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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

PROPOSED WASTEWATER TREATMENT PLANT EXTENSION AND RISING MAIN

DAWN MEATS IRELAND, GREENHILLS, BEAUPARC, NAVAN, CO. MEATH

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NON-TECHNICAL SUMMARY

GENERAL

This Environmental Impact Assessment Report has been prepared on behalf of, and for the exclusive use of Dawn Meats Ireland Unlimited Company (also referred to as Dawn Meats (Slane) within this report) by Panther Environmental Solutions Ltd., with respect to an application for planning permission to Meath County Council for the construction of alterations to an existing approved effluent plant development (Planning Ref: LB180300) to include:

a) Demolition of an existing storage building (17.50 m^2) and construction of a new single-storey industrial type building to enclose the DAF unit granted planning permission under planning reference LB180300 and to provide new enclosed chemical store and control room (total floor area 119 m^2).

b) Install a new sludge press at intake to WWTP, change aeration tank to anoxic tank, install 2no additional aeration tanks, and alteration to perimeter berm to increase the footprint of WWTP by 539 m^2 to that granted planning permission under planning reference LB180300.

c) Treated wastewater rising main from the site of the proposed development to a new discharge point at the River Boyne (distance 7.2km), where pipeline shall be laid along a section of Windmill Road, the L1013, Yellow Furze Road, the L1600 (Boyne Rd), and the unnamed local road leading from the L1600 to the private lands abutting the River Boyne at the discharge point.

…at Painestown, Seneschalstown, Dollardstown, Hayestown-Carryduff Little & Ardmulchan, Navan, Co Meath.

This planning application relates to amendments to the approved effluent plant design, an extension to the approved wastewater treatment compound at Dawn Meats (Slane), and the construction of a rising main pipeline route to the River Boyne alone. There are no proposed changes to the construction or processes or management at the main facility.

The proposed development would involve the construction of a WWTP which would be anticipated to exceed the threshold population equivalent as defined under Class 11, Part 2 of Schedule 5 of the Planning and Development Regulations, 2001 as amended: "*Waste water treatment plants with a capacity greater than 10,000 population equivalent as defined in Article 2, point (6), of Directive 91/271/EEC not included in Part 1 of this Schedule.*"

Therefore, the proposed development would fall within the category of development listed under Class 13(a), Part 2 of Schedule 5, where: "*Any change or extension of development already authorised, executed or in the process of being executed (not being a change or extension referred to in Part 1) which would: (i) result in the development being of a class listed in Part 1 or paragraphs 1 to 12 of Part 2 of this Schedule, and (ii) result in an increase in size greater than 25 per cent, or an amount equal to 50 per cent of the appropriate threshold, whichever is the greater,*" which would render the submission of an EIS / EIAR a mandatory requirement.

Dawn Meats (Slane) is a producer and processor of beef products. The facility at Slane, which was previously operating as Newgrange Meats, was acquired by the Dunbia Group in 2001, and incorporated into Dawn Meats Group in 2018.

This site takes in live cattle and produces sides and quarters for further processing at other Dawn Meats sites or direct sale. The facility employs 77 people, and slaughtering usually operates Monday to Friday from 7.00am – 5.00pm. The site of the abattoir was originally a farmyard where on-farm slaughter of cattle was undertaken.

Dawn Meats (Slane) originally held an IPPC licence (Registration No. P0811-01), issued by the Environmental Protection Agency (EPA) in March 2010. The licence was granted for the following activity: "*The operation of slaughterhouses with a carcass production capacity greater than 50 tonnes per day*".

The IPPC licence was amended in January 2013 to comply with the European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. 9 of 2010), and again in December 2013 to comply with the Industrial Emissions Directive (Council Directive 2010/75/EU), where a new IE licence was granted (replacing the IPPC licence terminology). Dawn Meats (Slane) requested a licence review in May 2016, following the grant of planning permission in 2015 (Planning Reference LB140803). The IE Licence was reviewed and the current IE Licence (P0811-02) was issued on the 27th June 2017.

The Dawn Meats (Slane) facility is located in the townland of Painestown, approximately 4.5km south of Slane and 8.5km east of Navan, Co. Meath. The site location map, existing site layout map and a map of currently approved effluent plant works are included as **Attachments 2.1 and 2.2** respectively. The overall site, owned by Dawn Meats (Slane) is approximately 11.5 hectares in size and is located in a rural, farming area predominantly comprised of pastureland and hedgerows. Residential development in the area is predominantly linearly aligned along the existing road network. A number of large farmsteads, as well as some industrial developments are also located within the area. A railway line runs in a west to east direction approximately 1.4 km north of the site. The River Boyne flows in a north-westerly direction and is located, at its closest, 3.1 km north of the site.

The site is accessed via Windmill Road, a local road linking to the L1013 road. The L1013 road connects to the N2 National Primary Road 1.3 km to the east and to the R153 Regional Road (between Navan and Kentstown) some 5.4 km to the west.

Dawn Meats (Slane) are proposing to amend and extend the approved on-site effluent treatment system to provide for additional treatment to a quality sufficient for discharge to the River Boyne. The discharge of treated effluent to the River Boyne would necessitate the construction of a treated effluent rising main from the Dawn Meats (Slane) facility to the River Boyne at Ardmulchan, Co. Meath.

Wastewater at the Dawn Meats (Slane) site currently undergoes primary treatment, comprising of a pumping sump, meva screen, slatted tank and drum screening. Effluent from the production facility, domestic effluent from the onsite buildings and dirty yard drainage is collected via a network of process drains and passes through the pumping sump and meva

screen before being directed to a slatted collection tank. Solid wastes collected from the meva screen are transferred to dolavs and treated as Category 1 waste.
The slatted collection tank allows for the settlement of solids and removal of floating soluble fats. There are also additions from the dewatering of organic fertiliser by-product (lairage/lorry-wash centrate and potentially bellygrass centrate) to this tank. From the slatted tank, effluent is pumped to a drum screen where secondary fine screening takes place to remove additional solids from the wastewater. Drum screen solids are collected in dolavs and treated as Category 1 waste. Wastewater is then discharged to the adjoining HDPE wastewater storage lagoon (Lagoon 2). From Lagoon 2, effluent is pumped to the Dissolved Air Flotation (DAF) Treatment Unit where further solids and fats are removed. The DAF solids are stored in onsite storage tanks for landspreading during the open season (as per the Nitrates Regulations) or transferred to offsite storage awaiting the open season. Once wastewater has been treated by the DAF, wastewater is discharged to the adjoining HDPE wastewater storage lagoon (Lagoon 1) to await collection and transfer off-site to a licenced municipal wastewater treatment plants at Navan and Ringsend for further treatment.

The currently approved development (Planning Ref: LB180300) would allow for Primary Treatment – Stage 2 and Biological Treatment – Stage 3.

The approved Stage 2 would comprise the construction and commissioning of a new balance tank and sludge holding tank and the relocation of the DAF unit. The balance tank would provide storage capacity to buffer the effluent composition/loading and balance out flow fluctuations from the plant in order to facilitate the treatment of effluent via the DAF and biological stages at a steady rate. Effluent from the balance tank would pump to the relocated DAF unit. From here, sludge would gravity feed into a sludge transfer tank and into the new sludge holding tank. The sludge holding tank would store the DAF sludge and biological activated sludge prior to off-site treatment.

The approved Stage 3 would comprise the construction and commissioning of a single anoxic tank basin, clarifier and sand filter.

The proposed amendments to the approved Stage 3 effluent treatment process would improve nutrient removal rates and future proof the effluent treatment plant.

Two aeration tanks are proposed as part of the application for planning permission. It is proposed to initially construct one aeration basin, which would have sufficient capacity to treat the effluent currently generated to a high standard. The second construction phase would include a new second aeration basin to increase the treatment capacity of the effluent plant and maintain a sufficient effluent quality for discharge to the River Boyne.

Effluent from the DAF unit would pump to the anoxic tank to allow for the de-nitrification process through the use of bacteria, which breaks down the nitrate in the effluent waste. In the anaerobic/anoxic tank, denitrification would take place by mixing the food source (DAF out-flow), micro-organisms (return activated sludge) and nitrates (aeration tank effluent). From the anoxic tank, effluent would flow to the biological aeration tank, where biological breakdown of the effluent takes place. The aeration tanks would be fitted with an air diffuser network and three air blowers, which would run as duty, duty and assist to manage any high loading on the treatment plant from the effluent.

From the aeration tank, effluent would enter the clarifier, which acts as a settlement tank by removing suspended solids and returning the settled sludge to the aeration tank. Heavier sludge would settle to the bottom of the clarifier while the lighter clear water would flow over the weir to a pump sump where it would pass through a column sand filter. The sand filter would reduce the suspended solids in the final effluent, which would also lower the COD/BOD level of effluent. Treated effluent from the sand filter would gravity feed to a final discharge sump, which would temporarily store the final effluent prior to collection via road tanker. The proposed WWTP layout is included in **Attachment 2.3**.

It is also proposed to extend the approved control house building. The approved control house includes for a room to enclose the effluent plant computerised control systems and the effluent plant laboratory. It is proposed to extend the control house to include a bunded room to house the effluent plant chemicals and chemical dosing equipment, and another room to enclose the relocated DAF unit. The enclosure of the DAF unit would improve the management of the potential for odours at the site. This would involve the demolition of an existing storage building located beside the currently approved control house footprint.

Following effluent treatment, Dawn Meats (Slane) proposes to discharge the treated effluent to the River Boyne. This would involve the construction of an underground treated effluent rising main, approximately 7.2 km in length, from the Dawn Meats (Slane) facility to the River Boyne at Ardmulchan, Co. Meath. The proposed treated effluent rising main would commence at Dawn Meats and follow local roads to the River Boyne north-west of the site, passing through the townlands of Painestown, Seneschalstown, Dollardstown, Hayestown-Carryduff Little and Ardmulchan. The proposed treated effluent rising main route is shown in **Attachment 2.4**.

The proposed discharge to the River Boyne would take place at Ardmulchan, Co. Meath. The proposed treated effluent emissions have been based upon the assimilative capacity of the River Boyne, the current water quality of the River Boyne and comments made by Meath County Council. The assimilative capacity assessment (included as **Attachment 9.1**) was used to predict the river's ability to accommodate treated effluent discharge of BOD_5, Total Phosphorous, Orthophosphate, Nitrogen, Nitrate, Ammonia, Suspended Solids and Oils, Fats and Greases from the Dawn Meats (Slane) facility. The assessment concluded that the River Boyne would have sufficient assimilative capacity to accommodate the proposed discharge from the Dawn Meats (Slane) facility.

An outline Construction Environmental Management Plan (CEMP) and outline Traffic Management Plan have also been prepared as part of this application. These plans would be required to be reviewed by the construction works contractor and agreed with Meath Co Co prior to implementation.

HUMAN BEINGS

The proposed development is located within a rural agricultural landscape, sparsely populated, with residential development primarily linearly aligned along the existing road network. A number of large farmsteads and agricultural facilities involved in cattle rearing and beef production are located in the surrounding area of the Dawn Meats (Slane) site. The area also supports a number of commercial developments.

The investment required for the proposed development demonstrates Dawn Meats Group's commitment to the Painestown area. The proposed development would have a positive impact upon the local economy by providing temporary employment during the construction phase and by contributing to the local economy through direct spending of goods and services in the area.

The proposed development would have a potential nuisance upon human beings during the construction phase due to increased dust and noise emissions. However, the potential impact would be temporary given the transient nature of construction works. Noise and dust control measures would be implemented throughout the construction phase to reduce the potential impact. Therefore, noise and dust would not be considered to pose a significant impact.

During the operational phase, there would be potential for odour generation from the wastewater treatment process. The potential for odour impacting upon human beings would be considered low, given that odour control and operational measures are currently in place at the Dawn Meats (Slane) site, and would be updated to incorporate the new development.

No significant additional noise impact would be anticipated during the proposed development's operational phase. The site currently undertakes noise monitoring in accordance with their IE Licence conditions and has in place a Noise Management Plan to ensure good operational measures and housekeeping. This plan would be updated to incorporate the new development. There is a potential for construction noise to cause an environmental nuisance, particularly along the route of the pipeline, however, this would be mitigated through standard construction noise mitigation methods and the short term nature of the pipelines phased construction.

The proposed development has the potential to impact upon traffic volumes in the area, which may subsequently impact upon the generation of noise and dust emissions. While there would be increased vehicle movements during the construction phase, this would be for a limited period of time only. An outline Traffic Management Plan for the proposed construction works has been prepared, and would be reviewed by the construction works contractor once appointed. The traffic management plan includes measures to ensure there would be no impact to school traffic, around the hours of 9am and 3pm. Areas of public road in which the rising main would be installed or required to cross would be fully reinstated in accordance with Meath County Council's requirements. During the operational phase, there would be a significant decrease in vehicle movements as the current practice of tankering final effluent offsite would cease.

The proposed rising main and discharge to the River Boyne would result in an overall decrease in vehicle movements during the operational phase, as the proposed discharge of treated effluent to the river would remove the need for tankers to transport wastewater daily to municipal WWTPs.

The proposed development would not be anticipated to have any significant impact upon the land use of the area. The proposed WWTP extension would be within the area previously used for Integrated Constructed Wetland wastewater treatment and the planned rising main would be located underground.

There would be no significant impact upon the visual landscape due to the proposed development, as the WWTP extension would merge with the existing WWTP and the planned rising main would be located underground.

There would be no adverse impacts to human beings due to a deterioration in water quality. During the construction phase, water quality would be protected by the implementation of mitigation measures and through the preparation and implementation of a Construction Environmental Management Plan by the construction works contractor. Standard best practice methods for construction, including construction works within drains and within rivers would be adhered to at all times.

There would be no deterioration in water quality as treated final effluent values proposed by Dawn Meats (Slane) have been based upon the River Boyne's assimilative capacity and current water quality.

The proposed development and planned discharge of final effluent to the River Boyne would not be anticipated to have an adverse impact upon drinking water quality. The overall risk from the planned discharge to drinking water from the Staleen water abstraction point would be considered low, based upon the proposed treatment process, the future planned discharge limits, the level of dilution, the quality of the receiving water and the anticipated impact of discharges during normal and abnormal operations.

AIR QUALITY AND ODOUR

The main potential sources of air pollutants from the proposed development would be emissions of carbon dioxide and nitrous oxide emissions arising from wastewater treatment and dust generated during construction works.

Carbon dioxide would be generated during biological wastewater treatment, with the organic carbon component of wastewater incorporated into biomass (sludge) or oxidised to carbon dioxide.

Nitrous oxide emissions may arise during the biological breakdown of nitrogenous compounds present in wastewaters, through the processes of de-nitrification and nitrification. De-nitrification involves the use of bacteria to break down the nitrate present in wastewater into oxygen and nitrogen gas. The oxygen is consumed by the bacteria and the nitrogen gas releases to the atmosphere. This process would place within the anoxic tank proposed for the WWTP extension. Emissions of nitrous oxide to the atmosphere can be generated during both the nitrification (within aeration basins) and de-nitrification processes. While nitrous oxide can be an intermediate product of both the nitrification and de-nitrification processes, it is more often associated with denitrification.

It should be noted that wastewaters currently generated at the Dawn Meats (Slane) facility are transported to a municipal WWTP for treatment, where carbon dioxide and nitrous oxide emissions would be generated and released to atmosphere. Therefore, the proposed development would result in the release of carbon dioxide and nitrous oxide emissions occurring at the Dawn Meats (Slane) site as opposed to the municipal WWTP, and consequently, would not result in a significant overall increase of either carbon dioxide or nitrous oxide emissions to the atmosphere.

The treatment of wastewaters from slaughtering and meat processing facilities has the potential for the generation of odours due to the high organic content of wastewaters and the volatilisation of odorous gases during the treatment process. Odours generally arise from effluent treatment plants as a result of poor management, bad housekeeping or equipment failure.

Current wastewater treatment involves screening the wastewater and pumping it to an effluent storage lagoon. The wastewater passes from the first lagoon through a Dissolved Air Flotation (DAF) unit to the second lagoon. Wastewater is then sent off-site to a municipal WWTP or other suitable wastewater treatment facility. At present effluent is stored without aeration, however, it is transported off-site daily.

The potential for odour emissions from the effluent treatment system at the site would reduce following completion of the proposed development due to the higher standard of treatment provided.

The guidance document EPA 1997 "Wastewater Treatment Manuals – Primary, Secondary and Tertiary Treatment" states that "Biological treatment processes are not generally a major source of odour". This statement is in the context of sufficient and appropriate design and managerial measures being in place at the treatment plant in question.

The Dawn Meats (Slane) facility has an Odour Management Plan in place to minimise the risk of odour arising from the facility and to ensure compliance with their IE Licence conditions pertaining to odour, including for monitoring and management measures for key odour sources, odour audit checks and management system review.

It is anticipated that, due to the design of the proposed WWTP and provided appropriate management measures are implemented, that there would be no significant odour impact at odour sensitive locations as a result of the proposed development. However, odour scrubber units are proposed to be installed on the balance tank and the sludge holding tank in order to provide additional controls. It is also proposed to enclose the DAF unit within the control house to improve the management of the potential for odours at the site.

Earthworks during construction are a potential source of dust pollution. Minimal levels of dust would be expected to be generated during the construction phase given the confined area of earth-works and the short term of the construction phase. The issue of construction dust dispersion may be exaggerated with vehicles transporting sand/gravels/concrete/etc. to and from the site, having the potential to cause an environmental nuisance to use of the local road.

Construction dust control is a common part of construction management practices. The effect of construction activities on air quality, in particular construction dust, would not be significant following the implementation of the proposed mitigation measures such as good working practices, dust suppression measures, sweeping of roads and hardstand areas where required and undertaking reinstatement works as soon as practicable.

Currently, wastewater from the existing WWTP is collected 7-8 times per day by tanker and transferred to a municipal WWTP. The upgrade of the WWTP and the proposed discharge of treated effluent to the River Boyne would therefore eliminate these effluent tanker movements, leaving approximately one collection of de-watered sludge required per day. The proposed development would therefore result in a decrease in air emissions due to the overall reduction in tanker movements.

NOISE

A Noise Assessment Report has been prepared in support of this EIAR and is presented in **Attachment 6.1**. The Noise Assessment Report identified the main noise sensitive locations (NSLs) and assessed the potential impact of the proposed development at these locations, in accordance with the methodologies prescribed in ISO 9613-2:1996 "*Attenuation of Sound during Propagation Outdoors*," and in BS 4142:2014 "*Methods for Rating and Assessing Industrial and Commercial Sound*".

As a result of the predictive noise assessment, it is anticipated that the proposed development would have a moderate impact for a limited period of time at noise sensitive locations during the construction phase. No significant additional noise impact would be anticipated during the operational phase of the proposed development at noise sensitive locations.

Maximum construction noise levels at the WWTP would be anticipated to arise from excavator activity and water pumps and general construction noise.

The National Roads Authority's "*Guidelines for the Treatment of noise and vibration in National Road Schemes*" (2004) states construction noise levels at noise sensitive locations of 70 dB(A) L_{Aeq} between daytime hours (07:00-19:00) and 60 dB(A) L_{Aeq} between evening (19:00-22:00 hours) are considered to be acceptable.

During the construction phase of the proposed WWTP compound, noise arising from the construction works is predicted to range from 38 to 47 L_{Ar30}. It is predicted that there would be a low to no significant impact on noise sensitive locations as a result of the WWTP construction works.

Horizontal directional drilling (HDD) would allow for the set-up of construction equipment as remote as possible from noise sensitive receptors, thereby minimising potential noise impacts. While HDD is the preferred method for the laying of the rising main, this may not be possible at all locations depending on ground conditions and the open-cut excavation method would need to be used.

In the event of using the open-cut method for laying the rising main within 20m of a noise sensitive receptor, construction noise is predicted to fall above the NRA Guidelines limits of 70 dBA daytime and 60 dBA evening time.

As construction noise would occur over a short period, would be managed through appropriate mitigation measures and would result in no permanent change to the existing noise environment of the area, it is considered that there would be a moderate noise impact as a result of proposed construction works along the pipeline route.

Within the WWTP compound, maximum construction has been predicted to be in compliance with the NRA Guidelines limits of 70 dBA daytime (07:00am to 19:00pm) and 60 dBA evening time (19:00pm to 23:00pm). Along the pipeline route where the pipeline would pass within 20m of the residence façade, the use of temporary noise barriers would be required in order to comply with the NRA daytime limit of 70 dBA.

It is recommended that guidance on control of noise, as per The National Roads Authority's "*Guidelines for the Treatment of noise and vibration in National Road Schemes*" (2004) and British Standard 5228-1 "*Code of practice for Noise Control on Construction and Open Sites*" be followed during the construction phase.

It is recommended that all construction works be conducted between the hours of 07:00am and 19:00pm Monday to Friday. All works should be timed during the work day so as to minimise noise impacts upon local residents in so far as is possible.

Any works which, by necessity, are required to be carried out outside of these times should be notified to the relevant bodies, i.e. the local council or the EPA, and any potentially affected local residents in good time and prior to specified works commencing.

It is recommended that all onsite workers, hauliers and contractors be informed of noise considerations, both onsite and on local access roads, during the operational and construction phases of the proposed development.

It is recommended that considerations with regard to noise be included in a Construction Environmental Management Plan (CEMP), as per the outline CEMP included in this application, to be prepared by the construction firm prior to beginning works.

At the proposed WWTP compound, maximum operational phase noise levels could arise from the operation of large vehicles, aeration blowers operating at maximum output and general background effluent treatment plant noise.

There would be no operational noise associated with the operation of the pipeline.

A worst case scenario has been predicted for noise arising from the operation phase of the proposed effluent treatment plant. This is principally based on the maximum noise which could occur from the operating of a HGV within the site and air blowers.

The operational phase worst case scenario assessment has predicted that noise levels from HGV's would range from 11 to 21 dBA below the existing background noise levels. An 'inaudible' noise would typically be 10 dB or more below the measured L_{A90} background noise level at a noise sensitive location.

Therefore, it is predicated that worst case scenario noise arising onsite would be inaudible to very lowly audible above the existing daytime background noise levels at the nearest noise sensitive locations.

However, it should be noted that during evening and night time periods, lorry noise levels would be anticipated to range from 3-4 dBA below background at the closest noise sensitive receptors. Therefore, there would be anticipated to be a slight impact at the exterior of these residences should lorry activities occur outside of daytime hours. This activity is not predicted to cause an impact within living spaces at the closest noise sensitive receptors.

Maximum equipment noise would also be greater than 10 dBA below the existing evening and night-time background noise levels at receptors. Normal site operational noise at the site would also be expected to be inaudible at the nearest noise sensitive locations.

The principal factors controlling noise from the proposed development are by design, in particular the set-back distance from nearby noise sensitive locations and the construction of an earth berm surrounding the development.

All operational noise from the proposed development has been predicted to be in compliance with the EPA (NG4) daytime, evening and night-time guidance limits.

It is also concluded that Dawn Meats (Slane) would remain in compliance with their EPA IE licenced noise limits.

It is the main conclusion of this noise impact assessment that no significant alteration to the existing noise environment would occur as a result of the proposed development at Greenhills, Beauparc, Co. Meath.

In order to ensure continued good practice in relation to the management of noise at the Dawn Meats (Slane) facility, it is recommended that the existing site Noise Management Programme be updated prior to commissioning of the proposed effluent treatment plant.

VISUAL IMPACT

The existing development is located within a rural agricultural landscape, dominated by pasture fields of varying sizes, bordered by hedgerows. Arable fields and small wooded areas can also be found scattered around the landscape. The surrounding topography can be described as undulating in nature with well-established hedgerows and treelines, providing an effective natural screen for the proposed development.

The proposed construction of an extended effluent treatment compound would take place on infilled ground, in an area which has been reinstated from a previous use as integrated constructed wetlands. The proposed compound area would be recessed by one metre below the existing reinstated ground level. The existing, approved and proposed development would include six treatment tanks, the tallest of which would be the anoxic tank at 6.5m (5.5m OEL) (Over Existing Ground Level). A landscaped and planted earth berm would also be constructed at approximately 2.0m OEL surrounding the eastern, northern and western boundaries of the proposed compound area which is proposed to be planted with suitable tree and shrub species.

It is anticipated that the proposed WWTP compound area would have a moderate medium-term visual impact prior to the establishment of boundary planting. Following the establishment of planted native hedgerow species, the development would effectively blend with the existing facility and hedgerows of the surrounding area and have no significant long-term impacts to visual amenity.

The proposed WWTP extension would only be visible along a short section of Windmill Road, and would not constitute a significant feature of the wider landscape. Where the structures would be visible, the proposed structures would be framed to the left and right by

existing structures at the site and the structures would not exceed the height of the existing structures from these perspectives. Along the section of the Windmill Road leading from the site entrance to the summit of the hill, the proposed compound would be effectively screened by the intervening topography and the roadside hedgerow.
The proposed pipeline route would be underground and would therefore not be visible. The proposed pipeline route would follow the path of the roads in the area and would be placed on the margin of the road where possible. Any necessary disturbance to hedgerows would be minor and short term as vegetation becomes re-established.

A natural stone revetment outfall would be small in scale and would effectively blend into the riparian edge of a meadow. The rising main outlet would be constructed below the low flow level of the River Boyne, and therefore would have no visual impact. Following re-establishment of vegetation on the bank surrounding the structure, it is considered that the revetment would effectively blend with the character of the riparian zone.

Given the nature, location and design features of the proposed site, it is considered that the proposed development would result in no significant landscape and visual impact.

BIODIVERSITY

A Natura Impact Statement has been prepared in support of this report and is presented in **Attachment 8.1**.

The closest protected sites to the proposed development are the River Boyne and River Blackwater SAC (Site Code 002299) and the River Boyne and River Blackwater SPA (Site Code 004232). The proposed treated effluent discharge point would be located at the River Boyne, therefore the discharge point would be located within the SAC and SPA sites. It is not anticipated that the proposed development, by itself or in combination with other developments, would impact negatively upon the Natura 2000 network during the construction or operational phases of the project.

The site is not anticipated to have a significant negative ecological impact upon the flora and fauna of the area, given the relatively small footprint of the development, the temporary loss of habitats during the treated effluent rising main works and given that habitats within the proposed development area generally of either low ecological value or common to the area.

The design of the proposed outfall for treated effluent at the River Boyne has yet to be finalised. However, given the limited footprint and given that the majority of the outfall would be constructed on the area of wet grassland at the river bank, it is not considered that the proposed outfall would result in a significant loss or destruction of habitat for aquatic fauna.

The removal of mature trees would be avoided where possible. Where sections require removal, they would be replanted using native species. As it may be necessary to undertake hedgerow removal works during the bird nesting season (1st March to the 31st August), a suitably qualified ecologist would be engaged to carry out inspections for the presence of breeding birds prior to any clearance works taking place. Where nests are present, the ecologist would make a decision as to whether a "*Licence to interfere with or destroy the breeding places of any wild animals*", is required from the NPWS. Alternatively, the ecologist may establish a suitable buffer zone around an active nest, with removal works rescheduled until chicks have fledged. Where no evidence of nests are found during inspection, hedgerow removal works must be undertaken within three days of inspection.

No rare or protected flora or fauna were recorded within the proposed development site during the field assessment. Where protected species, such as bats or the common frog are found during the construction phase of the project, an officer of the NPWS would be notified prior to the resumption of activities.

No invasive flora species of concern were noted as present for the proposed development area during the site assessment. Given the nature of the proposed development, it is considered that there would be no risk of introducing invasive species during the operational phase. The potential risk of introducing invasive species during the construction phase would be considered low.

The proposed development is not anticipated to have a significant ecological impact to flora and fauna due to a deterioration in water quality of the River Boyne. The proposed treated effluent emission values have been based upon current water quality in the River Boyne and the river's assimilative capacity. The assimilative capacity assessment has determined, assuming a theoretically clean river, that the proposed discharge would not result in the River Boyne failing to achieve good status. The assessment concluded that the River Boyne would have sufficient assimilative capacity to accommodate discharges from the Dawn Meats (Slane) facility.

During construction works of the proposed development and the treated effluent rising main, surface water quality would be protected by means of buffer zones and appropriate silt control features.

No significant impacts on fauna would be envisaged due to noise or dust from the proposed development. Any fauna present within the Dawn Meats (Slane) facility or immediate area would be accustomed to the facility's existing noise environment, therefore the potential impact due to operational noise associated with the WWTP extension would be considered low. The Dawn Meats (Slane) facility has a noise management plan in place for the site, which ensures good controls with regard to noise outside the site boundary. This plan would be updated to incorporate the new development onsite.

While there would be increased noise emissions during the construction phase of the development along the rising main route, these would not be considered to pose a significant risk owing to the transient nature of works and given that all vehicles where possible would be equipped with mufflers to suppress noise, as is standard practice.

During the construction phase of the development, there would be potential for dust emissions. However, dust emissions would not be considered to have a significant potential impact on fauna due to the transient nature of construction works and the implementation of dust control measures.

SURFACE WATER

The proposed development would not result in any changes to the current stormwater run-off system onsite and there are no anticipated changes to existing storm discharges from the facility, or current runoff rates within the proposed footprint of the development. Storm-water falling within the proposed WWTP compound area would be collected and diverted to the proposed balance tank and would pass through the treatment system. Discharge volumes would continue to be limited by the plant treatment capacity and limits proscribed within any agreed discharge licence.

Wastewater at the Dawn Meats (Slane) facility currently undergoes primary treatment, consisting of screening and the removal of solids and fats via settlement and DAF treatment. Following treatment, wastewater is discharged to a storage lagoon to await collection. Wastewater stored in the lagoon is collected daily by road tankers and transferred off-site to a licenced municipal WWTP for further treatment.

The approved and proposed development would allow for primary treatment – Stage 2 (new flow balancing and emergency storage) and biological treatment – Stage 3. Stage 2 would comprise of a new balance tank and sludge holding tank and Stage 3 would comprise of an anoxic tank, two aeration basins, clarifier and sand filter. Following treatment, it is proposed to discharge the treated effluent to the River Boyne via an underground treated effluent rising main, approximately 7.2 km in length.

An assimilative capacity assessment has been undertaken for the River Boyne for the treated effluent discharge and has concluded that the River Boyne would have sufficient assimilative capacity to accommodate the proposed discharge from the Dawn Meats (Slane) facility.

The proposed effluent plant has been designed in order to achieve sufficient effluent quality to discharge to the River Boyne. It should be noted that any such development in the future would be subject to an application for a revision of the site's IE Licence.

Proposed emission limit values for the treated effluent have been based upon the assimilative capacity of the River Boyne and the current water quality of the River Boyne. The assimilative capacity assessment (included as **Attachment 9.1**) was undertaken to determine the risk of negative impacts from the proposed discharge of treated trade effluent from the site to the River Boyne.

The assimilative capacity assessment was undertaken during 95%ile flow conditions, the lowest daily average flow which is equalled or exceeded 95% of the time. It is therefore the low flow which is likely to occur for 5%, or 18 days, of each year. The assessment was used to predict the river's ability to accommodate treated effluent discharge of BOD_5, Orthophosphate, Nitrogen, Total Ammonia and Suspended Solids from the Dawn Meats (Slane) facility. The assessment concluded that the River Boyne would have sufficient assimilative capacity to accommodate the proposed discharge from the Dawn Meats (Slane) facility.

A water abstraction point is located approximately 12.7km downstream of the candidate discharge point on the River Boyne, at Staleen, Co. Meath, serving the Drogheda / East Meath agglomeration. A Drinking Water Risk Assessment was prepared as part of this EIAR and concluded that the overall risk from the proposed discharge to the Staleen water abstraction point would be considered low. This was based upon proposed discharge limits, the proposed wastewater treatment process, the level of dilution of treated effluent in the River Boyne, the quality of receiving water and the anticipated impact of discharges during normal and abnormal operations.

During the construction phase, particularly along the rising main route, the main potential impact upon water quality would be through the release of suspended solids during soil disturbance works, the release of uncured concrete and the release of hydrocarbons from construction plant. Surface water quality would be protected during the construction phase through the implementation of mitigation measures, which include the use of appropriate silt control features, the regular maintenance and inspection of construction plant and the appropriate storage of potentially polluting substances. A Construction Environmental Management Plan (CEMP) would be prepared by the construction work contractor, in line with the outline CEMP prepared as part of this application, which would include measures for the protection of water quality.

SOILS, GEOLOGY AND HYDROLOGY

Soils underlying the proposed WWTP site are classified as shallow, well-drained mineral soil derived mainly form calcareous parent material (**BminSW**), with site specific details indicating the soil comprises sandy CLAY topsoil.

The soils underlying the pipeline route options comprise **Rck** (Bedrock), **BminDW** (Deep well drained mineral (Mainly basic), **BminPD** (Mineral soil, poorly drained till chiefly derived from limestone), **A** (alluvial) **BminSW** (Shallow well drained mineral (Mainly basic).

Groundwater vulnerability at the proposed WWTP site and along the treated effluent rising main within the vicinity of the WWTP site and at the discharge to the River Boyne is classed as extreme. Groundwater vulnerability along the remainder of the rising main route is classed as low vulnerability with some areas of moderate vulnerability.

There proposed WWTP and rising main would not be located within any Source Protection Zone identified or delineated by the Geological Survey of Ireland (GSI) or EPA. The closest identified Source Protection Zone is approximately 3 km to the north of the Dawn Meats (Slane) site. An inner and outer groundwater source protection zone is delineated along the southern side of the River Boyne in Slane.

The existing site currently uses three on–site production wells for all water use on the site (BW01, BW02 and BW03), as shown in Drawing IE1380-002-A of **Attachment 10.2**. The zones of contribution (ZOC) to the site production wells have been delineated, assuming an essentially circular ZOC, and show that the ZOC to TW01 extends beneath part of the eastern side of the former ICW ponds but not beneath the location of the proposed WWTP and treated effluent rising main.

During the construction phase, the main potential impacts upon soils would be through soil removal as part of excavation works, soil compaction arising from the use of construction plant and hydrocarbon contamination from leaks and spills. Mitigation measures would include the minimisation of volumes of soils to be excavated, the control of excavations and export of materials from the site, the re-use of excavated soils for reinstatement and landscaping works where possible, the use of specialised machinery to minimise soil compaction and the appropriate storage of potentially polluting materials.

During the construction phase, the potential impacts to groundwater would be associated with the altering of the hydrogeological regime in terms of flows or quality. Groundwater quality could be impacted upon by contaminants arising from construction plant such as hydrocarbons and cement/concrete percolate to the aquifer. Mitigation measures would include the appropriate storage of potentially polluting substances, the availability of spill kits and the use of designated areas assigned for machinery re-fuelling and washing of any construction plant.

A CEMP would be prepared by the construction works contractor which would also address potential impacts to soils, geology and hydrology, in line with the outline CEMP prepared as part of this report.

During the operational phase of the development, the potential impacts to soils, geology and hydrology would be considered as limited on the area. The primary potential impacts would relate to the storage and handling of potentially polluting substances and potential leakage from the treated effluent rising main.

CLIMATE

The construction phase of the proposed development would slightly increase the volume of greenhouse gas emissions in the area due to the presence of machinery and HGVs onsite.

It is anticipated that there would be a minor decrease in the annual emission of greenhouse gasses, due to the elimination of the practice of tankering factory effluent to offsite municipal facilities. Assuming an emissions factor of 1.019 kg CO_2 / km travelled for HGV vehicles, and an average 110 km round trip from the treatment plant, the carbon emission would fall from 327 tonnes CO_2/ annum to 41 tonnes CO_2/annum from site transport for effluent management onsite, a saving of 286 tonnes of carbon per annum.

Agriculture, residences and traffic within the area would remain the dominant sources of greenhouse gases – namely methane and carbon dioxide.

Under its Corporate social responsibility policy, Dawn Meats Group has stated a commitment to putting in place measures to mitigate against the potential impacts of climate change. As part of the Dawn Meats (Slane) IE licencing regime and membership with Origin Green, there is a commitment to improving the facilities resource and energy use on an ongoing basis. The proposed development would form part of improvements to environmental management and impact upon the climate for the Dawn Meats (Slane) facility.

Such policies and management systems support the Action Strategy outlined within the Meath Co Co (June 2018) "*Climate Action Strategy*".

Due to the relatively small footprint of the proposed site, there would be no significant impact on the microclimate of the area. There would be no significant direct impacts predicted on the macroclimate as a result of the proposed development.

MATERIAL ASSETS

There would be no significant impacts upon Natural Resources and Agricultural Assets due to the proposed development.

There would be no significant change of use or loss of land due to the proposed development. There would be a minor loss of disturbed ground, previously containing an Integrated Constructed Wetland (ICW) treatment system, for the WWTP upgrade and extension. The proposed rising main route would traverse agricultural land within Dawn Meats owned lands at the start of the pipeline and primarily along the verge of local roads to the planned outfall at the River Boyne.

Construction material, when needed, would be brought in from nearby sources such as local quarries where practical. It is considered that the proposed development would have no significant impact on mineral resources in the vicinity of the area.

The discharge of treated effluent to the River Boyne would not be anticipated to have a significant impact upon the Tourism, Recreational or Fishery resources of the River Boyne due to the low environmental load of the material and the controls and mitigation measures proposed by design.

During the construction phase, there is potential for noise and dust to impact upon agricultural and non-agricultural resources. However, the potential impact would not be considered significant, given the transient nature of construction works and given that noise and dust control measures would be implemented throughout the construction phase, as discussed in **Sections 5 and 6**.

TRANSPORTATION NETWORK

NRB Consulting Engineers Ltd were appointed to address the Traffic & Transportation issues associated with the construction of a Wastewater Treatment Plan and associated Sewer Pipe-laying for Dawn Meats (Slane), Greenhills, Beauparc, Navan, Co. Meath.

The site is long established and the proposed works when operational will, in reality, result in reduced traffic demand. The completed works will remove existing traffic volumes associated with current de-sludging and decanting operations when the pipeline and wastewater treatment plant is installed. The report addresses the traffic impact associated with the construction of the wastewater treatment plant in tandem with the sewer laying works along the route.

The Transportation Assessment Report (TA) was prepared to address the Traffic and Transportation issues associated with the construction works, the capacity of the existing road network and the impact of the temporary very small increases in traffic locally. The report was prepared in accordance with TII's Traffic & Transportation Assessment Guidelines and addresses the worst case traffic impact of the proposal with both construction operations proceeding.

Comprehensive classified turning movement surveys of the existing affected roads and junctions were carried out during the weekday AM and PM Peak Hours in 2020. These surveys, undertaken in the normal school term, formed the basis of the study. Adjacent permanent TII Traffic Counters on the N2 were utilised to apply 'Covid Factors' to the survey data, and this represents industry standard practice during pandemic times.

The analysis included the effects of the existing traffic on the local roads and assessed the impact during the traditional peak commuter peaks periods in accordance with Traffic & Transportation Assessment Guidelines.

The Transportation Assessment confirmed that the road network and the affected junction capacities are more than adequate to accommodate the worst case traffic associated with the operations. It should be acknowledged that the completion of the works, and the operation of an on-site treatment plant will result in less traffic on the local roads, as in future there will be no requirement to remove bulk sludge for off-site treatment.

Based on this study, NRB concluded that there would be no adverse traffic/transportation capacity or operational issues associated with the construction operations that would prevent planning permission being granted by Meath County Council.

ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE

An Archaeological, Architectural & Cultural Heritage Impact Assessment was undertaken by Shanarc Archaeology Ltd for Panther Environmental Solutions, as part of an application for the extension of a previously approved effluent treatment plant and the construction of a new rising main pipeline at the Dawn Meats (Slane) facility.

The assessment comprised of a desktop study, consisting of the consultation of relevant and readily available archaeological and built heritage records, cartographic and literary sources, a site inspection, and an archaeological testing report. It aims to assess the baseline archaeological and cultural heritage environment, to evaluate the likely impacts of the proposed development on this environment, and to recommend mitigation measures to ameliorate these impacts.

The assessment has identified that the proposed effluent rising main pipeline will have a direct and potentially negative impact on a number of heritage sites identified along its alignment. Two recorded monuments - an enclosure and associated burial (ME026-019); and an enclosure (ME026-001); two areas of archaeological potential - the riverside of the Boyne; the site of a corn mill; and one architectural heritage site, namely Stackallen Railway Bridge, were identified within and in proximity to the proposed new effluent rising main pipeline.

In order to mitigate the impacts of the proposed treated effluent rising main pipeline, test excavation is proposed at the pre-construction stage in identified areas of archaeological potential. As the positioning of the pipeline route along a public road may render it unsuitable for testing, these areas will also be subject to monitoring during construction, with the level of monitoring dictated by the results of testing. When it is selected, the greenfield area at the compound will also be subject to monitoring of ground works at construction stage is proposed as mitigation.

In order to mitigate the potential impacts of the proposed development on Stackallen Bridge, it is proposed to erect a temporary protective barrier and to impose a buffer zone. Two recorded monuments were also identified in proximity to the effluent treatment plant site at the Dawn Meats (Slane) facility, namely a mound barrow (ME026-008), and the find-site of an Ogham Stone (ME026-009).

The potential construction impacts on sub-surface archaeological remains associated with either of these, or on other hitherto unknown archaeological features or deposits, was addressed in August 2018, when Shanarc Archaeology carried out test excavation at the site of the approved effluent treatment plant (**Attachment 14.1**). No features or material of archaeological or architectural significance were identified. No further archaeological mitigation is proposed for these sites.

SUMMARY

The potential for the proposed development to cause adverse environmental impacts during the construction and operational phases, considering the proposed mitigation measures, is anticipated to be negligible. This is due to the nature, scale, high specification, management and location of the proposed development.

SUMMARY OF MITIGATION MEASURES

Construction Phase Mitigation Measures

Air Quality & Odour – Construction Measures

An outline Construction Environmental Management Plan (CEMP) has been prepared as part of this application and should be updated and adhered to by the construction contractor.

The following dust control measures would be implemented by the construction works contractor for the duration of the construction of the proposed development:

- Cognisance would be taken of the guidelines published by the Institute of Air Quality Management (IAQM), "Assessment of dust from demolition and construction 2014";
- Material handling systems and site stockpiling of materials would be designed and laid out to minimise exposure to wind;
- Prolonged storage of materials onsite would be avoided;
- Where possible, the storage of materials, such as stockpiled excavated soils, would be located as far as possible from adjacent residential properties;
- A 15kph speed limit would be implemented for all traffic onsite to reduce the potential for dust generation;
- When transporting materials to and from the site, vehicles would be fitted with covers where possible to prevent material loss;
- Public roads outside the site would be regularly inspected for cleanliness and cleaned as necessary. A road sweeper would be used where required;
- Any un-surfaced roads would be restricted to essential construction site traffic only;
- While the natural recolonisation of exposed areas of soil during reinstatement activities is preferred, re-seeding would be undertaken where required to promote the rapid stabilisation of soils;
- Regular visual inspections would be undertaken around the proposed site boundary to monitor the effectiveness of dust control measures.

Should additional dust control measures be required, for instance during particularly dry weather, dust suppression measures would be undertaken, including the following:

- Water misting plant, such as bowsers and sprays would be used as required and where necessary;
- Wheel-wash facilities would be provided for vehicles exiting the site to reduce the level of dust travelling offsite;
- Where practicable, stockpiles of excavated soils and exposed surfaces would be dampened down via misting plant.

Noise Environment – Construction Measures

It is recommended that guidance on control of noise, as per The National Roads Authority's "*Guidelines for the Treatment of noise and vibration in National Road Schemes*" (2004) and British Standard 5228-1 "*Code of practice for Noise Control on Construction and Open Sites*" be followed during the construction phase.

The following mitigation measures are proposed for the construction phase of the proposed project:

- Plant and machinery used on-site would comply with the EC (Construction Plant and Equipment) Permissible Noise Levels Regulations, 1988 (S.I. No. 320 of 1988). All noise producing equipment would comply with S.I. No 632 of 2001 European Communities (Noise Emission by Equipment for Use Outdoors) Regulations 2001
- All construction activities would take place between 7:00am and 7:00pm, Monday to Saturday. Any works which, by necessity, are required to be carried out outside of these times would notified to relevant bodies (i.e. the local council or the EPA), and any potentially effected local residents in good time and prior to specified works commencing;
- Where practicable, construction works would be phased to maximize the noise screening benefit from boundary structures;
- Where residences are likely to be occupied during the day, the use of acoustic screens and huts would be considered during high noise generating activities which are expected to occur over extended periods of the work day;
- Construction plant would be selected, where possible, with low inherent potential for the generation of noise;
- Regular maintenance would be carried out on all construction equipment, machinery and vehicles;
- Engine and machinery covers would be maintained in good working order and would remain closed whenever machinery is in use;
- Construction plant would be switched off or throttled back to a minimum when not in use;
- Ensure any compressors required would be silenced or of sound reduced models fitted with acoustic enclosures;
- Ensure all pneumatic tools required would be fitted with silencers or mufflers;
- Noisy equipment would be orientated in one direction so that noise would be directed away from noise-sensitive areas;
- Deliveries would be organised to arrive during daytime hours;
- Care would be taken when unloading vehicles to minimise noise disturbance. Materials should be lowered, not dropped, insofar as practicable and safe;
- Construction plant would be operated in accordance with the operator's instructions;
- Where practical and safe to use, it is recommended that temporary noise barriers are erected around anticipated noisy activities, such as excavation along the pipeline route.

Visual & Landscape Environment – Construction Measures

In order to minimise the visibility of the proposed development, it is recommended that;

- Suitable material finishes for the effluent treatment tanks are agreed with the planning authority prior to construction. The use of dark coloured and non-reflective building materials would mitigate the site as a focus of attention.
- Planting of screening shrubs and trees around the main effluent compound should be of native hedge and tree species. This would increase the ecological value of the site by providing wildlife corridors and shelter for fauna. Native tree species may include species such as ash, alder, and willow. The shrub layer may include species such as blackthorn, hawthorn and holly.

Biodiversity (Terrestrial Environment) – Construction Measures

- All construction works would be confined as far as possible to the development footprint;
- All plant machinery and equipment would be maintained in good working order and regularly inspected;
- Where possible, no construction works would be conducted outside of normal working hours;
- The construction work contractor would prepare a detailed Construction Environmental Management Plan (CEMP) for all construction activities, in line with the outline CEMP prepared as part of this application. The CEMP would describe how construction work would be undertaken in an environmentally sensitive manner and would include measures for the protection of water quality.
- Regular site inspections would be undertaken to ensure that no growth of invasive species has taken place;
- The construction works contractor would ensure that all equipment and plant is inspected for the presence of invasive species and thoroughly washed prior to arriving to the development site;
- In the event of any invasive species listed in Part 1 of the Third Schedule appearing onsite, works within the immediate vicinity would cease until the invasive plant has been appropriately treated and disposed of, in accordance with Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations 2011;
- Cognisance would be taken of National Roads Authority's Guidelines on "*The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*";
- Excavated soil during rising main works would be segregated into subsoil and topsoil, and reused reinstatement works. Where possible, natural recolonisation would be allowed to take place;
- Where sections of hedgerows are removed and require replanting, only native flora species would be used.
- As a minimum, the construction work contractor would comply with all legislative provisions relating to hedgerow / tree removal and the protection of birds and bats, and would have regard to reducing impacts on nesting birds;
- Where hedgerow removal works are required during the bird nesting season, prior to any removal works taking place, the sections required for removal would be inspected by a suitably qualified ecologist for the presence of breeding birds. Where nests are present, the ecologist would make a decision as to whether a "Licence to interfere with or destroy the breeding places of any wild animals", is required from the NPWS. Alternatively, the ecologist may establish a suitable buffer zone around an active nest, with removal works rescheduled until chicks have fledged. Where no evidence of nests are found during inspection, hedgerow removal works must be undertaken within three days of inspection;
- Where sections of hedgerow are removed, these would be replanted using native species;
- Should a protected fauna species such as badger or the common frog be found during the construction phase of the project, an officer of the NPWS would be notified prior to the resumption of construction works;
- To reduce the potential for disturbance due to noise, all plant and machinery would be maintained in good working order and regularly inspected, where possible vehicles would be equipped with mufflers to suppress noise and where possible, no construction works would be conducted outside of normal working hours.

- Construction works in the hours of darkness, when bats are active (April – October), would be kept to a minimum;
- Lighting of treeline and hedgerow boundaries would be avoided where possible, to ensure that commuting and foraging corridors are maintained;
- Should lighting be required during construction works, it would be of a low height (without compromising safe working conditions) to ensure minimal light spill. Where possible and where practicable to do so, timers or motion sensors would be used;
- Directional lighting would be used where possible, by use of louvres fitted to the lighting;
- White light emitting diode (LED) would be used where possible, which is considered to be a low impact in comparison to other lighting types.

Biodiversity (Aquatic Environment) – Construction Measures

The following mitigation measures would be proposed to ensure there is no significant impact upon the aquatic biodiversity of the area owing to a deterioration in water quality:

- The construction works contractor would adhere to standard construction best practice, taking cognisance of the Construction Industry Research and Information Association (CIRIA) guidelines "*Control of Water Pollution from Construction Sites; guidance for consultants and contractors*" 2001 and "*Control of Water Pollution from Construction Sites – Guide to Good Practice*", 2002;
- Cognisance would be taken of the 2016 guidelines published Inland Fisheries Ireland, "*Guidelines on Protection of Fisheries During Construction Works in and adjacent to Waters*";
- Daily visual inspections would be undertaken of watercourses during construction works;
- A 6m buffer zone would be maintained around all watercourses (with the exception of watercourse crossings), where feasible;
- Provision of silt control features where appropriate, such as silt fencing;
- Silt fencing (comprising of a porous filter fabric which detains sediment) would be provided along the boundary of the 6m buffer zone along the Dollardstown River, and at places where the rising main comes within close proximity to any other watercourses. Silt fencing would remain in place until the completion of construction works;
  - Additional silt fencing would be placed adjacent to storage areas of stockpiled soil, until such time as the excavated soil has been used in landscaping / re-instatement works or removed offsite by a licenced waste contractor;
- Silt control features would be inspected on a daily basis and maintained as appropriate;
  - Where spoil is generated, this would only be stored temporarily and away from surface waters. Where possible, spoil would be covered or alternatively, graded to avoid ponding or water saturation;
  - Excavations and earth-moving activities would be planned outside periods of heavy rainfall, to limit the potential for suspended solids to become entrained within surface water run-off;
  - Should water be encountered during excavation works, water would be pumped to a constructed silt control feature, such as a settlement pond or detention pond. A filter would be provided at the pump inlet and, where required, dewatering bags or silt fences would be used at the outlet to retain any potential silt entrained in the water. Pumping operations would be supervised at all times;
  - Where possible, surface water run-off would be diverted from areas of bare / exposed ground;

  - All construction plant machinery and equipment would be maintained in good working order and regularly inspected;
- The temporary site compound would be used for the storage of all machinery and plant when not in use, the re-fuelling of plant and the storage of all associated oils and fuels for plant;
  - A self-contained mobile welfare unit providing sanitary services would be located at the temporary site compound and would be emptied by a licenced contractor on a regular basis;
  - Any fuels, oils or chemicals would be stored in accordance with the EPA guidance on the storage of materials, in designated bunded areas at the temporary site compound, with adequate bund provision to contain 110% of the largest drum volume or 25% of the total volume of containers;
  - Material storage areas would be appropriately labelled and marked;
  - The designated area for the storage of hydrocarbons would be inspected on a regular basis;
  - Deliveries of fuels and oils to the site would be supervised and records maintained;
  - All loading and unloading of hydrocarbons would take place within the bunded area where possible;
  - Fuels / oils would be handled and stored with care to avoid spillage or leakage;
  - Where appropriate, small construction plant equipment would be placed on drip trays;
  - The diesel generator would be suitably bunded;
  - Any waste fuel / oils would be collected in bunded containers at designated areas (i.e. temporary construction compound for rising main works) and properly disposed of to an authorised waste contractor;
  - Spill kits, adequately stocked with spill clean-up materials such as booms and absorbent pads, would be readily available onsite;
  - In the unlikely event of a hydrocarbon spillage, contaminated spill clean-up material would be properly disposed of to an authorised waste contractor;
  - The construction works contractor would ensure the relevant site personnel are trained in spillage control;
- Where re-fuelling of construction plant is required to take place onsite, re-fuelling would take place within a bunded area, within the temporary site compound or at a designated location within the site boundary for WWTP works. Under no circumstances would re-fuelling take place within the immediate vicinity of watercourses, including drainage ditches;
  - Re-fuelling onsite would only be undertaken by experienced and trained personnel;
  - Where construction plant shows signs of hydrocarbon leakage, site personnel would cease the operation of the item in plant in question. Any defective plant would be kept out of service until the necessary repairs are undertaken;
  - The use of pre-cast concrete where possible;
  - The delivery and pouring of concrete would be supervised at all times;
  - Concrete would be poured directly into the shuttered formwork from the Ready-Mix Truck, reducing the risk of spillage;
  - The wash-out of Ready-Mix Truck drums would not be permitted onsite, in the environs of the site, or at a location which could result in a discharge to surface water;
  - The disposal of excess uncured concrete would be removed from site by an authorised waste contractor;
  - The pouring of concrete would be avoided during periods of expected heavy rainfall;
  - It is not envisaged that vehicle wheel wash facilities would be required. However, in particularly dry weather, additional dust control measures may be required, including

the provision of a wheel wash facility. Should a wheel wash facility be required, it would be located at an area isolated from any watercourses. The associated run-off would be collected via a settling pond;

- Particular care would be taken during the construction of the discharge point outfall. Plant operation within the River Boyne or the Dollardstown River would be avoided. Mitigation measures specified above for suspended solids, concrete and hydrocarbons would be followed;
  - To minimise any potential impacts on salmonid fish, outfall works would be undertaken in the July to September period where possible, which would avoid the salmonid spawning season. Should outfall works be required outside the July – September timeframe, works would only commence upon prior agreement with IFI;
  - While a crossing method has not yet been determined for the watercourse crossing required to accommodate Construction Access Route 1, cognisance would be taken of the IFI's "*Guidelines on Protection of Fisheries During Construction Works in and adjacent to Waters*". The design and choice of crossing would provide for the passage of aquatic fauna, would prevent erosion and sedimentation and would be laid in such a manner as to maintain the existing watercourse profile. The structure would be covered with clean, inert material and would be fenced with silt fencing or similar to prevent sediment entering the watercourse;
  - Monitoring of receiving water for suspended solids would be undertaken where required;
  - In the unlikely event of a suspected deterioration in water quality within any of the watercourses due to construction works at the development site, works would immediately cease, an investigation into the cause undertaken and the relevant NPWS and Inland Fisheries Ireland personnel informed;
- The construction work contractor would prepare a detailed Construction Environmental Management Plan (CEMP) for all construction activities, in line with the Outline CEMP prepared as part of this application. The CEMP would describe how construction work would be undertaken in an environmentally sensitive manner and would include measures for the protection of water quality such as the implementation of silt control features;

Land (Soils, Geology & Hydrogeology) – Construction Measures

- Minimisation of volumes of subsoil and bedrock required to be excavated. Some of the excavated subsoils removed during construction would be re-used on site in the form of landscaping where suitable and legally permitted and licensed sites would be used for off-site treatment/recycling/disposal where necessary.
- Specialist machinery (such as tracked machinery) would be used to minimise compaction of the subsoils. Excavations would be backfilled as soon as is possible to prevent any infiltration of potentially polluting compounds to the subsurface and the aquifer.
- All excavations would be supervised by a competent professional (contaminated land scientist, geologist, geotechnical engineer) to identify the composition of excavated material particularly any potentially contaminated material (made ground) within the proposed WWTP compound footprint. All potentially contaminated material would be either; left in situ and characterised by a competent professional through laboratory testing, or; segregated and stockpiled in a contained manner and characterised by a competent professional through laboratory testing.
- Prior to the storage of any potentially polluting material on-site the site manager would be responsible for ensuring that a material safety data sheet for each product would be

available for inspection. A copy of all relevant material safety data sheets would be available at storage locations as well as the site office.

- Any soil imported to site would be subject to assessment, in order to identify any invasive alien species present.
- The construction works contractor would prepare a Construction Environmental Management Plan (CEMP), which would adhere to available guidance.
- Storage of soil on-site would be seeded and periodically topped. Such stores would be subject to on-going monitoring.
- Subject to the identification of invasive alien species present at any of the sites – machinery would be cleaned between infested sites (including footwear and tools).
- All fill and aggregate would be sourced from reputable supplies as per the Construction Works Contractor's Contract and Procurement Procedures.
- All potentially polluting materials would be stored in bunded areas, the capacity of which would be 110% the volume of the largest volume of material OR 25% of the total volume of liquid to be stored, whichever is greater.
- Machinery refuelling would be carried out by competent personnel at a temporary construction compound during rising main works and at a designated location within the site boundaries for WWTP works.
- All machinery would be inspected at the start of each work shift for signs of leaking hydrocarbons. Parking areas would be inspected on a daily basis for evidence of hydrocarbons leaking from machinery.
- Spill kits would be stored at the machinery refuelling areas. The spill-kits would comprise suitable absorbent material, refuse bags etc. to allow for the appropriate clean-up and storage of contaminated material in the event of a spillage or leak occurring.
- The washing of any plant equipment would be carried out in designated areas constructed to prevent potentially polluting material from entering surface or groundwater.
- There would be no discharge of effluent to groundwater during the construction phase. All wastewater from the construction facilities would be stored for removal off site for disposal and treatment.
- The construction works contractor would be obliged to ensure no deleterious discharges would be released from the site to surrounding watercourses during excavation, testing, flushing or washing activities.
- Throughout the Design – Build works the Contractor would also take account of relevant legislation and best practice guidance including but not limited to the following:
    - C532 Control of water pollution from construction sites: guidance for consultants and contractors;
    - C648 Control of water pollution from linear construction projects;
    - SP156 Control of water pollution from construction sites – guide to good practice.
- Inland Fisheries Ireland (IFI) would be informed in advance of works crossing culverted waterways and would be welcome to inspect the site at any time.
- A buffer zone of 6m would be maintained, where possible, between the proposed pipeline route working area and any open drains or river channels.
- Silt fencing would be erected in advance of works and remain in place until after landscaping elements have become established.
- Silt fencing would be inspected on a daily basis during works to ensure it is functioning correctly.

Material Assets (Utilities & Transport Network) – Construction Measures

- An outline Traffic Management Plan for the proposed construction works has been prepared as part of this application.
- Prior to works commencing along the roadway sections, the construction works contractor, once appointed, would review the outline Traffic Management Plan and revise where necessary, and submit for approval to the Meath County Council Road Engineers for approval.

Archaeological, Architectural & Cultural Heritage – Construction Measures

Pre-Construction Phase

- It is recommended that pre-construction archaeological testing is undertaken on the proposed wayleave of the effluent rising main pipeline through zones of identified archaeological potential. Where this is not possible due to public roadway, construction phase monitoring is recommended.
- Archaeological testing should be undertaken well in advance of the construction phase to allow a satisfactory timeframe in which the mitigation measures can be undertaken and the results assessed without causing construction delays.
- This work should be done under licence in accordance with Section 26 of the National Monuments Acts 1930 – 2014, and with a method statement agreed in advance with the National Monuments Service (Department of Arts, Heritage and the Gaeltacht) and the National Museum of Ireland.

Construction Phase

- It is recommended that groundworks for the proposed effluent rising main pipeline in untested areas of archaeological potential be archaeologically monitored.
- In order to prevent disturbance or inadvertent damage to the original fabric of Stackallen Railway Bridge (AH1), it is recommended that, during construction works associated with the proposed effluent rising main pipeline:
    - A buffer zone of 1m from each abutment be put in place;
    - A temporary barrier be erected around the bridge abutments.

Operational Phase Mitigation Measures

Air Quality & Odour – Operational Measures

The site odour management plan should be updated to include management measures for the prevention of odours from biological wastewater treatment processes as detailed below:

- Odour perimeter checks should continue at least weekly up to one month after commissioning of the new WWTP.
- Frequency of odour checks may be reviewed and reduced during the operation phase.
- It is recommended that all operators, and deputy operators, receive training in the management of the biological wastewater treatment system.
- Ensure all plant and equipment is installed to manufacturer's specification to ensure correct operation.
- Maintain equipment, including preventative maintenance schedule, to ensure high efficiency.
- Ensure that backup critical equipment is available onsite (e.g. back-up aerators etc.)
- Ensure all drains are flushed regularly and prevent persistent build-up of organic matter in drains by design.
- Minimise the retention of wastewater under anaerobic conditions in balance tank, especially in the balancing tank to prevent the formation of odorous compounds.
- Ensure wastewater is kept adequately mixed to avoid anaerobic conditions in balance tank.
- Empty and clean DAF unit with hot water at least monthly.
- Monitor chemical addition to ensure on-going treatment efficiency.
- Keep DAF unit lid closed as practical.
- Maintain aeration tank dissolved oxygen levels > 1 mg/l.
- Calibrate aeration tank DO probe annually
- Operator trained to check DO daily in aeration tank.
- Ensure sludge tank is kept adequately mixed to avoid anaerobic conditions.
- Avoid exposure of treated sludge to the atmosphere when emptying the sludge tank.
- Operator trained to inspect the sludge tank daily.
- Ensure all trailers and skips used to transport sludges off-site are sealed and adequately covered to prevent any potential odours in transit.
- Clean yard as required and wash into yard sump.
- Clean up any spills as they occur and wash down the area to prevent the build-up of organic material on surfaces.
- Include the odour scrubber in the daily check-sheet and preventative maintenance schedule.

Noise Environment – Operational Measures

The following mitigation measures would be proposed for the operational phase of the proposed project:

- Operational noise within the compound area would be mitigated principally by the set-back distance from noise sensitive locations and a constructed earth berm surrounding the compound;
- Dawn Meats (Slane) have an existing Noise Action Programme operating at the facility,
- In order to ensure continued good practice in relation to the management of noise at the Dawn Meats (Slane) facility, it is recommended that the existing site Noise Management

Programme be updated prior to commissioning of the proposed effluent treatment plant. A draft noise management programme has been provided with the attached Noise Report (Attachment 6.1) to be used as a starting point, subject to site specific review;

- Noisy operations, such as the removal of effluent and sludge, would be conducted during normal working hours to mitigate any additional noise impacts. Where potentially noisy operations would be required to be carried out outside of these times, the relevant bodies (i.e. EPA, local council) and any potentially affected local residents would be notified in good time and prior to specified works commencing;
- Lorry operators would be informed of site noise controls as part of the existing environmental management system, to keep high revs to a minimum and to keep to the onsite speed limits;
- Any plant and equipment would be sited, as far as is practicable, to benefit from the noise screening effects of local barriers, such as the lie of the land and buildings, to achieve optimum benefit. Acoustic barriers to absorb noise would also be installed where deemed necessary (e.g. the proposed earth berm);
- Noisy equipment would be orientated in one direction so that noise would be directed away from noise-sensitive areas;
- Regular maintenance would be carried out on all equipment, machinery and vehicles to ensure that noise disturbance from such sources would be kept to a minimum;
- The idling of machines would be avoided between work periods and revving of engines;
- Unnecessary movements of forklifts / other vehicles would be avoided during unsociable hours;
- Site roads/tracks would be maintained in a state of good repair to reduce excessive noise from the passage of vehicles;
- Any testing of emergency generators and alarms would be carried out during the daytime of the normal working week and preferably between 09.00 and 17.00;
- The noise level emitted by the alarms must not exceed that required to alert persons working within the site. However, to ensure the response given by call centres is 100%, alarms may also be tested at weekends. The disturbance caused by their testing can be minimized by testing at the same time and day of the week or month etc. If there are problems, local residents would be consulted and timings of testing discussed with them;
- All onsite workers, hauliers and contractors would be informed of noise considerations onsite.

Biodiversity (Terrestrial Environment) – Operational Measures

It is considered that the proposed development would have no significant impacts on biodiversity or upon any European site (Natura 2000 network). The following design and operational measures would further reduce the significance of potential impacts:

- Good housekeeping practices would be observed throughout the site during the operational phase;
- The Dawn Meats (Slane) facility has a documented Environmental Management System, which would be updated to incorporate the proposed development;
- In accordance with the facility's Industrial Emissions (IE) Licence (P0811-02), noise monitoring is undertaken annually. In the unlikely event noise emissions from the facility increased, they would be captured during monitoring, identified and addressed;
- Dawn Meats (Slane) ensures all chemicals, oils and fuels are stored within designated, bunded areas and undertake bund integrity testing every three years. The site has an

adequate supply of spill clean-up material in the event of any spillages. Therefore, the potential for spills/leaks to impact upon the ecology of the area is minimal.

Land (Soils, Geology & Hydrogeology) – Operational Measures

- All materials required for the maintenance of the WWTP site and pipeline route would be stored according to good practice and in areas either off-site or in bunded areas with impermeable floors.
- A programme of inspection and maintenance of the rising main, which would be included as part of the integrity testing undertaken every three years, as per the site's IE Licence conditions, would ensure that any damage, blockages etc. would be identified and remedied.

1.0 INTRODUCTION AND METHODOLOGY

1.1 INTRODUCTION

This section broadly describes the legislative context in which the Dawn Meats Ireland Unlimited Company (also referred to as Dawn Meats (Slane) within this report) site's proposal is presented for the facility at Beauparc, Navan, Co. Meath. This Environmental Impact Assessment Report (EIAR) is compiled following an Environmental Impact Assessment with regard to a proposed amendment and extension to the existing and currently approved Waste Water Treatment facilities and a proposed rising main pipeline from the effluent plant to a discharge at the River Boyne.

A primary effluent treatment system is currently in place at the facility. An upgraded effluent plant, consisting of primary treatment and secondary biological treatment, has been approved for planning at Dawn Meats (Slane). The amendments to the existing and approved WWTP would consist of the demolition of an existing storage building, construction of a new control and storage building, install a new sludge press, convert approved aeration tank to anoxic tank, two new aeration tanks including extension to WWTP compound area, and a treated effluent rising main.

This EIAR is to be submitted to Meath County Council in support of an application for planning permission for the proposed development, as described above, under the Planning and Development Regulations 2001 (S.1.No 600 of 2001).

1.2 ENVIRONMENTAL IMPACT ASSESSMENT & PLANNING LEGISLATION

This EIAR has been prepared in accordance with the requirements of the European Communities (Environmental Impact Assessment) Regulation, 1989 to 2018, the Planning and Development Act 2000 and the Planning and Development Regulations 2001 to 2018. This legislation requires the assessment of the effects of certain public and private projects on the environment.

The proposed development would involve the construction of a Waste Water Treatment Plant (WWTP) with an estimated population equivalent (p.e.) of 28,000 at the existing Dawn Meats (Slane) site. This would exceed the threshold population of 10,000 as defined under Class 11, Part 2 of Schedule 5 of the Planning and Development Regulations, 2001, as amended:

(c) Waste water treatment plants with a capacity greater than 10,000 population equivalent as defined in Article 2, point (6), of Directive 91/271/EEC not included in Part 1 of this Schedule.

This report is drafted with particular regard to Article 94 and Schedule 6 in the 2018 planning regulations, and is submitted to provide information that may be helpful to the planning authority in making its decision on this application for planning permission.

The EIA Directive, 2014/52/EU, was transposed into Irish law by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018). Circular letters issued by the Department of Housing, Planning, Community and Local Government on the 15th of May 2017 (Ref. PL1/2017) and 27th August 2018(Ref. PL05/2018) have also been consulted in preparation of this report, advising planning authorities and An Bord Pleanála of the procedures and information necessary to comply with the EIA Directive required under the new regulations:

"The new Regulations transpose the requirements of Directive 2014/52/EU, amending previous Directive 2011/52/EU, on the assessment of the effects of certain public and private projects on the environment (the EIA Directive) into planning law with effect from 1 September 2018."

The documents "*Guidelines on the information to be contained in Environmental Impact Statements*" 2002, "*Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements)*" 2003, the draft "*Guidelines on the information to be contained in Environmental Impact Assessment Reports*" 2017 as prepared by the EPA and "*Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*" August 2018 as prepared by Department of Housing, Planning and Local Government were followed in the preparation of this report.

The guidelines state that in preparing an EIAR, the Developer will carry out an analysis of the likely effects of the project (positive or negative) on the environment. The Environmental Impact Assessment procedure commences at the project design stage when the scope of the study is determined. Studies are then carried out to investigate in detail, any potential environmental impacts. Where significant adverse impacts are identified, measures are recommended to mitigate or avoid the impact of the proposed development.

This Environmental Impact Assessment Report examines the potential significant impacts of the proposed extension to the existing WWTP at Painestown, Beauparc, Co. Meath, the proposed discharge of treated effluent to the River Boyne and the proposed treated effluent rising main from the Dawn Meats (Slane) facility to the River Boyne.

The extent of the proposed scheme is described in detail in **Section 2 – Description of Development**. The potential environmental impacts of the proposed scheme are addressed in **Sections 5 – 14** of this volume of the report under the headings Human Environment, Natural Environment, Material Assets and Architecture, Archaeology and Cultural Heritage.

1.2.1 INFORMATION TO BE CONTAINED IN AN EIS / EIAR

Schedule 6 of the Planning and Development Regulations 2001 specifies the information to be contained within an EIS / EIAR, including:

1. (a) A description of the proposed development, comprising information on the site, design and size of the proposed development.

   (b) A description of the measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects.

   (c) The data required to identify and assess the main effects which the proposed development is likely to have on the environment.

   (d) An outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment.

2. Further information, by way of explanation of the information referred to in paragraph 1, on the following matters:

   (a) (i) A description of the physical characteristics of the whole proposed development and the land-use requirements during the construction and operation phases.

   (ii) A description of the main characteristics of the production processes, for instance, nature and quantity of the materials used.

   (iii) An estimate, by type and quantity, of expected residues and emissions (including water, air, and soil pollution, noise, vibration, light, heat and radiation) resulting from the operation of the proposed development.

   (b) A description of the aspects of the environment likely to be significantly affected by the proposed development, including in particular:
   - Human beings, fauna and flora,
   - Soil, water, air, climate factors and the landscape
   - Material assets, including the architectural and archaeological heritage,
   - The cultural heritage,
   - The inter-relationship between the above factors

   (c) A description of the likely significant effects (including direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative) of the proposed development on the environment resulting from:
   - The existence of the proposed road development
   - The use of natural resources
   - The emission of pollutants, the creation of nuisance and the elimination of waste and
   - A description of the forecasting methods used to assess the effects on the environment:

   (d) An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the developer in compiling the required information.

1.3 SCOPE OF THE EIAR

Scoping is an essential part of the preparation of an EIAR as it ensures that all potential and important significant impacts on the receiving environment are taken into account at the earliest possible time.

Scoping provides relevant information on the most important potential impacts of the project, which will have to be addressed in the EIAR. With regard to EPA criteria for scoping, the environmental areas that may be impacted by the proposed scheme were identified and are as follows:

Human Beings
During scoping, particular regard was given to the potential impact of the proposed WWTP extension and proposed rising main and operations on human beings.

In particular, potential impacts which may occur due to noise during the construction phase and noise and odour during the operational phase were considered.

Natural Environment
The closest protected sites to the proposed development are the River Boyne and River Blackwater SAC (Site Code 002299) and the River Boyne and River Blackwater SPA (Site Code 004232).

It is proposed to discharge treated effluent into the River Boyne, therefore the discharge point would be located within the SAC and SPA sites. A portion of the River Boyne and River Blackwater SAC and SPA sites have a proposed designation for the Boyne Woods pNHA. There are no Ramsar sites within 15km of the proposed development.

The proposed development site is located on an aquifer categorised as a locally important aquifer. The proposed WWTP and the rising main within the vicinity of the WWTP and River Boyne are classified as being of extreme groundwater vulnerability, with the remainder of the rising main route characterised by low to moderate groundwater vulnerability.

The potential impacts on land, waters and biodiversity must be assessed with care to ensure that all impacts are clearly identified and where possible removed, reduced or minimised to a satisfactory level.

Material Assets
This involves assessing impact of the land proposed to be taken on the availability of resources such as soils, utilities etc. for activities such as agriculture. The proposed WWTP extension would be constructed within the existing Dawn Meats (Slane) facility. The proposed treated effluent rising main would be constructed mainly on agricultural lands, however as the rising main would be located underground, there would be no loss of land as a result.

Architecture, Archaeology & Culture Heritage
The proposed development is located within an area which can be considered as of heritage and cultural value, with the Brú na Bóinne World Heritage Site located approximately 6km north-east from the Dawn Meats (Slane) facility. A number of archaeological and architectural features are located within and in close proximity to the proposed development.

1.3.1 SCENARIOS INVESTIGATED

A number of different scenarios have been examined when determining likely significant impacts.

The "do nothing" scenario which compares the quality of the existing receiving environment with that of the likely environment should the proposed scheme not be built.

The "do something" scenario which compares the quality of the existing receiving environment with that of the likely environment should the proposed scheme be built.

1.4 IDENTIFICATION OF LIKELY SIGNIFICANT IMPACTS

Schedule 6 of the Planning and Development Regulations requires that an EIS describes likely, direct and indirect significant impacts of a proposed scheme. The EPA's draft "Guidelines on the information to be contained in Environmental Impact Assessment Report, 2017" defines an impact as the "change resulting from the implementation of project" and goes on to elaborate on impacts in terms of:

- Quality (positive, neutral or negative);
- Significance (imperceptible, not significant, slight, moderate, significant, very significant or profound);
- Extent and context;
- Probability of effects (likely, unlikely);
- Duration (momentary, brief, temporary, short-term, medium-term, long-term, permanent, reversible);
- Type (indirect, cumulative, Do-Nothing, worst-case, indeterminable, irreversible, residual, synergistic).

The following factors have been considered for this EIAR when determining the significance of the impacts, both positive and negative, of the proposed development on the various aspects of the receiving environment:

- The quality and sensitivity of the existing/baseline receiving environment.
- The relative importance of the environment in terms of national, regional, or local importance.
- The degree to which the quality of the environment is enhanced or impaired.
- The scale of change in terms of land are, number of people impacted, number and population of species affected including the scale of change resulting from all types of impacts.
- The consequence of that impact/change occurring.
- The certainty/risk of the impact/change occurring.
- Whether the impact is temporary or permanent.
- The degree of mitigation that can be achieved.

The magnitude of the impacts outlined in the sections which follow, take into account the guidelines given by the EPA and those scales used in other EIS / EIAR documents for significant developments in this country. A broad outline of the scale of impacts is given in **Table 1.1**.

Where mitigation in the form of design measures have been suggested throughout the evolution of the EIAR, these have been incorporated into the scheme design as far as is possible from an engineering perspective.

Table 1.1: General Criteria used to quantify the Potential Impacts of the Proposed Scheme

SIGNIFICANCE LEVEL	DEFINITION OF IMPACT
Profound	Significant Impact An impact, which obliterates sensitive characterisation
Major	An impact, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Moderate	An impact that alters the character of the environment in a manner that is consistent with existing and emerging trends
Slight	An impact, which causes noticeable changes in the character of the environment without affecting its sensitivities
Not significant	Neutral or imperceptible impact An impact which does not change the quality of the environment is capable of being measured but without noticeable consequences and causes changes in the character of the environment which are not significant or profound

1.5 COMPETENT EXPERTISE

Directive 2014/52/EU states that the preparation of EIAR documents should be undertaken by "competent experts", ensuring that the information provided is of high quality.

Panther Environmental Solutions Ltd. (PES Ltd.) is a leading Environmental Consulting Firm based in Carlow, Ireland. PES Ltd was established in 2005 by Environmental Consultant Mike Fraher who has over two decades of experience working in the Environmental Consultancy Industry, both in Ireland and in the UK. The PES Ltd. team are experienced in preparing EIS / EIAR documents, having completed a number of these reports for a range of industries including the intensive agriculture sector.

PES Ltd. has been requested by the applicant to prepare an EIAR in support of a planning permission application for the proposed development comprising of an upgrade and extension of the wastewater treatment plant at the Dawn Meats Ireland Unlimited Company facility, the construction of the proposed treated effluent rising main from the Dawn Meats facility to the River Boyne at Ardmulchan, Co. Meath, and the discharge of treated effluent to the River Boyne at Ardmulchan, Co. Meath.

Mr. Mike Fraher has over 25 years' of consultancy experience and has a B.Sc Degree in Environmental Sciences from the University of Glamorgan, Cardiff in Wales and a Diploma in Food Sciences from Cork Institute of Technology.

Mr. Martin O'Looney has over seven years' environmental consultancy experience and has a B.Sc Degree in Environmental Science and Technology from Sligo Institute of Technology. Ms. Lorraine Wyse has over four years' consultancy experience and has a B.Sc Degree in Environmental Science and Health from Dublin City University and a Diploma in Field Ecology from University College Cork. Mr. Nial Ryan has over four years' consultancy experience and has a B.Sc in Applied Physics from Dublin City University and an M.Sc in Medical Device Regulatory Affairs from Institute of Technology Carlow. Dr Ross Donnelly-

Swift has a BSc (Hons) Biology from Maynooth University NUI, a MSc in Environmental Science from Trinity College Dublin and a PhD in Biosystems Engineering from University College Dublin.

Additional expertise was obtained for the preparation of this EIAR and contributors are outlined in the following table:

Table 1.2: Contributors to the EIAR

REF	EIAR TOPIC	COMPANY	PERSONNEL
1	Introduction	PES Ltd.	Mr. Martin O'Looney Ms. Lorraine Wyse
2	Description of Development	PES Ltd.	Mr. Martin O'Looney Ms. Lorraine Wyse
3	Alternatives	PES Ltd.	Mr. Martin O'Looney Ms. Lorraine Wyse
4	Population and Human Health	PES Ltd.	Mr. Martin O'Looney Ms. Lorraine Wyse
5	Air Quality & Odour	PES Ltd.	Mr. Martin O'Looney Mr. Nial Ryan Ms. Lorraine Wyse
6	Noise Environment	PES Ltd.	Mr. Martin O'Looney Mr. Nial Ryan
7	Landscape and Visual	PES Ltd.	Mr. Martin O'Looney
8	Biodiversity – Terrestrial Environment	PES Ltd.	Ms. Lorraine Wyse Dr Ross Donnelly-Swift
9	Biodiversity – Aquatic Environment	PES Ltd.	Mr. Martin O'Looney Ms. Lorraine Wyse
10	Land – Soils, Geology and Hydrology	IE Consulting Ltd.	Ms. Áine McElhinney Mr. Jer Keohane
11	Climate	PES Ltd.	Mr. Martin O'Looney Ms. Lorraine Wyse
12	Material Assets – Natural & Agricultural Resources	PES Ltd.	Mr. Martin O'Looney
13	Material Assets – Utilities & Transport Network	NRB CE PES Ltd.	Mr. Eoin Reynolds Mr. Martin O'Looney
14	Archaeological, Architectural and Cultural Heritage	Shanarc Archaeology Ltd.	Mr. Seán Shanahan Ms. Edel Barry
15	Interactions and Inter-relationships	PES Ltd.	Mr. Martin O'Looney Ms. Lorraine Wyse

Land – Soils, Geology and Hydrology

This section has been prepared by IE Consulting Ltd, a water, environmental and civil engineering consultancy established in 2001. IE Consulting provide specialist services in hydrogeology and environmental geology.

The section has been prepared by Ms. Áine McElhinney, who has over eight years' experience as a consultant environmental geologist and has a B.Sc Degree in Geology and a Masters in Applied Environmental Science.

The soils, geology and hydrology section has been reviewed by Mr. Jer Keohane, a director with IE Consulting, who has over 33 years' experience in consulting and whose qualifications include a B.Sc Degree in Geology, Masters and CGeol FCIWEM MIEI.

Transportation Assessment / Traffic Impact Assessment

The Transportation Assessment Report, which has been summarised by PES within this EIAR, has been prepared by Mr. Eoin Reynolds of NRB Consulting Engineers Ltd.

Eoin Reynolds is a Director on NRB Consulting Engineers Ltd., specialist in the area of Traffic/Transportation and Roads. He is directly involved in all aspects of the NRB business from client liaison, project management through to technical output, and is the Company Traffic/Transportation Expert

Eoin is a Chartered Engineer with over 30 years experience in a wide range of civil engineering projects. Eoin specialises in the field of Traffic & Transportation and Roads Design - assessing the infrastructure needs of development.

Eoin provides advice to both private sector and public sector clients on all aspects of roads, traffic and transportation, and mobility management. Eoin is expert in the use of Traffic Engineering Modelling Software (TRICS, ARCADY, PICADY, LINSIG, TRANSYT and Micro-Simulation Techniques). He has given expert evidence at planning appeals, oral hearings and public enquiries. Eoin was previously Director of the Irish Office of Waterman Boreham Transport Planning and prior to that was Manager of the Belfast office of JMP Consultants Ltd. He is a noted Professional/Expert Witness in the field of Traffic/Roads & Road.

Archaeological, Architectural and Cultural Heritage

The Architectural, Archaeological and Cultural Heritage section has been prepared by Mr. Seán Shanahan and Ms. Edel Barry, of Shanarc Archaeology Ltd. Shanarc Archaeology Ltd. was established in 2014 by Mr. Shanahan, specialising in archaeological and geophysical services.

Mr. Seán Shanahan has over 20 years' experience working in commercial archaeology and is a licence eligible director. Mr. Shanahan has an honours degree in Archaeology and Philosophy from NUI Galway and a Master's Degree in Geographical Information Systems and Remote Sensing from NUI Maynooth.

Ms. Edel Barry has several years' experience as both a recorder on built heritage surveys and an editor, as well as a site assistant and supervisor in the field. Ms. Barry has an honours degree in Archaeology and English from NUI Galway, a Masters in Philosophy from UCC and a Higher Diploma in ArcGIS from UCC.

PART I – PROPOSED DEVELOPMENT

This section of the EIAR describes the proposed development, comprising of alterations to an existing approved effluent plant development (Planning Ref: LB180300) and construction of new treated effluent rising main pipeline to proposed outfall at River Boyne at Dawn Meats Ireland Unlimited Company (also referred to as Dawn Meats (Slane) within this report).

This section describes the existing development at the Dawn Meats (Slane) site, including a description of the current wastewater treatment system at the site, the currently approved wastewater treatment plant, the proposed alterations and extension to the wastewater treatment plant and summarises previous planning applications and consents for the site.

This application includes for a rising main pipeline and discharge to the River Boyne. The new treated effluent rising main pipeline would be constructed from the approved discharge pump sump within the WWTP compound to a proposed outfall at River Boyne. The planning application shall include for the laying of the pipeline along public roadways and private lands between the pumping station and river discharge point.

2.0 DESCRIPTION OF THE DEVELOPMENT

2.1 INTRODUCTION

Dawn Meats Ireland Unlimited Company are applying for planning permission to Meath County Council for a development consisting of the following:

a) Demolition of an existing storage building (17.50 m^2) and construction of a new single-storey industrial type building to enclose the DAF unit granted planning permission under planning reference LB180300 and to provide new enclosed chemical store and control room (total floor area 119 m^2).

b) Install a new sludge press at intake to WWTP, change aeration tank to anoxic tank, install 2no additional aeration tanks, and alteration to perimeter berm to increase the footprint of WWTP by 539 m^2 to that granted planning permission under planning reference LB180300.

c) Treated wastewater rising main from the site of the proposed development to a new discharge point at the River Boyne (distance 7.2km), where pipeline shall be laid along a section of Windmill Road, the L1013, Yellow Furze Road, the L1600 (Boyne Rd), and the unnamed local road leading from the L1600 to the private lands abutting the River Boyne at the discharge point.

…at Painestown, Seneschalstown, Dollardstown, Hayestown-Carryduff Little & Ardmulchan, Navan, Co Meath.

The Dawn Meats (Slane) facility has an existing WWTP onsite, with wastewater undergoing primary treatment, consisting of screening and the removal of solids and fats via settlement and Dissolved Air Flotation (DAF) treatment. After primary treatment, wastewater is stored and collected daily via tanker and transferred to third party municipal WWTP for further treatment and discharge.

Dawn Meats (Slane) have received planning approval (Planning Ref: LB180300) to extend their existing on-site effluent treatment system to provide for additional treatment to the process effluent produced at the facility, including Primary Treatment – Stage 2 (new flow balancing and emergency storage) and Biological Treatment – Stage 3 of wastewaters, resulting in a treated effluent of high quality.

This planning application includes for the construction of two aeration tanks, with the additional aeration tank within a proposed extension to the existing approved effluent plant compound area. During the first phase of construction a single aeration tank would be installed within the currently approved WWTP compound area. Planning approval is being sought for the second aeration tank and extension to the WWTP compound area in order to future proof the plant for potential future development at the Dawn Meats (Slane) facility. It should be noted that, should the Dawn Meats (Slane) facility wish to increase production in the future, consent would be required from the Department of Agriculture, the EPA and the Planning Authority.

It is also proposed to lay a new treated effluent rising main to a proposed outfall at the River Boyne. The treatment of onsite effluent and discharge to surface water would reduce the cost of disposing of the effluent to third party municipal treatment plants and reduce the operating costs of the Dawn Meats facility.

The proposed amendments to the WWTP development would allow for greater control of the final effluent quality, greater control of odours at the site and reduce the risk of environmental impacts associated with final effluent.

The Dawn Meats facility intends to provide for the discharge of final effluent to the River Boyne. This proposed rising main and discharge outlet revetment development would remove the requirement to tanker treated effluent to municipal wastewater treatment plants.

The proposed effluent plant has been designed with the discharge of final effluent to surface water in mind. Following planning approval, the proposed discharge would be subject to an application for review of the site's current EPA Industrial Emissions (IE) Licence (P0811-02), in order to include a new discharge to surface waters, the River Boyne.

2.2 PLANNING AND CONSENTS HISTORY

The existing facility at Beauparc (Painestown) was originally developed as an abattoir by the Booth family in the 1980s and was acquired by Dunbia in 2001, and incorporated into Dawn Meats Group in 2018. An overview of planning permissions lodged for the site is included in **Table 2.1** below.

Table 2.1: Overview of Planning for the Dawn Meats (Slane) Facility at Painestown

PLANNING REFERENCE	DECISION DATE	PERMISSION	DESCRIPTION
SA20110	20/06/2003	Permission	Two storey extension to the front and rear of existing abattoir with revisions including site boundaries, car parking spaces, infilling of existing septic tank, installation of new sewage treatment system and two underground storage tanks.
SA30332	19/03/2004	Permission	Construction of an integrated constructed wetland system to treat wash-waters and yard-waters from the existing plant.
SA801209	16/07/2008	Permission	Construction of two 2 effluent aeration tanks, control building and additional smaller storage tanks for effluent treatment purposes. This development did not proceed.
FS8224	01/10/2008	Permission	Extension to existing side chill serving existing abattoir.
SA100576	28/02/2011	Withdrawn	Extension to side chill & extension to lairage to existing meat processing plant.

PLANNING REFERENCE	DECISION DATE	PERMISSION	DESCRIPTION
SA140210	24/06/2014	Permission	Retention of extensions to the side chill in three units and extension to the existing lairage. Retention of change of use of separate lairage extension from agricultural use to commercial use. Retention of ancillary development comprising a trailer port, existing green offal chills, existing office and staff welfare facilities, three separate surface parking areas to accommodate 51 car parking spaces and six delivery/dispatch vehicles spaces, together with lairage yard extension and associated site infrastructure works. Permission was also sought for works required to facilitate rainwater harvesting, enhancement of water supply and upgrading of on-site drainage and surface water management infrastructure. The application relates to development for the purpose of an activity requiring an Integrated Pollution Prevention and Control Licence.
LB140803	22/01/2015	Permission	Development comprising: (i) Intensification of livestock slaughtering activities at existing plant; (ii) Demolition and removal of existing offices as required under Condition No. 3 of planning permission SA/140210; (iii) Construction of new offices, staff welfare and storage facilities at the location of the demountable structure referred to in (ii) above; (iv) Change of use of an existing farmhouse from residential use to office use; (v) Construction of additional lairage facilities; (vi) Construction of a green offal processing room; (vii) Construction of an external gantry to support a stomach press; (viii) Construction of a pumphouse; (ix) Addition of five new ancillary car parking spaces. The application is in respect of an activity which requires an Integrated Pollution Prevention and Control Licence (IPPC).
LB161202	22/12/2016	Permission	Construction of single storey extension to north elevation of existing Bovine Slaughtering Building, to include extension to Offal Process Area with covered bin storage area, locker room & laundry store.
LB180300	15/05/2018	Permission	The development consists of the construction of extension to an existing waste water treatment plant to include: - a) Coarse & fine screen, Balance tank, Sludge tank, Sludge press, Anoxic tank, Aeration tank, Clarifier, Sand Filter, Treated effluent pump sump, Coagulant storage tank, Odour Scrubber Unit, Control building and relocation of existing DAF unit. b) Associated site development works, including earth berm to perimeter of extended treatment plant and landscaping. This planning application is accompanied by an Environmental Impact Assessment Report (EIAR). This application relates to a development which operates the activity 7.4.1 of Schedule 1 of the EPA Acts 2003 to 2013, under an Industrial Emissions Licence (formerly Integrated Pollution Prevention and Control Licence)

During the planning permission process for Planning Reference SA100576, a request for further information from the EPA was issued to Dawn Meats (Slane) regarding requirements for the management of wastewaters at the site, which would necessitate a review of the site's IPPC licence. The EPA approved the variation to the IPPC licence in October 2013, which involved lining and covering the wastewater retention lagoons. Following the variation to the IPPC licence, Dawn Meats (Slane) submitted a planning application in 2014, Planning Reference SA140210, which included for the upgrading of on-site drainage and surface water management infrastructure.

