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INTRODUCTION

- 16.1 This Chapter of the Environmental Impact Assessment Report (EIAR) provides a summary of mitigation and monitoring commitments in respect of the proposed materials recovery / recycling facility and inert landfill at Ballinclare Quarry as set out in the preceding technical chapters, as is recommended by Section 3.8.4 of the Environmental Protection Agency (EPA) Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022).

MITIGATION MEASURES

Inherent and ‘Designed-In’ Mitigation Measures

- 16.2 The application site, by its nature, offers a number of advantages in terms of natural mitigation. The proposed development maximises the potential of an existing established quarry, which is no longer operational. The final completed landform will substantially re-establish the former landform that existed at the application site prior to commencement of historical quarrying activities.
- 16.3 The proposals incorporate extensive biodiversity enhancement measures and advances in soil washing technologies as core features of the design to ensure minimum impact and maximum potential for environmental enhancement. The proposed restoration of the landfill facility and C&D working areas to a native woodland habitat will ultimately result in the full integration of the site into existing views and the local landscape character, as well as having many biodiversity benefits
- 16.4 The application site is located in an area of naturally low visibility, with almost all views into the existing quarry screened by roadside and intervening vegetation. The proposed backfilling / landfilling activities and progressive planting and restoration works within the application site will remediate any existing visual impacts over time.
- 16.5 Dust blows at the landfill area will also be partially screened by existing quarry faces as landfilling activities progress upwards in the former quarry void. Some additional screening will also be provided by perimeter screening berms.
- 16.6 The operation of the proposed facility includes inherent mitigation measures with respect to noise, including:
- working below and behind former quarry faces for much of the working life of the proposed landfill development;
 - retaining existing boundary screening berms and boundary hedgerows to provide some additional acoustic screening; and
 - undertaking C&D waste processing activities within the confines of the proposed recovery shed at the C&D waste recovery area.
- 16.7 There will be a voice and camera link between HGV drivers and staff based at the weighbridge office. CCTV cameras will be installed around the weighbridge and will provide a live feed to screens at the weighbridge office to facilitate visual inspection of all soil / C&D materials being imported for landfilling, recovery/ recycling and processing activities at the proposed facility.

Legislation and Best Practice Mitigation Measures

- 16.8 The facility will be operated in accordance with all relevant legislation and published guidance on industry best practice which is implemented and followed at all Kilsaran's established operations.
- 16.9 For example, operations at the site will adhere to the Health and Safety Authority Safe Quarry Guidelines in relation to the Safety Health and Welfare at Work (Quarries) Regulations 2008 and this will limit the potential for unplanned events such as instability of quarry / backfilled / stockpile slopes or instability in adjacent lands.
- 16.10 Current best practice guidance includes, but is not limited to the following:
- EPA Landfill Manual - Guidance Note of Landfill Operational Practices (1997);
 - EPA Environmental Management Guidelines (2006): Environmental Management in the Extractive Industry (Non-Scheduled Minerals); and
 - DoEHLG (Department of the Environment, Heritage and Local Government) April 2004: Quarries and Ancillary Activities Guidelines for Planning Authorities.
- 16.11 Operations at the facility will be subject to strict licencing requirements from the EPA, and will be subject to regular monitoring, testing and reporting, the results of which will be publicly available on the EPA's website.

Specific Mitigation Measures

- 16.12 **Table 16-1** below sets out the specific mitigation measures that are proposed to be implemented as part of the proposed development.

Table 16-1
Schedule of Site-Specific Mitigation Measures to be Implemented

Mitigation Measure Proposed		Timeframe
General	Kilsaran will establish an environmental management programme to monitor and manage emissions from the proposed materials recovery / recycling facility and inert landfill at Ballinclare Quarry.	Throughout all activities of the applicant
Population and Human Health - General	The main potential for disturbance to the local population and human health is through the potential for environmental emissions associated with the topic areas that are assessed within other chapters of the EIAR, therefore the mitigation measures proposed in relation to those media are deemed appropriate to address population and human health issues.	Throughout development
Population and Human Health - Radon	Radon testing can be undertaken at on-site structures and, should elevated radon gas levels be detected, remedial measures such as enhanced ventilation or installation of a radon sump can be implemented by agreement with an EPA registered radon tester.	Following construction
Biodiversity - EcoW	A suitably qualified Ecological Clerk of Works (ECoW) will be appointed for the project and will supervise and monitor the implementation of the mitigation and enhancement measures over the operational life of the facility.	Throughout the development
Biodiversity – Designated Sites and Protected Species	Mitigation measures identified through the land, soils and geology, hydrology and hydrogeology, air quality, noise and transport assessments (set out below) will be implemented to safeguard designated nature areas.	Throughout the development
Biodiversity – Pre Works Survey L1157	A pre-works survey will be carried out at the proposed development site and along the L1157 to record and map the presence of any invasive or protected plant species or non-volant mammals. Any measures recommended to protect / enhance biodiversity along the L1157 corridor will be implemented as appropriate.	Prior to commencement
Biodiversity – Deer Management	A Deer Management Plan will be implemented throughout the operation of the facility and for three years after the completion of tree planting on site to minimise the negative effects of grazing pressure on newly established woodland.	Throughout operation and for 3 years following completion of tree planting
Biodiversity – Protection of Non-volant Mammals	<ul style="list-style-type: none"> All trees to be felled on site will be left on the ground for at least 24 hours before being logged and removed to allow any mammals present to depart. The lighting proposed as part of the development will be downward directed and cowled to minimise light spill. All site lighting that is not required for operation or security will be extinguished. 	Throughout the development

