OPERATIONAL REPORT

EXISTING DEVELOPMENT

Development History

The proposed development site at Ballinclare Quarry comprises a worked-out void in a former bedrock quarry located in the townlands of Ballinclare and Carrigmore, near the village of Kilbride, Co. Wicklow. Historically, the permitted activities at the quarry have included extraction of diorite bedrock using blasting techniques; processing (crushing and screening) of the fragmented rock to produce aggregates for concrete (readymix) production and asphalt production for road construction and site development works.

The quarry was owned and operated by S.M. Morris Ltd up to 2009, at which time it closed as a result of the downturn in the Irish construction industry. In 2014, the quarry was acquired by Kilsaran Concrete Unlimited Company (hereinafter 'Kilsaran'). Extraction activities re-commenced shortly thereafter and there was significant investment in upgrading the concrete batching plant, new aggregate production plant and a new asphalt and tarmacadam production plant.

In January 2016, Kilsaran obtained planning permission for continuation of extraction activities at the quarry for a further 25 years. It also sought permission for a revised extraction scheme which provided for deepening of the quarry to a floor level of +1mOD over an extended extraction area of 16.5 hectares, a concrete block manufacturing plant and concrete block manufacturing yard and an increase total quarry output c. 800,000 tonnes / annum (Wicklow County Council Planning Ref. 14/2118).

Extraction and production activities at the quarry ceased in June 2016 following the discovery of small quantities of naturally occurring asbestos (NOA) in the diorite bedrock being quarried at the time. Since then, and following the cessation of quarry dewatering, the water level in the quarry void has risen to cover the quarry floor.

Existing Site Layout

The existing extraction area at Ballinclare Quarry extends to c.9.3 hectares (c.22.9 acres) within a wider site / development area of 24 hectares (c.59.3 acres). Ground levels in the vicinity of the quarry vary between 55mOD to 60mOD along the southern site boundary, close to the L1157 Local Road and rise to 90mOD at the highest point along the northern boundary where the main quarry face cuts into a rock slope which rises northwards. Typical levels along the northern quarry boundary range from 50mOD to 70mOD.

Extraction across the quarry generally extended to a floor level of approximately 37mOD. At the time of its closure, two quarry benches were being extended westwards. As a result the quarry floor is locally higher at the western end, where the first bench has only been developed to a level of approximately 52mOD. The quarry floor is also locally deeper in the central eastern area of the quarry area and extends to approximately 22mOD where a third bench had been commenced. This area effectively acted as the quarry sump when it was operational.

The quarry is accessed via a 120m long surfaced entrance road leading off the L1157 Local Road. The former concrete batching plant, aggregate plant and asphalt plant were located to the south-east of the quarry holding, east of the access road, in an area where rock was previously excavated to a relatively shallow depth (of between 5m and 10m).

Established ancillary facilities at the quarry include the main site office, a weighbridge and adjoining weighbridge office, staff canteen and toilets, a wastewater treatment system, a wheelwash, a bunded fuel storage area, a garage / workshop and a laboratory.

A number of former farm buildings and a storage yard remain in place to the west of the site access road and the concrete block yard which was built on foot of the 2016 quarry planning permission. The farm buildings comprise a stone barn and two concrete walled barns, each with a corrugated tin roof. A more modern brick-built two-storey building is also present in this location. The existing site layout at Ballinclare Quarry is shown in Figure 4-8-1A.

When it was operating, the quarry at Ballinclare was effectively worked dry, with very little inflow of groundwater recorded into the quarry void. A sump located at the lowest point on the quarry floor collected minor groundwater inflows and any surface water falling over the excavated area.

Water collecting in the sump was periodically pumped to water storage tanks for subsequent re-use in concrete production or for on-site dust suppression. Surplus water was pumped off-site via a surface water treatment system (a number of settlement lagoons in series) to a drainage channel which falls to the Ballinclare Stream immediately beyond the north-western site boundary.

Existing Water Management System

At the present time, rainfall across the existing quarry site (including the former concrete / asphalt production yard) generates run-off which generally falls to the quarry void, while run-off across the western side of the quarry site falls to the drainage channel leading off-site to the Ballinclare Stream. Given that the diorite bedrock is a poor aquifer, there is relatively little infiltration to ground or recharge to the underlying groundwater table.

