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Environment Agency

Malton and Norton Flood Alleviation Scheme

Preliminary Environmental Report
Final

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Introduction

Background

- 1.1 Malton and Norton are situated on the River Derwent in North Yorkshire and comprise the largest settlement in the Ryedale District Plan area. The town occupies a key position at the junction of the Howardian Hills to the west, the Chalk Wolds to the east and the Vale of Pickering to the north. Malton lies on the right bank of the river while Norton is located on the left. Old Malton lies on the right bank north east of these two towns. (Figure 1.1)
- 1.2 Malton with Norton are important commercial towns located approximately halfway between York and Scarborough, near to the A64 trunk road. The main railway line through Norton along with the A64 links all these settlements.
- 1.3 The key environmental and archaeological features of Malton and Norton are shown in Figures 10.1 – 10.4 and 11.1 – 11.7. A number of important historic features and the attractive character of the towns contribute towards their importance as a tourist base. The semi rural nature of the River Derwent corridor, its designation as an Site of Special Scientific Interest (SSSI) and Site of Importance for Nature Conservation (SINC) and other designated sites give the area high nature conservation value. Policies contained in the Ryedale Local Plan seek to protect, conserve and enhance these features.

History of Flooding

- 1.4 For the purpose of this report, Malton also includes the towns of Old Malton and Norton.
- 1.5 Malton has an extensive and well documented history of flooding resulting in damage to residential properties, petrol stations, factories, shops and recreational areas. Local roads and the railway line have been severely disrupted by floodwaters.
- 1.6 The second highest recorded flood of 18.9m AOD occurred in March 1999 when 155 properties were affected. The rail links between York and Scarborough were closed for several days and many roads, including the A169 Malton to Pickering road, were flooded.
- 1.7 Flooding in the autumn of 2000 reached 19.03m AOD and resulted in considerable disruption to the town as well as flooding to many properties.
- 1.8 Previous significant flooding occurred in 1892, 1947, 1968 and 1982. The second worst recorded flood occurred in 1931 when the flood level was 18.7m AOD. After the 1947 event, there were alterations to the channel upstream of Malton. Regular events since 1982 have caused some damage and/or disruption in Malton.

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- 1 9 The low lying parts of the town are most often affected by floodwater. The main areas at risk include housing in the Welham Road/St Nicholas Street area, commercial and recreational facilities along both banks, housing in Bark Knotts Terrace and housing and commercial properties in Church Street.
- 1 10 Flood levels in the River Derwent are largely the result of heavy rain and/or snow melt on the North Yorkshire Moors. Flooding in Malton also occurs due to the backing up of watercourses which discharge to the river. For example, the initial flooding in the Welham Road area arises due to a tributary of the River Derwent backing up when river levels are high, so that floodwater overflows from manholes.
- 1 11 There are no existing flood defences in Malton or Norton. There are some floodbanks in Old Malton. Out of bank flows are predicted to have a 1 in 2 year return period with flooding of property occurring at approximately 1 in 5 years.

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Purpose of Study

- 2.1 Balfour Beatty were commissioned by the Environment Agency to carry out a feasibility study into a flood alleviation scheme for Malton and Norton
- 2.2 An environmental assessment of the main scheme options is an integral part of the study. As part of the work, an Environmental Scoping Report was produced in November 1999 which outlined sensitive environmental issues and identified the potential issues of concern and issues requiring further study. The scoping report was circulated to a number of consultees. A review of responses to the Scoping Report is given in Section 4, while copies of correspondence are in Appendix A.
- 2.3 The scoping study included site visits, consultations and review of existing data and literature. In addition, the following specialist documents were produced:
- Cultural Heritage Assessment Report (October 1999)
 - Geotechnical desk top study
 - River Corridor Survey (October 1999)
- 2.4 The study area was the estimated area within Malton and Norton which was subjected to flooding during March 1999. Figure 1.1 indicates the general study area. This includes the river corridor from south of Lascelles Lane in Old Malton as far as the sewage works at Malton to the south west. The land use, landscape and visual studies also embraced the wider setting of the towns.
- 2.5 Extending the study area to include detailed assessment of the areas affected by Option 4 upstream storage and Option 6 storm relief culvert was considered inappropriate at this stage. The full extent of the necessary works for options 4 and 6 and the resulting flood area from the upstream storage option would need to be determined to assess the extent of detailed studies required.
- 2.6 In the Feasibility Study, the economic analysis of Option 4 reveals a cost benefit ratio substantially less than unity. With regard to Option 6 storm relief culvert, the hydraulic analysis has shown that this option on its own would not provide any reductions in flood levels in Malton.
- 2.7 Thus for Options 4 and 6, a professional judgement has been made as to the likely potential impacts, although further detailed study would be required to clarify and elaborate on this assessment.
- 2.8 This report incorporates information about the existing environment from the Scoping Report and outlines the options which include do nothing, do minimum and various options relating to a 1 in 200 year defence level. This report makes a preliminary assessment of the potential impacts of each option, under the environmental subject headings given in the

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Scoping Report. Proposals for mitigation of impacts and opportunities for enhancement are given.

2.9 Section 14 contains a summary and recommendations and gives reasons for selecting preferred options.

2.10 The study has been undertaken in accordance with the requirements of the Town and Country Planning (Environmental Impact Assessment) (England & Wales) Regulations 1999.

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Summary of Options

3 1 Introduction

3 1 1 A full description of the flood alleviation options is given in the Feasibility Report. A summary of these is given below.

Option 1 – Do Nothing

3 1 2 The do nothing option would not involve the construction of any defences and assumes no further work or expenditure. There would be no alleviation of flooding.

Option 2 – Do Minimum

3 1 3 The do minimum option would entail maintaining the status quo. Current management regimes to control in channel and bankside vegetation would continue as at present. The existing flood warning system would be operated and maintained. This option would not provide any flood protection.

Option 3 – Enhanced Maintenance

3 1 4 Under this option, the programme implemented to control in channel and bankside vegetation as well as silting up of the channel would be increased. The channel cross section would be increased, thus improving conveyance. There may be minor beneficial effects, however, flooding impacts would continue to occur.

Option 4 – Washland Storage

3 1 5 The washland storage option would entail the storage of floodwater on land upstream of Malton, shown in Figure 2.1. This would entail on line storage at two large flood control structures crossing the Rivers Rye and Derwent. Flows would be retained resulting in inundation of the adjacent land. Sluice gates in the control structures would control the flow of floodwater downstream. This option would alleviate flooding in the towns.

Option 5 – Channel Widening

3 1 6 There are two alternatives. The first entails widening the River Derwent locally between Old Malton and the wastewater treatment works south of Malton by over 100m, to accommodate increased flows of water within the channel. There would be some flood alleviation benefits. This is shown in Figure 3.1.

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- 3 1 7** The second alternative entails widening the channel to approximately 30m throughout its length downstream of Old Malton to the confluence with the River Ouse. All weirs would be removed or replaced with adjustable gates and many of the bridges would need to be altered. This alternative would reduce the incidence of flooding in Malton, Norton and Old Malton.

Option 6 – Storm Relief Culvert

- 3 1 8** A storm relief culvert (Figure 4.1) would be constructed by boring or other tunnel construction methods between two ends of a meander in the River Derwent approximately 5km downstream of Malton. This option would not be viable since it would not provide sufficient flood protection to properties in the towns.

Option 7 – County Bridge Arch

- 3 1 9** A fourth arch through the existing bridge structure located above the existing island in the river would allow additional flows to pass forward. An artist's impression in Figure 5.1 indicates how this may appear. This option would not protect properties in Malton, Norton and Old Malton from flooding and thus is not viable.

Option 8 – Combination of Flood Defences

- 3 1 10** This option uses a combination of hard and soft defences to provide flood protection to Malton, Norton and Old Malton, as well as to the York – Scarborough railway line.

- 3 1 11** Option 8A is similar to option 8 except that the railway line would not be afforded flood protection. For the purposes of simplifying assessment, option 8A will not be considered separately from Option 8.

- 3 1 12** Figures 6.1 – 6.3 and 7.1 – 7.2 show the possible location of the works for Options 8 and 8A respectively. These are split into sections which are referred to throughout this report.

- 3 1 13** Options 8 and 8A include flood protection measures at Mill Beck and Priorpot Beck (Figures 9.1 and 9.2). Flooding from these tributaries occurs when high water levels within the River Derwent cause flows in the becks to back up.

- 3 1 14** Options to provide flood protection from high water levels in Mill Beck would include a flap valve to the outlet and a pumping station located immediately upstream of the outfall. Alternatively, local defences along Mill Beck and Mill Pond would be required.

- 3 1 15** It is proposed to incorporate a culvert through the defences to accommodate Priorpot Beck. A flap valve would be fitted to the outfall and a new pumping station would be required to pump flow during storm events. Alternatively, local defences along Priorpot Beck and Priorpot Beck Pond would be required.

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Option 9 – Combination of Flood Defences

- 3.1.16** Figures 8.1 – 8.2 show the location of this combination of hard and soft defences which would provide flood protection to Malton, Norton and Old Malton, but would not afford protection to any part of the railway line. Defences on the right side of the river would be identical to those proposed in Option 8. Defences constructed on the left side of the river would be located east of the railway line, so that the railway would not be protected from flooding. Floodwalls of up to 1.2m high would be required along Church Street, Welham Road, St Nicholas Street and Springfield Garth in Norton.
- 3.1.17** Works proposed at Mill Beck and Priorpot Beck would be as described for Option 8.

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Consultation

4.1 Review of Consultations and Responses

4.1.1 Consultations were carried out with a variety of interested parties including the following as required by the Brief

- North Yorkshire County Council
- Ryedale District Council
- Council for Protection of Rural England
- English Nature
- Yorkshire Wildlife Trust

4.1.2 The Environment Agency have been involved throughout this project and their comments have been included into the fabric of the study and the resulting reports

4.1.3 Not all the above consultees responded to the Environmental Scoping Report. The following raised various points which are summarised below

Environment Agency

4.1.4 The Environment Agency raised specific concerns regarding the water quality at Malton and associated rare invertebrates

4.1.5 The Fisheries Department's major concerns with any flood alleviation scheme are maintenance of good water quality and the sensitive nature of local fisheries. The Esk and Derwent Fisheries Consultative has been contacted on recommendation of the Agency

4.1.6 The Agency have also indicated that they would not generally be in support of culverting (Option 6)

English Nature

4.1.7 English Nature's main concern with the scoping study is that it does not reflect a strategic approach incorporating the concept of sustainable development to flood alleviation but has a bias towards short term local hard engineering options

4.1.8 English Nature suggested that upstream flood storage capacity be considered as a separate option which has been identified as an option for the Preliminary Environmental Report

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4 1 9 English Nature suggest that the study area needs to extend upstream of Malton / Norton in order to address other factors which contribute to flooding such as existing upstream flood banks. An extension of this upstream flood area has been considered in flood alleviation Option 4.

4 1 10 Other major concerns are listed below

- Mitigation measures to be identified for protected species within proposed works areas
- Indirect impacts of flood defence proposals on upstream and downstream area (Lower Derwent Valley Complex)
- Use of soft engineering / washlands to increase flood storage capacity and land use

Yorkshire Wildlife Trust

4 1 11 The Yorkshire Wildlife Trust raised no specific response to environmental issues in the scoping study but requested additional information regarding the Brief set by the Agency and whether the code of practice on Environmental Procedures for Flood Defence Operating Authorities published in 1996 by MAFF and The Welsh Office should be regarded as relevant.

4 1 12 During the public consultation exercise the Trust requested that studies should consider the use of a combination of upstream storage and local raised defences in the towns.

Council for the Protection of Rural England

4 1 13 The Council's main concern is the narrow focus of the scoping study on the urban area affected by the March 1999 flooding with the wider issue of re-creating upstream washland area not being addressed. The Council considers that an alternative to hard defences is to consider the re-creation of upstream inlets and washland to help reduce flood peaks as a more imaginative solution.

