ENVIRONMENTAL IMPACT STATEMENT

for the

Clonakilty Wastewater Treatment Plant Upgrade

at

Clonakilty, Co. Cork

September 2006

VOLUME I

Prepared by:

White Young Green Ireland Ltd.
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Reference: Clonakilty WWTP, Co. Cork - EIS

Issue		Prepared by	Checked by	Verified by
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V2	Apr '06			
V3	Sept '06	D. Good	Kieran Thornton	
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File Reference: CE04324/Doc/EIS/Final Doc

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NON-TECHNICAL SUMMARY

Prepared by:

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Introduction

This is a Non Technical Summary of the Environmental Impact Statement (EIS) for the upgrade of the existing Waste Water Treatment Plant (WWTP) at Clonakilty, Co. Cork (referred to as the development from here on in). This EIS has been prepared to accompany an application to Clonakilty Town Council for full planning permission for the development.

The proposed scheme involves the upgrading and expansion of the existing Clonakilty WWTP to increase its treatment capacity from 5,333 to 20,500 population equivalent (PE). The WWTP will treat wastewater generated from Clonakilty, the Technology Park, Shannon Vale, Inchdoney and Ring. The main upgrades to the plant involve upgrading of the inlet works, provision of primary settlement, additional aerobic digestion and final settlement capacity, additional sludge treatment and storage capacity and provision of odour control equipment.

The EIS presents the findings of studies conducted to assess the impacts of treated effluent discharges from the Clonakilty WWTP to the Clonakilty Estuary. Proposals for upgrading the development were investigated and consideration was given to relocating the outfall further downstream at the following potential discharge locations; the existing site, a site below the proposed tidal barrage and a site near Ring Pier.

Consultation and Scoping

Consultation with a number of bodies was conducted in 2005, to identify the key aspects that needed to be addressed in the EIA process. This included An Taisce, the Department of the Environment Heritage and Local Government, the Southern Fisheries Board, Duchas, Birdwatch Ireland, Irish Wildlife Trust, the Meteorological Service, Bord Iascaigh Mhara, Environmental Protection Agency and the Department of Communication, the Marine & Natural Resources.

Scoping for the Environmental Impact Statement identified the principal matters of likely concern as;

- Water Quality
- Air Quality

This EIS for the development has been prepared by the applicant, Cork County Council and their Consultants (White Young Green) to accompany the planning application.

This EIS describes the existing environment in which the development will be located. The potential impacts that the development will have on the environment have been identified and the proposed mitigation measures, which would prevent or reduce the identified potential impacts have also been specified.

The need for such a development is driven by the following:

- The original WWTP is currently overloaded as town of Clonakilty has grown immensely since the WWTP was first constructed.
- The treatment plant no longer serves solely Clonakilty town. Inchydoney, a constantly growing summer resort, now has a collection sewer with discharges to the Clonakilty WWTP.
- Ring, a small village southeast of Clonakilty, is currently discharging it's untreated wastewater directly into the harbour. The village is developing at a fast rate. With no means of wastewater treatment currently in Ring, the upgrading of the treatment works in Clonakilty shall provide for treating a future population of 500 PE from Ring.

- The upgrade of the WWTP is considered necessary in order to deal with existing and future expansion in industry, tourism and urban growth.

This document summarises the EIS and describes the scale and scope of the proposed development. No difficulties were encountered during the EIA process and it was concluded that adequate technical knowledge and information has been available in the production of this statement.

Location and Setting

The development is located on an area of approximately 2.2 hectares and is located within the Clonakilty area, approximately 9 km west of Timoleague, 13 km north east of Rosscarbery and 20 km south of Bandon as illustrated in Figure 1.1.

The proposed development is located at the existing wastewater treatment plant site within the existing site boundary at the north western tip of Clonakilty Harbour where the River Fealge emerges from the town and enters the sea as illustrated in Figure 1.2.

The proposed development is located on a site that is well screened by the surrounding landform and boundary vegetation. The low level form of the proposed development means that it blends unobtrusively into the existing site.

The site is bounded by the local Gaelic Athletic Association (GAA) ground to the west, the Model Railway Village tourist attraction to the south, the River Fealge to the north and the harbour to the east.

Alternatives

The EIS regulations require that alternative locations, designs and processes be considered.

Clonakilty Sewerage Scheme was based on a Preliminary Report prepared by MC O'Sullivan, Consulting Engineers in 1975. This report considered various options for the location, type of treatment and outfall for the wastewater from Clonakilty and Inchydoney. The location at the "old town dump" was considered the best location and extended aeration was deemed the best treatment option.

The Sewerage Scheme was constructed in the mid 1980's on behalf of Clonakilty Urban District Council and since then considerable money has been invested in the Wastewater Treatment Plant. Due to the increased volume of wastewater from the rapidly expanding town the current works are overloaded and odour problems have arisen from time to time. Other than this the current location has proved to be a suitable site.

The Preliminary Report on Upgrading of Clonakilty Sewage Treatment Plant and Associated Works – June 2006 prepared by RPS demonstrates that it is possible to upgrade the existing plant to cater for a population equivalent of 20,500 within the existing site. This EIS confirms that any potential negative impacts from the upgraded wastewater treatment plant can be successfully mitigated so that any residual impacts are at an acceptable level.

Therefore the current site, considering the level of investment already spent on the existing infrastructure and its suitability for expansion is considered to be the best location for the 20,500 PE Wastewater Treatment Plant.

The wastewater treatment processes for the Clonakilty WWTP will be required to result in a treated wastewater which at a minimum meets the following standards as set out in the Urban Wastewater Treatment Regulations:

- BOD : 25 mg/l
- TSS : 35 mg/l
- COD : 125 mg/l

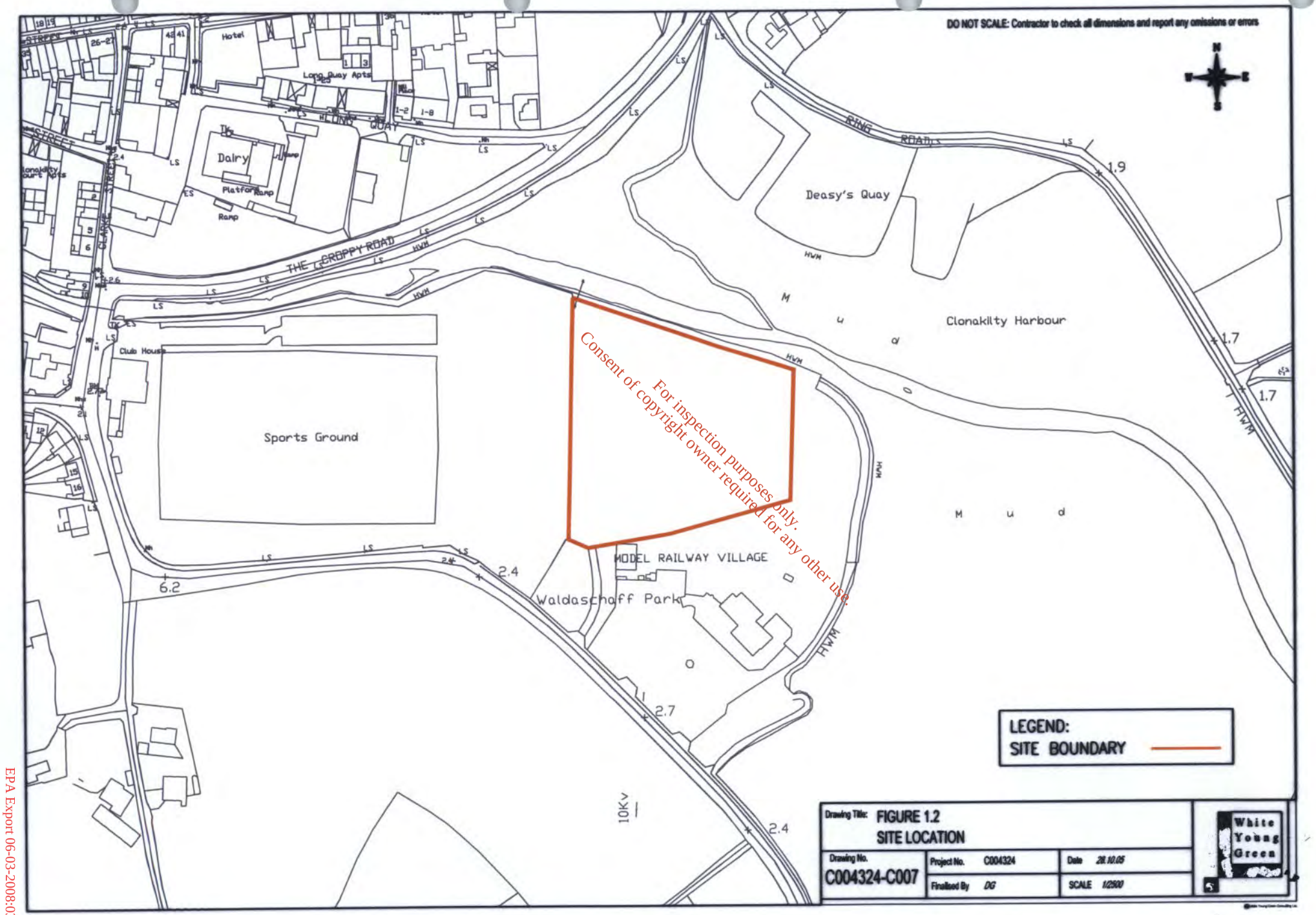
The requirement for higher standards will be examined as part of the EIS.

The Preliminary Report has reviewed the current processes on site and has recommended the following amendments as the preferred option;

- Upgraded Inlet Works
- New Primary Settlement
- Additional Aerobic Digestion
- Additional Final Settlement
- Upgraded Outlet Works
- Additional Sludge Treatment and Storage

The new and additional processes were selected on the basis of similarity with existing processes in the existing WWTP. They are well proven processes for the treatment of municipal waste water and typical of the processes in use in other similar sized WWTPs in Ireland.

Drawing Title: FIGURE 1.1 SITE CONTEXT			
Drawing No. C004324-C006	Project No. C004324	Date MM	White Young Green
	Finalised By DG		



EIS Methodology

The EIS is presented in the "Grouped Format Structure" as described in the "Guidelines on Information to be Contained in an EIS" produced by the Environmental Protection Agency (2002). This facilitates the assessment of each environmental topic in its entirety in one section i.e. the review of the existing environment, potential impacts, mitigation measures and an assessment of interactions with other environmental topics. In general, it follows the framework presented in the EPA Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (September 2003).

This EIS contains the following information:

Description of the proposed development (Section 2)

- Site, design and size of the facility
- Outline of main alternatives studied
- Nature and quantity of materials to be used
- Physical characteristics of the facility and land-use requirements during construction and operation

Description of the existing environment (Sections 3-13)

- Climatic factors
- Air
- Noise
- Geology/ soil
- Surface water
- Groundwater/ hydrogeology
- Flora and fauna (i.e. Ecology)
- Human beings
- Traffic
- Landscape
- Cultural heritage and
- Material assets

Description of the likely significant impacts (Sections 3-13)

- The existence of the facility
- Residues from the facility
- Emissions from the facility
- Aspects of the environment to be affected by the facility
- The use of natural resources
- The emission of pollutants
- The creation of nuisances

Description of the mitigation measures (Sections 3-13)

- Measures envisaged for avoiding, reducing and if possible remedying those effects on each environmental aspect

Description of the existing environment, likely significant impacts and mitigation measures

Introduction

As outlined previously the development will include the upgrade of the existing WWTP. The major components of the facility include:

- **Inlet Works;** The wastewater entering the works will continue to come from the three pumping stations; Long Quay Pumping station, Clarke Street Bridge Pumping Station and Inchydoney Pumping Station. The existing 'Jetta' 200 grit trap has sufficient capacity to cater for 3 x DWF from a PE of 22,000 and the PR does not recommend any change to it. A grit

collection chamber is located adjacent to the grip trap. New grit removal facilities are currently being installed at the WWTP. A grit classifier is to be installed which will wash organic material from the grit and allow it to drain adequately before depositing the grit in a skip for removal from site to landfill.

The Haigh Ace 991 currently screens inflows. A Lisep unit washes, dewaters and compacts the screenings for disposal. A second inlet screen such as the Haigh Ace 290 Inlet System or equivalent is to be installed. This will operate in parallel with the existing inlet screen. A second Lisep unit to wash, dewater and compact the screenings will be installed to handle the screenings from the proposed second screen. The screenings will be disposed of to landfill

The flow from the inlet works will be split to flow to the two primary settlement tanks.

- **Primary Settlement Tanks;** It is proposed to construct two primary settlement tanks. The settling tanks will allow the heavier solids to settle from the flow and thereby reduce the BOD load to the downstream aeration system by approximately 25% which will result in a wastewater population equivalent of 15,375 PE passing to the secondary aeration phase. The settled sludge will be pumped to the sludge picket fence thickener for thickening and blending with the secondary aerated sludge.