Mitigation Measure Proposed	Timeframe
<ul style="list-style-type: none"> Any excavations on site will be fitted with an egress board and inspected prior to works. All edible and putrescible wastes will be stored and disposed of in an appropriate manner. Similarly, all construction materials will be stored and stockpiled at planned locations. Mammal gates or openings (as per TII Guidance) will be provided along the deer fence at locations chosen by the ECoW at separation distances of 150m or less. This will ensure free passage into and out of the site by species such as Badger. Any roadkill along the length of the L1157 Local Road from the site access road to its junction with the R772 Regional Road will be recorded daily with a log held for inspection at the site office. 	
Biodiversity – Breeding Birds <ul style="list-style-type: none"> The clear-zone between the edge of the proposed woodland and the retained cliff-face will be maintained by annual mowing outside of the bird breeding season. This will control the potential encroachment of scrub and woodland into this area. No bioaccumulating pesticides will be used to control pest species on site. This will help protect the health of apex predators including Peregrine Falcon. There will be no felling of trees, or clearance of vegetation, including along the margins of the L1157 during the bird breeding season (March 1st to August 31st inclusive). Site traffic will be limited to approved routes in order to limit accidental damage to potential foraging or nesting habitats. The lighting proposed as part of the development will be downward directed and cowled to minimise light spill. All site lighting that is not required for operation or security will be extinguished. Peregrine Falcon activity will be monitored annually during the operational phase, with liaison maintained with NPWS to inform the local wildlife officials of the status of Peregrine and their nests at the site. All edible and putrescible wastes will be stored and disposed of in an appropriate manner. Similarly, all construction materials will be stored and stockpiled at planned locations. Bird species diversity and abundance will be monitored annually throughout the years of operation. A report on the species activity will be prepared and provided to the planning authority and NPWS. 	Throughout the development

Mitigation Measure Proposed	Timeframe
Biodiversity – Bats <ul style="list-style-type: none"> The lighting proposed as part of the development will be downward directed and cowled to minimise light spill. All site lighting that is not required for operation or security will be extinguished. All new site lighting will be provided in the colour temperature range of 2,700-3,000K to minimise disturbance to bats. This is a colour temperature that is less disruptive to bats (BCT 2010). All trees to be felled on site will be left on the ground for at least 24 hours before being logged and removed to allow any bats present to depart. Bat activity at the site will be monitored by deployment of passive detectors annually during the years of operation. A report on the species activity will be prepared and provided to the planning authority and NPWS. 	Throughout the development
Biodiversity – Aquatic Ecology <ul style="list-style-type: none"> A survey of the quarry basin / sump will be carried out prior to commencement of works and any frogs or spawn present will be translocated under licence to the settlement ponds on site by a suitably qualified ecologist. The quarry sump will be monitored each spring for any signs of frog spawn and this will be translocated under licence (if required) to the settlement ponds or constructed wetland on site. A survey of species diversity at the constructed wetland and settlement ponds will be conducted every five years during the operational life of the facility. A report will be prepared and submitted for information to NPWS and the Planning Authority. Biological water quality will be monitored annually upstream and downstream of the treated water discharge location. This information will be submitted as part of an annual report to the planning authority / EPA. All requirements of an EPA waste licence in respect of discharge of treated water from the facility will be fully observed. 	Throughout the development
Biodiversity - Enhancement Measures <p>A range of biodiversity enhancement measures are proposed to enhance the site's potential in combination with significant commitments to planting of native woodland as part of the progressive landscaping and restoration plan. Indicative locations of key biodiversity mitigation and enhancement commitments are shown on the Landscaping and Restoration Plan.</p> <ul style="list-style-type: none"> A permanent nesting box or ledge for Peregrine Falcon will be installed on the cliff-face that is to be retained post closure. It will be installed outside of the bird breeding season at a location chosen by and under the supervision of the ECoW. The ledge will be weatherproof and a camera mount will be provided to enable the nest-site to be easily monitored by NPWS. 	

Mitigation Measure Proposed		Timeframe
	<ul style="list-style-type: none">• An artificial Sand Martin nesting colony will be installed on-site at a location near the settlement ponds, or constructed wetland area.• Two of the existing buildings on site will be fitted with a heated maternity bat roost box• A cluster of four Swift boxes will be installed on the external wall of the unoccupied house on site. These will be fitted with a sound system to play a tape lure call (under licence from NPWS) to attract Swifts.• To encourage nesting birds and roosting bats at the site, a selection of bird nest boxes and bat boxes will be erected at the site. The boxes will be weather resistant (woodcrete/recycled plastic) and the designs and erection locations will be chosen by a suitably qualified ecologist and these will be erected under the supervision of the ECoW. A total of 50 bird and 50 bat boxes will be erected at the site. Nest box design will include boxes suitable for Kestrel and Barn Owl.• To encourage grassland species diversity the grassland areas at the west of the site will be managed according to the recommendations of the All-Ireland Pollinator Plan. The grassland areas will be mown, once a year (in September ideally) with all cuttings removed from the area. The area will not receive any fertiliser or pesticide input. In time this will enhance the floristic diversity present and encourage biodiversity. Permanent quadrats will be established and monitored by a suitably qualified botanist every three years during the operational phase of the facility. A monitoring report will be prepared and submitted for the information of the planning authority and NPWS.	
Land, Soil and Geology – Control of Infill Materials	A multiple level soil / C&D waste inspection and testing regime will be implemented which will test the material for intake compliance, in line with established EPA waste licence methodologies. Refer to Paras 2.178 to 2.288 of Chapter 2 of this EIAR.	During infilling
Land, Soil and Geology – Soil Management	<p>Soils excavated in grassland areas in the south-western corner of the application site will be re-used where possible in the ICW area construction, with any excess soil stockpiled pending its re-use in restoration / landscaping works.</p> <p>Routine refueling of plant and machinery (and HGVs and lorries on occasion) will take place over a sealed concrete pavement which drains via a hydrocarbon interceptor to a soakaway area.</p> <p>Oils, greases and hydraulic fluids will be stored under cover, over fuel spill trays / bunded containers within the existing site workshop / garage.</p> <p>Good site management practices will be implemented to reduce risks of spills to ground, including regular monitoring and inspection of storage vessels and regular maintenance and servicing of construction plant and equipment.</p>	During construction / site preparation works.

