4 The Proposed Development

4.1 Introduction

This chapter describes the proposed development for which Irish Water is seeking consent in Arklow town (Refer to **Volume 3** for the relevant scheme drawings of the proposed development). Specifically, this section describes the design, operation and decommissioning elements of the proposed development whilst the construction aspects of the proposed development are described separately in **Chapter 5**.

This chapter of the EIAR has been prepared in accordance with Part 1 of Annex IV of the EIA Directive. This chapter has been structured to describe the following:

- The strategy for procurement of the proposed development and how it will influence the detailed design;
- The design of the proposed development;
- Associated aspects of the proposed development of relevance including community gain and separate consents required;
- The operation of the proposed development; and
- The decommissioning of the proposed development.

4.2 Procurement Strategy

Irish Water intends to procure the detailed design and construction of the proposed development using a Design and Build type contract. This form of contract has the benefit of encouraging innovation and value engineering, particularly for a project of this nature and scale, by giving the contractor ownership of both the detailed design and construction of the development. Design and Build contracts traditionally also lead to shorter construction programmes. Under this type of contract, the successful contractor will ultimately be responsible for the final detailed design of the proposed development, within the constraints as outlined herein.

The contractor is required to comply with all of the performance requirements set out in the tender documentation including the statutory consent approvals and any associated conditions that may be granted by An Bord Pleanála, Department of Housing, Planning and Local Government, EPA and other statutory stakeholders.

Irish Water has developed a detailed specimen design of the proposed development for assessment within this EIAR. This EIAR has considered the likely significant effects on the environment associated with our detailed specimen design. The contractor will develop this design further, in accordance with the proposed mitigation measures, and any conditions that may be prescribed as part of the consent for the proposed development, ensuring that there is no material change in terms of significant effects on the environment.

As such, the assessment herein is considered to be the 'reasonable worst-case scenario' in terms of significant environmental effects with regard to the overall planning boundary of the proposed development. The detailed design by the contractor should seek to identify opportunities for reducing further any significant adverse environmental effects where practicable.

4.3 Design of the Proposed Development

4.3.1 Introduction

4.3.1.1 Overview

Wastewater in Arklow is currently collected and discharged (untreated), through 19 existing discrete storm water overflows (SWOs) and/or outfalls to the Avoca River. To ensure compliance with the UWWT Directive, it is necessary to appropriately treat wastewater from agglomerations such as Arklow, prior to discharge to water bodies. The proposed development is designed to address this deficiency and provide appropriate wastewater treatment for Arklow town.

The proposed development will improve water quality in the Avoca River and provide adequate treatment capacity to support further development in Arklow town. All existing SWOs and/or outfalls that currently discharge to the Avoca River will be captured by the proposed interceptor sewers that will be provided to the north and south of the river channel. The interceptor sewers will convey wastewater to the WwTP for treatment and eliminate in so far as possible the current practice of discharging untreated wastewater to the Avoca River.

The proposed infrastructure at the head of the southern interceptor sewer, i.e. the Alps SWO and storage tank, will intercept wastewater flows in this part of the catchment, provide appropriate storage as well as pipework and a new overflow to allow storm flows, in excess of this storage capacity, to discharge to the Avoca River. The SWO and stormwater tank is designed to pass forward minimum Formula A flows[1] and to limit spills to the river to no more than seven times per bathing season in accordance with the requirements of the Wastewater Discharge (Authorisation) Regulations 2007, as amended and the guidance[2].

The proposed interceptor sewers will convey wastewater by gravity to the proposed WwTP that will be located at the Old Wallboard Site at Ferrybank. The interceptor sewers will be provided along the northern and southern quays and a river crossing will be provided between south Quay and Mill Road.

[1] Formula A flows are the industry standard for design that considers the Dry Weather Flow (DWF) plus allowance for storm flows as a factor of population (i.e. Formula A = DWF +1.36P + 2E where DWF = PG + I +E; Where 'P' is the population served and 'G' is the average per capita water consumption, 'E' is the average industrial effluent and 'I' is the rate of infiltration) as per HMSO (1970) *Report of the Technical Committee on Storm Overflows and the Disposal of Storm Sewage*

[2] Department of the Environment (1993) *Procedures and Criteria in relation to Storm Water Overflows*. Available from: http://www.epa.ie/pubs/forms/lic/wwda/uwwtdirective91271eecprocedurescriteriairtstormwateroverflows.html [Accessed 22 May 2018]

Two further SWOs will be provided on the network, one at the junction of South Quay -Harbour Road (discharging from the southern bank of the Avoca River) and one at the proposed WwTP site (discharging from the toe of the revetment into the Irish Sea). These SWOs will act as an emergency relief for excess storm flows in the sewered catchment during extreme rainfall events or during extended power outages at the WwTP. All flows through the SWOs will be screened prior to discharge.

The WwTP will provide both preliminary and secondary treatment of the wastewater, in a bespoke, architect designed WwTP. The WwTP will have an ultimate capacity of 36,000PE with an initial treatment capacity of 24,000PE installed in the first instance. As outlined in **Chapter 1**, Irish Water are seeking consent for the 36,000PE WwTP and the effects of such have been assessed in this EIAR.

It has been assumed (for the specimen design) that a sequencing batch reactor (SBR) treatment technology will be provided for the secondary treatment in the Process building. Following treatment, the treated effluent will discharge to the Irish Sea through the long sea outfall.

Excess storm flows in the WwTP will, in the first instance, be diverted to a stormwater holding tank in the Inlet Works building, particularly during significant rainfall events. These excess storm flows will discharge to the Irish Sea through the proposed SWO located at the WwTP site, which also operates as an emergency relief for excess flows in the sewered catchment as described above.

A new, upgraded coastal revetment will also be installed on the shoreline adjoining the WwTP site to replace the existing rock armour revetment. The crest of the existing revetment will be raised by approximately 2m and rock armour will be installed to achieve the relevant design standard. This revetment upgrade will improve flood resilience by providing protection to the WwTP from the wave and tidal action of the Irish Sea.

In summary, the key design aspects of the proposed development are:

- Alps SWO and Stormwater Storage Tank (approximately 400m^3);
- Interceptor Sewers;
    - Northern interceptor sewer along North Quay (approximately 800m);
    - Southern interceptor sewer along River Walk and South Quay (Approximately 1.1km) of which approximately 300m will be constructed in the Avoca River;
    - Underpinning works on the two southernmost arches of Arklow Bridge;
    - Tunnelled crossing under the Avoca River (approximately 120m) between South Quay and Mill Road and SWO for excess storm flows; and
    - Associated manholes and vent stacks along the alignment of the proposed interceptor sewer network.

- WwTP
  - Demolition and site clearance of existing structures on the Old Wallboard site;
  - 36,000PE WwTP providing preliminary and secondary treatment (Sequencing Batch Reactor process) in four buildings, two of which will have vent stacks;
  - SWO to discharge excess storm flows from a storage tank (approximately 3,150m^3); and
  - Ancillary site infrastructure development and landscaping.
- Outfalls
  - Long sea outfall (approximately 930m long) to discharge treated effluent terminating with a diffuser; and
  - SWO as outlined above.
- Upgrade of the existing rock armour revetment on shoreline adjacent to the WwTP site.

Design drawings illustrating the proposed development are available in **Volume 3** (full set of scheme drawings provided therein).

4.3.1.2 Land Requirements

Lands for the proposed development will be acquired pursuant to the following legislation:

- Form of Compulsory Purchase Order under Section 76 of, and the Third Schedule to, the Housing Act, 1966, as extended by Section 10 of the Local Government (No.2) Act, 1960 and amended by the Planning and Development Act, 2000, as amended
- Local Government (No.2) Act, 1960
- Section 10 of the Local Government Ireland Act, 1898, as amended by Section 11 of the Local Government (No.2) Act, 1960 and Section 213 of the Planning and Development Act, 2000, as amended, as applied by Section 93 of the Water Services Act, 2007
- Water Services (No.2) Act, 2013

The Compulsory Purchase Order (CPO) includes under the CPO Schedule the extent of the following:

- Lands to be acquired (purchased);
- Permanent wayleaves;
- Temporary working areas;
- Permanent rights of way.

The land requirements identified in the CPO are necessary to construct, operate and maintain the proposed development.

As part of the CPO process, supporting documentation is provided in the form of an Engineer's Report, CPO drawings and land schedules.

The Engineer's Report outlines the following:

- The Community Need underlying the proposed development covering:
  - The existing situation and the need for the proposed development;
  - Description of the proposed development and public interest;
  - History of proposed development and statutory processes; and
  - The need for the identified lands and the need to acquire them compulsorily.
- Planning considerations; and
- Resources and alternatives considered.

The CPO drawings and schedules clearly identify the land plots required for the CPO process including ownership/reputed ownership/occupiers and the associated area (size) necessary to facilitate the proposed development.

4.3.2 Alps SWO and Stormwater Storage Tank

4.3.2.1 Overview

The existing SWO, located in the north-east corner of the Alps, will be upgraded and associated site works undertaken to link with the existing network and provide storm water storage at this location. The scope of works for this portion of the proposed development includes:

- Provision of a new online enclosed storage tank structure (approximately 400m^3 storage volume) that would consist of reinforced concrete base, walls and roof;
- Installation of a non-powered static overflow screen inside the storage tank and provision of access covers in the roof structure (included at ground level);
- Raising of existing ground profile by approximately 1m to accommodate the tank structure – with appropriate landscaping provided in the form of grassing above the tank and tarmac surfacing to provide vehicular access;
- Provision of gabion retaining wall (approximately 40m in length and up to 1.8m in height to the toe of existing embankment) in the area between the tank and access gate;
- Diversion of existing foul sewer via two new manholes (MHA1 and MHA2) to enable construction of the proposed storage tank. The smaller approximately 225mm diameter pipeline would be permanently diverted to connect to the larger (approximately 1200mm diameter) pipeline[3];

[3] The existing sewer would be maintained from this point until the proposed development is commissioned. On completion, flows would be diverted to the proposed SWO and storage tank from the same manhole.

- Provision of a new manhole (MHA3) to divert upstream flows in the approximately 1200mm diameter pipeline into the storage tank;
- Provision of three manholes (MHA5, MHA6 and MHA7) and approximately 300mm diameter pipeline to collect downstream flows from the storage tank (including additional interceptor sewers to divert the existing sewers to the manhole [MHA7]);
- Upgrade of existing manhole (MH1) to divert existing flows to the proposed interceptor sewer (via MHA7);
- Connection of overflow pipework (via a new approximately 900mm diameter pipeline) to the existing 1200mm diameter sewer, manhole (MHA4) and existing box culvert which discharges to the Avoca River;
- Installation of fence (up to approximately 2.4m high) to secure the storage tank and facilitate ongoing maintenance and operation;
- Provision of a gate suitable for vehicular access (required for maintenance);
- Provision of power supply/control panel to enable monitoring of tank levels and overflow events;
- Installation of water supply hose reel (in kiosk) to allow wash down of overflow screen/chamber floor within the storage tank; and
- Abandonment of up to approximately 130m of sewer in this area of which approximately 80m will be left in situ and approximately 50m will be removed.