- **Selector Tank;** The selector tank will consist of two chambers, the first being the inlet chamber where the return sludge and raw wastewater will mix. A spill-over weir will divide this chamber and the adjacent splitter chamber will be benched to balance the three flows exiting the selector tank and flowing into the oxidation tanks. Three hand penstocks will be fitted on the three outlets from the selector tank, so that one stream (oxidation tank and settling tank) may be shut down for maintenance or during the winter period when loadings to the works are considerably lower.

- **Oxidation Tanks;** A third oxidation tank will be constructed to cater for the additional loading to the treatment plant. It will have the same plan area as the two existing tanks but will be 3.0m deep compared to a depth of 1.5m for the existing tanks. The treatment plant will then operate in three streams, the first two serving 4,000 PE each and being fed through the existing oxidation tanks and the third stream serving 7,375 PE being fed through the proposed deeper oxidation tank. Therefore the total future treatment capacity of the extended aeration plant will be 15,375 with the balance of the 20,500 PE (= 5,125) being removed at the primary settlement stage. The existing rotors will be replaced in the existing oxidation tanks in order to increase the oxygen supply. Air diffusers will be installed on the floor of the new tank. Mixers will be installed in all tanks to ensure adequate circulation.

- **Final Settlement Tanks;** A third settling tank with a radius of 8.5m and a depth of 2.25m is proposed to cater with settlement of effluent from the third (proposed) oxidation tank.

- **Outlet Works;** A Venturi flume will be fitted to the existing outlet channel to enable measurement of flow by means of an

ultrasonic beam. The outfall from the treatment plant currently discharges into the tidal reach of the River Fealge adjacent to the WWTP. A study of the effluent discharge from the WWTP has been carried out as part of the EIS. The study assessed the assimilative capacity and dilution / dispersive characteristics of the receiving waters and commented on the siting of the outfall with regard to possible impacts, particularly on the 'Blue Flag' bathing beaches at Inchydoney. The results showed that the optimum location for the outfall in terms of minimising bacterial contamination at Inchydoney beach is the existing outfall location adjacent to the town.

- **Submersible Sludge Pumping Station;** The existing sludge lifting wheel chamber will be replaced with a submersible sludge pump sump. This will collect the sludge from the existing secondary settling tanks and pump it to the proposed submersible sludge return pump sump. The proposed submersible sludge return pump sump will also collect sludge from the proposed third settling tank. The activated sludge will be pumped to the selector tank where it will mix with the wastewater prior to entering the oxidation ditches while any waste sludge will be pumped to the picket fence thickener.

- **Picket Fence Thickener;** A second picket fence thickener is to be installed.

- **Sludge Dewatering House;** It is proposed to isolate the sludge-dewatering house from the office premises by building a new dewatering house/compressor house. A second filter belt press as well as a second set of polyelectrolyte dosing pumps and mixing tanks similar to those already in the treatment plant will be installed to act as a standby.

- **Office / Reception;** As mentioned above the existing dewatering house and main office / reception are all part of the one building. The sludge dewatering will be located within the newly constructed dewatering house / compressor house and the existing building will be converted to the main office and reception area.

- **Long Quay Pumping Station;** The existing pumps at the Long Quay Pumping Station will be replaced and macerators will be provided. A lower overflow will be provided at the pump house. A 750 m^3 wastewater balancing tank will be provided adjacent to the pump house.

It is estimated that the development will take approximately 12 months to construct. It is expected that one staff member will be employed on site permanently during facility operation. It is anticipated that the working hours during construction will be from Monday to Friday, 8am to 6pm and Saturdays, 8am to 1pm.

The timing of the commencement of construction is subject to budgeting, planning and the contractor appointed. It is not expected that there will be any phasing of the works. The order in which the construction is carried out will be determined by the contractor's method statement for the construction of the works. The commencement of the works will be dependent on obtaining planning permission, approval by the Department of the Environment, Heritage and Local Government to proceed to contract document stage, procurement of a contractor to carry out the works and contract award.

The Client will establish an environmental management plan with the contractor that will form part of the contract between the parties for the construction of the proposed development. It will be the responsibility of the contractor to ensure strict compliance with all aspects of the environment management plan. The Resident Engineer or Clients Representative will audit the environmental performance of the contractor on a regular basis and will make recommendations or log incidence as necessary. It is proposed that a programme be established for regular monitoring of construction noise, dust, air emissions and water quality.

In so far as possible, construction materials will be from local sources. All imported material that will be used on site will be from approved sources.

Equipment which will be used during the construction of the facility will be typical of a project of this scale. In general this will include excavators, dumper trucks, mobile cranes and teleporters.

Construction activities will have potential impacts on the environment including air, dust, noise, vibration, traffic, water and waste. However, with the implementation of proper construction practices and mitigation measures including an environmental management plan there will be no negative residual impacts associated with the construction of the facility.

The proposed development will be designed for the acceptance and treatment of municipal wastewater. The plant will comprise a number of distinct process units namely:

- Inlet Works
- Primary Settlement
- Aerobic Digestion
- Final Settlement
- Outlet Works
- Sludge Treatment
    - Sludge Thickening
    - Sludge Dewatering

The plant will be designed for continuous operation 24 hours a day 365 days a year.

Human Beings

As part of the existing human being assessment, Central Statistics Office data was evaluated. The development is within the townland of Youghals. The electoral division (ED) in which Youghals is part of was reviewed as part of this assessment. The assessment included an evaluation of existing receptors in close proximity to the development. This included homes, schools, heritage and amenities.

Economic impacts associated with the development include:

- The number of employees working in the building and construction sector within the study area in 2002 was 163 people, therefore it is anticipated that this proposed development will increase the numbers of employees in this sector in the short term by 12%.
- The permanent employment of 1 person within the facility after the extension works have been conducted will continue.

The landuse impacts associated with the development were also evaluated and included:

- The proposed development will be located on the existing WWTP site and within the existing site boundary.
- There will be no severance of land as a result of the proposed development or loss of rights of ways or amenities or rezoning of land required.

The health and safety impacts associated with the development were also evaluated. This assessment concluded that:

- The contractors will be required to comply fully with the Safety, Health and Welfare at Work (Construction) Regulations, 2001 and Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2003, the Health and Safety Act 2005 and
- The client will establish a Health and Safety Management System with all contractors and all design consultants engaged in construction activities on the facility

Mitigation measures have been specified which will minimise impact on the human environment and include:

- Where possible, employment of local residents during the constructions phase and operational phase of the proposed facility will occur

Interactions between one environmental topic and another are evaluated in the EIA process as all environmental factors are interrelated. The significant interactions which potentially could result from the proposed redevelopment are illustrated in Table 3.8, page 3-15 of the main EIS.

Human beings have the potential to interact with all environmental topics, specifically landscape, air and noise; however, the impacts can be reduced and/ or eliminated by the implementation of specific mitigation measures.

Landscape

Potential Landscape and Visual impacts are considered in detail as follows:

Landscape

- The harbour in which the site is located is a 'candidate Special Area of Conservation', a 'proposed Natural Heritage Area' and a 'Special Protection Area'.
- The site is situated in close proximity to a Scenic Landscape which is located along the northern shoreline of the harbour.
- There is potential for significant visual impact at sensitive viewpoints along local routes, in particular the 'A89 & A90 Scenic Routes', from the adjacent Model Railway Village and from the adjacent Gaelic Athletic Association ground.
- The proposed development of the GAA lands which have been re-zoned for residential development.

Visual

- The proposed development could have significant visual prominence on the coastal landscape. It could affect the image of the eastern fringe of the town and impact on a number of regional and local route ways. It could impact upon adjacent tourist leisure and sports facilities and proposed residential area.

The sensitivity of the landscape resource has to be examined at two separate levels. At the macro scale the site lies within a landscape of recognised scenic character, that exhibits a very strong positive character and as such its sensitivity as a whole must be classified as

high. However, the extent to which the site is screened and can remain screened is such that the upgraded works will still blend almost seamlessly into the landscape at a macro level.

The scale or magnitude of landscape effects the proposed development will have at the micro scale are low with the exception of the adjacent Model Railway Village where the boundary between the two sites may require some additional screen planting if the proposed works incur any loss of existing boundary vegetation.

Topography and vegetation limit the sites prominence in the local landscape. While portions of the development may be visible on close scrutiny the development will generally blend unobtrusively into the general setting of the harbour and town. Consequently, it is perceived that the proposed development would have a low and neutral landscape impact.

There are no residual impacts anticipated after mitigation measures are implemented. There are a number of factors, which have been outlined in the EIS, which contribute towards the ability of the site to absorb development of this scale with such relatively low incidence of negative visual impact.

Geology & Soils

The bedrock of the Clonakilty region is composed of Devonian and Lower Carboniferous rocks and is dominated by the east-west trending Rosscarberry Anticline. The bedrock geology of the site location is Old Head Sandstone Formation. The depth to bedrock on the site is unknown. This formation reportedly consists of grey sandstones and heterolithic bedded sandstones and mudstones. To the north is the Kinsale Formation and the Toe Head Formation is to the south.

According to the general soils map for Ireland, 1980 the regional principal soil cover consists of brown podzolics soils and associated acid brown earth and gleys. The land beneath the existing wastewater treatment plant consists of reclaimed land. A limestone fill wall surrounds the shoreline boundary around this reclaimed land. The depth of the fill material beneath the sewerage works site is unknown but is likely to be in excess of 3 metres from visual observation at the shoreline.

A groundwater protection scheme has not currently been prepared for West Cork; however, an aquifer classification map is completed for the area. Information was obtained from the GSI in relation to the bedrock underlain the site. The Old Head Sandstone Formation that underlies the site is classed as a locally important aquifer (Ll), which is bedrock that is moderately productive only in local zones. The middle portion of the Old Head Sandstone Formation reportedly consists mostly of sandstone beds and hence has the potential for groundwater yield.

Removal of overburden during the construction phase will have no geological significance. Any air and noise issues generated during the removal have been addressed under the air and noise sections of this EIS. As the system installed will be fully contained it will not increase the vulnerability of the site.

Hydrology, Surface Water & Receiving Water Quality

The site is located on the coastline at the north western bank of the Clonakilty Harbour. The tidal estuary has extensive mudflats and is fed by a number of rivers and streams. The Fealge River drains the land to the west of the Clonakilty town and enters the harbour approximately 150 metres west northwest of the

site location. An unnamed stream also discharges into the harbour approximately 100 metres to the north of the site.

A marine study of the proposed treated waste water discharges from the Clonakilty WWTP was carried out. The study assessed the dispersive characteristics of the coastal area and commented on the siting of the outfall with regard to possible impacts, particularly on the 'Blue Flag' bathing beaches at Inchydoney.

A two dimensional flow model together with a particle track dispersion model was used to simulate the discharges. Recorded data from current meter, drogue and dye releases were used for calibration and validation purposes.

The results show that the optimum location for the outfall in terms of minimising bacterial contamination at Inchydoney beach is the existing outfall location adjacent to the town.

The modelling of the receiving waters has indicated that there should be no impact on designated Bathing Waters in the vicinity of Clonakilty Harbour due to the increased discharge of treated effluent from the WWTP. In order to allow for any change in the designation of the receiving waters or any increase in the wastewater flows, the WWTP should be designed to allow retrofitting of disinfection equipment so that coliform levels in the treated effluent could be reduced if necessary. Regular monitoring of the treated effluent and designated bathing waters will identify any excessive levels of coliforms in the treated effluent and any breaches of the bathing water standards.

The modelling of the receiving waters has indicated that an increase in nutrient levels in Clonakilty Harbour is unlikely to occur due to full tidal flushing of the estuary on each tidal cycle. However, at low river flows, the effluent from the WWTP will result in unacceptable high concentrations of nitrogen and phosphates in the receiving water. This is discussed further in the Section 7 Ecology.

An assessment of the impact of the discharge of the effluent from the WWTP on the receiving waters was also carried out for the scenario of a barrage being located across Clonakilty Harbour. The modelling indicated that the barrage would make only a very minor difference to water quality.

It is recommended that the WWTP should provide for reduction of nitrogen and phosphates in the treated effluent. The maximum levels of total phosphorus (P) and total nitrogen (N) in the treated effluent being discharged to sensitive areas under the Urban Wastewater Treatment Regulations 2001 are 2 mg/l P and 15 mg/l N for population equivalents (PE) between 10,000 and 100,000. These levels are considered appropriate for the upgraded and expanded Clonakilty WWTP which will have a PE of 20,500. Regular monitoring of the nutrient levels (nitrogen and phosphorus) in the receiving waters should be carried out in the future to determine if the nutrients from the WWTP are still considered to be the cause of unacceptable nutrient levels in Clonakilty Harbour after the upgrade works are carried out. Allowance should be made in the design of the WWTP for the further reduction in nitrogen and phosphates in the effluent if required.

The construction phase will involve the excavation and construction of the buildings. The main potential impacts arising out of these works will consist of the following:

- Suspended clay and silt laden rainfall run-off from excavations. Excessive amounts of silt may enter the adjacent harbour.
- Depending on the depth to groundwater and depth of construction foundations dewatering of groundwater may be required.
- Hydrocarbon contaminated run-off during construction from oil storage areas, machinery refuelling areas, leaky site machinery or accidental spillages or leakages.