4 1 14 Following agreement with the Environment Agency a copy of the final Preliminary Environmental Report will be sent to all consultees for comments.

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Planning

5.1 Existing Environment

- 5.1.1 The planning context is set out by indicating the national, regional, strategic and local level policies and planning guidance which are relevant to the proposal for a flood defence scheme in Malton and Norton. The relevant planning documents and summaries of the relevant policies are set out in Table 1.

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Table 1 – Summary of Relevant Planning Guidance and Policies

National and Regional Planning Guidance	
Planning Guidance	Purpose
UK Strategy for Sustainable Development (1994 DOE)	The strategy examines key elements of sustainable development for different sections of society in the future
PPG 1 General Policies and Principles (1997 DOE)	Provides an overview and general statement of the objectives of the planning system and upholds the principles of sustainable development
PPG 7 The Countryside – Environmental Quality and Social Development (1997 DOE)	Takes on board the key elements of sustainability and tries to address the dilemma of meeting economic and social needs whilst protecting environmental quality and the character of the countryside
PPG 9 Nature Conservation (1994 DOE)	Emphasises the importance of the development plan system to provide certainty about the weight given to nature conservation. The guidance determines the hierarchy of important sites of interest. It also sets a development control framework for the consideration of impacts on these sites
PPG 12 Development Plans and Regional Planning Guidance (1992 DOE)	Provides a comprehensive statement of the role of the development plan and re-enforces the need for a plan-led system
PPG 15 Planning and the Historic Environment (1994 DOE)	Explains the role of the planning system in achieving sustainable development objectives through the protection of historic buildings, conservation areas and other elements of the historic environment. The guidance stresses the need to protect and conserve the nation's built and natural assets
PPG 16 Archaeology and Planning (1990 DOE)	Advises on how to preserve and record archaeological remains in the urban and rural environment. The guidance stresses archaeological finds to be finite natural resources that are fragile and vulnerable to damage or destruction. The guidance also suggests that remains have important economic value as they are generators of tourism, leisure and education resources. The development plan is seen as a key element in retaining, preserving and protecting these assets
PPG 17 Sport and Recreation (1991 DOE)	Outlines the need to protect open areas of recreational value from development. These open spaces may also play a part in conserving an area's natural and built heritage

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Table 1 – Summary of Relevant Planning Guidance and Policies

National and Regional Planning Guidance	
Planning Guidance	Purpose
PPG 21 Tounsm (1992 DOE)	Stresses the economic importance of tourism to the prosperity of towns and rural areas. Since tourism may depend on the quality of the environment it can become an impetus for protection and enhancement of key tourism assets such as characteristic landscapes, historic buildings and townscapes and areas of nature conservation interest.
PPG 23 Planning and Pollution Control (1994 DOE)	Is particularly relevant to development which possesses the greatest potential for pollution, as well as for contamination of land. The planning system has a role in controlling pollution by locating and restricting operations to avoid or minimise adverse effects on the use of land and the environment. The guidance seeks to ensure polluting developments are located away from sensitive locations.
RPG 12 Regional Planning Guidance for Yorkshire and Humberside	Of the general objectives, policies relating to land use should aim to ensure that sustainable development is encouraged and facilitated. Advises that land use policies in development plans should, as one of four broad objectives, aim to conserve, and where possible, to enhance the environment of the Region.

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Table 1 – Summary of Relevant Planning Guidance and Policies

Strategic Planning Guidance	
North Yorkshire Conservation Strategy (1991) (Non Statutory guidance)	
This document acts as a guide to the County Council in their rural conservation work. It describes the County's key resources in terms of nature conservation, landscape and heritage, and then sets priorities and policies for action aimed at conserving and enhancing landscape conservation in the wider countryside through work in partnership with other agencies. The document is not directly concerned with development control, rather it aims to influence local development plans and control policy in order to protect the County's resources.	
Nature Conservation NC3	– to discourage activities which are damaging to wetlands and associated habitats, and to identify opportunities to conserve and create these
NC6	– to ensure the future of important wildlife sites through advice and other means
Landscape Conservation LC8	– to have regard to landscape character in response to proposals for major land use changes
County Heritage CH3	– to protect and conserve County Heritage Sites which includes sites considered to be of at least county importance either for their nature conservation, landscape, historic or archaeological interest
North Yorkshire Structure Plan (August 1996) North Yorkshire County Council	
North Yorkshire Structure Plan Section/Policy	Purpose
Environment	
Policy E2	Development normally only permitted in open countryside for small scale operations requiring such a location for operational reasons. It should not harm the character, appearance, general amenity or nature conservation interests of the surrounding area.
Policy E4	To afford strict protection to buildings and areas of special townscape, architectural or historic interest.
Policy E5	To refuse development proposals which would damage archaeologically important sites.
Policy E6	To normally prevent development in or adjoining an SSSI (and other sites) which would adversely affect it. Special consideration given to other notified nature conservation sites and wildlife habitats.

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Table 1 – Summary of Relevant Planning Guidance and Policies

Local Planning Guidance	
Ryedale Local Plan Deposit Draft (November 1997) Ryedale District Council*	
Local Plan Section/Policy	Purpose
The Historic Environment	
C1 New development and changes of use within Conservation Areas	– To ensure that new development is of a high standard of design and respects and maintains the character and appearance of the Conservation Area in terms of scale form materials and quality
C3 Open spaces within or adjacent to Conservation Areas	– To protect important and attractive open spaces from development
C4 Trees in Conservation Areas	– To prevent the loss of trees of high amenity value – To prevent works to a tree which make an important contribution to the character of an area
C10 Applications affecting the setting of Listed Buildings	– To prevent development adversely affecting the setting of a Listed Building
C13 Ancient monuments and archaeological sites	– To protect from development to preserve and to prevent adverse effects on such sites and their settings
Sport Recreation and Community Facilities	
L2 Playing fields	– To prevent the total or partial loss of the playing fields due to development Development would be permitted where facilities on the site would be retained and enhanced
L6 New Public Open Space	– To secure public open space at i) land alongside the River Derwent Malton and Norton
L7 Public Open Space	– To prevent development which would impact upon or cause the loss of public open spaces
L8 Allotments	– To protect allotments or land last used for such purposes from development which would result in their total or partial loss

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Table 1 – Summary of Relevant Planning Guidance and Policies

Local Planning Guidance	
Ryedale Local Plan Deposit Draft (November 1997) Ryedale District Council*	
Local Plan Section/Policy	Purpose
Transport	
T11 Disused Railway Lines	– To protect from development which would prejudice their future use as possible cycle/footpath/horse riding routes or for potential public transport
Landscape Wildlife and Environmental Quality	
ENV 1 New Development outside Development Limits	– Subject to provisions of other Policies within the Local Plan to permit development outside the Development Limits provided that i) they would benefit economic or social activity and ii) they would maintain or enhance the rural environment The proposal should safeguard worthy landscape features and should not impact on character or landscape and protects nature conservation and archaeological interests
ENV 2 Development in the Howardian Hills AONB	To give priority to the greatest possible protection of the natural beauty of the Howardian Hills Area of Outstanding Natural Beauty in the determination of development proposals – to prevent development adversely affecting the natural beauty of the landscape – to permit small scale development required to meet the social and economic needs of rural communities so long as it protects the natural beauty of the landscape – to normally resist large scale developments – to ensure a high standard of design using traditional materials – to examine the environmental implications of all proposals

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Table 1 – Summary of Relevant Planning Guidance and Policies

Local Planning Guidance	
Ryedale Local Plan Deposit Draft (November 1997) Ryedale District Council*	
Local Plan Section/Policy	Purpose
ENV 4 River and stream corridors	<ul style="list-style-type: none"> – To resist development which would have a material detrimental impact on the natural features of rivers and stream corridors – To conserve and enhance the environmental amenity value – To protect natural features and marginal vegetation – To protect the character amenity and landscape – To require that the design and scale of structures and engineering works is appropriate in form and scale to their setting
ENV 5 Visually Important Undeveloped Areas	<ul style="list-style-type: none"> – To protect from the loss of or damage to the character
ENV 6 Tree Preservation Orders	<ul style="list-style-type: none"> – To consider the condition of trees when determining applications to fell or carry out work to trees subject to Tree Preservation Orders
ENV 7 Landscaping	<ul style="list-style-type: none"> – To incorporate with development suitable high quality landscaping schemes that enhance and compliment the local environment Landscaping schemes to be submitted to the local authority for detailed permission
ENV 9 Environmental Impact Assessments	<ul style="list-style-type: none"> – To require EIAs for all major development proposals likely to have a significant effect upon the environment – To generally require an EIA for proposals likely to have a significant effect upon <ul style="list-style-type: none"> i) A site of Special Scientific Interest ii) A Scheduled Ancient Monument
ENV 11 Sites of Special Scientific Interest	<ul style="list-style-type: none"> – To prevent development except where its benefits would clearly out weigh the national importance of the site – To use conditions and planning obligations for permitted development within an SSSI
ENV 12 Sites of Importance for Nature Conservation	<ul style="list-style-type: none"> – To prevent development except where its benefits would clearly outweigh the significant importance the site To prevent material damage to the value of the site through planning conditions and/or obligations which may include compensatory habitat creation and/or enhancement measures on or near the site

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Table 1 – Summary of Relevant Planning Guidance and Policies

Local Planning Guidance	
Ryedale Local Plan Deposit Draft (November 1997) Ryedale District Council*	
Local Plan Section/Policy	Purpose
ENV 14 Semi natural Habitats	– To minimise damage to semi natural habitats by permitted development and to require appropriate habitat creation and enhancement measures
ENV 15 Plant and Animal Species Protected by Law	– To protect animal or plant species protected by law from any adverse effects of development where permitted
ENV 16 Notable Species	– To prevent development which would have a materially detrimental effect on a notable species unless the development clearly outweighs the need to safeguard that species – use of planning conditions/obligations to minimise detrimental effects of development
ENV 18 Ponds	– To minimise damage to the ecological historical or landscape value of an important pond by permitted development – Habitat creation and/or enhancement measures would be implemented on or close to the site
ENV 19 Wildlife Corridors	– To prevent development which would be materially detrimental to a countryside feature which acts as a wildlife corridor – Where development is permitted to use planning obligations/conditions to minimise damage and ensure habitat creation or enhancement on or close to site
ENV 20 Habitat Creation and Public Access to Nature Conservation Sites	– To support proposals for habitat creation and public access to nature conservation sites New development should include measures to achieve this aim wherever possible
ENV 22 Water Quality	– To prevent development which would prejudice the quality of surface or groundwater – To support initiatives which would improve surface or groundwater quality
ENV 25 Development within floodplains and other areas liable to flood	– To permit development within floodplains or areas liable to flood only where ii) Any flood protection or mitigation measures would not have any material adverse effect upon the nature conservation value of the area or detract from the character and setting of nearby settlements or listed buildings

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Table 1 – Summary of Relevant Planning Guidance and Policies

Local Planning Guidance	
Ryedale Local Plan Deposit Draft (November 1997) Ryedale District Council*	
Local Plan Section/Policy	Purpose
The Market Towns and Rural Settlements	
MN1 Malton/Norton Riverside Project	– To ensure among other objectives that proposals for redevelopment of sites would not have any adverse effect upon the water quality or nature conservation value of the River Derwent that development would accord with the principles of Policy C1 that the proposal would not impact adversely upon townscape quality or local amenity and that development on the north bank of the river should make provision for the establishment of a riverside footpath The Project aims to improve the attractiveness of the nverside area and allow greater public enjoyment of and access to the riverside

*** Note** The Ryedale Local Plan Deposit Draft (Nov 97) states that there are a number of old style local plans in operation in the District which will eventually be superseded by the District wide Local Plan These plans will continue in force until the Ryedale Local Plan is adopted However as the more recent document The Ryedale Local Plan will be taken into account in reaching decisions on planning applications and as it progresses through the Local Plan process less weight will be accorded to the old style Local Plans

