Limerick WWTP Upgrade and Regional Bioresource Centre

EIAR Chapter 22 - Summary of Mitigation and Monitoring Measures

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Formerly JB Barry Partners who became part of Egis in 2023

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Glossary and Defined Terms

ACRONYM	DESCRIPTION
AA	Appropriate Assessment
AASR	Appropriate Assessment Screening Report
ACP	An Coimisiún Pleanála
AD	Anaerobic Digestion
AGS	Aerobic Granular Sludge
AER	Annual Environmental Report
BOD	Biochemical Oxygen Demand
BC	Bioresource Centre
C	Carbon
CAFÉ	Clean Air for Europe Directive
CHP	Combined Heat and Power
DIN	Dissolved Inorganic Nitrogen
ECJ	European Court of Justice
EIAR	Environmental Impact Assessment Report
ELV	Emission Limit Value
EPA	Environmental Protection Agency
ESB	Electrical Supply Board
EU	European Union
FOG	Fats Oils and Grease
FST	Final Settling Tank
GHG	Greenhouse Gas
HGV	Heavy Goods Vehicle
MLPS	Main Lift Pumping Station
MCA	Multi-Criteria Analysis
MRP	Molybdate Reactive Phosphate
IDA	Industrial Development Agency
IFAS	Integrated Fixed-Film Activated Sludge
N	Nitrogen
NDP	National Development Plan
NHA	National Heritage Area
NIS	Natura Impact Statement
NPF	National Planning Framework
NSO	National Strategic Outcomes
NSS	National Spatial Strategy
NWSMP	National Wastewater Sludge Management Plan
P	Phosphorous

ACRONYM	DESCRIPTION
PE	Population Equivalent - The amount of wastewater received at a treatment plant (and its design capacity) is measured in units known as population equivalent (or PE). The wastewater received from all sources, e.g. industrial, tourism, commercial, residential, etc., is converted into these units, with one unit of PE representing the wastewater treatment load typically generated by a single person.
PFF	Pass Forward Flow
PFT	Picket Fence Thickener
pNHA	Proposed National Heritage Area

ACRONYM	DESCRIPTION
SEA	Strategic Environmental Assessment
SBR	Sequencing Batch Reactor
SHC	Sludge Hub Centre
SIA	Stable Isotope Analysis
SID	Strategic Infrastructure Development
Sludge	Solid by-products of wastewater
SPA	Special Protection Area
SS	Suspended Solids
UWWTD	Urban Wastewater Treatment Directive
WFD	Water Framework Directive
WWDA	Wastewater Discharge Authorisation
WWTP	Wastewater Treatment Plant
WSPS	Water Services Policy Statement
ZTV	Zone of Theoretical Visibility
PS	Pumping Station
QI	Qualifying Interest
RAS	Return Activated Sludge
RBC	Regional Bioresource Centre
RSES	Regional Spatial and Economic Strategy
SAC	Special Area of Conservation
TDS	Total Dry Solids
THP	Thermal Hydrolysis Process

Departments and Stakeholders

ACRONYM	DEPARTMENTS & STAKEHOLDERS
ACP	An Coimisiún Pleanála
DPER	Department of Public Expenditure and Reform
CACNaT	Department of Climate Action, Communication Networks and Transport
DCCAE	Department of Communications, Climate Action and Environment – Changed in 2020
DCHG	Department of Culture, Heritage and the Gaeltacht – Changed in 2020
DoF	Department of Finance
DHPLG	Department of Housing, Planning and Local Government – Changed in 2020
HLGaH	Department of Housing, Local Government and Heritage
EPA	Environmental Protection Agency
GSI	Geological Survey Ireland
GWS	Group Water Schemes
IFI	Inland Fisheries Ireland
IR	Irish Rail (Iarnród Éireann)
UÉ	Uisce Éireann
LCCC	Limerick City & County Council
LA	Local Authority
NMS	National Monuments Service
NPWS	National Parks & Wildlife Service
NRA	National Roads Authority
NTA	National Transport Authority
OPW	Office of Public Works
OSi	Ordnance Survey Ireland
SRA	Southern Regional Assembly

22 SUMMARY OF MITIGATION AND MONITORING MEASURES

22.1 Introduction

The purpose of this Chapter is to collate the mitigation and monitoring measures identified in the Environmental Impact Assessment Report (EIAR) that are considered necessary to protect the environment, prior to the commencement of, and throughout the duration of the Construction and/or Operational Phases of the Limerick WWTP and Regional Bioresource Centre (hereafter referred to as the Proposed Development).

The design of the Proposed Development has evolved through comprehensive design iteration, with particular emphasis on minimising the potential for environmental impacts, where practicable, whilst ensuring the objectives of the Proposed Development are attained. In addition, feedback received from the comprehensive consultation programme undertaken throughout the option selection and design development process has been incorporated, where appropriate. Full details of the Proposed Development can be found in Chapter 3 in Volume 2 of this EIAR.

As described throughout this EIAR, the design of the Proposed Development has been progressed taking account of environmental constraints and considerations that have been identified in assessments. This has enabled the avoidance of potential environmental impacts, wherever possible.

22.2 Mitigation and Monitoring Schedules

Mitigation and monitoring measures have been identified as environmental commitments and overarching requirements which shall avoid, reduce or offset potential impacts.

Mitigation and monitoring measures specified within the EIAR technical assessments are also provided in Chapter 6 to Chapter 21 of this EIAR.

The timing and implementation of the mitigation and monitoring measures are indicated within this Chapter as either during the:

- Construction Phase: The undertaking of physical works to construct elements of the Proposed Development, as outlined in Chapter 3 (The Proposed Development); and
- Operational Phase: When the Proposed Development commences operation, (i.e., any mitigation associated with planned maintenance).

The following tables summarise the Construction and Operational Phase mitigation outlined in the relevant EIAR technical assessments but should be read in conjunction with the mitigation outlined in the specific chapter and also with the Construction Environmental Management Plan (CEMP) in Appendix 4.1 in Volume 4 of this EIAR (note that the CEMP summarises the Construction Phase mitigation only). Where appropriate, the location to which the mitigation relates to is identified and where the mitigation measure is scheme wide the location is given as 'throughout (as required)'.

22.3 General Mitigation Requirements

TABLE 22-1 GENERAL MITIGATION MEASURES

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
GM1	**CEMP Section 6**	The mitigation measures appropriate to the construction - summarised in this Chapter have been included in the Construction Environmental Management Plan (CEMP) and its associated management plans (provided in Appendix 4.1 in Volume 4 of this EIAR).	**Construction**

22.4 Traffic and Transport

TABLE 22-2 TRAFFIC AND TRANSPORT MITIGATION MEASURES

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
TT1	**Section 6.8.1**	• A Preliminary Traffic Management Plan will be drafted by the Project Supervisor Design Process for the works in full consultation with Limerick City and County Council, An Garda Síochána, the Fire Service and the Ambulance service prior to the issuing of tender documents. When the works are awarded to a contractor, the Preliminary Traffic Management Plan will be developed by the Project Supervisor Construction Phase into a Detailed Traffic Management Plan in full consultation with the same stakeholders. All traffic management plans, including working times, will be agreed with and approved by Limerick City and County Council Transportation Department in advance of implementation. • Tracked excavators will be moved to and from the site on low-loaders and will not be permitted to drive on the street pavements. • The appointed contractor is to arrange for staff parking on-site. Contractor's, subcontractor's or supplier's vehicles or staff vehicles, or any vehicles associated with the works are not permitted to park, idle or queue on the public road network. • Set construction traffic routes to and from the site will be agreed with Limerick City and County Council prior to the commencement of construction activities on site. Where necessary, the time of day permittable for such routes will also be agreed upon and outside of the morning/evening peak hours. • During construction, the appointed Contractor should monitor traffic flows and vehicle queue lengths at Junction 3 as part of the Detailed Traffic Management Plan. If deemed necessary following	**Construction**

		monitoring, then mitigation measures (i.e. all construction vehicles (i.e. HGVs) will travel to/from the sites outside the morning peak hour of 08:00-09:00) should be proposed and agreed with the relevant Authorities in order to minimise the traffic impact to public. - To minimize the traffic impact to public, regular deliveries to site will be generally confined to daytime hours but outside of peak traffic hours (i.e. 10am to 4pm). - Good planning and coordination of works will be conducted in order to avoid an overlapping of peak traffic generated from the Limerick WWTP Site and Corcanree Pump Station Site as far as possible. - Wheel washers/ judder bars will be placed at all site access points to minimise the migration of detritus onto the public roads, where appropriate. - Haul vehicles will be covered after loading to ensure there is no risk of construction material falling or to any prevent any nuisance due to dust particles. - Water bowsers will be deployed within the sites during periods of hot weather to damp down potential dust generation from unbound surfaces. - A new temporary haul road between Dock Road East Roundabout and Limerick WWTP Site will be introduced across the lands to the south of Limerick WWTP Site before tying in with the existing road that bounds the site to the west. This will allow current plant operations to continue as normal, particularly the transportation of sludge. - An Application for an Abnormal Load Permit will be made to Limerick City and County Council in advance for any abnormal loads exceeding the thresholds laid out in the Road Traffic (Construction and Use of Vehicles) (S.I. No. 5/2003) Regulations 2003. Where possible abnormal load movements will be restricted to evening or night-time to minimize disruption to local traffic and traffic on strategic routes.	
TT2	**Section 6.8.2**	No mitigation measures are proposed for the operational phase of the Proposed Development	**Operational**

