17 Summary of Impacts and Mitigation Measures

17.1 Introduction

It has been the intention of Indaver to reduce the adverse effects of the proposed development on the environment to a practical minimum. Where unavoidable environmental effects have been identified during the environmental impact assessment process, measures have been proposed to mitigate these effects as much as reasonably possible.

This chapter summarises the likely residual environmental effects associated with the proposed development. The predicted impacts and recommended mitigation measures are comprehensively detailed in the relevant chapters of the EIS, and are summarised in Table 17.1 below.

Table 17.1 Assessment of Potential Effects and Mitigation Measures – CONSTRUCTION PHASE

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
CONSTRUCTION PHASE		
General		
	Every effort will be made to ensure that any detrimental environmental effects will be avoided, prevented or reduced during the construction phase of this project. A construction environmental management plan (CEMP) will be prepared prior to construction commencing. The CEMP will comprise all of the construction mitigation measures, which are set out in this EIS, and any additional measures which are required by the conditions attached to the Board's decision. Implementation of the CEMP will ensure disruption and nuisance are kept to a minimum. The plan will have regard to the guidance contained in the handbook published by Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015). Indaver will appoint a construction management team for the duration of the construction phase. The team will supervise the construction of the project, including monitoring the performance of the contractors to ensure that the proposed construction phase mitigation measures are implemented and that construction impacts and nuisance are minimised. Indaver will liaise with neighbours and the general community during the construction phase to ensure that any disturbance is kept to a minimum.	Negligible No significant impact predicted
L2545 road upgrade		
Traffic impact on road users Closure of Gobby Beach carpark	It is anticipated that the road upgrade, associated road drainage and diversions of services will proceed in advance of the main construction of the Resource Recovery Centre. The road upgrade, associated road drainage and diversions of services will take circa 8 weeks to complete. The diversion to the 220kV underground cables, if required would take circa 4 additional weeks. Of the 12 week duration period, Gobby Beach car park may need to be closed for up to 6 weeks to	Slight Short term effects during construction phase.

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
Diversion of existing services	facilitate the construction works. However, access to the beach will be maintained for the duration of the works. Temporary road will be constructed to facilitate through traffic during the L2545 road upgrade Refer to Services section below	
Site Clearance and Preparation		
Removal of topsoil Raising of the level of the western fields area Bulk excavation and general site re-grading Construction of earth-retaining structures Diversion of existing services including gas main and overhead power line Setting up of site fencing, site office, site facilities, secure storage compound, temporary car parking Importation of equipment	Implementation of CEMP (see above) Some spoil material from the excavation works will be retained, deposited and shaped for bulk fill and with the remainder being sent to a permitted waste facility. All efforts will be made to minimise the quantity of materials to be moved off site. The construction of the proposed development will require considerable movements of materials to and from the site. Most of the materials leaving the site will consist of spoil from the excavation works. It is estimated that almost 74,664m^3 of surplus material will be removed from the site. This material is expected to be suitable for deposition in a permitted site. Almost 30,261m^3 of engineering fill and crushed stone will be imported onto the site. These figures include an allowance for bulking up of material. Uncontaminated soil and stone materials which are not suitable for re-use will be disposed of to an appropriate site which is permitted under the Waste Management (Collection Permit) Regulations 2007 and 2008 to accept soil and stone. There are 13 such permitted sites within a 40km radius of the proposed resource recovery centre site. The environmental impacts associated with the permitted site have already been assessed by the planning authority under the approval process specified in the Waste Management (Collection Permit) Regulations 2007 and 2008. All traffic movements associated with the export of materials have been included in the construction traffic impact assessment. Refer to Chapter 7 (Roads and Traffic) for further details Materials required for the construction works will be sourced locally where possible. Materials required from quarries will only be sourced from quarries which are listed on the register maintained by the local	Moderate Temporary increase in traffic in the vicinity of the site. Change in appearance of site (green fields to earthworks).

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
Excavation of soil and disposal of spoil offsite.	authority. The environmental impacts associated with the registered quarry have already been assessed by the local authority under Section 261 of the Planning and Development Act 2000, as amended. All traffic movements associated with the import of materials have been included in the construction traffic impact assessment. Refer to Chapter 7 (Roads and Traffic) for further details Refer to other relevant sections below	
Health and Safety on site	As required by the Safety, Health and Welfare at Work (Construction) Regulations 2013, a Health and Safety Plan will be prepared which will address health and safety issues from the design stages through to the completion of the construction and maintenance phases. This plan will be reviewed as the development progresses. The contents of the Health and Safety Plan will comply with the requirements of the Regulations. Safety on site will be of paramount importance. During the selection of the contractors and subcontractors, their safety records will be investigated. Only contractors with high safety standards will be selected. Prior to working on site, each individual will receive a full safety briefing and will be provided with all of the safety equipment relevant to the tasks the individual will be required to perform during employment on site. Safety briefings will be held regularly and prior to any onerous or special task. 'Toolbox talks' will be held to ensure all workers are fully aware of the tasks to be undertaken and the parameters required to ensure the task will be successfully and safely completed. All visitors will be required to wear appropriate personal protective equipment prior to going on to the site and will undergo a safety briefing by a member of the site safety team. Regular site safety audits will be carried out throughout the construction programme to ensure that the rules and regulations established for the site are complied with at all times. At any time that a potentially unsafe practice is observed, the site safety manager will have the right as well as the responsibility to halt the work in question, until a safe system of working is again put in place.	Negligible No significant impact predicted

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
Coastal Protection Works		
Impacts on users of Gobby Beach and car park	The placement of the sacrificial beach material (shingle) required for the coastal protection works will take approximately three weeks to complete. It is envisaged that the first instalment of the shingle will be undertaken towards the end of the construction phase. The shingle, required for the coastal protection works will be sourced from a quarry which is listed on the register maintained by the local authority. The environmental impacts associated with the registered quarry have already been assessed by the local authority under Section 261 of the Planning and Development Act 2000, as amended. The registered quarry will have similar geological properties to the material found on Gobby Beach so that the shingle chosen will match the existing material on Gobby Beach All traffic movements associated with the import of the shingle have been included in the construction traffic impact assessment. Refer to Chapter 7, Roads and Traffic of this EIS for further details. To ensure the safety of the general public, it is envisaged that the area of the beach, in which the construction works will take place and the area of the car park in which the materials will be stored, and which will be used by the machinery, will be closed to the public for the duration of the proposed works, approximately three weeks. However, access to the rest of the beach will be maintained for the duration of the works. The impacts experienced for the first instalment of the shingle will be repeated when the shingle is replenished.	Slight Short term during the three week duration of coastal protection works Impacts will be repeated when the shingle is replenished (approximately every 2-5 years)
Generation of Waste		
Construction waste, sewage and domestic type waste	The contractor will be required to develop, implement and maintain a Waste Management Plan during the construction works. A senior manager will be responsible for the waste management plan. The manager will be competent in waste management, and will receive training, where necessary, such as the CIF Site Waste Management and Environmental Awareness course. The key principles underlying the plan will be to minimise waste generation and to segregate waste at source. The measures to achieve these aims include:	Slight Waste not suitable for reuse will use up landfill space.

