
NEWTON STEWART FLOOD PROTECTION SCHEME

118908

VM DOCUMENT



FINAL

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SWECO UK LIMITED

Change list

VER.	DATE	CHANGE CONCERNS	REVIEWED	APPROVED
1	07/08/17	DRAFT FOR COMMENT	DRL	DRL
2	25/08/17	UPDATED FOLLOWING COMMENTS	JPF	DRL

Summary

A proposed flood protection scheme is currently being appraised for the town of Newton Stewart, Dumfries & Galloway. Newton Stewart has been identified as a Potentially Vulnerable Area (PVA) in the Solway Local Plan District (Local Flood Risk Management Plan) with an action for Dumfries and Galloway Council to reduce the risk of river flooding to properties in Newton Stewart from the River Cree. Further need for this scheme has been identified through a number of recent severe flood events and hydraulic modelling.

This document identifies a long-list of 24 potential options and outlines the subsequent consultations and decision making processes. Consultation with statutory stakeholders and the local community has assisted in the production of a short-list of possible options presented within the report. This is a live document which will be updated after each formal stakeholder engagement meeting.

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1 Introduction

Sweco have been appointed by Dumfries & Galloway Council to design a flood protection scheme for the town of Newton Stewart. Kaya Consulting, having undertaken the original flood study, were retained by DGC on the project to provide hydraulic modelling services advisory to the design.

1.1 Background to Project

A Strategic Flood Risk Assessment (FRA) was carried out by Dumfries & Galloway Council in 2007, highlighting Newton Stewart as a priority. The River Cree and Penkiln Burn flow through the towns of Newton Stewart and Minnigaff, which are situated adjacent to each other and can be seen on a location plan in Figure 1-1.

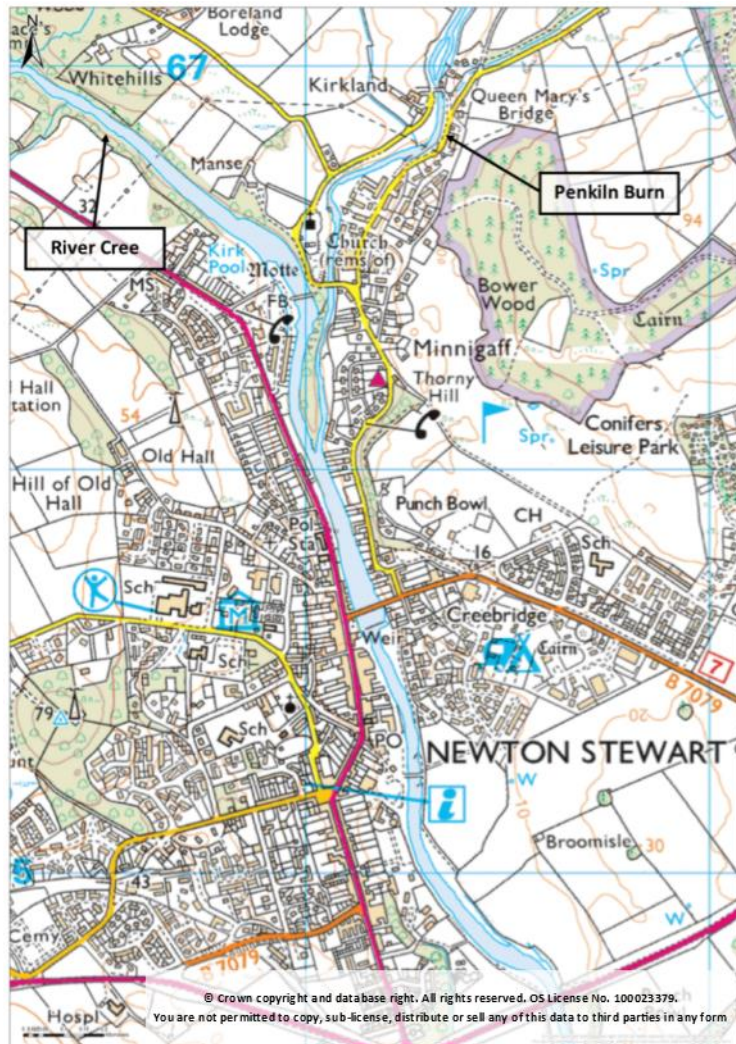


Figure 1-1 - Newton Stewart and Associated Watercourses

Since 2001, Dumfries & Galloway Council have recorded eleven fluvial flood incidents from these watercourses within the towns. Of these incidents two were considered major, one in 2012 and the other in 2015, resulting in severe damage and requiring widespread response from the emergency services. The community have commented that these large flood events have now had a negative impact on the town over the longer term.

1.2 Previous Reports

A previous study was carried out by Kaya Consulting in 2015. A 1D-2D hydraulic model was constructed, in Flood Modeller Pro, to assess the impact of the flooding on the town. A number of flood mitigation measures were suggested as a result of the hydraulic modelling. One of these measures, the relocation of a footbridge (the Sparling Bridge) within the town, has now been actioned. An update to the report was provided in May 2017, to account for an updated hydrological assessment and in response to the major flooding event of 2015.

1.3 Current Scope

The scope of the current project is to assess all possible options for flood risk mitigation within Newton Stewart and, ultimately, provide a design solution for the flood protection scheme.

1.3.1 Design Brief

The aim of the project is to formulate a design solution for the flood protection scheme that will (i) protect as much of the town as is practical; and (ii) attract Scottish Government funding for its construction. This brief requires a wide range of considerations to be taken into account, including technical feasibility; economic viability; environmental impacts; and views of the local community.

1.3.2 Optioneering Process

The optioneering process is shown graphically in Figure 1-2. Initially, a long-list of potential options was generated including options noted in previous Kaya Consulting reports and options suggested by the local community. This long list was assessed for feasibility at a high-level and the relevant stakeholders consulted prior to a short-list being formed.

Detailed consideration of the options within the short-list will be made, at a technical level, to ensure that a full understanding of the practical feasibility is reached. In addition an economic analysis of the protection level offered by each short-list option will be made. This will facilitate a cost-benefit analysis exercise to assist in the assessment of which option (or combinations thereof) would provide optimum benefit for the town.

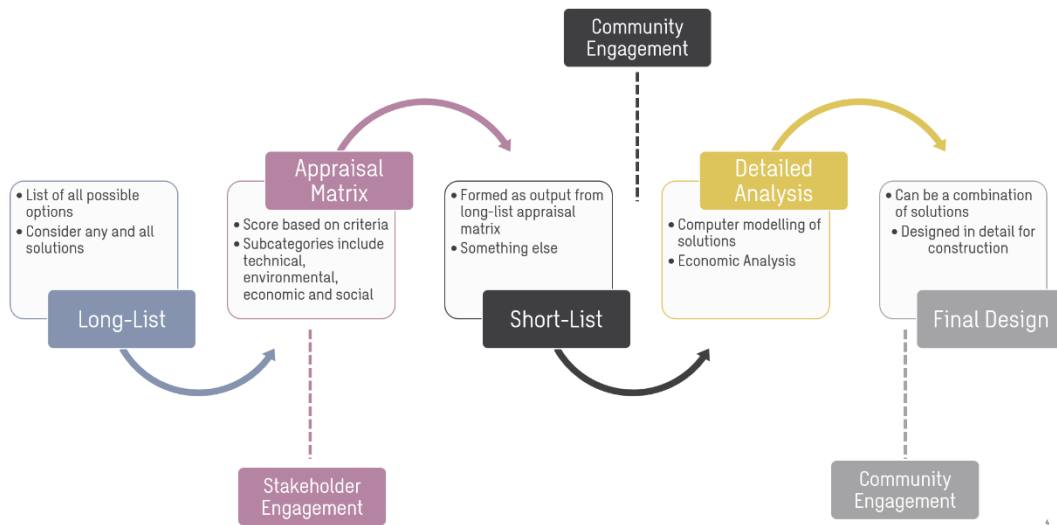


Figure 1-2 - Optioneering Process

1.3.3 Consultation and Engagement

Consultation with relevant stakeholders and engagement with the local community forms an essential part of the optioneering process. Engagement with the following groups was carried out, and will continue throughout the optioneering process:

- Scottish Environment Protection Agency (SEPA):** SEPA provide advice on works that may be carried out within the river, and on environmental considerations that may require to be taken into consideration in any proposed scheme. SEPA also have detailed expertise on previous flood protection schemes that may assist here. SEPA attended the VM1 meeting on Tuesday, 1 August 2017.
- Scottish Natural Heritage (SNH):** SNH are knowledgeable in the field of biodiversity and ecosystems and can highlight any potential issues that may arise within this area for potential options. SNH were invited to the VM1 meeting, but provided no response.
- Scottish Water:** Scottish Water have a network that discharges to the River Cree and, hence, any works relating to flood prevention could have an impact on this network. Scottish Water would be in a position to highlight any options that could impact on their network, or would require additional consideration to mitigate backing-up effects. Scottish Water were invited to the VM1 meeting, but declined due to other commitments.
- Forestry Commission Scotland:** The Forestry Commission are responsible for a large area of forest in the upper Cree catchment. Any options in this area would impact on forestry and their views and input is needed in this respect. The Forestry Commission attended the VM1 meeting on Tuesday, 1 August 2017.

- **Royal Society for the Protection of Birds (RSPB):** *The RSPB are able to advise on any options that could impact bird species in the local area and within the catchment as a whole. The RSPB attended the VM1 meeting on Tuesday, 1 August 2017.*
- **Galloway Fisheries:** *A high volume of fishing activity takes place on the River Cree and Penkiln Burn. Those fishing on the watercourses have an interest in the potential options, and furthermore a number of protected species are known to be present in the area. Galloway Fisheries have in-depth knowledge in this field and attended the VM1 meeting on Tuesday, 1 August 2017.*
- **Kaya Consulting:** *Kaya Consulting carried out a previous flood study in the area and are continuing to provide hydraulic modelling services for this study. Therefore, Kaya Consulting bring detailed knowledge of the area and flood-related issues and attended the VM1 meeting on Tuesday, 1 August 2017.*
- **Cree Valley Community Council (CVCC):** *The CVCC represent the views of the local community and the Cree Valley Flood Action Group and are able to highlight options that may be more (or less) desirable to the local people. The CVCC were present at a public engagement event on Monday, 24 July 2017 and had representatives at the VM1 meeting on Tuesday, 1 August 2017.*
- **Elected Members:** *Elected members represent the views of the community and provide further means to engage with local people. They have also knowledge of flood-related issues within the town in the past. Two elected members attended the VM1 meeting on Tuesday, 1 August 2017.*

It is anticipated that the above consultees will also be invited to the VM2 meeting, following appraisal of the short-list.

2 Long-List Options

A total of 24 options have been present in the long-list. This comprises 19 options put forward by Sweco and Kaya Consulting, and a further 5 options added following suggestions at the meeting with CVCC on Monday, 24 July 2017.

Options were assessed using a multi-criteria assessment. This assessment considered a total of 29 assessment elements under the headings of technical, economic, environmental and social. Each assessment element was assigned a weighting ranging 1 – 5. Additional to these weightings, the heading areas were also weighted to provide preference to the technical and economic areas that are key to the realisation of the project.

Results of the Multicriteria assessment were presented at the VM1 meeting to the stakeholders noted in Section 1.3.3 and discussion took place to reach consensus as to whether an option should progress to the short-list. Details of each individual option and the associated discussions follow.

2.1 Multicriteria Assessment Process

This section outlines the multi-criteria assessment process. This approach used a ranking matrix, split into four main sections: technical, economic, environmental and social. Each of these is detailed further below, in turn. Note that each of the 4 assessment areas within the ranking matrix has been weighted to provide overall results that favour options more likely to be successful in fulfilling the overall project aims. Key areas where major problems were identified could be classified as a 'fail' to discount the option in cases where an unacceptable issue or risk was found to be present.

2.1.1 Technical

Technical aspects of each option are considered to be an important indicator, and as such a high weighting of 35% was applied to this assessment area. This is to favour interventions that are more buildable and have lower construction risk and are hence more likely to be successful overall. The assessment elements used in this part of the ranking matrix were:

- Condition of any existing contingent assets;
- Flood damage reduction;
- Site space constraints;
- Site topography;
- Vegetation density;
- Health & safety during construction; and
- Buildability.

2.1.2 Economic

Economic aspects of each option were also considered an important indicator, as schemes with a higher benefit-cost ratio are of greater benefit. As such, this assessment area was assigned a weighting of 35%. The assessment elements used in this part of the ranking matrix were:

- Site access;
- Ground conditions;
- Land ownership;
- Impact upon development potential;
- Flood damage reduction; and
- Preliminary whole-life costing.

2.1.3 Environmental

Environmental aspects of each option were assigned a weighting of 15%. This is because (i) any undesirable environmental scores are relatively easily mitigated; and (ii) environmental scores that would result in overall objection to the scheme from statutory authorities are marked as an overall 'fail' on the matrix to discount the option as a whole. The assessment elements used in this part of the ranking matrix were:

- Flood risk susceptibility;
- Impact on recreational users;
- Ecology and designated sites;
- Heritage sites;
- Water quality impacts;
- Biodiversity;
- Climate change resilience;
- Air quality impact and carbon footprints;
- Air quality impact (post-construction);
- Controlled activities regulations; and
- Carbon emissions.

2.1.4 Social

Social aspects of each option were assigned a weighting of 15%. This highlights issues that may arise for each option. The lower weighting represents the fact that mitigation of any potentially negative social effects would be relatively straightforward in comparison to

problems relating to the technical/economic aspects of the project. The assessment elements used in this part of the ranking matrix were:

- Public safety (operation);
- Stakeholder issues;
- Proximity to urban areas; and
- Indirect benefits.

2.2 Option 1: Upstream Storage at Glenhapple

This option utilises the concept of attenuating flow in the upper catchment prior to reaching the town, with a location plan shown in Figure 2-1.



Figure 2-1 - Upstream Storage at Glenhapple

2.2.1 Background

This option was considered as part of the original 2015 Kaya Consulting study, which identified a potential upstream storage area near to Glenhapple. This area was estimated to provide around 2,000,000 m³ of storage volume within the upper catchment. An initial modelling assessment has found that this would likely only be effective up to the 1:75 year return period. It should be further noted that no additional modelling was conducted with the increased flow estimates reported in the 2017 report update and, therefore, the option would now be considered effective at return periods lower than the 1:75 year standard.

2.2.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-1. The option scored highly on technical, due to simple impoundment design requirements; however yielded poor scores for economic (due to high costs) and environmental (due to in-line impoundment). The overall score for this option placed it approximately within the middle of all the considered options.

Table 2-1 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
63%	22%	25%	69%	44%

2.2.3 Feedback from Stakeholders

Galloway Fisheries questioned the impact of the scheme on protected fish species, which all have their main spawning areas upstream of Glenhapple. It was noted that a fish ladder would be incorporated into any design here.

SEPA expressed preference that other opportunities were considered before they would be happy with an on-line storage area.

Further discussions at the VM1 meeting with stakeholders formed the conclusion that this option would be unlikely to solve the problem on its own, and therefore the cost-benefit ratio was considered to fall into a range too low to achieve Scottish Government funding.

2.2.4 Decision

Option to be removed, and this should not proceed to the short-list. This was due to initial modelling from Kaya Consulting showing that the likely effect on flood risk in the town was not great enough, combined with the likely cost and complexity of dam construction in the upper catchment.

2.3 Option 2: Upstream Storage at Linloskin Bridge

This option utilises the concept of attenuating flow in the upper catchment prior to reaching the town, with a location plan shown in Figure 2-2.



Figure 2-2 - Upstream Storage at Linloskin Bridge

2.3.1 Background

This option was considered due to the local topography which may provide up to 3,000,000 m³ of storage volume upstream of the town. This storage volume is situated on a tributary of the River Cree (Challoch Burn) although it is envisaged that a diversion from the Cree into this area may be possible. An existing road embankment separates this area from the River Cree, and a flow restriction beneath this road would be needed to impound water within the area.

2.3.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-2. The option scored lower on economic due to the volume of land-take near to the town required. Note that the environmental score was found to be greater than option 1 at this location, however. The overall score for this option placed it approximately within the middle of all the considered options.

