

### Introduction

The work to refurbish and upgrade the north gate of the Tidal Weir will require a temporary structure to be in place to retain the river water. The structure also needs to provide a safe working access to complete the repair work to the north gate. In order to do this, George Leslie Ltd (GL) will provide a rock bund with a sheet pile cut-off wall. The bund will be upstream of the gate and will allow the initial works on the gate to progress during periods of low tide.

### Design

The structure will consist of a rock bund extending out from the north embankment to the north pier. Sheet piles will be driven through the bund to form a central cut-off wall. The piles will be toed into the riverbed to limit the flow of water entering the working area. Concrete plugs will be cast at each end of the sheet pile wall to effectively seal the cut-off wall on the masonry of the north pier and north embankment wall. Gabion baskets will be placed around the outer toe of the bund, this will prevent small rock material migrating into the river flow under the central gate and onto the concrete sill of the north gate.

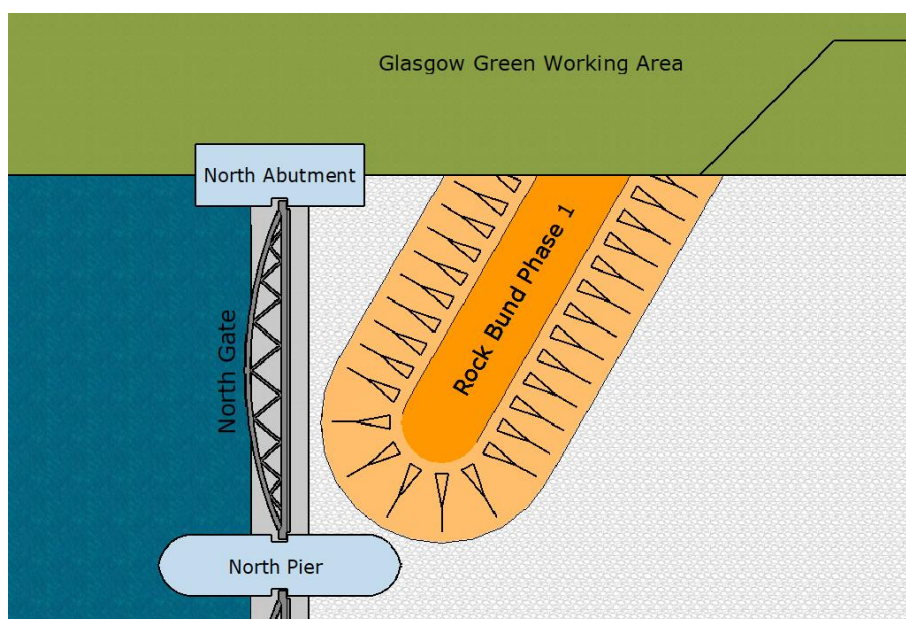
GL have employed Wallace Stone LLP consulting engineers to design analysis of the structure and possible water flow when complete. A copy of the Design Summary Report is appended to this document for reference.

### List of Principle Materials

1. 1,500m<sup>3</sup> of Imported Rock Fill, grade 300mm to 100mm.
2. 9m long AZ18-800 Steel Sheet Piles. Total weight of piles is 36 tonnes.
3. Rock Filled Gabion Baskets. A total of 25 baskets filled with 50m<sup>3</sup> of rock will be used.
4. 20m<sup>3</sup> Mass Concrete

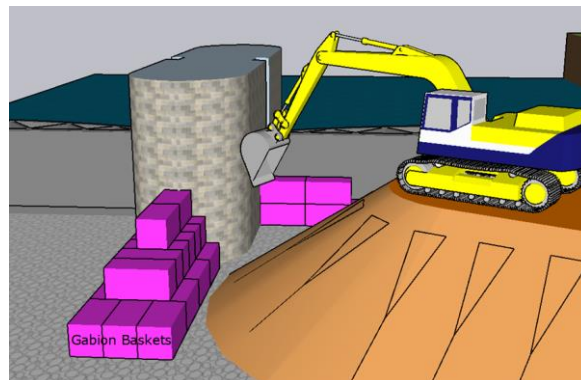
### Construction Method

1. The rock bund will be constructed from the north embankment extending towards the north pier. The toe of the bund will not extend beyond the line of the north pier or onto the sill area of the north gate.



