



Broadland Flood Alleviation Project

Protecting



Broadland

St. Benet's Level and Ludham Marshes (Compartment 5) Consultation Document - April 2004

Introduction

In May 2001 Broadland Environmental Services Limited (BESL) was awarded a long-term contract by the Environment Agency to improve and maintain flood defences in Broadland. The Agency's approach to flood alleviation in Broadland was adopted in the 1990's and is based on a strategy consisting mainly of bank strengthening and erosion protection and reducing the risk of banks breaching. BESL has recently updated this strategy and it now sets the scene for how this and future improvement schemes are designed, programmed and carried out.

Recent detailed surveys and monitoring confirm that improvements are needed to flood defences for the right bank of the River Thurne and Womack Water and the left bank of the Rivers Ant and Bure. All of this area is referred to as Compartment 5.



Reeded rond along River Ant



Consultation

This leaflet has been prepared as part of an ongoing process of consultation to inform you about BESL's proposals and to seek your views on them.

The purpose of this consultation document is to:

- ▶ Explain the range of flood defence options that BESL can consider
- ▶ Outline our preferred flood defence proposals and explain why this is BESL's preferred option in each case
- ▶ Invite your views on these proposals
- ▶ Make sure, from the responses we receive, that we are aware of any specific local issues that ought to be considered as we go on to develop the proposals in greater detail.

BESL will carefully consider any comments it receives, seeking clarification and incorporating changes before finalising its plans. The results of this consultation will play an important part in BESL's planning application for the proposals. General feedback on this consultation will be contained in planning application documents.

A questionnaire is provided with this leaflet. If you have not received one, or if you would like an electronic copy of the questionnaire by e-mail, please contact Tanja Hofmann at the address given at the end.

The need to improve existing flood defences

The existing flood defences along the right bank of the River Thurne and Womack Water and the left bank of the Rivers Ant and Bure in Compartment 5 are continuous clay floodbanks, with a mixture of reed ronds and harder defences such as sheet metal and timber piling.

The overall standard of flood defence within the compartment has progressively reduced over time due to bank settlement, age and the combined effects of erosion and corrosion. In some areas the original floodbanks are too narrow and the banks too steep, making them vulnerable to breaching during very high tides when floodwater overtops them. Tidal surges add to this vulnerability.

BESL has taken every effort to ensure that the solutions presented here are technically feasible, cost-effective, and environmentally sound. It is the combination of these principles for a 'sustainable' project that underpin BESL's specific detailed proposals here and across Broadland.



Erosion along the River Bure by St. Benet's Abbey



Remains of St. Benet's Abbey

What options are BESL considering for improvement works in this compartment?

The range of flood alleviation solutions BESL are proposing for these works follows the Environment Agency's and BESL's overall strategy for flood alleviation in Broadland. These are always the solutions BESL will examine first, before looking at alternatives. BESL's choice of technique needs to follow the strategy options for sustainable flood defences that are technically feasible; offer value for money; are

environmentally sound; and acceptable to local communities. Specific solutions are based on up-to-date survey data (assessing the condition of the existing floodbank and erosion protection), an evaluation of the level of flood defence provided, local environment issues and legal designations.

The considered options are listed below and illustrated on page 3. A brief outline of some of the decision criteria leading to a particular option as the preferred solution is also given:

► Floodbank strengthening

This involves the strengthening of the existing clay embankment in its present location by placing material on the front and/or back slope of the bank (Fig.1), raising the crest may also be necessary. Typically the strengthened banks will have a 2m crest width and a back slope of between 1 in 2 and 1 in 3. Bank crests must be wide enough to allow maintenance access and further topping up if necessary following settlement.

This is a feasible solution when the rond in front of the existing floodbank is sufficiently wide (generally >10m) and or piling/other erosion protection has a remaining life span of 20 years or more.