The main potential impacts associated with the operational phase will comprise the following:

- Leaks or spill from wastewater holding tanks/associated pipelines.
- Increase in coliform levels above allowable standards in applicable regulations
- Increase in nutrient levels above levels likely to result in euthrophication of Clonakilty Harbour.

Mitigation measures during the construction phase include but are not limited to the following;

- The implementation of good construction management practices will minimise the risk of pollution to surface water and groundwater. The required measures will be agreed with the contractor and incorporated into the Environmental Management Plan. The Environmental Management Plan will include mitigation measures to ensure excessive amounts of silt does not migrate off site.

Mitigation measures during the operational phase include but are not limited to the following;

- Treatment of wastewater to meet the following limits in the treated effluent at a minimum;
    - BOD5 25 mg/l
    - COD 125 mg/l
    - Suspended Solids 35 mg/l
    - Nitrogen 15 mg/l
    - Phosphorous 2 mg/l
- All untreated wastewater entering the facility will be stored in fully contained structures. Therefore there will be no potential for leakage to groundwater.
- Regular maintenance of tanks and associated pipelines.
- Regular monitoring of the treated effluent and designated bathing waters will identify any excessive levels of coliforms in the treated effluent and any breaches of the bathing water standards. The WWTP should be designed to allow retrofitting of disinfection equipment so that coliform levels in the treated effluent could be reduced if necessary.
- Regular monitoring of the nutrient levels (nitrogen and phosphorus) in the receiving waters should be carried out.

With the above mitigation measures in place, neither the construction nor operational phases of the proposed development will result in any significant negative impacts on the existing surface water.

Surface water interacts with all environmental media to some extent but most significantly with groundwater/ hydrogeology, ecology, and human beings. As part of the proposed development concerns regarding the proper management of construction activities are noted relating to the groundwater and coastal water of Clonalkilty Harbour. All construction activities will be conducted in an environmentally safe manner as outlined in all the Sections 3 to 13

and in particular in accordance with Section 5.0 (Geology/Soils and Hydrogeology), Section 7, (Ecology) and Section 3, (Human Beings).

Ecology

An ecological assessment was conducted in 2005 taking regard of the following;

- The existing WWTP site
- Long Quay Pumping Station
- Site of the Storm Water Holding Tank
- Impacts on designated sites – Clonakilty Estuary

Clonakilty Waste Water Treatment Plant

Development of additional infrastructure within the site necessarily means some permanent removal of habitats within the site. However as these habitats are considered of low local ecological value (predominantly artificial or managed habitats) the impact is deemed to be imperceptible. If development activities follow the recommendations given and are undertaken with due consideration of the adjacent areas of conservation importance, then residual impacts should be imperceptible.

Long Quay Pumping Station

Habitats within the site of the Long Quay Pumping Station are man-made or managed habitats and are considered of low local ecological value. Development within this site is predicted to have no observable impacts on ecology and therefore no residual impacts are predicted.

Site of the proposed storm water holding tank

This site is a small amenity park that supports a variety of native and non-native broadleaved trees. The development of the proposed storm water holding tank will necessitate the removal of some trees but the site is considered unlikely to have any high value for wildlife. The residual impacts are predicted to be imperceptible-slight.

The development of the site is expected to lead to the permanent loss of the site as an amenity area.

Impacts on designated sites – Clonakilty Estuary

The proposed upgrade of the WWTP and subsequent changes in the organic/nutrient loading to Clonakilty Estuary are predicted to lead to a complex range of positive and negative impacts on the flora and fauna associated with the estuarine ecosystem. Some of these predicted impacts are contradictory e.g. a reduction in nutrient/BOD loading to the estuary, while potentially leading to a reduction in the occurrence of algal mats (over a long-time period) (positive impact), may also lead to a reduction in macroinvertebrate densities (a negative impact upon estuarine birds).

If the proposed development leads to long-term reductions in nutrients (N and P) entering the estuary then reductions in macroalgal blooms (mats) are predicted over time. This could lead to a moderate-major long-term positive impact but is also strongly related to the amount of nutrients entering the estuary from other sources which are largely undetermined. However, nutrient removal during treatment would be a major step in tackling the problem of eutrophication and has a long-term beneficial effect.

Impacts upon wading birds and wildfowl in terms of disturbance during the construction or operation phases, is deemed to be imperceptible - slight. Residual impacts are not expected.

Changes in the organic/nutrient loading to Clonakilty Estuary will result in indeterminable impacts upon macroinvertebrates and wading birds and wildfowl. Current scientific evidence does not allow accurate impact assessment and this document discusses the different possible impact scenarios. Residual impacts are therefore impossible to predict although these may be determined as a result of the on-going monitoring recommended.

The main interaction of ecology will be with water quality. A change in nutrient/BOD loading to Clonakilty Estuary may induce a range of ecological impacts that range from positive to negative depending on the changes that occur in the WWTP emissions. The EIS has discussed the potential conflicting impacts upon ecology of an improvement in estuarine water quality, i.e improvements may result in a decrease in macroinvertebrate densities which could result in a significant impact upon birds. In general however, a reduction in the potential eutrophic status of Clonakilty Estuary is viewed as beneficial to ecology. In general however, a reduction in the potential eutrophic status of Clonakilty Estuary is viewed as beneficial to ecology.

The impact of habitat loss in relation to the WWTP site itself, Long Quay pumping station and the site of the proposed storm water holding tank are considered to be imperceptible.

Ecology may interact with noise during the construction phase whereby some disturbance may be placed upon wading birds and wildfowl. However, the potential impact of noise (during construction) upon birds is predicted to be imperceptible-slight over a relatively short time period.

Air

To characterise the existing air quality on the proposed development site and assess the impacts of both the construction and operational phases of the proposed development, the following approach has been adopted:

- Identification of potential pollutants
- Assessment of the impacts of the proposed development for both the construction and operational phases
- Propose mitigation measures to minimise or ameliorate any identified impacts

The predominant impact of the plant on the local air quality is potentially from odour which may arise as a result of the activities from the wastewater treatment process and sludge dewatering activities.

During the construction phase, the main potential impacts on air quality will arise from the generation of dust caused by the movement of construction traffic at the site. The dust effects will be localised and will not extend beyond the site boundary of the development with mitigation measures in place.

The Clonakilty WWTP will be fully operational during the construction phase of the proposed upgrade. However, there may be some disruption to the operations. Air emissions are not expected to change during this period.

Odour will be the main potential emissions to air from the proposed WWTP upgrade. To predict the impact of the above emissions from the proposed facility during the operational phase, air dispersion modelling techniques have been used. The dispersion modelling has predicted that the proposed upgrade which includes the installation of the proposed abatement units will

not have an odour impact above the odour annoyance criterion of $\leq 3.0 ou_E/m^3$ for the 98th percentile at any sensitive receptor beyond the plant boundary. Therefore, with the covering and abatement of odorous sources, the impact of odour emissions from the proposed upgraded plant will not be of significance.

There will be a marginal increase in traffic during the operational phase of the development entering/leaving the proposed upgraded WWTP. As a worst case scenario, a maximum of 5 vehicles will access the proposed upgraded WWTP which is considerably less than 1% of the total traffic volume along the Inchdoney road. The proposed development upgrade will have negligible impact on the receiving environment from traffic emissions.

During the construction phase dust minimisation measures will be implemented to reduce the potential for dust migration from the site and from construction traffic using public roads.

Cork County Council will comply with all conditions stipulated in S. I. No. 787 of 2005 for the prevention of causing nuisance through odour generation. A number of mitigation measures are stated within the main body of the EIS to prevent an odour nuisance at the site.
Odour emissions from the proposed plant have the potential to interact with human beings. However, emissions are not predicted to be perceived at any sensitive receptor beyond the site boundary. There is a potential risk of negative impact on human beings and habitats from dust generation during the construction phase. However, the implementation of stringent mitigation measures will ensure that any impact will be minimised.

Climate

The potential impacts of the proposed development are addressed in relation to the generation of greenhouse gases from process activities, through energy consumption and from traffic associated with the construction and operational phases of the development.
Given the relatively small scale of the development and the nature of the local environment, the development will not have an adverse impact on the local climate. Potential release of minor pollutants may occur during both the construction and operational phases.

Mitigation measures have however, been recommended for both the construction and operational phases of the facility to ensure emissions to atmosphere are minimised.

Noise

An assessment of the existing noise quality at the development site was undertaken. The results illustrated that the noise environment is characteristic of a rural environment on the outskirts of a town influenced by nearby transportation activities.

It was noted that the main potential noise impacts on site would result from:

- The construction phase including noise resulting from excavation works and earth moving machinery
- The operation phase, however it has been concluded that the facility will not result in an adverse impact at the nearest sensitive receptors arising from on-site plant noise.

Mitigation measures have been specified which will minimise impact on the noise environment both during the construction and operations phase and include but are not limited too:

- The use of quiet working methods will be selected
- All contractors will employ the best practicable means to minimise noise emissions
- All mechanical plant used on site will be fitted with effective exhaust silencers and will be maintained in good working order
- All compressors will be of the *"noise reduced"* variety and fitted with properly lined and sealed acoustic covers
- All pneumatic percussive tools will be fitted with mufflers or silencers
- The facility will be operated in accordance with EC (Waste Water Treatment) (Prevention of Odours and Noise) Regulations 2005, S.I. No. 787 of 2005.
- All pumps, coolers, compressors, generators will be housed internally
- The interior plant layout and design, where possible will be constructed to minimise noise output from plant machinery.
- A regular maintenance programme will be implemented for all plant items to ensure they are operating effectively

In summary with proposed mitigation implemented, the proposed development will not result in an increase in ambient noise levels in excess of specified guideline levels at the nearest noise sensitive receptors.

The main interaction of noise and vibration is likely to be with human beings. Noise levels recorded at the nearest noise sensitive receptors ranged from 45 to 66 dB $L(A)_{eq}$ during daytime hours and traffic noise was noted as the dominant noise source. It is considered that there will be minimal change to the existing level of traffic movements associated with the operation and maintenance of the WWTP. This is not considered to be of significance and will be barely perceptible at these locations. Vibration impacts may occur during the construction phase and will be minimised by adherence to guideline values.

Roads and Traffic

An assessment of the potential traffic impacts associated with the proposed upgrade and expansion of the Clonakilty WWTP has been completed. The expected construction traffic impacts will have only a small negative impact on current road capacity. The construction traffic impacts will be mitigated through the preparation and use of a project specific traffic management plan, the use of adequate signage to warn traffic users of the construction traffic and through the use of traffic control at the entrance to the site if deemed necessary.

There are not expected to be any impacts during the operational phase of the WWTP as one caretaker carries out the current operational duties at the WWTP. It is expected that one person will continue to be employed in the operation of the plant following its upgrade and expansion as the process will be largely automated and only requires surveillance and monitoring for the most part. There are periodic visits to the WWTP at present to take samples of the treated effluent for laboratory analysis. This is not expected to change in the future.

Cultural Heritage

For the purpose of setting the proposed development within its wider archaeological and cultural heritage landscape, and to assess the archaeological potential of the site, a comprehensive desk survey of all available archaeological, historical and cartographic sources was undertaken. The field survey was undertaken to verify the results of the desk survey and to assess on the ground the impact of the proposed development on recorded archaeological monuments and areas of archaeological potential.

The site of the proposed development contains no previously recorded archaeological sites or finds and no additional archaeological sites were revealed during the field survey. However, the site lies immediately to the east of the town of Clonakilty and the reclaimed nature of the area indicates the potential for archaeological remains to occur within the site.

Archaeology and other aspects of cultural heritage have the potential to interact with a number of other environmental factors examined in this study. If archaeological mitigation consisting of archaeological excavation is necessary it may impact on both ground and surface water, soils and the landscape.

Material Assets

The evaluation of the existing economic assets at the development included an assessment of ownership and access, local settlements, water supply and usage, non renewable resources, waste management and site utilities.

The assessment of air, water, settlements and transportation infrastructure is detailed previously. The impacts associated with renewable and non renewable resources indicated that where possible non renewable resources will be sourced from locally approved sources. ESB provide the electrical network and supply for the existing site and it is proposed to continue using them.

There will be no severance of land as a result of the proposed development or loss of rights of ways or amenities or rezoning of land required. The proposed development will be constructed on Cork County Council lands only that currently form part of the WWTP site.

Material assets have the potential to interact with water, air and transport; however these impacts can be eliminated by the implementation of mitigation measures as detailed in the earlier sections.

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1. INTRODUCTION

1.1 BACKGROUND

This Environmental Impact Statement (EIS) has been prepared to accompany an application to Clonakilty Town Council for full planning permission for the upgrading of the existing waste water treatment plant at Clonakilty, Cork.

The proposed scheme involves the upgrading and expansion of the existing Clonakilty wastewater treatment plant (WWTP) to increase its treatment capacity from 5,333 to 20,500 population equivalent (PE). The WWTP will treat effluent generated from Clonakilty, the Technology Park, Shannon Vale, Inchdoney and Ring. The main upgrades to the plant involve additional aeration and settling capacity, upgrading of the inlet works, sludge treatment and odour control.

