

Ballycotton Sewerage Scheme – Improvement Programme

Introduction

As of 14th January 2014, Irish Water assumed responsibility from local authorities for water services functions nationally. A key element of the infrastructure challenge for Irish Water is to meet the demands of decades of underinvestment in wastewater infrastructure. Between 2016 and 2021, the period of the Irish Waters Business Plan which funded the proposed works, Irish Water ramped up investment to spend an average of €326m per year on wastewater infrastructure.

Irish Water is a regulated water services utility. The Environmental Protection Agency (EPA) is the technical and environmental regulator that issues and enforces authorisations for wastewater discharges. The Commission for Regulation of Utilities (CRU) is the financial regulator and aims to ensure water services are delivered in a safe, secure and sustainable manner and that Irish Water operates in an efficient manner. One of the key ways in which the CRU does this is through the revenue control process.

Irish Water identified 44 agglomerations in Ireland where untreated sewerage is discharged directly to receiving waters, either from sewer network outfalls or via septic tanks, where the level of treatment provided is negligible.

Ballycotton is one of the agglomerations which has been identified. At present, wastewater generated in Ballycotton is discharged into the Ballycotton Bay with little to no treatment.

The objective of the Ballycotton Sewerage Scheme project is to provide pumping stations (PS), gravity sewers, rising mains and a wastewater treatment plant (WWTP) capable of providing primary treatment for the village in accordance with the current Waste Water Discharge Licence (D0516-01). The Ballycotton Sewerage Scheme has been designed to cater for a 30-year projected capacity, but the initial project objective is to provide infrastructure for the 10-year projected load.

Existing Scheme

Wastewater flows generated in Ballycotton are collected in two combined collection networks with two separate outfalls. These two networks will be referred to as the 'west' network and the 'east' network throughout this report.

The west of the agglomeration is served by a sewer network that conveys combined wastewater and storm water to a septic tank located along the foreshore to the west of Ballycotton harbour. The septic tank is an above ground structure and it is believed that it was constructed in the 1950s. The septic tank was designed to serve a PE of 50-60 people. The above ground portion of the septic tank appears to be in good condition. The passage of sewage through the septic tank helps in the removal of suspended solids but there is very little biological activity and the removal of BOD is not significant (Cork County Council (2009)). The treatment capacity of the septic tank is considered to be negligible as it is significantly hydraulically overloaded.

Effluent from the septic tank currently discharges into Ballycotton Bay via a sea outfall which is approx. 80m in length and is encased in concrete (existing WWDL code SW001).

The east of the agglomeration is served by a collection network which discharges untreated sewage as well as storm water into Ballycotton Bay via an outfall at the end of the harbour pier (existing WWDL code SW002). The outfall at Ballycotton pier is exposed at low tide.

Proposed Improvements

The objective of the Ballycotton sewerage scheme is to provide a wastewater treatment plant (WWTP) capable of primary treatment. Two new pumping stations (PS) will be required to deliver the waste water to the WWTP. The PSs will be located to intercept the discharges from the eastern and western collection networks.

The first PS will be located on the Ballycotton pier at the eastern end of the town. From this pumping station the wastewater will be pumped, via a rising main, in a north westerly direction along Main Street to a header manhole west of the grotto.

From the header manhole, the wastewater will flow via a new section of gravity sewer and then an existing gravity sewer westward along Main Street to the second pumping station which is to be located along 'Cow Lane' at the top of the slipway.

This pumping station will then pump the wastewater via a rising main to the proposed WwTP. The proposed site for the WwTP is located north of the existing water reservoir and south of the development boundary.

The treated wastewater will then flow via gravity to the top of 'Cow Lane' where it will tie into the existing outfall which discharges to the sea (new code SW004 instead of SW001).