4.3.2.2 Design details

SWO and Storage Tank

The upgraded SWO has been designed for return periods in excess of 5 years, i.e. any flows up to a 5-year storm return period could be contained within the storage tank. The storage tank will have a storage volume of approximately 400m^3.

The SWO has been designed to pass forward minimum Formula A flows and to limit spills to the river to no more than seven times per bathing season as noted in **Section 4.3.1.1**. All excess storm flows discharged to the Avoca River will be screened to ensure that all particles greater than 6mm in diameter will be retained by the screen in the storage tank.

Structure

The SWO structure and storage tank will comprise a reinforced concrete base and walls to a depth of approximately 4m below existing ground level. The tank itself will be enclosed by a reinforced concrete slab roof with access covers provided in the roof to facilitate maintenance during operation. The access covers will be appropriately vandal proofed at the ground level and secured by means of perimeter fencing.

The SWO and storage tank will be contained in a structure that will protrude above existing ground level and require the raising of existing ground levels by approximately 1m in this area. Perimeter fencing will be erected and a gate will be provided at the northern end for vehicular access (to facilitate operational maintenance). Soft landscaping will be incorporated in the form of wildflower grass and perimeter hedging except where vehicular access is required (i.e. tarmac hardstanding would be installed to the north). A footpath will also be provided around the tank where access is required to inspect manholes.

Sewer connections and diversions

The existing foul sewer (225mm diameter pipeline) will be diverted at a new manhole (MHA1). This pipeline diversion will connect to another new manhole (MHA2) that will be provided on the line of the existing sewer (1200mm diameter pipeline).

The existing foul sewer currently discharges untreated wastewater directly to the Avoca River via a concrete box culvert. This culvert will be maintained to facilitate discharge of overflow (i.e. excess storm flows) during flood events. Excess storm flows will be passed from the storage tank via an approximately 900mm diameter pipeline that will connect to the culvert and this discharge of storm flows, during rainfall events, will continue to the Avoca River.

Once operational, flows will be diverted from MHA2 into the SWO and storage tank via another manhole (MHA3) and into an approximately 1200mm diameter pipeline that will connect to the structure. The flows through the tank will be via an open channel reducing in size from approximately 1200mm diameter inlet to approximately 300mm diameter at the outlet. The outlet will divert flows into a new approximately 300mm diameter pipeline via three manholes (MHA5, MHA6 and MHA7).

At this point, flows from the tank will be combined with an existing 225mm diameter pipeline (flowing from the west). At MH7, the pipeline will increase to approximately 450mm diameter and flows will be conveyed to the head of the new interceptor sewer at MHS1. The proposed interceptor sewer between MHA7 and MHS1 will cross under the existing box culvert.

Functionality

The proposed development will intercept the existing combined and storm sewers that currently conveys wastewater. Flows will therefore be passed through the SWO once operational with the wastewater conveyed to the interceptor sewers whilst the storm flows will be passed to and stored in the proposed online storage tank.

The storage tank will provide capacity for holding storm flows. Modelling has been undertaken to ensure that the storm water tank is sized to provide sufficient storage (up to approximately 400m^3). This will ensure that the SWO will discharge to the Avoca River no more than seven times per bathing season in accordance with requirements in the guidance[2] and in the Wastewater Discharge Authorisation Regulations 2007, as amended (Refer to **Section 4.5** for further detail on the relevant licenses and consents).

During significant rainfall events where storm flows exceed the tank storage capacity, excess flows will spill via the SWO to the Avoca River (entering the river channel via the existing culvert). These spills will be screened through a static upward flow screen to ensure particles of more than 6mm in diameter are retained within the tank.

As noted in **Section 4.3.2.2**, access covers will be provided in the roof of the structure. Primary covers will be located over the static screen and a hose reel in a kiosk (approximately 1m x 1m x 1.5m) will be installed adjacent to assist with screen cleaning required to support regular maintenance. Whilst, the tank is designed to be self-cleansing through suitable gradient, benching and a dry weather channel, regular maintenance may be required to facilitate inspections of the tank inlet and outlet pipes.

A small control kiosk is also required to provide power and control signals for instrumentation installed in the stormwater storage tank. The instruments record the level of stormwater and monitor the number of overflow spills to the river.

4.3.2.3 Abandonment of sewers

On diversion of all flows through the SWO and storage tank, there will be no flows from MHA2 to MHA4. This section of 1200mm sewer will be abandoned, though remaining in place. The existing wastewater network pipes that are redundant will typically be pumped with concrete to form a plug at either end of the line.

MHA2 and MHA4 inlet and outlet pipework will be modified to suit flow diversion and abandonment.

Approximately 130m of sewer will be abandoned in this area and approximately 80m will be left in situ. This will include the following as illustrated in **Drawing No.'s 247825-00-C-IS-801 to 247825-00-C-IS-806 in Volume 3**:

- Foul sewer currently collecting between the proposed manholes MHA2 and MHA4;
- Some of the foul sewers currently collecting between the proposed SWO and storage tank and the Avoca River;
- Foul sewer currently collecting under the proposed SWO and storage tank; and
- Foul sewer discharging to the Arklow Bridge.

4.3.3 Interceptor Sewers

4.3.3.1 Overview

Interceptor sewers will be provided to the north and south of the river channel. A sewer will also be provided from the south quay to the north quay under the Avoca River (i.e. the 'river crossing').

The proposed sewers will intercept the existing foul network (that currently discharges untreated wastewater to the Avoca River). The interceptor sewers will join on Mill Road (to the north of the river channel) in order to convey untreated wastewater to the WwTP for appropriate treatment and eliminate in so far as possible, the discharge of untreated wastewater into the Avoca River.

The scope of works for this portion of the proposed development includes:

- Provision of approximately 1.1km of sewer on the southern side of the Avoca River between River Walk and South Quay (of which approximately 300m will be in the river channel).
- Underpinning works to abutments and adjacent bridge pier at South Quay end of Arklow Bridge (a protected structure: RPS A26) to facilitate interceptor sewer construction through southernmost bridge arch;
- Lowering of the river bed under a second bridge arch at South Quay end of Arklow Bridge (a protected structure: RPS A26) by approximately 1m;
- Provision of a SWO located at a new manhole chamber adjacent to South Quay -Harbour Road junction with a discharge point to the Avoca River;
- Provision of approximately 120m of tunnelled sewer crossing under the Avoca River from the South Quay to Mill Road;
- Provision of approximately 800m of tunnelled sewer on the northern side of the Avoca River along North Quay and extending as far as the Inlet Works building in the WwTP;
- Diversion of flows from the existing sewer network along both the southern and northern sides of the river channel on commissioning of the new WwTP;
- Provision of manholes and service shafts along the route of the proposed interceptor sewers;
- Provision of 12 vent stacks along the length of the northern and southern interceptor sewers for ventilation at each of the tunnel shafts;
- Abandonment of approximately 590m of existing sewer network on completion of diversion of flows to the new interceptor sewer.

It should be noted that, as described in detail in **Section 5.6 of Chapter 5**, the interceptor sewers will be installed off line, therefore allowing existing network flows to be maintained until the completion and commissioning of the WwTP.

4.3.3.2 River Walk / South Quay

Overview

The interceptor sewer on River Walk will commence adjacent to the proposed Alps SWO and storage tank (at MHS1) and continue east along River Walk to Arklow Bridge. Immediately upstream of Arklow Bridge, which is a protected structure (RPS: A26), the sewer will enter the Avoca River (i.e. it will be within the river channel) and pass under the most southerly arch of Arklow Bridge to just downstream of South Green.

The sewer will exit the river channel adjacent to the South Quay – South Green junction, pass through the existing quay wall and be on the landside and continue east to the proposed river crossing at Harbour Road. The sewer will traverse under the existing roadway and green space along this section of South Quay to Harbour Road. Approximately 30m of sewer will be installed to the east of the river crossing to collect flows from the existing foul sewer network in this area.

The interceptor sewer network has been designed to tie in with the existing watewater network.

Design details

River Walk

At MHS1 flows from the SWO will be passed into the proposed approximately 450mm diameter pipeline and flow east along the promenade to River Walk and onwards to the proposed WwTP. The sewer will increase to approximately 525mm in diameter after MHS4 and subsequently to approximately 750mm in diameter after MHS5. The proposed and existing sewers will interface at a number of locations along this section.

The proposed sewers will therefore be installed at depth (up to c. 3.5m below ground level) to allow the existing foul sewer network to operate as normal until the proposed development is commissioned. There are four locations along this section where flows will be transferred from the existing foul sewer network to the proposed sewer upon operation, therefore the following will be provided:

- c. 150mm diameter spur pipeline at MHS2 to connect to the existing foul sewer and proposed manhole (MHS2A);
- c. 150mm diameter spur pipeline at MHS3 to connect to the existing foul sewer and proposed manhole (MHS3A);
- c. 150mm diameter spur pipeline at MHS4 to connect to the existing foul sewer and proposed manhole (MHS4A); and
- c. 300mm diameter spur pipeline to the south of MHS5 to connect to the existing foul sewer.

The 750mm diameter pipeline (approximately) between MHS6 and MHS9 will pass under River Walk at a depth of up to approximately 4m below ground level. There are four locations along this section where flows will be transferred from the existing foul sewer network to the proposed sewer upon operation, therefore the following will be provided:

- c. 375mm diameter spur pipeline at MHS7 to connect to the two existing foul sewers;
- c. 300mm diameter spur pipeline at MHS8 to connect to the existing foul sewer; and
- c. 300mm diameter spur pipeline at MHS9 to connect to the existing foul sewer.

Arklow River / Arklow Bridge

At MHS9 the approximately 750mm diameter pipeline will enter the river channel at a depth of approximately 2m below the river bed. The pipeline will be protected with mass concrete and the river bed will be reinstated to its current condition upon completion of construction.

The pipeline will pass under the most southern arch of Arklow Bridge. It should be noted that significant land constraints and the presence of a range of existing utilities, services and infrastructure at the southern end of Arklow Bridge mean that the interceptor sewer cannot be accommodated on the landside portion of this area as discussed in detail in **Chapter 3**.

A small area of land (approximately 40m^2) on River Walk (i.e. upstream of Arklow Bridge around MHS9) will be reclaimed from the river channel to accommodate the proposed manhole and sewer. At this location, the quay wall will be moved further north, by approximately 4m, into the river channel.

The sewer will exit the river channel approximately 15m downstream of Arklow Bridge and connect to MHS10 within another section of reclaimed land on South Quay as described below.

South Quay

An area of approximately 1,650m^2 on South Quay (downstream of Arklow Bridge around MHS10) will be reclaimed from the river channel. At this location, the quay wall will be moved further north, by approximately 6m, into the river channel over distance of approximately 275m.

Sheet piling will be installed outside the area of reclaimed land and the sewer will be laid within the section of reclaimed land. This permanent sheet piling will be capable of accommodating the flood defence walls proposed as part of the forthcoming Arklow Flood Relief Scheme (Refer to **Section 2.6.7 of Chapter 2** for further detail). The sheet pile walls will be capped to match the existing road level on South Quay whilst the reclaimed land will be brought up to ground level (approximately 1.25mAOD) with suitable material, topsoil and seeded. A cross section of the sewer in this area is illustrated in Figure 4.1.