Table 2-2 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
52%	15%	50%	69%	41%

2.3.3 Feedback from Stakeholders

SEPA spoke more favourably on this type of option, as it is off-line storage. Galloway Fisheries also commented that this would be preferred for them in comparison to on-line storage as there would be minimal impact on fish species.

Discussion at the VM1 meeting came to the conclusion that this may have some impact on flood reduction despite being a smaller area than Glenhapple. Further modelling would be required to assess this impact.

2.3.4 Decision

This option is to be taken forward to the short-list for additional investigation. Further hydraulic modelling will be completed by Kaya Consulting to ascertain likely effects of this option on flood risk within the town.

2.4 Option 3: Upstream Storage at Frankie Hill

This option utilises the concept of attenuating flow in the upper catchment prior to reaching the town, with a location plan shown in Figure 2-3.

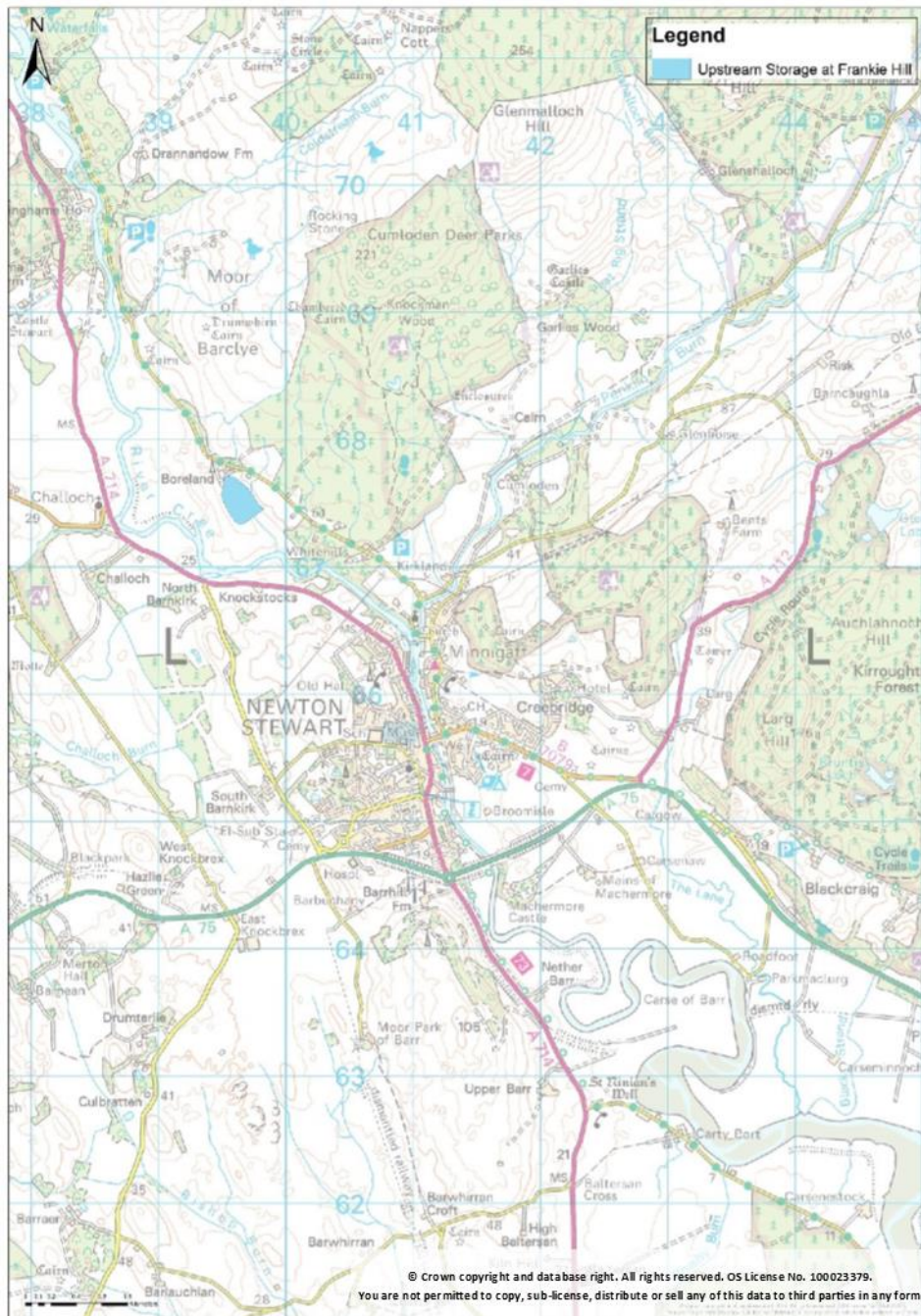


Figure 2-3 - Upstream Storage at Frankie Hill

2.4.1 Background

This option provides around 200,000 m³ of storage within the local topography near to Frankie Hill, in the Boreland area upstream of Newton Stewart. The storage area is situated on an unnamed tributary of the River Cree, and only storage of water flowing upstream from this tributary is possible within this option. A small dam structure would need to be constructed to impound water within this area.

2.4.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-3. The option scores lower than the option at Linloskin Bridge for technical due to the much lower storage volume available. Economic considerations are greater due to less impact on private landowners here.

Table 2-3 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
37%	23%	50%	69%	41%

2.4.3 Feedback from Stakeholders

Kaya Consulting noted that from their previous modelling expertise of the local area, it was felt that this would only reduce flows within the town by around 10 m³/s – which is a very small reduction and far from the required standard of protection.

Further discussion at the VM1 meeting clarified this option as being split across two tributaries; which meant that the cost would be greater due to the need to construct two impoundments. A consensus was reached that option 2 would be a preferred off-line storage area in comparison to option 3.

2.4.4 Decision

Option to be removed, and should not proceed to the short-list. The primary reason for this was that the storage volume was low and would likely have minimal or no effect on flood risk within the town.

2.5 Option 4: Installation of Obstructions on River Cree

This option utilises the concept of attenuating flow along the length of the river channel prior to reaching the town, with a location plan shown in Figure 2-4.

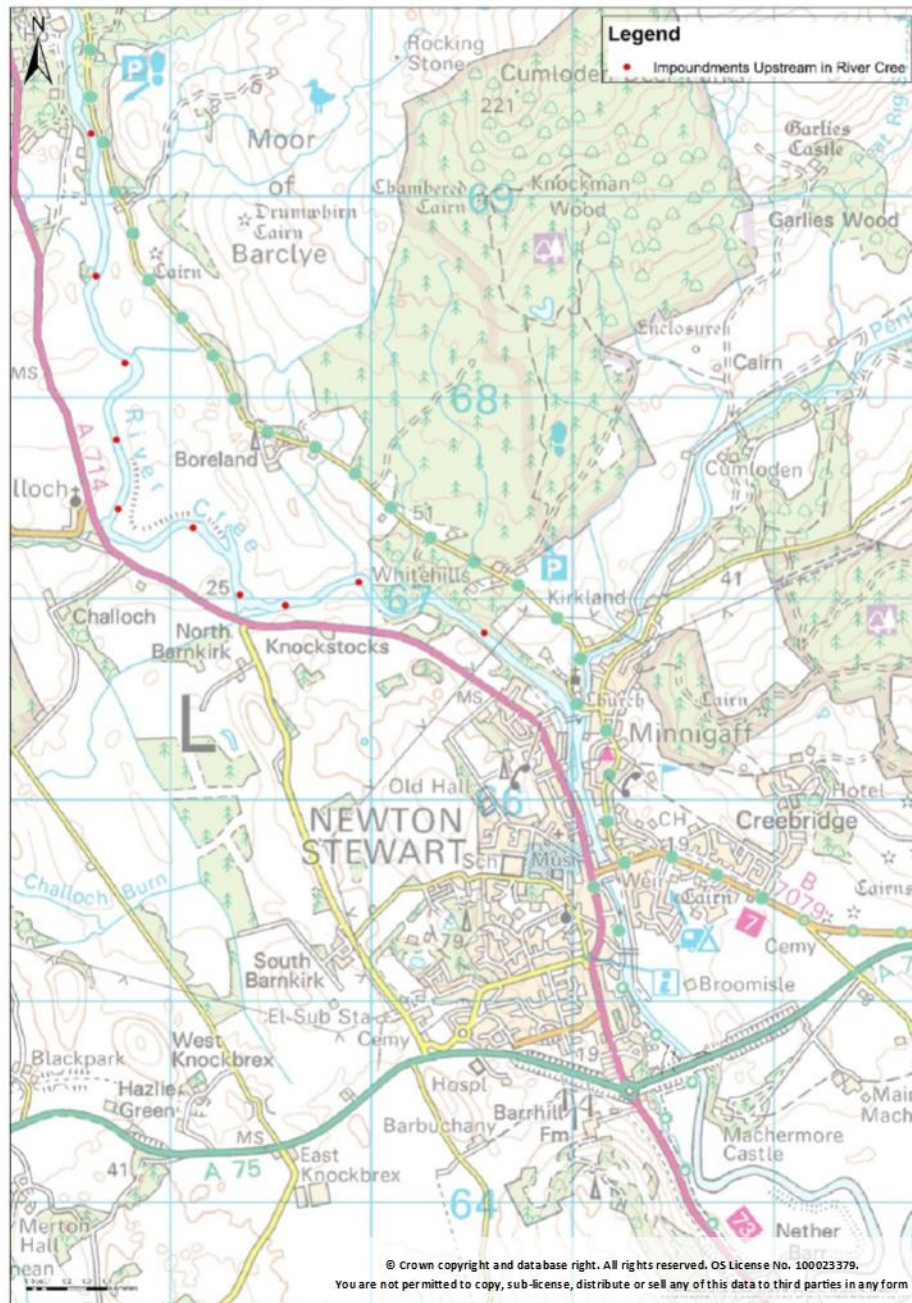


Figure 2-4 - Possible Locations for Obstructions on the River Cree

2.5.1 Background

A series of obstructions on the River Cree upstream of the town was investigated. These would take the form of weirs within the channel, holding small volumes of water back within the river channel upstream of the town to reduce flows within the town. These weirs would be around 1m in depth, although a range of sizes were considered at this high level stage to proof the concept.

2.5.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-4. This option scored higher on the technical and economic than other storage options due to its likely high impact at low return periods for relatively low cost. However, note that this option was found to be less effective at increasing return period events. The overall score for this option placed it approximately within the middle of all the considered options.

Table 2-4 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
59%	50%	43%	88%	57%

2.5.3 Feedback from Stakeholders

Kaya Consulting was asked to model this option ahead of the VM1 meeting and came with the conclusion that it would likely only reduce flood water levels at the 1:200 year return period by around 5-10%.

Galloway Fisheries have stated that they would consider this option to have issues for them due to the potential for erosion and impediment to fish passage. This option could potentially be a big concern for fisheries. SEPA echoed the concerns of Galloway Fisheries.

2.5.4 Decision

This option is to be taken forward to the short-list for additional investigation. Additional hydraulic modelling at lower return periods (1:200 year already modelled) is to be conducted to consider the effect of this option on less extreme events.

2.6 Option 5: Installation of Obstructions on Penkiln Burn

This option utilises the concept of attenuating flow along the length of the river channel prior to reaching the town, with a location plan shown in Figure 2-5.

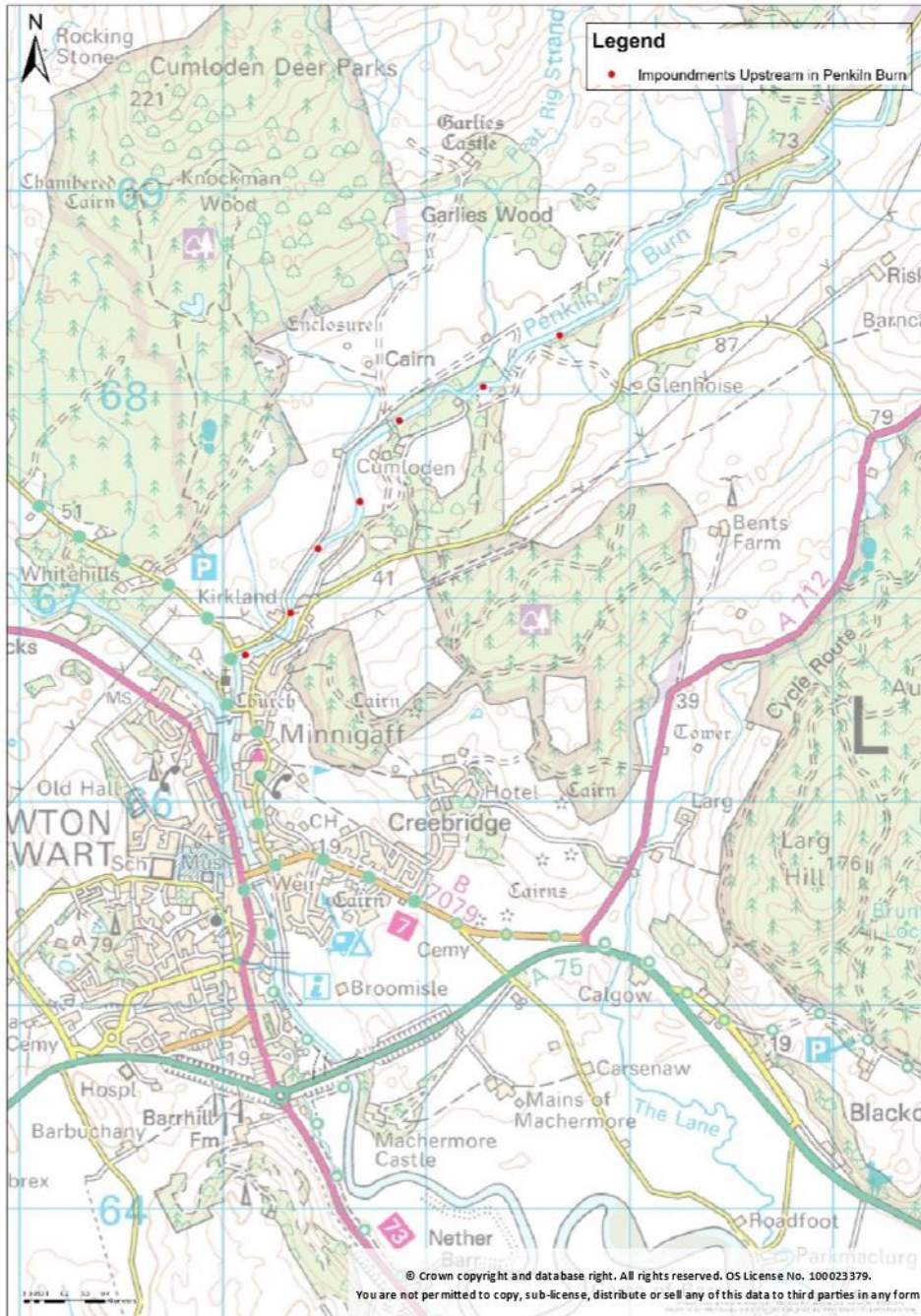


Figure 2-5 - Possible Locations for Obstructions on the Penkiln Burn

2.6.1 Background

Similar to Option 4, a series of obstructions on the Penkiln Burn upstream of the town was considered. These would take the form of weirs within the channel, holding small volumes of water back within the river channel upstream of the town to reduce flows within the town.

2.6.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-5. This option failed the assessment based on constructability, in light of difficult access requirements and overall restricted working space.

Table 2-5 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
FAIL	35%	48%	88%	FAIL

2.6.3 Feedback from Stakeholders

The consensus reached at the VM1 meeting is that this option would likely have minimal impact due to the relatively small proportion (approx. 15%) of flows towards the town originating in the Penkiln Burn.

2.6.4 Decision

Option to be removed, it should not proceed to the short-list. The reason for this is the low proportion of flows entering the town from the Penkiln Burn (approximately 15% of total flows) meaning that interventions here are likely to have minimal or no impact on flood risk.

2.7 Option 6: Construction of Direct Defences

This option utilises the concept of holding flow within the river and ensuring it passes downstream rather than floods receptors within an urban area, with a location plan shown in Figure 2-6.

