

Tyndrum WTW

£5.2m scheme brings improved treatment in Scottish Highlands

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Located just yards from the West Highland Way, the Tyndrum Water Treatment Works serves one of Scotland's most popular tourist villages. Although its resident population is only around 170, the village - at the foot of Ben Lui - is a popular tourist destination and stop off point for travellers. Facilities including a large hotel and busy roadside cafe have contributed to significant growth in water demand at peak periods over recent years.



Tyndrum: A view of the existing treatment works

courtesy Scottish Water Solutions

Existing process

The existing water treatment process at the works is raw water storage followed by sodium hypochlorite dosing and UV disinfection. Water is supplied from the Crom Allt burn before being screened and passed to raw water holding tanks via a 100mm transfer pipe.

Following storage the water flows to the treatment building where it is dosed with sodium hypochlorite solution and fed into distribution via a clear water tank. Booster chlorination and an ultra-violet sterilisation units are installed downstream of the clear water tank.

Issues to resolve

Treated water turbidity occasionally exceeds regulatory levels and the local health authority has expressed concern about the lack of barrier treatment as low levels of Cryptosporidia have been detected in the final water. Analysis of the water quality data for Tyndrum WTW and the zone it supplies has also indicated that there have been PCV failures for lead, bromate and turbidity.

The current works serve a population of 171 with an average demand

of 0.236MLD against a design capacity of 0.35MLD. The present Water Order is 15,000 gallons per day and the works currently breaches its Water Order. There are also issues with raw water availability as the existing Water Order is significantly lower than the average treated water flow and raw water flows are restricted during drought conditions.

Solution

A number of options were considered for the project being carried out by Scottish Water Solutions/Biwater Leslie as part of Scottish Water's Q&Silla investment programme. They included installation of new slow sand filters to reduce turbidity and provide a crypto barrier, sourcing alternative supplies from the nearby Crianlarich or Callander network or local water recycling schemes

The preferred and chosen option was to build a 0.35MI/d - Membrane Plant with new water intake with pumping station. As increase in water required could not be supplied from the existing source, discussion with the Scottish Environmental Protection Agency led to an alternative water source from the River Cononish being identified. A new 3.7km rising main would be required to bring



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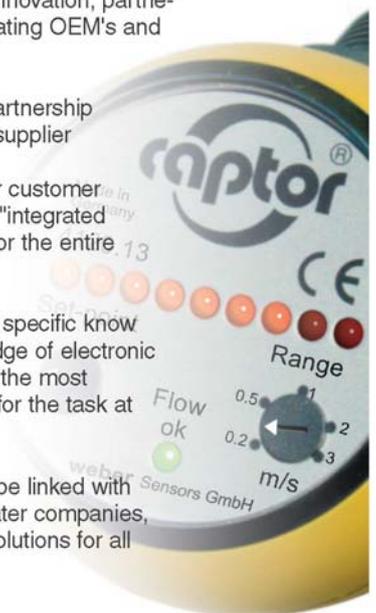
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View of existing treatment works at Tyndrum

photo courtesy of Scottish Water Solutions

water from the new source to the plant. The chosen option satisfies all relevant drivers and deals with the crypto issue at the lowest whole life cost. As well as providing the best value option, the membrane solution minimises impact on the environment and keeps the plant's footprint to a minimum.

The works require construction of a new intake on the River Cononish, construction of a new pumping station and rising main to link the new intake with the existing raw water tanks and installation of a packaged membrane plant to be located downstream of the existing raw water storage tanks and upstream of the clear water tank. The membrane plant, supplied by ITT, will be skid mounted for installation into building.

Pipeline

The new rising main is being constructed from the hamlet of Dalrigh, south of Tyndrum, to the raw water storage tanks.

The pipeline is 100mm in diameter and consists of PN 25 Ductile Iron including tape wrap with 25% overlap, and will include washouts, line valves and air valves to enable suitable cleaning and maintenance. The pipeline is being laid at a minimum depth of 900mm.

As well as a number of land issues, the peated nature of the ground posed a number of challenges for the sub-contractors Drumclog Plant Ltd. An important consideration was to minimise any disruption and pollution to the watercourses as the River Cononish eventually feeds the River Tay, a designated Special Area of Conservation.

The contractors have employed low ground pressure excavators and left vegetation in place to significantly reduce surface run off and to minimise any potential scarring to the landscape.

Intake works

The new intake is located on the River Cononish, upstream of the

Crom Allt at Dalrigh. The intake structure, consisting of a perforated manhole structure of 1500mm diameter and 2.5m depth, will be situated near the edge of the river to allow the ease of access for maintenance.

It will collect raw water from the River Cononish and transfer it through 50 metre of 150mm DI river intake pipeline to the new pumping station wet well. In order to ensure water collection in the intake during times of low flows, a section of the river bank will be excavated and built up.

The intake will then be surrounded by rip rap and layers of geotextile filter fabric to prevent silting up and damage to the intake structure. The pumping station structure will consist of a wet well (1.9m x 1.9m x 4.55m) with the chamber split in two with a 6mm mesh screen separating the two compartments.

Water treatment works

Although the new works is being constructed within the compound of the existing site, its proximity to the West Highland Way - the track that accesses the works is part of the walking route and the compound fence line sites on it - has led the project team to employ sensitive construction techniques where possible.

Planning restrictions also demanded that some trees which are within the compound need to be retained.

The membrane plant is enclosed in a steel portal frame structure encased in cladding. The existing raw water tank outlet will be used for the inlet connection to the membrane plant and the outlet of the membrane plant to the clear water tank will be made when construction is complete. The connection will be made upstream of the clear water tank during works shut down. As the clear water tank has the capacity for 29 hours storage the connection will need to be carried out within a day.



A view of the existing treatment works at Tyndrum

photo courtesy of Scottish Water Solutions

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Work began on the project in November 2007, the partnering team consisting of Scottish Water Solutions and Biwater Leslie jv, and is due to be completed in Autumn 2008.

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