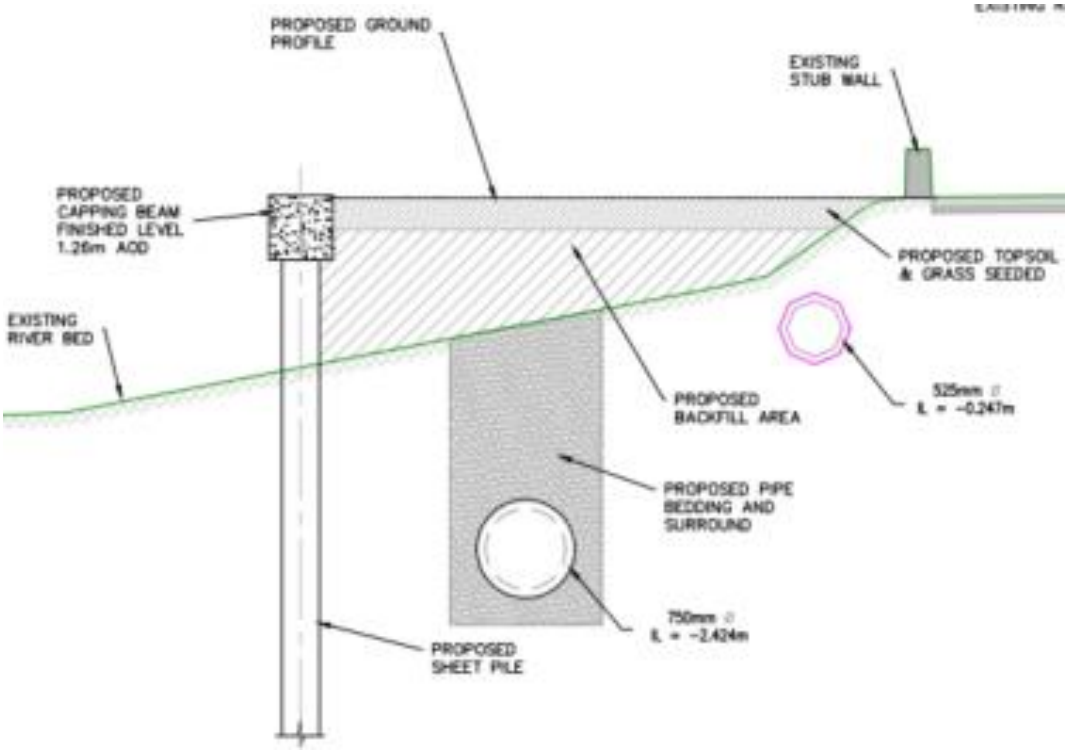

Figure 4.1: In-river section of the interceptor sewer

The existing outfalls along this sewer section will be extended to meet the proposed interceptor sewer in this area and therefore will transfer flows into the proposed interceptor sewer upon operation. The following will therefore be provided:

- c. 600mm diameter spur pipeline at MHS10 to connect to the existing foul sewers;
- c. 150mm diameter spur pipeline at MHS11 to connect to the existing foul sewer;
- c. 600mm diameter spur pipeline at MHS12 to connect to the existing foul sewers;
- c. 300mm diameter spur pipeline at MHS13 to connect to the existing foul sewer;
- c. 225mm diameter spur pipeline at MHS14 to connect to the existing foul sewer; and
- c. 900mm diameter spur pipeline at MHS15 to connect to the existing foul and surface water sewers.

At TSS1 the sewer will leave the existing river channel and be approximately 5.5m below ground level on the existing landside of the quay wall. From TSS1, the approximately 1500mm diameter pipeline will run under South Quay as far as the river crossing at TSS3. Flows will be transferred from the existing sewer (running along South Quay between Doyle's Lane and South Green) to the proposed sewer upon operation, therefore the following will be provided:

- c. 900mm diameter spur pipeline at TSS1 to connect to the existing foul sewer; and
- c. 525mm diameter spur pipeline at TSS3 to connect to the existing foul sewer.

To the east of TSS3, approximately 30m of approximately 1050mm diameter pipeline will be installed between the junction of the South Quay – Harbour Road sewer/river crossing and Rockview Terrace. This pipeline will connect to the existing sewer (at MHS17).

A SWO will be provided in the easternmost tunnel shaft on South Quay (TSS3). This SWO will provide emergency relief for excess storm flows in the sewered catchment and during extended power outages at the proposed WwTP. Hydraulic modelling has been undertaken and the results of spill frequency analysis (of the future system with a 10 year time series rainfall event) indicated that the proposed SWO will spill on average less than once per bathing season which is well below the permitted 7 spills per bathing season that is documented in the guidance[2] and in the Wastewater Discharge Authorisation Regulations 2007, as amended.

An approximately 1200mm diameter pipeline will be installed from the tunnel shaft through the existing river sheet pile wall. The SWO will have a flap valve to prevent water ingress. All spills through the SWO will be screened to ensure that all particles greater than 10mm are retained by the screen.

Abandonment of sewer

Approximately 460m of sewer will be abandoned along River Walk and South Quay and left in situ. The existing foul sewer network pipes that are redundant will typically be pumped concrete to form a plug at either end of the line. This will include the following:

- Foul sewer currently collecting and discharging to Avoca River via the box culvert adjacent to the Alps;
- Some of the foul sewers collecting along the western end of River Walk and associated outfalls;
- Foul sewer adjoining the southern end of Arklow Bridge;
- Foul sewer along South Quay between Doyle's Lane and South Green;
- Foul sewer and outfall between Harbour Road and the Avoca River; and
- Foul sewer and outfall between Rockview Terrace and the Avoca River.

4.3.3.3 River Crossing

The river crossing will be approximately 1500mm diameter pipeline tunnelled 4m beneath the river bed for approximately 120m between the South Quay - Harbour Road junction (on the southern side of the river) and Mill Road (on the northern side of the river). A tunnel shaft will be provided to the north and south of the river channel (TSS3 and TSN6 respectively) and an SWO (as described above) will be constructed at this location to facilitate discharge of excess storm flows.

The 1500mm diameter pipeline will continue along Mill Road to meet the proposed interceptor sewer from North Quay (Refer to **Section 4.3.3.4**). These sewers would ultimately join to convey foul flows and enter the WwTP at the pumping station located at the Inlet Works building (which as described in **Section 4.3.4.4** is 17m below ground level).

There are two locations along this section (to the north of the river channel) where flows will be transferred from the existing foul sewer network to the proposed sewer upon operation, therefore the following would be provided:

- c. 525mm diameter spur pipeline at TSS3 to connect to the existing foul sewer; and
- c. 150mm diameter spur pipeline at TSN6 (which decreases to c. 100mm in diameter) to connect to the existing foul sewers.

4.3.3.4 North Quay

Design details

To the north of the river channel, an approximately 525mm diameter pipeline will be provided upstream of Arklow Bridge to collect from the existing foul sewer to the west of the Arklow Town Marsh. This pipeline will be approximately 2m below ground level. Flows from the existing sewer (that runs along the rear of properties to the west of Ferrybank, i.e. the R772) will be intercepted at a new manhole (MHN1). This approximately 525mm diameter pipeline will connect to the existing sewer and continue east to TSN1 which is located at 1 Ferrybank (i.e. on the site of a demolished property).

At TSN1, the approximately pipeline will increase to approximately 1200mm in diameter in order to provide capacity to accommodate population growth and anticipated future network improvements in Ferrybank and north Arklow.

This approximately 1200mm diameter pipeline will cross under the roundabout to the north of Arklow Bridge before traversing along North Quay following the alignment of the road around Arklow Harbour until it joins the proposed river crossing on Mill Road (as described in **Section 4.3.3.3**). The pipeline will be approximately 1200mm in diameter all along North Quay and it will be entirely tunnelled, typically up to approximately 3-4m below ground level.

At TSN7 on Mill Road, the pipeline will meet the proposed river crossing (Refer to **Section 4.3.3.3**). These sewers will convey wastewater and enter the WwTP at the pumping station located at the Inlet Works building (which as described in **Section 4.3.4.4**, this building is up to 17m below ground level (with an additional 1m for the base slab). The invert level of the incoming sewer is up to approximately 11m below ground level.

There are seven locations along this section where flows will be transferred from the existing foul sewer network to the proposed sewer upon operation, therefore the following will be provided:

- c 525mm diameter spur pipeline to the west of TSN1 to connect to the existing foul sewer;

- c. 300mm diameter spur pipeline and manhole (MHN3A) at MHN3 to connect to the existing foul sewer;
- c. 600mm diameter spur pipeline and manhole (MHN4A) at MHN4 to connect to the existing foul sewer;
- c. 300mm diameter spur pipeline at TSN2 to connect to the existing foul sewer;
- c. 400mm diameter spur pipeline and manhole (MHN5) at TSN3 to connect to the existing foul sewer;
- c. 450mm diameter spur pipeline and manholes (MHN6, MHN7 and MHN8) to connect to the existing foul sewers; and
- c. 300mm diameter spur pipeline at MHN9 to connect to the existing foul and surface water sewers.

Abandonment of sewers

Approximately 130m of sewer will be abandoned along North Quay and left in situ. The existing wastewater network pipes that are redundant will typically be pumped with concrete to form a plug at either end of the line. This will include the following:

- Foul sewer currently crossing the eastern side of the roundabout (to the north of Arklow Bridge) and discharging to the Avoca River via the culvert approximately 50m downstream of Arklow Bridge; and
- Foul sewers and associated outfalls that would be intercepted by the sewer along North Quay.

4.3.3.5 Vent Stacks

12 vent stacks will be provided along the length of the interceptor sewers for ventilation at each of the tunnel shafts (Refer to **Drawing No.'s 247825-00-C-IS-700 to 247825-00-C-IS-716 in Volume 3**). Dispersion into the atmosphere will be via these vent stacks (approximately 300mm in diameter) extending to a height of approximately 7.6m above ground level to provide effective dispersion under all meteorological conditions.

The vent stacks will be provided with appropriate sampling and access points. At ground level, the vent stacks will be designed to resemble lighting columns.

4.3.4 WwTP

The proposed wastewater treatment plant at the Old Wallboard site will comprise: demolition and site clearance and the development of a wastewater treatment plant to provide for 36,000PE wastewater treatment capacity, with preliminary and secondary treatment processes. The main elements of the proposed WwTP are described below.

4.3.4.1 Demolition and Site Clearance

As described in **Section 2.6 of Chapter 2**, the WwTP will be located on the Old Wallboard Site at Ferrybank. There are a number of buildings and structures on this site, that are be required to be demolished and the site will require clearance, prior to the commencement of construction (as described in detail in **Section 5.5 of Chapter 5**).

The existing Old Wallboard factory building is in a poor structural condition and has significant asbestos panel cladding that will require specialist removal prior to the commencement of construction. As outlined in **Section 5.5 of Chapter 5**, this will precede all other work on the WwTP site and a specialist contractor will ensure that the demolition and site clearance works are done in full accordance with health and safety and waste legislation, with all hazardous materials transferred to an authorised facility in respect of which a waste permit or a waste licence is granted.

Once the buildings have been demolished, further site investigations will be undertaken under the footprint of the buildings, to provide further detail of the underlying ground conditions and levels of site contamination (Refer to **Section 5.5 of Chapter 5** for further detail).