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
	Ordering of appropriate quantities of materials, with a just-in-time philosophy. Immediate and careful storage of materials delivered to the site. Storing materials which are vulnerable to damage by rain under cover and raised above the ground. Careful handling of materials, using appropriate equipment, to avoid undue damage. Designation of separate storage areas for different types of waste, in order to maximise the reuse and recycling potential of the waste. The Waste Management Plan will outline how residual waste will be handled as follows: The identification of disposal sites. the identification of quantities to be excavated and disposed of and classification of this material, the identification of measures to prevent nuisance, etc. The identification of the amounts intended to be stored temporarily on site and the location of such storage. The contractor's approach to waste management, the names, roles, responsibilities, and authority of the key personnel involved in the waste management. The Waste Management Plan will include documented procedures for dealing with waste management including liaison with third parties, statutory undertakers and other companies. The Waste Management Plan will meet the requirements of the guidelines prepared by the National Construction and Demolition Waste Council (NCDWC), Best Practice Guidelines on the Preparation of Waste Management Plans for Construction & Demolition Projects, NCDWC 2006. Waste generated during the construction phase will be carefully managed according to the accepted waste hierarchy which gives precedence to prevention, minimisation, reuse and recycling over disposal with energy recovery and finally disposal to landfill. All waste removed from the site will be collected only by contractors with valid waste collection permits, under the Waste Management (Collection Permit) Regulations. All facilities to which waste will be taken will have appropriate waste licences or permits, under the Waste Management Act 1996, as amended, and the regulations thereunder, allowing them to accept the type of waste that is to be sent there. Hazardous waste generation will be minimised, and such waste will be recovered where feasible, and only disposed of if recovery is not feasible. Hazardous waste will be managed in accordance with the relevant legislation.	
Site Tidiness		

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
Untidy site	The following are some of the measures that will be taken to ensure that the site and surroundings are maintained to a high standard of cleanliness: Daily inspections will be undertaken to monitor tidiness. A regular program of site tidying will be established to ensure a safe and orderly site. If necessary, scaffolding will have debris netting attached to prevent materials and equipment being scattered by the wind. Food waste will be strictly controlled on all parts of the site. Wheel wash facilities will be provided for vehicles exiting the project site. Wheel wash run off will be stored in an onsite storage tank and will be disposed of by permitted waste haulage company at a permitted or licensed facility. In the unlikely event that mud is carried from the project site to the public road, it will be cleaned as required and will not be allowed to accumulate. Loaded Lorries and skips will be covered if required. Surrounding roads used by trucks for access to and egress from the site will be inspected regularly and cleaned, using an approved mechanical road sweeper, when required. In the event of any fugitive solid waste escaping the site, it will be collected immediately and removed to storage on site, and subsequently disposed of in the normal manner.	Negligible No significant impact predicted.
Visual Impact		
Site establishment will require erection of hoarding and fencing. Removal of land cover and excavation of slopes. Temporary office and welfare facilities. Construction of superstructure.	Limit of construction activity will be adequately fenced-off in order to avoid damage or disturbance to landscape elements outside of minimum area required for such works. Construction works will proceed in a controlled and orderly manner. Site hoardings, cranes, temporary buildings and plant will be removed once construction has been completed.	Slight Short term impacts during construction phase.
Traffic		

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
Increase in traffic due to construction activities in form of HGVs, workforce and general site traffic.	The site start time will ensure that construction workers arrive in the Ringaskiddy area prior to the morning peak hour for traffic on the local network. No construction vehicles will arrive or depart the proposed development site during the morning and evening peak periods (07:00-09:00 and 16:00-18:00) during the construction phase. A Construction Traffic Management Plan will be prepared by the appointed main contractor prior to construction commencing. The Construction Traffic Management Plan will comprise all of the construction traffic mitigation measures which are set out in this EIS and any additional measures which are required by the conditions attached to the Board's decision. The Construction Traffic Management Plan will also include any specific requirements of Cork County Council during the construction phase including any monitoring and reporting requirements. This Plan will be submitted to and agreed with Cork County Council prior to construction commencement. The plan will be regularly reviewed and updated to take into account the changing patterns of both the existing traffic and the construction traffic, following consultation with Cork County Council. The routing of any exceptional loads will require liaison with Cork County Council and the Garda Siochána. During the road upgrade works and the coastal protection works, the traffic management plan will ensure that disruption to local traffic will be minimised. The implementation of this plan will be monitored by the Indaver Site Management team during the course of the project and will also be reviewed at the main site meetings. All parking will be contained within the confines of the proposed site for the construction phase. All trucking movements will occur within the sites and it is expected that no vehicles will queue on the external road network.	Moderate There will be a moderate impact during the construction phase in the 18:00-19:00 evening period. This impact is temporary in nature as it is associated with construction activity at the site
Noise and Vibration		
Principal sources of noise Earthworks plant and equipment. Construction plant and	The construction phase appraisal has indicated that, during the various key activities proposed as part of this development, construction activities can be undertaken within the proposed noise criteria at the nearest sensitive buildings. Construction works will take place outside of normal working hours for up to 8 weeks. During these working hours, construction noise will be limited to the criteria set within Section 10.5.1.1 of this EIS to	Slight/Major Temporary slight to major impacts

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
equipment. Construction traffic. Potential impacts on nearby residences from vibration associated with excavation and piling operations, if required.	avoid any significant impacts to the surrounding environment. During out-of- hours construction periods, or other construction scenarios with high potential for noise and vibration generating activities best practice noise and vibration control measures will be employed by the contractor in order to avoid significant impacts at the nearest sensitive buildings. The best practice measures set out in BS 5228 (2009) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to: selection of quiet plant; noise control at source; screening; liaison with the public, and; monitoring. Details in relation to these mitigation measures is set out in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise and vibration monitoring. <u>Selection of Quiet Plant</u> This practice will relate to static plant, such as compressors and generators. Units will be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative. <u>Noise Control at Source</u> If required, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact. For mobile plant items such as cranes, dump trucks, excavators and loaders, the installation of an acoustic exhaust and or maintaining enclosure panels closed during operation can reduce noise levels by up to 10dB. Mobile plant will be switched off when not in use and not left idling. For piling plant, noise reduction will be achieved by enclosing the driving system in an acoustic shroud, where necessary. For steady continuous noise, such as that generated by diesel engines, it is possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic	

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
	canopy to replace the normal engine cover. For percussive tools such as pneumatic concrete breakers, rock drills and tools a number of noise control measures include fitting muffler or sound reducing equipment to the breaker 'tool' and ensure any leaks in the air lines are sealed. Further reductions in noise levels will be achieved by erecting localised screens around breakers or drill bits when in operation in close proximity to noise sensitive boundaries. For concrete mixers, control measures will be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum For all materials handling, materials will not be dropped from excessive heights. Drops chutes and dump trucks will be lined with resilient materials. For compressors, generators and pumps, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation, where required. All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures. <u>Screening</u> Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. It has been assumed for the purposes of this assessment that a standard construction site hoarding will be erected around the site boundaries. The site hoarding will be constructed of a material with a mass per unit of surface area greater than 7 kg/m2 to provide adequate sound insulation. In addition, careful planning of the site layout will also be considered. Where feasible, site buildings such as offices and stores will be placed between the source and receiver to provide noise screening. <u>Liaison with the Public</u> A designated noise liaison officer will appointed to site during construction works. Any noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In addition, prior to particularly noisy construction activity, e.g. rock breaking, piling, etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.	