► Floodbank rollback

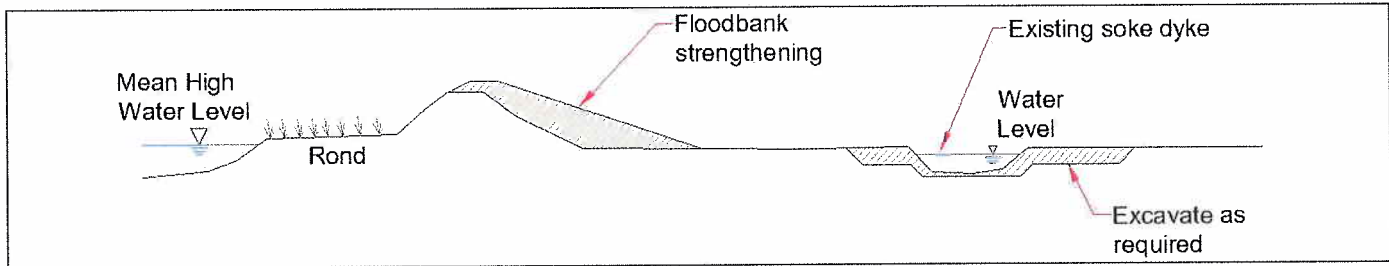
This option is similar to setback (see below), however, the distance the floodbank is moved inland is considerably less (dependent on existing soke dyke, ground conditions and size of folding) (Fig.2).

This is a preferred solution when rond/erosion protection is insufficient to allow for just bank strengthening and where ground conditions do not permit full setback. It requires less material and land compared to setback and utilises the total lifespan of any existing piling. However, this relies on adequate remaining life of piles.

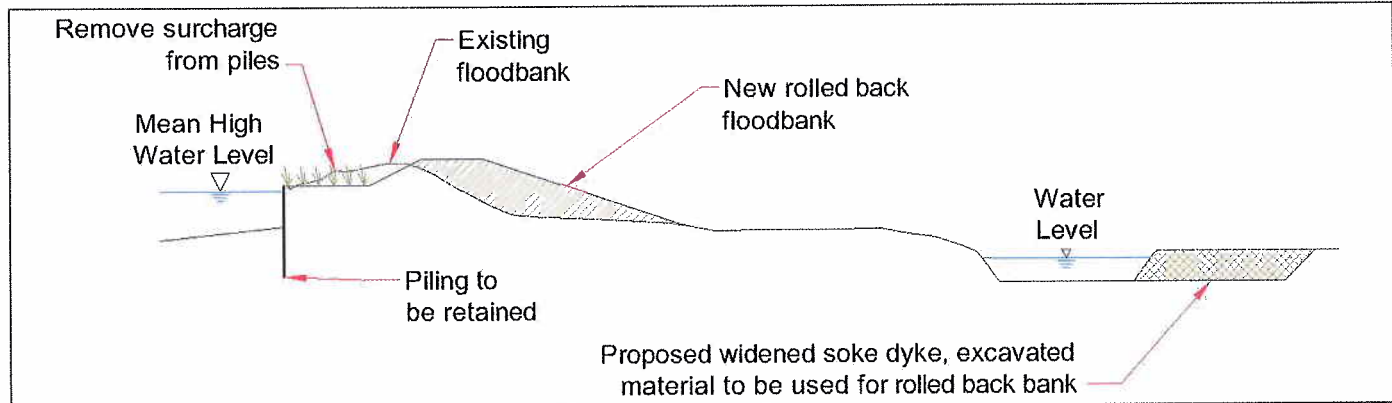
► Floodbank setback

This option consists of construction of a new clay embankment, 20m to 30m behind the existing floodbank (Fig.3). The actual distance of setback depends on local erosion rates, river depth and the quality of land behind the existing floodbank. Once the new bank has been constructed the existing floodbank will be removed, the material levelled and profiled to promote the development of a new stable rond. A new folding and soke dyke will also be provided.