4.3.4.2 Proposed WwTP site layout

Overview of WwTP site layout

There are four buildings proposed as part of the WwTP (Illustrated in Figure 4.2) including:

- The Inlet Works building to the north;
- The Process building to the south-east;
- The Sludge Tank Enclosure to the east (located between the Inlet Works and Process buildings); and
- The Administration Building to the south (adjacent to the site entrance at Mill Road).

Figure 4.2: Proposed site layout

Treatment processes at the WwTP would take place within the buildings that have been designed to maximise gravity flows and minimise pumping where possible. The buildings would be stand-alone structures, however the Inlet Works and Process buildings would be connected by an underground services tunnel.

Incoming wastewater will enter the WwTP from the interceptor sewer network via the inlet works pumping station, located below the Inlet Works building. From here, the wastewater will be pumped to the inlet works (within the Inlet Works building) where it would undergo preliminary treatment before gravitating to secondary treatment in the Process building, as outlined in Figure 4.6. The treated effluent and excess storm flows will be discharged via the long sea outfall and SWO respectively, to the Irish Sea. Excess sludge from the treatment processes will be dewatered on site and transported off site for further treatment and appropriate disposal. Further detail on the treatment processes is provided in **Section 4.3.4.4**.

Vehicular and pedestrian access to the WwTP site will be via the entrance on Mill Road. This entrance will be normally closed by a security gate for safety and security control and access will be restricted to employees and contractors accessing the WwTP (i.e. the site will not generally be accessible to the public). The following infrastructure will be provided to serve the WwTP:

- 20 car parking spaces;
- loading bays
- Internal circulation roads and associated hard standing;

- Site lighting;
- all ancillary connections to electricity, telecommunications and water supply networks and site drainage.

4.3.4.3 Architecture

Design Concept

The Old Wallboard site at Ferrybank (i.e. the WwTP site) has a long history as an industrial site, and the existing structures that have stood on the site have formed a key part of the urban memory and character of Arklow town. This part of the town is currently characterised by the remnants of this industrial history - sheds, tanks and silos which stand apart from one another on the site, separated by yards and scrub.

Its setting, between the river and the sea, and close to the new developments along the banks of the Avoca River mean that this area could accommodate larger, more urban structures offering places to live and to work in the future. This potential is expressly set out in the waterfront zoning of this area in the Arklow LAP (as discussed in detail in **Section 6.4.2 of Chapter 6**) – a zoning that encompasses a wide range of uses that requires:

"Any new developments in the Waterfront Zone to meet a high standard of design that respects the unique historical, environmental, visual and recreational amenities of the area".

In understanding this context, the proposed development may be thought of as more than just necessary infrastructure as it presents an opportunity to make a civic structure that will positively contribute to the visual environment in Arklow town whilst delivering those environmental and social benefits associated with providing wastewater treatment to the local community.

As set out in **Chapter 3**, the architectural approach has informed the shaping of the massing and appearance of each of the buildings. The design team has collaborated throughout and the result has been an integrated approach in which operational aspects and architectural approaches have been united throughout the design development. There is a clear lineage (from Victorian times to today) of infrastructure which perform as civic structures, and it is in this tradition that Clancy Moore Architects has iteratively designed the proposed development based on comments received during the public consultation and meetings with stakeholders including Wicklow County Council and An Bord Pleanála.

Clancy Moore Architects have sought to design the WwTP to acknowledge this industrial history whilst emphasising the transition of the site to support the future development of Arklow and form a part of the town's growing civic landscape. An iterative, critical and robust design process has resulted in the design which acknowledges this hybrid connection and is therefore rooted in the logics of the plant function and with cognisance of its role as civic infrastructure.

The site layout and landscaping (as described in **Section 4.3.4.1**) is cognisant of those concepts and the customary approach for arranging the site into disaggregated sheds and tanks was not applied to the proposed development. The approach has been to stack and arrange the elements of the WwTP into stand-alone compact structures. The design of the buildings presents a more coherent form and scale that allows the proposed development to set the tone for other future developments in Arklow town. The buildings are more responsive to human scale than elements of the existing site (i.e. the conventional industrial structures). The buildings are arranged so that they will conceal the car parking areas between them and to facilitate soft landscaping around the entire perimeter so that this can form a further positive contribution to the broader landscape character in Arklow town.

Form and Massing

The architecture of the proposed development is anticipated to become an important part of Arklow's visual character given the prominent location between the Avoca River and the Irish Sea. The form and massing of each of the buildings will be as described in Table 4.1.

Table 4.1: Building dimensions for the WwTP

Building	Approximate maximum height (above ground level)	Approximate maximum depth (below ground level)	Approximate plan area
Inlet Works building	16.5m[4]	18m	63.6m x 38.5m
Process building	14.5m[4]	3.5m	66m x 39m
Sludge tank enclosure	8.5m	0m	54.3m x 16m
Administration building	10.1m	0m	18.5m x 9.4m

The Inlet Works building is the tallest of the proposed buildings, however at approximately. 16.5m above ground level, it is about 13m lower than the highest point of the existing building structures. A vent stack will be incorporated on the Inlet Works building and on the Process building each extending approximately 1m higher than the building structures.

The massing of the Inlet Works building has been designed to maintain a shoulder which reinforces the planning objectives that this area is to be developed at a greater density and urban form. Further, this massing echoes the presence of the tall flank of the existing wallboard factory building, close to Mill Road, although the structure will be set back. In the lee of this structure the hard landscaping will be screened from view from the surrounding areas. To the north-eastern end, the longer, lower form of the Process building will accommodate photovoltaic (PV) panels on its roof as described in detail in **Section 4.3.4.6**. The administration building, located to the south of the site will adjoin the entry roadway and will therefore mark the transition to the entrance to the WwTP from Mill Road.

[4] Note – Vent stack extends 1m above the maximum height of the building

The boundary to Mill Road will be set back along the entire frontage by approximately 5m. This will provide passive provision for a future pavement that may be provided by others at some point in the future (i.e. this is not part of the proposed development, however there is no restriction on this being provided in the future by other developers). The site boundary fronting onto Mill Road will comprise a timber fence with low level planting to the pavement edge.

Façade

The façade design takes its cues from the site's history and the nature of this infrastructure. The Inlet Works and Process buildings have an inner, operational façade and an outer façade which allows them to address the civic nature in response to human scale. This external façade will act to screen loading bays, cranes, pipe runs, and internal lighting. This façade will also run above the top of the structures to shield the roofs, including the PV panels on the Process building. The sludge tank enclosure will be screened by a permeable steel and aluminium framework. The façade of the administration building will echo the Inlet Works and Process buildings and would be clad in fibre cement panels.

The external façade will be made with industrial materials (including fibre cement panels, aluminium flashings and aluminium supports surrounded by a steel frame), modulated and serrated into oversized louvred planes so that it has a presence in silhouette when viewed from a distance and responds to human scale when closer to the structure. The serration refers both to the maritime context and the building form.

The horizontal striation produced by the overlapping planes will allow for the buildings masses to respond to the horizon as the primary context of river and sea horizons. Further, the angles of the planes will provide differing levels of shelter at different areas and this will therefore allow the building to subtly change its character depending on the ambient light conditions and rain - inflecting the architecture to its climatic context as illustrated in Figure 4.3 and Figure 4.4.

Figure 4.3: Illustration of the indicative façade on the WwTP from Mill Road

Figure 4.4: Illustration of the horizontal emphasis in façade detailing allows the buildings to respond to the sites riverine and maritime context.

Landscaping Strategy

Landscaping around the four buildings will follow a basic grid, derived from the primary geometries of the site. This grid will include hard landscaping between the buildings in addition to soft landscaping planted around the site perimeter. Soft landscaping is likely to be native plant shrub, grass and tree species found locally such as gorse, grasses, birch and pine trees. The selection of plant species has been undertaken in consultation with the lead ecologist for the proposed development and is proposed as a consolidation and extension of existing biodiversity on the site.

Hard landscaping between the buildings will include concrete and gravel finishes with marked areas for workers on foot to navigate between the buildings. Parking will be provided on site for up to approximately 20 vehicles (including two electric car charging points), approximately four bays for fork lifts and standby areas will be provided for approximately two trucks collecting sludge.

A landscaped area that with additional native planting will be provided to the north-west of the site on the seaward side of Mill Road. This area is outside the boundary of the WwTP site between the road and the upgraded revetment. Upon commissioning, this landscaped area will be handed over to Wicklow County Council as a continuation and contribution to the public realm of the area (Refer to **Section 4.4** for further detail).

External lighting will be installed around the WwTP for the safety and security of staff on the site. Lighting for traffic and pedestrian movements will be low level and discrete.

Flood lighting for operational areas close to the building will be integrated into and shielded behind the architectural façade (Refer to Figure 4.5). Flood lighting to the main yard will not be regularly required and so this lighting (also integrated into the building facades) will only be switched on when required. Flood lighting will not be required to any other areas of the WwTP site.

Figure 4.5: Illustration of the indicative façade and lighting contained therein

4.3.4.4 Treatment Processes

Overview

An overview of the wastewater treatment processes is provided in Figure 4.6. The basis of the specimen design for treatment processes is to ensure that the wastewater is treated in accordance with best practice and legislative requirements and that the effluent discharged from the WwTP will not impact on the receiving waters. The specimen design, which will be developed further by the contractor appointed under the Design and Build contract, will be fully compliant with the requirements of the WFD, UWWT Directive and Urban Wastewater Treatment Regulations, 2001, as amended.

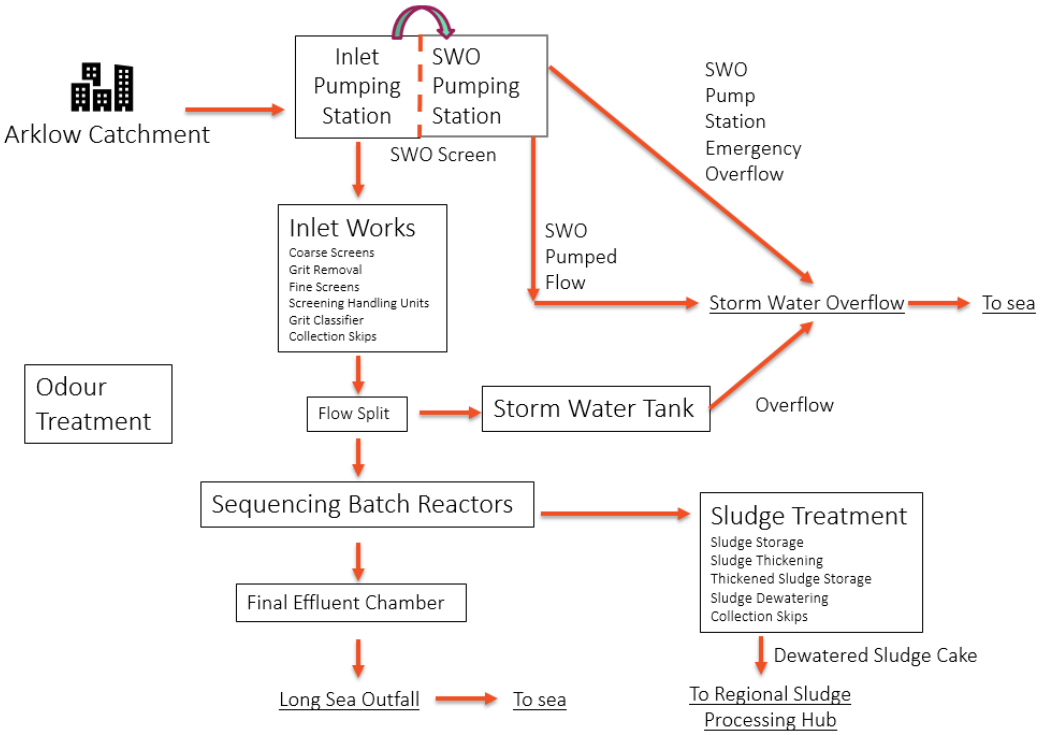

Figure 4.6: Treatment processes in the WwTP

Plant Sizing and Loading

The WwTP will be sized for an ultimate loading of 36,000PE. While the installation of process equipment may be phased, it is proposed that the civil and structural works for the full 36,000PE capacity will be completed during the construction of the proposed development (as described in detail in **Chapter 5)**. The process equipment for an initial capacity of 24,000PE will be installed in the first instance and in this way, the process capability can be scaled up within the proposed buildings as required to accommodate the future growth in Arklow town, to the ultimate capacity of 36,000PE.