22.5 Odour

TABLE 22-3 ODOUR MITIGATION MEASURES

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
O1	**Section 7.7.1**	• Mitigation and monitoring measures have been identified to avoid, reduce, or offset potential impacts during the Construction Phase of the Proposed Development. • The key mitigation measures focus on integrating the new infrastructure and processes with existing site activities. • Integration activities may generate odour effects and the duration of integration activities should be minimised to minimise the potential for adverse impacts on the surrounding area. • The duration of these integration activities should be kept as short as possible to minimise potential odour effects on the surrounding area. • Although the potential effects have been assessed as Imperceptible to Not Significant, reducing the duration of these activities is still recommended.	**Construction**
O2	**Section 7.7.2**	• Containment of odours at source for the most significant odour sources and treatment in dedicated Odour Control Units (OCU). • Monitoring of OCU performance during a comprehensive Process Proving Phase at commissioning. • Ongoing monitoring of OCU performance at regular intervals throughout the facility's operational life. • Installation of continuous monitors measuring key abatement performance indicators (e.g., H_2S levels in exit gases). • Independent performance checks by an ISO17025-accredited laboratory at quarterly intervals during the first two years of operation. • Verification of the odour emission rates from abatement systems at the facility, which has been determined from the dispersion model to not cause odour nuisance at the site boundary. • Routine operational measurements of odour concentration at abatement system outlets to confirm compliance with design specifications. • Assurance that odour levels remain below nuisance thresholds beyond the site boundary. • Ongoing regulation of the facility by the EPA to ensure continued adherence to best practice operational and management procedures.	**Operational**

22.6 Air Quality

TABLE 22-4 AIR QUALITY MITIGATION MEASURES

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
AQ1	**Section 8.6.1**	**Communications**: • Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. • Display the head or regional office contact information **Site Management**: • Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. • Make the complaints log available to the local authority when asked. • Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook. • Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes. **Monitoring**: • Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This will include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary. • Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked • Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. • Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during earthworks and construction.	**Construction**

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		Preparing and Maintaining the Site: - Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. - Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. - Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period - Avoid site runoff of water or mud. - Keep site fencing, barriers and scaffolding clean using wet methods. - Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. - Cover, seed or fence stockpiles to prevent wind whipping. **Operating vehicle/machinery and sustainable travel**: - Ensure all vehicles switch off engines when stationary – no idling vehicles. - Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable. - Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate) - Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials. - Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing) **Operations:** - Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems - Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate - Use enclosed chutes and conveyors and covered skips. - Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. - Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		Waste Management: - Bonfires and burning of waste materials are legally prohibited. **Measures Specific to Earthworks**: - Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable - Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as is practicable. - Only remove the cover in small areas during work and not all at once. **Measures Specific to Construction**: - Avoid scabbling (roughening of concrete surfaces) if possible. - Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. - Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. - For smaller supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust. **Measures Specific to Trackout**: - Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. - Avoid dry sweeping of large areas. - Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. - Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. - Record all inspections of haul routes and any subsequent action in a site logbook. - Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned. - Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). - Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		• Access gates to be located at least 10 m from receptors where possible.	
AQ2	**Section 8.6.2**	There is no mitigation required for the operational phase of the Proposed Development as impacts to air quality are predicted to be imperceptible	**Operational**

22.7 Climate

TABLE 22-5 CLIMATE MITIGATION MEASURES

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
C1	**Section 9.5.1**	**Embedded design mitigation**: • Stormwater tank installation to reduce the frequency and duration of untreated storm discharges during extreme rainfall events; • Installation of an Aerobic Granular Sludge (AGS) process system will reduce energy demand from the existing AGS process; • Development of Regional Bioresource Centre with Thermal Hydrolysis Process which reduces energy demand required for sludge treatment and reduces biosolids volume whilst increasing biogas production. Biogas can then be used on the site as fuel for the CHP to generate heat and power; • Increased biogas storage capacity to reduce the need for gas flaring; • Incorporation of THP reduces biosolids production and therefore transportation of sludge offsite, relative to the increased capacity of the sites processes. • The biosolids that are produced are Class A and can therefore be reused as fertiliser. This supports a circular economy and lowers demand for the production of synthetic fertilisers.	**Construction**
C2	**Section 9.5.2**	Appointed contractor will be required to minimise construction-related CO_2 emissions through best-practice construction management. Measures will include: • Efficient programming of works, consolidation of deliveries associated with tank construction, optimisation of haul routes, and the use of modern, fuel-efficient plant compliant with current emissions standards. • Where practicable, electrically powered or hybrid equipment will be used in preference to diesel-powered plant, and temporary site power will be sourced from the electricity grid rather than diesel	**Construction**

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		generators, consistent with national objectives to reduce fossil fuel consumption and emissions intensity. - Given that the two tanks (AGS tanks and stormwater storage tank) represent the most material-intensive elements of the scheme, embodied carbon will be reduced where practicable through the specification of optimised concrete mixes, responsible sourcing of steel, and the reuse of excavated materials on site in accordance with the Site Waste Management Plan. - Construction energy use and fuel consumption will be monitored and recorded through the Construction Environmental Management Plan (CEMP), enabling identification of inefficiencies and implementation of corrective actions. - All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction.	
C3	**Section 9.5.3**	- The upgraded Limerick WWTP will achieve a substantial reduction in carbon intensity compared with the existing facility through energy-efficient process selection and the recovery and utilisation of renewable energy on site. - Advanced anaerobic digestion with Thermal Hydrolysis, increased biogas storage, and and expanded combined heat and power generation will reduce reliance on imported grid electricity and fossil fuels, supporting progress towards operational energy self-sufficiency. - Approach aligns with Uisce Éireann's National Wastewater Sludge Management Plan (NWSMP) and national policy commitments on greenhouse gas reduction, renewable energy, and the transition to a low-carbon, climate-resilient wastewater treatment sector.	**Operational**

22.8 Noise and Vibration

TABLE 22-6 NOISE MITIGATION MEASURES

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
NV1	**Section 10.6.1**	- To protect residential amenity, construction activities will be restricted to daytime hours as outlined (except during exceptional circumstances): Monday to Friday: 07:00 hours – 19:00 hours; Saturday: 08:00 hours – 14:00 hours.	**Construction**

		• An on-site speed limit will be enforced for all traffic;
		• Best practicable means will be employed to minimise noise emissions and will comply with the general recommendations of BS 5228;
		• All plant will be maintained in good working order. Where practicable, machines will be operated at low speeds and will be shut down when not in use;
		• Mechanical plant used on site will be fitted with effective exhaust silencers. Vehicle reverse alarms will be silenced appropriately to minimise noise breakout from the site while still maintaining their effectiveness;
		• If required, compressors will be of the "noise reduced" variety and fitted with properly lined and sealed acoustic covers;
		• In all cases, engine and/or machinery covers should be closed whenever the machines or engines are in use;
		• All pneumatic percussive tools will be fitted with mufflers or silencers as recommended by the equipment manufactures. Where practicable all mechanical static plant will be enclosed by acoustic sheds or screens;
		• Employees working on the site will be informed about the requirement to minimise noise and undergo training on the following aspects:
		  ◦ The proper use and maintenance of tools and equipment;
		  ◦ The positioning of machinery on-site to reduce the emission of noise to the noise sensitive receivers;
		  ◦ Avoidance of unnecessary noise when carrying out manual operations and when operating plant and equipment; and
		  ◦ The use and maintenance of sound reduction equipment fitted to power pressure tools and machines.
		• It is recommended that if complaints are received from nearby residential properties, periodic noise monitoring will be undertaken during construction works to determine noise levels at noise sensitive receivers. Based on the findings of such noise monitoring, appropriate additional noise mitigation measures will be implemented to reduce noise impacts. Where excessive noise levels are recorded, further mitigation measures will be employed which may include temporary screening of the nearest receiver to on-site activities;
		• Responsible Person - It is recommended that the Contractor will appoint a responsible and trained person (e.g. Community Liaison Officer) who will be present on site and who will be willing to answer and act upon complaints and queries from the local public; and
		• To protect residential amenity, the cumulative noise level from construction activities on the development site (including plant and equipment) shall not exceed 65 dB LAeq (12 hour) at residential dwellings outside the nearest window of the occupied room closest to the site boundary (SR11).	

NV2	**Section 10.6.2**	• The contractor shall monitor noise to ensure compliance with the site noise limits in accordance with all relevant legislation, including S.I. No. 787/2005 – European Communities (Waste Water Treatment) (Prevention of Odours and Noise) Regulations 2005. • The Contractor shall implement a noise monitoring programme, including selecting noise monitoring points (to be agreed with the Employer's Representative) during preparation of the Operation and Maintenance Plan.	**Operational**

22.9 Archaeology, Architectural and Cultural Heritage

TABLE 22-7 ARCHAEOLOGY, ARCHITECTURAL AND CULTURAL HERITAGE MITIGATION MEASURES

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
AAC1	**Section 11.7.1**	**Archaeological Heritage**: • Archaeological monitoring of all groundworks shall be undertaken by an experienced, licence-eligible archaeologist working under licence from the DHLGH. Test trenching is not feasible as the site is located within historic flood plains, with the potential for archaeological remains to survive deeply stratified in natural sediment accumulations, hence identification during test trenching would be particularly challenging; • Any archaeological features, deposits or artefacts identified during monitoring will require mitigation. Groundworks within that area should be halted and the appropriate authorities informed. The archaeological remains will be preserved *in situ* or by record (excavation) following consultation with the National Monuments Service. Adequate time and resources will be provided by the developer for the resolution of any archaeology identified within the development site that will be directly impacted by groundworks. Time and resources will also be allowed for any post-excavation work and specialist analysis necessary following any archaeological excavation that takes place; • A report is required to be compiled on completion of any archaeological monitoring and excavation and will be submitted to the relevant authorities. **Architectural and Cultural Heritage**: • The subsurface remains of the embankment and any associated features shall be recorded during monitoring.	**Construction**

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
AAC2	**Section 11.7.2**	There will be no mitigation required in relation to archaeological, architectural or cultural heritage during the operational phase.	**Operational**