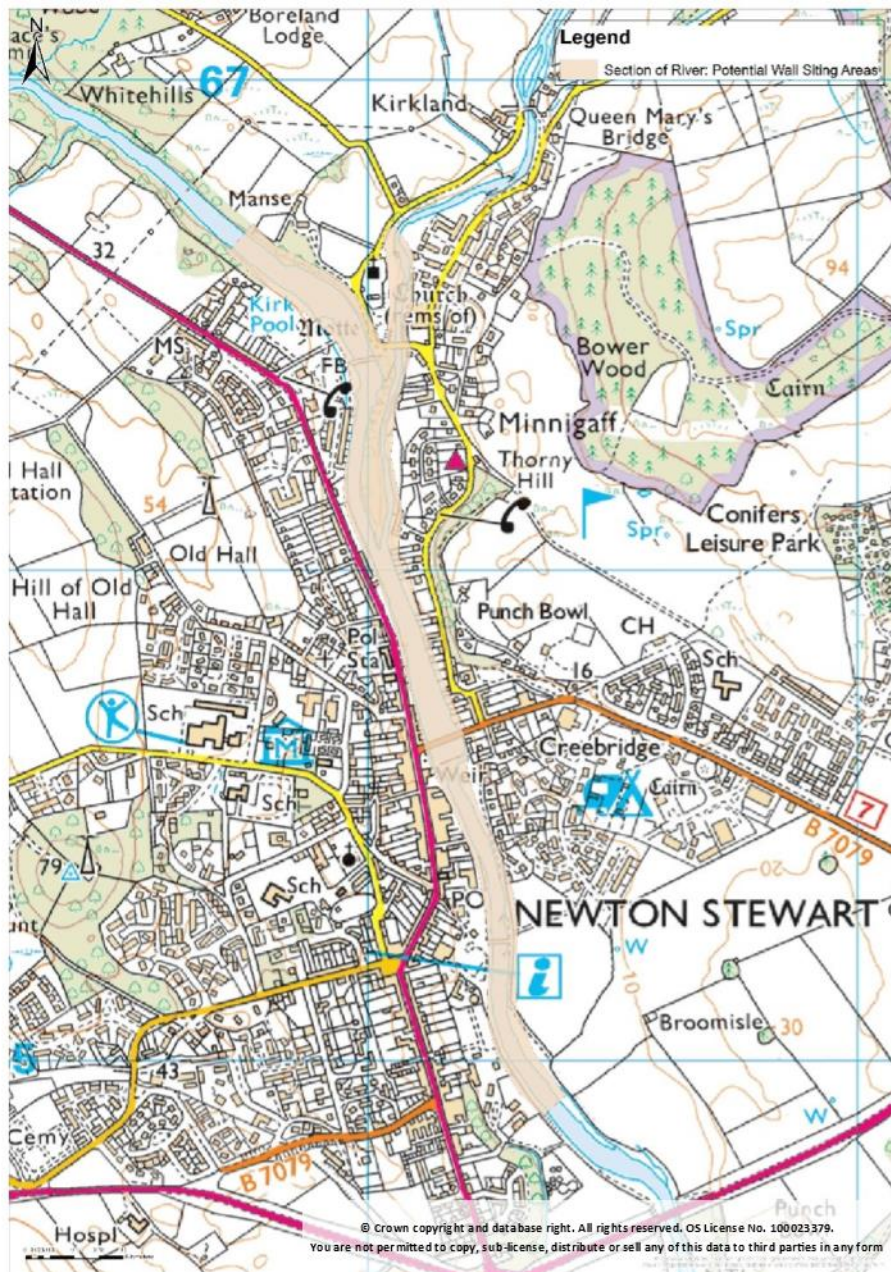


Figure 2-6 - Potential Area of River for Direct Defences

2.7.1 Background

Direct defences include barriers - walls or levees are commonly used in flood protection schemes, although often in conjunction with other solutions. Direct defences are often built in conjunction with landscaping and regeneration of riverside area to provide additional amenity benefit. At this stage a high level analysis was conducted, having not considered any specific location for direct defences.

2.7.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-6. This option scored highly overall, aided by the likely effectiveness in reducing flood levels while at the same time being a relatively low-cost option in comparison with the other options considered. The score for social was, however, lower due to the need to construct within the town itself. The overall score for this option placed it within those which scored the highest (>60%).

Table 2-6 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
66%	78%	45%	38%	63%

2.7.3 Feedback from Stakeholders

CVCC noted in a letter to DGC ahead of the VM1 meeting that this option was a high preference, with the reason being the importance of protecting the commercial heart of the town. There was consensus among stakeholders at the VM1 meeting that there was an inevitability that some form of direct defences would be required.

2.7.4 Decision

This option is to be taken forward to the short-list for additional investigation. It was considered that this option will be required in some way, even in combination with other options.

2.8 Option 7: Increase Flow Area Beneath A75 Bridge

A location plan for the A75 bridge is shown in Figure 2-7.

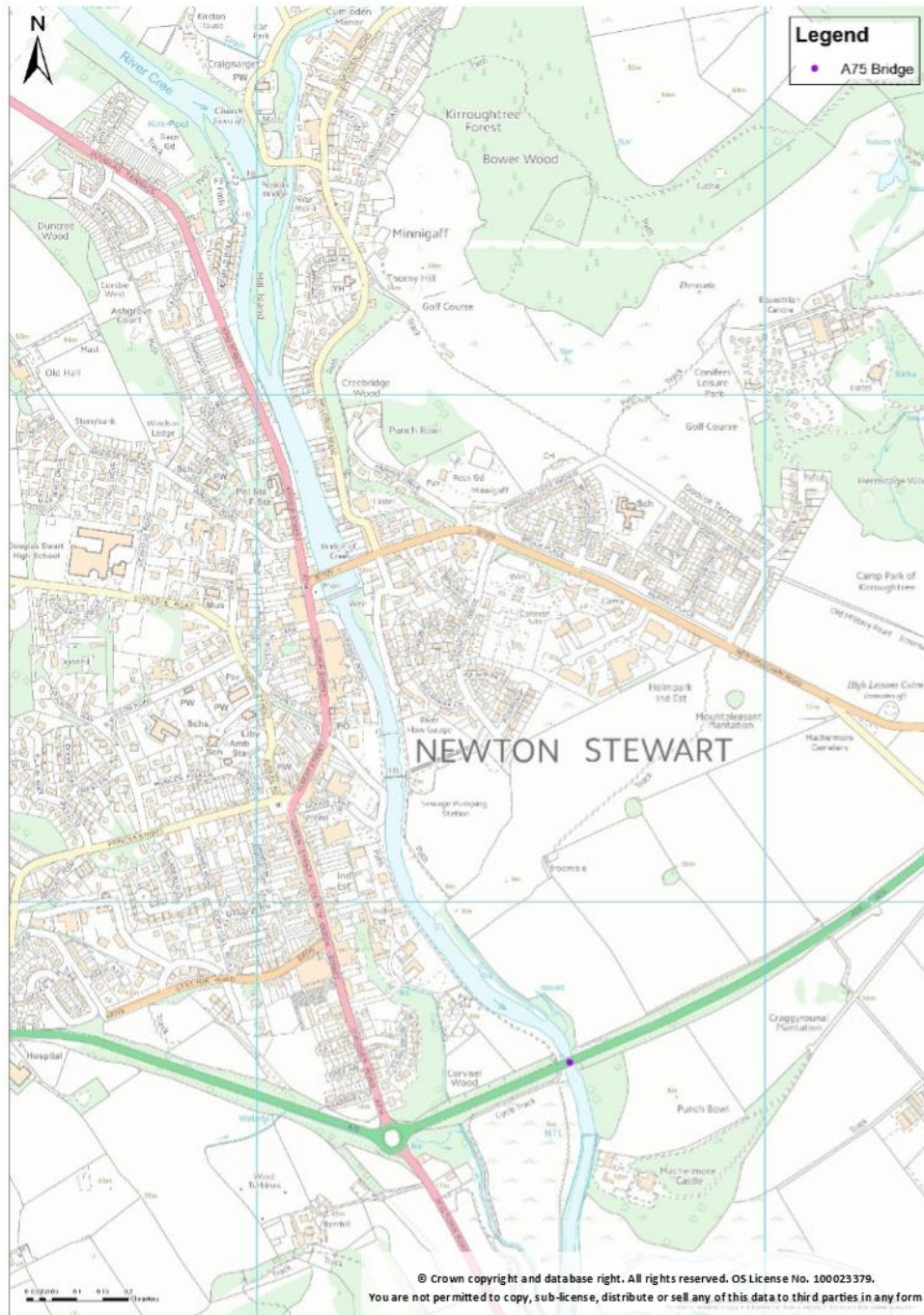


Figure 2-7 - A75 Bridge Location

2.8.1 Background

This option was considered as part of the original 2015 Kaya Consulting study, which identified scope to increase the width of the channel beneath the bridge carrying the A75 above the River Cree. At this point, the embankment for the A75 crosses the floodplain of the River Cree, resulting in barrier to flow. The point at which the bridge spans the River Cree is the only point at which large volumes of flow can be conveyed downstream. Increasing conveyance at this point would result in less backing-up of flows upstream towards the town from this location.

2.8.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-7. Scores for the option were relatively low, partly due to complexities associated with a nearby SSSI and removal/relocation of amenity in the local area during construction. The overall score for this option placed it approximately within the middle of all the considered options.

Table 2-7 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
49%	56%	46%	34%	49%

2.8.3 Feedback from Stakeholders

CVCC noted in a letter to DGC ahead of the VM1 meeting that either this option or option 9 should be taken into consideration as they feel the embankment effectively dams the natural floodplain.

Galloway Fisheries noted that this is a spawning location, and downstream of the A75 crossing is a SSSI. As such any modifications here should carefully take these facts into account.

Further discussion noted that while the option would remove a social amenity (path/cyclepath), the scheme design would likely be in a position to replace this amenity in a similar location so that there was no overall loss.

Kaya Consulting previously carried out some modelling in the area which indicated benefits were localised and consequently not effective at reducing flood risk in the urban areas upstream, although it was agreed that further work could be completed to provide a more detailed insight to the potential impacts.

2.8.4 Decision

This option is to be taken forward to the short-list for additional investigation. Further hydraulic modelling once additional survey information has been gathered to refine the assessment of this option is needed to fully understand the potential here.

2.9 Option 8: Removal of A75 Embankment

A location plan for the A75 embankment is shown in Figure 2-8.

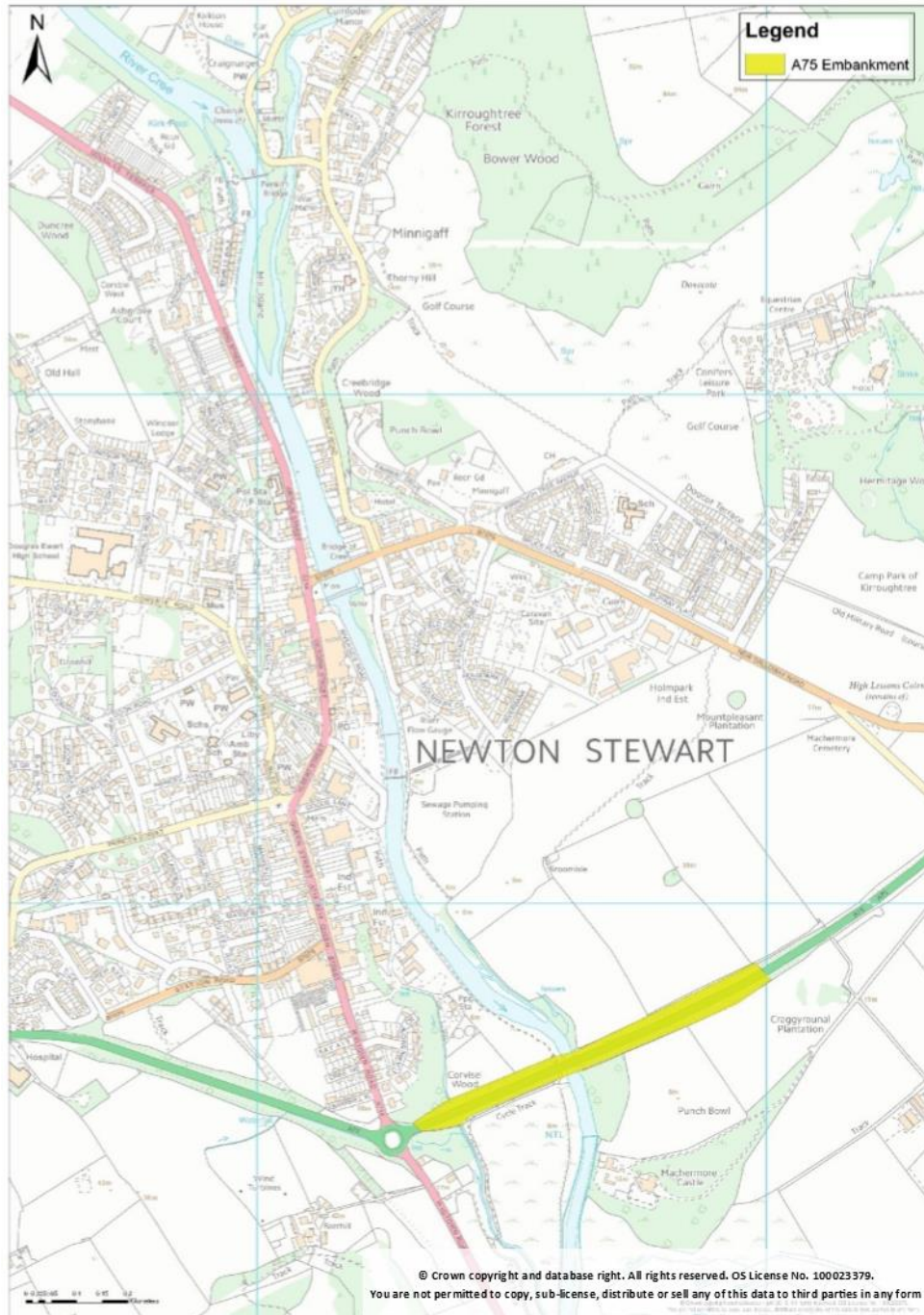


Figure 2-8 - A75 Embankment Location

2.9.1 Background

As highlighted in the background for Option 7, the A75 embankment was constructed on the floodplain of the River Cree and acts as a barrier to out-of-bank flow. This results in backing-up of flows from this location towards the town. While water does not back-up on the floodplain to inundate the town directly from here, the feature is likely responsible for raising water levels upstream through the river itself.

2.9.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-8. Scores for the option were low due to the high cost of embankment removal and associated disruption to the local traffic network. The overall score for this option placed it within those which scored the lowest (<40%).

Table 2-8 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
35%	21%	35%	84%	37%

2.9.3 Feedback from Stakeholders

Kaya Consulting carried out some modelling work on this idea, which was found not to have a significant impact on flood levels further upstream at the town. Locally, this lowers levels up to 1m – but this reduction effect decreases quickly moving upstream.

Antony Berretti (Community Council) noted that there were effects seen downstream of the bridge since the construction of the A75. This has been in the form of an altered sediment erosion/deposition regime.

2.9.4 Decision

Option to be and removed, and should not proceed to the short-list.. This was due to the high complexity and likely high cost of completely removing and replacing the embankment – and also the associated disruption to the town implementation of the option would likely cause.

2.10 Option 9: Increase A75 Flood Relief Culvert Size/Numbers

A location plan for the existing flood relief culverts beneath the A75 is shown in Figure 2-9.

