Newton Stewart
FLOOD PROTECTION SCHEME

Overview and Summary (Design Justification) Report

Dumfries & Galloway Council

April 2023

Introduction

The Newton Stewart Flood Protection Scheme has been developed with extensive consultation and engagement events being held with stakeholders and the local community. The Scheme will provide a 1 in 200 standard of protection and is being designed to keep any visual and environmental impacts to a minimum.

Background

National Flood Risk Assessment

Newton Stewart was identified in the National Flood Risk Assessment published by the Scottish Environmental Protection Agency (SEPA) in December 2011 as a Potentially Vulnerable Area. This confirmed the work undertaken previously by Dumfries and Galloway Council in the publication of the 2007 Strategic Flood Risk Appraisal which ranked Newton Stewart as one of the top five settlements in the region in terms of numbers of properties at flood risk.

From 2011, and in accordance with the Flood Risk Management (Scotland) Act 2009, SEPA progressed the development of the Flood Risk Management Strategies for the 14 Local Plan Districts (LDP) across Scotland including the Solway LPD.

In December 2015, SEPA published the Flood Risk Management Strategy which set out a plan-led, risk-based, sustainable approach to flood risk management across Scotland.

The delivery of the actions required to reduce flood risk across Dumfries and Galloway were agreed by the Council and the first Solway LPD Local Flood Risk Management Plan was published in June 2016, covering a period from 2016 - 2022.

Flooding in Newton Stewart

In November 2012, Newton Stewart suffered from the worst flooding event experienced ‘in living memory’. A flood event of approximately a 1 in 35 year return period on the River Cree led to property flooding on both the west and east sides of the river. The rising river reached above deck level of the Sparling Bridge (the pedestrian footbridge) which resulted in it being blocked with debris and caused an additional obstruction to the river flow. Residents of some of the riverside properties were rescued by the Dumfries and Galloway Fire and Rescue Service by boat.

Evacuation from Riverside flats, November 2012. Photo credit: Galloway Gazette

Following this event, Dumfries and Galloway Council tendered for the production of a Flood Study and Kaya Consulting Limited were duly appointed.

Kaya and Initial Hydraulic Modelling

Kaya were appointed in 2013 to undertake hydraulic (river) modelling of the River Cree and Penkiln Burn, to produce flood inundation mapping for various return periods, and to consider feasible options for flood protection.

Further Flooding in December 2015

In December 2015 a flood event in excess of that experienced in November 2012, approximately a 1 in 50 year return period, impacted upon Newton Stewart. The flood led to collapse of the riverside wall at the War Memorial exacerbating flooding in Victoria Street. Again, the Sparling footbridge was surcharged but this time significant scour to the east abutment meant the bridge had to be removed for public safety.

Details on the replacement of the bridge are included later in this report. The replacement was classed as advance works of the Flood Protection Scheme as it was a priority to have this vital link between the Communities in Minnigaff and Newton Stewart restored but in a more flood resilient manner, and at a level so as not to impact upon upstream water levels during a high flow event.

The 2015 flood event led to the further commissioning of Kaya to refine their modelling work reflecting the impacts of the event, and to help inform a future commission to design a Flood Protection Scheme to a standard that would, as a minimum, avoid a repeat of flooding events of December 2015.

Outline Design

Following a tender process, Sweco were appointed to undertake outline design work based on the findings of Kaya and to prepare the necessary documentation and information for the publication of a Flood Protection Scheme.

Included in the technical work to develop an effective Scheme, a community engagement strategy was prepared, and this led to extensive consultation and discussion with all parties throughout including community meetings, a regular newsletter and specific project webpage.

At each key stage the Project Team met with stakeholders to assess the various options, and this was then followed by engagement events with the community.