22.10 Biodiversity Marine

TABLE 22-8 BIODIVERSITY MARINE MITIGATION MEASURES

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
BM1	**Section 12.5.1**	**Sediment Control and Water Quality Protection**: - The CEMP will include all required mitigation measures to prevent sediment-laden runoff and pollution from reaching estuarine-connected surface water drainage pathways. - CEMP will set out detailed procedures for surface-water management, including sediment controls, pollution-prevention measures, and emergency response protocols to ensure risks of sediment or contaminant release are effectively controlled during construction. - Settlement ponds or silt traps will be employed in all areas where surface water runoff may occur. Discharges from construction areas will comply with the Environmental Quality Standards (EQS) for turbidity and suspended solids. Continuous monitoring is not anticipated but may be deployed if risk levels require heightened control. - All excavation groundwater and surface-water runoff will be fully contained and managed, with no uncontrolled discharge to ground, drainage features, or the receiving environment. - Dewatering water will be collected in lined sumps, treated (e.g., via settlement tanks), and must meet a suspended solids limit of <35 mg/L before discharge. - Dewatering infrastructure (sumps, pumps, pipework, tanks) will be inspected weekly and after significant rainfall events, with all inspections recorded. - All construction materials and stockpiles will be stored within designated compound areas and away from site drainage points to prevent sediment or contaminant runoff to adjacent watercourses. - Drainage features will be identified and marked before works begin, with targeted sediment controls (e.g., silt fencing) installed, exposed soils minimised, and protected stockpiles kept within the construction footprint; sediment measures will be inspected weekly and after rainfall, with repairs made promptly. - Materials, stockpiles, plant, and hazardous substances will not be stored in flood-risk areas, and temporary flood-protection and containment measures will be used as needed to prevent uncontrolled releases.	**Construction**

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		Noise and Vibration Management: - Construction will follow standard good-practice noise and vibration controls, including using modern well-maintained plant, avoiding unnecessary idling, installing noise barriers where needed, and adhering to set working hours. - Predicted noise and vibration levels remain well below thresholds at sensitive estuarine receptors, and no underwater noise mitigation is required as no in-water piling, percussion, excavation, or other impulsive noise activities is envisaged. **Pollution Prevention Measures**: - Refuelling, plant maintenance, and fuel/chemical storage will occur only in designated bunded areas at least 10 m from drainage features and outside flood zones, with oils and fuels stored in 110% retention bunded tanks. - No refuelling will occur within 10 m of excavations or drains, and vehicles will not be left unattended during refuelling. - All machinery will use biodegradable hydraulic oils where possible and be subject to daily inspection for leaks. - A Spill Response Plan will be in place, including staff training and spill kits on site. - Cementitious and other hazardous materials will be handled in designated areas with controlled washout procedures to prevent discharge to drainage pathways - The contractor will comply with relevant Control of Substances Hazardous to Health (COSHH) and Safety, Health and Welfare at Work (Chemical Agents Regulations) requirements. **Monitoring and Ecological Supervision**: - Weekly inspections of drainage controls, sediment control measures, dewatering systems, fuel and chemical storage areas, and spill response equipment; - additional inspections following significant rainfall events or where there is an increased risk of sediment mobilisation or pollutant release; and - routine visual checks to confirm that no visible sediment-laden runoff or contamination is entering drainage pathways connected to Ballinacurra Creek or the Shannon Estuary. - Targeted water quality monitoring (e.g. turbidity or suspended solids measurements) will be undertaken where there is a risk of discharge to drainage pathways, including during dewatering activities or where the control measures were compromised. - If monitoring or inspections identify ineffective controls, elevated turbidity, or any pollutant release, corrective actions will be taken immediately, including repairing or replacing controls, adjusting working methods, or temporarily stopping relevant construction activities.	

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		• All inspections, monitoring results, incidents, and corrective actions will be recorded and reported through the project's environmental compliance procedures in line with the CEMP.	
BM2	**Section 12.5.2**	**Compliance with Discharge Quality Standards**: • The WWTP will operate under a valid EPA Wastewater Discharge Licence (WWDL) and must comply with the Urban Waste Water Treatment Regulations (2001) and relevant EU Directives (e.g., Water Framework Directive, Habitats Directive). • Routine effluent monitoring for BOD, COD, TSS, Ammonia, Total Nitrogen, and Phosphorus to ensure compliance with emission limit values (ELVs). • Inclusion of advanced nutrient removal (nitrogen and phosphorus) and sludge treatment via Thermal Hydrolysis Process (THP) to reduce downstream eutrophication risk. • Hydrodynamic and water quality modelling indicating low-magnitude changes in nutrients and BOD, limited to the immediate mixing zone, with no measurable estuary-wide effects. **Outfall Management**: • Continued use of the existing 1.1 km outfall pipe to the Shannon Estuary, with flow balancing and operational adjustments to ensure even effluent distribution and minimise localised water quality effects. • Effluent managed to remain within acceptable salinity thresholds to avoid impacts on oligohaline benthic communities, including intertidal habitats dominated by Tubifex tubifex and Limnodrilus spp. **Ongoing Water Quality Monitoring**: • Routine estuarine water quality monitoring at established sampling locations will continue after the WWTP upgrade, ensuring ongoing assessment of conditions and compliance with relevant standards. • Monitoring results will help detect any unexpected changes in key parameters (e.g., nutrients, dissolved oxygen) so that they can be addressed promptly through the WWTP's operational management framework. **Fish and Marine Mammal Protection**: • A trigger-response protocol will be implemented whereby any exceedance of discharge licence emission limit values (ELVs) for key parameters (e.g. ammoniacal nitrogen, BOD, suspended solids) will result in immediate investigation by the WWTP operator, in accordance with site Environmental Management System procedures. This will include identification of the cause of the exceedance and implementation	**Operational**

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		of appropriate corrective operational measures. Compliance with ELVs will be regulated and enforced by the Environmental Protection Agency (EPA) under the site discharge licence. - In addition, any unexpected deterioration in receiving water quality, as identified through routine monitoring, will prompt review of plant performance and operational controls by the WWTP operator. - In consultation with Inland Fisheries Ireland (IFI), an emergency response procedure will be implemented by the WWTP operator to minimise potential impacts on fish populations in the event of an effluent management failure, including notification procedures and implementation of corrective actions. **Stormwater overflows and operational reliability**: - The new stormwater storage tank and improved treatment efficiency will significantly reduce the frequency and duration of storm overflows, allowing storm flows to be stored, attenuated, and returned to the treatment process after rainfall events. - These measures will reduce the volume of partially treated effluent discharged to the estuary, supporting the protection of receiving water quality during extreme rainfall. **Maintenance and Emergency Response**: - All pumping, treatment, and monitoring equipment will be maintained on a strict preventive maintenance schedule to reduce the risk of leaks or untreated discharges. - A SCADA-based automation and alarms system will provide real-time data to operators and enable rapid shutoff or rerouting in case of process malfunction. - A site-specific Environmental Management Plan (EMP) will outline mitigation and containment strategies for potential spillages, system overloads, or mechanical failures.	

22.11 Biodiversity Terrestrial

TABLE 22-9 BIODIVERSITY TERRESTRIAL MITIGATION MEASURES

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE

BT1	**Section 13.5.1.1**	**Habitat Loss**:
		• Temporary Habitat losses:
		  ◦ Trees to be lost for construction access will be strictly limited to the width required for access (approx. 5m).
		  ◦ After construction, trees will be replanted to restore the habitat and connectivity. Trees will be of native stock and will be species that are already present within the habitat and will comprise semi-mature specimens.
		  ◦ Any trees that are felled to facilitate construction access will be re-used as deadwood for biodiversity enhancement purposes as part of the proposed landscape plan.
		• Permanent Habitat losses:
		  ◦ Meadow management of existing amenity grassland areas in line with All Ireland Pollinator Plan.
		  ◦ Grasscrete in new hardstanding areas where feasible.
		  ◦ Any trees that are felled to facilitate construction access will be re-used as deadwood for biodiversity enhancement purposes as part of the proposed landscape plan.
		  ◦ Installation of 1 or more swift boxes to a building/infrastructure in an appropriate location to be agreed with the Project Ecologist, in line with Bird Watch Ireland guidelines[1].
		  ◦ Installation of kestrel nesting box within the linear woodland edge to the west of Limerick WWTP, given that kestrel were regularly recorded hunting in the area. The nest should be very sturdy and not rock or move. It is vital that the box is not covered or obstructed by branches or leaves in order to achieve a clear flight path. Installation will require a lone standing tree, or if unavailable, a constructed bare pole. The entrance of the nest should face away from prevailing winds and be installed at a height of at least 3 metres.
		  ◦ Installation of 3 no. bat boxes along linear woodland edge to the west of Limerick WWTP, where bat roosting suitability is currently limited. Bat boxes will be of a design that is suitable for installation on trees. It will be ensured that there is no obstruction to flight path for access to the bat box by vegetation. The bat boxes will be installed at least 3m from the ground. The locations will be chosen based on an assessment of proposed external lighting and lux contours and it will
			Construction

[1] *https://birdwatchireland.ie/app/uploads/2019/10/Saving-Swifts-Guide_pdf.pdf*

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		be ensured that they are installed in areas of darkness. This will be decided by a qualified ecologist or the project ECoW.
		
		- Corcanree PS:
		
		  - Meadow management of existing amenity grassland areas in line with All Ireland Pollinator Plan.
		  - New trees proposed around the new storm tank (both linear treeline and tree clusters)
		  - Green roof on top of the storm tank, with planting in line with the All-Ireland Pollinator Plan.
		  - Green walls around the storm tank (i.e ivy walls)
		  - Swift boxes (as many as feasible) to be incorporated onto storm tank.	

	Section 13.5.1.2	**Construction Impacts on Waterbirds**:
		Disturbance:
		- Construction activities will be restricted to daytime hours as outlined:
		
		  - Monday to Friday: 07:00 hours – 19:00 hours;
		  - Saturday: 08:00 hours – 14:00 hours.
		
