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# Selkirk Flood Protection Scheme

## Preferred Scheme Report

Executive Summary

Stage: 05 Document: 02 Version: 2.1

Scottish Borders Council

November 2011



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Executive Summary

Stage: 05 Document: 02 Version: 2.1

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## Document history

### Selkirk Flood Protection Scheme – Preferred Scheme Report – Executive Summary

Scottish Borders Council

This document has been issued and amended as follows:

Version	Date	Description	Created by	Verified by	Approved by
V1.0	22/09/2011	Partially complete preliminary Draft for Client comment	SRV	SRV	SRV
V1.1	30/09/2011	Final Draft for Client internal use	SRV	JMD	SRV
V1.2	21/10/2011	SBC comments during review of Preferred Scheme process	CP	CP	SV
V2.0	28/10/2011	Final to accompany Scheme submission	SRV	JMD	SRV
V2.1	04/11/2011	Minor revision	SRV	JMD	SRV

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# 1 Executive Summary

The original brief for the Selkirk Flood Protection Scheme (Selkirk FPS, developed by Scottish Borders Council in 2009, listed six key objectives for taking the Scheme forward through its various stages. These parameters were:

- 1) To investigate and develop design solutions for a flood protection scheme (FPS) that are technically sound and the most fit for purpose.
- 2) To ensure the solutions are environmentally acceptable and sustainable.
- 3) To ensure the solutions include appropriate natural flood management measures.
- 4) To ensure the solution represents the best value for money.
- 5) To consult with stakeholders and general public within and without the FPS Area to establish the issues of concern with the local population.
- 6) To allow for regeneration of Riverside Industrial Area within the current flood plain

**It can be stated without qualification that each one of these key criteria has been met (or the potential for them to be met in the case of item 6) by the Scheme Outline Design described in this report.**

A very high degree of detail has been applied to the design process to ensure that the solutions for the various flood cells are technically robust, offering a blend of tried and tested techniques with some truly innovative thinking. Examples of this include the use of an existing minor road to route excess flood water to prevent flooding to a property and the adaptation of the Scottish Borders' largest waterbody to mitigate flood risk to Selkirk and also in the Yarrow Valley.

This high degree of detail has led to a cost estimation procedure which is sufficiently accurate to reduce the Optimism Bias to almost half that of the Optimism Bias at Scheme Appraisal stage. A degree of value engineering has been applied during the design to discard unnecessarily costly options and focus on minimising the use of carbon hungry materials and solutions which require the import of material over long distances. Such an approach was adopted for the Long Philip Burn design, to concentrate on improving the conveyance of the channel to reduce the requirement for high walls and embankments.

Significant effort has been expended in ensuring the environmentally acceptable and sustainable credentials of the Scheme are met. Utilising the storage capacity of St Mary's Loch, restoring the natural shape of the Long Philip Burn and developing a suite of Natural Flood Management measures which could be implemented in the Long Philip Burn catchment are all examples of this effort.

The potential social impacts of the solutions has been accounted for in many situations, including ensuring that new flood defences are no higher than 1.6m above any adjacent footpath (even if this means raising the footpath), and providing suitable mitigation features (jetty extensions, bed dredging) to offset the adverse impacts of change in level at St Mary's Loch on loch users.

The Selkirk FPS Project Team have consulted with over 125 organisations and individuals in the form of one to one discussions, working groups, exhibitions, presentations and the Scheme website. This demonstrates a full commitment to determining the main concerns and, by listening and understanding those concerns, hopefully reduce the risk of objection before finalising the designs.

The highest level of flood protection for a publicly funded flood protection scheme in the UK is being proposed for Selkirk Riverside (1 in 500 years plus climate change). This means that, if the Scheme is confirmed, there is huge potential for regeneration at the Riverside and for a subsequent major boost to the local economy and jobs market.

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The proposed Selkirk Flood Protection Scheme can therefore be summarised as follows:

#### **Areas included in the Scheme**

The five flood cells to be included in the Scheme are:

- St Mary's Loch
- Ettrick Water (Philiphaugh and Bannerfield)
- Ettrick Water (Riverside)
- The Long Philip Burn
- The Shaw Burn

The defences associated with these cells meet the minimum economic criteria (as defined by the Scottish Government) for inclusion in a publicly funded project. The defences do not meet any unacceptable environmental, social, cultural or technical criteria and in most instances deliver improvements to the local area to each of their categories.

### **Areas not included in the Scheme**

The flood cell which cannot be taken forward as part of the Scheme due to the fact that the defences associated with these cells do not meet the minimum economic criteria are:

- Ettrick Water (Lindean)

The Project Team recognised that although there are valid social reasons for including the Lindean cell in the Scheme, the absence of a robust economic case for so doing prohibited this cell from being included in the Scheme (Benefit Cost Ratio of 0.3 at this stage). This was confirmed by the Project Team with the Scottish Government's Flooding Policy Team during the Option Assessment Stage of the design.

Alternative measures have been proposed to provide defences to these areas which, whilst not offering the same level of protection as a formal Scheme, will at least provide a noticeable reduction in the threat of flooding to the Lindean community. These measures will be advanced by the Council's Flooding Team separately from the Selkirk FPS

Two further flood cells exist, relating to Natural Flood Management (NFM), namely

- Long Philip Burn catchment; and
- Ettrick & Yarrow Water catchment

Neither of these cells are included in the Scheme, but the reason is not economic – the Long Philip Burn NFM measures could be included in the Scheme, but the fact that the NFM measures (planting, wetland creation, land management improvements) are difficult to precisely define, mean that direct negotiation with landowners will prove to be the most effective method of implementation.