Since extraction and production activities ceased in 2016, the quarry void has been flooded with surface water run-off and groundwater ingress and water levels have risen to cover the quarry floor. The current discharge licence issued by Wicklow County Council in respect of the existing quarry development (WPL 116, dated 1 November 2019) provides for the ongoing off-site discharge of water collecting in the quarry void to the Ballinclare Stream (and Potters River further downstream).

The discharge licence requires water pumped from the existing sump (using a rising main pipe) to be passed through an approved treatment system located at the former storage area. The treatment system comprises a bespoke Siltbuster treatment unit required to treat naturally elevated levels of arsenic in the water collecting in the quarry void. As well as reducing arsenic concentrations, the unit also removes suspended solids from the water.

Following treatment, surface water run-off flows under gravity towards the existing network of settlement lagoons for further polishing and sediment removal. The settlement lagoons provide approximately 16 hours retention time which is generally considered sufficient, as the treatment plant removes the majority of suspended solids in the discharge waters.

Thereafter, the treated run-off flows under gravity along the channel which drains to the Ballinclare Stream. Approximately 400m north and downstream of the discharge point, the Ballinclare Stream flows into the much larger Potters River. The layout and configuration of the existing surface water management system, including the treatment system approved by the current discharge licence, is shown in Figure 4-8-1A.

The background normal pumping volume from the quarry, based on groundwater inflows and surface water run-off is of the order of 860m^3/day, while the maximum discharge volume is of the order of 1,730m^3/day. If pumping proceeds at the maximum rate permitted, it is estimated that it could take many months to pump out the existing void in advance of quarry backfilling / landfilling.

PROPOSED DEVELOPMENT

Development Overview

The proposed development at Ballinclare Quarry provides for the importation, disposal and/or recovery of inert construction and development wastes (C&D) generated by projects in Counties Wicklow, Dublin and Wexford and for the long-term restoration of the former quarry.

It is proposed to backfill the existing quarry void to original / surrounding ground level by importing and landfilling inert soil and stone waste and in so doing re-establish the landform which existed prior to quarrying. The landfilling and restoration activities will both be undertaken on an ongoing, progressive basis.

As part of the proposed development, suitable uncontaminated, undisturbed, natural soil waste and/or soil by-product (ie. non-waste) which conforms to an engineering specification will be imported for re-use in the construction of basal and sidewall clay liners required for the inert landfill.

Some uncontaminated topsoil waste and/or topsoil by-product will also be imported for use in the final restoration of the backfilled landform. Topsoil will be temporarily stockpiled at the landfill facility as required, pending its re-use as capping / cover material.

The proposed development also provides for the establishment and operation of a construction and demolition (C&D) waste recovery / recycling facility across the footprint of the existing paved concrete blockyard at the quarry. The principal wastes to be recycled at this facility will include concrete (ready-mixed, reinforced, blocks and/or pavement slabs), bricks and bituminous mixtures (hardened asphalt returns and road planings).

The proposed development provides for the following:

- The backfilling of the existing void at Ballinclare Quarry, through disposal of imported inert soil and stone waste (and other particulate / sludge wastes) and its progressive restoration to long-term grassland / scrub habitat thereafter;
- Continued use of established site infrastructure and services including, site / weighbridge office, staff welfare facilities, wastewater treatment system, weighbridge, garage / workshop, wheelwash, hardstand areas, fuel and water storage tanks to service the proposed development;
- Installation of a new weighbridge along the inbound lane of the quarry access road; together with a new wheelwash facility to be located along the proposed egress route leading out of the facility,
- Decommissioning of any remaining fixed plant and infrastructure associated with former rock extraction activities or aggregate, concrete and asphalt production activities;
- Off-site removal of any materials or bulky wastes associated with the former quarrying and production activities;
- Construction of an industrial shed (portal frame structure) at the paved blockyard area to house crushing and screening equipment and process / recycle inert source segregated C&D waste (principally solid / reinforced concrete, bricks, ceramics and solid bituminous waste mixtures);
- Use of any remaining external paved area surrounding the C&D waste processing shed as a hardstanding area for the external handling and storage of both unprocessed and processed C&D wastes;