		- An on-site speed limit will be enforced for all traffic;
		- Noise emissions and will comply with the g recommendations of BS 5228;
		- Machines will be operated at low speeds and will be shut down when not in use;
		- Mechanical plant used on site will be fitted with effective exhaust silencers. Vehicle reverse alarms will be silenced appropriately to minimise noise breakout from the site while still maintaining their effectiveness;
		- Compressors will be of the "noise reduced" variety and fitted with properly lined and sealed acoustic covers;
		- In all cases, engine and/or machinery covers will be closed whenever the machines or engines are in use;
		- All pneumatic percussive tools will be fitted with mufflers or silencers. Mechanical static plant will be enclosed by acoustic sheds or screens;
		- For sheet piling, vibration hammer will be used, with impact hammer used only when vibration hammer is unable to complete the drive due to high ground resistance.
		- Furthermore, for sheet piling, an acoustic screen will be used, enclosing the hammer head and the top of the pile, which will reduce noise by 5 to 10dB (BS5228 2009-2014).	

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE

		• The use of the impact hammer sheet piling method, if needed, will be avoided at Limerick WWTP during the cormorant breeding period 1st March to 30th June.
		• Employees working on the site will be informed about the requirement to minimise noise and undergo training on the following aspects:
		  ◦ The proper use and maintenance of tools and equipment
		  ◦ The positioning of machinery on-site to reduce the emission of noise
		  ◦ Avoidance of unnecessary noise when carrying out manual operations and when operating plant and equipment
		  ◦ The use and maintenance of sound reduction equipment fitted to power pressure tools and machines.
		
		Habitat Degradation
		• Please note that mitigation measures with regard to impacts on water quality thus affecting supporting habitat for waterbirds in the freshwater environment, i.e., the Bunlicky Lake adjacent to Limerick WWTP, are provided in Chapter 16 'Water'. Please note that mitigation measures with regard to impacts on water quality thus affecting supporting habitat for waterbirds in the marine/estuarine environment are provided in Chapter 12 'Biodiversity (Marine)'. With the construction phase mitigation measures in place to prevent impacts on water quality, there is no potential for residual significant effect on waterbirds as a result of habitat degradation within Bunlicky Lake or the Shannon Estuary.	

	Section 13.5.1.3	**Construction Impacts on Other Bird Species**: **Disturbance** • Any requirement for removal of vegetation will be carried out in line with the provisions of the Wildlife Act. Therefore, the necessary removal of trees, and clearance of wet grassland and swamp habitat within the site will not be carried out between 1st of March and 31st of August inclusive, unless a breeding bird survey is carried out by a qualified ecologist 2 weeks before scheduled clearance, and a second survey no more than 48 hours before the felling.	
	Section 13.5.1.4	Construction Impacts on Bats: • Bat Habitat Loss:	

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		- Limited vegetation removal is required for access and new infrastructure, but no significant loss of bat commuting or foraging habitat is expected; overall site connectivity will remain largely intact, and cleared areas will be restored and replanted with native tree species. - The Landscaping Plan will deliver a net gain in linear and commuting habitats for bats, and additional roosting opportunities will be provided through bat boxes installed in the western linear woodland at Limerick WWTP. - Disturbance: - Although no potential roost features (PRF) were found during the dedicated baseline assessments, on a precautionary basis the condition of the trees to be felled will be assessed again in advance of felling, due to the possibility of deterioration of trees and development of PRFs. - If any trees have developed a new Potential Roost Feature (PRF), this will be inspected by a licenced bat ecologist no more than 24 hours in advance of felling. - If roosting bats are detected, the felling of the tree in question will not progress until a derogation is obtained from the NPWS. - The requirement for a pre-commencement survey does not present a lacuna in the survey assessment but is fully in line with best practice guidance. The purpose of the pre-commencement survey will be to assess any changes in the baseline conditions of the site since the time of carrying out the baseline surveys. Should a bat roost be identified during this pre-commencement survey, a bat derogation licence will need to be obtained from NPWS and further mitigation prescribed by a licenced ecologist prior to commencement of works. Further, to prevent any potential barrier effects associated with construction phase lighting spillage onto linear habitats, the following mitigation will also be in place. These measures will also include for construction lighting, if required, along the construction access route to the proposed storm tank area at Corcanree PS. - Work will be completed during daylight hours. However, if lighting is needed for construction during certain periods over winter months, this lighting will be downwards facing with downward lighting accessories used including louvres, baffles or shields. In addition, any required lighting will be directed away from key commuting corridors including the linear woodlands surrounding Limerick WWTP and Corcanree PS. - Construction phase lighting along the proposed construction access route into Corcanree PS in the vicinity of Spillane's Tower will be avoided. If absolutely necessary, it will be ensured that lighting is	

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		installed away from the Tower and underground cavity, and this will be checked and signed off by the project ecologist/ECoW.	
	Section 13.5.1.5	**Construction Impacts on Otter:** • A pre-commencement survey for Otter will be carried out prior to any works commencing. Should Otter holts be recorded within 150m of the proposed works at Limerick WWTP or Corcanree PS, a derogation license will be obtained from NPWS and works carried out in accordance with NRA (2006) *Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes*. The otter survey will be carried out no more than 10 months in advance of commencement. The survey will be supplemented with an additional inspection immediately prior to commencement. The requirement for a pre-commencement survey does not present a lacuna in the survey assessment but is fully in line with best practice guidance. The purpose of the pre-commencement survey will be to assess any changes in the baseline conditions of the site since the time of carrying out the baseline surveys. Should an otter holt be identified during this pre-commencement survey, and if it is deemed that the construction works have the potential to significantly disturb otter, a derogation licence will be obtained from NPWS and further mitigation prescribed by a suitably qualified ecologist prior to commencement of works. Please note that mitigation measures with regard to impacts on water quality thus affecting supporting habitat for otter in the freshwater environment, i.e., the Bunlicky Lake adjacent to Limerick WWTP, are provided in Chapter 16 'Water'. Please note that mitigation measures with regard to impacts on water quality thus affecting supporting habitat for otter in the marine/estuarine environment are provided in Chapter 12 'Biodiversity (Marine)'. With the construction phase mitigation measures in place to prevent impacts on water quality, there is no potential for residual significant effect on otter as a result of habitat degradation within Bunlicky Lake or the Shannon Estuary.	
BT2	**Section 13.5.2.1**	**Operational Impacts on Terrestrial Fauna**: **Faunal Habitat Loss:** With the Landscaping Plan in place, there will be additional habitats created for fauna within the Proposed Development sites, which will include increased potential bat roosting habitat, bird nesting habitat, and wildlife corridors. No potential for significant effect on fauna as a result of habitat loss during the Operational Phase is predicted. • Lighting Impact:	**Operational**

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		Consideration was given to ecological sensitivities on the site in the design of the lighting layout, including peripheral woodland areas with suitability for bat foraging. Therefore, the proposed new lighting layout has been designed with the following mitigations in place, in line with Bat Conservation Trust - Guidance Note 08/18 *Bats and artificial lighting in the UK* and 2022 NPWS guidance (Marnell et al. 2022). **Limerick WWTP:** - All lights will be of maximum warm colour temperature 2700K. - External lights will contain motion sensor systems, therefore, there will be the option for all lights to be off, or dimmed, when not needed. - Light spill onto the vegetation and linear features around the site boundary of Limerick WWTP has been completely avoided for the most part, with small sections kept below a lux level of 1. However, as outlined in the above point, the site will be dark when not in use due to the provision of motion sensor. - Lighting will be directional and will be focused onto roads and infrastructure and away from adjacent habitats. Directional accessories including baffles and cowls will be used. **Proposed New Storm Tank Location at Corcanree PS** The location of an existing lighting column currently operational within the PS provides sufficient lighting coverage for the proposed storm tank. The existing 6m column will be replaced with 2 no. luminaires to cover the interface area between the existing PS and the proposed new storm tank. The following mitigations will be in place: - Luminaries will be of max colour temperature 2700K. - Task lighting only is required, and these will comprise motion sensors with a manual override. The storm tank area will therefore be dark when not in use. - There will be no light spill onto the proposed tree planting to the north of the storm tank, or into the SPA/SAC boundary.	
NIS1	**Section 6.2.1.1.4**	- Mitigations include use of silt fencing to prevent run-off to perimeter drainage ditches, management of excavation dewatering and deep excavations, and management of spoil, concrete and hydrocarbons.	**Construction**
NIS2	**Section 6.2.1.1.4**	**Limerick WWTP:**	**Construction**

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE

		• Dewatering and Surface Water Management:
		
		  ◦ All surface water, construction runoff, and excavation groundwater shall be fully contained and managed in a controlled system. No uncontrolled discharge to ground, drainage channels, or the receiving environment is permitted.
		  ◦ Excavation groundwater and surface water runoff shall be collected in lined sumps and pumped to mobile settlement tanks or equivalent treatment systems to allow suspended solids to settle prior to discharge.
		  ◦ Temporary surface drains and bunds shall be lined to prevent infiltration and interaction with groundwater.
		  ◦ Pumping and treatment systems shall be sized to manage combined excavation groundwater and surface runoff, including rainfall events up to the 1-in-30-year return period intensity, and maintained to prevent overtopping or system failure.
		  ◦ Dewatering shall be undertaken in a controlled manner to manage groundwater drawdown to minimise hydraulic gradients, sediment mobilisation, or instability within the excavation.
		  ◦ Groundwater levels shall be monitored during dewatering using standpipe piezometers (or other suitable methods), to verify that drawdown remains localised to the excavation area and does not adversely affect surrounding soils or structures.
		  ◦ Water quality monitoring of key parameters (e.g. pH, turbidity, and suspended solids) shall be undertaken at the treatment system outlet, with daily visual inspections and routine sampling using calibrated field equipment and standard grab sampling methods, as agreed with the Project Supervisor and ECoW and in accordance with the CEMP and applicable discharge licence conditions.
		  ◦ Final treated water shall meet a Suspended Solids limit of <35 mg/L prior to discharge.
		  ◦ Treated water shall be discharged to the existing WWTP final effluent chamber and subsequently to the Shannon Estuary.
		  ◦ All dewatering infrastructure (sumps, pumps, pipework, tanks) shall be inspected weekly and following significant rainfall events, with records maintained.
		