Mitigation Measure Proposed	Timeframe
	Contingency plans / procedures will be developed to deal with potential leaks and spills. An emergency spill response kit will be held on site.
Land, Soil and Geology – Land Stability	<p>Temporary side slopes in landfilled soils / waste will generally be graded at an angle no steeper than 35° (approximately 1v:1.5h) and often much shallower, to ensure no large-scale instability arises over the short-term. Ongoing assessment of stability will be undertaken at the application site as landfilling progresses and recycled materials are stockpiled. Where necessary, slopes developed in these materials will be graded having due regard to safe systems of work.</p> <p>During inert landfilling activities, all temporary surfaces will be graded to facilitate overground run-off and its capture in surface water ponds developed in closed depressions at low points within the landfilled waste body, thereby minimising the volume of rainfall percolating through the landfilled materials.</p>
Land, Soil and Geology - Soil Erosion	<p>In order to reduce the risk of localised erosion (and potential dust emissions) during the recovery, recycling, landfilling and restoration operations, areas of bare or exposed soils / wastes will be kept to a minimum, insofar as practicable, by ongoing progressive restoration of the restored landform and the establishment of native woodland in line with the proposed long-term restoration plan. Where required, consideration can also be given to establishing temporary vegetation cover over any stockpiled soils (pending re-use) or exposed surfaces (pending further backfilling to final ground level).</p>
	<p>A minimum 150mm thick layer of topsoil will be placed over the landfilled materials.</p>
Land, Soil and Geology – Protection of Geological Resources	<p>The construction and installation of an engineered (natural clay) liner at the base and sides of the proposed landfill will afford protection to the ground and geological elements which would otherwise be in direct contact with the landfilled waste materials.</p>
Land, Soil and Geology – General Management	<p>The Applicant will ensure that such plant and resources as are necessary will be deployed to ensure that the recovery / recycling and landfilling activities will be managed and operated in accordance with best waste management practice and that activities comply fully with environmental management systems, planning consents and waste licence conditions.</p>
Hydrology - General	<p>Some mitigation measures were previously / are currently in place at the existing quarry to prevent any reduction in the quality of the local aquatic environment. These measures are in accordance with the “best practice / possible remedial measures” set out in Chapter 3.4 of the DoEHLG (2004) Quarries and Ancillary Activities: Guidelines for Planning Authorities.</p>

Mitigation Measure Proposed	Timeframe
<p>Hydrology – Spill / Leak Prevention / Groundwater Protection</p> <p>The discharge water to the Potters River will comply with conditions in the discharge licence (WPL116), or any required revisions arising from conditions set by the planning consent or EPA waste licence.</p> <ul style="list-style-type: none"> • The discharge water will be treated in a water treatment plant and will pass through the settlement lagoons / attenuation pond at the site. • No refueling of plant / machinery, maintenance or repairs will take place in the quarry void to prevent accidental spillages reaching the ground or being washed off in surface water. • A refueling pad with connection to hydrocarbon separator is provided at the application site, beside the workshop. Most mobile plant and machinery refueling will take place on the refueling pad. • Drip trays will be used for all other refueling activities. • All refueling will be completed by competent / trained operatives. • All plant / machinery maintenance and repairs will take place under cover in the existing workshop at the site or on the hardstand refueling pad. • All plant will be regularly maintained and inspected daily for leaks of fuels, lubricating oil or other contaminating liquids. • Fuel storage will continue at the existing bunded storage facility at the site. • All petroleum-based products (lubricating oils, waste oils, etc.) will be stored on drip trays under cover in the workshop to prevent pollution due to accidental leakages. • Waste oil and grease containers will be stored under cover in the workshop. Waste containers will be collected and disposed of by a suitably licenced contractor. • An emergency spill response kit (with containment booms, absorbent materials and drip tray) will be provided on-site to contain/ stop the migration of any accidental spillages, should they occur. • Plant operators will be briefed during 'toolbox' talks and site induction on where the spill kit is kept and how and when it is deployed. • Regular visual inspection and testing will be undertaken of the integrity of tanks, drums, bunded pallets and double skinned containers. • Traffic management systems at the site will reduce potential conflicts between vehicles, and the potential risk of collisions and associated fuel spills or oil leaks. • Site speed limits will be implemented across the site to further reduce the likelihood and significance of collisions and the possibility of a fuel leak from such a collision. 	<p>Throughout the development</p>

