Services, [https://www.northyorks.gov.uk/recruitment/media/Local\\_transport\\_plan\\_four\\_\(LTP4\)\\_Part\\_3.pdf](https://www.northyorks.gov.uk/recruitment/media/Local_transport_plan_four_(LTP4)_Part_3.pdf), 2016.
8. Online - Malton, Norton and Old Malton Flood Study Final Report, ARUP, Reference – 9P7C-JXSERY, October 2015.
9. Online - Local Flood Risk Management Strategy, NYCC, October 2014.