The plant sizing and loading has therefore been designed to serve an ultimate capacity of 36,000PE. Specifically, the loading has been estimated based on per-capita contributions for 36,000PE during the specimen design as outlined in Table 4.2.

Table 4.2: Average daily loading of the plant considered in the specimen design

Design criteria	**36,000PE WwTP**	
Average daily organic loads[5]		
Biological Oxygen Demand (BOD)	2,293kg/day	
Total Suspended Solids (TSS)	3,033kd/day	
Chemical Oxygen Demand (COD)	4,986kg/day	
Total Nitrogen (TN)	4452kg/day	
Hydraulic loads[6] (exclusive of return flows)		
Dry Weather Flow (DWF)	8,100m^3/day	94l/s
Formula A flows	61,891 m^3/day	716 l/s
Average Flow (AWF)	10,125m^3/day	117l/s
Full Flow to Treatment (FFT)	24,300m^3/day	281l/s

Effluent Standards

In designing the WwTP, the effluent standards to be achieved have dictated the treatment processes required (Refer to **Section 3.4 of Chapter 3** for further detail). The EPA will ultimately dictate the Emission Limit Values to be achieved in its Waste Water Discharge Authorisation (Refer to **Section 4.5.3** for further detail). However the specimen design for the WwTP has been undertaken on the basis that any discharge from the WwTP (i.e. effluent) will be treated to achieve those standards (i.e. Design Emission Limit Values) outlined in Table 4.3.

Table 4.3: Effluent Emission Limit Values (Source: Urban Wastewater Treatment Regulations 2001, as amended)

Parameter	**Design Emission Limit Values**
BOD	25mg/l
TSS	35mg/l
COD	125mg/l
TN	15mg/l

[5] Average daily loads have been based on per-capita contributions of 60 g BOD/c/d, 75 g TSS/c/d., 120g COD/c/d and 12g TN/c/d

[6] Hydraulic loads have been based on per-capita contributions of 225l/c/d for Dry Weather Flow in line with industry practice

Specifically, the specimen design for treatment processes has been undertaken to ensure that the effluent from the WwTP will achieve these Emission Limit Values to guarantee compliance with the requirements of the UWWT Directive. The proposed treatment processes will therefore meet all regulatory requirements and significantly improve the quality of effluent being discharged in Arklow town.

Approach to Treatment Processes

The criteria outlined in Table 4.2 and Table 4.3 were used as the basis of design for determining and designing the treatment processes incorporated into the WwTP. On the basis of the above, the WwTP will provide preliminary and secondary level of treatment and the processes included therein can be categorised into the following:

a) Inlet works;

b) Storm water management;

c) Activated sludge processes, (Carbonaceous Biochemical Oxygen Demand (cBOD) removal; and

d) Sludge treatment and disposal.

Inlet Works

Wastewater from Arklow town (collected via the proposed interceptor sewer network) will be conveyed to the Inlet Works building at the WwTP. Wastewater will be passed by gravity via a c. 1500mm diameter pipeline into the inlet works sump, from where it will be lifted to the head of the inlet works.

The inlet works sump is up to approximately 18m below ground level (including 1m allowance for the base slab), to allow all wastewater from Arklow to flow by gravity to the WwTP. The pumps in the inlet works sump will convey Formula A flows (see Table 4.2) to the inlet works (i.e. preliminary treatment) located on the first floor of the Inlet Works building. Formula A flows, for context equate to approximately 7 -8 times dry weather flow (DWF). All flows up to Formula A will receive preliminary treatment. The inlet works sump will also include an overflow for flows in excess of Formula A. These excess flows, which may occur from time to time during significant rainfall events, will be passed to the pump sump for discharge through the proposed SWO.

The inlet pumps will lift the wastewater for preliminary treatment in the upper level of the inlet works building. This lift will facilitate a gravity flow through the remaining downstream units. Preliminary treatment will comprise screening and grit removal, as well as stormwater management (as described above). These processes will be contained entirely within the Inlet Works building (as described in detail in **Section 4.3.4.3**).

Flows will be passed through 25mm coarse screening channels which would remove large objects to protect pumps, valves and pipelines from ragging. This is followed by an aerated grit tank and 6mm fine screens to remove smaller particles in the incoming wastewater.

The aerated grit tank, located on the upper floor of the Inlet Works building will be configured into two chambers. Each of the chambers will have blowers for aeration to support settlement. Once the grit has settled, it will be passed via a grit clarifier into nearby skips for removal.

Fats, oils and greases (FOG) removal will also be provided at the Inlet Works building. This will be provided in accordance with Irish Water design specifications and best practice.

Skips will be located within the building and it is anticipated that approximately 1.62m^3 of screenings will be typically produced per day. Once the c. 8m^3 grit skip is filled, the grit will be collected by a suitably permitted contractor and transferred to an authorised facility in respect of which a waste permit or a waste licence is granted. It is anticipated that the grit in the grit skips on the ground floor of the Inlet Works building will be removed approximately twice per week.

Stormwater Management

As outlined in **Section 4.3.2**, other than the proposed SWOs at the Alps and on South Quay, it is not proposed to discharge any wastewater to the Avoca River (in normal conditions). Provision to cater for excess surface water flows, during and/or following significant rainfall events would be provided at the WwTP at an additional SWO that will discharge to the Irish Sea.

Following preliminary treatment, the Formula A flows would enter a storm flow splitter chamber that would separate flows into the full flow to treatment (FFT) and stormwater (the balance of the Formula A flows) channels.

A c. 3,150 m^3 stormwater holding tank will be provided in the Inlet Works building to provide stormwater storage for flows between 3DWF and Formula A flows (with 2 hours storage provided therein) in accordance with the Irish Water standards for Inlet Works and Stormwater Management. Once the inlet flows have reduced to below the FFT flow rate, the contents of the stormwater holding tank will be returned in a gradual manner to a location downstream of the inlet works, to proceed through the WwTP (receiving secondary treatment). Return flows will be controlled by a flow meter on the FFT line. The return pumps will be capable of returning the full volume of the stormwater holding tank in a 12-hour period.

The stormwater holding tank will also be fitted with an emergency overflow, to allow discharge of flows in excess of the tank capacity through the SWO that will discharge to the Irish Sea. This SWO will also provide emergency relief for excess storm flows in the sewered catchment during extreme rainfall events and during extended power outages at the WwTP. The purpose of the SWO storm pumps is the prevent surcharge of the network during wet weather.

The storm flows will be screened at this location. The screenings will not pass into the SWO chamber, they will remain in the Inlet chamber for pumping to the inlet works The pumps in this SWO have been sized to cater for a 1 in 30-year storm event. The pumps will lift excess storm flows to a chamber which will allow discharge under gravity, through the SWO pipeline, discharging through the toe of the upgraded revetment to the Irish Sea). Appropriate non-return valves will be fitted to the pipeline to ensure against sea ingress to the SWO.

The stormwater holding tank will be located on the ground floor of the Inlet Works building and will be covered. A dry weather flow channel will be provided to achieve self-cleansing during normal flow conditions whilst any overflow from the flow control chamber will pass to the storm tank.

The storm tank would be equipped with an automatic cleaning system (re-using final effluent as washwater) to wash the tank following use.

Activated Sludge Process, cBOD removal and nitrification

From the inlet works, wastewater will then be conveyed to the secondary treatment process in the Process building via a pipeline in the underground services tunnel. Secondary treatment will comprise an activated sludge process (i.e. biological process). The basis of design has assumed a sequencing batch reactor (SBR) activated sludge process, however the final detailed design will be selected by the appointed contractor.

The treatment process will include a number of SBR tanks that will treat the wastewater to the appropriate standard for discharge. This treatment process will also produce sludge that can be subsequently thickened and dewatered (on site) prior to removal off site.

The SBR is a fill and draw type reactor system, in which all the steps of the activated sludge process occur within a single reactor. The SBR goes through a number of cycles per day with a typical sequence as follows:

- Fill - 3 hours in duration
- Aerate - 2 hours
- Settle - 0.5 hours
- Decant - 0.5 hours

An idle stage can also be included to provide flexibility during high flow events. Six SBR tanks will be provided in the Process building to provide the ultimate capacity for 36,000PE. At least one SBR tank will be available for fill at any moment, while the other tanks can go through the react, settling and decanting sequences. Mixed liquor will remain in the SBR tank at all times to provide the biomass for the cBOD removal processes.

Wastewater will enter the SBR tank from the Inlet Works building via the inlet valve during the filling stage. Once filled, aeration will be accomplished by fine bubble diffused air which encourages biomass to multiply and reduces organic matter by consuming nutrients. One air blower will be provided in each SBR with a standby air blower also provided for contingency.

Following aeration, sludge biomass will be allowed to settle to the bottom of the SBR tank. The sludge will be periodically removed, and stored in a local sludge tank. As described in detail below, the sludge will then be thickened and stored as thickened sludge before dewatering. Dewatering will be the final step converting liquid sludge to dry cake for export off site (i.e. for removal to the sludge hub centre).

From the SBR tanks, the effluent will be discharged to the final effluent tank and thereafter conveyed by gravity to the Irish Sea via the long sea outfall, as described in detail in **Section 4.3.5**.

Sludge Treatment and Disposal

Sludge generated from the activated sludge process in the SBR tanks (i.e. secondary sludge) will be transferred, via progressive cavity pumps to two secondary sludge buffer tanks in the Sludge Tank Enclosure (Refer to **Drawing No. 247825-00-STE-001 in Volume 3**). Based on the 36,000PE ultimate capacity, it is estimated that an excess sludge volume of approximately 400 m^3 per day, at a dry solids content of approximately 0.67% will be produced. The secondary sludge buffer tanks have been designed to provide up to approximately 4 days storage. The sludge buffer tanks will also provide contingency when excess sludge is produced and/or where the dewatering equipment is temporarily out of service or overloaded. The sludge buffer tanks will be equipped with a high-level overflow to the supernatant sump (return liquor sump).