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
	Monitoring Prior to the construction works commencing on site, environmental noise and vibration monitors will be installed at the selected monitoring locations. Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2007: Acoustics - Description, measurement and assessment of environmental noise. Vibration monitoring should be conducted in accordance with BS 4866 (2010) Mechanical vibration and shock. Vibration of fixed structures. Guidelines for the measurement of vibrations and evaluation of their effects on structures. Project Programme The construction programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. If piling or rock breaking works are in progress on a site at the same time as other works of construction that themselves may generate significant noise and vibration, the working programme will be phased so as to prevent unacceptable disturbance.	
Air Emissions		
Dust from movements on site in dry windy weather.	A dust minimisation plan will be formulated for the construction phase of the project, as construction activities are likely to generate some dust emissions. In order to ensure that no dust nuisance occurs, a series of measures will be implemented. Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic only apart from the contractor's car park which will be hardcore only. Furthermore, any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions. Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20 kph, and on hard surfaced roads as site management dictates. Vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust. Wheel washing facilities will be provided for vehicle exiting site in order to ensure that mud and other wastes are not tracked onto public roads. Public roads outside the site will be regularly inspected for cleanliness, and cleaned as necessary.	Slight During the construction phase of the project there may be some impact on nearby properties due to dust emissions from the construction site and other activities. However, due to the formulation of an effective dust minimisation plan, it is considered that the residual impact will be slight. No significant impact

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
	Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods. During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions. At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.	predicted
Climate		
Construction vehicles, generators etc., may give rise to CO_2 and N_2O emissions.	As there will be no significant impact on climate, no mitigation measures are proposed.	Negligible No significant impact predicted.
Soils and Geology		
Excavation works below the existing ground level will be required during the construction of the facility Potential impact on soil from leaks or spills from fuel, etc.	Re-use surplus soil, where possible, for site re-grading. Refer to previous section of this table – Site Clearance and Preparation The employment of good construction management practices will serve to minimise the risk of pollution of soil. See also surface water and groundwater section below	Negligible No significant impact predicted.
Surface Water and Groundwater		
Rainwater run off	Protection of water quality	Negligible

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
which could contain silt. Potential impacts on hydrogeology will arise from the re-grading of the site. Alteration of the topography will result in localised alteration of the groundwater table and ground water flow in the immediate vicinity of the re-graded parts of the site. Control of foul sewage.	There are no watercourses on site. Cork Harbour lies adjacent to the eastern boundary of the site. A dedicated holding tank for storage of construction foul effluent will be constructed prior to commencement of the main construction activities. The effluent will be regularly disposed of off-site by tanker by a licensed contractor to an approved licensed facility Storm water will be managed carefully during construction. In general, storm water will be infiltrated to ground via silt traps and managed soakaways. The laydown areas will be suitably drained and any areas which will involve the storage of fuel and refuelling will be paved and bunded and hydrocarbon interceptors will be installed to ensure that no spillages will get into the surface water or groundwater. The employment of good construction management practices will minimise the risk of pollution of soil, storm water run-off, seawater or groundwater. The Construction Industry Research and Information Association (CIRIA) in the UK has issued a guidance note on the control and management of water pollution from construction sites, Control of Water Pollution from Construction Sites, guidance for consultants and contractors (Masters-Williams et al 2001). Additional guidance is provided in the CIRIA technical guidance on Control of Water Pollution from Linear Construction Projects (Murnane et al 2006). Construction mitigation measures are further outlined in Section 5.8 of the EIS. Measures, as recommended in the guidance above, that will be implemented to minimise the risk of spills and contamination of soils and waters, include: Training of site managers, foremen and workforce, including all subcontractors, in pollution risks and preventative measures, Careful consideration will be given to the location of any fuel storage facilities. These will be designed in accordance with guidelines produced by CIRIA, and will be fully bunded. All vehicles and plant will be regularly inspected for fuel, oil and hydraulic fluid leaks. Suitable equipment to deal with spills will be maintained on site. Where feasible, soil excavation will be completed during dry periods and undertaken with excavators and dump trucks. Topsoil and subsoil will not be mixed together. Specific measures will be implemented, as specified by the Invasive Species Management Plan to ensure that Japanese Knotweed is not spread within the site or outside the site boundaries (see further details below). Ensure that all areas where liquids are stored or cleaning is carried out are in a designated impermeable	No significant impact predicted.

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
	area that is isolated from the surrounding area, e.g. by a roll-over bund, raised kerb, ramps or stepped access. Use collection systems to prevent any contaminated drainage entering surface water drains, watercourses or groundwater, or draining onto the land. Minimise the use of cleaning chemicals. Use trigger-operated spray guns, with automatic water-supply cut-off. Use settlement lagoons or suitable absorbent material such as flocculent to remove suspended solids such as mud and silt. Ensure that all staff are trained and follow vehicle cleaning procedures. Post details of the procedures in the work area for easy reference. Best practice, in accordance with relevant codes of practice and guidelines, will be followed to minimise the risk of spreading Japanese knotweed on or off the site (See further details below). The implementation of the above measures will ensure that the risk of pollution of groundwater, soils and surface waters, resulting from the construction activities will be minimised.	
Biodiversity		
Site Clearance, will result in loss of existing vegetation and removal of habitat	The CEMP will comprise all of the construction mitigation measures, which are set out in this EIS and NIS, and any additional measures which are required by the conditions attached to the Board's decision. The principal measures which will be set out in the CEMP are summarised below. <u>Protection of habitats</u> To prevent incidental damage by machinery or by the deposition of spoil during the site clearance stage, any trees /habitats earmarked for retention will be securely fenced early in the construction phase. The fencing will be clearly visible to machine operators. To prevent Japanese Knotweed from outside the site being inadvertently being brought in to the site, the contractor will be required to inspect vehicles before using them on site, and will pay particular attention to caterpillar tracks and where trucks and dumpers are stowed. The supplier of fill will be required to provide a guarantee that the fill to be imported does not contain knotweed. In addition, the fill will be	Moderate negative

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
	inspected for signs of knotweed, prior to importation to site. The UK Environmental Agency's publication Managing Japanese knotweed on development sites - The Knotweed Code of Practice (EA 2013), states that inspection of topsoil brought into the site, should be carried out using the guidance in appendix I-IV of the code BS 3882:2007 'The British Standard Specification for topsoil and requirements for use'. This Standard was replaced subsequently by BS3882:2015 Specification for Topsoil. The inspection of fill will be carried out according to this Standard. (Further details on Japanese Knotweed below) Water quality – see section on surface water and ground water above Air quality – see section on dust emissions above Waste management – see section on construction waste management above	
Control of Invasive Species within the site	A number of mature stands and scattered emerging shoots of Japanese Knotweed were recorded along the western boundary of the site and in the fields adjacent to western boundary. The site layout of the proposed development has been designed not to directly impact on the stand of Japanese knotweed. The method for the elimination of Japanese knotweed on the site will be implemented with reference to the relevant codes of practice and guidelines: Best Practice Management Guidelines – Invasive Species Ireland (Maguire et al. 2008), NRA (2010) and EA (2007) Managing Japanese Knotweed on Development Sites: The Knotweed Code of Practice. As part of the management of the infestation, the site will be resurveyed in the spring of 2016 and treatment (spraying) will commence in the summer of 2016. Following treatment in 2016, a management plan for the control of Japanese knotweed on the site during construction will be developed with reference to the relevant codes of practice and guidelines. There is an adequate lead in time to accommodate a 3 year spraying and monitoring programme for Japanese Knotweed. This eradication/control method is more cost effective and poses less risk of causing further spread of the species than other potential methods where time allows. No impediment to the successful eradication of invasive species from the site has been identified. As mentioned above, a detailed up to date survey for invasive species will be carried out immediately	Negligible No significant impact predicted.