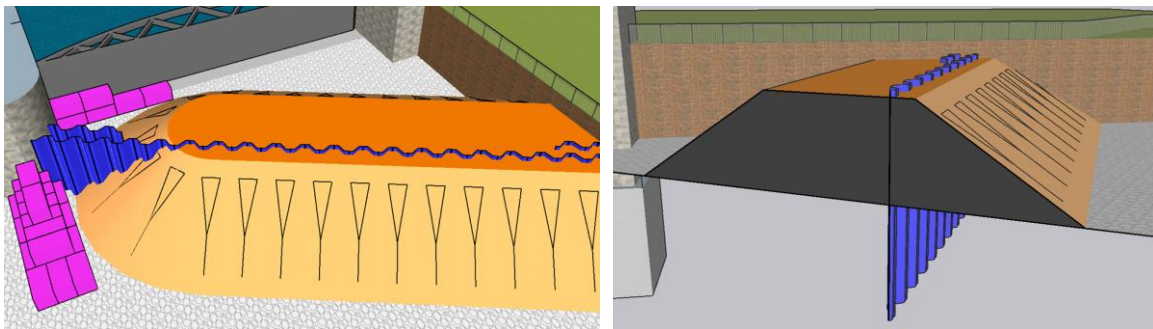
Plan of Rock Bund Phase 1

- The rock bund will be used to provide access for plant and resources to construct the gabion basket retaining walls. Prefilled baskets will be lifted with a backhoe excavator located near the end of the bund. Divers will guide and position the baskets on the riverbed.



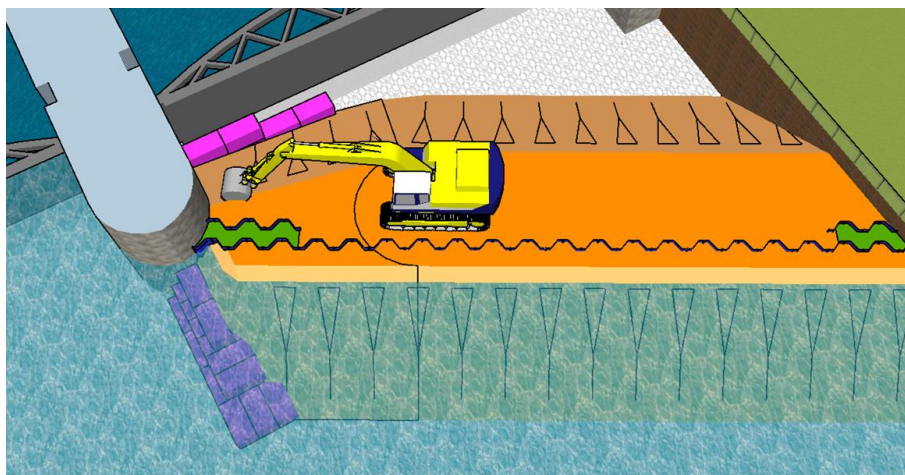
Gabion Baskets placed with divers

- Drive sheet pile wall through the rock bund and into the riverbed. A proprietary sealant will be applied to the clutches of the piles before driving. The piles will be driven to the pre-determined toe level with a soft start hydraulic vibrating hammer. Underwater sounds and vibrations emanating from the pile driving operation will be greatly muffled when driven through the rock bund as opposed to open water.



3D view and typical section of bund showing location of sheet piles and gabions.

- The rock bund will then be closed off against the gabion baskets and the sheet pile walls. The void between the two rows of piles adjacent to the masonry will be filled with mass concrete to effectively seal the ends of the cut-off wall.



Completed Cofferdam retaining river water from the working area