

# Malton, Norton and Old Malton Flood Study

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## Final Report



October 2015

## Report Summary

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North Yorkshire County Council (NYCC), in our capacity as Lead Local Flood Authority (LLFA) has commissioned this study to identify an initial business case for measures to reduce local flood risk to the communities of Malton, Norton and Old Malton.

The report summarises that work, identifying a range of potential options and their relative economic and technical merits. It also includes an economic assessment of the benefit of continuation of the existing levels of support.

Options presented in this report do not represent a final decision to be implemented; rather the report identifies the likely front running options, as well as the work required to make them a reality.

Significant flooding occurred in Malton, Norton and Old Malton in November 2012. The areas most significantly affected were as follows:

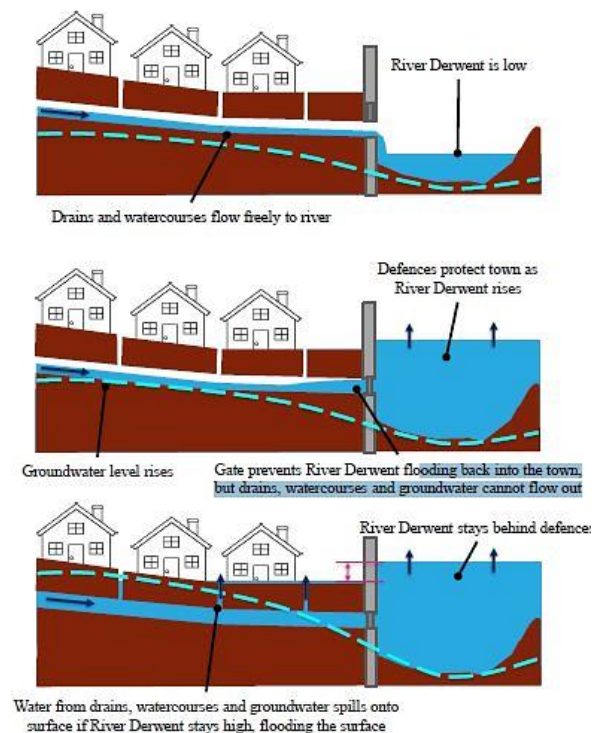
- Castlegate, Sheepfoot Hill and Railway Street, Malton;
- Welham Road, Church Street and St Nicholas Street, Norton;
- Old Malton Road and Town Street, Old Malton.

The combination of existing defences and operational response ensured that the level of property flooding that occurred was relatively low – only 20 properties suffered internal flooding. However, the distress and disruption within the community was still significant.

Flood risk from the Main River in Malton, Norton and Old Malton is currently managed through operation and maintenance of: the River Derwent flood defences. The broader flood risk management system includes mechanisms to stop the river pushing back into the drainage systems, flood gates and land drainage pumping stations, in addition to highway and land drains and the combined sewer network with associated sewerage pumping stations.

The remaining risk (which is primarily that associated with surface water flooding) is currently managed through river monitoring, flood warning, emergency preparedness, planning and response measures. Should all these activities cease, the Net Present Value (NPV) cost of the flood damages that would occur over the next 100 years is estimated to be just under £30m.

The primary cause of the flooding problems experienced in 2012 is 'flood-locking', whereby the drainage systems cannot flow into the river because of the high river levels, as illustrated in this schematic.



Surface water flooding generally happens when flows in the River Derwent exceed 80m<sup>3</sup>/s, (cubic metres per second). This corresponds broadly with the threshold at which the gravity drainage systems become impeded.

There have been seven occasions when a flow of greater than 80m<sup>3</sup>/s has occurred in the River Derwent, Malton since the Main River flood defences were constructed in 2003. In 2012 this flow was exceeded for ten days, requiring a major operation to over-pump the flood defences using temporary pumps.

Despite these efforts, property flooding could not be avoided and because of the source of the flooding brought with it additional problems summarised below:

- Whilst local surface water and ground water flooding may not affect as many properties as would flood from the River Derwent, infiltration and overloading of the combined public sewer network makes it particularly unpleasant for the residents and businesses affected;
- Flood warnings in Malton are based on the river levels, so warning and response surface water and groundwater flooding relies on anecdotal and eyewitness accounts;
- The emergency pumping plan developed by the Multi-Agency group while having proved effective in the 2012 flood has its limitations;
  - Although a number of agencies are involved, pumps are not absolutely guaranteed to be available when required;
  - There are no formal 'well' points connected into the drainage systems in which to deploy the pumps;

- Arrangements still result in disruption to local residents and the local transport network.
- The residual risk of surface and groundwater flooding in Malton, Norton and Old Malton is potentially too high for the emergency response procedures to fully make sense as a long-term solution, if an economically viable investment now could save costs in the longer term.

In assessing potential options to reduce flood risk to businesses and communities the study has been guided by two overriding objectives:

- To reduce flood risk in a way which represents best value for money in the short, medium and long term;
- To propose solutions that are socially and environmentally acceptable to local people and statutory authorities, which respect the heritage setting and avoid disruption to local residents and businesses where possible.

The consultant employed to carry out the study have gained an understanding of the catchment and flood mechanisms from a combination of local knowledge and experience, technical data and hydrologic models.