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
	prior to the commencement of the management programme. The mitigation measures outlined below can then be incorporated into a specific non-invasive species management plan based on the most up to date information prior to the commencement of treatment. Any areas of JKW will be identified and marked to within 7m of each individual stand or plant using hazard tape. It is noted that the proposed works will not impact directly on existing stands of this species. In Ireland, spraying of Japanese Knotweed usually proceeds between mid-August and mid-September, however, the exact timing of spraying a particular infestation is site-specific as it is dependent on temperature and growth stage/physiology of the plant. The entire plant canopy will be treated with a systemic (translocated) herbicide via a backpack cowled knapsack sprayer. A treatment dye will be utilised with the herbicide to ensure that all plants are treated. While the upper surface of the leaves will be easier to treat, it is also important to treat the leaf under surface as Japanese Knotweed possesses many stomata openings on the leaf under surface. A second similar treatment is required in the days following this initial treatment. The timing of the second treatment is also dependent on weather and day and night temperatures. The timing of the first and second spray will be determined on site by an experienced invasive species specialist. Appropriate site hygiene protocols should be deployed throughout the process. Elevated work platforms and a telescopic lance should be deployed to ensure that vehicles and equipment will not come into contact with the plants. If machinery and equipment (including footwear) used during this procedure d come into contact with with the plants they will be power washed prior to leaving the site at the designated wash area. The spraying programme will take into account the following: Presence of ecological receptors i.e. native hedgerows and trees within and adjacent to the infestations, bird nesting season, traffic management in relation to management of roadside infestations, future arable crop harvesting and cultivation, presence of other non-native invasive species, roadside vegetation maintenance on the L2545 Ringaskiddy Road and overhead cables along the L2545 Ringaskiddy Road which may cause hinder treatment of roadside infestations and gaining access to the infestation within the scrub vegetation.	

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
Impacts on Badgers	Although badgers have been previously recorded from the site, no active setts were recorded within this area. The sett that was previously located within the study area, but outside the proposed development area, is no longer utilised. As a precautionary measure it is recommended that the site be surveyed for badgers immediately prior to the commencement of site works, so as to confirm the absence of badgers. If badgers are discovered at that time, the mitigation measures outlined in the NRA publication, Guidelines for the Treatment of Badgers Prior to the Construction of a National Road Scheme (NRA, 2006c), should be followed. If necessary, the following measures will be employed for all construction works where badger issues arise. Badger sett tunnel systems can extend up to c. 20m from sett entrances. Therefore, no heavy machinery should be used within 30m of badger setts (unless carried out under licence); lighter machinery (generally wheeled vehicles) should not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance should not take place within 10m of sett entrances. During the breeding season (December to June inclusive), none of the above works should be undertaken within 50m of active setts nor blasting or pile driving within 150m of active setts. Following consultation with the NPWS and badger experts, works closer to any active setts may take place during the breeding season provided appropriate mitigation measures are in place, e.g. sett screening, restricted working hours, etc. All affected badger setts will be clearly marked and the extent of bounds prohibited for vehicles clearly marked by fencing and signage. Bunting is an option on a temporary basis. Hazard tape is inadequate as it is prone to deterioration and damage by wind or cattle etc. All contractors/operators on site should be made fully aware of the procedures pertaining to each sett on site. Construction activities within the vicinity of affected setts may commence once these setts have been evacuated and destroyed under licence from the NPWS. Where affected setts do not require destruction, construction works may commence once recommended alternative mitigation measures to address the badger issues have been complied with. Works close to badger setts or removal of badgers from a site may only be carried out under the supervision of a qualified expert under licence from the NPWS.	Negligible No significant impact predicted.

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
Impacts on bats	No suitable roosting sites are located within the area to be affected. The hedgerows and treelines on external boundaries are of some local value for feeding bats, but do not provide roosting habitat.	Negligible No significant impact predicted.
Impact on Otters	No otter signs or holts were noted within 300m of the proposed development. However, otters do occur within the wider landscape and are common within Cork Harbour. A detailed pre-construction survey will confirm the absence of otter holts within 300m of the proposed development area. Any holts found to be present will be subject to monitoring and mitigation as set out in the NRA Guidelines for the Treatment of Otter prior to the Construction of National Road Schemes (2006b). If found to be inactive, exclusion of holts may be carried out during any season. No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance will also not take place within 15m of such holts, except under licence. The prohibited working area associated with otter holts will be fenced and appropriate signage erected. Where breeding females and cubs are present no evacuation procedures of any kind will be undertaken until after the otters have left the holt, as determined by a specialist ecologist. Breeding may take place at any season, so activity at a holt must be adjudged on a case by case basis. The exclusion process, if required, involves the installation of one-way gates on the entrances to the holt and a monitoring period of 21 days to ensure the otters have left the holt prior to removal.	Negligible No significant impact predicted.
Impact on breeding birds. There will be a net loss of breeding bird habitats within the site	The Wildlife Act 1976, as amended, provides that it is an offence to cut, grub, burn or destroy any vegetation on uncultivated land, or any such growing in any hedge or ditch from the 1st of March to the 31st of August. Exemptions include the clearance of vegetation in the course of road or other construction works or in the development or preparation of sites on which any building or other structure is intended to be provided. Nonetheless, it is recommended that vegetation be removed outside of the breeding season. Retention of the native hedges along the southern boundaries will reduce the loss of breeding and nesting habitat for birds. Some new hedgerow will also be planted along this boundary, a treeline along the northern boundary will be removed, however replacement planting is proposed. NRA guidelines on	Slight Overall, the impact will be low. No significant impact predicted.

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
	the protection of trees and hedges prior to and during construction should be followed (NRA, 2006b). Primarily native species will be utilised for new planting at the site. The development of a more species rich sward on grassland in the southwest of the site will in time provide additional feeding resources for birds.	
Impacts on marine habitats and wintering birds	Coastal protection works will take place outside the main wintering season for birds (October to March). It is anticipated that monitoring of the sacrificial material placed on the beach and of the glacial till face will take place every year. If such material is to be replaced in the future, an ecological survey will be carried out in advance to ensure that ecological conditions have not changed in the intervening period.	Negligible No significant impact predicted.
Archaeological Architectural and Cultural Heritage		
Impact of ground disturbance on any potential archaeological material that may survive below the ground surface. Potential impact of the development on any remaining parts of the 'Martello path'. Impacts on the beach	Areas of the site which will not be disturbed by groundworks will be fenced off during the construction process and no construction works will be undertaken within them. This includes Areas 3 and 4 (Refer to Archaeology chpt for details). In Area 3 along the route of the amenity walkway the path will be built on a no-dig basis. The National Monuments Service assesses the archaeological requirements for each proposed development on a case by case basis generally following a review of the archaeological assessment. The requirement for geophysical survey, archaeological testing and other mitigations are outlined. In this case it is anticipated that a programme of archaeological investigations in advance of construction will be required. This may include geophysical survey and archaeological testing of areas which will be impacted by the development. Notwithstanding additional requirements of the National Monuments Service Indaver propose to undertake a programme of archaeological investigations in agreement with the National Monuments Service, the National Museum of Ireland and the Local Authority on Areas 1 and 2 in advance of development. A programme of geophysical survey will be undertaken in Area 1. The current ground conditions in Area 2 make this ground unsuitable for geophysical survey. A programme of licensed archaeological testing will follow the geophysical survey and will extend across Area 2, in consultation with the above bodies.	Negligible There will be no significant impact on archaeological remains.

