

Ashford WwTW

Southern Water boosts Ashford's wastewater treatment capacity by 30% to provide for future population growth

by Dave Carlisle MIET & Brian Smith

Ashford WwTW is located approximately 15 miles north-west of Folkestone in Kent. Prior to Southern Water's £12.6m expansion, the works served a population equivalent of 100,000 people. Starting in June 2012, this extensive project will ensure that the site continues to serve the growing population of this busy catchment, which is forecast to rise to 130,000 by 2020. To cater for this increase in demand, Southern Water has invested heavily in upgrading and modifying the process units at the site. When complete in March 2014, there will be an increase of 30% in the Full Flow to Treatment (FFT) from 547 to 694 litres/second. As well as providing extra capacity, the new equipment also had to help meet tightening environmental permit limits. Under the National Environmental Programme, the new consents are 20mg/l Suspended Solids, BOD 10mg/l, NH₃ 2mg/l, Fe 4mg/l and P 1mg/l.



The New NTF starts to seed - Courtesy of Southern Water

Works requirements

The following works were identified for the extension in order to meet the consent standards and forecast rise in the PE:

- Upgrading of the inlet works.
- Refurbishment of the 16 (No.) biological filters.
- Construction of a new humus desludging pumping station and MCC kiosk for pump sets.
- Construction of 2 (No.) 27-metre diameter humus tanks.
- Construction of a new nitrifying trickling filter (NTF) to join the three already on the site and an elevated walkway to link the four together.
- Construction of 2 (No.) deep bed sand filters (DBSF) to join the six already on the site.
- Refurbishment and upgrade of the works return pumping station.
- Refurbishment and upgrade of the NTF feed pumping station.
- Refurbishment and upgrade of the DBSF feed pumping station.
- Refurbishment and upgrade of wash water pump set.
- Associated chambers, manholes, pipelines and ducts.

Inlet works

The new inlet works was required to accept an uplift in flows up to a predicted peak flow to works of 2000l/s. The existing screens were replaced with 4 (No.) Longwood Escalator fine screens 6mm 2d that were placed into the existing inlet works structure with the



Sewaco specializes in design, manufacture, supply and construction of purpose built plant and equipment for use in water supply systems and treatment of municipal sewage and industrial waste water.

Our range of products includes:

- HYCOVER Static & Rotary distributor systems (from 5 l/s up to 980 l/s flow range) with optional auto cleanse and electro pneumatic belt drive mechanism, respectively.
- HYRATE Polytower biofilter systems using modular plastic media for:-
 - High Rate (BOD/COD reduction), upstream of existing treatment plant,
 - Secondary (BOD removal only or combined BOD removal/Nitrification)
 - Tertiary Nitrification applications, downstream of existing secondary treatment processes.
- HYRATE Polytowers can easily incorporate natural ventilation or air extraction systems for odour control purposes, if required.
- Water Meter Boxes for single and multiple water meter installation (up to 16 water meters in one chamber). Suitable for installation in brownfield location.

Ashford WwTW

Sewaco manufactured, supplied, and installed new 20.15 mt. HYRATE Polytower Biofilter shell constructed as eight-sided open top structure complete with low level air ventilation system, timber support matrix and HYCOVER trough type 4 arm rotary distributor designed to receive up to 291 lt/sec.

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hewitech

INNOVATION IN PLASTIC

Constructing nitrifying trickling filters to facilitate the nitrification of the wastewater to remove ammonia and carbon.

Hewitech's CF 15 PP Cross Flow Media was specified at Southern Water's Ashford WwTW, by Barhale for the application as NTF media as its structure provides a suitable surface for the growth of the bacterial film necessary in the nitrification process.

The polypropylene 190m²/m³ model was applied in 1,733m³ quantity, providing a large surface area through which a substantial volume of water can be filtered.

NTFs benefit from many advantages over other systems, low power requirements and durability of process elements as well as the ability to handle and recover from shock loads being some. The cross flow media also benefits from promoting better bio growth and lesser chances of blockage.

Hewitech trickling filter technology can incorporate innovative online measuring and control of biomass, including simple and effective snail elimination.