The location of the existing wastewater treatment plant is shown in Figures 1.1 and 1.2 and has an Irish National Grid reference of Eastings 38800 Northings 41200. The proposed development is located at the existing wastewater treatment plant site at the north western tip of Clonakilty Harbour where the River Feale emerges from the town and enters the sea. The site is bounded by the local Gaelic Athletic Association (GAA) ground to the west, the Model Railway Village tourist attraction to the south, the River Fealge to the north and the harbour to the east. The site is approximately 2.2 ha in area on reclaimed land and is relatively flat.

1.2 ENVIRONMENTAL IMPACT STATEMENT METHODOLOGY

1.2.1 Requirement for an EIS

An EIA is required for certain types of development as set out in the European Directive (85/226/EEC) and amended by Council Directive 97/11/EC and effected by the Statutory Regulations in Ireland (S.I. No. 349 of 1989 and SI No's. 92 & 93 of 1999). Schedule 1 of the 1999 Regulations, (S.I. No.93 of 1999), specifies development to which EIA applies and for which an EIS is required. Similarly, the requirement for an EIS is also set out in Part 10 of the Planning and Development Regulations (S.I. No. 600 of 2001).

The development of this type of infrastructure project falls into class 11(c) in Part II of the First Schedule in the Environmental Impact Assessment (Amendment) Regulations, 1999, S.I. No. 93/1999. Class 11(c) is as follows;

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

It is proposed to upgrade the existing Waste Water Treatment Plant at Clonakilty to cater for the projected population and the commercial/institutional and industrial loadings from Clonakilty Town and Environs. As the ultimate design capacity of the proposed waste water treatment plant is 20,500 PE, an EIS is required.

The plant will be required to comply with current EU and Irish legislation including the EU Urban Waste Water Treatment Directive (91/271/EEC).

This EIS has been prepared in accordance with the Environmental Protection Agency (EPA) "Guidelines on the Information to be contained in Environmental Impact Statements" and also "Advice Notes on Current Practice in the Preparation of Environmental Impact Statements", published in 2002 and 2003 respectively.

1.2.2 EIS Methodology

The EIS is presented in the "Direct Format Structure" as set down in the "Guidelines on Information to be Contained in an EIS" produced by the Environmental Protection Agency (March 2002). In general, it follows the framework presented in the EPA Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (September 2003).

Under the EIA Regulations an EIS should contain the following:

Description of the proposed development (Section 2)

- site, design and size of the proposed development
- outline of main alternatives studied by developer
- nature and quantity of materials to be used
- physical characteristics of the development and land-use requirements during construction and operation

Description of the existing environment (Sections 3-13)

- human beings
- flora and fauna (grouped under the title of Ecology within EIS)
- soil and water
- air and noise
- climatic factors and the landscape
- material assets and cultural heritage
- the inter-relationship between the above factors.

Description of the likely significant impacts (Sections 3-13)

- the existence of the proposed development
- residues from the proposed development
- emissions from the proposed development
- aspects of the environment to be affected by the proposed development

- the use of natural resources
- the emission of pollutants,
- the creation of nuisances

Description of the mitigation measures (Sections 3-13)

- Measures envisaged avoiding, reducing and if possible remedying those effects on each environmental aspect

1.3 NEED FOR PROPOSAL

The project involves the upgrading of an existing WWTP to treat the effluent from the town of Clonakilty and the surrounding environment. The original WWTP constructed in 1987 was designed to serve a population equivalent (PE) of 5,333. Since then the town of Clonakilty has grown immensely and now serves a population (both industrial and domestic) far greater than this.

The treatment plant no longer serves solely Clonakilty town. Inchydoney, a constantly growing summer resort, now has a collection sewer with a pumping rising main which discharges to the Clonakilty WWTP. This serves a domestic population of 150 in the winter period, but with the Inchydoney Hotel and large number of self catering apartments and summerhouses on this island, the population served grows to over 3,000 in the summer months.

Ring, a small village southeast of Clonakilty, is currently discharging it's untreated effluent directly into the harbour. The village is developing at a fast rate. With no means of wastewater treatment currently in Ring, the upgrading of the treatment works in Clonakilty could provide for treating a future population of 500 PE from Ring if the wastewater is directed to Clonakilty.

A number of industries also discharge into the Clonakilty WWTP. The industries in Clonakilty currently make up almost 33% of the overall loading to the works.

The upgrade of the WWTP is considered necessary in order to deal with existing and future expansion in industry, tourism and urban growth.

The improvements in upgrading the waste water treatment plant will ensure the environs of Clonakilty takes responsibility through the following:

- Implementation of the Nitrates Directive (91/676/EEC), to reducing the water pollution caused or induced by nitrates from sewage sources and to preventing further such pollution.
- Implementation of the Water Framework Directive (2000/60/EC) to maintain high status waters where they exist, preventing any deterioration in the existing status of waters and achieving at least good status in relation to all waters by 2015. This general improvement

in water quality will be achieved through the implementation of a programme of measures across the country. The improvement of the waste water treatments plants operation will assist in achieving the objectives of the Water Framework Directive within the supply catchment of the proposed facility.

1.4 WASTE WATER TREATMENT PROCESS ALTERNATIVES

Clonakilty Sewerage Scheme was based on a Preliminary Report prepared by MC O'Sullivan, Consulting Engineers in 1975. This report considered various options for the location, type of treatment and outfall for the wastewater from Clonakilty and Inchydoney. The location at the "old town dump" was considered the best location and extended aeration was deemed the best treatment option.

The Sewerage Scheme was constructed in the mid 1980's on behalf of Clonakilty Urban District Council and since then considerable money has been invested in the Wastewater Treatment Plant. Due to the increased volume of wastewater from the rapidly expanding town the current works are overloaded and odour problems have arisen from time to time. Other than this the current location has proved to be a suitable site.

The Preliminary Report on Upgrading of Clonakilty Sewage Treatment Plant and Associated Works – June 2006 prepared by RPS demonstrates that it is possible to upgrade the existing plant to cater for a population equivalent of 20,500 within the existing site. This EIS confirms that any potential negative impacts from the upgraded wastewater treatment plant can be successfully mitigated so that any residual impacts are at an acceptable level.

Therefore the current site, considering the level of investment already spent on the existing infrastructure and its suitability for expansion is considered to be the best location for the 20,500 PE Wastewater Treatment Plant.

The wastewater treatment processes for the Clonakilty WWTP were examined and the preliminary report recommended a treated effluent which at a minimum meets the following standards as set out in the Urban Wastewater Treatment regulations:

- BOD: 25 mg/l
- TSS : 35 mg/l
- COD: 125 mg/l

The requirement for higher standards will be examined as part of the Environmental Impact Statement.

The compliance levels will be in accordance with the EU Urban Waste Water Treatment Directive, and as further set out in the EPA document "The Environmental Protection Agency Act 1992, Urban Wastewater Treatment Regulation, 1994 – A handbook on implementation for Sanitary Authorities, 1996" and the Waste Water Treatment Regulations 2001.

The Preliminary Report has reviewed the current processes on site and has recommended the following amendments as the preferred option waste;

- Upgraded Inlet Works
- New Primary Settlement
- Additional Aerobic Digestion
- Additional Final Settlement
- Upgraded Outlet Works
- Additional Sludge Treatment and Storage

The new and additional processes were selected on the basis of similarity with existing processes in the existing WWTP. They are well proven processes for the treatment of municipal waste water and typical of the processes in use in other similar sized WWTPs in Ireland.

The processes are detailed in Section 2.5.3.1 of the Environmental Impact Statement.

The waste water treatment process proposed by the tendering contractors will be required to comply fully with the performance requirements set out in the Contract Documentation.

1.5 SCOPING

Scoping is described in the EPA document, 2002, 'Guidelines on the information to be contained in Environmental Impact Statements' and as a process that 'identifies the issues and emphasis that are likely to be important during EIA and eliminates those that are not'. The contents and scoping of the EIS were determined following consideration of:

- Consultation with Cork County Council
- An assessment of the nature and scale of the proposed development
- A review of existing information
- 'Guidelines on the Information to be Contained in Environmental Impact Statements' (EPA 2002).

The following were also informed of the plans for the proposed facility.

- An Taisce
- Department of the Environment Heritage and Local Government
- Duchas
- South Western Fisheries Board
- Birdwatch Ireland
- Irish Wildlife Trust
- The Meteorological Service
- Bord Iascaigh Mhara
- Environmental Protection Agency
- Department of Communication, the Marine & Natural Resources
- Marine Institute

Scoping for the Environmental Impact Statement identified the principal matters of likely concern as;

- Water Quality
- Air Quality

1.6 CONTRIBUTORS TO THE EIS

The contributors to the Statement, in alphabetical order by topic, are as follows;

Air Quality	White Young Green Ireland Ltd
Climate	White Young Green Ireland Ltd
Construction	White Young Green Ireland Ltd
Cultural Heritage	Cultural Resource Development Service Ltd.
Fauna (Terrestrial)	Limosa Environmental
Freshwater Ecology/Flora/Birds	Limosa Environmental
Human Beings	White Young Green Ireland Ltd
Interactions	White Young Green Ireland Ltd
Landscape and Visual Appraisal	Cunnane Stratton Reynolds
Material Assets	White Young Green Ireland Ltd
Noise	White Young Green Ireland Ltd
Non-Technical Summary	White Young Green Ireland Ltd
Orchestration of Statement	White Young Green Ireland Ltd
Planning Issues	White Young Green Ireland Ltd
Project Description	White Young Green Ireland Ltd
Roads and Traffic	White Young Green Ireland Ltd
Soils and Geology	White Young Green Ireland Ltd
Water	Irish Hydrodata White Young Green Ireland Ltd

In addition to the main contributors to the EIS a number of organisations provided services/information and are detailed in alphabetical order as follows;

Met. Eireann – Meteorological Data
Alcontrol Laboratories - Water Analyses
Ordnance Survey – Survey maps
Geological Survey of Ireland – Geological/Hydrogeological information

1.7 DIFFICULTIES COMPILING SPECIFIED INFORMATION

In consideration of paragraph 2(d), Second Schedule of the European Communities (Environmental Impact Statement) Regulations, 1999 (S.I. No. 93 of 1999), which allows for the inclusion of a description of difficulties encountered in compiling the EIS, it is concluded that adequate technical knowledge and information has been available in the production of this statement.

1.8 REFERENCES

- Commission of European Communities (2001). S.I. No. 600 of 2001 *Planning and Development Regulations*.
- Environmental Impact Assessment (Amendment) Regulations, 1999, S.I. No. 93/1999.
- Environmental Protection Agency (2003). *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements*. EPA, Wexford, Ireland.
- Environmental Protection Agency (2002). *Draft Guidelines on the information to be Contained in Environmental Impact Statements*. EPA, Wexford, Ireland.
- RPS / MCOS (2004). *Upgrading of the Clonakilty Sewage Treatment Plant and Associated Works Preliminary Report*. RPS / MCOS, Cork, Ireland.

2. DESCRIPTION OF PROPOSED DEVELOPMENT

2.1 CHARACTERISTICS OF THE PROJECT

The existing wastewater treatment plant (WWTP) in Clonakilty was constructed in 1987 and was designed to treat a population equivalent (PE) of 5,333. Since the commissioning of the existing WWTP, the load on the plant has increased to a peak of 15,000 PE during the summer period.

The proposed scheme involves the upgrading and expansion of the existing WWTP to treat a wastewater load of 20,500 PE generated from Clonakilty, the Technology Park, Shannon Vale, Inchdoney and Ring.

The Preliminary Report prepared by RPS/MCOS (June 2006) recommended a future design population equivalent of 20,500 PE to allow for future domestic and industrial expansion. The main upgrades to the plant involve upgrading of the inlet works, additional aeration and settling capacity, sludge treatment and odour control.

2.2 DESCRIPTION OF SITE LAYOUT

The 2.2 ha site is located at Clonakilty, West Cork off the N71 National Primary road, Figure 1.1 Site Context. The proposed development is located at the existing wastewater treatment plant site at the north western tip of Clonakilty Harbour where the river Fealge emerges from the town and enters the sea. The proposed development is located on a site that is well screened by the surrounding landform and boundary vegetation. The low level form of the proposed development means that it blends unobtrusively into the existing site. The site is bounded by the local Gaelic Athletic Association (GAA) ground to the west, the Model Railway Village tourist attraction to the south, the river Fealge to the north and the harbour to the east.

The site is located approximately 9 km west of Timoleague, 13 km north east of Rosscarbery and 20 km south of Bandon.

The prevailing landscape of the area is the estuary and its shoreline. The hillsides are characterised by rolling agricultural landscape comprising field patterns defined by hedgerows interspersed with clumps of trees in places. There is some woodland cover along the western shoreline of the harbour. This estuarine agricultural setting is interrupted by the urban form of Clonakilty town which nestles in the sheltered inlet and extends upwards along the high ground to the north of the town. The general impression is of residential properties and some noticeably larger institutional buildings such as the school at the eastern end of the town. The landscape of the area is discussed in more detail in Section 4.