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
	The testing will target potential archaeological anomalies highlighted by the geophysical survey in Area 1 and will comprehensively investigate Area 2. Archaeological testing will be carried out in the area of the path from Gobby Beach, shown on the 1st 2nd and 3rd editions of the OS maps, in an attempt to identify its nature and extent. Any archaeological features identified during the programme of archaeological investigations, including the line of the path will be fully resolved to professional standards of archaeological practice. Such material will be preserved in situ or preserved by record, as appropriate, as outlined in Policy and Guidelines on Archaeological Excavation – Department of Arts, Heritage, Gaeltacht and the Islands. The upgrading of the L2545 road will be within the footprint of the existing road and no archaeological mitigation is proposed. To minimise the impact on the beach during coastal protection works, a single access route to the working area at the base of the glacial till slope will be established and fenced off for the duration of the proposed works. This will be archaeologically monitored during the works. Any archaeological features identified during the work will be fully resolved to professional standards of archaeological practise. Such material will be preserved in situ or preserved by record, as appropriate. Archaeological monitoring of the groundworks within the Lough Beg substation will be undertaken to facilitate the electrical connection to and from the site	

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
Human Beings		
Investment of €160 million. 350 (peak) jobs on site and additional jobs off-site.	No controls or mitigation measures required. In addition to the direct employment during the construction phase, there will be substantial off-site employment and economic activity associated with the supply of construction materials and services during the construction phase. Temporary office accommodation and other construction facilities will be installed on site for the construction phase. All temporary units will be of a high standard in accordance with statutory regulations, as a minimum. The co-ordination of people and materials on-site will be one of the key activities throughout the construction phases. The construction traffic management plan will designate traffic routes, timings and parking arrangements.	Moderate Beneficial Employment.
Impact on local residents from construction and from construction traffic.	Construction site fencing. Careful management of site operations. Traffic management -see section above. It will be necessary to work overtime (including at weekends) and night shifts at certain critical stages during the project. Consideration of safety, weather or sub-contractor availability is likely to necessitate working outside normal hours. Over the 31 month construction phase there will be up to 8 weeks of night time working. Heavy or noisy construction activities will be avoided outside normal hours and the amount of work outside normal hours will be strictly controlled Construction materials will be transported from the suppliers via the national primary route network as far as Ringaskiddy village and will use the L2545 from the Village to the site	Slight Short term temporary effects during construction phase.
Use of Natural Resources		
Construction phase will require potable water,	Equipment will be serviced regularly to ensure efficient operation.	Moderate

Source / Scale of Effect	Control and Mitigation	Residual Impacts, Significance Level, Environmental Consequence
power, fuel and materials such as steel and concrete.	Materials will be carefully stored and handled to avoid waste and damage. Water use will be controlled to avoid waste. In liaison with the ESB Networks, a temporary transformer served from local supplies will be installed to provide power during construction. In agreement with Irish Water, water will be sourced from the existing water main located in the L2545 road to the north of the site where there is ample supply to meet this demand. The selection and specification of construction materials will be informed by local availability of these materials. Within the necessary constraints of performance, durability and cost, construction materials will be sourced from local suppliers and manufacturers, where possible.	Resource use will be typical for the type and size of project.
Existing Services		
Diversion of services	The existing services running in and adjacent to the site and the road will be carefully located, identified and suitable working methods will be employed to ensure that these services are protected. Diversion or relocation of services will be undertaken in consultation with the owners of the services and will be undertaken in accordance with the relevant standards and codes of practice. Service users will be notified in advance of any temporary disruption or outages necessitated by the construction works. The disruption to services or outages will be carefully planned so the duration are minimised. Some protection measures such as cover slabs may be used for the services which will be left in place. Pipeline protection slabs will be used for works carried out in the vicinity of the gas transmission line along the L2545, once it has been diverted.	Slight Short term temporary effects during construction phase.

Table 17.2 Assessment of Potential Effects and Mitigation Measures – OPERATIONAL PHASE

Source / Scale of Effect	Control and Mitigation	Environmental Consequence Significance Level
OPERATIONAL PHASE		
Landscape and Visual Impact		
Removal of land cover and excavation of slopes Visual impact of buildings Visual impact from the Martello Tower	Mitigation measures have been included in the design and will be implemented in the development of the project. The primary objectives of the proposed mitigation measures include to reduce visual impact through careful and sensitive design of the built elements and assist the visual integration of the development on the site into the surrounds and reduce landscape impacts with an appropriate scale of planting. The form, height, positioning and cladding of the process building has been carefully chosen to reflect the shape of the existing natural ridgeline, and to sit within it. The narrowest part of the building has been aligned to face and minimise visual impact on views from Ringaskiddy Martello tower. The varying heights of the roof are at minimum heights to house the internal machinery. The cladding materials have been chosen to reflect the existing shades and tones apparent in the area. Darker sections are proposed towards the bottom of the building and lighter sections towards the top, with angled sections of different tones to reflect the angle to the ridge depending on whether the viewer is viewing from the north, south, east or west and what the predominant backdrop from that direction will be. Many shapes, heights and colour ranges were tested using a 3D model and photomontages. The dark green and grey colour palette worked best against the sky and sea and the darker greys, greens, browns and black colours against the landform. The breaking down of the facades and roofline also helped to reduce the overall appearance of scale of the building. The other buildings including the administration, warehouse, electrical substation, aero-condenser, turbine and tanks will be of relatively small scale and will be placed behind the larger buildings or landscaped mounding where possible which will reduce their visual impact significantly. These buildings will be clad in a similar colour and material where they may be visible. Although closer to the road, due to the scale, these buildings will not be as visible as the larger main process building in longer range views. The landscape proposals and mitigation measures are illustrated in Figures 11.38-11.41 of the EIS, along with the more detailed landscape masterplan drawings and sections which form part of the	Moderate / Significant Generally, the residual impacts vary from slight to moderate to significant, depending on proximity to the development, direction of view and the character of intervening topography and vegetation.

Source / Scale of Effect	Control and Mitigation	Environmental Consequence Significance Level
	planning application package (dwg no's. 6124_300-303). These proposals include ground remodelling to fit the larger process building into an excavated area of the slope to help reduce its height and visual mass. This involves retaining walls and reinforced grass slopes to the rear of the buildings around the service yards which will not be visible to the public. The landscape proposals also include screen mounding along the eastern and northern boundaries of the whole site. These will have an immediate screening effect, while vegetation alone will take a few years to establish. The mounding shall predominantly be around 1 in 1.5 to 1 in 2 slopes although the height will vary in places and therefore will be of differing heights dependant on the shape and space available along the boundary at different sections of the site. They are intended not to be uniform in shape and height but to form more natural organic forms which relate to the existing contours of the site. They will in general, form bunds of 1-3m high and will effectively screen many close views. The overall strategy for the landscape planting proposals throughout the site is to utilise and emulate the species that are already present on the site. Retaining as much vegetation as possible and also planting with the same native species as found in the local area will blend the site visually with the surrounding established vegetation particularly when viewed from a distance. The triangular field at the top of the embankment to the south west of the site will provide habitat enhancement, transitioning it from improved agricultural grassland to an area of more diverse natural meadow grassland, as set out in Chapter 13, Soils, Geology, Hydrogeology, Hydrology & Coastal Recession of this EIS. Along the northern boundary, the direction where most views of the site are from, the planting shall be dense mixed deciduous and evergreen planting on the earth mounds, using a range of age and sizes of tree, up to semi mature to provide some instant screening effect. The planting shall have a high percentage of the evergreen species for year round screening in particular pine which is found throughout the area. The mounds will be planted with native woodland and over time as this establishes and grows in height the building will become even less visible. This planting will occur during the first planting season (November – March) after all of the construction works have been completed. The development has been sensitively designed in relation to the Martello Tower protected structure in order to retain its prominence when viewed from around the harbour. The main process building is situated at a distance from the tower and aligned to have its narrowest part face the tower. The	