From this they developed a range of measures based on their engineering judgement and experience, which were then assessed in respect of their technical and economic viability, as well as their social/environmental impacts. A table of the Long List of options considered can be found in Section 4 of the main report and the Short List in Section 5.

The options appraised include, for each area of study, the 'Walk Away' scenario – where all spending on activities and infrastructure to reduce flood risk would cease. This theoretical scenario provides a baseline against which all schemes are compared, in line with national guidance.

An explanation of the process can be found in the full technical final report and the outputs detailed in the appendices to the report

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The shortlisted options across the 3 sites can be generally described as follows:

**Option 1:** Under this purely theoretical scenario, all spending on activities and infrastructure to reduce flood risk would cease.

**Option 2:** Maintain existing levels of support.

**Option 3:** Improve local flood warning procedures; construct permanent pumping chambers in which to deploy the temporary pumps. Reduce the residual risk with property level protection measures.

**Option 4:** As option 3 but with wider changes to the various drainage systems and pumping arrangements. In Malton, this option involves groundwater control measures in Castlegate.

**Option 5:** As above, but with installation of permanent pumps within the pump chambers, with associated telemetry and control systems.

The tables below summarise the initial estimates of the costs and benefits of the five options for each site, together with an indication of the local partnership funding required in order to secure central government money.

An explanation of the terms used in the tables is shown below;

**Flood and Coastal Erosion Risk Management Grant in Aid - (FCERM GiA)** – Central Government Funding for flood risk management schemes administered by the Environment Agency. Eligibility for this is based on the cost/benefit ratio and the availability of local partnership funding.

**Partnership Funding – (PF)** Locally secured funding from private or public sources.

**Residual Damages** - the flood damages that would still be expected to be incurred after the measures in this option are put in place. Used along with the damages avoided to calculate the **Benefits** of an option.

**Costs** - estimated by a Quantity Surveyor from a specification of the measures contained under each option.

**Benefit Cost Ratio (BCR)** – comparison of the costs of the scheme versus the benefits it would provide. This is used to calculate the portion of the costs eligible for FCERM GiA, and therefore the amount that would need to be met by local Partnership Funding (**PF**).

	Malton Options				
	M1	M2	M3	M4	M5
<b>Residual Damages (£)</b>	10,189,000	4,527,000	1,901,000	1,868,000	1,556,000
<b>Benefits (£)</b>	-	5,662,000	8,288,000	8,321,000	8,633,000
<b>Costs (£)</b>	-	42,000	1,311,000	1,104,000	1,091,000
<b>BCR</b>		134.7	6.32	7.54	7.92
<b>Costs eligible for FCERM GiA (£)</b>			724,000	726,000	744,000
<b>PF contribution required (£)</b>			587,000	377,000	347,000

	Norton Options				
	N1	N2	N3	N4	N5
<b>Residual Damages (£)</b>	15,428,000	12,047,000	5,410,000	5,168,000	4,774,000
<b>Benefits (£)</b>	-	3,381,000	10,017,000	10,259,000	10,654,000
<b>Costs (£)</b>	-	42,000	2,278,000	2,176,000	2,545,000
<b>BCR</b>		80.4	4.40	4.71	4.19
<b>Costs eligible for FCERM GiA (£)</b>			1,007,000	1,020,000	1,042,000
<b>PF contribution required (£)</b>			1,271,000	1,156,000	1,503,000

	Old Malton Options				
	OM1	OM2	OM3	OM4	OM5
<b>Residual</b>			1,276,000	506,000	485,000



<b>Damages (£)</b>	3,759,000	2,671,000			
<b>Benefits (£)</b>	-	1,087,000	2,482,000	3,252,000	3,274,000
<b>Costs (£)</b>	-	84,000	1,004,000	746,000	1,150,000
<b>BCR</b>		12.9	2.47	4.36	2.85
<b>Costs eligible for FCERM GiA (£)</b>			388,000	431,000	432,000
<b>PF contribution required (£)</b>			616,000	315,000	718,000

The study concludes that 'cost beneficial' options exist for reducing flood risk in the communities, and that consequently there is a 'good economic case' for the proposals identified. However, it is important to note that none of the options would be wholly fundable from central government FCERM Grant in Aid (FDGiA). All proposals would therefore require significant partnership funding contributions, from local or private sources, to achieve the cost/benefit scores required for the options to proceed.

The study goes on to identify potential sources of funding and proposes next steps.

The most promising likely sources of funding identified are:

- Funds within the Multi-Agency Flood Group organisations, as well as other organisations, individuals and local businesses with vested interests in the reduction of flood risk;
- Key local businesses including landowners and property developers affected or those with a financial interest in the area;
- Local residents and community groups benefitting from the proposals.

Other potential options include, for example, Local Enterprise Partnership - European Strategic and Investment Fund (ESIF), Regional Flood and Coastal Committee (RFCC) Local Levy funding, Community Infrastructure Levy and/or setting up a Business Improvement District.

The recommended next steps are as follows:

- Consultation with stakeholders, potential contributors and affected parties;
- Preparation of Partnership Funding calculations, factoring in the likely contributions;
- Discussions with the Environment Agency with a view to developing a full Project Appraisal Report (PAR) and application for FCERM GiA, making best use of this report, which contains all the essential elements of such an application.

Development of a full PAR will involve further refinement of scheme design and costs, as well as discussion with the communities, individuals and organisations affected by the proposals.