Sludge drum thickeners will be provided to thicken the secondary sludge to approximately 5.5% dry solids. The specimen design is based on the drum thickeners operating 7 hours per day over a 4-day week. The thickened sludge volume produced on this basis will be approximately 47 m^3 per day. Thickening polymer will be added to the sludge to assist with the thickening process.

The thickening process will also produce a filtrate, at a rate of approximately 415 m^3 per day, which will discharge to the supernatant sump.

The thickened sludge will then transferred to the thickened sludge storage tank, where c.18 days storage will be provided in the sludge tank enclosure. From the thickened sludge storage tank, sludge will be fed by progressive cavity pumps to a duty/standby dewatering unit (belt press or centrifuge) which will dewater the sludge to a minimum of 18% total dry solids. The dewatering process units will be located in the Inlet Works building (Refer to **Drawing No.'s 247825-00-INL-001 to 247825-00-INL-D-003 in Volume 3**).

Dewatering polymer will be added to assist with the dewatering process and the design of each of the dewatering units has been sized to operate over a five-day week. The anticipated volume of dewatered sludge cake produced will be up to approximately 14 m^3 per day.

The dewatered sludge will subsequently be transferred to one of three covered skips contained in the Inlet Works building. This sludge will then be removed from the site by the operators' collection vehicles and transported for disposal to a regional sludge hub as described in **Section 4.6.2.1**.

Return liquors/supernatant from the following areas, will be collected and pumped back to downstream of the inlet works, to re-join the treatment stream:

- Filtrate from the sludge drum thickeners;
- Filtrate or Centrate from the sludge dewatering units;
- Emergency overflow from each sludge tanks;

  - Two sludge storage tanks;
  - A thickened sludge storage tank;
- Contaminated site drainage (sludge wash-down areas);
- Screenings handling dirty water from Inlet Works (dewatering of screenings);
- Analyser/instrument waste water;
- Drainage from Inlet Works building and Process Building;
- Odour control wastewater; and
- Wash Water Filter waste water.

As described in detail in **Section 4.3.4.3**, the Sludge Tank Enclosure will be open and naturally ventilated, however the tanks will be covered and an Odour Treatment Unit (OTU) would be provided for this enclosed space, as described below.

Odour Treatment

A centralised OTU has been designed for the WwTP, with an odour concentration of 183 odour units (OU)/m^3 and an emission rate of approximately 1,592 OU/sec. The OTU will comprise biological and carbon filters and the treated air will discharge through a 600 mm, 17.5 m high vent stack, in the Inlet Works building (i.e. 1m above the roof).

Air from the following areas would be treated in the OTU:

- Inlet pump sump;
- Stormwater holding tanks;
- Inlet works – screenings and grit disposal skips;
- Sludge holding tanks;
- Sludge thickeners;
- Sludge dewatering;
- Dewatered sludge skips; and
- Supernatant sump.

No odour treatment will be provided in the Process building as it will be sealed and mechanically ventilated. The design odour concentration for the Process building is 1,323 OU/m^3 with an emission rate of 1,890 OU/sec. The Process building will be vented via a 600mm diameter vent stack at 15.5m height (i.e. 1m above the roof).

The odour control system for the WwTP has been designed to comply with an odour limit of 3OU/m^3 at the WwTP site boundary. As outlined in **Section 9.2.2 of Chapter 9,** Irish Water has recommended an odour limit value of 3OU/m^3 of the 98th percentile of 1-hour value at the site boundary for the proposed development. This limit value has been determined by Irish Water's odour specialist in cognisance of the forthcoming Irish Water Odour Management Plan.

Monitoring and Flow Measurement

As a minimum, flow measurement will be provided for the following aspects of the WwTP:

- Inlet pumping station on the rising main upstream of the inlet works;
- Full flow to treatment (FFT) downstream of the flow splitter chamber;
- Stormwater return rising main;
- Stormwater holding tank – on the emergency overflow;
- SBR feed – upstream of the flow distribution chambers;
- Final effluent discharge;
- Waste activated sludge; and
- Return liquors rising main.

As a minimum, it is also proposed to sample the following:

- Raw water time composite (24 hour) automated sampler, to be located downstream of the Inlet Works fine screens and upstream of the return liquors and stormwater return; and
- Flow proportional composite automatic sampler to be located downstream of the final effluent tank.

It is anticipated that some testing of sludge and/or effluent may be required within a laboratory contained within the Administration building for quality control. Such operations will be subject to detailed design and operational procedures employed by the contractor. The contractor will be responsible for specifying and getting the appropriate consents prior to operation.

4.3.4.5 Structural and Civil Structures

Inlet works

The inlet works is likely to be a steel framed building supported by reinforced concrete shear walls/cores extending to roof level, however the contractor may use a concrete framed structure.

The façade will be supported on a steel frame connected back to the primary building structure. In-plane bracing will be provided at intermediate bays to prevent “racking” of frames due to lateral loads.

The Inlet Works building will cover the dry well of the inlet and pump station.

Process Building

The Process building frame will be a two-span duo-pitch roof supported by rafter beams, columns and bracing in the walls. An alternative braced frame roof structure will also be a possibility that may be explored by the contractor.

The reinforced concrete tanks within the Process building will be founded on a reinforced concrete raft slab at ground level that will extend locally to support the building columns.

The service area enclosed by the Process building to the north of the tanks will have pad foundations below columns and strip foundations below walls. The internal slab will be ground bearing.

Sludge Tank Enclosure

The Sludge Tank Enclosure will be a steel frame trellis type structure fully open on top. Stability of the columns will be achieved through moment connections onto their pad foundations. Alternative framing arrangements may also be explored by the contractor.

Administration Building

The Administration building will be a two-storey building constructed using domestic scale type construction with load bearing masonry founded on strip foundations.

4.3.4.6 Mechanical Electrical and Plumbing

Mechanical Services

The mechanical services scope will comprise heating, ventilation and cooling (HVAC) systems, water services installations, drainage services installations, fire-fighting installations and a building management systems (BMS) installation.

HVAC Services

Foul air generated by the initial stages of the treatment process within the WwTP will be extracted by an Odour Control (OC) system and discharged to atmosphere via the vent stacks. A combination of natural ventilation and mechanical ventilation will be provided to service the remaining areas of the WwTP including within the Inlet Works Building, and the Process building. Mechanical ventilation will be provided either by internal Air Handling Units (AHUs) or by extract fan systems installations. The Sludge Tank Eenclosure will be naturally ventilated, therefore mechanical ventilation will not be required therein.

The WwTP will be mostly unoccupied, therefore a minimum level of heating would be incorporated in the Inlet Works and Process buildings to prevent the formation of condensation and frost. Electrical energy will be used directly for this purpose (i.e. for heater batteries in AHUs, localised panel heaters, etc.), therefore a full heating system installation is not proposed.

The Administration building will be provided with a full air conditioning installation and a mechanical ventilation installation for the supply of fresh air. An extract fan system will also be provided for the sanitary accommodation and a fume cabinet is envisaged for installation within the testing laboratory.

Water Services and Drainage

A dedicated watermain, connected to the public water supply will be provided as part of the overall infrastructure at the WwTP site. This incoming water main will be metered upon entry after which it will be distributed below ground to serve each of the individual buildings.

A complete water services installation including for the provision, as required, of mains, cold and hot water to each building. The mains water will feed a number of mains water break tanks within the Inlet Works and Process buildings which will in turn service the respective cold water service requirements such as safety showers, wash-down hose reels, process equipment etc. The mains water will also feed a 24hr cold water storage tank which will in turn service the cold water service requirements of the Administration building. Point of use type electric water heaters will be provided to service any hot water service requirements of areas such as the sanitary accommodation.

An above ground soil and waste drainage installation will be provided for all buildings including the provision of, as required, drainage from all equipment, from all sanitary accommodation and from all items of equipment within ancillary spaces including workshop, laboratory, canteen etc. Condensate drainage will also be provided as necessary from any HVAC equipment installations.

Rainwater collection from the roofs of the various buildings will be discharged directly to drain.

Fire Suppression / Firefighting Installations

Fire suppression systems will not be installed within any spaces in the buildings other than possibly within the main communications room. There is no requirement for a sprinkler system, dry risers, or wet risers to be provided within any of the buildings, however portable fire extinguishers will be provided in the Administration building in accordance with the standard[7]. An industrial purpose fire hose reel will be installed to service both the Inlet Works Building and the Process Building in accordance with the standard[8].

Electrical services

The electrical services will comprise low voltage reticulation inside the buildings, small power distribution, lighting design, fire alarm, security (CCTV and access control), lightning protection systems, renewable energy generation (PV), bulk power supply to process equipment and other specialist services.

A passenger lift will be provided within the Administration building. Electric vehicle charging stations will be provided as part of the car parking provided at the WwTP site.

[7] NSAI (2015) *IS291:2015 Selection, commissioning, installation, inspection and maintenance of portable fire extinguishers.*
[8] NSAI (2012) IS EN 671-1:2012: Fixed firefighting systems. Hose systems. Hose reels with semi-rigid hose

Electrical reticulation

The proposed development will be connected to the existing ESB distribution network via a new 10kV connection at the WwTP site boundary on Mill Road (adjacent to the administration building). The maximum demand for the WwTP is currently estimated at 900kVA. The new 10kV connection will require a dedicated ESB substation room in the Process building. This substation room will house all ESB equipment and access would be restricted to ESB personnel only.

A 10/0.4kV, 1,250kVA cast resin stepdown transformer will be provided in the Process building. The transformer will be located in a dedicated room adjacent to the ESB substation. The use of a dry-type transformer is preferable as oil is not required for cooling of the transformer.

ICA (instrumentation, control and automation) equipment and panels will also be provided to monitor and control the treatment processes and be housed in the WwTP buildings, as shown on the **Drawing No. 247825-00-MP-001 in Volume 3**.

Generator Supply

The WwTP will have an emergency power supply from a standby diesel generator located in the Process building that will provide up to 24 hours' backup supply. The intention is that this generator will operate in the event of power outages. Preliminary estimates suggest a generator set of approximately 1,250kVA.

The generator room will be acoustically treated, to ensure that noise levels (outside of the generator room) do not exceed 80dB(A) at 1m from the exhaust.

There will be up to approximately 6,200l of diesel stored on site to supply the generator for 24 hours before refuelling is required. The diesel will be stored in a separate room, adjacent to the generator room in a bunded area to ensure containment and prevent spillages of fuel.

PV Installation

Photovoltaic (PV) panels will be installed on the roof of the Process building to provide an onsite source of renewable energy. The PV installation will tie-into the low voltage electrical installation at the main distribution board.

The PV installation will consist of around 450 PV panels appropriately mounted on the roof of the Process building. There will be 15 rows of panels (30 panels in each row), with approximately 1m separation distance between every panel to allow for maintenance access and to prevent shading. The PVs will be 0.5 – 0.8m in height above the proposed building and it is anticipated that they will be shielded from view by the façade of the Process building as described in **Section 4.3.4.3.**

The PV installation will connect into the main distribution board of the facility and assist in reducing the daytime power requirement from the national grid. The anticipated energy yield for the first year is 110MWh.