- Separation of any intermixed construction and demolition (C&D) wastes (principally metal, timber, PVC pipes and plastic) prior to its removal off-site to authorised waste disposal or recovery facilities;
- Installation and operation of a soil washing plant in the former concrete / asphalt yard in the south-eastern corner of the application site to produce recycled aggregates from claybound C&D waste intake for use in construction. Intake and recovered materials associated with this activity will be stockpiled around the surrounding paved yard area;
- Construction of an on-site (passive) wetland treatment system (in phases, as required to achieve water quality discharge limits) and attendant drainage infrastructure to treat excess surface water run-off / groundwater collecting in the sump / floor of the quarry area during backfilling / landfilling operations, surface water run-off from the C&D waste recovery / recycling area and any run-off over or through the landfilled inert waste prior to discharge off-site;
- Re-use of an existing storage shed as a dedicated waste inspection and quarantine facility to inspect and store suspect waste consignments as required. Any waste which has been accepted at the facility and is suspected of failing to comply with the inert waste acceptance criteria for the facility will be temporarily stored at this location pending results of further waste classification testing and a decision as to how and where they should ultimately be disposed of or recovered.
- Upgrading and ongoing maintenance of established internal haul roads across the application site;
- Temporary stockpiling of topsoil pending re-use as cover material for final restoration of the inert landfill / backfilled quarry;
- Environmental monitoring of noise, dust, surface water and groundwater for the duration of the landfilling and restoration works and C&D waste recovery / recycling activities and for a short aftercare period thereafter.

The proposed layout of site infrastructure and locations of site services are shown on Figure 4-8-1B.

SITE INFRASTRUCTURE

Site Screening

At the present time, almost all views into the existing quarry and the application site are screened by roadside and intervening vegetation. Dense vegetation growth and perimeter screening berms along the site boundary essentially reduce the visibility into the existing quarry development to almost zero.

Site Access

Under the 2016 quarry planning permission, HGV's travelling to and from Ballinclare Quarry are directed to use a dedicated one-way haul route. HGV's approaching the quarry from M11 Junction 18 (at the Beehive Inn) travelled approximately 4km along the L1113 Local Road, then turned left onto the L1157 Local Road and travelled a further 600m up to the junction with the existing quarry access road. Traffic departing the quarry turned left and travelled along the L1157 for approximately 2km, up to its junction with the R772 Regional Road (the former N11 National Primary Road) at the Tap Restaurant, and from there proceeded north (or south) to the M11 Motorway.

In pre-application consultations with Wicklow County Council, a walkover survey of the existing local road network around the quarry was undertaken and an assessment made of aspects such as road

geometry, structural integrity, traffic flows and travel speeds. Based on these assessments and having regard to local traffic flow characteristics and the changes arising after the M11 motorway opened in 2015, the Council advised that it would be preferable to revise the existing long established haul route to the quarry / application site so that HGVs would avoid the L1113 Local Road and would instead travel the shorter distance to and from the R772 Regional Road, in both directions along the L1157 Local Road.

In light of this feedback, its is proposed to route all traffic to and from the proposed waste facility at Ballinclare Quarry along the L1157 and to make provision for a comprehensive road improvement scheme along the length of the L1157 leading up to the quarry access road , including road widening to 6.0m over most of the route length, with road strengthening and repair overlay and road markings.

The majority (>95%) of the HGVs travelling to the proposed waste management facility from the direction of Dublin and North Wicklow will use the M11 Motorway, exiting at Junction 18 and joining the R772 southbound. After travelling south for approximately 4km, traffic heading for the waste facility will turn right from the R772 and onto the L1157 at the ghost island junction near the Tap Restaurant at Kilbride. The access junction to the quarry / waste facility is located along the L1157, approximately 2km north-west of the R772 junction.

It is estimated that less than 5% of HGV traffic will arrive from the direction of Arklow and North Wexford. This traffic will use the M11 Motorway, exiting at Junction 19 to turn onto the R772 Regional Road at Jack Whites Pub. It will then travel north for approximately 5km and turn left, off the R772, and onto the L1157 and continue up to the quarry / waste facility.