The development proposed by Dawn Meats (Slane) would further improve the water management system onsite, by providing for additional treatment of wastewaters to a quality sufficient for proposed discharge to surface waters (River Boyne).

The proposed amendments to Planning Reference LB180300 would allow for greater control of the final effluent, improve odour management, future proof the wastewater treatment plant and allow for a rising main pipeline to a discharge at the River Boyne.

Dawn Meats (Slane) submitted an application to the EPA in October 2006 for an Integrated Pollution Prevention and Control (IPPC) licence. This licence was granted by the EPA in March 2010, Licence Registration Number P0811-01, for the following activity: "*The operation of slaughterhouses with a carcass production capacity greater than 50 tonnes per day*".

The licence was amended in January 2013 to ensure compliance with the provisions of the European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. 9 of 2010). In December 2013, the licence was amended from an IPPC licence to an Industrial Emissions (IE) Licence, to ensure compliance with the Industrial Emissions Directive (Council Directive 2010/75/EU).

The Dawn Meats (Slane) IE licence was reviewed and the current IE licence (P0811-02) was issued on the 27th June 2017, for the following activity: 7.4.1 "*The operation of slaughterhouses with a carcass production capacity greater than 50 tonnes per day*".

2.3 EXISTING DEVELOPMENT

2.3.1 SITE AND SURROUNDING AREA

The Dawn Meats (Slane) facility is located in the townland of Painestown, approximately 4.5km south of Slane and 8.5km east of Navan, Co. Meath. The approximate Irish National Grid (ING) reference for the Dawn Meats (Slane) site is 295320E, 269716N. A site location map is included as **Attachment 2.1**. The site is approximately 11.5 hectares in size and includes buildings, hardstanding areas, car parking areas, wastewater lagoons and two agricultural fields. Three groundwater supply wells are located on the northern and eastern boundaries of the site.

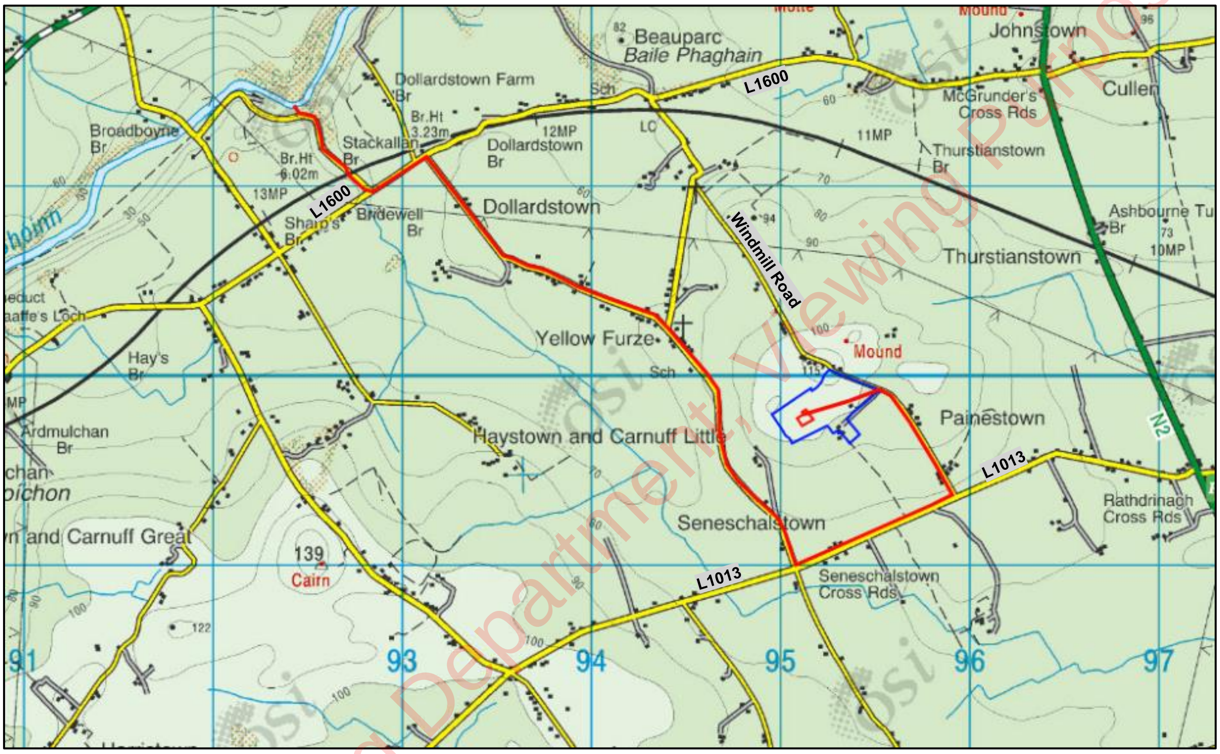

Figure 2.1: Location of Dawn Meats (Slane) facility and Proposed Development

The site is accessed via Windmill Road, a local road linking to the L1013 road. The L1013 road connects to the N2 National Primary Road some 1.3 km to the east and to the R153 Regional Road (between Navan and Kentstown) some 5.4 km to the west.

The site is located in a rural, farming area predominantly comprised of pastureland and hedgerows. Arable fields and small wooded areas can also be found scattered around the landscape. Residential development in the area is predominantly linearly aligned along the existing road network. A number of large farmsteads, as well as some industrial developments are also located within the area. A railway line runs in a west to east direction approximately 1.4 km north of the site. The River Boyne flows in a north-westerly direction and is located, at its closest, 3.1 km north of the site.

The topography surrounding the site is gently undulating between low points of around 60m AOD and a number of local highpoints of over 100m AOD. The Dawn Meats (Slane) facility is located between 90-100m AOD on the southern slopes of one such highpoint, reaching

115m AOD, less than 500m to the north of the site. Levels fall to under 30m AOD along the course of the River Boyne.

The Dawn Meats (Slane) facility does not lie within a Special Area of Conservation (SAC), Special Protection Area (SPA) or Natural Heritage Area (NHA) designated sites. The closest protected sites to the facility are the River Boyne and River Blackwater SAC (Site Code: 002299) and the River Boyne and River Blackwater SPA (Site Code: 004232), located approximately 2.6km and 3km north-west of the facility respectively.

The site is located within an area which can be considered as of heritage and cultural value. The UNESCO Brú na Bóinne World Heritage Site is located approximately 6km north-east from the Dawn Meats (Slane) facility.

2.3.2 EXISTING INFRASTRUCTURE AND UTILITIES

Dawn Meats (Slane) is a producer and processor of beef products. This site takes in live cattle and produces sides and quarters for further processing at other Dawn Meats sites or direct sale. The site currently have a permitted slaughter rate of 350 head of cattle per day. The facility employs 77 people, and slaughtering usually operates Monday to Friday from 7.00am – 5.00pm.

The layout of the existing development is included as **Attachment 2.2**. The existing development is comprised of the following:

- Main building housing slaughter facilities, cold storage, side chills, water treatment plant, plant room, hygiene room, boiler room, workshop and staff facilities including changing rooms and toilets;
- Lairage and pen areas;
- Hides store;
- Two chill extension units adjoining the main building;
- Green offal chill unit;
- External and over-ground water storage tanks, blood tanks, wastewater tanks and grey water storage tanks;
- Vet offices;
- Raw material / packaging / chemical / oil storage areas;
- External canopy structure covering Category 1 trailer;
- Staff and vet offices;
- Car parking areas;
- Pump-house;
- Waste / by-product storage areas;
- Wastewater treatment system comprising of a pumping sump, meva screen, slatted tank, drum screening, wastewater storage lagoons and DAF treatment unit.

<u>Energy</u>

The site currently uses three energy sources:

1. LPG in the boiler;
2. Gas oil in the back-up generator and forklifts;
3. Electricity for process and office.

Electricity is used as efficiently as possible throughout the site. Significant investment has been put into the site planning and initial build programme to ensure good overall site energy monitoring and control. The main users of electricity on site are the refrigeration plant, production lines and office areas.

The existing effluent treatment process is not individually metered for energy consumption; however, the current effluent treatment equipment would contribute a small fraction of the site's daily energy use.

The facility sets energy efficiency targets as part of the site's Environmental Management Programme. The site undertakes regular energy audits to ensure maximum efficiency and to identify energy saving measures.

Figure 2.2 below provides an estimate of the energy consumption based on Sector Guidance information.

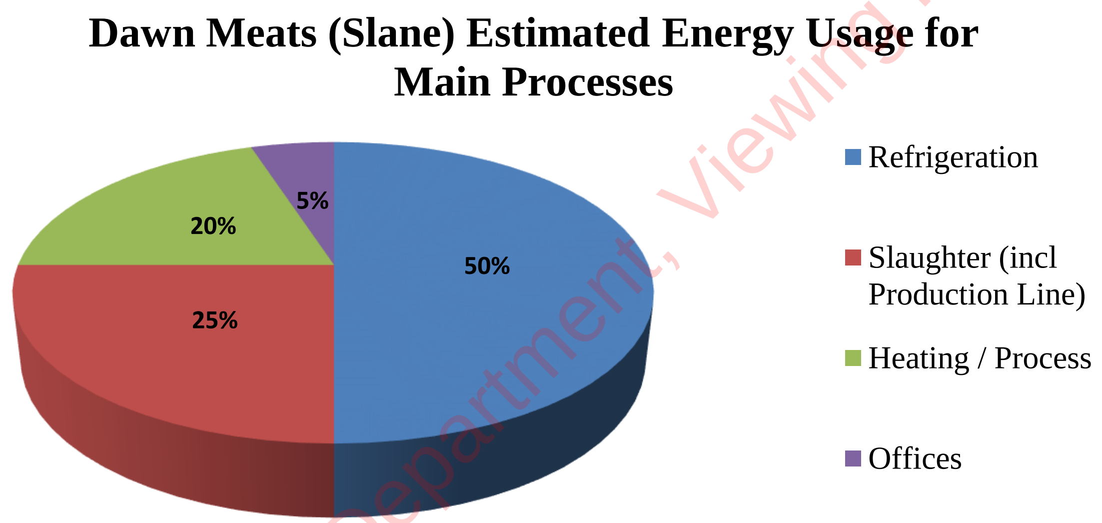

Figure 2.2: Estimated Energy Usage for Main Processes

Water Supply

Water at the existing Dawn Meats (Slane) site is sourced from onsite wells, in addition to the ancillary mains water supply.

Drainage Network

There are no discharges to sewer at the site. There are no process or sanitary water emissions to surface water at the site.

Stormwater from roof and clean-yard areas is directed to the rainwater harvesting system onsite and stored, via a pumped sump, on the surface covers of the HDPE lined lagoons. Stormwater from these clean areas may also be discharged via an interceptor to SW2 (295357E, 269652N), at the Painestown Stream south of the site, in compliance with the site's IE licence.

The collected stormwater is used for lorry washing activities, supplementing the groundwater supply. The water from lorry washing is directed to the lairage tank. The contents of the lairage tank are landspread in accordance with the Nitrates Regulations. During the closed land-spreading period, the centrate arising from the dewatering of lairage tank contents is directed to the site's WWTP.

Run-off from "dirty" yard areas, process waters and sanitary effluent from staff welfare facilities are directed to the site's WWTP.

Waste Management

The waste arising at the Dawn Meats plant comes under the broad European category of LoW 02 01 wastes – Wastes from Agriculture, Horticulture, Aquaculture, Forestry, Hunting and Fishing, Food preparation and processing.

Solid animal derived wastes produced are CAT 1, CAT 3 and packaging waste generated during the production process. From an economic viewpoint, loss management control is utilised to prevent or recover as much product as possible, however a certain base loss is attributable to each process.

The only waste currently produced at the existing effluent treatment operations is screenings from the Meva and Drum Screens, which are disposed of as CAT 1 waste.

All waste handling contractors and waste disposal facilities used by Dawn Meats (Slane) must be fully permitted by Local Authorities or licensed by the EPA as relevant. In addition, all transportation of waste materials from the site is undertaken by contractors who have valid Waste Collection Permits (WCP) in place.

All waste is stored in an area designated specifically for each particular waste and is clearly labelled. All putrescible wastes are stored in an area of hardstanding that drains to foul. It is site practice that all putrescible waste is removed regularly as required.

2.3.3 PROCESS DESCRIPTION

The main stages of meat production and processing at the facility are discussed below and outlined in **Figure 2.3**. A process description of the wastewater treatment system currently in operation is discussed in **Section 2.3.4**.

Lairage

Cattle scheduled for slaughter are delivered to the site by road. On arrival, the documentation for the animals is checked; only those animals having the necessary documentation are accepted. The animals are placed in livestock holding pens in the lairage. After unloading, the cattle delivery vehicles are taken to the lorry wash area for washing before leaving the site. The lairage is designed to allow the maximum amount of dry content to be collected before it is necessary to hose down the floor. The site procurement procedure ensures that the number of breaks in slaughtering processing are minimised, by ensuring that there is a constant supply of animals to the slaughter floor.

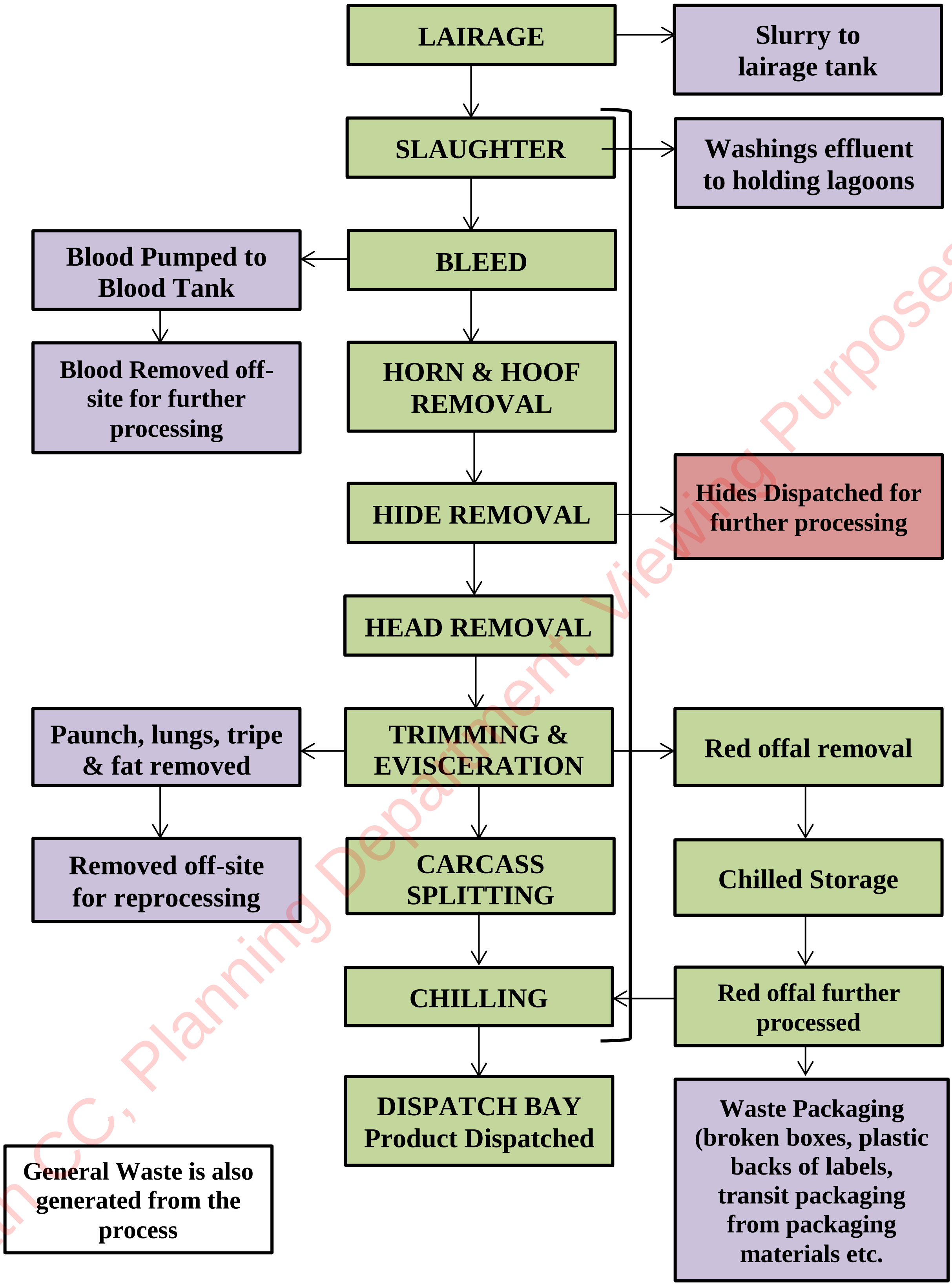

Figure 2.3: Process Flow Diagram

Slaughter and Bleed Lines

Cattle are stunned / killed in a purpose designed stun box using a captive bolt pistol. The animals are then hung by their back legs on an overhead rail system. The cattle then have the main arteries in their throats cut by trained slaughter operatives. Slaughter lines are normally only operated on weekdays i.e., Monday to Friday, however, slaughtering may be undertaken at weekends for reasons such as casualty animals and demand. Blood from slaughtered animals is collected by means of a dedicated collection system. The blood trough is designed to facilitate "squeegeeing" of partially congealed blood into the blood collection system. There are no additional bleed points on the slaughter floor. Blood is then transferred from the blood trough to the blood storage tank, where it is held until it is removed off site by tanker. Citric acid is added to the blood removal system and blood is chilled to aid coagulation of the blood so that it can be used for plasma removal.

Head, Horn and Hoof Removal

Heads, horns and hooves are manually removed from cattle carcass using hydraulically operated cropping shears and sent to Specified Risk Material (SRM) skips for staining with blue dye.

Hide Removal

After bleeding, cattle have the mask and ear manually removed. After removal, the mask, which is classed as SRM, is stored in dedicated storage areas and stained with blue dye before disposal. Hides are removed from cattle by means of an automated hide puller system and stored pending removal off-site for further processing.

Trimming and Evisceration

Green offal (lungs, trachea and paunches) are collected and taken for processing as pet food at off-site facilities. The spleen, intestines and pancreas are classed as SRM and are stained with blue dye and sent to the relevant skips. Gut (paunch) contents are also removed at this stage and taken by a contractor for land-spreading. The respiratory, pulmonary and digestive organs are then removed and the resulting offal sent for disposal or further processing as required. Red offal (heart, liver and kidneys) is removed and sent to the Red Offal processing area.

Red Offal Further Processing

Further to being initially chilled, red offal is trimmed, packed, labelled and weighed and then sent to the chill for storage. This process may produce some waste packaging such as broken boxes, backs of labels, transit packaging for the packaging materials etc. and as these volumes are so small they are treated as general waste.

Carcass Splitting

After the removal of offal, the cattle carcasses are split along the spine using purpose designed electric saws. The spinal cords are then removed from the carcass using a vacuum suction system. The spinal cords are classed as SRM and stained with blue dye and sent to the correct SRM skip. The prepared carcasses are then weighed and finally inspected before being sent to the carcass chill.

Chilling

After weighing and grading, the carcasses are placed in chilled storage prior to dispatch. Meat is kept in chilled storage (at 2°C) for a minimum period of 24 hours before dispatch.

Cleaning
Procedures ensure that residual material is removed from floors, water is used efficiently and employees are trained in the handling and making up of working solutions and their applications.

2.3.4 WASTE WATER TREATMENT PROCESS

Effluent generated on the site comprises of wash-down of the production floor, drainage from dirty yard areas, drainage from the floor of chill areas, domestic effluent and centrate return from fertiliser by-product (belly-grass and lairage) dewatering.

The site's current effluent treatment plant consists of the following:

- Pumping sump;
- Meva screen;
- Slatted tank;
- Drum screening;
- HDPE wastewater storage lagoon (Lagoon 2);
- Dissolved Air Flotation (DAF) unit;
- HDPE wastewater storage lagoon (Lagoon 1).

A schematic diagram of the site's existing effluent treatment system is provided in **Figure 2.4**.

Collection of Effluent
Raw process effluent, process wash waters, domestic effluent from the main product building and dirty yard drainage from the offal yard are collected daily via a network of process drains and passes through a pumping sump (2.7 M^3) and meva screen (<5mm) before being directed to a slatted collection tank (40 M^3), located at the south-west corner of the facility.

Solid wastes within the wash waters are captured by the 'meva screen' (<5mm). These Category 1 materials are transferred to dolavs and from there to the Category 1 trailer in the main facility yard. The contents of the Category 1 trailer are recovered via a rendering process at an offsite authorised facility.

Drainage from the floor of chill areas, domestic effluent and drainage from the lower lairage dirty yard area drains directly to the 40 M^3 slatted tank, without passing through the pump sump and meva screen. This 40 M^3 slatted collection tank is a settlement stage where solids are able to drop out and soluble fat can solidify and float. This also reduces the amount of Fats, Oils and Greases within the effluent entering the lagoon system. Solids and OFG from the 40 M^3 slatted collection tank are directed to the Category 1 trailer.

Raw process effluent, mainly process wash water and dirty yard drainage, is then pumped to the main effluent treatment area located to the north of the facility. Prior to entering the main effluent treatment area, all effluent passes through an inline volume flow meter. There are also additions from the processing of organic fertiliser by-product (lairage/lorry-wash centrate and potentially bellygrass centrate) to the effluent collection system.

Liquid from the lairage and truck wash area is collected in a separate 40 M^3 tank adjacent to the 40 M^3 slatted tank referenced above. During the open landspreading period, liquid from this tank is removed directly via tanker for transfer to an off-site store before it is applied to land as a fertiliser in accordance with a Nutrient Management Plan.

During the closed period, once the off-site liquid store has been fully utilised, liquid from the lairage and truck-wash tank is passed through a FAN GmbH separator. The centrate return liquids from fertiliser by-product dewatering are directed to the $40M^3$ slatted effluent tank, as detailed above.

Bellygrass from the production process is collected in dolavs, which are emptied into the bellygrass trailer. Bellygrass is not currently being dewatered prior to collection onsite for removal to offsite storage and it is not intended to be normal practice in the future. However, the facility for the dewatering of bellygrass has been retained onsite and, in the event of the bellygrass press being used, centrate return from the bellygrass press would be directed to the $40M^3$ slatted effluent tank.

Bellygrass, and dewatered lairage/lorry-wash material during the closed landspreading period, is collected in a skip / trailer and transferred to an off-site store. This dewatered material is applied to land as a fertiliser during the open spreading season in accordance with a Nutrient Management Plan.

Treatment of Effluent

Effluent from the underground slatted tank is pumped to a $20m^3$/hour drum screen located in the main effluent treatment area, where further secondary fine screening (>0.75mm) takes place to remove additional solids from the wastewater. Drum screen solids are collected in dolavs which are regularly emptied into the CAT 1 waste trailer in the main facility yard. The contents of the Category 1 trailer are recovered via a rendering process at an offsite authorised facility.

After passing through the drum screen, the wastewater is discharged to the adjoining HDPE wastewater storage lagoon (Lagoon 2). From Lagoon 2, effluent is pumped to the DAF Treatment Unit where further solids and fats are removed.

During the open season, as per the Nitrates Regulations, wet DAF sludge is directed to onsite sludge storage tanks ($15M^3$ and $25M^3$) from which it is collected for removal offsite for landspreading directly on farmland in accordance with a Nutrient Management Plan.

During the closed season, DAF solids are collected in the onsite sludge tanks prior to removal offsite for storage in an offsite store. Stored DAF sludge would be applied to land in the open spreading season in accordance with a Nutrient Management Plan.

DAF sludge is not currently being dewatered prior to collection onsite for removal to offsite storage and it is not intended to be normal practice in the future. However, the facility for the dewatering of DAF sludge has been retained onsite and, in the event of the screw press being used, centrate return from the screw press would be directed to Lagoon 2, with dewatered solids directed to a sludge trailer for removal offsite to an offsite store.

Once wastewater has been treated by the DAF, wastewater is then discharged to the adjoining HDPE wastewater storage lagoon (Lagoon 1) to await collection.

Once per year during the open season, as per the Nitrates Regulations, as and when weather conditions permit, sludge which has collected on the bottom of HDPE Lagoon 1 and HDPE Lagoon 2 is removed and spread on farmland, in accordance with a Nutrient Management Plan.

Storage

The wastewater lagoons (Lagoon 1 & Lagoon 2) are both 3m deep, lined and covered and have a combined storage volume of 7,500m^3. They are lined by a 0.5m thick engineered layer of clay, a Geosynthetic Clay Liner (GCL) with permeability of 2x10-11 m/sec and a HDPE liner, which combine to give an overall permeability of 1x10-9 m/sec, in accordance with EPA requirements.

Wastewater holding capacity in excess of routine requirements is provided at the lagoons and at the off-site wastewater treatment facilities. At the present time, the lined lagoons provide in excess of 9 weeks storage capacity in the open landspreading season and 7.7 weeks storage capacity in the closed landspreading season. Actual storage levels in the lagoons are maintained below 50% of the lagoon volume at all times, providing at least 4.5 / 3.85 weeks emergency storage / firewater capacity on-site if required. The level of both Lagoon 1 and Lagoon 2 are separately monitored by way of two ultrasonic level control probes (US1 & US2).

Back-up pipework connections have been provided as part of the HDPE Lagoon effluent treatment and storage system for use in the event of an issue or maintenance in Lagoon 2 (Settlement Lagoon), Lagoon 1(Final Effluent), or maintenance on the DAF treatment unit. These pipework connections are not used as part of the normal effluent treatment procedure at the site, and would only be utilised when required during maintenance or in an emergency situation.

A back-up connection provides the facility to pump from the drum screen directly to Lagoon 1, in the event of an issue with Lagoon 2. There is also a back-up piped connection between Lagoon 1 and Lagoon 2 to allow for the transfer of effluent, in either direction, in the event of an issue with one of the lagoons. There is also a back-up draw off connection for tankers in Lagoon 2 in the event that this is temporarily used for the storage of final effluent.

There are manual valves onsite that would be used to control the re-direction of wastewater during abnormal situations as described above. The inlet effluent flow meter (EM1) is located on the wastewater line before wastewater passes through the drum screen and any diversion during abnormal operating circumstances which may occur would be after the drum screen. Therefore, all wastewater pumped to the HDPE lagoon would be accounted should the changes as outlined above be implemented for a short period of time.

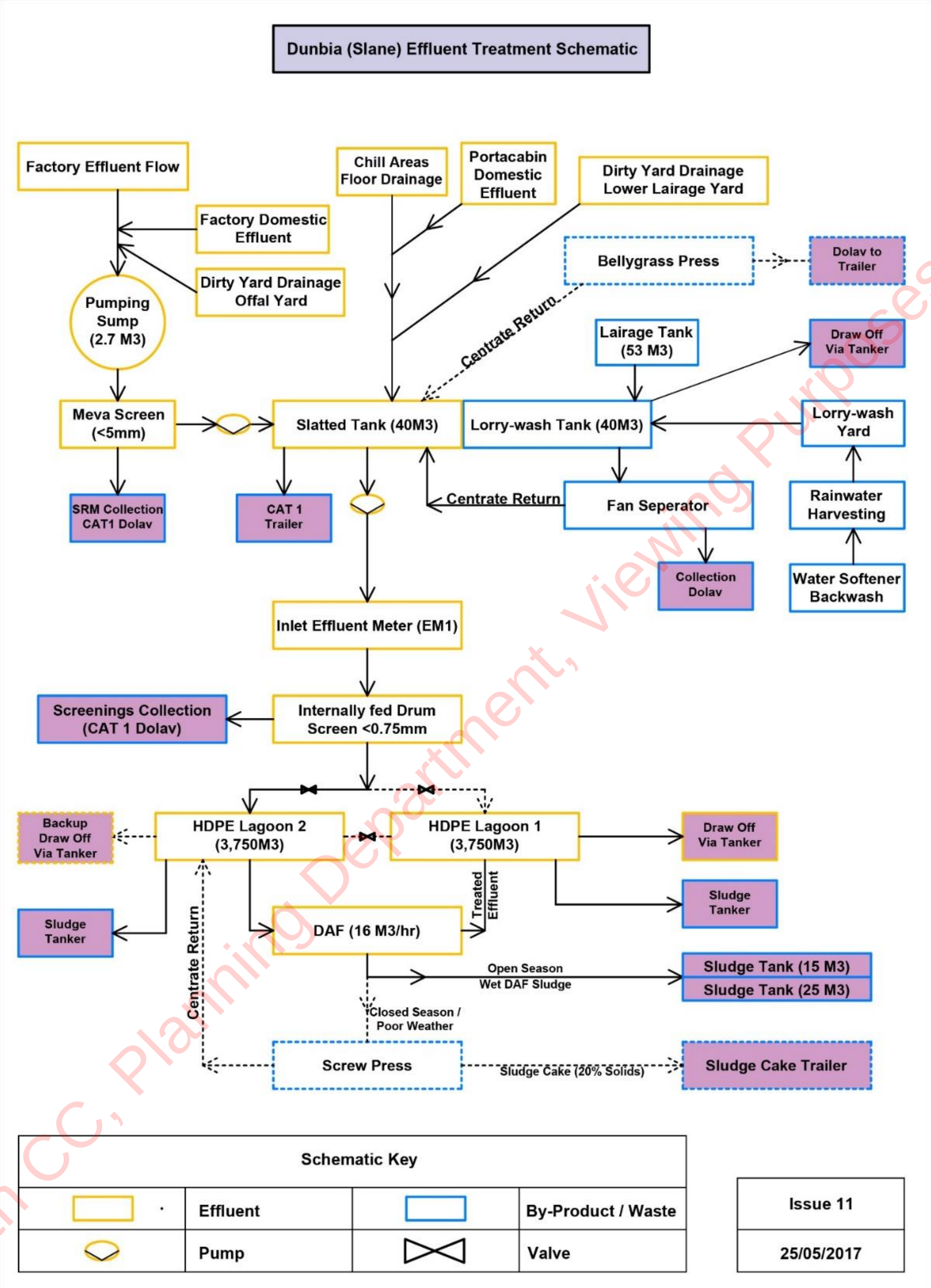

Figure 2.4: Schematic of Existing Effluent Treatment System

Effluent Removal Off-Site

Wastewater stored in Lagoon 1 is collected daily (7-8 times per day) by road tankers and transferred off-site to licensed municipal wastewater treatment plants at Navan and Ringsend for further treatment.

There is a dedicated connection and take-off point for tankers removing wastewater from Lagoon 1 located at the end of the access road which runs to the rear (north) of the main factory building. Wastewater is pumped from Lagoon 1 to a designated effluent extraction point (SE2). In abnormal circumstances, as described above, if wastewater should be required to be removed directly from Lagoon 2 the effluent extraction point (SE2) will remain in the same location as this designated location is the outlet from the extraction pump, not the connection point to the lagoons.

This temporary change would be facilitated by disconnecting pipework from lagoon 2 to the DAF unit, connecting the pipework / portable effluent pump to the Lagoon 2 discharge location and then connecting this to the designated effluent extraction point. Therefore, the location of the extraction point would not change and existing spill controls for collection during normal process operations would still apply if effluent was required to be removed from Lagoon 2, rather than Lagoon 1.

Each tanker of wastewater is weighed on the site weighbridge before it is removed from site and a record of the volume removed and destination it was removed to is recorded.

2.3.5 ENVIRONMENTAL MANAGEMENT

An Environmental Management System (EMS) is in place at the Dawn Meats (Slane) facility. The form of the EMS includes the following constituents:

- Environmental Policy;
- Management & Reporting;
- Schedule Objectives and Targets;
- Environmental Management Programme;
- Corrective Action;
- Awareness and Training;
- Environmental Management System Documentation;
- Communications Programme;
- Emergency Response;
- Maintenance Programme;
- Annual Environmental Report;
- Efficient Process Control.

An Environmental Management Programme (EMP) in place to implement the EMS onsite, with objectives and targets set. Objectives and targets are reviewed regularly as part of on-going management of the facility.

Dawn Meats (Slane) has an Environmental Policy in place.

2.4 DEVELOPMENT APPROVED BY PLANNING AUTHORITY

The development approved under Planning Reference LB180300 consisted of the construction of extension to the existing waste water treatment plant to include: -

a) Coarse & fine screen, Balance tank, Sludge tank, Sludge press, Anoxic tank, Aeration tank, Clarifier, Sand Filter, Treated effluent pump sump, Coagulant storage tank, Odour Scrubber Unit, Control building and relocation of existing DAF unit.

b) Associated site development works, including earth berm to perimeter of extended treatment plant and landscaping.

A drawing detailing the approved WWTP layout is included in **Attachment 2.2**.

This approved development did not include for the discharge of treated effluent to the River Boyne.

2.5 PROPOSED DEVELOPMENT

Dawn Meats (Slane) are proposing a rising main pipeline from the effluent plant to the River Boyne, amendments to the existing and approved effluent plant design to improve final effluent nutrient removal and a further extension to the effluent compound to future proof the existing approved effluent treatment system at the facility.

The planned discharge of treated effluent to the River Boyne would be subject to a revision of the site's IE Licence by the EPA. The proposed effluent plant has been designed with the discharge of final effluent to surface water in mind.

This proposed development would provide for future proofing of effluent treatment at the WWTP development up to a maximum of 400 M^3 per day.

The proposed development is described in detail in **Sections 2.5.1 to 2.5.6**.

This planning application relates to (1) demolition of the existing storage building to construct a new control house, chemical store and enclose the DAF unit, (2) amendment of the existing approved effluent plant development and an extension to the existing wastewater treatment compound, and (3) construction of a rising main discharge pipeline at Dawn Meats (Slane) alone. There are no proposed changes to the construction or processes or management at the main facility.

The Dawn Meats (Slane) facility currently provides employment for 77 staff. The proposed development would provide additional employment during the construction and landscaping phase over a period of approximately eight months.

The proposed layout for the WWTP extension is included as **Attachment 2.3**.

2.5.1 WWTP UPGRADE AND EXTENSION

Design drawings of the existing effluent management area and approved effluent treatment plant are provided in **Attachment 2.2**. A drawings of the proposed amendment to the approved effluent treatment plant and the extension are provided in **Attachment 2.3**.

The upgrade and extension of the WWTP would improve the permitted wastewater treatment process:

1. **Primary Treatment – Stage 1** (in place)
   - Pumping Sump
   - Meva Screen
   - Slatted Tank/Sump and Pumping

2. **Primary Treatment – Stage 2** (approved)
   - Drum Screening (replace existing screen in current location)
   - Balance Tank
   - DAF Unit (Relocate to within new control house) (PROPOSED)
   - Sludge Holding Tank
   - Sludge Volute (PROPOSED)

3. **Biological Treatment – Stage 3** - Approved
   - Anoxic Tank (converted from approved Aeration Tank)
   - Two 750 M^3 Aeration Basins (PROPOSED)
   - Clarifier
   - Sand Filter
   - Final Sump

The proposed stages of wastewater treatment and associated WWTP plant are shown in **Figure 2.5** below. A schematic diagram of the proposed effluent treatment system is provided in **Figure 2.6**.

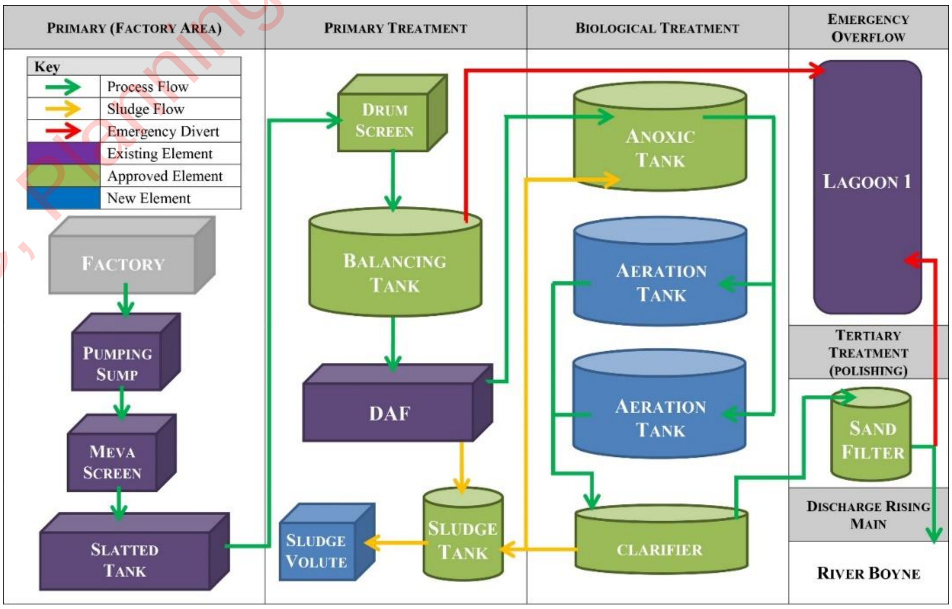

Figure 2.5: Proposed Stages of Wastewater Treatment and Associated WWTP Plant

Primary Treatment – Stage 2

The proposed Primary Treatment – Stage 2 would comprise of the approved screen, balance tank and sludge holding tank, in addition to the relocation of the DAF unit within a proposed extension to the approved control house. The existing screw press would remain in its current position. Details for the approved Stage 2 process are included below.

Control House (Extension to approved building)
Under existing planning consents, it has been approved to build a control house building to house the effluent plant computer control system and effluent monitoring laboratory. The building was to be constructed adjacent to an existing shed in the effluent plant area.

It is proposed to demolish the existing building 17.5 m^2 (3.5m x 5m x 2m high), and construct a new 119m^2 control house (9.45m x 13.9m x 2.5m high).

The proposed control house would include three rooms, one housing the effluent plant computer control system and effluent monitoring laboratory, the second bunded room housing effluent plant chemical storage, chemical dosing machinery and the inlet flow meter, and a third room to house the Dissolved Air Floatation (DAF) unit. The enclosure of the DAF unit would allow for improved management of the potential for odours to be generated at the facility.

Screen (Approved)
The approved new rotary drum screen would replace the existing drum screen. The new screen (2mm wedge wire) would be capable of receiving 30 M^3 per hour raw effluent. Screenings would be collected in a designated dolav and disposed of as CAT 1 waste.

Balance Tank (Approved)
The approved Balance Tank (13m diameter x 4.5m high) would have a maximum operating volume of 600 M^3. This would be an over-ground, glass-lined steel tank, with adequate mechanical mixing provided. The tank would be covered with ventilation provided to an adjacent odour scrubber in order to prevent potential odour emissions.

This new balance tank would provide storage capacity to buffer the effluent composition/loading and balance out flow fluctuations from the plant in order to facilitate the treatment of effluent via the DAF and biological stages at a steady rate.

The maximum capacity of the effluent plant would be 400 M^3 per day, and the Balance tank would have a 1.5 day retention capacity.

The flow to the DAF unit would be maintained under flow control via a flow control valve in the feed line and an ultrasonic level sensor / controller on the balancing tank which would be linked to a main control SCADA system.

An emergency divert connection would be installed to the existing Lagoon 1, for use in the event of a treatment system malfunction. Following a return to normal operations, stored effluent within the lagoon would be returned to the treatment process via gradual pumping into the drum screen sump, before entering the balance tank.

DAF Unit (Relocation Approved)
A DAF unit is currently in place at the site. This would be relocated to an internal room of a proposed extended control house building. The DAF unit would treat the balanced screened effluent. Solids would be removed from the raw effluent using a chemical programme with a coagulant and flocculent, followed by diffused air. pH control would be achieved by the controlled addition of acid and caustic into the DAF inlet point as required.

The DAF unit is designed to accept flows of 25 to 30 M^3 per hour. The aeration system is sized to optimise fat removal and sludge concentration.

Treated effluent would be pumped to the anoxic tank for further biological treatment.

The DAF sludge would gravity feed into a sludge transfer tank/trough which would form an integral part of the DAF unit. The sludge transfer tank would be fitted with duty/standby sludge pumps and the level in this tank would be controlled by starting and stopping the duty pump between levels. Sludge would be fed from the DAF sludge transfer tank into the new sludge holding tank.

Sludge Holding Tank (Approved)
A sludge holding tank (250 M^3) would be required to store the DAF sludge and biological waste activated sludge prior to on-site dewatering and then off-site treatment. This would be an over-ground, glass lined steel tank, with adequate mixing (2.5 Kw/hr submersible mixer). The tank would be a covered tank with extracted ventilation provided to an adjacent odour scrubber in order to prevent potential odour emissions.

An estimated maximum 5 tonnes of DAF sludge (solids concentration of 4%) and 25 tonnes of biological sludge (solids concentration of 1%) would be created daily during the initial construction phase of the development. Following the second construction phase installation of the second aeration tank, an estimated maximum 8 tonnes of DAF sludge (solids concentration of 4%) and 40 tonnes of biological sludge (solids concentration of 1%) would be created daily.

This sludge would be collected by a registered contractor for land-spreading. Any such landspreading would be required to be completed in compliance with a Nutrient Management Plan in compliance with the Nitrates Directive (S.I. 31 of 2014).

Sludge Screw Press (Proposed)
A new volute type sludge screw press would be installed as part of the initial works phase.

The press would be structured with a filter element that consists of two types of rings: a Fixed Ring and a Moving Ring; and a screw that thrusts the filter element and transfers and pressurizes the sludge. The gaps between the rings and the screw pitch gradually get narrower towards the direction of sludge cake outlet and the inner pressure of the filter element increases due to the volume compression effect, which thickens and dewaters the sludge.

The sludge press has the capacity to process 10 M^3/hour of sludge, producing a sludge cake at 20% solids content. This may be used during the closed landspreading period in order to ensure compliance with storage requirements under the Nitrates Directive S.I. 31 of 2014.

Biological Treatment – Stage 3

The revised Biological Treatment – Stage 3 would comprise the construction and commissioning of two new aeration tanks, and construction of the approved clarifier and sand filter. Details for the proposed Stage 3 process are outlined below.

Anoxic Tank (Approved)
It is proposed to repurpose an aeration tank approved under LB180300 as an anoxic tank. The originally proposed anoxic tank would not be installed.

The anoxic tank would have a maximum operating volume of 912 M^3. This would be an over-ground, glass-lined steel tank, with an internal submersible mixer in order to ensure adequate treatment of all inflow.

The tank would allow for a longer residence time for effluents within the Anoxic Tank, in order to ensure that sufficient nutrient removal takes place. The longer residence time would also allow for greater percentage removal of nitrogen from the effluent, creating a final effluent with a lower environmental load.

Anoxic mixers are used in de-nitrification basins in wastewater treatment plants. The process involves the de-nitrification of waste streams through the use of bacteria which break down the nitrate in the waste to use as an oxygen source (energy source). This breakdown of nitrate from the waste stream releases oxygen and nitrogen gas. The oxygen is respired by the bacteria and the nitrogen gas releases to the atmosphere. The waste stream then has acceptable nitrogen levels so the water can be discharged into the environment (streams, ponds, lakes, etc.).

In the anaerobic/anoxic tank, denitrification would take place by mixing the food source (DAF out-flow), microorganisms (return activated sludge) and nitrates (aeration tank effluent). Effluent containing nitrates would be pumped and recirculated from the aeration tanks back to the anoxic tank.

The anoxic tank would contain a submersible mixer to allow constant mixing of the tank contents. The nitrates would be converted to nitrogen gas and available oxygen (denitrification) in this tank. After this processing, the effluent would flow to the biological aeration tank.

Aeration Tanks (Proposed)
Planning permission is being requested for two 750 M^3 aeration tanks.

A single aeration basin would be constructed as part of the initial construction phase and would have sufficient capacity to treat the effluent to a standard sufficient to discharge to the River Boyne. The second aeration basin would be installed during the second construction phase in order to increase the treatment capacity of the effluent plant. Both of the proposed aeration tanks (13m x 5.7m high) would each have a maximum operating volume of 750 M^3. The tanks would be over-ground, glass-lined steel tanks, with adequate diffused-bubble aeration/mixing (65 kW) in order to ensure adequate oxygen for the microbial population.

This is where the biological breakdown of the effluent takes place. The aeration tanks would be fitted with an air diffuser network and three air blowers which run as duty, duty and assist to manage any high loading on the treatment plant from the effluent. The speed and operation of the blowers would be varied by the plant control system in response to signals received from the dissolved oxygen sensor mounted in the aeration basin. This sensor would also be linked to the site's building management system which allows continuous monitoring and real time readings.

The aeration tanks, anoxic tank and sludge tank would have manual valves between each tank which would enable tanks to be isolated / segregated if required.

Upon commission of the second aeration basin, the effluent from the anoxic tank would be treated in parallel and split equally between the two aeration tanks for treatment before flowing to the clarifier.

Clarifier (Approved)
The approved clarifier would act as a settling tank, with a diameter of 8 metres and a height of 2.5 metres.

The purpose of the secondary settlement tank is to:
- Remove suspended solids;
- Return settled sludge to the aeration tank.

Success in meeting the outflow quality objectives of the treatment system depends on the settleability of the mixed liquor. While settlement of solids is prevented from occurring in the aeration tank by the action of the aeration equipment, the secondary settlement tank is designed to promote settlement.

Design overflow rates in a secondary settlement tank are typically 21-28.8 m^3/m^2/day. Adequate retention time must be allowed in the settlement tank to allow good separation of the mixed liquor. Other design parameters to be considered include tank depth weir placement and shape, MLSS, sludge settleability and draw-off rate and solids flux. Solids (or sludge) mass flux, expressed as kg/m^2h, bases the design of the settlement tank on the solids loading rate, the settleability of the sludge (SSVI) and the return sludge flowrate.

$$\text{Design Solids loading (kg/m}^2\text{/h)} = \frac{\text{Solids applied (kg/h)}}{\text{Clarifier surface are (m}^2\text{)}}$$

For activated sludge, the Solids loading rate is typically 3.0 to 6.0 kg/m^2/h.

Mixed liquor from the aeration tank would flow to the clarifier via an inter-connecting over-ground pipe. The heavier sludge would settle to the bottom of the clarifier while the lighter clear water flows over the weir launder to a pump sump where it would be pumped through the column sand filter.

Waste sludge would be pumped from the clarifier to the sludge holding tank for a set time daily. Otherwise, activated settled sludge would be continuously returned to the anoxic tank via sludge return pumps.

Sand Filter (Approved)
Clarified effluent from the clarifier would be pumped through a column sand filter. This is a simple sand filtration system, with a diameter of 2.5 M and height of 5 metres.

A sand filter is mainly used to reduce the suspended solids in the final effluent. Suspended solids removal at this stage would also lower the COD/BOD level of the effluent.

The method of backwash is important and the most common and acceptable method is a continuous backwash system.

Treated effluent from the sand filter would gravity feed to a final discharge sump.

Final Sump (Approved)
From the final sump, treated effluent would be pumped to surface water using two submersible pumps (duty / stand-by) operated on ultra-sonic float level probe.

The expected dimensions of the final effluent sump would be 3M x 3M x 4M deep, giving a capacity of 36 M^3. The final sump would have an emergency return connection to the existing HDPE lined Lagoon 1, providing storage for emergencies or other such contingency purposes.

On-line continuous effluent monitoring would also be installed in this sump, which would divert treated effluent back to the storage lagoon if set-points were exceeded.

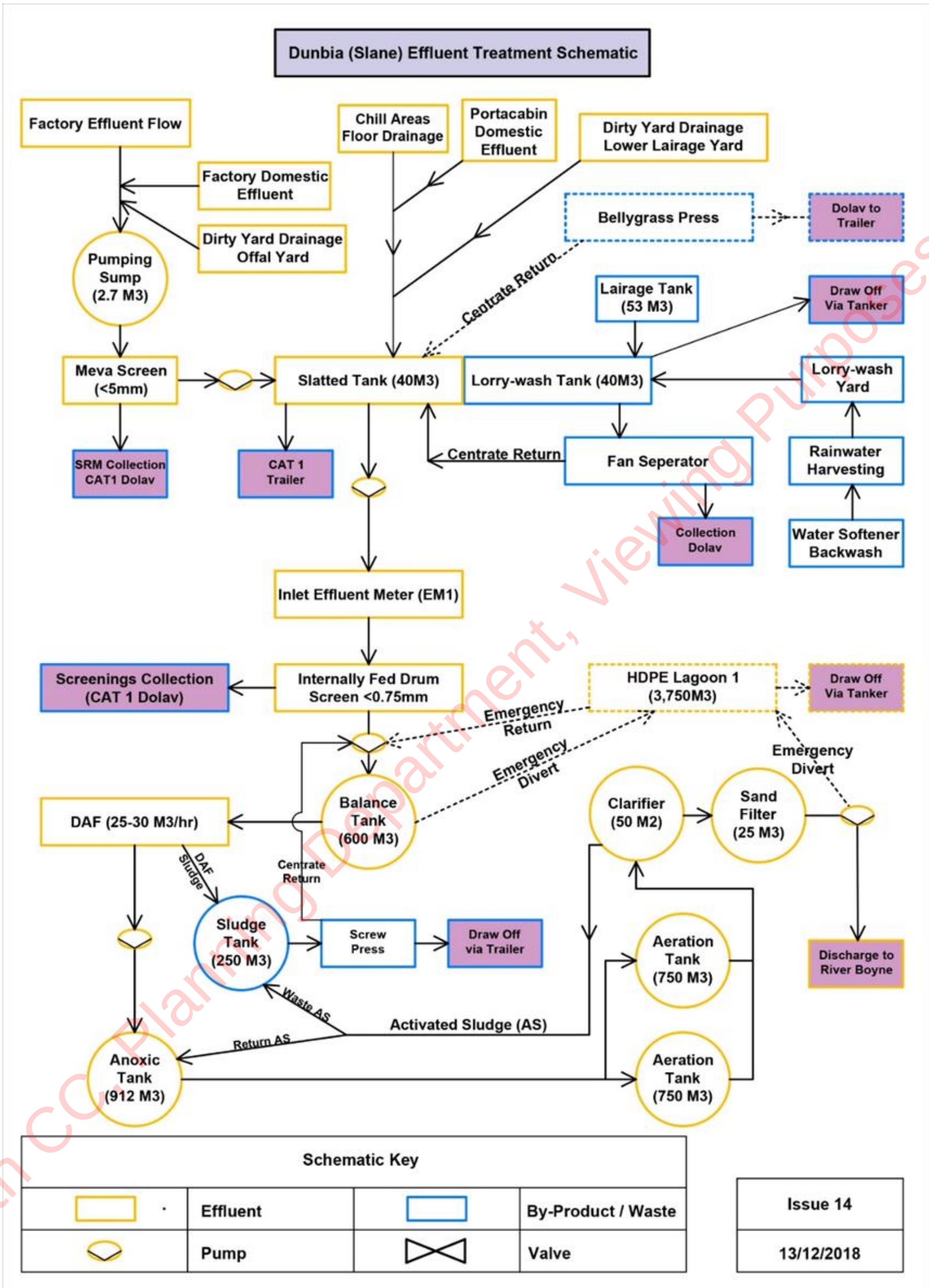

Figure 2.6: Schematic of Proposed Effluent Treatment System

2.5.2 DISCHARGE OF TREATED EFFLUENT

Following treatment, as described in **Section 2.5.1**, it is proposed to discharge treated effluent to the River Boyne. **Table 2.2** details the proposed effluent quality following treatment onsite.

Table 2.2: Proposed Final Effluent Quality

Parameter	Units	Final Effluent Quality
Volume Flow	M^3/Day	400
pH	-	6 - 9
BOD_5	mg/l O_2	20
COD	mg/l O_2	100
Orthophosphate	mg/l PO_4-P	2
Nitrogen	mg/l N	20
Total Ammonia	mg/l N	5
Suspended Solids	mg/l SS	30

The following table indicates the expected effluent quality at each stage of the proposed treatment processes, as discussed in **Section 2.5.1**. The raw effluent analysis is based on average figures from laboratory testing on the DAF unit. Total Nitrogen and Orthophosphate data is based on an average industry standard for the meat slaughtering sector.

Table 2.3: Expected Effluent Quality per Treatment Stage

Parameter	Raw Effluent (Average 2016 & 2017)	After DAF (Average 2016 & 2017)	After Biological (Expected)	Final Effluent Quality
Flow	185 M^3/day	185 M^3/day	185 and 400 M^3/day scenarios	400 M^3/day
pH (units)	7.11	7.17	7	6 - 9
BOD (mg/l O_2)	4,200	2,179	10	20
COD (mg/l O_2)	7,546	3,780	50	100
Orthophosphate (mg/l PO_4-P)	25	3	<1	2
Total Nitrogen (mg/l N)	700	650	<10	20
Total Ammonia (mg/l N)	646	576	<2	8
Total Suspended Solids (mg/l)	1,576	228	15	30

The following table provides for the current average daily effluent to be treated in the proposed effluent treatment facility. Seasonal variation would occur as lairage slurry is dewatered during the closed landspreading period for overwinter storage offsite at locations agreed with the EPA. The centrate from the separator is directed into the process effluent system. It is anticipated that the peak effluent flow rate from the facility would be 12.5 M^3/hour currently.

Table 2.4: Effluent Volumes and Seasonal Variability

Effluent Wastewater	Estimated Total Annual Volume (M^3)	Average Daily Volume (M^3/day) (5 day week)	% of Total (Open Period)	% of Total (Closed Period)
Process and Process Wash-water, Dirty Yard Drainage & Chill Product Floor Drainage*	45,250	174	94.43%	81.45%
Water Softener Backwash*	2,042	7.85	4.26%	3.68%
Domestic Effluent (P.E. Industry)	698	2.69	1.31%	1.13%
FAN Screw Separator (Estimated)***	2,819	29.36		13.74%
Total (Open Period) (Metered)	50,809	185	100.00%	100.00%
Total (Closed Period) (Estimated)		214		

* Effluent is metered prior to entering the existing effluent treatment area.
** Water softener backwash line is metered.
*** Estimate based upon closed spreading period of 15th October to 15th January, as per the Nitrates Directive, (67 business days) plus 30 days for poor weather.

The effluent flow from domestic sources has been based upon the population equivalent (P.E) figure of 30 l/person/day for offices and/or factories without a canteen, as outlined in the EPA "*Wastewater Treatment Manuals – Treatment Systems for Small Communities, Business, Leisure Centres and Hotels*" 1999. There are currently 77 full time equivalents employed at Dawn Meats (Slane), and this is not expected to increase.

2.5.3 SLUDGE MANAGEMENT AND STORAGE

The proposed development would result in changes to sludge volumes currently produced at the Dawn Meats (Slane) facility. Organic fertiliser by-product would include bellygrass, tank contents from the lairage and lorry wash tank, DAF sludge and biological sludge from the clarifier (Waste Activated Sludge).

The proposed development would comply with the Nitrates Regulations with regards the required storage facilities for organic fertiliser by-product. However, additional storage facilities would be required should effluent flow increase from existing volumes to the design 400 M^3 / day effluent.

The European Union (Good Agricultural Practice for Protection of Waters) Regulations 2014 (S.I. 605 of 2017), require that storage facilities equal or exceed the capacity required to store all such livestock manure produced on the holding during the period specified in Schedule 3 of the regulations. The required storage period for Co Meath, as per Schedule 3, is 18 weeks (i.e. the closed period of the 15th October to the 15th January plus 5 weeks).

The regulations also require that storage facilities shall be maintained free of structural defect and be maintained and managed in such manner as is necessary to prevent run-off or seepage, directly or indirectly, into groundwater or surface water

The following table calculates the storage volume required for organic fertiliser by-product that would be produced in an 18-week period at the site. Fertiliser production figures have been based upon current the estimated peak volumes generated during the proposed wastewater treatment system.

Organic fertiliser generation from the proposed effluent treatment system has been based upon an effluent treatment rate of 220 M^3/day.

During the closed landspreading period, and once the offsite liquid lairage & lorry-wash store is full, the FAN™ separator would be used to dewater this material. Dewatering is applied to organic fertilisers in order to reduce the volume of materials to be transported and to ensure sufficient storage volumes offsite. Lairage and lorry-wash would be produced at a dry matter content of approximately 8.1%. The FAN™ separator increases the dry matter content to 30%.

It is not intended to regularly dewater Bellygrass prior to storage off-site; however the dewatering facility for this fertiliser by-product would be retained onsite for use when and if required.

Sludge from the new sludge storage tank would only undergo dewatering in the sludge screw press during the closed landspreading season.

The following table details the required storage volumes for organic fertiliser by-products generated at Dawn Meats (Slane) in an 18-week period.

Table 2.5: Required Storage Volume for Organic Fertiliser By-Products

Organic Fertiliser By-product	Volume per week (M^3)	Proposed Maximum Volume per week (M^3)	Wet Storage (18 Weeks) (M3)	Dry Storage (18 Weeks) (M3)	Required Storage Volume (18 Weeks) (M3)
Lairage / Lorry-wash	173*	193	3,477	939	**939**
Bellygrass (wet)	37*	41	738	598	**738**
DAF Sludge		35	630	98	**98**
Waste Activated Sludge		175	3,150	158	**158**
Total Storage Volume Required			7,995	1,634	**1,774**

**Figures calculated based upon actual volumes and DM% produced from February to July 2016.*

The following table details the available storage volumes for onsite and offsite storage of organic fertiliser by-products.

Table 2.6: Available Storage Volumes for Organic Fertiliser By-Products

Storage	**Available Storage Capacity (M^3)**	
	Onsite	**Offsite**
Lairage Tank	53	
Lairage/Lorry-wash Tank	40	
Sludge Holding Tank	250	
Matt Murtagh's Store (Liquid)		1,033
John McDermott's Store		1,500
Tara Stud		1,000
Total Available Storage	**343**	**3,533**

As can be seen above, there is sufficient storage capacity available in order to comply with the 18-week requirement of the Nitrates Regulations, allowing for storage of wet and dewatered organic fertiliser by-product.

The onsite underground lairage tank and lairage/lorry-wash tank are in compliance with the Nitrates Regulations and Irish Department of Agriculture and Food Specifications S123 (*Minimum Specification for Bovine Livestock units and Reinforced Tanks*) March 2006.

The sludge holding tank would be an above ground, steel tank which would be regularly checked for integrity as per the facility's IE Licence conditions.

Dawn Meats (Slane) have exclusive use of offsite storage facilities.
Matt Murtagh's Store was inspected by Rowan Engineering consultants Ltd in January 2016. It was concluded that the underground tanks provide impermeable storage and are fit for the purpose of storing lairage and truck wash materials.

John McDermott's Store and Tara Stud were inspected by Wynne Civil Engineering Ltd in August 2016. It was concluded that the stores would be fit for use as storage facilities for the product concerned.

2.5.4 TREATED EFFLUENT RISING MAIN

Dawn Meats (Slane) propose to construct an underground rising main to convey the treated effluent from the proposed WWTP to a discharge point on the River Boyne at Ardmulchan / Dollardstown, Co. Meath. The proposed rising main would be approximately 7.2 km in length, commencing at the existing Dawn Meats (Slane) site at Painestown, Beauparc, and passing through the townlands of Seneschalstown, Dollardstown, Hayestown-Carryduff Little and Ardmulchan, prior to reaching the River Boyne. The proposed rising main route is shown in **Attachment 2.4**.

The proposed treated effluent rising main would have a 150mm diameter (nominal bore), a specification class of PE150 SDR17 (10-BAR) and would be laid at a depth of approximately 900mm below the existing ground levels for the entirety of its length. Granular fill (Clause 503 material) would surround the rising main.

The rising main would incorporate sluice valves, in addition to air valves, at strategic locations to allow the release of air pockets that may form during the periods when pumping would not be taking place within the rising main. Inspection chambers would also be installed along the rising main at 500m intervals.

The cleaning and integrity testing of the rising main pipeline would be undertaken every three years, in accordance with the Dawn Meats (Slane) facility's IE Licence. This would involve the closing of the sluice valve at the end of the pipeline, near the outfall, and the power-washing of the line, with wash-water collected by means of a tanker. A CCTV survey of the line would then be undertaken, followed by pressure testing.

The lands through which the proposed treated effluent rising main would traverse are primarily along the verge of the road network, where possible. The final section of the rising main from the local road to the outfall at the River Boyne is in private ownership, therefore Dawn Meats (Slane) would agree a way-leave with the landowner.

The treated effluent rising main would start at the Dawn Meats site at an elevation of 100m above sea level. As the route travels towards the River Boyne, generally the topography gradually slopes to an approximate elevation of 50m at Ardmulchan and 20m upon reaching the river bank.

While the proposed treated effluent rising main would cross approximately 45 metres of agricultural land beside the River Boyne, the majority of the rising main route would be lain along the verge of public roads, bordered by ditches, hedgerows and some areas of stone walls.

The works would also entail the crossing of the culverted Dollardstown Stream. There are also several drainage ditches along the pipeline route which would be culverted underneath the road surface. It should be noted that the extent of works which would be required for crossing the Dollardstown Stream and other drainage have not been fully defined at this stage. A more detailed site investigation would be undertaken at the detailed rising main design stage should planning permission be approved and in agreement with Council engineers.

The proposed route also passes under the Stackallen Railway Bridge and would be installed within the existing roadway under the bridge.

Prior to the laying of the rising main, a buffer zone around any surface water drains (with the exception of culverted watercourse crossings) would be marked out and the installation of silt control features undertaken where appropriate.

It is proposed to use a combination of open-cut and horizontal directional drilling (HDD) methods, as ground conditions allow. HDD is the preferred option by the developer as it will involve less opening of the public roads. However, the extent of the use of each method cannot be confidently defined for the route until detailed site investigations are complete. Where possible, HDD methods would be used in the vicinity of residences, road crossings / junctions and roadway with little to no grass verge to minimise disturbance to the road structure. Further details of these methods are described below.

The outfall for the discharge of the treated effluent rising main into the River Boyne at Ardmulchan would consist of natural stone revetment constructed along the bank of the river on either side of the discharge point. The revetment would be approximately 4m in length and would be formed using large stones that would be placed in position to minimize erosion around the new discharge point. Where concrete is required, this would comprise of pre-cast concrete where possible. The new treated effluent rising main would be located at a level below the low flood level within the river. It should be noted that the extent of works which would be required for the outfall construction have not been fully defined at this stage. A more detailed investigation would be undertaken at the detailed pipeline design stage.

2.5.4.1 Pipeline Installation: Open-Cut Method

The open-cut method is the standard method for the installation of underground infrastructure such a pipelines. This involves the use of an excavator to remove soil or other materials to the required depth of the pipeline, laying of aggregate stone, placing the pipeline within the trench, filling aggregate stone around the pipeline, infilling and reinstating the ground with excavated material.

It is expected that most of the open-cut trench will be excavated within the grass margin of the local roadways. However, there will be some cases where the open-cut method will have to be located within the road carriageway.

This would arise within the village of Yellow Furze where there is a public footpath, where it may be easier to install the pipeline within the carriageway. It is also expected that this method will be employed leading up to the country road's junction to the L1600 (i.e. road from Yellow Furze travelling North) where the existing bridge walls are in line with the road carriageway. This would also apply to the pipeline route section along the L1600 itself where there are no grass margin and where there are natural stone walls on both sides.

Where the open-cut method is used, the trench width of the proposed treated effluent rising main will be 450mm wide plus or minus c.100mm, based on local conditions.

Excavations within the grass margin of the roads would be reinstated as works progress along the route, using excavated material from the excavations. While the natural recolonisation of exposed areas of soil is preferred for ecological benefit, re-seeding would be undertaken, where required, to promote the rapid stabilisation of soils.

Where the pipeline is installed within the carriageway, the contractor would carry out temporary and permanent reinstatement of the road surface. The temporary reinstatement would occur after the pipeline is installed and the trench backfilled to within 250mm of the road surface. The remaining depth would be filled with a bitumen material where it will then be left for 6 to 12 months to allow for consolidation. After this period the contractor would remove the top bitumen material, makeup any consolidation with the clause 804/808 material before laying a road base course and then a wearing course as noted in the following image.

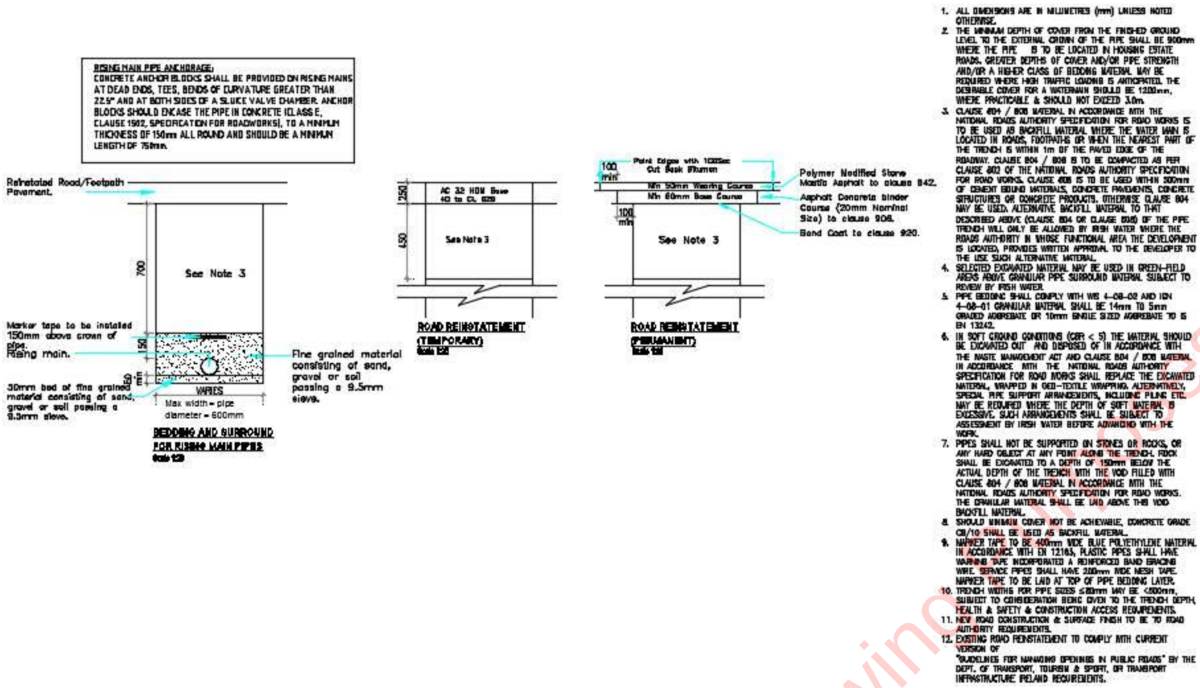

Figure 2.7: Details of Rising Main Pipe Anchorage and Reinstatement.

2.5.4.2 Pipeline Installation: Horizontal Directional Drilling (HDD) Method

Horizontal Directional Drilling or HDD, is a steerable trenchless method of installing an underground pipe in a shallow arc along a prescribed bore path by using a surface-launched drilling rig, with minimal impact on the surrounding area. It is used as an alternative option to open-cut trenching subject to the ground conditions being suitable.

A drilling rig is set up at a location where a pilot bore is formed to a point which can extend for up to 250m. Once the bore is formed, a reaming tool is fitted to the end of the bore rod (at the opposite end to the rig) where the pipeline that is being installed is then attached to the end of the reaming tool where the rig then pulls the bore rod back while the reaming tool is forming a larger conduit for the pipeline to fit into.

The benefit of this system is that there is a minimum trench opening and, if the ground conditions are suitable, it may be possible to install the pipeline quicker than in the case of the open trench. There is also have the benefit of not having large sections of road carriage reinstatement.

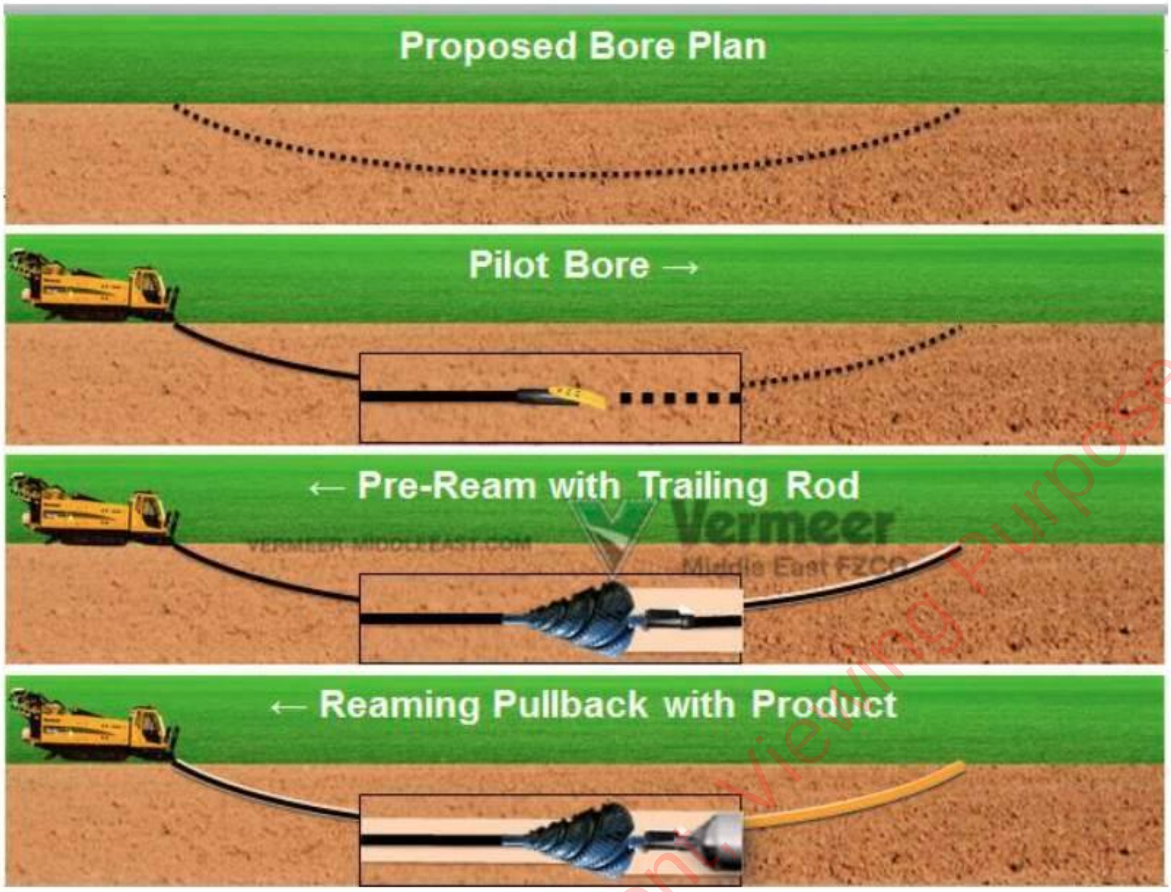

Figure 2.8: Horizontal Directional Drilling (HDD) Method

2.5.4.3 Watercourse Crossings

The rising main route would traverse culverted drainage ditches and the Dollardstown Stream. The Dollardstown stream crossing and identified open roadside drainage ditches are outlined in **Figure 2.8** below.

The extent of construction works which would be required for the Dollardstown Stream and drainage crossings have not been fully defined at this stage, however a detailed investigation would be undertaken at the detailed rising main design stage.

Table 2.7: Locations of Watercourse Crossings along Rising Main Route

NO.	WATERCOURSE TYPE / NAME	APPROX. GRID REFERENCE	PROPOSED CROSSING METHOD
1	Dollardstown Stream	N 927 710	Within existing bridge infrastructure

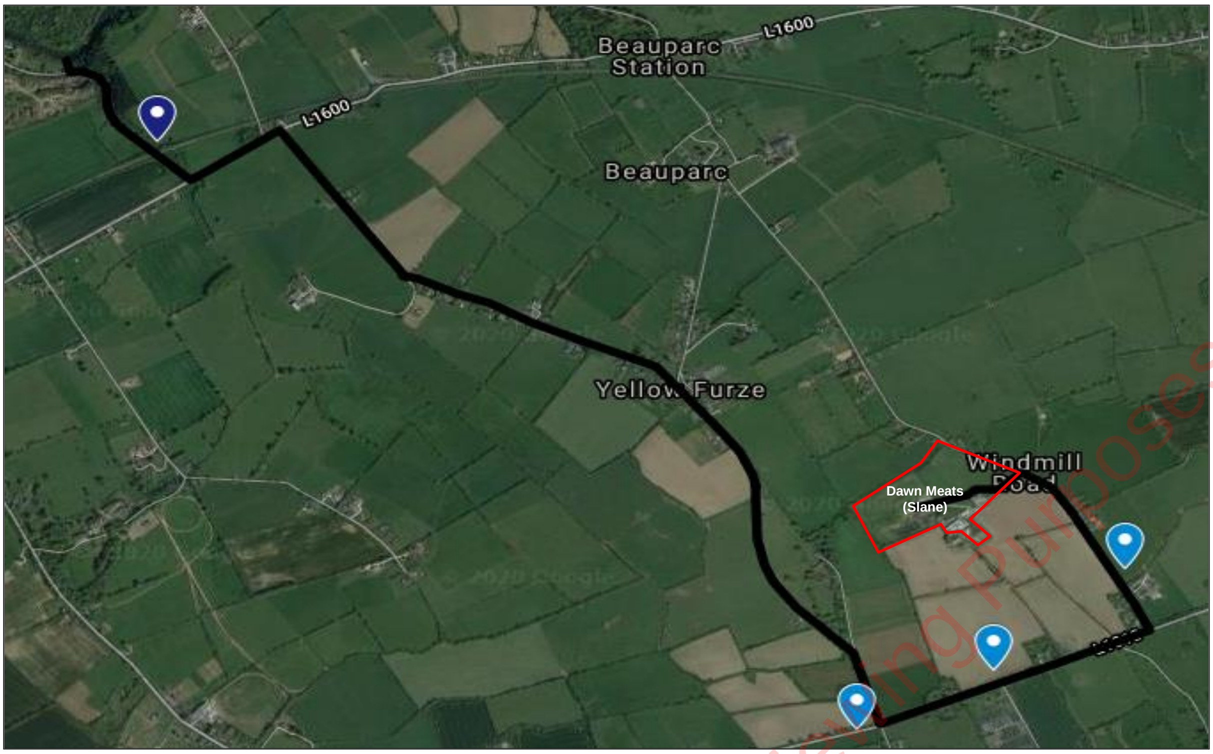

Figure 2.9: Locations of Watercourses along Rising Main Route

The crossing of open drains or watercourses is not proposed as part of this development. However, if this occurs, horizontal directional drilling would be the preferred option to avoid disturbance of the drainage network.

Where this is not possible, crossings would be undertaken via the dry open cut method. This would involve damming the water flow from the rising main footprint using sandbags to create the seal / dam across the drainage ditch. Pumps would be set up to take the flow from upstream to downstream of the crossing point. A filter would be provided at the pump inlet to prevent the entry of aquatic fauna into the pump, and to limit the potential disturbance to the drainage ditch bed due to sediments. Pumping operations would be supervised at all times. Excavation of the drainage ditch bed would then proceed, with the excavated material stockpiled for later reinstatement. Following the completion of reinstatement works, including any required drainage bank reinstatement works, the sandbags would be removed.

2.5.5 TEMPORARY CONSTRUCTION SITE COMPOUND

A temporary site compound would be established by the construction works contractor for the storage of all machinery and plant when not in use, dedicated storage for oils and fuels required for construction plant and for the re-fuelling of plant. The temporary site compound may also house, if necessary, a temporary office and staff welfare facilities including a canteen, toilet and first aid supplies.

The location of the temporary construction compound would be within the grounds of the existing Dawn Meats (Slane) facility.

If the compound were to be established on greenfield area within the facility boundary, works to establish the compound would include removing and storing the existing topsoil on site for reinstatement and constructing a new hardcored area by laying a geotextile membrane over the entire compound area to take 200mm of 75mm down broken stone, with 50mm clause 8404 blinding on top.

Portable cabin structures would be used to provide the temporary site office and staff canteen, if required. A storage container would be provided for the storage of construction equipment, tools and materials required for construction. All fuels and oils required would be stored within a designated bunded area, located within the storage container or at an alternative designated location with the temporary site compound.

If required, a mobile welfare unit providing sanitary services would be installed at the temporary compound and would be emptied by a licenced contractor on a minimum weekly basis.

The compound would also be the designated location for construction waste receptacles during the project. Waste would be segregated where possible and placed within recycling and general waste skips provided by a licenced waste contractor.

During the construction phase, a portable water supply would be provided via a mobile water tanker, or alternatively a connection to the Dawn Meats groundwater supply would be obtained. Power would be provided using a diesel generator, which would be suitably bunded. Telecommunications would be provided using mobile phones and broadband.

For a greenfield compound and following the completion of construction works, the temporary structures, blinding, hardcore and geotextile would be removed and the area reinstated using the stockpiled topsoil. The topsoil would be broken up and cultivated to create a fine tilt, where any stones and debris greater than 30mm would be removed before re-seeding the area.

2.5.6 CONSTRUCTION OVERVIEW

The approximate construction period for the proposed WWTP extension and treated effluent rising main works are expected to take approximately eight months. Rising main and the WWTP extension works would be undertaken concurrently. Construction on the rising main route would be undertaken in phases, with only one working section open at a time. Upon receipt of planning approval, the construction schedule would be finalised at a detailed design stage. The proposed development would include the following main construction activities:

General

- Mobilisation of personnel and equipment to site;
- Designate and establish a temporary site compound, including designated materials storage area, at Dawn Meats (Slane);
- Site inductions and relevant training;
- Erection of health and safety / construction works signage.
- Installation of external lighting;
- If required for greenfield area, establishment of temporary construction access points and routes;
- Site clearance.

WWTP Extension

- Excavation of area for new WWTP plant;
- Stockpiling of topsoil for use in an earth berm and reinstatement / landscaping;
- Construction of bases / plinths for proposed tanks;
- Construction of new balance tank;
- Relocation of DAF unit;
- Construction of new sludge holding tank;
- Construction of anoxic tank and aeration tanks;
- Construction of clarifier tank
- Construction of sand filter unit;
- Replacement of old drum screen with new drum screen;
- Demolition of existing shed building and construction of new control house building;
- Installation of interconnecting pipework.

Treated Effluent Rising Main

- Marking out of buffer zones around surface water drains (with the exception of watercourse crossings);
- Installation of silt control features where appropriate, such as silt fencing;
- Excavation of rising main trench (rising main would be laid approximately 800 – 1,000 mm underground);
- Stockpiling of topsoil for use in reinstatement;
- Laying of pipework.

Reinstatement / Landscaping

- Construction and landscaping of earth berm around the new WWTP compound;
- If established in a greenfield area, removal of temporary construction compound & temporary access routes and reinstatement of temporary construction compound and access routes using stockpiled topsoil;
- Finishing / landscaping of WWTP compound;
- Reinstatement of treated effluent rising main route using stockpiled topsoil;
- Removal of silt control features (once soil stabilisation has taken place).

3.0 ALTERNATIVES

3.1 EXAMINATION OF POSSIBLE ALTERNATIVES

Schedule 6, Article 94 of the Planning and Development Regulations 2001 requires that:

Information to be contained in an Environmental Impact Statement shall include –

(1d) an outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects on the environment.

This section investigates the following alternatives to the proposed development:

- Alternative Location;
- Alternative Layout and Design;
- Alternative Process.

3.2 ALTERNATIVE LOCATION

Dawn Meats (Slane) considered alternative locations for the proposed WWTP extension, treated effluent rising main and discharge outfall. It is considered that the proposed location for the development would be the most suitable option with regards feasibility, visual impact and environmental impacts, as discussed below.

The option for construction of a new WWTP at alternative offsite greenfield sites was considered and ruled out at an early stage due to the continued inherent risk of transporting untreated effluent from the site.

Dawn Meats (Slane) are proposing to amend the approved effluent treatment system to provide for additional treatment to the final effluent produced at the facility, to a quality sufficient for discharge to the River Boyne. As the WWTP development would be an extension to the existing WWTP, thereby using existing plant infrastructure, it would not be feasible to construct an entirely new WWTP at an alternative location. Furthermore, the proposed WWTP extension would have access to existing utilities and approved effluent plant development, removing the need and cost associated with connecting to the electricity grid and mains water / groundwater supply.

Given that the existing facility at Painestown was originally established in the 1980's (acquired by Dawn Meats in 2018), it can be considered as long established and part of the existing landscape of the area. Therefore, an extension to the existing infrastructure at Painestown was considered to have the potential to pose a lesser risk of generating a significant additional visual impact.

The proposed location of the treated effluent rising main complements the proposed location of the WWTP extension. The proposed route would be considered the most feasible route, as the route follows existing built roads and would avoid open watercourses and unaltered habitats, ensuring environmental impacts are reduced.

More direct routes through surrounding agricultural fields were considered, however, wayleaves could not be agreed with all landowners along these potential routes.

The proposed treated effluent rising main would be primarily located along the verge of the road network, avoiding areas of watercourses and hedgerows. An important consideration in the design phase of the rising main route was the proximity of existing services within the roadway, particularly within Yellow Furze village. The treated effluent rising main would be lain on the opposite side of the road to such services, in so far as is possible.

The location of the treated effluent rising main took into consideration the crossing of the railway line running in an east-west direction. The proposed route would be installed within the existing roadway, which passes under the railway at Stackallen Bridge. Therefore, the proposed rising main would have no impact upon the integrity and structure of the railway line.

A number of architectural and archaeological features are present within the environs of the Dawn Meats (Slane) facility. The location of the treated effluent rising main took into consideration the presence of archaeological and architectural features of note present within the environs of the Dawn Meats (Slane) facility. It is considered that the proposed rising main route would minimise potential impacts to archaeological and architectural features. Further details on the treated effluent rising main route with regards design and layout are included in **Section 3.3**.

Alternative outfall locations were also considered, however, the proposed location is the most feasible option with regards the proposed treated effluent rising main route. The potential for the discharge of treated effluent to the Dollardstown and Roughgrange streams, which are located closer to the site, were considered as part of project feasibility assessments, however, assimilative capacity assessments determined that these watercourses did not provide sufficient capacity to accommodate discharges from the site. The proposed outfall location also avoids areas of riparian woodland, reducing the potential for environmental impact to the river and its bankside habitat.

3.3 ALTERNATIVE LAYOUT AND DESIGN

The layout and design of the proposed WWTP extension, treated effluent rising main and outfall has been based upon feasibility, environmental impacts, efficiency of wastewater treatment and operational cost.

Alternative layouts and designs were considered for the WWTP extension; however, as the proposed development would be an extension to the existing Dawn Meats (Slane) WWTP, it was considered practical to design the WWTP development as adjoining the existing WWTP. The layout and design proposed takes into consideration the required connections with existing onsite drainage infrastructure and utilities.

The proposed WWTP extension has been designed to ensure wastewater treatment would be as efficient as possible, while ensuring treated effluent discharging to the River Boyne would be of high quality, thereby having no significant impacts upon river water quality. Tanks have been designed to ensure adequate storage and treatment capacity. With regards odour, tanks have been designed to reduce the potential for odorous conditions, through the provision of adequate aeration / mixing systems and the provision of an odour scrubber to treat emissions from the covered balance and sludge holding tanks. The enclosure of the DAF unit would also improve odour performance at the site.

While the operation of the proposed WWTP extension would not be anticipated to have a significant noise impact outside the site boundary, the inclusion of an earth berm in the design of the WWTP would further reduce the potential for noise impact. Furthermore, the earth berm would also reduce the visual impact of the proposed WWTP plant.

As noted in **Section 3.2**, while alternative treated effluent rising main routes were investigated, the proposed route was considered the most feasible option. The design of the proposed rising main (pipeline bore, air release valves, sluice valves, inspection chambers etc.) has been based upon the specifications of the proposed effluent treatment plant and engineering standards. Reinstatement of the proposed pipeline would be to the specification required by Meath County Council.

3.4 ALTERNATIVE PROCESSES

While alternative wastewater treatment processes are available, the biological treatment process is the standard for the industry. The biological treatment process is also noted by the BREF document for Slaughterhouses and Animals By-products Industries (2005) as being the best available technique (BAT).

The following table summarises BAT for the treatment of wastewater from slaughterhouses and animal by-products installations, as per **Section 5.1.5** – Treatment of Waste Water, and the proposed implementation of these measures as part of the proposed WWTP development.

Table 3.1: BAT for Wastewater Treatment and Proposed WWTP Measures

BAT	PROPOSED WWTP DEVELOPMENT
Prevent waste water stagnation	Drainage to the existing WWTP has been installed to avoid stagnation of wastewater. Where new drainage is required, it would be laid with sufficient gradient to avoid stagnation and / or pumps would be used. Tanks would be installed with sufficient aeration and mixing to ensure stagnation does not occur.
Apply an initial screening of solids using sieves at the slaughterhouse or animal by-products installation	A meva screen with an aperture of <5mm is in place after the pumping sump. A drum screen with an aperture of 2mm would be installed before the proposed balance tank.
Remove fat from waste water, using a fat trap	The slatted collection tank acts as a settlement tank, with fats solidifying and floating at the top, allowing for removal.
Use a flotation plant, possibly combined with the use of flocculants, to remove additional solids	A Dissolved Air Flotation (DAF) unit is in use at the existing WWTP. This would be relocated to treat effluent from the balance tank. The DAF unit would remove solids using a chemical programme with a coagulant and flocculent, followed by diffused air.

BAT	PROPOSED WWTP DEVELOPMENT
Use a waste water equalisation tank	The proposed balance tank would provide storage capacity to buffer the effluent composition / loading and balance out flow fluctuations from the facility.
Provide a waste water holding capacity in excess of routine requirements	The balance tank would have sufficient capacity for approximately 1.5 days of T daily effluent flow. An emergency return connection would be installed to the existing HDPE lined Lagoon 1 from the balance tank and final sump, providing storage for emergencies or other such contingency purposes.
Prevent liquid seepage and odour emissions from waste water treatment tanks, by sealing their sides and bases and either covering them or aerating them	Tanks would be lined and sealed as standard practice, and constructed on a base. Integrity testing would be undertaken every three years as per the site's IE licence conditions. Tanks would be mixed / aerated where necessary to minimise the potential for odour generation. The Balance Tank and Sludge Holding Tank would be covered and ventilated to an Odour Scrubber to prevent odour impacts offsite. The DAF unit would also be enclosed.
Subject the effluent to a biological treatment process	Effluent would undergo biological treatment via the aeration basins and the anoxic tank.
Remove nitrogen and phosphorus	Nitrogen removal would take place in the aeration basins and anoxic tank, through the use of bacteria in nitrification and denitrification processes. While some phosphorous removal would be achieved during biological treatment, the proposed addition of a coagulant and subsequent solids removal would significantly reduce phosphorous levels in wastewater.
Remove the sludges produced and subject them to further animal by-product uses.	Sludges would be landspread in accordance with the Nitrates Regulations.
Use CH4 gas produced during anaerobic treatment for the production of heat and/or power	Not applicable.
Subject the resulting effluent to tertiary treatment	The proposed WWTP would include a sand filtration system, which would reduce further the suspended solids in the final effluent. This would also lower the COD / BOD level of the effluent.
Regularly conduct laboratory analyses of the effluent composition and maintain records	As part of the proposed development, a review of the site's current IE Licence would be prepared and submitted to the EPA for approval. Dawn Meats (Slane) would be required to undertake scheduled monitoring at the proposed discharge point for parameters specified by the EPA in the revised licence. This monitoring would ensure that treated effluent quality would remain high. Records would be maintained as per Condition 11 of site's IE Licence.

A membrane bioreactor (MBR) was considered as an alternative to the proposed clarifier and sand filter system. MBR units combine activated sludge treatment with a membrane liquid-solid separation process, with the membrane component using either low pressure microfiltration or ultrafiltration membranes. An MBR unit has a greater amount of operational maintenance and has an increase susceptibility to clogging with fats and grits. In making an informed decision, several sites were visited in order to assess the wastewater treatment systems. The use of a clarifier and sand filter were standard for the industry in Ireland, and were viewed as being BAT for the project.

3.5 "DO-NOTHING" SCENARIO

The "Do-Nothing" scenario would result in no upgrade in wastewater treatment at the Dawn Meats (Slane) facility and no discharge of treated effluent to the River Boyne. Wastewater would continue to undergo primary treatment, with daily transfer of wastewaters to licenced municipal WWTPs. The current high costs of disposing of wastewater to municipal WWTPs, in addition to current operating costs of the Dawn Meats (Slane) WWTP, would remain the same.

Dawn Meats (Slane) are proposing to extend their existing on-site effluent treatment system to provide for additional treatment to a quality sufficient for discharge to the River Boyne. This would eliminate the daily tanker movements transferring wastewater to municipal WWTPs for further treatment. In the "Do-Nothing" scenario, the current volume of HGV traffic on local roads attributed to the transfer of wastewater from the Dawn Meats (Slane) facility to municipal WWTPs would remain. Furthermore, any increase in wastewater volume generated at the Dawn Meats (Slane) site would result in elevated costs associated with transferring the wastewater for further treatment at municipal WWTPs.