		Monitoring and Inspection:
		• The Project Supervisor shall inspect containment structures, pumps, and temporary controls weekly. The ECoW will inspect water quality daily and verify compliance using visual assessments and field monitoring equipment. The frequency and scope of monitoring shall be defined in the CEMP and may be adjusted by the ECoW based on monitoring results and site conditions.
		• The ECoW has the authority to suspend pumping immediately if suspended solids limits are exceeded or if any control measure fails, and all inspections, monitoring results (including field	

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE

		measurements and any laboratory analysis), maintenance, and corrective actions shall be fully documented in site environmental records and retained for compliance and audit purposes.
		
		- Drainage Protection and Sediment Control:
		
		  - The contractor shall identify and map all existing drainage features prior to works commencing and protect them with temporary fencing and targeted silt control measures where they interface with construction areas.
		  - Silt fences shall be supported by timber posts and geotextile buried in an 'L' configuration to a minimum depth of 250 mm.
		  - Targeted silt fencing and sediment control measures shall be installed at locations where sediment mobilisation risk is identified during weekly or post-rainfall (>10 mm) inspections. Continuous perimeter fencing is not required due to full containment of surface water and the protected nature of drainage features.
		  - Construction works shall be sequenced to minimise exposed soil, ensuring no disturbed area remains uncovered for more than 7 days. Exposed areas where works are paused or completed shall be stabilised or covered to prevent sediment mobilisation.
		  - Temporary stockpiles shall be located within the active construction footprint, at least 20 m from drainage features, and managed with bunding, covers, or perimeter silt fencing to prevent erosion and runoff into drainage pathways.
		  - Drainage protection and sediment controls shall be inspected weekly by the Project Supervisor, and within 24 hours after rainfall events exceeding 10 mm, with any damaged or ineffective controls repaired or replaced within 48 hours.
		  - Where reasonably possible, bulk earthworks shall be scheduled during drier months (April–September) to reduce sediment generation.
		
		Monitoring & Inspection: The Project Supervisor and ECoW will oversee weekly inspections, review corrective actions, and verify compliance with sediment control measures.
		
		- Pollution and Spill Prevention:
		
		  - Designated bunded areas shall be provided for refuelling, plant maintenance, and fuel/chemical storage, located at least 10 m from drainage features.
		  - Oils and fuels shall be stored in bunded tanks providing 110% retention capacity.
		  - No refuelling shall occur within 10 m of the excavation perimeter or drains, and vehicles must not be left unattended during refuelling.	

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		• Spill kits, absorbent materials, and oil containment booms shall be available on-site, proportionate to the volume of materials stored, with staff trained in their correct use. • Cementitious and hazardous materials shall be handled in designated areas at least 5 m from drainage features or the excavation, with controlled washout procedures to prevent discharge. • An Emergency Spill Response Plan shall be implemented and maintained, including contact details for relevant statutory bodies, and made accessible to all site personnel. • All spill response equipment shall be maintained in fully operational condition at all times. **Monitoring and Inspection**: Project Supervisor shall inspect bunded areas, fuel/chemical storage, and spill kits weekly; ECoW to verify compliance and respond to any spills or breaches of handling protocols. • Piling and Groundwater Controls: • Excavation and piling for the AGS tank shall use low-vibration methods, with no hard rock expected, to minimise disturbance to saturated soils and surrounding groundwater. • Temporary drainage protection measures (silt fences, sediment traps) shall be inspected and maintained to ensure any vibration-mobilised sediments are captured at source. • Inspection and monitoring of drainage features shall be undertaken during piling through regular visual inspections of on-site drains to ensure that any mobilisation of sediments or changes in local groundwater conditions remain localised and controlled, and that no silt-laden runoff enters the drainage network or downstream lake. **Monitoring and Inspection**: Project Supervisor to verify vibration-sensitive areas are protected during piling or heavy compaction; ECoW to monitor ground vibration at sensitive drainage locations and ensure drainage protection measures remain effective.	
NIS3	**Section 6.2.1.1.4**	**Corcanree PS:** • Dewatering and Surface Water Management: • All excavation groundwater and surface water runoff shall be fully contained and managed in a controlled system. No uncontrolled discharge to ground, drainage features, or the receiving environment shall occur. • Groundwater abstracted during excavation shall be collected in lined sumps and pumped to mobile settlement tanks or equivalent treatment systems to remove suspended solids prior to discharge.	**Construction**

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		• Pumping and treatment systems shall be sized at detailed design stage to manage combined groundwater inflows and surface runoff, including rainfall events up to the 1-in-30-year return period intensity, and shall be maintained to prevent overtopping or system failure. • Dewatering shall be undertaken in a staged and controlled manner to manage groundwater drawdown, minimise excessive hydraulic gradients, and reduce the risk of sediment mobilisation or instability within the excavation. • Groundwater levels shall be monitored during dewatering using standpipe piezometers (or other suitable methods), to verify that drawdown remains localised to the excavation area and does not adversely affect surrounding soils or structures. • Water quality monitoring of key parameters (e.g. pH, turbidity, and suspended solids) shall be undertaken at the treatment system outlet, with daily visual inspections and routine sampling using calibrated field equipment and standard grab sampling methods, as agreed with the Project Supervisor and ECoW and in accordance with the CEMP and applicable discharge licence conditions. • Final treated water shall meet a Suspended Solids limit of <35 mg/L prior to discharge. • Treated water shall be discharged to the storm overflow chamber and subsequently to the Shannon Estuary via the existing controlled outfall. • All dewatering infrastructure (sumps, pumps, pipework, tanks) shall be inspected weekly and following significant rainfall events, with records maintained. **Monitoring and Inspection**: All containment structures, sumps, pumps, and temporary controls shall be inspected weekly by the Project Supervisor, with daily water quality checks by the ECoW. The ECoW has the authority to suspend pumping immediately if suspended solids limits are exceeded or if any control measure fails, and all inspections, maintenance, and corrective actions shall be fully documented. • Drainage and Sediment Control: • All existing drainage features, including the OPW drain located approximately 50 m north-west of the excavation area, shall be identified and clearly demarcated prior to commencement of works. • Temporary protective fencing shall be installed along the eastern and northern site boundaries to prevent encroachment, trafficking, or accidental discharge toward the OPW drain. • Localised silt fencing and sediment control measures shall be installed at points where construction activities interface with drainage pathways or where there is a risk of sediment migration. Continuous perimeter buffering is not required given the site layout and flood defence embankments.	

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		• Exposed soils shall be minimised through sequencing of works. Areas not actively under construction shall be stabilised as soon as practicable. • Stockpiles shall be located within the active construction footprint, at least 15 m from any watercourse, and managed to prevent erosion, including bunding, covering, or temporary stabilisation during heavy rainfall. • Sediment control measures shall be inspected weekly by the Project Supervisor, with daily checks by the EcOW in high-risk areas such as near drainage features, steep benches, or stockpiles. Any ineffective controls shall be repaired immediately, and all inspections and corrective actions documented. **Monitoring and Inspection**: All sediment control measures shall be checked weekly by the Project Supervisor, with daily checks by the EcOW for high-risk areas (adjacent to the watercourse, steep benches, or stockpiles). Any damaged or ineffective controls shall be repaired or replaced immediately, and records of inspections, maintenance, and corrective actions maintained. • Pollution Prevention and Spill Management: • Refuelling, plant maintenance, and fuel/chemical storage shall take place within designated bunded areas located at least 10 m from drainage features and outside the mapped flood zone. • Oils and fuels shall be stored in bunded tanks providing 110% retention capacity. • No refuelling shall occur within 10 m of the excavation perimeter or drains, and vehicles must not be left unattended during refuelling. • Spill kits and absorbent materials shall be available on-site at all times, proportionate to the volume of materials stored, with staff trained in their correct use. • Cementitious and hazardous materials shall be handled in designated areas at least 5 m from drainage features or the excavation, with controlled washout procedures to prevent discharge. • An Emergency Spill Response Plan shall be implemented and maintained for the duration of the works, including contact details for relevant statutory bodies. • All spill response equipment shall be maintained in fully operational condition at all times. **Monitoring and Inspection**: The Project Supervisor shall inspect bunded areas, fuel and chemical storage, and spill kits weekly, with the ECoW verifying compliance, ensuring all handling protocols are followed, and responding immediately to any spills or breaches; records of inspections, maintenance, and corrective actions shall be maintained.	

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE

		• Piling and Groundwater Controls:
		
		  ◦ Excavation and sheet pile installation for the storm tank shall use low-vibration methods to minimise disturbance to saturated soils and surrounding groundwater conditions.
		  ◦ Sumps and sediment traps shall be inspected and secured prior to piling works and maintained throughout construction to ensure any mobilised sediment is captured at source.
		
		Monitoring and Inspection: The Project Supervisor shall verify that vibration-sensitive areas and drainage features are protected, with the EcOW conducting inspections and reviewing monitoring data to confirm that drainage controls remain effective; any failures shall be corrected immediately and documented.
		
		• Flood Risk Management:
		
		  ◦ Stockpiles, plant and hazardous materials will be managed and stored in designated areas to minimise the risk of flood-related damage or pollution.
		  ◦ Deployable measures such as portable bunds, sandbags, or silt fencing shall be installed if weather forecasts or river level monitoring indicate potential flooding.
		  ◦ Drains, sumps, and pumping systems shall be maintained to ensure that any incidental water does not cause uncontrolled release or damage.
		