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5 2 Potential Impacts (Mitigation and Enhancement)

5 2 1 The assessment of impacts on the relevant planning policies is set out in Tables 2 1 to 2 7 below

Option 1 – Do Nothing

Table 2 1 – Assessment of Impacts on Planning Guidance (Option 1)

National and Regional Planning Guidance		
Guidance	Impact	Ranking
UK Strategy for Sustainable Development PPG 1 and RPG12	Continued impacts of flooding on agricultural land transport routes and business property	Strong conflict
PPG 7 PPG 9 PPG 15 PPG 17 PPG 21	Continued impacts of flooding on infrastructure property and historic and semi natural environment	Strong conflict
Strategic Planning Guidance		
Guidance/Policy	Impact	Ranking
North Yorkshire Conservation Strategy	Continued impacts of flooding which would include areas of historic or archaeological interest	Conflict
North Yorkshire Structure Plan E4 and E5	Continued risk of flooding also affecting built heritage	Conflict
Local Planning Guidance – Ryedale Local Plan		
Policy	Impact	Ranking
C13	Continued risk of flooding to sites of cultural heritage significance	Conflict
L7	Continued impacts of flooding on public open space	Conflict
ENV 4 and ENV 5	Continued impacts of flooding on the character amenity and natural features of the river corridor	Conflict
ENV22	Potential in long term for siltation and vegetation growth to lead to a deterioration of the river water quality No opportunities for habitat creation	Conflict
ENV20	Missed opportunity for habitat enhancement	Conflict
MN1	Lack of flood protection would be in conflict with proposals to redevelop underused sites in this area	Conflict

Option 1 would not provide any flood protection to the towns in conflict with economic development aims and policies aiming to protect the built and natural environment The main impact would be on policies to protect the river water quality

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Option 2 – Do Minimum

Table 2 2 – Assessment of Impacts on Planning Guidance (Option 2)

National and Regional Planning Guidance		
Guidance	Impact	Ranking
UK Strategy for Sustainable Development PPG 1 and RPG12	Continued impacts of flooding on agricultural land transport routes and business property	Strong conflict
PPG 7 PPG 9 PPG 15 PPG 17 and PPG 21	Continued impacts of flooding on property infrastructure and the historic and undeveloped environment	Strong conflict
Strategic Planning Guidance		
Guidance/Policy	Impact	Ranking
North Yorkshire Conservation Strategy	Minor negative ecological impact	Conflict
North Yorkshire Structure Plan E4 and E5	Continued risk of flooding notably to the built heritage	Conflict
E6	Minor negative ecological impact	Conflict
Local Planning Guidance – Ryedale Local Plan		
Policy	Impact	Ranking
C13	Continued risk of flooding to sites of cultural heritage significance	Conflict
L7	Continued impacts of flooding on existing public open space	Conflict
ENV4 and ENV5	Continued effects of flooding and some ecological impact	Conflict
ENV11 – ENV16 ENV19	Minor negative ecological impact	Conflict
MN1	Lack of flood protection would be in conflict with proposals to redevelop underused sites in this area	Conflict

Option 2 would not provide any flood protection to the towns in conflict with economic development aims and policies aiming to protect the built and natural environment

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Option 3 – Enhanced Maintenance

Table 2 3 – Assessment of Impacts on Planning Guidance (Option 3)

National and Regional Planning Guidance		
Guidance	Impact	Ranking
UK Strategy for Sustainable Development PPG 1 and RPG12	Impacts of flooding on agricultural land transport routes and business property potentially reduced	Support
PPG 7 PPG 9 PPG 15 PPG 17 and PPG 21	Extent and impacts of flooding may be reduced	Support
Strategic Planning Guidance		
Guidance/Policy	Impact	Ranking
North Yorkshire Conservation Strategy	Reduction in vegetation may impact on character of the towns Reduced value of R Derwent SSSI and SINC	Conflict
Policy	Impact	Ranking
North Yorkshire Structure Plan E6	Reduced value of R Derwent SSSI and SINC	Conflict
Local Planning Guidance – Ryedale Local Plan		
Policy	Impact	Ranking
C4	Possible loss of trees potentially of high value	Conflict
ENV 4	Compromise between impacts of reduction in bankside and channel vegetation and benefits to channel flow	Conflict
ENV 5	Loss of vegetation contributing to character of towns	Conflict
ENV 9	Conditions could be met	
ENV 11 ENV 16 and ENV 19	Reduced value of R Derwent SSSI and SINC	Conflict
MN1	Potentially reduced effects of flooding in areas which may be redeveloped	Support

Option 3 would provide minimum improvements in flood protection to the towns and would remain in conflict with economic development aims and policies aiming to protect the built and natural environment. The main impact would be on policies to protect the value of the River Derwent SSSI and SINC and their associated habitats.

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Option 4 – Washland Storage Option

Since a detailed assessment of the impacts of this scheme has not been undertaken the following are initial comments on the potential impacts on planning policies

The most significant positive impact of this option would be the potential to support national policies to create wetlands. However, the scale of the defences required for this option would be in strong conflict with policies to protect landscape character and may affect the setting of historic features. There would also be considerable impact on farmland and potentially on settlements during flooding.

Option 4 would alleviate flooding in the towns.

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Option 5 – Channel Widening

Table 2 4 – Assessment of Impacts on Planning Guidance (Option 5)

National and Regional Planning Guidance		
Guidance	Impact	Ranking
UK Strategy for Sustainable Development PPG1 and RPG 12 PPG 7	Potential for extensive impacts on properties in town	Strong Conflict
PPG 9 PPG 15 and PPG 16	Compromise between economic and social benefits scheme and loss of agricultural land	Strong conflict
PPG 21	Large impact on River Derwent SSSI	Strong conflict
	Impacts on sites of regional and local importance and within conservation areas	Conflict
	Continued impacts of flooding on tourist assets	Conflict
Strategic Planning Guidance		
Guidance/Policy	Impact	Ranking
North Yorkshire Conservation Strategy	Significant impacts on R Derwent character of river corridor and on archaeological sites	Strong conflict
North Yorkshire Structure Plan E2 and E6	Large impact on River Derwent SSSI and rural and semi rural land	Strong conflict
E4 and E5	Impacts on site of regional and local importance	Strong conflict
Local Planning Guidance		
Policy	Impact	Ranking
C1 – C4 and C13	Potential to impact on a number of sites of regional and local importance and in conservation areas	Strong conflict
L2 – L8	High potential to affect recreational and public spaces	Strong conflict
ENV 1 and ENV 4	Significant impacts on natural features and built and landscape character	Strong conflict
ENV 6	Tree Preservation Orders not known	
ENV 9	Conditions could be met	
ENV 11	Direct impacts on River Derwent with significant detrimental effects	Strong conflict
ENV 14 – ENV 16 and ENV 19		
ENV22	Risk of siltation during construction	Conflict
ENV 25	High impact on nature conservation value	Strong conflict
M11	Possible high impacts on Derwent and an townscape quality and local amenity	Strong conflict

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Local channel widening by 100m would provide some flood alleviation benefits while widening by 30m to the confluence with the River Ouse would protect properties in the towns from all but the most severe flood events

Option 5 would have substantial impacts on policies to protect the River Derwent SSSI and its associated habitats. There would also be significant impacts on policies to protect landscape and townscape character and archaeological features

Option 6 – Storm Relief Culvert

Detailed impacts of this option have not been considered at this stage since Option 6 would not be viable. This option would conflict with economic development policy aims since existing and potential business areas and development sites would still be at risk from flooding. It is likely that this option would also be in strong conflict with policies to protect the Derwent SSSI bankside habitats and landscape character within the Howardian Hills AONB

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Option 7 – County Bridge Arch

Table 2 5 – Assessment of Impacts on Planning Guidance (Option 7)

National and Regional Planning Guidance		
Guidance	Impact	Ranking
UK Strategy for Sustainable Development PPG1 and RPG 12 PPG 9 PPG 15 and PPG 16 PPG 21	Would not fully protect business properties and town areas from flooding Impacts on R Derwent SINC and local species Impacts on 2 regionally important sites including County Bndge Impacts on tourist assets not eliminated	Conflict Conflict Conflict Conflict
Strategic Planning Guidance		
Guidance/Policy	Impact	Ranking
North Yorkshire Conservation Strategy North Yorkshire Structure Plan E2 and E6 E4 and E5	Impacts on natural habitats listed building and archaeological sites River Derwent SINC affected Impacts on 2 sites of regional importance within conservation area Mitigation is proposed	Conflict Conflict Conflict
Local Planning Guidance – Ryedale Local Plan		
Policy	Impact	Ranking
C1 C10 C13 ENV 4 ENV 6 ENV 7 ENV 12 ENV 14 – 16 ENV 19 MN1	Conditions could be met Impacts on listed building Mitigation proposed Potential impacts on archaeological site Impacts on natural features of river Works could comply with requirements for appropriate scale and form of engineering works Tree Preservation Orders not known Conditions could be met Impacts on River Derwent SINC Impacts on island in river supporting wildlife Underused sites in this area which may be redeveloped would not be protected from flooding	Support Strong conflict Conflict Conflict/Support Support Conflict Conflict Conflict

Option 7 would not prevent flooding in the towns in conflict with economic development aims and policies aiming to protect the built and natural environment. The main impacts would be on policies to protect listed buildings (County Bridge) and on policies to protect notable and legally protected species in the River Derwent SINC.

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Option 8 – Combination of Flood Defences

Table 2 6 – Assessment of Impacts on Planning Guidance (Option 8)

National and Regional Planning Guidance		
Guidance	Impact	Ranking
UK Strategy for Sustainable Development PPG1 and RPG 12 PPG 7	Defences would protect business properties and town areas from flooding	Strong support
PPG 9	Compromise between economic and social benefits of flood defences and impacts on semi rural land Mitigation proposed	Conflict
PPG 15 and PPG 16	SSSI and SINC designated areas and local ponds potentially affected Mitigation proposed to minimise/avoid damage	Conflict
PPG 17	Impacts on sites of national regional and local importance and within conservation areas	Conflict
PPG 21	Defences to be located within existing and proposed public open spaces Mitigation proposed	Conflict
	Defences would protect tourist assets e.g historic buildings	Support
Strategic Planning Guidance		
Guidance/Policy	Impact	Ranking
North Yorkshire Conservation Strategy	Potential effects on SSSI and SINC designated areas and local ponds Mitigation proposed Potential impact on landscape character Mitigation proposed Potential impacts on a number of archaeological sites	Conflict Conflict Conflict
North Yorkshire Structure Plan E2 and E6	Compromise between economic and social benefits of defences and possible impacts on landscape and natural environment Mitigation proposed	Conflict
E4 and E5	Impacts on sites of national regional and local importance and within conservation areas	Conflict

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Local Planning Guidance		
Policy	Impact	Ranking
C1 and C3	Conditions could be met	Support
C4	Potential risk to vegetation and mature trees	Potential conflict
C10 and C13	Potential impacts on sites of national regional and local importance	Conflict
L6 and L7	Some impacts on existing and proposed public open space	Conflict
L8	Potential impact on allotments at Old Malton	Strong conflict
ENV 1	Compromise between economic and social benefits of flood defences and impacts on environment Mitigation proposed	Support
ENV 4	Potential impacts in river corridor Mitigation proposed	Conflict
ENV 5	Compromise between economic and social benefits and localised impacts on character	Conflict
ENV 6	Tree Preservation Orders not known	
ENV 7	Conditions could be met	Support
ENV 9	Conditions could be met	Support
ENV 11 ENV 12 ENV 14 – ENV 16 ENV 18 ENV 19 and ENV 25	Potential impacts on SSSI SINC and other wildlife areas Mitigation proposed to avoid/minimise impacts	Conflict
ENV 20	Works would create opportunities for habitat creation through mitigation and enhancement works	Support
ENV22	Long term impacts not known in detail	
MN1	Protection from flooding would be in support of proposals to redevelop underused sites in this area Conditions could be met	Support

Option 8 would provide flood protection to the towns in support of economic development aims and policies to protect the built and natural environment. There would be impacts on a range of policies aiming to protect the historic environment, landscape and natural features from the adverse impacts of development. The most significant of these are likely to be impacts on policies to protect SSSI and SINC designated areas as well as cultural heritage sites due to unknown potential impacts on two scheduled ancient monuments. However, within this option there are opportunities to reduce the impacts on policies to protect natural features such as through minor re-alignment of the proposed defences. Careful design of the defences would be required to ensure support of policies to protect key features, landscape and townscape character and ecological assets.