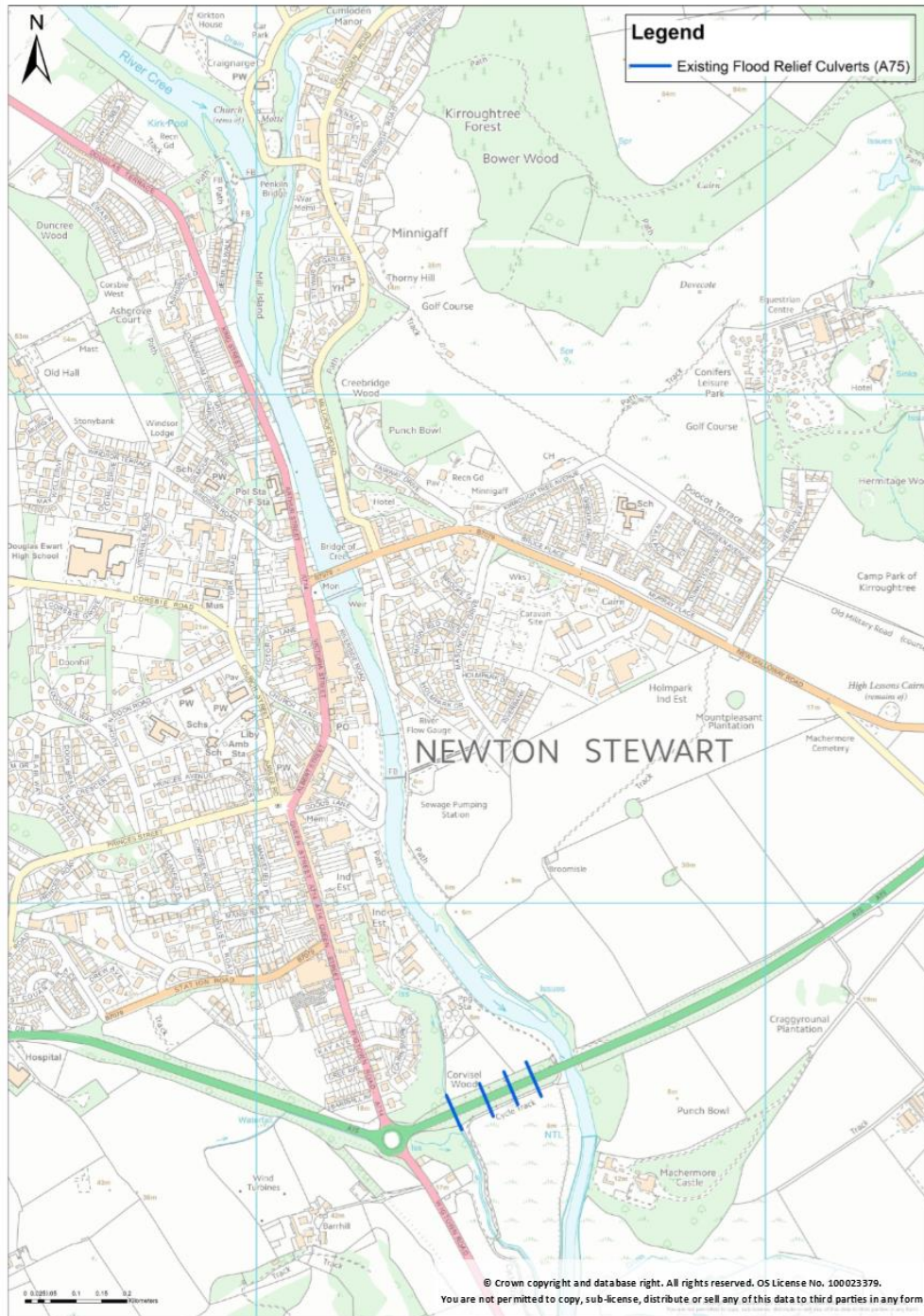


Figure 2-9 - Flood Relief Culverts Beneath A75

2.10.1 Background

Existing flood relief culverts are present beneath the A75 embankment, on the western bank of the river. These culverts are considered to be ineffective at present due to their condition and also due to poor drainage pathways towards them from the River Cree. Increasing the size and number of these culverts; and creating provision for water to efficiently reach and pass through them has been considered here.

2.10.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-9. Scores for the option were relatively high due to the low cost of providing culverts; although the effectiveness of this option would require further detailed modelling to be fully understood. The overall score for this option placed it approximately within the middle of all the considered options.

Table 2-9 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
55%	65%	45%	69%	59%

2.10.3 Feedback from Stakeholders

CVCC noted in a letter to DGC ahead of the VM1 meeting that either this option or option 7 should be taken into consideration as they feel the embankment effectively dams the natural floodplain.

Discussion at the VM1 meeting suggested that the current flood relief culvert system was not working well. It was considered that upgrading them, and finding improved flow paths was likely a useful low cost solution; although could not be considered alone.

2.10.4 Decision

This option is to be taken forward to the short-list for additional investigation. It was felt that this would at least contribute to lowering water levels at the town if implemented well. Further hydraulic modelling of this option is to be carried out following receipt of additional survey data to investigate its potential.

2.11 Option 10: Removal of Gravel Berm

A location plan of the gravel berm is shown in Figure 2-10.

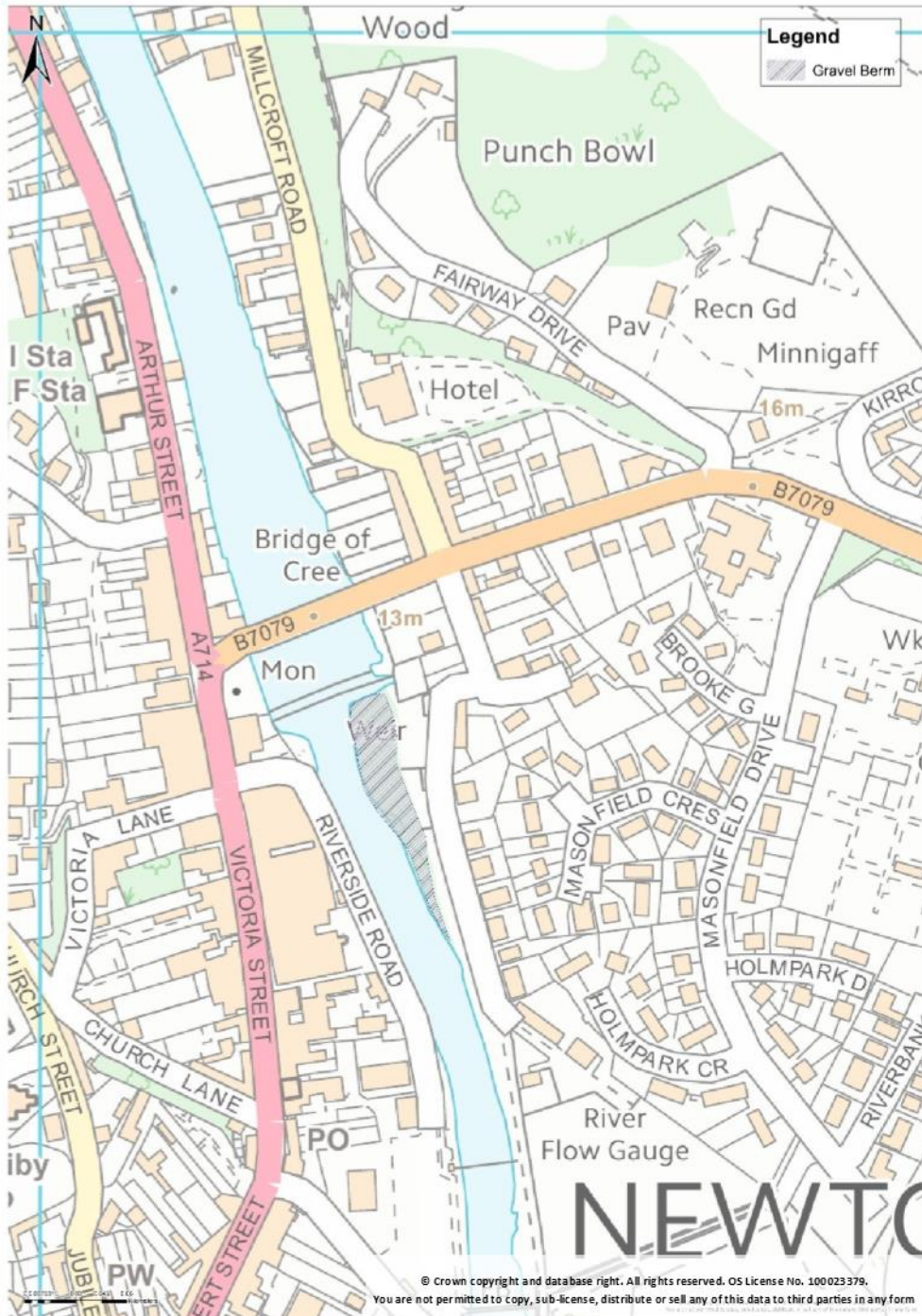


Figure 2-10 - Gravel Berm

2.11.1 Background

An area of high deposition exists immediately downstream of the in-line weir within the town centre. This has, over time, become an island that is now vegetated. There is local concern that this gravel berm exaggerates flood levels within the River Cree. Therefore, removal of the berm has been considered.

2.11.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-10. Scores for this option were relatively low resulting from the expected detriment to the local environment and also the small additional flow area provided through removal of this feature. The overall score for this option placed it within those which scored the lowest (<40%).

Table 2-10 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
33%	43%	28%	59%	59%

2.11.3 Feedback from Stakeholders

The CVCC representatives at the VM1 meeting commented on the strong feeling from the community that this berm should be removed. It is felt that there has been a substantial change in the height of the berm over time and this has contributed to flood risk. There are also a two further islands that are also thought, within the local community, to result in flow backing up throughout the town. This may be exacerbated by the presence of vegetation and trees, the growth of which is facilitated by the presence of the gravel berm. CVCC also noted a preference for this option in their letter to DGC ahead of the VM1 meeting, as they felt it pushes water over towards the western bank adding pressure to the wall at Riverside Road.

Kaya Consulting felt that, taking into account the hydraulics of the system as a whole, the impact of removing the gravel berm on flood risk would in fact be minimal. Reference is made to the initial modelling exercise that looked into this and found low impact following removal.

DGC felt that any removal of trees on the berm could result in a negative visual impact for those with properties on the east side of the river. They also noted that historical mapping has shown the berm to always be there.

SEPA noted that a CAR license would be required to remove this material from the river. Authorization for this would be possible, however monitoring of the build-up would be needed in the first instance and a benefit to flood risk would need to be demonstrated.

Given that modelling shows that removal of the gravel berm and associated vegetation has very little impact upon flood risk, DGC would not consider its removal is merited with respect to duties imposed by Section 18 of the Flood Risk Management (Scotland) Act 2009. In

other words the gravel island removal is not considered to substantially reduce the risk of flooding.

2.11.4 Decision

Option to be removed, and this should not proceed to the short-list. This was due to the very low impact that berm removal would have on predicted flood levels within the town, already shown through initial modelling by Kaya Consulting.

An agreement was reached between CVCC and DGC to look at other maintenance issues surrounding the gravel berm and vegetation growth thereupon; however this was agreed to be carried out separate to discussions regarding the flood protection scheme.

2.12 Option 11: Removal of In-Line Weir (Town Centre)

A location plan for the in-line weir is shown in Figure 2-11.

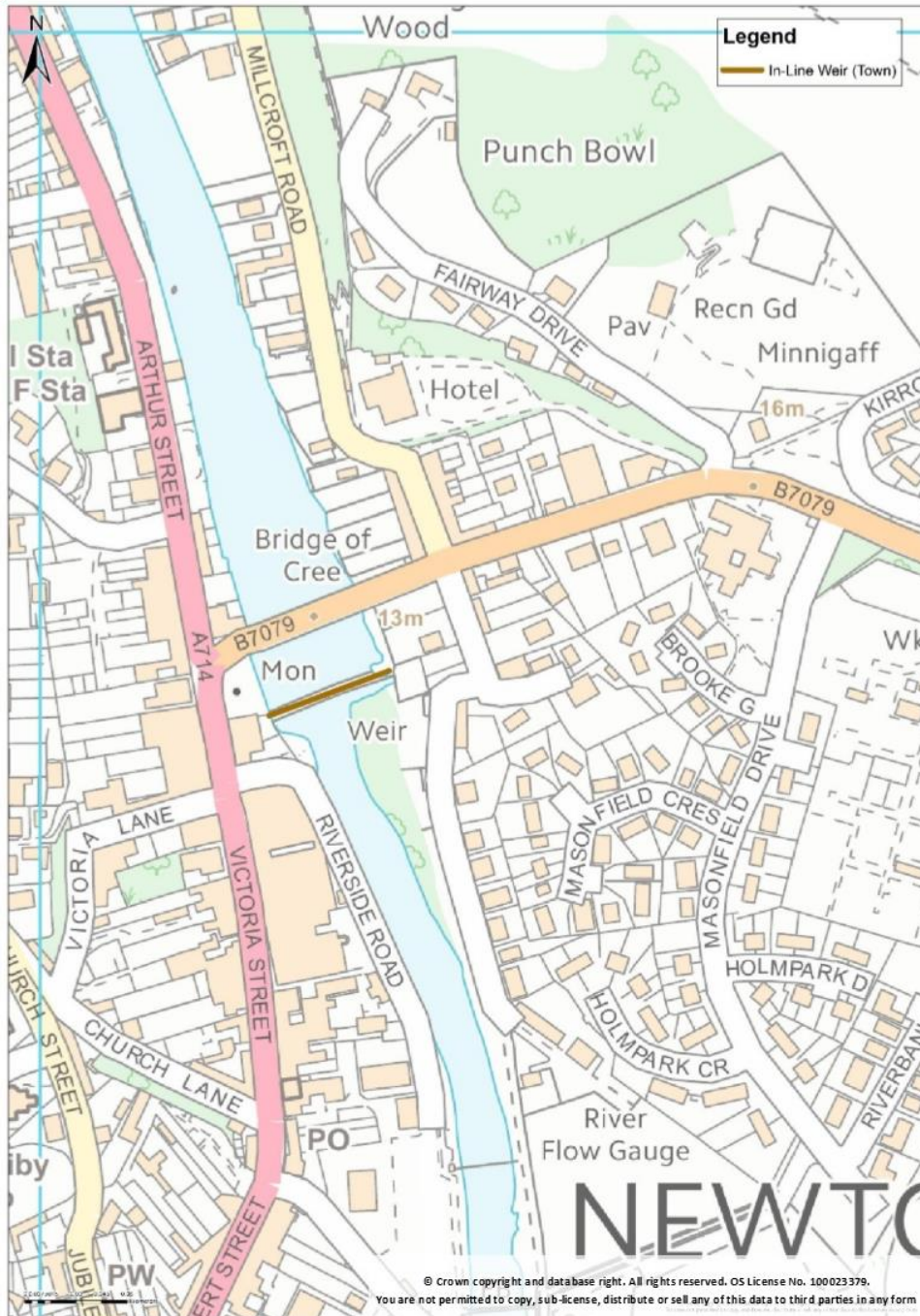


Figure 2-11 - In-Line Weir Location

2.12.1 Background

An in-line weir exists within the town centre, situated between the Cree Bridge and the gravel berm. This weir raises water levels upstream, and is also responsible for the high deposition rate locally. Consideration has been made of the possibility that flood levels may reduce if the weir were to be removed.

2.12.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-11. Scores for this option were relatively low resulting from the expected detriment to the local environment and also the additional consideration of the Cree Bridge upstream, which would be subject to additional flow velocities in the event of weir removal. The overall score for this option placed it within those which scored the lowest (<40%).

Table 2-11 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
16%	41%	23%	59%	32%

2.12.3 Feedback from Stakeholders

Kaya Consulting carried out some hydraulic modelling on this option ahead of the VM1 meeting, and stated that this option reduced flood levels by approximately 400mm locally.

There was local concern that the weir was causing a build-up of gravel and DGC commented that this build-up is being monitored.

2.12.4 Decision

Option to be and removed and should not proceed to the short-list. This was a result of concerns for the structure upstream (due to scour) and also the minimal impact demonstrated via Kaya Consulting modelling.

2.13 Option 12: Removal of In-Line Weir (Upstream of Town)

A location plan for the upstream weir is shown in Figure 2-11.

