



**Glenmosston Flood Protection Scheme
2021**

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1 Introduction

The Glenmosston Burn flows through Glen Moss Wildlife Reserve before flowing through the urban parts of the village of Kilmacolm and discharging into the River Gryffe further west.

1.1 Project Priority

There is a history of flooding from the burn, particularly in the Market Place and Smithy Brae areas of Kilmacolm. Studies of the burn undertaken previously indicated that the channel though the village is largely under capacity and incapable of conveying the estimated 200 year flow. This causes flooding along Gillburn Road, Market Place and Smithy Brae areas.

The scheme lies within the potentially vulnerable areas 11/21c as identified by the National Flood Risk Assessment.

2 Previous Flood Protection Work

No previous flood protection work has been carried out.

3 Flood Protection Scheme

In order to mitigate such flooding risk, Inverclyde Council commissioned a study to assess the potential for additional flood storage within Glen Moss Wildlife Reserve, which is located in the upper part of the burn. At present, the upper part of the Glenmosston Burn flows through the wildlife reserve, with flow out of the reserve site being controlled by a partially dilapidated sluice gate.

A flood routing model was set up using the Flood Modeller software which indicated that the estimated 200 year flow of 2.64m³/s flowing into the reserve area would result in a peak flow of 0.73m³/s through the existing sluice passing downstream, indicating that at present the reserve site provides approximately 70% reduction in peak flows.

There is approximately an additional 0.3km² catchment between the reserve area and Smithy Brae which drains to the burn. Much of this area is urbanised and is served by a drainage system. However, the drainage system is not designed to accommodate the 200 year flows and much of such flows would run overland towards the burn. It is likely that flows from this urban area would peak earlier than flows from the upper catchment passing through Glen Moss Wildlife Reserve. However, as the entire catchment is relatively small, such time differences may be small and therefore have not been taken into account in this analysis.

During the previous studies of the Glenmosston Burn, the capacity of the culvert through the fields at Smithy Brae was estimated to be approximately 0.6m³/s. The 200-year peak flow from the reserve site is estimated to be approximately 0.7m³/s. This flow, together with the additional flow from the catchment between the reserve site and Smithy Brae, means that the resulting flow well exceeds the capacity of the culvert at Smithy Brae. Any blockage of the culvert would exacerbate the flooding risk.

The above predictions are consistent with historical flooding in the Smithy Brae area.

The surface area of the ponded water within the reserve site was estimated from LiDAR DTM for a range of elevations. This indicated that at an elevation of 130.5m AOD (Above Ordnance Datum) surface area is approximately 1ha (hectare)). At a level of 130.6m AOD, surface area increases to 3.6ha, and at 130.8m AOD it increases to 11.6ha. This indicates that as the water level rises by 0.3m, surface area of water within the reserve increases by 10.6ha. Such an increase in surface area and consequently in storage volume would provide substantial attenuation to peak flows passing downstream, in particular during extreme flood events.

In order to provide a better control of flows passing downstream and increase flood storage within the reserve, a V Notched weir is proposed. This would be a metal V shaped weir. Such weirs are used to control low flows. A model was set up to assess effectiveness of such weirs for Glen Moss Wildlife Reserve.

A flood routing model was set up of the reserve area and the control structure. This indicated that it is possible to store more flows within the reserve area than at present and that it is possible to reduce flows passing downstream through a new flow structure. A flow control structure in the form of a V Notched weir is proposed.

Two V Notched weirs were considered: a 90 degrees notch and a 60 degrees notch. This resulted in peak 200-year flows passing downstream of approximately 0.12m³/s and 0.092m³/s respectively. These compare to existing structure which would allow a peak flow of 0.73m³/s downstream for the same 200 year flood event. The above assumes that water level in the reservoir is at the weir crest level at the start of the flood event. These figures indicate that a V Notched weir would result in more storage within the wildlife reserve and reduce peak flows passing downstream.

As a 60 degree V Notched weir would provide more attenuation compared to a 90 degree V Notched weir with a small increase in peak water level in the reserve site, it has been used for the design of the new flow control structure.

3.1 Multiple Benefits

Increasing attenuation within the reserve has the following benefits:

- During dry seasons, the V-notch level can be altered which will increase the water depth within the reserve. This will benefit wildlife and habitats that rely on water.
- A reduction of flows downstream and a reduction of pressure on the capacity of existing culverts.
- A controlled flow from reserve via V-notch at all times even during storm conditions.

3.2 Contribution to the Implementation of Current Measures

Currently flows are controlled by a dilapidated sluice gate. The sluice has historical importance to the reserve and as such the structure will be retained although the internal workings i.e. the gates will be removed. This will not affect the proposals.

3.3 Notification

Schedule 2 of the Flood Risk Management (Scotland) Act 2009 places a duty upon local authorities to give notice of a proposed flood protection scheme. The

following sub-sections outline the notice which has been given to various interested parties and it is believed that this notification fulfils all the relevant obligations for the proposed scheme.