The components of the proposed development are described below:

1. A 120m long, 225mm internal \emptyset gravity sewer extending from Cliff Road to the new Ballycotton Pier Pumping Station.
2. A pumping station on Ballycotton pier with 65m³ stormwater storage capacity and a dual function stormwater/emergency overflow (new code SW006 instead of SW002).
3. A 660m long, 114.6mm internal \emptyset rising main to convey wastewater from Ballycotton Pier Pumping Station to the header manhole located along Main Street.
4. A 35m, 225mm internal \emptyset gravity sewer to convey flows from the header manhole to the existing gravity sewer along Main Street.
5. A 50m long, 375mm internal \emptyset gravity sewer to divert flows from the existing septic tank to new Cow Lane Pumping Station.
6. A pumping station along Cow Lane with 105m³ stormwater storage capacity and a dual function stormwater/emergency overflow (new code SW007).
7. A 560m long, 163.6mm internal \emptyset rising main to convey wastewater from the Cow Lane pumping station to the WWTP site.
8. A WWTP providing primary treatment for a population equivalent of 1082 complete with a dual function stormwater/emergency overflow (new code SW005 instead of SW003).
9. 370m long access road from the L-3633 public road to the WWTP site.
10. A 450m long, 300mm internal \emptyset terrestrial gravity pipeline to convey treated effluent from WWTP to existing outfall (new code SW004 instead of SW001)
11. Repair works to the existing outfall pipe.

WwTP

The proposed Ballycotton WwTP design shall consist of preliminary and primary treatment only for the interim 10-year design horizon. Preliminary treatment shall be provided by screening to 6mm aligned to Irish Water Asset Standard IW-TEC-700-99-02 Inlet Works & Stormwater. Primary treatment shall be provided by 'upward flow' type primary settlement tanks aligned to Irish Water Asset Standard IW-TEC-700-02 Primary Treatment (Wastewater).

The WwTP has been designed to meet the following key design requirements:

- Discharge Emission Licence Values (ELVs) specified in the Discharge Licence (D0516-01) which are a 20% reduction in cBOD levels and a 50% reduction in suspended solids.
- Seasonal variation in wastewater loading.
- Sludge production and sludge handling to be in line with the requirements of Irish Water's Draft National Wastewater Sludge Management Plan.
- Minimise environmental impact.
- Provide an energy efficient design.

WwTP Process Elements Summary

The proposed Ballycotton WwTP consists of the following elements:

- Inlet flow attenuation chamber with overflow
- Self-contained inlet micro strainer 6mm screen c/w integral hand raked bypass
- Piped bypass manual raked bar screen 19mm
- Overflow chamber c/w spill weir and actuated outlet penstock
- Flow buffer tank (127m³) c/w return pumps
- Flow measurement flume
- Flow split chamber
- 3No. primary settlement tanks (PST)
- PST desludge/descum chamber to primary sludge pumping station
- Sludge holding tank with supernatant decant tree
- Supernatant return liquors pumping station
- Collection manhole post PST
- Treated effluent balance tank
- Sample chamber c/w final effluent wash water pumps
- Potable/final effluent wash water kiosk c/w break tank and booster pumps
- MCC and welfare kiosk

WwTP Operational Philosophy

Waste water flows shall be pumped to the WWTP via the 163.6mm diameter internal diameter rising main from the Cow pumping station. Pumped Formula A flow will discharge to an inlet chamber complete with actuated penstock prior to passing forward flow to the proposed 6mm screen package plant.

In the event of package plant malfunction/power outage/maintenance flows will be diverted to a manual raked 19mm bar screen.

Flows from the screening plant will pass forward to the buffer flow split chamber (Formula A – Flow to Full Treatment) (FA-FFT) complete with weir and actuated outlet penstock/valve allowing FFT flows to pass forward for primary treatment.

The proposed WwTP is operated based on providing three primary settlement tanks (PST) enabling optimal configuration to manage seasonal variations and operational plant maintenance. Even flow split is provided within the flow split chamber by incorporating adjustable v-notch weirs for each PST.