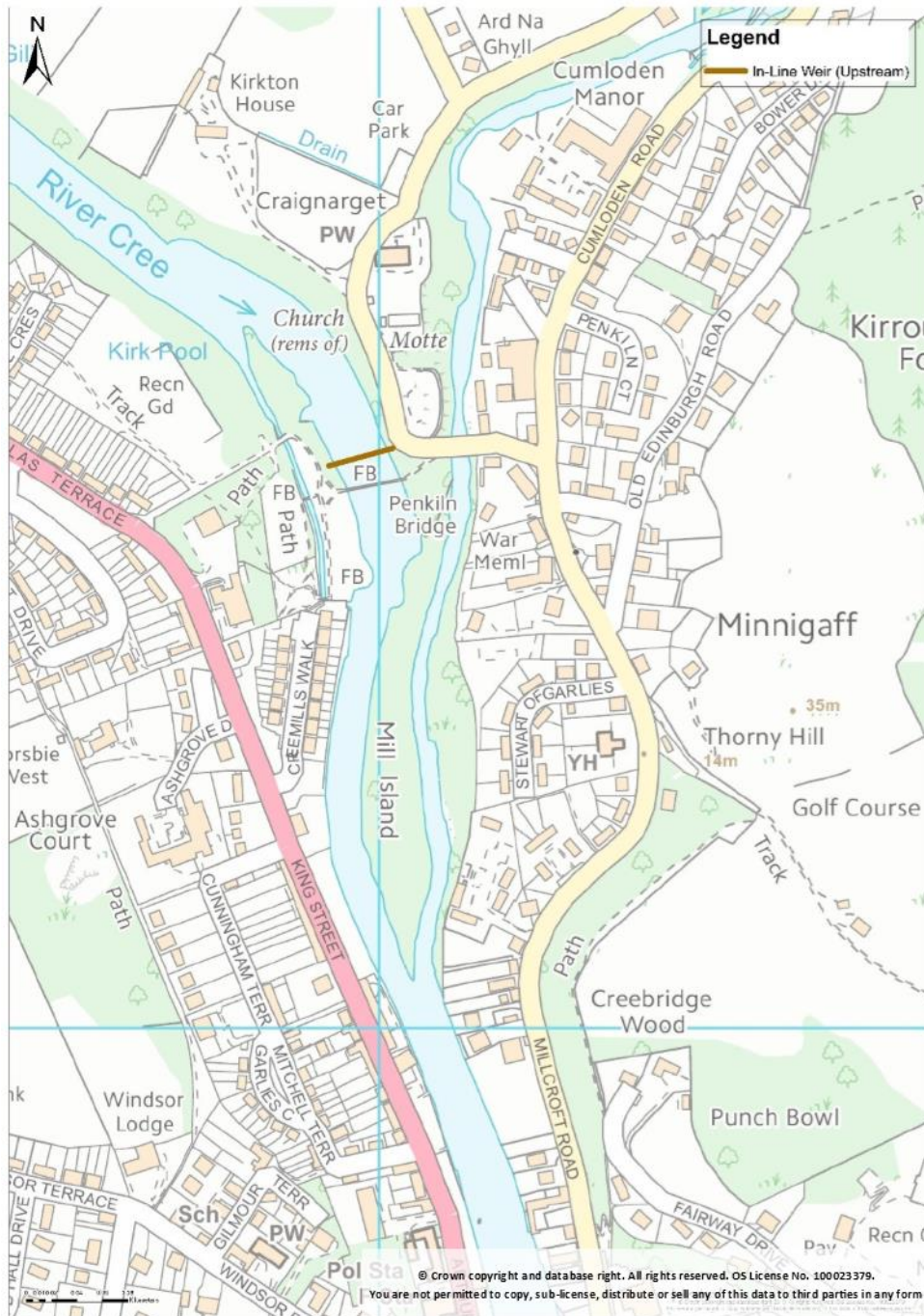


Figure 2-12 - Upstream Weir Location

2.13.1 Background

A weir (or part thereof) is suspected to exist just upstream of the town, as part of the former mill operations nearby. Similarly to Option 11, it may be that removal of this weir could reduce water levels locally.

2.13.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-12. This option has failed due to the consideration that, if present, the weir is likely holding water back away from the town and any attempts to remove the weir are likely to result in the opposite effect.

Table 2-12 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
FAIL	FAIL	23%	59%	FAIL

2.13.3 Feedback from Stakeholders

Galloway Fisheries noted that there are, in fact, a series of weirs at this location and that the lowest one has already been completely removed.

Further discussion at the VM1 meeting found that there are still two small weirs at this location, although the conclusion was reached that as they hold water back there would be no benefit to their removal.

2.13.4 Decision

Option to be removed and should not proceed to the short-list. This was due to the fact that removal of any obstructions upstream of the town would, likely, result in increased flood risk rather than alleviating the issue.

2.14 Option 13: Reconnect Penkiln Burn and River Cree Upstream

A location plan showing the possible reconnection route is shown in Figure 2-13.

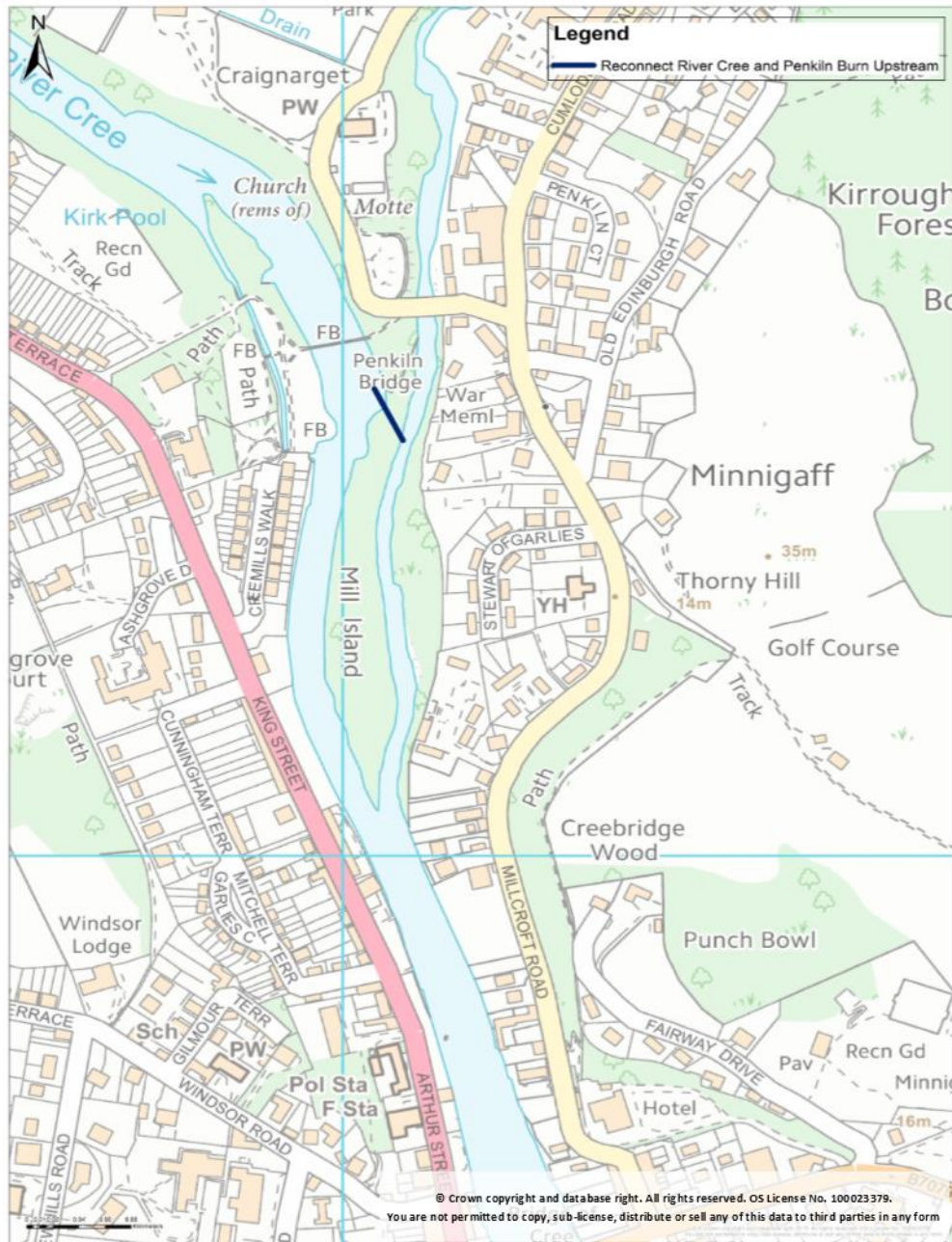


Figure 2-13 - Possible Reconnection of Watercourses

2.14.1 Background

Historical mapping shows the River Cree linked to the Penkiln Burn at a location further upstream than is presently the case. It is suspected that either deposition, or modification to accommodate nearby mill activities has resulted in this link being lost and Mill Island being rejoined to the land.

2.14.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-13. This option has scored very low on technical and economic aspects due to the likelihood that this option will not reduce flood levels within the town as flow will still be directed towards the current flood risk areas, albeit via a different route. There were also significant environmental concerns regarding excavation to accommodate this option. Therefore, this option has failed on these reasons.

Table 2-13 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
FAIL	21%	18%	41%	FAIL

2.14.3 Feedback from Stakeholders

General consensus at the VM1 meeting was that this option was not feasible.

2.14.4 Decision

Option to be removed and should not proceed to the short-list. This was because any reconnection would simply route water towards the town via a different channel, thus having no effect on flood alleviation. Note that at present, during high flows water does spill from the River Cree to the Penkiln Burn via the line shown on Figure 2-13.

2.15 Option 14: Remove Mill Island

A location plan for Mill Island is shown in Figure 2-14.

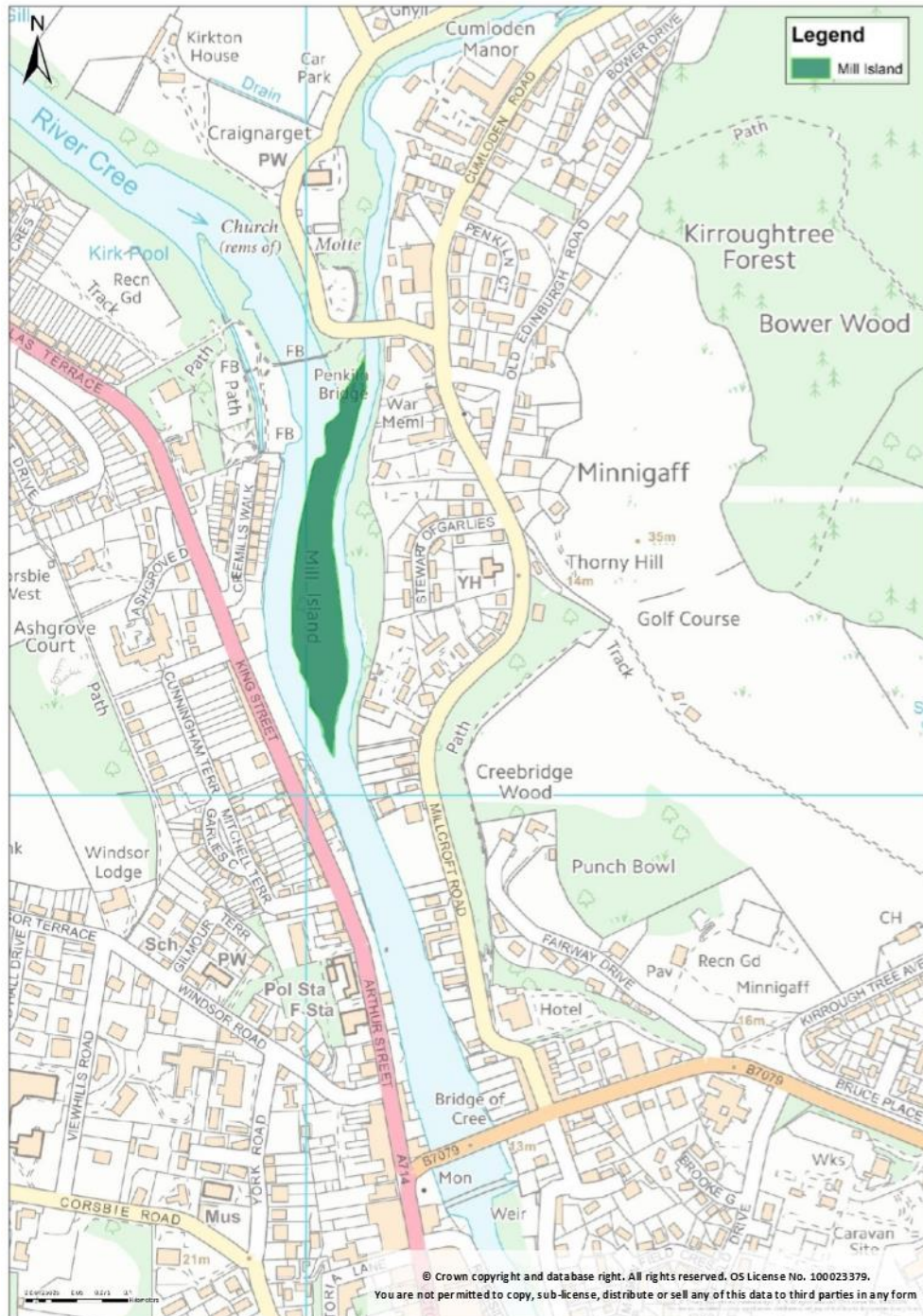


Figure 2-14 - Mill Island

2.15.1 Background

Mill Island exists between the River Cree and Penkiln Burn, at the upstream of the town. Removal of this island would create a wider channel at the confluence point between the two watercourses and may result in increased conveyance locally resulting in reduced likelihood of out-of-bank flow occurring here.

2.15.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-14. Similarly to Option 13, which is at a nearby location, the environmental impact of this option is considered to be negative. Furthermore, the impact on flood levels throughout the town as a whole is thought to be low as the funnelling effect created through removal of the island would cause out-of-bank flow at a location further downstream. There were also significant environmental concerns regarding excavation to accommodate this option. This option has failed for these reasons.

Table 2-14 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
FAIL	46%	25%	59%	FAIL

2.15.3 Feedback from Stakeholders

General consensus at the VM1 meeting was that this option was not feasible.

2.15.4 Decision

Option to be removed and should not proceed to the short-list. This was due to the fact that removal of the island may have a local effect in that specific area, but the funnelling effect downstream was not likely to yield any improvement to flood levels within the town itself.

2.16 Option 15: Remove Sediment Around Key Structures

A location plan of key structures is shown in Figure 2-15.