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Option 9 – Combination of Flood Defences

Table 2 7 – Assessment of Impacts on Planning Guidance (Option 9)

National and Regional Planning Guidance		
Guidance	Impact	Ranking
UK Strategy for Sustainable Development PPG 1 and RPG 12 PPG 7	Defences would protect business properties and town areas from flooding	Strong support
PPG 9	Compromise between economic and social benefits of flood defences and impacts on semi rural land Mitigation proposed	Conflict
PPG 15 and PPG 16	SSSI and SINC designated areas and local ponds may be affected Mitigation proposed	Conflict
PPG 21	Impacts on sites of national regional and local importance and within conservation areas Defences would protect tourist assets e.g historic buildings	Conflict Support
Strategic Planning Guidance		
Guidance/Policy	Impact	Ranking
North Yorkshire Conservation Strategy	Potential effects on a number of archaeological sites as well as landscape and ecological features	Conflict
North Yorkshire Structure Plan E2 and E6 E4 and E5	Compromise between economic and social benefits of flood defences and impacts on environment Mitigation proposed Impacts on sites of national regional and local importance and within conservation areas	Conflict Conflict
Local Planning Guidance		
Policy	Impact	Ranking
C1	Impact of floodwalls in Norton Conservation Area Conditions could be met	Conflict/Support
C4 C10 and C13	Potential risk to vegetation and mature trees Potential impacts on sites of national regional and local importance	Potential conflict Strong conflict
L6 and L7	Some impacts on existing and proposed public open space Mitigation proposed	Conflict
L8	Potential impact on allotments at Old Malton and Norton	Strong conflict
ENV 1	Compromise between economic and social benefits of flood defences and impacts on environment Mitigation proposed	Conflict
ENV 4	Potential impacts in river corridor Mitigation proposed	Conflict
ENV 5	Compromise between economic and social and localised impacts on character	Conflict
ENV 6	TPOs not known	

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Local Planning Guidance		
Policy	Impact	Ranking
ENV 7	Conditions could be met	Support
ENV 9	Conditions could be met	Support
ENV 11 ENV 12 ENV 14 – ENV 16 ENV 18 ENV 19 and ENV 25 ENV 20	Potential impacts on SSSI SINC and other wildlife areas Mitigation proposed to avoid/minimise impacts	Conflict
ENV22 MN1	Works would create opportunities for habitat creation through mitigation and enhancement works Long term impacts not known in detail Protection from flooding would be in support of proposals to redevelop underused sites in this area Conditions could be met	Support

Option 9 would provide flood protection to the towns in support of economic and development aims and policies aiming to protect the built and natural environment. There would be impacts on a range of policies aiming to protect the historic environment, landscape and natural features from the adverse impacts of development. It is likely that impacts on policies to protect natural features would be less than for Option 8 due to the location of defences away from the river. However, by locating defences in central Norton there is greater potential to affect policies protecting the setting of historic buildings and the conservation area.

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Land Use

6.1 Existing Environment

6.1.1 The River Derwent at Malton flows north east to south west past a variety of land uses. The railway line is a major feature within the river corridor.

6.1.2 In the upper reaches of the river near Old Malton, the landscape is agricultural with numerous hedges and belts of trees. Most of the developed areas are located some distance from the river itself. Further downstream, the river borders agricultural land, recreation grounds and the site of a former Roman fort. Residences are located closer to the river on the left side. Both banks of the river are lined with many trees. The river then passes Lady Spring Wood before entering the town where there are sections of wall in the river channel. Both residential and commercial buildings are located in this area.

6.1.3 West of the town, the land is predominately agricultural, with an industrial estate incorporating a sewage treatment works sited on the slope between York Road and the River. The fields are divided by hedgerows and some trees.

6.1.4 A number of public footpaths and recreational areas are located close to the river in the study area. Further details are given in Section 10.

6.1.5 The Malton/Norton Riverside Project Area covers land north and south of the river in central Norton and Malton. The Council aim to encourage inward investment into this area along with environmental regeneration.

6.2 Potential Impacts (Mitigation and Enhancement)

6.2.1 The assessment of impacts is based upon preliminary studies of land use and vegetation. Further detailed study would be required to determine the area of land affected including haul routes, storage areas and site compounds and species and condition of vegetation. This should include any areas identified as borrow pits to source fill material for embankments. More specific mitigation measures could then be set out to avoid or minimise potential impacts.

Option 1 – Do Nothing

6.2.2 There would be an increase with time in the amount of vegetation growing within and along the banks of the channel. Impacts on land use would continue to occur during flooding.

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Option 2 – Do Minimum

- 6 2 3 The amount of vegetation within and along the banks of the channel would remain the same or increase slightly. Impacts on land use would continue to occur during flooding.

Option 3 – Enhanced Maintenance

- 6 2 4 The amount of vegetation within and along the banks of the channel would be reduced. Without the use of flood defences, impacts on land use would continue to occur during flooding, however, the flow characteristics of the river channel would be improved.

Option 4 – Washland Storage Option

- 6 2 5 For a 200 year flood event, a dam of length 3.7km across the River Derwent would be required, of up to 2.2m height (located in Figure 2.1). The dam could be constructed along the line of an existing disused railway embankment, tying into higher ground. A sluice gate would be required to regulate flows in the river. The water would be on average 0.91m deep across the flooded area. This would require permanent relocation of around 25 houses and 17 farm buildings which are located within the proposed flooded area. A perimeter road around the flooded area would be required to maintain access.

- 6 2 6 In the valley of the River Rye, a dam of 4.1km length would be required, which would be around 5.1m high. The dam would tie into higher ground on the valley sides. A sluice gate in the dam would regulate flows in the river. The floodwater, at an average depth of 1.86m, would extend 900m south of the river and 3200m north of the river. Approximately 42 houses and 8 farm buildings would be permanently relocated, and a new perimeter road would be required around the flooded area to maintain access.

- 6 2 7 The defences are likely to have substantial impacts on land uses located within the footprint of the required control structures, both during and post construction. Similarly, construction of an alternative access route and of new properties to replace those displaced would have substantial impacts on farmland.

- 6 2 8 During flooding, all existing land use within the flood area would be suspended. Agricultural land would be put out of production, while vegetation may be affected. Access within and across the flooded area would also be impeded.

Option 5 – Channel Widening

- 6 2 9 Localised widening of a section of the river by over 100m would have unacceptable, substantial impacts on land use and vegetation. There would be a permanent loss of agricultural land, and substantial losses of bankside vegetation, and vegetation on land adjacent to the river. Any property in this corridor would be removed.

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- 6 2 10** Widening the Derwent from Old Malton downstream to the confluence with the River Ouse is also likely to cause unacceptable widespread impacts on landuse and vegetation in addition to the impacts caused by removal or replacement of weirs and alteration of bridges

Option 6 – Storm Relief Culvert

- 6 2 11** The construction of a storm relief culvert could involve disruption to small areas of agricultural land and bankside vegetation at the culvert s entrance and exit. There would be impacts on land in the area of haul routes and site compounds. A considerable quantity of excavated material would be removed from site. Once constructed, agricultural land would be restored to its current use except for the relatively small area required for the culvert entrance and penstock.

Option 7 – County Bndge Arch

- 6 2 12** The bridge would be closed during construction.
- 6 2 13** Vegetation loss is likely to occur on the island in the nver during the works, due to regrading of the island and construction of the arch. Removal of only part of the island would have substantially lower impacts on landuse and vegetation than removal of all of it.

- 6 2 14** In the long term, the island would be reduced in size, with less area to support vegetation.
- Mitigation and Enhancement

- 6 2 15** The island should be restored as closely as possible to its existing condition. Opportunity should be taken to replant the island with native species beneficial to wildlife.

Option 8 – Combination of Flood Defences

- 6 2 16** At Old Malton (Sections A B, B C and C D) (Figures 6 1 – 6 3) construction of the embankments would impact on agricultural land and potentially, upon vegetation to the rear of residential properties around the Doodales and growing on the nverbanks. The parking area north of the Abbey House which is also used as an informal village green would be closed. In this area there is a potential risk of damage to mature trees during construction works.

- 6 2 17** West of the railway line (Sections J K, K L) construction of embankments and walls would affect agricultural land and vegetation, while over Section L M, works could impact on Norton lngs which is a SINC and lies within the area proposed as public open space.

- 6 2 18** Works over all sections between the disused railway embankment and Railway Bridge, as well as Sections H I and Q R, would potentially impact on bankside vegetation. This

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includes small and mature trees (semi natural and ornamental) as well as herbaceous vegetation. Over Section G H mature and semi mature trees in the supermarket car park would be at risk from damage due to the works. Further assessment would be required to quantify these impacts.

6 2 19 Construction of defences alongside the picnic area between the bridges (sections N O and O P) could affect semi mature trees. The area would be closed during construction. The recreation area alongside Riverside View (Section R S) would also be considerably disrupted with temporary closure of the children's play area and access to the public footpath by the river east of this.

6 2 20 There is the potential for impacts at the boundaries of commercial and residential properties along Sections G H H I and Q R and at commercial properties along Section P Q. In addition works at Priorpot Beck and Mill Beck are likely to result in disruption to private properties. The area around Mill Beck would be inaccessible during construction.

6 2 21 For works within the built up areas there would be some disruption to roads and the bridges during construction including that due to the construction of the pumping stations.

Mitigation and Enhancement

6 2 22 Care should be taken to minimise disturbance to agricultural land public open spaces and private property and to avoid damage to or loss of vegetation particularly mature trees. This could be achieved by careful alignment of defences to avoid important features by minimising the working area through the construction of temporary access routes with ground protection measures and by protection of vegetation. Existing roads and access routes should be used as far as possible to minimise tracking over public open spaces and agricultural land. Any land currently in use as allotment gardens or last used for such purposes should be avoided.

6 2 23 All land in the construction areas used for site compounds working areas and access routes should be restored to its original condition post construction. Floodbanks should be re seeded to match surrounding areas. Walls should be clad with a locally appropriate facing material. Any vegetation lost should be replaced and opportunity could be taken to enhance vegetation woodland and ecological areas and to create areas with greater ecological value.

6 2 24 In the long term there would be some permanent loss of agricultural land with new areas of floodwall in the central town areas. A wall in the parking area north of the Priory would occupy less land than an embankment. At the picnic area (section O P) a wall at the south side would have a much smaller impact on the area and possibly on the trees than an embankment parallel to the riverbanks. A new embankment would occupy part of the recreation area at Riverside View so a wall may be preferable in this section as well.

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Defences at Mill Pond would not affect use of this area. South of the hotel on Yorkersgate a floodwall would again occupy less land than a bank in this open area.

6.2.25 Construction of defences in the Malton/Norton Riverside Project Area may act as a catalyst for redevelopment of unused sites by protecting these from future flood events.

6.2.26 Construction of pumping stations to pump floodwater from Mill Beck and Pnorpot Beck into the Derwent would have a significantly smaller long term impact on landuse than providing localised defences.

Option 9 – Combination of Flood Defences

6.2.27 Refer to Figures 8.1 – 8.2. For defences proposed at Old Malton on the right side of the River Derwent and in the Mill Beck and Pnorpot Beck areas the effects on land use during and post construction would be similar to those described for Option 8.