Should the proposed development proceed, it would provide Dawn Meats (Slane) with the opportunity for economic growth, thereby supporting the following core principle outlined in the Meath County Development Plan, 2013 – 2019:

Core Principle 8	*To support agriculture and agricultural related development in Meath and strengthen the county as a hub for the vibrant agricultural and food sectors.*

In the "Do-Nothing" scenario, wastewater would continue to be transferred to municipal WWTPs for further treatment. Should the development proceed, the treatment of wastewater and discharge to the River Boyne would reduce the loading to the municipal WWTPs, thereby supporting the following objective of Meath County Council, as outlined in the County Development Plan, 2013 – 2019:

WS SO 2	*To improve and extend the County's water supply and wastewater collection and treatment infrastructure to serve the planned levels of growth, during the lifetime of this plan, in order to facilitate development.*

PART II - ENVIRONMENTAL IMPACTS

This section of the EIAR describes the likely significant environmental impacts arising from the proposed development comprising of an upgrade and extension to the Waste Water Treatment facilities at Dawn Meats Ireland Unlimited Company, at Painestown, Navan, Co. Meath.

The proposed alterations to the approved WWTP would consist of a new control and storage building, converting an approved aeration tank to an anoxic tank, two new aeration tanks and installation of a new sludge volute dewatering unit. The facility also proposed to provide for the discharge of final effluent via a rising main to the River Boyne.

Where possible, design measures have been included to reduce or eliminate possible impacts. Where this has not been possible, mitigation measures have been suggested to reduce or eliminate the identified impacts of the proposed development.

SECTION A - HUMAN ENVIRONMENT

This section of the Environmental Impact Assessment Report deals with the potential effects of the proposed scheme on human beings.

These effects have been grouped into:

Air Quality Impacts

The impact of emissions to air generated by the proposed development.

Odour Impacts

The impact of odours generated by the proposed development on nuisance odour in the general vicinity has been assessed.

Noise and Vibration Impacts

The impact of noise and vibration generated by the proposed development on noise and vibration levels in the general vicinity has been assessed.

Landscape and Visual Impacts

The impact of the proposed development on the visual amenity of the landscape has been assessed.

While human beings interact in some way with every aspect of the environment, the above interactions are considered the most significant in this case. The impacts of the proposed development on human beings in relation to effects on the natural environment are further considered in **Section B**, while the impacts of effects on material assets and archaeology, architecture, and cultural heritage are considered in **Sections C and D** respectively.

4.0 POPULATION AND HUMAN HEALTH

4.1 INTRODUCTION

Any development that alters the existing environment has the potential to impact upon human beings at a local and / or regional scale, through impacts upon socio-economic factors including demographics, land use, economic development, employment and human health.

This section of the EIAR provides an overview of the receiving social-economic environment and human environment of the area. This section briefly outlines the main potential impacts of the proposed development, comprising of an extension to the site's existing wastewater treatment facilities including a treated effluent rising main and discharge to surface water, at both the construction and operational phases on human beings.

The following sections of this EIAR provide assessments of potential impacts to human beings and detail proposed mitigation measures to address the identified impacts.

4.2 METHODOLOGY

A study was undertaken to assess the potential impact of the proposed development on the receiving socio-economic environment. This study comprised a review of available information with regards population and dynamics, economic activity, employment, land use and residential amenity. Information was obtained from the Central Statistics Office (CSO) and the Meath County Development Plan 2013 – 2019.

4.3 RECEIVING ENVIRONMENT

4.3.1 POPULATION AND DYNAMICS

According to the 2016 Census, County Meath had a population of 195,044, comprising 96,776 males and 98,268 females, growing from 184,135 in 2011. This represents a population increase of approximately 6% since the previous Census in 2011.

The Dawn Meats (Slane) facility is located within the Painestown Electoral District (ED), which had a population of 1,176 during the 2016 Census. This was a very slight decrease (0.2%) upon the 2011 Census results. The Painestown ED is within the Meath East Constituency, which had a population of 91,142 during the 2016 Census, a 5.3% increase on the number recorded during the 2011 Census.

Table 4.1 shows the changes in population by age group between the 2011 Census and 2016 Census. Considerable increases are noted for the older age groups, with an increase of 23% for the 60-84 age group and an increase of 24.4% for the 85+ age group. A decrease (10%) was only noted in the 20-39 age group.

Table 4.1: Population Change between 2011 Census and 2016 Census per Age Group

Age Group (Years)	2011 Census	2016 Census	% Change
0 – 19	57,530	61,925	+7.6
20 – 39	55,975	49,991	-10
40 – 59	46,696	53,670	+14.9
60 – 84	22,334	27,467	+23
85+	1,600	1,991	+24.4

The nearest urban areas to the Dawn Meats (Slane) facility include Slane, Navan, Kentstown, Duleek and Donore. **Table 4.2** details the population change within these areas between the 2011 Census and 2016 Census. All of the urban areas within the vicinity of the Dawn Meats (Slane) facility experienced population growth since the previous 2011 Census.

Table 4.2: Population Change in Local Towns, 2011 – 2016.

Area	2016 Population	% Increase since 2011
Slane	1,369	1.5
Navan	30,173	5.7
Kentstown	1,179	7.3
Duleek	4,219	5.8
Donore	760	9.8

4.3.2 ECONOMIC ACTIVITY

The Department of Agriculture, Food and the Marine (DAFM) reports that the agri-food sector is Ireland's largest indigenous industry, contributing €26 billion to the national economy in 2015, employing 8.4% of the working population and accounting for 10.7% of Ireland's exports. The DAFM's report, "Food Wise 2025", identifies further growth opportunities for the sector, with the aim to position Ireland as a world leader in sustainable agri-food production.

Dawn Meats (Slane) is a long-term employer of 77 people at their plant at Painestown, Co. Meath. Staff employed would make contributions to the local economy in the Painestown area and surrounds by direct spending of goods and services. In addition to providing employment, Dawn Meats (Slane) strengthens the local economy of the agri-food sector by sourcing cattle from farmers and suppliers within the catchment area.

A number of small-scale commercial enterprises are located within the vicinity of Dawn Meats (Slane), including six enterprises located within one kilometre of the facility. These include two transport businesses, an event catering business, a carpet / rug / floor retail enterprise, an amusement / recreation business and Yellow Furze Nurseries Limited. Several facilities licenced by the EPA are located within 15km of the Dawn Meats (Slane) site, including two with a "Food and Drink" class of activity and six with an "Intensive Agriculture" class of activity. Further details are provided in **Sections 12 and 13** of this EIAR.

4.3.3 EMPLOYMENT

The total labour force for 2016 in County Meath was 93,782 individuals, which represents 48% of the total population. In the 2016 Census, the labour force participation rate was calculated by expressing the labour force, aged 15 years and over who are at work, looking for their first regular job or unemployed, as a percentage of the total population aged 15 years and over. The labour force participation rate for 2016 was 64.2%, with the unemployment rate at 11.2%. **Table 4.3** below provides a summary of the working population for County Meath. The agriculture sector accounted for 3.5% employment of the labour force in 2016.

Table 4.3: Summary of Working Population in Co. Meath, 2016

Area	Number of People	% of Labour Force
Total at work	83,259	88.8
Unemployed looking for first regular job	1,092	1.2
Unemployed, having lost or given up previous job	9,431	10

4.3.4 LAND USE AND SETTLEMENT PATTERNS

The existing Dawn Meats (Slane) facility is located in the townland of Painestown, approximately 4.5km south of Slane and 8.5km east of Navan, Co. Meath. The proposed WWTP extension would be located within the existing site.

The route for the proposed rising main would pass through the following townlands: Painestown, Seneschalstown, Dollardstown, Hayestown-Carryduff Little & Ardmulchan.

The proposed development is located within a rural agricultural landscape, sparsely populated, with residential development primarily linearly aligned along the existing road network. A number of large farmsteads and agricultural facilities involved in cattle rearing and beef production are located in the surrounding area of the Dawn Meats (Slane) site. The area also supports a number of commercial developments.

The nearest settlement to the existing Dawn Meats (Slane) facility is the village of Yellow Furze, located approximately 700m north-west of the site. The towns Slane, Navan and Duleek are located approximately 4.5km, 8km and 9.5km respectively from the facility. Drogheda is the largest closest town and is located approximately 13km to the east of the site.

Figure 4.1 below shows the address points of properties within the vicinity of the existing Dawn Meats (Slane) facility and proposed development. Points in yellow represent residential properties, points in purple represent commercial only properties, points in green represent properties accommodating both residential and commercial uses while points in blue are unknown. As can be seen in the figure below, the majority of developments within the vicinity of the Dawn Meats (Slane) site are residential properties.

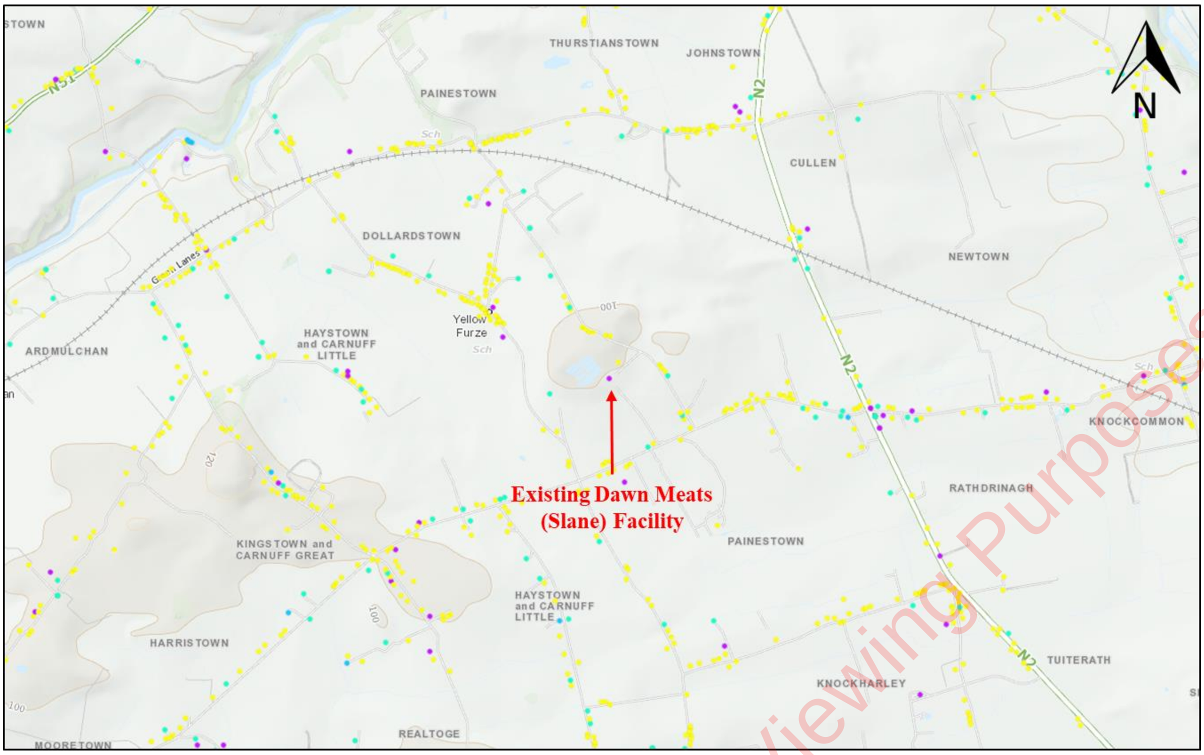

Figure 4.1: Address Points by Buildings for Properties within the vicinity of the Proposed Development (Source: myplan.ie)

4.3.5 COMMUNITY AND SOCIAL INFRASTRUCTURE

Community infrastructure within the vicinity of the proposed development is primarily located within the village of Yellow Furze, located approximately 700m north-west of the existing Dawn Meats (Slane) site.

The village is a small settlement, with approximately 50 residential properties, centred on the road junction that links the townlands of Dollardstown, Seneschalstown and Painestown. Community infrastructure includes a Roman Catholic Church (Church of Our Lady of the Assumption), Yellow Furze National School and Seneschalstown Gaelic Athletic Association pitch.

The Navan to Drogheda railway line (operated by Iarnróid Éireann), is located approximately 1.4km north of the Dawn Meats (Slane) facility. This railway is no longer used for passenger services, however, it is used for freight services.

4.4 IMPACTS

A brief overview of the potential impacts upon human beings is provided below. More detailed assessments are discussed in the following sections of this EIAR.

4.4.1 ECONOMY AND EMPLOYMENT

The proposed development would consist of alterations to an existing and approved wastewater treatment plant at the Dawn Meats (Slane) facility. It is not considered that he proposed development would have any significant impact upon the population demographics of the surrounding area.

Dawn Meats (Slane) employ 77 full time employees at their facility. The proposed investment at the Dawn Meats (Slane) facility demonstrates Dawn Meats Group's commitment to the Painestown area.

The proposed development would have a positive impact upon the local economy by providing temporary employment for the duration of the construction phase (approximately eight months). The provision of employment would further contribute to the economy of the area through direct spending of goods and services in the Painestown area and surrounds.

Dawn Meats (Slane) are proposing to extend their existing on-site effluent treatment system to provide for additional treatment to a quality sufficient for discharge to the River Boyne. This would eliminate the daily tanker movements transferring wastewater to municipal WWTPs for further treatment.

This would reduce the level of service required for a single haulage operator for the removal of materials from the site. This service would continue to be required, at a lower level, for the removal of wastewater sludge from the site.

The current transport of wastewater from the facility incurs uncompetitive and potentially unsustainable operating costs which may jeopardise the future of the abattoir factory. Any increase in wastewater volume generated at the Dawn Meats (Slane) site would result in further elevated costs associated with transferring the wastewater for treatment at municipal WWTPs.

Should the proposed development proceed, it would improve the competitiveness of the facility with other abattoirs in Ireland and provide Dawn Meats (Slane) with the opportunity for economic growth. This would free capital at the site and would have the potential to allow for future expansion and development leading to create further full time job positions at the site.

4.4.2 AIR, DUST AND ODOUR

While it is not considered that the proposed development would adversely impact upon air quality, there would be a potential nuisance impact upon human beings with regards the generation of dust during the construction phase and odour during the operational phase. An assessment of the potential air quality impacts and odour impacts arising from the proposed development are discussed in detail in **Section 5** of this EIAR.

The potential for dust generation during construction works may impact upon the community and residents on the local roads to the Dawn Meats (Slane) site. However, the potential impact of dust would be temporary, given the transient nature of construction works. Dust control measures would be implemented throughout the construction phase to reduce the potential impact. Mitigation measures for dust control are outlined in **Section 5.7**.

During the operational phase of the proposed development, there would be potential for odour generation from the wastewater treatment process at the new compound. The potential for odour impacting upon human beings would be considered low, given that odour control and operational measures are currently in place at the Dawn Meats (Slane) site, and would be updated to incorporate the new development. Mitigation measures for odour control are outlined in **Section 5.6**.

4.4.3 NOISE

Noise generated during the construction and operational phases of the proposed development has the potential to impact upon human beings within the vicinity of the site. An assessment of potential impacts upon human beings due to noise associated with the proposed development is discussed in **Section 6**. A Noise Impact Assessment has also been undertaken and is included in **Attachment 6.1**.

During the construction phase, it would be anticipated that there would be a moderate impact, for a limited period of time, on local residences within close proximity to the proposed pipeline route. The construction of the effluent plant compound would have a low to no significant impact upon existing noise levels. Control and mitigation measures to reduce the potential for noise are outlined in **Section 6.9**. Given the transient nature of construction works and the provided control and mitigation measures are implemented, noise from construction would not be considered to pose a significant impact upon human beings.

No significant additional noise impact would be anticipated during the operational phase of the currently approved or proposed development. The site currently undertakes noise monitoring in accordance with their IE Licence conditions and has in place a Noise Management Plan to ensure good operational measures and housekeeping. This plan would be updated to incorporate the new development. Further details on the potential for noise during the operational phase are provided in **Sections 6.7 and 6.8**.

4.4.4 TRAFFIC

The proposed development has the potential to impact upon traffic volumes in the area, which may subsequently impact upon the generation of noise and dust emissions.

While there would be increased vehicle movements during the construction phase of the development, this would be for a limited period of time only (approximately eight months). The results of traffic impact assessment modelling clearly showed that all of the affected junctions would have significantly more than adequate capacity to accommodate the worst case traffic associated with the construction project. Further detail of the traffic impacts carried out by NRB Consulting Engineers is included in **Section 13** and **Attachment 13.1**.

An outline Traffic Management Plan for the proposed construction works has been prepared by Finn Design Partnership Ltd. Prior to works commencing along the roadway sections, the construction works contractor, once appointed, would review the outline Traffic Management Plan and revise where necessary, and submit for approval to the Meath County Council Road Engineers for approval. The traffic management plan includes measures to ensure there would be no impact to school traffic, around the hours of 9am and 3pm. Areas of public road in which the rising main would be installed or required to cross would be fully reinstated in accordance with Meath County Council's requirements.

During the operational phase of the proposed development, there would be a significant decrease in vehicle movements as the current practice of tankering final effluent offsite would cease. The proposed WWTP extension and discharge of treated effluent to the River Boyne would remove the need for tankers to transport wastewater daily to municipal WWTPs.

4.4.5 LAND-USE

The proposed development would not be anticipated to have any significant impact upon the land use of the area. The location of the proposed WWTP extension would be within the area previously used for wastewater treatment via Integrated Constructed Wetlands (decommissioned), therefore, there would be no significant land loss as a result of the WWTP extension.

As the proposed rising main would be located underground, there would only be a temporary land loss during the construction phase. The majority of the route would occur within the road verge and, following reinstatement, there would be no impact upon the use of roads.

4.4.6 VISUAL AMENITY

The proposed development would have the potential to adversely impact upon the visual landscape through the construction of the proposed WWTP extension, thereby reducing the visual amenity for local residents. However, the proposed WWTP amendments and extension would merge with the existing WWTP, reducing the potential impact.

The proposed rising main would be located underground and therefore would have a temporary impact upon the visual amenity of the area.

An assessment of the potential impacts upon visual amenity arising from the proposed development is discussed in detail in **Section 7** of this EIAR.

4.4.7 WATER

A deterioration in the water quality of the River Boyne has the potential to impact upon human beings by adversely affecting drinking water quality, the fishery industry and water-based leisure activities in the area. A detailed assessment of potential impacts to water quality is included in **Section 9** of this EIAR.

During the construction phase of the proposed development, there would be a potential impact upon water quality due to contamination of underlying groundwater. During the proposed rising main construction, a deterioration could arise through the release of suspended solids during soil disturbance works, the release of uncured concrete and the release of hydrocarbons (fuels and oils) in run-off to surface waters. Water quality would be protected by the implementation of mitigation measures as outlined in **Section 9.8** and through the preparation and implementation of a Construction Environmental Management Plan (CEMP) by the construction works contractor. An outline CEMP has been prepared as part of this application.

It is not anticipated that the proposed development has the potential to adversely impact upon water quality during the operational phase. Should the proposed development proceed, the current practise of tankering effluent offsite to municipal WWTPs would cease, eliminating the inherent risk in the transport of effluent offsite.

The primary potential impact upon the River Boyne catchment from the proposed development would be a deterioration in water quality arising from a discharge of treated effluent. However, no impact on water quality is anticipated during the operational phase as treated final effluent values proposed by Dawn Meats (Slane), as discussed in **Section 9** and **Attachment 9.1**, have been based upon the River Boyne's assimilative capacity and current water quality. The assimilative capacity assessment concluded that the River Boyne would have sufficient assimilative capacity to accommodate discharges from the Dawn Meats (Slane) facility.

The proposed development and discharge of final effluent to the River Boyne would not be anticipated to have an adverse impact upon drinking water quality. The overall risk from the planned discharge to drinking water from the Staleen water abstraction point would be considered low, based upon the proposed treatment process, the proposed discharge limits, the level of dilution, the quality of the receiving water and the anticipated impact of discharges during normal and abnormal operations. A Drinking Water Risk Assessment is included as **Attachment 9.2** and is discussed in further detail in **Section 9.6**.

4.5 MAJOR ACCIDENTS AND NATURAL DISASTERS

As noted in Directive 2014/52/EU, precautionary actions need to be put in place for certain projects which, "*due to their vulnerability to major accidents and/or natural disasters (such as flooding, sea level rise or earthquakes) are likely to have significant adverse effects on the environment*".

The Dawn Meats (Slane) facility does not fall within the Seveso III Regulations or European Communities (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015, as no dangerous substances are being used at the site.

Dawn Meats (Slane), as part of their IE Licence, undertakes Environmental Liabilities Risk Assessment (ELRA) for the facility which addresses the potential impacts of accidents or unforeseen events, which may have an adverse environmental impact. The ELRA is reviewed annually, updated as required, and identifies the operational risks from unplanned and unexpected events, recommended risk mitigation measures and calculated the most suitable environmental liabilities for financial provisions.

The Dawn Meats (Slane) site has an emergency response procedure in place to deal with all likely site emergencies including fire and chemical / process spills. There is a trained emergency response team onsite, trained to basic level in fire-fighting procedures with re-training undertaken annually.

At the Dawn Meats (Slane) facility, all potentially polluting substances, including chemicals and fuels, are appropriately bunded. Bunds are integrity tested every three years as per IE Licence conditions. Outdoor bunded chemical storage areas are located upon hardstanding. A designated and locked chemical store is used at the site for the storage of cleaning chemicals. Spill kits are located throughout the site, are easily accessible and are regularly inspected to ensure kits contain adequate stock.

During the construction phase of the proposed development, the risk of spills to the environment would be minimised through the implementation of measures, such as the appropriate storage of potentially polluting substances (e.g. oils, fuels), the regular maintenance and inspection of construction plant, the implementation of good housekeeping practices and the provision of spill kits. Further details are provided in **Sections 9.8 and 10.6**.

It is considered that the most likely natural disaster to which the proposed development may be vulnerable to and could have significant adverse effects on the environment, is fluvial flooding. However, the proposed development site is not located in an area of flood risk or flood benefitting land. The proposed development would not significantly alter the flood characteristics of the area.

4.6 MITIGATION MEASURES

The following sections of this EIAR provide further information on the potential impacts to human beings as a result of the proposed development. Mitigation measures have been proposed to address the potential impacts and are detailed under the following sections:

- Air Quality;
- Odour;
- Noise;
- Biodiversity – Aquatic Environment;
- Soils, Geology and Hydrology;
- Climate;
- Material Assets;
- Architectural, Archaeological and Cultural Heritage.

4.7 REFERENCES

Central Statistics Office. Available at: http://www.cso.ie/en/index.html

Department of Agriculture, Food and the Marine. Available at: https://www.agriculture.gov.ie/agri-foodindustry/

Environmental Protection Agency Licence public access information, Available at: http://www.epa.ie/licensing/iedipcse/

Meath County Council (2016) *Meath County Development Plan 2013 – 2019.* Consolidated version, Available at: https://countydevelopmentplan.meath.ie/

Myplan.ie Viewer. Available at: http://www.myplan.ie/viewer/

5.0 AIR QUALITY & ODOUR

5.1 INTRODUCTION

This air quality study identifies, describes and assesses the impact of the proposed WWTP upgrade and extension development at the Dawn Meats (Slane) facility on the air climate. This study also takes into consideration the proposed discharge of treated effluent to the River Boyne, via a rising main.

Particular attention has been given to sensitive receptors, such as residential areas and to the extent of the exposure of these receptors to airborne pollutants derived as a result of the development. This assessment was prepared in accordance with the EPA documents "*Guidelines on the information to be contained in an Environmental Impact Statement*, 2002" and draft "*Guidelines on the information to be contained in an Environmental Impact Assessment Reports*, 2017".

5.1.1 AIR EMISSIONS

Air quality is variable and subject to significant spatial and temporal variation. In relation to spatial variation in air quality, concentrations generally fall significantly with distance from major sources. Thus, residential exposure is determined by the location of sensitive receptors relative to major sources in the area. Temporally, air quality can vary significantly due to changes in traffic volumes, meteorological conditions and wind direction.

The main potential sources of air pollutants from the proposed development would be carbon dioxide and nitrous oxide emissions from the biological treatment stage of the wastewater treatment process.

5.1.2 ODOUR

The treatment of wastewaters from slaughtering and meat processing facilities has the potential for the generation of malodours due to the high level of incoming organic material such as blood and protein (BREF, 2005). Odours generally arise from effluent treatment plants as a result of poor management, bad housekeeping or equipment failure.

5.1.3 DUST

During construction, there would be potential for dust generation associated with excavations and earth moving operations. The potential for dust generation would depend upon the nature of construction works and the local meteorological conditions such as rainfall, wind speed and wind direction.

5.2 LEGISLATIVE FRAMEWORK, GUIDANCE AND PLANNING POLICY

5.2.1 LEGISLATIVE CONTEXT AND GUIDANCE

The main legislation and guidelines pertaining to air quality in Ireland is outlined below.

The Public Health Act, 1878

This act introduced legislation to control nuisance in Ireland, but its execution only became viable after the implementation of the Planning and Development Act, 1963. Any industry producing a nuisance was controlled under these regulations and subsequent pressure from environmental lobby groups, together with the development of scientific measurement techniques, made it practical to quantify and control the release of gaseous environmental pollutants from these enterprises. Odour impact from any facility on the surrounding vicinity may be considered a nuisance. Section 107 of the Act states that; "*Sanitary authorities are bound to inspect their district for nuisances*". Where nuisance is deemed to exist, the sanitary authority can serve an abatement notice on either the person responsible for the nuisance or the owner / occupier of the premises on which the nuisance arises.

Air Pollution Act, 1987

Under this act, local authorities and / or the Environmental Protection Agency (EPA) are given responsibilities relating to air quality monitoring, to the prevention of air pollution and the issuing of air pollution licences. Owners of certain industrial facilities must obtain an air pollution licence from their local authority or an Industrial Emissions / Integrated Pollution Prevention and Control licence from the EPA.

This act allocates responsibility to local authorities to investigate facilities (not holding a licence issued by the EPA) found to be causing odour nuisance and serve offenders with an abatement notice.

Environmental Protection Agency (EPA) Act, 1992

This act allowed for the regulation of large developments with the potential for pollution. Private and public sector developers of certain types and sizes of projects are required under section 72(4) of the EPA Act (1992) to submit a copy of an Environmental Impact Statement (EIS). If the project is of a class listed in Part II of the first schedule to the 1989 EIA regulations, but does not exceed the threshold of criteria specified, the planning authority must require an EIS if it considers the project is likely to have a significant impact on the environment

Odour is considered an impact due to nuisance under Section 4(2) of the EPA Act (1992). The EPA has responsibility for ensuring licenced facilities comply with their licence requirements. Where a facility is found to be causing odour nuisance, the EPA can either serve the facility with non-compliances or prosecute the facility. Verification for the presence of odour nuisance usually encompasses the licensing officer visiting the facility and detecting the odour beyond the boundary.

Air Quality Standards Regulations, 2011 (S.I. No. 180 of 2011)

These regulations transpose the Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) into Irish legislation. The regulations specify the limit or target values for specific air pollutants including sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter (PM_{10} and $PM_{2.5}$), lead, benzene, carbon monoxide and ozone. The EPA is the competent authority for the purpose of the CAFE Directive.

TA Luft Air Quality Standard

There are no statutory limit values for dust deposition in Ireland, above which nuisance is considered to exist. Generally, the German regulation "*Technical Instructions on Air Quality Control*", commonly known as the "TA Luft Air Quality Standard", is referred to in measuring and assessing the level of dust deposition and potential for dust nuisance.

Air Guidance Note 5 (AG5) – Odour Impact Assessment Guidance for EPA Licensed Sites

Published by the EPA, these guidelines outline a subjective odour impact assessment procedure, which offers a consistent and systematic approach to the assessment of odours on and in the local area of facilities and installations that are licensed by the Agency. The guidelines contain information on the following:

- The perception, impact and acceptability of odours;
- Regulatory approach, including enforcement of permit conditions;
- The importance of odour management plans and their scope;
- Risk assessments and monitoring of odour;
- Measures for the control of odour;
- Forms for recording levels of odour impact.

Industrial Emissions Licence Conditions

Dawn Meats (Slane) were issued with an Industrial Emissions Licence (originally an IPPC Licence) by the EPA, Ref. No. P0811-02. Conditions 5.1 and 5.2 relate to odour and are as follows:

Condition 5.1: No specified emission from the installation shall exceed the emission limit values set out in Schedule B: Emission Limits of this licence. There shall be no other emissions of environmental significance.

Condition 5.2: No emissions, including odours, from the activities carried on at the site shall result in an impairment of, or an interference with amenities or the environment beyond the installation boundary or any other legitimate uses of the environment beyond the installation boundary.

5.2.2 PLANNING POLICIES

Local planning policies are detailed in the Meath County Development Plan, 2013-2019. Policies relating to air quality and dust are outlined in **Table 5.1**.

Table 5.1: Local Polices Relevant to Air Quality

POLICY REFERENCE	POLICY
ED POL 20	To normally permit development proposals for the expansion of existing authorised industrial or business enterprises in the countryside where the resultant development does not negatively impact on the character and amenity of the surrounding area. In all instances, it should be demonstrated that the proposal would not generate traffic of a type and amount inappropriate for the standard of the access roads. This policy shall not apply to the National Road Network.
ED POL 21	To permit development proposals for industrial or business enterprises in the countryside where generally the following criteria are met: (i) the proposed use has locational requirements that can more readily be accommodated in a rural location than an urban setting and this has been demonstrated to the satisfaction of Meath County Council; (iii) the resultant development is of a size and scale which remains appropriate and which does not negatively impact on the character and amenity of the surrounding area; (iv) the proposal demonstrates that it has taken into account traffic, public health, environmental and amenity considerations; (vi) it is demonstrated to the satisfaction of Meath County Council that the proposal would not generate traffic of a type and amount inappropriate for the character of the access roads or would require improvements which would affect the character of these roads. This policy shall not apply to the National Road Network.
PC POL 1	To seek to preserve and maintain air and noise quality in the county in accordance with good practice and relevant legislation.

5.3 METHODOLOGY

This section has been prepared following a desktop review, which involved reviewing baseline air quality monitoring data for the area, the identification of existing air emissions sources and any sensitive receptors and the assessment of potential impacts to air quality resulting from the proposed development. Potential emissions from the operation of the WWTP and dust emissions during construction were identified as the main potential impacts upon the air quality of the area.

5.4 DESCRIPTION OF BASELINE AIR QUALITY

5.4.1 SITE LOCATION AND ACCESS

The proposed development is located in the Greenhills, Beauparc area, within the vicinity of the Painestown townland. The proposed treated effluent rising main would traverse the Painestown, Seneschalstown, Dollardstown, Hayestown-Carryduff Little & Ardmulchan townlands. The proposed development is located 800m from the small village of Yellow Furze. The towns Slane, Navan and Duleek are located approximately 4.5km, 8km and 9.5km respectively from the facility. Drogheda is the largest closest town and is located approximately 13km to the east of the site.

The site is accessed via Windmill Road, a local road which links to the L1013 road 700m to the south. The L1013 road connects to the N2 National Primary Road some 1.3km to the east and to the R153 Regional Road (between Navan and Kentstown) some 5.4km to the west.

5.4.2 EXISTING SOURCES OF AIR EMISSIONS

The townlands of Painestown, Seneschalstown, Dollardstown, Hayestown-Carryduff Little and Ardmulchan are rural areas. According to the Environmental Protection Agency (EPA) Air Quality Index for public health, the townlands are located in the Rural East Air Quality Index for Health (AQIH) Region, which is classed as 2 – Good. This is the second highest category for air quality. The index is based on information from monitoring instruments at representative locations in the region and may not reflect local incidents of air pollution.

The dominant existing sources of air pollution in the area would be local road traffic, private residences, the main Dawn Meats (Slane) facility and emissions from agricultural activities, such as housing of animals and spreading of organic fertilisers. Dust would also be generated on local roads and from agricultural activities, particularly during dry periods. Significant odours would generally be present during the slurry spreading season associated with the agricultural industry in the area. However, the combined effect on air quality would be expected to be low.

Air quality is judged relative to the Air Quality Standards, which are concentrations of pollutants in the atmosphere, which achieve a certain standard of environmental quality. Air Quality Standards are formulated on the basis of an assessment of the effects of the pollutant on public health and ecosystems.

The EPA has been monitoring national air quality from a number of sites around the country. This information is available from the EPA's website. According to the EPA's classification of zones for air quality, the proposed development would be located in a Zone D – Rural.

There are no air monitoring stations currently operating within the vicinity of the proposed development. The nearest monitoring station is located at Navan, Co. Meath, approximately 8km from the proposed development. However, it should be noted that this monitoring station is located within Zone C – Other Cities and Large Towns.

Air monitoring was undertaken at Navan during the 2007-2008 period for particulate matter (PM_{10}), nitrogen oxides, sulphur dioxides, carbon monoxide and metals. No limit values were exceeded during the measurement period. Concentrations of carbon monoxide, nitrogen dioxide, sulphur dioxide, benzene and lead were below their respective lower assessment thresholds while concentrations of PM_{10} exceeded the upper assessment threshold.

Station 68 (Navan) was commissioned in November 2019 and automated hourly records of NO_2, PM_{10} and $PM_{2.5}$ are available from the EPA website (https://airquality.ie/). The air monitoring location is at Navan Fire Station, Abby Road C15 A407, approximately 8.7km west of the Dawn Meats (Slane) site. This station is also located within Zone C (Other Cities and Large Towns) and may be expected to have poorer air quality than the area of the proposed development. **Table 5.2** below summarises the annual mean results for monitoring during the 2019-2021 period (December 2019 only and January 2021 only). All results returned were below the relevant annual mean limit values.

Table 5.2: Annual Mean for Air Monitoring at Navan (Station 68) for 2019 to 2021.

Parameter (µg/m³)	Annual Mean Limit Value	Year		
		2021 YTD	2020	2019
NO_2	40	24.9	18.8	14.5
PM_{10}	20	15.3	14.0	19.7
$PM_{2.5}$	40	12.3	8.4	12.2

While station specific monitoring information is not available in the EPA reports, "*Air Quality in Ireland, 2019*" showed:

- No exceedances of the NO_2 EU annual limit value within Zone D,
- No exceedances of the PM_{10} EU annual limit value within Zone D,
- The World Health Organisation (WHO) PM_{10} air quality guideline daily value was exceeded at 14 of 30 monitoring stations.
- No exceedances of the $PM_{2.5}$ EU annual limit value within Zone D,
- The World Health Organisation (WHO) PM_{10} air quality guideline daily value was exceeded at 5 of 30 monitoring stations.
- The WHO air quality guideline daily value was exceeded at 25 of the 30 monitoring stations.

The EPA report concludes that "*Residential use of solid fuel such as coal, peat and wood is still the largest problem for air quality and health in Ireland. The continued use of solid fuel burning for home heating remains the leading contributor to fine particulate matter ($PM_{2.5}$) pollution across Ireland. This pollutant is the most health-impactful of those affecting Irish people today and is thus the largest problem from an air quality point of view.*"

5.5 IMPACTS

5.5.1 AIR QUALITY IMPACTS

The potential impacts to air quality related to the operational phase of the proposed development would be associated with the biological treatment of wastewaters. WWTPs have been identified as sources of the greenhouse gases methane, carbon dioxide and nitrous oxide (Daelman *et al.*, 2013). As methane is generated through anaerobic wastewater treatment processes (IPPC, 2006), and given that the proposed WWTP would include aeration, the proposed development would not be anticipated to generate significant methane emissions. The main potential impacts to air quality from the proposed biological treatment of wastewaters would therefore be carbon dioxide and nitrous oxide emissions to the atmosphere.

Wastewaters generated at slaughtering and meat processing facilities typically have a high organic strength. Carbon dioxide is generated during biological wastewater treatment, with the organic carbon component of wastewater incorporated into biomass (sludge) or oxidised to carbon dioxide (Campos *et al*., 2016).

The EPA's UWW PRTR Toolset was used to estimate the volume of carbon dioxide emissions which would be generated as a result of the proposed development. Based upon the Biochemical Oxygen Demand (BOD) loading of the incoming wastewater to the proposed WWTP, and based upon the aerobic processes, the proposed WWTP would be estimated to generate 226,000 kg/year of fugitive carbon dioxide emissions.
Wastewaters generally contain forms of nitrogenous compounds including nitrate, nitrite, ammonia and ammonium. Slaughtering and meat processing facilities are typically associated with high protein content and therefore require efficient wastewater treatment to ensure nitrogenous compounds are effectively broken down to acceptable levels prior to discharge to surface waters (streams, rivers, ponds, lakes etc.).

The breakdown of nitrogenous compounds in wastewaters is achieved during biological treatment in WWTPs, comprising of aeration tanks and an anoxic or anaerobic tank. The generation of nitrogen emissions to the atmosphere primarily takes place within the anaerobic or anoxic tank. The proposed development would increase the size of the previously approved anoxic tank.

Anoxic tanks are used for de-nitrification process, which involves the de-nitrification of wastewater through the use of bacteria which break down the nitrate present in the wastewater to use as an oxygen source (energy source). This breakdown of nitrate from the wastewater releases oxygen and nitrogen gas. The oxygen is metabolised by the bacteria and the nitrogen gas releases to the atmosphere. Emissions of nitrous oxide to the atmosphere can also be generated during both the nitrification (within aeration basins) and de-nitrification processes. While nitrous oxide can be an intermediate product of both the nitrification and de-nitrification processes, it is more often associated with denitrification (IPCC, 2006).

It would not be possible to accurately quantify emissions of nitrous oxide to atmosphere arising during the wastewater treatment process, owing to the nature of treatment and given that the anoxic tank and aeration basins would be open to the atmosphere. The Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories (2006) provide a default emission factor for nitrous oxide emissions of 0.005

(0.0005-0.25) kg N_2O-N/kg N for domestic wastewaters, while studies by Campos *et al.* (2016) estimated that nitrous oxide emissions were between 0-14.6% of the nitrogen load of the wastewater. Due to the difficulties in measuring nitrogen emissions and in the absence of standardised measurement methods, nitrogen emissions may be estimated based upon models without the input of measured data (Law *et al.*, 2012). Using the EPA's UWW PRTR Toolset, the proposed WWTP would be estimated to generate 1 kg/year of fugitive nitrous oxide emissions.

Wastewaters currently generated at the Dawn Meats (Slane) facility are transported to a municipal WWTP for treatment, where carbon dioxide and nitrous oxide emissions would be generated and released to atmosphere. Therefore, the proposed development would result in the release of carbon dioxide and nitrous oxide emissions occurring at the Dawn Meats (Slane) site as opposed to the municipal WWTP, and consequently, would not result in a significant overall increase of either carbon dioxide or nitrous oxide emissions to the atmosphere.

It should be noted that the proposed development, by discharging treated effluent to the River Boyne, would eliminate the majority of daily tanker movements associated with the current operation of the WWTP, thereby resulting in a reduction of air emissions due to traffic movements. Currently, wastewater from the existing WWTP is collected 7-8 times per day by tanker and transferred to a municipal WWTP. The proposed development would reduce the number of tanker movements to only one per day for the collection of effluent sludge. Further detail is provided in **Section 13** of this EIAR.

5.5.2 ODOUR IMPACTS

The Dawn Meats (Slane) facility has an Odour Management Plan in place to minimise the risk of odour arising from the facility and to ensure compliance with their IE Licence conditions pertaining to odour, including monitoring and management measures for key odour sources, odour audit checks and management system review.

Owing to the implementation of best practice and odour management measures, the site can be considered to have a good environmental performance with regards odour. In the previous nine years, only two odour complaints have been lodged, one in 2016, which related to landspreading of organic fertiliser, and one in 2010.

Potential odour generating activities at the existing facility include the transport and storage of waste and animal by-products, the storage of blood, lairage activities and the treatment of wastewater at the existing WWTP.

Current wastewater treatment involves screening the wastewater and pumping it to an effluent storage lagoon. The wastewater passes from the first lagoon through a Dissolved Air Flotation (DAF) unit to the second lagoon. Wastewater is then sent off-site to a municipal WWTP or other suitable wastewater treatment facility. At present effluent is stored without aeration, however, it is transported offsite daily.

The currently approved WWTP development would comprise of the construction and operation of a new balance tank, sludge holding tank, anoxic tank, aeration basin, clarifier and sand filter, in addition to the relocation of the DAF unit. The approved anoxic tank and planned two aeration tanks would have no significant impacts upon odour generation.

Odours from WWTP operations arise mainly from the volatilisation of odorous gases from:

- Aeration tanks where insufficient oxygen is being provided.
- The surfaces of non-quiescence processes including overflow weirs, returned pumped centrate/liquor above the working height of the tank/channel etc.
- Anaerobic decay of settled/floating organic debris upon quiescence surfaces including organic matter attached to grit, rags, organic matter carryover to secondary tanks, etc.
- Screens operation and build-up of organic debris within screens area.
- DAF operation and fat storage/handling.
- Sludge handling operations including dewatering, thickening, storage and transport of raw/processed sludge's offsite and desludging.
- Turbulent processes within the inlet works, storage of screens (i.e. grit and coarse material removal) and DAF process and fat/skim storage.
- Inefficient odour control/abatement equipment operation and design including loose fittings covers, inefficient extraction and odour control unit failure.

Fugitive emissions are generally associated with:

- Yard areas used to store waste compactors and skips.
- Sludge and bio solids removed from the effluent treatment plant.
- Blocked waste water pipes, gullies and drains.

As the proposed rising main would only contain treated final effluent, there is considered to be no risk of odours arising along the pipeline route or discharge. The final effluent would be of sufficient quality to discharge to the River Boyne, and as such, the quantities of materials with the potential to become odorous would be negligible. It should also be noted that the effluent treatment plant design includes controls on effluent quality and emergency measures in the event of a plant malfunction to prevent effluent which is out of specification reaching the rising main.

In certain facilities, drainage and bad housekeeping can be a significant source of odours. Spillages and drain liquid from raw material storage containers and raw material handling can contaminate large surface areas. The build-up of organic matter on rough concrete surfaces can lead to significant emissions especially during warmer summer months.

The guidance document EPA 1997 "*Wastewater Treatment Manuals – Primary, Secondary and Tertiary Treatment*" states that "*Biological treatment processes are not generally a major source of odour*". This statement is in the context of sufficient and appropriate design and managerial measures being in place at the treatment plant in question.

As per the EPA Guidance, the control of odours from primary and biological treatment processes is commonly achieved by operational practices such as:

Primary Settlement	• Frequent cleaning of scum scrapers and pits thereby reducing the biological breakdown of grease and scum; • Frequent sludge withdrawal ensuring that solids residence times of 1 hour at average flow conditions are established; • Preventing septic conditions by reducing hydraulic retention times and increasing the frequency of settled solids scraping; • Reducing the turbulence at the weir overflow by reducing the height of the drop between the weir overflow and the channel

Activated Sludge	• Maintaining aerobic conditions in the aeration tank; and • Maintaining the velocity of the mixed liquor in the tank at a minimum of 0.15m/s.
Secondary Settlement Tanks	• Similar controls to primary units except that withdrawal rates can be increased to 1.5 to 2 hours; cleaning is critical as odours can occur more quickly due to the mixed liquor being more biologically active.

The biological effluent treatment plant has been designed with the potential for odour generation in mind. Sufficient aeration, mixing and retention times have been provided by design, in addition to the provision of an odour scrubber for a covered balance tank and covered sludge holding tank ventilation. The DAF unit would also be enclosed within the proposed control house, which would improve odour control. However, in order to ensure the effectiveness of these measures, an adequate standard of treatment process management is essential.

It is anticipated that, provided appropriate management measures are implemented, that there would be no significant odour impact at odour sensitive locations as a result of the proposed development.

The potential for odour emissions from the effluent treatment system at the site may reduce following completion of the proposed development due to the higher standard of treatment provided.

5.6 MITIGATION MEASURES

The only significant adverse potential impacts the operation of the proposed development may have on air quality, both at the local level and on a broader national / global scale, would be the generation of carbon dioxide and nitrous oxide emissions. As discussed in **Section 5.5**, the proposed development would not result in a significant overall increase in either carbon dioxide or nitrous oxide, as these emissions would be generated by any municipal WWTP treating wastewaters generated by Dawn Meats (Slane). Furthermore, the proposed development would reduce the current number of daily tanker movements associated with the operation of the WWTP, which would result in a reduction of air emissions arising from vehicles.

The release of carbon dioxide and nitrous oxide due to the treatment of wastewaters to atmosphere would not be anticipated to have any potential significant impacts upon the air quality of the local area, given the scale of the proposed development. Potential air emissions from the proposed development would be similar in nature and extent as existing sources of air pollution in the area, including agricultural activities such as housing of animals and the spreading of organic fertilisers.

Therefore, no mitigation measures would be required as the proposed development would not cause significant impacts upon air quality in the area or on a broader scale.

The site odour management plan should be updated to include management measures for the prevention of odours from biological wastewater treatment processes, as per **Table 5.3**.

Table 5.3: Odour Management Plan Measures for the Prevention of Odours from Biological Wastewater Treatment

ODOUR SOURCE	ACTION PLAN
Odour perimeter checks	Odour perimeter checks should continue at least weekly up to one month after commissioning of the new WWTP. Frequency of odour checks may be reviewed and reduced during the operation phase.
Training	It is recommended that all operators, and deputy operators, receive training in the management of the biological wastewater treatment system.
Plant and equipment	Ensure all plant and equipment is installed to manufacturer's specification to ensure correct operation. Maintain equipment, including preventative maintenance schedule, to ensure high efficiency. Ensure that backup critical equipment is available onsite (e.g. back-up aerators etc.)
Drains	Ensure all drains are flushed regularly and prevent persistent build-up of organic matter in drains by design.
Balancing Tank	Minimise the retention of wastewater under anaerobic conditions, especially in the balancing tank to prevent the formation of odorous compounds. Ensure wastewater is kept adequately mixed to avoid anaerobic conditions. Ensure odour scrubber is working efficiently.
DAF plant	Empty and clean DAF unit with hot water at least monthly. Monitor chemical addition to ensure on-going treatment efficiency. Keep DAF unit lid closed as practical.
Aeration tank	Maintain Dissolved Oxygen levels > 1 mg/l. Calibrate DO probe annually Operator trained to check DO daily.
Sludge tank	Ensure sludge is kept adequately mixed to avoid anaerobic conditions. Avoid exposure of treated sludge to the atmosphere. Ensure odour scrubber is working efficiently. Operator trained to inspect daily.
Sludge in transport	Ensure all trailers and skips used to transport sludges off-site are sealed and adequately covered to prevent any potential odours in transit.
Yard area	Clean yard as required and wash into yard sump. Clean up any spills as they occur and wash down the area to prevent the build up of organic material on surfaces.

5.7 CONSTRUCTION IMPACTS AND MITIGATION

The primary potential nuisance associated with construction activities is dust. Excavations and earth moving operations may generate quantities of construction dust, particularly in drier weather conditions. The extent of any construction dust generation depends on the nature of the construction dust (soils, sands, gravels, silts etc.) and the construction activity. The potential for construction dust dispersion depends on the local meteorological conditions such as rainfall, wind speed and wind direction.

5.7.1 IMPACTS

Emission of air pollutants would typically arise from the operation of construction plant onsite and emissions from delivery vehicles. It is anticipated that air emissions from these sources would have a negligible impact upon air quality in the area in the context of emissions from traffic on nearby roads.

It is proposed to use locally sourced rock and concrete for the supply of rock fill and processed aggregate where possible.

Earthworks during construction are a potential source of dust pollution. Minimal levels of dust would be expected to be generated during the construction phase given the confined area of earth-works and the short term of the construction phase at the main compound and along the pipeline route (horizontal directional drilling (HDD) and limited / phased open-cut trenching).

Greater levels of dust may be associated with the construction of an earth berm around the proposed WWTP extension.

The issue of construction dust dispersion may be exaggerated with vehicles transporting sand/gravels/concrete/etc. to and from the site, having the potential to cause an environmental nuisance to use of the local roads.
Construction dust control is a common part of construction management practices. The effect of construction activities on air quality, in particular construction dust, would not be significant following the implementation of the proposed mitigation measures outlined below. Periodic rainfall, which is common in Ireland, would also mitigate the dispersal of dust generated by from the site.

5.7.2 MITIGATION

The Dawn Meats (Slane) facility is operated in accordance with their IE Licence conditions. Condition 5.2 of the IE Licence relates to the prevention of nuisances onsite, which includes dust, and is as follows:

Condition 5.2: No emissions, including odours, from the activities carried on at the site shall result in an impairment of, or an interference with amenities or the environment beyond the installation boundary or any other legitimate uses of the environment beyond the installation boundary.

An outline Construction Environmental Management Plan (CEMP) has been prepared as part of this application and should be updated and adhered to by the construction contractor. It is proposed to adhere to good working practices and dust mitigation measures to ensure that the levels of dust generated would be minimal during the construction phase and are unlikely to cause any significant environmental nuisance. Cognisance would be taken of the guidelines published by the Institute of Air Quality Management (IAQM), "*Assessment of dust from demolition and construction 2014*".

Topsoil arising from the proposed WWTP extension would be used for the construction of an earth berm and for any landscaping required at the site.

Topsoil arising from the road verge along the rising main route would be stockpiled for use in reinstatement of the area following completion of works. Excess topsoil and stone would be removed from the site as a waste by an appropriately registered waste contractor. While the natural recolonisation of exposed areas of soil is preferred for ecology, re-seeding would be undertaken, where required, to promote the rapid stabilisation of soils.

Construction on the treated effluent rising main route would be undertaken in phases, with only one working section open at a time. This would reduce the potential for dust during rising main works.

The following dust control measures would be implemented by the construction works contractor for the duration of the construction of the proposed development:

- Cognisance would be taken of the guidelines published by the Institute of Air Quality Management (IAQM), "*Assessment of dust from demolition and construction* 2014";
- Material handling systems and site stockpiling of materials would be designed and laid out to minimise exposure to wind;
- Prolonged storage of materials onsite would be avoided;
- Where possible, the storage of materials, such as stockpiled excavated soils, would be located as far as possible from adjacent residential properties;
- A 15kph speed limit would be implemented for all traffic onsite to reduce the potential for dust generation;
- When transporting materials to and from the site, vehicles would be fitted with covers where possible to prevent material loss;
- Public roads outside the site would be regularly inspected for cleanliness and cleaned as necessary. A road sweeper would be used where required;
- Any un-surfaced roads would be restricted to essential construction site traffic only;
- While the natural recolonisation of exposed areas of soil during reinstatement activities is preferred, re-seeding would be undertaken where required to promote the rapid stabilisation of soils;
- Regular visual inspections would be undertaken around the proposed site boundary to monitor the effectiveness of dust control measures.

Should additional dust control measures be required, for instance during particularly dry weather, dust suppression measures would be undertaken, including the following:

- Water misting plant, such as bowsers and sprays would be used as required and where necessary;
- Wheel-wash facilities would be provided for vehicles exiting the site to reduce the level of dust travelling offsite;
- Where practicable, stockpiles of excavated soils and exposed surfaces would be dampened down via misting plant.

5.8 REFERENCES

Air Pollution Act, 1987, 6 of 1987.

Air Quality Standards Regulations, S.I. No. 180 of 2011, Dublin: Stationery Office.

BREF Document for Slaughterhouses and Animals By-products Industries (2005) *Reference Document on Best Available Techniques in the Slaughterhouses and Animal By-Products Industries.*

Campos, J.L., Valenzuela-Heredia, D., Pedrouso, A., Val del Rio, A., Belmonte, M. and Mosquera-Corral, A. (2016) Greenhouse Gases Emissions from Wastewater Treatment Plants: Minimization, Treatment and Prevention. *Journal of Chemistry*, Article ID 3796352.

Daelman, M.R.J., van Voorthuizen, E.M., van Dongen, L.G.J.M, Volcke, E.I.P. and van Loosdrecht, M.C.M. (2013) Methane and nitrous oxide emissions from municipal wastewater treatment – results from a long-term study. *Water Science and Technology*, 67(10), pp. 2350-2355.

Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.

Environmental Protection Agency (2018) *Air Quality in Ireland 2017*.

Environmental Protection Agency (2017) *Air Quality in Ireland 2016*.

Environmental Protection Agency (2016) *Air Quality in Ireland 2015*.

Environmental Protection Agency (2015) *Air Quality in Ireland 2014*.

Environmental Protection Agency (2014) *Air Quality in Ireland 2013*.

Environmental Protection Agency (2013) *Air Quality in Ireland 2012*.

Environmental Protection Agency (2012) *Air Quality in Ireland 2011*.

Environmental Protection Agency (2012) UWW PRTR Electronic Toolset V5.0. Available at:http://www.epa.ie/pubs/advice/aerprtr/uwwtpaerprtrguidance/newuwwprtrelectronictoolsetv50.html

Environmental Protection Agency (2008) *Ambient Air Monitoring at Navan, April 26th 2007 – 28th February 2008*.

Environmental Protection Agency (2017) Draft. *Guidelines on the information to be contained in Environmental Impact Assessment Reports*.

Environmental Protection Agency (2002) *Guidelines on the information to be contained in an Environmental Impact Statement*.

EPA Envision Online Mapping, Available at: http://gis.epa.ie/Envision/

EPA 1997 "*Wastewater Treatment Manuals – Primary, Secondary and Tertiary Treatment*"

Environmental Protection Agency (2010). *Odour Impact Assessment Guidance for EPA Licensed Sites (AG5).*

IAQM (2014) *Assessment of dust from demolition and construction 2014.* Available at: http://iaqm.co.uk/text/guidance/construction-dust-2014.pdf

IPCC (2006). *Guidelines for National Greenhouse Gas Inventories*. Volume 5, Chapter 6 – Wastewater Treatment and Discharge.

Law, Y., Ye, L., Pan, Y. and Yuan, Z. (2012). Nitrous oxide emissions from wastewater treatment processes. *Phil. Trans. R. Soc. B.*, 367, pp. 1265-1277.

6.0 NOISE ENVIRONMENT

6.1 INTRODUCTION

Dawn Meats (Slane) has received planning permission (Planning Reference LB180300) for the construction of a new WWTP, to include primary treatment and secondary biological treatment at their beef processing facility in Greenhills, Co. Meath.

It is proposed to build two new aeration tanks and construct an extension to the approved control house. This current planning application would also include a 7.2 km treated effluent rising main connecting the WWTP to the Boyne River.

The completed WWTP would consist of a Balancing Tank, Dissolved Air Flotation (DAF) and a Sludge Holding Tank. The biological plant would consist of an Anoxic tank, two Aeration Tanks, a Clarifier and Sand Filter.

A Noise Assessment Report has been prepared to accompany this EIAR for Dawn Meats (Slane) who are applying to Meath County Council for planning permission for the proposed development as mentioned above. The report is attached to this EIAR (**Attachment 6.1**) and was prepared with reference to BS 4142 (2014) *Method for Rating and Assessing Industrial and Commercial Sound* and the EPA (2016) *Guidance Note on Noise (NG4)*.

The study identifies, describes and assesses the impact of the proposed development in terms of noise, in particular, the potential noise impacts on residential locations (sensitive receptors) in the vicinity of the proposed development.

This section of the EIAR summarises the findings of the Noise Assessment Report.

6.2 LEGISLATIVE CONTEXT

Planning and Development Act 2000 (S.I. No. 30 of 2000), as amended

Local authorities are responsible for the planning and environmental regulation of any proposed developments. The current planning and environmental regulatory framework requires these developments to comply with the Planning and Development Act (2000) and related regulations.

The local authorities and An Bord Pleanála attach conditions relating to environmental management of these developments to planning permissions granted. Local authorities consider the land use and planning issues associated with the proposed developments in their County Development Plans.

The EPA Act (Noise) Regulations 1994 (S.I. No. 179 of 1994)

The relevant part of the Environmental Protection Agency Act 1992 dealing with noise is Part VI, Sections 106 to 108. These Sections deal with the control of noise, the power of local authorities to prevent or limit noise and the issue of noise as a nuisance.

The 1994 Regulations came into effect in July 1994 and outline the procedures for dealing with noise nuisance. The Regulations allow affected individuals, local authorities or the EPA to take action against an activity causing a noise nuisance.

These Regulations replaced the procedures for noise complaints contained in the Local Government (Planning & Development) Act 1963. Companies must show that reasonable care was taken to prevent or limit the noise from their activities. If the courts decide that a company is responsible for causing a noise nuisance, they can order the company to take measures to reduce, prevent or limit it.

EPA "Guidance Note on Noise (NG4)" (2012)

It deals in general terms with the approach to be taken in the measurement and control of noise, and provides advice in relation to the settling of noise Emission Limit Values (ELVs) and compliance monitoring. In relation to production facilities and ancillary activities, it is recommended that noise from the activities on site shall not exceed the following noise ELV's at the nearest noise-sensitive receptor:

Table 6.1: EPA NG4 Guidance Noise Limits

Divisions	Times	dB(A)
Day	(07:00 to 19:00hrs)	55dB LAr,T
Evening	(19:00 to 23:00hrs)	50dB LAr,T
Night	(23:00 to 07:00hrs)	45dB LAeq,T

The National Roads Authority (NRA) Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004)

The NRA's guidance document Guidelines for the Treatment of Noise and Vibration in National Road Schemes (2004) is the recognised Irish guidance document for the assessment of road traffic noise. This document sets out the key items that should be included in a noise and vibration assessment for any significant road scheme. As a minimum, it stipulates that the following items should be included:

- A series of noise surveys to quantify the prevailing noise climate at sensitive receptors along the existing and proposed routes
- Preparation and calibration of a suitable noise prediction model;
- Prediction of Do Minimum and Do Something noise levels for opening and design years;
- Comparison of predicted Do Something noise levels with the design goal and three conditions that must be satisfied before mitigation measures are deemed necessary;
- Specification and assessment of road traffic mitigation measures, where required;
- Assessment and review of construction impacts and mitigation measures;
- Assessment and review of vibration.

This document has been referred to in the consideration of road traffic noise associated with the proposed development. The document also presents maximum permissible noise levels at dwelling facades during construction activities. This provide a useful reference for assessing construction noise of the proposed development.

Table 6.2: The National Roads Authority (NRA) Guideline Construction Noise Limits

Days / Times	**$L_{Aeq\ (1hr)}$ dB**	**$L_{pA\ (max)slow}$ dB**
Monday to Friday (07:00 – 19:00hrs)	70	80
Monday to Friday (19:00 – 22:00hrs)	60	65
Saturday (08:00 – 16:30hrs)	65	75
Sundays and Bank Holidays (08:00 – 16:30hrs)	60	65

<u>Dawn Meats (Slane) EPA Industrial Emissions Licence (P0811-02)</u>

The current Dawn Meats (Slane) licence, issued by the EPA, provides for the following conditions in relation to noise;

Condition 4.1 Noise
"*Noise from the installation shall not give rise to sound pressure levels measured at the Noise Sensitive Locations of the installation which exceed the limit value(s).*"

Condition 6.15 Noise
"*The licensee shall carry out a noise survey of the site operations not later than two months from the date of grant of this licence and annually thereafter. The noise survey shall pay particular regard to tonal and impulsive noise sources during night time operations. The survey programme shall be undertaken in accordance with the methodology specified in the 'Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)' as published by the Agency.*"

Condition 6.20
"*Where refrigeration trailers are parked at the installation overnight these shall be powered on electricity to minimise noise emissions.*"

Table 6.3: EPA Licnece Limits (P0811-02) Schedule B.4 Noise Emissions

Daytime dB $L_{Ar,T}$ (30 minutes)	**Evening dB $L_{Ar,T}$ (30 minutes)**	**Night-time dB $L_{Aeq,T}$ (30 minutes)**
55	50	45

Note 1: There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity of any noise-sensitive location.

Table 6.4: EPA Licnece (P0811-02) Schedule C.6 Noise Emissions

Location Note 1	**Measurement**	**Frequency**
RA1 (295177E. 270076N) dwelling east of installation RA2 (29528lE. 270016N) dwelling north of installation RA3 (295651E, 269816N) dwelling north of installation RA4 (295839E, 269504N) dwelling southeast of installation	$L_{Aeq,T}$ L_{A90} L_{A10} 1/3 Octave Band Analysis	Annually
Period	**Minimum Survey Duration**	
Daytime	A minimum of 3 sampling periods at each noise monitoring location Note3	
Evening-time	A minimum of 1 sampling period at each noise monitoring location.	
Night-time Note 2	A minimum of 2 sampling periods at each noise monitoring location.	

Note 1 Locations shown on Figure 8.1 Noise Monitoring Locations of the Environmental Impact Statement

Note 2 Night-time measurements should be made between 2300 hrs and 0400 hrs, Sunday to Thursday, with 2300 hrs being the preferred start time.

Note 3 Sampling period is to be the time period T stated as per Schedule B.4 Noise Emissions, of this licence. This applies to day, evening and night time periods.

Daytime	**Evening-time**	**Night-time**
0700 hrs to 1900 hrs.	1900 hrs to 2300hrs	2300hrs to 0700 hrs

6.3 REGIONAL ENVIRONMENTAL SETTING

Dawn Meats (Slane) is located in a rural location west of the Ashbourne-Slane national road (N2), approximately 4.5km south of the village of Slane, Co. Meath. The site of the abattoir was originally a farmyard where on-farm slaughter of cattle was undertaken. The facility at Slane, which was previously operating as Newgrange Meats, was acquired by the Dunbia Group in 2001, and incorporated into Dawn Meats Group in 2018.

The topography in the area surrounding the proposed development at Painestown is generally flat, ranging between 80-100m above sea level with a gentle slope rising to the north-east. The area is rural in character with residences in the area predominantly linearly aligned along the existing road network.

Panther Environmental Solutions Ltd (PES Ltd) was commissioned by Dawn Meats (Slane) to carry out an Environmental Noise Impact Assessment. Maps of the proposed site boundary, and surrounding noise sensitive locations are provided in the detailed noise report in **Attachment 6.1**.

6.4 EXISTING NOISE CLIMATE

The existing noise climate would consist of typical agricultural activities associated with rural farming areas, local road traffic, noise associated with the nearby school and potentially noise from the railway line located north of the site. Noise sources from the existing Dawn Meats (Slane) facility add to the existing noise climate of the area.

The Dawn Meats (Slane) facility holds an Industrial Emissions (IE) Licence by the Environmental Protection Agency (EPA). The site's IE Licence (Ref. P0811-02) sets out conditions regarding noise emissions from the site, as shown in **section 6.2** above.

As part of the sites IE licence compliance, annual noise monitoring is carried out at the following local noise sensitive receptors. Locations RA1 to RA4 are specifically required to be monitored under the IE licence, and RA5 has been included in the annual monitoring programme since 2017 as agreed with the EPA.

Table 6.5: Dawn Meats Slane IE Licence Noise Monitoring Locations

Location Ref. No.	Grid Reference (Easting: Northing)	Location Type	Location
RA1	295177: 270076	Noise Sensitive Receptor	House along roadway leading to site, east of site ~300m from the facility.
RA2	295281: 270016	Noise Sensitive Receptor	House along roadway leading to site, north of site ~250m from the facility.
RA3	295651: 269816	Noise Sensitive Receptor	House along roadway leading to site, north of site ~300m from the facility.
RA4	295839: 269504	Noise Sensitive Receptor	House along roadway leading to site, south of site near crossroads~520m from facility.
RA5	295650: 269250	Noise Sensitive Receptor	Houses to southeast of site along L1013 roadway ~500m from the facility.

These locations are shown in a map provided in Appendix A.1 of **Attachment 6.1 - Noise**. A summary of the results of these annual monitoring surveys are presented in **Table 6.6** below. **Table 6.6** details the averages of annual monitoring carried out between 2013 and 2019 at noise sensitive receptors in the viscidity of the Dawn Meats (Slane) facility.

As can be seen in the detailed noise report provided in **Attachment 6.1**, the existing noise environment has been screened under the EPA NG4 guidance methodology for categorisation as a "Low Noise Area" or "Area of Low Background Noise". Given the noise monitoring results obtained during annual monitoring and the presence of significant noise sources in the area, it is considered that this area would not be classified in either of these categories.

Therefore, the existing Dawn Meats (Slane) licence noise limits are considered to be appropriate for the area.

Table 6.6: Long Term Average Background Noise Levels

Ref	Location	Daytime		Evening		Night-time	
		LAeq, T	LAF_{90}	LAeq, T	LAF_{90}	LAeq,T	LAF_{90}
RA1	House along roadway leading to site, east of site ~300m from site.	57	45	51	38	47	37
RA2	House along roadway leading to site, north of site ~250m from site.	51	44	46	36	42	36
RA3	House along roadway leading to site, north of site ~300m from site.	46	42	38	36	37	35
RA4	House along roadway leading to site, south of site near crossroads ~520m from site.	58	45	56	38	50	36
RA5	Houses to southeast of site along L1013 roadway ~500m from site	53	49	50	35	42	34
Average		**53**	**45**	**48**	**37**	**44**	**36**

6.5 PREDICTIVE NOISE ASSESSMENT

The International Standards Authority guidance ISO 9613-2:1996 has been used in the prediction of the propagation of potential noise from the proposed works and development to the nearest noise sensitive receptors. The British Standard BS4142:2014 has been used to assess the potential for noise impact at local noise receptors as a result of the proposed development.

6.5.1 SELECTION OF RECEPTOR LOCATIONS FOR PREDICTIVE NOISE

The locations of the proposed noise receptor locations are shown in **Attachment 6.1** – Appendix A and are described below.

WWTP

In order to predict the impact of the construction and operational phases of the proposed amendments to the approved WWTP extension, sample noise-sensitive locations were selected based upon the nearest location within groups of NSL's sharing similar orientation with regard to the proposed site and intervening topography.

Table 6.7: Noise Sensitive Receptor Locations

Location Ref. No.	Grid Reference (Easting: Northing)	Location Type	Location
NSL1	295651: 269816	Noise Sensitive Receptor	Residences located 500m East of the proposed site (RA3).
NSL2	295281: 270016	Noise Sensitive Receptor	Residences located 275m North of the proposed site (RA2).
NSL3	294857: 269613	Noise Sensitive Receptor	Residences located 335m West-South-West of the proposed site.
NSL4	295839: 269504	Noise Sensitive Receptor	Residences located 735m South-South-East of the proposed site (RA5).
NSL 5	294530: 270014	Noise Sensitive Receptor	School located 665m North-West of the proposed site.

Pipe Line

The proposed pipeline would pass along the roadside on the Windmill Road, L1013 road, Yellow Furze road and through the village, L1600 road, and local road leading to the River Boyne. The pipeline route is mapped in Appendix A.

The pipeline will pass close by roadside houses, and the school and church in the village of Yellow Furze. Typical set back distances would be greater than 20m for the majority of residences and structures along the route, however, distances of 5 to 10 metres from the façade may occur, depending on the precise location along the road.

It should be noted that horizontal directional drilling (HDD) would be the preferred method for laying the rising main pipework. This would allow for the drilling equipment to be set-up at an appropriate distance from any noise sensitive receptors to minimise potential impacts. Therefore, the predicted levels for pipeline excavation noise are a worst case scenario.

6.5.2 SOURCE NOISE SPECIFICATIONS & FORMULAE

Construction Noise

The noisiest aspect of the proposed development is likely to be the construction phase of the project. During construction, the noisiest phase is typically excavation and landscaping activities.

The guidance document BS5228-Part 1 2009 "*Code of practice for noise and vibration control on construction and open sites. Noise*" provides typical noise levels for standard construction equipment during typical construction and demolition activities.
The typical noise level of construction is summarised in the following table.

Table 6.8: Construction Plant Noise Levels (Ref: BS5228:2009)

Sound Pressure Level (dBA) @ Octave Band Centre Frequency									
Frequency (Hz)	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**dBA**
C2.3 - 22T Excavator (clearing site) @ 1 m	75	88	88	91	93	92	91	86	99
C2.14 - 22T Excavator (excavating) @ 1 m	80	83	89	91	92	90	85	21	97
C2.45 Water Pump 6in @ 1 m	68	73	74	80	82	78	75	61	86
Resultant Noise Level	**81**	**89**	**92**	**94**	**96**	**94**	**92**	**86**	**101**

It should be noted that this resultant noise level is considered a worst case scenario for noise levels expected at the site during construction activities.

Operational Noise

Operational noise at the site would typically be characterised by general motor and noise from air blowers. Occasional noise from agricultural machinery and deliveries would also occur. Large goods vehicles and lorries typically generate noise levels of 78 – 95 dBA, depending on their size.

Table 6.9: Maximum Operational Noise Level at the Proposed Development

Sound Pressure Level (dBA) @ Octave Band Centre Frequency									
Frequency (Hz)	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**dBA**
C.4.19 Truck (idling)	72	76	77	83	87	88	82	71	**92**
3 x 65kW Blower (Max)	79	74	72	74	78	75	72	71	**84**
1 x 24kW Blower (Max)	69	58	59	60	63	65	59	56	**72**
ETP Background Noise	53	56	59	48	48	50	44	39	**62**
Resultant Noise Level	**80**	**78**	**79**	**83**	**88**	**88**	**82**	**74**	**93**

Octave readings provided from PES Ltd library data are based upon monitoring conducted on similar equipment, machinery or vehicles and locations which would be in place at the proposed development.

It should be noted that this resultant noise level is considered a worst case scenario for noise levels expected at the proposed development. Normal ETP operational noise levels would be expected to be in the region of 62 dBA (ETP Background Noise), as measured at similar developments of this type.

6.6 RESULTS OF NOISE MODELLING ASSESSMENT

The assessment has been conducted in accordance with international best practice and represents an accurate representation of background noise levels and predicts noise levels at noise sensitive locations surrounding the proposed development.

To determine the impact of noise from the facility during construction activities and normal operation, the resultant noise levels at noise sensitive locations were calculated (included in **Attachment 6.1** – Appendix B). **Tables 6.10 and 6.11** below summarise the findings of this predictive noise assessment.

The source construction noise at the proposed biological plant is based upon the operation of one 22 tonne excavator during site clearing and excavation, and an operating water pump within the proposed construction site area.

Operational Noise (Lorries) assesses noise based upon a single lorry idling at the site.

Maximum operation noise takes into account general equipment noise at the proposed effluent facility, noise from a 24kW and three 65kW blowers. It should be noted that blowers operating at their maximum rated output would be a rare occurrence. This is considered to be a worst case scenario for noise which could be generated during operations at the proposed development.

Table 6.10: Predicted Noise Results Summary (dBA) – WWTP

NSL Ref	Location	Construction Noise	Operational Noise - Lorries	Maximum Operational Noise
Source Noise Level (dBA)		**101**	**92**	**84**
NSL1	NSL 500m E	36	24	14
NSL2	NSL 275m N	42	29	19
NSL3	NSL 335m WSW	40	28	18
NSL4	NSL 735m SSE	33	23	14
NSL5	NSL 665m NW	34	19	9

The source construction noise at the proposed biological plant is based upon the operation of one 22 tonne excavator during site clearing and excavation, and an operating water pump within the proposed construction site area.

Horizontal directional drilling (HDD) would allow for the set-up of construction equipment as remote as possible from noise sensitive receptors, thereby minimising potential noise impacts. While HDD is the preferred method for the laying of the rising main, this may not be possible at all locations depending on ground conditions. As a worst case scenario, the source construction noise along the pipeline route is based upon the operation of one 22 tonne excavator during site clearing and excavation at different set back distances.

There would be no ongoing noise from the operation of the pipeline along its route. While pipeline integrity testing and washing would occur periodically, these are not inherently noisy activities. Therefore, no operational noise scenario has been included in this assessment.

Table 6.11: Predicted Noise Results Summary (dBA) – PIPELINE ROUTE

NSL Ref	Location	Construction Noise
Source Noise Level (dBA)		101
NR1	NSL @ 5m	76
NR2	NSL @ 10m	70
NR3	NSL @ 20m	64

6.6.1 BS4142:2014 ASSESSMENT

The methodology outlined in BS4142 requires that predicted noise levels be compared to existing L_{90} figures at noise sensitive locations in order to determine the likely noise impact.

Representative baseline noise levels have been taken as the averages of annual noise monitoring carried out by Dawn Meats (Slane) from the area.

The overall average L_{AF90} value for all annual noise monitoring locations has been used to represent the background noise for each noise sensitive location. The overall average long term L_{AF90} value has also been used to represent the baseline noise level for noise sensitive receptors along the pipeline route.

The following tables detail the results of predicted noise levels, employing the BS4142 methodology, at selected noise sensitive locations during worst case scenario noise levels at the proposed development during construction and operational phases.

A noise character penalty of +5 has been applied to predicted noise levels containing machine noise. This is to account for distant impulsive noise from operating machinery.

BS4142:2014 – Construction Noise

The following table determines the likelihood of construction noise impacts at noise sensitive locations following the BS4142 methodology;

Table 6.12: BS4142 Construction Noise Assessment – WWTP

Location	Background Noise	Predicted Noise			Difference from Background
	Average Daytime L_{AF90}	Predicted Noise	Predicted Penalty	Rating Level ($L_{Ar,T}$)	
NSL1	**45**	36	5	**41**	-4
NSL2	**45**	42	5	**47**	2
NSL3	**45**	40	5	**45**	0
NSL4	**45**	33	5	**38**	-7
NSL5	**45**	34	5	**39**	-6

The following table determines the likelihood of construction noise impacts at noise sensitive locations following the BS4142 methodology;

Table 6.13: BS4142 Construction Noise Assessment – PIPELINE ROUTE

Location	Background Noise	Predicted Noise			Difference from Background
	Average Daytime L_{AF90}	Predicted Noise	Predicted Penalty	Rating Level ($L_{Ar,T}$)	
NSL(i)	**45**	76	5	**81**	36
NSL(ii)	**45**	70	5	**75**	30
NSL(iii)	**45**	64	5	**69**	24

The following graph compares the calculated construction noise rating arising from onsite activities (blue) average existing daytime baseline noise at noise sensitive locations (green) and the NRA weekday daytime noise limit (red line), as summarised in **section 6.0** above.

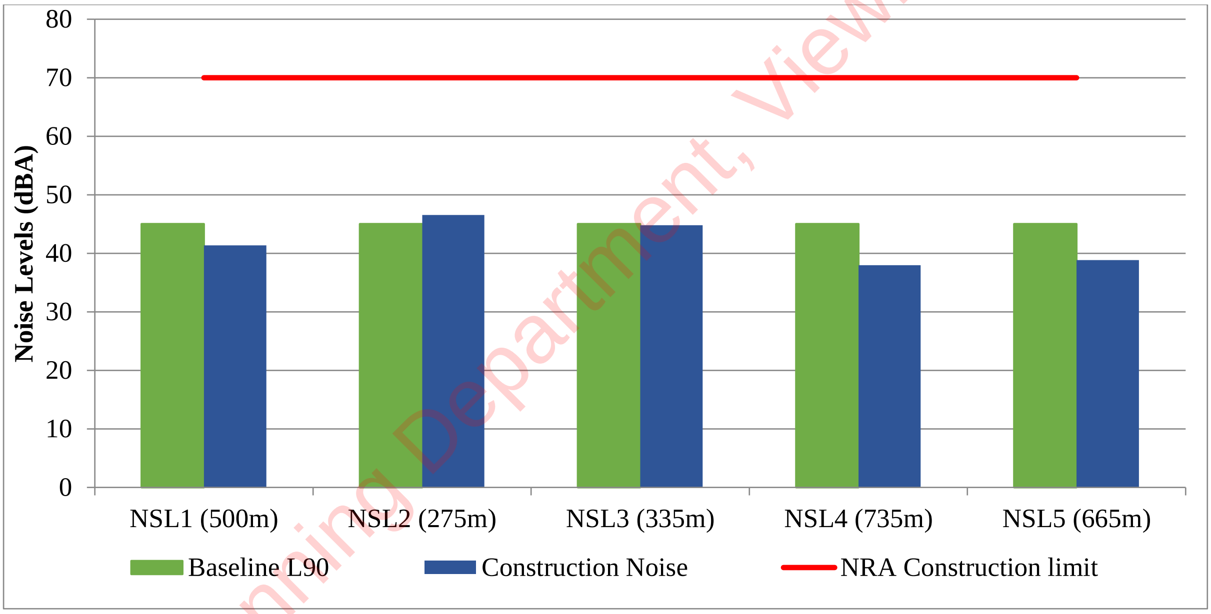

Figure 6.1: Predicted Construction Noise Rating ($L_{Ar,T}$) vs. Existing Daytime Background Noise (L_{AF90}) – WWTP

The following graph compares the calculated noise rating arising from pipeline construction activities at set back distances (dark blue), average existing daytime baseline noise at noise sensitive locations (green) and the NRA weekday daytime noise limit (red line), as summarised in **section 6.0** above.

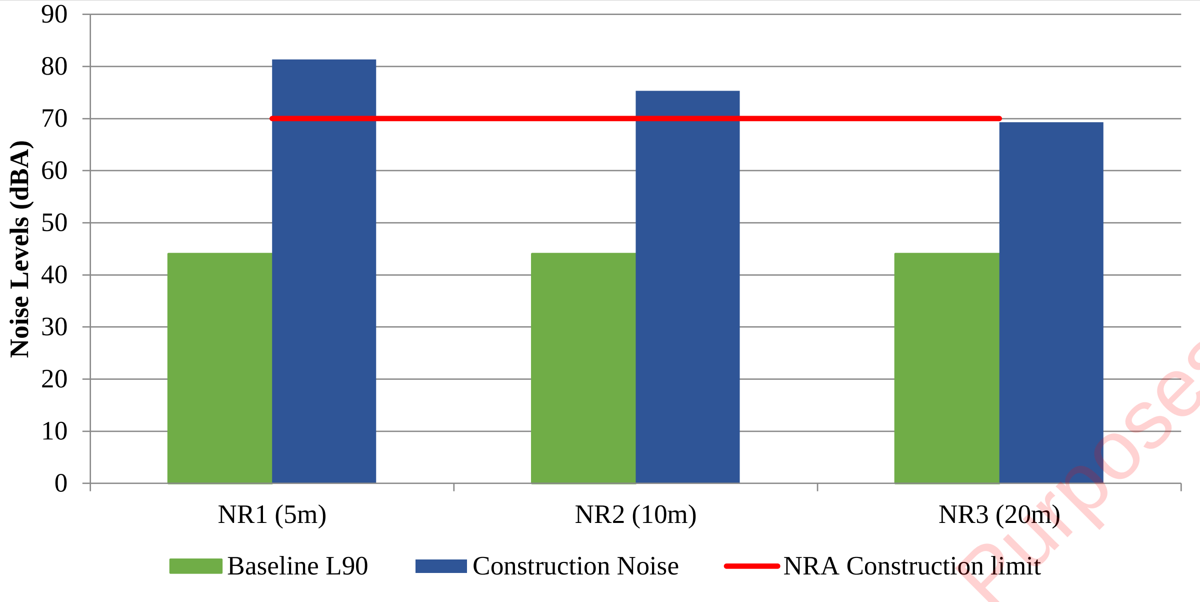

Figure 6.2: Predicted Construction Noise Rating ($L_{Ar,T}$) vs. Existing Daytime Background Noise (L_{AF90}) – PIPELINE

BS4142:2014 – Operational Noise

The following table determines the likelihood of operational noise from lorries onsite causing impacts at noise sensitive locations following the BS4142 methodology;

Table 6.14: Operational Noise Assessment – WWTP Lorries

Location	Background Noise	Predicted Noise			Difference from Background
	Average Daytime L_{AF90}	Predicted Noise	Predicted Penalty	Rating Level ($L_{Ar,T}$)	
NSL1	**45**	24	5	**29**	-16
NSL2	**45**	29	5	**34**	-11
NSL3	**45**	28	5	**33**	-12
NSL4	**45**	23	5	**28**	-17
NSL5	**45**	19	5	**24**	-21

The following table determines the likelihood of maximum operational noise impacts at noise sensitive locations following the BS4142 methodology;

Table 6.15: Maximum Operational Noise Assessment - WWTP

Location	Background Noise	Predicted Noise			Difference from Background
	Average Daytime L_{AF90}	Predicted Noise	Predicted Penalty	Rating Level ($L_{Ar,T}$)	
NSL1	**45**	14	5	**19**	-26
NSL2	**45**	19	5	**24**	-21
NSL3	**45**	18	5	**23**	-22
NSL4	**45**	14	5	**19**	-26
NSL5	**45**	9	5	**14**	-31

The following graph compares the calculated noise rating arising from onsite WWTP activities from lorries (light blue), maximum equipment noise (dark blue), average existing daytime (light green), evening (green) and night-time (dark green) baseline noise at noise sensitive locations and the EPA Guidance / IE licence daytime (gold line), evening (blue line) and night-time (black line) noise limits, as summarised in **section 6.0** above.

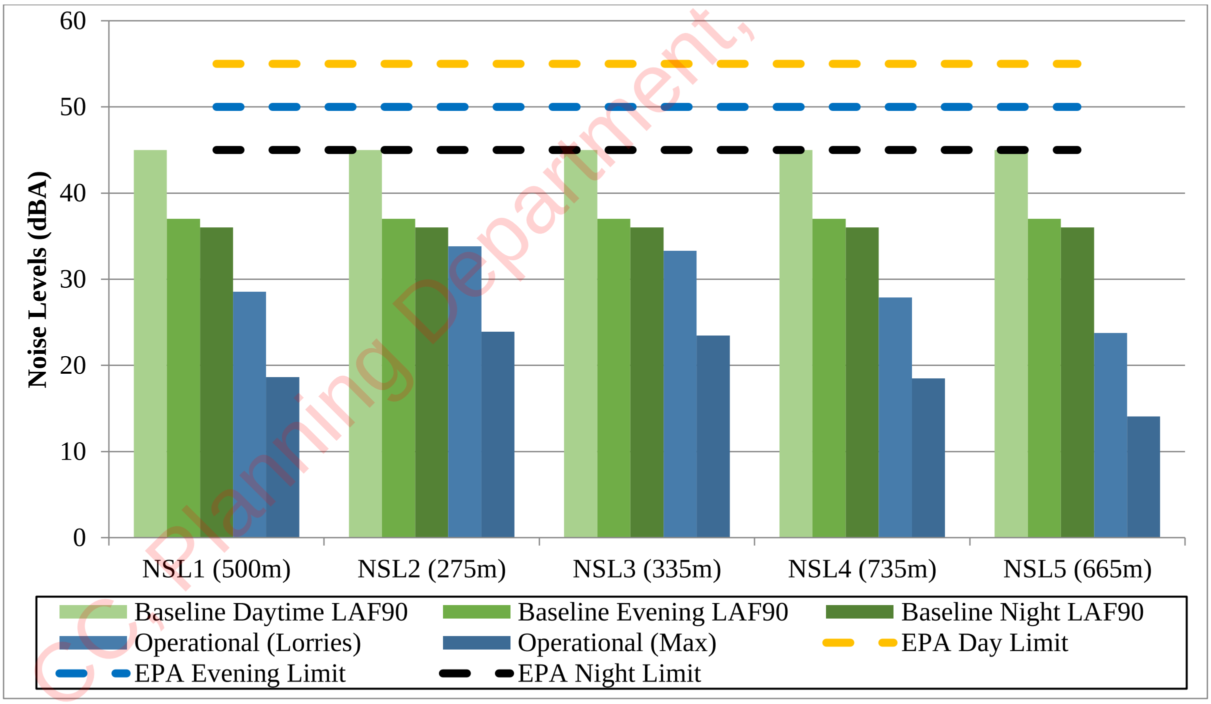

Figure 6.3: Predicted Operational Noise Rating ($L_{Ar,T}$) vs. Existing Background Noise (L_{AF90}) – WWTP

6.7 IMPACTS

The potential noise impacts due to the operational phase of the proposed development are discussed below.

Predicted Maximum Operational Noise – WWTP

In order to predict the highest likely risk of impact from the operation of the proposed effluent treatment plant during its operational phase, noise sources likely to contribute to the highest noise levels onsite at any one time were included in this assessment. The mitigation of noise from the treatment plant compound would principally be by design, including set-back distance from receptors and, in particular, screening of the compound area by the proposed earth berm.

The principal noise sources which would account for the maximum noise levels at the facility would be vehicles onsite, general background noise from pumps and particularly aeration blowers operating at maximum output.

This is considered the worst case scenario for noise as a result of the operation of the proposed development. Vehicles would only be operating within the treatment plant area for limited periods of the day and aeration blowers are selected and designed to operate within the centre of their power range.

It should also be noted that the frequency of vehicles operating in the vicinity of the proposed effluent plant would be significantly reduced from existing daily removal of effluent 7 to 8 times per day. Collection of a maximum of 15 tonnes of dewatered sludge would be expected to occur once per day.

Under the BS4142 criteria, a rated noise level from the proposed development, which is greater than 10 dBA below the existing background noise level, would to be masked by other dominant local noise sources and would be inaudible at the exterior of the closest noise sensitive locations.

Maximum operational noise levels from lorries onsite are predicted to result in noise levels ranging from 11 to 21 dBA below existing baseline daytime noise levels, and therefore would not be anticipated to cause a nuisance (No significant impact) under the BS4142 criteria.

However, it should be noted that during evening and night time periods, lorry noise levels would be anticipated to range from 3-4 dBA below background at NSL2 (275m) and NSL3 (335m). Therefore, there would be anticipated to be a slight impact at these locations should lorry activities occur outside of daytime hours.

Maximum Operational Noise at the proposed biological plant would be between 21 to 31 dBA below the existing background noise level at noise sensitive locations. Maximum equipment noise would also be greater than 10 dBA below the existing evening and night-time background noise levels at receptors and therefore it is predicted that there would be no significant noise impact.

The operation of blowers at maximum output is considered to be an unlikely event, as the equipment would be sized to ensure operation at normal, mid-range outputs. However, this assessment has determined that maximum noise from the air blowers would not cause an impact at noise sensitive locations when operating at maximum power.

As onsite equipment would normally operate at noise levels well below these predicted levels, it is anticipated that normal operation at the facility would be unlikely to cause a noise impact at local receptors.

The EPA "*Guidance Note on Noise (NG4)*" (2016) recommends the following limits for noise from facilities when measured at the facades of the nearest noise sensitive locations;

	Times	**dB(A)**
Day	(07:00 to 19:00hrs)	55dB LAr,T
Evening	(19:00 to 23:00hrs)	50dB LAr,T
Night	(23:00 to 07:00hrs)	45dB LAeq,T

The Dawn Meats (Slane) facility operates under licence limits for noise which are based upon these NG4 guidance limits.

In this worst case scenario, it is predicted that maximum noise arising from the proposed development would be in compliance with daytime, evening and night time guidance limits at the nearest noise sensitive locations and existing facility EPA IE licence limits.

Therefore, it is predicted that in the worst case scenario for operational noise at the proposed development, there would be no significant impact at these noise sensitive locations. The proposed development noise would result in no additional noise impact in the surrounding area.

6.8 MITIGATION MEASURES

The following mitigation measures would be proposed for the operational phase of the proposed project:

- Operational noise within the compound area would be mitigated principally by the set-back distance from noise sensitive locations and a constructed earth berm surrounding the compound;
- Dawn Meats (Slane) have an existing Noise Action Programme operating at the facility,
- In order to ensure continued good practice in relation to the management of noise at the Dawn Meats (Slane) facility, it is recommended that the existing site Noise Management Programme be updated prior to commissioning of the proposed effluent treatment plant. A draft noise management programme has been provided with the attached Noise Report (**Attachment 6.1**) to be used as a starting point, subject to site specific review;
- Noisy operations, such as the removal of effluent and sludge, would be conducted during normal working hours to mitigate any additional noise impacts. Where potentially noisy operations would be required to be carried out outside of these times, the relevant bodies (i.e. EPA, local council) and any potentially affected local residents would be notified in good time and prior to specified works commencing;

- Lorry operators would be informed of site noise controls as part of the existing environmental management system, to keep high revs to a minimum and to keep to the onsite speed limits;
- Any plant and equipment would be sited, as far as is practicable, to benefit from the noise screening effects of local barriers, such as the lie of the land and buildings, to achieve optimum benefit. Acoustic barriers to absorb noise would also be installed where deemed necessary (e.g. the proposed earth berm);
- Noisy equipment would be orientated in one direction so that noise would be directed away from noise-sensitive areas;
- Regular maintenance would be carried out on all equipment, machinery and vehicles to ensure that noise disturbance from such sources would be kept to a minimum;
- The idling of machines would be avoided between work periods and revving of engines;
- Unnecessary movements of forklifts / other vehicles would be avoided during unsociable hours;
- Site roads/tracks would be maintained in a state of good repair to reduce excessive noise from the passage of vehicles;
- Any testing of emergency generators and alarms would be carried out during the daytime of the normal working week and preferably between 09.00 and 17.00;
- The noise level emitted by the alarms must not exceed that required to alert persons working within the site. However, to ensure the response given by call centres is 100%, alarms may also be tested at weekends. The disturbance caused by their testing can be minimized by testing at the same time and day of the week or month etc. If there are problems, local residents would be consulted and timings of testing discussed with them;
- All onsite workers, hauliers and contractors would be informed of noise considerations onsite.