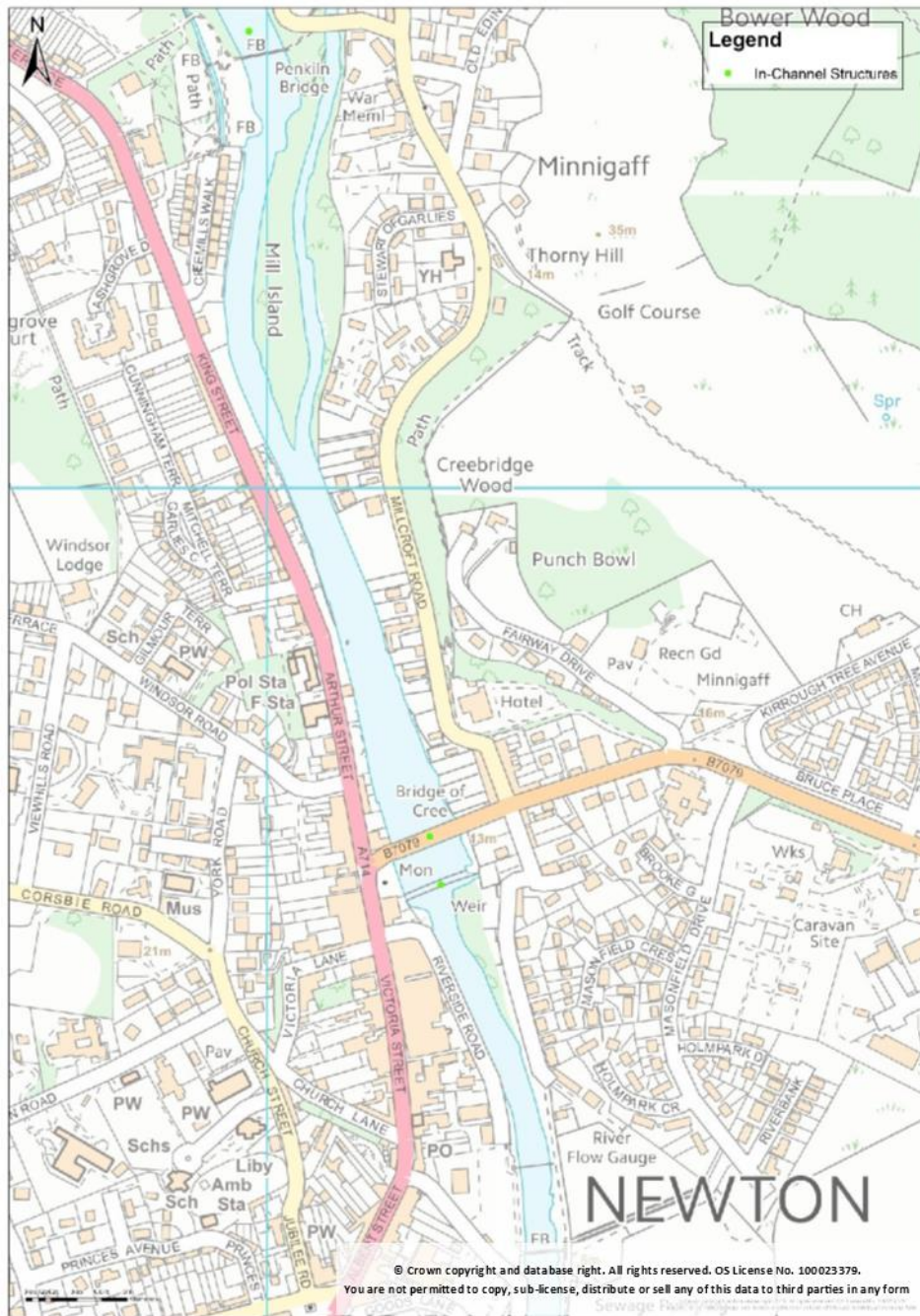


Figure 2-15 - In-Channel Structures

2.16.1 Background

As highlighted in previous options, the volume of sediment deposition in the River Cree locally is high. This is particularly prevalent around the Cree Bridge and weir within the town centre. Excessive build-up can increase water levels during some return period events and as such consideration has been taken of the possibility to remove this build-up at key structures. Note this option is regarding removal of excessive sediment deposits at structures, distinct from dredging.

2.16.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-15. Similarly to Option 13, which is at a nearby location, the environmental impact of this option is considered to be negative. Furthermore, the impact on flood levels throughout the town as a whole is thought to be low as the funnelling effect created through removal of the island would cause out-of-bank flow at a location further downstream. There were also significant environmental concerns regarding excavation to accommodate this option. The overall score for this option placed it approximately within the middle of all the considered options.

Table 2-15 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
35%	56%	33%	38%	42%

2.16.3 Feedback from Stakeholders

CVCC noted in their letter to DGC ahead of the VM1 meeting that they felt it would be valuable to remove the stone deposits within this area.

There were local concerns that sediment build-up was resulting in greater force on the Cree Bridge from flow during times of flood. DGC commented that their assessment found the bridge unlikely to fail via this mechanism. General consensus found that, in terms of the flood protection scheme, this would have minimal benefit.

2.16.4 Decision

Option to be and removed and should not proceed to the short-list. This was due to the fact that small deposits in this area are unlikely to have a significant effect on reduction of flood risk if removed, and furthermore that their presence did not pose any additional risk to the structures themselves.

2.17 Option 16: Divert Penkiln Burn

A plan indicating a potential diversion route is shown in Figure 2-16.



Figure 2-16 - Potential Diversion Route, Penkiln Burn

2.17.1 Background

The topography of the land to the north-east of the town itself accommodate the possibility for a diversion channel to re-route the Penkiln Burn (or significant flows from) around the north of the town; rejoining the River Cree downstream of the A75 crossing. This would take water out of the system and away from the areas of the town which flood.

2.17.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-16. This option, overall would be high cost and highly disruptive to the local environment and residents – hence, the low scores on economic, environmental and social. The overall score for this option placed it within those which scored the lowest (<40%).

Table 2-16 -Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
40%	25%	20%	19%	29%

2.17.3 Feedback from Stakeholders

Consensus reached at the VM1 meeting was that this was likely to be an option that could cause a lot of environmental and landowner based issues. Furthermore, this would only divert the flows from the Penkiln Burn, which account for approximately 15% of the flow towards the town; thus expected impact would be minimal.

2.17.4 Decision

Option to be removed, and this should not proceed to the short-list. This was due to the significant scale of the works required, that would be highly costly and disruptive; as well as low likelihood of being constructed within a reasonable timeframe. Furthermore, the relatively low flows passing through the town from the Penkiln Burn compared to the River Cree mean that any impact from such a scheme would be minimal.

2.18 Option 17: Dredging of River

A plan showing the area of river over which dredging could take place is shown in Figure 2-17.

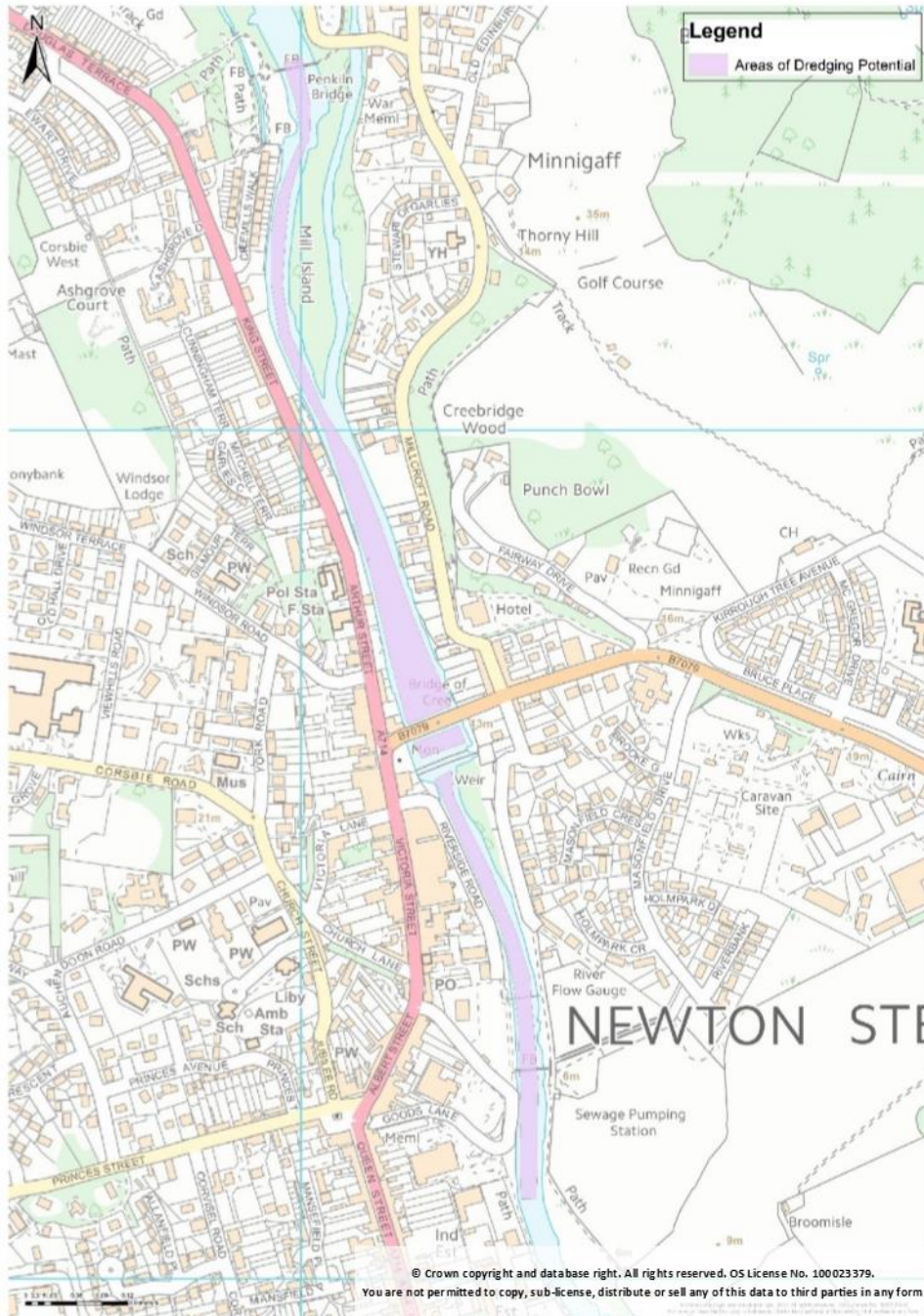


Figure 2-17 - Areas of Dredging Potential

2.18.1 Background

Dredging is the process whereby river bed levels are excavated in order to provide greater conveyance area for the flow; hence increasing the capacity of the river. The dredging process comes at a cost of being a temporary measure, and produces the requirement for the watercourse to be dredged at regular intervals in the future to continue to provide the same standard of flood protection.

2.18.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-17. This option fails the assessment as SEPA guidelines require other options, less damaging to the environment, to be considered ahead of dredging. As a high number of other options are available, the likelihood of gaining authorization to dredge is considered to be very low. As a result of this, the option has failed.

Table 2-17 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
36%	56%	FAIL	69%	FAIL

2.18.3 Feedback from Stakeholders

SEPA noted that a CAR license would be required. Authorization for this would necessitate the provision of a sediment management plan such as to show the dredging as a regular occurrence in the future. Therefore, as a whole life cost this option was considered to be unsustainable.

Further discussion at the VM1 meeting came to the conclusion that a long section of the river would need to be dredged, and this could also have negative implications on the stability of structures.

2.18.4 Decision

Option to be removed and should not proceed to the short-list. This was because initial modelling by Kaya Consulting suggested removal of material from the bed would have minimal impact; and furthermore the operation would require to be carried out at regular intervals throughout the future. Additionally, there were concerns regarding structures along the watercourse, particularly the Cree Bridge, and the effects that any dredging would have on them.

2.19 Option 18: Disconnect Former Mill Lade

A location plan denoting the former mill lade is shown in Figure 2-18.

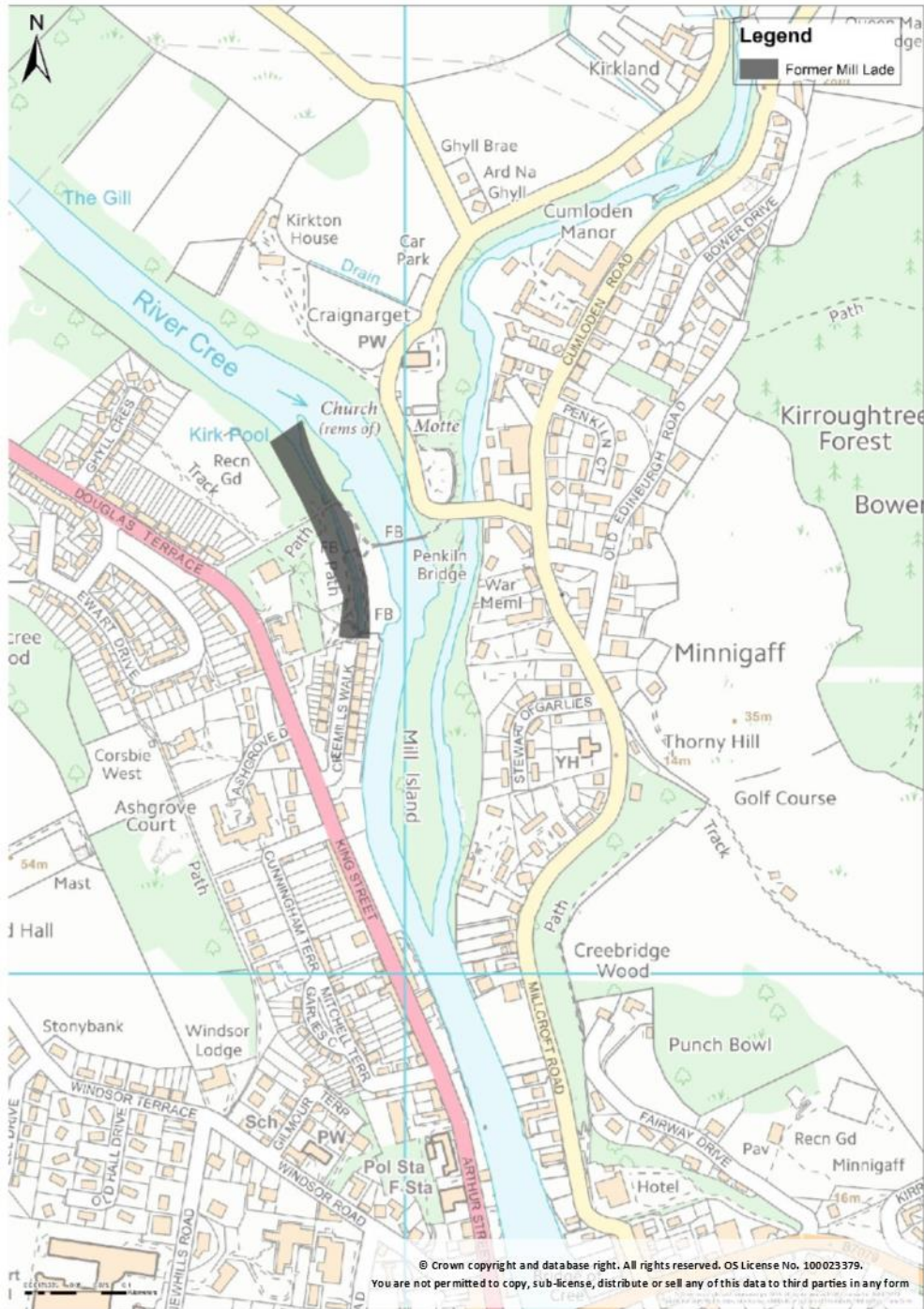


Figure 2-18 - Former Mill Lade

2.19.1 Background

A former mill lade is present at the upstream end of the town, and has been shown to channel flows towards receptors from the River Cree. Disconnection of this mill lade would reduce risk in this area.

2.19.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-18. This option fails the assessment as recent development within the area has already created a barrier between the mill lade and residential receptors, constructed to the 1:200 year return period standard in line with Scottish Planning Policy. Therefore, a high level technical assessment fails as no additional flood protection is gained through this option and as such this option has failed.

Table 2-18 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
FAIL	50%	48%	53%	FAIL

2.19.3 Feedback from Stakeholders

Feedback from CVCC was that a new development was constructed here recently that has alleviated flooding in the local area. This new development has already shown itself to be resilient to out-of-bank flow events.

2.19.4 Decision

Option to be removed and should not proceed to the short-list. This was because discussions found that a solution has already been implemented within this area, hence no further work would be needed.

2.20 Option 19: Re-profile Land at Broomisle

A location plan of land at Broomisle that could be re-profiled is shown in Figure 2-19.