6.2.28 South of the railway line the defences would be constructed beyond property boundaries however where there is insufficient space construction of defences may affect land and vegetation at the boundaries of residential and commercial properties. During construction there would be substantial disruption to properties and traffic in central Norton with diversion of services likely. The walls/embankments may also impact upon allotment garden areas in the town. Further east (section S T) some agricultural land is impacted upon.

Mitigation and Enhancement

6.2.29 Mitigation measures described for Option 8 for defences on the right side of the river would apply. On the left side of the river there is likely to be considerably greater disruption to private property than in Option 8. Care would be required to minimise the impact of this on gardens and private access routes. All land including private and business property would require full restoration.

6.2.30 In the long term defences constructed in central Norton are likely to result in restricted access along public footpaths and/or along public highways. During flooding all floodgates would be closed resulting in confinement of residents to their properties or exclusion from them if these people were evacuated.

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Landscape and Visual Amenity

7.1 Existing Environment

7.1.1 Malton is an attractive town located on sloping land on the right hand bank of the River Derwent. The Market Place forms a focus to the historic core of the town. Here there are numerous listed and historic buildings including the Town Hall, now occupied by Malton Museum. Further architecturally and historically important areas are evident around Yorkersgate, Wheelgate, Old Maltongate and Castlegate. These streets and the Market Place contain the main shopping area. Most of Malton's historic areas lie within Malton Conservation Area.

7.1.2 Norton is located on mostly flat land on the left hand bank of the River Derwent. The town is not of as strong townscape quality as Malton but nevertheless features a number of architecturally and historically important buildings around Church Street and Commercial Street. The central area of Norton is designated a Conservation Area. There is a large amount of recent housing development west of the town.

7.1.3 The attractive village of Old Malton lies north east of Malton. Most of the village is included in the Old Malton Conservation Area, with numerous buildings of historical and architectural interest. The area around St Mary's Priory Church is a Scheduled Ancient Monument. Most buildings are situated well away from the river. The River Derwent SSSI extends into an area of former fish ponds, The Doodales, east of the settlement.

7.1.4 The Conservation Area boundaries in Malton and Norton are shown in Figures 10.1 – 10.4. Policies C1-C3 of Ryedale District Local Plan control development and demolition of features in the Conservation Area. Any permitted development would be required to reflect the historic character and appearance of the settlement in its design, detailing and choice of materials used. Policy C4 of the Ryedale District Local Plan protects trees within the conservation area.

7.1.5 Areas alongside the River Derwent are designated as Visually Important Undeveloped Areas (VIUA). These comprise land on both the left and right hand side of the river. These are undeveloped areas which make an important contribution to the character of the settlement. Their loss would significantly damage the appearance and character of that settlement.

7.1.6 The well vegetated river corridor contributes significantly to the character of the towns and forms the setting for 3 no. Scheduled Ancient Monuments (refer Section 9).

7.1.7 Policy MN1 of the Ryedale Local Plan, Malton/Norton Riverside Project Area aims in general to improve the environmental quality of the area of the towns near the river and to increase access to the northern bank of the river in conjunction with development proposals.

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7 1 8 From both Malton and Norton there are many views to the attractive river corridor. Some views, particularly from York Road, Yorkersgate and Old Maltongate encompass panoramic views of the surrounding landscape.

7 2 Potential Impacts (Mitigation and Enhancement)

7 2 1 The landscape and visual assessment makes a preliminary judgement as to the likely impacts based on existing information. It is possible that sites could be identified as potential borrow pits for embankment fill material. These sites could then act as the focus for enhancement measures such as the creation of new habitats. Norton Ings could have potential as such a site. Further assessment would be required at the detailed design stage in order to clarify any impacts arising from borrowing fill material and to recommend appropriate mitigation and enhancement measures.

7 2 2 The following assessment considers the impact of defences required to provide protection for a 1 in 200 year flood event. It is likely that defences for smaller scale events, say a 1 in 50 or 1 in 100 year event would be lower and thus the landscape and visual impact would be reduced.

Option 1 – Do Nothing

7 2 3 With no control over the growth of vegetation within the river corridor, this would become increasingly dense.

7 2 4 Views of the river, across it and along its length, would become increasingly obscured with time.

Option 2 – Do Minimum

7 2 5 Under this scenario, the existing character would be largely maintained, with mature trees and shrubs and trees featuring along much of the length of the river corridor.

7 2 6 Visibility and views of the river would remain similar to that existing.

Option 3 – Enhanced Maintenance

7 2 7 The river corridor would take on a more open character than at present. Reduced vegetation would result in some character change to the river corridor.

7 2 8 Over time, views would be opened up and the river would become a more prominent visual feature.

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Option 4 – Washland Storage Option

- 7 2 9** The scale of defences and flooded area has been described in paragraphs 6 2 5 – 6 2 6. Defences extending for several kilometres across the landscape would have substantial impacts on landscape character both during and post construction. There may be substantial impacts on vegetation within and around the footprint of the flood control structures.
- 7 2 10** In addition, construction of new access roads and construction of relocated properties would be associated with landscape and visual impacts during and post construction. Properties which became unoccupied would need to be dismantled in order to prevent decaying structures remaining in the landscape.
- 7 2 11** This option would require detailed consideration of these impacts in order to determine mitigation requirements.

Option 5 – Channel Widening

- 7 2 12** The area around the river between Old Malton and Norton is designated a VIUA. The character of the river and surrounding areas would be substantially altered by both alternatives. The impacts are considered to render this option unacceptable. In particular, widening the whole length of the river by 30m would have additional visual impacts due to works to all structures along the river and would alter the character of existing bridges.

Option 6 – Storm Relief Culvert

- 7 2 13** Option 6 would be located in the Howardian Hills AONB. This national designation aims to enhance and conserve geological and landscape features as well as flora and fauna of the area.
- 7 2 14** Constructing a culvert is likely to have a substantial impact on landscape character and views at the construction area. Mitigation measures would be required to minimise impacts during and post construction, however, further information about this option would be required to detail these.

Option 7 – County Bridge Arch

- 7 2 15** During construction, the impact on the character of the bridge (a grade II listed building) and island would be substantial as part of the bridge structure, part of the island and vegetation are removed.
- 7 2 16** During construction, there would be a substantial visual impact to nearby road users and pedestrians. Some residents around the junction of Welham Road and Church Street and workers in nearby offices may also have views to the works.

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Mitigation and Enhancement

- 7 2 17** The design and finished appearance of the arch should be in keeping with the style materials and colour of the existing bridge. Any engineering structures which may be required should be visually obscured. The island should be replanted with trees and shrubs of ecological value.
- 7 2 18** In the long term, an additional arch would permanently alter the character of the bridge resulting in a moderate impact. However, creating a feature in keeping with the detailed design and finish of the original bridge would mitigate the impact. Overall, this area is likely to be more open in character than at present. It would be preferable to retain part of the island to support vegetation which contributes to the character of the river corridor.

Option 8 – Combination of Flood Defences

- 7 2 19** Introduction of flood embankments and walls to land which is largely flat would have moderate localised impacts on character. Defences would be constructed within Malton and Old Malton Conservation Areas and within the VIUA.
- 7 2 20** During construction, there are likely to be substantial impacts on landscape character and views, particularly in central Malton and Norton, where properties are located near to the river.
- 7 2 21** At Old Malton, floodbanks less than 0.5m in height over Section A/B are unlikely to have significant landscape and visual impacts. Raising the existing bank over Section B/C by around 1.7m and constructing defences of some 2m north of St Mary's Church are likely to have substantial impacts on character and a loss of visual amenity due to obstruction of views across river. A floodwall in this area would require floodgates, while an embankment would require an access ramp. Sensitive design would be required to reduce substantial impacts on the setting of the Scheduled Ancient Monument, on mature trees, and on views from properties along Town Street.
- 7 2 22** Over Section J/K banks of less than 1m height adjacent to the railway line would have moderate local impacts on character, while views to the defences are likely to be limited to a few farm properties. Over Section K/L, hard defences at around 3m in height may result in moderate to substantial landscape impacts. Views from the rear of properties on Scarborough Road may be moderately affected over Section K/L. Properties are located some distance from the defences in this area. There would be similar impacts over Section L/M, where defences would again be around 3m in height. Over Section M/N, hard defences around 2m height are likely to be visible from the rear of properties.

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- 7 2 23** Over Sections F G and M N introducing hard defences would likely require removal of some trees and shrubs on the banks and would change the character of this area. Some views from the lower windows of residences along section F G may be affected by defences around 1.7m high.
- 7 2 24** In central Malton and Norton (Section G H) there are already walls of varied facing materials fringing the river channel so that new clad floodwalls here would not significantly change the character. Some views from the car park may be reduced due to floodwalls around 1.6m high. Use of quality cladding materials may help to improve the environmental quality of this area which lies within the Malton/Norton Riverside Project Area.
- 7 2 25** There may be floodgates located at one or both ends of County and Railway Bridges which would require sensitive design.
- 7 2 26** The public area between the bridges (Sections N O O P and P Q) is an attractive intimate space offering an alternative route to walking along Norton Road. A wall along the southern edge of this area would moderately alter its character by fully enclosing the space and possibly restricting views from traffic and pedestrians on Norton Road. A floodbank adjacent to the river however would substantially alter its character and would result in loss of semi mature trees. The spatial relationship with the river would change and views would alter as the bank screened views from the picnic area however new elevated views would be available if the footpath was aligned along the crest of the bank. The wall would be around 1.2m over Section N O 1.9m over Section O P and 1.4m over Section P Q. A floodgate would be required at the entrance to the picnic area if a floodwall were constructed.
- 7 2 27** At Section H I a wall would be in keeping with the local character over part of this section. South of the hotel on Yorkersgate a flood wall could be tied into the existing wall and would be preferable to an embankment. There would be a risk of damage to mature trees over Section H I.
- 7 2 28** Over Section H I defences around 1.6m high would be mainly visible from Railway Bridge. At Riverside View (section R S) unscreened defences of around 1.2m would be visible to residents but would not impact on wider views of the river environment. Embankments further west may cause slight visual intrusion to residents on York Road and walkers on the left bank of the river.
- 7 2 29** Construction of walls/embankments in the Pnorpot Beck and Mill Beck areas may result in localised slight impacts on character due to the introduction of new built structures. Low floodbanks around the ponds are likely to have slight impacts on character and views.

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7 2 30 Construction of pumping stations for both becks are likely to have significantly smaller impacts than localised defences. However, further visual assessment would be required once the scale of the pumping station was known. Careful design would avoid the introduction of a visually intrusive structure.

7 2 31 At Priorpot Beck, post construction, there may be slight visual impact due to walls/embankments (0.75m high) along some property boundaries. The embankment around Mill Pond would cause negligible visual intrusion at 0.1m in height, while defences along Mill Beck (1.2-1.3m high) would be visible at the bottom of private gardens. The pumping station is likely to cause little visual intrusion.

Mitigation and Enhancement

7 2 32 Any substantial losses of vegetation, particularly of mature trees, would compound the impacts of defences on the landscape character and on views. Thus the alignment of defences should be carefully considered in order that vegetation losses are kept to the minimum necessary to allow construction. All areas, particularly the public open spaces, should be restored as closely as possible to their original features and any vegetation damaged or lost should be replaced. Footpaths should be reinstated.

7 2 33 Tree and shrub planting could help to screen defences from where space allows and where this would not diminish wider views of the landscape. Where walls/piles are constructed, these should be clad with brick or stone to match the appearance of existing walls and/or buildings. Opportunity could be taken to improve the appearance of the river environment in the Malton/Norton Project Area by using high quality brick and coping materials. Any floodgates required should be sensitively designed, particularly if they are required at County Bridge.

7 2 34 Flood banks should be re-seeded with a grass mix to match the surroundings.