Mitigation Measure Proposed	Timeframe
<p>Hydrology – Water Management (Construction Phase)</p> <p>Water in the quarry void will be pumped to the treatment plant and will then be routed to the existing settlement / attenuation ponds for further treatment (settlement) prior to discharge to Potters River.</p> <p>All surface water discharges to the Potters River will comply with the emission limits set by the discharge licence [WPL116] (or those which may supersede them in an EPA waste licence).</p> <p>The volume of water discharged from the site compared to flood flows in the Potters River is negligible and therefore the discharge water will not result in increased flood risk in the river</p>	
<p>Hydrogeology – Inert Landfill Clay Liner</p> <p>Suitable uncontaminated natural, undisturbed soil waste and/or soil by-product (i.e. non-waste) which conforms to an engineering specification will be imported for re-use in the construction of the 1m thick basal and side clay liners required for the inert landfill facility. The clay liner will be low permeability (less than or equal to 1×10^{-7} m/s) to provide an appropriate level of protection to groundwater and the surrounding aquifer, in line with accepted inert landfill design standards. The clay liner will have the following functions:</p> <ul style="list-style-type: none"> • Prevent discharge through the base of the backfilled quarry void. • Prevent discharge through the sidewalls of the backfilled quarry void. • Ensure that the wider aquifer and underlying groundwater system and groundwater quality are physically protected by a pathway/flow barrier. <p>A separate drainage system will be provided to reduce pressures and dewater groundwater beneath the basal liner</p>	During infilling operations
<p>Hydrology – Passive Wetland Treatment System</p> <p>Dewatered groundwater and storm runoff from the inert landfilling activities will be managed separately to run-off which is not in contact with the imported wastes. Run-off in contact with waste bodies will be collected separately and directed for recycling / re-use at the soil wash plant and or water storage tanks.</p> <p>Any excess run-off in contact with imported waste will be pumped to the proposed on-site (passive) wetland treatment system before being discharged off-site to Potters River. The sizing and design of the wetland treatment system has been developed having regard to the likely contaminants (and concentrations thereof) which could be present in the inert soil / C&D waste intake source from construction sites.</p> <p>The effectiveness of the proposed wetland treatment systems can be enhanced by the temporary addition of various, more active treatment systems, such as chemical dosing, aeration or other such processes. This can allow a wetland system to handle higher contaminant loads or flows for periods</p>	Throughout the development

Mitigation Measure Proposed	Timeframe
<p>of time (should it be necessary) before reverting to more standard (passive) modes of operation, therefore providing flexibility should leachate generation rates and chemical constituents change over time.</p> <p>Based on the initial assessment and design, the proposed wetland treatment system at Ballinclare Quarry will comprise the existing approved treatment system in addition to:</p> <ul style="list-style-type: none"> (i) A wetland treatment system: comprising the following elements in series: <ul style="list-style-type: none"> a. Anaerobic (biochemical reactor) wetland; b. Iron Sequestering Unit (ISU); c. Aerobic wetland. (ii) A leachate reception tank: up to 50m³, self-bunded storage tank with level controls. (iii) A pump house: housed in a standard shipping container (6.0m x 2.4m x 2.6m) containing feed, discharge and chemical dosing pumps; (iv) Off-site discharge via existing ditch / drainage channels to the Ballinclare Stream and the Potters River further downstream. 	
<p>Hydrology – Testing and Inspection of Imported Materials</p>	<p>During infilling</p>
<p>Hydrology - Waste Quarantine and Compliance Testing</p> <p>If, following its acceptance at the facility, there is any subsequent grounds for concern about the nature of the wastes imported to and/or handled on site, it will be segregated and transferred to the covered waste inspection and quarantine shed for closer inspection and classification testing to establish whether it can be accepted at the facility or not. A detailed record will be kept of all such inspections.</p> <p>Should detailed inspection and/or any subsequent testing indicate that the quarantined materials are non-inert or cannot be accepted and used for landfilling or recovery / recycling purposes at the facility, they will be transferred off-site by to another appropriately authorised waste facility.</p> <p>It is proposed to designate the former aggregate storage shed at the southern site boundary (at the southern limit of the former concrete / asphalt production area) as the on-site waste inspection and quarantine facility. The shed is roofed, closed on three sides and has a concrete floor, thereby protecting any suspect waste which might be transferred and held there from incident rainfall and avoiding the potential to generate (suspect) contaminated surface water run-off (and a requirement for separate wastewater collection and storage infrastructure).</p>	<p>Throughout operation</p>

Mitigation Measure Proposed	Timeframe
<p>Any significant volumes of intermixed non-inert C&D wastes (principally metal, timber, PVC pipes and plastic) inadvertently imported to the facility will be separated out and temporarily stored in skips or covered at the waste recovery area / shed or at the waste quarantine area prior to removal off-site to appropriately authorised waste facility.</p> <p>A representative sample will be taken (in accordance with waste licence requirements) of waste materials accepted at the inert landfill facility and subjected to compliance testing which focuses on key contaminant indicators. This data shall be used to confirm that the accepted soils are inert / acceptable (according to Council Decision 2003/33/EC) and/or comply with approved waste intake acceptance criteria. Compliance testing will be undertaken by the Applicant.</p> <p>Only operators and/or haulage firms holding valid current waste collection permits will be engaged to transfer waste streams off-site to other authorised waste disposal or recovery facilities as required.</p>	
<p>Hydrology – Surface Water Quality</p> <p>The operational phase of the Proposed Development includes for a phased infilling of the quarry void. During Phase 1A, surface water runoff from the infill area will be captured and recirculated (or supplied to soil wash plant). Any excess runoff will be tankered off site. Surface water runoff from the C&D recovery yard will be captured and supplied to the soil wash plant, while runoff from the soil processing area will be directed towards a sump behind the wash plant for use in the washing process. Any excess water in the sump on the quarry floor will be treated prior to discharge.</p> <p>Following the capping and restoring of the Phase 1A area, surface water runoff will be captured by a perimeter toe drain and discharged offsite.</p> <p>Before the end of Phase 1A, the construction of the Integrated Constructed Wetland will commence. During that construction phase, excess water from the construction area will be pumped back to the quarry void. In addition, a temporary cutoff drain and double line of silt fencing will be used to ensure separation between the wetland construction area and the Ballinclare stream.</p> <p>During the follow-on Phase 1 development, the discharge/runoff from the inert landfilling areas will be collected and treated in an Integrated Constructed Wetland. Runoff from the C&D waste recovery and soil processing area will be supplied to the soil wash plant. Any excess water collecting in the sump on the quarry floor will be treated by the Siltbuster system and settlement ponds prior to discharge.</p> <p>During Phase 2 of the development, whereby the land surface will be raised to 80mAOD, the runoff from active inert landfill areas will be collected and treated within the Integrated Constructed Wetland. Runoff from capped landfill areas and the C&D waste recovery facilities will be collected and directed to temporary balancing ponds. Excess water in these balancing ponds will be treated by the Siltbuster system and settlement ponds prior to licensed discharge.</p>	Operational Phase