		Monitoring and Inspection: The Project Supervisor shall monitor weather and river levels daily during the construction stage; the ECoW shall review flood mitigation measures where the area is in use. Any observed risk or breaches shall be managed immediately and recorded.	

NIS4	**Section 6.2.2.1.1**	**Disturbance of Fauna:**
		
		• Construction activities will be restricted to daytime hours as outlined:
		
		  ◦ Monday to Friday: 07:00 hours – 19:00 hours;
		  ◦ Saturday: 08:00 hours – 14:00 hours.
		
		• An on-site speed limit will be enforced for all traffic;
		• Noise emissions and will comply with the recommendations of BS 5228;	

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE

		• Machines will be operated at low speeds and will be shut down when not in use;
		• Mechanical plant used on site will be fitted with effective exhaust silencers. Vehicle reverse alarms will be silenced appropriately to minimise noise breakout from the site while still maintaining their effectiveness;
		• Compressors will be of the "noise reduced" variety and fitted with properly lined and sealed acoustic covers;
		• In all cases, engine and/or machinery covers will be closed whenever the machines or engines are in use;
		• All pneumatic percussive tools will be fitted with mufflers or silencers. Mechanical static plant will be enclosed by acoustic sheds or screens;
		• For sheet piling, vibration hammer will be used, with impact hammer used only when vibration hammer is unable to complete the drive due to high ground resistance.
		• Furthermore, for sheet piling, an acoustic screen will be used, enclosing the hammer head and the top of the pile, which will reduce noise by 5 to 10dB (BS5228 2009-2014).
		• The use of the impact hammer sheet piling method, if needed, will be avoided at Limerick WWTP during the cormorant breeding period 1st March to 30th June.
		• Employees working on the site will be informed about the requirement to minimise noise and undergo training on the following aspects:
		  - The proper use and maintenance of tools and equipment
		  - The positioning of machinery on-site to reduce the emission of noise
		  - Avoidance of unnecessary noise when carrying out manual operations and when operating plant and equipment
		  - The use and maintenance of sound reduction equipment fitted to power pressure tools and machines.	

NIS2	**Section 6.2.2.2.1**	**Otter:** • A pre-commencement survey for Otter will be carried out prior to any works commencing. Should Otter holts be recorded within 150m of the proposed works at Limerick WWTP or Corcanree PS and a potential for disturbance identified thereon, a derogation license will be obtained from NPWS and works carried out in accordance with NRA (2006) Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes. The otter survey will be carried out no more than 10 months in advance of commencement. The survey will be supplemented with an additional inspection immediately prior to commencement.	**Construction**

22.12 Land and Soils

TABLE 22-10 LAND AND SOILS MITIGATION MEASURES

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
LS1	**Section 14.6.1**	The mitigation measures for the construction phase are outlined in this section. The proposed construction shall comply with the requirements of statutory bodies (Building Control Amendment Regulations, Health Service Executive inspections, Uisce Eireann and Health Safety Authority (HSA) inspections. Loss or damage of topsoil - Topsoil will be stripped and stored separately from subsoil by the appointed contractor using appropriate methods. Stockpiles will be kept at ≤3m, located away from drainage pathways, and managed to minimise the effects of degradation and erosion. - Stripped topsoil will be reused on site for reinstatement and landscaping purposes, thereby reducing the need for off-site disposal. All topsoil will be appropriately handled, stored and reinstated to maintain its structure and quality. Where practical, the removal of topsoil from the Proposed Development will be avoided. **Construction of Structures:** - During construction of structures, including foundation excavation works, the extent of excavation will be the limited to the structure footprints to minimise disturbance to surrounding soils and subsoils. - Excavation works will be controlled and sequenced to prevent over excavation and unnecessary exposure of founding strata. Where deep excavation is required, temporary or permanent lateral support (sheet piles or cofferdams) will be implemented to maintain ground stability and prevent collapse or lateral movement of soils as outlined in Chapter 4 (Construction Strategy). Soft ground removal will be limited to the minimum depth required to achieve suitable formation levels. - Construction plant and equipment will operate within designated working areas only, with clearly defined haul routes to avoid compaction of adjacent soils outside the construction footprint. - Where dewatering is required, physical cut-off barriers and controlled pumping stations will be used to limit groundwater ingress, avoiding softening of founding strata and all pumped water will be treated prior to discharge. - Excavated materials will be stockpiled in a designated temporary stable areas. A substantial proportion of excavated materials is anticipated to be unsuitable for reuse, requiring off-site disposal as outline in Chapter 17 (Resources and Waste Management), while suitable materials for reuse will be reinstated after the appropriate test are carried. Erosion and sediment control measures will be implemented to prevent mobilisation of fine materials from exposed or stockpiled soils.	**Construction**

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		• An Environmental Clerk of Works will oversee implementation of these measures, supported by regular site inspections. **Pollution from construction activities:** • All fuels, oils and chemicals will be stored in designated bunded areas, located away from drainage pathways and watercourses. • Refuelling and maintenance activities will be undertaken in designated areas equipped with spill kits, and plant will be regularly inspected to prevent leaks. Concrete and cement washout will be contained and managed to prevent discharge to soils or groundwater. • An Environmental Clerk of Works (ECoW) will oversee implementation of all prevention measures, and works will be carried out in accordance with the Construction Environmental Management Plan (CEMP), including emergency spill response procedures. **Piling activities:** • Piling works will be undertaken in accordance with the best practice geotechnical and environmental guidance to minimise disturbance to soils, subsoils and groundwater. Piling works will be undertaken using Continuous Flight Auger (CFA) piling, as outlined in Chapter 4 (Construction Strategy), which is a low-vibration and low-displacement technique suitable for the prevailing soft ground conditions. • To prevent the formation of preferential pathways for groundwater movement; piling will be undertaken using the continuous flight auger method, whereby the auger is continuously drilled to the required depth and concrete is pumped through the hollow of the auger as it is being withdrawn, thereby maintaining support to the surrounding soils and ensuring that the bored holes are not left open. All piling activities will be supervised by suitably qualified personnel to ensure compliance with specifications and protocols. **Dewatering:** • Dewatering works will be controlled and limited in extent and duration to minimise localised groundwater drawdown and associated effects on surrounding soils. Physical cut-off barriers (sheet piles or cofferdams) and controlled pumping system will be implemented to minimise groundwater ingress and softening of founding strata. • All abstracted water will be treated through lined sumps and settlement ponds, along with any other treatment required by the governing bodies before discharge to the Lower River Shannon. Monitoring of water discharge will be completed to ensure compliance.	

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		Groundwater contamination: • Control measures to prevent groundwater contamination will include the implementation of standard construction management and pollution control measures. All fuels, oils and chemicals will be stored in bunded areas, the use of designated refuelling areas with spill kits, and the implementation of spill response procedures. All surface water and dewatering activities will be contained and treated as necessary prior to discharge, and no direct discharge of untreated water to ground will be permitted. • These measures will prevent the infiltration of contaminants into soils and groundwater, thereby minimising the potential for groundwater contamination.	
LS2	**Section 14.6.2**	• The proposed development has been designed to a high engineering and environmental standard, embedding mitigation measures that minimise the potential for impacts on land, soils and geology. • The development includes a high standard surface water management system designed to ensure that surface water is collected, controlled and managed, preventing uncontrolled infiltration and mobilisation of contaminants to soils and subsoils. • With the implementation of the proposed structures design measures, no additional measures for land, soils and geology are considered necessary during for the operation of the Proposed Development. • In the operational phase, the infrastructure will be maintained by Uisce Éireann and will be subjected to their management procedures as well as compliance with EPA standards, to ensure that the correct measures are taken in the event of any accidental spillages. This will reduce the potential for any impacts.	**Operational**

22.13 Landscape and Visual Amenity

TABLE 22-11 LANDSCAPE AND VISUAL AMENITY MITIGATION MEASURES

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
LV1	**Section 15.8**	• Only minimal, localised vegetation removal (up to 5 m width) is required at Limerick WWTP and Corcanree PS for access and construction, with mature boundary vegetation largely retained and protected. • Removed vegetation will be reinstated with native planting, and additional tree and herbaceous planting based on ecologist recommendations will enhance existing habitats.	**Construction**

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		• These measures will reduce long-term visual impacts as new vegetation matures and will improve landscape character along the Upper Shannon Estuary.	