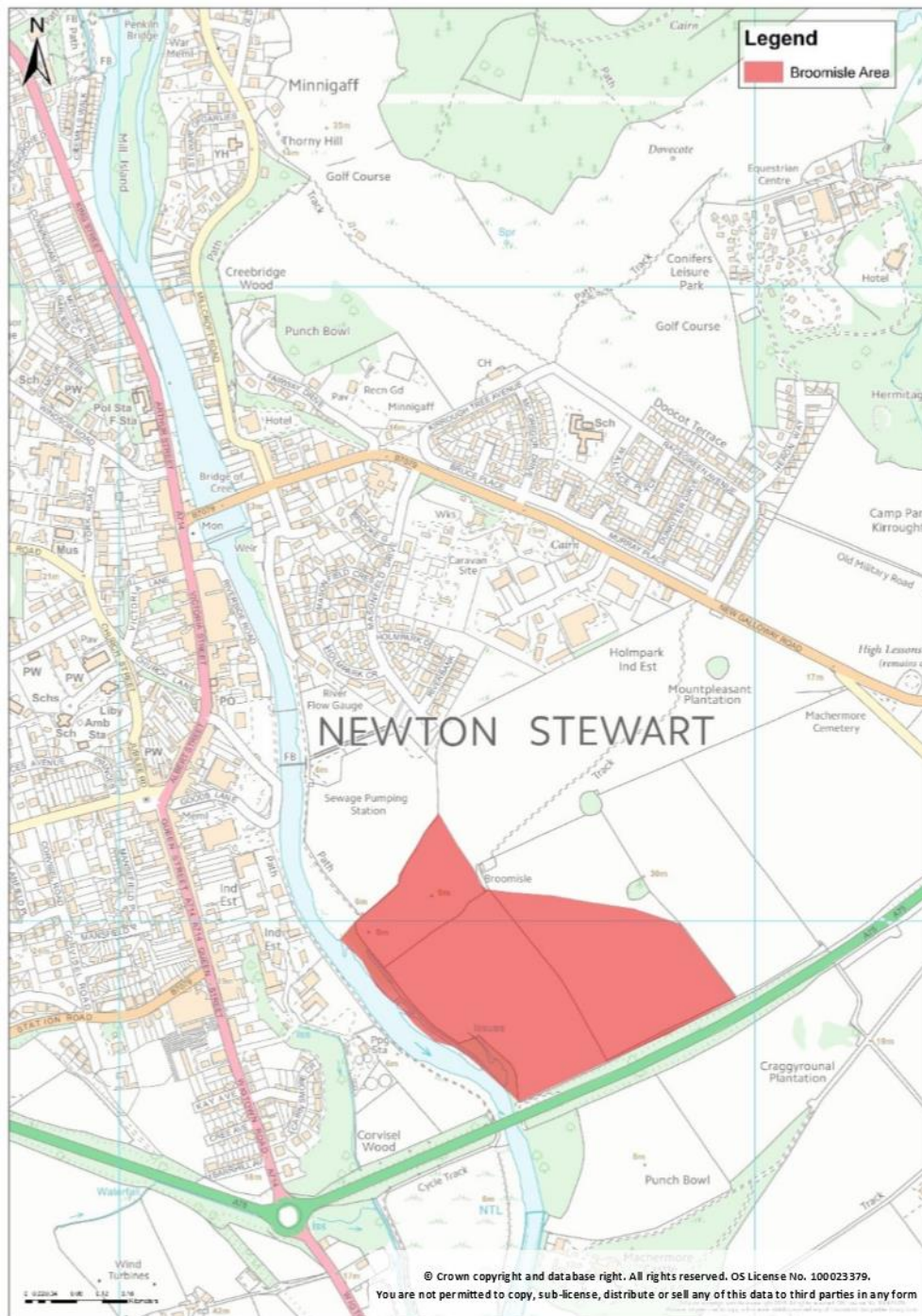


Figure 2-19 - Broomisle Area

2.20.1 Background

Downstream of the town, land at Broomisle has been identified from initial hydraulic modelling not to be inundated during extreme flood events. Re-profiling of this land to create a flood storage area may have an impact on flood levels locally. This option can also be combined with amenity benefit, such as the creation of a new wetland/parkland area.

2.20.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-19. This is a straightforward solution to implement, and therefore scores highly on technical. In light of the high volumes of water needed to be stored, it is unlikely that this option could exist alone and as such the economic score is low. The overall score for this option placed it within those which scored the highest (>60%).

Table 2-19 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
89%	46%	51%	56%	63%

2.20.3 Feedback from Stakeholders

CVCC noted in their letter to DGC ahead of the VM1 meeting that increasing access to additional areas of floodplain from the river is an important issue (suggesting support for this option). No specific further feedback was gained at the VM1 meeting itself, but the general consensus was that this area was worth looking into in more detail.

2.20.4 Decision

This option is to be taken forward to the short-list for additional investigation. The reason for this is that additional survey data is needed to fully understand the potential benefits here. Kaya Consulting will carry out further modelling of this option once the survey data has been returned.

2.21 Option 20: Reinstate Flood Storage Area at Water of Minnoch

This option utilises the concept of attenuating flow in the upper catchment prior to reaching the town, with a location plan shown in Figure 2-20.

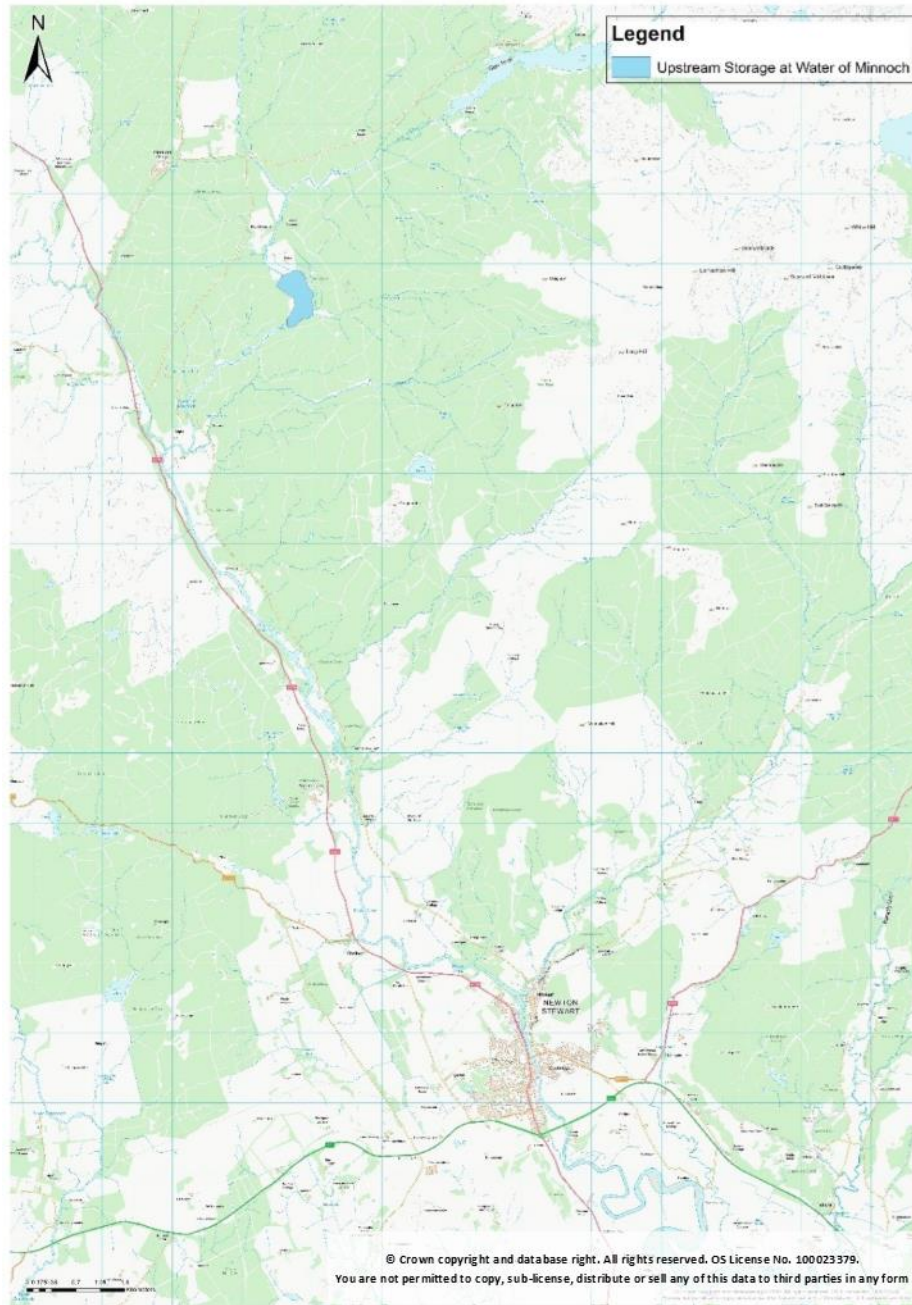


Figure 2-20 - Upstream Storage at Water of Minnoch

2.21.1 Background

A former flood storage area exists upstream at the Water of Minnoch, with local people commenting that there used to be bunds present to store water. This would act similarly to the upstream storage areas described in Options 1-3; and would be an on-line feature. This is within Forestry Commission owned land.

2.21.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-20. This option is technically complicated due to poor access to the area, and economically scores minimally due to the low volume of water expected to be stored here. The overall score for this option placed it within those which scored the lowest (<40%).

Table 2-20 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
27%	15%	40%	88%	34%

2.21.3 Feedback from Stakeholders

CVCC noted in their letter to DGC ahead of the VM1 meeting that they believe there may be substantial opportunities in the upper catchment for storage of water.

Kaya Consulting notes that assessment in this area may be difficult due to the lack of LiDAR data. Forestry Commission Scotland have noted that they have ground level data that could be provided for any assessment here.

2.21.4 Decision

This option is to be taken forward to the short-list for additional investigation. Kaya Consulting have stated that modelling could be carried out using OS data as LiDAR is not available in the area, and a high level appraisal of the option will be carried out in this way.

2.22 Option 21: Upstream Storage at The Ghyll

This option utilises the concept of attenuating flow in the upper catchment prior to reaching the town, with a location plan shown in Figure 2-21.

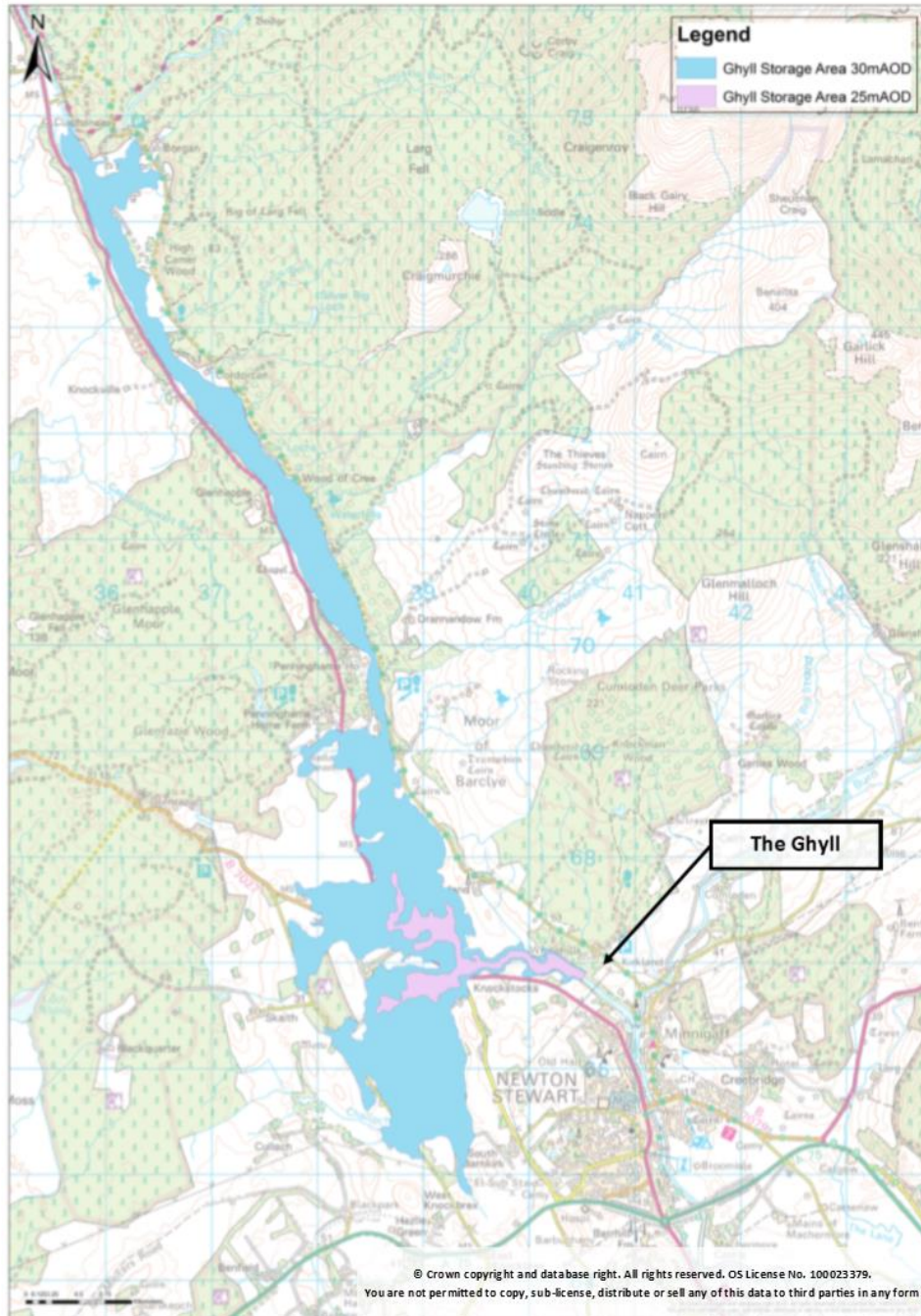


Figure 2-21 - The Ghyll Storage Area

50 (60)

NEWTON STEWART FLOOD PROTECTION SCHEME
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2.22.1 Background

A deep valley in an area known as The Ghyll has been reported by local people as having the potential to store a large volume of water. This is located just upstream of the town, and hence would capture much of the Cree catchment area prior to reaching Newton Stewart. This would be an on-line storage area.

2.22.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-21. Technically, this option receives a lower score due to the complexity of working in the valley. Economically, a high volume of water can be stored here (hence, high standard of protection) but the scheme cost would be high. The overall score for this option placed it approximately within the middle of all the considered options.

Table 2-21 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
39%	40%	49%	78%	47%

2.22.3 Feedback from Stakeholders

CVCC commented that this was a steep valley and that they believe a large volume of storage could be held here.

Galloway Fisheries and SEPA re-iterated their concerns about on-line storage areas.

2.22.4 Decision

This option is to be taken forward to the short-list for additional investigation. Kaya Consulting will carry out a high-level modelling exercise to investigate the potential for this option.

2.23 Option 22: Upstream Storage in River Cree Tributaries

This option utilises the concept of attenuating flow in the upper catchment prior to reaching the town, with a location plan shown in Figure 2-22.