7 2 35 There is a particular requirement that defences located in the VIUA Conservation Areas and existing and proposed public open spaces are sensitively designed and constructed with minimal disturbance to the built and natural environment and to private property. Consideration of the impact of the defences on the setting of historic areas, scheduled ancient monuments and listed buildings should be a strong factor in deciding whether to use floodbanks or walls at the design stage. The surface finish of the defences should not detract from these features, nor from local character or views. Where possible, grading embankment slopes into the surrounding land would reduce their visual impact.

7 2 36 In addition, creation of a buffer strip between the defences and watercourses would help to maintain its visual appearance and amenity value and reduce the risk of impact on riparian wildlife.

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Option 9 – Combination of Flood Defences

- 7 2 37** Defences would be located within or adjacent to Old Malton Malton and Norton Conservation Areas and the VIUA Impacts on landscape character and views during construction at Old Malton and Malton would largely be as described for Option 8 Within Norton the visual impact on residential properties drivers pedestrians and rail passengers during construction is likely to be substantial
- 7 2 38** The introduction of floodwalls and embankments east of the railway (sections J K and K L) is likely to have moderate to substantial impacts on the locally flat character while floodwalls up to 1 5m and numerous floodgates in the Welham Road and Church Street areas (Sections L M N Q and P Q) would have substantial impacts on the townscape character
- 7 2 39** The visual impact of the completed defences at Old Malton and Malton and at Mill Beck and Priorpot Beck would be as described for Option 8 At Norton within section J K defences around 1 3m high may affect ground floor seated views to the adjacent open area where these are currently available Over the western half of section K L existing ground floor seated and standing views of Norton Ings and the riverside would be affected by defences up to 3m high In the eastern half of this section defences around 1m high would have less impact on views
- 7 2 40** Defences over Sections P O O R and S T range in height from around 0 8m to 1 5m There are likely to be some views of defences from properties but due to distance from the defences these impacts are likely to be slight to moderate

Mitigation and Enhancement

- 7 2 41** Measures to minimise the impacts of construction as described for Option 8 would apply This includes measures to restore original features and planting to screen defences from views All land and property affected should be reinstated to the original condition Floodwalls should be clad with materials to match those used locally Opportunity could be taken to create design features within floodwalls and floodgates in the town in order to reduce their visual impact Floodbanks could be regraded to gentler side slopes grading into the surrounding land

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Ecology and Nature Conservation

8.1 Existing Environment

Existing Information

- 8.1.1 A number of bodies have been contacted regarding existing site and species data including the Agency (Conservation Fisheries and Biology) English Nature (EN) North Yorkshire County Council (NYCC) Ryedale District Council (RDC) Yorkshire Wildlife Trust (YWT) the Ryedale Badger Group RSPB Yorkshire Rivers and Otters Project and PLACE (Vale of Pickering Wetlands Project) To date some initial and some more detailed responses have been received from EN NYCC RDC YWT and Ryedale Badger Group Further responses are anticipated

Site Survey and Investigation

- 8.1.2 A River Corridor Survey (RCS) of the areas that may be affected by the works in Malton Norton and Old Malton was undertaken Fieldwork for this was completed in September 1999 and the Report produced in October 1999 (Babtie Group 1999) The RCS covered those reaches of watercourse that are within the mapped flood envelope of the March 1999 floods
- 8.1.3 The River Derwent flows from the North Yorkshire Moors southwards through the Vale of Pickering to its confluence with the River Ouse The rural towns of Malton and Norton are sited on opposite banks of the lowland R Derwent Two tributaries are within the study area Mill Beck and Pnorpot Beck

Designated Sites of Ecological Importance

- 8.1.4 The River Derwent was designated a SSSI in 1986 under section 28 of the Wildlife and Countryside Act 1981 from Ryemouth to the confluence with the River Ouse with the exception of a stretch through Malton/Norton This statutory designation reflects the site's national importance The lowland course of the Derwent supports an aquatic flora uncommon in northern Britain Several species are more often found in lowland southern England and are present in the Derwent near their north eastern limit in the UK for example flowering rush *Butomus umbellatus* shining pondweed *Potamogeton lucens* arrowhead *Sagittaria sagittifolia* opposite leaved pondweed *Groenlandia densa* and water parsnip *Berula erecta* The river supports several species of rare and notable fauna It has a diverse fish population including the bleak ruffe and burbot the latter being protected under Schedule 5 of the Wildlife and Countryside Act 1981 (WCA 81) Bleak and ruffe spawn between March and July whilst burbot spawn between December and January A breeding population of otters is present throughout the SSSI Otters are also listed on Schedule 5 of the WCA 81

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- 8 1 5** The diverse invertebrate community also reflects a lowland southern river with many notable species. The Doodales at Old Malton – a series of medieval fish ponds which are surrounded by overgrown scrub – are included in the SSSI. The river supports an excellent breeding bird community – including an internationally important population of Bewick's swans in association with the adjoining Derwent Ings. Sand martins and kingfishers are known to breed along the river banks. Both are listed on Schedule 1 of the WCA. 81
- 8 1 6** Located 35–40 km downstream of Malton and Norton is the Derwent Ings. The Ings are a series of alluvial flood meadows, fen and swamp communities and freshwater habitats lying alongside the River Derwent between Sutton under Derwent and Wressle. The sites represent one of the most important examples of agriculturally improved species-rich alluvial flood meadow habitat remaining in the UK. A wide range of wildfowl and wader species breed and overwinter here in nationally and internationally important numbers. A rich diversity of plant species including two nationally scarce species are found here and the site has an outstanding assemblage of invertebrates. The Derwent Ings has been included in the Lower Derwent Valley – which is a National Nature Reserve (designated under the National Parks and Access to the Countryside Act 1949) – a Special Protection Area (designated under the EC Birds Directive 79/409) – and a Ramsar Site (designated under the Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat) – the latter two confirming the international importance of the site.
- 8 1 7** The section of the River Derwent through Malton/Norton which is not included in the SSSI has been designated a SINC reflecting its county importance. SINC's are non-statutory sites that are included in the Local Plan and given protection through the planning system. Much of the flora and fauna listed for the SSSI are also present in the SINC. It is thought by English Nature that the River Derwent SINC may be of SSSI quality and its designation is likely to be under future review.
- 8 1 8** Lady Spring Wood in Malton is also designated a SINC. It supports spring-flushed riparian woodland, riverbank habitat and a small area of improved neutral grassland. A botanical survey by Ryedale District Council (RDC) has highlighted the presence of field garlic *Allium oleraceum* and sand-leek *Allium scorodoprasum* – both nationally uncommon species.
- 8 1 9** Norton Ings is an area on the floodplain between the River Derwent to the north, the disused railway line to the east, a pumping station to the west and the maintained railway line to the south. The land was acquired by RDC several years ago and the land has since developed into a more ecologically interesting area. A mosaic of wetland communities has developed along the railway embankment including water horsetail *Equisetum fluviatile* dominated areas, stands of slender tufted grass *Carex acuta* and reed sweetgrass *Glyceria maxima* swamp. It also supports amphibians (smooth newt, common frog and common toad) and notable birds such as snipe and jack snipe have been observed by previous surveyors. The communities are changing as hydrological conditions change and are likely to become of increased value. The site was designated a SINC in 1999.

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Habitats/Flora

- 8 1 10 In addition to the habitats and flora described in the previous section some other areas contain habitat of local ecological importance. Habitat mapping of the area was undertaken in September 1999 and reported in the Malton/Norton Flood Alleviation Scheme River Corridor Survey Report (Babtie Group 1999)

Fauna

- 8 1 11 In addition to those mentioned above there are other notable i.e. rare or protected species present

Invertebrates

- 8 1 12 RDC have supplied data from recent invertebrate surveys along the River Derwent corridor at Malton and Norton (Table 3). Two mayflies have been recorded on the River Derwent for the first time in Britain: *Caenis pseudrivulorum* and *Electrogena affinis*. The former has subsequently been found to occur in other rivers in north eastern England but the latter has not yet been found anywhere else in the country.

Table 3 Notable Invertebrate Species

SITE	SPECIES		TAXON	STATUS
Norton Ings	<i>Bembidion fumigatum</i>	A ground beetle	Coleoptera	Nb
Norton Ings	<i>Agabus unguicularis</i>	A diving beetle	Coleoptera	Nb
Norton Ings	<i>Helophorus nanus</i>	A water beetle	Coleoptera	Nb
Norton Ings	<i>Cercyon tristis</i>	A water beetle	Coleoptera	Nb
Norton Ings	<i>Helochares lividus</i>	A water beetle	Coleoptera	Nb
Norton Ings	<i>Arctoconopa melampodia</i>	A crane fly	Diptera	RDB2
Norton Ings	<i>Cheilotrichia imbuta</i>	A crane fly	Diptera	Nb
Norton Ings	<i>Molophilus niger</i>	A crane fly	Diptera	Nb
Norton Ings	<i>Bemisia clavipes</i>	A soldier fly	Diptera	Nb
Norton Ings	<i>Dolichopus argyrotarsis</i>	A long headed fly	Diptera	Nb
Norton Ings	<i>Rhaphium rivale</i>	A long headed fly	Diptera	Nb
Lady Spring Wood	<i>Bembidion gilvipes</i>	A ground beetle	Coleoptera	Nb
Lady Spring Wood	<i>Gyrinus urinator</i>	A whirligig beetle	Coleoptera	Nb
Lady Spring Wood	<i>Agabus chalconatus</i>	A diving beetle	Coleoptera	Nb
Lady Spring Wood	<i>Stenus carbonarius</i>	A rove beetle	Coleoptera	Nb
Lady Spring Wood	<i>Gyrophaena angustata</i>	A rove beetle	Coleoptera	Nb
Lady Spring Wood	<i>Dicranomyia omissinervis</i>	A crane fly	Diptera	RDB2
Lady Spring Wood	<i>Medetera inspissata</i>	A longheaded fly	Diptera	RDB3
Lady Spring Wood	<i>Gnophomyia viridipennis</i>	A crane fly	Diptera	Nb
Lady Spring Wood	<i>Molophilus niger</i>	A crane fly	Diptera	Nb

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SITE	SPECIES		TAXON	STATUS
Lady Spring Wood	<i>Bens clavipes</i>	A soldier fly	Diptera	Nb
Lady Spring Wood	<i>Dolichopus argyrotarsis</i>	A longheaded fly	Diptera	Nb
Lady Spring Wood	<i>Rhaphium rivale</i>	A longheaded fly	Diptera	Nb
Lady Spring Wood	<i>Neoascia obliqua</i>	A hover fly	Diptera	Nb
River Derwent	<i>Hydraena pulchella</i>	A moss beetle	Coleoptera	RDB3
River Derwent	<i>Gyrinus urinator</i>	A whirligig beetle	Coleoptera	Nb
River Derwent	<i>Caenis pseudorivulorum</i>	A mayfly	Ephemeroptera	NEW
River Derwent	<i>Electrogena affinis</i>	A mayfly	Ephemeroptera	NEW
River Derwent	<i>Heptagenia fuscognsea</i>	A mayfly	Ephemeroptera	Nb
River Derwent	<i>Sialis nigripes</i>	An alderfly	Megaloptera	Nb

Status designations RDB2 Red Data Book 2 (Vulnerable)

RDB3 Red Data Book 3 (Rare)

Nb Nationally scarce (=nationally notable)

NEW New to Britain (=RDBK?)

River Derwent sampled at County Bridge

8 1 13 The Agency (Biology Dept) undertake routine sampling of invertebrates as indicators of water quality. Data is available for sampling on the River Derwent at Malton (NGR SE 7890 7140) between 1990 and 1995. The Biological Monitoring Working Party (BMWP) Score of the 8 sampling occasions averages 129 and the Average Score Per Taxa (ASPT) averages 5.03. These are good scores for this type of river indicating good water quality and good species diversity.

Fish

8 1 14 The Agency have reported that the River Derwent through Malton provides high quality mixed coarse fishing although brown trout *Salmo trutta* (spawn autumn to winter), grayling *Thymallus thymallus* (spawn March to May), bullhead *Cottus gobio* (spawn March to late summer) and brook lamprey *Lampetra planeri* (spawn April to June) are also present.