The general layout of the proposed scheme is shown in Figure 1.3 Existing Layout Plan and Figure 1.4 Proposed Layout Plan which details the location of existing and proposed structures, extent of the proposed development and the total land holding.

The main upgrades to the plant as recommended by the Preliminary Report are as follows;

- Inlet works to be upgraded.
- Additional aeration and settling capacity to be provided.
- Existing mechanical plant to be refurbished.
- Sludge treatment and storage to be upgraded and capacity expanded.
- Odour control and odour removal to be provided both at the sludge treatment plant and on the raw sewage from Inchydoney.

In addition to the upgrades at the WWTP, the Preliminary Report recommended that the Long Quay Pumping Station is to be upgraded and a storm water holding tank is to be constructed as part of the upgrade of the collection system.

2.3 DESCRIPTION OF EXISTING WASTEWATER TREATMENT PLANT

The original wastewater treatment plant was designed to serve a population of 5,333 PE with a peak hydraulic flow of 102 l/s. The influent is pumped into the inlet works from two pumping stations located at Clarke Street Bridge and Long Quay. A pumped feed from Inchydoney also enters the works.

2.3.1 Flows

The wastewater currently entering the works comes from three pumping stations.

Long Quay Pumping station

The Long Quay Pumping Station is located on Long Quay north of the treatment plant, which has two duty pumps and one standby. A 300mm rising main conveys the wastewater form the pumping station to a hatchbox west of the treatment works and onto the header manhole in the treatment works site.

Clarke Street Bridge Pumping Station

The Clarke Street Bridge Pumping Station is located by the northwest corner of the GAA pitch, west of the treatment plant. This pumping station has one duty pump and one standby pump. A 150 mm rising main conveys the wastewater from the pumping station to the same hatchbox west of the treatment works and continues parallel to the Long Quay rising main, onto the header manhole in the treatment works site.

Inchydoney Pumping Station

The Inchydoney Pumping Station is located on the south side of Inchydoney Island, approximately 3.5 km from the Clonakilty treatment works. The pumping station has one duty pump and one standby pump as well as air injection facilities. A second air injection station is located on this pressure main about 0.55 km south of the treatment plant. The wastewater is collected at and pumped from the pumping station to a header manhole approximately 0.5 km north of the pumping station. From there, it is conveyed via a 150 mm uPVC pressure main to the treatment works. The pressure main enters the works directly opposite the storm overflow penstock just after the inlet works and before the inlet flumes.

2.3.2 Grit Removal & Collection

A 'Jetta' 200 grit trap is currently in operation at the plant with a design flow capacity of 0 – 180 l/s. A grit collection chamber is located adjacent to the grip trap. New grit removal facilities are currently been installed at the WWTP.

2.3.3 Screening

In 2000 a mechanically brushed screen and Lisep Unit (Haigh Ace Inlet System) were installed which produces approximately one skip of macerated screenings per fortnight.

2.3.4 Storm Overflow

A hand-operated penstock is located between the screen and the inlet flumes at the inlet works. This penstock leads to a backdrop manhole, which connects to the treatment plant outfall at the easterly end of the site. In a heavy rainfall event, this penstock is opened allowing the storm overflow to flow directly to the sea outfall for discharge.

2.3.5 Inlet Flumes

After the screen outlet, the inlet channel splits into two channels 300mm wide, with future provision for a third channel. The two channels have Venturi flumes installed with a 200mm throat to enable measurement of the flow through the works. These channels were designed for a flow capacity of 51 l/s.

2.3.6 Oxidation Tanks

Extended aeration is by means of two racetrack oxidation tanks with four rotors located midway along their length as a means of aeration. The design PE for these ditches was 2,666 per ditch with a maximum flow of 6 DWF (51 l/s) flowing through each ditch and a biological loading of 182 kg BOD/day/stream. Aeration is by means of rotors located midway along the racetrack, which also maintains a velocity of approximately 3 m/s for the mixed liquor within the tank.

2.3.7 Settling Tanks

There are currently two circular settling tanks in operation as a means of final sedimentation.

2.3.8 Sludge Return

Currently the sludge is being returned from the settling tanks to the oxidation tanks by means of a sludge-lifting wheel.

2.3.9 Outlet Channel

The 400mm outlet channel collects the treated effluent from the settling tanks that then it flows by gravity to the outfall at Clonakilty Bay.

2.3.10 Excess Sludge Pumps

Two 'Mono Merlin ABS' submersible pumps, one duty and one standby pump the excess sludge produced from the extended aeration process on to the picket fence thickener.

2.3.11 Picket Fence Thickener

A picket fence thickener is located adjacent to the control house which returns the supernatant effluent to the head of the oxidation ditch and wastes the thickened sludge to the sludge filter belt.

2.3.12 Filter Belt Press

The filter belt press is located in the control house. Polyelectrolyte is mixed with the thickened sludge prior to dewatering to enable optimum dewatering of the sludge. The sludge belt filter press produces approximately 14 – 17 tonnes of sludge cake, with a dry solids content of approximately 12%, per week, depending on the season.

2.3.13 Sludge Disposal

The sludge cake is disposed of by soil injection into agricultural land at Balineen.

2.4 DESCRIPTION OF PROPOSED DESIGN, SIZE AND SCALE

The site layout is illustrated on Figure 1.3 Existing Layout Plan and Figure 1.4 Proposed Layout Plan. As mentioned previously the scheme was the subject of the Upgrading of the Clonakilty Sewage Treatment Plant and Associated Works Preliminary Report (PR) completed by RPS / MCOS in June 2006. The report outlined the proposed elements for upgrade of the existing plant, which are discussed in more detail under the headings below. The ultimate design loadings for the wastewater treatment plant (WWTP) stated in the PR are as follows:

Population equivalent	= 20,500
Peak hydraulic load	= 111 l/s
Biological load	= 1,230kg BOD / day

2.4.1 Inlet Works

The wastewater entering the works will continue to come from the three pumping stations; Long Quay Pumping station, Clarke Street Bridge Pumping Station and Inchydoney Pumping Station. The existing 'Jetta' 200 grit trap has sufficient capacity to cater for 6 x DWF from a PE of 22,000 and the PR does not recommend any change to it. A grit collection chamber is located adjacent to the grip trap. New grit removal facilities are currently been installed at the WWTP. A grit classifier is to be installed which will wash organic material from the grit and allow it to drain adequately before depositing the grit in a skip for removal from site to landfill.

The Haigh Ace 991 currently screens inflows and has a maximum capacity of 100l/s. A Lisep unit washes, dewaters and compacts the screenings for disposal. To cater for the maximum hydraulic load of 111 l/s (see section 5 of PR), a second inlet screen such as the Haigh Ace 290 Inlet System or equivalent is to be installed. This will operate in parallel with the existing inlet screen. A second Lisep unit to wash, dewater and compact the screenings will be installed to handle the screenings from the proposed second screen. The screenings will be disposed of to landfill

A single 750mm wide channel shall replace the two existing Venturi flumes and channels with a flow capacity of 115 l/s. A prefabricated polystyrene Venturi flume will be fitted to enable measurement of flow by means of an ultrasonic beam. The existing flow recorder will be altered to enable measurement and recording of flows through this new channel and Venturi flume.

The flow from the inlet works will be split to flow to the two primary settlement tanks.

2.4.2 Primary Settlement Tanks

It is proposed to construct two primary settlement tanks, each with a radius of 7.8 metres. The settling tanks will allow the heavier solids to settle from the flow and thereby reduce the BOD load to the downstream aeration system by approximately 25% which will result in a wastewater population

equivalent of 15,375 passing to the secondary aeration phase. The settled sludge will be pumped to the sludge picket fence thickener for thickening and blending with the secondary aerated sludge.

2.4.3 Selector Tank

The selector tank will consist of two chambers, the first being the inlet chamber where the return sludge and raw wastewater will mix. A spill-over weir will divide this chamber and the adjacent splitter chamber will be benched to balance the three flows exiting the selector tank and flowing into the oxidation tanks. Three hand penstocks will be fitted on the three outlets from the selector tank, so that one stream (oxidation tank and settling tank) may be shut down for maintenance or during winter period when loadings to the works are considerably lower.

2.4.4 Oxidation Tanks

A third oxidation tank will be constructed to cater for the additional loading to the treatment plant. It will have the same plan area as the two existing tanks but will be 3.0m deep compared to a depth of 1.5m for the existing tanks. The treatment plant will then operate in three streams, the first two serving 4,000 PE each and being fed through the existing oxidation tanks and the third stream serving 7,375 PE being fed through the proposed deeper oxidation tank. Therefore the total future treatment capacity of the extended aeration plant will be 15,375 with the balance of the 20,500 PE (= 5,125) being removed at the primary settlement stage. The existing rotors will be replaced in the existing oxidation tanks in order to increase the oxygen supply. Air diffusers will be installed on the floor of the new tank. Mixers will be installed in all tanks to ensure adequate circulation.

The proposed aeration and circulation system will result in little or no disturbance of the water surface thereby reducing considerably the potential for spray aerosol and odours arising from the oxidation ditches.

2.4.5 Final Settlement Tanks

The two existing settling tanks have a radius of 7.95m and a side wall depth of 1.5m. A third settling tank with a radius of 8.5m and a depth of 2.25m is proposed to cater with settlement of effluent from the third (proposed) oxidation tank.

2.4.6 Outlet Works

A Venturi flume will be fitted to the existing outlet channel to enable measurement of flow by means of an ultrasonic beam. A flow recorder will be installed to enable measurement and recording of flows through this new Venturi flume.

The outfall from the treatment plant currently discharges into the tidal reach of the River Fealge adjacent to the WWTP (see figure1.3). A study of the effluent discharge from the WWTP has been carried out as part of the EIS. The study assessed the assimilative capacity and dilution/dispersion characteristics of the receiving waters and commented on the siting of the outfall with regard to possible impacts, particularly on the 'Blue Flag' bathing beaches at Inchydoney. The results showed that the optimum location for the outfall in terms of minimising bacterial contamination at Inchydoney beach is the existing outfall location adjacent to the town (see figure 1.4). This is discussed in further detail in Section 6 (Surface Water).

2.4.7 Submersible Sludge Pumping Station

The existing sludge lifting wheel chamber will be replaced with a submersible sludge pump sump. This will collect the sludge from the existing secondary settling tanks and pump it to the proposed submersible sludge return pump sump. The proposed submersible sludge return pump sump will also collect sludge from the proposed third settling tank. Both sumps would also take the sludge bleed from the oxidation ditches when required. The activated sludge will be pumped to the selector tank where it will mix with the wastewater prior to entering the oxidation ditches while any waste sludge will be pumped to the picket fence thickener.

2.4.8 Picket Fence Thickener

The existing picket fence thickener has a radius of 3.25m and a sidewall depth of 3m. This thickener is stated to have more than adequate capacity to serve a PE of 20,500 assuming 90g/head/day produced with a storage volume of 3 days sludge production. The introduction of a similar sized second thickener will provide a total of six days storage of thickened sludge.

2.4.9 Sludge Dewatering House

The existing dewatering house and main office/reception are all part of the one building. The existing sludge is dewatered by means of polycelectrolyte dosing and the use of a filter belt press. It is proposed to isolate the sludge-dewatering house from the office premises by building a new dewatering house/compressor house in the location shown on Figure 1.4 Proposed Layout Plan. A second filter belt press as well as a second set of polyelectrolyte dosing pumps and mixing tanks similar to those already in the treatment plant will be installed, to act as a standby in the event of a breakdown or necessary maintenance of the existing filter belt press.

2.4.10 Office / Reception

As mentioned above the existing dewatering house and main office / reception are all part of the one building. The sludge dewatering will be located within the newly constructed dewatering house / compressor house and the existing building will be converted to the main office and reception area.

2.4.11 Long Quay Pumping Station

The existing pumps at the Long Quay Pumping Station will be replaced and macerators will be provided. A lower overflow will be provided at the pump house with "Tideflex" non-return valve. A 750m^3 wastewater balancing tank will be provided adjacent to the pump house.

2.5 EXISTENCE OF THE PROJECT

Under the EPA Advice Notes on Current Practice in the Preparation of Environmental Impact Statements the description of the existence of the projects defines all aspects of the proposed lifecycle of the facility under the following headings:

- Construction
- Commissioning
- Operation
- Decommissioning
- Description of Other Developments

Each of these items are addressed individually in the following sections.

2.5.1 Description of Construction

2.5.1.1 Introduction

This section details the construction works required for the proposed scheme and the mitigation measures to be implemented to ensure that potential environmental impacts are minimised.

Land Use Requirement/ Site Evaluation

All ground investigations required prior to enabling works shall be carried out in accordance with BS 5930 (Code of Practice for Site Investigations).

Access and Haul Roads

Construction staff will access the site from the main entrance and parking facilities will be provided in a temporary parking area located in a suitable area as laid out by the contractor.

Pipe and Drainage Diversions

There are no proposals to divert drainage on the site.