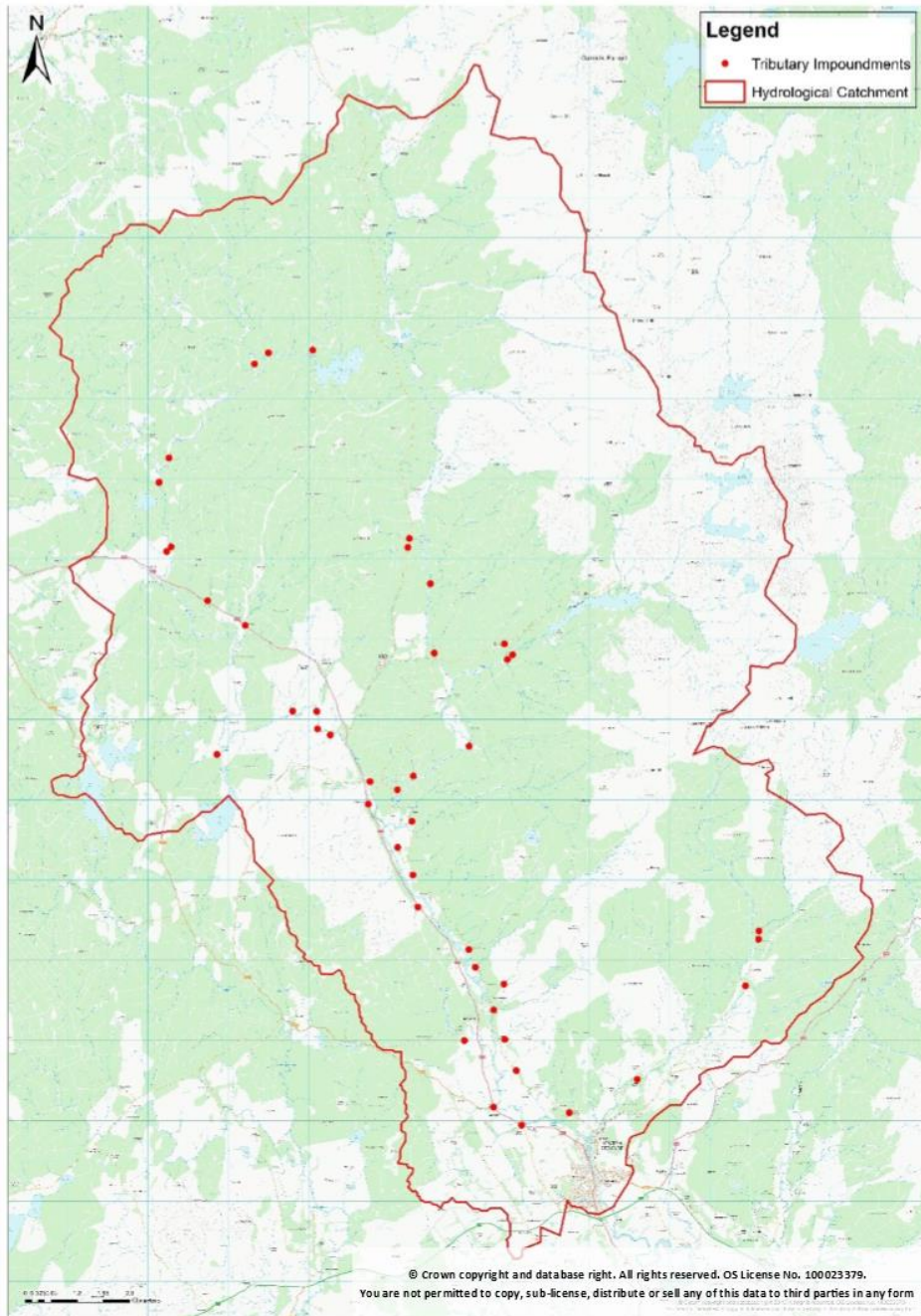


Figure 2-22 - Potential Tributary Impoundments

2.23.1 Background

There are a high number of small tributaries that flow into the River Cree. Many of these exist along far upstream of the town, and it was suggested by the local community that holding back water within these tributaries before it reached the Cree itself may have an impact on flood risk. An initial, high level assessment of this option has shown that small scale interventions on 44 tributaries would likely achieve the desired effect.

2.23.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-22. Technically, this option is highly complex and would likely take a long time to implement due to the number of individual sites needed. Economically, a high volume of water can be stored overall, but the scheme cost would be high. The overall score for this option placed it within those which scored the lowest (<40%).

Table 2-22 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
35%	22%	40%	38%	32%

2.23.3 Feedback from Stakeholders

Forestry Commission Scotland were happy to assist with any flood alleviation projects. They did, however, state concerns over the possibility that impounding structures would be created that may leave them with additional responsibilities under the Reservoirs Act – which they would not be able to undertake.

SEPA noted that each individual catchment would have its own characteristics and these would need to be taken into account in any further assessment of this option.

CVCC asked if NFM could be implemented in some locations rather than hard engineering structures.

Consensus was reached at the VM1 meeting that 44 locations would be impractical, but that a small number of locations for NFM could be looked at which may be beneficial at low return period events.

2.23.4 Decision

This option is to be taken forward to the short-list for additional investigation. Only some locations will be considered, however, as it was concluded that 44 individual interventions would not meet the timescales required for the completion of the flood protection scheme. A high level assessment on some of the storage areas will be carried out via modelling from Kaya Consulting. Impacts of synchronisation must also be considered.

2.24 Option 23: Mitigation of Forest Management

This option involves NFM features within the forested areas, which can be seen on Figure 2-23 as the areas of green:

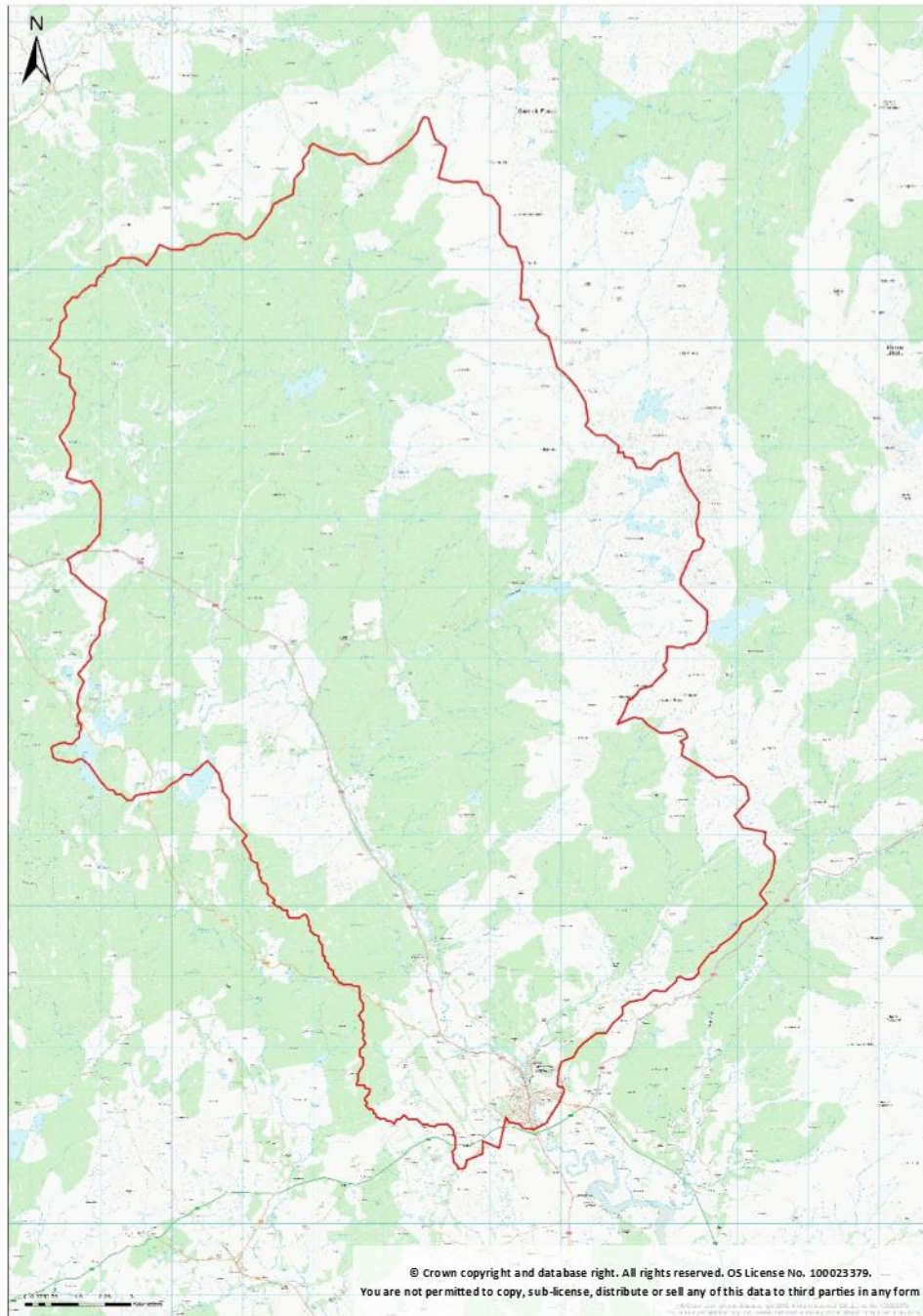


Figure 2-23 - Hydrological Catchment and Forestry

2.24.1 Background

Forest management techniques over both short and long term have been perceived to increase rates of runoff in the upper catchment to the River Cree and its tributaries. It has been suggested by the local community that forms of natural flood management (NFM) in the upper catchment within the forest areas could help alleviate the situation.

2.24.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-23. Both technically and economically this option scores low due to the minimal reduction in flow that these techniques are likely to achieve. It is noted, however, that the presence of NFM techniques score highly within the environment and social categories making them desirable for local people and visitors to the forest. The overall score for this option placed it within those which scored the lowest (<40%).

Table 2-23 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
23%	25%	66%	78%	39%

2.24.3 Feedback from Stakeholders

Forestry Commission Scotland noted that the current forestry management practises are in line with NFM practises and that their work actively alleviates flooding. They believe that there is nothing further or additional that could be done, and would be happy to discuss their management plans to show that is currently being undertaken.

CVCC would prefer to see water held back within the upper catchment area, but SEPA noted that flood related benefits generally only exist in areas close to where an NFM intervention is located.

2.24.4 Decision

It was concluded at the close of discussions on this option at the VM1 meeting that the direction of travel here was similar to that of option 22. As such, it was decided to merge this option with option 22.

2.25 Option 24: Re-profile Land Around Pumping Station

A location plan showing the raised area at and around the pumping station is provided in Figure 2-24.

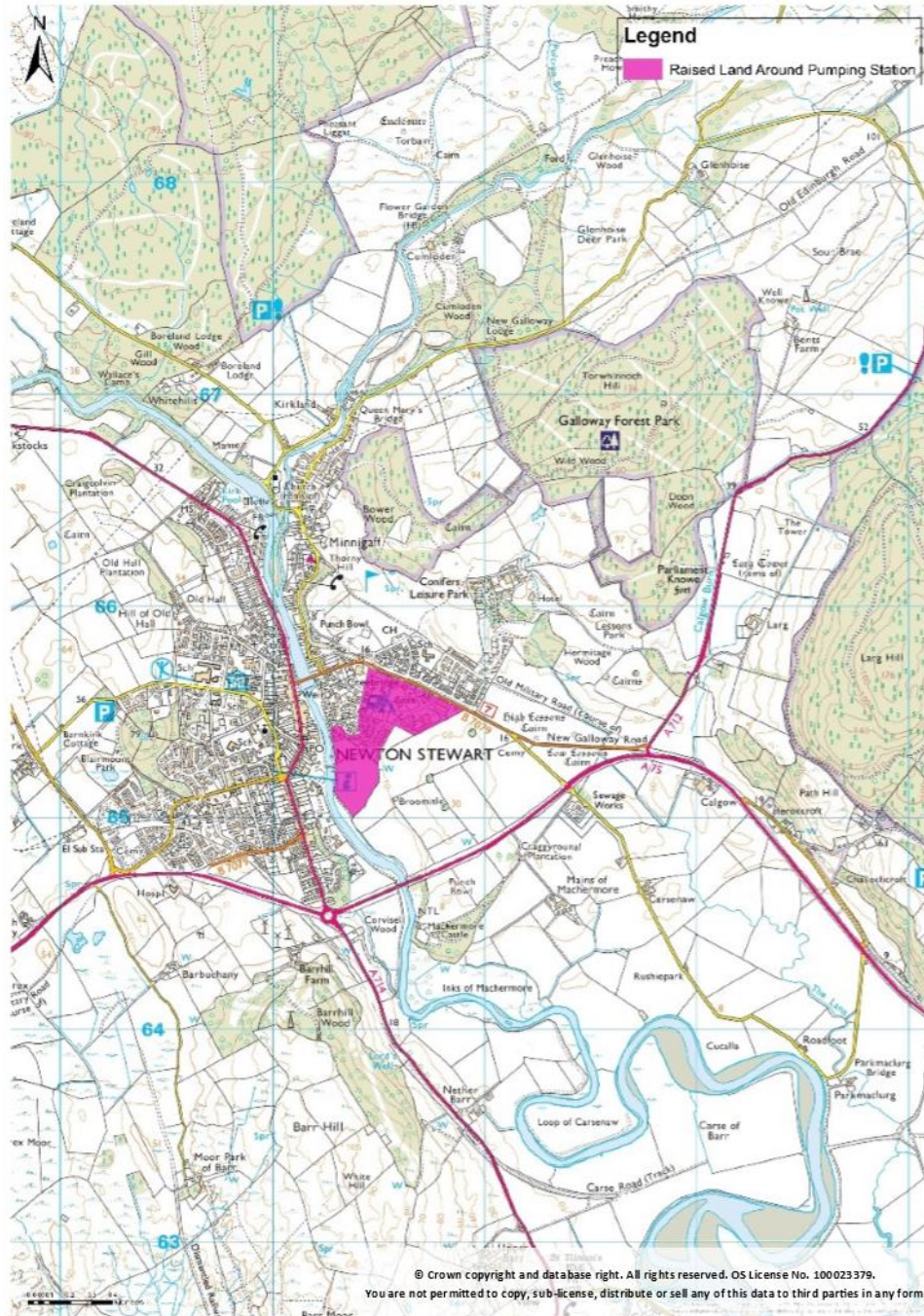


Figure 2-24 - Land Around Pumping Station

56 (60)

NEWTON STEWART FLOOD PROTECTION SCHEME
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118908/VM

2.25.1 Background

It has been reported that the presence of the pumping station on the east side of the river Cree, at the furthest downstream extent of the town has exacerbated the risk of flooding. Multiple reports cite flooding having been worse since the construction of this pumping station on land which has been raised above the flood level. Further investigation has found that additionally, residential properties were also built near this pumping station on land raised to the same level. Re-profiling of land in this area to restore the floodplain is considered within this option.

2.25.2 Multicriteria Assessment

The outcomes from the Multicriteria assessment for this option are provided in Table 2-24. Economically, this option scores very low due to the likely requirement to move properties and other facilities to other locations. Further impact resulting from these likely relocation requirements are that the score for social make the option a poor choice in terms of public perception. The overall score for this option placed it within those which scored the lowest (<40%).

Table 2-24 - Multicriteria Assessment Scores

Technical	Economic	Environmental	Social	Overall Score
44%	22%	53%	25%	35%

2.25.3 Feedback from Stakeholders

CVCC and elected members noted that the bund around the pumping station has resulted in noticeable increased flood levels since its construction.

DGC stated that it was not possible for the pumping station to be removed.

2.25.4 Decision

This option is to be taken forward to the short-list for additional investigation. The conclusion reached is that this option should be investigated further when the additional survey data is obtained as re-profiling in the local area may be of some benefit. Following receipt of additional survey data, Kaya Consulting will carry out further modelling to quantify how beneficial re-profiling may be here.

2.26 VM1 Summary and Conclusions

The following options have been taken forward for further assessment:

- Option 2 – Upstream storage at Linloskin Bridge
- Option 4 – Obstructions on River Cree
- Option 6 – Construction of Direct Defences
- Option 7 – Increase Flow Area Beneath A75 Bridge
- Option 9 – Increase A75 Flood Relief Culvert Size/Number
- Option 19 – Re-profile Land at Broomisle
- Option 20 – Reinstate Flood Storage Area at Water of Minnoch
- Option 21 – Upstream Storage Area at The Ghyll
- Option 22 – Upstream Storage in River Cree Tributaries
- Option 24 – Re-profile Land Around Pumping Station

The following upstream storage options are to be modelled at the following return periods: 1 in 2, 5, 10, 25, 50, 100, 200 and 500 year. These will be carried out ahead of the additional survey return to provide a high level assessment of the associated option feasibility:

- Storage at Linloskin Bridge (Option 2)
- Upstream obstruction in River Cree (Option 4)
- Upstream storage in Water of Minnoch (Option 20)
- Upstream storage at The Ghyll (Option 21)
- Upstream storage in *selected* tributaries (Option 22)

The following modelling exercises will be carried out after receipt of additional survey data:

- Construction of Direct Defences (Option 6)
- Assessment of increasing flow area beneath the A75 bridge (Option 7)
- Increasing size of A75 flood relief culverts (Option 9)
- Reprofiling of land at Broomisle (Option 19)
- Reprofiling of land around pumping station (Option 24)

Following this modelling there will be further civil engineering design and technical and environmental assessment of the options including a high level costing exercise.

3 Short-List Options

Assessment of options on the short-list will take place between the VM1 and VM2 meetings. Conclusions and associated discussions relating to the short-list will be reported following the VM2 meeting.

4 Selected Options

Detailed assessment of the selected options will take place between the VM2 and VM3 meetings. Conclusions and associated discussions relating to the selected option(s) will be reported following the VM3 meeting.