6.9 CONSTRUCTION IMPACTS & MITIGATION

6.9.1 IMPACTS

Construction noise, while inherently noisy and disruptive, is temporary in duration. It is anticipated that the construction of the treated effluent rising main and the construction of the WWTP extension would take approximately 8 months to complete. The works involving "heavy machinery" for the purposes of excavation, and the preparation of building foundations usually cause the most disturbances to nearby residents.

Construction HGV movement to and from the Dawn Meats (Slane) site may result in additional noise at noise sensitive locations in the vicinity due to an increase in frequency of movements, however, this would be in the context of existing frequent HGV traffic on the local roads.

Temporary noise nuisance would occur when earthmoving or excavation works take place at the main WWTP compound.

Generally, the type of works involved at this site would include the following:

- Excavation/Levelling: Excavator, dump truck & dozer.
- Foundations: Excavations, cement mixers & concrete vibrators.
- General Construction: Masonry construction, services, drainage and surfacing etc.

For construction noise impact prediction purposes, it can be assumed that at any one stage in the construction of this development, several activities occur together.

WWTP Construction Phase Noise Impact

Noise from the construction of the main WWTP compound of the development is predicted to result in noise rating levels at noise sensitive locations of 38 to 47 L_{Ar30}.

These noise levels would range from 7 dBA below to 2 dBA above the existing background daytime noise level at noise sensitive locations.

It should be noted that these noise levels are considered a worst case scenario, as it assumes that the noisiest operations are carried out simultaneously. This event would be anticipated to be a rare occurrence and only for short periods of the construction phase.

According to The National Roads Authority's "*Guidelines for the Treatment of noise and vibration in National Road Schemes*" (2004), noise levels at noise sensitive locations of 70 dB(A) L_{Aeq} between daytime hours (07:00-19:00) and 60 dB(A) L_{Aeq} between evening (19:00-22:00 hours) are considered to be acceptable.

It is anticipated that construction activities would generally be conducted between the hours of 7:00am and 7:00pm Monday to Friday. Predicted noise from the construction phase of the main WWTP compound would not exceed the NRA guidance levels for these periods.

Maximum construction has been predicted to be in compliance with the NRA Guidelines limits of 70 dBA daytime (07:00am to 19:00pm) and 60 dBA evening time (19:00pm to 23:00pm) at the nearest noise sensitive locations.

Therefore, it is predicted that there would be a low to no significant impact on noise sensitive locations as a result of the WWTP construction phase of the proposed development, due to the predicted noise levels and limited period of time over which the impact would occur.

Treated effluent rising Main Construction Phase Noise Impact

Horizontal directional drilling (HDD) would allow for the set-up of construction equipment as remote as possible from noise sensitive receptors, thereby minimising potential noise impacts. While HDD is the preferred method for the laying of the rising main, this may not be possible at all locations depending on ground conditions and the open-cut excavation method would need to be used.

It is predicted that there would be an impact for a limited period of time on noise sensitive locations as a result of the rising main construction phase of the proposed development.

It is anticipated that the highest noise levels which would be generated during the construction phase of the proposed rising main would be from the excavation of the route.

Noise from the construction of the rising main is predicted to potentially result in noise levels at noise sensitive locations of 81 L_{Ar30} at 5 metres to 69 L_{Ar30} at 20 metres of residences.

With an average background noise level of 45 L_{AF90}, construction activities at the proposed pipeline would be 24 to 36 dBA above the existing background noise level at noise sensitive locations.

Therefore, depending on distance from works, it is predicted that there would be a major to moderate impact to noise sensitive locations as a result of the pipeline construction phase of the proposed development. In the event of using the open-cut method for laying the rising main within 20m of a noise sensitive receptor, construction noise is predicted to fall above the NRA Guidelines limits of 70 dBA daytime and 60 dBA evening time.

As stated above, these noise levels are considered to be a worst case scenario and represent the maximum likely noise from excavation activities. However, such noise generating activities would occur over a short period of time.

It is recommended that guidance on control of noise, as per The National Roads Authority's "*Guidelines for the Treatment of noise and vibration in National Road Schemes*" (2004) and British Standard 5228-1 "*Code of practice for Noise Control on Construction and Open Sites*" be followed during the construction phase.

It is recommended that all construction works be conducted between the hours of 07:00am and 19:00pm Monday to Friday.Any works which, by necessity, are required to be carried out outside of these times should be notified to relevant bodies, i.e. the local council or the EPA, and any potentially effected local residents in good time and prior to specified works commencing.

Where practical and safe to use, it is recommended that temporary noise barriers are erected around anticipated noisy activities, such as excavation, along the pipeline route. Where houses are likely to be occupied during the day, the use of acoustic screens and huts should be considered during high noise generating activities which are expected to occur over extended periods of the work day.

Therefore, it is predicted that there would be a moderate impact on noise sensitive locations as a result of the pipeline construction phase of the proposed development, due to the limited period of time over which the impact would occur and proposed mitigation.

6.9.2 MITIGATION MEASURES

The following mitigation measures are proposed for the construction phase of the proposed project:

- Plant and machinery used on-site would comply with the EC (Construction Plant and Equipment) Permissible Noise Levels Regulations, 1988 (S.I. No. 320 of 1988). All noise producing equipment would comply with S.I. No 632 of 2001 European Communities (Noise Emission by Equipment for Use Outdoors) Regulations 2001

- Cognisance would be taken of the National Roads Authority's "Guidelines for the Treatment of Noise and Vibration in National Road Schemes" and British Standard 5228-1 "Code of practice for Noise Control on Construction and Open Sites";
- All construction activities would take place between 7:00am and 7:00pm, Monday to Saturday. Any works which, by necessity, are required to be carried out outside of these times would notified to relevant bodies (i.e. the local council or the EPA), and any potentially effected local residents in good time and prior to specified works commencing;
- Where practicable, construction works would be phased to maximize the noise screening benefit from boundary structures;
- Where residences are likely to be occupied during the day, the use of acoustic screens and huts would be considered during high noise generating activities which are expected to occur over extended periods of the work day;
- Construction plant would be selected, where possible, with low inherent potential for the generation of noise;
- Regular maintenance would be carried out on all construction equipment, machinery and vehicles;
- Engine and machinery covers would be maintained in good working order and would remain closed whenever machinery is in use;
- Construction plant would be switched off or throttled back to a minimum when not in use;
- Ensure any compressors required would be silenced or of sound reduced models fitted with acoustic enclosures;
- Ensure all pneumatic tools required would be fitted with silencers or mufflers;
- Noisy equipment would be orientated in one direction so that noise would be directed away from noise-sensitive areas;
- Deliveries would be organised to arrive during daytime hours;
- Care would be taken when unloading vehicles to minimise noise disturbance. Materials should be lowered, not dropped, insofar as practicable and safe;
- Construction plant would be operated in accordance with the operator's instructions;
- Where required, screens or barriers would be installed to shield particularly noisy activities;
- It is recommended that considerations with regard to noise be included in a Construction Environmental Management Plan (CEMP) be prepared by the construction firm prior to beginning works, as per the draft CEMP in this report.

6.10 REFERENCES

EN BS 5228-1:2009 "*Code of practice for noise and vibration control on construction and open sites*"

EN BS 4142:2014. *Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas*.

Grant S. Anderson and Ulrich J. Kurze, "*Outdoor Sound Propagation*," Chapter 5 in Noise and Vibration Control Engineering – Principals and Applications, edited by L.L. Beranek and I.L. Vér, (John Wiley & Sons, NY, NY 1992).

ISO 9613-2:1996. *Attenuation of Sound during Propagation Outdoors*.

National Roads Authority, (2004). *Guidelines for the Treatment of Noise and Vibration in National Road Schemes*".

7.0 LANDSCAPE AND VISUAL ENVIRONMENT

7.1 INTRODUCTION

This section of the report provides an assessment of the likely landscape and visual impacts of the proposed development comprising an upgrade and extension to existing Waste Water Treatment facilities and the proposed rising main route for Dawn Meats (Slane) at Beauparc, Navan, Co. Meath.

This assessment involved a detailed review of all plans, sections and elevations of the existing and proposed scheme and various publications and reports, together with a visit to the proposed site and its environs.

7.2 METHODOLOGY

This assessment is made with regard to the vulnerability of the landscape to change and to the location of visual receptors relative to the proposed development. The methodology used in the assessment is based on the EPA's "*Guidelines on the information to be contained in Environmental Impact Statements*, 2002", "*Advice Notes on Current Practice in the preparation of Environmental Impact Statements*, 2003" and draft "*Guidelines on the information to be contained in Environmental Impact Assessment Reports*, 2017".

7.2.1 BASELINE STUDY METHODOLOGY

In order to facilitate the assessment of the proposed development, the visual envelope was determined. The envelope defines the general area within which the development site may be visible, whether completely or slightly due to topography. The visual envelope extends to 0.4 to 0.5km from the site at its furthest point (see **Attachment 7.1**). Beyond the visual envelope, any visual impacts are considered negligible.

Potential viewpoints were established using online mapping sources. These were investigated along with all other potential viewpoints identified during the site survey.

The site survey was carried out on Wednesday 31st May 2017 in clear weather conditions. The visibility assessment concentrated on the publicly accessible areas such as road networks, residential and amenity areas.

Desktop and fieldwork was supported by online mapping tools from Bing, Google and OSI, the Meath County Development Plan 2013-2019 and the Meath Landscape Character Assessment (published with the County Development Plan).

Photographs illustrating views from viewpoints were taken using a Canon EOS 1100D Digital SLR Camera.

7.2.2 LANDSCAPE ASSESSMENT CRITERIA

With regard to landscape assessment, there are two separate but closely related aspects. The first aspect is visual impact, i.e. the extent to which a new structure in the landscape can be seen. Visual impacts may be categorised under "Visual intrusion" and "Visual Obstruction", where:

> **Visual intrusion** is impact on a view without blocking, and
> **Visual obstruction** is impact on a view involving blocking thereof.

In assessing visual impact, various aspects and stages are considered in detail including, impact during phasing, impact on completion and longer term established impact.

The second aspect is **impact on landscape character,** i.e. responses that are felt towards the landscape and drawn on the appearance of the land, including aspect, land-use topography, vegetative cover etc. and their interaction to create specific patterns and landscape units distinctive to particular localities. The character of the existing landscape setting is considered taking account of the various natural and man-made features, such as topography, landform, vegetation, land-use, built environment together with the visibility of and the views to and from the landscape.

The significance criteria used in the assessment are based on the impact levels suggested in the EPA Guidelines on the information to be contained in Environmental Impact Statements (2002) which are set out in this volume of the EIAR.

7.2.3 LANDSCAPE PLANNING

The Meath County Development Plan (CDP) 2013-2019 is the statutory plan detailing the development objectives / policies of the Local Authority responsible for development control at the application site.

The Meath CDP places protection on a number of views and prospects. Objective LC OBJ 5 in **Section 9.10** of the current Meath CDP identifies the following objective: *"To preserve the views and prospects and the amenity of places and features of natural beauty or interest listed in Appendix 12 and shown on Map 9.5.1 from development that would interfere with the character and visual amenity of the landscape."*

The Meath Landscape Character Assessment was published as part of the Meath CDP. The Landscape Character Assessment divides the county into four Landscape Character Types (LCTs), i.e. "*"generic areas of distinctive character"* and further into twenty *"more geographically specific"* Landscape Character Areas (LCAs).

The proposed WWTP extension and the majority of the proposed treated effluent rising main route are located within LCT2 – Lowland Areas, within LCA6 – Central Lowlands. A small section of the rising main is located within LCT3 – River Corridors and Estuaries, within the LCA5 – Boyne Valley.

Figures 7.1 and 7.2 depict the approximate location of the proposed in relation to the Landscape Character Areas.

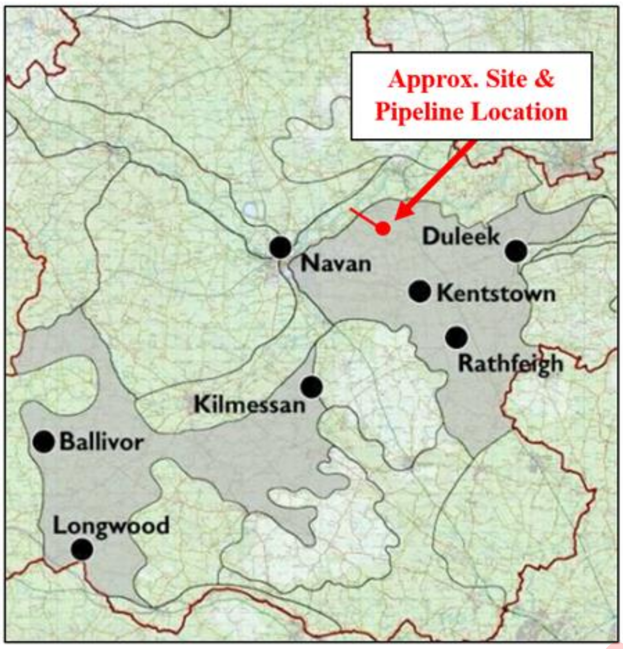

Figure 7.1: Location of Proposed Development within LCA6 – Central Lowlands

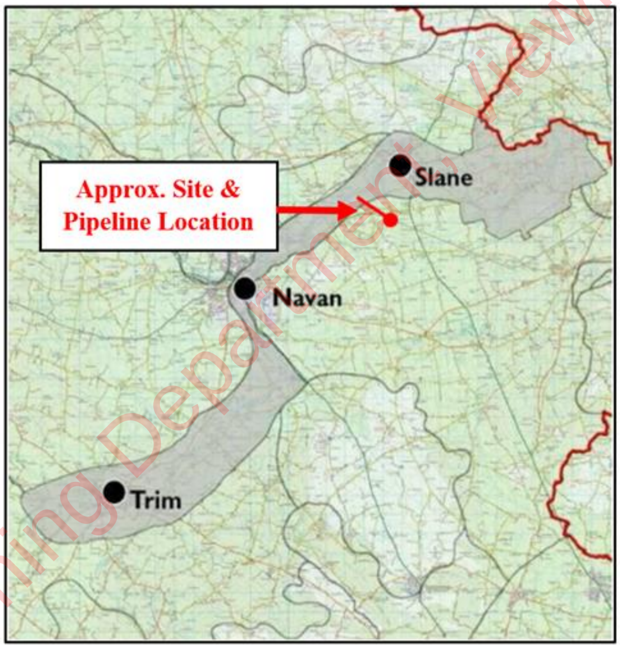

Figure 7.2: Location of Proposed Development within LCA5 – Boyne Valley

LCA6 is classed as being of "High" Landscape Value, i.e. "*Areas which are considered to be of value by virtue of their positive characteristics, sense of place or local associations. These areas may be of regional or local importance*". In the case of this LCA it has been afforded 'Regional' Landscape Importance. This LCA is further classed as being of a "Medium" Landscape Sensitivity, i.e. "*A landscape that can accommodate a certain amount of change without affecting the overall character. There are unlikely to be large numbers of people using or viewing this landscape.*" The recommendations for LCA6 relevant to the proposed development are detailed in **Table 7.1**.

Table 7.1: Recommendations for LCA6 – Central Lowlands

REF. NO.	RECOMMENDATIONS
1	This LCA is in good condition so the existing methods of managing the rural landscape should be maintained.
5	Maintain the visual quality of the landscape by avoiding development that would adversely affect short range views between drumlins.
7	Have regard to the presence of national and European designated ecological sites along the Westmeath border.

The Landscape Character Assessment also includes an appraisal of the potential capacity of each of the LCAs to accommodate a number of *"likely forms of development"*. The following were found to have some relevance to this assessment:

"This LCA is characterized by medium-scale farms so large agricultural buildings would be a change of character. This LCA is also of medium sensitivity and high landscape value. Overall the potential capacity to accommodate such development is medium."

"Medium potential capacity to accommodate underground services as the small scale farmland and variety of land use is not as sensitive to change and is not as archaeologically rich as other areas although the loss of landscape features such as hedgerows would need to be avoided to minimise negative impacts."

Under the Meath County Development Plan 2013-2019, the road passing to the east of the Dawn Meats (Slane) facility is designated as a "protected view or prospect" as detailed in Appendix 12 of the plan;

VIEW	LOCATION	DIRECTION	DESCRIPTION	SIGNIFICANCE
35	County Road between Beaupark and Painestown	North West	View to northwest across settled landscape with settlements and infrastructure (power-line, wind-farm, roads visible). Many large woodland lots.	Regional

As noted above, a small section of the treated effluent rising main is located within LCT3 – River Corridors and Estuaries, within the LCA5 – Boyne Valley. LCA5 is classed as being of "Exceptional" Landscape Value, i.e. *"Areas which are of outstanding value by nature of their dramatic scenic quality, unspoilt beauty, conservation interests, historic, cultural or other associations that influence landscape value. These areas may be of national or international importance."* In the case of the LCA it has been afforded 'International' Landscape Importance.

This LCA is further classed as being of a "High" Landscape Sensitivity, i.e. *"A vulnerable landscape likely to be fragile and susceptible to change. Frequency and sensitivity of users is likely to be high. The introduction of a change is likely to significantly alter the character to the extent that it would be difficult or impossible to restore."* The recommendations for LCA5 relevant to the proposed development are detailed in **Table 7.2**.

Table 7.2: Recommendations for LCA5 – Boyne Valley

REF. NO.	RECOMMENDATIONS
1	Preserve the Boyne Valley as a unique landscape setting for Trim, Slane, Navan and Newgrange, some of the most valuable historic assets in the County.
8	Have regard to the fact that the entire River corridor is designated as an SAC and the stretch between Navan and Drogheda is also an NHA. Development should not conflict with the reasons for which these designations have been made.
9	When siting development have regard to the nature of views within this area: the river valley is narrow and high-sided so views along its length and across to either side are clear and often uninterrupted. Development on the skyline should be avoided unless it is demonstrated to have no adverse visual impacts that cannot be mitigated against.

The Landscape Character Assessment also includes an appraisal of the potential capacity of each of the LCAs to accommodate a number of *"likely forms of development"*. The following were found to have some relevance to this assessment:

"Low potential capacity to accommodate large farm buildings due to the high sensitivity of the landscape and the enclosed nature of this LCA. Any such development would require careful planning considering location, appearance and landscape treatment."

"Low potential capacity to accommodate underground services that would be detrimental to the integrity of existing landscape features due to the high sensitivity of the area."

7.3 EXISTING ENVIRONMENT

7.3.1 CENTRAL LOWLANDS AND BOYNE VALLEY LANDSCAPES

According to the Landscape Character Assessment of County Meath, the proposed development is primarily located within LCA6 – Central Lowlands, with a small section of the proposed treated effluent rising main located within LCA5 – Boyne Valley.

The landscape description of LCA6 includes the following:

"Large lowland landscape area composed of rolling drumlins interspersed with numerous large estates and associated parkland. Thick wooded hedgerows, with some conifer plantations, and shelterbelts of ash and larch, separate medium to large fields. Deep roadside drainage ditches and banked hedgerows are a common feature of the landscape in the enclosed rural road corridors…. The agricultural landscape comprises a series of small farms rather than few large ones. Views within this area are generally limited by the complex topography and mature vegetation except at the tops of drumlins where panoramic views are available particularly of the Hill of Tara uplands and Skryne Church…."

The landscape description of LCA5 includes the following:

"The landscape in the Boyne Valley is characterised by a steep river valley with areas of rolling lowland adjacent to the River Boyne. It runs from Carbury, Co. Kildare,

northeastwards, winding it's way through the landscape to the sea at Drogheda. It is arguably the most significant and highly valued landscapes in the county because it contains the Bru na Boinne World Heritage Site. This LCA also includes the heritage towns of Trim and Slane…The lowlands have an undulating landform with areas of wetland associated with the River Boyne, particularly surrounding the flat river plain in the narrow valley adjacent to Slane. The valley is steeply sided with large rolling hills providing good vantage points and views across the valley. Pasture farmland is predominant in the rolling lowland with areas of poorly drained marshland adjacent to the River Boyne."

7.3.2 LANDSCAPE SETTING OF THE PROPOSED SITE

The existing development is located within a rural agricultural landscape, dominated by pasture fields of varying sizes, bordered by hedgerows. Arable fields and small wooded areas can also be found scattered around the landscape.

The topography surrounding the site is gently undulating between low points of around 60m AOD and a number of local highpoints of over 100m AOD. The Dawn Meats (Slane) facility is located between 90-100m AOD on the southern slopes of one such highpoint, reaching 115m AOD, less than 500m to the north of the site. To the north/northwest of this highpoint and within 3km of the application site, levels fall to under 30m AOD along the River Boyne.

The N2-National Road passes the site approximately 1.5km to the east, the R153 Regional Road approximately 4km to the south and the N51 National Secondary Road approximately 4km to the northwest. A fairly dense network of local roads surrounds the Dawn Meats (Slane) facility, connecting national and regional roads. Extensive roadside residential development has taken place along all of these roads. A number of large farmsteads, as well as some industrial developments are also located within the study area.

The existing Dawn Meats (Slane) facility comprises a factory, office buildings, hard standing yard, access road, car parking area, a property, existing wastewater treatment plant and two fields. The proposed rising main route traverses areas of improved grassland, arable crop fields, areas of wet grassland, grassy verges and some hedgerows, treelines and drainage ditches. The undulating rural agricultural landscape immediately surrounding the proposed development is attractive, due to its lush tree / vegetation cover. However, it is not classified within the areas of high scenic quality as other parts of County Meath, such as the Hill of Slane, approximately 5km to the north, or Newgrange, approximately 5km to the northeast.

Due to the undulating topography as well as mature vegetation throughout the study area, the landscape is enclosed somewhat, resulting in an overall medium scale. There are however a number of elevated locations where distant views open up and the scale of the landscape increases.

The undulating topography and abundant mature vegetation provides good screening potential for low rise development, such as agri-commercial buildings, provided they are similar in scale to the agricultural buildings / sheds which are typical within this landscape.

7.3.3 "DO-NOTHING" SCENARIO

Should the proposed development not proceed, the existing use of the Dawn Meats (Slane) site as disturbed and recolonising bare ground and the existing agricultural use of the proposed rising main route, and landscape would remain unaltered. There would be no impact to the visual amenity of the area.

7.3.4 "DO-SOMETHING" SCENARIO

Should the proposed development proceed, the landscape would be altered with the permanent inclusion of the WWTP extension.

As the planned future rising main would be located underground, with only inspection chambers visible above ground, no significant alteration to the landscape would be anticipated.

The riparian area of the River Boyne in the region of the rising main outfall would be altered with the permanent inclusion of a landscaped stone structure.

7.4 CHARACTERISTICS OF THE PROPOSAL

Dawn Meats (Slane) are proposing to extend their existing on-site effluent treatment system to provide for additional treatment to a quality sufficient for discharge to the River Boyne. The discharge of treated effluent to the River Boyne would necessitate the construction of a rising main from the Dawn Meats (Slane) facility to the River Boyne at Ardmulchan, Co. Meath.

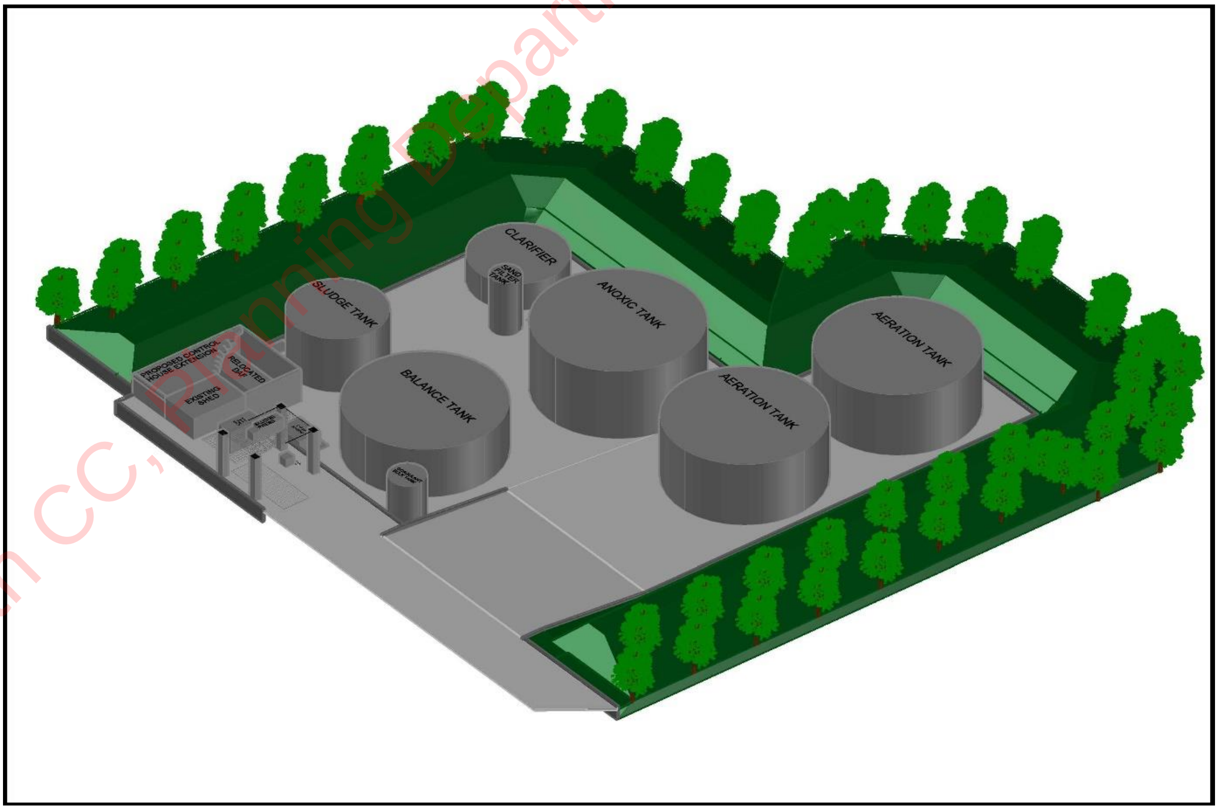

Figure 7.3: Proposed Effluent Treatment Plant Compound

The proposed development would consist of the construction of an extended effluent treatment compound on infilled ground, in an area which has been reinstated from a previous use as integrated constructed wetlands. The main proposed compound area would be recessed below the existing reinstated ground level by one metre in order to provide for adequate ground stability. The footprint of the development, including noise and visual screening earth berms, would be 3,605 M^2. The concrete and built ground area would have a footprint of 1,557 M^2.

The development would include six treatment tanks, the tallest of which would be the anoxic tank at 6.34m (5.34m OEL) (Over Existing Ground Level). The tanks would be constructed of glass-lined steel, with the exterior of the tanks typically of a dark brown or dark green colour. A landscaped earth berm would also be constructed at approximately 2.0m OEL surrounding the eastern, northern and western boundaries of the proposed compound area.

The earth berm area would be landscaped with a mixture of non-native and native species such as European Hornbeam (*Carpinus betulus*), Common Alder (*Alnus glutinosa*), Mountain Ash (*Sorbus aucuparia*), Silver Birch (*Betula pendula*), Hawthorn (*Crataegus monogyna*), Common Hazel (*Corylus avellana*), Wild Cherry (*Prunus avium*) and Guelder Rose (*Viburnum opulus*).

The proposed development would also include an underground treated effluent rising main to convey the treated effluent from the proposed WWTP to a discharge point on the River Boyne. The proposed rising main would be approximately 7.2 km in length, commencing at the existing Dawn Meats (Slane) site at Painestown, Beauparc, and passing through the townlands of Seneschalstown, Dollardstown, Hayestown-Carryduff Little and Ardmulchan, prior to reaching the River Boyne.

The proposed treated effluent rising main would have a 150mm diameter (nominal bore) and would be laid at a depth of approximately 900mm below the existing ground levels for the entirety of its length.

While the proposed treated effluent rising main would cross approximately 45 metres of agricultural land beside the River Boyne, the majority of the rising main route would be lain along the verge of public roads, bordered by ditches, hedgerows and some areas of stone walls, with the final 400m bordering woodland. Proposed rising main works would also entail the crossing of culverted ditches and Dollardstown Stream at different locations along its length.

The outfall for the discharge of the 150mm diameter pipeline into the river would consist of natural stone revetment constructed along the bank of the river on either side of the discharge point. The revetment would be approximately 4.0m in length and would be formed using large stones that would be placed in position to minimize erosion around the new discharge point. The bankside would be reinstated with existing soils to the level of the natural stone revetment. The new pipeline would be located at a level below the low drought level within the river.

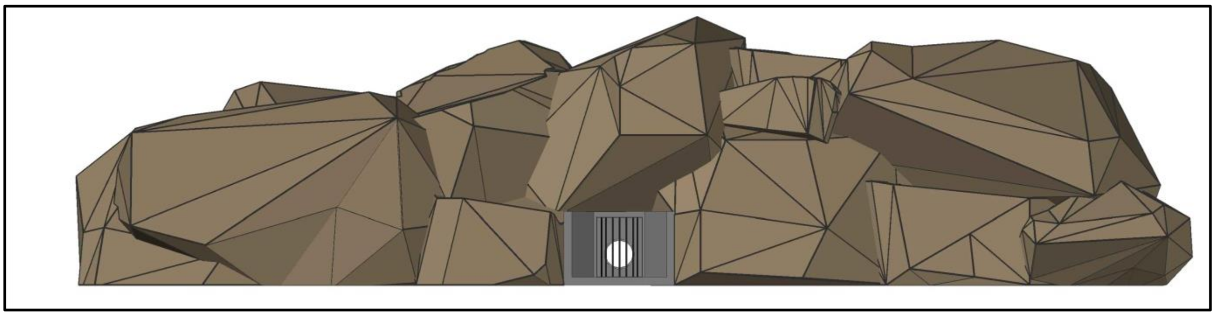

Figure 7.4: Potential Future Outfall Natural Stone Revetment

7.5 IMPACTS

7.5.1 IMPACT ASSESSMENT

The assessment of potential visual amenity impacts involved examining the locations of domestic dwellings, views from public roads and the location of the proposed development, as shown in **Attachment 7.1**. In assessing the impact, potential impacts associated with both the construction and operational phases were considered.

7.5.2 CONSTRUCTION PHASE

The construction phase would have a relatively low landscape and visual impact. Aspects which pertain to the construction phase proper include:

(i) General site works;
(ii) Excavation of stockpile, of topsoil and subsoil;
(iii) Construction of the WWTP compound concrete base;
(iv) Installing of permaglass tanks;
(v) Construction of the surrounding earth berm;

A pipeline development would include;

(vi) Instatement of the temporary construction compound;
(vii) Excavation and laying of the rising main including reinstatement of soils and
(viii) Construction of the rising main outfall natural stone revetment.

By its nature, these works would take place at a relatively low level.

There would be a moderate and temporary visual impact from construction works at visible locations from the adjacent public roads and dwellings immediately in the vicinity of the proposed works. This impact would be predominantly construction vehicles and plant, such as excavators and delivery vehicles, and structures as they are erected.

The undulating landscape, along with the existing hedgerows too, would screen construction works in all other areas and ensure no associated significant visual impact is observable. It is anticipated that the visual impact of the construction phase in all other areas would be insignificant due to intervening topography and treelines.

7.5.3 OPERATIONAL PHASE

Undulating topography, as represented in much of the surrounding landscape, has the ability to both shelter and absorb the visual impact of developments. Firstly, the physical shielding of a built form within the lee of hill where it does not break the skyline renders it visually unobtrusive and reflective of landscape scale. Secondly, the dynamic and complex nature of undulating country provides fore, middle, and distant ground to a vista that helps to provide a realistic scale and visual containment not available in open country.

As mentioned, the topography of the landscape in the immediate vicinity of the proposed site is characterised by "*undulating topography as well as mature vegetation throughout",* which serve to screen the proposed development from the majority of surrounding residences and public roads. In addition, the majority of the surrounding hedgerows are well-established, are high and are thick, providing good screening.

VP1 – Local Road to the West-South-West of the proposed Site

Vantage points VP1a and VP1b are located along a 300m length of the Windmill Road leading up to the site entrance from the south. Four residences are located in this area. At present, these locations are afforded views of the existing Dawn Meats (Slane) facility set within a densely hedgerow/treelined pastoral agricultural landscape.

Plate 7.1: VP1a – (Local Road to West-South-West of Site) (31/05/2017)

These locations provide the most unobstructed views of the proposed WWTP compound development from any public or third party area. As can be seen in **Plate 7.1 and 7.2**, the proposed treatment plant compound would be seen just above the height of the roadside hedge and would be clearly visible from the fenced entranceway to the facility. In 2016, the boundary hedgerow leading up to the site entrance was removed and replaced with the current fencing, as pictured below.

While the development would somewhat break the skyline from these positions, the apparent heights of the proposed structures are similar to that of the existing buildings. The proposed development would form a single visual element, blending with the industrial aesthetic of the existing facility. The proposed earth berm would screen parts of the profile of the proposed effluent tanks and would mitigate the visual impact of the development, particularly as landscape planting on the berm becomes established.

Following completion of the development, it is anticipated that the site would result in a moderate to major short-term visual impact and landscape character impact from these locations, prior to the establishment of proposed semi-mature plantings.

It is recommended to agree suitable material finishes with the planning authority prior to construction. The use of dark coloured and non-reflective building materials would mitigate the site as a focus of attention.

Following establishment of boundary planting the long-term visual impact from the development is anticipated to be slight.

Plate 7.2: VP1b – (Local Road to West of Site) (31/05/2017)

VP2 – Local Road to the West of the proposed Site

Vantage points VP2a and VP2b are located along the incline of the hill on the Windmill Road to the west and north-west of the proposed site. Two residences are located in this area. At present, this section of road is afforded limited views in the direction of the development of pastoral land through dense hedgerow/treeline.

Plate 7.3: VP2a – (Local Road to West of Site) (31/05/2017)

At VP2a, the intervening topography between the proposed development and the public roads and residences along this section of road raises and provides the majority of the screening from view. As can be seen in **plate 7.3** above, the tops of the tallest tanks are just visible above the middle horizon of the adjacent hill, however, hedgerow/treelines in the background mitigate the visibility of the structures.

However, travelling up the hill from VP2a, the road approaches the same ground level as the proposed effluent plant compound and more of the profile of the proposed treatment plant would be visible above the medium horizon. However, this section of the public road is bordered by dense hedgerow/treeline, and the proposed development would only be visible intermittently through small gaps in the vegetation and the field entrance gate at VP2b.

As the proposed development is well screened by the existing topography and roadside hedgerow, it is considered that there would be a slight to no significant visual impact as a result of the proposed development at these locations.

In order to ensure that any potential for visual impact is minimised, it is recommended that vegetation growth is promoted on the proposed earth berm and that suitable material finishes are agreed with the planning authority prior to construction. The use of dark coloured and non-reflective building materials would mitigate the site as a focus of attention.

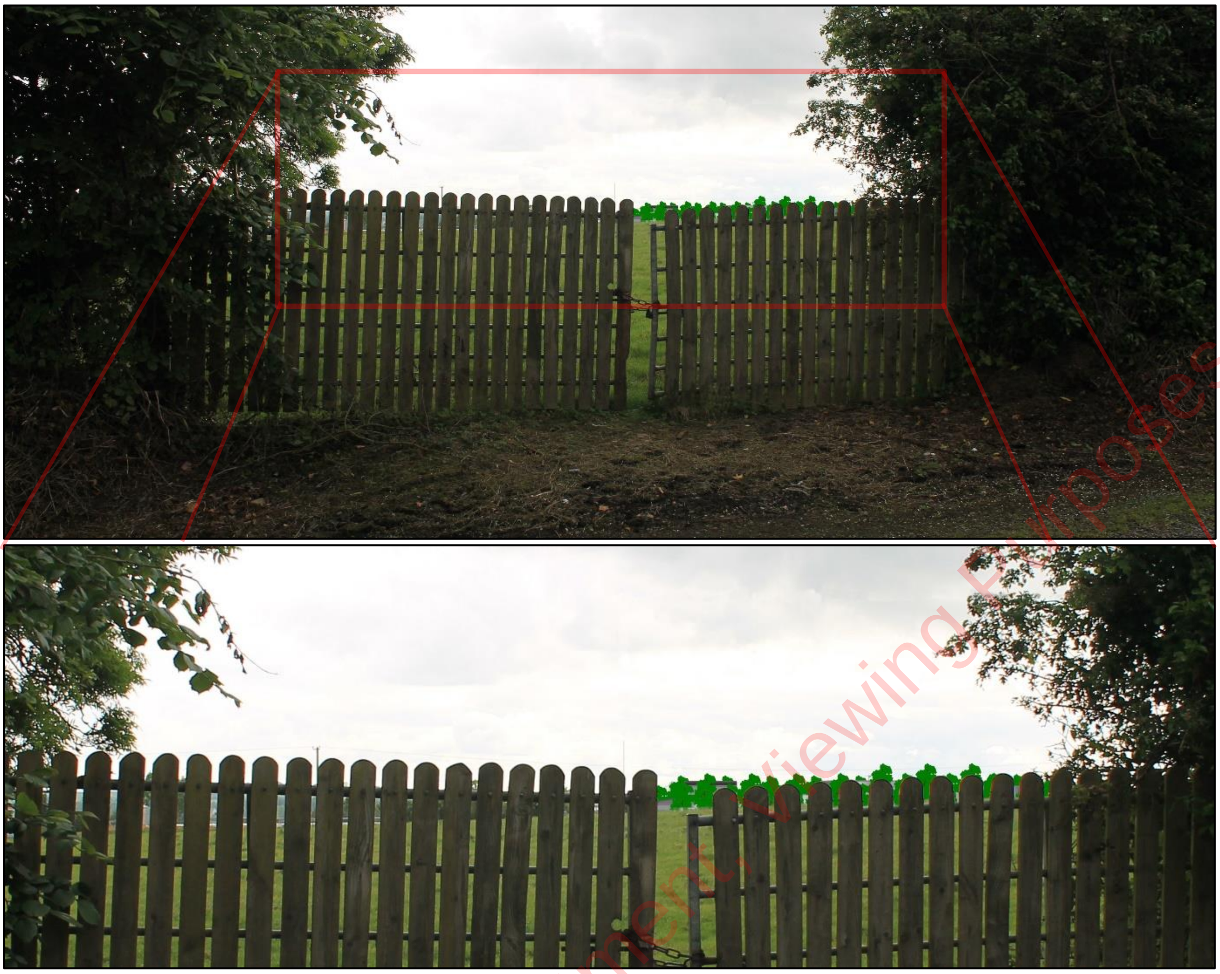

Plate 7.4: VP2b – (Local Road to West of Site) (31/05/2017)

VP3 – Other Local Roads Surrounding the Site

The proposed effluent compound development would not be visible at any other public road or residence in the vicinity.

The site is located in the lee of a shallow hill which blocks the proposed development from view at locations to the north.

To the south-west, south and south-east the site is blocked from view by the main Dawn Meats facility building, which is itself screened by the dense hedgerow/tree-lined nature of the area, as can be seen in **plate 7.5** below.

Following completion of the development, these views would be unaltered from their existing character. Therefore, there would be no impact upon visual amenity at these locations.

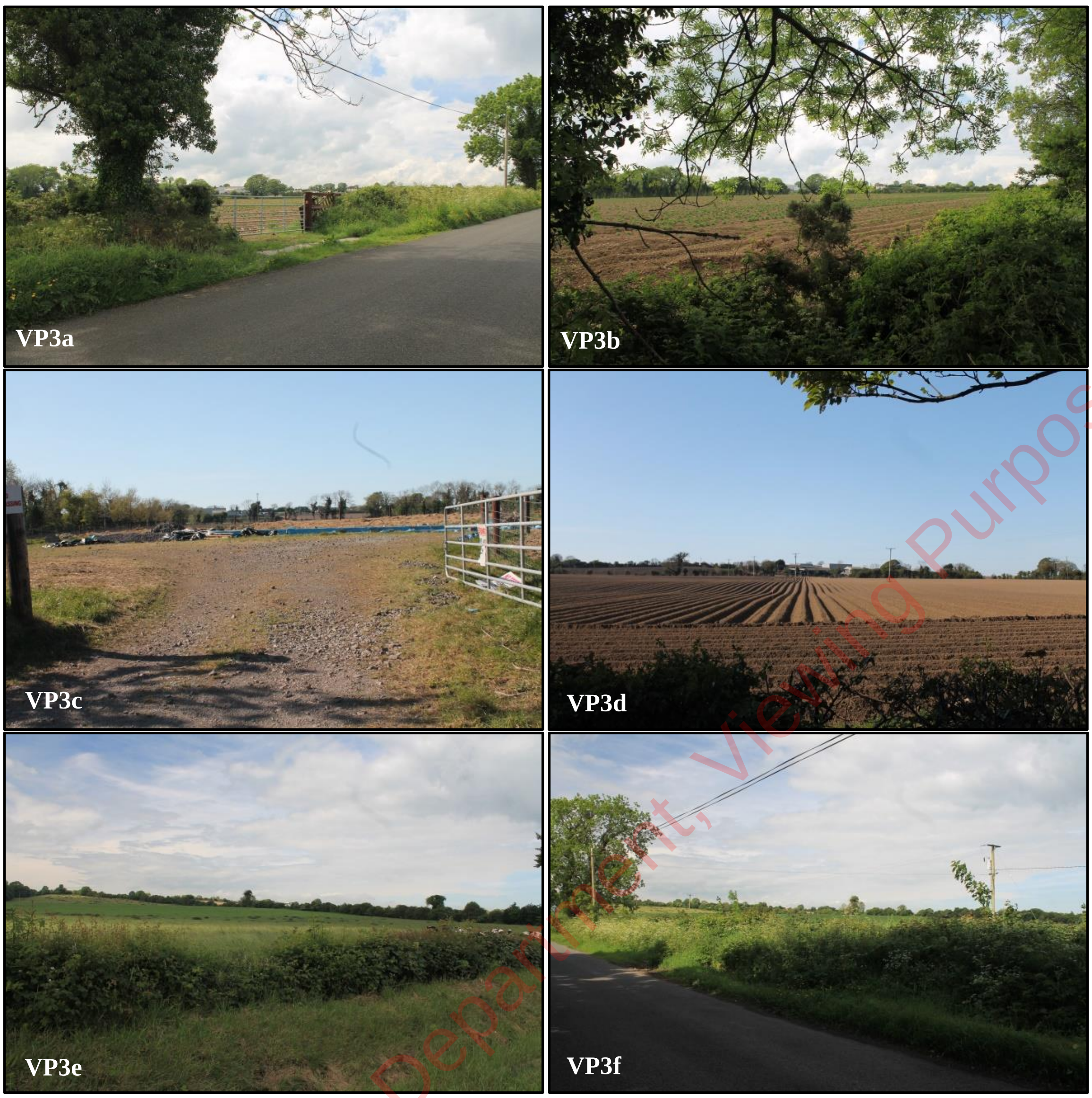

Plate 7.5: VP3a-d – (Other Local Roads surrounding the Site) (31/05/2017)

7.5.4 RISING MAIN AND OUTFALL

As the footprint of a pipeline is narrow along its route, it is anticipated that this would cause minor to no-significant visual impact. The majority of the route is likely to be in agricultural fields and distant from areas of public views. The ground would be excavated and some limited sections of hedgerow may be removed as the rising main crosses these locations. These areas would be reinstated with the original excavated soil and would be allowed to recolonize with local vegetation. Therefore, there would be anticipated to be a temporary and slight visual impact from the laying of a pipeline.

The only long-term visible section of a rising main would be at the outfall to the River Boyne. A candidate discharge site (292415E, 271415N) near the confluence of the Dollardstown tributary and the River Boyne has been selected for the purposes of this assessment.

VP4 – Front Views of Natural Stone Revetment

At present, the candidate outfall location is the riparian edge of a meadow, common to the area. The bank of the river is characterised by a mixture of grassland species, such as thistle and dock, and wetland species, such as yellow iris.

Plate 7.6: VP4 – (Front views of Natural Stone Revetment) (31/05/2017)

Following development, the bank would be altered with the inclusion of c. 4m long natural stone revetment as can be seen in **Plate 7.6** above. The stone would be incorporated into the bank and, once vegetation has become established, the stone would visually merge with the existing bankside.

The rising main pipe and concrete housing would be constructed so as to fall below the low water level on the River Boyne and would not be visable above the water surface.

The revetment would be most visable from within the river channel and the far bank, however, due to the small extent of the structure and the use of natural stone, it is considered that the visual impact would be slight.

VP5 – Views of Natural Stone Revetment along the Riparian Zone

The riparian area of the River Boyne in this section is characterised by vegetated meadows with sporadic trees and bushes and by riparian woodland downstream of the candidate outfall. This results in a significant limitation of the length of the rivers' edge from which the proposed natural stone revetment can be viewed.

As can be seen in **Plate 7.7 and 7.8**, vegetation and the undulating nature of the bank edge would act to the shield the majority of the revetment from view.

Therefore, due to the limited views of the proposed natural stone revetment along the riparian zone, it is considered that there would be no significant visual impact from the potential future development of a rising main outfall in this area.

Plate 7.7: VP5a – (View from downstream on the River Boyne) (31/05/2017)

Plate 7.8: VP5b – (View from upstream on the River Boyne) (31/05/2017)

VP6&VP7 – Views of Natural Stone Revetment from the Local Road

The Local Road is set back approximately 40m from the bank of the River Boyne at the proposed discharge location. The local road is also approximately 4m higher than the ground level at the edge of the River Boyne.

Plate 7.9: VP6 – (View from local road) (31/05/2017)

As can be seen in **Plate 7.10** below, views of the revetment from the local road would be limited by vegetation on the roadside and within the field itself. Any views of the revetment would be likely to be intermittent along roads and at a low level.

At those locations where the revetment would be visible, the natural stone construction would constitute a very small portion of the view as the majority of the structure would be shielded by the river bank, as can be seen in **Plate 7.9** above.

As growth becomes established around and on top of the revetment, it would be likely to form an indistinguishable part of riparian meadow landscape at viewpoints along local roads.

Plate 7.10: VP7 – (Other Views from Local Roads) (31/05/2017*)*

General Discussion

Additional landscape character zones and views were considered and reviewed with the result that there was a similar view or a lesser impact than the vantage points listed above, or the site was imperceptible. The other locations included a range of residences and public roads surrounding the proposed development site.

Though the development would remain as a permanent feature, the impact of the proposed development on the visual amenity of the surrounding landscape in the longer term is considered to be slight. This is due to the existing facility at this location, the surrounding dense hedgerows, proposed landscaped visual screening, the topography of the site and surrounding area and the setback distance from the majority of private residences.

Mitigation measures proposed in **Section 7.6** would further reduce the visual impact of the proposed development.

7.5.5 LANDSCAPE PLANNING IMPACT

The following table assesses the proposed development in relation to visual amenity planning policies, objectives and recommendations of the Meath County development Plan 2013 – 2019 and the Landscape Character Assessment of County Meath (Appendix 07 of the CDP).

Table 7.3: Visual Amenity Planning Policies, Objectives and Recommendations

POLICY / OBJECTIVE REF	POLICY / OBJECTIVE / RECOMMENDATION	COMPLIANCE ASSESSMENT
LC POL 1	To support and implement the provisions of the National Landscape Strategy.	N/A
LC SP 1	To protect the landscape character, quality, and local distinctiveness of County Meath in accordance with relevant government policy and guidelines and the recommendations included in Meath Landscape Character Assessment (2007) in Appendix 7.	This landscape and visual impact assessment has been completed in compliance with relevant government policy and guidelines and the recommendations included in Meath Landscape Character Assessment (2007) in Appendix 7.
LC POL 2	To require that any necessary assessments, including landscape and visual impact assessments, are provided when undertaking, authorising, or approving development.	Fulfilled by this EIAR.

POLICY / OBJECTIVE REF	POLICY / OBJECTIVE / RECOMMENDATION	COMPLIANCE ASSESSMENT
LC OBJ 1	To seek to ensure the preservation of the uniqueness of all landscape character types, and to maintain the visual integrity of areas of exceptional value and high sensitivity.	LCA5 – Boyne Valley; LCA5 is classed as being of "Exceptional" Landscape Value and "High" Landscape Sensitivity. As described above, future planned development within this area would consist of an underground pipeline with no significant visual impact. A natural stone revetment outfall to the River Boyne would be low in profile and assimilated with the existing character of the area as growth around the stone develops. LCA6 – Central Lowlands; LCA6 is classed as being of "High" Landscape Value and "Medium" Landscape Sensitivity. Where visible, the proposed main treatment compound would form a homogeneous part of the existing facility. The available views to the proposed development are short range, therefore, the anticipated slight visual impacts would be very local.
LC OBJ 2	To assess development proposals having regard to the recommendations contained in the Meath Landscape Character Assessment 2007.	Outlined below
LC OBJ 3	To work in partnership with key stakeholders to promote County Meath as a centre for cultural heritage education and learning.	N/A
LC OBJ 4	To complete the pilot study on Historic Landscape Characterisation and utilise the results to complement and contribute to Landscape Character Assessment (LCA).	N/A

Policy / Objective Ref	**Policy / Objective / Recommendation**	**Compliance Assessment**
LC OBJ 5	To preserve the views and prospects and the amenity of places and features of natural beauty or interest listed in Appendix 12 and shown on Map 9.5.1 from development that would interfere with the character and visual amenity of the landscape.	Outstanding view No. 35 "*County Road between Beaupark and Painestown*" is located to the east of the proposed site. This protected view relates to views from this road to the north-west across settled landscape. Due to the presence of a hill to the north of the proposed site, there are no unimpeded views to the north-west along the section of road leading up to the proposed site. It is therefore considered that this protected view relates to locations on the northern side of this hill and further along the road towards Beaupark. Therefore, it is considered that the proposed development would not impinge upon this protected view.
LC POL 3	To protect the archaeological heritage, rural character, setting and amenity of the Tara landscape and Loughcrew and Slieve na Calliagh Hills.	N/A
LC OBJ 6	To progress the designation, in a timely fashion, of a Landscape Conservation Area, pursuant to Section 204 of the Planning & Development Acts, 2000 - 2012, for the Tara Skryne Landscape.	N/A
LC OBJ 7	To explore, over the life of the plan, the designation of a Landscape Conservation Area, pursuant to Section 204 of the Planning & Development Acts, 2000 - 2012, in respect of Loughcrew and Slieve na Calliagh Hills.	N/A
LC OBJ 8	To develop and support the implementation of an agreed and innovative Landscape Action Plan for the Tara Skryne Landscape.	N/A

POLICY / OBJECTIVE REF	POLICY / OBJECTIVE / RECOMMENDATION	COMPLIANCE ASSESSMENT
LC OBJ 9	To work in partnership with the Consultative Group on the day-to-day management of the Hill of Tara and to prepare a Conservation Plan for the State Owned Lands at the Hill of Tara.	N/A
Meath CDP Appendix 07 - Landscape Character Assessment		
LCA5 - 1	Preserve the Boyne Valley as a unique landscape setting for Trim, Slane, Navan and Newgrange, some of the most valuable historic assets in the County.	As discussed further above, it is not considered that a rising main route and outfall would significantly impact upon the landscape character of the River Boyne Valley.
LCA5 – 2	Maintain the viability of small scale farming which is complimentary to the landscape character and critical to maintaining the condition of features such as hedgerows, hedgerow trees and woodlands	It is considered that the proposed development would have no significant negative impacts upon the viability of small-scale farming. The proposed development would have no significant impacts upon hedgerows.
LCA5 – 3	Produce design guidelines to provide information on suitable land uses and types of development including scales, layouts, locations, materials.	N/A
LCA5 – 4	Produce design guidelines to aid the development of new visitor facilities and the enhancement of existing ones including parking areas, signage/ interpretation methods, methods of interpretation, toilets and picnic areas.	N/A
LCA5 – 5	Improve public access to the river and historic features in a sensitive manner through the creation of way marked trails and driving routes. Interpret and communicate the full range of attractions in this area to relieve visitor pressures on key sites during peak periods.	N/A

POLICY / OBJECTIVE REF	**POLICY / OBJECTIVE / RECOMMENDATION**	**COMPLIANCE ASSESSMENT**
LCA5 - 6	Enhance the appearance of urban fringe areas through planting of trees and hedgerows and maximise the potential for amenity areas adjacent to population centres to provide buffer zones between urban and rural areas.	N/A
LCA5 – 7	Respect the unique scale and character of historic settlements which are still very much intact in terms of historic character. The production of guidelines that are unique to each settlement would ensure that development is properly integrated.	An archaeological heritage impact assessment has been carried out as part of this EIAR, **Section 14.0**. Mitigation measures have been proposed to ensure that there would be no significant impacts upon archaeological heritage as a result of the proposed development.
LCA5 – 8	Have regard to the fact that the entire River corridor is designated as an SAC and the stretch between Navan and Drogheda is also an NHA. Development should not conflict with the reasons for which these designations have been made.	An Appropriate Assessment Screening / Natura Impact Statement has been prepared as part of this EIAR, **Attachment 8.1**. It has been concluded that there would be no significant impacts upon the qualifying interests of the River Boyne and River Blackwater SAC as a result of the proposed development.
LCA5 – 9	When siting development have regard to the nature of views; within this area the river valley is narrow and high sided so views along its length and across to either side are clear and often uninterrupted. Development on the skyline should be avoided unless it is demonstrated to have no adverse visual impacts that cannot be mitigated against.	The nature of views to a natural stone revetment outfall on the River Boyne has been addressed in **Section 7.5.4** above. There would be no development on the skyline within the Boyne River Valley.
LCA6 - 1	This LCA is in good condition so the existing methods of managing the rural landscape should be maintained.	The proposed development is considered to be consistent with existing and emerging development in the area due to the presence of the existing Dawn Meats (Slane) facility.

POLICY / OBJECTIVE REF	POLICY / OBJECTIVE / RECOMMENDATION	COMPLIANCE ASSESSMENT
LCA6 – 2	The settlements of Longwood, Kildalkey and Kinnegad have potential to be developed as venues for events such as regular farmers markets to increase links between urban and rural areas and sustain a viable rural economy.	N/A
LCA6 – 3	Future expansion of settlements should take place in accordance with design guidelines to inform layout, scale, detailing, use of materials and location. Also to ensure that the existing strong interfaces between urban and rural areas are maintained.	N/A
LCA6 – 4	Promote links to the Royal Canal in adjacent area (LCA 14) and interpretation of historic nature of this LCA including 18th Century estate landscapes, buried archaeology and historic towns.	N/A
LCA6 – 5	Maintain the visual quality of the landscape by avoiding development that would adversely affect short range views between drumlins.	All views of the proposed main effluent treatment compound are short range due to topography and dense hedgerows in the area. It is considered that there would be no significant change to the existing short-range views of the site as the proposed effluent plant would be similar in character to the existing facility and would be shielded / framed by existing structures.
LCA6 - 6	Have particular regard to the retention of high quality landscapes on the tops of drumlins which are intervisible with the Hills of Tara and Skryne in LCA 12.	N/A
LCA6 – 7	Have regard to the presence of national and European designated ecological sites along the Westmeath border.	N/A

The proposed development is not anticipated to impact upon any vulnerable feature or area, scenic route, protected view or prominent ridgeline. The proposed site would not be visually prominent from the majority of public locations in the surrounding area. Therefore, it is considered that the proposed development would have no significant landscape planning impacts.

7.5.6 LANDSCAPE AND VISUAL IMPACT SUMMARY

Given the nature, location and design features of the proposed site, it is considered that the proposed development would result in no significant landscape and visual impact.

The proposed main effluent treatment plant compound would only be visible along a short section of the Windmill Road, and would not constitute a significant feature of the wider landscape. Where the structures would be visible, the proposed structures would be framed to the left and right by existing structures at the site and the structures would not exceed the height of the existing structures from these perspectives. Along the section of the Windmill Road leading from the site entrance to the summit of the hill, the proposed compound would be screened by the intervening topography and the roadside hedgerow.

The pipeline route would be underground and would not be visible. Horizontal directional drilling (HDD) is the preferred method for laying of the pipeline and would result in minimal disturbance of the ground surface at the entrance and exit points of the bore. Where open cut methods are required due to ground conditions, existing ground or road surface would be reinstated in compliance with Meath Co. Co. requirements. Stone walls, hedgerows and trees along the route would be avoided in so far as is possible.

A natural stone revetment outfall would be small in scale and the rising main outlet would be constructed below the low flow level of the River Boyne, and therefore would have no visual impact. Following re-establishment of vegetation on the bank surrounding the structure, it is considered that the revetment would effectively blend with the character of the riparian zone.

The proposed development is considered to be in keeping with, and would not negatively impact upon, the landscape planning policies, objectives and recommendations outlined in the Meath county development Plan 2013-2019.

As a result, it is considered that the proposal may be viewed as having an acceptable level of landscape and visual impact.

7.6 MITIGATION MEASURES

In order to minimise the visibility of the proposed development, it is recommended that;

- Suitable material finishes for the effluent treatment tanks are agreed with the planning authority prior to construction. The use of dark coloured and non-reflective building materials would mitigate the site as a focus of attention.

- Planting of screening shrubs and trees around the main effluent compound should be of native hedge and tree species. This would increase the ecological value of the site by providing wildlife corridors and shelter for fauna. Native tree species may include species such as ash, alder, and willow. The shrub layer may include species such as blackthorn, hawthorn and holly.

7.7 RESIDUAL IMPACTS

The completed development, on its own or in combination with other developments, would result in no significant residual impact to the visual amenity of the landscape. The proposed structures would be anticipated to effectively blend with the existing character of the area.

7.8 REFERENCES

Environmental Protection Agency (2017) Draft. *Guidelines on the information to be contained in Environmental Impact Assessment Reports*.

Environmental Protection Agency (2003). *Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements).*

Environmental Protection Agency (2002). *Guidelines on the information to be contained in an Environmental Impact Statement*.

Meath County Council (2016) *Meath County Development Plan 2013 – 2019.* Consolidated version, Available at: https://countydevelopmentplan.meath.ie/

SECTION B - THE NATURAL ENVIRONMENT

This Section of the Environmental Impact Assessment Report deals with the potential effects of the proposed development on the natural environment. The effects have been grouped as follows:

Impacts on Biodiversity – Terrestrial Environment
Impacts on Biodiversity – Aquatic Environment
Impacts on Land – Soils, Geology and Hydrogeology
Impacts on Climate

The various aspects of the natural environment interact to some degree with each other so that assessing one aspect in isolation can be misleading. For example, the survival of terrestrial fauna can be dependent on floral composition, which is in turn dependent on soil composition and groundwater levels. Similarly, the diversity of aquatic flora and fauna would be impacted by both hydrology and the quality of waters receiving drainage from the proposed scheme.

Human Beings also interact with the natural environment, often by altering land-use and landscape patterns for the purpose of agriculture and settlement.

8.0 BIODIVERSITY – TERRESTRIAL ENVIRONMENT

8.1 INTRODUCTION

This section outlines the biodiversity currently present in the area of the proposed development and assesses the impact of the proposal on terrestrial habitats and species identified. This section should be read in conjunction with the site layout plans for the proposed development and project description sections of the EIAR. Mitigation measures have been proposed where feasible.

The ecological assessment involved a desktop review and the undertaking of field assessments of the site to identify habitats and species of flora and fauna present in order to determine the ecological diversity of this area. A Natura Impact Statement has also been prepared as part of the application and is included as **Attachment 8.1**.

The objectives of the ecological assessment were as follows:

- To undertake a comprehensive desktop review to identify Natura 2000 sites within the vicinity of the proposed development and to determine previously recorded fauna for the area;
- To undertake a field assessment of the proposed development site and surroundings;
- To evaluate the biodiversity value of the proposed development and surroundings;
- To determine and assess the potential impacts of the proposed development on terrestrial biodiversity;
- To propose mitigation measures for both the construction and operational phases of the development to reduce potential impacts upon terrestrial biodiversity.

8.1.1 PLANNING POLICIES

This section outlines the relevant planning policies relevant to biodiversity and the proposed development.

National Policies

A number of documents have been published in relation to the Government's commitment to sustainable development, including the National Spatial Strategy 2002-2020 and the Sustainable Development: A Strategy for Ireland 1997.

Regional Policies

The Regional Planning Guidelines (RPGs) for the Greater Dublin Area 2010-2022, which includes the counties of Meath, Kildare and Wicklow, outlines the long-term spatial planning strategy for the area. As part of the guidelines, a number of policies relating to biodiversity were outlined, with those relevant to the proposed development outlined in **Table 8.1** below.

Table 8.1: Regional Policies Relevant to Biodiversity and the Proposed Development

STRATEGIC POLICY REFERENCE	POLICY
GIP2 – Natural Heritage	To protect and conserve the natural environment, in particular nationally important and EU designated sites such as SPA, candidate SAC and proposed NHAs, protected habitats and species, and habitats and species of local biodiversity value. This policy also includes new or extended ecological sites that are notified or designated in the lifetime of the RPGs. Appropriate measures to protect Natura 2000 sites should be identified at the initial stages of all planning processes and included as a material consideration in order to inform future development.
GIP3 – River Basins	To ensure alignment between the core objectives of the Water Framework Directive, (including River Basin Management Plans and Programmes of Measures affecting the Greater Dublin Area) and other related plans such as County Development Plans and related Local Area Plans; Habitat and Species Protection Plans under the Habitats Directive, Water Services Investment Programme, Nitrates Action Programme; and Flood Management Plans.
GIP6 – Green Infrastructure	To ensure the protection, enhancement and maintenance of the natural environment and recognize the health benefits as well as the economic, social, environmental and physical value of green spaces through the development of an integration of Green Infrastructure (GI) planning and development in the planning process.

Local Policies

Local planning policies are detailed in the Meath County Development Plan, 2013-2019. Policies relevant to biodiversity and the proposed development are outlined in **Table 8.2**.

Table 8.2: Local Policies Relevant to Biodiversity and the Proposed Development

POLICY REFERENCE	POLICY
CSA SP 1	To ensure that the unique cultural heritage of Meath is protected, conserved and sensitively integrated into the sustainable development of the county for the benefit of present and future generations.
CSA SP 2	To ensure that features of Meath's natural heritage and green infrastructure that provide ecosystem services are protected; that biodiversity is conserved and where possible enhanced, and; that the character of landscapes are maintained and enriched, and that tourist and recreational uses are facilitated in a sensitive manner.
NH POL 1	To protect, conserve, and seek to enhance the County's biodiversity
NH POL 2	To promote measures to protect biodiversity in the development management process by creating / improving habitats, where possible.
NH POL 3	To raise public awareness and understanding of the county's natural heritage and biodiversity.
NH POL 4	To promote increased public participation in biodiversity conservation by supporting and encouraging community-led initiatives.

POLICY REFERENCE	POLICY
NH POL 5	To permit development on or adjacent to designated Special Areas of Conservation, Special Protection Areas, National Heritage Area or those proposed to be designated over the period of the plan, only where an assessment carried out to the satisfaction of the Meath County Council, in consultation with National Parks and Wildlife Service, indicates that it will have no significant adverse effect on the integrity of the site.
NH POL 6	To have regard to the views and guidance of the National Parks and Wildlife Service in respect of proposed development where there is a possibility that such development may have an impact on a designated European or National site or a site proposed for such designation.
NH POL 7	To undertake appropriate surveys and collect data to provide an evidence-base to assist Meath County Council in meeting its obligations under Article 6 of the Habitats Directives, subject to available resources.
NH POL 8	To seek to ensure that development does not have a significant adverse impact, incapable of satisfactory avoidance or mitigation, on plant, animal or bird species protected by law.
NH POL 9	To consult with the National Parks and Wildlife Service, and take account of any licensing requirements, when undertaking, approving or authorising development which is likely to affect plant, animal or bird species protected by law.
NH POL 10	To promote best practice in the control of invasive species in the carrying out of developments.
NH POL 11	To seek to ensure that peatland areas which are designated (or proposed for designation) as NHAs, SACs or SPAs are conserved for their ecological, archaeological, cultural and educational significance.
NH POL 13	To encourage the retention of hedgerows and other distinctive boundary treatments in rural areas and prevent loss and fragmentation, where possible. Where removal of a hedgerow, stone wall or other distinctive boundary treatment is unavoidable, mitigation by provision of the same type of boundary will be required.
NH POL 14	To promote and encourage planting of native hedgerow species of local provenance.
NH POL 15	To recognise the archaeological importance of townland boundaries including hedgerows and promote their protection and retention.
NH POL 16	To seek to maintain the natural heritage and amenity of the county by promoting the preservation and enhancement of native and semi-natural woodlands, groups of trees and individual trees.
NH POL 18	To encourage the retention of mature trees and the use of tree surgery rather than felling where possible when undertaking, approving or authorising development.
NH POL 19	To protect Champion and Heritage Trees identified on the Tree Register of Ireland and Heritage Tree Database when undertaking, approving, or authorising development.

Biodiversity Plans
Ireland's third National Biodiversity Plan 2017–2021, identifies actions towards understanding and protecting biodiversity with a vision that, "*biodiversity and ecosystems in Ireland are conserved and restored, delivering benefits essential for all sectors of society and that Ireland contributes to efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally*".

A number of Local Biodiversity Action Plans have been prepared, including the County Meath Biodiversity Action Plan 2008-2012 and the Draft County Meath Biodiversity Action Plan 2015-2020 which identify the actions required to protect and enhance biodiversity at local level.

8.2 METHODOLOGY

8.2.1 LEGISLATIVE CONTEXT AND RELEVANT GUIDELINES

The following legislation is relevant to the proposed development and biodiversity:

The Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000
The Wildlife Act is the primary piece of Irish legislation providing for the protection and conservation of wildlife and provides for the control of specific activities which could adversely affect wildlife, for example the regulation of hunting and wildlife trading. Under the Wildlife Act, all bird species, 22 other fauna species and 86 flora species in Ireland are afforded protected status. The Wildlife Act, 1976 allows for the designation of specific areas of ecological value such as Statutory Nature Reserves and Refuges for Fauna. The Wildlife (Amendment) Act, 2000 provides for greater protection and conservation of wildlife and also provides for the designation and statutory protection of Natural Heritage Areas (NHA).

The Flora (Protection) Order, 2015 (S.I. 356 of 2015)
This order provides statutory protection to flora listed in Section 21 of the Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000. Under the Order, it is illegal to wilfully cut, uproot or damage the listed species or interfere in any way with their habitats.

European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477 of 2011)
These regulations transpose the European Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora (known as the "Habitats Directive") and the European Council Directive 2009/147/EC on the Conservation of Wild Birds (known as the "Birds Directive") into Irish Law. The regulations provide for the designation and protection of Natura 2000 sites comprising of Special Areas of Conservation (SAC) and Special Protection Areas (SPA). The regulations safeguard the SAC and SPA sites from developments with the potential to significantly impact upon them. The EC (Birds and Natural Habitats) Regulations also address invasive species, making it an offence without a licence to plant, allow to disperse, escape or spread, to reproduce or propagate, to transport, to sell or advertise invasive species specified in the regulations.

Planning and Development Regulations, 2001 to 2018
These regulations transpose the requirements of Directive 2014/52/EU (and previous Directive 2011/52/EU) on the assessment of the effects of certain projects on the environment into planning law. Under these regulations, development plans must include mandatory objectives for the conservation of natural heritage and for the conservation of European sites.

The following guidance documents have been consulted for this assessment, with a full list of consulted documentation and guidelines included within **Section 8.8**:

- *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2016);
- *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (Draft) (EPA, 2017);
- *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009);
- *A Guide to Habitats in Ireland* (Fossitt, 2000);
- *Best Practice Guidance for Habitat Survey and Mapping* (Smith *et al.*, 2011);
- *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes* (NRA, 2009);
- *Expedition Field Techniques: Bird Surveys* (Bibby *et al.*, 2000);
- *Bird census and survey techniques* (Gregory *et al.*, 2004);
- *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn.) (Collins 2016);
- *Bat Mitigation Guidelines for Ireland* (Kelleher and Marnell, 2006);
- *Bats and artificial lighting in the UK (Bat Conservation Trust, 2018).*

8.2.2 STUDY AREA / ZONE OF INFLUENCE

Following guidance set out by the Chartered Institute of Ecology and Environmental Management (CIEEM) (2016) and the National Roads Authority (2009), a Zone of Influence should be determined, which identifies the area in which the development could potentially impact upon ecological receptors. The zone of influence takes into consideration the assigned ecological value of the receptors, which ranges from international, national, county to local, and potential pathways for impacts to occur.

Taking into consideration best practice guidance and the nature of the development, the study area for the assessment ranges from the site boundary only for habitats, to buffers of 100m for specific species. However, it should be noted that these buffers were extended where required.

8.2.3 DESKTOP REVIEW

Desktop research comprised of gathering information on designated sites within 15km of the proposed development, reviewing mapping sites to provisionally identify any potential ecologically important features prior to the site assessment and reviewing online resources to determine what notable species, including protected, rare or invasive, had previously been recorded for the proposed development area and environs. The following online resources were consulted as part of this process:

- NPWS website: mapping of designated sites and information on designated sites within the vicinity of the development;
- NPWS Wildlife Manuals for certain habitats and species;
- National Biodiversity Data Centre (NBDC) website: data on notable species (protected, rare or invasive) within a 5km radius of the development;

- NPWS reports on "*The Status of Protected EU Habitats and Species in Ireland*";
- NPWS Ireland Red Lists for species;
- Botanical Society of Britain and Ireland website: flora distribution maps;
- Data on the status of bird species from "*Birds of Conservation Concern in Ireland 2014-2019*", (Coulhoun and Cummins, 2013);
- Various mapping websites, including EPA Envision, Google Maps, Myplan and OSI.

In addition to the above, the National Parks and Wildlife Services (NPWS) was contacted on the 7th of December 2018 in relation to records for sensitive, rare, threatened and protected species within 10km of the development location. Results were returned on the 21st of December 2018.

8.2.4 FIELD SURVEY METHODOLOGIES

Site assessment was undertaken on the 28th February 2020 to examine the ecological context of the proposed development, as outlined in table below. The survey had due consideration for the relevant best practice guidelines as referenced in **Section 8.2.1**.

Table 8.3: Ecological Surveys Informing the EIAR

SURVEY	STUDY AREA	SURVEY DATES
Habitat Survey (including invasive, rare or notable flora)	6km	28th February 2020
Fauna Survey	6km	28th February 2020
Daytime Assessment of Bat Roost Potential	6km	28th February 2020
Bird Survey (General)	6km	28th February 2020

Habitats and Flora Surveys

These assessments involved determining the habitats and flora present within the proposed development. The habitat survey was undertaken in accordance with the standard methodology outlined in Fossitt's "*A Guide to Habitats in Ireland*", (Fossitt, 2000), a hierarchical classification scheme based upon the characteristics of vegetation present. The Fossitt system also indicates when there are potential links with Annex I habitats of the E.U. Habitats Directive (92/43/EEC). Cognisance was also taken of the Heritage Council guidelines, "*Best Practice Guidance for Habitat Survey and Mapping*", (Smith *et al.*, 2011). The relative abundances of flora was determined using the DAFOR Scale, an acronym for the abundance levels – Dominant, Abundant, Frequent, Occasional and Rare.

During site walkovers, any notable flora species were recorded, with an emphasis on statutorily protected or rare species, species of conservation significance and invasive species.

Fauna Survey (Excluding Bats)

Fauna surveys were undertaken during bright and dry weather conditions. Direct observation methods were used for the survey of fauna, however, these methods may not be suitable for shy and nocturnal species. Therefore, indirect methods were also employed, focusing on evidence of fauna including tracks, burrows/setts/nests, droppings, food items and hair. The habitats on site were assessed for signs of usage by fauna, and the potential to support protected or red-listed species.

Bat Survey

Areas within the proposed development site at the Dawn Meats (Slane) facility and rising main route with the potential to support bat roosts and / or foraging / commuting routes, and which have the potential to be impacted upon by the proposed development were the main focus of this survey.

A daytime assessment of individual trees, treelines and hedgerows within the proposed development site potentially affected by the proposed development was undertaken on the 28th February 2020.

The assessment comprised of an external inspection of trees to identify potential roost features (PRFs) and evidence of bat activity. The criteria used to categorise the PRFs or suitability of trees as a potential roost are summarised in the table below, based upon the guidelines by Collins (2016) and Hundt (2012).

Table 8.4: Bat Roost Potential Categories

CATEGORY	DESCRIPTION
High Trees that are suitable for use by large numbers of bats on a regular basis	Features include holes, cracks or crevices that extend or appear to extend back to cavities suitable for bats. In trees, examples include hollows and cavities, rot holes, cracks/splits and flaking or raised bark which could provide roosting opportunities. Any ivy cover is sufficiently well-established and matted so as to create potential crevices beneath. **Further survey work would be required to determine whether or not bats are present, and if so, the species present. Appropriate mitigation and potential licencing requirements may then be determined.**
Moderate Moderate potential is assigned to trees with potential to support bat roosts but supports fewer features than a high potential tree and is unlikely to support a roost of high conservation value.	From the ground, tree appears to have features (e.g. holes, cavities, cracks or dense ivy cover) that may extend back into a cavity. However, owing to the characteristics of the feature, they are deemed to be sub-optimal for roosting bats. **Further survey work would be required to determine whether or not bats are present, and if so, the species present. Appropriate mitigation and potential licencing requirements may then be determined.**
Low Low potential is assigned to	If no features are visible, but owing to the size, age and/or structure, hidden features, sub-optimal for roosting bats, may

CATEGORY	DESCRIPTION
trees with features that could support individual bats opportunistically.	occur that only an elevated inspection may reveal. In respect of ivy cover, this is not dense (i.e. providing PRF in itself) but may mask presence of PRF features. **Works may proceed using reasonable precautions (e.g. controlled working methods, under license or supervision of a bat worker).**

Bird Survey

General bird usage of the proposed development site was assessed on the 28th February 2020. While walking along the proposed rising main route, stops were undertaken on a regular basis during which time the area was scanned as far as the terrain or weather conditions allowed. Birds were identified by visual sightings and auditory identification of songs and calls. Birds flying overhead were also included as part of the survey.

Surveys Scoped Out

The following ecological features were scoped out:

Invertebrate (aquatic) / Fish surveys: The aquatic features identified at the proposed development site comprise of drainage ditches and Dollardstown River along the proposed rising main route, in addition to the River Boyne at the proposed rising main outfall. As the rising main would traverse the Dollardstown River via the existing road infrastructure, and given that the outfall location would be located mainly within the River Boyne river bank, it was considered that aquatic invertebrate / fish surveys were not required for these watercourses. Given that the drainage ditches encountered are man-made and have limited potential to support protected aquatic species or species of conservation interest (with the exception of amphibians), it was also considered that aquatic invertebrate / fish surveys were not required. It is considered that the water quality assessment, discussed in **Section 9**, is sufficient in assessing the potential impact of the development upon water quality, which would indicate if there is a potential for the proposed development to impact upon aquatic invertebrate or fish species.

Invertebrate surveys (terrestrial). Terrestrial habitats within the study area are considered unlikely to support any protected invertebrate species, as the study area does not support the food plants of the protected marsh fritillary (*Euphydryas aurinia*) or suitable habitat for protected whorl snail species (*Vertigo* spp.).

Reptile surveys: The proposed development site and rising main route may provide areas of suitable basking and refuge habitat for protected viviparous lizard (*Zootoca vivipara*), in particular areas of stone walls and the ruins of Dollardstown Demesne garden walls. The numbers of viviparous lizard, if present at the development site and rising main route, are likely to be low and unlikely to be picked up in survey. Consequently, viviparous lizard is presumed to be present in low numbers.

8.2.5 SURVEY LIMITATIONS

Every effort has been made to provide an accurate assessment of the situation pertaining to the site. However, an ecological survey can only assess a site at a particular time, and is limited by various factors such as the season, timing of the survey, climatic conditions and species behaviour. Ecological surveys are therefore snapshots in time and should not be regarded as a complete study. Direct observations or evidence of protected species is not always recorded during ecological surveys. However, this does not indicate that the species is absent from the site.

The optimal habitat survey period runs from April to September, the growing season for the majority of plants (Smith *et al.*, 2011). While the site assessments were undertaken outside this optimal time period (28th February 2020), it was possible to identify all habitats to Fossitt Level 3. The site assessments were also outside the optimal survey period for breeding avifauna.

To ensure any limitations encountered did not significantly impact upon the findings of the ecological assessments, the ecological surveys undertaken also assessed the potential of the habitats to support protected species and breeding birds and cognisance has been taken of available online baseline data (e.g. flora and fauna records from the NBDC, consultation with NPWS regarding protected / threatened species) and a precautionary approach taken.

8.2.6 ECOLOGICAL VALUATION CRITERIA

The ecological value of the habitats and species identified at the development site have been assessed following the criteria outlined in the 2009 NRA guidelines, and is consistent with *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal* (CIEEM, 2018).

8.3 CONSULTATIONS

Consultation has been undertaken with the following statutory bodies and competent authorities in relation to the potential impact of the proposed development. Details of any concerns raised in relation to biodiversity are outlined in the table below. Concerns have been addressed as part of this EIAR.

Table 8.5: Consultation with Statutory Bodies and Competent Authorities

STATUTORY BODY / AUTHORITY	PERSONNEL	DATE OF MEETING / CONTACTED	COMMENT
Inland Fisheries Ireland (IFI)	Mr. Noel McGloin, Senior Fisheries Environmental Officer	02/03/2017 (Follow up in Dec 2018)	A copy of the correspondence is contained in **Attachment 8.2**. Considerations / concerns raised include the following: • An Appropriate Assessment and / or EIS to be carried out, with sufficient information on the potential effects of the application. *This has been completed as part of this application.* • Concerns over the mechanism of the construction of the pipeline, in particular the crossing of watercourses. IFI guidance document provided. *Cognisance has been taken of the IFI document, as discussed further in **Section 9**.*
Environmental Protection Agency (EPA)	Mr. Leo Sweeney Ms. Marian Doyle Ms. Niamh Connolly	26/04/2017	• Include consideration and a risk assessment of microbiological assessment of the addition to the R. Boyne *A Drinking Water Risk Assessment (DWRA) has been prepared as part of the EIAR (**Attachment 9.2**)* • Review safety plan from Irish Water in relation to Staleen abstraction facility *As above, a DWRA has been prepared as part of the EIAR.* • Consider the design of the headworks for discharge to the R. Boyne and also the potential for cleaning same and retaining water prior to discharge to the river *A description of the proposed outfall is included in **Section 2**. The cleaning of the pipeline would be undertaken every three years, in conjunction with integrity testing. This would involve the closing of the sluice valve at the end of the pipeline, near the outfall, and the power-washing of the line, with wash-water collected by means of a*

STATUTORY BODY / AUTHORITY	PERSONNEL	DATE OF MEETING / CONTACTED	COMMENT
			tanker. • How have licence parameters been established? *1. The 2005 Slaughterhouses and Animals By-products Industries BREF* *2. Review of the SA BREF, document 2* *3. Assimilative Capacity assessment on River Boyne*
Development Applications Unit (DAU), Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs	Ms. Yvonne Nolan	03/05/2017	A copy of the correspondence is contained in **Attachment 8.2**. Considerations / concerns raised include the following: • With regards the NIS and assimilative capacity assessment, water quality should be assessed in terms of the needs of the qualifying interests of the River Boyne and River Blackwater SAC and SPA. • A large tufa spring is located in a field upstream of the Stackallen Bridge and any pipe laying in the vicinity of this may negatively impact upon it. General scoping comments for EIS and appropriate assessment screening / appropriate assessment and for licencing requirements were also provided by the DAU. *Concerns have been addressed within the EIAR and NIS.*
Development Applications Unit (DAU), Department of Culture, Heritage and the Gaeltacht	Ms. Sinéad O'Brien, Executive Officer	21/12/2018	A copy of the correspondence is contained in **Attachment 8.2**. The DAU noted that the general area of the proposed development is of high archaeological potential, and recommended that the applicant engage the services of a suitably qualified archaeologist to carry out an appropriate archaeological assessment (see **Section 14**). *An archaeological assessment has been undertaken – see* ***Section 14****.*

STATUTORY BODY / AUTHORITY	PERSONNEL	DATE OF MEETING / CONTACTED	COMMENT
National Parks and Wildlife Services (NPWS)	Mr. Hugh McLindon, Conservation Ranger for North-Eastern Region	09/01/2019	Asked that contact be made with the Development Applications Unit directly. *DAU has been contacted (see above)*
Meath County Council	Ms. Loreto Guinan	09/01/2019	No comment to date.
Environmental Protection Agency (EPA)	Ms. Niamh Connolly	14/02/2019	• Include pressure testing and CCTV every 3 years - refer to the EPA "Guidance to Storage and Transfer of Materials for Scheduled Activities" *Integrity testing of the rising main pipeline would be undertaken every three years, in accordance with the Dawn Meats (Slane) facility's IE Licence. A CCTV survey of the line would be undertaken, followed by pressure testing.* • Washing / cleaning of pipeline - no washwater to enter river - tanker at last sump - washings back to balance tank *The cleaning of the pipeline would be undertaken every three years, in conjunction with integrity testing. This would involve the closing of the sluice valve at the end of the pipeline, near the outfall, and the power-washing of the line, with wash-water collected by means of a tanker.*

8.4 DESCRIPTION OF EXISTING ENVIRONEMNT

8.4.1 DESIGNATED SITES

No RAMSAR sites occur within 15km of the proposed development. One Special Area of Conservation (SAC), one Special Protection Area (SPA) and one Natural Heritage Area (NHA) occur within 15km of the proposed development as per the table below.

Table 8.6: Designated Sites within 15km of the Proposed Development

SITE NAME	DESIGNATION	SITE CODE	DISTANCE
River Boyne and River Blackwater	SAC	002299	Rising main discharges to River Boyne within SAC
River Boyne and River Blackwater	SPA	004232	Rising main discharges to River Boyne within SPA
Jamestown Bog	NHA	001324	14.3km SW

There are also 11 proposed Natural Heritage Areas (pNHAs) and 1 Area of Scientific Interest within 15km of the proposed development. These are listed in the following table:

Table 8.7: Proposed Designated Sites within 15km of the Proposed Development

SITE NAME	DESIGNATION	SITE CODE	DISTANCE
Painestown Quarry	ASI	789	300m NE
Boyne Woods	pNHA	001592	Rising main discharges to River Boyne within pNHA
Slane Riverbank	pNHA	001591	3.8km NE
Crewbane Marsh	pNHA	000553	4.3km NE
Balrath Woods	pNHA	001579	4.5km SE
Rossnaree Riverbank	pNHA	001589	5.1km NE
Thomastown Bog	pNHA	001593	5.4km SE
Duleek Commons	pNHA	001578	8.7km E
Dowth Wetland	pNHA	001861	9.5km NE
King William's Glen	pNHA	001804	10km NE
Boyne River Islands	pNHA	001862	11.6km NE
Mellifont Abbey Woods	pNHA	001464	13.2km NE

For this assessment, the designated sites considered to be within the zone of influence of the proposed development were the River Boyne and River Blackwater SAC (Site Code 002299) and the River Boyne and River Blackwater SPA (Site Code 004232), due to hydrological connectivity and given that the proposed treated effluent rising main would discharge to the River Boyne within the SAC and SPA sites.

Jamestown Bog NHA (Site Code: 001324) is located upstream of the proposed development and within a separate sub-catchment, and therefore has not been included within the potential zone of influence of the proposed development.

River Boyne and River Blackwater SAC (Site Code 002299)

The conservation objective of the River Boyne and River Blackwater SAC is:

"*To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected".*

The River Boyne and River Blackwater SAC, measuring almost 2,320 hectares, is designated for two Annex I habitats, Alkaline Fens [7230] and the priority habitat Alluvial Forests [91E0] and three Annex II species including River Lamprey (*Lampetra fluviatilis*), Atlantic Salmon (*Salmo salar*) and Otter (*Lutra lutra*). This site comprises most of the freshwater element of the River Boyne from upriver of the Boyne Aqueduct at Drogheda, the Blackwater River as far as Lough Ramor and the principal Boyne tributaries, notably the Deel, Stoneyford and Tremblestown Rivers. This system drains a considerable area of Cos. Meath and Westmeath and smaller areas of Cavan and Louth.

The underlying geology is Carboniferous Limestone for the most part with areas of Upper, Lower and Middle well represented. In the vicinity of Kells Silurian Quartzite is present while close to Trim are Carboniferous Shales and Sandstones. The rivers flow through a landscape dominated by intensive agriculture. Much of the river channels were subject to arterial drainage schemes in the past. Natural flood-plains now exist along only limited stretches of river, though often there is a fringe of reed swamp, freshwater marsh, wet grassland or deciduous wet woodland. Along some parts are stands of tall, mature mixed woodland. Substantial areas of improved grassland and arable land are included in the site for water quality reasons. The main channel of the Boyne contains a good example of alluvial woodland of the *Salicetum albo-fragilis* type which has developed on three alluvium islands. Alkaline fen vegetation is well represented at Lough Shesk, where there is a very fine example of habitat succession from open water to raised bog.

The Boyne and its tributaries is one of Ireland's premier game fisheries. The site is one of the most important in eastern Ireland for Salmon and has very extensive spawning grounds. The site also has an important population of River Lamprey, though the distribution or abundance of this species is not well known. Otter is widespread throughout the site. Some grassland areas along the Boyne and Blackwater are used by a nationally important winter flock of Whooper Swan (*Cygnus Cygnus*). Several Red Data Book plants occur within the site, with Round-leaved Wintergreen (*Pyrola rotundifolia*), Swamp Meadow-grass (*Poa palustris*) and Round-Fruited Rush (*Juncus compressus*). Also occurring are a number of Red Data Book animals, notably Badger (*Meles meles*), Pine Marten (*Martes martes*) and Common Frog (*Rana temporaria*). The River Boyne is a designated Salmonid Water under the EU Freshwater Fish Directive.

The site supports populations of several Annex II listed species of the E.U. Habitats Directive and contains habitats listed on Annex I of this Directive in addition to other important habitat types. Although the wet woodland areas appear small there are few similar examples of this type of alluvial wet woodland remaining in the country. The semi-natural habitats, particularly the woodland strips extending along the river banks, and the marsh and wet grasslands, increase the overall habitat diversity and add to the ecological value of the site, as does the presence of a range of Red Data Book plant and animal species and the presence of nationally rare plant species.

The site vulnerabilities, including any key pressures or trends within and around the River Boyne and River Blackwater SAC that have been identified as impacting upon the site, may be summarised as:

- Urbanisation;
- Pollution to surface waters;
- Man-made alterations to the rivers' hydraulic conditions;
- Spread of non-native invasive species;
- Agricultural management (i.e. livestock farming, cultivation, fertilisation, removal of vegetation, use of biocides and chemicals;
- Forestry management;
- Sand and gravel extraction;
- Roadways and motorways.

<u>River Boyne and River Blackwater SPA (Site Code 004232)</u>

The River Boyne and River Blackwater SPA, measuring almost 460 hectares, is designated under the E.U. Birds Directive for the Kingfisher (*Alcedo atthis*). The conservation objective of the River Boyne and River Blackwater SPA is:

"*To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA".*

The River Boyne and River Blackwater SPA is a long linear site that comprises stretches of the River Boyne and several of its tributaries: most of the site is in Co Meath but it extends also into Counties Cavan, Louth and Westmeath. It includes the following river sections: The River Boyne from the M1 motorway bridge, west of Drogheda, to the junction with the Royal Canal, west of Longwood, Co Meath; the River Blackwater from its junction with the River Boyne in Navan to the junction with Lough Ramor in Co Cavan; the Tremblestown River (and Athboy River) from the junction with the River Boyne at Kilnagross Bridge to the bridge in Athboy, Co Meath; the Stoneyford River from its junction with the River Boyne to Stonestone Bridge in Co. Westmeath; the River Deel from its junction with the River Boyne to Cummer Bridge, Co. Westmeath. The site includes the river channel and marginal vegetation.

The SPA also supports populations of Mute Swan (*Cygnus olor*), Teal (*Anas crecca*), Mallard (*Anas platyrhynchos*), Cormorant (*Phalacrocorax carbo*), Grey Heron (*Ardea cinerea*), Moorhen (*Gallinula chloropus*), Snipe (*Gallinago gallinago*) and Sand Martin (*Riparia riparia*).

The site vulnerabilities, including any key pressures or trends within and around the River Boyne and River Blackwater SPA that have been identified as impacting upon the site, may be summarised as:

- Urbanisation;
- Man-made alterations to the rivers' hydraulic conditions;
- Roadways and motorways.

8.4.2 HABITATS & FLORA

The location of the proposed WWTP compound is within the Dawn Meats (Slane) site, within the townland of Painestown, while the proposed treated effluent rising main would be located at the verge of local roads within the townlands of Painestown, Seneschalstown, Dollardstown, Hayestown-Carryduff Little and Ardmulchan. The proposed development would be located mainly within a rural, farming area predominantly comprised of pasture land and hedgerows. Small rural settlements and farmyard complexes exist in the area.