4.3.5 Long Sea Outfall and SWO

A long sea outfall and SWO will be provided as part of the proposed development. The long sea outfall will discharge treated effluent and the SWO to the north of the long sea outfall, will discharge excess stormwater flows from the WwTP and will also act (in parallel with the proposed SWOs at South Quay and the Alps), as an emergency relief for excess flows in the sewered catchment during extreme rainfall events and extended power outages. Both the long sea outfall and the SWO will cross under the upgraded revetment and discharge into the Irish Sea.

The long sea outfall and SWO as illustrated in **Drawing No.'s 247825-00-M-O-1001 to 247825-00-M-O-4101 in Volume 3** will be perpendicular to the shoreline. A 100m wide pipe corridor (i.e. 50m either side of the long sea outfall) is included in the consent application, to allow flexibility for construction activities required within this corridor.

The SWO (located to the north) will terminate at the toe of the upgraded revetment and likely comprise concrete material. It will have an internal diameter of approximately 2000mm. A precast culvert concrete structure will be installed through the revetment to accommodate the SWO pipeline. Flows through the SWO will discharge below Mean Low Water Spring levels. The SWO pipeline will be fitted with a non-return value.

The long sea outfall (located to the south) will be approximately 955m in length (i.e. approximately 900m from shoreline) and will likely comprise high density polyethene (HDPE). It will have an internal diameter of approximately 630mm.

The specimen design provides for up to approximately 6 elastomeric variable orifice check valves as part of a subsurface diffuser located at the end of the long sea outfall. The riser valves would be vertical, therefore aiding the dispersion of treated effluent in the water column. Each diffuser will be equipped with a non-return flex valve and marker buoys would be provided to mark the location of the end of the outfalls therefore ensuring that boats are aware of their presence.

Flow through the long sea outfall will be via gravity and sufficient capacity will be provided to allow for high velocity pumped flush, therefore avoiding any blockages in the outfall during continuous periods of low rainfall.

4.3.6 Revetment

The existing rock armour revetment adjoining the site will be upgraded as part of the proposed development. The existing rock armour will be removed and subsequently replaced over a distance of approximately 360m along the coastal side of the WwTP site boundary as illustrated in **Drawing No.'s 247825-00-M-R-1001 to 247825-00-M-R-2003 in Volume 3.**

The alignment of the revetment will follow the existing shoreline on its northern and southern ends. The curve of the central part of the existing revetment will be slightly softened to provide additional space between the Inlet Works building and the revetment.

It should be noted that there is an existing cable (owned by GE Energy) that runs under the existing revetment. The proposed development will encroach within the existing 50m cable buffer zone for this cable, however as agreed with GE, a 10m buffer zone around the cable would be adhered to and thus the proposed development would not extend within this zone.

The revetment would consist of a double layer of rock armour of approximately 6-10 tonnes (T) on an underlayer of approximately 0.3 to 1T. The thickness of the armour layer and underlayer will be approximately 2.9m and approximately 1.3m respectively. The revetment will be finished at approximately 7.5mOD (i.e. approximately 1 to 3m above the level of the existing revetment crest) with a crest width of approximately 9 – 10m.

The total width of the upgraded revetment at its base will be approximately 50m (including the toe of the revetment that is to be buried under the seabed), however this will be subject to local minor variations due to changes in ground and seabed levels. Fill material will form the foundation of the revetment and a geotextile layer will be placed between the underlayer and the fill material to provide an adequate interface.

4.3.7 Energy Efficiency

The need to transition to a low carbon economy is well recognised and acknowledged in the Irish context. The National Planning Framework[9] reiterates that:

"The Government is committed to a long term climate policy based on the adoption of a series of national plans over the period to 2050, informed by UN and EU policy. This is being progressed through the National Mitigation Plan and the National Climate Change Adaptation Framework."

It also states that in addition to legally binding targets that:

"It is a national objective for Ireland to transition to be a competitive low carbon economy by the year 2050."

As a public-sector body, Irish Water is required to meet targets set by the Public Sector Energy Efficiency Strategy[10] (PSES) throughout, which fulfils the commitments made in Ireland's third National Energy Efficiency Action Plan[11],

[9] Project Ireland 2040 – National Planning Framework, Government of Ireland, 2018, http://www.npf.ie
[10] Public Sector Energy Efficiency Strategy, Department of Communications, Climate Action and Environment, 2017 https://www.dccae.gov.ie/documents/Public%20Sector%20Energy%20Efficiency%20Strategy.pdf
[11] National Energy Efficiency Action Plan, 2014, Department of Communications, Energy and Natural Resources, https://www.dccae.gov.ie/documents/NEEAP%203.pdf

the Energy Policy White Paper, Ireland's Transition to a Low Carbon Energy Future 2015 – 30[12] and the Programme for a Partnership Government 2016[13].

The PSES requires public bodies such as Irish Water to improve its energy efficiency by 33% when measured against the base year of 2009. It requires the public sector to:

"*Employ an action focussed and results driven approach to public sector reform and cost efficient energy management*', which will '*foster a cleaner and healthier environment now and for future generations.*"

Irish Water recognises the need for energy efficient design of its assets, as set out in its Water Services Strategic Plan[14] (Strategic Plan) which includes its vision that:

"*…through responsible stewardship, efficient management and strong partnerships, Ireland has a world class water infrastructure that ensures secure and sustainable water services, essential for our health, our communities, the economy and the environment.*"

The Strategic Plan includes key objectives with regard to the protection and enhancement of the environment, including:

"*ensure that Irish Water services are delivered in a sustainable manner which contributes to the protection of the environment…*

mitigating our climate impact by reducing our carbon footprint…

Supporting the objectives of the National Energy Efficiency Action Plan through targeted investments and adapting asset operations."

Irish Water is committed to designing, building and operating assets to be as energy efficient as possible. Irish Water's energy policy sets out the following specific commitments:

- Continuous improvement and certification to ISO 50001;
- Improving energy efficiency and replacing inefficient plant and process;
- Designing, building and operating assets to ensure energy efficiency;
- Including energy efficiency performance and reporting future contracts;
- Encouraging the use of innovative technologies;
- Using renewable energy where feasible; and
- Measuring energy performance indicators.

[12] Ireland's Transition to a Low Carbon Energy Future 2015 – 2030, Department of Communications, Energy and Natural Resources, https://www.dccae.gov.ie/documents/Energy%20White%20Paper%20-%20Dec%202015.pdf
[13] A Programme for a Partnership Government, May 2016, https://merrionstreet.ie/MerrionStreet/en/ImageLibrary/Programme_for_Partnership_Government.pdf
[14] Water Services Strategic Plan, 2015, Irish Water, https://www.water.ie/docs/WSSP_Final.pdf

Energy efficiency has therefore been fully integrated into the design of the proposed development from the outset. All design proposals have been challenged to ensure that maximum efficiency can be delivered throughout the life cycle. Key energy and resource efficiency measures incorporated as part of the proposed development include:

- The WwTP has been located as close as possible to the load centre in Arklow town;
- The WwTP is adjacent to the Irish Sea (i.e. the target location for final discharge of effluent) and all discharge will be conveyed to the long sea outfall via gravity flow to minimise pumping requirements (and thus associated energy use);
- All foul flows in the interceptor sewer network will be conveyed by gravity to the WwTP to minimise pumping requirements (and thus associated energy use);
- Wastewater in the WwTP will be mostly conveyed by gravity flows (with the exception of the initial inlet works pump station lift) to minimise pumping requirements (and thus associated energy use);
- Soft start pumps/efficient pump selection will be utilised throughout;
- On-site renewable energy in the form of PV panels that use solar energy have been incorporated into the plant design (As described in detail in **Section 4.3.2**) to optimise the generation and use of renewable energy at the WwTP;
- The plant design has incorporated energy efficient design throughout, considering whole life cycle cost and measures to minimise energy use, in accordance with Irish Waters Energy Efficient Design Standard;
- Energy efficient lighting technologies will be used throughout the proposed development (to minimise associated energy use);
- Provision has been made for two electric car charging points at the WwTP site;
- The buildings on the WwTP site will be naturally ventilated where possible, with heating limited to mitigate the effects of frost and condensation in the Inlet Works and Process buildings only. Occupied spaces will have heat recovery ventilation systems. The combination of these HVAC elements will minimise associated energy use in the building during operation;
- Re-use of final effluent for washing of units, the provision of grey water collection, storage and re-use; and
- The production of sludge for use of the regional Sludge Hub centre to support opportunities for energy recovery and reuse of sludge where possible (in accordance with the National Sludge Management Plan).

4.4 Community Gain

Irish Water recognises the importance of ensuring that the development and operation of its assets is undertaken with minimum impact and indeed to the benefit of the local community. A number of community gain initiatives are included as part of the proposed development, as outlined below.

- The primary community gain benefit is the proposed development itself, i.e. the provision of the WwTP, which will provide appropriate treatment of wastewater for the people of Arklow now, and into the future.
- The provision of the WwTP will also result in significant environmental improvements in Arklow, particularly with regard to water quality. The existing outfalls discharging untreated wastewater into the Avoca River will be discontinued, with a long marine outfall, discharging treated effluent, replacing the existing outfalls. This will result in a significant improvement in water quality in the Avoca River.
- At the WwTP, the site boundary has been pulled back from the existing road line, by 5m, to further accommodate pedestrian traffic along Mill Road and to provide passive provision for additional public realm in this area.
- As described in **Section 4.3.4.3**, a landscaped area with additional native planting will be provided to the north-west of the WwTP site. Upon commissioning, this landscaped area will be handed over to the Wicklow County Council as a continuation and contribution to the public realm of the area.
- Facilities will be provided within the signature WwTP building for use by schools.
- Irish Water is also committed to making all relevant environmental data it gathers as part of the EIA process and during operation, available to stakeholders.
- The provision of wastewater treatment in Arklow town aligns with the County Development Plan as it will help create a safe and healthy environment whilst assisting in the protection of its natural resources as well facilitating the achievement of the population and employments targets set out for Arklow.
- The proposed development will meet the land use zoning outlined in the Arklow LAP by providing a high standard of design that respects the local area and providing the required wastewater treatment in the appropriately zoned area in Arklow town.

4.5 Separate Consents

4.5.1 Overview

This section provides an overview of the relevant consents, licences, authorisations and permits that would be required in addition to the consent for the proposed development from An Bord Pleanála (Refer to **Section 1.3 of Chapter 1** for further information on the planning process).

4.5.2 Foreshore License/Lease

Under the provisions of the Foreshore Act 1933 to 2014, as amended, a lease or licence must be obtained from the Minister for Housing, Planning and Local Government for development works on the State-owned foreshore. A lease is generally issued for a development that requires exclusive occupation of the foreshore whilst a licence is generally issued for a development that does not require exclusive occupation of the foreshore.

Foreshore consent applications would therefore be required for specific elements of the proposed development including the following:

- The underpinning of Arklow Bridge;
- Construction works in the Avoca River to construct the interceptor sewer and sheet pile walls;
- The tunnelling of the interceptor sewer under the Avoca River from the South Quay to Mill Road;
- Construction works to construct the long sea outfall in the Irish Sea; and
- Construction works for the SWO and upgraded revetment at the WwTP site.

Foreshore consent application(s) for the above works are being submitted to the Department of Housing, Planning and Local Government in parallel to the application for consent that is being submitted to An Bord Pleanála. A pre-application consultation meeting was held with the Foreshore Unit in the Department of Housing, Planning and Local Government on 20 June 2018.