Mitigation Measure Proposed	Timeframe
<p>During Phase 3 of the Proposed Development, the water management system will mimic the Phase 2 operation outlined above.</p> <p>Surface water quality testing of the discharge from the site will be completed on a quarterly basis (subject to any update of the existing discharge license and/or conditions within the Waste License).</p> <p>As such, runoff from the site will be managed during each phase of the proposed infilling, as well as management of surface water from the C&D waste recovery facility, in order to mitigate against any potential effects on downstream watercourses following discharge off-site.</p>	
<p>Hydrogeology – Groundwater Quality and Groundwater Levels / Flows</p> <p>A clay liner will be installed underlying the waste material being infilled in the quarry. This clay liner will have sufficient low permeability (at least $1 \times 10^{-7} \text{m/s}$) so as to hydraulically isolate it from the underlying bedrock aquifer.</p> <p>Groundwater quality testing will be completed (on a quarterly basis) in wells GW1-GW3 to ensure there is no change in groundwater quality and no effects from the importation and placement of the inert soil and stone material at the lined landfill facility.</p> <p>The mitigation measures outlined in relation to waste material will further ensure no impacts occur to local groundwater quality.</p> <p>Minor hydrocarbon detections were recorded at GW2 and in view of this, in-situ remedial works are proposed at GW2 to remove the minor hydrocarbon issue noted in that monitoring well during groundwater sampling (refer to section on Monitoring below).</p>	Operational Phase
<p>Hydrology – Surface Water Management Systems</p> <p>Water management systems as described in EIAR Chapter 7 will be implemented to ensure all surface water discharges will continue to comply with the conditions in the existing discharge licence (WPL116), or any required revisions arising from conditions set by the planning consent or EPA waste licence.</p>	Throughout the development
<p>Hydrology – Buckronev Brittas Dunes and Fen SAC/pNHA</p> <p>Mitigation for the protection of surface water quality during all phases of the proposed development are outlined above.</p>	Operational Phase
<p>Hydrology and Hydrogeology - Monitoring</p> <p>A detailed monitoring programme for surface water and groundwater will be implemented. The monitoring programme includes monitoring of surface water and quarry discharge, and groundwater quality, including groundwater quality in local domestic wells.</p>	Throughout the development

Mitigation Measure Proposed	Timeframe
Hydrogeology – Remedial Works at GW2	In-situ remedial works are proposed at GW2 to remove the minor hydrocarbon issue noted in that monitoring well during groundwater sampling.
Hydrology – Soil Erosion	Appropriate seasonal timing of site restoration works, soil subsoiling and grass seeding will reduce adverse impacts of soil erosion across the site.
Air Quality - Dust Protection of Water Quality	<p>On top of inherent dust mitigation such as carrying out operations within the quarry void (behind faces and below ground level) and retention of existing screening berms, the following measures can be implemented:</p> <ul style="list-style-type: none"> • Minimise drop heights when handling materials. • Minimise work in adverse / windy conditions. • Provide protection from the wind where possible. • Minimise distances of onsite haul routes. • Use water sprays / tractor and bowser to moisten surfaces during dry weather. • Restrict vehicle speeds through signage / staff training. • Locate haul routes away from sensitive receptors. • All HGVs exiting the facility to be routed through the wheelwash facility. • Use of road sweeper to reduce the amount of available material for re-suspension. • Minimise mechanical disturbance. • Consider paving additional length of access road leading to the recovery facility (if required to achieve emission limits). • Consider installation of fixed sprinkler system where materials consistently stockpiled (if required to achieve emission limits). • Carry out C&D processing activities within the proposed waste processing shed. • Provide training on dust management provided to staff. • Cover loads on vehicles delivering and dispatching materials from site. • Protect / reinforce perimeter vegetation screening around the application site. • Undertake regular plant and vehicle maintenance (cleaning).