The proposed WWTP and the first section of the proposed treated effluent rising main is within the Dawn Meats site, in an area with dry meadows and grassy verges (GS2) with various grasses including Ryegrasses (*Lolium* spp.). Flowering plants include Buttercup (*Ranunculus* spp.), Clover (*Trifolium* spp.), Colt's Foot (*Tussilago farfara*), Dandelion (*Taraxacum* spp.), Dock (*Rumex* spp.), Groundsel (*Senecio vulgaris*), Nettle (*Urtica dioica*), Ragwort (*Senecio jacobaea*), Spear Thistle (*Cirsium vulgare*), Creeping Thistle (*Cirsium arvense*) and Burdock (*Arctium*) present. Also present at this location is an area of wet grassland (GS4) habitat with Sedge (*Carex* spp.), Couch-grass (*Elytrigia repens*) and Rushes (*Juncus* spp.) present.

At the Dawn Meats (Slane) site, the proposed treated effluent rising main passes through a pasture field, identified as improved agricultural grassland (GA1) habitat. This habitat is dominated by ryegrasses (*Lolium* spp.), with other flora present including Buttercup, Clover, Common Chickweed (*Stellaria media*), Dandelion, Dock, Creeping Thistle (*Cirsium arvense*), Greater Plantain (*Plantago major*) and Ribwort Plantain (*Plantago lanceolata*). A portion of the Dawn Meats (Slane) site can be classed as buildings and artificial surfaces (BL3) habitat owing to the existing wastewater treatment plant and lagoons in operation.

The proposed route of the rising main will follow alongside the road network with footpaths, buildings and carparks all classified as BL3 habitat. The dominant habitats alongside the road network route are hedgerows (WL1), treelines (WL2) earth banks (BL2), dry meadows and grassy verges (GS2) and drainage ditches (FW4).

The flora found in WL1 include Ash (*Fraxinus excelsior*), Blackthorn (*Prunus spinosa*), Beech (*Fagus sylvatica*), Sycamore (*Acer pseudoplatanus*), Yew (*Taxus baccata*), Elder (*Sambucus nigra*), Hawthorn (*Crataegus monogyna*), Oak (*Quercus* spp.), Snowberry (*Symphoricarpos albus*), Bramble (*Rubus fruticosus*) Ivy (*Hedera helix*) with Buttercup (*Ranunculus* spp.), Cleavers (*Galium aparine*), Lords-and-ladies (*Arum maculatum*), Nettle (*Urtica dioica*), Primrose (*Primula vulgaris*), Violet (*Viola* spp.), Hart's Tongue Fern (*Asplenium scolopendrum*), Common Polypody (*Polypodium vulgare*) and Dwarf Male Fern (*Dryopteris oreades*).

The flora found in WL2 include Ash (*Fraxinus excelsior*), Blackthorn (*Prunus spinosa*), Beech (*Fagus sylvatica*), Blue Spruce (*Picea pungens*), Crab Apple (*Malus sylvestris*), Elm (*Ulmus* sp.), Hawthorn (*Crataegus monogyna*), Horse-chestnut (*Aesculus hippocastanum*), Lime (*Tilia* spp.), Oak (*Quercus* spp.), Scot's Pine (*Pinus sylvestris*), Sycamore (*Acer pseudoplatanus*) and Willow (*Salix* spp.)

The flora found in BL2 are grasses such as Annual Meadow-grass (*Poa annua*) and flowering plants such as Lesser Celandine (*Ficaria verna*), Cow Parsley (*Anthriscus sylvestris*), Nettle (*Urtica dioica*), Cleavers (*Galium aparine*), Speedwell (*Veronica* spp.), Groundsel (*Senecio* *vulgaris*), Winter Heliotrope (*Petasites fragrans*), Herb-Robert (*Geranium robertianum*). Other flora found in GS2 include Cock's-foot (*Dactylis glomerata*), Couch-grass (*Elytrigia repens*), Nettle (*Urtica dioica*), Hogweed (*Heracleum sphondylium*), Vetch (*Vicia* spp.) and Common Figwort (*Scrophularia nodosa*)

With regards aquatic habitats, the proposed rising main route would run alongside drainage ditches (FW4) habitat and would come in close proximity to the Dollardstown Stream, which can be considered depositing / lowland rivers (FW2) habitat. The proposed discharge point would be located at the River Boyne, which is also considered as FW2 habitat. Flora encountered within or immediately adjacent FW2 and FW4 habitats include Common duckweed (*Lemna minor*), Hemlock Water Dropwort (*Oenanthe crocata*), Lesser Celandine (*Ficaria verna*), Willowherb (*Epilobium* spp.) Marsh Marigold (Caltha palustris), Meadow Buttercup (*Ranunculus acris*), Opposite-leaved Golden-saxifrage (Chrysosplenium oppositifolium), Water-cress (Rorippa nasturtium-aquaticum) and Yellow Iris (Iris pseudacorus).

Sections of stone walls and other stonework (BL1) habitat are present along the route one section of stone wall approximately 330m along the boundary with agricultural grassland with Ivy (*Hedera helix*) and Moss (*Bryophyta*). Lichen is also found here. Shorter sections of BL1 habitat are found along the route such as along the boundary with the Dollardstown River.

Behind the boundary hedges are tillage fields, classed as arable crops (BC1) and horticultural land (BC2) habitats. The BC1 habitat mainly comprises of planted cereal crops. The BC2 habitat mainly comprises of agricultural grasslands for grazing animals. Along the road network are areas of amenity grassland (improved) (GA2) with Daffodil (*Narcissus*) present among species of grass. Also present are small sections of ornamental/non-native shrub (WS4) habitat with Leyland cypress, (*Cupressus × leylandii*) and Mexican orange blossom (*Choisya ternate*).

The rising main route would traverse areas of wet grassland (GS4) habitat, at the last section of the pipeline prior to the outfall to the River Boyne. This habitat comprises of various grasses and rushes (*Juncus* spp.), in addition to many of the flora species encountered in the improved agricultural grassland (GA1) habitats.

Limited areas of mixed broadleaved woodland (WD1), conifer plantation (WD4) and scrub (WS1) were identified adjacent the proposed rising main route. Flora of the WD1 habitat includes Alder (*Alnus glutinosa*), Ash (*Fraxinus excelsior*), Beech (*Fagus sylvatica*), Blackthorn (*Prunus spinosa*), Hazel (*Corylus avellana*), Horse-chestnut (*Aesculus hippocastanum*), Oak (*Quercus* spp.) and Willow (*Salix* spp.), Species found in WD4 include Sitka Spruce (*Picea sitchensis*) while the WS1 habitat mainly comprised of Ash, Hawthorn and Gorse (*Ulex europaeus*). Ground and field flora were similar to that encountered in the GS2 habitat.

Generally, the habitats identified during the onsite assessments were of low to medium ecological value. No rare species or invasive flora species of concern were recorded within the proposed development footprint and immediate vicinity.

The habitats identified as per the Fossitt habitat classification scheme for the proposed development works are summarised in **Table 8.8** below and a habitat map provided in **Figure 8.1**. A photo log and full list of plants recorded are included in **Attachments 8.3 and 8.4** respectively.

Table 8.8: Summary of Habitats Identified for the Proposed Development Works at the Dawn Meats (Slane) site and Proposed Rising Main Route

Habitat Classification Hierarchy		
Level 1	**Level 2**	**Level 3**
F – Freshwater	**FW** – Watercourses	**FW2** – Depositing / lowland rivers
		FW4 – Drainage ditches
G – Grassland and marsh	**GA** – Improved grassland	**GA1** – Improved agricultural grassland
		GA2 – Amenity grassland (improved)
	GS – Semi-natural grassland	**GS2** – Dry meadows and grassy verges
		GS4 – Wet grassland
W – Woodland and scrub	**WD** – Highly modified / non- native woodland	**WD1** – (Mixed) broadleaved woodland
		WD4 – Conifer Plantation
	WS – Scrub / transitional woodland	**WS1** – Scrub
		WS3 – Ornamental/ non-native shrub
	WL – Linear woodland / scrub	**WL1** – Hedgerows
		WL2 – Treelines
B – Cultivated and built land	**BC** – Cultivated land	**BC1** – Arable crops
		BC2 – Horticultural land
	BL – Built land	**BL1** – Stone walls and other stonework
		BL2 – Earth Banks
		BL3 – Buildings and artificial surfaces

Legend

- Main Raising Route
- BC1 - Arable crops
- BC2 Horticultural land
- BL1 Stone walls and borders
- BL3 - Buildings and artificial surfaces
- FW2 - Depositing/lowland rivers
- FW4 - Drainage ditch
- GA1- Improved agricultural grassland
- GA2 – Amenity grassland (improved)
- GS2 - Dry meadows and grassy verges
- GS4 - Wet grassland
- WD2 - Mixed broadleaved/conifer woodland
- WD4 - Conifer plantation
- WL1 Hedgerows
- WL2 Treelines
- WS1 Scrub

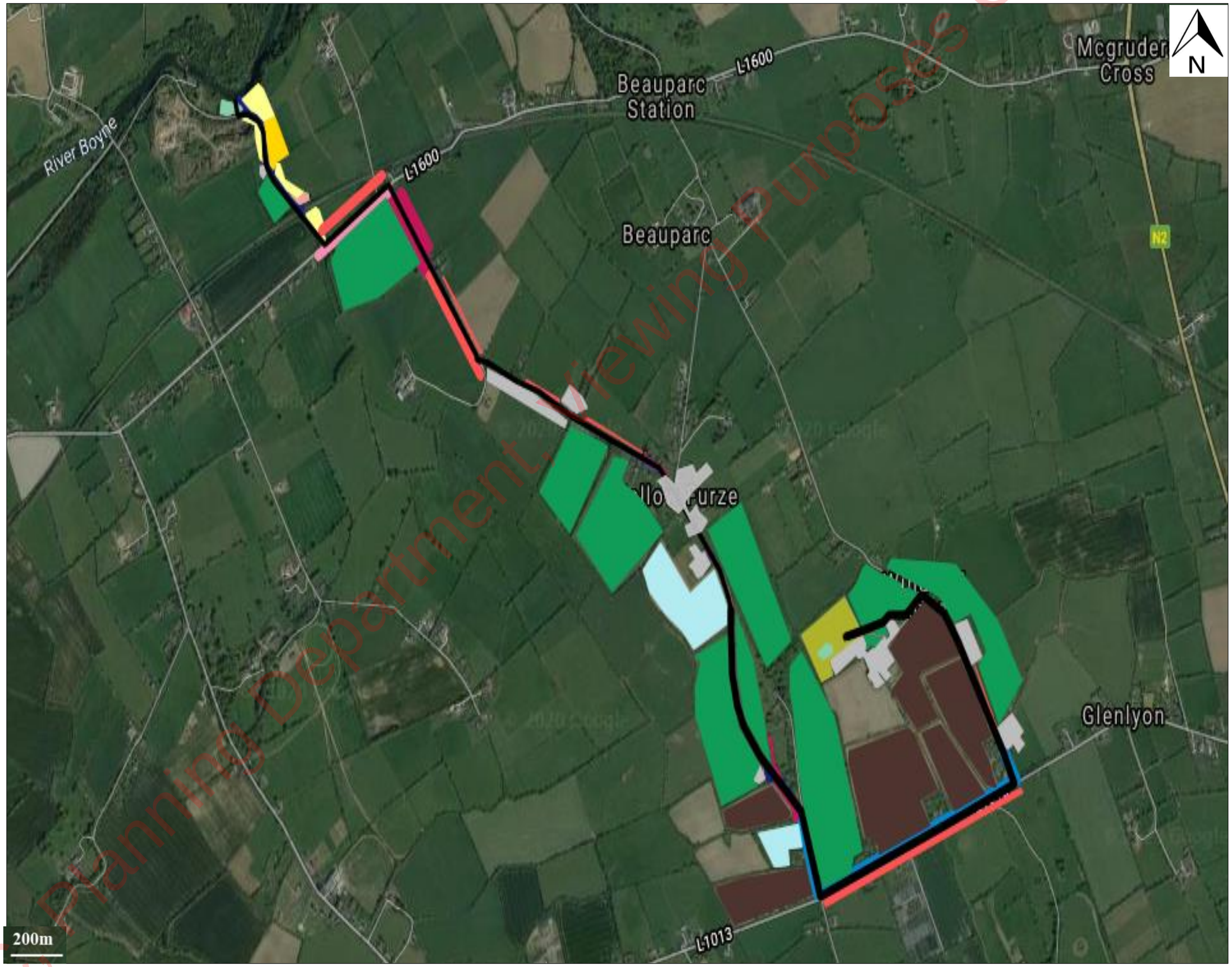

Figure 8.1: Map of Habitats Encountered during Site Assessments

8.4.3 FAUNA (EXCLUDING BATS)

While no fauna were observed at the proposed development site, burrows were noted along some areas of hedgerows, identified as likely Rabbit (*Oryctolagus cuniculus*) and Rat (*Rattus norvegicus*) burrows. No frogs (*Rana temporaria*) or smooth newts (*Lissotriton vulgaris*) were present in any of the freshwater habitats encountered during the walkovers of the proposed rising main route.

However, other fauna typical of that found throughout the rest of Ireland, which would be expected to be found in the general area include Badger (*Meles meles*), Fox (*Vulpes vulpes*), Irish Hare (*Lepus timidus hibernicus*), Red Squirrel (*Sciurus vulgaris*), Grey Squirrel (*Sciurus carolinensis*), Hedgehog (*Erinaceus europaeus*), Pine Marten (*Martes martes*), Stoat (*Mustela erminea hibernica*), Wood Mouse (*Apodemus sylvaticus*) and Pygmy Shrew (*Sorex minutus*). Given that the proposed development is located in close proximity to the Dollardstown Stream, and given that the proposed discharge point is located within the River Boyne, it is likely that aquatic fauna such as Otter (*Lutra lutra*) are present within the vicinity. It is noted that the River Boyne is designated as a salmonid water under the European Commission (Quality of Salmonid Waters) Regulations 1988.

8.4.4 FAUNA - BATS

It is likely that bats are present within the area of the proposed development, given the presence of hedgerow / treeline habitat which likely provide suitable foraging and commuting habitats for bats. According to the Bat Conservation Ireland website, the bat species likely to be present in the area include Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Leisler's Bat (*Nyctalus leisleri*), Brown Long-eared Bat (*Plecotus auritus*) and Daubenton's Bat (*Myotis daubentonii*), while records exist for County Meath for Nathusius' Pipistrelle (*Pipistrellus nathusii*), Natterer's Bat (*Myotis nattereri*) and Whiskered Bat (*Myotis mystacinus*).

The age and species of trees varies along the route varies and none are scheduled for removal. Some are covered in significant amounts of well-established Ivy which has the potential for high bat roost potential. Other trees were identified with both low and medium bat roost potential, given the relatively young age of some trees and in the absence of suitable roost features such as natural holes, cracks / splits in major limbs, loose bark and hollows / cavities in the older trees.

8.4.5 AVIFAUNA

Given the agricultural land use of the surrounding area, it would be expected that common grassland and hedgerow bird species would be present in the area. The proposed discharge point would be located at the River Boyne, therefore it is likely that waterfowl would be present within the vicinity of the discharge point. Bird species noted during the site walkover on the 28th February 2020 are included in **Table 8.9** below, which also details the protection and conservation concern statuses of the bird species encountered.

Table 8.9: Protection and Conservation Concern Statuses for Recorded Birds

COMMON NAME	SCIENTIFIC NAME	E.U. BIRDS DIRECTIVE	BOCCI* RED LIST	BOCCI* AMBER LIST
Blackbird	*Turdus merula*	-	-	-
Blue Tit	*Parus caeruleus*	-	-	-
Bullfinch	*Pyrrhula pyrrhula*	-	-	-
Buzzard	*Buteo buteo*	-	-	-
Chaffinch	*Fringilla coelebs*	-	-	-
Dunnock	*Prunella modularis*	-	-	-
Great Tit	*Parus major*	-	-	-
Long-tailed Tit	*Aegithalus caudatus*	-	-	-
Mute Swan	*Cyngus olor*	-	-	✓
Pied Wagtail	*Motacilla alba*	-	-	-
Reed Bunting	*Emberiza schoeniclus*	-	-	-
Robin	*Erithacus rubecula*	-	-	✓
Rook	*Corvus frugilegus*	-	-	-
Snipe	*Gallinago gallinago*	-	-	✓
Song Thrush	*Turdus philomelos*	-	-	-
Starling	*Sturnus vulagaris*	-	-	✓
Woodpigeon	*Columba palumbus*	-	-	-
Wren	*Troglodytes troglodytes*	-	-	-

**The BoCCI (Birds of Conservation Concern in Ireland) List classifies bird species into one of three lists (Red, Amber or Green) based on their conservation status and conservation priority.*

None of the bird species are listed under Annex I of the E.U. Birds Directive. No species are red listed under the BoCCI classification, four species, Mute Swan, Robin, Snipe and Starling, are amber listed.

8.4.6 RECORDS OF PROTECTED, RARE AND INVASIVE SPECIES

National Biodiversity Data Centre Records

Flora and fauna records were reviewed on the National Biodiversity Data Centre (NBDC) website for the proposed development site and vicinity. Only one protected plant species under the Flora (Protection) Order, 2015 (S.I. No. 356 of 2015), Meadow Barley (*Hordeum secalinum*) was recorded within approximately 5km from the Dawn Meats site and rising main route, while nine invasive plant species have been recorded; Black Currant (*Ribes nigrum*), Butterfly-bush (*Buddleja davidii*), Canadian Waterweed (*Elodea canadensis*), Cherry Laurel (*Prunus laurocerasus*), Giant Knotweed (*Fallopia sachalinensis*), Japanese Knotweed (*Fallopia japonica*), Red Oak (*Quercus rubra*), *Rhododendron ponticum* and Sycamore (*Acer pseudoplatanus*). Four of these invasive species are listed in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011); Canadian Waterweed, Giant Knotweed, Japanese Knotweed and Rhododendron.

Fauna records for the previous twenty years were reviewed on the NBDC website for the three 2km squares (N96P, N97F and N97K) in which the proposed development and proposed rising main route are located. The bird species of note include the Kingfisher (*Alcedo atthis*) and Mallard (*Anas platyrhynchos*). Mammals of note include the protected species Otter (*Lutra lutra*) and Badger (*Meles meles*). Also of note is European Eel (*Anguilla anguilla*).

National Parks and Wildlife Services Records

Records of protected, rare or threatened flora and fauna species within 10km of the proposed development obtained from the NPWS are included in **Tables 8.10 and 8.11** below.

Table 8.10: Records of Protected, Rare or Threatened Flora Species from the NPWS

COMMON NAME	SCIENTIFIC NAME	PROTECTION[1]	CONSERVATION STATUS[2,3]
Annual Knawel	*Scleranthus annuus*	FPO	Vulnerable
Betony	*Stachys officinalis*	FPO	Near Threatened
Green-Winged Orchid	*Orchis morio*	None	Vulnerable
Hairy St John's-wort	*Hypericum hirsutum*	FPO	Vulnerable
Heath Cudweed	*Gnaphalium sylvaticum*	FPO	Endangered
Meadow Barley	*Hordeum secalinum*	FPO	Vulnerable
Meadow Saxifrage	*Saxifraga granulate*	FPO	Regionally Extinct
Round-fruited Rush	*Juncus compressus*	None	Critically Endangered
Shepherd's-needle	*Scandix pecten-veneris*	None	Regionally Extinct
Swamp Meadow-grass	*Poa palustris*	None	Excluded from Red List

Notes:
[1] HD II/IV = Habitats Directive Annexes II/IV; FPO = Flora Protection Order.
[2] Vascular flora from the Irish Red Data Book 1 Vascular Plants (Curtis and McGough, 1988; Wyse Jackson *et al*., 2016); Bryophytes from the Irish Red List No. 8 (Lockhart *et al*., 2012).
[3] IUCN Red list http://www.iucnredlist.org/ - accessed December 2018

Table 8.11: Records of Protected, Rare or Threatened Fauna Species from the NPWS

COMMON NAME	SCIENTIFIC NAME	PROTECTION[1]	CONSERVATION STATUS[2,3]
Badger	*Meles meles*	WA	Least Concern
Common Frog	*Rana temporaria*	WA	Least Concern
Common Sandpiper	*Actitis hypoleucos*	WA	Medium Concern - Amber
Coot	*Fulica atra*	WA	Medium Concern - Amber
Cormorant	*Phalacrocorax carbo*	WA	Medium Concern - Amber
Golden Plover	*Pluvialis apricaria*	WA	High Concern - Red

COMMON NAME	SCIENTIFIC NAME	PROTECTION[1]	CONSERVATION STATUS[2,3]
Grey Heron	*Ardea cinerea*	WA	Least Concern - Green
Hedgehog	*Erinaceus europaeus*	WA	Least Concern
Herring Gull	*Larus argentatus*	WA	High Concern - Red
House Martin	*Delichon urbica*	WA	Medium Concern - Amber
Irish Hare	*Lepus timidus hibernicus*	WA	Least Concern
Irish Stoat	*Mustela erminea hibernica*	WA	Least Concern
Kingfisher	*Alcedo atthis*	BDI, WA	Medium Concern - Amber
Little Grebe	*Tachybaptus ruficollis*	WA	Medium Concern - Amber
Mallard	*Anas platyrhynchos*	WA	Least Concern - Green
Moorhen	*Gallinula chloropus*	WA	Least Concern - Green
Mute Swan	*Cygnus olor*	WA	Medium Concern - Amber
Otter	*Lutra lutra*	HD II/IV, WA	Near Threatened
Peregrine Falcon	*Falco peregrinus*	BDI, WA	Least Concern - Green
Pine Marten	*Martes martes*	WA	Least Concern
Pygmy Shrew	*Sorex minutus*	WA	Least Concern
Red Deer	*Cervus elaphus*	WA	Least Concern
Red Squirrel	*Sciurus vulgaris*	WA	Near Threatened
Sand Martin	*Riparia riparia*	WA	Medium Concern - Amber
Skylark	*Alauda arvensis*	WA	Medium Concern - Amber
Smooth Newt	*Lissotriton vulgaris*	WA	Least Concern
Swallow	*Hirundo rustica*	WA	Medium Concern - Amber
Swift	*Apus apus*	WA	Medium Concern - Amber
Viviparous Lizard	*Lacerta vivipara / Zootoca vivipara*	WA	Least Concern
White-clawed Crayfish	*Austropotamobius pallipes*	HD II, WA	Endangered

Notes:
[1] HD II/IV = Habitats Directive Annexes II/IV; WA = Wildlife Acts; BDI = Birds Directive Annex I.
[2] Terrestrial Mammal Red List (Marnell *et al.* 2009); Birds of Conservation Concern in Ireland 2014-2019 (Colhoun and Cummins, 2013); Red-listed Amphibians, Reptiles and Freshwater Fish (King *et al.* 2011); Red-listed Non-marine Molluscs (Byrne *et al.*, 2009).
[3] IUCN Red list http://www.iucnredlist.org/ - accessed December 2018

8.5 IMPACTS

8.5.1 DETERMINATION OF ECOLOGICAL VALUE

The ecological value of the habitat types and species identified at the proposed development site and the proposed treated effluent pipeline route have been assessed following the criteria outlined in the National Roads Authority (NRA) guidelines (2009). **Tables 8.12 and 8.13** below detail the habitats recorded and potential species, and their associated ecological value.

Table 8.12: Ecological Value of Identified Habitats of the Proposed Development and Rising Main Route

HABITAT TYPE	HABITAT RATING	KEY ECOLOGICAL RECEPTOR?
Depositing / lowland rivers (FW2)	International importance	Yes. River Boyne is designated as an SAC and SPA. The Dollardstown Stream flows to the River Boyne.
Drainage ditches (FW4)	Local importance, lower value	No. Mainly small in extent with limited volume. May provide suitable habitat for amphibians. Low ecological value.
Improved agricultural grassland (GA1)	Local importance, lower value	No. Species poor habitat. Low ecological value.
Amenity grassland (improved) (GA2)	Local importance, lower value	No. Species poor habitat. Low ecological value.
Dry meadows and grassy verges (GS2)	Local importance, higher value	Yes. May contain a high biodiversity
Wet grassland (GS4)	Local importance, higher value	Yes. May contain a high biodiversity at the last section of the pipeline prior to the outfall to the River Boyne.
Mixed broadleaved woodland (WD1)	Local importance, higher value	No. The proposed development is located adjacent this habitat and therefore would not result in the loss of or disturbance to this habitat.
Conifer Plantation (WD4)	Local importance, lower value	No. The proposed development is located adjacent this habitat and therefore would not result in the loss of or disturbance to this habitat.
Scrub (WS1)	Local importance, higher value	No. The proposed development is located adjacent this habitat and therefore would not result in the loss of or disturbance to this habitat.
Ornamental/ non-native shrub (WS3)	Local importance, lower value	No. Modified habitat, low ecological value.

HABITAT TYPE	HABITAT RATING	KEY ECOLOGICAL RECEPTOR?
Hedgerows (WL1)	Local importance, higher value	Yes. Area of semi-natural habitat, comprising mainly of native species. May provide opportunities for bird nesting and foraging for bats.
Treelines (WL2)	Local importance, higher value	Yes. Area of semi-natural habitat, comprising of native and non-native species. May provide opportunities for bird nesting and foraging for bats.
Arable crops (BC1)	Local importance, lower value	No. Modified habitat, low ecological value.
Horticultural land (BC2)	Local importance, lower value	No. Modified habitat, low ecological value.
Stone walls and other stonework (BL1)	Local importance, lower value	No. Comprised of stone walls. Limited vegetation growth. Low ecological value.
Earth Banks (BL2)	Local importance, lower value	No. Modified habitat, low ecological value.
Buildings and artificial surfaces (BL3)	Local importance, lower value	No. Comprised of road network, footpaths, dwellings and WWTP compound. Low ecological value.

Table 8.13: Ecological Value of Species of the Proposed Development and Rising Main Route

SPECIES	SPECIES RATING	KEY ECOLOGICAL RECEPTOR?
Badger	Local importance, higher value	No. Not recorded within the vicinity of the proposed site.
Otter	International importance	Yes. This species is a qualifying interest of the River Boyne and River Blackwater SAC, into which it is proposed to discharge treated effluent.
Pine Marten	Local importance, higher value	No. The route of the proposed rising main has limited potential to support this species. Areas of woodland with the potential to support this species are located in close proximity to the proposed route, however, there would be no loss or disturbance to woodland habitats.
Bats (foraging and commuting habitat only – no bat roosts identified)	Local importance, higher value	Yes. The hedgerows / treelines within and adjacent to the proposed development are likely to be utilised by bats for both foraging and commuting.

SPECIES	SPECIES RATING	KEY ECOLOGICAL RECEPTOR?
Other	Local importance, low to high value	No. Limited Fauna sightings / evidence of other mammals. Site has limited potential to support other mammal species.
Breeding Birds	Local importance, higher value	Yes. All birds, their nests, eggs and young are protected under the Wildlife Act.
Aquatic Fauna	Local importance, lower value	No. Drainage ditches are present within the proposed rising main route, however they are mainly small in extent with limited volume.

8.5.2 CONSTRUCTION PHASE

Designated Sites

The majority of the proposed development does not directly impinge on any designated area of conservation, the exception being the location of the proposed rising main discharge point just within the boundary of the River Boyne and River Blackwater SAC (Site Code: 002299) and SPA (Site Code: 004232).

It is not considered that the proposed development site, including the rising main route, would contain the habitats for which the River Boyne and River Blackwater SAC has been designated. No areas of woodland or fen habitats occur within the proposed development footprint, therefore the proposed development does not contain any habitats with potential links to Alluvial Forests [91E0] or Alkaline Fens [7230].

Given that the proposed outfall would be located at the River Boyne, it is possible that River Lamprey, Atlantic Salmon, Otter and Kingfisher would be present within the vicinity of the proposed development footprint. While the construction of the proposed outfall would take place along the bank of the River Boyne, the majority of the footprint would be located within the field comprised of wet grassland, with a negligible loss of river habitat. Therefore, there would be no significant impact upon these qualifying interests due to habitat loss or habitat fragmentation.

The potential disturbance on protected species due to construction noise would not be considered significant, given the nature and scale of the proposed development and the transient nature of construction works. The potential disturbance on protected habitats and species due to dust during the construction phase would not be considered significant, given the transient nature of construction works, the scale of the proposed development and given the limited extent of groundworks in close proximity to the designated sites.

Activities as part of the construction of the development would not have the potential to cause a significant impact upon designated sites due to invasive species. There would be no significant import of materials with the potential to contain invasive flora species. Soils excavated during construction works would be stockpiled and re-used for site levelling and site landscaping, therefore no importation of topsoil or subsoil would be required as part of the development works.

The proposed development would be hydrologically connected to the River Boyne and River Blackwater SAC and SPA, given that the proposed rising main would be located in close proximity to the Dollardstown Stream (a tributary of the River Boyne) and given that the proposed outfall would be located at the River Boyne.

During the construction phase of projects, a deterioration in water quality can arise through the release of uncured concrete, the release of suspended solids during soil disturbance works and the release of hydrocarbons (fuels and oils). Construction works would be confined to the proposed development footprint. While the risk of water quality deterioration due to the proposed development would be considered low, measures would be required to ensure that there would be no potential significant impacts to the listed habitats and species of the River Boyne and River Blackwater SAC and SPA. These measures are outlined in **Section 9.8**.

Habitats and Flora

The construction phase of the development would result in a direct and permanent loss of the existing habitat dry meadows and grassy verges (GS2) and wet grassland (GS4) at the proposed WWTP compound. These habitats are considered modified and of low ecological value. Therefore, the loss of these habitats would not be considered significant.

The preferred method for the laying of the rising main would be horizontal directional drilling (HDD) and the only impacted areas of habitat would be at the entrance and exit point of the bore. Where HDD is not possible due to ground conditions, the standard open-cut method would be employed. The proposed rising main would be constructed underground, and therefore would result in a temporary loss of habitat, with a limited footprint. The rising main route would be primarily located along the road network along the earth banks (BL2), bounded by hedgerows, treelines and some drainage ditches. The route would also pass through areas of amenity grassland and grassy verges. The majority of these habitats can be considered as common to and typical of rural Ireland, and are considered of low ecological value. Therefore, a minor temporary loss of these habitats would not be considered significant.

The rising main route concludes at a habitat of international importance, depositing / lowland rivers (FW2). A negligible loss of habitat would occur at this habitat due to the proposed outfall of the proposed discharge point

Sections of the proposed rising main route would pass through habitats of local importance, higher value; drainage ditches (FW4), wet grassland (GS4) at the site of the proposed outfall, hedgerows (WL1) and treelines (WL2). Given the limited footprint of the proposed rising main, and given that these habitats are common in the area, a minor temporary loss of these habitats would not be considered significant.

A very limited section of hedgerow removal may be required as part of the construction of the proposed rising main as the rising main passes from the local road to the grassland bordering the River Boyne. It is estimated that a maximum of approximately 5m of hedgerow in total may be removed as part of the development. No mature trees would be removed and where sections of hedgerows are removed, they would be replanted using native species. Therefore, the potential impact upon flora and habitats due to hedgerow removal would not be considered significant.

No rare plant species or protected flora under the Flora (Protection) Order 2015, were recorded within the proposed development area. Therefore the proposed development would not be considered to impact upon any rare or protected flora species.

Noxious weeds encountered along the proposed rising main route should be treated with herbicides as per the National Road Authority guidelines (NRA, 2010). An example of a non-native noxious weed is Winter Heliotrope (*Petasites fragrans*) which can be found in BL2 habitat.

During construction works, there is potential for invasive species to be introduced to the site and along the proposed pipeline route through the movement of materials, such as soil and stone, and the arrival of construction plant and equipment from an area with invasive species.

Under Regulation 49(2) of the European Communities (Birds and Natural Habitats) Regulations 2011, save in accordance with a licence granted under paragraph (7), any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to any plant which is included in Part 1 of the Third Schedule shall be guilty of an offence. Materials containing invasive species such as Japanese Knotweed (*Fallopia japonica*) are considered "controlled waste" and, as such, there are legal restrictions on their handling and disposal. Under Regulation 49(7) of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), it is a legal requirement to obtain a license to move "vector materials" listed in the Third Schedule, Part 3.

The potential risk of introducing invasive species during the construction phase would be considered low, as no invasive species of concern were recorded during the site assessments and given that there would be no significant import of materials with the potential to contain invasive flora species. Soils excavated during construction works would be stockpiled and re-used for site levelling and site landscaping, therefore no importation of topsoil or subsoil would be required as part of the development works. Any stone required would be sourced locally where possible and would be inspected prior to arrival onsite for the presence of invasive species.

The construction works contractor would also ensure that all equipment and plant would be thoroughly washed and inspected prior to arriving to the development site. Therefore, it is considered that there would be no significant risk of introducing invasive species during construction works from importation of materials or the arrival to site of construction plant and equipment.

Dust emissions may arise during construction activities, in particular during earth-moving works, which may have the potential to impact upon photosynthesis, respiration and transpiration processes of flora due to the blocking of leaf stomata. However, given the transient nature of construction works and standard working practices including dust control, the potential impact to flora would not be considered significant.

The potential impact upon flora and habitats due to a deterioration in water quality is discussed in detail in **Section 9**.

Fauna

As the proposed development would take place primarily within habitats of low ecological value, the potential impact upon fauna due to habitat loss or habitat fragmentation would be reduced. As noted above, there would be permanent loss of GS2 and GS4 habitats at the WWTP compound. However, given that these habitats are modified and of low ecological value, there would be no significant impact upon any fauna species present. The proposed rising main outfall would result in a limited loss of GS4 habitat and a negligible loss of FW2 habitat. Given the limited footprint of the outfall, there would be no significant impact upon fauna. The proposed construction of the treated effluent rising main would not be considered to significantly impact upon fauna due to habitat loss, given that the route would be primarily located within habitats of low ecological value, and given that habitat loss would be temporary as the rising main would be located underground.

A limited section of hedgerow would be required as the rising main traverses a field boundary. The loss of hedgerows habitat would be considered as having a slight impact upon fauna species, given the limited extent of removal required. However, the section requiring removal would be replanted using native species, which would considerably reduce the impact of vegetation removal upon fauna.

Direct mortality of fauna may occur due to the removal of vegetation at the site, in addition to the use of heavy construction plant and machinery. Mortality of fauna is most likely to occur during the mammal and bird breeding season, when young are at their most vulnerable. Given the limited footprint of hedgerow removal, the potential impact upon fauna would be reduced. As it may be necessary to undertake hedgerow removal works during the bird nesting season, a suitably qualified ecologist would be engaged to carry out inspections for the presence of breeding birds prior to any clearance works taking place. Where nests are present, the ecologist would make a decision as to whether a "*Licence to interfere with or destroy the breeding places of any wild animals*", is required from the NPWS. Alternatively, the ecologist may establish a suitable buffer zone around an active nest, with removal works rescheduled until chicks have fledged. Where no evidence of nests are found during inspection, hedgerow removal works must be undertaken within three days of inspection.

No protected fauna, or evidence of protected fauna, were noted as present on the proposed development site or along the proposed treated effluent rising main route. Given that the rising main is in close proximity to the Dollardstown River and discharges to the River Boyne, it is likely that Otter are present within the area. Should protected fauna be present, it is not anticipated that construction works would have a significant impact owing to the extent of the development footprint, the habitat types impacted upon and the short duration of construction works.

While the majority of the proposed treated effluent rising main route would be situated beside or within local roads, the route would pass near three roadside drainage ditches. Should amphibians be present onsite, there would be no significant potential habitat loss or habitat disturbance due to the nature of rising main works and given that the proposed development site is surrounded by similar areas with numerous drainage ditches and small streams.

In the event a protected species is encountered during construction or vegetation removal works, an officer of the NPWS would be notified prior to the resumption of construction works.

Construction work has the potential to disturb fauna due to the generation of construction noise. However, construction noise would not be considered to pose a significant risk to fauna owing to the transient nature of works and given that all vehicles where possible would be equipped with mufflers to suppress noise, as is standard practice. Where possible, no construction works would be conducted outside of normal working hours, therefore there would be no disturbance to nocturnal species.

Artificial lighting during the construction phase has the potential to negatively impact upon nocturnal species, particularly bat species, as illumination can impact upon their roosting sites, commuting routes and foraging areas. While some bat species, such as Leisler's bats (*Nyctalus leisleri*), may take advantage of prey concentrating around light sources, other bat species are sensitive to lighting and will avoid artificially lit up areas. As noted above, construction works would be conducted outside of normal working hours, which would considerably reduce the potential impacts upon bat species. Measures with regards artificial lighting, as outlined in **Section 8.6.1**, would therefore be required to be implemented to reduce the potential impact of light pollution.

The potential impact upon fauna due to a deterioration in water quality is discussed in **Section 9**.

8.5.3 POTENTIAL CUMULATIVE IMPACTS

Considering the nature of the proposed development and the agricultural use of the surrounding lands, it is considered that the main potential cumulative impact upon biodiversity would be a deterioration in water quality, resulting in an impact upon aquatic flora and fauna species. However, given that the proposed development is not anticipated to result in a significant impact upon water quality during either the construction or operational phases, subject to recommended mitigation measures as discussed in detail in **Section 9**, it is considered that there would be no cumulative water quality impacts which would pose a significant risk to aquatic biodiversity.

8.5.4 "DO NOTHING" SCENARIO

The footprints of the proposed WWTP compound and rising main are mainly comprised of habitats which are modified and of low ecological value. Should the development not proceed, the roads and agricultural lands through which the rising main route is proposed would continue to be used for existing purposes. The WWTP compound area, mainly comprising of dry meadows and grassy verges (GS2) and wet grassland (GS4) would likely transition into scrub. Given that the location of the proposed WWTP compound is within the Dawn Meats Slane facility, it is unlikely that the proposed area would be of significant ecological value in the future.

8.5.5 POTENTIAL IMPACTS PRE-MITIGATION

Table 8.14 below provides a summary of the potential impacts of the proposed development pre-mitigation, during the construction and operational phases.

Table 8.14: Summary of Predicted Impacts Pre-Mitigation

IMPACT	DEVELOPMENT PHASE	DIRECT / INDIRECT	LIKELIHOOD	DURATION	REVERSIBLE	SIGNIFICANCE	IMPACT TYPE
Habitat Loss – WWTP Compound	Construction & Operational	Direct	Certain	Permanent	No	Not significance	Neutral
Habitat Loss – Rising Main	Construction	Direct	Certain	Temporary	Yes	Slight to Moderate significance	Negative
Introduction of Invasive Flora Species	Construction	Direct	Unlikely	Temporary	Yes	Slight significance	Negative
Fauna Disturbance	Construction	Indirect	Possible	Temporary	Yes	Slight significance	Negative
	Operational	Indirect	Unlikely	Permanent	Yes	Not significant	Neutral
Fauna Mortality	Construction	Direct	Dependent upon timing of works relevant to breeding season	Permanent	No	Moderate significance	Negative
Bats – Disturbance / Severance of Habitat	Construction	Direct & Indirect	Certain	Temporary	Yes	Moderate significance	Negative
	Operational	Indirect	Unlikely	Permanent	Yes	Not significant	Neutral
Surface Water Quality Deterioration (Discussed in **Section 9**)	Construction	Indirect	Possible	Temporary	Yes	Moderate significance	Negative
	Operational	Direct	Unlikely	Permanent	Yes	Not significant	Neutral
Designated Sites	Construction	Direct & Indirect	Possible	Temporary	Yes	Moderate significance	Negative
	Operational	Direct & Indirect	Unlikely	Permanent	Yes	Not significant	Neutral

8.6 MITIGATION MEASURES

8.6.1 CONSTRUCTION PHASE

The mitigation measures outlined below would be implemented to ensure there is no significant impact upon the biodiversity of the area and designated sites during the construction phase of the development. These measures have also been incorporated into the Construction Environmental Management Plan, which has been prepared for the project. Mitigation measures for the protection of water quality are included in **Sections 9.7 and 9.8**.

General Mitigation Measures

- All construction works would be confined as far as possible to the development footprint;
- All plant machinery and equipment would be maintained in good working order and regularly inspected;
- Where possible, no construction works would be conducted outside of normal working hours;
- The construction work contractor would prepare a detailed Construction Environmental Management Plan (CEMP) for all construction activities, in line with the outline CEMP prepared as part of this application. The CEMP would describe how construction work would be undertaken in an environmentally sensitive manner and would include measures for the protection of water quality.

Habitats and Flora

- Regular site inspections would be undertaken to ensure that no growth of invasive species has taken place;
- The construction works contractor would ensure that all equipment and plant is inspected for the presence of invasive species and thoroughly washed prior to arriving to the development site;
- In the event of any invasive species listed in Part 1 of the Third Schedule appearing onsite, works within the immediate vicinity would cease until the invasive plant has been appropriately treated and disposed of, in accordance with Regulation 49 of the European Communities (Birds and Natural Habitats) Regulations 2011;
- Cognisance would be taken of National Roads Authority's Guidelines on "*The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*";
- Excavated soil during rising main works would be segregated into subsoil and topsoil, and reused reinstatement works. Where possible, natural recolonisation would be allowed to take place;
- Where sections of hedgerows are removed and require replanting, only native flora species would be used.

Fauna

- As a minimum, the construction work contractor would comply with all legislative provisions relating to hedgerow / tree removal and the protection of birds and bats, and would have regard to reducing impacts on nesting birds;
- Where hedgerow removal works are required during the bird nesting season, prior to any removal works taking place, the sections required for removal would be inspected by a suitably qualified ecologist for the presence of breeding birds. Where nests are present, the ecologist would make a decision as to whether a "Licence to interfere with or destroy the breeding places of any wild animals", is required from the NPWS. Alternatively, the ecologist may establish a suitable buffer zone around an active nest, with removal works rescheduled until chicks have fledged. Where no evidence of nests are found during inspection, hedgerow removal works must be undertaken within three days of inspection;
- Where sections of hedgerow are removed, these would be replanted using native species;
- Should a protected fauna species such as badger or the common frog be found during the construction phase of the project, an officer of the NPWS would be notified prior to the resumption of construction works;
- To reduce the potential for disturbance due to noise, all plant and machinery would be maintained in good working order and regularly inspected, where possible vehicles would be equipped with mufflers to suppress noise and where possible, no construction works would be conducted outside of normal working hours.

Construction works have the potential to impact upon bat species due to lighting disturbance on commuting and foraging habitat. Therefore, the following measures would be implemented by the construction works contractor:

- Construction works in the hours of darkness, when bats are active (April – October), would be kept to a minimum;
- Lighting of treeline and hedgerow boundaries would be avoided where possible, to ensure that commuting and foraging corridors are maintained;
- Should lighting be required during construction works, it would be of a low height (without compromising safe working conditions) to ensure minimal light spill. Where possible and where practicable to do so, timers or motion sensors would be used;
- Directional lighting would be used where possible, by use of louvres fitted to the lighting;
- White light emitting diode (LED) would be used where possible, which is considered to be a low impact in comparison to other lighting types.

8.6.2 OPERATIONAL PHASE

It is considered that the proposed development would have no significant impacts on biodiversity or upon any European site (Natura 2000 network). The following design and operational measures would further reduce the significance of potential impacts:

- Good housekeeping practices would be observed throughout the site during the operational phase;
- The Dawn Meats (Slane) facility has a documented Environmental Management System, which would be updated to incorporate the proposed development;
- In accordance with the facility's Industrial Emissions (IE) Licence (P0811-02), noise monitoring is undertaken annually. In the unlikely event noise emissions from the facility increased, they would be captured during monitoring, identified and addressed;
- Dawn Meats (Slane) ensures all chemicals, oils and fuels are stored within designated, bunded areas and undertake bund integrity testing every three years. The site has an adequate supply of spill clean-up material in the event of any spillages. Therefore, the potential for spills/leaks to impact upon the ecology of the area is minimal.

8.6.3 "WORST CASE" SCENARIO

If the proposed development proceeded without the mitigation measures outlined in **Section 8.6.1 and 8.6.2**, there would be a potential moderate impact upon bat species due to the removal of commuting and foraging habitat, in addition to lighting impacts during the construction phase. There would also be a potential moderate impact upon fauna, should vegetation clearance be undertaken during the mammal and bird breeding season. However, this is unlikely to occur, given that there are legal restrictions under the Wildlife Act 1976 as amended, with regards the removal of vegetation from uncultivated land.

During construction works, there would be potential to inadvertently introduce invasive species to the area. However, even in the absence of mitigation measures, this would be considered unlikely given that there would be no significant import of materials to the site and given that delivery of materials would be inspected prior to removal from the site of origin. Where invasive species are confirmed, the loads would be required to be adequately treated or disposed of appropriately and therefore, would not be transported to the proposed development site.

8.6.4 PREDICTED IMPACTS WITH MITIGATION

The following table provides a summary of the residual effects the proposed development may have, once recommended mitigation measures are implemented. It is not envisaged that there would be any considerable adverse impacts upon biodiversity due to the proposed development.

Table 8.15: Summary of Residual Impacts Post-Mitigation

IMPACT	DEVELOPMENT PHASE	SIGNIFICANCE	MITIGATION MEASURES	RESIDUAL SIGNIFICANCE	RESIDUAL IMPACT TYPE
Habitat Loss – WWTP Compound	Construction & Operational	Not significant	None required	Not significant	Neutral
Habitat Loss – Rising Main	Construction	Slight to Moderate significance	• Excavated soil during rising main works would be segregated into subsoil and topsoil, and reused reinstatement works. Where possible, natural recolonisation would be allowed to take place • Where sections of hedgerows are removed, they would be replanted using only native flora species	Not significant	Neutral
Introduction of Invasive Flora Species	Construction	Slight significance	• Construction plant would be inspected and washed prior to arriving onsite • Regular site inspections for the presence of invasive species would be undertaken • Should invasive species appear onsite, works would immediately cease until the plant was appropriately treated and disposed of	Not significant	Neutral
Fauna Disturbance	Construction	Slight significance	• All plant machinery and equipment would be maintained in good working order and regularly inspected • Where possible, vehicles would be equipped with mufflers to suppress noise • Where possible, no construction works would be conducted outside of normal working hours	Slight significance	Minor Negative
	Operational	Not significant	None required	Not significant	Neutral
Fauna Mortality	Construction	Moderate significance	• As a minimum, the construction works contractor would comply with all legislative provisions relating to hedgerow removal and the protection of birds and bats • Where hedgerow removal works are required	Slight significance	Minor Negative

IMPACT	DEVELOPMENT PHASE	SIGNIFICANCE	MITIGATION MEASURES	RESIDUAL SIGNIFICANCE	RESIDUAL IMPACT TYPE
			during the bird nesting season (1st March to 31st August), the sections for removal would be inspected by an ecologist for the presence of breeding birds. Where nests are present, a decision would be made as to whether a licence is required from the NPWS, or alternatively, whether a suitable buffer zone could be established around the active nest, with removal works rescheduled until chicks have fledged		
Bats – Disturbance / Severance of Habitat	Construction	Moderate Significance	• Where sections of hedgerow require removal, these would be replanted using native species • Measures would be implemented to reduce the potential for light pollution • Construction works in the hours of darkness would be kept to a minimum	Not significant	Neutral
	Operational	Not significant	None required	Not significant	Neutral
Surface Water Quality Deterioration	Construction	Moderate significance	• Mitigation measures are outlined in **Section 9**, and include the following: - Standard construction control measures for the protection of surface waters would be implemented - Concrete works would be supervised - Appropriate storage and handling of fuels and oils - Provision of spill kits	Not significant	Neutral
	Operational	Not significant	None required	Not significant	Neutral
Designated Sites	Construction	Moderate significance	• Mitigation measures as outlined in the rows above and as outlined in **Section 9**	Not significant	Neutral
	Operational	Not significant	None required	Not significant	Neutral

8.7 RESIDUAL IMPACTS

There would be a permanent loss of habitat from beneath the footprint of the new extension to the proposed WWTP compound. The habitats for this area are noted as dry meadows and grassy verges (GS2) and wet grassland (GS4). Given the small footprint of the proposed development and given that the habitats are of low ecological value, the habitat loss would not be considered significant.

The proposed treated effluent rising main would be located underground. Once the rising main pipeline has been laid, the area would be reinstated using stockpiled topsoil removed during excavations. Therefore, there would only be a temporary loss of habitat as a result of rising main works

8.8 REFERENCES

Averis, B. (2013) *Plants and Habitats: An introduction to common plants and their habitats in Britain and Ireland*. United Kingdom: Swallowtail Print Ltd.

Bat Conservation Trust (2018) *Bats and artificial lighting in the UK. Bats and the Built Environment series*. Guidance Note 08/18.

Bibby, C., Jones, M. and Marsden, S. (2000) "Expedition Field Techniques: Bird Surveys".

Botanical Society of Britain and Ireland flora distribution maps, available at: https://bsbi.org/maps

Byrne, A., Moorkens, E.A., Anderson, R., Killeen, I.J. & Regan, E.C. (2009) *Ireland Red List No. 2 – Non Marine Molluscs*. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

Chartered Institute of Ecology and Environmental Management (2016) *Guidelines for Ecological Impact Assessment in the UK and Ireland*.

Colhoun, K. and Cummins, S. (2013) Birds of Conservation Concern in Ireland 2014-2019, *Irish Birds*, 9, pp. 523-544.

Council Directive (EC) 2009/147/EC of 30 November 2009 on the conservation of wild birds.

Council Directive (EC) 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

Council Directive (EC) 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy – more commonly known as the Water Framework Directive.

Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edition). The Bat Conservation Trust, London

Curtis, T.G.F. and McGough, H.N. (1988) *The Irish Red Data Book 1 Vascular Plants*. Wildlife Service Ireland.

Department of Culture, Heritage and the Gaeltacht (2017) *National Biodiversity Action Plan 2017-2021*.

Devlin, Z. (2014) *Wildflowers of Ireland: A Field Guide*. Cork: Collins Press.

Dublin Regional Authority (2010) *Regional Planning Guidelines for the Greater Dublin Area 2010 – 2022.*

Environment DG, European Commission (2002) *Assessment of plans and projects significantly affecting Natura 2000 sites - Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*.

Environmental Protection Agency (2017) Draft. *Guidelines on the information to be contained in Environmental Impact Assessment Reports*.

Environmental Protection Agency (2015) Draft. *Advice Notes for Preparing Environmental Impact Statements*.

Environmental Protection Agency Licence public access information, Available at: http://www.epa.ie/licensing/iedipcse/

Environmental Protection Agency Envision Online Mapping, Available at: http://gis.epa.ie/Envision/

Fossitt, J.A. (2000) *A Guide to Habitats in Ireland*. Kilkenny: The Heritage Council.

Gregory, R.D., Gibbons, D.W. and Donald, P.F. (2004) Bird census and survey techniques. *Bird Ecology and Conservation*, pp.17-56. United States: Oxford University Press.

Hundt, L. (2012) Bat Surveys: Good Practice Guidelines, 2nd edition.

Inland Fisheries Ireland (2016). *Guidelines on Protection of Fisheries During Construction Works in and adjacent to Waters.*

Johnson, O. and More, D. (2006) *Collins Tree Guide: The Most Complete Field Guide to the Trees of Britain and Europe.* London: HarperCollins Publishers.

Kelleher, C. and Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. *Irish Wildlife Manuals*, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

King, J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., FitzPatrick, Ú., Gargan, P.G., Kelly, F.L., O'Grady, M.F., Poole, R., Roche, W.K. & Cassidy, D. (2011) *Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Lockhart, N., Hodgetts, N. & Holyoak, D. (2012) *Ireland Red List No.8: Bryophytes*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Marnell, F., Kingston, N. & Looney, D. (2009*) Ireland Red List No. 3: Terrestrial Mammals*, National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

Meath County Council (2016) *Meath County Development Plan 2013 – 2019.*

National Parks & Wildlife Service, Available at: http://www.npws.ie/protected-sites

National Roads Authority (2010) *The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads.*

National Roads Authority (2009) *Guidelines for Assessment of Ecological Impacts of National Road Schemes.*

National Roads Authority (2009) *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*.

National Roads Authority (2006a) *Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes.*

National Roads Authority (2006b) *Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes.*

National Roads Authority (2006c) *Guidelines for the Treatment of Bats during the Construction of National Road Schemes.*

National Roads Authority (2006d) *Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes.*

NPWS (2018) *Conservation Objectives: River Boyne and River Blackwater SAC 002299*. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

NPWS (2018) *Conservation Objectives: River Boyne and River Blackwater SPA 004232*. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

NPWS (2014) *Site Synopsis: River Boyne and River Blackwater SAC 002299.* National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2010) *Site Synopsis: River Boyne and River Blackwater SPA 004232.* National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013) *The Status of Protected EU Habitats and Species in Ireland. Volume 1.* Unpublished Report, National Parks and Wildlife Services, Department of Arts, Heritage and the Gaeltacht.

NPWS (2013) *The Status of EU Protected Habitats and Species in Ireland*. *Habitats Assessments Volume 2*. Version 1.0. Unpublished report. National Parks and Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin.

NPWS (2013) *The Status of EU Protected Habitats and Species in Ireland. Species Assessments Volume 3. Version 1.0*. Unpublished report. National Parks and Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin.

Parnell, J. and Curtis, T. (2012) *Webb's An Irish Flora*. Cork: Cork University Press.

Regan, E.C., Nelson, B., Aldwell, B., Bertrand, C., Bond, K., Harding, J., Nash, D., Nixon, D., & Wilson, C.J. (2010) *Ireland Red List No. 4 – Butterflies*. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Ireland.

Reid, N., Hayden, B., Lundy, M.G., Pietravalle, S., McDonald, R.A. & Montgomery, W.I. (2013) National Otter Survey of Ireland 2010/12. *Irish Wildlife Manuals*, No. 76. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Rose, F. (2006) *The Wildflower Key: How to identify wild flowers, trees and shrubs in Britain and Ireland*. China: Frederick Warne & Co.

Smith, G.F., O'Donoghue, P., O'Hora, K. and Delaney, E. (2011) *Best Practice Guidance for habitat survey and mapping*. The Heritage Council, Kilkenny.

Strachan, R. (2010) *The Mammal Detective*. Cambridge: Whittet Books Ltd.

Sutherland, W.J. (Ed.). (2006) *Ecological Census Techniques*. United Kingdom: Cambridge University Press.

Wheater, C.P., Bell, J.R. and Cook, P.A. (2011) *Practical Field Ecology: A Project Guide.* John Wiley & Sons.

Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016) *Ireland Red List No. 10: Vascular Plants*. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.

9.0 BIODIVERSITY – AQUATIC ENVIRONMENT

9.1 INTRODUCTION

The abundant supplies of surface and groundwater within Ireland dictate the importance of measures to protect the aquatic environment. This section outlines the aquatic environment currently present in the area and assesses the impact of the proposed development.

Dawn Meats (Slane) are proposing to extend their existing on-site effluent treatment system to provide for additional treatment to a quality sufficient for discharge to the River Boyne. The discharge of treated effluent to the River Boyne would necessitate the construction of treated effluent rising main from the Dawn Meats (Slane) facility to the River Boyne at Ardmulchan, Co. Meath.

It should be noted that this development would be subject to an application for a review of the site's current Industrial Emissions (IE) Licence (P0811-02), in order to include a new discharge to surface waters, the River Boyne.

The proposed final treated effluent quality parameters are included in **Table 9.1** below.

Table 9.1: Proposed Final Effluent Quality discharging to the River Boyne

Parameter	Units	Proposed limits	2005 Slaughter Industry BREF	2017 Food & Drink BREF
BOD_5	mg/l O_2	20	10 - 40	<20
Orthophosphate	mg/l PO_4-P	2.0	–	–
Nitrogen	mg/l N	20	15 – 40	2 – 20
Total Ammonia	mg/l N	5.0	–	–
Suspended Solids	mg/l SS	30	5 – 60	4 – 65
Flow Rate	M^3/day	400	–	–

This section should be read in conjunction with the site layout plans for the proposed development and the project description sections of the EIAR. Risks to the aquatic environment were considered during the design of the proposed development and mitigation measures have been proposed where feasible.

This aquatic ecological assessment involved a desktop review, the undertaking of an assimilative capacity study and a field assessment. A Natura Impact Statement has been prepared by Panther Environmental Solutions (**Attachment 8.1**).

The objectives of the ecological assessment were as follows:

- To undertake a comprehensive desktop review of the aquatic habitats, in particular the River Boyne, within the vicinity of the proposed development;
- To assess the current water quality status of the River Boyne;

- To assess the impact from the proposed rising main and discharge of treated effluent to the River Boyne;
- To undertake a field assessment of the proposed development site and surroundings in the context of aquatic ecology;
- To determine and assess the potential impacts of the proposed development on aquatic flora and fauna;
- To propose mitigation measures for both the construction and operational phases of the development to reduce potential impacts upon aquatic flora and fauna.

9.2 LEGISLATIVE FRAMEWORK AND PLANNING POLICY

9.2.1 LEGISLATIVE CONTEXT

The main legislation pertaining to aquatic biodiversity and nature conservation in Ireland is briefly outlined below.

The Local Government (Water Pollution) Act, 1977, as Amended

This Act provides for the control of water pollution, by prohibiting the discharge of un-licenced polluting matter into waters.

European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. 272 of 2009)

The regulations give statutory effect to Directive 2008/105/EC and provide legal status to quality objectives for all surface waters and environmental quality standards for pollutants. The regulations allow for the classification of surface waters by the Environmental Protection Agency (EPA) in accordance with the ecological objectives approach of the Water Framework Directive. The regulations also provide for the establishment of inventories of priority substances by the EPA and the preparation of pollution reduction plans.

The Fisheries (Consolidation) Act, 1959, as Amended

The Act prohibits the entry of polluting substances into waters which have the potential to adversely impact upon fish, prohibits the obstruction of passage of certain fish species and provides legal protection to the spawn/fry of eels, salmon and trout, in addition to their spawning or nursery grounds.

Fisheries (Amendment) Act, 1999

This Act outlines the responsibilities of the Regional Fisheries Board to ensure the protection and conservation of fish and their habitats within its area of jurisdiction.

European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. 293 of 1988)

These regulations give statutory effect to Directive 78/659/EEC. The regulations designate salmonid waters, specify the quality standards for designated salmonid waters and outline the monitoring requirements.

Water Framework Directive (2000/60/EC)

The Water Framework Directive (WFD) aims to improve the water environment (including groundwater, rivers, lakes, estuaries and coastal waters) of E.U. Member States. The aim of the WFD is for Member States to achieve and maintain "good status" in all water bodies.

The Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000

The Wildlife Act is the primary piece of Irish legislation providing for the protection and conservation of wildlife. Under the Amendment Act of 2000, the scope was broadened to include freshwater aquatic species, including the majority of fish. The Act provides for the control of specific activities which could adversely affect wildlife. Under the Wildlife Act, all bird species, 22 other fauna species and 86 flora species in Ireland are afforded protected status. The Wildlife Act, 1976 allows for the designation of specific areas of ecological value such as Statutory Nature Reserves and Refuges for Fauna. The Wildlife (Amendment) Act, 2000 provides for greater protection and conservation of wildlife and also provides for the designation and statutory protection of Natural Heritage Areas (NHA).

European Communities (Birds and Natural Habitats) Regulations, 2011 (S.I. 477 of 2011)

These regulations transpose the European Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora (known as the "Habitats Directive") and the European Council Directive 2009/147/EC on the Conservation of Wild Birds (known as the "Birds Directive") into Irish Law. The regulations provide for the designation and protection of Natura 2000 sites comprising of Special Areas of Conservation (SAC) and Special Protection Areas (SPA). The regulations safeguard the SAC and SPA sites from developments with the potential to significantly impact upon them. Under the Habitats Directive, a number of Annex I habitats are aquatic habitats, while Annex II species include Atlantic salmon, white-clawed crayfish and the three species (Brook, River and Sea) lamprey.

The Flora (Protection) Order, 2015 (S.I. 356 of 2015)

This order provides statutory protection to flora listed in Section 21 of the Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000. Under the Order, it is illegal to wilfully cut, uproot or damage the listed species or interfere in any way with their habitats. The Flora (Protection) Order includes aquatic species such Opposite-leaved Pondweed (*Groenlandia densa*) and Short-leaved Water-Starwort (*Callitriche truncata*).

9.2.2 PLANNING POLICIES

Regional Policies

The Regional Planning Guidelines (RPGs) for the Greater Dublin Area 2010-2022, which includes the counties of Meath, Kildare and Wicklow, outlines the long-term spatial planning strategy for the area. The policies relating to aquatic ecology and relevant to the proposed development are outlined in **Table 9.2** below.

Table 9.2: Regional Polices Relevant to Aquatic Biodiversity and the Proposed Development

STRATEGIC POLICY REFERENCE	POLICY
GIP2 – Natural Heritage	To protect and conserve the natural environment, in particular nationally important and EU designated sites such as SPA, candidate SAC and proposed NHAs, protected habitats and species, and habitats and species of local biodiversity value. This policy also includes new or extended ecological sites that are notified or designated in the lifetime of the RPGs. Appropriate measures to protect Natura 2000 sites should be identified at the initial stages of all planning processes and included as a material consideration in order to inform future development.
GIP3 – River Basins	To ensure alignment between the core objectives of the Water Framework Directive, (including River Basin Management Plans and Programmes of Measures affecting the Greater Dublin Area) and other related plans such as County Development Plans and related Local Area Plans; Habitat and Species Protection Plans under the Habitats Directive, Water Services Investment Programme, Nitrates Action Programme; and Flood Management Plans.

Local Policies

Local planning policies are detailed in the Meath County Development Plan, 2013-2019. Policies relating to aquatic ecology and relevant to the proposed development are outlined in **Table 9.3**.

Table 9.3: Local Polices Relevant to Aquatic Biodiversity and the Proposed Development

POLICY REFERENCE	POLICY
WS SO 8	To ensure that in so far as is reasonably practicable, waste water treatment plants are operated in compliance with their Waste Water Discharge Licenses / Certificates of Authorisation, in order to protect water quality.
WS OBJ 8	To generally require new developments to provide for the separation of foul and surface water drainage networks within the application site
WS SOBJ	To promote compliance with environmental standards and objectives established— (i) for bodies of surface water, by the European Communities (Surface Waters) Regulations 2009; (ii) for groundwater, by the European Communities (Groundwater) Regulations 2010; which standards and objectives are included in river basin management plans.
WS POL 20	To ensure through the implementation of the River Basin Management Plans and their associated programmes of measures, and any other associated legislation, the protection and improvement of all drinking water, surface water and ground waters throughout the county

POLICY REFERENCE	POLICY
WS POL 22	To continue efforts to improve water quality under the Local Government (Water Pollution) Act 1977, as amended and by implementing the measures outlined under the Nitrates Directive (91/676/EEC) and complying with the requirements of the Surface Water Legislation Environment Objectives (Surface Waters) Regulations 2009 and other relevant regulations.
WS POL 25	To protect, maintain and improve the natural character of the watercourses and rivers in the county Meath.
WS POL 26	To seek the continued improvement of water quality, bathing facilities and other recreational opportunities in the coastal, estuarine and surface waters in the County.
WS POL 27	To ensure that proposed septic tanks and proprietary treatment systems, or other waste water treatment and storage systems, and associated percolation areas where required as part of a development, comply with the recommendations of the Environmental Protection Agency and that they are employed only where site conditions are appropriate.
WS POL 31	To ensure that all developments have regard to the surface water management policies in the Greater Dublin Strategic Drainage Study (GDSDS). Compliance with the recommendations contained in Technical Guidance Document, Volume 2, Chapter 4 of the Greater Dublin Strategic Drainage Study shall be required in all instances.
NH POL 5	To permit development on or adjacent to designated Special Areas of Conservation, Special Protection Areas, National Heritage Area or those proposed to be designated over the period of the plan, only where an assessment carried out to the satisfaction of the Meath County Council, in consultation with National Parks and Wildlife Service, indicates that it will have no significant adverse effect on the integrity of the site.
NH POL 6	To have regard to the views and guidance of the National Parks and Wildlife Service in respect of proposed development where there is a possibility that such development may have an impact on a designated European or National site or a site proposed for such designation.
NH OBJ 2	To ensure an Appropriate Assessment in accordance with Article 6(3) and Article 6(4) of the Habitats Directive, and in accordance with the Department of Environment, Heritage and Local Government Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 2009 and relevant EPA and European Commission guidance documents, is carried out in respect of any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect on a Natura 2000 site(s), either individually or in combination with other plans or projects, in view of the site's conservation objectives.
NH OBJ 3	To protect and conserve the conservation value of candidate Special Areas of Conservation, Special Protection Areas, National Heritage Areas and proposed Natural Heritage Areas as identified by the Minister for Arts, Heritage and the Gaeltacht and any other sites that may be proposed for designation during the lifetime of this Plan.
NH POL 8	To seek to ensure that development does not have a significant adverse impact, incapable of satisfactory avoidance or mitigation, on plant, animal or bird species protected by law.
NH POL 9	To consult with the National Parks and Wildlife Service, and take account of any licensing requirements, when undertaking, approving or authorising development which is likely to affect plant, animal or bird species protected by law.

9.3 METHODOLOGY

Records of ambient water quality testing for the River Boyne, Broadboyne Bridge station code 2000, were requested from the EPA. Analysis results from 20th January 2016 to 05th December 2019 were provided for the closest physico-chemical monitoring station upstream of the proposed discharge location, Broadboyne Bridge, EPA station code 2000. The average results of monitoring on the River Boyne have been used to represent the typical chemical water quality of these watercourse.

9.3.1 DESKTOP REVIEW

The desktop review comprised gathering information pertaining to the Boyne and Dollardstown watercourses and catchments, reviewing mapping sites and determining if notable aquatic species, including protected, rare or invasive, had previously been recorded for the watercourses in the vicinity of the proposed development. The desktop review also served to provide supporting documentation for the assimilative capacity assessment.

9.3.2 ASSIMILATIVE CAPACITY

An assimilative capacity assessment was conducted on the River Boyne to determine the risk of negative impacts from a potential future discharge of treated effluent from the Dawn Meats (Slane) facility.

For the purposes of this assessment, a discharge location to the north of the Dawn Meats (Slane) facility (E292410, N271420) was used as this is the closest point of the River Boyne to the site. It should be noted that the design of the discharge point would be subject to the agreement of the EPA and Irish Fisheries.

The assimilative capacity assessment was used to predict the Boyne River and the Dollardstown River's ability to accommodate a treated effluent discharge of BOD_5, Orthophosphate, Nitrogen, Total Ammonia and Suspended Solids. The assessment concluded that the River Boyne would have sufficient assimilative capacity and therefore would be able to accommodate treated effluent discharge from the facility. The assimilative capacity assessment is included as **Attachment 9.1**, Hydrological Assessment of Discharge to Watercourses.

The figures used to demonstrate the existing water quality of the watercourses is displayed below in **Table 9.4**.

Table 9.4: Background Water Quality Values for Receiving Watercourse

Parameter	Parameter	EPA Testing 2016 –2019
BOD_5	mg/l O2	1.31
Orthophosphate	mg/l PO4-P	0.031
Nitrogen	mg/l N	2.85
Total Ammonia	mg/l N	0.036
Suspended Solids	mg/l SS	8.6

9.4 DESCRIPTION OF EXISTING ENVIRONMENT

9.4.1 WATER QUALITY

The River Boyne is located within the River Boyne Catchment (River Code 07B04), as shown below.

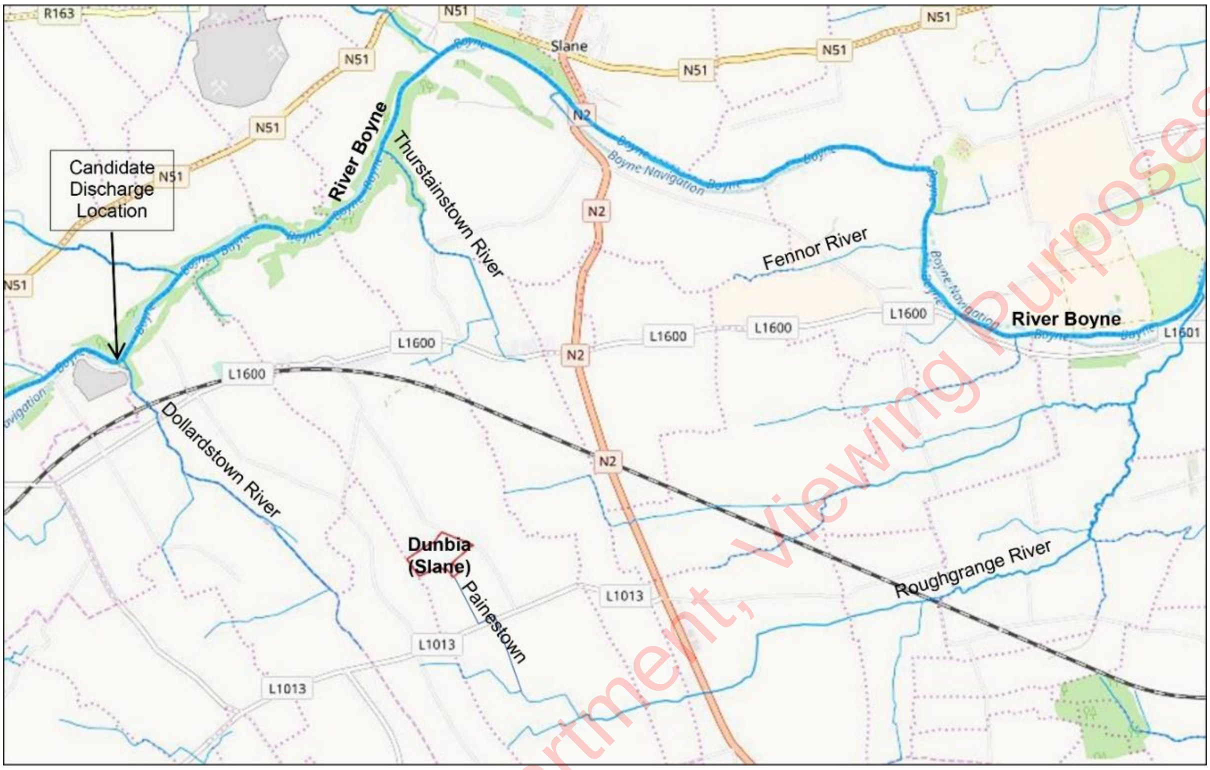

Figure 9.1: Watercourses within the vicinity of Dawn Meats (Slane)

The River Boyne is located within the River Boyne Catchment (River Code 07B04). The rising main route will pass adjacent to drainage ditches bordering local roads (light blue marker in **figure 9.1** below). The route would traverse a culverted section of the Dollardstown Stream which crosses beneath the local road (dark blue marker in **figure 9.1** below). It is unknown how many culverted field / road drainage ditches are present along the route, and these would be identified during the detailed design phase. **Table 9.5** below details the locations of known water course crossings that would be required as part of the route.

Table 9.5: Locations of Watercourse Crossings along Rising Main Route

NO.	WATERCOURSE TYPE / NAME	APPROX. GRID REFERENCE	PROPOSED CROSSING METHOD
1	Dollardstown Stream	N 927 710	Within existing bridge infrastructure

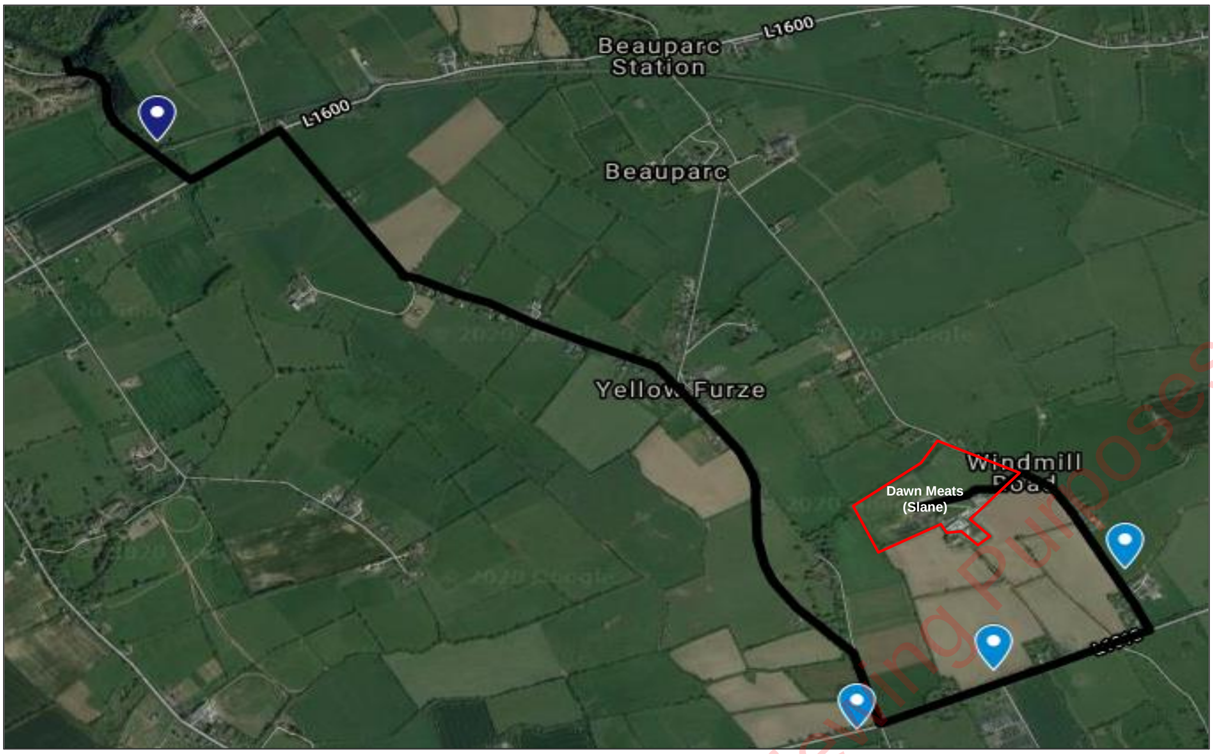

Figure 9.2: Locations of Watercourses along Rising Main Route

As previously discussed in **Section 2**, the extent of construction works which would be required for the Dollardstown River and any culverted drainage crossing have not been fully defined at this stage, however a detailed investigation would be undertaken at the detailed rising main design stage.

The crossing of open drains or watercourses is not proposed as part of this development. If any drainage ditches have to be crossed then the method undertaken would be via the dry open cut method. This would involve damming the water flow from the rising main footprint using sandbags to create the seal / dam across the drainage ditch. Pumps would be set up to take the flow from upstream to downstream of the crossing point. A filter would be provided at the pump inlet to limit potential disturbance to the drainage ditch bed due to sediments. Pumping operations would be supervised at all times. Excavation of the drainage ditch bed would then proceed, with the excavated material stockpiled for later reinstatement. Following the completion of reinstatement works, including any required drainage bank reinstatement works, the sandbags would be removed

The River Boyne rises at Trinity Well, Newberry Hall, near Carbury, County Kildare, and The River Boyne has been classified as being at risk of not achieving good status between Navan town and Slane Bridge.

The River Boyne, main channel, is designated as a salmonid water under the European Commission (Quality of Salmonid Waters) Regulations 1988.

The River Boyne and River Blackwater are designated as a Special Area of Conservation (SAC code: 002299) for Alkaline fen and alluvial forest habitats and the species river lamprey *Lampetra fluviatilis*, salmon *Salmo salar*, and otter *Lutra lutra*. The site is also a Special Protection Area (SPA code: 004232) for the Kingfisher *Alcedo atthis*.

The Slane Agglomeration Wastewater Treatment Plant (Discharge Licence: D0257-01) [E295890, N274260] comprises of two separate treatment systems. The first system has a design capacity of 1500 p.e. and consists of preliminary treatment (screening,) secondary treatment (aeration and followed by settlement). The second system has a design capacity of 750 p.e. which consists of primary settlement, rotating biological contactor followed by settlement. The outflows from both systems combine prior to discharge. At present, the plant is operating below its design capacity of 2,250 p.e.

Navan UWWTP (D0059) discharges to the River Boyne [E 288954, N 269554], approximately 4.6km upstream of the proposed discharge location. Slane UWWTP (D0257) discharges to the River Boyne [E296247, N273851], approximately 5.4 kilometres downstream of the proposed discharge location.

The Staleen Water Treatment Works is located downstream of the proposed discharge location [E303375, N273095], and provides coagulation, sedimentation, filtration and disinfection treatment. The water abstraction point is located at Staleen (Abstraction Code: 2100PUB1019) [E301795, N272201], approximately 12.7 kms downstream of the proposed discharge point.

Table 9.6: EPA Monitoring Points on the River Boyne within the vicinity of the Discharge Point (Source: http://www.epa.ie/qvalue/webusers/HAResults.asp#BOYNE)

Station No.	Station Location	National X	National Y	Approx. Location Relative to Discharge Point
1800	Railway Br Navan	287430	267428	7.78km Upstream
1900	2km d/s Navan (LHS)	288493	269122	5.11km Upstream
2000	Broadboyne Br	291863	271315	0.64km Upstream
2010	d/s Broadboyne Br (RHS)	292440	271435	At Candidate Discharge Location
2100	Slane Br	296414	273631	5.66km Downstream
2150	Ford S of Broc Ho	300003	271834	10.69km Downstream
2200	Obelisk Br	304510	276200	18.75km Downstream

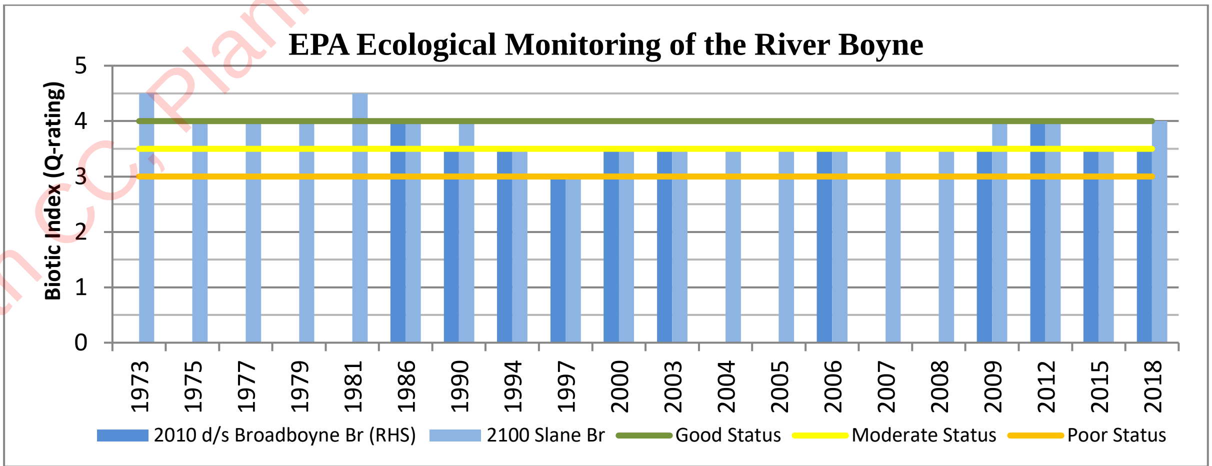

Figure 9.3: Longitudinal Biotic Index of the River Boyne

As can be seen in the above graph, the quality of the River Boyne in the vicinity of the proposed discharge has maintained a moderate status for the majority of the past 15 years. Both EPA monitoring sites achieved good status in 2012, however, only Slane Bridge has returned to good status in the 2018 reporting year.

9.4.2 DRINKING WATER ABSTRACTION POINT

The Staleen Water Treatment Works is located downstream of the proposed discharge location [E303375, N273095], and provides coagulation, sedimentation, filtration and disinfection treatment. The water abstraction point is located at Staleen (Abstraction Code: 2100PUB1019) [E301795, N272201], approximately 12.7 kms downstream of the proposed discharge point.

This abstraction point serves a total population of 77,595 (EPA, 2016) in the Drogheda / East Meath agglomeration, providing in the region of 24,000-28,000 M^3/day of drinking water. While the abstraction point is located within Co. Meath, the water treatment plant is operated by Louth County Council. A map detailing the locations of the proposed discharge point in relation to the Staleen Water Abstraction Point is included as **Attachment 9.2** – Appendix A.

The source is located about 1.6 km from Staleen WTP, at Roughgrange pumping station. The abstraction is taken from the canal off the River Boyne. The canal is fenced off to prevent animal access from the adjacent fields.

9.4.3 ECOLOGICAL VALUE

The River Boyne is designated as a Special Area of Conservation (Site Code: 002299) for Alkaline Fens [7230] and Alluvial Forest [91E0] habitats and the species River lamprey (*Lampetra fluviatilis)*, Atlantic Salmon (*Salmo salar)*, and Otter (*Lutra lutra)*. The site is also a Special Protection Area (Site Code: 004232) for the Kingfisher (*Alcedo atthis)*.

The River Boyne is designated as a salmonid water under the European Commission (Quality of Salmonid Waters) Regulations, 1988. The NPWS SAC Site Synopsis notes that the River Boyne and River Blackwater SAC site is one of the most important in eastern Ireland for Atlantic salmon, with extensive spawning grounds. The site is also noted has supporting an important population of River Lamprey and otter are considered widespread throughout the site.

The NPWS SPA Site Synopsis notes that the River Boyne is of high ornithological importance as it supports a nationally important population of kingfisher, an Annex I species of the E.U. Birds Directive. Other birds noted in the area include Mute Swan (*Cyngus olor*), Teal (*Anas crecca*), Mallard (*Anas platyrhynchos*), Cormorant (*Phalacrocorax carbo*), Grey Heron (*Ardea cinerea*), Moorhen (*Gallinula chloropus*), Snipe (*Gallinago gallinago*) and Sand Martin (*Riparia riparia*).

9.4.4 FISHERY VALUE

The River Boyne and River Blackwater SAC Site Synopsis notes the importance of the River Boyne for fishing as a main tourist attraction. The site synopsis notes the following:

"The Boyne and its tributaries form one of Ireland's premier game fisheries and the area offers a wide range of angling, from fishing for spring salmon and grilse to seatrout fishing and extensive brown trout fishing. Atlantic Salmon (Salmo salar) use the tributaries and headwaters as spawning grounds. Although this species is still fished commercially in Ireland, it is considered to be endangered or locally threatened elsewhere in Europe and is listed on Annex II of the Habitats Directive. Atlantic Salmon run the Boyne almost every month of the year. The Boyne is most important as it represents an eastern river which holds large three-sea-winter fish from 20-30 lb. These fish generally arrive in February, with smaller spring fish (10 lb) arriving in April/May. The grilse come in July, water permitting. The river gets a further run of fish in late August and this run would appear to last well after the fishing season. The salmon fishing season lasts from 1st March to 30th September."

9.5 IMPACTS

9.5.1 "DO-NOTHING"

Should the proposed development not take place, there would be no changes to the quality of surface waters in the area. The inherent risk involved in the transport of treated effluent offsite would remain unaltered in likelihood and potential consequence.

9.5.2 "DO-SOMETHING"

Transport of Effluent

Final effluent is currently collected daily by road tankers and transferred off-site to licensed municipal wastewater treatment plants at Navan and Ringsend for further treatment. However, the list of municipal plants accepting final effluent may change in the future.

Following completion of the development, inherent risks of incidents and spills associated with the transport of effluent offsite would cease.

River Boyne

The primary potential impact upon the River Boyne during the operational phase of the proposed development would be a deterioration in water quality arising from the proposed discharge of treated effluent.

The proposed development would not result in any changes to the current stormwater run-off system within the current facility area and there are no anticipated changes to existing storm discharges from the facility, or green-field runoff rates within the proposed footprint of the development. Storm-water falling within the proposed WWTP compound area would be collected and diverted to the balance tank and would pass through the treatment system. Discharge volumes would continue to be limited by the plant treatment capacity and limits proscribed within any agreed discharge licence.

The BREF document for Slaughterhouses and Animals By-Products Industries notes that the most significant environmental impact arising from slaughterhouses is the emissions to water. Generated wastewaters typically have a high organic strength owing to the high BOD (biochemical oxygen demand) and COD (chemical oxygen demand) properties of blood and animal by-products. Additionally, wastewaters from slaughtering facilities and meat processing facilities generally have a high suspended solids and nutrient content (phosphorous and nitrogen).

Organic pollution to rivers can occur when high organic wastewaters are insufficiently treated and discharged to waterbodies. When a high organic load enters a waterbody, the growth of bacteria and other micro-organisms increase significantly in response to the available food supply. The rapid break down of organic compounds by bacteria and micro-organisms results in the deoxygenation of the water. Where significant organic pollution takes place, the river can become uninhabitable for aquatic flora and fauna due to the lack of required oxygen.

Bacteria also break down the protein content of the wastewater into various nitrogen compounds including nitrate, nitrite, ammonia and ammonium. Depending on the concentration, these compounds can have further impacts upon water quality and aquatic flora and fauna. For example, the compound ammonia (NH_3) is considered toxic to freshwater fish at low concentrations (EPA, 2013).

Oils and fats from wastewaters can cause deoxygenation of waters due to the consumption of oxygen during bacterial breakdown and, in the instance of an oil film, by disrupting oxygen diffusion from the atmosphere to water.

An increase in suspended solids can affect aquatic habitats by reducing water clarity, affecting the light availability to flora and visibility required by fauna for feeding and other behaviour. Furthermore, an increase in suspended solids can have significant impacts upon fish by damaging spawning beds, smothering eggs and, in extreme cases, interfering with gills.

Aquatic flora and fauna could also be impacted upon by an increase in the nutrients nitrogen and phosphorous. A significant increase in nutrients (particularly phosphorous for freshwater bodies), could result in excessive eutrophication, whereby an increase in nutrients results in the significant growth of aquatic plants, particularly algae (EPA, 2015). As plant growth increases, oxygen depletion occurs due to increased photosynthesis and through the decomposition of plant organic material. The increase in plant growth can also limit the availability of sunlight.

Wastewater at the Dawn Meats (Slane) facility currently undergoes primary treatment, consisting of screening and the removal of solids and fats via settlement and DAF treatment. Development approved under planning permission LB180300 would allow for primary treatment – Stage 2 and biological treatment – Stage 3. Stage 2 would comprise of a balance tank and sludge holding tank. The balance tank would provide storage capacity to buffer the effluent composition/loading and balance out flow fluctuations from the plant in order to facilitate the treatment of effluent via the DAF and biological stages at a steady rate. Effluent from the balance tank would pump to the relocated DAF unit. From here, sludge would gravity feed into a sludge transfer tank and into the new sludge holding tank. The sludge holding tank would store the DAF sludge and biological activated sludge prior to off-site treatment.

The proposed development would alter the approved Stage 3 system, comprising of a new anoxic tank and two new aeration basins. Stage 3 also includes an approved clarifier and a sand filter. The anoxic tank would allow for the de-nitrification process through the use of bacteria, which break down the nitrate in the effluent waste. In the anaerobic/anoxic tank, denitrification would take place by mixing the food source (DAF out-flow), micro-organisms (return activated sludge) and nitrates (aeration tank effluent). Biological breakdown of effluent would take place in the two aeration tanks, using activated sludge. From the aeration tanks, effluent would enter the clarifier, where suspended solids removal would occur, with the resulting clear water flowing to the sand filter. The sand filter would further reduce the suspended solids in the final effluent, which would also reduce the COD/BOD level of treated effluent.

Following treatment, it is proposed to discharge the treated effluent to the River Boyne. The treated effluent emission values proposed by Dawn Meats (included in **Table 9.1**), have been based upon the current water quality of the River Boyne (discussed in **Section 9.4.1**) and upon the river's assimilative capacity. The assimilative capacity assessment is included as **Attachment 9.1**. – Hydrological Assessment of Discharges to Watercourses.

The assimilative capacity assessment was undertaken during 95%ile flow conditions, the lowest daily average flow which is equalled or exceeded 95% of the time. It is therefore the low flow which is likely to occur for 5%, or 18 days, of each year. The assimilative capacity assessment was used to predict the river's ability to accommodate treated effluent discharge of BOD_5, Orthophosphate, Nitrogen, Total Ammonia and Suspended Solids from the Dawn Meats (Slane) facility.

The following table summarises the existing background quality of the River Boyne, the legislated limits downstream of the proposed discharge, the proposed discharge limits from the facility and the resultant concentration within the watercourses due to the proposed discharge.

Table 9.7: Assimilative Capacity of the River Boyne and Proposed Effluent Limits

RIVER BOYNE		CHARACTERISTICS OF WATERCOURSE			PROPOSED EFFLUENT	400 M³ EFFLUENT FLOW SCENARIO		
						Mass Balance		Headroom
Parameter	**Unit**	**Existing Level in Stream**	**Downstream Legislated Limits**	**Available Assimilative Capacity (kg/day)**	**Discharge Concentration**	**Rise in Levels due to Discharge**	**Predicted Levels Post Discharge**	**% Headroom Utilised**
BOD_5	mg/l O2	1.31	2.6	533	20	0.018	1.332	1.40%
Orthophosphate	mg/l PO4-P	0.031	0.075	18	2	0.0019	0.0325	4.28%
Nitrogen	mg/l N	2.85	3.00	60	20	0.017	2.871	11.33%
Total Ammonia	mg/l N	0.036	0.14	43	5	0.005	0.041	4.62%
Suspended Solids	mg/l SS	8.6	25.0	6,785	30	0.021	8.659	0.13%

As can be seen from the above table, a proposed discharge at 400 M^3 per day would result in no significant increases in concentrations within the River Boyne. The proposed discharge would not, in and of itself, result in the River Boyne failing to achieve good status.