Source / Scale of Effect	Control and Mitigation	Environmental Consequence Significance Level
	development does not block views of the tower from most viewpoints around the harbour. The building has been set down as far as possible into the ridgeline and appears to be at a similar or lower height than the Martello tower from most viewpoints. The stack does however extend well above the height of the tower although it is set at a distance from it, and the vertical form of the existing wind turbines and electricity pylons rise higher than the tower and are situated directly adjacent to it. The landscape treatment along to the northern boundary of the site from Gobby Beach to Western Fields will create a more 'campus' style landscape reflecting the evolving change of the nearby NMCI, Beaufort, Imerc and Haulbowline campuses. At the entrances to the site larger semi mature species shall be planted for immediate effect. Closer to the buildings, the planting areas will predominantly be used for higher woodland planting rather than grasses or shrub planting to minimise visual effects. To the east of the site, along the coast there is currently an area of dry heathland, with scrub. A native grassland/scrub habitat will be maintained along the proposed public amenity walkway which will travel through the area. Between the footpath and site, a mixture of native scrub and taller oak and pine woodland will be planted to assist in screening close range views of the development from the walkway. The site will require security, wire mesh type fencing which will be coloured matt black and will be set back from the public road and will be located within the planting on the internal slopes of the mounding where possible to reduce the visual impact and retain a vegetated boundary to the public footpath. To the south the site will be fenced and the existing boundary hedgerows supplemented where these have been retained and replanted where there has been disruption due to the construction phase. The lighting effects have been illustrated from particular viewpoints in the three night time photomontages (viewpoints 11.17, 11.25 and 11.36). Relatively low level lighting has been proposed to reduce night time impacts on the wider area while still illuminating the entrances and exits. Reinforced grass slopes will be used where possible instead of concrete retaining walls for environmental, biodiversity and to a lesser degree visual reasons as these are generally required to the rear of the main process building, tanks and pump house where the visual impact will be screened. Similarly, reinforced grass areas will be provided in the 'shutdown yard'. A new bitumen macadam footpath will be constructed to give access from Gobby Beach to the Martello Tower. It is proposed to run along the eastern edge of the site and will be fenced with a low timber fence along the eastern edge. A viewing area will be provided at the higher south east corner of the site	

Source / Scale of Effect	Control and Mitigation	Environmental Consequence Significance Level
	providing expansive views over Cork harbour, Spike Island and Cobh. The footpath will then run along the elevated southern boundary of the site towards the Martello Tower. There will be low additional mounding and planting to the northern edge of the footpath to mitigate any views down into the service yard of the proposed development.	
Traffic		
Increase in traffic	Indaver has prepared a Mobility Management Plan (MMP) for staff employed at the facility, which is intended to reduce the amount of single-occupancy car trips to and from the site. This MMP will be reviewed and revised on an annual basis. The review will comprise the undertaking of staff travel-to-work surveys and the review of targets set in the MMP. In the longer term, this MMP will remain part of company policy in order to ensure that the longer term capacity of the N28 and upgraded M28 are still considered. Indaver has structured staff working hours in order to ensure that arrivals and departures will occur outside of the AM and PM network peak periods. This will ensure that the traffic flows associated with staff movements at the site will occur during hours where there will be sufficient reserve capacity on the local road network to accommodate the projected increase in traffic. Indaver has prepared a HGV Mobility Management Plan to manage HGV arrivals and departures to and from the site. This will optimise the volume of waste delivery HGV traffic travelling to and from the site on the road network over the course of the whole day, allowing for traffic arrivals to be controlled and scheduled during peak periods. This will include the following measures: A dedicated Waste Planner who manages the SAP delivery booking system Control of gate operations at the site entrance, Extended operating hours to allow customers to avoid the morning and evening peak periods on the local road network, A web-text service to disseminate information to customers. The above measures will allow Indaver to control the arrival and departure of HGVs in the 07:00-09:00 and 16:00-18:00 peak periods and reduce HGV trips to and from the resource recovery centre during these times to a minimal level. The number of HGV vehicles that arrive and depart during the peak	Negligible No significant impact predicted. Regardless of whether or not the resource recovery centre proceeds, there are ongoing capacity issues on the local road network at a number of key junctions, particularly at Shannon Park and Shanbally roundabouts. The majority of the issues at these junctions are associated with the morning and evening network peak periods (07:30-08:30 and 16:30-17:30), with the Shannon Park Roundabout also quite busy in the early portion of 18:00-19:00 period (although less so than the two periods mentioned above).

Source / Scale of Effect	Control and Mitigation	Environmental Consequence Significance Level
	periods will be capped at 3 arrivals and 3 departures per hour. All trucking movements will occur within the sites and it is expected that no vehicles will queue on the external road network.	It is likely that the M28 upgrade will significantly improve the operation of Shannon Park and Shanbally roundabouts by removing strategic traffic flows from these junctions
Noise and Vibration		
Noise from process and building services plant	Noise control measures will be employed to ensure compliance with the daytime and night-time residential dwelling noise limits criteria (45dB and 35dB $L_{Ar,T}$ respectively). The inclusion of an acoustic attenuator to the aero condenser structure will be required to meet, as a minimum, the insertion loss values included in Table 10.18 of this EIS. In addition to the measures outlined above, the following forms of noise control techniques will be employed as standard to ensure operational plant noise levels are kept to a minimum: plant will be sited as far away from noise-sensitive locations as is practicable; duct mounted attenuators will be installed on the atmosphere side of all air moving plant; splitter attenuators will be installed providing free ventilation to internal plant areas; anti-vibration mounts will be installed on all reciprocating plant	Negligible No significant impact predicted.
Air Emissions		
Emissions from the process building	A number of measures have been incorporated into the design of the resource recovery centre to ensure that emissions from the plant do not exceed regulatory emission limit values as outlined in Industrial Emissions Directive 2010/75/EU. In addition, the stack height has been designed in an iterative fashion in order to ensure that ambient ground level concentrations are minimised. Air modelling predictions indicate that ambient air quality levels from the proposed facility will be within the ambient air quality standards at all locations beyond the site boundary, based on maximum and abnormal operating conditions. Thus no specific additional mitigation measures are required during the	Negligible No significant impact predicted.

Source / Scale of Effect	Control and Mitigation	Environmental Consequence Significance Level
	operational phase of the facility.	
Climate		
Road traffic will be a source of GHG emissions. The combustion process will be a source of GHG emissions.	The export of 18.5MW will give a direct benefit in terms of GHG emissions which would have been released in the production of 18.5MW from fossil-fuel burning power stations The facility will recover and recycle ferrous and non-ferrous materials during the thermal treatment process. The recycling of these metals will require less energy than processes using virgin inputs and thus lead to a direct saving in energy and thus GHG emissions	Negligible No significant impact predicted. Residual emissions from the operational phase will be 0.07% of Ireland's GHG target for 2020 and thus is not considered to be significant in the context of aggregated national emission sources and the benefits associated with energy recovery and displacement of electricity derived from fossil fuel sources.
Soils, Geology, Hydrology, Hydrogeology and Coastal Recession		
Potential impacts on soils and geology during the operation phase	The potential impacts on soils and geology during the operational phase will be limited to accidental spillage of potentially polluting substances including fuel, oils, paints, incoming wastes, raw materials such as lime, hydrochloric acid, caustic soda or ammonia/urea, activated carbon or clay and residues.	Negligible No significant impact predicted.
Potential impacts on hydrogeology	There will be no direct discharges to groundwater during the operational phase of the proposed development. Due to the creation of roads, yards, hardstanding areas and buildings, infiltration of surface water will be reduced. The potential impacts on hydrogeology during the operational phase will be limited to accidental spillage	Negligible No significant impact predicted.