Construction Accommodation/ Facilities

All relevant statutory requirements will be provided for all construction workers including:

- Canteen facilities and drinking water supply
- Toilet, wash up and locker facilities and hot water
- Drying room
- Car parking for workforce
- First Aid Facilities
- Site Engineers & Resident Engineers offices
- Site offices for Contractors
- Secure site compounds

Fencing and Security

Currently the site is enclosed by palisade fencing along the eastern, northern, southern and western boundaries. The construction site will be adequately secured to ensure proper safety for employees and the general public.

2.5.1.2 Construction Activity

Site Preparation

Site preparation works will be required in order to facilitate the upgrading of the works. Such works will involve stripping of topsoil from grass areas, construction of temporary hardstanding areas and erection of temporary fencing and access gates.

Site preparation works will also include the provision of a contractors facility which will include:

- Site Office
- Site Facilities (canteen, toilets etc.)
- Office for Resident Engineer
- Secure compound for the storage of all on site machinery and materials.

Duration and Phasing

The timing of the commencement of construction is subject to budgeting, planning and contractor appointment. It is not expected that there will be any phasing of the works, The order in which the construction is carried out will be determined by the contractor's method statement for the construction of the works. The commencement of the works will be dependent on obtaining planning permission, approval by the Department of the Environment, Heritage and Local Government to proceed to contract document stage, procurement of a contractor to carry out the works and contract award. The duration of the construction works will be dependent on the contractor's method statement and programme but is expected to be in the order of 12 months.

Major Temporary Features/ Plant

Equipment to be used during the construction of the facility will be typical of a project of this scale. In general the following machinery will be used:

- Cranes
- Hymac excavators
- JCB Excavators
- Dumper trucks
- Road Grader
- Teleporters
- Cherry Pickers
- Scissor Lifts
- Temporary truck park, car park and stockshed

Construction Operation Hours

Subject to being conditioned by planning requirements, it is anticipated that the following will be the working hours on the construction site:

- Monday to Friday 8am to 6pm
- Saturdays 8am to 1pm
- Site closed on Sundays

Working hours may vary slightly depending on weather conditions and daylight hours during winter months. Heavy construction activities will be avoided where possible outside the normal working hours outlined above. The WWTP will remain operational on a continuous basis during the construction period.

Construction Techniques

The construction techniques used will be standard normal techniques that would be associated with a large infrastructural project with both a building work element and civil engineering works.

Materials

In so far as possible, construction materials will be from local sources. All imported material that will be used on site will be from approved sources.

Extension of Infrastructure

Services such as ESB and Telecom will be brought to the dedicated construction compound from the nearest available point. Temporary sanitary accommodation will be provided on site which will be discharged into the existing foul system on site.

2.5.1.3 Significant Effects

Air, Dust, Noise and Vibration

Air, dust, noise and vibration emissions and the proposed mitigation measures during the construction period have been detailed under Section 8, Air and Section 10, Noise. No adverse impacts are anticipated.

Traffic

Traffic volumes during the construction period have been detailed under Section 11.

Water

Surface water management during the construction period has been detailed under Section 6.

Waste Management

During the construction phase both solid and liquid waste will be produced at the facility. Minor quantities of liquid waste will be produced during the construction phase of the facility. Waste oils, solvents and paints will be stored in a temporary bunded area prior to transport off site by a licensed contractor. All solid waste generated during the construction phase will be adequately stored prior to transfer to an authorized facility for recovery / recycling / disposal.

Construction Safety

As required by the Safety, Health and Welfare at Work (Construction) Regulations a Safety and Health Plan will be formulated which will address health and safety issues from the design stages, through to the completion of the construction phase. The plan will be reviewed as the development progresses. The contents of the Safety and Health plan will follow the recommendations of the Guidelines to Parts I, II, III of the Safety, Health and Welfare at Work (Construction) Regulations, 2001 and Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2003 and the Safety, Health and Welfare at Work Act 2005.

2.5.1.4 Environmental Protection Measures

The Client will establish an environmental management plan with the contractor that will form part of the contract between the parties for the construction of the proposed development. It will be the responsibility of the contractor to ensure strict compliance with the aspects of the environment management plan. The Resident Engineer or Clients Representative will audit the environmental performance of the contractor on a regular basis and will make recommendations or log incidence as necessary. It is proposed that a programme be established for regular monitoring of construction noise, dust, air emissions and water quality.

2.5.1.5 Potential Impacts

In general it is anticipated, that with proper management, the construction phase of the development will not have significant or long term negative impacts.

2.5.2 Description of Commissioning

The commissioning of the extended and upgraded WWTP will consist of the following stages;

- Dry Commissioning
- Clean Water Testing
- Wastewater Testing
- Performance Testing
- Handover

The commissioning will be carried out in accordance with the contract documents and the contractor's work programme and method statements. It is envisaged that it will be carried out in stages in order to ensure the continuing operation of the WWTP.

2.5.3 Operation of the Project

The following sections detail the operation of the project as detailed in the EPA's Advice Notes on Current Practice in the Preparation of Environmental Impact Statements. The operation is described under a number of headings including on site processes, staffing, natural resource requirement and emissions.

2.5.3.1 Description of Principle Process or Activities

The wastewater treatment processes for the Clonakilty WWTP will be required to result in a treated effluent which, at a minimum, meets the following standards:

- BOD : 25 mg/l
- TSS : 35 mg/l
- COD : 125 mg/l

Additional requirements with respect to treatment standards may be determined by this EIS. The compliance levels will be as required by the EU Urban Waste Water Treatment Directive and the Urban Waste Water Treatment Regulations 2001 and as further set out in the EPA document "The Environmental Protection Agency Act 1992, Urban Wastewater Treatment Regulation, 1994 – A handbook on implementation for Sanitary Authorities, 1996".

The proposed facility will be designed for the acceptance and treatment of municipal wastewater. The facility will comprise a number of distinct process units namely:

- Inlet Works
- Primary Settlement

- Aerobic Treatment
- Final Settlement
- Outlet Works
- Sludge Treatment and Storage

The process flow chart is shown in Figure 2.1.

Inlet Works

The wastewater entering the works will continue to come from the three pumping stations; Long Quay Pumping station, Clarke Street Bridge Pumping Station and Inchydoney Pumping Station. The existing 'Jetta' 200 grit trap has sufficient capacity to cater for 3 x DWF from a PE of 22,000. A grit collection chamber is located adjacent to the grip trap. New grit removal facilities are currently been installed at the WWTP. A grit classifier is to be installed which will wash organic material from the grit and allow it to drain adequately before depositing the grit in a skip for removal from site to landfill.

The Haigh Ace 991 currently screens inflows and has a maximum capacity of 100l/s. A Lisep unit washes, dewaters and compacts the screenings for disposal. To cater for the maximum hydraulic load of 111 l/s (see section 5 of PR), a second inlet screen such as the Haigh Ace 290 Inlet System or equivalent is to be installed. This will operate in parallel with the existing inlet screen. A second Lisep unit to wash, dewater and compact the screenings will be installed to handle the screenings from the proposed second screen. The screenings will be disposed of to landfill

A single 750mm wide channel shall replace the two existing Venturi flumes and channels with a flow capacity of 115 l/s. A prefabricated polystyrene Venturi flume will be fitted to enable measurement of flow by means of an ultrasonic beam. The existing flow recorder will be altered to enable measurement and recording of flows through this new channel and Venturi flume.

The flow from the inlet works will be split to flow to the two primary settlement tanks.

The wastewater entering the works will continue to come from the three pumping stations; Long Quay Pumping Station, Clarke Street Bridge Pumping Station and Inchydoney Pumping Station by flow separation. The grit is then lifted to the grit classifier and the grit is then removed off site to landfill.

Primary Settlement

The flow will be directed after the inlet flume to two primary settling tanks. After settlement, the flow will be pumped to the selector tank prior to entering the aeration tanks. The introduction of primary settlement will result in an estimated 25% reduction in BOD load to the aeration tanks. The actual BOD load to be aerated would then be 15,000 PE. The sludge at this point settles in the tank and is removed by forward feed pumps to the picket fence thickener.

The selector tank will act as the initial contact zone of the extended aeration process where the primary effluent and return activated sludge are combined. This initial contact process prevents and controls the growth of filamentous organisms, which can often lead to bulking sludge. These selector tanks will alleviate the current problem of Nocardia foam evident in the settling tanks. A retention time of 2.5 minutes is sufficient to ensure adequate mixing of the primary sludge and return activated sludge.

Aerobic Digestion

The treatment plant will operate in three streams from the selector tank, the first two serving 4,000 PE each and being fed through the existing oxidation tanks and the third stream serving 7,375 PE being fed through the proposed deeper oxidation ditch. The wastewater will be treated using an activated sludge process through a well mixed and aerated suspension of microbes and organic matter. Microbes will be maintained at a suitable level in the oxidation ditches to aerobically digest the organic matter in the wastewater. Oxygen will be supplied through rotors in the existing tanks and air diffusers in the new tank to support the microbe population.

Final Settlement

The final settlement tanks, also known as clarifiers, allow the active sludge to be separated from the treated wastewater by gravity settlement. The treated wastewater overflows a weir and discharges to the outlet works while the sludge settles and is removed by hydrostatic pressure.

Outlet Works

The 400mm outlet channel collects the treated effluent from the settling tanks which then flows by gravity to the outfall at the tidal reaches of the River Fealge. Discharge is to continue at the existing outfall located adjacent to the town.

Sludge Return

The proposed submersible sludge pump sump will collect the sludge from the existing settling tanks and pump it onto the proposed submersible sludge return pump sump which will also collect sludge from the third proposed settling tank. These sumps also have the facility to bleed sludge from the oxidation ditches, when required.

From the proposed submersible sludge pumping station, activated sludge will be returned to the head of the selector tank at a rate of 1 DWF, where it will mix with the wastewater prior to entering the oxidation tanks.

Sludge Thickening

Primary sludge and excess secondary sludge will be thickened in a sludge picket fence thickener where the sludge settles by gravity and the supernatant flows over a weir and returns to the primary treatment stream. The thickened sludge is drawn off from the bottom of the thickener and pumped forward to the de-watering plant.

Sludge Dewatering

The sludge will continue to be dewatered by means of the existing filter belt press following polyelectrolyte dosing. A second filter belt press as well as a second set of polyelectrolyte dosing pumps and mixing tanks similar to those already in the treatment plant will be installed, to act as a standby in the event of a breakdown or necessary maintenance of the existing filter belt press.

Sludge Disposal

Currently the sludge cake is disposed of by soil injection into agricultural land at Balineen. This method of disposal is in line with the Sludge Management Plan for County Cork, 2000, Code of Good Farming Practice and the Waste Management (Use of Sewage Sludge in Agriculture) Regulations S.I. No. 267 of 2001. This method of disposal is proposed to continue following the upgrade of the works.

2.5.3.2 General Operation

The facility will be designed for continuous operation 24 hours a day 365 days a year. There will be no scheduled shut down period of the facility for maintenance / holiday periods.

2.5.3.3 Process Guarantees

The contract will include significant monitoring to confirm that the wastewater treatment plant meets the required standards. The contractor will be required to provide process guarantees.

2.5.3.4 Occupants / Staffing

There is currently one full time employee for the existing works. It is expected that the number of employees will not increase in the new WWTP. Staff movements should also remain at current levels because of a greater use of automatic control equipment and improved methods for handling screenings and grit.

2.5.3.5 Description of Natural Resources Used

The requirements for natural resources are discussed under Section 15 Material Assets.

2.5.3.6 Description of Effects, Residues and Emissions

Detailed description of the effects, residues and emissions associated with the facility are presented in Sections 4 - 15 under the following headings:

- Climate
- Air
- Noise
- Geology & Soils

- Groundwater and Hydrogeology
- Surface Water
- Ecology *
- Traffic
- Landscape
- Human Beings
- Material Assets

* Flora and Fauna included in Ecology

2.5.3.7 Description of Secondary Process / Activities

Off Site Traffic Movements

The current traffic movements at the WWTP site are due to:

- Staff
- Material deliveries
- Removal of screenings, grit and sludge.
- Maintenance crew

One caretaker carries out the current operational duties at the WWTP. It is expected that one person will continue to be employed in the operation of the plant following its upgrade and expansion as the process will be largely automated and only require surveillance and monitoring for the most part. There are periodic visits to the WWTP at present to take samples of the treated effluent for laboratory analysis. This is not expected to change in the future.

There is very little material required for the operation of the plant. Polyelectrolyte is required in the sludge treatment process. The increased throughput in the WWTP will lead to an increased requirement for polyelectrolyte but it is expected that the quantity of polyelectrolyte per delivery will increase and the frequency of deliveries will remain the same.

The only other consumables would be general office supplies.

Screenings are extracted from the raw wastewater as it enters the WWTP. The screenings are then dewatered and placed in a skip. The screenings are removed from site approximately once per fortnight and disposed of at a licenced landfill facility. The quantity of screenings will increase over time in proportion to the increase in wastewater passing through the WWTP. As mentioned previously the current load at the plant is approximately 15,000 pe which is to increase to approximately 20,500 pe as a result of the upgrade, therefore the increase in screenings will be in the order of 33%. At most, the traffic movements will increase from 2 to 3 per month.