3.3.1 Newspaper advert

In accordance with Paragraph 1 of the Schedule, adverts have been placed in two local newspapers to ensure that the circulation includes the potentially affected areas. These newspapers are the Greenock Telegraph and the Paisley Daily Express. An advert was also placed in the Edinburgh Gazette to comply with the requirements of the Schedule.

3.3.2 Notice Displayed Locally for Public Inspection

Notices for the Flood Protection Scheme have been displayed in accordance with Paragraph 2(1) on the following webpage throughout the duration of the consultation period:

<https://www.inverclyde.gov.uk/environment/roads-lighting/flood-prevention>

The notice has been available for inspection at all times up until the date that the scheme was confirmed. There have been no valid objections to the scheme as a whole or to any individual elements.

3.3.3 SEPA and Scottish Natural Heritage

Discussions with SEPA and SNH have been on-going regarding the flood risk protection proposals.

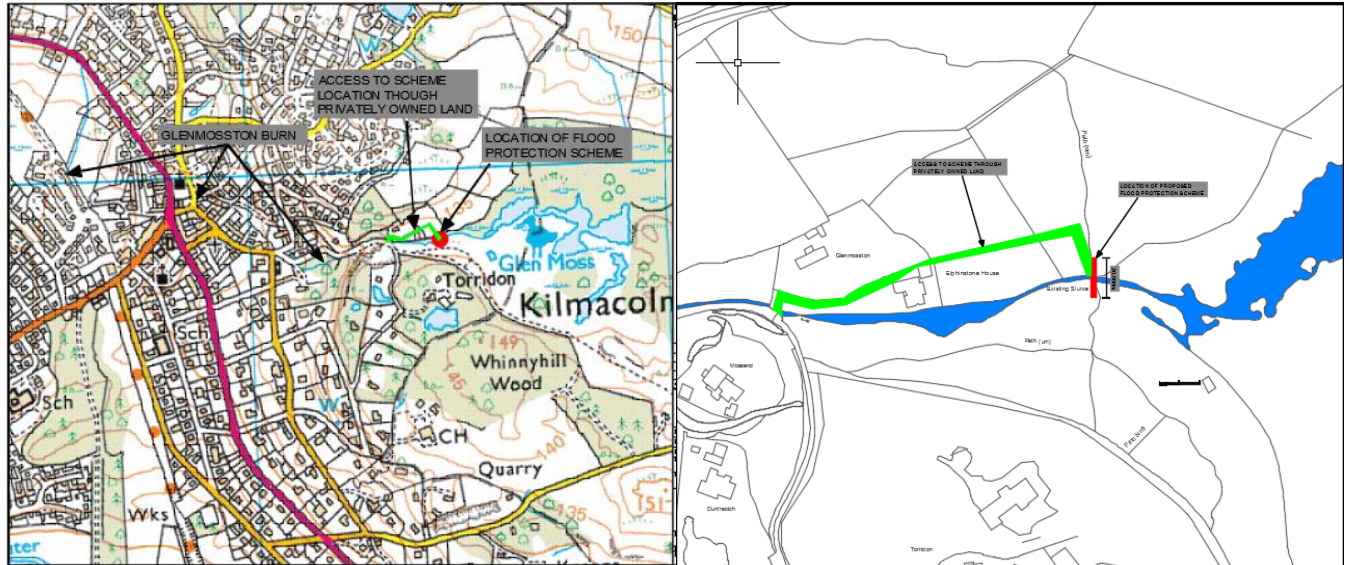
Discussions with both SEPA and SNH have been positive with no objections to the proposals received.

Appendix A

Location Plan

Address: Glenmoss Wildlife Reserve, Kilmacolm PA13 4PG

Location Plan: The Local Authority will require to enter privately owned land to the north of the proposed location, as highlighted on the location plan below, to facilitate the carrying out of the operations. The land is currently an unused field accessed by way of a private driveway and access track. The Local Authority has been given express written permission by the land owner to utilise this access for the purposes of carrying out the operations.



Proposed Operations: Construction of an earth bund with v-notch weir to control flows and increase attenuation.

Summary of Benefits: During dry seasons, the V-notch level can be altered which will increase the water depth within the reserve. This will benefit wildlife and habitats that rely on water. There will be a reduction of flows downstream and a reduction of pressure on the capacity of existing culverts. There will also be a controlled flow from the reserve via the V-notch at all times, even during storm conditions.

Effect on the Environment: The works would impact on a very limited area with the consequential alteration to water storage limited geographically. The wider area benefits in terms of controlling flows through the village during flooding events. The scheme is likely to have a beneficial impact on human health in preventing flooding and helping to improve biodiversity through the expansion of a wetland area.

Cost of scheme operations to be carried out: The cost of scheme operations to be carried out is approximately £300,000.