4.5.3 Waste Water Discharge Authorisation

Water Services Authorities are required to apply for a Waste Water Discharge Authorisation (WWDA) for any agglomeration with a population equivalent of over 500. Specifically, under Regulation 5 of the Waste Water Discharge Regulations 2007 as amended, the proposed development will require a WWDA from the EPA to discharge treated effluent to the Irish Sea and discharge storm overflows to the Avoca River and the Irish Sea.

Prior to the commencement of operations, Irish Water will apply to the EPA for the waste water discharge licence or certificate of authorisation for the proposed development (including the discharge of storm overflows and treated effluent).

It is anticipated that Irish Water will amend the previous application for a WWDA for Arklow and Environs that was submitted in December 2007[15]. On 14 April 2014, Irish Water confirmed[16] with the EPA that the intention is to submit a revised WWDA licence application to the EPA on completion of the planning process and receipt of consent for the proposed development.

4.5.4 Building Certification

The Building Control Act 1990 and the Building Control (Amendment) Regulations 2014, provide an enforcement framework to ensure improved quality of buildings. A Code of Practice has been issued by the Department of Environment, Community and Local Government[17] outlining the steps required to ensure compliance with the applicable legislation.

On this basis, suitably competent parties will be appointed by Irish Water, to certify that all buildings are fully compliant with the relevant legislation. This will include undertaking the construction in accordance with the plans and specifications, provision of a competent person to oversee the works, obtaining relevant certificates including the Fire Safety Certificate, Disability Access Certificate and maintenance of all relevant records as required.

4.5.5 Other Licences/Consents required

Any other relevant consents, authorisations and/or licences required for the proposed development are described in detail as appropriate in **Chapters 7 – 19**. A summary of likely requirements is provided below:

- Derogation licence from the National Parks and Wildlife Service (in accordance with the Habitats Directive and under the European Communities Birds and Natural Habitats) Regulations 2011, as amended) to undertake construction works that may disturb individual bats and their breeding and resting places;
- Licence for archaeological excavation from the National Monuments Service (Under Section 26 of the National Monuments Act 1930 to 2014) for any intrusive works that would require archaeological excavation and/or monitoring;
- Licence for a dive survey from the National Monuments Service (under Section 3(5) of the National Monuments Act 1987) for any underwater archaeological activities;

[15] EPA (2018) License Details: D0006-01. Available from: http://www.epa.ie/terminalfour/wwda/wwda-view.jsp?regno=D0006-01 [Accessed 25 June 2018].
[16] EPA (2018) Correspondence re license D0006-01: Available from: http://www.epa.ie/licences/lic_eDMS/090151b2805318eb.pdf [Accessed 25 June 2018]
[17] Department of Housing, Planning, Community and the Local Government (2016) Code of Practice for Inspecting and Certifying Buildings and Works: Building Control Regulations 2007 to 2015. Avialable from: http://www.housing.gov.ie/sites/default/files/publications/files/2016-10-21_code_of_practice_for_inspecting_and_certifying_buildings_and_works_final_version.pdf [Accessed 21 June 2018]

- Section 50 Consent from the Office of Public Works (in accordance with the Arterial Drainage Acts 1945 and 1995 and The European Communities (Assessment and Management of Flood Risks) Regulations 2010 and 2015) to undertake any works to Arklow Bridge that may impact on flood risk;
- Trade Effluent Licence from Wicklow County Council (in accordance with Section 4 of the Local Government (Water Pollution) Acts 1977 to 2007) to discharge to a surface waterbody such as the Avoca River and/or Irish Sea during the construction of the proposed development;
- Relevant licences under the Roads Acts 1993 to 2016 from Wicklow County Council to undertake temporary road closures and diversions during the construction period;
- Relevant waste permits from the EPA (in accordance with the Waste Management Acts 1996 to 2011) to ensure compliance during the removal, transfer and disposal of waste; and
- Certificate of Planning Compliance from Wicklow County Council (in accordance with Part VII of the Planning and Development Act 2000, as amended) to certify that supervision and construction has been undertaken in compliance with relevant building and planning legislative obligations. The Certificate of Planning Compliance (Certificate of Compliance on Completion) is required to be validated by Wicklow County Council under Part IIIC of the Building Control Regulations 1997, as amended.

4.6 Operation of the Proposed Development

4.6.1 Overview

This section describes the likely operational activities of relevance to this EIAR. It should be noted that as outlined in **Section 4.2**, the contractor will be responsible for the initial operations during the early years of the proposed development.

4.6.2 Management

4.6.2.1 Maintenance and Monitoring

Maintenance activities will typically include the following:

- General maintenance on a daily basis;
- Preventative maintenance as scheduled by the operator;
- Inspections of equipment including the SWOs on a weekly basis;
- Inspection of chambers on pipelines on an annual basis; and
- Inspection of diffusers via dive survey on an annual basis.

Monitoring activities will be undertaken in accordance with the WWDA and will typically include:

- Quality and quantities of influent and treated effluent discharge;
- Individual elements of the treatment processes in the WwTP;
- Individual elements of the pumping station;
- Flows in the interceptor sewers, SWOs and long sea outfall; and
- Air, noise and odour emissions.

4.6.2.2 Sludge

The sludge generated by the WwTP will be produced in accordance with the National Wastewater Sludge Management Plan (Refer to **Section 6.2.7 of Chapter 6** for further detail) which requires dewatering to a minimum 18% dry solids for treatment plants in excess of 10,000PE.

The dewatered sludge will be placed in one of three skips, with the skips removed by licensed contractors once filled. The dewatered sludge will be transported to a sludge hub centre for further treatment and appropriate disposal in accordance with the National Wastewater Sludge Management Plan.

As outlined in **Section 4.3.4.4**, It is anticipated that approximately 14 m^3 of dewatered sludge will be typically generated per day under normal conditions. It is therefore estimated that removal of dewatered sludge from the skip may be required every day (worst case scenario).

The vehicles required for this purpose will travel down Mill Road and South Quay to the Arklow Bridge junction where they will travel onwards to the relevant sludge hub centres (Refer to **Section 4.6.2.4** and **Chapter 7** for further information).

4.6.2.3 Site Deliveries/Exports

There will be a number of deliveries of the necessary equipment and materials to the WwTP site once operational, e.g. polymer will be regularly required to support the activated sludge process and deliveries may be required to the Administration building including chemicals, office consumables etc.

Further, a number of vehicles will regularly come to the WwTP site to remove waste such as the grit produced in the Inlet Works building and municipal waste generated from the Administration building.

It is anticipated that these vehicular movements would be minimal in the context of existing traffic levels in the local area (Refer to **Section 4.6.2.4** and **Chapter 7** for further information).

4.6.2.4 Access

The above ground structures of the proposed development (i.e. the Alps SWO and Stormwater Storage Tank and the WwTP) will be located in sites secured by perimeter fencing with controlled access gates and appropriate security measures in place. This will restrict site access and ensure that only relevant personnel can access these assets during the operation of the proposed development.

As outlined in **Section 4.3.2**, the Alps SWO and Stormwater Storage Tank will be accessed via River Walk.

As outlined in **Section 4.6.2.1**, it is anticipated that up to 10 vehicles will be required to enter and exit the WwTP per day (i.e. 10 - 20 additional trips per day) which will be minimal in the context of existing traffic levels and prevailing traffic conditions in the local area. It is anticipated that parking for all vehicles accessing the WwTP can be accommodated on site.

4.6.2.5 Environmental, Health and Safety Management

In accordance with the Irish Water procurement procedures, the operator will be required to have certified health and safety (OHSAS 18001) and environmental (ISO 14001) management systems. The management systems provide for the monitoring of environmental and safety performance and implementation of continuous improvement through associated action programmes. These programmes are frequently and routinely monitored by Irish Water and will continue to be developed over the operating life of the proposed development.

In accordance with the typical requirements of a WWDA, procedures will be established and put in place to notify the EPA of emergencies, exceedance of licence conditions and where environmental pollution has, or may have, taken place.

4.6.3 Employment

When completed and fully operational, the proposed development is likely to employ approximately 3 - 5 personnel, some of whom would work in shifts as the facility will be operational 24 hours per day.

4.7 Decommissioning

This section describes the relevant assumptions that have been made with regard to the decommissioning of the proposed development. It should be noted that the design life for the proposed development is 50 years and Irish Water considers the proposed development to be a key strategic asset in its portfolio.

As such, it is anticipated that the proposed development will be maintained and upgraded by Irish Water as required in line with all their other strategic assets. In the event of decommissioning, the following measures will be undertaken by Irish Water to ensure that there will be no likely significant effects associated with the decommissioning of the proposed development:

- All raw materials, chemicals, oils, fuel etc. on site at the time of closure will be returned to the supplier, or collected and recycled or disposed of by an authorised waste contractor, as appropriate;
- All WwTP buildings and process equipment will be decontaminated and decommissioned in an appropriate manner;
- Infrastructure and underground pipelines are not anticipated to be removed. Generally, specialist equipment will be sold for reuse, where possible, or disposed of off-site;
- All buildings, structures and pipelines will be decommissioned;
- Roads, hard-standing and site fencing will be retained; and
- When operations have ceased, it is expected that there will be no requirement for long-term aftercare management at the site.

The decommissioning measures are required to be implemented to the satisfaction of the competent authority and any relevant licenses and discharges will be surrendered in accordance with the relevant requirements.

4.8 References

Department of Communications, Climate Action and Environment (2017) *Public Sector Energy Efficiency Strategy*

Department of Communications, Energy and Natural Resources (2015) *Ireland's Transition to a Low Carbon Energy Future 2015-2030*

Department of Communications, Energy and Natural Resources (2014) *National Energy Efficiency Plan*

Department of the Environment (1993) *Procedures and Criteria in relation to Storm Water Overflows*. Available from: http://www.epa.ie/pubs/forms/lic/wwda/uwwtdirective91271eecproceduresrcriteriairtstormwateroverflows.html [Accessed 22 May 2018]

Department of Housing, Planning, Community and the Local Government (2016) *Code of Practice for Inspecting and Certifying Buildings and Works: Building Control Regulations 2007 to 2015*.

EPA (2018) Correspondence re license D0006-01: Available from: http://www.epa.ie/licences/lic_eDMS/090151b2805318eb.pdf [Accessed 25 June 2018]

EPA (2018) License Details: D0006-01. Available from: http://www.epa.ie/terminalfour/wwda/wwda-view.jsp?regno=D0006-01 [Accessed 25 June 2018].

Government of Ireland (2018) *Project Ireland 2040 – National Planning Framework*

HMSO (1970) *Report of the Technical Committee on Storm Overflows and the Disposal of Storm Sewage*

Irish Water (2015) *Water Services Strategic Plan.* Available from: https://www.water.ie/projects-plans/our-plans/water-services-strategic-plan/ [Accessed 20 June 2018]

NSAI (2012) *IS EN 671-1:2012: Fixed firefighting systems. Hose systems. Hose reels with semi-rigid hose*

NSAI (2015) *IS291:2015 Selection, commissioning, installation, inspection and maintenance of portable fire extinguishers.*

A Programme for a Partnership Government, May 2016, https://merrionstreet.ie/MerrionStreet/en/ImageLibrary/Programme_for_Partnership_Government.pdf