The grit removal system produces approximately 2 bins of 180 litres capacity per week. Again, with the increase in flow, the quantity of grit will increase by approximately 33%. The method of grit removal will, however, be upgraded with the result that washed and de-watered grit will be discharge into a skip for removal once per week. There will therefore be a reduction in traffic movements associated with the grit removal.

At present, sludge from the treatment process is thickened and de-watered on site with 2 to 3 tankers of sludge being removed from the WWTP each week. It is expected that the traffic movements will increase by one in the future due to the increased quantity of sludge being produced.

Currently, maintenance of mechanical and electrical plant at the WWTP is carried out on a scheduled basis and when required due to breakdowns. It is expected that, following the upgrade of the plant with more modern equipment, no additional traffic movements will be generated.

In summary it is considered that there will be minimal change to the existing level of traffic movements associated with the operation and maintenance of the WWTP.

Monitoring

Plant monitoring requirements will be structured as set out in the EPA document "The Environmental Protection Agency Act 1992, Urban Wastewater Treatment Regulations, 1994. A handbook on implementation for Sanitary Authorities, 1996" and in the Urban Waste Water Treatment Regulations, 2001. Also, the performance of the WWTP will be monitored and reported on in accordance with the Performance Management System for Wastewater Treatment Plants prepared by the , Water Services National Training Group. The frequency of water quality monitoring shall be as defined in the fifth schedule of the regulations. Flow-proportional or time-based 24-hour samples shall be collected at the same well-defined point in the outlet. Good laboratory practices aimed at minimising the degradation of samples between collection and analysis shall be applied. Extreme values for water quality will not be taken into consideration if they are as a result of unusual conditions such as mechanical breakdown, power failure or extreme weather conditions.

The above requirements shall apply whether the WWTP is operated and maintained directly by Cork County Council or by a service provider on their behalf.

2.5.4 Description of Decommissioning

There is no site life defined for the proposed facility therefore detailed financial, administrative and technical provisions are not presented under a decommissioning plan for the site. Only in the event of a new waste water treatment facility being provided at another site will the current facility be closed and decommissioned.

In the event of decommissioning, measures will be undertaken by the operator to ensure that there will be no environmental impacts from the closed facility. Such measures are outlined as follows;

- All wastes at the facility at the time of closure will be transported to a suitable treatment facility.
- All oils, fuels etc. on site at the time of closure will be collected and disposed/ recycled by an authorised waste contractor.
- Site infrastructure will be dismantled and disposed of at a licensed facility.
- All tanks will be de-sludged and interceptors cleaned. The waste from the cleaning operations will be disposed to relevant licensed facilities.
- A monitoring programme of all potential emissions including surface water and dust will be conducted after the decommissioning process in order to ensure that emissions from the facility have ceased.

When operations have ceased, and assuming confirmation from the monitoring programme that emissions have ceased, it is expected that there will be no requirement for long tern aftercare management of the site.

2.6 REFERENCES

- Environmental Protection Agency (2003). *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements.* EPA, Wexford, Ireland.
- Environmental Protection Agency (2002). *Draft Guidelines on the information to be Contained in Environmental Impact Statements.* EPA, Wexford, Ireland.
- RPS / MCOS (June 2006). *Upgrading of the Clonakilty Sewage Treatment Plant and Associated Works Preliminary Report.* RPS / MCOS, Cork, Ireland.
- Urban Waste Water Treatment Regulations 2001
- The Environmental Protection Agency Act 1992, *Urban Wastewater Treatment Regulation, 1994 – A handbook on implementation for Sanitary Authorities*, 1996".
- Water Services National Training Group, Performance Management System for Wastewater Treatment Plants.
- Waste Management (Use of Sewage Sludge in Agriculture) Regulations, S.I. No. 267 of 2001.
- Fehily Timoney, *Sludge Management Plan for County Cork.* Fehily Timoney, 2000.

3. HUMAN BEINGS

3.1 INTRODUCTION

In accordance with the EPA 'Advice Notes on Current Practice (in the preparation of an Environmental Impact Statements'), 2003, this chapter has considered the 'existence, activities and well being of people' with respect to 'topics which are manifested in the environment such as new landuses, more buildings or greater emissions'. Issues examined in this section include:

- Economic Activity
- Social Consideration
- Land Use
- Health and Safety
- Employment

These issues, the findings of the scoping study and the human beings baseline study are detailed below.

3.1.1 OUTCOME OF THE SCOPING STUDY

As outlined in Section 1.4, Introduction, the contents and scoping of the EIS including consultation with Cork County Council in 2005 identified the principal matters of likely concern were identified as;

- *Water Quality*
- *Air Quality*

These comments have been considered and addressed within the various sections of the EIS.

3.1.2 Human Beings Baseline Study

3.1.2.1 Introduction

Intrinsic to the human being assessment, is a review of the current socio economic status and prospects of areas close to the proposed redevelopment facility. The proposed development relates to the upgrading of an existing waste water treatment plant (WWTP). The WWTP is located within the townland of Youghals, which is partly in the electoral division (ED) of Clonakilty Rural District (CRD) and in the electoral division (ED) of Clonakilty Urban District (CUD). Both EDs are assessed as part of the study.

Identification of principal potential receptors and analysis of recent trends in population, employment economic performance and land use including local amenities was reviewed. The impact of the proposed development was assessed against this background. Reference was made to the Central Statistics Office data including the Small Area Population Statistics (SAPS) 1996 and 2002. Reference to the Cork County Development Plan 2003 and the Clonakilty Development Plan, 2003 was also made. The study area includes an assessment of the townlands in the electoral division of Clonakilty Rural District and Clonakilty Urban District as identified in Table 3.1.

Table 3.1 Townlands in the electoral division of Clonakilty Rural and Urban Districts

Clonakilty Rural District	Clonakilty Urban District
Capeen (part of)	Kilgarriff
Miles (part of)	Island Stand Intake
Cloheen (part of)	Kilbree
Desert (part of)	Lackenagobidane
Youghals (part of)	Cashelisky
Tawnies Upper (part of)	Grillagh
Gallanes(part of)	Inchidoney Island
Scartagh	Timplebryan South
Maulnaskehy	Timplebryan North
Carhoo	Capeen (part of)
Ballyduvane	Miles (part of)
Streets within Clonakilty Town	Cloheen (part of)
	Desert (part of)
	Youghals (part of)
	Tawnies Upper (part of)
	Gallanes(part of)

The proposed facility is located in close proximity to other settlements as detailed in Section 13.3, Material Assets. These settlements include Timoleague, Rosscarbery, Bandon, Leap, Ballinspittle and Drinagh, which are all located <25Km away from the proposed redevelopment. However, for the purpose of this assessment the study area relates to the electoral division of Clonakilty Rural and Urban District only.

3.1.2.2 Principal Potential Receptors

An assessment of principal potential receptors within the environs of the facility including homes, hospitals, hotels, holiday accommodation, schools and rehabilitation workshops and commercial premises was conducted and is detailed overleaf.

Homes

The number of residential properties within 1km of the proposed facility has been assessed and illustrated in Figure 3.1.

An Action Area Plan, prepared in September 2005 for Clonakilty GAA and Clonakilty Town Council, examined the potential for the development of lands, owned by each of the above, adjacent to the WWTP site. The report forms the basis on which the GAA lands have been rezoned to "Primarily Town Centre Zoning" incorporating primarily residential development with an element of smaller scale retail and retail services, complementary to the residential development. The Plan proposed a phasing of development as outlined in Figure 4.4. Phase one includes the provision of residential and associated retail in an urban block pattern that forms an extension to the existing town centre, a significant area of public open space adjacent to the treatment plant, riverside walkway and bridge links across the River Fealge. Development of the site is limited by the 70m setback from the WWTP site imposed by the EPA.

CSO information for 1996 and 2002 was used in assessing the number of households and the number of people in private households within the study area. The household size i.e. the number of people residing permanently at a household was evaluated on a national, county and DED level. The findings are illustrated in Table 3.1 and 3.2 respectively.

Table 3.2 Numbers of Households in the Study Area, 1996 and 2002

	1996	2002	increase/ decrease
Persons in private households in CUD	2,419	2,927	+508
Persons in private households in CRD	1,085	1,083	-2
Number of households in CUD	834	1,081	+247
Number of households in CRD	321	338	+17

Table 3.3 Number of Individuals Residing in Individual Houses on National, County and DED Level, 1996 and 2002

	1996	2002	% increase/ decrease
State	3.14	2.97	- 0.17 %
County Cork	3.25	3.02	- 0.23%
CUD	2.90	2.71	- 0.19%
CRD	3.38	3.20	- 0.18%

The findings illustrate that within the Clonakilty Urban District area the number of households has increased and that the number of people residing permanently at a household has decreased between 1996 and 2002. Within the Clonakilty Rural District area the number of households has decreased marginally and that the number of people residing permanently at a household has decreased between 1996 and 2002.This decrease in household occupancy in both the Clonakilty Urban and Rural Districts is reflected throughout the country as illustrated in Table 3.2.

Health, Social and Community Facilities

Health, social and community facilities located in the study area are detailed below.

Health organisations in the study area include:

- A medical centre
- Private dental practices
- Private nursing homes
- A public nursing home
- A number of Senior Day Care facilities supported by voluntary organizations
- Health and beauty services, treatments and therapies including Thalassotherapy programmes at the local Lodge and Spa at Inchydoney Island
- Mount Carmel District Hospital

Community organisations in the study area include:

- A Garda Station
- The Fire Brigade
- Three banks
- Clonakilty Credit Union
- Clonakilty Town Council
- Clonakilty Chamber of Tourism
- County Architects Department
- Cork County Council
- The Department of Agriculture and Food, FDS Regional Office
- The Department of Social Welfare
- West Cork Enterprise Board
- Tidy Towns Committee
- Churches (Catholic Church, Church of Ireland and Methodist churches)
- West Cork Leader
- The Southern Health Board

Schools located in the study area include:

- Six primary/national schools including a Gaelscoil
- Two second-level schools, including a convent and a Community College
- A Vocational Educational College
- Clonakilty Agricultural College
- Eight crèches, including two Montessori schools, operating within the town and one other crèche located at the West Cork Business & Technology Park

Heritage and Amenity

Heritage and amenities recognized by Cork County Council and referenced in the Cork Development Plan, 2003 include:

- Clonakilty Bay is a proposed Natural Heritage Area and Candidate Special Area of Conservation
- Castlefreake Warren (The Long Strand Little Island Strand) is an area of geological interest due to its coastal geomorphology
- Galley Head to Belacoon Cave is an area of geological interest due to its Lower Carboniferous Geology
- Inchydoney Beaches (Mucross, Strand, Clonakilty Harbour) is an area of geological interest due to its coastal geomorphology
- Timoleague Estuary/ Coolamine Bay is an area of geological interest due to its coastal geomorphology
- The road between Timoleague and Clonakilty via the North Ring is a designated scenic route
- The coastal road from Clonakilty to Inchydoney and Ardfield is a designated scenic route

Other amenities in the locality include:

- Clonakilty Parish Hall
- Clonakilty Tourist Office
- Clonakilty Shopping Centre
- Clonakilty Post Office
- Library
- Community sports complex including an all weather outdoor surfaced pitch and a tennis facility with three courts
- A number of public parks and a public playground
- Quality hotel Fitness & Leisure Centre (hotel residents and local members)
- Over 10 scenic beaches within an eight mile radius of Clonakilty some with blue flag status e.g. Inchydoney
- Two hotel swimming pools
- A community sports hall
- GAA and Rugby pavilions

- An agricultural exhibition hall
- Numerous GAA fields
- Rugby pitches
- Two golf clubs in Clonakilty, Dunmore (9 hole) and 9 holes at Lisselan Estate
- Two gyms located at the Quality Hotel and Inchydoney Lodge and Spa
- Three AIRE registered equestrian centres and various livery yards adjacent to the town
- The West Cork Model Railway Village
- Walking and cycling trails including Clonakilty to Ring, Templebryan/Shannonvale, and Inchydoney

Tourism

Tourism plays an important part in the economy of the heritage town of Clonakilty and its environs. Some of the attractions within the study area are listed above under 'Heritage and Amenity'. Clonakilty is also reknown for its numerous pubs, restaurants, nightclubs and annual festivals which include:

- The festival of West Cork
- The West Cork Car Rally
- The Clonakilty August Festival
- Clonakilty Agricultural Show

Clonakilty is also famous as the birthplace of the Republican leader Michael Collins and Henry Ford and both are commemorated in the town.

Clonakilty has eight hotels in its immediate environs ranging from the small family style property to Four Star standard including the Lodge and Spa at Inchydoney Island, Dunmore Hotel, Quality Hotel, Fernhill Hotel, Emmet Hotel, Imperial Hotel and O'Donovan's Hotel. The town also has several registered self-catering accommodation, B & B and guesthouses.

