

Tiree WTW

protecting unique habitat key focus for island project team

by
Toni Ferretti

The Tiree Water Treatment Works (WTW) is located on the Isle of Tiree, the most westerly of the Inner Hebrides. The existing WTW was originally fed from Loch a' Phuill with the subsequent addition of three boreholes to supplement water from the loch. The plant was designed to produce 400m³ of water per day but in peak periods was required to produce up to 580m³ a day, and currently serves a population of 702, rising to 1,700 in summer. An upgrade of the works was required to meet driver compliance on Trihalomethanes and disinfection control and also to increase capacity to remove the need to tanker water into the popular tourist region during peak seasons.



Pipeline construction underway

Courtesy of Scottish Water Solutions

The project scope was to upgrade the existing WTW along with connection of a further three boreholes installed under a previous project. The scope also included new borehole pumps, pipework, wellhead housings and ducts.

Environmental Issues

Much of the project was to be carried on or adjacent to land protected by a number of environmental designations. Tiree is renowned throughout the world for its unique sand dune and Machair Grasslands, and Loch a' Phuill is also an internationally important natural eutrophic loch, with Magnopotamion and Hydrocharition-type vegetation.

In addition the project area was close to a number of protected habitats for breeding populations of endangered birds such as Corncrakes. The project design along with the works programme had to minimise the impact on the local environment and wildlife.

Three main challenging issues were identified as critical to achieving a positive outcome to the delivery of the project with regards to the environmental sustainability of the project:

- Protecting the unique Machair Grasslands;
- Reducing the abstraction from Loch a' Phuill during dry periods;
- The timing of the works to address concerns over the impact on the Machair and on birdlife.

Machair

Minimising the intrusive works scope on the Machair would reduce both the duration of the works on the environmentally sensitive area and also the time required for the Machair to recover post project completion. With assistance from a Consultant Ecologist it was agreed that the most beneficial method of trench construction would be to utilise a 1 metre wide trench to allow the grass turfs to be cut to minimise the reinstatement time. This would minimise the exposure of the fragile sub soil to wind erosion and maximise the opportunity for a re-establishment of the grass on the Machair.

To minimise the risk to the vegetation the contractor and consultant ecologist restricted vehicle movements to a minimum and used plywood protection during excavation operations to protect the grasslands. Also to access the work areas, plant used random access routes and random access gates along the work area.



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Courtesy of Scottish Water Solutions

Reducing Abstraction from Loch a'Phuill

The design proposal to use the boreholes installed during a previous project would be beneficial in reducing the dependence on the additional abstraction from Loch a'Phuill to meet the increased demands during the summer months due to tourism. The subsequent reduction in level during these periods of additional abstraction was endangering the conservation objectives for the area by lowering the levels in the Loch.

This was having a detrimental effect on the wildlife in and around the Loch. The project would also improve the environmental sustainability of both the water supply to the island and the conservation objectives for the area through minimising the lowering of the loch and mitigation of the environmental impact of the alternative solution of tankering water onto the island.

Timing of works

Once the design scope had been finalised and the design developed the required pipe sizes for connecting the boreholes to the treatment facilities were identified and the routings of the pipelines were agreed to minimise intrusive works on the Machair.

With the routing and the pipe sizes finalised the timing of the construction works became a major factor in maintaining the environmental sustainability of the Machair during and post site works.

The project team identified that the timing of the onsite works had the potential to disturb both breeding and the transient population of rare birds which used this unique environment.

The team consulted with various bodies including Scottish Natural Heritage, Royal Society for the Protection of Birds and Scottish Agricultural College and it was agreed that the process at the treatment works would take place during winter with the pipeline construction carried out between February and the end October.

Process upgrade

The existing treatment works and process consisted of three existing boreholes, infiltration gallery and delivery pumps, an aerator/degassing tower, two Rapid Gravity Filters (RGF), combined Contact Tank and Clear Water Tank and chemical dosing systems.

Work under the project saw the three wells previously installed brought into use, upgrades to existing instrumentation and controls, installation of a third filter, provision of new manganese dioxide/sand filter media, new chemical dosing facilities and increased CWT pumping capacity

Project Benefits

The use of the boreholes as an alternative source of raw water has removed the need for abstraction from Loch a'Phuill during dry periods and avoided the lowering of the water level during periods of increased demand.

The project solution has also secured a safe water supply removing the risk of having to tanker in potable water to the island with the associated negative environmental impact and costs.

The construction activities on the Machair could have had a very negative impact on this unique grassland environment, but due to the extensive consultation with third parties, detailed investigations with respect to ensuring the best construction methods were utilised and that control procedures and independent checks were in place, the project team and contractors ROK delivered the project with minimal impact on the environment.

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For more details contact: jonathan.crabtree@rokgroup.com