Mitigation Measure Proposed	Timeframe
<ul style="list-style-type: none"> Undertake regular monitoring and inspection of access and haul roads to identify and attend to accidental spillages (of particulate waste / by-product materials) and any structural defects (i.e. potholes) to minimise shearing and break-up of road materials. Consider meteorological conditions (wind speed and wind direction) when deciding where to site / locate material stockpiles. 	
Climate Change - Resilience <ul style="list-style-type: none"> Consider changes / flexibility in construction / operations that allow for localized flooding and possible rise in water levels (and/or groundwater levels). Consider weather warnings and create plans adequate to warning intensity. Design / provide adequate surface water drainage. Design / provide adequate procedures for wildfire scenarios. Ensure design can withstand increases in high winds and storms. Ensure the choice of equipment is weather efficient / resilient. Secure insurance for damage of assets / site incidents. 	Throughout the development and with experience of climate trends
Climate Change – Mitigation / Reduction of GHG Emissions <ul style="list-style-type: none"> Consider using renewable energy sources / suppliers. Deploy clean energy production on site (e.g. solar roof panels on C&D recovery shed). Use energy efficient machinery. Unnecessary equipment / transport journeys to be avoided by managing transport and travel demands. Equipment should not be left idling. Use backloading to dispatch recycled aggregates off site (i.e. ensure inbound HGVs transport outbound materials on return leg of trip when required) <p>Training programme on GHG mitigation to be provided for employees / contractors.</p>	Throughout the development and as technology continues to develop
Noise – Reduction through Management <p>The Applicant intends to implement best practice construction noise and vibration management techniques throughout the construction phase in order to further reduce noise and vibration impact below predicted acceptable levels.</p>	During construction / site preparation works
Noise – Reduction through Management <p>Prior to commencement, a Construction Noise and Vibration Management Plan (NVMP) will be prepared which will:</p> <ul style="list-style-type: none"> Outline management processes and mitigation measures to be utilised to remove or reduce significant noise impacts from the intended construction works 	Reparation of plan prior to commencement

Mitigation Measure Proposed	Timeframe
<ul style="list-style-type: none"> Define noise and vibration monitoring and reporting. Include method statements for each phase of the works including associated specific measures to minimise noise and vibration in so far as is reasonably practicable for the specific works covered by the plan and a detailed appraisal of the resultant construction noise and vibration generated. 	
Noise – Local Community Engagement <ul style="list-style-type: none"> Kilsaran will distribute information circulars informing the local community of the progress of site-based works during the construction phase. It will proactively engage with residents in potential noise / vibration sensitive properties before the commencement of any works which would be likely to generate any appreciable levels of noise or vibration, explaining the nature and duration of the works. 	Prior to noise generating activities
Noise – Plant and Traffic Management <p>Kilsaran will manage plant and machinery during site operations as follows:</p> <ul style="list-style-type: none"> All plant and equipment will be properly and regularly maintained and operated to avoid causing excessive noise. All vehicles delivering and operating on the site will have white noise reversing alarms fitted. All plant will be fitted with effective exhaust silencers which are maintained in good working order to meet manufacturers' noise rating levels. Any defective silencers will be replaced immediately. Access / internal haul roads will be kept clean and maintained in a good state of repair - specifically any uneven surfaces will be repaired, potholes filled, and large bumps removed. Vehicles waiting within the application site will be prohibited from leaving their engines running and there will be no unnecessary revving of engines. Care will be taken when unloading vehicles to reduce or minimise potential for noise disturbance. HGVs / trucks accessing and egressing the proposed development will be required to adhere to a 60 kmph speed limit travelling along on the L1157. All HGVs / trucks travelling to and from the application site will be required to be kept and maintained in good working order. Any deliveries to the proposed development site will be programmed to arrive during daytime hours only. 	Throughout the development
Cultural Heritage Archaeological Protection <p>Due to the possibility of the survival of previously unknown sub-surface archaeological deposits or finds within the proposed Integrated Constructed Wetland (ICW) area, any soil-stripping associated with future development works at the application site will be archaeologically monitored.</p>	During site clearance works

Mitigation Measure Proposed	Timeframe
<p>Traffic – Management during Construction</p> <p>A Construction Traffic Management Plan will be prepared, including measures to provide information to affected parties, including advising land and property owners in advance of any diversions. Local access shall be maintained at all times and temporary signage shall be put in place to minimise disruption and ensure all road users are aware of any construction works that are in progress.</p> <p>A detailed 'Construction Environmental Management Plan' (CEMP) sets out the allowable working day, construction traffic, parking arrangements and incorporates environmental protection measures.</p>	Prior to commencement
<p>Traffic – Road Strengthening and Widening</p> <p>Comprehensive road improvement works along the length of the L1157 Local Road from the site access junction to its junction with the R772 Regional Road are identified together with traffic management and speed control measures.</p>	Throughout the development
<p>Traffic – Enforcement of Haul Route</p> <p>Acceptance of materials at the proposed development will be by pre-approval only. Haulage contractors will be assigned to a particular job / contract and so can be easily identified. Any individual driver associated with these hauliers who fails to adhere to the designated haul route along L1157 will be banned sanctioned and temporality / permanently restricted from making deliveries to the facility, depending on the frequency on any transgressions. This approach has proven effective in managing hauliers at other similar developments operated by Kilsaran.</p>	Throughout the development
<p>Traffic - Safety</p> <p>Electronic driver feedback signing will be provided by the applicant as part of the road improvement works to L1157. Electronic Driver Feedback Signing (DFS) are equipped with digital displays that provide real-time information to drivers, usually regarding their speed or other relevant driving conditions.</p>	Prior to infilling activities
<p>Traffic -Safety and Minimisation of Disturbance to Amenity</p> <p>When commencing the operational phase of the proposed development drivers using the facility will be required to attend a HGV driver induction training which the Applicant has initiated at other similar sites and considers a crucial tool for ensuring that all drivers are fully aware of the rules and expectations regarding safety, adherence to the haul route, speed limits, and courteous behavior towards other road users.</p>	Prior to infilling activities
<p>Traffic – Advance warning signage and road cleaning</p> <p>If required, the Applicant will provide for these in accordance with any requests from the Roads Authority (Wicklow County Council) or An Bord Pleanála.</p>	As requested by Planning Authority

MONITORING MEASURES

- 16.13 A number of environmental monitoring activities are to be continued during all stages of the proposed development to confirm the effectiveness of the mitigation measures described above, to establish if there are any trends in environmental parameters and to highlight the need for remedial action if necessary.
- 16.14 Environmental monitoring requirements have been identified in the specific chapters of the EIAR. The frequency of the monitoring requirements identified below have been collated and provided in a schedule displayed in **Table 16-2**.
- 16.15 **Figure 16-1** indicates the monitoring locations across the application site. Additional monitoring locations can be provided if deemed necessary by Wicklow County Council and/or the Environmental Protection Agency should planning permission and a waste licence be granted in respect of the proposed development.