The Ettrick and Yarrow catchment NFM strategy requires to be worked up into further detail before being considered further. This will be undertaken by the Council's Flooding Team separately from the Selkirk FPS. It is assumed that this will try to integrate with the ongoing Water Framework Directive objectives and developing Flood Risk Assessment objectives. Both of these are currently being managed by SEPA

### **Scheme Description and costs**

The descriptions, standards of protection and total capital and maintenance costs associated with the five flood cells included in the Scheme are:

Flood Cell	Standard of Protection	Brief Description of works	Estimated Capital and Maintenance Cost
St Mary's Loch	Provides flood risk reduction for all return periods to Selkirk, the Yarrow Valley and Lindean	<ul style="list-style-type: none"> <li>• Approx 630 properties with reduced flood risk</li> <li>• Raising existing 100m long spillway by 250mm</li> <li>• Improve fish passage at outlet</li> <li>• Reduce the normal loch level by 390mm</li> <li>• Create up to 2.6 million cubic metres of flood storage capacity in advance of a major storm</li> <li>• Reduce compensation flows into Yarrow Water during dry periods</li> <li>• Ancillary works around the loch to mitigate against higher maximum level and lower normal level</li> </ul>	<b>£386,544</b>
Ettrick Water (Philiphough and Bannerfield)	1 in 200 year plus climate change allowance	<ul style="list-style-type: none"> <li>• Approx 47 properties in Philiphough protected and 202 properties protected in Bannerfield</li> <li>• Raise A708 by 1m near the Old Mill Farm</li> <li>• 3.6 km of flood defence embankments and walls</li> <li>• 1.4km of seepage protection to 6m below ground level</li> <li>• 300m of overhead power cable diversion</li> <li>• 1 new footbridge at Ettrickhaugh Road</li> <li>• Over 250 new trees</li> </ul>	<b>£8,545,716</b>
Ettrick Water (Riverside)	1 in 500 years plus climate change allowance	<ul style="list-style-type: none"> <li>• Approx 335 properties protected</li> <li>• 2.3km of flood defence embankments and walls</li> <li>• 2.0 km of seepage protection</li> <li>• 35m of culvert</li> <li>• Over £1 million worth of service diversions</li> <li>• Over 100 new trees</li> <li>• 300m of erosion protection</li> </ul>	<b>£10,851,840</b>
Long Philip Burn	1 in 100 years plus climate change allowance	<ul style="list-style-type: none"> <li>• Approx 55 properties protected</li> <li>• 700m of new restored river channel</li> <li>• Demolition of the existing stone arch A707 and A708 bridges</li> <li>• Provision of a new combined vehicle/pedestrian bridge at the A707 bridge crossing</li> <li>• Provision of three new footbridges</li> <li>• Creation of a flood overflow channel along Corby Linn Road</li> <li>• 200m of flood defence wall along Corby Linn Road</li> <li>• 400m of set back flood defence embankment</li> <li>• 750m of new footpath</li> <li>• Creation of a park area which could significantly enhance local wildlife habitats</li> <li>• Over 60 new trees</li> </ul>	<b>£3,204,300</b>

Flood Cell	Standard of Protection	Brief Description of works	Estimated Capital and Maintenance Cost
Shaw Burn	1 in 200 years plus climate change allowance	<ul style="list-style-type: none"> <li>• Approx 12 properties protected</li> <li>• 155m of flood defence walls from A7 bridge to Oregon Timber culvert</li> <li>• 30m of bank stabilisation upstream of A7 bridge</li> <li>• 200m of storm overflow culvert within Oregon Timber</li> <li>• Major diversion of Scottish Water sewer infrastructure</li> </ul>	<b>£1,630,755</b>

All costs include an Optimism Bias, which varies depending on the complexity and risks associated with each flood cell. Where the form of construction is tried and tested and few major risks are apparent, the OB is calculated to be 31% (Philiphaugh, Bannerfield and Long Philip Burn). Where there are greater risks (e.g. seepage protection or multiple service diversions), the OB is increased to 40% (Riverside and Shaw Burn). The risks associated with the St Mary's Loch option, combined with its low capital cost attract a 50% Optimism Bias.

#### Conclusion 2: Scheme cost summary

<b>Total Scheme cost =</b>	<b>£24,619,155</b>
<b>Total Scheme Benefits =</b>	<b>£55,121,430</b>
<b>Scheme Benefit Cost Ratio =</b>	<b>2.24</b>

**Conclusion 3: It can therefore be concluded that the Scheme is feasible from an economic perspective, and this represents a 41% increase since Option appraisal stage**

It is worthy of note that the St Mary's Loch flood storage component, if implemented as a standalone flood protection measure would offer a Benefit Cost Ratio of 24.9.

**Conclusion 4: The St Mary's Loch Flood Storage Option is not only technically feasible but offers an extraordinary economic argument for its delivery. It is recommended that this aspect of the Scheme is advanced as quickly as possible such that the significant flood risk reduction benefits can be achieved**

Whilst works at Lindean are not included within the Scheme, these works have been designed and costed within this report, such that a platform for taking them forward via other methods has been created.

**Conclusion 5: The Lindean Flood Protection Works have been designed and costed through the Outline Design Stage and their delivery is now passed out of the Selkirk FPS and over to the SBC Flood Protection Team.**

The NFM measures in the Long Philip Burn catchment are not included within the Scheme, these works have been designed and costed within this report, such that a platform for taking them forward via other methods has been created.

**Conclusion 6: The provision of specific NFM measures in both the Long Philip Burn catchment and throughout the wider Ettrick Water catchment have been developed through the Outline Design Stage and their delivery is now passed out of the Selkirk FPS and over to the SBC Flood Protection Team.**