Excess flows (FA-FFT) are diverted to the buffer tank by gravity and stored until pass forward flows to the primary tanks are below 1.5DWF. Buffer tank effluent is then returned for treatment to the FA-FFT flow split chamber at a rate not exceeding 1.5DWF (Dry Weather Flow).

Sludge will be gravity thickened (consolidation) on site, prior to decanting to the nearest IW Sludge Hub as per IW's Draft National.

Sludge/scum drawn off (by hydrostatic head) from each PST shall gravitate to a common primary sludge pump sump and pumped forward to the sludge holding tank. Supernatant liquors shall be decanted via the valved decant tree and discharge via gravity to the supernatant liquors return pumping station. Return liquors will be returned to the head of the PST flow split chamber with flows estimated at 10% of plant FFT.

Flows leaving the PSTs shall be collected in a common manhole prior to discharging to the downstream sample chamber or via the balance chamber dependent on tidal/downstream conditions at the sea outfall pipe (new code SW004).

Pumping Stations

The proposed Ballycotton Sewerage Scheme requires two new PS's. The first pumping station will be located on the Ballycotton pier (The Pier PS) at the eastern end of the town. From this pumping station the wastewater will be delivered via rising main and gravity sewer in a north westerly direction along Main Street to a second pumping station to be located close to the slip way along 'Cow Lane' (The Cow PS).

The Cow PS pumping station will pump the wastewater to the proposed WwTP.

The pumping station structures will be insitu reinforced concrete and will contain a wet well with twin submersible pumps, an overflow with a mechanical screen, a valve chamber and a storm water holding tank.

The pumping stations and associated chambers have been designed to minimise the creation of confined spaces. Adequately sized openings have been specified for the wet well, valve chamber and storm water holding tank to allow for safe access.

Irish Water's technical standard IW-TEC-800-02 Wastewater Pumping Stations & Rising Mains has been referenced throughout the design process and the design is broadly in line with it. Where differences exist, they shall be noted.

Pumping Station Configuration

Each PS consists of three chambers including a wet well (inlet chamber with mechanical overflow screen & pump sump), valve chamber and storm water holding tank.

All pumping station chambers have been designed to minimise the creation of confined spaces (particularly the wet well and valve chamber which require more regular maintenance).

A self-cleaning mechanical screen screens overflows from the wet well to the storm water holding tank.

A manual penstock (operable from the surface) has been installed to shut off the inlet sewer.

The Pier PS will have a 225mm diameter overflow, with a flow measurement weir, allowing any overflows from the storm holding tank to discharge to the proposed outfall.

A 300mm diameter return pipe with non-return valve allows the storm water in the storm water holding tank to return to the pump sump.

Pumping Station Holding Tank

Each pumping station will include a stormwater/emergency storage tank. The Pier PS will have 65m³ storage capacity and the Cow PS will have 105m³ storage capacity.

The storm water holding tank, screen and its associated components have been designed in accordance with Irish Water technical standard 'Storm Water Overflows' (IW-TEC- 800-3).

Should the flows entering the wet well be greater than the pump forward flow rate, the excess flows will spill into the storm water holding tank through an electronically operated mechanical screen.

At the Pier PS, an existing 225mm diameter overflow pipe will be used to discharge the excess flow from the holding tank (new code SW006). The existing overflow pipe discharges on the eastern side of the pier. An overflow weir has been provided in the design to facilitate flow measurement and logging of the emergency overflow, so that volumes of storm spillage to the receiving waters can be quantified.

At the Cow PS, an overflow pipe will not be provided. Instead a combined sewer overflow (CSO) chamber will be constructed at the head of Cow Lane to accommodate any excess flows should the stormwater holding tank reach capacity which discharges to Ballycotton Bay via marine outfall (new code SW007)

A venturi aerator has been incorporated into the design at both pumping stations to provide mixing and aeration in the stormwater holding tank. The operation will be based on a high and low level in the tank.

Programme for Completion of Improvement Works

The proposed Ballycotton Sewerage Scheme construction stage will be completed by quarter 4 of 2024.