Population and Human Health

- 16.16 Monitoring for the protection of population and human health during the proposed development will be carried out in accordance with the wider environmental monitoring programme for the protection of water, air quality and noise.

Biodiversity

- 16.17 A suitably qualified Ecological Clerk of Works (ECoW) for the project will be appointed and supervise and monitor the delivery of the mitigation and enhancement measures throughout the operation of the facility. They will also arrange for and oversee the specific monitoring proposed for bird, bat, aquatic species and grassland management as set out in **Table 16.1**.

Land, Soils and Geology

- 16.18 A multiple level testing regime will be established to test soils / wastes imported to the proposed facility to ensure compliance with agreed inert waste intake parameters (as per established EPA methodologies for licensed waste facilities).

Hydrology and Hydrogeology

- 16.19 The current surface and groundwater monitoring regime in place at Ballinclare Quarry will be extended to include the measures indicated in **Table 16.1**.

Air Quality

- 16.20 Dust deposition monitoring will be undertaken at the application site. Dust monitoring locations shall be reviewed and revised where and as/when necessary. The results of the dust monitoring shall be submitted to Wicklow County Council and the EPA on a regular basis for review and record purposes as required.
- 16.21 The dust monitoring locations (D1, D2 and D3) that have been used at the site to date are shown on **Figure 16-1**.

Climate Change

- 16.22 A framework and set of indicators shall be developed to assess project preparedness for adaptation against climate change. Provision shall be made for a periodic review of plans and the allocation of reporting responsibilities for a regime to measure and evaluate progress on adaptation.
- 16.23 This process shall include regular feedback and/or updates from the implementation efforts. Enhancement and monitoring related to the projects' predicted impacts with respect to climate change should be set out in an Environmental Management Plan.

Noise

- 16.24 The Applicant will undertake an annual compliance noise survey to establish operational noise emissions arising at the application site and demonstrate compliance with noise emission thresholds set by any grant of planning permission or waste licence issued by the EPA.
- 16.25 The survey shall be completed by a Competent Person in accordance with the EPA Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) using a Class 1 Sound Level meter.
- 16.26 The noise monitoring locations (N1, N2, N3 and N4) that have been used at the site to date are showing on **Figure 16-1**.

Cultural Heritage

- 16.27 Soil-stripping in the proposed Integrated Constructed Wetland (ICW) area will be archaeologically monitored in agreement with Wicklow County Council and the National Monuments Service.

Landscape

- 16.28 There will be a 2-year aftercare period, as part of the Landscape and the Restoration Proposals to ensure the successful establishment of the native woodland planting followed by the long-term management of the woodland areas by a suitably qualified forestry contractor (refer to **EIAR Figure 2-4**).

Traffic

- 1.1 Route adherence by HGV drivers will be monitored during operation of the facility.

Table 16-2
Indicative Schedule of Environmental Monitoring

Activity (Responsibility)	Q1			Q2			Q3			Q4		
	J	F	M	A	M	J	J	A	S	O	N	D
Biodiversity - Ecological Clerk of Works (ECoW) to be appointed throughout the operation of the facility and will undertake all general monitoring.												
Biodiversity – Bat activity to be monitored by deployment of passive detectors annually during the years of operation.												
Biodiversity - Bird species diversity and abundance will be monitored annually throughout the years of operation. A report on the species activity will be prepared and provided to the planning authority and NPWS.												
Biodiversity - Quarry sump will be monitored each spring for any signs of Frog spawn												