Source / Scale of Effect	Control and Mitigation	Environmental Consequence Significance Level
	of potentially polluting substances including fuel, oils, paints, incoming wastes, raw materials such as lime, hydrochloric acid, caustic soda or ammonia/urea, activated carbon or clay and residues.	
Impacts on hydrology	There will be no discharges of process effluent from the site to surface water. Potential sources of pollution during the operational phase of the facility would be the accidental spillage or leakage of process materials or wastes, particularly during unloading or loading operations, which could then enter the surface water drainage system. A fire on site during operations could cause water use for fire-fighting to become contaminated, with the potential for this contaminated water to be discharged to the surface water system. Other potential sources of pollution that may have an effect on surface water during the operational phase could be oil/fuel leaks from parked cars, trucks and service vehicles. During operation, all sanitary wastewater will be collected and treated in a standalone wastewater treatment plant that will treat the wastewater to a 20:30 standard, i.e. 20mg/l BOD and 30mg/L SS. The treated domestic process effluent will then be pumped to the Irish Water foul sewer which is located east of Ringaskiddy village. When the Shanbally plant commences operations, the site wastewater treatment plant will be removed, and the untreated sanitary wastewater will be pumped directly to the same Irish Water sewer east of Ringaskiddy village, from which sewage will be pumped to the Lower Harbour wastewater treatment plant.	Negligible No significant impact predicted.
Potential impacts from flooding within the site	The minimum design flood defence level of the proposed development has been calculated as 3.8m OD Malin. Arup however has proposed a far more conservative flood defence level of 4.55m OD Malin for the site. The levels of the low-lying parts of the site will be raised to 4.55m OD. This level will offer a very high standard of flood protection to the site. Refer to Appendix 13.4 (Flood Risk Assessment) for further details. This measure will ensure that the risk of flooding to the site is very remote. The finished floor level of the buildings on the site will be set at even more conservative levels, all above 5mOD.	Negligible No significant impact predicted.
Potential impacts from flooding on the L2545 road	The propose upgrade to the L2545 road will mitigate flooding impacts on the road. Refer to **Chapter 4 *Project Description*** for details.	Negligible No significant impact predicted.

Source / Scale of Effect	Control and Mitigation	Environmental Consequence Significance Level
Potential impacts on the amenity walkway, viewing platform and small section of a diverted gas pipeline outside of the fence line after 40 years.	Coastal protection mitigation measures are not required for the waste-to-energy facility element of the development. However, given the concerns raised by An Bord Pleanála in 2008/2009 and given the low risk that the amenity walkway and viewing platform and a section of the diverted gas pipeline could be impacted in 40 years' time, coastal protection measures to reduce the rate of erosion have been included in this planning application as a precautionary measure so as to reduce the rate of erosion of the glacial till face. It is proposed that the Indaver coastal boundary is monitored on an annual basis. In addition, approximately 1100m3 of sacrificial material (shingle) of appropriate size and shape (rounded) will be placed above the foreshore on Gobby beach along the eastern boundary of the Indaver site. This will be a 'soft' solution which will potentially reduce erosion rates by limiting the exposure of the toe of the glacial till face to wave action. The placing of the sacrificial material, acting as beach nourishment on Gobby Beach above the foreshore, will reduce the rate of recession of the glacial till slope along the eastern site boundary. It is noted that the construction impacts experienced during the placement of the shingle will be repeated when the shingle is reapplied in the future. With the application of the sacrificial material, there will continue to be no impact from coastal erosion on the entire proposed development after 30 years. With the application of the sacrificial material, the diverted gas pipeline will not be impacted after 40 years. The waste-to-energy section of the proposed development will not be impacted by coastal erosion for the entire duration of the planning permission.	There is still low a risk of an impact on small section of the amenity walkway and viewing platform after 40 years. The Cork Harbour Special Protection Area (SPA) is located to the south west of the site therefore the sacrificial material will not impact on the SPA.
Flora and Fauna		
Impacts on marine habitats due to the deposition of the shingle above the foreshore at Gobby	No rare or uncommon species or habitats have been recorded within the area of the proposed coastal protection works and re-colonisation of this area is expected to proceed quickly. The material to be deposited will be similar to the existing material in this area and thus no changes in flora/fauna communities will occur. If any of this material reaches the intertidal zone during storm surges, it will be rapidly re-colonised and will not have a significant impact on marine ecology. It is anticipated that	No significant impact predicted. Negligible.

Source / Scale of Effect	Control and Mitigation	Environmental Consequence Significance Level
beach	monitoring of the sacrificial material placed on the beach and of the glacial till face will take place every year. If such material is to be replaced in the future, an ecological survey will be carried out in advance to ensure that ecological conditions have not changed in the intervening period.	
Impacts on the water quality in the marine habitats from solid or aqueous wastes.	All trucks carrying solid waste will be covered. Aqueous waste will come in tankers. All trucks will have to comply with the road transport legislation and regulations	No significant impacts predicted.
Impacts of accidental spillage of boiler ash and flue gas cleaning residues on the marine habitats during transport and shipping.	The residues will be collected on the site in sealed silos. The silos are emptied into a tanker via a sealed connection. This will ensure there are no fugitive releases on the site. The accident risk during shipping is low. Van Den Bosch are the preferred international logistic services provider which transports such residues for Indaver. They note that in the 51 years of their history no container has ever fallen overboard and no ship has sank with their containers on board. The addition of water leads to the residues solidifying. Thus in event of a shipping accident and if the transport container were to loose integrity, the residues would solidify on contact with water and solidified residues will be salvaged from the sea bed.	No significant impacts predicted. Negligible.
Otters	No significant impacts on water quality in the marine environment or significant impacts on prey availability for otters have been identified. The impacts on air quality from emissions are specifically addressed in Chapter 9 of this EIS which concluded that based on the results of air dispersion modelling of process emissions, the air quality impact of the proposed facility will be insignificant. Therefore no impact on otter via air emissions or subsequently via bioaccumulation of potentially toxic compounds is predicted to occur.	No significant impacts predicted Negligible
Seals	Any impact on seals will be negligible. The impacts on air quality from emissions are specifically addressed in Chapter 9 of this EIS which concluded that based on the results of air dispersion modelling of process emissions, the air quality impact of the proposed facility will be insignificant. Therefore no impact on otter via air emissions or subsequently via bioaccumulation of potentially toxic compounds is predicted to occur.	No significant impact predicted. Negligible.
Cetaceans	No significant impacts on water quality in the marine environment or significant impacts on prey	No significant impact.

Source / Scale of Effect	Control and Mitigation	Environmental Consequence Significance Level
	availability for cetaceans have been identified. The impacts on air quality from emissions are specifically addressed in Chapter 8 of this EIS which concluded that based on the results of air dispersion modelling of process emissions, the air quality impact of the proposed facility will be insignificant. Therefore, no impact on cetaceans via air emissions or subsequently via bioaccumulation of potentially toxic compounds is predicted to occur.	Negligible.
Bats	The overall impact on bats is predicted to be permanent but of low significance. It is proposed to develop a semi-natural grassland habitat within the site boundary which is likely to be of positive value for feeding bats.	No significant impact. Negligible.
Badgers	There is no longer any evidence that the Indaver site is utilised by badgers.	No significant impact. Negligible.
Birds associated with terrestrial habitats	During the operational phase, the levels of activity will stabilise and birds in the surrounding landscape will be expected to habitualise to the volume of activity proposed. The development of a more species rich sward on grassland in the southwest of the site will in time provide additional feeding resources for birds.	No significant impact. Negligible.
Birds associated with marine/shoreline habitats – noise and traffic	During the operational phase, noise, disturbance and traffic levels will increase in the context of an area where there are already moderate levels of background noise and traffic. Any impacts on birds from disturbance due to increased traffic and noise are predicted to be permanent and minor.	
Birds associated with marine/shoreline habitats – air quality	The impacts on air quality from emissions are specifically addressed in Chapter 9 of this EIS which concluded that based on the results of air dispersion modelling of process emissions, the air quality impact of the proposed facility will be insignificant. A literature review, which forms Appendix 3 of the NIS which accompanies this application, looked at the potential for bioaccumulation in piscivorous birds. Based on the information provided in these assessments including the insignificant levels of potentially toxic substances in emissions and the low background levels in marine sediments any direct impact on birds and mammals via direct emissions or from bioaccumulation are predicted to be negligible.	No significant impact. Negligible