8 1 15 An NRA electrofishing survey report of the River Derwent catchment (NRA 1995) includes a sampling site at Malton. The larger fish were dominated by pike *Esox lucius* and gudgeon *Gobio gobio* and smaller fish by eels *Anguilla anguilla*. Also present in smaller numbers were brown trout *Salmo trutta*, grayling *Thymallus thymallus*, brook lamprey *Lampetra planeri*, minnow *Phoxinus phoxinus* (spawn April to July), roach *Rutilus rutilus*, dace *Leuciscus leuciscus* (spawn March to April), stone loach *Barbatula barbatulus* (spawn April to July), three spined stickleback *Gasterosteus aculeatus*, ruffe *Gymnocephalus cernuus* and bullhead *Cottus gobio*. In previous years perch *Perca fluviatilis* (spawn March to June) have also been caught at Malton. Of these the grayling, bull head and brook lamprey are included on the UK Biodiversity Action Plan long list and the latter two are listed on Annex IIa of the EC Habitats and Species Directive.

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8 1 16 In 1992 a fish kill of 375 stone loach and 750 stickleback due to pollution was recorded on Priorpot Beck. The type of pollution was unrecorded.

8 2 Potential Impacts (Mitigation and Enhancement)

8 2 1 A summarised assessment of the probable impacts of the options on the existing environment is discussed in this section. Specific mitigation measures and possible enhancement are recommended where appropriate.

Option 1 Do Nothing

8 2 2 With no changes to the environment there can be no impacts. However the opportunities that do exist for habitat enhancement will not be realised if no maintenance works are carried out.

Option 2 Do Minimum Existing Maintenance Levels

8 2 3 Minimum maintenance procedures would involve the removal of riparian willow (*Salix* spp) branches where these are trapping debris within the channel, the cut back of some aquatic flora and weed growth, and the carrying out of minimal desilting works. These are likely to result in a minor negative impact to the ecology of the area.

8 2 4 If adopted, pollarding and coppicing would be preferable to the total removal of riparian trees as their roots stabilise the banks and they provide habitat for invertebrates and mammal fauna. Maintenance would be best undertaken on alternate rotations of the banksides and during the winter season to minimise the impacts further. The same applies to weed removal. Cut weeds should be left in situ for 24 hours to allow for the escape of occupying invertebrates before their removal from the site.

8 2 5 If undertaking vermin control, the maintenance team must be wary of the presence of both otters (confirmed) and water voles (potential) in the area. The consent of English Nature would also be required for any such works to take place within the SSSI.

Option 3 Enhanced Maintenance

8 2 6 A combination of more intensive maintenance procedures are likely to result in a more significant negative impact to the ecology of the area when compared to Option 2. Moreover, such enhanced maintenance would not be sufficient to adequately reduce the flood risk. More substantial alternatives would need to be used if this option was to be considered in conjunction with Options 4 to 9. On a cumulative basis, these measures would reduce the value of both the SSSI and SINC designated stretches of river and its habitat value for protected and rare species.

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8 2 7 Silt removal would benefit species that prefer more oxygen rich water and clearer substrates but the brook lamprey (one of the scheduled fish species of the area) requires shallow silt areas for breeding which should be borne in mind Any silt removal from the island at County Bridge should be kept to a minimum and preferably undertaken only on the upstream side of this feature The silt that has accumulated on the downstream side to form an island is used by otters as a strategic point of cover Otters are frequently seen by members of the public from the bridge

8 2 8 Overhanging trees can be important for fauna that use a perching strategy for hunting such as kingfishers and certain dragonfly species They also provide valuable cover for the movement of riparian mammals such as otters and shade which is used by juvenile and mature fish The loss of overhanging tree branches and removal of underwater stumps should therefore be kept to a minimum and should only be undertaken with consent from English Nature within the SSSI This applies also to the removal of trees following the *Wildlife and Countryside Act 1981* Willow tree removal including the roots may cause bank erosion where the roots are currently the bank protection mechanism Again pollarding and coppicing would be preferable options

Option 4 Washland Storage

8 2 9 Washlands in general represent a more sustainable solution Potentially this option could enhance local habitats as flooded grassland can be of great ecological value Such controlled methods have been used successfully upstream of York Under this option the potential local impacts on ecology of flood control structures would need to be assessed Furthermore farmers may need compensation and/or grants for managing their land in a more sustainable way and using more traditional methods Flooding of intensively managed arable land would not be beneficial and could encourage fertilizer inputs downstream when flooding occurs Further information about the quality of land to be flooded and the extent frequency and duration of flooding would be required to determine the potential to create wetland areas

8 2 10 It is possible that storage of large volumes of floodwater upstream of Malton could impact on the ecology of the Derwent Ings by altering the rate of input of water and by removing the peaks from flows This would need to be clarified by detailed study to determine the effect on water levels

Option 5 Channel Widening

8 2 11 If the channel were widened there would be a total loss of established bank and marginal habitat This would be a direct and significant detrimental impact to local ecology particularly within the SINC and SSSI areas representing the most damaging option of those proposed Works within the SSSI would again be conditional upon consent from English Nature under the *Wildlife and Countryside Act 1981* We would also advise consultation with Ryedale District Council for works occurring within the SINC area

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- 8 2 12** Indirect impacts would include an increase in suspended solids within the channel disturbance the loss of shelter refuge and food sources for many aquatic and riparian species including protected species such as otter kingfisher and locally scarce flora such as flowering rush and shining pondweed The right hand bank in particular has significant tree and scrub cover
- 8 2 13** If widening should occur then this should only be undertaken on one side (and preferably not the right hand side) The river's marginal zone is narrow at present and so mitigation should include the reprofiling of the new bank to include more marginal habitat areas (up to 1.5m wide in places if possible) Works should be scheduled to avoid both the fish spawning and invertebrate reproduction seasons
- 8 2 14** The replacement of these bankside features should not include any hard engineering forms of bank protection If necessary it would be preferable to use geotextiles and hazel hurdling Alternatively a stake and brush platform could be created This would involve inserting wooden stakes (with faggots woven into them) into the banks at an angle and to the mean water level leading to a gradual build up of silt behind them This would have the effect of widening the banks increasing habitat diversity and creating a refuge for fish from predators All tree and shrub removal should be followed by replacement planting using similar native species of local provenance
- 8 2 15** Mitigation would have to include measures such as the creation of sheltered and shallow backwater areas in part as additional fish spawning habitat Even after substantial mitigation pursuing this option would result in a net ecological loss on a significant scale All of the above assumes works and access from the bankside only additional plant machinery within the channel would result in an even more ecologically damaging scenario

Option 6 Storm Relief Culvert

- 8 2 16** It has not been possible to assess this option in full as it falls outside of the River Corridor Survey area However there are five known SSSIs within the vicinity of this proposal including the River Derwent and the surrounding land falls within the Howardian Hills AONB Furthermore current Environment Agency policy is to avoid culverting where possible If this option were to be selected surveys would need to be undertaken of both the immediate bankside and terrestrial environments before a satisfactory assessment of impacts could be made
- 8 2 17** The most significant impacts of this option would be concentrated around the points of river entrance and exit Significant structures such as headwalls and screens would be required at both entrance and exit points and these would have potentially significant impacts on the immediate river environment Not only would these impacts relate to disturbance through activity during construction and the loss of bankside habitat but also to suspended solids discharges and scour affecting both fish spawning grounds and macroinvertebrate populations The terrestrial habitat between these two points should

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theoretically not be altered as the tunnel is to be constructed using boring and not cut and cover techniques. It may be necessary to construct temporary storage compounds etc that may themselves have further minor deleterious impacts.

- 8.2.18** It is possible that this option could affect flow rates and inputs downstream at Derwent Ings.

Option 7: County Bridge Arch

- 8.2.19** The largest disturbance and impact created by this option is likely to be as a result of works within the channel. There is good gravel bed formation in this area of the site. Diverse fish breeding occurs in the area and the channel supports a Red Data Book species of invertebrate, 3 nationally notable invertebrate types and 2 invertebrate species not recorded elsewhere in the country. Impacts therefore have the potential to be significant.

- 8.2.20** Furthermore, an island has developed both up and downstream of the bridge and is used by otters for cover. This is more significant because of the lack of alternative cover in the adjacent areas (strategic importance). For this reason it would be preferable to retain part of the island rather than remove all of it. Works should be scheduled for winter, assuming that no holts are located on the island (none were noted at the time of survey). The proposals may leave the island area more exposed to scouring flow resulting in erosion and a further loss of cover. The proposed changes to prevent public access would be of benefit in terms of reduced disturbance.

- 8.2.21** Potential for mitigation includes adding a refuge holt here or a breeding holt elsewhere (probable human disturbance on the island may deter breeding attempts). Opportunities for a holt elsewhere, however, are not ideal. There are no other islands or junctions between large watercourses. The most suitable possibility would be the location of an artificial holt at the confluence with Pnorpot Beck on the left hand bank of the River Derwent. This should be designed according to the Environment Agency publication (NRA (1993) River Management for Otters – Conservation Technical Handbook Number 3). Consultation with the local Otter Trust on holt construction would also be beneficial.

Option 8: Combination of Flood Defences

- 8.2.22** If this Option were to be adopted, several measures should be adhered to in order to minimise the potentially detrimental impacts that would exist. Several specific engineering options accompany this proposal.

- A/B: Although outside of the SSSI boundary, it is advised that English Nature is consulted on the proposed new floodbank adjacent to the Doodales. No significant impacts are likely.

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- B C As above in relation to raising the existing floodbank in this area. Also it is advised that care be taken not to damage the ditch on the far side of the bank. No significant impacts are likely.
- C D The proposed new bank in this area is unlikely to have any significant impacts as the area is currently improved grassland of low ecological value.
- F G The construction of hard defences in this area is likely to involve the loss of some of the abundant willows and scrub along this stretch. Within the SSSI works will require consent from English Nature. Such works would serve to isolate the floodplain from the river and it would be preferable if these features were set back.
- G H This section of the river is already partially walled. If machinery were to access the works via the river channel there would be a significant detrimental impact to the local ecology of the area. There are some areas of existing scrub and marginal vegetation but mitigation should be provided in the form of creating additional marginal habitat (e.g. coir rolls along the foot of the bank).
- H I As with G H but may additionally involve the loss of large trees. Again it would be preferable to set works back from the river in areas without existing hard engineering.
- J K The defences in this area are unlikely to have significant impacts since the area is currently arable land which is unlikely to have substantial ecological value. This would require further clarification should this option be taken forward to design.
- K L Part of this stretch falls within the SSSI and English Nature consent would be required for the proposals. The new defence may have negative local impacts. The clearance zone should be kept to a minimum to limit the loss of scrub. This work should be undertaken outside of the bird breeding season and the scrub replanted afterwards. Riparian trees should be retained. If done within the bird breeding season scrub should first be checked for the presence of nests (birds and their nests are protected under the *Wildlife and Countryside Act 1981*).
- L M This would cause some damage to Norton Ings SINC particularly at the foot of the embankment where the habitat is at its most wet. There would be an adverse effect but this would be mitigable. Appropriate due care and attention should be taken to minimise impacts in this area including the use of tracking mats. Mitigation would include the provision of scrapes which should be excavated whilst the machinery is on site. This would benefit wildfowl and waders in particular.
- M N Minor detrimental impacts. Wherever possible the wall should be set back from the river bank and tree and scrub loss should be avoided.