The assessment of theoretical maximum discharge concentrations for a discharge of 400 M^3 per day have shown that the River Boyne has sufficient capacity to accept concentrations in excess of those achievable by standard industry technology.

Therefore, it is concluded that the River Boyne would have sufficient assimilative capacity to accommodate discharges from the Dawn Meats (Slane) facility and consequently, the proposed discharge would not have a significant impact upon the River Boyne.

Drinking Water Abstraction Point

As noted in **Section 9.4.2**, a water abstraction point is located at Staleen, approximately 12.7km downstream of the proposed discharge point. A deterioration in water quality would have the potential to adversely impact upon the quality of drinking water, particularly with regards microbial loading.

Discharges from slaughtering facilities have the potential to cause a microbial impact upon receiving waters due to the presence of total coliform, faecal coliform (including *Escherichia coli*) and streptococci groups of bacteria, in addition to parasites such as *Cryptosporidium parvum*. It has been estimated that densities of total and faecal coliforms and streptococci are in the order of several million colony forming units (cfu) per 100ml of wastewaters generated at slaughtering facilities (USEPA, 2004).

Sources of micro-organisms present within wastewaters at the Dawn Meats (Slane) facility include blood and rinsing waters from the slaughter hall and human waste from onsite staff welfare facilities. During the closed landspreading period, centrate arising from the dewatering of lairage tank contents is directed to the WWTP and would be considered an additional source of micro-organisms.

Total coliform, faecal coliform and streptococci groups of bacteria present in slaughtering facility wastewaters are primarily enteric in origin, coming from the intestinal tract of warm-blooded animals. The treatment of human waste arising from staff welfare facilities at the Dawn Meats (Slane) facility would also contribute to populations of enteric bacteria.

While these groups of bacteria are not generally considered as pathogenic, they can be used to indicate the possible presence of pathogenic enteric organisms, such as *Salmonella* ssp., *Campylobacter jejuni* and *Listeria monocytogenes*, gastrointestinal parasites including *Ascaris* sp., *Giardia lamblia*, and *Cryptosporidium parvum*, and enteric viruses (Mittal, 2004).

As enteric micro-organisms leave their optimal environmental conditions (intestinal tract of animals), their survivability would be impacted upon during the wastewater treatment process and discharge to surface water. For instance, studies undertaken on E. Coli have indicated that their survival in freshwater is adversely affected by the cooler temperatures, visible light and predation by endemic micro-organisms such as flagellates and ciliates (Wcislo and Chróst, 2000). While viruses can survive adverse conditions, they can only multiply within their hosts and are therefore limited in population once they enter the wastewater process.

A Drinking Water Risk Assessment has been prepared as part of this report and is included in **Attachment 9.2**. The Drinking Water Risk Assessment has been based upon the methodology described in guidance documents published by the EPA, including the "*Drinking Water Regulations Guidance Booklet No.4*", and the "*Handbook on the Implementation of the Regulations for Water Service Authorities for Public Water Supplies*".

Slane WWTP (Waste Water Discharge Licence Reg. No. D0257-01), operated by Irish Water, is located within the same catchment as the proposed development, approximately 5km downstream of the proposed discharge point and approximately 7km upstream of the Staleen Water Abstraction Point. The Drinking Water Risk Assessment provided by Slane WWP as part of their 2015 Annual Environmental Report was referenced with regards to catchment specific details.

The Drinking Water Risk Assessment report for the Dawn Meats (Slane) development concluded that the overall risk from the proposed discharge to the Drogheda / East Meath (Staleen) water abstraction plant would be considered low. This conclusion was based upon the nature of generated wastewaters, proposed discharge limits, the wastewater treatment process, the level of dilution, the quality of receiving water and the anticipated impact of discharges during normal and abnormal operations.

As noted in the section above, the proposed treated effluent emission values for BOD, Orthophosphate, Nitrogen, Total Ammonia and Suspended Solids from Dawn Meats (Slane) to the River Boyne have been based upon the river's assimilative capacity (included as **Attachment 9.1**) and current water quality. The assimilative capacity report concluded that the River Boyne would have sufficient assimilative capacity to accommodate discharges from the Dawn Meats (Slane) facility. Therefore, there would be no significant impact to the Staleen Water Abstraction Point due to emissions of Orthophosphate, Nitrogen, Total Ammonia and Suspended Solids, or due to the BOD strength of the treated wastewater.

As part of the proposed development, effluent from the clarifier would be directed to a sand filtration system, comprising a simple column sand filter, 2.5m in diameter and 5m height. While the sand filter serves to reduce the suspended solids in the final effluent, this would also reduce the microbial content of the wastewaters by filtering and retaining micro-organisms from the treated effluent. Sand filtration is estimated to remove enteric bacteria by over 90% (Rajala *et al.*, 2003; Koivunen *et al.*, 2003) with the World Health Organisation (2002) estimating that 99% of larger parasites and between 50-90% of enteric viruses are removed.

There would be a high level of treated effluent dilution in the receiving waters (River Boyne). Using the 95%ile flow figure for the River Boyne at the proposed discharge point (4.8 M^3/s) and the proposed discharge volume (400 M3/day), there would be a discharge dilution of 1 in 1,037.

It should also be noted that the proposed discharge point would be located at a significant distance, approximately 12.7km upstream, from the Staleen water abstraction point. Furthermore, a number of small streams and tributaries (including the Thurstiantown, Castleparks and Graigs streams), join the River Boyne downstream of the proposed discharge point. The considerable distance and the addition of waters from tributaries would significantly dilute the proposed discharge further.

Flora

While the proposed WWTP extension and treated effluent rising main would be within the vicinity of local drainage ditches and the Dollardstown Stream, there would be no significant loss of aquatic habitat, including riparian, or destruction to aquatic habitat. A negligible loss of riparian habitat would occur at the outfall of the proposed discharge point at the River Boyne.

No rare aquatic plant species or protected flora under the Flora (Protection) Order 2015 (S.I. 356 of 2015), were recorded within the proposed development area or immediate vicinity during the site assessment. No protected aquatic plant records for the area were submitted to the National Biodiversity Data Centre within the last decade. It is considered that there would be no risk of introducing invasive species during the discharge of treated effluent.

The assimilative capacity assessment determined that the River Boyne would have sufficient assimilative capacity for a discharge from Dawn Meats (Slane), therefore, there would be no anticipated negative impacts upon aquatic flora due to a deterioration in water quality, such as excessive eutrophication or deoxygenation of waters.

Fish

The proposed rising main and discharge would not be anticipated to result in a significant loss or destruction of habitat for fish present in the River Boyne. Development around an outfall would have a negligible footprint with minimal instream works.

Fish are susceptible to increases in sediments which can damage gravel beds required for spawning, smother fish eggs and, in extreme cases, interfere with gills. The proposed discharge limit for Suspended Solids would be 30mg/l at a flow of 400 M^3/day, resulting in only 0.13% of the headspace of the River Boyne being consumed. There would be no significant impacts upon fish due to a deterioration in water quality, as the treated effluent discharge limits have been proposed based upon the River Boyne's assimilative capacity and current water quality.

The effect of noise on fish is not fully known, however, some studies have shown that significant noise sources can halt migrating fish or result in death in extreme cases. The discharge of treated effluent from the proposed outfall to the River Boyne would not be considered to have a significant noise impact upon fish.

Therefore, the proposed development would not have any significant impacts upon fish or upon the River Boyne's designation as a salmonid water under the European Commission (Quality of Salmonid Waters) Regulations, 1988.

Birds

The majority of the footprint of the proposed development would be situated upon terrestrial habitats. Therefore, the proposed development would not result in a significant loss or destruction of aquatic habitat, including riparian, for waterbirds.

There would be no significant impacts upon waterbirds, their habitats or their prey due to a deterioration in water quality, as the treated effluent discharge limits have been proposed based upon the River Boyne's assimilative capacity and current water quality.

The River Boyne is designated as a Special Protection Area for the Kingfisher (*Alcedo atthis*), which may be present within the vicinity of the proposed discharge point and development. The proposed development would have no significant impacts upon the kingfisher as there would be no significant loss or destruction of habitat, no deterioration in water quality and no significant impacts upon the kingfisher's prey (fish and aquatic insects).

Mammals

The majority of the proposed development would take place upon terrestrial habitats. Therefore, there would be no significant loss or destruction of aquatic / riparian habitat for mammals. The proposed development would not be anticipated to have any direct disturbance to otter breeding sites.

No protected mammals or evidence of protected mammals, such as otters, were noted as present on the proposed development site or within the vicinity of the proposed route during the site assessment. However, should protected mammals be present, there would be no significant impacts from the proposed development as there would be no significant loss or destruction of habitat, no deterioration in water quality and no anticipated impacts upon potential prey such as fish.

Amphibians

While no amphibians were recorded during the site assessment, should amphibians be present onsite, there would be no significant potential habitat loss or habitat disturbance as the majority of the development would take place on land.

There would be no significant impact to amphibians due to a deterioration in water quality, as the proposed discharge limit values have been based upon the River Boyne's current water quality and assimilative capacity.

9.6 MITIGATION MEASURES

As the treated effluent discharge limits have been proposed based upon the assimilative capacity and current water quality of the River Boyne, there would be no significant impacts upon the aquatic environment.

As part of the proposed development, a review of the site's current IE Licence would be prepared and submitted to the Environmental Protection Agency (EPA) for approval. The proposed emission limit values would be assessed by the EPA, and once agreed, would be specified within the amended licence. It is likely that Dawn Meats (Slane) would be required to undertake scheduled monitoring at the discharge point for parameters specified by the EPA in the revised licence. This monitoring would ensure that treated effluent quality would remain high, and that any deviations in parameter results would be identified and addressed prior to the potential for impact upon the River Boyne.

In accordance with site's IE Licence, cleaning and integrity testing of the rising main pipeline would be undertaken every three years. This would involve the closing of the sluice valve at the end of the pipeline, near the outfall, and the power-washing of the line, with wash-water collected by means of a tanker. A CCTV survey of the line would then be undertaken, followed by pressure testing. This would reduce the potential for any leakages due to any potential damage or weaknesses within the pipeline in its lifetime.

9.7 CONSTRUCTION IMPACTS AND MITIGATION

9.7.1 PROPOSED DEVELOPMENT IMPACTS

The principal risk areas during the construction phase with regard to aquatic habitats and water quality would occur during works in the vicinity of drainage channels and the Dollardstown Stream, crossing culverted ditches / watercourses and works on the natural stone revetment at the pipeline outfall area.

As discussed in **Section 9.4**, the proposed rising main route would pass adjacent to three open field / road drainage ditches. There would be no crossings of open field drainage ditches. The Dollardstown Stream crossing, or any other culverted road drainage would likely take place within the existing road / bridge infrastructure. A detailed investigation would be undertaken for the culverted drain crossings and Dollardstown Stream crossing at the detailed design stage.

The outfall for the discharge of the treated effluent rising main into the River Boyne would consist of natural stone revetment constructed along the bank of the river on either side of the discharge point. The revetment would be approximately 4m in length and would be formed using large stones that would be placed in position to minimize erosion around the new discharge point. Where concrete is required, this would comprise of pre-cast concrete where possible. It should be noted that the extent of works which would be required for the outfall construction have not been fully defined at this stage. A more detailed investigation would be undertaken at the detailed pipeline design stage.

Risks of a deterioration in water quality could arise through the release of suspended solids during soil disturbance works, the release of uncured concrete and the release of hydrocarbons (fuels and oils).

Suspended solids could become entrained in surface water run-off and could affect aquatic habitats through deposition. An increase in sediments has the potential to impact upon fish, including Salmon and River Lamprey, by damaging gravel beds required for spawning, smothering fish eggs and in extreme cases, by interfering with the gills of fish. An increase in suspended solids has the potential to reduce water clarity, which can impact the light penetration of water and may also affect certain behaviours of aquatic fauna such as foraging success. Aquatic flora and fauna could also be impacted upon by an increase in nutrients which are bound to suspended solids. A significant increase in nutrients can result in excessive eutrophication, leading to deoxygenation of waters and subsequent asphyxia of aquatic species.

In the event of uncured concrete entering a waterbody, the pH would be altered locally, potentially leading to the death of aquatic flora, fish and macroinvertebrates and alteration to the river substrate. There is also a potential for releases of hydrocarbons from the operation of heavy construction plant and associated equipment. Hydrocarbons can affect water quality, potentially resulting in toxic and / or de-oxygenating conditions for aquatic flora and fauna.

A section of the treated effluent rising main would run adjacent to the Dollardstown Stream and would cross the stream at one location using the existing bridge infrastructure. No instream works would take place within the Dollardstown Stream and as such, it is considered there would be no significant impact to aquatic flora or fauna.

During consultation with the Development Applications Unit (**Attachment 8.2**), it was noted that a tufa spring is located in a field upstream of Stackallen Bridge. As the treated effluent rising main would be laid on the verge or within the road area, the rising main would not impact upon the hydrogeological regime of the area and therefore, there would be no impact on the tufa spring.

There would be no permanent loss of aquatic habitat due to the construction phase of the development. During construction works, there would be potential for disturbance to aquatic habitats and species. A 6m buffer zone would be established around all open surface waters and disturbance to riparian vegetation would be kept to a minimum.

The construction phase would result in increased noise emissions. The effect of noise on fish is not fully known, though some studies have shown that significant noise sources can halt migrating fish or result in death in extreme cases. However, noise emissions are not considered to pose a significant risk to aquatic species owing to the transient nature of works, the absence of in-stream works and given that all vehicles where possible would be equipped with mufflers to suppress noise, as is standard practice.

9.7.2 MITIGATION

The following mitigation measures would be proposed to ensure there is no significant impact upon the aquatic biodiversity of the area owing to a deterioration in water quality:

- The construction works contractor would adhere to standard construction best practice, taking cognisance of the Construction Industry Research and Information Association (CIRIA) guidelines "*Control of Water Pollution from Construction Sites; guidance for consultants and contractors*" 2001 and "*Control of Water Pollution from Construction Sites – Guide to Good Practice*", 2002;
- Cognisance would be taken of the 2016 guidelines published Inland Fisheries Ireland, "*Guidelines on Protection of Fisheries During Construction Works in and adjacent to Waters*";
- Daily visual inspections would be undertaken of watercourses during construction works;
- A 6m buffer zone would be maintained around all watercourses (with the exception of watercourse crossings), where feasible;
- Provision of silt control features where appropriate, such as silt fencing;

- Silt fencing (comprising of a porous filter fabric which detains sediment) would be provided along the boundary of the 6m buffer zone along the Dollardstown River, and at places where the rising main comes within close proximity to any other watercourses. Silt fencing would remain in place until the completion of construction works;

  - Additional silt fencing would be placed adjacent to storage areas of stockpiled soil, until such time as the excavated soil has been used in landscaping / re-instatement works or removed offsite by a licenced waste contractor;
- Silt control features would be inspected on a daily basis and maintained as appropriate;
  - Where spoil is generated, this would only be stored temporarily and away from surface waters. Where possible, spoil would be covered or alternatively, graded to avoid ponding or water saturation;
  - Excavations and earth-moving activities would be planned outside periods of heavy rainfall, to limit the potential for suspended solids to become entrained within surface water run-off;
  - Should water be encountered during excavation works, water would be pumped to a constructed silt control feature, such as a settlement pond or detention pond. A filter would be provided at the pump inlet and, where required, dewatering bags or silt fences would be used at the outlet to retain any potential silt entrained in the water. Pumping operations would be supervised at all times;
  - Where possible, surface water run-off would be diverted from areas of bare / exposed ground;
  - All construction plant machinery and equipment would be maintained in good working order and regularly inspected;
- The temporary site compound would be used for the storage of all machinery and plant when not in use, the re-fuelling of plant and the storage of all associated oils and fuels for plant;
  - A self-contained mobile welfare unit providing sanitary services would be located at the temporary site compound and would be emptied by a licenced contractor on a regular basis;
  - Any fuels, oils or chemicals would be stored in accordance with the EPA guidance on the storage of materials, in designated bunded areas at the temporary site compound, with adequate bund provision to contain 110% of the largest drum volume or 25% of the total volume of containers;
  - Material storage areas would be appropriately labelled and marked;
  - The designated area for the storage of hydrocarbons would be inspected on a regular basis;
  - Deliveries of fuels and oils to the site would be supervised and records maintained;
  - All loading and unloading of hydrocarbons would take place within the bunded area where possible;
  - Fuels / oils would be handled and stored with care to avoid spillage or leakage;
  - Where appropriate, small construction plant equipment would be placed on drip trays;
  - The diesel generator would be suitably bunded;

  - Any waste fuel / oils would be collected in bunded containers at designated areas (i.e. temporary construction compound for rising main works) and properly disposed of to an authorised waste contractor;
  - Spill kits, adequately stocked with spill clean-up materials such as booms and absorbent pads, would be readily available onsite;
  - In the unlikely event of a hydrocarbon spillage, contaminated spill clean-up material would be properly disposed of to an authorised waste contractor;
  - The construction works contractor would ensure the relevant site personnel are trained in spillage control;
- Where re-fuelling of construction plant is required to take place onsite, re-fuelling would take place within a bunded area, within the temporary site compound or at a designated location within the site boundary for WWTP works. Under no circumstances would re-fuelling take place within the immediate vicinity of watercourses, including drainage ditches;
  - Re-fuelling onsite would only be undertaken by experienced and trained personnel;
  - Where construction plant shows signs of hydrocarbon leakage, site personnel would cease the operation of the item in plant in question. Any defective plant would be kept out of service until the necessary repairs are undertaken;
  - The use of pre-cast concrete where possible;
  - The delivery and pouring of concrete would be supervised at all times;
  - Concrete would be poured directly into the shuttered formwork from the Ready-Mix Truck, reducing the risk of spillage;
  - The wash-out of Ready-Mix Truck drums would not be permitted onsite, in the environs of the site, or at a location which could result in a discharge to surface water;
  - The disposal of excess uncured concrete would be removed from site by an authorised waste contractor;
  - The pouring of concrete would be avoided during periods of expected heavy rainfall;
  - It is not envisaged that vehicle wheel wash facilities would be required. However, in particularly dry weather, additional dust control measures may be required, including the provision of a wheel wash facility. Should a wheel wash facility be required, it would be located at an area isolated from any watercourses. The associated run-off would be collected via a settling pond;
- Particular care would be taken during the construction of the discharge point outfall. Plant operation within the River Boyne or the Dollardstown River would be avoided. Mitigation measures specified above for suspended solids, concrete and hydrocarbons would be followed;
  - To minimise any potential impacts on salmonid fish, outfall works would be undertaken in the July to September period where possible, which would avoid the salmonid spawning season. Should outfall works be required outside the July – September timeframe, works would only commence upon prior agreement with IFI;
  - While a crossing method has not yet been determined for the watercourse crossing required to accommodate Construction Access Route 1, cognisance would be taken of the IFI's "*Guidelines on Protection of Fisheries During Construction Works in and*

adjacent to Waters". The design and choice of crossing would provide for the passage of aquatic fauna, would prevent erosion and sedimentation and would be laid in such a manner as to maintain the existing watercourse profile. The structure would be covered with clean, inert material and would be fenced with silt fencing or similar to prevent sediment entering the watercourse;

  - Monitoring of receiving water for suspended solids would be undertaken where required;
  - In the unlikely event of a suspected deterioration in water quality within any of the watercourses due to construction works at the development site, works would immediately cease, an investigation into the cause undertaken and the relevant NPWS and Inland Fisheries Ireland personnel informed;

- The construction work contractor would prepare a detailed Construction Environmental Management Plan (CEMP) for all construction activities, in line with the Outline CEMP prepared as part of this application. The CEMP would describe how construction work would be undertaken in an environmentally sensitive manner and would include measures for the protection of water quality such as the implementation of silt control features;

9.8 RESIDUAL IMPACTS

Assuming all mitigation measures are put in place, there would be no significant residual impacts to the aquatic environment from the proposed development.

9.9 REFERENCES

BREF Document for Slaughterhouses and Animals By-products Industries (2005). *Reference Document on Best Available Techniques in the Slaughterhouses and Animal By-Products Industries.*

Dublin Regional Authority (2010). *Regional Planning Guidelines for the Greater Dublin Area 2010 – 2022.*

Environmental Protection Agency, Biological Q Value Results for the River Boyne. Available at: http://www.epa.ie/qvalue/webusers/HAResults.asp#BOYNE

Environmental Protection Agency Ireland (Environmental Protection Agency) (2001). *Parameters of Water Quality: Interpretation and Standards.* Environmental Protection Agency, Wexford.

Environmental Protection Agency (2017) Draft. *Guidelines on the information to be contained in Environmental Impact Assessment Reports*.

Environmental Protection Agency (2015). *Water Quality in Ireland 2010 – 2012.* Available at: https://www.epa.ie/pubs/reports/water/waterqua/wqr20102012/

Environmental Protection Agency (2013). *Integrated Water Quality Report 2012 – Monaghan & Louth.* Available at:https://www.epa.ie/pubs/reports/water/waterqua/iwqmolou/

Environmental Protection Agency (2010). *A Handbook on the Implementation of the Regulations for Water Service Authorities for Public Water Supplies.* Available at: http://www.epa.ie/pubs/advice/drinkingwater/publicwatersupplieshandbook/Introduction.pdf

Environmental Protection Agency (2008). *Drinking Water Regulations Guidance Booklet No.4*.

Environmental Protection Agency, 2016. *Drinking Water Audit Report, Staleen WTP and Roughgrange Pumping Station.,* Available at : https://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwaterauditreports/Staleen.pdf [Accessed January 2021]

EPA Envision Online Mapping, Available at: http://gis.epa.ie/Envision/

European Communities Environmental Objectives (Surface Waters) Regulations (S.I. No. 272 of 2009).

European Communities (Quality of Salmonid Waters) Regulations (S.I. No. 293 of 1988).

European Communities (Quality of Surface Water Intended For The Abstraction of Drinking Water) Regulations (S.I. No. 294 of 1989).

Fossitt J. (2000). A Guide to Habitats in Ireland. Heritage Council.

Inland Fisheries Ireland (2016). Guidelines on Protection of Fisheries During Construction Works in and adjacent to Waters.

Koivunen, J., Siitonen, A. and Heinonen-Tanski, H. (2003). Elimination of enteric bacteria in biological-chemical wastewater treatment and tertiary filtration units. Water Research, 37, pp. 690-698.

Meath County Council (2016). Meath County Development Plan 2013 – 2019. Consolidated version, Available at: https://countydevelopmentplan.meath.ie/

Mittal, G.S. (2004). Characterization of the Effluent Wastewater from Abattoirs for Land Application. Food Reviews International, 20(3), pp. 229-256.

NPWS (2018) Conservation Objectives: River Boyne and River Blackwater SAC 002299. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

NPWS (2018) Conservation Objectives: River Boyne and River Blackwater SPA 004232. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

NPWS (2014) Site Synopsis: River Boyne and River Blackwater SAC 002299. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

NPWS (2010) *Site Synopsis: River Boyne and River Blackwater SPA 004232.* National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

National Parks & Wildlife Service, Available at: http://www.npws.ie/protected-sites

National Roads Authority (2008). *Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes.*

Rajala, R.L., Pulkkanen, M.P, Pessi, M. and Heinonen-Tanski, H. (2003). Removal of microbes from municipal wastewater effluent by rapid sand filtration and subsequent UV irradiation. *Water Science & Technology*, 47(3), pp. 157-162.

USEPA (2004). *Technical Development Document for the Final Effluent Limitations – Guidelines and Standards for the Meat and Poultry Products Point Source Category*.

Wcislo, R. and Chróst, R.J. (2000). Survival of Escherichia coli in Freshwater. *Polish Journal of Environmental Studies*, 9(3), pp. 215-222.

World Health Organisation, (2002). *Managing Water in the Home: Accelerated Health Gains from Improved Water Supply*.

WSTG (2011). Guidance, Procedures and Training on the Licensing of Discharges to Surface Waters, Groundwater and to Sewer for Local Authorities: Volume 1 – Technical Guidance Manual. Water Services Training Group, Monastery Road, Roscrea, Co. Tipperary.

10.0 LAND – SOILS, GEOLOGY AND HYDROGEOLOGY

10.1 INTRODUCTION

This chapter of the EIAR describes the Soils, Geology and Hydrogeology in the existing environment surrounding the proposed development. The objective of this chapter is to determine the likely impacts on the soils, geology and hydrogeology of the area arising from the proposed development and to propose measures to mitigate against these impacts, if required.

Dawn Meats Ireland Unlimited Company are applying for planning permission to Meath County Council for an extension to their existing on-site effluent treatment system including construction of a new treated effluent rising main pipeline which would discharge to the River Boyne.

Currently effluent is screened and pumped from an underground storage tank (UST) in the southern area of the abattoir to two on-site effluent storage lagoons, prior to being tankered off-site to a municipal wastewater treatment plant or other suitable wastewater treatment facility. Up to 2014 the effluent was partially treated using an on-site Integrated Constructed Wetland (ICW) before being tankered off-site. Decommissioning of the ICW area commenced in early 2014 was successfully completed by November 2015. The proposed extension to the existing on-site effluent treatment plant is located in the area previously occupied by the former ICW ponds.

Dawn Meats (Slane) have received planning approval (Planning Ref: LB180300) to extend their existing on-site effluent treatment system to provide for additional treatment to the process effluent produced at the facility, including Primary Treatment – Stage 2 (new flow balancing and emergency storage) and Biological Treatment – Stage 3 of wastewaters, resulting in a treated effluent of high quality.

This planning application includes for the demolition of an existing storage building, construction of an extension to the approved control house within the approved WWTP compound area, installing a new sludge press, converting the approved aeration tank to an anoxic tank, two new aeration tanks including a proposed extension to the existing approved effluent plant compound area.

The proposed development also includes for a proposed treated effluent rising main from the Dawn Meats (Slane) facility to a discharge outfall at the River Boyne.

A detailed description of the existing and proposed development is outlined in **Section 2** of this EIAR.

10.2 METHODOLOGY

The assessment of this desk based soils, geology and groundwater chapter comprised the following:

- Desk study to establish existing geology, soils and groundwater information for the site and surrounding area;
- Review of details of previous site investigations undertaken in:
  - 2007, '*Hydrogeological Site Characterisation'*, GES. This study involved trial pit excavations as part of monitoring works for the ICW;
  - 2011, *Preliminary Hydrogeological Investigation report.* Report Reference DB/11/5336/WR02, AWN Consulting. The study focused, in particular, on groundwater quality in the bedrock beneath the area of the site which was occupied by the ICW;
  - 2014, *Hydrogeological/Water Supply Report.* SLR Consulting. Report Reference 501.00213.00006. Rev 01. This study reported the results of the water supply drilling and testing programme undertaken;
  - 2014, *Intensification of Use - Soils and Geology EIS chapter and Hydrology and Hydrogeology EIS Chapters.* SLR Consulting. This assessed the impacts of increasing the cattle throughput at the Dunbia / Dawn Meats site from 200 – 300 cattle per day;
  - 2017 *Groundwater Monitoring Report for the Environmental Protection Agency*. IE Consulting Report No. IE1340-2050. This report comprised a review of groundwater monitoring data from 2011 to 2016 at the Dawn Meats (Slane) site.
- Review of information for the proposed development including any available site investigation data;
- Interpretation of all data, assessment and reporting.

This chapter was prepared in accordance with the following national guidance documents on environmental impact assessment:

- Guidelines on the Information to be Contained in Environmental Impact Statements (Environmental Protection Agency, 2002);
- Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft) (Environmental Protection Agency, 2015);
- Advice Notes on Current Practice in the preparation of Environmental Impact Statements (Environmental Protection Agency, 2003);
- Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (Institute of Geologists of Ireland, 2013);
- Control of Water Pollution from Construction Sites (Construction Industry Research and Information Association, 2001).

10.3 INFORMATION SOURCES

In addition to those outline above, the following sources of information were consulted during the desk study:

- Geraghty, M. and McConnell, B. (Compilers) 1999. Bedrock Geology 1:100,000 Scale Map Series, Sheet 13, Meath. Geological Survey of Ireland;
- Environmental Protection Agency's online mapping viewer Envision. Accessed 31st March 2020;
- Geological Survey of Ireland's Spatial Resources Viewer. Accessed 31st March 2020;
- Ordnance Survey of Ireland's online Geohive Viewer. Accessed 31st March 2020;
- European Communities Environmental Objectives (Groundwater) Regulations (S.I. No. 366 of 2016).

10.4 DESCRIPTION OF EXISTING ENVIRONMENT

This section describes the existing environment in terms of the current soils and geology underlying the abattoir site and the area extending northward towards the river Boyne where the proposed pipeline route would be. The soils and geology is described on a regional and local scale as well as its interaction with the groundwater regime at the site. Based on this information, the potential impacts of the proposed development are identified, as are the measures required to mitigate against any identified negative impacts on the soils, geology and groundwater environment.

10.4.1 SOILS

Soil is the top layer of the earth's crust. Soil formation is dependent upon geology, climate, vegetation, altitude, landform shape and finally management over time. The soil landscapes found in Ireland are a consequence of the changing climatic conditions over the last 100,000 years (with periods of glaciation, the last of which was 12,000 years ago) and the management of land by farmers.

<u>Proposed Wastewater Treatment Plant (WWTP) Compound Extension</u>

The Geological Survey of Ireland's (GSI's) on-line mapviewer indicates that the soils underlying the WWTP site are classified as shallow well drained mineral soils derived mainly from calcareous parent material (**BminSW**) as shown on Figure 2, Appendix A of **Attachment 10.1**. Site specific details from the trial pits excavated in 2007 indicate the soil comprises sandy CLAY topsoil (**Table 10.1**).

<u>Proposed Treated Effluent Rising Main Route</u>

The Geological Survey of Ireland's (GSI's) on-line mapviewer indicates that soils vary along the treated effluent rising main route. The soils underlying the pipeline route comprise **Rck**, **BminDW** (Deep well drained mineral (Mainly basic), **BminPD** (Mineral soil, poorly drained till chiefly derived from limestone), **A** (alluvial) **BminSW** (Shallow well drained mineral (Mainly basic) as shown on Figure 2, Appendix A of **Attachment 10.1**.

10.4.2 QUATERNARY GEOLOGY

The Quaternary Period includes the start of the Ice Age (approximately 1.6 million years ago), known as the Pleistocene Epoch, right through to the postglacial period, known as the Holocene Epoch, which began 10,000 years ago. In Ireland the Pleistocene Epoch began when there was a significant cooling of the Earth's climate and it was characterized by alternating extended periods of very cold conditions, during which time much of the country was covered by an ice sheet. As the ice travelled over the ground, it eroded the underlying bedrock, which caused sediment to form within and beneath the ice sheet. The sediment consisted of particles with a wide ranging size distribution (from clay particles to boulders).

The two main deposits of Quaternary subsoil in Ireland are glacial till, deposited at the base of the ice sheets, and sand and gravel deposits associated with the melting of the ice sheets, which are generally called glaciofluvial outwash sands and gravels.

Proposed WWTP Compound Extension

The Geological Survey of Ireland's (GSI's) on-line webmapper indicates that subsoils are absent at the location of the proposed WWTP with bedrock being at, or close to, the surface (**Rck**). To the north, south and west of the Dawn Meats (Slane) site the subsoils comprise mainly Carboniferous Limestone till (**TLs**) (see Figure 3, Appendix A of **Attachment 10.1**). The EPA WFD HydroTool website indicates the limestone till in the area is of Low (L) permeability. Site specific information on subsoils is available from the site investigations conducted in 2007, 2011 and 2014 as described below.

Four trial holes excavated in 2007 (**Table 10.1**) in the vicinity of the proposed WWTP site (Geotechnical & Environmental Services Ltd.) describe light brown sandy **CLAY** topsoil, underlain by gravelly **CLAY**. Depth to bedrock (SHALE) was logged as 1.2 m – 1.6 m below ground level (mbgl). Particle Size Distribution (PSD) analysis of subsoil samples taken from the trial holes indicated a clay content ranging from 11.4% – 22%. Assessment of the results concluded that the subsoils had a permeability of at least 1 x10^{-8} m/s and at least 1 x10^{-9} m/s in places. The results also suggested that the natural permeability of the subsoils underneath the former ICW ponds varied from north to south with the higher content clay subsoils occurring on the southern side of the former ICW. The trial hole locations are shown in Drawing No. IE1380-003-A of **Attachment 10.2** and trial holes logs are included in Appendix B of **Attachment 10.1**.

Five shallow bedrock monitoring boreholes drilled in 2011 (M1-M5) encountered mainly sandy **CLAY** subsoils to depths of 1.8 mbgl – 5.0 mbgl in the vicinity of the WWTP site (Drawing No. IE1380-002-A, **Attachment 10.2**).

Sandy gravelly **CLAY** subsoils were encountered, in the field to the east of the proposed WWTP site, to depths of between 2 mbgl - 3 mbgl during test well and monitoring well drilling in 2014 (Drawing No. IE1380-002-A, **Attachment 10.2**).

In summary, investigations indicate sandy, gravelly **CLAY** subsoils to depths of between 1.6m – 5.0m beneath the proposed WWTP site. Groundwater was not encountered in the subsoils during any trial pitting or borehole drilling works.

Table 10.1: Trial Pit Summary Details

	TP1	TP2	TP3	TP4
Year Excavated	16/01/07	16/01/07	09/01/07	09/01/07
Depth (mbgl)	1.3	1.4	2.5	2.0
Trial Pit summary details	0 – 0.6 Slightly sandy CLAY topsoil 0.6 – 1.3 Slightly gravelly silty CLAY	0.0 - 0.4 Sandy CLAY topsoil 0.4 – 1.4 Gravelly CLAY	0.0 – 0.4 Sandy CLAY topsoil 0.4 – 1.2 Gravelly CLAY 1.2 – 2.5 SHALE bedrock	0.0 – 0.6 Slightly sandy topsoil 0.6 – 1.6 Silty gravelly CLAY 1.6 – 2.0 SHALE bedrock
Depth water ingress (mbgl)	-	-	1.5 m	

Proposed Treated Effluent Rising Main Route

The Geological Survey of Ireland's (GSI's) on-line mapviewer indicates the subsoils underlying the proposed WWTP site are Bedrock at, or close, to surface (Rck).

The subsoils mapped by the GSI along the pipeline route are as follows: Gravels derived from Limestone, Alluvium, Till derived from Limestones and Bedrock Outcrop/Subcrop.

Refer to Figure 3, Appendix A of **Attachment 10.2** for the spatial distribution of soil types along the rising main pipeline route.

10.4.3 MADE GROUND

Proposed WWTP Compound Extension

It is proposed to construct the new WWTP extension adjacent to the current approved compound, in the area of the abattoir site that was formerly occupied by the ICW ponds. The ICW ponds have been decommissioned and this area now comprises MADE GROUND (although this is not mapped on the GSI's on-line web-viewer). Due to the construction of the ICW, the natural topography on this part of the site has been highly modified because of the cut and fill design and construction. The former layout and location of the ICW ponds in relation to the main process area of the site is shown in Drawing No.IE1380-003-A, **Attachment 10.2**). The composition of the made ground is not known.

Proposed Treated Effluent Rising Main Route

The rising main route will encounter MADE GROUND where excavation is required along public roadways. Site specific investigations along the public roadways have not been completed as part of this study. Thus, the composition of the made ground is unknown (Figure 3, Appendix A, **Attachment 10.1**).

10.4.4 BEDROCK AND STRUCTURAL GEOLOGY

The Geological Survey of Ireland's (GSI's) online webviewer indicates that the proposed WWTP site and the majority of the proposed treated effluent rising main route is underlain by **Loughshinny Formation (LO).** This formation is described as laminated to thinly bedded, argillaceous, pyritic, locally cherty limestone interbedded with dark grey to black shale (GSI, 2001). This limestone is represented on GSI's Generalised Bedrock Map as **Dinantian Upper Impure Limestones (DUIL).** The northern part of the treated effluent rising main route B, where the rising main is proposed to discharge to the River Boyne, is underlain by the **Boyne Formation (BX)** described as a mainly nodular and irregularly bedded argillaceous limestone, commonly dolomitised and subordinate calcareous shale, also with units of distinctive limestone (GSI, 2001).

The rising main section which runs along the L1013, Windmill Road and enters the factory along its main access route is located in the **Donore Formation (DR).** The formation consists mainly of interbedded shale and subordinate basinal limestone (Figure 1, Appendix B of **Attachment 10.1**.).

The Dinantian rocks in the area have been highly folded and faulted. The proposed WWTP site is located on the north-western limb of a northeast/southwest trending Variscan syncline (V-shaped fold). The surrounding area is characterised by numerous NNW/SE trending faults and E-W faults. The nearest fault, the regional Beauparc Fault, is mapped is mapped c. 200 m east of the proposed WWTP site.

Site specific information on geology was available from wells installed for abstraction purposes at the existing Dawn Meats (Slane) site in 2014. Drilling encountered a significant thickness (c.50 m) of competent limestone overlain by 2 m - 3 m of clayey (glacial till) superficial deposits. The limestone was described as "grey" or "grey/black" limestone and the upper weathered zone encountered (MW3a, MW4, MW5 and MW5a) ranged in thickness from 0.3m (M4) to 1.3 m (M5). Summary details for all boreholes at the existing site are tabulated in **Table 10.2** below and borehole locations are shown in Drawing IE1380-002-A of **Attachment 10.2**. A water bearing cavity was encountered in MW02 at 2.5 mbgl - 3.5 mbgl. This is interpreted to be due to karstification of the limestone. Evidence of karstification is absent from the remaining drilling records. Limestone, below the weathered zone is generally described as competent with isolated fractures encountered at depth (58 mbgl - 118 mbgl) in the deep test/production boreholes.

A spring rises south of the site (Drawing No. 1380-004-A, **Attachment 10.2**). An assessment of this spring was undertaken in 2005 ('Newgrange Meats - Assessment of Spring', Geotechnical & Environmental Services Ltd., 2005. Report No. 05-35). The springs location in close proximity to a geological contact between the Loughshinny Formation (Dinantian Limestones) and the Donore/Balrickard Formations (Namurian undifferentiated) was interpreted to indicate that that the spring is related to the contact, causing upwelling of groundwater at this location.

10.4.5 DEPTH TO BEDROCK

Site specific information on depth to bedrock in the vicinity of the WWTP site is available. The nearest groundwater monitoring wells (MW5, MW5a and MW3a) indicate that depth to bedrock is 3.2 mbgl – 5.0 mbgl in the vicinity of the WWTP site.

No site specific information on depth to bedrock is available for the treated effluent rising main route. Groundwater vulnerability (**Section 10.4.15**) along the treated effluent rising main route is classified as Extreme (E and X) in vicinity of the WWTP site and at the discharge to the River Boyne. (Figure 5, Appendix A of **Attachment 10.1***)*. This would indicate that there are 0 - 3 m depth of subsoil's the extreme vulnerability areas.

The majority of the remaining route is characterised by low groundwater vulnerability with some small stretches of moderate vulnerability. This indicates these areas are underlain by subsoils >3 m in thickness.

Table 10.2: Summary of Borehole Details

Well Details	M1	M2	M3	M3a	M4	M5
Year of Installation	2011	2011	2011 (Decommissioned 2014)	2014	2011 (Decommissioned 2014)	2011
Drilled Well Depth (m)	10.5	10.0	10.0	10.5	10.5	10.0
Screened/Open Interval (m)	4.5 - 10.5	3.0 - 10.0	5.0 - 10.0	4.5 - 10.5	7.5 - 10.5	6.0 - 10.0
Depth to Bedrock (m)	3.1	1.8	4.1	3.2	7.2	3.2
Drilling Log Summary	0-3.1m: Sandy CLAY with boulders 3.1-10.5m: Grey LIMESTONE	0-1.8 m: Sandy CLAY 1.8-10.0m: Grey LIMESTONE	0-4.1 m: Sandy CLAY 4.1-10. m: Grey LIMESTONE	0-3.2m: Gravelly CLAY 3.2-4.2m: Weathered LIMESTONE 4.2-10.5m: Dark grey/black competent LIMESTONE	0-4. 3m: MADE GROUND 4.3-7.2m: CLAY with boulders 7.2-7.5m: Weathered LIMESTONE 7.5-10.5m: Dark grey silty LIMESTONE	0-3.2m: Sandy CLAY 3.2-4.5m: Grey weathered LIMESTONE 4.5-10.m: Grey LIMESTONE
Depth Water Strikes (m bgl)	6.6	3.5	4.1	None (damp at 6.0 m)	7.5	5.8
Internal diameter (m)	50	50	50	50	50	50
Measured Well Depth (m)	10.0	9.7	-	9.8	9.9 - 10.0	-

Well Details	M5a	MW01	MW02	BW01 (TW01)	BW02	BW03
Year of Installation	2014	2014	2014	2014	Not known	Not known
Drilled Well Depth (m)	12.2	118.5	118.5	118.5	-	-
Screened/Open Interval (m)	8.2 - 12.2	18 – 118.5	3 - 118.5	50 - 110	-	-
Depth to Bedrock (m)	5.0	3	2	3	-	-
Drilling Log Summary	0-0.5m: Gravelly CLAY 0.5-3.2m: Clayey SAND 3.2-5.0m: Gravelly CLAY 5.0-6.2m: Weathered LIMESTONE 6.2-12.2m: Dark grey/black competent LIMESTONE	0-3 m: CLAY 3-118.5 m: LIMESTONE	0-2 m: CLAY 2-2.5m: LIMESTONE 2.5-3.5m: cavity/broken limestone 3.5-118.5m: Competent LIMESTONE	0-3m: CLAY 3-118.5m: LIMESTONE	-	-
Depth Water Strikes (m bgl)	5.0	75 (4 m^3/hr) 75-118 (minor strikes)	2.5-3.5 (80 m^3/hr) 59 (1m^3/hr) 74 (1m^3/hr)	58 (4m^3/hr) 110 (30m^3/hr)	-	-
Internal diameter (m)	50	63	63	165	-	-
Measured Well Depth (m)	12.6 – 12.7	-	-	-	-	-

10.4.6 GEOLOGICAL HERITAGE

The Irish Geological Heritage (IGH) Programme identifies and selects a complete range of sites that represent Ireland's geological heritage under sixteen themes ranging from Karst features to Hydrogeology. The IGH Programme is a partnership between the GSI and the National Parks and Wildlife Service (NPWS) and sites identified as important for conservation are conserved as Natural Heritage Areas (NHA). The Meath County Development Plan (2013 – 2019) states that geology is now recognised as an intrinsic component of natural heritage and it is appropriate that due regard is given to the conservation of geological heritage features in planning and control.

Reference to the GSI online database confirms there are no sites of geological heritage within the perimeter of the WWTP and proposed pipeline route. The nearest site of geological heritage is Painestown Quarry, c. 0.3 km to the northeast of the WWTP and 110 m north east of the effluent rising main route (Figure 4, Appendix A of **Attachment 10.1**) The site is designated under the Lower Carboniferous Geology IGH 8 theme (Appendix C, **Attachment 10.1**). This disused quarry, now heavily vegetated, contains exposures of chevron folding of the Loughshinny Formation with limestone and shale complementing the coastal geology at Loughshinny. The quarry is classified as a County Geological Site (CGS) and may be recommended for NHA designation in the future.

The next nearest site of geological heritage is the Boyne River Valley (Site ID: 001592) c. 3.0 km to the northwest of the WWTP site designated under the IGH7 theme (Appendix C, **Attachment 10.1**). This nationally important example of a glacially derived valley is classified as a County Geological Site (CGS) and is designated as a proposed NHA.

The rising main enters the proposed NHA where the treated effluent will be discharged to the River Boyne.

The discharge point is also located within the River Boyne & River Blackwater Special Area of Conservation (SAC) (Site ID: 002299) and the River Boyne & River Blackwater Special Protection Area (SPA) (Site ID: 004232).

10.4.7 ECONOMIC GEOLOGY

There are no operational quarries in the vicinity of the site. The online GSI quarry database indicates the nearest operational quarry (as of 2020) is Slane Quarry c. 4.3 km to the NNW of the site. Examination of historic 25" OSI mapping (1897-1913) and 6" OSI mapping (1829-1941) shows no records of historic quarrying activity, apart from Painestown Quarry, described above in **Section 10.4.6**, c. 0.3 km to the NW of the proposed WWTP site, within the boundaries of the proposed development site or along the proposed pipeline route.

GSI online web-mapping indicates the following mineral localities in the vicinity of the proposed WWTP site and proposed rising main route:

- A disused quarry (Painestown Quarry) of blue grey limestone located 0.3 km to the north of the proposed WWTP site. This site has potential for walling stone production. The quarry is c. 110 m north east of the effluent rising main route.

- Disused quarry of limestone and dimension stone located c. 2.3 km to the northwest of the proposed WWTP site. It has potential as a source of blocks for cutting as well as for walling stone, although access difficulties could cause problems;
- Quarry of limestone and dimension stone located c. 2.6 km to the west/southwest of the proposed WWTP site. It may have potential as a source of walling stone. It is not clear if this quarry is still operational although it appears unlikely to be.
- Beauparc Copper Mine located c. 1.7 km north/northwest of the proposed WWTP site. The pipeline route is located c. 1 km South East, 'as the crow flies' from the Beauparc Copper Mine. The mine was enlarged in 1909 and is recorded as containing 15% Cu in the form of chalcopyrite in a 2 ft vein.

10.4.8 GEOHAZARDS

The GSI's online landslide database indicates there are no historic landslides recorded on the site of the proposed WWTP or within 5km radius of it. The nearest recorded landslide is c.10km to the east/northeast at Sheephouse where a shallow rotational earth flow occurred (date not given). There are no recorded landslides along the treated effluent rising main route.

There are no karst features mapped on the site or proposed treated effluent rising main route or within a 1 km radius of the route. It must be noted, however, that the GSI's karst database is by no means comprehensive and that karst features that have not been mapped by the GSI may exist.

10.4.9 RADON

Radon is a naturally occurring radioactive gas formed by the radioactive decay of uranium and thorium which may be present in varying quantities in rocks, soils and groundwater. The greatest health risk from radiation in Ireland is caused by radon. It accounts for more than half of the total radiation dose received by the Irish population (EPA, 2016).

Radon is classified by IARC (International agency for research on cancer) as *Group 1 - carcinogenic to humans*. Radon is second only to smoking as the leading cause of lung cancer. It is estimated that some 250 lung cancer cases each year in Ireland are linked to radon exposure (EPA, 2016).

The EPA's online Radon Map was consulted. This map shows a prediction of the number of homes in a given grid square that exceed the national Reference Level (200 bequerel per cubic metre (Bq/m^3)). Grid squares in which the predicted percentage of homes is 10% or greater are called High Radon Areas.

The EPA's Radon Map shows that the site of the proposed WTP is not in a High Radon area (where radon levels in >10% of homes are estimated to be above the reference level). In the vicinity of the WWTP site between 5% and 10% of the homes are estimated to have radon levels above the Reference Level. The area to the north of the proposed WWTP site, between it and the River Boyne, (the general area of the proposed rising main route) is a High radon area with between 10% and 20% of the homes in this area estimated to be above the Reference Level. A high radon level can be found in any home/building in any part of the country, but these homes/buildings are more likely to be located in High Radon Areas.

10.4.10 AQUIFER CLASSIFICATION AND GROUNDWATER BODY CHARACTERISATION

The carboniferous limestone beneath the existing facility, proposed WWTP site and proposed treated effluent rising main route are classified by the GSI as a **Locally Important aquifer (Lm) – bedrock which is generally moderately productive** and forms part of the **Trim Groundwater Body (GWB).**

The rising main section which runs along the L1013, Windmill Road and enters the factory along its main access route is located in a **Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones.** This forms part of the **Donore GWB.** Overall, the route runs for c. 1.16 km in the Donore GWB.

The GWB is the management unit under the WFD that is necessary for the subdivision of large geographical areas of aquifer in order for them to be effectively managed. The Trim GWB has the following characteristics as described by the GSI (GSI, 2004):

- Aquifers in this GWB comprise a large area of extremely heterogeneous limestone. The main aquifer lithology comprises Dinantian Upper Impure Limestones (Calp Limestones) which are typically impure limestones and limestones interbedded with calcareous shales;
- Aquifer thickness varies due to the highly variable structural and weathering influences on the bedrock across the region;
- There is evidence of groundwater inflows from cavities 50 m below ground level (at Summerhill and Enfield, Co. Meath);
- Groundwater flows from the areas of high recharge in the uplands, where soils are thin, to the main surface water bodies overlying the aquifer (e.g. River Boyne);
- The nature of groundwater flow in the aquifer is determined by the degree of karstification, fracturing and purity if the limestones;
- Pumping tests from Slane WS (PW1) indicate a hydraulic conductivity of 70 – 200 m2/d. The specific yield of 0.002 was calculated from the early data from the Trial Well No.2 and indicates that the aquifer is unconfined;
- A pumping test conducted at the existing Dawn Meats (Slane) site in 2014 indicated transmissivity values ranging between 2.2 x 10^{-4} m2/sec and 8.5 x 10^{-5} m2/sec (0.12 m/d and 0.4 m/d), assuming an aquifer thickness of c. 60 m. The estimated storage coefficient ranged between 7 x 10^{-4} and 3 x 10^{-3}, which suggest confined to leaky conditions;
- The hydraulic gradient within the saturated zone of the aquifer was estimated at 0.036, based on groundwater contours published in the preliminary hydrogeological investigation report (SLR, 2015).
- The pumping test results suggested the productive part of the aquifer is protected from surface pollution impacts due to the substantial thickness (50 m) of overlying 'competent' limestone strata. Vertical travel times through this aquitard are expected to be significant. It's possible the regional fault which may be present in the vicinity of the site may act as a vertical pathway from the ground surface to the productive part of the aquifer. However, the pumping test results did not indicate that significant vertical leakage via such a pathway is likely to be present. This is supported by water quality results for TW01 which show no evidence of pollution impacts in this well (SLR, 2014).

10.4.11 SITE HYDROGEOLOGY AND GROUNDWATER FLOW

The local hydrogeology of the existing facility and proposed WWTP site was investigated during the drilling programs conducted in 2011 and 2014. Shallow groundwater monitoring wells M1 – M5 were installed at the now decommissioned ICW for groundwater monitoring purposes and an additional water supply well was developed to the north east of the ICW. Groundwater strikes were encountered in all boreholes drilled in the shallow bedrock. The depth of the strikes varied from 3.5 mbgl (M2) to 7.5 mbgl (M4). No water strikes are recorded in the subsoils during drilling.

A water bearing cavity was encountered in MW02 at 2.5 mbgl - 3.5 mbgl. This is interpreted to be due to karstification of the limestone. Evidence of karstification is absent from the remaining drilling records. Limestone, below the weathered zone is generally described as competent with isolated fractures encountered at depth (58 mbgl - 118 mbgl) in the deep test/production boreholes.

The deeper test/production wells encountered a significant thickness (c.50 m) of competent limestone overlain by 2 m – 3 m of clayey (glacial till) superficial deposits. The productive part of the limestone aquifer was taken to be the zone below 50 mbgl where water strikes occurred in the deep wells.

A pumping test indicated transmissivity values ranging between 2.2 x 10^{4} m^2/sec and 8.5 x 10^{-5} m^2/sec, resulting in a corresponding permeability ranging from 1.4 x 10^{-6} m/sec to 4 x 10^{-6} m/sec (0.12 m/d and 0.4 m/d), assuming an aquifer thickness of approximately 60 m. The estimated storage coefficient ranged between 7 x 10^{-4} and 3 x 10^{-3}, which suggests confined to leaky confined conditions. The regional fault is mapped close to TW01 but results of drilling and test pumping did not suggest this well intercepted a permeable zone that may be associated with the fault. The test data suggested there is a possibility that monitoring well MW01 intercepted the fault given the initial higher permeability data at this location (SLR, 2014).

The pumping test results suggested the productive part of the aquifer is protected from surface pollution impacts due to the substantial thickness (50 m) of overlying ‘competent’ limestone strata. Vertical travel times through this aquitard are expected to be significant. It’s possible the regional fault which may be present in the vicinity of the site may act as a vertical pathway from the ground surface to the productive part of the aquifer. However, the pumping test results did not indicate that significant vertical leakage via such a pathway is likely to be present. This is supported by water quality results for TW01 which show no evidence of pollution impacts in this well (SLR, 2014).

A spring rises south of the site (Drawing No. 1380-004-A, **Attachment 10.2**). An assessment of this spring was undertaken in 2005 (‘Newgrange Meats - Assessment of Spring’, Geotechnical & Environmental Services Ltd., 2005. Report No. 05-35). The springs location in close proximity to a geological contact between the Loughshinny Formation (Dinantian Limestones) and the Donore/Balrickard Formations (Namurian undifferentiated) was interpreted to indicate that that the spring is related to the contact, causing upwelling of groundwater at this location.

The hydraulic gradient within the saturated zone of the aquifer was estimated at 0.036, based on groundwater contours published in the preliminary hydrogeological investigation report (SLR, 2015).

10.4.12 GROUNDWATER BODY STATUS

The EU Water Framework Directive (2000/60/EC) (WFD) establishes a framework for the protection, improvement and management of surface and groundwater. The overall aim for groundwater was to achieve at least 'good quantitative status' and 'good chemical status', by 2015, as well as preventing deterioration in those waters that have been classified as 'good' status. The EC Environmental Objectives (Groundwater) Regulations 2010 (S.I No. 9 of 2010) give effect to the criteria and standards to be used for classifying groundwater in accordance with the requirements of the WFD.

The Trim GWB is classified as having 'good' status for the 2013-2018 WFD monitoring period and is at risk of not achieving good status in the future due to agriculture and domestic wastewater treatment systems (EPA, 2020).

The Donore GWB classified as having 'good' status for the 2013-2018 WFD monitoring period and its risk is currently 'under review' (EPA, 2020).

10.4.13 GROUNDWATER LEVELS, GRADIENT AND FLOW DIRECTION

Existing ground levels at the location of the proposed WWTP site slope moderately in a southerly direction from approximately 108m AOD to 101m AOD at its southern boundary. The land continues to slope in a southerly direction from approximately 95m AOD at the location of the Dawn Meats (Slane) abattoir to 80m AOD to its south.

Static groundwater level measurements from 2011 (M1-M5) indicated groundwater levels in the shallow bedrock generally close to the subsoil/bedrock interface (within 6 m of ground level), with confined groundwater conditions occurring at times in M2, M3 and M4 (whereby shallow groundwater in the bedrock is confined beneath the overlying low permeability CLAY subsoils). As part of the preliminary hydrogeological assessment in 2011 the elevations of boreholes M1-M5a were surveyed in relative to Ordnance Datum. A contour map was prepared using static groundwater levels from 2013 and indicates groundwater flow direction in the shallow bedrock is to the south-southeast, as would be expected given the topography and position of surface water features (see Drawing No. IE1340-004-A, **Attachment 10.2**). Two rounds of groundwater levels were undertaken during 2016 (22/6/16 and 15/12/16) and are detailed in **Table 10.3** below. These levels agree with the contour map.

Groundwater strikes in the test and monitoring wells drilled in 2014 occurred at c.50 mbgl and were confined, with groundwater levels monitored at the site within c.15 mbgl. The hydraulic gradient within the saturated zone of the aquifer was estimated at 0.036, based on groundwater contours published in the preliminary hydrogeological investigation report (SLR, 2015).

No site specific information on groundwater levels along the treated effluent rising main route is available for this assessment. It is expected that the proposed WWTP is located close to a groundwater divide with groundwater beneath the abattoir and proposed WWTP flowing to south/southeast towards a tributary of the River Boyne and groundwater beneath the area to the north of the proposed WWTP flowing northwards towards the River Boyne.

Table 10.3: Static Groundwater Levels M1 – M5 (2016)

Monitoring Borehole	Static Groundwater Level (m btoc) (Taken from annual groundwater monitoring report 2017)	
	22/6/2016	**15/12/2016**
M1	3.34 (105.42)	3.2
M2	1.93 (102.05)	1.58
M3A	2.51 (99.7)	2.68
M4	5.9 (88.63)	6.03
M5A	5.86 (96.2)	6.27

10.4.14 SOURCE PROTECTION ZONES AND SITE PRODUCTION BOREHOLES ZOCS

The proposed WWTP site and treated effluent rising main route are not located within any Source Protection Zone (SPZ) identified or delineated by the GSI or EPA. The closest identified SPZ is c.3 km to the north of the WWTP (Slane). An inner and outer groundwater source protection zone is delineated along the southern side of the River Boyne in Slane.

The existing abattoir currently uses three on–site production wells for all water use on the site (BW01, BW02 and BW03), however a connection to the mains supply is present for emergency use. The locations of the production wells are shown on Drawing IE1380-002-A of **Attachment 10.2**.

The zones of contribution to the site production wells have been delineated (SLR, 2014) (see Appendix D of **Attachment 10.1**.) assuming an essentially circular ZOC, and show that the proposed WWTP is likely to be just inside the delineated ZOC to TW01 (renamed BW03).

10.4.15 GROUNDWATER VULNERABILITY

Vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated by human activities. Where the subsoil thickness is <3 m, the vulnerability is rated as Extreme (the highest risk situation). Where the subsoil thickness is >3 m, the vulnerability is rated as High, Moderate or Low (depending on the nature and thickness of the subsoil). The GSI's criteria for mapping vulnerability are shown in **Table 10.4** below.

The GSI's online webviewer indicates the vulnerability of groundwater beneath the proposed WWTP compound is mapped as Extreme (X) (Figure 5, Appendix A of **Attachment 10.1**.) and available site investigation data confirms this.

Groundwater vulnerability along the treated effluent rising main route is Extreme (E and X) in vicinity of the WWTP site and at the discharge to the River Boyne (Figure 6, Appendix A of **Attachment 10.1**). The majority of the remaining route is characterised by low groundwater vulnerability with some small stretches of moderate vulnerability.

Table 10.4: Vulnerability Mapping Guidelines

Vulnerability Rating	Hydrogeological Conditions				
	Subsoil Permeability (Type) and Thickness			Unsaturated Zone	Karst Features
	High permeability (sand/gravel)	Moderate permeability (e.g. Sandy subsoil)	Low permeability (e.g. Clayey subsoil, clay, peat)	(Sand/gravel aquifers only)	(<30 m radius)
Extreme (E)	0 - 3.0m	0 - 3.0m	0 - 3.0m	0 - 3.0m	-
High (H)	>3.0m	3.0 - 10.0m	3.0 - 5.0m	>3.0m	N/A
Moderate (M)	N/A	>10.0m	5.0 - 10.0m	N/A	N/A
Low (L)	N/A	N/A	>10.0m	N/A	N/A

Notes: (1) N/A = not applicable.
(2) Precise permeability values cannot be given at present.
(3) Release point of contaminants is assumed to be 1-2 m below ground surface.

10.4.16 GROUNDWATER QUALITY

The description for the Trim GWB indicates groundwater from the calcareous strata in this GWB will have a calcium bicarbonate chemical signature. Water sampling by the EPA shows these waters to be “moderately hard” to “very hard” with typical values of 150 µs/cm – 350 µs/cm (GSI, 2004).

A review of groundwater monitoring data from the existing Dawn Meats (Slane) site (2011 to 2016) was undertaken for the site by IE Consulting in 2016 and submitted in the Annual Groundwater Monitoring report (IE Consulting, 2017). The review identified the following Contaminants of Potential Concern (COPCs) in the shallow bedrock groundwater (M1-M5) which exceeded compliance values: ammonia (M2), total coliforms (boreholes M2, M3A, M4), faecal coliforms (borehole M2, M3 and M4), chloride (M2 and M4), sodium (M2) and potassium (boreholes M5A). These parameters are indicative of contamination from organic waste. The concentration of a number of parameters (also indicative of contamination from organic waste e.g. nitrate) in the up-gradient borehole frequently exceeded the concentrations in down-gradient boreholes over the monitoring period. This suggests an off-site source of contamination (e.g. agricultural activity in the fields to the north of the site). Highest concentrations of COPCs occur mostly in M2 and M5 in the western area of the former ICW (now decommissioned) suggesting contamination of shallow bedrock groundwater is localised in this area and not widespread within the shallow bedrock groundwater. The potential sources are considered to be residual organic contamination from the former ICW ponds and off-site agricultural activity.

Groundwater in the deep bedrock boreholes is generally of significantly better quality than in the shallow bedrock groundwater. This is attributed to the significant protection afforded to the productive zone of the aquifer at depth.

Since decommissioning of the ICW (which commenced in 2014 and was successfully completed by end 2015) there has been a downward trend in ammonia in M1 and M2; and in chloride in M1, M2 and M5. Further monitoring is required to assess the full impact of decommissioning works on shallow bedrock groundwater quality.

10.4.17 GROUNDWATER ABSTRACTION

On-site Production Wells

The existing site currently uses three on–site production wells for all water use on the site (BW01, BW02 and BW03). In 2014 a water supply drilling and testing programme was undertaken (*'Hydrogeological / Water Supply Report'. Report Reference 501.00213.00006. Rev 01, SLR Consulting, March 2014*). BW03 was drilled in 2014 in response to shortage in water supply at BW01 and BW02 during drier times of the year. Four wells were drilled and installed during the development of the BW03. The wells comprised a pilot well (PW01), a test well (TW01) and two additional monitoring wells (MW01 and MW02). All borehole locations are shown in Drawing No. IE1340-002-A of **Attachment 10.2**.

GSI Abstraction Database

Reference to the Geological Survey of Ireland (GSI) well database indicates a number of groundwater supplies within a 2 km radius of the site and the area to the north towards the River Boyne as tabulated in **Table 10.*5*** below.

A well is located adjacent to the Bridgewell Bridge along the rising main route where it turns northwards and runs off the L1600 on its northwards course to the River Boyne. (Refer to **Attachment 2.4** Proposed Pipeline Route Map)

A pump is noted to the east of the proposed rising main route, north of Yellow Furze at Dollardstown. It is not known if this this pump is still in use, although it is likely to be abandoned and no longer used to provide potable supplies (Refer to **Attachment 2.4** Proposed Pipeline Route Map).

Table 10.5: GSI Abstraction within a 2 km of the Existing Site & in the Area to the North towards the River Boyne (Pipeline Route Options).

GSI Reference/ Name	GPS Easting Northing	Well Type	Aquifer	Drill Date	Depth (m bgl)	Depth to Rock (m bgl)	Well Use	Yield Class	Yield (m^3/d)	Townland
2925NWW011	295400 269920	Borehole	Loughshinny Formation (Lm)	21/03/1995	60	0	Public Supply		-	PAINESTOWN
2925NWW012	295830 269460	Borehole	Balrickard Formation (Pl)	21/03/1995	-	-	Other		-	PAINESTOWN
2925NWW017	296290 269480	Borehole	Balrickard Formation (Pl)	21/03/1995	1.8	-	Public Supply	Poor	38	PAINESTOWN
2925NWW025	296160 269440	Dug Well	Balrickard Formation (Pl)	01/09/1960	1.8	-	Public Supply	Moderate	76	PAINESTOWN
2927SWW016	294850 270490	Spring	Loughshinny Formation (Lm)	01/07/1980	-	-	Public Supply	-	-	DOLLARDSTOWN
2925NWW026	295650 269900	Borehole	Loughshinny Formation (Pl)	-	18	8.5	Public Supply	Moderate	76	PAINESTOWN
2927SWW051	295150 270100	Borehole	Loughshinny Formation (Lm)	01/07/1963	30.5	3	Domestic	Poor	21.8	PAINESTOWN
2927SWW064	295200 272100	Borehole	Fennor Formation (Lk) Loughshinny Formation (Lm)	1/2/1962	14.6	-	Agri & Domestic	Poor	28	GILLTOWN

GSI Reference/ Name	GPS Easting Northing	Well Type	Aquifer	Drill Date	Depth (m bgl)	Depth to Rock (m bgl)	Well Use	Yield Class	Yield (m^3/d)	Townland
2927SWW027	295100 272380	Dug Well	Fennor Formation (Lk)	30/12/1899	6.7	-	-	-	-	FENNOR
2927SWW074	292300 270400	Borehole	Lucan Formation (Lm) Loughshinny Formation (Lm)	16/3/1966	13.7	9.8	Agri & Domestic	Poor	21.8	HAYSTOWN
2927SWW069	292300 270500	Borehole	Lucan Formation (Lm) Loughshinny Formation (Lm)	7/2/1966	16.5	7.9	-	Moderate	65	HAYSTOWN
2927SWW072	292300 270450	Borehole	Lucan Formation (Lm) Loughshinny Formation (Lm)	21/12/1965	16.5	1.07	Agri & Domestic	Moderate	87	HAYSTOWN
2927SWW035	291850 271250	Borehole	Boyne Formation (Lm)	31/12/1899	31.5	-	Domestic	Poor	27.3	STACKALLAN
2927SWW078	291230 270540	Dug Well	Lucan Formation (Lm)	2/6/1905	5.5	-	Domestic	Failure	-	ARDMULCHAN

GSI Reference/ Name	GPS Easting Northing	Well Type	Aquifer	Drill Date	Depth (m bgl)	Depth to Rock (m bgl)	Well Use	Yield Class	Yield (m^3/d)	Townland
2927SWW079	291240 270500	Borehole	Lucan Formation (Lm)	24/11/1994	53.3	-	Domestic	Moderate	87	ARDMULCHAN
2927SWW080	291250 270330	Borehole	Lucan Formation (Lm)	24/11/1994	42.7	-	-	Failure	-	ARDMULCHAN
2925NWW016	290880 269960	Dug Well	Lucan Formation (Lm)	30/12/1899	33.5	-	Other	Failure	-	ARDMULCHAN
2925NWW078	290680 269940	Borehole	Lucan Formation (Lm)	24/11/1994	88.4	-	Public supply (Co Co)	-	-	ARDMULCHAN
2927SWW077	290450 271050	Borehole	Boyne Formation (Lm)	1/9/1953	18.3	11.6	-	Poor	3	DUNMORE
2927SWW076	290450 271100	Borehole	Boyne Formation (Lm)	29/12/1899	3	30.5	-	-	43.6	DUNMORE

10.4.18 SURFACE WATER FEATURES

The proposed WWTP compound extension and the rising main pipeline route are located in the Eastern River Basin District (ERBD). The WWTP site is located within the Roughgrange Upper Catchment and the pipeline route is located within the River Boyne catchment area, which flows in an easterly direction approximately 4 km to the north of the existing Dawn Meats (Slane) facility (Drawing No. 1380-001-A, **Attachment 10.2**). The EPA Envision webmap indicates that there are two surface water quality monitoring points (RS07BO42010 and RS07B042100) on the River Boyne to the north of the site, and the water quality Q value for both is 3-4 (slightly polluted). The River Boyne was classified as having 'good' status for the 2013-2018 monitoring period, while it is was deemed to be 'at risk of not achieving good status' under the WFD (EPA, 2020).

The Dollardstown River (a tributary of the River Boyne) flows northwards, c.0.9 km west of the proposed site. Two small tributaries lie to the west of the Dollardstown River and discharge to the Dollardstown River. The Dollardstown River was classified as having 'good' status for the 2013-2018 monitoring period, while it is was deemed to be 'at risk of not achieving good status' under the WFD (EPA, 2020).

For Locally Important (Lm) aquifers such as the limestone aquifer beneath the proposed WWTP there is likely to be a substantial groundwater contribution to surface waters ('baseflow'). The main discharge mechanism for this aquifer is as baseflow to the River Boyne and its tributaries. Discharge from the aquifer will also occur via springs - for example the spring to the south of the site (referred to in **section 10.4.14**).

Surface water is further discussed in **Section 9** of the EIAR.

10.4.19 CLIMATE / GROUNDWATER RECHARGE

Based on the GSI website the effective rainfall in the vicinity of the WWTP site is 453 mm/yr. The GSI have designated that the recharge co-efficient in the immediate area of the WWTP site as 85%. Based on the GSI recharge model the total recharge would be equivalent to approximately 385 mm/yr.

Based on the GSI website the effective rainfall in the vicinity of the pipeline route ranges from 453 mm/yr – 526 mm/yr (Figure 6, Appendix A of **Attachment 10.1**). The GSI have designated that the recharge coefficients along the pipeline route range from 7.5% (low permeability till) to 85 % (sands and gravels). Based on the GSI recharge model the total recharge range along the pipeline route would be equivalent to approximately 39 mm/yr – 447 mm/yr (Figure 7, Appendix A of **Attachment 10.1**).

10.4.20 CONCEPTUAL SITE MODEL

The geological and hydrogeological conceptual site model is described below and presented graphically in Drawing No. IE1380-005-B, **Attachment 10.2**)

The subsoils beneath the majority of the proposed WWTP extension are thin or absent and bedrock is at, or close to, surface. Site investigation data indicate sandy, gravelly CLAY subsoils to depths of between 1.6 m - 4.1 m beneath the site. Groundwater was not encountered in the subsoils during any trial pitting or borehole drilling works.

The subsoils mapped by the GSI along the pipeline route are as follows: Gravels derived from Limestone, Alluvium, Till derived from Limestones and Bedrock Outcrop/Subcrop.

The bedrock beneath the proposed WWTP site and the treated effluent rising main route comprises Carboniferous limestones and shales of the **Loughshinny Formation (LO)**. The northern part of the treated effluent rising main route, where the pipeline is proposed to discharge to the River Boyne, is underlain by the **Boyne Formation (BX)** described as a mainly nodular and irregularly bedded argillaceous limestone, commonly dolomitised and subordinate calcareous shale, also with units of distinctive limestone (GSI, 2001).

The rising main route section which runs along the L1013, Windmill Road and enters the factory along its main access route is located in the **Donore Formation (DR).** The formation consists mainly of interbedded shale and subordinate basinal limestone.

The north/northwest trending **Beauparc fault** is mapped in the eastern area of the abattoir site where it juxtaposes the Carboniferous and Namurian rocks against each other.

The groundwater vulnerability in the area of the proposed WWTP is generally **Extreme (X).** Groundwater vulnerability along the treated effluent rising main route is **Extreme (E and X)** in vicinity of the WWTP site and at the discharge to the River Boyne. The majority of the remaining route is characterised by **Low (L**) groundwater vulnerability with some small stretches of **Moderate (M)** vulnerability.

The carboniferous limestone beneath the existing facility, proposed WWTP site and proposed treated effluent rising main route are classified by the GSI as a **Locally Important aquifer (Lm) – bedrock which is generally moderately productive** and forms part of the Trim Groundwater Body (GWB).

The rising main route section which runs along the L1013, Windmill Road and enters the factory along its main access route is located in a **Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones**. This forms part of the Donore GWB. Overall, the route runs for c. 1.16 km in the Donore GWB.

The GSI's online webviewer website indicates that the flow regime in both the Trim and Donore GWB is 'productive fissured bedrock'. This was confirmed by site investigation works, described in **Section 10.4.4**.

Groundwater monitoring indicates that groundwater in the deeper limestone aquifer beneath the abattoir site is of significantly higher quality that the shallow groundwater. This is attributed to the significant protection afforded to the productive zone of the aquifer at depth.

It is expected that the proposed WWTP extension is located close to a groundwater divide with groundwater beneath the abattoir and proposed WWTP extension flowing to south/southeast towards a tributary of the River Boyne and groundwater beneath the pipeline route flowing northwards towards the River Boyne.

The Dollardstown River is located 0.9 km to the west of the site and flows northwards discharging to the River Boyne. The treated effluent rising main is routed alongside, and crossing, this river in the latter part of the route and at the discharge point to the Boyne River. A buffer zone of 6 m is incorporated into the proposed design.

A spring occurs to the south of the site along the mapped location of the fault. It is considered likely that the spring is related to this fault, with groundwater from the more permeable carboniferous limestone aquifer being forced upwards where it encounters the less permeable Namurian rocks along the fault contact as it flows in southerly/southeasterly direction (Figure1, Appendix B of **Attachment 10.1**.).

10.4.21IGI TYPE OF GEOLOGICAL ENVIRONMENT

The type of Geological Environment as per the Institute of Geologists of Ireland Guidelines is *Type A - Passive geological /hydrogeological environments* e.g. historically stable geological environments.

10.5 "DO NOTHING" SCENARIO

In the case where the WWTP and associated treated effluent rising main were not developed, there would be no resulting additional impacts on the soils, geology or hydrogeological environment in the area of the Dawn Meats (Slane) site.

10.6 POTENTIAL CONSTRUCTION IMPACTS

The construction phase holds the greatest number of activities which could potentially impact on the geological and hydrogeological environments. Potential construction impacts are detailed below and summarised in **Table 10.7**.

10.6.1 SOILS

<u>Soil Removal</u>

The construction of the proposed WWTP and associated treated effluent rising main would require the permanent removal of soils and subsoils, within the footprint area of the WWTP site (natural and made ground) and along the rising main route. While it is proposed to re-use as much of the excavated soils and subsoils (for landscaping etc.) in line with relevant Waste and Planning Legislation, there would be permanent removal of soil and subsoils from the proposed WWTP site and treated effluent rising main pipeline route.

The vast majority of the WWTP excavation would be c. 1 mbgl extending into made ground/gravelly CLAY subsoils. No groundwater inflows were encountered in the clay deposits. The proposed works would include excavations to a maximum of c. 5 mbgl for the final sump at the WWTP site (located at the former ICW ponds). The excavation to c. 5 mbgl would likely require permanent excavation into weathered bedrock.

A 1.3 mbgl deep excavation will be required along the length of the proposed rising main. The areas of Extreme groundwater vulnerability correspond to areas where subsoils are thin

(0 -3m) or absent and would indicate that permanent excavation of weathered bedrock may be required in limited areas along the pipeline route.

It is estimated that a total of approximately 1,557 m^3 of soils/subsoils would require excavation at the WWTP development.

The preferred method for the laying of the rising main would be horizontal directional drilling (HDD). Where HDD is not possible due to ground conditions, the standard open-cut method would be employed. Assuming a worst case scenario of using only open-cut along the treated effluent rising main route, approximately 2,135 m^3 of soils/subsoils or road surface would be excavated.

The permanent removal of natural soils would be a negative slight permanent impact on the soils and geology aspect of the environment. The permanent removal of made ground would be a positive slight permanent impact on the soils and geology aspect of the environment. The re-use of excavated soils on site would be a positive slight long-term impact.

Vehicular movement and soil compaction

The majority of the traffic movement associated with the proposed WWTP site would be over the existing roadways within the Dawn Meats (Slane) site. During the construction phase of the pipeline route, vehicles would also cross over or excavate into greenfield areas in order to lay the pipeline in the initial and final sections of the route. Soil compaction can occur due to movement of construction and maintenance traffic. This would be considered a negative slight medium term impact on the soil and in-situ earth materials.

Hydrocarbon Leakage/Spillage

Possible contamination of soil and subsoil, by leakage or spillage from machinery and associated equipment, may occur during the construction phase. An accidental hydrocarbon spillage would have a negative moderate short-medium term impact on soil and subsoil quality.

Material Requirement

The proposed scheme would have a requirement for imported materials, primarily comprising high standard fill and stone for pipeline construction, hardstanding areas, concrete for foundations, reinforced concrete structures (**Table 10.6**). The fill material would comprise primarily of Clause 503 material. Granular bedding and surrounds to the treated effluent rising main shall consist of free draining hard clean and chemically inert gravel or crushed stone.

Table 10.6: Rough Order of Magnitude Estimate of Principal Quantities of Imported Materials

Description	Approximate Quantity in M^3
Clause 503 Material (Surround to rising main pipeline)	975
Concrete Grade xc2, c30/37, 200, 0.85, s2	55
Concrete Grade c8/15	35
Pipework Watermain Wavinsure 100mm PE100 SDR17 (10-BAR)	3,700
Clause 802 or Cement Bound Granular Material, Category B (CBGM B) to SRW Series 800	200
AC 32 HDM BASE 40/60 to Cl. 929	25
Close Graded Asphalt Concrete to Cl. 912	35
Asphalt Concrete Binder Course (20mm Nominal Size) to Clause 906	25

10.6.2 GEOLOGY

Bedrock Excavation

The vast majority of the excavation and construction of the proposed WWTP extension would be expected to be within the made ground/ low permeability clays. In addition it would not be expected that the 1.3 mbgl excavation for the pipeline would encounter significant bedrock - if this occurs it would likely be limited to the upper weathered bedrock zone. Upper weathered bedrock encountered during excavation to c. 5 mgbl of the final sump (WWTP site) would likely be permanently removed. The impact associated with any removal of weathered bedrock would be considered a negative slight permanent impact.

Possible contamination of bedrock, by leakage or spillage from machinery and associated equipment, could occur during the construction phase only. Leakages or spillages would have a negative moderate short-term impact on groundwater quality. Exposure of the underlying bedrock to the atmosphere can result in weathering of the bedrock, which would be considered a negative slight short-term impact. No further impact on the quality or quantity of the bedrock would be expected during construction.

10.6.3 GROUNDWATER

The potential impacts to groundwater during the construction phase would be associated with altering the hydrogeological regime in terms of flows or quality.

Subsurface structures within the footprint of the sites may have the potential to impact on groundwater flow regimes if they are built across the aquifer's flow path.

Groundwater quality can be impacted by construction activities if contaminants arising from construction sites such as hydrocarbons and cement/concrete percolate to the aquifer. The magnitude of an impact on groundwater quality is dependent on the duration, size and nature of any pollution event happening on the surface and the vulnerability of the underlying aquifer to such an event.

Entry of Surface Contaminants

The removal and disturbance of soil, during the construction phase, in the locality the WWTP site and rising main route would increase the risk to groundwater as the protective soil layer is removed and the vulnerability of the groundwater to surface contaminants is increased. The granular fill in the pipeline trench would represent a new potentially more permeable pathway (than excavated soil) along the pipeline route.

Possible contamination of groundwater in the underlying Lm aquifer, the site abstraction wells and any private wells located in the vicinity of the proposed pipeline by hydrocarbon leakage or spillage from machinery and associated infrastructure and equipment may occur during the construction phase. An accidental spillage would have a negative moderate short term impact on groundwater quality at the spillage location and down-gradient, if not quickly contained and removed.

Foundation Pouring

The spillage of concrete/cement material poses a potential risk to groundwater. During the construction phase this risk may be realised during the construction of buildings and equipment wash-down. The percolation of cement washwater into the underlying aquifer would have a negative moderate short term impact on groundwater water quality in the underlying aquifer and the site abstraction wells.

Groundwater Ingress to WWTP Excavation

Some very localised pumping of groundwater may be required to prevent ingress of groundwater to the deeper excavation area for the final sump (maximum 5 mbgl). This would be pumped and discharged overland, within the field containing the WWTP development, and away from the vicinity of any local drainage ditches. Any sediments entrained in the water would be retained onsite as the excavated water percolates to the ground.

Groundwater Flow Paths

Subsurface structures within the footprint of the sites may have the potential to impact on groundwater flow regimes if they are built across the aquifer's flow path. Given the very limited size of the excavation into bedrock, there would be no specific mitigation measures required relating to the groundwater flow in the bedrock.

Excavation works can potentially cause an alteration in water-bearing fissure/fracture flow paths and result in the emergence of groundwater as a spring/seepage in another location. This impact would be considered to be a negative moderate long-term impact.

Table 10.7: Construction Phase Main Impact Assessment Summary – Soils, Geology and Hydrogeology

Activity / Source	Environmental Receptor	Impact Description	Quality	Significance	Duration	Mitigation	Residual Impact
Earthworks	Bedrock	Potential bedrock excavation for WWTP foundation/rising main pipeline.	Negative	Slight	Permanent	The vast majority of the excavation and construction of the proposed WWTP plant would be expected to be within the Made ground/ low permeability clays. It is also not expected that the 1.3 mbgl excavation for the pipeline would encounter significant bedrock. If excavation into bedrock occurs it would be limited to the upper weathered bedrock zone. Given the very limited size of the excavation into rock, there would be no specific mitigation measures required relating to the groundwater flow in the bedrock. Some very localised pumping of groundwater may be required to prevent ingress of groundwater to the deeper excavation area for the final sump (maximum 5 mbgl). This would be pumped and discharged overland, within the field containing the WWTP development, and away from the vicinity of any local drainage ditches. Any sediments entrained in the water would be retained onsite as the excavated water percolates to the ground.	Imperceptible

Activity / Source	Environmental Receptor	Impact Description	Quality	Significance	Duration	Mitigation	Residual Impact
Earthworks	Soils	Natural soil excavation for WWTP foundation and rising main pipe laying.	Negative	Moderate	Permanent	The minimum amount of space to construct the WWTP and rising main pipeline has been designed for. Material would be reused where possible.	Imperceptible
Earthworks	Soils, & groundwater in the underlying Lm aquifer	Made ground (contaminated and non-inert material) excavation for WWTP foundation.	Positive	Slight	Permanent	Controlled excavation of contaminated material would be managed under the construction works contractor's Construction Environmental Management Plan (CEMP).	Slight Positive
Earthworks	Soils	Vehicular movement and soil compaction.	Negative	Slight	Medium	Specialist machinery (such as tracked machinery) would be used to minimise compaction of soils/subsoils.	Imperceptible
Earthworks	Soils	Reuse of soil on-site.	Positive	Slight	Long-term	Spoil generated may be a resource and would be re-used onsite where possible in line with relevant Waste and Planning Legislation.	Imperceptible

Activity / Source	Environmental Receptor	Impact Description	Quality	Significance	Duration	Mitigation	Residual Impact
Storage of potentially polluting materials	Soils, groundwater in the underlying Lm aquifer, the site abstraction wells and any nearby private wells along the route of the pipeline	Potential leak or spillage from construction related liquids on site percolating to the underlying aquifer.	Negative	Moderate	Short term	There would be no direct discharge to groundwater during construction. However indirect discharges to the underlying bedrock aquifer may occur. Protection of groundwater from potentially polluting substances would be mitigated against through good housekeeping on all sites and proper handling, storage and disposal of any potentially polluting substances. Designated and bunded storage areas would be maintained. The construction work contractor would prepare a CEMP for the development, which would include measures for the protection of soils, geology and hydrology. Further details are included in **Section 10.8** below.	Imperceptible
Earthworks	Groundwater in the underlying Lm aquifer	Potential for groundwater flow paths to be altered due to construction of subsurface structures.	Neutral	-	Short term	The vast majority of the excavation and construction would be within the made ground or low permeability clays at the WWTP site (apart from the limited c. 5 mbgl excavation of the final sump) and within 1.3 mbgl along the rising main route. Given the very limited size of the excavation, there would be no specific mitigation measures required relating to the groundwater flow in the bedrock.	Imperceptible

10.7 POTENTIAL OPERATIONAL IMPACTS

During the operational phase of the WWTP and associated rising main there would be limited potential impact on the soils, geology and hydrogeology of the area (summarised in **Table 10.9**).

The primary source of potential operational impacts relate to:

- Storage and handling of deleterious substances. Improper handling or storage could result in contamination of the underlying aquifer;
- Potential leakage from the rising main pipe.

10.7.1 INDICATIVE CHEMICALS STORAGE ON-SITE

Typical chemical storage at a site like this includes the chemicals tabulated below;

Table 10.8: Indicative Chemical List

Chemical	Containment	Typical Volume Stored
Coagulant	Bulk tank	c.28 m^3
Polymer	IBC	1 m^3 (possibly one IBC backup)
Caustic	IBC	1 m^3 (possibly one IBC backup)

10.7.2 SOILS

Possible localised contamination of soils and subsoils by accidental leakage or spillage of hydrocarbons from vehicles on-site or of process materials (e.g. above) may occur during the operational phase at the WWTP site. Potential leakage of treated effluent may occur during the operational phase of the rising main pipeline. Leakages or spillages associated with these activities would have a negative significant short-term impact on the soils and subsoils if mitigation measures are not put in place.

10.7.3 BEDROCK

Possible localised contamination of bedrock by accidental leakage or spillage of hydrocarbons from vehicles on-site or of process materials (e.g. above) may occur during the operational phase at the WWTP site. Potential leakage of treated effluent may occur during the operational phase of the rising main pipeline. Leakages or spillages associated with these activities would have a negative slight to moderate short-term impact on the bedrock if mitigation measures are not put in place.

10.7.4 GROUNDWATER QUALITY & WATER SUPPLY WELLS

Possible localised contamination of groundwater by accidental leakage or spillage of hydrocarbons from vehicles on-site or of process materials (e.g. above) may occur during the operational phase at the WWTP site. Potential leakage of treated effluent from the final sump may occur during the operational phase of the WWTP. Potential leakage of treated effluent may occur during the operational phase of the treated effluent rising main pipeline and migrate through the permeable fill and underlying subsoils to the underlying groundwater. Leakages or spillages associated with these activities would have a *negative slight to moderate short-term impact* on groundwater quality in the aquifer, the site abstraction wells and in any nearby private wells along the route of the pipeline if mitigation measures are not put in place.

Table 10.8: Operational Phase Impact Assessment Summary – Soils, Geology and Hydrogeology

Activity / Source	Environmental Receptor	Impact Description	Quality	Significance	Duration	Mitigation	Residual Impact
Storage of potentially polluting materials	Soils, bedrock & groundwater in the underlying Lm aquifer, site abstraction wells and any nearby private wells	Leakage of hydrocarbons/chemicals stored for maintenance/upkeep of WWTP. Leakage from sumps on site.	Negative	Significant	Short term	All sumps and bunds would undergo integrity testing every three years, as per the site's IE Licence conditions. No further specific operational measures would be required outside the appropriate design, construction and containment.	Imperceptible
Rising main maintenance	Soils, bedrock & groundwater in the underlying Lm aquifer, site abstraction wells and any nearby private wells	Leakage of treated effluent from the rising main to the soils and groundwater underlying the route.	Negative	Significant	Short term	An appropriate programme of inspection and maintenance of the rising main pipeline would ensure that any damage, blockages etc. would be identified and remedied.	Imperceptible

10.8 MITIGATION MEASURES

This section describes a range of recommendations and mitigation measures designed to avoid, reduce or offset any potential adverse impacts identified. The main objective of the mitigation measures is to avoid any potential adverse impacts in the first instance, and where this is not possible then to reduce the impacts of any emissions on the receiving environment.

Many of the mitigation measures below have been based on CIRIA (Construction Industry Research and Information Association, UK) technical guidance on water pollution control and on currently accepted best practice.

10.8.1 CONSTRUCTION PHASE

Soils and Bedrock

Controls on Damage to Underlying Geological Materials

In order to reduce the impacts on the soils and geology environment a number of mitigation measures would be adopted as part of the construction works on site. The measures would address the main activities of potential impact which include:

- Control of soil/bedrock excavation and export from the Dawn Meats (Slane) site and associated rising main pipeline;
- Sources of fill and aggregates for the WWTP site and associated rising main pipeline;
- Fuel and chemical handling, transport and storage.

The removal of soils and subsoils/bedrock would be an unavoidable impact of the development. One of the primary mitigation measures already employed at the preliminary design stage has been the minimisation of volumes of subsoil and bedrock required to be excavated. Some of the excavated subsoils removed during construction would be re-used on site in the form of landscaping where suitable and legally permitted and licensed sites would be used for off-site treatment/recycling/disposal where necessary.

Specialist machinery (such as tracked machinery) would be used to minimise compaction of the subsoils. Excavations would be backfilled as soon as is possible to prevent any infiltration of potentially polluting compounds to the subsurface and the aquifer.

Contaminated Material and Export from Site

All excavations would be supervised by a competent professional (contaminated land scientist, geologist, geotechnical engineer) to identify the composition of excavated material particularly any potentially contaminated material (made ground). All potentially contaminated material would be either; left in situ and characterised by a competent professional through laboratory testing, or; segregated and stockpiled in a contained manner and characterised by a competent professional through laboratory testing. The excavation of materials in the uppermost strata at the WWTP site i.e. the made ground and top of natural clays would require careful and methodical excavation. Prior to the storage of any potentially polluting material on-site the site manager would be responsible for ensuring that a material safety data sheet for each product would be available for inspection. A copy of all relevant material safety data sheets would be available at storage locations as well as the site office.

Any soil imported to site would be subject to assessment, in order to identify any invasive alien species present. The construction works contractor would prepare a Construction Environmental Management Plan (CEMP), which would adhere to available guidance e.g. The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads (NRA, 2009). Storage of soil on-site would be seeded and periodically topped. Such stores would be subject to on-going monitoring. Subject to the identification of invasive alien species present at any of the sites – machinery would be cleaned between infested sites (including footwear and tools).

The majority of new material brought to site, would be used immediately or would be stored within the site boundary. Other materials such as asphalt or concrete would be brought directly to the construction site when required and immediately placed.

Dust suppression measures (e.g. damping down during extended dry periods), vehicle wheel washes, road sweeping and general housekeeping would ensure that the surrounding environment is free of nuisance dust and dirt on roads. A CEMP would be prepared by the construction works contractor, which would include dust suppression measures to be implemented throughout construction activities.

Sources of Fill and Aggregates

All fill and aggregate would be sourced from reputable supplies as per the Construction Works Contractor's Contract and Procurement Procedures.

10.8.2 GROUNDWATER

Control & Storage of Potentially Polluting Substances

All potentially polluting materials would be stored in bunded areas, the capacity of which would be 110% the volume of the largest volume of material OR 25% of the total volume of liquid to be stored, whichever is greater.

Machinery refuelling would be carried out by competent personnel at a temporary construction compound during rising main works and at a designated location within the site boundaries for WWTP works.