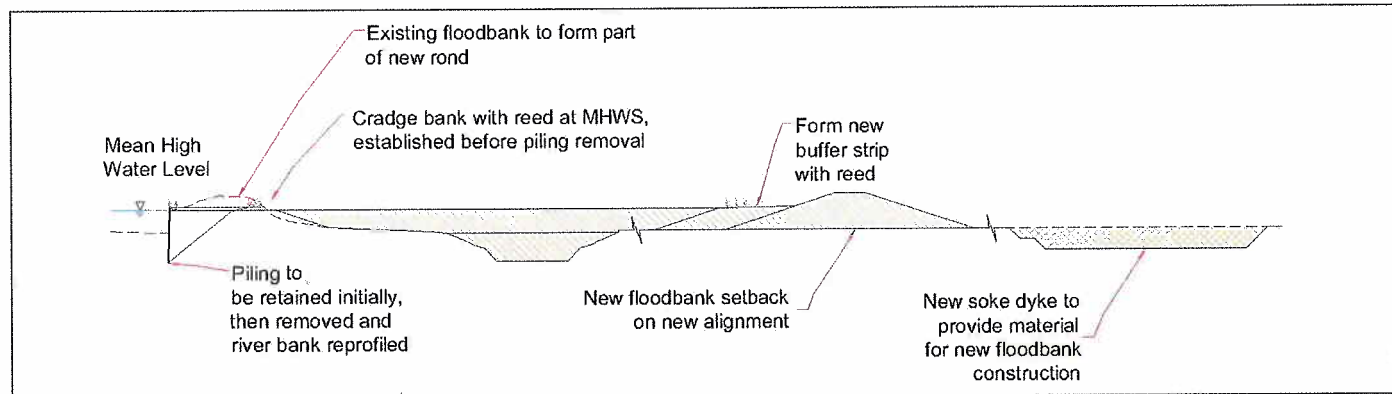
This is a preferred solution when the bank might become unstable due to failed piling or the reed rond failing, subject to adjacent land use, suitable ground conditions and availability of sufficient material for construction of a new floodbank.



1) Floodbank Strengthening



2) Floodbank Rollback



3) Floodbank Setback

► Erosion protection

This stabilises the riverbank and the edge of the rond and is used where erosion may threaten the floodbank. There are several types of erosion protection and most types are soft engineering such as asphalt matting, coir and reed rolls and alder poles. In a small number of locations, BESL installs replacement steel sheet piling but this hard engineering is used very sparingly. Erosion protection is used in conjunction with the above options where needed.

The type of erosion protection that is chosen depends mainly on the existing erosion protection and its lifespan, adjacent land use and long-term sustainability.

► Material sourcing

BESL prefer to use local material where possible, by widening the existing soke dykes and internal drains. Along the River Ant, some material will become available as a result of the Broads Authority's reed bed creation scheme (Bittern II project) near How Hill nature reserve. BESL use a sequential approach to material sourcing: Local sourcing by widening existing soke dykes or construction new soke dykes is preferred, followed by local sourcing from adjacent areas and finally importing material from outside the working area, where insufficient material is available locally. Only if there are no reasonable alternatives, will it be necessary to create local borrow pits.

What are BESL's specific proposals for the right bank of the River Thurne and Womack Water and the left bank of the Rivers Ant and Bure?

BESL will need to obtain approval from statutory bodies including planning permission from the Broads Authority for works other than maintenance or replacement of existing defences.

The drawing on page 5 shows the solutions that BESL are proposing for different lengths of floodbank in Compartment 5. These are based on the current best available information. Factors such as ground conditions may affect the final solution.

A summary of these works is as follows:

Compartment 5 (St Benet's Level and Ludham Marshes): (Please refer to planning drawing on the opposite page)

River Ant

- ▶ Setback 3270m, maintain 530m and strengthen 1340m of floodbank. This includes the floodbank near the Broads Authority's Bittern II project area for which setback is proposed. The new setback floodbank will incorporate the excavated clay that results from the scrapes of the reed creation scheme.
- ▶ Remove piles along 1780m and install new sheetpiles along 550m.