Value Management (VM1) Meeting

Sweco and the Council held a value management meeting on 1 August 2017 with the intention of assessing the 24 high level options and reducing these to a short list of potentially practicable options to be taken forward. The meeting was attended by representatives of the following groups;

- Elected Members
- Cree Valley Community Council
- Scottish Environment Protection Agency
- Scottish Natural Heritage
- Scottish Water
- Forestry Commission Scotland
- Royal Society for the Protection of Birds
- Galloway Fisheries Trust
- Kaya Consulting

Value Management Meeting

The 24 options are listed below. Each of the options were considered using a multi-criteria assessment under the headings of technical, economic, environmental and social. Results of the multi-criteria assessment were presented at the VM1 meeting and discussion took place to reach consensus as to whether an option should remain on the short-list for further consideration.

- Upstream Storage at Glenhapple
- Upstream Storage at Linloskin Bridge ***(Shortlisted)***
- Upstream Storage at Frankie Hill
- Installation of Obstructions on River Cree ***(Shortlisted)***
- Installation of Obstructions on Penkiln Burn
- Construction of Direct Defences ***(Shortlisted)***
- Increase Flow Area Beneath A75T Bridge ***(Shortlisted)***
- Removal of A75T Embankment
- Increase A75T Flood Relief Culvert Size/Numbers ***(Shortlisted)***
- Removal of Gravel Berm
- Removal of In-Line Weir (Town Centre)
- Removal of In-Line Weir (Upstream of Town)
- Reconnect Penkiln Burn and River Cree Upstream
- Remove Mill Island
- Remove Sediment Around Key Structures
- Divert Penkiln Burn
- Dredging of River
- Disconnect Former Mill Lade
- Re-profile Land at Broomisle ***(Shortlisted)***
- Reinstate Flood Storage Area at Water of Minnoch ***(Shortlisted)***
- Upstream Storage at The Ghyll ***(Shortlisted)***
- Upstream Storage in River Cree Tributaries ***(Shortlisted)***
- Mitigation of Forest Management
- Re-profile Land Around Pumping Station ***(Shortlisted)***

Value Management (VM2) Meeting

Sweco and the Council held the second value management meeting on 7 November 2017 with the intention of assessing the 10 short list options and selecting a preferred option, or options, to be taken forward for outline design.

- Upstream storage at Linloskin Bridge
- Obstructions on River Cree
- Construction of Direct Defences ***(Taken Forward)***
- Increase Flow Area Beneath A75 Bridge ***(Taken Forward)***
- Increase A75 Flood Relief Culvert Size/Number
- Re-profile Land at Broomisle
- Reinstate Flood Storage Area at Water of Minnoch
- Upstream Storage Area at The Ghyll
- Upstream Storage in River Cree Tributaries
- Re-profile Land Around Pumping Station/Sparling Bridge ***(Taken Forward)***

As with the first VM meeting this was an inclusive process which was attended by the main stakeholders.

The consensus of those in attendance was that the option which had the greatest benefit, and provides the optimum solution for flooding, was the construction of direct defences. This was to be progressed in combination with the replacement of the Sparling Bridge (at a location further downstream and above the defended flood event level), reprofiling around the new Sparling Bridge, and increasing flow beneath the A75 bridge.

Public Engagement Event (PE1)

As part of the overall Scheme Programme and the Stakeholder Engagement Plan a public engagement event was held following the VM2 meeting, which was held in the McMillan Hall on 30 November to 2 December 2017.

The event included a number of display boards, plans and proposals, and was staffed by the Project Team. The display boards were shared on the project webpage the week following the event.

Public Engagement Event (PE1)

The total number of people attending the event was 107, with 57 questionnaires completed.

A summary of the main feedback was;

- 100% want to see a Flood Protection Scheme provided in Newton Stewart,
- 86% agreed with the approach being taken to develop a Scheme,
- 77% agreed all the available options to address the flooding had been included and considered.

Following the event all the feedback, including queries and comments (and response to the same) were compiled into a report and published on the project webpage.

Value Management (VM3) Meeting

The third VM meeting was held on the 5 June 2018 and as with the previous VM meetings attendance included all the main stakeholders and interested parties.

Discussion was held on the outline design of the preferred Scheme with details presented on the construction type, height, and location of the direct defences.

All in attendance agreed the outline proposals with the next step in the process being a public engagement event.

Public Engagement Event (PE2)

As with PE1, a second event was held in the McMillan Hall on 21 June to 23 June 2018 and included a number of display boards, plans and proposals. Again the event was staffed by the Project Team, and display boards were placed on the project webpage the week following the event.