22.14 Water

TABLE 22-12 WATER MITIGATION MEASURES

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
W1	**Section 16.7.1.1**	**Limerick WWTP:** **Dewatering and Surface Water Management**: • All surface water, construction runoff, and excavation groundwater shall be fully contained and managed in a controlled system. No uncontrolled discharge to ground, drainage channels, or the receiving environment is permitted. • Excavation groundwater and surface water runoff shall be collected in lined sumps and pumped to mobile settlement tanks or equivalent treatment systems to allow suspended solids to settle prior to discharge. • Temporary surface drains and bunds shall be lined to prevent infiltration and interaction with groundwater. • Pumping and treatment systems shall be sized to manage combined excavation groundwater and surface runoff, including rainfall events up to the 1-in-30-year return period intensity, and maintained to prevent overtopping or system failure. • Dewatering shall be undertaken in a controlled manner to manage groundwater drawdown to minimise hydraulic gradients, sediment mobilisation, or instability within the excavation. • Groundwater levels shall be monitored during dewatering to verify that drawdown remains localised to the excavation area and does not adversely affect surrounding soils or structures. • Final treated water shall meet a Suspended Solids limit of <35 mg/L prior to discharge. • Water quality monitoring shall be undertaken at the treatment system outlet, with daily visual inspections and routine sampling as agreed. • Treated water shall be discharged to the existing WWTP final effluent chamber and subsequently to the Shannon Estuary.	**Construction**

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		• All dewatering infrastructure (sumps, pumps, pipework, tanks) shall be inspected weekly and following significant rainfall events, with records maintained. • The ECoW has the authority to suspend pumping immediately if suspended solids limits are exceeded or if any control measure fails, and all inspections, maintenance, and corrective actions shall be fully documented. **Drainage Protection and Sediment Control**: • The contractor shall identify and map all existing drainage features prior to works commencing and protect them with temporary fencing and targeted silt control measures where they interface with construction areas. • Silt fences shall be supported by timber posts and geotextile buried in an 'L' configuration to a minimum depth of 250 mm. • Targeted silt fencing and sediment control measures shall be installed at locations where sediment mobilisation risk is identified during weekly or post-rainfall (>10 mm) inspections. Continuous perimeter fencing is not required due to full containment of surface water and the protected nature of drainage features. • Construction works shall be sequenced to minimise exposed soil, ensuring no disturbed area remains uncovered for more than 7 days. Exposed areas where works are paused or completed shall be stabilised or covered to prevent sediment mobilisation. • Temporary stockpiles shall be located within the active construction footprint, at least 20 m from drainage features, and managed with bunding, covers, or perimeter silt fencing to prevent erosion and runoff into drainage pathways. • Drainage protection and sediment controls shall be inspected weekly by the Project Supervisor, and within 24 hours after rainfall events exceeding 10 mm, with any damaged or ineffective controls repaired or replaced within 48 hours. • Where reasonably possible, bulk earthworks shall be scheduled during drier months (April–September) to reduce sediment generation. • The Project Supervisor and ECoW shall oversee all inspections, verify compliance with sediment control measures, and review corrective actions to ensure that drainage features and the receiving water environment remain protected throughout construction. **Pollution Prevention and Spill Management**: • Designated bunded areas shall be provided for refuelling, plant maintenance, and fuel/chemical storage, located at least 10 m from drainage features. • Oils and fuels shall be stored in bunded tanks providing 110% retention capacity.	

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		• No refuelling shall occur within 10 m of the excavation perimeter or drains, and vehicles must not be left unattended during refuelling. • Spill kits, absorbent materials, and oil containment booms shall be available on-site, proportionate to the volume of materials stored, with staff trained in their correct use. • Cementitious and hazardous materials shall be handled in designated areas at least 5 m from drainage features or the excavation, with controlled washout procedures to prevent discharge. • An Emergency Spill Response Plan shall be implemented and maintained, including contact details for relevant statutory bodies, and made accessible to all site personnel. • All spill response equipment shall be maintained in fully operational condition at all times. • Weekly inspections of storage areas, bunds, and spill response equipment shall be undertaken by the Project Supervisor, with verification by the ECoW, and all inspections, maintenance, and corrective actions documented. **Piling and Groundwater Controls:** • Excavation and piling for the AGS tank shall use low-vibration methods, with no hard rock expected, to minimise disturbance to saturated soils and surrounding groundwater. • Temporary drainage protection measures (silt fences, sediment traps) shall be inspected and maintained to ensure any vibration-mobilised sediments are captured at source. • Targeted monitoring of water quality and drainage features shall be undertaken during piling to verify that any mobilisation of sediments, changes in groundwater levels, or temporary hydraulic gradients remain localised and controlled. • Drainage features, sediment controls, and water-sensitive areas shall be inspected by the Project Supervisor, with verification by the EcOW. Any failures or breaches shall be corrected immediately and fully documented.	
W2	**Section 16.7.1.2**	**Corcanree PS:** **Dewatering and Surface Water Management**: • All excavation groundwater and surface water runoff shall be fully contained and managed in a controlled system. No uncontrolled discharge to ground, drainage features, or the receiving environment shall occur. • Groundwater abstracted during excavation shall be collected in lined sumps and pumped to mobile settlement tanks or equivalent treatment systems to remove suspended solids prior to discharge. • Pumping and treatment systems shall be sized at detailed design stage to manage combined groundwater inflows and surface runoff, including rainfall events up to the 1-in-30-year return period intensity, and shall be maintained to prevent overtopping or system failure.	**Construction**

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		• Dewatering shall be undertaken in a staged and controlled manner to manage groundwater drawdown, minimise excessive hydraulic gradients, and reduce the risk of sediment mobilisation or instability within the excavation. • Groundwater levels shall be monitored during dewatering to verify that drawdown remains localised to the excavation area and does not adversely affect surrounding soils or structures. • Final treated water shall meet a Suspended Solids limit of <35 mg/L prior to discharge. • Treated water shall be discharged to the storm overflow chamber and subsequently to the Shannon Estuary via the existing controlled outfall. • Water quality monitoring shall be undertaken at the treatment system outlet, with daily visual inspections and routine sampling as agreed. • All dewatering infrastructure (sumps, pumps, pipework, tanks) shall be inspected weekly and following significant rainfall events, with records maintained. • The ECoW has the authority to suspend pumping immediately if suspended solids limits are exceeded or if any control measure fails, and all inspections, maintenance, and corrective actions shall be fully documented. **Drainage and Sediment Control**: • All existing drainage features, including the OPW drain located approximately 50 m north-west of the excavation area, shall be identified and clearly demarcated prior to commencement of works. • Temporary protective fencing shall be installed along the eastern and northern site boundaries to prevent encroachment, trafficking, or accidental discharge toward the OPW drain. • Localised silt fencing and sediment control measures shall be installed at points where construction activities interface with drainage pathways or where there is a risk of sediment migration. Continuous perimeter buffering is not required given the site layout and flood defence embankments. • Exposed soils shall be minimised through sequencing of works. Areas not actively under construction shall be stabilised as soon as practicable. • Stockpiles shall be located within the active construction footprint, at least 15 m from any watercourse, and managed to prevent erosion, including bunding, covering, or temporary stabilisation during heavy rainfall. • Sediment control measures shall be inspected weekly by the Project Supervisor, with daily checks by the ECoW in high-risk areas such as near drainage features, steep benches, or stockpiles. Any ineffective controls shall be repaired immediately, and all inspections and corrective actions documented. **Pollution Prevention and Spill Management**: • Refuelling, plant maintenance, and fuel/chemical storage shall take place within designated bunded areas located at least 10 m from drainage features and outside the mapped flood zone.	

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		• Oils and fuels shall be stored in bunded tanks providing 110% retention capacity. • No refuelling shall occur within 10 m of the excavation perimeter or drains, and vehicles must not be left unattended during refuelling. • Spill kits and absorbent materials shall be available on-site at all times, proportionate to the volume of materials stored, with staff trained in their correct use. • Cementitious and hazardous materials shall be handled in designated areas at least 5 m from drainage features or the excavation, with controlled washout procedures to prevent discharge. • An Emergency Spill Response Plan shall be implemented and maintained for the duration of the works, including contact details for relevant statutory bodies. • All spill response equipment shall be maintained in fully operational condition at all times. • Weekly inspections of storage areas, bunds, and spill response equipment shall be undertaken, with verification by the ECoW, and all records of inspections, maintenance, and corrective actions shall be documented. **Piling and Groundwater Controls**: • Excavation and sheet pile installation for the storm tank shall use low-vibration methods to minimise disturbance to saturated soils and surrounding groundwater conditions. • Sumps and sediment traps shall be inspected and secured prior to piling works and maintained throughout construction to ensure any mobilised sediment is captured at source. • Targeted monitoring of water quality and drainage features shall be undertaken during piling to verify that any mobilisation of sediments or changes in groundwater conditions remain temporary and localised. • Drainage features, sediment controls, and water-sensitive areas shall be inspected by the Project Supervisor, with verification by the ECoW. Any failures or breaches shall be corrected immediately and fully documented. **Flood Risk Management**: • Stockpiles, plant and hazardous materials will be managed and stored in designated areas to minimise the risk of flood-related damage or pollution. • Deployable measures such as portable bunds, sandbags, or silt fencing shall be installed if weather forecasts or river level monitoring indicate potential flooding. • Drains, sumps, and pumping systems shall be maintained to ensure that any incidental water does not cause uncontrolled release or damage.	

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		• Flood risk mitigation shall be inspected daily by the Project Supervisor, with review and verification by the ECoW where the area is in use. Any observed risk, breach, or failure shall be addressed immediately, and all actions recorded.	
W3	**Section 16.7.2**	During operation, the Limerick WWTP and Corcanree PS will implement measures to maintain water quality and protect Bunlicky Lake, Ballinacurra Creek, and the Shannon Estuary. Key measures include: • Wastewater treatment and discharge: Ensure all treated effluent meets licence requirements, maintain storm tanks and pumps, and monitor effluent quality. • Stormwater management: The new stormwater storage tank at Corcanree PS will increase storage capacity, reducing the risk of untreated storm spills to the Shannon Estuary. This brings the agglomeration into compliance with relevant legislation. • Surface water and drainage management: Inspect and maintain all drainage systems, including perimeter drains and temporary attenuation features. Implement Sustainable Drainage Systems (SuDS) measures where practicable to manage runoff. Maintain sediment controls, manage vegetation, and control runoff from hardstanding areas. • Groundwater and flood management: At Limerick WWTP, the FRA confirms flooding does not extend within the site. At Corcanree PS, the stormwater tank will be submerged (~10–15 m), with the top wall of the tank set at a minimum of 5.10 mOD to prevent flood water ingress, including allowances for climate change and freeboard. • Pollution prevention and spill control: Store chemicals and fuels in bunded areas, maintain spill kits, and provide staff training in spill response. • Sediment and erosion control: Stabilise exposed soils and stockpiles and maintain access routes to minimise sediment transport. • Monitoring and reporting: Conduct routine water-quality monitoring, maintain operational logs, and report to regulatory authorities. • Training and procedures: Provide environmental training, maintain Standard Operating Procedures (SOPs), and update practices based on monitoring and regulatory requirements.	**Operational**