River Bure

- ▶ Setback 1640m, strengthen 1290m and maintain 200m of floodbank.
- ▶ Remove piles along 1270m and install erosion protection along 700m. This includes the river margin near St. Benet's Abbey where stone-filled gabions are proposed as erosion protection. These will be backfilled with imported clay to bury and protect remains of the abbey wall. The detailed proposals for this section depend on the Norfolk Archaeological Trust obtaining some of the required funding, which is currently still outstanding.

River Thurne

- ▶ Setback 390m, strengthen 900m and maintain 800m of floodbank.
- ▶ Remove piles along 490m and install erosion protection along 160m.

Womack Water

- ▶ Rollback 690m and strengthen 100m of floodbank.
- ▶ Remove piles along 430m of floodbank.

BESL's proposals to improve the floodbanks in the works area comprise a mixture of maintenance, strengthening, rollback and setback. The proposed solutions are chosen using the decision criteria outlined previously (page 2 and 3).

BESL's proposals for the River Ant immediately north of Ludham Bridge were based on these decision criteria and originally consisted of floodbank setback. This was subsequently adapted to accommodate Ludham Bridge Drainage Mill (SMR record no. 5236), which is situated 200m north of the bridge and which would have been lost as a result of the setback scheme. BESL are now proposing floodbank strengthening with new sheet piling for this river section in order to preserve the post-medieval windpump.