Over the three days the total number of people attending the event was 124 with 64 questionnaires completed.

A summary of the main feedback was;

- 100% want to see a Flood Protection Scheme provided in Newton Stewart.
- 82% agreed with the approach being taken to develop a Scheme.
- 68% agreed all the available options to address the flooding had been included and considered.

Following the event all the feedback, including queries and comments (and response to the same) were compiled into a report and published on the project webpage.

Replacement of Sparling Bridge

Following extensive flooding in the town and damage to the abutment, the old Sparling Bridge was removed in late 2016. The bridge was acting as a dam and had been a contributory factor in flooding to the town in both 2012 and 2015.

The proposal was to install the old bridge at a higher level but at the request of the Cree Valley Community Council an alternative location further downstream to be considered. The choice of location was then put to the Community, who voted for the new location.

A further request from the Community Council asked if there was a possibility of installing a new bridge rather than the old one. Dumfries and Galloway Council considered the request and agreed to proceed with the design of a new structure at the preferred location for community benefit. Sweco were appointed to lead on the design and work alongside Sustrans, the Community Council, and Dumfries and Galloway Council to design a combined cycle/footbridge.

Engagement ran alongside the main Scheme and involved regular meetings, Committee reports, newsletters, project webpage and updates.

The Community Council outlined their aspirations for the new bridge which were taken on board by the Design Team leading to the final design which received the support of all parties.

Bridge under construction

The replacement of the bridge is an integral part of the Flood Protection Scheme but was undertaken as an advanced phase due to it being a priority to reconnect the communities of Minnigaff and Newton Stewart and provide a safe route which was accessible to all users.

Construction work commenced in early 2019 with the bridge officially opened on 2 December 2019.

Website Update to Include Interactive PDF and Continue Engagement During COVID-19 Restrictions

An interactive PDF was added to the project's website in May 2021, to present information in a more engaging way. With this tool, the viewer could click on banners to access documents. The documents included the Scheme overview board (showing locations, types and approximate heights of defences) banners presenting key information on the Scheme, a 3D fly-through, and a summary of the publication process.

Public Engagement (PE3) and Individual discussions with owners of Most Affected Properties

This event was held in the McMillan Hall on 21 September to 25 September 2021, and again included a number of display boards, plans and proposals, and was staffed by the Project Team. The event included engagement with the owners of property directly impacted "most affected" by the construction of the proposed defences.

At these engagement sessions and site meetings it was noted that there was a need to undertake additional survey work to enable a review and revision of the alignment and height of the proposed defences.

The surveys were completed in early 2022 and the data gathered was assessed and modelled to enable the completion of updated plans which were issued to the most affected properties in late 2022.

Approval to Publish the Scheme.