22.15 Resource and Waste Management

TABLE 22-13 RESOURCE AND WASTE MANAGEMENT MITIGATION MEASURES

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
RWM1	Section 17.7.1	**Waste Prevention and Material Management**: • The Contractor will minimise waste generation and disposal insofar as reasonably practicable, with priority given to prevention and reuse in accordance with the waste hierarchy. • Opportunities for reuse of materials, by-products and wastes will be identified and implemented throughout the construction phase. • Excavated materials will be managed to maximise on-site reuse, including balancing cut and fill and reusing suitable materials for backfilling, drainage layers, landscaping and site levelling, subject to appropriate testing. • Where the off-site reuse or recovery of soil and stone is proposed, an Article 27 by-product notification will be prepared and submitted to the EPA, as required. Notifications will be submitted in advance of excavation works, allowing sufficient time for regulatory approval and coordination with receiving sites. • 'Just-in-time' delivery of materials will be implemented, where practicable, to minimise material wastage. • The Contractor will engage with supply chain partners to minimise packaging and promote reuse of packaging materials where feasible. **Segregation, Reuse and Recycling**: • Where reuse on-site is not feasible, materials (including excavation materials) will be prioritised for recovery or recycling over disposal. • Waste materials such as metals, timber, glass and packaging will be segregated at source and stored in clearly labelled containers (including use of colour coding and signage) to maximise recycling rates and material quality. • Suitable materials from site clearance and existing infrastructure (e.g. stone, concrete, paving materials and vegetation) will be reused on-site where practicable. • Materials that cannot be reused on-site (e.g. asphalt or tarmac) will be sent to appropriately authorised facilities for recovery or recycling. **Waste Handling, Storage and Transport**: • All waste materials will be stored in designated areas on-site prior to removal. • Hazardous wastes (e.g. waste oils and fuels) will be stored in secure, bunded areas prior to collection.	Construction

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		• Waste will be transported by authorised waste collectors in accordance with the Waste Management (Collection Permit) Regulations, 2007, as amended. • Waste will be delivered to appropriately authorised waste facilities in accordance with the Waste Management Acts 1996–2022, as amended. • Any off-site interim storage or recovery of excavated materials will only take place at facilities holding the appropriate waste authorisations. **Waste Recording and Monitoring**: • The Contractor will maintain records of the types and quantities (in tonnes) of waste and materials generated and removed from site. • Records will include details of the destination facilities, including their name, address and authorisation status, and will identify whether materials are recovered or disposed.	
RWM2	**17.7.2**	The export of Class A biosolids and the management of biogas and energy production during operation will be undertaken by the appointed operator in accordance with Uisce Éireann procedures, EPA guidance and all applicable regulatory requirements. The facility will operate under an EPA Wastewater Discharge Licence, which sets out conditions relating to environmental performance, monitoring and reporting. • Proper Waste Handling and Disposal by Contractors: All operational waste, including screenings, grit, residual maintenance waste and biosolids, will be managed by permitted waste contractors holding valid NWCPO Waste Collection Permits and delivering to authorised EPA-licensed facilities. Contractors will be required to provide waste documentation (e.g., waste transfer forms, certificates of acceptance, and treatment records) to demonstrate full compliance with statutory requirements. • Staff Training and Awareness: Operational staff will receive training on correct waste segregation, handling, labelling and storage procedures. Training will cover the Waste Management (Collection Permit) Regulations, Uisce Éireann procedures, emergency response actions, and site-specific environmental controls. Refresher training will be provided periodically, and induction training will be mandatory for all new site personnel. • Compliance with Guidelines and Procedures: Waste management activities will comply with Uisce Éireann operational procedures, EPA guidance (including biosolids reuse requirements), and the waste hierarchy. Sludge/biosolids will be handled and exported in accordance with the National Wastewater Sludge Management Plan, ensuring appropriate stabilisation (e.g., lime treatment) prior to agricultural reuse. All storage areas, waste containers and transfer points will be managed to prevent odour, spills, contamination, or environmental nuisance.	**Operational**

22.16 Material Assets

TABLE 22-14 MATERIAL ASSETS MITIGATION MEASURES

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
MA1	**Section 18.6.1**	• The Proposed Development is designed to avoid interactions with existing utility infrastructure, with most works carried out offline; where proximity cannot be avoided, standard protection measures and established construction practices will be applied. • Before works commence, the Contractor will obtain up-to-date utility records, consult relevant service providers, and complete confirmatory surveys to verify utility locations. • Works near utilities will follow best-practice methodologies and service-provider requirements, including signage and service marking, safe-digging techniques, and use of exclusion zones where necessary. • Localised works near infrastructure will be planned and coordinated to prevent damage and minimise disruption, with any required service interruptions kept short and pre-arranged with site and utility operators.	**Construction**
MA2	**Section 18.6.2**	No specific mitigation measures are required during the Operational Phase, as impacts on material assets are minimal.	**Operational**

22.17 Population and Human Health

TABLE 22-15 HUMAN HEALTH AND POPULATION MITIGATION MEASURES

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
PHH1	**Section 19.5.1**	• Dust mitigation measures from Chapter 8 will be implemented and have been incorporated into the CEMP (Appendix 4.1). • A preliminary Traffic Management Plan will be prepared with Limerick Council to manage vehicle, pedestrian and cyclist movements, including road closures, diversions, signage and manned hazard points. • Construction traffic will use only the eastern section of Dock Road; abnormal loads will be scheduled off-peak; no staff parking will be allowed on public roads; wheel washers, water bowsers and controls on tracked vehicles will prevent dust and debris on roads.	**Construction**

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
		• Construction noise mitigation from Chapter 10 will follow best practice, including monitoring, restricted hours for high-noise works, traffic speed limits, stakeholder communication, staff training and careful plant selection and placement. • Chapter 13 notes existing vegetation will be retained at Limerick WWTP; limited vegetation removal at Corcanree PS will be offset with new screening planting; temporary hoardings will be installed at both sites. • Chapter 16 notes construction will be managed under the CEMP, including measures for runoff control, dewatering, sediment management and spill prevention to protect water quality and human health. • Monitoring measures outlined in Sections 6–16 and 18 will be implemented throughout construction to identify and address any issues.	
PHH2	**Section 19.5.2**	• The operational phase is not expected to cause significant negative impacts on population or human health and is anticipated to provide positive community benefits; therefore, no specific mitigation measures are required. • A Risk Management Plan and maintenance programme will be updated and implemented to ensure effective response to Major Accidents and Natural Disasters (MANDs). (Refer Chapter 20) • A noise monitoring programme will be carried out to ensure compliance with relevant noise limits and legislation (Refer to Chapter 10). • Measures will be implemented to maintain water quality including monitoring effluent quality, managing stormwater efficiently, inspecting and maintaining drainage systems, flood risk management, chemical management, routine monitoring and training (Refer to Chapter 16). • Continuous odour monitors will be installed and the performance of the Odour Control Units will be monitored regularly. Independent performance checks will be carried out by an ISO17025 accredited testing laboratory at quarterly intervals during the first two years of operation to verify the effectiveness of control measures and ongoing compliance with the required performance standards (Refer to Chapter 7).	**Operational**

22.18 Major Accidents and Disasters

TABLE 22-16 MAJOR ACCIDENT AND DISASTER MITIGATION MEASURES

MITIGATION NUMBER	EIAR SECTION REFERENCE	DESCRIPTION OF MITIGATION OR MONITORING MEASURE / ENVIRONMENTAL COMMITMENT	IMPLEMENTATION STAGE
MAD1	**Section 18.5.2**	• A CEMP has been prepared to be implemented during the Construction Phase of the Proposed Development. • A Construction Resource and Waste Management Plan (CRWMP) will be prepared by the appointed contractor to ensure all construction and demolition waste is managed in full compliance with the Waste Management Act 1996 (as amended). • A Construction Traffic Management Plan will be developed in consultation with the local authority and emergency services, then finalised by the contractor and kept as a live document to safely manage construction traffic, control vehicle movements and minimise accident risks throughout the works. • An Invasive Species Management Plan will be prepared and further developed by the contractor, with input from a qualified ecologist, to manage and prevent the spread of non-native invasive plant species identified within and near the Proposed Development boundary. • A Surface Water Management Plan will be developed by the contractor as part of the CEMP to set out sediment, erosion and pollution control measures and ensure effective management of surface water impacts during construction. • An Environmental Incident Response Plan will be prepared by the contractor as part of the CEMP to ensure prompt and effective response to incidents, outlining procedures for managing sediment releases, chemical or fuel spillages, permit non-compliance and other pollution risks, with ongoing monitoring to ensure that major accident and disaster risks do not increase over time.	**Construction**
MAD2	**Section 18.5.3**	• The Proposed Development will be designed in line with best international practice, ensuring that mitigation against the risk of MANDs is incorporated directly into the design. • The on-site Risk Management Plan will be updated and implemented in accordance with European Commission guidance to ensure effective response to MAND, including appropriate preparedness and emergency planning measures. • The site maintenance programme will be updated and implemented to meet the requirements of the Wastewater Discharge Authorisation Regulations (2007–2016), ensuring all critical equipment operates correctly and reducing the risk of MANDs on-site. • Uisce Éireann and the site operator will continuously monitor MAND risks during operation at all relevant sites. • The maintenance programme, records of reported incidents and general site activities will be reviewed on an ongoing basis to ensure that MAND risk does not increase over time.	**Operational**

22.19 Residual Effects Summary

Considering all the mitigation measures suggested have been put in place, it is concluded that there will not be significant residual effect(s) during the construction and operation of the Proposed Development.

22.20 References

EPA 2022. Guidelines on the information to be contained in the Environmental Impact Assessment Reports

European Commission 2017. Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment of Projects

Ireland

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