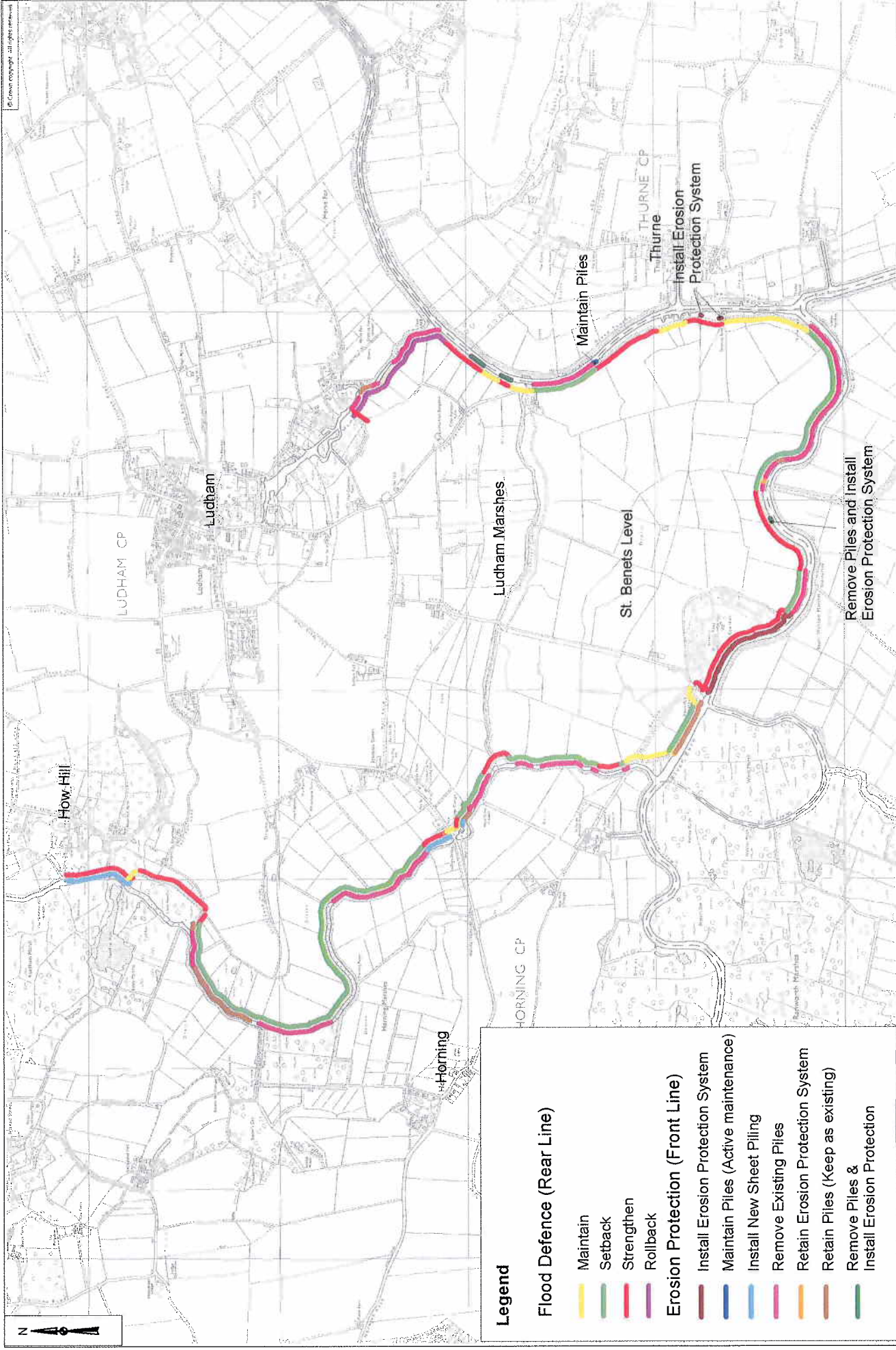
Marsh dyke in Compartment 5



Marsh dyke in Compartment 5



Cattle on grazing marsh



Flood Defence Proposals for Flood Compartment No 5



What are the potential issues associated with this work?

The Strategic Environmental Assessment (SEA) process, developed by BESL with extensive stakeholder input, sets out environmental standards for maintenance, flood defence improvements and first-time defences at undefended communities. The scheme details are consistent with these environmental standards.

Specific issues were raised during pre-consultation discussions with key stakeholders and a summary of the main questions raised and considered can be found below.

BESL would be pleased to discuss any aspects of these consultation proposals with stakeholders, if necessary. Our contact details are given on page 8.

<p>▶ <i>What are the implications for landowners within the compartment as a result of the improvement works?</i></p>	<p>▶ Where setback is proposed there will be a loss of grazing marsh and individual arrangements will be made with landowners for changes in the use of their land (including the loss of ESA tier payments). Overall, the scheme will result in long-term protection of the grazing marshes from the damaging effects of flooding.</p>
<p>▶ <i>How will the work affect St. Benet's Abbey, a Scheduled Ancient Monument on the River Bure??</i></p>	<p>▶ The proposed work will protect the remnants of the Abbey walls, which were built along the bank of the River Bure. The detailed proposals for this river section (as outlined on page 4) are subject to successful funding being obtained by the Norfolk Archaeological Trust to cover some of the additional cost of the scheme.</p>
<p>▶ <i>What changes will the work have on the local landscape?</i></p>	<p>▶ The main change to the view across the landscape will be during the construction phase. This will be temporary, whilst completion of the flood alleviation works will provide long-term protection to the Broads landscape and its valuable habitats from the damaging effects of flooding, were there to be a major breach. In some locations (setback), the river margins will change from piling to a more natural edge.</p>
<p>▶ <i>How will the proposed work disturb the flora and fauna?</i></p>	<p>▶ Surveys of water voles, scarce plants and soke dyke vegetation have been completed to identify specific requirements that need to be incorporated into the detailed design and work schedule. Wildlife issues, including breeding and wintering birds, will be addressed in detail in the Environmental Statement.</p>
<p>▶ <i>How do the proposals tie in with the Broads Authority's Bittern II project along the River Ant?</i></p>	<p>▶ BESL co-operate fully with the Broads Authority in the Bittern II project area. The flood alleviation proposals for the floodbank along this river section include the use of excavated clay from the reed creation scheme, which will be incorporated into the new setback bank (see page 4).</p>
<p>▶ <i>To what extent will the proposed work affect navigation?</i></p>	<p>▶ Any water-based work will be completed outside of the main holiday season and on weekdays only to limit effects on navigation. Temporary channel markers will be provided to mark any hazards arising during and immediately after construction work while vegetation re-establishes. Erosion will be monitored in setback areas after piling removal and where necessary erosion protection installed.</p>