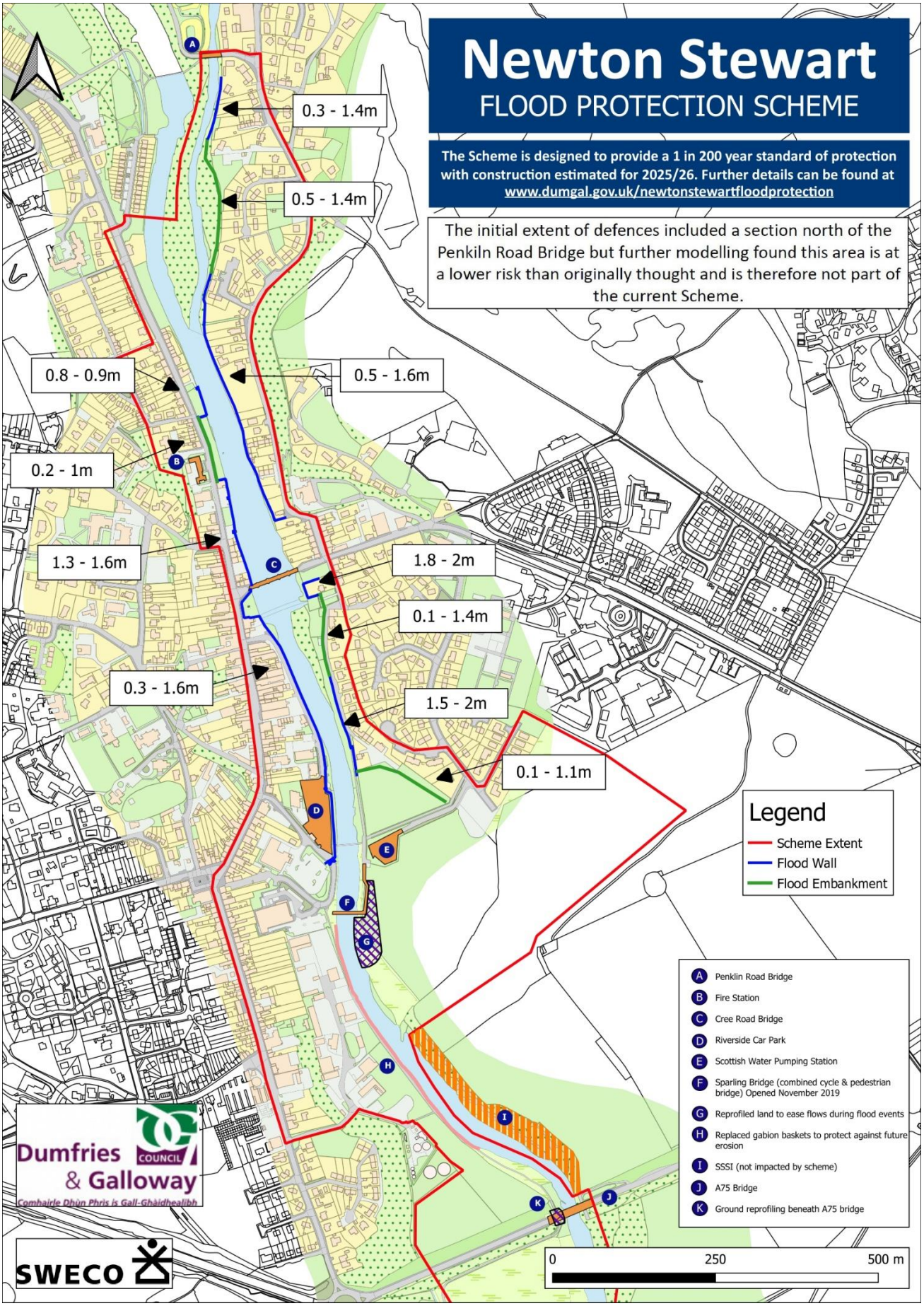
Approval to publish the Scheme was given by the Council's Communities Committee in February 2023 with documents and drawings of the Scheme to be the subject of a further technical review.

Final Amendments

A review was undertaken following the Committee with a few modifications made to the Scheme which were integrated into the final outline design which was presented at the 'pre-publication information' event held in the McMillan Hall on 19 April 2023.

Publication

The publication will be undertaken in May 2023 with the Final Outline Design shown on the following page.


Newton Stewart
FLOOD PROTECTION SCHEME
The Scheme is designed to provide a 1 in 200 year standard of protection with construction estimated for 2025/26. Further details can be found at www.dumgal.gov.uk/newtonstewartfloodprotection
The initial extent of defences included a section north of the Penkiln Road Bridge but further modelling found this area is at a lower risk than originally thought and is therefore not part of the current Scheme.
0.3 - 1.4m
0.5 - 1.4m
0.8 - 0.9m
0.5 - 1.6m
0.2 - 1m
1.3 - 1.6m
1.8 - 2m
0.1 - 1.4m
0.3 - 1.6m
1.5 - 2m
0.1 - 1.1m
Legend
Scheme Extent
Flood Wall
Flood Embankment
A Penklin Road Bridge
B Fire Station
C Cree Road Bridge
D Riverside Car Park
E Scottish Water Pumping Station
F Sparling Bridge (combined cycle & pedestrian bridge) Opened November 2019
G Reprofiled land to ease flows during flood events
H Replaced gabion baskets to protect against future erosion
I SSSI (not impacted by scheme)
J A75 Bridge
K Ground reprofiling beneath A75 bridge
Dumfries & Galloway Council
Comhairle Dhùn Phris is Gall-Ghàidhealibh
SWECO
0
250
500 m

Common Themes and FAQ's

During the Value Management meetings, and at the various Community Engagement Events, the Project Team were presented with alternative solutions and asked for further information on a few common themes. These are detailed below with explanation and reasoning why they were discounted as part of the Scheme development.

