

Margate & Broadstairs Wastewater scheme brings benefits to residents, visitors & marine environment

Currently, wastewater from the two communities of Margate and Broadstairs receives only preliminary treatment – screening and grit removal – before being discharged to sea through long sea outfalls. The Margate Headworks currently provides preliminary treatment for flows up to 1100 litres/sec, whilst Broadstairs Headworks caters for a maximum flow of 377 litres/sec. As a consequence of the Urban Wastewater Treatment Directive and the Bathing Water and Shellfish Waters Directive, it has been necessary to significantly improve the quality of effluent. Under the new scheme, wastewater from both communities will receive secondary and UV disinfection treatment, thus bringing significant improvements to the local marine environment and benefits to residents and visitors.



Working safely with minimum disruption to Manston Airport to bring cleaner seas to Margate & Broadstairs

Photo courtesy Southern Water; copyright Connors.

Due to planning restrictions, it was not possible to construct a wastewater treatment plant near either Margate or Broadstairs Headworks, which are located in chalk cliffs at Foreness Point and North Foreland respectively. However, Southern Water operates a wastewater treatment plant at Weatherlees, near Ramsgate, which serves Ramsgate, Deal and Sandwich. It was, therefore, decided to construct a new treatment plant alongside the existing treatment works there to serve Margate and Broadstairs.

The Weatherlees site is 11km from the Margate Headworks and a twin 800mm diameter ductile iron pipeline is being installed to:

- * transfer wastewater to the treatment plant at Weatherlees;
- * return cleaned water to Margate Headworks for release through the existing long sea outfall.

Much of the pipeline route crosses agricultural land and, in these areas, the twin pipeline is being installed by the open cut method.

Ancient remains & crossing an airport

Before installation of the twin pipeline could commence, a number of areas along the route were investigated by archaeologists. Their excavations yielded a number of interesting finds, including skeletons dating from the Romano-British period and various items from the late Bronze Age (c.850BC).

The pipeline route also crossed the end of the runway at Kent International Airport at Manston. In order to provide additional protection here, the ductile iron pipes were threaded through precast concrete pipes and the annulus filled with foamed concrete. The works within the airport were completed without any disruption to aircraft movements.

Tunnels

There are, however, two built up areas along the route and at these locations, tunnels are being constructed to provide a suitable alignment for the pipelines.

The tunnels - 640m long and 1380m long - are 3.0m in diameter and are being driven by a Lovat M131 full face Tunnel Boring Machine.



Margate Tunnel: Light at the end of the tunnel as work continues on 1380m long tunnel

photo courtesy Southern Water, copyright Connors Press

They are being constructed through a chalk layer and this is proving to be an excellent medium for tunnelling. The tunnels are lined with precast concrete segments supplied by *Charcon*.

A 2.8km long, 450mm diameter pipeline is also being constructed to transfer flows from Broadstairs Headworks to the Headworks at Margate (for onward transmission to the Wastewater Treatment Plant). The installation of this pipe is by means of open cut methods along the headland and nearby roads. However, where the route passes through a local golf course, the pipeline will be installed by the directional drilling technique.

Margate WwTW

Margate's wastewater treatment facilities have been located at Foreness Point for over a century. The current Headworks is located in an underground structure within the chalk cliff face with access being via an above-ground building.

Improvements to the Margate Headworks, under the scheme, include the upgrading of screening to provide 6mm 2D (2-Dimensional) screening with enhanced washing and dewatering, revised de-gritting arrangements to improve grit removal, the construction of 6,200m³ of additional storm water storage, the provision of transfer pumps of 809 litres/sec capacity, upgrading the power supply and associated electrical equipment, extension of the existing above ground building and construction of a new short storm outfall. In addition, a new odour control plant is being built in accordance with the planning requirements to ensure that all air is treated before being released to the environment.

The improvements to the Headworks will lead to a significant increase in the pumping capacity at Margate. The three duty transfer pumps are rated to provide in excess of 809 litres/sec for transfer of flows to Weatherlees. The length and topography of the route results in a pumping head of approximately 75m which is achieved using single stage submersible pumps. To handle flows under storm conditions, new storm pumps are provided with a total capacity of approximately 7,000 litres/sec. Additionally, all storm flows are now screened to 6mm, 2D.

Underground

The facilities at Broadstairs Headworks are located within an underground structure constructed in the chalk cliff at North Foreland but are much smaller in scale than the facilities at Margate

Headworks. Scheme works at Broadstairs include the installation of lift pumps and transfer pumps, upgrading of the power supply and electrical equipment and the installation of new 6mm 2D storm screens. The existing odour control facilities are being improved.

The new Wastewater Treatment Plant, being constructed adjacent to Southern Water's existing treatment plant at Weatherlees on land already owned by Southern Water, will have a capacity to treat 830 litres of wastewater per second.

The complexity of the plant will be reduced by the omission of a primary settlement stage. Screened sewage will enter a step-feed activated sludge plant, comprising four aeration lanes, each equipped with a fine bubble diffuser system.

Four final settlement tanks will remove sludge solids from the treated effluent before it is disinfected using ultraviolet radiation equipment.

A new pumping station will house the pumping equipment necessary to transfer the treated water back to Foreness Point for release back to the environment.

A new sludge treatment facility is being built to process sludges from the new and existing treatment works. Two new odour control plants are being provided to treat emissions from the aeration plant and the sludge treatment centre, in order to meet strict odour limits imposed on the site. Both the wastewater plant and the sludge treatment works incorporate a high degree of control and automation, together with a telemetry system for remote monitoring of plant status.

The scheme also includes for the construction of a new storm outfall at Foreness Point. This 1800mm diameter, 600m long outfall tunnel will be constructed by the micro tunnelling/pipejacking technique and the procedure will also involve the use of marine craft for the construction of a marker dolphin at the end of the outfall and retrieval of the tunnel boring machine.

The Margate and Broadstairs scheme is scheduled to be operational by Autumn 2007. ■

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