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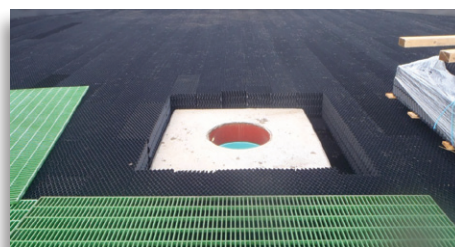
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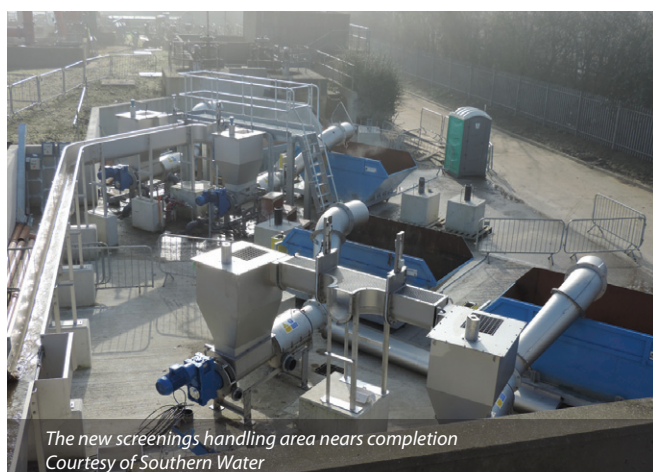
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Water & Wastewater Treatment Stormwater Management Cooling Towers Water Treatment



Ashford WwTW has undergone a £12.6m redevelopment. Southern Water specified the best suppliers to meet their high expectations through design workshops in which Hewitech successfully showcased their range of cross flow media.





minimum of structural modifications. A means of by-pass in the event of more than one screen being unavailable was also built into the design by installing a new manually raked screen in a dedicated channel with its own actuated penstock.

The existing penstocks had to be refurbished and new penstocks installed where required upstream of the inlet to allow progressive operation of the screens and screen rotation. The bypass screen penstock was fitted with an actuator with battery back-up. Manual penstocks were installed at the rear of each screen for isolation purposes.

Longwood Combi wash screenings handling units were also installed. The size of these units was calculated based upon the predicted screenings load from a population of 250,000 based on all flows being pumped. The screenings are washed via launder channels into the 4 (No.) Longwood units situated at ground level adjacent to the inlet works. Suitable skip handling/covers were also supplied. The wash water requirements for the new equipment has also been upgraded.

In addition, a new MCC and standby generator were installed to control the new equipment and ensure its resilience in the event of power outages.

All of the above works was carried out and commissioned with the existing inlet works live and flows uninterrupted. This was achieved by carrying out the work in two phases, with half of the new equipment being installed in each phase.

Biological filters

There were 16 (No.) filters in all to refurbish. 6 (No.) filters contained blast furnace slag (BFS) media which was washed and reused in the filters. The remaining 10 (No.) filters contained clinker media that was washed on site and then taken away to be recycled.

New BFS media was supplied and installed into these 10 (No.) filters. Replacement of all underdrain tiles took place and pipework and valves were also refurbished.

New motorised drive arms and columns were fitted to the existing 16 (No.) filter bed distributors which were designed to accept a combined flow rate of 874l/s. Only 2 (No.) filters at any one time could be taken out of service for refurbishment. So the critical path for the project went through this part of the works.

A new flow distribution chamber was also constructed between the primary sedimentation tanks and the existing filters, with the flows distributed via four new actuated penstocks and magflow meters to the existing syphon chambers.

Humus tanks

The humus tank capacity was also increased in line with the new FFT of 694l/s and a new distribution chamber on the effluent pipeline from the set of 16 (No.) filter beds was also constructed to distribute flows through two pipelines to the two existing banks of 4 (No.) humus tanks and a new gravity pipeline to flow split chamber feeding the new humus tanks 9 and 10. Again this chamber was built over live pipes that had to be kept in service throughout construction and commissioning while also putting in new magflow meters and actuated penstocks within the existing as well as the new works.