Sediment Management (Dredging)

A number of options were considered to remove gravel and build-up within the river channel namely:

- Removal of Gravel Berm
- Removal of Mill Island
- Remove Sediment Around Key Structures
- Dredging of River

These options were considered and modelled but the results clearly demonstrated that they did not reduce water levels during a flood event and could not therefore be taken forward. This very much aligns with the report prepared by Chartered Institution of Water and Environmental Management, called Floods and Dredging[1].

Furthermore, any dredging may also have a detrimental effect on the stability of the Cree Bridge, it will raise silt and debris in the river affecting fish and through natural processes it will simply return.

Natural Flood Management

Natural Flood Management (NFM) uses the environment to store or slow down flood water. The planting of woodlands, wetland and storage creation and river restoration are some of the measures that can help. In addition to benefitting flood control, NFM can also increase biodiversity, water quality, and can increase resilience to climate change. Commercial Forestry Practices (tree species, drainage works, road construction and felling operations etc.) can also have an influence on flood risk and improvements to these practices can contribute towards reducing flood risk downstream during less extreme events.

Improvements within the catchment that provide NFM opportunities can be progressed as part of the overall catchment management by those currently in control of the land. The Council along with stakeholders would support any future development in that regard. NFM does have the potential to offer minor reductions in flood risk and should be encouraged. However, their implementation will be a long term approach and would never replace the need for the proposed defences within the town.

Accordingly extensive consideration was given to these matters from the outset of the Scheme with numerous options on upstream storage and NFM being modelled and benefits assessed, namely:

- Upstream Storage at Glenhapple
- Upstream Storage at Linloskin Bridge
- Upstream Storage at Frankie Hill
- Installation of Obstructions on the River Cree
- Installation of Obstructions on Penkiln Burn
- Reinstate Flood Storage Area at Water of Minnoch

[1] **Floods and Dredging – a reality check**. https://www.ciwem.org/assets/pdf/Policy/Reports/Floods-and-Dredging-a-reality-check.pdf

- Upstream Storage at the Ghyll
- Upstream Storage on River Cree Tributaries
- Natural Flood Management as part of forest management.

None of these options have a positive benefit cost ratio and some had extensive negative impacts. Therefore, they could not be taken forward to the preferred option stage.

Height of Defences and Impact on Views

The height of walls and embankments varies throughout the town to maintain a consistent 1 in 200 year return period standard of protection. Where there is sufficient width, the preference is usually to build an embankment, as this generally is more in keeping with the riverbank environment.

There is no doubt that in certain locations there will be a significant impact on views of the river but unfortunately, this is the trade-off when providing effective, long-term protection from flooding. To assist in reducing the impact on river views glass panels can be used on top of solid walls to maintain visibility.

The location of glass panels will vary and could be continuous lengths or smaller sections. This will be part of the detailed design but the emphasis will be on keeping the defences as transparent as possible and maintaining as much visibility to the river as we can.

With regard to current access routes and use of some of the river banks for recreation, fishing etc., this will form part of the detailed design process. The defences will include access points (these can for example be stepped arrangements over low walls, sloped pathways, or even gates).

Secondary flooding

Secondary flooding (the surface water behind the defences) will be considered in more detail during the detailed design phase. With the defences in place the surface water will still flow freely to the river as it does now. During times when river levels are high then this may prevent the surface water draining directly to the river and therefore storage and pumped systems may be required to ensure there is no ponding or flooding from surface water.

An initial ‘Surface Water Options Report’ has been completed which includes work identified to mitigate any adverse effect including water storage and underground pumping stations. Work will continue throughout the project to manage any surface water flood risk.