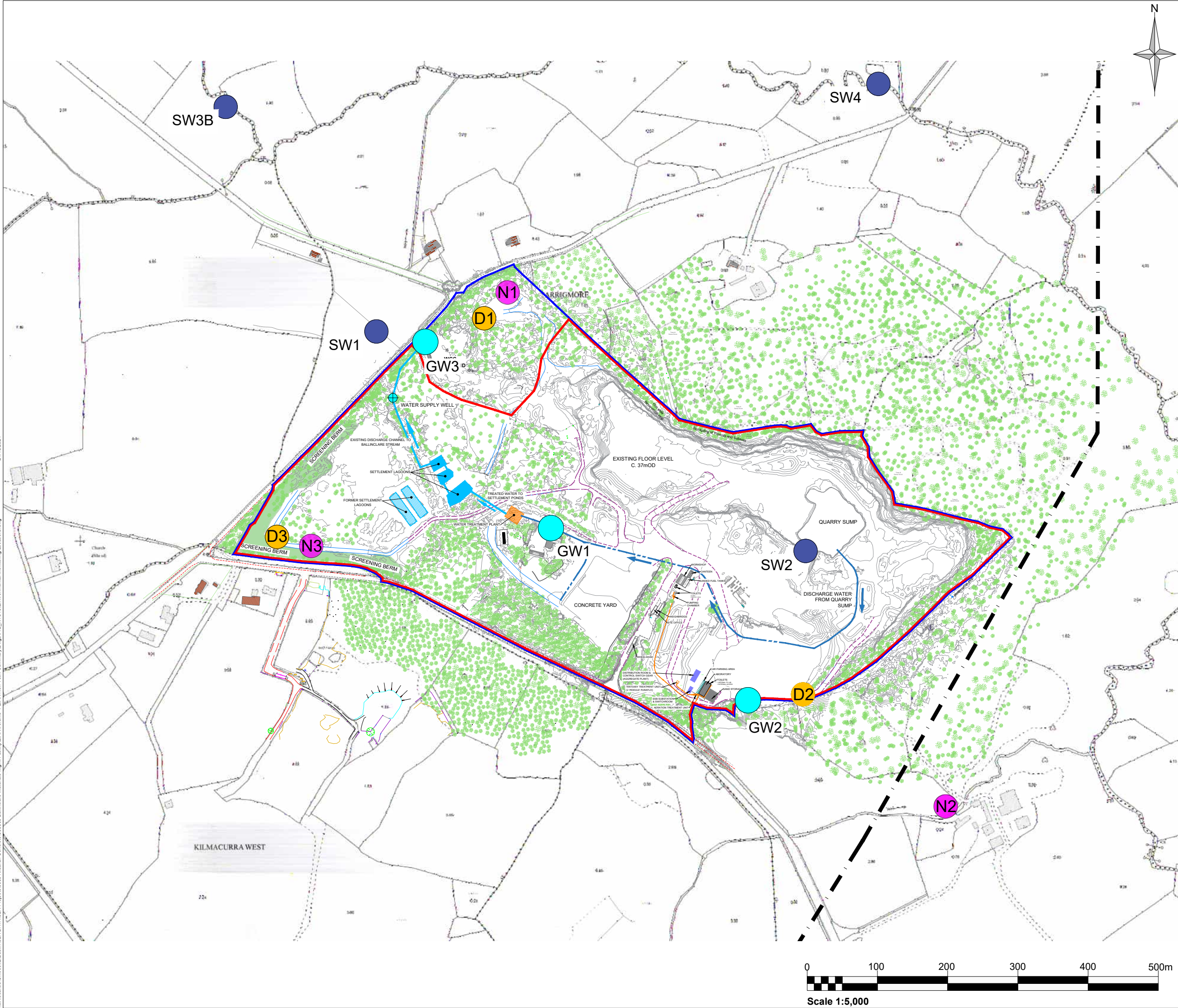
Activity (Responsibility)	Q1			Q2			Q3			Q4		
	J	F	M	A	M	J	J	A	S	O	N	D
Biodiversity - Biological water quality will be monitored annually upstream and downstream of the treated water discharge location.												
Biodiversity - Permanent quadrats will be established and monitored by a suitably qualified botanist every three years during the operational phase of the facility.	Every three years											
Land, Soils and Geology – Rigid, continual testing during infill operations												
Hydrology – Surface water in accordance with discharge licence (WPL116), or any required future revision thereto p to be replaced in time by EPA waste licence												
Hydrology – Groundwater levels at GW1, GW2a and GW3 (continuous borehole logs, downloaded quarterly). <i>Monitoring to be carried out for 5 years post closure</i>		*			*			*			*	
Hydrology – Groundwater quality at GW1, GW2a and GW3												
Hydrology – Local Wells CBDW1, GLDW1, DW2, LDDW1, DW3, ODW1, and ODW2	Prior to commencement and every two years thereafter (throughout the development)											
Quarterly Dust Monitoring at 3 locations:												
Climate Progress – GHG Monitoring Report (Kilsaran)	In line with wider Kilsaran ESG Reporting											
Annual Noise Monitoring at 4 locations			*									
Cultural Heritage – ICW area soil stripping	As works occur											
Landscape Maintenance (Two years following Year 25 – Final Restoration)												
Traffic – Continuous tracking of timing and routing of HGV movements by Kilsaran and its contractors	During operation of the facility											

* Indicative month

FIGURES

Figure 16-1
Existing Environmental Monitoring Locations

24/10/2024
\\slr-local\au\Offices\IE\Dublin\SLR Data\SLR Projects\0036 Kilsaran Concrete\065366 Ballinclare Materials Mgmt Facility\EAIR\Volume-1 EAIR Non-Tech-Summary\Drawings\FIG. NTS10 Environmental Monitoring Locations.dwg



Notes:
1. EXTRACT FROM 1:50,000 O.S DISCOVERY SERIES MAP NO. 50.

Legend:

LAND INTEREST BOUNDARY (c. 36.0 HA)

PLANNING APPLICATION AREA (c. 32.6 HA)

D1

 DUST MONITORING LOCATIONS

N1

 NOISE MONITORING LOCATIONS

SURFACE WATER MONITORING LOCATIONS

GROUNDWATER MONITORING LOCATIONS

2	Title block and layout	06.24	AB	DL	DL
1	Layout	05.24	AB	DL	DL
0		01.24	EW	DL	DL
Rev	Amendments	Date	By	Chk	Auth

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FINAL

Client
KILSARAN CONCRETE
Ballinclare Quarry, Kilbride, Co. Wicklow

Project
Environmental Impact Assessment Report
Materials Recovery / Recycling Facility
and Inert Landfill

Drawing Title
ENVIRONMENTAL MONITORING LOCATIONS

Scale 1:5,000	@ A3	SLR Project No. 065366.00001	
Designed EW	Drawn EW	Checked DL	Authorised DL
Date 10/24	Date 10/24	Date 10/24	Date 10/24
Drawing Number FIGURE 16-1			Rev. 1