Two new radial flow humus tanks 27m diameter x 2.5m wall depth were also constructed complete with new scraper bridges and duty/standby humus tank desludging pumps (rated at 5l/s each), scum removal boxes connected to works drainage lines. The new desludging pumps discharge into an existing works return gravity line and were integrated into the existing humus desludging regime to ensure only one tank was desludged at any point in time. The

installation of new gravity pipe work to take humus tank effluent from these new tanks to the existing NTF lift pumping station was also part of the scope.

The supply and installation of a new MCC panel in its own kiosk adjacent to the new tanks was also included.

Works return

The existing works return pumping station was totally refurbished with new pumps, pipework and MCC to pump the 150l/s peak works return flows back to the PST distribution chamber along a new rising main.

A new auto start/auto changeover generator for the works return station and wash water system at the existing recirculation pumping station was also installed along with the supply and installation of a new washwater pumping station and rising main to feed the new inlet works washwater system.

Tertiary treatment

As part of the tertiary treatment upgrade new gravity pipework to take humus tank effluent from these new tanks to the existing NTF lift pumping station had to be installed as well as providing larger pumps and pipe work within the existing NTF pumping station structure. In addition a new fourth NTF filter bed, 20m diameter x 5m high, to match existing three NTF filters, was constructed.

This filter included a filter distributor the same as that fitted to the existing units and was integrated into the existing filter flushing regime software. A new elevated walkway from existing NTF distribution chamber was supplied and installed which also carried the 600mm feed pipework. A snail trap was built into the effluent line from new NTF to the DBSF pumping station.

Increased size pumps and pipework within the existing DBSF pumping station structure had to be installed along with their associated VSDs. Two new matching Tetra rapid gravity sand filters rated at 27m x 3m were added onto the existing bank of 6 (No.) filters and integrated into their current flow/backwash/dirty backwash return systems and then functionally integrated into the SCADA system.

Undertakings

In March 2012, Southern Water appointed BTU (a joint venture between Trant Holdings Ltd and Barhale Plc formed solely to service Southern Water on their MSF contract for AMP5) as principal contractor for the extension works of Ashford WwTW. BTU, along with their delivery partner, URS, undertook the design and construction of the project.

Conclusion

The expansion ensures the treatment works continues to provide top quality wastewater treatment to the growing population of Ashford with extra capacity to allow for future population growth in the area. Southern Water's continued investment in its infrastructure was praised by the town's MP Damian Green who officially opened the site by switching on the final treatment tank. He said:

"It's absolutely necessary that, as Ashford grows, our capacity to treat wastewater grows as well so I'm delighted to set in action the final part of a piece of important infrastructure which Southern Water has installed for the town."

The final filter bed was officially switched on by Damian Green MP on 28 March 2014.

The Editor & Publishers would like to thank Dave Carlisle, Project Manager (Major Projects) with Southern Water, and Brian Smith, Project Manager with Barhale plc, for providing the above article for publication.

The Ashford WwTW upgrade supply chain

Main designer	URS
Temporary works designers, civils installation and Access and stairs manufacture	Barhale Plc
Inlet screens, screenings handling plant and launder channels	Longwood Engineering
Refurbishment of the 16 biological filters - Filter arms	Ashbrook Simon-Hartley
Refurbishment of biological filters - Media	Day Group
Construction of humus tanks and DBSF - Shell	Carlow Precast & Barhale
Humus tanks - Scraper bridges	AJ Fab Tech
Construction of a nitrifying trickling filter	Sewaco
New nitrifying trickling filter - Media	Hewitech
Washwater Pumps and Boosters	KGN Pillinger
Standby Generators	Broadcrown
Formwork and Concrete	NBC
MCC/Systems integration	Max Wright & MCS
Piling	Roger Bullivants
Mechanical Installation	Arnolds Environmental
SCADA & Telemetry configuration	Multiform Technologies
Electrical installation	FSD Ltd
Deep bed sand filters - System	Severn Trent Services
Works Return, NTF & DBSF Pumps	Xylem
Sludge Pumps	Mono Pumps
Actuated Penstocks	Invicta Valves
Dewatering	WJ Groundwater
MCC Kiosks	Industrial GRP
Skips & Skip Transfer System	R & B Engineering
Overall Site Commissioning	MCS, Barhale & Multiform