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- N O The existing wall along this stretch limits the value of the river area in that there is no marginal vegetation present. Impacts of works here are therefore likely to be minimal. This does however present opportunities for mitigation through the creation of new and ecologically valuable marginal habitats.
- O P Works should be set back from the bank tops wherever possible along this stretch to minimise the impacts to the river corridor. Some scrub and trees are to be lost and should be replaced following the cessation of works. Mitigation can again be provided through the provision of additional marginal planting and habitat creation.
- P Q As O P
- Q R As O P and P Q
- R S Impacts are likely to be negligible along this stretch and therefore there are no ecological concerns over works in this area.
- S T As R S

The impacts of localised flood defences on the Derwent lngs are likely to be negligible due to the distance between the works and this designated area. Flow levels would not be diminished and therefore no direct threat is posed to wetland habitats downstream.

Priorpot Beck

8 2 23 This option of local protection is likely to be undertaken in conjunction with one or more of the other options and not as a separate alternative set of proposals. Therefore impacts should be judged as cumulative with those highlighted within the text for associated works. Additional potential impacts can be minimised through the adoption of the following recommendations:

- A B A survey of this area was not carried out during the RCS and as such cannot be assessed in full. Further consideration of potential impacts on the pond and surrounding trees would be required.
- C D There are no specific concerns over works in this area. However it should be ensured that if possible machinery tracking within the channel is avoided.
- E F Minimal probable impacts. Once again the wall should be set back from the margin if possible.
- G H The works may involve some tree felling that should be mitigated against through replanting.

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The alternative of a pumping station located near the railway line is unlikely to have significant ecological impact

Pumping Station

Mill Beck

8 2 24 This option is likely to be undertaken in conjunction with one or more of the other options. Therefore impacts should be judged as cumulative with those highlighted within the text for associated works. Additional potential impacts can be minimised through the adoption of the following recommendations:

- Further study would be required to determine impacts in this location
- C This proposal deals with the Old Mill Pond within the existing housing estate. Although not floristically diverse, the pond does contain marginal vegetation and therefore the defences should be set back as far as possible from this area.
- D E A wall would be a less damaging option within this stretch as it would involve a smaller footprint area. This should again be set back from the margin wherever possible and should avoid the need to fell trees if feasible to do so. Also avoid machinery access within the channel.
- F G as D E
- Pumping station location 1 No concerns exist over the potential impacts of works in this area.
- Pumping Station location 2 (Norton Road) The only potential impact associated with this proposal would be the small chance of increased scour at the discharge point. However, this is only likely to occur infrequently when river levels are very high. This point is opposite an island supporting both otters and a good amount of invertebrates within the river bed. The impacts of scour should therefore be prevented at the discharge point.

Option 9: Combination of Flood Defences

8 2 25 As the majority of works are to take place under this option are located some distance from the river corridor, this is considered to be preferable to Option 8. Several specific engineering options accompany this proposal and include A B to H I from Option 8 in terms of impacts on the right hand bank (see previous text)

- J K to R S (left hand bank) There are no concerns over works in these areas in terms of their potential impacts on ecology.

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- S T (left hand bank) This final stretch was not visited during the survey area and can not therefore be properly assessed. However, it is believed that impacts are likely to be negligible.

8.2.26 Assessment of Priorpot Beck and Mill Beck would be as for Option 8

8.3 Further General Mitigation Relevant to all Options

8.3.1 This would include

- In channel works should be carried out outside of the fish spawning season. The safest window for works falls between August and October as both coarse and game fish are present within the river and between them spawning occurs from late autumn through to mid summer.
- The riverside and channel works would be less ecologically damaging if undertaken outside of the period March to August, thus avoiding the breeding season of both birds and most invertebrates.
- The creation of shallow scrapes for wintering wildfowl and wader species at areas such as Norton Ings. Detailed creation and management techniques could be supplied at an appropriate later date.
- Pools and riffles with a clear, silt free gravel bed should be constructed at the sides of channels to increase available fish spawning habitat (particularly where channel sections are being widened).
- Gravel spawning beds should be de-silted where necessary.
- Additional wildlife opportunities should be provided through the construction of otter holts and bird and bat boxes.
- The complete removal of all non-native plant species and the managed control of invasive plants through an agreed maintenance regime. This would include dominant bankside species such as nettles and thistles where these flourish to the detriment of other species.
- The clearance of in-channel vegetation only where particularly overgrown. Such work should only be carried out on a staggered basis with the removal of no more than 30% of any vegetation type at any one time.
- All species for planting should be native, locally appropriate and of local provenance where possible.

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- Soil removed from the river banks should be replaced following English Nature guidelines to maintain the current seed bank
- The removal of litter and rubbish items from the river channel and adjacent land
- Good site practice methods should be followed at all times including the prevention of fires dumping and littering. In addition no materials storage should be permitted within 8m of the top of the banks. Machinery access to the banksides should be limited only to areas where this is absolutely necessary
- Repair work to man made features such as outfalls
- Any areas which may be used as potential sources for material to build earth banks would need to be surveyed in order to assess their ecological value. Appropriate mitigation and enhancement could then be identified

8.3.2 Many of the Options propose works which would take place adjacent to Sites of Special Scientific Interest. Continued consultation with English Nature would be required due to the potential impacts.

8.3.3 Opportunity should be taken to enhance vegetation communities wherever possible. Poor or rank vegetation could be replaced with a vegetation community of greater ecological value such as the sowing of native wildflower seed mixes on earth banks. The planting of trees and shrubs of ecological value could also have the benefit of visual screening of defences from nearby residents' views. More detailed enhancement proposals should accompany the preferred option when selected.

Cultural Heritage

9.1 Existing Conditions

9.1.1 A total of 333 sites of cultural heritage significance were recorded in a study area extending outwards to 100m from the edge of the 1999 flood event (see Figures) including 179 archaeological sites or finds. Of these three were Scheduled Ancient Monuments Malton Castle (Site 1) Malton Roman Fort (Site 65) and the Gilbertine Priory (Site 93). There were also 153 Listed Buildings and 3 Conservation Areas. St Mary's Church which forms part of Site 93 is a Grade I Listed Building while Sites 281, 319 and 315 are of Grade II* status. The remaining Listed Buildings were all Grade II. Full descriptions of each individual site are given in a separate desk based survey report.

The Prehistoric Period (to AD 71)

9.1.2 Known prehistoric activity in the study area ranges in date from the Mesolithic to the Iron Age. Most of the known sites are find spots of artefacts (Sites 108, 122, 125, 138, 151 and 325) ranging from flint tools to bronze weapons. There are also nine sites associated with burials including one of Neolithic date (Site 107), six Bronze Age (Sites 104, 106, 139, 146, 168) one Iron Age (Site 123, a cemetery of square barrows) and two undated (Sites 150 and 322). A linear ditched dyke (Site 162) may be of Bronze Age date.

9.1.3 The presence of numerous burials and artefactual finds suggests a significant level of activity in the area throughout the prehistoric period and it is likely that settlement sites were present but have either been destroyed or have not yet been discovered. The only known prehistoric settlement is the late Iron Age site (Site 124) at Orchard Cottage in Malton which may have been destroyed just before construction of the Roman fort.

The Romano-British Period (AD 71 to approximately AD 450)

9.1.4 A Roman fort (Site 64) was established in Malton in around AD 71 and replaced by a smaller one (Site 65) in about AD 79. Despite periodic partial abandonments it remained in use into the 4th century AD. A civil settlement or *vicus* (Site 66) stood outside the south east and east sides of the fort. Norton was established in the 3rd century as an industrial settlement (Site 94) with pottery kilns (Site 164). Two cemeteries (Sites 67 and 165) lie respectively to the south and north east of the fort and roads have been identified (Sites 136 and 137). There have also been numerous finds of Roman artefacts (Sites 127 to 136 and 166).

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The Anglo Saxon Period (AD 450 to AD 1066)

- 9 1 5 Early Anglo Saxon artefacts (Sites 11 14) have been found at Orchard Field. Other Anglo Saxon finds include a thin plate of bronze (Site 10) and bone implements (Site 90). The villages of Old Malton (Site 91) and Norton (Site 71) were established during the Anglo Saxon period and there were mills at Norton and Malton (Sites 73 and 92). The presence of an Anglo Saxon church at Old Malton is suggested by finds of carved stones (Sites 97 and 98) and there was also a church at Norton (Site 72).

The Medieval Period (AD 1066 to AD 1540)

- 9 1 6 A ditch (Site 2) identified during excavation may represent part of an early medieval motte with its associated bailey lying within the Roman fort. A bloomery within the fort (Site 4) may also date from this period. Malton Castle (Site 1) was built in the early 12th century.
- 9 1 7 A church (Site 3) was established on the present site of St Leonard's part of whose nave dates to the 12th century. A Gilbertine Priory (Sites 93 and 96) was founded in 1150 by Eustace Fitzjohn. A complex of fishponds (Site 163) was probably associated with the priory. A hospital (Site 70) was founded by Henry II and sculptured stones discovered in the 19th century are thought to be part of this site. Site 69 a Norman church largely built of Roman materials was demolished in 1846.
- 9 1 8 New Malton (Site 168) may have been founded in the early 12th century. The town wall (Site 171) was possibly built in the 13th century. The River Derwent was bridged (Site 140) in the 12th century. The village of Norton (Site 170) may have become dependent on New Malton at this time.
- 9 1 9 A medieval moated manor in Norton (Site 68) is now covered by modern buildings. Further medieval finds in the study area include a coin hoard (Site 7) and a weight (Site 103). Ridge and furrow (Site 169) visible on aerial photographs at Orchard Field may date to this period while a cross base and fragments (Site 60) were also found in this area.

The Post Medieval period (AD 1540 onwards)

- 9 1 10 Lord Eure's mansion (Site 167) was built around 1600, damaged in the civil war and finally destroyed in 1675. Other parts of the town including the parish church (Site 95) may have been damaged in the civil war.
- 9 1 11 The subsequent regeneration of the town may be linked to construction of the Derwent Navigation in the 18th century. By 1724 Malton stood at the head of a navigable waterway whose economic importance increased until superseded by the railway (Site 110) in the 1840s. A number of wharves (e.g. Site 28) were built along the Derwent. Industrial sites in Malton include mills (Sites 23 25 41 45 46 47 52 55 103 and 232) tanneries and skin yards (Sites 17 18 77 and 78) breweries and associated malt kilns and granaries (Sites 30

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39) a foundry (Site 24) lime kilns (Sites 156 and 156) quarnes (Sites 154 and 155) and saw pits (Site 79 and 87) There were also a number of sites associated with the production of bncks and tiles (Sites 80 86 and 153)

9 2 Potential Impacts

9 2 1 The extent and significance of the potential impacts of the proposed scheme on the cultural heritage sites were assessed using the methodology set out in Appendix B However in most cases the presence extent and condition of archaeological remains are unclear all the impacts listed should therefore be seen as potential impacts As well as physical damage to cultural heritage sites construction can cause damaging changes in water table or disturbance which reduces the value of remains such as severance of linked features or visual intrusion The potential impact of storage compounds or plant access have not been taken into account

9 2 2 Options 4 and 6 lie outside the study area originally defined for the Cultural Heritage study A proper assessment of the potential impact of these options cannot therefore be made at this stage However some initial comments can be made

Option 1 – Do Nothing

9 2 3 Cultural heritage sites especially built heritage sites would remain at risk from flooding While flooding may increase erosion on some sites the rate of erosion would not increase significantly with continued penodic flooding

Option 2 – Do Minimum

9 2 4 No impact on known cultural heritage sites

Option 3 – Enhanced Maintenance

9 2 5 No impact on known cultural hentage sites Prevention of erosion may be beneficial to cultural hentage sites on the floodplain

Option 4 – Washland Storage

9 2 6 The area forms part of the Vale of Pickenng a low lying wetland zone The Vale contains highly significant archaeological remains particularly relating to the early prehistoric period including the internationally important Mesolithic site of Starr Carr this site lies some distance to the east however The wetlands are also likely to contain important palaeoenvironmental data Any archaeological sites affected by construction would have a high potential for the survival of waterlogged deposits and are therefore likely to be particularly important The nature of the option however means that no deterioration of the palaeoenvironmental interest of the wetlands would be likely to occur Two Listed