All machinery would be inspected at the start of each work shift for signs of leaking hydrocarbons. Parking areas would be inspected on a daily basis for evidence of hydrocarbons leaking from machinery.

Spill kits would be stored at the machinery refuelling areas. The spill-kits would comprise suitable absorbent material, refuse bags etc. to allow for the appropriate clean-up and storage of contaminated material in the event of a spillage or leak occurring.

The washing of any plant equipment would be carried out in designated areas constructed to prevent potentially polluting material from entering surface or groundwater.

There would be no discharge of effluent to groundwater during the construction phase. All wastewater from the construction facilities would be stored for removal off site for disposal and treatment.

The construction works contractor would be obliged to ensure no deleterious discharges would be released from the site to surrounding watercourses during excavation, testing, flushing or washing activities. Throughout the Design – Build works the Contractor would also take account of relevant legislation and best practice guidance including but not limited to the following:

- C532 Control of water pollution from construction sites: guidance for consultants and contractors;
- C648 Control of water pollution from linear construction projects;
- SP156 Control of water pollution from construction sites – guide to good practice.

Implementation of these standards would ensure that negative effects to water quality do not occur.

<u>Surface water</u>

The pipeline route would involve the crossing of a culverted section of the Dollardstown Stream and potentially other culverted drains at various locations along its length (see **Section 9**). Inland Fisheries Ireland (IFI) would be informed in advance of works and would be welcome to inspect the site at any time.

A buffer zone of 6m would be maintained, where possible, between the proposed pipeline route working area and any open drains or river channels.

Silt fencing would be erected in advance of works and remain in place until after landscaping elements have become established. It would be inspected on a daily basis during works to ensure it is functioning correctly.

10.8.3 OPERATIONAL PHASE

During the operational phase of the development, all materials required for the maintenance of the sites would be stored according to good practice and in areas either off-site or in bunded areas with impermeable floors.

A programme of inspection and maintenance of the rising main, which would be included as part of the integrity testing undertaken every three years, as per the site's IE Licence conditions, would ensure that any damage, blockages etc. would be identified and remedied.

10.9 RESIDUAL IMPACTS

If the mitigation measures detailed above are implemented it is expected there would be no significant adverse direct or indirect impacts on groundwater and the underlying soils and geology as a result of the construction or operation of the proposed development.

10.9.1 SOILS & GEOLOGY

With the implementation of the mitigation measures outlined in **Section 10.8.1** above the proposed development scheme would be anticipated to have an overall negative short term imperceptible residual impact on the hydrogeological environment during the construction phase.

With the implementation of the mitigation measures outlined in **Section 10.8.2** above the proposed development scheme would be anticipated to have an overall neutral permanent imperceptible residual impact on soil and geological environment during the operational phase.

10.9.2 HYDROGEOLOGY

With the implementation of the mitigation measures outlined in **Section 10.8.1** above the proposed development scheme would be anticipated to have an overall negative short term imperceptible residual impact on the hydrogeological environment during the construction phase.

With the implementation of the mitigation measures outlined in **Section 10.8.2** above the proposed development scheme would be anticipated to have an overall negative medium to long term imperceptible residual impact on the hydrogeological environment during the operational phase.

10.9.3 MONITORING

Groundwater monitoring is undertaken at the site under the Industrial Emissions (IE) Licence (P0811-02) for the site issued by the Environmental Protection Agency. MW5a is located down-gradient of the proposed WWTP and Dawn Meats (Slane) submits an Annual Environmental Report (AER) to the EPA for the facility each year which includes details of groundwater monitoring and results.

Surface water monitoring is detailed and discussed in **Section 9** – Aquatic Environment, of this EIAR.

11.0 CLIMATE

11.1 INTRODUCTION

Climate can refer to both the long-term weather patterns in an area and also to localised atmospheric conditions in a given area, referred to as the microclimate. Climate has implications for many aspects of the environment from soils to biodiversity and land-use practices. In a global sense, much of the concern with facilities such as Dawn Meats (Slane) is the atmospheric emissions from the operation and the potential for increases in air pollutants, which may contribute to climate change.

This section addresses the existing climate in the area and how the proposed development, comprising an upgrade and extension to the existing Waste Water Treatment facilities at Dawn Meats (Slane) may impact on the microclimate. The planned future application for the discharge of treated effluent to the River Boyne, via a rising main, is also included within the scope of this EIAR chapter.

11.2 CLIMATE CHANGE OBLIGATIONS AND POLICY

International Context

In December 2008, the European Union (EU) Climate Change and Renewable Energy Package set out a number of commitments. This package commits to reduce the EU's Greenhouse Gas (GHG) emissions from non-Emission Trading Scheme (ETS) sectors (such as transport, agriculture, residential, waste and non- energy intensive industry) by 20% on 2005 levels by 2020 or by a more ambitious 30% in the event of a comprehensive global agreement.

As part of the effort-sharing proposal of this package, Ireland is one of the countries facing the highest target of a 20% reduction on 2005 levels for non-ETS sectors. This will result in a limit of approximately 38 million tonnes of carbon dioxide equivalent (Mt CO2 eq) for Ireland's non-ETS emissions in 2020, together with annual binding limits for each year from 2013 to 2020.

In October 2014, EU leaders agreed a 2030 policy framework to reduce greenhouse gas emissions by at least 40% compared to a 1990 baseline. No agreement on the contribution of individual EU Member states has yet been reached.

National Policy on Climate Action

The Climate Action and Low-Carbon Development National Policy Position for Ireland was published in 2014. The Position provides a high-level policy direction for the adoption and implementation by Government of plans to enable the State to move to a low carbon economy by 2050.

The Climate Action and Low Carbon Development Act was published by government in January 2015. The Act sets out the national objective of transitioning to a low carbon, climate resilient and environmentally sustainable economy in the period up to 2050.

The act provides for the preparation of National Mitigation Plans and Sectoral Plans which will specify policies to reduce greenhouse gas emissions for each sector. The first National Mitigation Plan was published in July 2017 by the Department of Communications, Climate Action and Environment. The Plan is designed to be a whole-of-Government approach to tackling greenhouse gas emissions, particularly, in the key sectors i.e. electricity generation, the built environment, transport and agriculture.

Local Climate Policy

Meath County Council published the "*Climate Action Strategy*" policy document in June 2018. The purpose of the strategy is to outline practical actions that will help County Meath adapt to and mitigate against climate change.

The targets set by the strategy are as follows;

1. Reducing Meath County Councils emissions by 33% by 2020.
2. Reducing CO2 emissions of the county by at least 40% by 2030.
3. Increasing our resilience by adapting to the impacts of climate change.
4. Sharing our vision, results, experience and know-how with fellow local and regional authorities within the EU and beyond through direct cooperation and peer-to-peer exchange, namely in the context of the Global Covenant of Mayors.

The strategy document sets out specific actions to be carried out and supported by Meath Co Co under the headings of economy, mobility, built environment, clean energy, resource management, water, natural resources and planning.

11.3 METHODOLOGY

Ireland has a temperate oceanic climate according to the Koppen-Geiger Climate Classification System. This means, like most of North-West Europe it is mild, moist and changeable, with abundant rainfall and a lack of temperature extremes. Due to its proximity to the Atlantic Ocean, Ireland has mild damp summers and cool wet winters and does not experience the temperature extremes of other countries at similar latitudes.

Ireland's weather patterns are characterised by the frequent passage of Atlantic low pressure weather systems and associated frontal rain belts from the South-West. These moisture-laden fronts break on the mountainous west coast, resulting in the highest rainfall levels in the west. Valentia Island of Kerry receives twice the level of rainfall to Dublin (1,684mm vs 884mm). In summer months, the influence of anti-cyclonic weather conditions results in drier continental air, in particular when winds are from an easterly direction are interspersed by the continuing passage of Atlantic frontal systems.

Occasionally, the establishment of a high pressure area over Ireland and the UK results in calm, dry conditions. In the winter these periods are characterised by the formation of low-level temperature inversions at night-time. Fog can occur in low-lying areas in the region under these conditions of slack winds and clear skies.

If anti-cyclonic conditions become established for a few days or more during the summer months, high daytime temperatures may be recorded, especially in Midland areas away from cooler coastal areas. Prolonged dry weather conditions are relatively infrequent but, should easterly continental airflows persist, drought conditions may result in the region which may last for up to 2 to 3 weeks.

The potential effects of climate change on a global scale have been investigated by the Intergovernmental Panel on Climate Change (IPCC). The resulting impacts in Ireland are outlined in the National Climate Change Strategy 2007-2012 (Department of Environment Heritage and Local Government, 2007) and by the EPA's Climate Change Research Programme.

The potential impacts include the following:

- Significant increases in winter rainfall, of the order of 10% in the southeast, with a corresponding increase in the water levels in rivers, lakes and soils.
- Lower summer rainfall, of the order of 10% in the southern half of the country. Less recharge of reservoirs in the summer.
- An overall annual increase in rainfall in the north and west. An overall decrease in rainfall in the east of the country and a resultant decrease in baseline river-flows.
- An overall mean temperature increase (0.7° between 1890 and 2008). This trend is set to continue and possibly accelerate.
- An increase in extreme weather events: serious flooding more frequent than at present – particularly in the southeast. More regular and prolonged droughts and associated water shortages, particularly in the southern half of the country.

Further adverse climate change impacts are projected to affect Ireland in the coming decades and during the rest of this century. Uncertainties remain in relation to the scale and extent of these impacts, particularly during the second half of the century. The greatest uncertainly lies in how effective global actions will be in reducing greenhouse gas emissions. Predicted adverse impacts include:

- Sea level rise;
- Further increase in intense storms and rainfall events;
- Water shortages in the summer in the east;
- Adverse impacts on water quality;
- Changes in distribution of plant and animal species;
- Adverse effects on fisheries.

The nearest Met Éireann meteorological station to the Dawn Meats (Slane) site providing monthly averages is located in Dunsany, Co. Meath (53° 30' 36" N, 6° 39' 21.6" W, 83m above sea level). As 30 year data was not available from the Dunsany station, data from the nearest synoptic station at Dublin Airport, Co. Dublin (53° 25' 22.8" N, 6° 14' 16.8" W, 71m above mean sea level) was used to determine 30-year monthly averages for rainfall, mean maximum temperature, mean minimum temperature and mean wind speed. These measurements would be generally representative of prevailing conditions experienced in the vicinity of the proposed development at Beauparc, Navan, Co. Meath.

11.4 DESCRIPTION OF EXISTING ENVIRONMENT

The 2019 total monthly rainfall, mean maximum temperature, mean minimum temperature and mean wind speed from the Dublin Airport station have been compared to the 30-year averages (1987 to 2020) for each month to determine the degree of representation of the actual meteorological conditions versus what is experienced on average at the site. This comparison is presented in **Table 11.1**.

Overall, rainfall during 2019 was 128.1mm higher than the corresponding 30 year averages. December, January and February were drier than the 30-year average, while March, September and November were considerably wetter.

The overall mean maximum temperatures for 2019 were +2.9°C to -1.4°C and mean minimum temperatures for 2019 were +0.5°C to -1.9°C from than the corresponding 30-year averages respectively.

The average wind speed recorded during 2017 was slightly lower than the 30-year average, with 9.1 knots compared to 10.3 knots.

Table 11.1: 2019 and 30-year Average Meteorological Conditions from Dublin Airport Synoptic Station

MONTH	RAINFALL		TEMPERATURE				WIND SPEED	
	2019 (mm)	Average (mm)	Mean Max 2019 (°C)	Mean Daily Max (°C)	Mean Min 2019 (°C)	Mean Daily Min (°C)	Mean 2019 (Knots)	Mean Average (Knots)
Jan	26.8	62.6	7.8	8.1	2.4	2.4	9.3	12.5
Feb	30.5	48.8	11.2	8.3	2.8	2.3	10.2	12.0
Mar	92.5	52.7	11.4	10.2	3.2	3.4	11.3	11.6
Apr	74.6	54.1	12.1	12.1	3.9	4.6	9.3	9.9
May	33.4	59.5	14.7	14.8	5.8	6.9	7.8	9.2
Jun	82.9	66.7	16.5	17.6	8.6	9.6	8.2	8.6
Jul	41.0	56.2	20.4	19.5	11.4	11.7	8.0	8.7
Aug	91.9	73.3	19.6	19.2	11.3	11.5	8.8	8.7
Sept	104.6	59.5	17.4	17.0	8.6	9.8	8.8	9.2
Oct	77.2	79.0	12.8	13.6	5.4	7.3	8.8	10.4
Nov	173.0	72.9	8.9	10.3	3.2	4.5	9.4	11.0
Dec	57.7	72.7	8.9	8.3	2.8	2.8	9.2	11.3
Annual	886.1	758.0	13.5	13.3	5.8	6.4	9.1	10.3

11.5 IMPACTS

Under its Corporate social responsibility policy, Dawn Meats Group has stated a commitment to putting in place measures to mitigate against the potential impacts of climate change. There is a commitment to continue to risk assess these areas looking at the impact extreme weather events may have.

The Engineering Design Team considers climate change adaptation during the design process to account for more extreme weather events, such as higher temperature or rainfall and Dawn Meats Group are committed to putting measures in place to offset these.

<u>Group level strategies on Climate:</u>

- Adopt innovative technologies to reduce energy usage and improve efficiency, whilst maximising the use of renewable energy and cleaner, greener fuel
- Improve water efficiency through management, design improvements, technologies and reuse strategies
- Reduce waste and increase recycling rates year on year on each site and raise staff awareness about resource management
- Enhance biodiversity at site level and protect high value conservation areas (HVCA) from our operations.

Dawn Meats (Slane) have an Industrial Emissions licence with the EPA, under which they are required to track water, resource and energy use annually. Ongoing management measures, compliance with best available techniques and monitoring for environmental impact are also carried out as part of licence compliance.

Dawn Meats (Slane) has in place an environmental management system. Implementation of an environmental management system provides a framework for environmental management best practice to help an organisation:

- Minimise environmental footprint and ensure compliance with relevant environmental legislation
- Diminish the risk of pollution incidents and provide operation improvements to develop our business in a sustainable manner

Dawn Meats has been actively involved and supportive of the Origin Green program since its inception in 2012, and is one of only 8 companies that sponsor the Origin Green Ambassador programme. Origin Green is the national sustainability programme for the Irish food and drink industry. The Group Sustainability Plan makes many commitments including: energy, water, emissions, waste, raw material sourcing, biodiversity, people and community.

During the initial projects period (2012 to 2016), Dawn Meats Group saved 350,000 M3 of water, 31,800 MWh of energy and 15,100 tonnes of CO_2 per annum.

These company policies and management systems would support the Action Strategy outlined within the Meath Co Co (June 2018) "*Climate Action Strategy*".

11.5.1 "DO NOTHING"

Should the proposed development not proceed, the existing Dawn Meats (Slane) site and the agricultural land through which the rising main would traverse would remain unaltered. The dominant greenhouse gas sources within the area, agriculture and vehicle traffic would not be altered.

11.5.2 "DO SOMETHING"

The construction phase of the proposed development would slightly increase the volume of greenhouse gas emissions in the area due to the presence of machinery and HGVs onsite.

The frequency of vehicles operating in the vicinity of the proposed effluent plant would be significantly reduced from existing daily removal of effluent 7 to 8 times per day.

Following the development of the rising main and outfall for discharging of final effluent to the River Boyne (subject to planning permission and a revision of the site's IE Licence by the EPA), there would be no requirement for tankering treated effluent offsite to municipal WWTPs. Only one collection of effluent sludge would be required per day. This would result in a decrease in air emissions due to the overall reduction in tanker movements.

Assuming an emissions factor of 1.019 kg CO_2 / km travelled for HGV vehicles, and an average 110 km round trip from the treatment plant, the carbon emission would fall from 327 tonnes CO_2/ annum to 41 tonnes CO_2/annum from site transport for effluent management onsite, a saving of 286 tonnes of carbon per annum.

Nitrous oxide emissions may be generated during the biological treatment stage of the proposed development. Nitrous oxide may arise during the nitrification (within aeration basins) and de-nitrification (within the anoxic tank) processes. However, it should be noted that wastewaters currently generated at the Dawn Meats (Slane) facility are transported to a municipal WWTP for treatment, where potential nitrous oxide emissions would be generated and released to atmosphere. Therefore, the proposed development would result in potential nitrous oxide emissions occurring at the Dawn Meats (Slane) site as opposed to the municipal WWTP, and consequently, would not result in an overall increase of nitrous oxide emissions to the atmosphere.

Agriculture, residences and traffic within the area would remain the dominant sources of greenhouse gases – namely methane and carbon dioxide.

Due to the relatively small footprint of the proposed site, there would be no significant impact on the microclimate of the area. There would be no significant direct impacts predicted on the macroclimate as a result of the proposed development.

11.6 MITIGATION

While the construction phase of the proposed development would slightly increase the volume of greenhouse gas emissions in the area due to machinery and HGVs, the increase would not be considered significant given the anticipated volume and transient nature of construction works.

Dawn Meats (Slane) is aware of the necessity to ensure maximum efficiency in all areas of the proposed development. The WWTP extension would be designed to the highest industry standard to ensure maximum energy efficiency for the wastewater treatment process.

Dawn Meats (Slane) are committed to ensure their activities do not have a significant adverse impact upon the climate. Dawn Meats Limited's Environmental Policy details the company's environmental commitments, which include the following objectives:

- To comply with Environmental Legislation, Regulations and other requirements to which the company subscribes;
- Improvements in the efficiency of Energy, Water and Raw Material use;
- Measuring and reporting our Environmental Performance;
- Pollution Prevention and Waste and Emission Reduction.

As part of their Industrial Emissions Licence, Dawn Meats (Slane) have an Environmental Management Plan (EMP) in place, which includes targets and objectives for a reduction in air emissions. The EMP would extend to cover the activities of the proposed development.

Therefore, due to the nature of the proposed development, the high design specification aimed at ensuring maximum efficiency of the proposed WWTP extension and the company's commitment to continually seeking improvements for air emissions, the impact to the climate from the proposed development would be minor.

11.7 REFERENCES

Meath Co Co (June 2018) "*Climate Action Strategy*"

Department of Environment, Heritage and Local Government (2007) *National Climate Change Strategy 2007 – 2012.*

Environmental Protection Agency Climate Change Research Programme. Available at: http://www.epa.ie/climate/climatechangeresearch/

Environmental Protection Agency Licence public access information, Available at: http://www.epa.ie/licensing/iedipcse/

Met Éireann historical weather data. Available at: http://www.met.ie/climate-request/

SECTION C - MATERIAL ASSETS

This section of the Environment Impact Assessment Report deals with material assets that would potentially be affected by the proposed upgrade and extension to the existing waste water treatment facilities at Dawn Meats Ireland Unlimited Company facility, the construction of the proposed treated effluent rising main from the Dawn Meats facility to the River Boyne at Ardmulchan, Co. Meath, and the discharge of treated effluent to the River Boyne at Ardmulchan, Co. Meath. Material assets are grouped into:

Material Assets:	**Agricultural Properties** including all agricultural enterprises.
Material Assets**:**	**Non-Agricultural Properties** including residential, commercial, recreational and non-agricultural land
Material Assets:	**Natural or other resources** including mineral resources, land and energy.

Material Assets are generally considered to be the physical resources in the environment which may be either of human or natural origin. The object of the assessment of these resources is to identify the impact of the development on individual enterprises or properties and to ensure that natural resources are used in a sustainable manner in order to ensure availability for future generations.

Agricultural enterprises interact, to a large extent, with the natural environment in terms of climate, aid quality, soil, hydrology and hydrogeology. Some domestic animals, such as horses and milking cows, may be impacted by traffic-generated noise.

Resources required for the proposed development includes existing land, fill material which would have to be sourced from quarries and electricity required for the operation of the WWTP extension.

12.0 MATERIAL ASSETS – NATURAL & AGRICULTURAL RESOURCES

12.1 INTRODUCTION

This section outlines the potential impact to Natural Resources and Agricultural Assets of the proposed WWTP upgrade and extension, the construction of the proposed treated effluent rising main from the Dawn Meats (Slane) facility to the River Boyne at Ardmulchan, Co. Meath, and the discharge of treated effluent to the River Boyne at Ardmulchan, Co. Meath.

12.2 METHODOLOGY

Both a field survey and desktop study were carried out to assess the potential impact of the proposed development on agriculture in the area.

Field surveys consisted of two walkover inspections of the proposed WWTP upgrade and extension development and the proposed treated effluent rising main route, conducted on the 21st March 2017 and the 5th of December 2018.

The desktop survey assessed potential impacts using statistical information from the CSO (Central Statistics Office) and mapping data from the 50,000 Discovery Series, 2,500 Ordnance Survey mapping, Geological Survey Ireland Spatial Resources, Teagasc Subsoil Mapping, EPA Envision Online Map Viewer, CORINE land use mapping and myplan.ie.

12.3 DESCRIPTION OF EXISTING ENVIRONMENT

The area in the immediate vicinity of the proposed operation is rural in nature, with much of the land in agricultural use. Other natural resources within the vicinity of the site would include the River Boyne as a recreational and fishery resource and extractive industry resources.

12.3.1 LAND USE AND SOIL

The CORINE data series shows that the land within the immediate vicinity of the proposed development is primarily used for pasture. The CORINE data series also shows that the surrounding region is primarily occupied by pastureland, with some small areas of non-irrigated land. Other land cover in the general region consists of land principally occupied by agriculture with areas of natural vegetation, broad-leaved forest, mineral extraction sites, discontinuous urban fabric (Navan and Slane towns) and sports and leisure activities (golf course and race course at Navan).

As discussed in **Section 10**, the soil type occurring within the footprint of the proposed WWTP development is classified as shallow, well drained mineral soil derived mainly from calcareous parent material (BminSW). The soil types occurring within the footprint of the proposed rising main are classified as **Rck**, **BminDW**, **BminPD** (Mineral soil, poorly drained till chiefly derived from limestone), **A** (alluvial) **BminSW** (Shallow well drained mineral derived mainly from calcareous minerals).

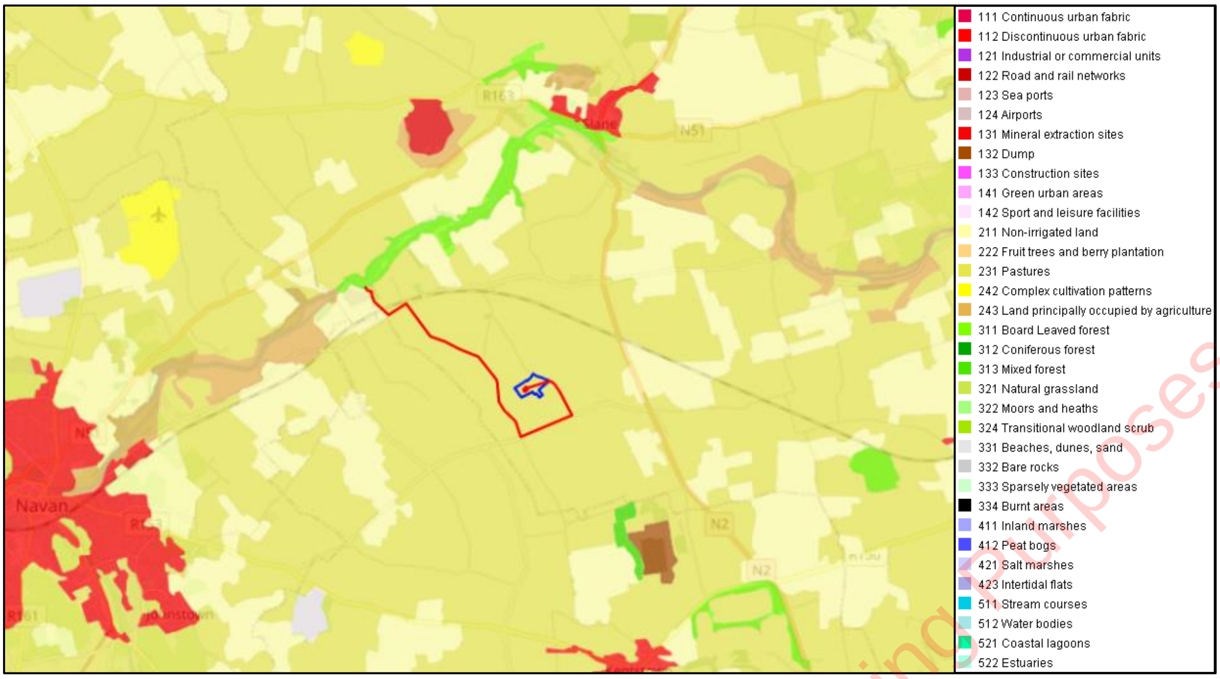

Figure 12.1: CORINE land cover 2018 (https://gis.epa.ie/EPAMaps/)

According to the EPA's Envision mapping system, much of the proposed development footprint would be underlain by bedrock at or close to the surface, with sections of glacial till composed primarily of Carboniferous Limestone.

12.3.2 AGRICULTURAL ENTERPRISES

According to the Census of Agriculture (2010), there are 191,940 hectares of agricultural land in County Meath (191,846 excluding commonage). The average farm size in Meath is 42 hectares, which is above the national average of 32.7 hectares.

Table 12.1: EPA Licenced Agricultural Enterprises within 15km of the Proposed Development

Licence No.	Licensee Name	Agricultural Enterprise	Approximate Distance from Proposed Development
P0917-01	Mr. Ivan Reynolds	Poultry Farm	5km South-East
P0887-01	Mr. David Murray	Poultry Farm	6.3km South-East
P0456-01	Marry Pig Farms Limited	Pig Farm	6.9km South
P0951-01	Mr. Dermot Crinion	Poultry Farm	7.2km North-East
P0431-02	Perma Pigs Limited	Pig Farm	8.5km North-East
P0618-02	Broomfield Pig Farm Limited	Pig Farm	10.6km North-East

There are 4,569 farms in Meath, the majority (53%) of which are specialist beef production farms, 12% are mixed grazing livestock, 10% are specialist dairying and the remainder are mixed field crops, specialist tillage, specialist sheep, mixed crops and livestock and "other".

In addition to agricultural farms and holdings, a number of agricultural enterprises, including pig and poultry farms, are located within the surrounding area of the proposed development.

Table 12.1 outlines the facilities licenced by the Environmental Protection Agency (EPA) for a class of activity defined as "Intensive Agriculture", within 15km of the proposed development.

12.3.3 NATURAL RESOURCES – TOURISM & RECREATION

The Boyne Valley tourism region of County Meath and south County Louth contains the greatest concentration of national heritage assets in Ireland and is a prime tourism area. Recreational uses for the River Boyne also include boat tours, boating and kayaking which would be reliant on the maintenance of the natural habitat resources of the Boyne.

The River Boyne and River Blackwater SAC Site Synopsis notes the importance of the River Boyne for fishing as a main tourist attraction. The site synopsis notes the following:
"The Boyne and its tributaries form one of Ireland's premier game fisheries and the area offers a wide range of angling, from fishing for spring salmon and grilse to seatrout fishing and extensive brown trout fishing. Atlantic Salmon (Salmo salar) use the tributaries and headwaters as spawning grounds. Although this species is still fished commercially in Ireland, it is considered to be endangered or locally threatened elsewhere in Europe and is listed on Annex II of the Habitats Directive. Atlantic Salmon run the Boyne almost every month of the year. The Boyne is most important as it represents an eastern river which holds large three-sea-winter fish from 20-30 lb. These fish generally arrive in February, with smaller spring fish (10 lb) arriving in April/May. The grilse come in July, water permitting. The river gets a further run of fish in late August and this run would appear to last well after the fishing season. The salmon fishing season lasts from 1st March to 30th September."

12.3.4 ECONOMIC MINERALS & EXTRACTION MATERIALS

There are no operational quarries in the vicinity of the site. The online GSI quarry database indicates the nearest operational quarry (as of 2020) is Slane Quarry c. 4.3 km to the NNW of the site. Examination of historic 25" OSI mapping (1897-1913) and 6" OSI mapping (1829-1941) shows no records of historic quarrying activity, apart from Painestown Quarry c. 0.3 km to the NW of the proposed WWTP site, within the boundaries of the proposed development site or along the proposed pipeline route options.

GSI online web-mapping indicates the following mineral localities in the vicinity of the proposed WWTP site and proposed rising main route:

- A disused quarry (Painestown Quarry) of blue grey limestone located 0.3 km to the north of the proposed WWTP site. This site has potential for walling stone production. The quarry is c. 110 m north east of the effluent rising main route.
- Disused quarry of limestone and dimension stone located c. 2.3 km to the northwest of the proposed WWTP site. It has potential as a source of blocks for cutting as well as for walling stone, although access difficulties could cause problems;

- Quarry of limestone and dimension stone located c. 2.6 km to the west/southwest of the proposed WWTP site. It may have potential as a source of walling stone. It is not clear if this quarry is still operational although it appears unlikely to be.
- Beauparc Copper Mine located c. 1.7 km north/northwest of the proposed WWTP site. Pipeline route is located c. 1 km South East from the Beauparc Copper Mine. The mine was enlarged in 1909 and is recorded as containing 15% Cu in the form of chalcopyrite in a 2 ft vein.

12.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The existing Dawn Meats (Slane) facility is located in the Greenhills, Beauparc area, within the vicinity of the Painestown townland. The proposed rising main would traverse the Painestown, Seneschalstown, Yellow Furze and Dollardstown townlands. According to the Landscape Character Assessment of Co. Meath, the proposed development is primarily located within the Central Lowlands, with the final section of the proposed rising main located within the Boyne Valley.

The existing development is located within a rural agricultural landscape, dominated by pasture fields of varying sizes, bordered by hedgerows. Arable fields and small wooded areas can also be found scattered around the landscape. Residential development in the area is predominantly linearly aligned along the existing road network. A number of large farmsteads, as well as some industrial developments are also located within the area.

The location of the proposed WWTP upgrade and extension is within the existing Dawn Meats (Slane) site. The proposed location is within the field previously used for the Integrated Constructed Wetland system, which has since been decommissioned and removed. During the site assessment, this field was noted as being comprised mainly of disturbed ground, with some recolonization of vegetation taking place. The proposed treated effluent rising main route is primarily located along the boundary of the local road network.

The extension to the approved WWTP and earth berm would add an additional c. 540m^2 to the land take for the development, for a total of approximately 3,605m^2 total land take. The demolition and reconstruction of the control house would occur within the existing and approved WWTP area and would result in no additional land take.

Excavated topsoil at the Dawn Meats (Slane) facility would be stockpiled for later landscaping use, while topsoil along the rising main route would be stockpiled for use in reinstatement of the area following completion of works.

Agricultural and natural resources used during the operation of the proposed development would be primarily comprised of live animals sourced from farmers, locally and wider afield.

12.5 IMPACTS

12.5.1 "DO-NOTHING"

Should the proposed development not be built, wastewater would continue to undergo primary treatment at the Dawn Meats (Slane) site, with daily transfer of wastewaters to licenced municipal WWTPs. There would be no licenced discharge from the facility to the River Boyne.

There would be no alterations to land-use in the area from the existing approved treatment plant.

There would be no alterations to the use of agricultural resources within the local economy.

12.5.2 LAND USE AND SOIL USE IMPACTS

If the proposed development is granted planning permission, there would be a minor loss of disturbed ground (comprised of recolonising bare ground and areas of spoil and bare ground) for the WWTP upgrade and extension. This area has historically been used in the treatment of wastewater via an Integrated Constructed Wetland (ICW) system. Therefore, the loss of land for the WWTP upgrade and extension would have no impact upon agriculture.

The proposed rising main route would traverse agricultural land within Dawn Meats owned lands at the start of the pipeline and primarily along the verge of local roads to the planned outfall at the River Boyne. As the proposed treated effluent rising main would be located underground and existing ground would be reinstated to its original use following the laying of the pipeline, there would be no loss or change of use of lands along the pipeline route.

12.5.3 RAW MATERIALS REQUIRED

Construction material, when needed, would be brought in from nearby sources such as local quarries where practical.

12.5.4 ECONOMIC MINERALS RESOURCES

It is considered that the proposed development would have no significant impact on mineral resources in the vicinity of the area.

12.5.5 TOURISM, RECREATIONAL & FISHERY RESOURCES

The proposed rising main would only carry treated final effluent of sufficient quality for discharge to the River Boyne. Therefore, this would be a material of low environmental risk. Inspection chambers would be installed at regular intervals along the route. It should be noted that effluent would be required to be tested continuously for discharge quality, and the rising main for integrity every three years, as part of the Dawn Meats (Slane) IE licence requirements.

Therefore, it is not considered that there would be a significant risk to the tourism, recreational or fishery resources on the River Boyne. This is discussed further in **section 9.5**.

12.5.6 AGRICULTURAL RESOURCES

The potential for construction and operational noise associated with the WWTP extension to cause disturbance to livestock or wild fauna surrounding the proposed development would be considered low. Any animals within the immediate area would be accustomed to the Dawn Meats (Slane) facility's existing noise environment. Animals would quickly become acclimatised to the new noise environment adjacent to the development, as with similar projects such as new roads and motorways.

It is considered that the proposed development would therefore not result in decrease or loss of material assets with regards agriculture.

12.6 MITIGATION MEASURES

Mitigation measures relating to potential risks of impacts to specific media, which may affect agricultural or natural resources, have been identified within this EIAR.

No additional mitigation measures would be required as the proposed development would not be anticipated to cause significant impacts upon the use of or existing value of agricultural or natural resources.

12.7 RESIDUAL IMPACTS

There would be no significant residual impacts on agricultural or natural resources.

12.8 REFERENCES

Central Statistics Office (2010). *Census of Agriculture 2010.* Available at: http://www.cso.ie/en/media/csoie/releasespublications/documents/agriculture/2010/full2010.pdf

Environmental Protection Agency (2017) Draft. *Guidelines on the information to be contained in Environmental Impact Assessment Reports*.

Environmental Protection Agency (2015) Draft. *Advice Notes for Preparing Environmental Impact Statements*.

Environmental Protection Agency (2003) *Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements).*

Environmental Protection Agency Licence public access information, Available at: http://www.epa.ie/licensing/iedipcse/

EPA Envision Online Mapping, Available at: http://gis.epa.ie/Envision/

Meath County Council (2016). *Meath County Development Plan 2013 – 2019.* Consolidated version, Available at: https://countydevelopmentplan.meath.ie/

Myplan.ie Viewer. Available at: http://www.myplan.ie/viewer/

Teagasc Subsoil Mapping. Available at: http://gis.teagasc.ie/soils/map.php

13.0 MATERIAL ASSETS – UTILITIES & TRANSPORT NETWORK

13.1 INTRODUCTION

This section outlines the potential impacts on utilities and transport resources of the proposed development comprising a WWTP upgrade and extension, the construction of a treated effluent rising main route from the Dawn Meats (Slane) facility to the River Boyne and the discharge of treated effluent to the River Boyne at Ardmulchan, Co. Meath.

Material assets are generally considered to be the physical resources in the environment, which may be either of human or natural origin. The object of the assessment of these resources is to identify the impact of the development on public and private utilities and to ensure that these resources are used in a sustainable manner in order to ensure availability for all stakeholders.

Economic assets of human origin, i.e. utilities and transport network, are considered in this section. Economic assets of natural origin are addressed in other sections of this EIAR, namely: ***Section 8/9:*** *Biodiversity;* ***Section 10:*** *Land - Soils, Geology, Hydrology and Hydrogeology* and ***Section 12****: Material Assets – Natural and Other Resources*. The purpose of this section is to assess the impacts of the proposed development on the existing utility network, which includes the following infrastructure:

- Electricity;
- Municipal Water Supply;
- Municipal Foul sewer;
- Municipal Storm water (surface water) drainage;
- Gas;
- Telecommunications;
- Road Network & Traffic;
- Utilities owned by other stakeholders.

13.2 METHODOLOGY

A desktop study was undertaken to assess the potential impact of the proposed development on the utilities of the area.

A transportation assessment report was completed by NRB Consulting Engineers in accordance with the methodologies outlined in the Institution of Highways and Transportation (IHT) Guidelines for Traffic Impact Assessment and the TII Traffic and Transport Assessment Guidelines. This assessment was supported by onsite traffic surveys carried out on the 11th November 2020 by Traffinomics Limited.

In light of the covid pandemic, historic and publicly available TII Traffic Census Data from the nearby N2 Ashbourne/Slane was used to establish 'normal' non-covid pandemic traffic conditions on the local network.

The supporting information and findings of the NRB Transportation Assessment Report has been summarised within this section. The full report is included as **Attachment 13.1** of this EIAR.

13.3 DESCRIPTION OF THE EXISTING ENVIRONMENT

The area in the immediate vicinity of the proposed operation is rural in nature, with much of the land in agricultural use. However, a network of utilities associated with residential houses, agricultural and commercial operations are all available in the general hinterland.

13.3.1 TRANSPORT NETWORK

The proposed development is located in the Greenhills, Beauparc area, within Painestown townland. The proposed rising main would traverse the Painestown, Seneschalstown, Yellow Furze and Dollardstown townlands.

The nearest settlement to the existing Dawn Meats (Slane) facility is the village of Yellow Furze, located approximately 800m north-west of the site. The towns Slane, Navan and Duleek are located approximately 4.5km, 8km and 9.5km respectively from the facility. Drogheda is the largest closest town and is located approximately 13km to the east of the site.

The site is accessed via Windmill Road, a local road linking to the L1013 road. The L1013 road connects to the N2 National Primary Road some 1.3km to the east and to the R153 Regional Road (between Navan and Kentstown) some 5.4km to the west.

The junction of the N2 and the L1013 (Rathdrinagh Cross Roads) takes the form of a large capacity priority junction with the provision of a dedicated right turn lane. The form of junction will ensure that the small volumes of construction related traffic will have easy & safe access to the construction compound from the N2.

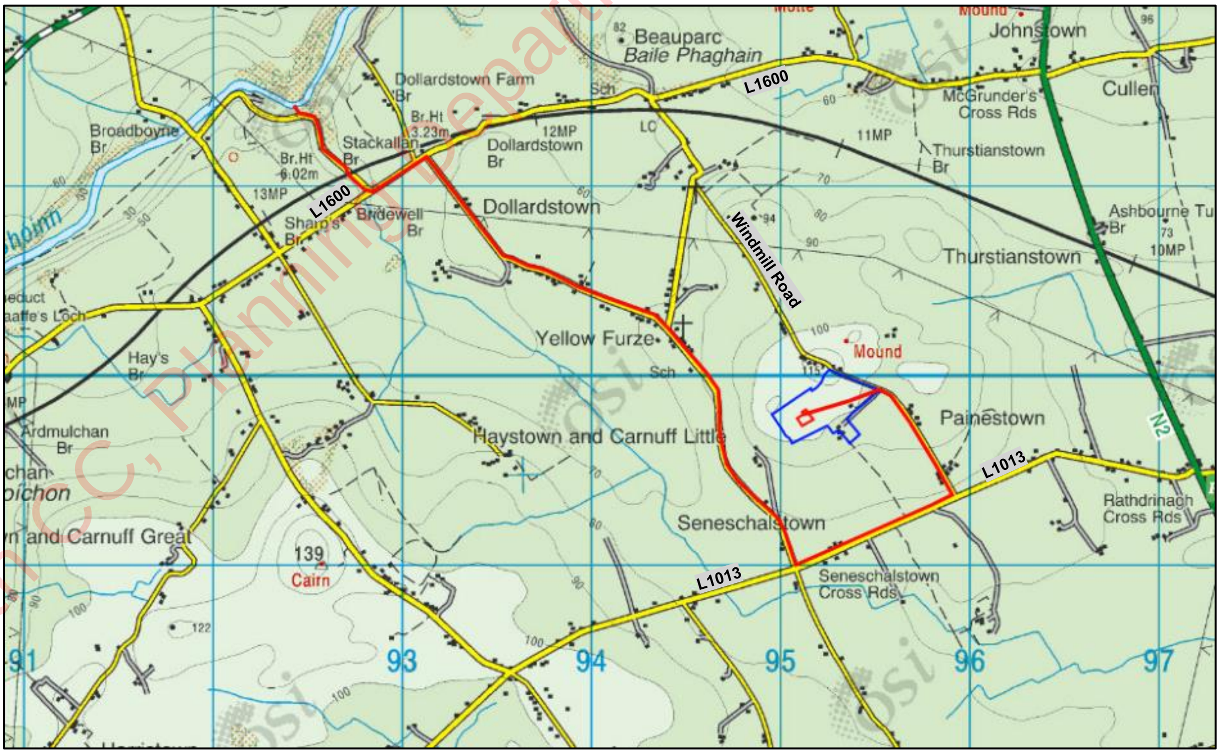

Figure 13.1: Local Transport Network (Discovery)

The local roads surrounding the site are traditional and rural in nature, all consisting of single carriageway roads bounded by established hedgerows. Each of the affected roads are classified as Local Roads (with the "L" designation), and are all subject to an 80kph speed restriction. Whilst there is an 80kph designation, the speeds are self-regulating in terms of the undulating and rural nature of the carriageways.

In terms of the capacity of the local roads, ultimately these have a theoretical traffic or link capacity of approximately 800-1,000 PCUs per direction per hour. The existing flows on the local roads need to be considered in this context.

The L1600 Boyne Road is orientated in an E-W direction and, in addition to the L1013, it can serves as a secondary or backup route from the N2 to the area. The L1600 currently carries a weekday AM Peak Hour 2-way flow of approximately 165 PCUs & a weekday PM Peak Hour 2-Way flow of approximately 171 PCUs. In these terms, it is clearly lightly trafficked in terms of its theoretical link capacity.

The local road past Yellow Furze, linking the L1600 to the L1013 to the south, carries a weekday AM Peak Hour 2-way flow of approximately 40 PCUs & a weekday PM Peak Hour 2-Way flow of approximately 45 PCUs. In these terms, it is clearly very lightly trafficked indeed.

The L1013 to the south, which will serve as the primary access from the N2, is also orientated in an E-W direction. It has a primary high quality access to/from the N2 by way of a large capacity Priority Junction (with Right Turn Ghost Island). It currently carries a weekday AM Peak Hour 2-way flow of approximately 90 PCUs & a weekday PM Peak Hour 2-Way flow of approximately 155 PCUs. In these terms, it is also considered lightly trafficked in terms of its theoretical link capacity.

13.3.2 WATER – TREATMENT OF DRINKING WATER

The Staleen Water Treatment Works is located downstream of the proposed discharge location [E303375, N273095], and provides coagulation, sedimentation, filtration and disinfection treatment. The water abstraction point is located at Staleen (Abstraction Code: 2100PUB1019) [E301795, N272201], approximately 12.7 kms downstream of the proposed discharge point.

The treatment plant produces approximately 24,000-28,000 m^3 /day and serves a total population of 77,595 across water supplies in Counties Louth and Meath (EPA,2016).

The source is located about 1.6 km from Staleen WTP, at Roughgrange pumping station. The abstraction is taken from the canal off the River Boyne. The canal is fenced off to prevent animal access from the adjacent fields.

13.3.3 WATER – TREATMENT OF WASTE WATER

The Slane Agglomeration Wastewater Treatment Plant (Discharge Licence: D0257-01) [E295890, N274260] comprises of two separate treatment systems. The first system has a design capacity of 1500 p.e. and consists of preliminary treatment (screening,) secondary treatment (aeration and followed by settlement). The second system has a design capacity of 750 p.e. which consists of primary settlement, Rotating Biological Contactor followed by settlement. The outflows from both systems combine prior to discharge. At present, the plant is operating below its design capacity of 2,250 p.e.

Navan UWWTP (D0059) discharges to the River Boyne [E 288954, N 269554], approximately 4.6km upstream of the proposed discharge location. Slane UWWTP (D0257) discharges to the River Boyne [E296247, N273851], approximately 5.4 kilometres downstream of the proposed discharge location.

13.3.4 ELECTRICITY

There are multiple power line systems within the vicinity of Painestown; 220 kV lines passing north-south through Navan and Slane with a 220 kV station located at Navan; and 110 kV lines passing east-west, north and south of the development area.

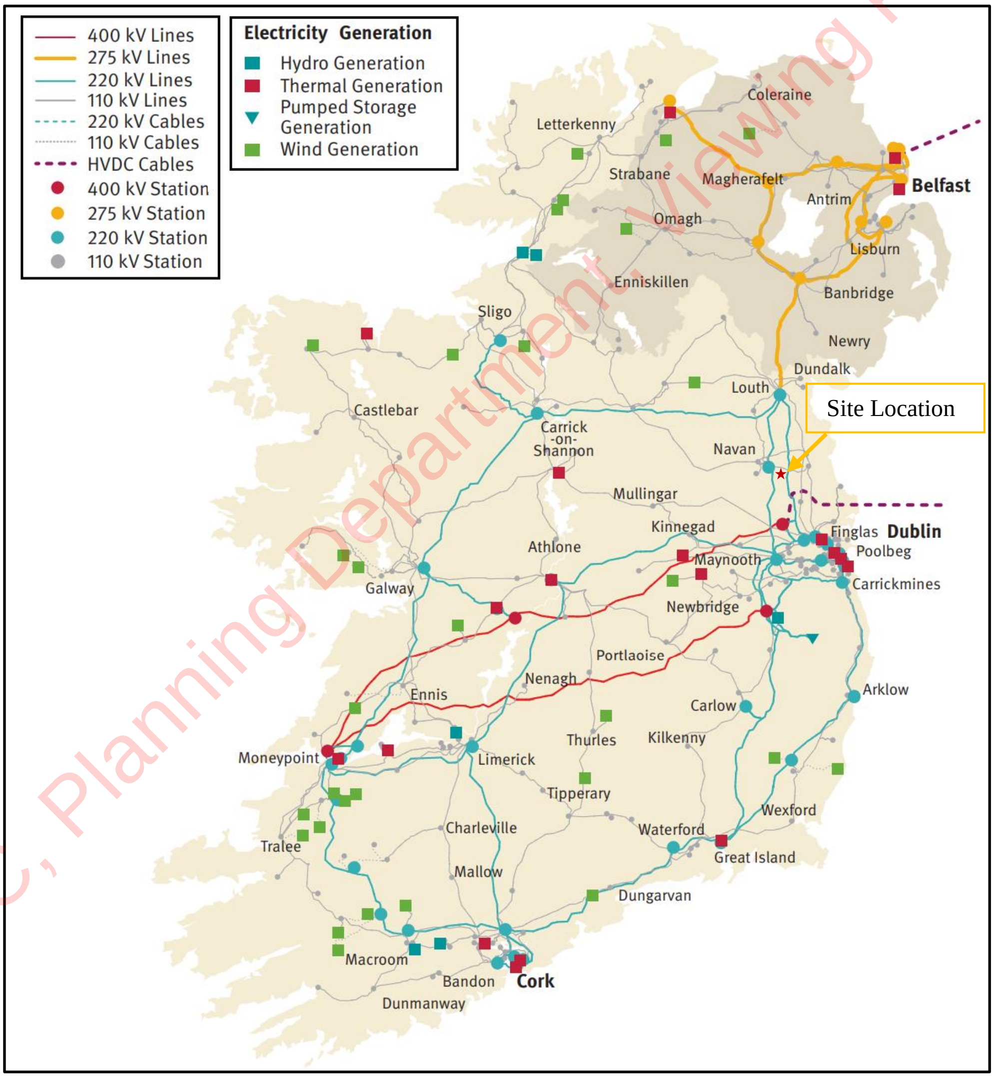

Figure 13.2: Electrical Grid Map Ireland – 2020 (Source: Eirgrid)

13.3.5 GAS

The Painestown and Slane area is not currently serviced by Gas Networks Ireland. However, the below map appears to indicate that there is a gas pipeline within a close proximity to Slane and the site at Painestown. The nearest gas supply is in Navan town.

Figure 13.3: Gas Network Map Ireland (Source: Gas Networks Ireland 2020)

13.3.6 TELECOMMUNICATIONS

The Painestown area has a number of broadband, phone and television channel providers, including Eir, Three Mobil, Sky, Virgin Media, Pure Telecom, Vodafone, Imagine and Aptus.

13.4 DESCRIPTION OF THE DEVELOPMENT

Dawn Meats Ireland Unlimited Company are applying for planning permission to Meath County Council for a development consisting of the following:

d) Demolition of an existing storage building (17.50 m^2) and construction of a new single-storey industrial type building to enclose the DAF unit granted planning permission under planning reference LB180300 and to provide new enclosed chemical store and control room (total floor area 119 m^2).

e) Install a new sludge press at intake to WWTP, change aeration tank to anoxic tank, install 2no additional aeration tanks, and alteration to perimeter berm to increase the footprint of WWTP by 539 m^2 to that granted planning permission under planning reference LB180300.

f) Treated wastewater rising main from the site of the proposed development to a new discharge point at the River Boyne (distance 7.2km), where pipeline shall be laid along a section of Windmill Road, the L1013, Yellow Furze Road, the L1600 (Boyne Rd), and the unnamed local road leading from the L1600 to the private lands abutting the River Boyne at the discharge point.

…at Painestown, Seneschalstown, Dollardstown, Hayestown-Carryduff Little & Ardmulchan, Navan, Co Meath.

As the proposed development would be an extension of an existing facility, connections to relevant utilities are already in place, or provided as stand-alone utilities within the site itself.

The site is connected to the national grid for electricity supply. An ESB substation is located onsite.

There is one main production boiler on site located in the main boiler house which is fuelled by three 2,000kg LPG gas tanks. Gas oil for the back-up generator and forklifts is supplied from an onsite bunded 8,330 litre gas-oil tank.

Water for production at the site is sourced from onsite wells, in addition to an ancillary mains water supply for emergency supply.

There are no discharges to public sewer or stormwater lines at Dawn Meats (Slane). There are currently no emissions of trade or sanitary effluents to waters or ground at the site.

Rainwater from the roofs and yard is collected via a network of storm water pipes and drains and is discharged via SW2, through a silt trap/oil interceptor, to the Painestown Stream south of the facility, a tributary of the River Boyne. Monitoring is carried out as per the sites IE licence and warning levels have been set and approved by the EPA.

The Dawn Meats (Slane) plant is long established in the area and in these terms has very well established traffic generation characteristics in its own right. The proposed works when complete will actually result in reduced traffic as it will mean that waste will no longer have to be regularly removed off-site by heavy goods vehicles for onward treatment.

The development consists of alterations to the existing and planning approved Wastewater Treatment Plant on the site of Dawn Meats (Slane) and also the construction of the associated outfall pipe to the River Boyne.

It is proposed to locate the Site Compound on the Dawn Meats (Slane) Site, accessible via the L1013 via the adjacent N2. The works compound and Dawn Meats (Slane) is located approximately 1.3km west of the N2, and in these terms is considered ideal in terms of the import of the expected small volumes of materials, machinery and construction staff.

An assessment of the worst case daily traffic volumes associated with both the pipe laying works (on the public roads) and the waste water treatment plant (within Dawn Meats) has been undertaken. Through the use of standard vehicle conversion factors to convert vehicle types to Passenger Car Units ('Car Equivalents'), we have utilised this information to quantify the traffic generated by both construction projects. In this case, a Light Goods Vehicle (LGV) is equivalent to 1 PCU and a Heavy Goods Vehicle to 2 PCUs for assessment purposes. The passenger car units (PCU) are illustrated in **Table 13.1 and 13.2** below.

Table 13.1: Total Traffic Generated by Waste Water Treatment Plant Works (PCUs)

Network Period	**Arrivals**	**Departures**
	(PCUs)	**(PCUs)**
24 hr AADT	**100**	**100**
Weekday AM Peak hr*	13	13
Weekday PM Peak hr*	13	13

Table 13.2: Total Traffic Generated by Pipe Laying Works (PCUs)

Network Period	**Arrivals**	**Departures**
	(PCUs)	**(PCUs)**
24 hr AADT	**140**	**140**
Weekday AM Peak hr*	18	18
Weekday PM Peak hr*	18	18

**** Industry Standard Method of Calculating Weekday Peak Hr is to Divide 24Hr AADT by 10 - We have Divided by 8 for Robustness, giving higher Peak Hr Flow Volumes for Assessment Purposes.***

Following the construction of the WWTP extension and proposed discharge outfall at the River Boyne, there would be a decrease in vehicle movements from the Dawn Meats (Slane) site. Currently, wastewater from the existing WWTP is collected 7-8 times per day by tanker and transferred to a municipal WWTP. The upgrade of the WWTP and the proposed discharge of treated effluent to the River Boyne would therefore eliminate these effluent tanker movements, leaving approximately one collection of de-watered sludge required per day.

An outline Traffic Management Plan for the proposed construction works has been prepared by Finn Design Partnership Ltd. Prior to works commencing along the roadway sections, the construction works contractor, once appointed, would review the outline Traffic Management Plan and revise where necessary, and submit for approval to the Meath County Council Road Engineers for approval. The traffic management plan includes measures to ensure there would be no impact to school traffic, around the hours of 9am and 3pm. Areas of public road in which the rising main would be installed or required to cross would be fully reinstated in accordance with Meath County Council's requirements.

While the construction works contractor would detail traffic safety measures to be implemented, in agreement with Meath County Council, the following is a brief description of expected traffic management measures to be implemented.

Works at the proposed main effluent plant compound and temporary construction compound would occur within the existing Dawn Meats (Slane) facility area and traffic management measures would not be necessary.

The preferred method for the laying of the rising main would be horizontal directional drilling (HDD). Where HDD is not possible due to ground conditions, the standard open-cut method would be employed.

Working areas for the HDD method would only occur at the entrance and exit of the bore, and therefore, traffic disruption would be much less than the open-cut method. However, traffic management measures would be similar in order to protect equipment operators.

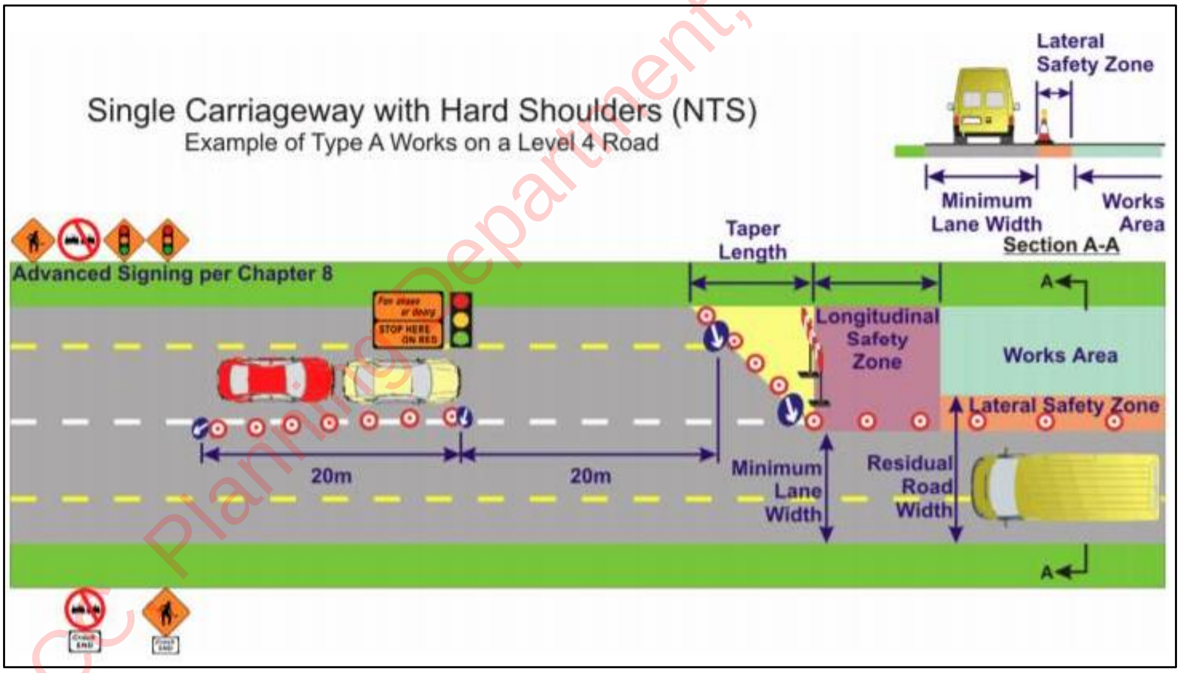

Figure 13.4: Diagrammatic Representation of Static Lane Closure Design Parameters.

With the open-cut option for installing the pipeline, a trench will have to be excavated. This would mean that one lane (the lane on the side where the pipeline is being installed) of the carriageway would be closed and a traffic-light system put in operation every day, as shown in **figure 13.4** above. This arrangement will have to take account of whether the pipeline is being installed within the grass verge or the carriageway.

It is expected that both lanes can be re-opened after the works are completed at the end of each day, although there may be times when a shorter section has to remain in place overnight. The contractor who is undertaking the works would set up the single lane arrangement for the pipeline's length (or slightly longer) which would be installed in one day, circa 200 to 300m.

13.5 IMPACTS

Overall, the proposed development would have a minor negative impact on utilities and transport network. Any disruption to services and existing transport networks would be minimal and of a temporary nature during the construction and installation phase of the development.

13.5.1 TRANSPORT NETWORK

The scenarios considered within the Transportation Assessment Report, and detailed further within **Appendix 13.1**, were;

- Scenario A – WWTP works at DAWN & Pipe laying on Windmill Rd.,
- Scenario B – WWTP works at DAWN & Pipe laying on L1013,
- Scenario C – WWTP works at DAWN & Pipe laying South of Yellow Furze
- Scenario D – WWTP works at DAWN & Pipe laying North of Yellow Furze
- Scenario E – WWTP works at DAWN & Pipe laying on the L1600.

A summary showing the worst case traffic conditions at each of the local junctions is below as **Table 13.3**.

Table 13.3: Total Traffic Generated by Construction Works (PCUs)

Network Junction	Total Worst Case Predicted Traffic Flow Through Junction									
	Scenario A		Scenario B		Scenario C		Scenario D		Scenario E	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Windmill Rd / L1013	271	253	270	252	270	252	270	252	**270**	**252**
L1013 Crossroads	182	194	183	194	218	229	218	229	**218**	**229**
T Junction Yellow Furze	42	47	42	47	42	47	77	82	**77**	**82**
L1600 / Yellow Furze T Junction	216	242	216	242	216	242	216	242	**251**	**277**

The assessment demonstrated that Scenario E unsurprisingly represented the worst case in traffic terms at each of the network junctions. Therefore, a junction capacity assessment for Scenario E at each junction was been undertaken.

The TII-approved software package 'Junctions 9' PICADY' (Priority Intersection Capacity and Delay) software package (as part of the TRL Package 'Junction 9') was used to assess the capacity of each of the junctions. PiCADY produces results based on a ratio of flow to capacity (RFC) and period mean-maximum queue length. An RFC greater than 1.00 indicates that a junction is operating at or above capacity, with 0.85 considered to be the optimum RFC value.

Table 13.4: Junctions9 PiCADY Summary Results, Windmill Rd/L1013 T-Junction

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2022 Construction Year AM Peak	<1	0.11
2022 Construction Year PM Peak	<1	0.10

Table 13.5: Junctions9 PiCADY Summary Results, L1013 Crossroads Junction

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2022 Construction Year AM Peak	<1	0.07
2022 Construction Year PM Peak	<1	0.08

Table 13.6: Junctions9 PiCADY Summary Results, Yellow Furze T Junction

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2022 Construction Year AM Peak	<1	0.02
2022 Construction Year PM Peak	<1	0.01

Table 13.7: Junctions9 PiCADY Summary Results, L1600 / Yellow Furze T-Junction

Modelled Scenario	Period Mean Max Q (PCUs)	Period Max RFC
2022 Construction Year AM Peak	<1	0.07
2022 Construction Year PM Peak	<1	0.70

The results of the modelling above clearly shows that all of the affected junctions will have significantly more than adequate capacity to accommodate the worst case traffic associated with both construction projects progressing in tandem. All of the RFCs are below the theoretical optimum capacity of 0.85 and no queuing whatsoever is anticipated.

It should be remembered that, whilst there will be a very small increase in traffic conditions locally during the construction works, the construction of the WWTP will result in a medium and long term improvement in traffic conditions locally, as large tanker vehicles will no longer be required to export effluent from the site for off-site treatment.

It is considered that there are no significant Operational Traffic Safety or Road Capacity issues that prevent a positive determination of the application by Meath County Council.

Therefore, there would be no significant impacts upon the transport network.

13.5.2 UTILITIES

As the proposed WWTP extension would be located at the existing Dawn Meats (Slane) site, the WWTP extension would avail of the existing utilities onsite, including electricity and groundwater.

Given the scale and transient nature of construction works, the power and water demand on the local electricity and mains water systems would not be considered significant and would not be anticipated to impact upon local power or water supply. Existing sanitary facilities are in place on site for construction staff. If required, a mobile welfare unit providing sanitary services would be installed at the temporary compound and would be emptied by a licenced contractor on a minimum weekly basis.

Increases to operational demand on utilities would be related to the operation of the proposed WWTP. As fuels and management of effluents and surface waters are provided as stand-alone utilities within the site, there would be anticipated to be no significant impacts to utility providers in the area. The only external utility would be to the electrical grid, and additional electrical demand would be minor for effluent plant equipment.

Telecommunications requirements during the construction phase would be minor and provided using mobile phones / broadband. Telecommunications infrastructure are currently in place for facility operations. There would be no anticipated impacts to the local telecommunications system.

If required during construction or operation, the construction contractor or factory general manager would liaise with the relevant utilities provider(s) prior to works commencing, with ongoing consultation throughout the proposed development. Where new services would be required, an application would be made to the relevant utility provider and the site would adhere to the requirements outlined in the connection permit / licence.

13.6 MITIGATION

13.6.1 OPERATIONAL PHASE MITIGATION

The proposed development would be serviced by existing utilities, with the capacity to accommodate the proposed development.

It has been concluded that there are no significant Operational Traffic Safety or Road Capacity as a result of traffic intensification due to construction traffic, and existing operational traffic levels would decrease following completion of works.

Therefore, no operational mitigation measures are considered necessary.

13.6.2 CONSTRUCTION PHASE MITIGATION

While the transportation assessment has determined that there would be no significant impact to the transport network of the area during the construction phase, an outline Traffic Management Plan for the proposed construction works has been prepared as part of this application.

The Traffic Management Plan would institute good practices for traffic management during the construction phase and ensure that the predicted low traffic impact levels are achieved.

Prior to works commencing along the roadway sections, the construction works contractor, once appointed, would review the outline Traffic Management Plan and revise where necessary, and submit for approval to the Meath County Council Road Engineers for approval.

13.7 RESIDUAL IMPACTS

The construction of the WWTP will result in a medium and long term improvement in traffic conditions locally, as large tanker vehicles will no longer be required to export effluent from the site for off-site treatment.

13.8 REFERENCES

Environmental Protection Agency (2017) Draft. Guidelines on the information to be contained in Environmental Impact Assessment Reports.

Environmental Protection Agency Licence public access information, Available at: http://www.epa.ie/licensing/iedipcse/

EPA Envision Online Mapping, Available at: http://gis.epa.ie/Envision/

EPA, 2016. *Drinking Water Audit Report, Staleen WTP and Roughgrange Pumping Station*., Available at : https://www.epa.ie/pubs/advice/drinkingwater/epadrinkingwaterauditreports/Staleen.pdf [Accessed January 2021]

Gas Networks Ireland, Pipeline Map. Available at: https://www.gasnetworks.ie/corporate/company/our-network/pipeline-map/ [Accessed January 2021].

Myplan.ie Viewer. Available at: http://www.myplan.ie/viewer/

Teagasc Subsoil Mapping. Available at: http://gis.teagasc.ie/soils/map.php

SECTION D – ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL

This section of the EIAR examines impacts of the proposed development, comprising a WWTP upgrade and extension, the construction of a treated effluent rising main route from the Dawn Meats Ireland Unlimited Company facility to the River Boyne and the discharge of treated effluent to the River Boyne on archaeology, architecture and cultural heritage.

Archeologically important sites, buildings of historic, artistic or architectural interest and sites of cultural heritage form part of the landscape of County Meath. As part of the scope and examination of alternatives phases of this development, every effort has been made to avoid known Archaeological, Architectural and Cultural Heritage sites.

This section of the Environmental Impact Assessment Report examines the impacts of the development on known sites (which could not be avoided) or potential sites which have come to light during the field survey of the proposed development.

14.0 ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE

14.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) assesses the archaeological, architectural and cultural heritage effects of the proposal to construct alterations to an existing approved effluent plant development at the Dawn Meats (Slane) facility, in Painestown, Beauparc Co. Meath and to construct a new treated effluent rising main pipeline from the treatment plant to an outfall on the River Boyne.

The purpose of the chapter is to provide an archaeological, architectural and cultural heritage assessment of the receiving environment, to identify the likely and significant effects on the receiving environment and to propose ameliorative measures to mitigate these effects.

The assessment has been carried out by Edel Barry MPhil and Seán Shanahan MSc MIAI MIASP, of Shanarc Archaeology Ltd, on behalf of Panther Environmental Solutions Ltd. in support of an application for planning permission to Meath County Council. Lead author, Edel Barry, has several years of experience in field archaeology and built heritage recording, and has authored numerous Impact Assessments on behalf of Shanarc Archaeology Ltd.

At the time of writing, the location(s) of the proposed working compound(s) have not been decided, which inhibits the overall efficacy of this report. Their location should take into account the locations of areas of archaeological potential, archaeological and architectural heritage sites presented in this report.

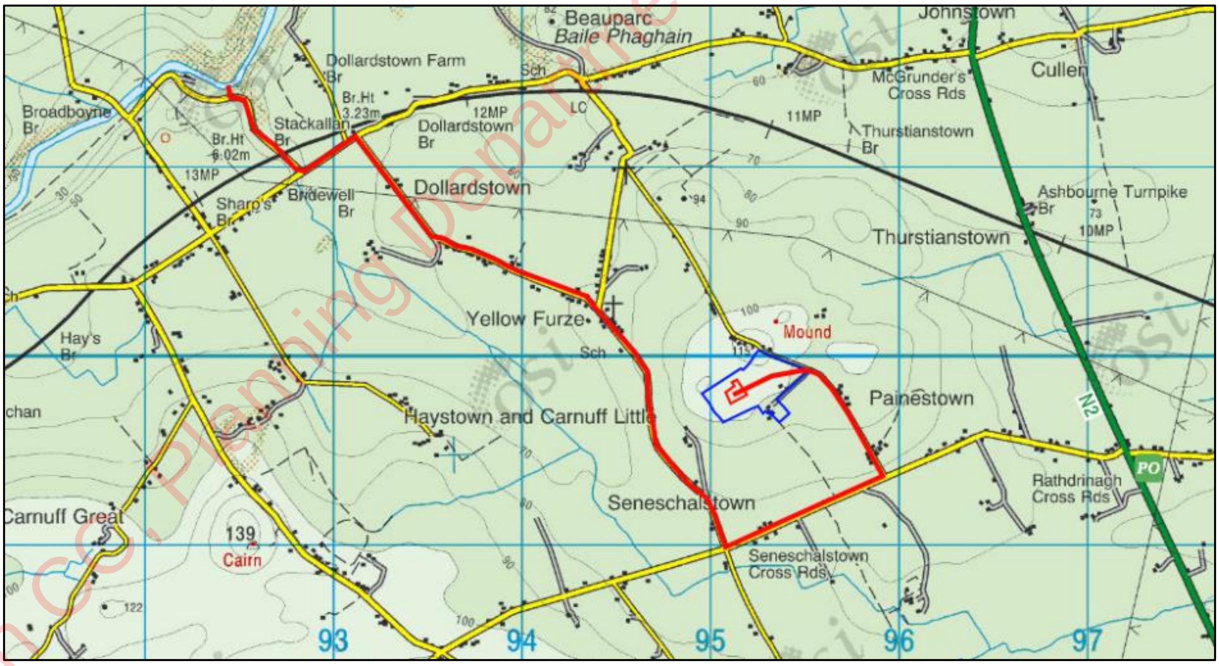

Figure 14.1: Location of effluent treatment plant at the existing Dawn Meats (Slane) facility relative to treated effluent rising main alignment

14.1.1 DEFINITION OF ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE

The term 'cultural heritage' is broadly used to describe any combination of archaeological, architectural and cultural heritage features.

- Archaeological heritage comprises objects, monuments, buildings or landscapes that generally pre-date AD1700.
- Architectural heritage, also referred to as built heritage, comprises structures, buildings, their settings and contents that generally post-date AD1700.
- Cultural heritage also comprises less tangible aspects of heritage such as folklore and cultural associations.

14.1.2 PROPOSED DEVELOPMENT

In brief, the proposed development would include an extension to an existing approved effluent plant development (Planning Ref: LB180300) at the Dawn Meats (Slane) facility, and the construction of a new c. 7.2 km underground effluent rising main from the effluent plant to an outfall on the River Boyne. The 150mm diameter effluent rising main pipe will be laid in a trench approximately 450mm in width (+/-100mm), with the cover to the pipe approximately 800 to 1000mm. The route of the pipeline will utilise public roadways throughout for the most part, with the exception of the start and end point at the existing facility and on the bank of the River Boyne. Where possible, the pipeline will be laid within the grass verge, which will facilitate the backfilling of the trench with excavated material. In cases where the trench is excavated on the roadway, it will be backfilled with imported hardcore (Cl. 808 Compacted in layers in accordance with Cl. 802 or Cement Bound Granular Material, Category B (CBGM B) to SRW Series 800).

Figure 14.2: Proposed development area at Dawn Meats (Slane) facility (*red square*) relative to owned lands (*outlined in blue*) (Source: **Attachment 2.3**, PES Ltd).

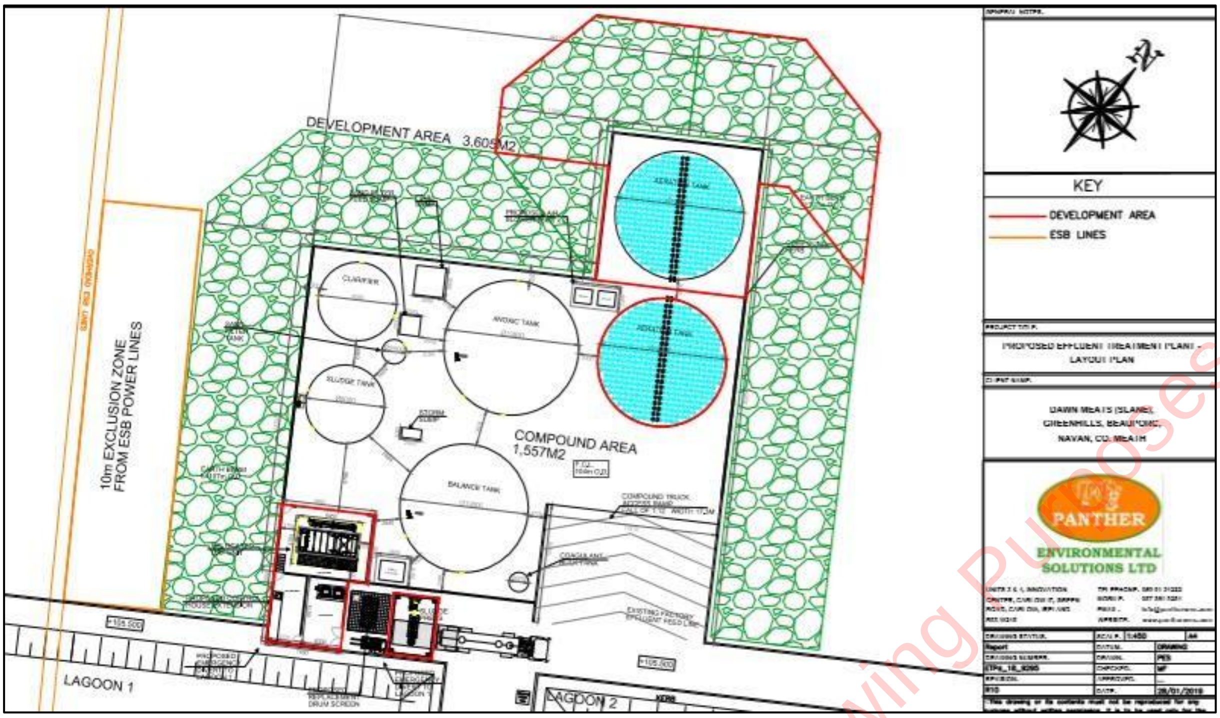

Figure 14.3: Approved layout plan of WWTP in relation to proposed extension (development/amendment areas *outlined in red*) (Source: PES Ltd).

Figure 14.4: Proposed route of pipeline (*red line*) (Source: PES Ltd).

14.2 LEGISLATIVE FRAMEWORK

14.2.1 STANDARDS AND GUIDELINES

Archaeological, architectural and cultural heritage in Ireland is protected by national and international policies.

Ireland has ratified several international and European conventions on the protection of cultural heritage, principally:

- UNESCO World Heritage Convention 1972;
- Charter for the Conservation and Restoration of Monuments and Sites (Venice) 1964;
- European Convention on the Protection of the Archaeological Heritage (Valetta Convention) 1992;
- European Convention on the Protection of the Architectural Heritage (Grenada Convention) 1985;
- EIA Directive.

National legislation protecting cultural heritage comprises:

- National Monuments Act 1930, amended 1954, 1987, 1994 and 2004;
- Heritage Act 1995;
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999; and
- Planning and Development Acts 2000 - 2014.

In addition to standards and guidelines relating to the preparation of EIAR's, the following cultural heritage guidelines were consulted as part of this assessment:

- Frameworks and Principles for the Protection of the Archaeological Heritage (1999), Department of Arts, Heritage, Gaeltacht & the Islands;
- Policy and Guidelines on Archaeological Excavation (1999), Department of Arts, Heritage, Gaeltacht & the Islands;
- The Heritage Council, 2000. Archaeology & Development: Guidelines for Good Practice for Developers, The Heritage Council;
- Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes (2005), National Roads Authority; and
- Guidelines for the Assessment of Architectural Heritage Impacts of National Roads Schemes (2005), National Roads Authority;
- Architectural Heritage Protection Guidelines for Planning Authorities (2011), Department of Arts, Heritage, Gaeltacht & the Islands.

14.2.2 ASSESSMENT CRITERIA

Impacts to archaeological, architectural and cultural heritage are generally categorised as one of three types, as described in **Table 14.1**.

Table 14.1: Type of Impact

Category of Impact	Description
Direct	Occurs where an archaeological, architectural or cultural heritage feature, site or structure is physically located within the footprint of the proposed development, resulting in the partial or total removal of that feature or site.
Indirect	Occurs where an archaeological, architectural or cultural heritage feature, site or structure, or its setting, is located in close proximity to the footprint of the proposed development.
None predicted	Occurs where an archaeological, architectural or cultural heritage feature, site or structure is not adversely or positively affected by the proposed development.

The impacts on archaeological, architectural and cultural heritage are assessed in terms of their quality, as described in **Table 14.2**.

Table 14.2: Quality of Impact

Quality of Impact	Description
Negative	A change that will detract from or permanently remove an archaeological, architectural or cultural heritage feature, site or structure.
Neutral	A change that will not affect an archaeological, architectural or cultural heritage feature, site or structure.
Positive	A change that will improve or enhance the setting of an archaeological, architectural or cultural heritage feature, site or structure.

The level or significance of impact is assessed, as described in **Table 14.3**.

Table 14.3: Significance of Impact

Level/Significance of Impact	Description
Profound	An impact that completely and irreversibly destroys an archaeological, architectural or cultural heritage feature, site or structure. Mitigation is unlikely to remove adverse effects. Reserved for adverse, negative effects only.
Significant	An impact that, by its magnitude, duration or intensity alters the character and/or setting of an archaeological, architectural or cultural heritage feature, site or structure. These effects arise where an aspect or aspects of the archaeological, architectural or cultural heritage are permanently impacted on, leading to a loss of character, integrity and data about the feature/site/structure. Appropriate mitigation is likely to reduce the impact.
Potentially significant	An impact to a potential feature/area of archaeological, architectural or cultural heritage that could be significant without mitigation measures being implemented, e.g. potential sub-surface archaeological remains.

Not significant	An impact which causes noticeable changes in the character of an archaeological, architectural or cultural heritage feature, site or structure, but without noticeable consequences.
Very significant	An impact which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of an archaeological, architectural or cultural heritage feature, site or structure.
Moderate	An impact that results in a change to an archaeological, architectural or cultural heritage feature, site or structure, which, although noticeable, does not compromises the integrity of the heritage. These effects arise where an archaeological, architectural or cultural heritage feature, site or structure can be incorporated into a modern day development without damage and that all procedures used to facilitate this are reversible.
Slight	An impact that causes a minor change in the character of the environment, which, although noticeable, does not directly impact or affect the integrity of an archaeological, architectural or cultural heritage feature, site or structure. Such impacts are generally reversible and of relatively short duration.
Imperceptible	An impact on an archaeological, architectural or cultural heritage feature, site or structure, which can be measured, but without noticeable consequences.

The magnitude of impact is assessed, as described in **Table 14.4**.

Table 14.4: Magnitude of Impact

Level of Impact	**Description**
Extent	The size of the area, the number of sites, and proportion of a population affected by an effect.
Duration	The period of time over which the effect will occur.
Frequency	How often the effect will occur.
Context	Whether the extent, duration or frequency will conform or contrast with established (baseline) conditions.

The probability of effects is assessed, as described in **Table 14.5**.

Table 14.5: Probability of Effects

Level of Impact	**Description**
Likely	The effects that can reasonably be expected to occur as a result of the planned project if all mitigation measures are properly implemented.
Indeterminable Effects	When the full consequences of a change in the environment cannot be described.
‘Worst case’ effects	The effects arising from a project in the case where mitigation measures substantially fail.

The duration of effects is assessed, as described in **Table 14.6**.

Table 14.6: Duration of Effects

Level of Impact	Description
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting less than a year
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years
Permanent	Effects lasting over sixty years

The types of effects are assessed, as described in **Table 14.7**.

Table 14.7: Type of Effects

Level of Impact	Description
Cumulative	The addition of many small effects to create one larger, more significant effect.
'Do nothing effect'	The environment as it would be in the future should no project of any kind be carried out.
Indeterminable	When the full consequences of a change in the environment cannot be described.
Irreversible	When the character distinctiveness is permanently lost
Residual	The degree of change which will occur after the proposed mitigation measures have taken effect
Synergistic	Where the resultant effect is greater than the sum of its constituents.
Indirect	Effects that arise off-site or are caused by other parties that are not under control of the developer
Secondary	Effects that arise as a consequence of a project.

14.3 METHODOLOGY

The assessment of archaeological, architectural and cultural heritage effects was based on a desk-top study of relevant archaeological, architectural and cultural heritage sources, supported by an on-site inspection and archaeological testing at the site of the proposed effluent treatment plant.

14.3.1 DESKTOP REVIEW

Record of Monuments and Places and Sites and Monuments Record

The Record of Monuments and Places (RMP) was established under Section 12 of the 1994 National Monuments (Amendment) Act. The statutory RMP is a list of archaeological monuments known to the National Monuments Service, and is based on the earlier Sites and Monuments Record (SMR) files housed at the National Monuments Service. The record is updated on a constant basis.

Topographical Files of the National Museum of Ireland

The topographical files of the National Museum of Ireland (NMI) are the national archive of all known antiquities recorded by the NMI. These files relate primarily to artefacts but also include references to monuments and contain a unique archive of records of previous excavations. The NMI's files present a catalogue of objects reported to the institution from 1928-95. The find-spots of artefacts can be an important indication of the archaeological potential of an area.

Excavations Bulletin and Excavations Database

The Excavations Bulletin is both a published annual directory and an on-line database that provides summary accounts of all the excavations carried out in Ireland – north and south – from 1969 to 2018. The on-line database has been compiled from the published Excavations Bulletins from the years 1970-2010, with additional online-only material from 2011 onwards. The database gives access to summary descriptions of archaeological excavation reports and can be browsed or searched using multiple fields, including Year, County, Site Type, Grid Reference, Licence No., Sites and Monuments Record No. and Author.

Meath County Development Plan 2013-2019

Each City and County Development Plan is compiled in accordance with the requirements of the Planning and Development Act 2000 (as amended) and contains a Record of Protected Structures (RPS), a list of buildings which cannot be materially altered or demolished without grant of permission under the Act. The RSP is listed in Appendix 8 of the Meath County Development Plan 2013-2019. Part 9 of the Plan outlines the Council's objectives and policies in respect of Cultural and National Assets, with Cultural Heritage specifically addressed in section 9.6. Meath County Development Plan 2020-2026 is available to view in draft form but has not been adopted at time of writing.

National Inventory of Architectural Heritage

The National Inventory of Architectural Heritage (NIAH) is an ongoing survey within the Department of Arts, Heritage and the Gaeltacht. The work of the NIAH involves identifying and recording the architectural heritage of Ireland, from AD1700 to the present day and includes country houses, churches, mills, bridges and other buildings of note. The NIAH survey for Meath was carried out in 2004 and is a representative sample of the post 1700 architectural heritage of County Meath.

Cartographic Sources

Information gathered from cartographic sources is fundamental to the identification of archaeological and architectural heritage sites and demesne landscapes, which are often now located from cartographic records alone. For example, the earliest Ordnance Survey maps date to the late 1830s and 1840s, but much change has occurred in the use and treatment of the landscape in the intervening years, particularly during the second half of the 20th century.

Toponomy Sources

A townland name may preserve information relating to its archaeology, history, folklore, ownership, topography or land use. Most placenames were anglicised by the Ordnance Survey, which begun in the 1830's. Despite some inaccuracies in translation, the Gaelic, Viking, Anglo-Norman and English origins of placenames are generally recognisable. The Placenames Database of Ireland website (wwww.logainm.ie) hosts online bi-lingual placename research and archival records for townlands.

Documentary Sources

Documentary sources are a valuable means of completing the written archaeological, architectural and cultural heritage record of an area, and of gaining insight into the history of the receiving environment. A list of all consulted documentary sources is provided in bibliographic form.

14.3.2 CONSULTATIONS

Consultation has been sought from statutory bodies and competent authorities in relation to the potential impact of the proposed development. This included contacting Robert Miles (Meath Co. Co. Heritage Officer) in January 2019 and no specific recommendations or concerns were raised at that time. Where applicable, any concerns raised in relation to cultural heritage have been addressed as part of this EIAR.

14.3.3 SITE INSPECTION

On-site inspection offers the opportunity to examine a study area in light of desk-based research and evidence. Inspection is essential in determining the nature and extent of any surviving above-ground evidence, and in predicting the potential effects of a proposal on potential below-ground remains. A site inspection of the WWTP site was conducted by Seán Shanahan of Shanarc Archaeology on 8 April 2017, while the route of the pipeline was inspected subsequently by Séan Shanahan on 27 February 2020.

14.4 DESCRIPTION OF EXISTING ENVIRONMENT

14.4.1 SITE DESCRIPTION

The site of the proposal is rural and predominantly agricultural in nature. The effluent treatment plant at an existing Dawn Meats (Slane) facility, in the townland of Painestown, is sited in an area previously subject to industrial usage, and contains a number of waste water storage pits. Its situation is described as a gently sloping south-facing hillside. The effluent rising main pipeline is aligned on public (local) road, which passes through the village of Yellow Furze. The first approximate 300m of the pipeline from the WWTP runs north-west through a greenfield site, flanking the entrance to the facility. The final approximately 60m of the pipeline leaves public road and is aligned in a greenfield environment to the south bank of the River Boyne.

14.4.2 ARCHAEOLOGICAL AND HISTORICAL CONTEXT

The extent of prehistoric and historic activity within the wider study area is attested to by the number and range of known archaeological monuments within the surrounding landscape. This part of Co. Meath was attractive for settlement due to its fertile land, and proximity to the River Boyne.

14.4.2.1 Prehistoric Period

Mesolithic *c.* 7000-4000BC
The earliest evidence of human occupation in Ireland can be seen in the remains of Mesolithic hunter-gatherers, who arrived in Ireland c. 7000BC, in the form of flint scatters and shell middens. Much of the activity in this era was riverine, allowing the natural resources furnished by the sea and rivers to be exploited. There is a strong possibility of encountering Mesolithic material at river crossings (O'Driscoll 2017, 44), although the River Boyne may contain evidence of sub-surface Mesolithic activity elsewhere along its banks.

Neolithic *c.* 4000-2500BC
The transition from the Mesolithic to the Neolithic periods is marked by the shift from a hunter-gatherer lifestyle to the introduction of an agricultural economy. Neolithic monuments, evidence of communal funerary and ritual activity, represent a change in burial practices and religion during this era, as well as being emblematic of an increasingly settled style of occupation. *Brú na Bóinne* is a complex of 40 passage graves, enclosures, henges and a cursus at Newgrange, Knowth and Dowth. Recognised as a world heritage site, it is situated approximately 6 km northeast of the proposed development area.

A site identified as a megalithic passage tomb (ME025-006, NM546) is situated 0.55km from the proposed development area. During the construction of a house, two stones with megalithic art were recovered adjacent to a low mound, thought to represent the remains of a passage tomb.

Approximately 5km east of the proposed development area, an excavation (00E0613) in the townland of Newtown revealed a flint scatter, believed to date to the late Neolithic. A transverse arrowhead was also discovered at the site.

Bronze Age c. 2500-800BC
Activity during the Bronze Age is characterised by the introduction of metalworking technology, as is evidenced by changes in material culture as well as the nature of sites and monuments of this era. The first metal artefacts were made of copper, before it was mixed with tin to form bronze. Stone tools continued in production and use. *Fulacht fiadh* are generally associated with this period. Described as horseshoe- or oval-shaped mounds, formed of burnt stone and charcoal, surrounding a pit that naturally filled with water, this site type is commonly thought to have been used for cooking. More recently a range of alternative theories have been proposed, including suggestions that the pits were employed for brewing or for sweat-houses. Despite the ubiquity of this class of monument across the country, there are none in the townlands associated with the proposed development, or townlands in the immediate vicinity, which is indicative of a lack of archaeological investigation in the area.

In the townland of Ardmulchan, a wedge-shaped cist covered by a large capstone, containing cremated remains (ME025-065) was identified in 1959, 0.54km from the proposed development area.

A cairn, comprising a low circular mound of earth and stones with a diameter of 30m and a central mound with a diameter of 5m has been identified in the townland of Kingstown and Carnuff Great (ME026-007). Thought to have had symbolic importance and have been significant assembly sites, these possible burial monuments are associated with the Neolithic era, with their use continuing into the Bronze Age (O'Sullivan and Downey 2011).

Iron Age c. 800BC-AD500
An inland promontory fort is recorded in the townland of Carrickdexter (ME019-032), comprising a semi-circular area backing onto a 30m-high cliff. This site type is thought to have its origins in the Iron Age, but continued in use into the Early Medieval period.

An ogham stone (ME026-009) was recovered from the grounds of Seneschalstown House in the 1940s and removed to the National Museum. Ogham, a system of strokes across a vertical central line, was the earliest form of writing in Ireland and began to be used from *c*.300 AD. The inscription on this example, two lines on the face, read 'MAQI-CAIRATINI AVI INEQAGLAS' (Macalister 1945, 45).

14.4.2.2 Historic Period

Early Medieval Period c. AD500-1100
The introduction of Christianity to Ireland occurred during the 5th century A.D., and settlement during this era is represented by the ringfort, alternatively referred to as '*rath*' '*lios'* or *'dún'* to indicate an earthen bank and exterior ditch enclosing a central area, or '*cashel*' to indicate a stone-walled enclosure. Usually circular or sub-circular in shape and often sited on raised ground, there are over 45,000 currently identified in Ireland, making this the most common site type in the country. Smaller, 'univallate' examples were homesteads for lower ranks of society, while larger bi- or tri-vallate examples were used by lords or wealthy landowners. Several examples of this site type have been identified in the vicinity of the survey area.

A ringfort in the townland of Ardmulchan (ME025-007, NM496) is described as a raised oval area, 38m in diameter, having an external berm and outer scarp. An enclosure at

Dollardstown (ME026-001) may have been a ringfort, or alternatively a motte. It comprises a raised area with two berms and the remains of earthen banks. A ringfort in the townland of Realtoge (ME06-011) comprised an uneven oval area defined by an earthen bank and external fosse, with a house site defined by an earthen bank against the inner edge of the bank to the east.

Medieval Period c. AD1100-1600

When the Anglo-Normans arrived in 1169, as mercenaries under Dermot Mac Murrough, the landscape changed dramatically, with the influx of new settlers signified by the construction of several new types of homesteads, defensive and ecclesiastical sites. Motte-and-bailey defensive settlements, comprising large flat-topped mounds atop which wooden castles were constructed, date to the early years of the Anglo-Norman conquest. An example of this site type is situated in the townland of Thurstianstown (ME019-047), comprising a grass-covered flat-topped oval mound with an irregular berm enclosing the base. A bank defines the berm from the south to the northwest, which may have constituted a bailey. A second motte (ME025-019) is situated in the townland of Ardmulchan, just over 2km from the proposed development area. Again, it is a flat-topped grass-covered earthen mound defined by a bank.