Commercial

Commercial developments in Clonakilty Urban and Rural Districts as detailed in the Clonakilty Development Plan, 2003 include:

- The West Cork Enterprise Park
- The West Cork Technology Park
- An Industrial site at Miles

The West Cork Enterprise Park is situated to the west of Clonakilty on the N71 and is suitable for commercial and manufacturing activity. The West Cork Technology Park is situated to the east of Clonakilty and the companies there are engaged in a variety of high value office based activities including telecommunications, customer services, back office processing, logistics and training. The town of Clonakilty itself is a commercial centre with administrative, market and medical functions. The town is serviced with a variety of shopping outlets ranging from traditional to modern.

3.1.2.3 Recent trends in population

CSO data provides details on recent trends in population within the study area over a six year period i.e. from 1996 to 2002 as illustrated in Table 3.4. During this period the population increased by 7.19% in the rural district and 26% in the urban district. The national population growth was 8%, therefore growth within the study area is average within the rural district and above average in the urban district.

Table 3.4 1996 and 2002 Population of the study area

	1996	2002	% increase
State	3,626,087	3,917,203	8
County Cork	293,323	324,767	10.7
CUD	2,724	3,432	26
CRD	1,085	1,163	7.19

Upon review of the demographic profile of the population i.e. the age structure, one can see that the population in the study area as illustrated in Table 3.5 is ageing. The percentage of young age groups 0-25 has decreased while the older age groups 25-64 are increasing. The percentage of older age groups 25-64 have increased by 4.1% in Clonakilty Urban District and 4.6% in the Clonakilty Rural District.

Table 3.5 Demographic Profile within the study area

	CUD 1996		CUD 2002		CRD 1996		CRD 2002	
	Actual	%	Actual	%	Actual	%	Actual	%
0 - 14	543	19.8	638	18.5	300	27.6	252	21.7
15 - 24	427	15.5	490	14.3	156	14.4	172	14.8
25 - 44	706	25.8	1,023	29.8	293	27.0	293	25.2
45 - 64	515	18.8	649	18.9	212	19.5	302	25.9
65+	553	20.1	632	18.5	124	11.5	144	12.4
Total	2,724	100	3,432	100	1,085	100	1,163	100

3.1.2.4 Recent trends in Employment

Recent trends in employment were evaluated using CSO Small Area population Statistics, (SAPS) information. The information was complied on the basis that:

- The Labourforce is defined as the sum of people aged 15+ who are at work and who are unemployed
- The participation Rate is the proportion of persons in the workforce aged 15 and over expressed as a percentage of all persons in that age group
- The unemployment rate is the proportion of all people unemployed expressed as a percentage of all persons in the labour force

Table 3.6 Employment Figures

	Persons aged 15+		At Work		Unemployed		Labourforce		Participation Rate		Unemployment Rate of Workforce	
	1996	2002	1996	2002	1996	2002	1996	2002	1996	2002	1996	2002
CUD	2,181	2,794	925	1,371	109	94	1,034	1,465	42.4	49.0	10.5%	6.4%
CRD	785	911	379	451	45	22	424	473	48.3	49.5	10.6%	4.65%

The findings illustrate that the unemployment rate within the study area in 2002 ranged from 4.6% to 6.4% which is a significant improvement upon the 1996 statistics of 10.5% and 10.6%.

Upon evaluation of the principal employment profiles in both ED as illustrated in Table 3.7, it is evident that employment rates decreased in two sectors only i.e. in agriculture, electricity and gas decreased, while employment rates in Building/ Construction and transport increased >45%. A significant increase in employment rates >45% was also noted in commerce in the CRD and in public administration in the CUD.

Table 3.7 Distribution of Employment Sectors within the Study Area

	CUD		CRD	
	1996	2002	1996	2002
Agriculture	24	30	85	61
Building/ Construction	75	124	25	39
Manufacturing/ Industry	184	199	50	56
Commerce	242	319	74	109
Transport	43	65	13	19
Public Admin	43	68	16	19
Prof. Services	196	255	84	95
Electricity & gas	8	0	2	0
Other	110	311	30	53
Totals	925	1,371	379	451

3.2 ECONOMIC ACTIVITY

3.2.1 Introduction

The combined total labourforce within the study area in 2002 is 1,938. The two largest employment sectors within the study area are:

- Commerce, which accounts for 22% i.e. 428 people and
- Agriculture, which accounts for 18% i.e. 350 people

In the six year period from 1996 to 2002, employment in agriculture has decreased by 16.5% and employment in electricity and gas has ceased.

3.2.2 Impacts

As outlined in Section 3, Construction, it is expected that during peak activities, employment on site will be a maximum of 20 persons working directly on the construction site. The construction phase will take approximately 12 months.

The number of employees working in the building and construction sector within the study area in 2002 was 163 people, therefore it is anticipated that this proposed dreevelopment will increase the numbers of employees in this sector in the short term by 12%. Furthermore, the permanent employment of 1 person within the facility after the redevelopment will continue.

It is envisaged that money generated during the construction phase alone will have an immense benefit to the community and similarly to the town of Clonakilty with respect to expenditure on local goods, services and accommodation.

3.2.3 Mitigation Measure

Where possible, employment of local residents during the constructions phase of the proposed facility will occur. As a result, it is anticipated that during the construction phase the proposed development will increase employment within the ED and introduce related expenditure into the economy as detailed above.

3.3 SOCIAL CONSIDERATIONS

3.3.1 Introduction

This proposed development is for the upgrade of the existing waste water treatment plant in Clonakilty. Currently the plant is able to treat a population equivalent (P.E) of 5,333; however, in light of recent population increases particularly during the summer tourist season the plant is overloaded. The upgraded and expanded plant will have the capacity to treat a P.E of 20,500. This need has been reflected in both the Clonakilty and Cork Development Plan, 2003 which states:

'The existing sewerage system is a combined scheme with secondary treatment discharging to the estuary. The plant also serves Inchydoney, Gallanes and the Enterprise Park. The plant, constructed in 1987 is presently overloaded and requires upgrading'.

In the EPA's 'Irelands Environment, 2004' publication it was noted that:

- 'Diffuse agricultural sources and municipal sewerage are the main causes of eutrophication in Ireland'.

The improvements in upgrading the waste water treatment plant will ensure the environs of Clonakilty takes responsibility through the following:

- Implementation of the Nitrates Directive (91/676/EEC), to reducing the water pollution caused or induced by nitrates from sewage sources and to preventing further such pollution.
- Implementation of the Water Framework Directive (2000/60/EC) to maintain high status waters where the exist, preventing any deterioration in the existing status of waters and achieving at least good status in relation to all waters by 2015. This general improvement in water quality will be achieved through the implementation of a programme of measures across the country. The improvement of the waste water treatments plants operation will assist in achieving the objectives of the Water Framework Directive within the supply catchment of the proposed facility.
- Implementation of the Nitrates Directive (91/676/EEC)

3.3.2 Impacts and Mitigation Measures

Impacts upon society as a result of this development have been considered in detail in this EIS. Detailed descriptions of the effects, residues and emissions associated with the facility are presented in Sections 4-13 under the following headings:

- Climate
- Air
- Noise
- Geology and Soils
- Groundwater and Hydrogeology
- Surface Water
- Ecology
- Traffic
- Landscape
- Material Assets

3.4 LANDUSE

3.4.1 Introduction

Cork County Council (CCC), intends to apply for full planning permission to Clonakilty Town Council for the development of the existing waste water treatment plant (WWTP) on lands owned by CCC within the site boundary of the existing WWTP (Figure 1.2). This environmental impact assessment evaluates the site in its entirety.

3.4.2 Impacts and Mitigation Measures

As outlined in Section 16, Material Assets, there will be no severance of land as a result of the proposed development or loss of rights of ways or amenities or rezoning of land required. The proposed development will be constructed on CCC lands only and not on any other agricultural lands, therefore a statistical farm survey, which would evaluate land take or severance factors was not necessary. Cognisance of the impact that this development will have on the environment as a whole has been evaluated in Section 3-13.

3.5 HEALTH AND SAFETY

3.5.1. Construction Stage: Potential Impacts

The construction of all facilities can give rise to an impact on the health and safety of human beings if such activities are not managed in an appropriate manner. During the construction stage of this project there is a potential impact on the health and safety of human beings due to the increased volume of traffic accessing the site and the typical health and safety issues associated with any construction site such as slips trips and falls, etc. There is also a low risk of nuisance levels of dust and noise being generated on site and impacting in a minor way on the health and safety of human beings. There is a low risk that persons visiting the site or accessing the site illegally during the construction stage may potentially be subjected to a range of impacts on their health and safety associated with construction sites.

3.5.2. Operational Stage: Potential Impacts

The operation of municipal facilities can give rise to an impact on the health and safety of human beings if such undertakings are not managed in an appropriate manner. The operation of this facility may give rise to a negative impact on the health and safety of human beings through the presence of traffic accessing the facility; the transport to and the handling of chemical agents on site i.e. polyelectrolyte; a fire or explosion on site; the failure of a vessel on site, the generation of nuisance noise levels and the risk of disease from biological contamination. Persons visiting the facility or accessing the facility illegally may potentially be subjected to a range of impacts on their health and safety that are associated with the activities carried out on site. Atmospheric emissions of gas or aerosols will not impact on people in the area and are not a health risk. These issues are dealt with in Section 8.

3.5.3 Mitigation Measures

The construction stage of the project will be managed in accordance with the *2001 Safety, Health and Welfare At Work (Construction) Regulations*, the *Safety, Health and Welfare at Work Act 2005* any associated Codes Of Practice and international best practice for projects of this type.

A Project Safety Plan will be developed to ensure that the safety of human beings is not impacted on in a negative way by the construction works. Nuisance noise and dust levels on site will be kept to a minimum. The site will be adequately secured to prevent unauthorised access and all visitors to the site will be required to report to the site manager. When implemented these mitigation measures will not have any additional negative impact on the health and safety of human beings. A construction project supervisor and a safety coordinator will be appointed in accordance with the *Construction Regulations, 2001* and will be on site during the construction phase of the proposed development. This person will have responsibility for ensuring that relevant health and safety legislation is adhered to and that recommended mitigation measures are implemented.

The operations of the facility will be undertaken in compliance with all relevant health and safety legislation and international best practice and in accordance with the performance management system as issued by the Water Services National Training Group.

The movement of traffic to and from the facility will continue to be managed so as to minimise any potential negative impact of such traffic on the health and safety of human beings. All deliveries of chemicals to the site i.e. polyelectrolyte will be carried out in accordance with any relevant carriage regulations where applicable.

Suitable and adequate hygiene / welfare facilities will be provided at the plant. Suitable personal protective equipment (PPE) will be provided to operational staff as necessary. Risk of disease as a result of biological contamination will be reduced as a consequence of this measure.

The safety statement for the existing facility will be updated to reflect the upgrade of the facility and all employees including operational staff will be adequately trained. A safe system of work will be developed for the daily activities (normal and abnormal) undertaken at the treatment plant.

All chemicals will be handled, stored and used on site in accordance with relevant legislation and international best practices, taking account of their properties and the risks that they pose to the health and safety of human beings in the environment. Infrastructure used for the storage, transfer and transport of chemical materials on site will be designed so as to minimise the risk of spillages. The facility will have in place at all times a *Spill Management And Containment Programme* with the purpose of guarding against the spillage of chemicals at the facility and minimising the impact of the spillage on the health and safety of human beings.

The facility will have in place at all times a *Fire Safety Management Programme* with the purpose of guarding against the outbreak of fire. To guard against the occurrence of fire and to minimise its impact the facility will have in place an automatic fire alarm in the office building; fire hydrant points and portable fire fighting equipment. A detailed emergency response plan will be prepared for the site which will outline the responses to be taken in the event of a fire or other emergency occurring on site. The emergency response plan will be tested on a regular basis.

The facility will be designed and operated so as to minimise the levels of nuisance noise generated on site. Persons visiting the site will be required to report to facility personnel immediately upon arrival on site. The facility will be adequately secured so as to prevent any unauthorised access.

3.6 RESIDUAL IMPACTS

Strict adherence to the mitigation measures recommended in Sections 4 to 13, will ensure that there will be no negative environmental impacts or effects on Human beings from the construction and operation phases of the proposed redevelopment.

3.7 INTERACTIONS

Table 3.8 presents a matrix of interactions likely to occur from the proposed development. The level of interaction between the various media will vary greatly but the table allows the interactions to be identified. If the development does not have the potential to impact or affect the interaction then that interaction is not highlighted in Table 3.8. Upon evaluation of all environmental topics, landscape, air, ecology, roads and traffic and noise have been identified as topics which interact with human beings. In particular these interactions would occur during construction activities as a direct result of earth works associated with installation of foundations and tank structures resulting in the generation of noise and dust. However, as outlined in Section 4 (Landscape), Section 8 (Air), Section 7 (Ecology), Section 11 (Roads & Traffic) and Section 10 (Noise) the development would have the potential of a negative impact if construction activities were to proceed without implementing adequate mitigation measures. The landscape, air, ecology, roads & traffic and noise sections recognise the importance of protecting these resources from potential damage during the construction phase and have made recommendations regarding mitigation measure to prevent negative impacts. Health and Safety on site is also recognised as being of paramount importance to human beings during the construction and operation phases and this will not be compromised if the specified mitigation measures outlined are adhered too.

3.8 REFERENCES

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