Source / Scale of Effect	Control and Mitigation	Environmental Consequence Significance Level
Birds associated with marine/shoreline habitats - collision risk	A literature review was carried out to assess the potential collision risk to birds created by the stack which will be 75m in height. This literature review forms Appendix 4 of the NIS which accompanies this application. The review notes that, information on the potential collision risk created by such stacks is scarce, however, there is evidence to suggest that towers lower than 60m pose a lower risk to migrating birds. The review notes that a recent radar study was commissioned by the Cork Lower Harbour Energy Group in order to identify nocturnal bird movement and interconnectivity within the Cork Harbour SPA (Simms et al. 2011). This study did not reveal any distinct flight patterns over the proposed development site. The literature review indicates that, while any light source has the potential to attract birds and therefore increase collision risk, flashing lights are involved in significantly fewer collisions than continuous lights. There is also some indication that white lights are less attractive than red lights, although the results to date are inconclusive. While bird vision does differ from human vision on the lower UV end of the spectrum, infra-red light is also invisible to birds. Therefore the proposal for a combination of white flashing and infra-red lights on the stack, is the most favourable choice and does not pose a significant collision risk to birds. The top of the stack will be indicated by white strobe (flashing) obstacle warning lights. The lights will be incandescent or of a type visible to Night Vision Equipment. The lights will emit light at the near infra-red (IR) range of the electromagnetic spectrum specifically at or near 850 nanometres (nm) of wavelength. Light intensity to be of similar value to that emitted in the visible spectrum of light. The study indicated that flashing lights are involved in significantly fewer collisions than continuous lights and there is indication that white lights are less attractive than red lights.	No significant risk
Birds associated with marine/shoreline habitats - Increased bird predator activity due to waste	Trucks with organic waste will discharge their loads within a sealed building and that there will no storage of waste in outside spaces. Trucks are inspected on arrival to ensure that there is no waste adhering to wheels. A standard pest control programme will be implemented at the site, which will include the use of standard bait boxes and ongoing monitoring as part of an annual service contract. The stack does not create suitable perches for predatory birds and thus does not increase the predation risk for nesting birds.	Negligible
Biodiversity	It is proposed therefore to enhance the habitat value of an area of improved grassland in the southwest corner of the site, which is approximately 3ha in size. This will be achieved by introducing specialist	Net positive impact

Source / Scale of Effect	Control and Mitigation	Environmental Consequence Significance Level
	grass seed mixes based on the naturally occurring plant species found in this area, the introduction of species such as the parasitic yellow rattle and of key species such as knapweed that are important attractors for butterflies and other invertebrates. A specific, long-term management programme that includes a grazing and/or cutting regime to maintain diversity within the sward will be implemented. Fertiliser applications will be discontinued. In line with the "no net loss" principle of the EU commission guidance on integrating climate change and biodiversity into EIA, the long-term aim will be the establishment of a species rich grassland (i.e. a combination of Dry Meadow and Grassy Verge GS2, Wet Grassland GS4 and Neutral Grassland GS1) as a replacement for grassland areas which have become dominated by scrub. Scrub will be retained within the site to the south west of the Hammond Lane site. Areas of dense bracken within this area will be treated to reduce the dominance of bracken which tends to suppress ground flora. This will also serve to increase biodiversity within the remaining areas of semi-natural habitat which will be retained within the site boundary.	
Archaeological, Architectural and Cultural Heritage		
Visual impact of any structures on the Martello tower.	An assessment of the visual impact of the proposed development on the Martello tower (CO087-053 and RPS No. 00575) is included in Chapter 11 Landscape and Visual, and demonstrated in the photomontages prepared. The visual impact of the proposed development on the Martello tower will be mitigated in the following ways: The waste-to-energy facility will be located in a substantial cut at the eastern end of the site screening much of the development from view. No buildings will be located along the southern site boundary adjacent to the Martello tower and the existing field boundary will be retained. The view from the tower to the north, over Haulbowline Island and the Great Island will be unaffected. The upper portion of the main process buildings and the upper portion of the stack will be visible from the top of the ridge and the Martello tower when looking northeast towards Spike Island. The orientation, massing and colouring of the main process building has been designed and laid out to	Slight No significant impact predicted.

Source / Scale of Effect	Control and Mitigation	Environmental Consequence Significance Level
	reduce the visual impact on the Martello tower. The main process building will be coloured varying shades of natural green to blend with the darker shades of the ridge background and lighter sky shades at the higher levels. The stack will be coloured off white/grey. Periodically, depending on climatic and/or atmospheric factors, including temperature and wind speed, a short, thin steam plume may be visible from the stack. The amenity walkway from Gobby Beach to the southern boundary of the Indaver lands and the associated viewing platform will facilitate public access to the Martello tower. The construction of the path will have a positive impact on the accessibility to the monument by providing a formalised route to it through Indaver owned lands.	
Human Beings		
Economic It is expected that some of the 63 direct jobs, and a number of indirect jobs, will be taken up by people moving to live in the area. There will be a consequent slight increase in demand for community facilities.	No controls or mitigation measures required.	Moderate Beneficial Improvement in local employment.
Health & Safety Impacts	Control measures are proposed as part of the proposed development (Refer to Chapter 4 Description of the Proposed Development of this EIS and Appendix 6.1 HAZID report). The study concluded that, with the control measures in place, the risks posed to human health and the environment by the facility will be as low as reasonably practical. The report of the Hazard Identification and Risk Assessment is provided in Appendix 6.1.	Negligible No significant impact predicted.

Source / Scale of Effect	Control and Mitigation	Environmental Consequence Significance Level
	EHA undertook an assessment of the potential impacts of the Ringaskiddy Resource Recovery Centre on human health, refer to Appendix 6.2. It has been suggested that emissions from incinerators cause various health effects. There have been extensive studies of the potential health effects of incinerators on human health. EHA undertook a literature review of peer-reviewed research papers reporting these studies. The review noted that many of the studies on health effects are of historical incinerators which had much higher emissions than the incinerator proposed as part of the resource recovery centre and predate the various EU Directives which have imposed stringent limits on emissions. The assessment concluded that the evidence is now very strong that well run, modern incinerators have no adverse effect on human health of the communities around them. No adverse human health effects are predicated from the proposed facility. The facility will have no impact on human health with respect to dioxin and furan intake.	
Agriculture, Fishing, Aquaculture	Process control systems	Negligible No significant impact.
Recreational Amenity	A path will be provided on the eastern and southern sides of the site, from the boundary near the shoreline to the boundary close to the Martello Tower.	Moderate/Significant Beneficial
Residential Amenity	Screening and mitigation measures for traffic generated, emissions to the atmosphere, noise, and visual impacts are discussed in this EIS.	Negligible No impact on residential amenity.
Community Gain	Indaver will pay a financial contribution per tonne of waste accepted into the facility to a Community Fund. This will be managed by a Community Liaison Committee for the provision of recreational and community projects in the vicinity of the proposed facility.	Moderate/Significant Beneficial
Use of Natural Resources		
Future increased	The thermal energy generated by burning the waste in the furnaces will be transformed into electricity.	Slight

Source / Scale of Effect	Control and Mitigation	Environmental Consequence Significance Level
consumption of potable water, power, fuel etc	The net electrical output will be approximately 18.5MW which will be exported to the local electrical distribution system.	Increased consumption of energy and water resources.
Less waste going to landfill.	No controls or mitigation measures required.	Significantly beneficial