Moated sites were defended farmsteads which characterise Anglo-Norman settlement throughout Ireland. An example of this site type has been identified in the townland of Reatoge (ME026-012), described as a rectangular area defined by a bank, highest at the corners, and an external fosse. Later in the Anglo-Norman era, stone tower-houses began to be built. A three-storey tower-house, having a stair tower and a garderobe tower, is recorded in the townland of Slanecastle Demesne (ME019-033002), which was thought to have been built by the D'Exeter family. This family had lost their land by the 17th century (Wilde 1850, 149-50), presumably as a consequence of the wars of that century.

In the medieval period, the monastic tradition which had heretofore flourished took on a new form, as several Continental orders were introduced during the 12th century. In the town of Navan, the Church of St Mary's was confirmed by John deCourcy to the Augustinian canons in 1189. The ecclesiastical settlement here is thought to have been founded prior to the Anglo-Norman settlement of the county, as a charter of 1175-84 was witnessed by an abbot.

Several ecclesiastic sites of early date are to be found in the wider survey area. In the townland of Painestown, a church (ME026-022) was described as being in ruins, with its chancel in poor repair, by Ussher in his visitation of 1622 (Elrington 1864, 64), although Lewis (1837) notes that the steeple had been repaired in 1823. Now visible only as the outline of a rectangular structure, Ardmulchan Parish Church (ME025-020) is dated to 1232 (Cogan 1862, 70). It was in ruins at the time of Ussher's visitation, although the chancel was undergoing repair. By the time of Dopping's Visitation (1682-5), the parish of Ardmulchan had been united with that of Painestown (Ellison 1971, 33-4). A three-storey bell tower adjoins the west end of the church; O'Neill dates this structure to the 15th century (2002, 17). An example of a sandstone cross slab (ME025-020002) is present at the site, having a raised ringed cross; it is reused on a doorway in the tower. Cross carved pillar stones are thought to date to the 9th and 10th centuries, indicating an earlier origin for this ecclesiastic site.

Civil parishes were based on the medieval church parish, which preserved the Gaelic tuath territorial boundary. Following the Anglo-Norman invasion, the tuath were retained for administrative purposes, and later re-named as parishes or manors. Grants of land were given by Hugh de Lacy in 1175 to an Ade Dullard and Paganus Dullard and it is suggested that the local placenames of Dollardstown and Painestown may derive from these (https://www.beauparcparish.ie/parish-history, retrieved 10 March 2020).

Post-Medieval Period c. AD1600-1800

The Down Survey map of 1655 indicates that the land of the parish of Painestown was predominantly owned by James Almer, who held the lands at Dollardstowne and Thenshalstown (Seneschalstown), Thurstianstowne and Rowlandstowne, while Simon Dalywill held 427 acres of arable pasture in the centre of the parish.

Nineteenth & Twentieth Centuries

From the 18th century, defensive settlements and castles gave way to the construction of country houses, and landed estates with associated demesnes began to develop across the country. Extensive demesne landscapes are apparent on historic maps in the vicinity of the proposed development site, including Ardmulchan Demesne, seat of R. Taafe Esq., Beauparc, the residence of Gustavus Lambert, Esq., Dollardstown, once the seat of the Meredyth family, and Seneschalstown, the property of the Aylmer family.

The construction of the Boyne navigation began in 1748, under the direction of engineer David Jebb. It comprises a number of sections of canal alongside the River Boyne, and was intended to carry bulk goods, including coal and wheat, inland, while carrying wheat, flour and oatmeal milled in the vicinity of the river towards the sea port. A number of mill complexes can be seen along the riparian zone of the Boyne and the canals on the early Ordnance Survey maps (**Figures 14.9, 14.10**). The locks on the canal were named after local landowners, reflecting investment in the endeavour.

Samuel Lewis describes Painestown as being of good quality land, which was employed for tillage and pasture in equal measure. A church, described as 'old, but very neat edifice, with a handsome tower' had had a gallery erected and the steeple roofed and repaired in 1823. Lewis (1837) also describes a school, having 30 boys and 12 girls, which situated at Yellow Furze. The Church of the Assumption was built in 1826, replacing the earlier structure, and renovated in 1862. A modern church (RPS Ref. MH026-107) was built to designs by Simon Aloysius Leonard in 1964 (https://www.dia.ie/works/view/57844, retrieved 16 March 2020).

The Drogheda to Navan Railway was constructed under the auspices of the Dublin & Belfast Junction Railway in 1850, and was taken over by the Great Northern Railway in 1876.

14.4.3 CARTOGRAPHIC ANALYSIS

A range of historic maps were consulted, a full list of which is provided in the bibliography. Relevant extracts are presented from the following historic maps:

- Down Survey map of the Barony of Duleek, Eastmeath County 1657 (**Figure 14.5**);
- Down Survey map of the Parish of Painestown (**Figure 14.6**);
- Down Survey map of the Barony of Skreen, Eastmeath County 1657 (**Figure 14.7**);
- Taylor and Skinner's Map, 1777 (**Figure 14.8**);
- First edition Ordnance Survey 6" map, 1837-43 (**Figure 14.9**);
- 1906-09 edition Ordnance Survey 25" map, 1906-09 (**Figure 14.10**), and
- c. 1940 edition Cassini 6" Ordnance Survey map (**Figure 14.11**).

The Down Survey map of the Barony of Duleek (**Figure 14.5**), shows the parish of 'Paynestonne' with its component townlands of Dollardstonne, Thenshallstonne (now Seneschalstown), Painestown, Ronlanstonne (which appears to have been later absorbed into Painestown), and 'Thurstianstonne' (now Thurstiantown). The map indicates that the land of the parish of Painestown was predominantly owned by James Almer, who held the lands at Dollardstowne and Thenshalstown (Seneschalstown), Thurstianstowne and Rowlandstowne, while Simon Dalywill held 427 acres of arable pasture in the centre of the parish

Dollardstown demesne is depicted as a substantial house surrounded by trees, and a pair of watermills are shown on the River Boyne at the northern boundary of the townland. The more detailed map of the parish of Painestown (**Figure 14.6**) indicates that these were a 'Tuck Mill' and a 'Corn Mill.' Three smaller structures are shown in Thenshallstonne (now Seneschalstown), labelled on the parish map as 'Cabins.' A single-arch bridge is depicted crossing the river from Painestown, which is not extant today, nor is it represented on any of the later maps. On the Barony map, a church is shown that probably represents ME026-002, the Church of the parish of Paynestown, referred to by Ussher (1622). Just northwest of this, a house of large scale is depicted, of which no trace is extant and which is not represented on subsequent maps, in addition to a tower. On the more detailed parish map, the tower is marked as 'ruined' and the substantial house is marked as 'a stone house.'

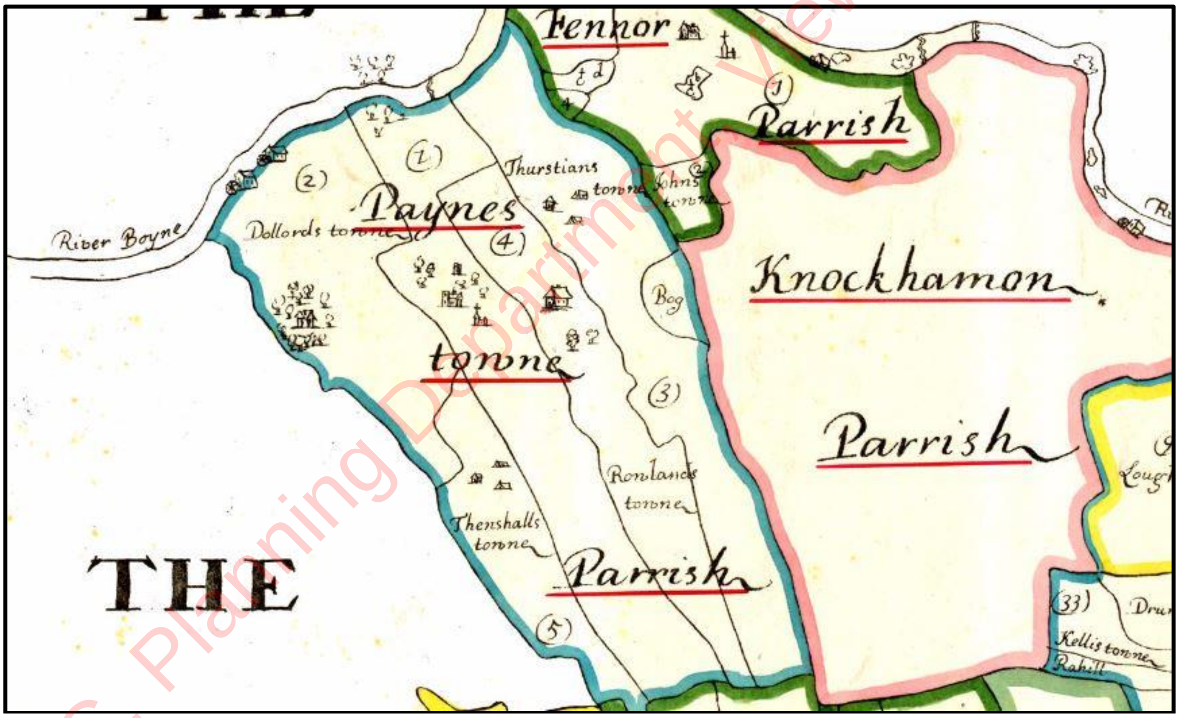

Figure 14.5: Down Survey Map of the Barony of Duleek.

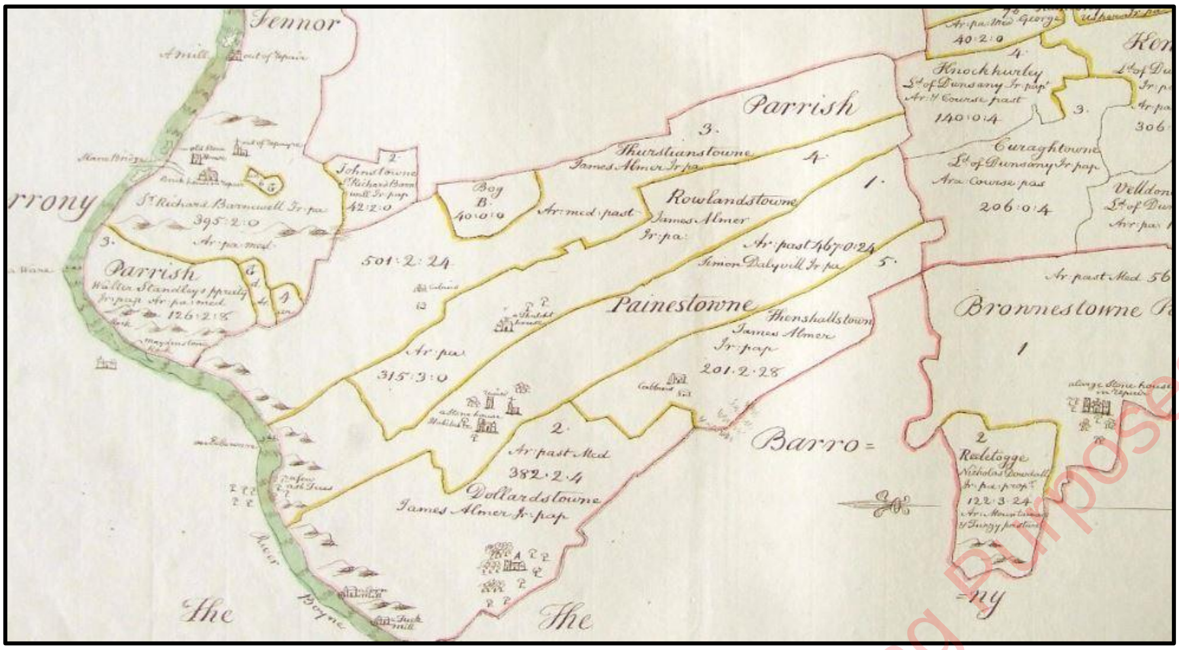

Figure 14.6: Down Survey Map of the Parish of Painestown.

The townland of Haystown and Carnuff Little, a component of the parish of Ardmulchan, is represented on the Down Survey map of the Barony of Skreen (**Figure 14.7**), as 'Hysetonne & Carnulfe'. The townland of Ardmulchan is also illustrated, with the parish Church (ME025-020) depicted'.

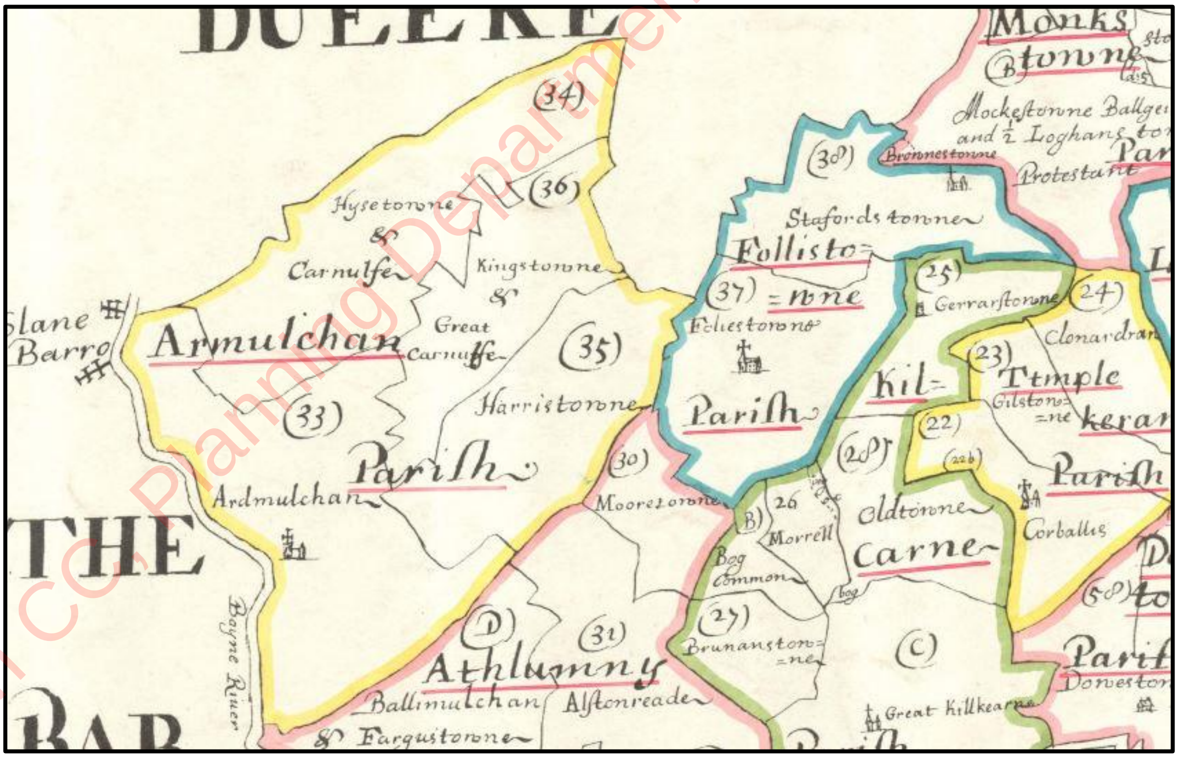

Figure 14.7: Down Survey Map of the Parish of Painestown.

Taylor & Skinners 'Maps of the roads of Ireland' was based on a survey undertaken in 1777 (**Figure 14.8**). Map number 263 covers the area to the north and west of the survey area, as it details the road from Slane to Navan. Haystown Demesne (Ld. 13th of Leighlin & Ferns), Dollardstown Demesne (Meredyth Esq) and Beaupark (Lambert Esq) are all depicted therein. A bridge crossing the River Boyne is shown, which may be the current 'Broad Boyne Bridge.'

Figure 14.8: Taylor & Skinner's Map of Road 'From Slane to Navan and Kells' 1777.

The first edition Ordnance Survey map (1837-43) depicts an improved landscape, with field systems enclosed by hedgerows and roads (**Figure 14.9**). To the north of the pipeline route, the River Boyne is shown, as well as sections of the Boyne navigation canal system, which was constructed in the 1750s-1760s. Several associated structures are shown, including Stackallen Lock (NIAH Ref. 14402507, RPS Ref MH026-100) and Broadboyne Bridge

(NIAH Ref 14402505). A Corn Mill complex and associated Mill Race are depicted in close proximity to the outflow pipe. A second Corn Mill complex is depicted on the west side of the road running north towards the River Boyne. The Dollardstown enclosure (ME026-001-) is represented as 'fort' and depicted as a circular three-enclosed feature. A number of small rectangular structures are shown immediately to the north-west of it. Opposite the junction with Yellow Furze Road, a trio of rectangular-plan structures, representing a farm house and pair of outbuildings which remain extant today are shown. Yellow Furze is shown as a single street having intermittent small structures on either side; the Church of the Assumption, which had been built in 1826 to replace the original structure, is depicted on the north-east side of the road. Shaded grey areas signify the demesne landscapes associated with Dollardstown House and neighbouring Haystown, with smaller grey areas signifying land associated with Green Hills House - the house site is located in the grounds of the Dawn Meats (Slane) facility - and with Seneschalstown House. A large house, with a yard partly enclosed by a series of linear buildings to the south, is depicted at Seneschalstown House, along with partly tree-lined avenues. A smaller house and two linear farm buildings are depicted in enclosed spaces at Green Hills House. It too had a tree-lined avenue to the road, where there was a rectangular building, a possible lodge structure.

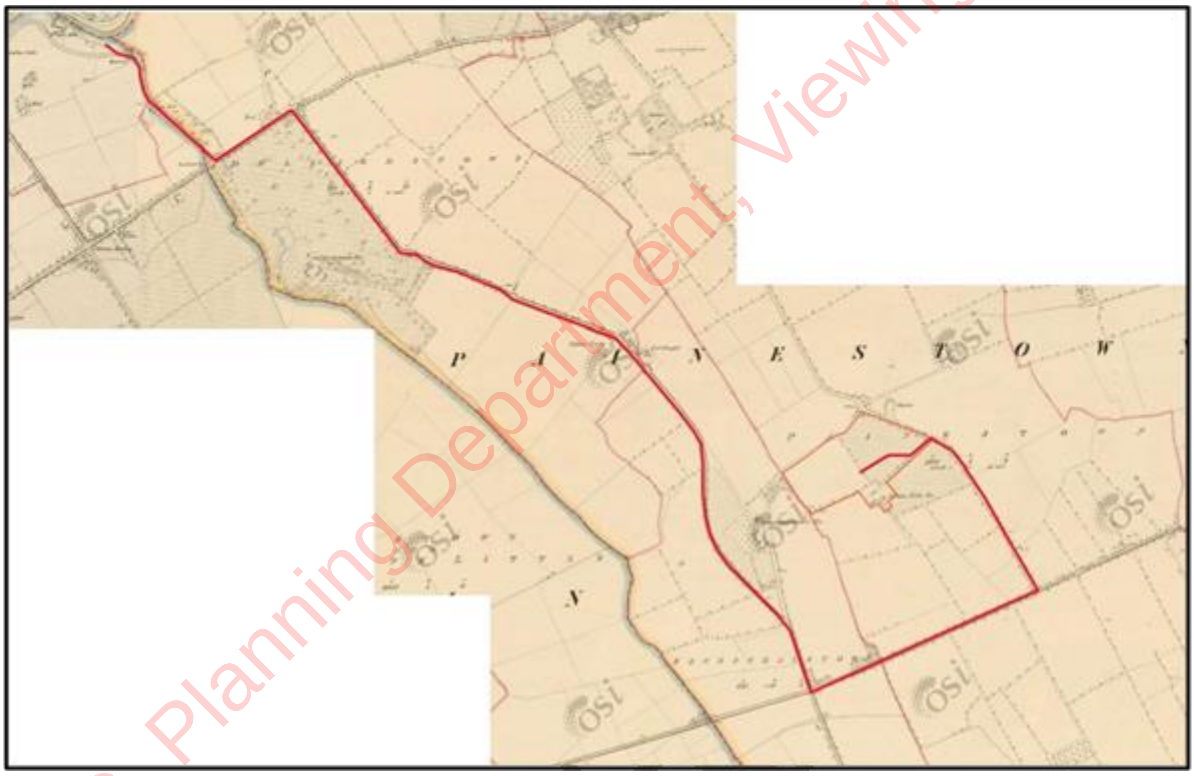

Figure 14.9: Location of proposed effluent treatment plant (outlined in orange) relative to effluent rising main alignment (outlined in red) on first edition OS map, 1837-43 (OSI Licence EN0077920).

Part of the map sheet of the 1906-1909 edition 25" Ordnance Survey map (**Figure 14.10**), which covers the Dollardstown House area, is missing. As a result, it is not possible to ascertain developments that took place in the intervening period in this area. The available portion of the map depicts the proposed effluent rising main pipeline outlet location on the bank of the River Boyne. The Corn Mills shown on the preceding map have been replaced by a Woollen Mill, with the footprint of its structures altered somewhat. A weir has been constructed adjacent to the Mill. The Drogheda to Navan Railway Line (later part of the

Great Northern Railway of Ireland), has been constructed and is depicted in the wider vicinity of the proposed development area. The village of Yellow Furze is shown to have had a very regular and formal field system put in place. The irregular layout of small structures has been removed, and replaced with a series of semi-detached houses having similar curtilage and yards to the rear. The Church, which had been renovated in 1862, is shown, with a rectangular structure marked 'School' now depicted within the curtilage of the school. A road has been constructed, running north towards Beauparc Graveyard (ME026-002002-) and the location of the historic church at Painestown (ME026-002). The grounds of Seneschalstown House, and the buildings associated with Green Hills House are also shown, as well as the newly-constructed Ashfield House. The location of the effluent treatment plant is depicted as a field, in agricultural use, adjacent to Green Hills House. Some structures in the yard at Green Hills House are potentially partly ruined/roofless, while the structure at the end of the avenue at Green Hills House is no longer depicted. In comparison, increased activity and development is depicted at Seneschalstown House, which has more formalised gardens.

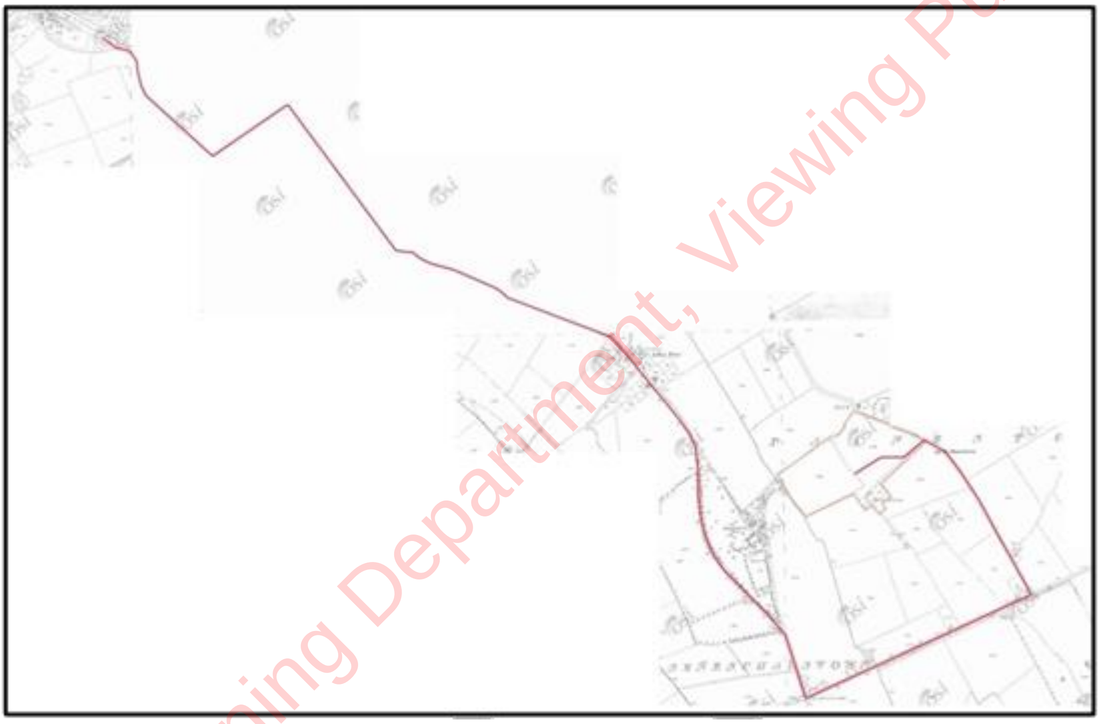

Figure 14.10: Location of proposed effluent treatment plant (outlined in orange) relative to effluent rising main alignment (outlined in red) on the 25 inch edition OS map, 1906-1909 (OSI Licence EN0077920)..

Cassini's later 20th century map (**Figure 14.11**) no longer depicts the corn mill on the local road heading to the bank of the River Boyne. The Woollen Mill complex to the north-west is depicted and noted to be disused. The railway line and Stackallan Bridge, which carried the railway over this local road, is depicted, as well as Dollardstown Farm Bridge to the east and Sharps Bridge (NIAH Ref. 14402502) to the south-west. The farmhouse facing the junction with Yellow Furze road has been altered, now having an L-plan footprint. The Church of the Assumption appears to have the same footprint, although a short while later plans were made for the construction of a new church (https://www.beauparcparish.ie/parish-history/beauparc-church/22-church-of-the-assumption-beauparc, accessed 16 March 2020). Seneschalstown House and Green Hills House appear relatively unchanged.

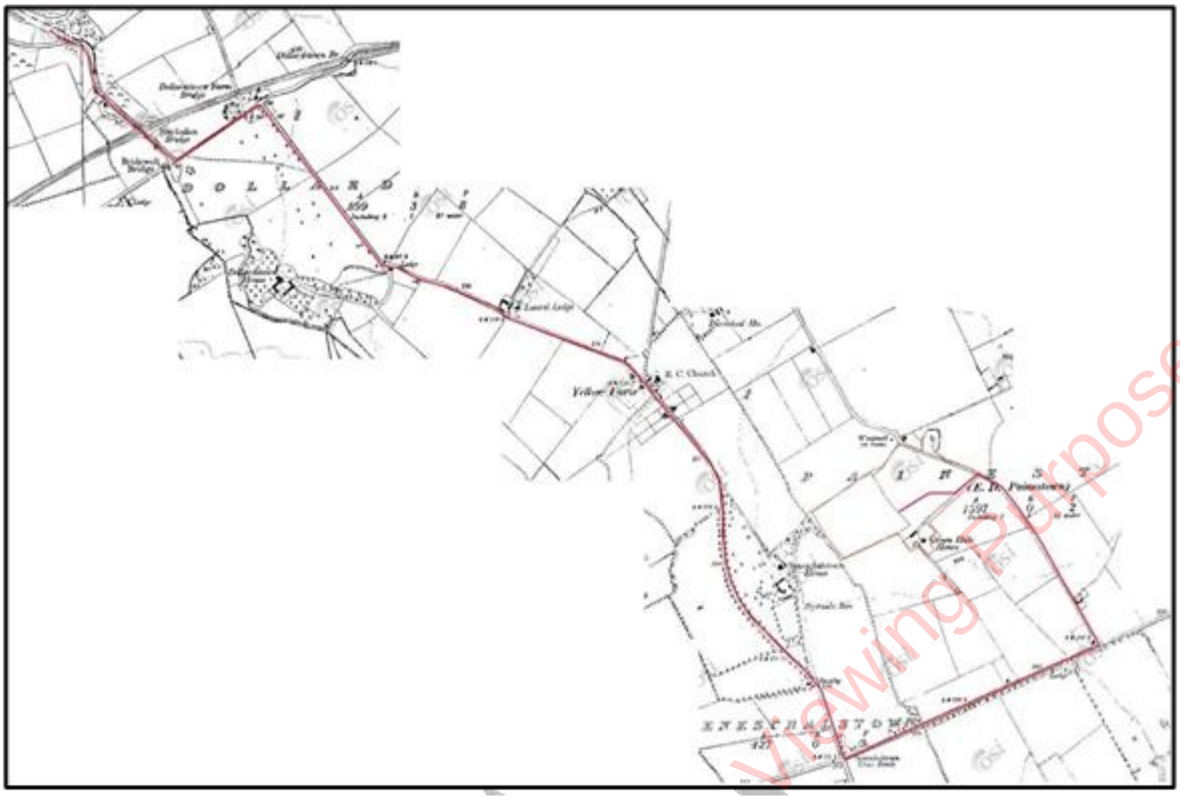

Figure 14.11: Location of proposed effluent treatment plant (outlined in orange) relative to effluent rising main alignment (outlined in red) on the 6 inch Cassini OS map, c.1940 (OSI Licence EN0077920).

14.4.4 PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

Few archaeological investigations have been undertaken in the wider vicinity.

Archaeological monitoring (1999:707) took place of ground works for the laying of a new gas pipeline from the south of Drogheda to the outskirts of Navan. Ground works involved the stripping of a 15m wide corridor and the excavation of a trench through 27 townlands, including Painestown. No features of a proven archaeological nature were uncovered as part of this investigation (Clinton, M, 1999).

Monitoring of groundworks (2011: 480) in advance of the erection of pylons for a 26km long ESB line through 18 townlands including Painestown similarly revealed nothing of archaeological significance (O'Driscoeil, C., 2011).

In August 2018, Shanarc Archaeology Ltd. carried out extensive test excavation at the site of the proposed effluent treatment plant at the Dawn Meats (Slane) facility (**Attachment 14.1**). The investigations were undertaken in accordance with Excavation Licence No. 18E0476, issued by the Department of Culture, Heritage and the Gaeltacht. Six test trenches, measuring 2 metres in width and approximately 20m in length, were machine-excavated around the area proposed for development. No features or material of archaeological significance were identified. The investigation identified fills of made ground with frequent inclusions of plastic, wood and concrete waste, consistent with considerable disturbance in the modern era and associated with the infilling of older effluent ponds.

14.4.5 ARCHAEOLOGICAL FINDS RECORDED IN THE TOPOGRAPHICAL FILES OF THE NMI

A number of finds have been located in the immediate vicinity.

Haystown and Carnuff Little:

1981:16 Axehead
Axehead measuring 12.3cm in length, 3.5cm in maximum thickness, 2.9cm wide at the butt and 6.45cm wide at the cutting edge, in good condition with a finely polished surface, slightly chipped to the body and cutting edge. Found in a ploughed field in an area of reclaimed bogland.

Dollardstown:

The topographical files list no archaeological finds from Dollardstown.

Painestown:

1978:139 Axehead
A large polished stone axehead was acquired in 1978 which had been found 'many years ago in a bog close to a spread of antlers'. Trapezoidal in shape with a flat butt, one side is slightly convex and at roughly a right angle to the butt, while the other side is concave and outsplaying, giving the axe a 'bearded' appearance. The cutting edge is worn and the axe is elliptical in cross section. The maximum length is 15.2cm, maximum width to cutting edge is 8.66cm and 5.8cm to the butt. Maximum thickness is 4.55cm.

1970:6 Ogham Stone
Originally found in Seneschalstown (also known as Painestown), this stone was taken to Seneschalstown House and thence to Piltown House, from where it was acquired by the NMI. An inscription on the surface reads : 'MAQI – CAIRATINI AVI INEQAGLAS' (Macalister, 1945 46). However, an older inscription existed on an edge, which had been battered away, leaving it illegible. The NMI found no evidence of the earlier inscription when the stone was inspected in 1970.

Ardmulchan:
2002:199 Cremated bone
Found in a short cist burial (ME025-065).

961: 83 Flint Object

14.4.6 TOPONOMY

A townland name may preserve valuable information relating to its archaeology, history, folklore, pervious ownership, topography or land use. Many placenames were anglicised by the Ordnance Survey which begun in the 1830's. Despite some inaccuracies in translation, the Gaelic, Viking, Anglo-Norman and English origins of placenames are generally recognisable.

The route of the proposed pipeline runs through a number of townlands.

The townland name of Ardmulchan derives from Ard Maolchan, and is situated in the Barony of Skreen and the civil parish of Ardmulchan (www.logainm.ie, accessed 11 March 2020).

The townland of Dollardstown is depicted as 'Dollordstonne,' in the parish of 'Paynestonne,' on the 1657 Down Survey Map of the Barony of Duleek (**Figure 14.5**). A house is depicted on the site of Dollardstown House, indicating that the townland name may be derived from the estate name. It has been recorded as having several different variations on the name, including 'Baile an Dolartaigh', 'Dollard's town' and 'Dullardston' (www.logainm.ie, accessed 11 March 2020)

The townland of Haystown and Carnuff Little is shown on the first edition Ordnance Survey map, and depicted as 'Hysetonne & Carnulfe' on the 1657 Down Survey Map of the Parish of Ardmulchan, in the Barony of Skreen (**Figure 14.7**). Haystown is derived from 'Baile Héigh,' as it is described in 1836. Carnuff is derived from 'Carn Ulfa' in reference to a cairn (www.logainm.ie, accessed 11 March 2020).

The townland of Painestown is situated within the civil parish of Painestown, the name of which is derived from Baile Phaghain. Depicted as 'Paynestonne' on the Down Survey maps, it has also been written as 'Painestown,' 'Painestowne' or 'Painstown' (www.logainm.ie, accessed 11 March 2020).

The townland of Seneschalstown is situated within the civil parish of Painestown, and the barony of Duleek Lower. It derives from Baile an tSeanascail (www.logainm.ie, accessed 11 March 2020) and is represented from the Down Survey Map of the Barony of Duleek (**Figure 14.6**) as Tenshallstonne.

14.4.7 ARCHAEOLOGICAL HERITAGE

14.4.7.1 Record of Monuments & Places and Sites & Monuments Record

A total of 9 RMP sites are located within a 500m radius of the proposed development. The closest RMP sites, an enclosure and associated burial (ME026-019; ME026-019001); and an enclosure (ME026-001-) are both situated to the immediate north-west side of local road L1600. The local road and route of the pipeline traverse the zone of archaeological potential around these monuments (**Figure 14.12**).

The closest RMP site to the approved effluent plant development at the Dawn Meats (Slane) facility, in Painestown, Beauparc, a barrow mound (ME026-008) in the townland of Painestown, is situated 162m to the north-east. Additionally, the find-site of an ogham stone (ME026-009-) in the townland of Seneschalstown, is sited 44m west of the proposed pipeline route (**Figure 14.17**). These will not be impacted as a result of the proposed development.

Table 14.8 lists the recorded monuments within a 500m radius of the proposed development; the location of the monuments within a 500m radius and associated zones of archaeological potential is shown on **Figure 14.12**.

Table 14.8: RMP sites in proximity to proposed development site

RMP No. National Monument #.	Class	Townland	ITM Ref (E,N)	Proximity (m)
ME025-006 NM#546	Megalithic Tomb – passage tomb	Ardmulchan	691828,771210	487
ME025-065	Cist	Ardmulchan	691960, 771133	419
ME025-007 NM#496	Ringfort-Rath	Ardmulchan	719321, 737565	363
ME026-001	Enclosure	Dollardstown	692955, 771160	0
ME026-019	Enclosure	Haystown and Carnuff Little	692688, 771004	0
ME026-019001	Burial	Haystown and Carnuff Little	692688, 771004	0
ME026-008	Barrow	Painestown	695254, 770210	162
ME026-009	Ogham Stone	Seneschalstown	694777, 769312	44
ME026-036	Enclosure	Haystown & Carnuff Little	692303, 770782	430

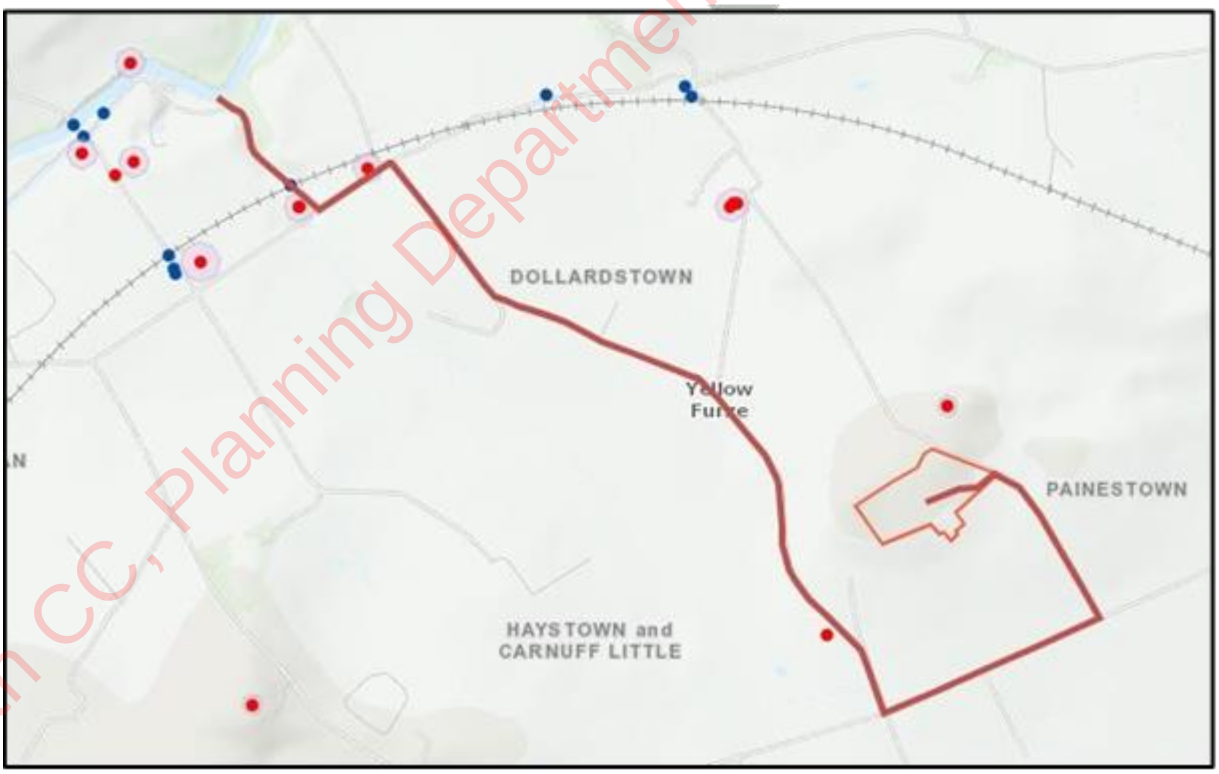

Figure 14.12: Location of effluent treatment plant (outlined in orange), effluent rising main alignment (outlined in red) relative to RMP sites (red dots) and NIAH structures (blue dots) (OSI Licence EN0077920).

14.4.7.2 National Monuments

There are two National Monuments in proximity to the proposed development site. These are a megalithic passage tomb (ME025-006, NM#546) and a ringfort (ME025-007, NM#496) both in the townland of Ardmulchan, situated 487m and 363m respectively from the proposed treated effluent rising main pipeline route (**Table 14.12**). There will be no impact upon these sites arising from the proposed development.

14.4.7.3 Areas of Archaeological Potential

A number of areas of Archaeological Potential have been identified in the vicinity of the proposed development site. Two of these are directly impacted by the route of the proposed effluent pipeline, and are discussed in **Section 14.5** Impacts.

14.4.8 ARCHITECTURAL AND CULTURAL HERITAGE

14.4.8.1 Meath County Development Plan 2013 - 2019

The Meath County Development Plan 2013-19, which provides a vision and an overall strategy or the development of County Meath over that period, was adopted 17 December 2012, and came into effect on 22 January 2013. The Meath County Development Plan 2020-2026 is available to view in Draft form but has not been adopted at the time of writing.

Record of Protected Structures

Three Protected Structures are listed within 500m of the proposed development (**Table 14.9**). One site, Stackallen Bridge (**Figure 14.15**), is situated directly on the proposed route of the pipeline. There is a low likelihood of potential direct impact to this structure resulting from the proposed development, unless the alignment of the pipeline is placed too close to the footings of the bridge. No impact is foreseen to Stackallen Lock, a historic structure situated some distance from the proposed route of the development; or to Yellow Furze Church (RPS Ref MH026-107; **Figure 14.16**), a modern building overlooking the proposed route. However, the character of the development is such that it will have no impact on the Church.

Table 14.9: RPS sites in the vicinity of the proposed development site

RPS No.	Name	Address	Proximity (m)
MH026-120	Stackallan Lock	Ardmulchan	420
MH026-100	Stackllan Bridge	Dollardstown	0
MH026-107	Yellow Furze Church	Seneschalstown	10

Architectural Conservation Areas (ACA)

The proposed development is not located within an Architectural Conservation Area (ACA). Stackallen Demesne is the closest ACA, situated approximately 2km north-west, to the northern bank of the River Boyne.

Section 9.6.14 of the Development Plan addresses Vernacular Heritage, referring to this architecture as 'the expression of the culture of a community.' It notes the increasing threat to traditional farm complexes and agricultural buildings, which are no longer economically viable. The site inspection noted a farm complex in the townland of Dollardstown, to the north of the L1600, opposite the junction with Yellow Furze Road (**Figure 14.14**). Comprising a two-storey three-bay farmhouse (**Plate 14.26**) and a pair of outbuildings (**Plate 14.27**) which are sited to the north-east thereof and flanking the road, these structures are apparent on the first edition Ordnance Survey map (**Figure 14.9**), appearing to be have the same footprint. They are not included in either the RPS or the NIAH. There is no predicted impact upon these structures due to the location and character of the proposed development.

14.4.8.2 National Inventory of Architectural Heritage

The Building survey of the NIAH list two entries with 500m of the proposed development (**Table 14.10; Figure 14.12**), both of which are also included in the Record of Protected Structures.

Table 14.10: NIAH sites in the vicinity of the proposed development site

NIAH Reg	Name	Rating	Proximity (m)
14402507	Stackallen Lock	Regional	420
14402601	Stackallen Bridge	Regional	0

14.4.9 SITE INSPECTION

The site inspection was undertaken by Séan Shanahan of Shanarc Archaeology on 8 April 2017. The proposed development is sited in gently undulating landscape, agricultural in nature, with predominantly rich, free-draining soil. The proposed location for the effluent treatment plant at the existing Dawn Meats (Slane) facilities is on a gentle south-facing slope, enclosed by mature hedgerows (**Plates 14.1 - 14.5**). No previously unrecorded features of archaeological, architectural or cultural heritage interest were noted during the site inspection of this site.

The inspection of the proposed route of the pipeline was undertaken by Séan Shanahan of Shanarc Archaeology on 27 February 2020. The alignment of the proposed effluent rising main pipeline was inspected from south-east to north-west, commencing at the proposed WWTP and ending at the proposed outlet on the south bank of the River Boyne.

The landscape through which the route of the proposed pipeline runs is gently undulating, becoming more hilly south of Yellow Furze. It is predominantly rural and agricultural in nature, being used as pasture and some tillage. The propose pipeline route follows the network of local roads for the most part, with the exception of the start and end points at the existing facility and on the bank of the River Boyle. At the entrance to the Dawn Meats facility, the road runs SSE for approximately 750m (**Plate 14.8**), terminating at a T-junction with local road L1013, and turning WSW (**Plate 14.9**). The road passes the entrance to Ashfield House on the right, with a cast-iron gate screen, re-built splayed gateway and gatelodge (**Plates 14.10, 14.11**). A wall, built in the same style of snecked squared masonry without mortar, forms the boundary to the left of the road before and after the gateway. There are many mature trees within and along the boundary of the site. Several earthworks are visible to the south of the road, in the grounds of Ashfield, taking the form of mounds and barrows, which are apparently of recent construction as landscape features. Further SW, neat hedgerows form the road boundaries, with occasional mature trees (**Plate 14.12**).

After approximately 930m the road meets the junction called Senschalstown crossroads and the pipeline follows the route to NNW (**Plates 14.13, 14.14**).

It continues along this road for approximately 273m, before the road curves to the NW (**Plates 14.15 and 14.16**) and then N for approximately 700m, passing the find-site for Ogham Stone ME026-009 (**Plate 14.17**), which has been removed to the National Museum and of which no trace is discernible. The field boundaries again are hedgerows with occasional mature trees. The road turns NNW once more just before the village of Yellow Furze (**Plates 14.18 - 14.21**). The road passes Yellow Furze school on the left at the south of the village, and centrally in the village, the Church of the Assumption stands on the right-hand side of the road. A short distance after this the road divides in two and veers NW, travelling for approximately 850m to the former entrance to Dollardstown House (**Plates 14.22-14.24**), before veering once more NNW and travelling for 680m to a T-junction with L1600 (**Plate 14.25**).

A three-bay two-storey hipped-roofed rubble-stone-built house (**Plate 14.26**), set back from the road, overlooks the junction. A pair of outbuildings is situated to the east (**Plate 14.27**), aligned parallel with the road, and a pebble-dashed wall fronts the site. Following the road (**Plates 14.28, 14.29**), the pipeline turns SW, passing enclosure ME026-001 (**Plate 14.30**). This monument is visible as a raised, roughly circular area, covered in trees and set back slightly from the road (**Plates 14.32, 14.33**). The boundary to the south side is a rubble stone wall, very much overgrown. Although there is no road boundary to the right side of a road, a gateway comprising a pair of square-plan squared rubble piers flanking a wrought-iron gate remains extant to the SW of the enclosure (**Plate 14.31**). Thereafter a low earthen boundary exists to the right side of the road. After approximately 390m (**Plates 14.34, 14.35**), the proposed pipeline route turns NW off L1600, passing in close proximity to enclosure ME026-019-, of which no trace is discernible, and its associated burial ME026-019001- (**Plates 14.36, 14.38**). After 136m the road travels under Stackallen Railway Bridge (NIAH Ref. 14402601) (**Plates 14.37, 14.39**) carrying the former Drogheda to Navan Railway Line (later part of the Great Northern Railway of Ireland).

The proposed pipeline route travels for approximately another 400m along a tortuous road, with a stream beside it, in a NNW direction, before the road veers NW, and the pipeline continues on to meet the River Boyne at the north (**Plate 14.41**). The road narrows at this point, is in poor condition, and is flanked by mature trees and scrub. The topography becomes more uneven towards the river, with raised ground alongside the road, dropping swiftly to meet the river. An extensive quarry is situated to the left of the road just south of the river.

No previously unrecorded features of archaeological interest were noted during the site inspection of the proposed effluent rising main pipeline.

The proposed site compound locations have not been decided at the time of writing, and thus have not been inspected in the field

Plate 14.1: View to northwest of effluent treatment plant location

Plate 14.2: View to northeast of effluent treatment plant location

Plate 14.3: View to south of effluent treatment plant location (existing WWTP in background)

Plate 14.4: View to southwest of proposed location of new control shed

Plate 14.5: View to west of effluent treatment plant location

Plate 14.6: View towards facility from entrance, looking SW

Plate 14.7: View SSE along road, from entrance to facility.

Plate 14.8: View NNW along local road

Plate 14.9: View SW along local road.

Plate 14.10: Entrance gates and lodge to Ashfield House, SE of road

Plate 14.11: Wall-mounted post-box to gateway of Ashfield House.

Plate 14.12: View NE along local road L1013.

Plate 14.13: View NE along local road L1013, from Seneschalstown crossroads.

Plate 14.14: View NW from Seneschalstown crossroads.

Plate 14.15: View SSE.

Plate 14.16: View NNW

Plate 14.17: View W across field to W of road, to find-spot of Ogham Stone ME026-009.

Plate 14.18: View SSE along road.

Plate 14.19: View NNW along road.

Plate 14.20: View SSE from Yellow Furze village.

Plate 14.21: View NNW towards Yellow Furze.

Plate 14.22: View SSE towards Yellow Furze.

Plate 14.23: View North along local road.

Plate 14.24: View South along local road.

Plate 14.25: View SE from junction with L1006, along Yellow Furze Road.

Plate 14.26: View NW to house facing junction with L1006

Plate 14.27: Outbuildings along north of L1600, opposite junction. View from SE.

Plate 14.28: View SW along L1600

Plate 14.29: View SW along L1600.

Plate 14.30: Enclosure (ME026-001-) viewed from ESE

Plate 14.31: Gateway to field/road boundary, adjacent to ME026-001.

Plate 14.32: Enclosure (ME026-001-) viewed from road at SW

Plate 14.33: Aerial view of enclosure (ME026-001-)

Plate 14.34: View NE along L1600

Plate 14.35: Ariel view from SE. View to site of ME026-019/ME026-019001; and Stackallen Railway Bridge

Plate 14.36: View SW along L1600.

Plate 14.37: View NW towards Stackallen railway bridge.

Plate 14.38: Location of enclosure and burial site ME026-019/ME026-019001

Plate 14.39: Stackallen railway bridge.

Plate 14.40: View to southeast along local road

Plate 14.41: View north to the River Boyne

14.4.10 ARCHAEOLOGICAL TEST EXCAVATION

As part of the proposed development, targeted archaeological test-excavation was undertaken across the site of the proposed waste water treatment plant under excavation licence No.18E0476, issued by the Department of Culture, Heritage and the Gaeltacht. This work was carried out by Jeremiah O'Dwyer of Shanarc Archaeology in August 2018. 6 test trenches, measuring 2 metres in width and approximately 20m in length, were machine-excavated around the area proposed for development (**Figure 14.13**; **Attachment 14.1**).

Test excavation did not identify any features or materials of archaeological significance. No evidence of any archaeological remains associated with the barrow (ME026-008--) or the ogham stone site (ME026-009-) were identified.

The material identified during test trenching in this area is consistent with considerable disturbance in the modern era, with frequent inclusions of plastic, wood and concrete waste, and fills of made –up ground as a result of the infilling of previous effluent ponds.

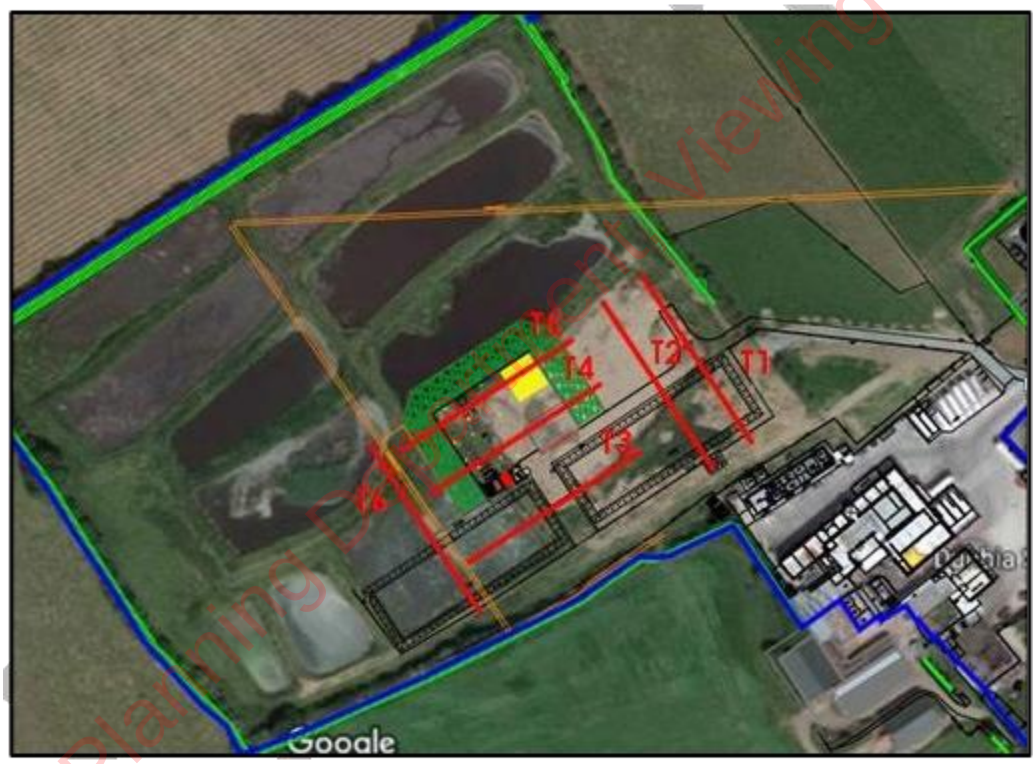

Figure 14.13: Location of test trenches across proposed development area (*red lines*) (Source: Shanarc Archaeology Ltd, Archaeological Assessment Report).

14.4.11 INVENTORY OF ARCHITECTURAL SITES, ARCHAEOLOGICAL SITES AND AREAS OF ARCHAEOLOGICAL POTENTIAL

The following inventory details all identified sites of heritage significance within and in direct proximity to the proposed development area, incorporating sites within an approximate 500m radius. The inventory consists of three architectural heritage sites (AH1, AH2 and AH3) and nine areas of archaeological potential (AP1 to AP9). Entries provide location information and a description of each site.

Table 14.11: Inventory of Architectural Sites.

SITE AH1	**Figures 14.11; 14.12; 14.15.** **Plate 14.37, 14.39**
TOWNLAND	Dollardstown
COUNTY	Meath
GRID REFERENCE	692164, 770812
IDENTIFICATION	Extant, Cartographic, NIAH
SITE TYPE	Railway Bridge
SITE NAME	Stackallen Bridge
NIAH REF. NO.	14402601
RPS REF. NO.	-
REFERENCES	Geraghty 2013
PROXIMITY	0m. Bridge carries railway line above local road and proposed pipeline alignment.
DESCRIPTION: Single-arch railway bridge built 1847. Round-headed arch with rusticated limestone voussoirs, rusticated ashlar limestone to spandrel walls and to pedimented parapets, sting course and coping. Arch flanked by rusticated limestone pilasters having splayed abutments. Plaques to pediment. The Navan Branch Line of the Dublin and Drogheda Railway was constructed as a famine relief scheme for the poor of Co Meath, with work on the line commencing in 1846 and it opening on February 15, 1850 (Geraghty 2013, 119-120). This line provided access to markets in Dublin and England for the produce of the rich agricultural landscape of Co Meath, opening up trade and commerce in the area. The simple form of this bridge is enhanced by pedimented parapets and tapered piers, and articulated by rusticated masonry detailing, creating a striking focal point in this rural area.	

Table 14.12: Inventory of Archaeological Sites and Areas of Archaeological Potential (listed northwest - southeast).

SITE AP1	**Figures 14.1; 14.9; 14.10; 14.11; 14.12; 14.14.** **Plate 14.31**
TOWNLAND	Ardmulchan
COUNTY	Meath
GRID REFERENCE	692408, 771393
IDENTIFICATION	Cartographic
SITE TYPE	River bank zone
SITE NAME	River Boyne
NIAH REF. NO.	-
RPS REF. NO.	-
REFERENCES	-
PROXIMITY	0m. Proposed pipeline outfall at River Boyne.
DESCRIPTION: Corn Mills indicated both upriver and downriver of proposed outlet on River Boyne. The mills are marked on the first edition OS map, 1837-43, inclusive of buildings, dams and mill races. Multi-era monuments, from pre-historic (cist ME025-065---; passage tomb ME025-006---) to early medieval (ringfort ME025-007---) in date are located in Ardmulchan and surrounding townlands in proximity to both banks of the River. Suggestive of continual occupation in surrounding area and potential for uncovering unrecorded archaeological remains on the bank of the River.	

SITE AP2	**Figures 14.9; 14.11; 14.12; 14.14.**
TOWNLAND	Haystown and Carnuff Little
COUNTY	Meath
GRID REFERENCE	692531, 771185
IDENTIFICATION	Cartographic
SITE TYPE	Corn Mill, site of
SITE NAME	Corn Mill
NIAH REF. NO.	-
RPS REF. NO.	-
REFERENCES	1st edition OS map, 1837-43; Cassini OS map, *c.* 1940
PROXIMITY	0m. Proposed pipeline in local road alignment adjacent to Corn Mill site.
DESCRIPTION: Corn Mill indicated on the south side of local road at northern boundary of Haystown and Carnuff townland, with possible associated mill race aligned southeast - north. Two rectangular structures with gables fronting road side on 1st edition OS map, 1837-43, with three additional structures further back from road. A single, enlarged structure indicated on Cassini OS map, *c.* 1940 with possible mill race alignment from southeast.	

SITE A1	**Figures 14.12; 14.15.** **Plates 14.35, 14.38**
TOWNLAND	Haystown and Carnuff Little
COUNTY	Meath
GRID REFERENCE	692691, 771005
IDENTIFICATION	RMP
SITE TYPE	Enclosure and burial
SITE NAME	ME026-019/ ME026-019001-
NIAH REF. NO.	-
RPS REF. NO.	-
REFERENCES	-
PROXIMITY	0m. Proposed pipeline in local road alignment in zone of archaeological potential of monument.
DESCRIPTION: The RMP records an enclosure in the townland of Haystown and Carnuff Little, with an associated burial (ME026-019001-). This is not represented on any of the maps of the area but is situated within close proximity of the proposed development.	

SITE A2	**Figures 14.12; 14.15** **Plates 14.30, 14.32. 14.33**
TOWNLAND	Dollardstown
COUNTY	Meath
GRID REFERENCE	692955, 771160
IDENTIFICATION	RMP
SITE TYPE	Enclosure
SITE NAME	ME026-001
NIAH REF. NO.	-
RPS REF. NO.	-
REFERENCES	-
PROXIMITY	0m. Proposed pipeline in local road alignment in zone of archaeological potential of monument.
DESCRIPTION: Situated on undulating grassland, the northern half of this site and its entire centre has been quarried. Originally the site comprised a natural hillock with a flat top, surmounted by a flat cairn of stones surrounded by earth and a small stone bank. During an excavation in 1956 a skeleton was found under the bank, and pockets of cremations were recovered under the cairn. A wide fosse-like area surrounded the hillock, which in turn was surrounded by a large earthen and gravel bank, which is best preserved to the west, it is defined to the south and very small to the east. A smaller shallower fosse and smaller earthen bank and embankment enclose the site. The outside of this outer bank and embankment was sharply profiled and acted and a field fence, which may have been its original function.	

14.5 IMPACTS

14.5.1 "DO-NOTHING"

In a do nothing scenario, subject to the existing landuse on the proposed effluent rising main pipeline remaining unaltered i.e. in use as a road, there will be no direct, negative impacts on the local cultural heritage highlighted in this assessment.

14.5.2 CONSTRUCTION PHASE

14.5.2.1 Potential Direct Impacts

The construction of the proposed effluent rising main pipeline will have a direct impact on the following areas of Archaeological Potential (AP):

1. River Boyne (**AP1**)
2. Corn Mill, site of (**AP2**);

The construction of the proposed effluent rising main pipeline will have a direct impact on the zone of archaeological potential associated with the following recorded monuments (A):

3. Enclosure and associated burial ME026-019 (**A1**)
4. Enclosure (ME026-001) (**A2**)

The construction of the proposed effluent rising main pipeline will have a potential direct impact on the following Architectural Heritage (AH) site;

5. Stackallen Railway Bridge (**AH1**)

The perceived impacts resulting from the construction of the proposed effluent treatment plant at the Dawn Meats (Slane) facility, including the proposed alterations to the existing approved design, are considered to have been resolved, as no features or material of archaeological or architectural significance were identified though Archaeological Test Excavation (**Attachment 14.1**).

14.5.2.2 Potential Indirect Impacts

There will be no potential indirect impacts at the construction stage of the development. At the time of writing, the location(s) of the proposed working compound(s) have not been decided and impacts could not be assessed. Their location should take into account the locations of areas of archaeological potential, archaeological and architectural heritage sites presented in this report.

14.5.3 OPERATIONAL PHASE

14.5.3.1 Potential Direct Impacts

It is anticipated that all archaeological heritage issues will be resolved to the satisfaction of the DCHG at the pre-construction phase of development and therefore there will be no potential impacts at the operation stage of the development.

14.5.3.2 Potential Indirect Impacts

It is anticipated that all archaeological heritage issues will be resolved to the satisfaction of the DCHG at the pre-construction phase of development and therefore there will be no potential impacts at the operation stage of the development.

14.5.4 DISCUSSION OF IMPACTS

Following an assessment of readily available archaeological records, cartographic and documentary sources, a visual inspection of the site, and perusal of the results of archaeological testing, it is concluded that the proposed development will directly impact a number of areas of archaeological potential which have been identified along the route of the effluent pipeline, and have a potential direct impact upon one architectural heritage site, as follows:

AH1: Stackallen Railway Bridge
The proposed effluent rising main pipeline will be installed in roadway under the Stackallen Railway Bridge, a NIAH and RPS listed structure. Depending on the proximity of the pipeline trench to the footings of the bridge, it is possible that inadvertent damage to the Bridge, or to the footings of the bridge, may occur during construction work associated with the proposed effluent rising main pipeline and the same would constitute a negative and potentially significant impact.

AP1: River Boyne
The bank of the River Boyne will be utilised as an outfall location for the proposed effluent rising main pipeline. The River is considered a zone of archaeological potential as a result of the known pre-historic and historic settlement and use of the River. Corn Mills of at least early post-medieval date are located a short distance upriver and downriver of the proposed outfall location. Multi-era monuments, from pre-historic (cist ME025-065---; passage tomb ME025-006---) to early medieval (ringfort ME025-007---) in date are located in Ardmulchan and surrounding townlands in proximity to both banks of the River. The construction of the effluent pipeline to the outfall on the River will have a direct, negative and potentially significant impact on unrecorded archaeological or architectural remains that may be present below the ground within the proposed wayleave.

AP2: Corn Mill, site of
A corn mill site is sited on the west side of the public roadway, a short distance to the north of the Stackallen Railway Bridge, in the townland of Haystown and Carnuff Little. Limited extant remains of the mill survive. The construction of the effluent pipeline in the public roadway will have an direct, negative and potentially significant impact on remains of the mill, as remains of the milling history at this site may extend beneath the roadway.

A1: Enclosure (ME026-019) and burial (ME026-019001-), Haystown and Carnuff Little

A recorded enclosure, with an associated burial, is sited on the west side of public roadway in the townland of Haystown and Carnuff Little, at the intersection with the L1600. The monument is not represented on any of the maps of the area, nor is it apparent in the landscape, and the records relating to this recorded monument are poor. The zone of archaeological potential, in which archaeological material associated with the monument could be present, extends over the width of the public roadway. As such, the proposed effluent rising main pipeline in public roadway will have a direct impact on the monument's zone of archaeological potential and on any sub-surface archaeological remains potentially located beneath the roadway.

A2: Enclosure (ME026-001), Dollardstown

A recorded enclosure is situated north-west of the L1600 in Dollardstown townland and in close proximity to enclosure and burial ME026-019. The Zone of Archaeological Potential of the monument is traversed by the route of the proposed effluent rising main pipeline The RMP detail for the site suggests the monument may constitute the remains of a ringfort or motte. The proposed effluent rising main pipeline will have a direct, negative and potentially significant impact on sub-surface archaeological remains that may be present outside of the known boundary of the monument. The worst case effects will be permanent and irreversible, as any archaeological deposits or features will be damaged by construction work.

The locations of cultural heritage sites listed above are illustrated on **Figures 14.14 - 14.17**.

Figure 14.14: Location of AP1, outfall location on the River Boyne, and AP2, Corn Mill, site of (*outlined in blue*), in relation to proposed route of effluent pipe (*orange line*).

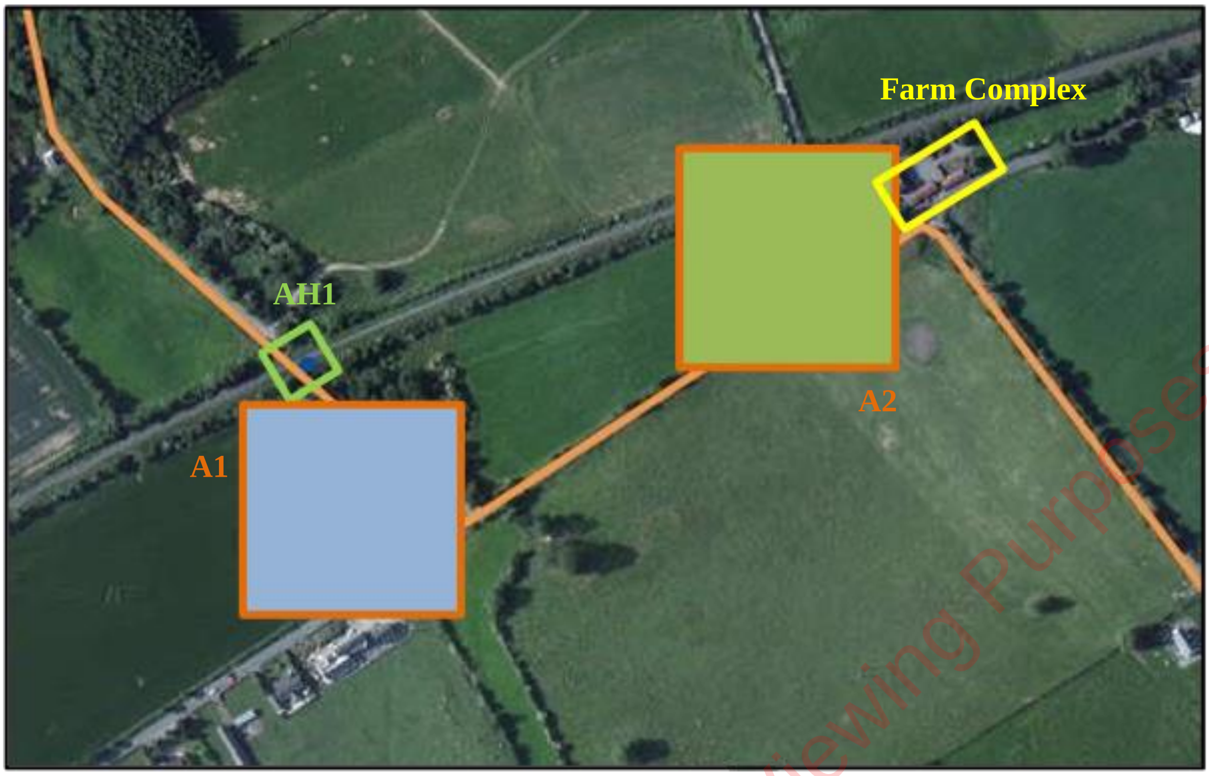

Figure 14.15: Location of A1, zone of archaeological potential at enclosure and burial ME026-019; A2, zone of archaeological potential at enclosure ME026-007 (*outlined in orange*); location of AH1, Stackallen Railway Bridge (*outlined in green*); and Farm Complex (*outlined in yellow*) in relation to proposed route of effluent pipeline (*in orange*).

Figure 14.16: Location of Church of the Assumption, Yellow Furze (*outlined in yellow*) relative to proposed route of effluent pipe (*orange line*)

Figure 14.17: Location of ME026-008 and ME026-009 (*outlined in orange*) relative to Dawn Meat (Slane) facility (outlined in red) and proposed route of effluent pipe (*orange line*)

Table 14.13: Summary of Impacts

Impact Phase	Feature/Site/ Structure	Impact	Quality	Significance	Magnitude/ Extent	Likelihood	Duration	Mitigation	Residual Impact
Construction	**AP1** River Boyne	Direct	Negative	Potentially significant	Local	Likely	Permanent	Test excavation on pipeline wayleave	Irreversible removal of sub-surface remains; testing reduces impact to imperceptible
	AP2 Corn Mill, site of	Direct	Negative	Potentially significant	Local	Unlikely	Permanent	Test excavation in vicinity of site	Irreversible removal of sub-surface remains; testing reduces impact to imperceptible
	A1 Enclosure and burial site, ME026-019	Direct	Negative	Potentially significant	Local	Likely	Permanent	Test excavation within Zone of Notification of monument.	Irreversible removal of sub-surface remains; testing reduces impact to imperceptible
	A2 Enclosure in Dollardstown, ME026-001	Direct	Negative	Potentially significant	Local	Likely	Permanent	Test excavation within Zone of Notification of monument.	Irreversible removal of sub-surface remains; testing reduces impact to imperceptible
	AH1 Stackallen Railway Bridge	Direct	Negative	Potentially significant	Regional	Unlikely	Permanent	(1) Buffer zone of 1m (2) Temporary barrier	Imperceptible if mitigation implemented

14.6 MITIGATION MEASURES

Mitigation measures, both at pre-construction and construction phases, are required to be undertaken in compliance with national policy guidelines and statutory provisions for the protection of archaeological and architectural heritage, including the National Monuments Acts 1930 – 2004, the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999 and the Planning and Development Act 2000 (as amended).

14.6.1 AVOIDANCE OF IMPACT

Avoidance of direct and indirect impacts upon all cultural, archaeological and architectural heritage sites is the preferred recommendation. As this is not always feasible, pre-construction and post-construction recommendations are offered to provide ameliorative measures when avoidance and preservation in situ are not possible.

14.6.2 PRE-CONSTRUCTION PHASE MITIGATION

It is recommended that pre-construction archaeological testing is undertaken on the proposed wayleave of the effluent rising main pipeline through zones of identified archaeological potential. As much of the proposed development route is to be situated on the public roadway, it is noted that it may not be possible to undertake pre-construction archaeological testing in all areas. In such potential cases construction phase monitoring is recommended (see 14.6.3 Construction Phase Measures).

Pre-construction archaeological testing will target the areas of archaeological potential identified in this impact assessment. Archaeological testing should be undertaken well in advance of the construction phase. This will allow a satisfactory timeframe in which the mitigation measures can be undertaken and the results assessed without causing construction delays.

This work should be done under licence in accordance with Section 26 of the National Monuments Acts 1930 – 2014, and with a method statement agreed in advance with the National Monuments Service (Department of Arts, Heritage and the Gaeltacht) and the National Museum of Ireland. The results of this investigation will determine whether redesign to allow for preservation in-situ, full archaeological excavation and/or monitoring are required. The investigation report will include mitigation proposals for dealing with the discovery of archaeological deposits and material during development. This work should be conducted by a suitably qualified archaeologist.

It is envisaged that the following would apply:

i. Should investigation yield evidence of archaeologically significant material or structures, preservation in-situ may be recommended. Strategies for the in-situ preservation of archaeological remains are conducted in consultation with the statutory authorities, and may include avoidance, if possible, of the remains during construction, or preservation through redesign.

ii. Should investigation yield evidence of archaeologically significant material or structures that cannot be preserved in-situ, archaeological excavation and recording, to full resolution, is recommended.

iii. Should archaeological features or material be uncovered, adequate funds to cover excavation, fencing (if required), post-excavation analysis and reporting, and conservation work should be made available.

14.6.3 CONSTRUCTION PHASE MITIGATION

As is may not be possible to undertake pre-construction archaeological testing in existing roadway, it is recommended that groundworks for the proposed effluent rising main pipeline in untested areas of archaeological potential be archaeologically monitored. Additional construction phase monitoring will be subject to the outcome of pre-construction archaeological testing. Monitoring will ensure the full recognition of, and proper excavation and recording of archaeological features, finds and deposits which may be exposed below the ground surface.

It is envisaged that the following would apply:

i. In the event of archaeological features or material being uncovered during the construction phase, it is crucial that machine work cease in the immediate area to allow the archaeologist to assess, excavate and record any such material.

ii. Should archaeological features or material be uncovered during construction phase, adequate funds to cover excavation, fencing (if required), post-excavation analysis and reporting, and conservation work should be made available.

iii. This work should be done under licence in accordance with Section 26 of the National Monuments Acts 1930 – 2014, and with a method statement agreed in advance with the National Monuments Service (Department of Arts, Heritage and the Gaeltacht) and the National Museum of Ireland.

In order to prevent disturbance or inadvertent damage to the original fabric of Stackallen Railway Bridge (AH1), it is recommended that, during construction works associated with the proposed effluent rising main pipeline:

i. A buffer zone of 1m from each abutment be put in place;

ii. A temporary barrier be erected around the bridge abutments.

14.7 RESIDUAL IMPACTS

The final or intended impact is that which occurs after the proposed mitigation measures have taken effect as planned' e.g. establishment of tree screening (EPA Guidelines, 2015, 43). When the recommended mitigation measures are taken into consideration, the level of impact is reduced.

The residual impacts of the proposal to construct alterations to an existing approved effluent plant development at the Dawn Meats (Slane) facility, in Painestown, Beauparc Co. Meath and to construct a new effluent rising main pipeline from the treatment plant to an outfall on the River Boyne in Dollardstown, Co. Meath are presented in **Table 14.13**. For the areas of archaeological potential identified in this assessment, recommended archaeological mitigation measures will facilitate the retrieval of relevant and surviving archaeological and architectural information, thereby reducing the overall significance of the impact.

14.8 REFERENCES

Bence-Jones, M., 1988. A Guide to Irish County Houses. Constable, London.

Cogan, A. 1862. The Diocese of Meath Ancient and Modern. Dublin.

Ellison, C. 1971. 'Bishop Dopping's visitation book 1682-1685' in *Riocht na Midhe* iv, pp 24-46.

Eogan, G. 1974. 'A Probable Passage Grave Site near Broadboyne Bridge, Ardmulchan, Co. Meath' in *JRSAI* Vol. 104 pp 146-150.

Elrington, C. 1864. The whole works of Most Rev. James Usher, Lord Archbishop and Primate of Ireland, 2 Vols., Dublin.

Geraghty, P.J. 2013. 'The Dublin and Drogheda Railway: The First Great Irish Speculation' in *Dublin Historical Record*, Vol.66. pp83-132.

Horner, A. and Loeber, R. 2011. 'Landscape in transition: Descriptions of forfeited properties in Counties Meath, Louth and Cavan in 1700' in *Analecta Hibernica* No.42, pp 59-179.

Joyce, P.W., 1913. Irish Names of Places. Vol. III. Dublin.

Lewis, S., 1837. A Topographical Dictionary of Ireland. Lewis & Co., London.

http://www.libraryireland.com/topog/A/Ardmulchan-Skreen-Meath.php retrieved 10 April 2017

http://www.libraryireland.com/topog/P/Painstown-Lower-Duleek-Meath.php retrieved 10 April 2017

Macalister, R.A.S. 1945. *Corpus incriptionum insularum Ceticarum*. Dublin Stationery Office.

Meath County Council. 2009. Meath County Development Plan 2013-2019.

McQuade, M., 2008. 'Gone Fishin''. *Archaeology Ireland* Spring 2008, 8-11.

Ó Cróinín, D., 1995. Early Medieval Ireland, 400-1200. Longman, England.

O'Driscoll, K. 2017. 'Approaching the Mesolithic though taskscapes: a case study from western Ireland' in U. Rajala and P. Mills (eds). *Forms of Dwelling: 20 Years of Taskscapes in Archaeology*. Oxford Books, pp 41-61.

O'Keeffe, T., 2000. Medieval Ireland, an Archaeology. Tempus, U.K.

O'Neill, M. 2002. 'The Medieval Parish Churches in County Meath' in *JRSAI* Vol. 132 pp 1-56.

O'Sullivan, M., and Downey, L. 2011 'Archaeological Alignments – Stone Rows' in *Archaeology Ireland* Vol.25, No.2 pp 32-25.

Reeves-Smith, T. 1997. 'The Natural History of Demesnes' in Foster, J.W., and Chesey, H.C.G. (eds.) *Nature in Ireland. A Scientific and Cultural History*. Dublin: The Lilliput Press, pp549-572.

Shanahan, S. & Barry, E. 2018. *Archaeological Impact Assessment at Painestown, Beauparc, Navan, Co. Meath* (18E0476). Unpublished report.

Thunder, J.M. 1889. 'The Kingdom of Meath' in *Journal of the Royal Historical and Archaeological Association of Ireland* Vol. 8 pp 507-525.

Waddell, J., 1998. The Prehistoric Archaeology of Ireland. Galway University Press, Galway.

Ware, Sir J., 1705. The Antiquities and History of Ireland.

Wilde, W.R. 1847. The beauties of the Boyne, and its tributary, the Blackwater. 2nd edition. Meath.

Electronic Sources

www.excavations.ie	Summary of archaeological excavations
www.archaeology.ie	DoCHG website listing RMP sites and NIAH sites
www.heritagemaps.ie	Cultural heritage datasets
www.logainm.ie	Placenames database
www.downsurvey.tcd.ie	Down Survey maps
www.jstor.org	Journal articles, books and primary sources
www.dia.ie	Irish Architectural Archive
www.libraryireland.com/topog	A Topographical Dictionary of Ireland
www.meath.ie	Meath County Development Plan 2013-2019
www.swilson.info	Heritage map viewer

Cartographic Sources

Taylor & Skinner Maps of the Roads of Ireland, 1777

Down Survey Map of County Meath, 1656-58

Down Survey map of Barony of Duleek, 1656-58

Down Survey map of Barony of Skreen, 1656-58

Ordnance Survey maps, 19th and 20th centuries

15.0 INTERACTIONS AND INTER-RELATIONSHIPS

In line with requirements of EC Directive 85/337/EC (as amended) and the Planning and Development Regulations 2001, any interactions/inter-relationship between the various environmental factors was also taken into account as part of the EIAR scoping and assessment.

Where a potential exists for interaction between two or more environmental topics, the relevant specialists have taken the potential interactions into account when making their assessment and where possible complementary mitigation measures have been proposed. An overview of these potential interactions is provided in **Table 15.1**, with the main interactions or inter-relationships discussed in **Sections 15.1 to 15.12** below.

Table 15.1: Summary of Potential Interactions / Inter-Relationships

Receptor / Source	Human Beings	Air	Noise	Landscape & Visual	Biodiversity	Water	Soils	Climate	Material Assets	Cultural Heritage
Human Beings		✓	✓	✓	✓	✓	✓	✓	✓	✓
Air	✓		*x*	*x*	✓	*x*	*x*	✓	✓	*x*
Noise	✓	*x*		*x*	✓	*x*	*x*	*x*	✓	*x*
Landscape & Visual	✓	*x*	*x*		*x*	*x*	*x*	*x*	*x*	✓
Biodiversity	✓	✓	✓	*x*		✓	*x*	✓	*x*	*x*
Water	✓	*x*	*x*	*x*	✓		✓	*x*	*x*	*x*
Soils	✓	✓	*x*	✓	✓	✓		*x*	✓	✓
Climate	✓	✓	*x*	*x*	✓	*x*	*x*		*x*	*x*
Material Assets	✓	✓	✓	*x*	✓	*x*	*x*	*x*		✓
Cultural Heritage	✓	*x*	*x*	✓	*x*	*x*	*x*	*x*	✓	

✓ - Anticipated Interaction
x - No Anticipated Interaction

15.1 AIR AND SOILS

Excavations and earth moving operations during construction works may generate quantities of dust, which have the potential to impact upon air quality in the vicinity of the proposed development. Consequently, an impact upon air quality has the potential to impact upon human health, cause dust nuisance and cause disturbance to fauna (further discussed in **Section 15.3**).

The extent of dust generation depends on the nature of the construction dust (soils, sands, gravels, silts etc.) and the construction activity. The potential for dust dispersion depends on the local meteorological conditions such as rainfall, wind speed and wind direction.

Mitigation measures to control dust emissions would be implemented, which would include dust suppression where necessary.

15.2 AIR AND CLIMATE

The proposed development has the potential to impact upon the air quality and climate of the area through air emissions, including potential greenhouse gases, arising from the wastewater treatment process and exhaust fumes from traffic.

There would be a small increase in traffic during the construction phase, however, this would not be considered significant given the transient nature of works. Overall, the proposed development would result in a decrease in vehicle movements from the Dawn Meats (Slane) site as the transport of wastewaters to a municipal WWTP via tanker would no longer be required.

While the biological treatment of wastewaters may result in the generation of carbon dioxide and nitrous oxide emissions, these emissions would not be considered significant. Furthermore, as wastewater from the Dawn Meats (Slane) site is currently treated at a municipal WWTP, the proposed development would result in the release of carbon dioxide and nitrous oxide emissions occurring at the Dawn Meats (Slane) site as opposed to the municipal WWTP. Consequently, the proposed development would not result in a significant overall increase of either carbon dioxide or nitrous oxide emissions to the atmosphere.

15.3 AIR, HUMAN BEINGS AND BIODIVERSITY

An adverse impact on air quality has the potential to impact upon human health, cause dust nuisance and cause disturbance to fauna. However, as discussed in **Section 15.2**, the risk to air quality as a result of the proposed development would not be considered significant, both at the local community level and on a broader national / global scale.

During the construction phase of the development, there would be potential for dust emissions, which could impact upon the communities and residents on the roads to the site and fauna in the surrounding area. The potential impact of dust would be temporary, given the transient nature of construction works. Dust control would be an integral part of construction management practices, with mitigation measures implemented where required, including sweeping of roads and hardstand areas, appropriate storage and transport of material and dust suppression measures where required.

Odour is another aspect of air quality with the potential to impact upon human beings, in the context of nuisance. While wastewater treatment has potential for odour generation, the potential for odour emissions from the effluent treatment system at the Dawn Meats (Slane) site would reduce following completion of the proposed development, due to the higher standard of treatment provided.

Potential odour impacts associated with the operational phase of the proposed development would not be considered significant given the odour control and operational measures currently in place at the site, in addition to the proposed updating of the site's odour management plan, as detailed in **Section 5.6**.

It should be noted that an important interaction exists between air quality and flora, whereby vegetation can play an important role in acting as an air purifier by absorbing carbon dioxide and giving out oxygen. It would therefore be anticipated that potential carbon dioxide emissions generated by the biological treatment of wastewaters and discharged via vehicle exhausts would be somewhat mitigated by vegetation in the environs of the site.

15.4 NOISE, HUMAN BEINGS AND BIODIVERSITY

Noise generated during the construction and operational phases of the proposed development has the potential to impact upon human beings and fauna within the vicinity of the site.

During the construction phase, noise may be generated due to increased vehicle movements and the operation of construction plant. It is anticipated that there would be a moderate impact, for a limited period of time, on local residences and fauna within the vicinity of the development. Control and mitigation measures would be implemented to reduce noise, including measures relating to equipment operation and maintenance and timing of activities. Given the transient nature of construction works, and provided mitigation measures are implemented, noise from construction would not be considered to pose a significant impact upon human beings or fauna.

The operational phase of the proposed development would have no significant additional impact upon the existing noise environment of the area. The Dawn Meats (Slane) facility currently undertakes noise monitoring in accordance with their IE Licence conditions and has in place a Noise Management Plan to ensure good operational measures and housekeeping. This plan would be updated to incorporate the new development. Furthermore, any fauna present within the Dawn Meats (Slane) facility or immediate area would be accustomed to the facility's existing noise environment, therefore the potential impact due to operational noise associated with the WWTP extension would be considered low.

15.5 MATERIAL ASSETS AND HUMAN BEINGS

As the location of the proposed WWTP extension is within the area previously used for wastewater treatment via the now decommissioned Integrated Constructed Wetlands, there would be no significant land loss as a result of the WWTP development. The proposed rising main would be located underground, therefore, there would only be a temporary land loss during the construction phase.

During the construction phase, there would be an increase in traffic volume using the local road network. However, given the nature of activities and temporary duration of construction works, this would not be considered significant.

The potential of the proposed development to create short-term employment during the construction phase would positively impact upon material assets.

15.6 MATERIAL ASSETS AND BIODIVERSITY

The proposed development would alter flora cover and the species of fauna supported due to land take and soil disturbance works. This impact would be minor due to the small footprint of the development and due to the low ecological value of the habitats present at the proposed WWTP compound. The proposed rising main would be located underground, and as such would only result in a temporary loss of habitat.

15.7 MATERIAL ASSETS AND NOISE

The proposed development is located in a rural agricultural area, primarily dominated by pastureland. Increased noise emissions during the construction or operational phases would have the potential to impact upon livestock due to disturbance. The potential for noise associated with the proposed development on livestock would be considered to be low, given the temporary duration of construction works and given that no significant increase in noise emissions would be anticipated for the operation of the proposed WWTP extension. Furthermore, any livestock within the immediate area of the Dawn Meats (Slane) facility would become quickly acclimatised to the new noise environment.

15.8 MATERIAL ASSETS AND AIR

As noted above, the proposed development is located in a rural agricultural area. The proliferation of dust during construction has a nuisance value and livestock would be at risk to eye irritation from high levels of wind blowing dust particles. Given the proposed mitigation measures for dust control and dust suppression, in addition to the transient nature of construction works, the potential for dust to impact upon livestock would be considered low.

15.9 WATER QUALITY AND SOILS

There would be a potential impact on water quality during the construction phase of the proposed development due to the release of suspended solids during soil disturbance works. Surface water run-off passing over exposed spoils has the potential to entrain suspended solids and release them into receiving waters. An increase in suspended solids would reduce water clarity, which could affect light penetration and therefore productivity in the waters. Water quality may also be impacted upon by an increase in nutrients, which are bound to suspended solids. A significant increase in nutrients can result in excessive eutrophication, leading to deoxygenation of waters and subsequent asphyxia of aquatic species.

Appropriate mitigation measures would be implemented during the construction phase including the implementation of a buffer zone around all surface water drains, the provision of silt control features and the appropriate storage of spoil.

15.10 WATER QUIALITY, HUMAN BEINGS AND BIODIVERSITY

A deterioration in water quality would impact upon aquatic flora and fauna, would negatively affect the fishery industry and in severe cases, may impact upon any water-based leisure activities and amenities of the area. Furthermore, a deterioration in water quality has the potential to adversely impact upon drinking water quality. A water abstraction point (Staleen) is located a considerable distance (approximately 12.7km) downstream of the proposed discharge point. Drinking water quality could be potentially affected due to the composition and strength of the proposed treated effluent, including microbial loading.

A deterioration in water quality could occur during construction works through the release of suspended solids during soil disturbance works, the release of uncured concrete and hydrocarbon spillages, and during the operational phase due to the discharge of treated effluent.

Suspended solids present in the proposed discharge and potentially entrained in surface water run-off during construction works can impact upon aquatic habitats through deposition, reducing clarity and by potentially increasing nutrients which are bound to the suspended solids. An increase in sediments has the potential to impact upon fish by damaging gravel beds required for spawning, smothering fish eggs and in extreme cases, by interfering with the gills of fish. Consequently, an impact on fish would affect fauna, such as the otter (*Lutra lutra*), who prey on fish.

During construction works, there would be a potential risk to water quality from releases of uncured concrete and hydrocarbons from the operation of heavy construction plant and associated equipment. Uncured concrete has the potential to alter the pH of waters locally, while hydrocarbons can lead to potentially toxic and / or de-oxygenating conditions within waters.

Water quality may be impacted upon due to an increase in nutrients, which may arise from surface water-run off containing nutrients bound to suspended solids or by the discharge of treated effluent emissions, in particular emissions of phosphates and nitrogenous compounds. A significant increase in nutrients can result in excessive eutrophication, leading to deoxygenation of waters and subsequent asphyxia of aquatic species.

The proposed development would not be anticipated to have a significant impact on drinking water quality, aquatic flora and fauna, the fishery industry or upon water-based leisure activities and amenities due to a deterioration in water quality of the River Boyne, during either the construction or operational phase.

During the construction phase, surface water quality would be protected through the implementation of mitigation measures, which include the use of appropriate silt control features, the regular maintenance and inspection of construction plant and the appropriate storage of potentially polluting substances. A Construction Environmental Management Plan (CEMP) would be prepared by the construction work contractor, in line with the Outline CEMP prepared as part of the application, which would include measures for the protection of water quality.

During the operational phase, no impact on water quality is anticipated due to the discharge of treated effluent, as the proposed discharge limit values have been based upon the River Boyne's assimilative capacity and current water quality. The assimilative capacity assessment concluded that the River Boyne would have sufficient assimilative capacity to accommodate discharges from the Dawn Meats (Slane) facility.

The overall risk from the proposed discharge to drinking water from the Staleen water abstraction point would be considered low, based upon the proposed treatment process, the proposed discharge limits, the level of dilution, the quality of the receiving water and the anticipated impact of discharges during normal and abnormal operations.

15.11 LANDSCAPE AND VISUAL, SOILS AND HUMAN BEINGS

The excavation, temporary storage and movement of soil within the site would affect the appearance of the landscape. This would be temporary as vegetation becomes established and would be necessary as part of the construction.

The proposed development would have the potential to adversely impact upon the visual landscape, thereby reducing the visual amenity for local residents. The proposed WWTP extension would permanently alter the immediate landscape of the Dawn Meats (Slane) facility, however, the extension would merge with the existing WWTP, reducing the potential impact.

The rising main would be located underground and thus would be a temporary alteration to the landscape. The proposed underground rising main would be reinstated as works progress along the route. Following reinstatement and the recolonisation of flora, the rising main development would merge with the existing rural environment.

15.12 CULTURAL HERITAGE, SOILS AND HUMAN BEINGS

Archeologically important sites, buildings of historic, artistic or architectural interest and sites of cultural heritage form part of the landscape of County Meath. The proposed development is located within an area which can be considered as of heritage and cultural value. The UNESCO Brú na Bóinne World Heritage Site is located approximately 60km north-east from the Dawn Meats (Slane) facility and a number of archaeological and architectural features are located within and in close proximity to the proposed development, including the remains of a walled garden and fish pond belonging to the Dollardstown demesne, two enclosures and a ringfort.

Potential impacts to archaeological, architectural and cultural sites may occur during topsoil stripping, excavation and soil movements during the construction phase of the development. These works may also impact upon the landscape of the area, particularly if existing archaeological and architectural features are physically affected.

The proposed development would potentially have a direct impact on any sub-surface architectural or archaeological features or material at the site. However, mitigation measures would be implemented at the pre-construction, during construction and post-construction phases to reduce or eliminate the predicted impact. The proposed development would also have a positive impact on the cultural heritage value of the area, by providing an opportunity to retrieve information on the demolished Dollardstown House and to preserve the relict elements of its demesne landscape in situ.