Adopting this haul route, will mean that all HGV traffic departing the proposed waste facility must turn left and follow the upgraded L1157 back to the R772 and the national motorway network.

Site Security

At the present time, the following measures have been put in place at Ballinclare Quarry to secure the external perimeter and restrict access to protect the property and safeguard public safety:

- Stockproof fencing has been erected along the site boundary (in accordance with the Quarry Regulations 2008). All necessary warning signs are displayed at visible locations around the property boundary at appropriate intervals;
- Existing perimeter hedgerows species have been reinforced where required to provide an impenetrable barrier around the property;
- A large, robust metal gate is in place at the entrance to the quarry. The gate is locked at all times outside operational hours and when there is no ongoing activity at the quarry.
- The site is currently actively monitored by NETWATCH security.

There is no other vehicular access to the quarry other than from the L1157 Local Road. Prior to commencement of the proposed landfilling and C&D waste recovery activities, a survey of the entire site boundary will be undertaken and where necessary, stockproof fencing will be replaced or repaired as necessary and hedgerows will be strengthened or fortified by additional planting.

All heavy good vehicles (HGVs) importing inert soil and stone / C&D wastes to the proposed development will be required to pass over a weighbridge along the access road leading into the site. CCTV cameras will be installed around the weighbridge and weighbridge office and used to inspect all inert soil and stone / C&D wastes being imported to the facility.

Offices and Ancillary Facilities

The existing quarry site / weighbridge office is located on an elevated platform in the centre of the existing access road leading into the quarry, as shown in Figure 4-8-1B. This office will be the designated site office for the proposed waste facility and a copy of all site records will be held there.

There is an established canteen / changing room and toilet facilities located at the end of the access road into the quarry, around the existing garage / workshop, as shown in Figure 4-8-1B. Effluent from the toilet facilities will be treated by way of a proprietary effluent treatment system (an Aeration Treatment Unit for secondary treatment and a two module Puraflo unit for tertiary treatment), previously approved by way of the 2104 planning permission.

Weighbridge

In order to track and record the amount of material imported to the waste facility, all HGV traffic will be directed across a new weighbridge which will be installed along the inbound lane of the site access road, as shown on the proposed site layout plan in Figure 4-8-1B.

The existing site / weighbridge office is located on an elevated platform alongside the existing / proposed new weighbridge, with windows at a similar level to that of driver cabins when HGV's are being weighed in. This configuration facilitates easy exchange of documentation between site staff and HGV drivers and avoids the need for drivers to leave their HGV's to complete / submit delivery dockets. The internal layout of the existing office will be re-configured to accommodate the new weighbridge along the inbound lane of the access road.

On arrival, HGV drivers will identify themselves to site-based staff at the site / weighbridge office (most likely the facility manager or an authorised assistant) before proceeding to the active landfilling area or C&D recovery areas (as appropriate). Staff will take a copy of the delivery docket, record the time and date of arrival, the nature, origin and weight of the imported waste (or by-product) , the customer / Client name, the truck licence plate number, the relevant waste collection permit details and any further details required by the EPA waste licence. All records of waste intake will be maintained on site for waste tracking and auditing purposes.

Any recycled aggregates produced from C&D wastes or non-inert construction and demolition waste inadvertently brought to the facility (and separated from other, acceptable wastes) will be dispatched off-site and will be weighed out at the existing weighbridge located along the outbound lane of the site access road.

Wheelwash

In order to prevent transport of mud, clay and dust onto the public road network, all traffic exiting the proposed waste facility will be a routed through a planned new wheelwash and existing wheelwash facility along the outbound / egress lane of the existing site access road, as indicated on the site layout plan in Figure 4-8-1B.

Site Roads, Parking and Hardstanding Areas

All trucks delivering inert soil / C&D waste (or by-product) to the facility will be confined within the existing site area. Trucks will turn into the site from the L1157 local road and travel over the existing paved road surface, over the weighbridge and up to the existing site garage / workshop before turning for the either the active inert landfill area or for the C&D waste recovery area / soil washing plant as appropriate. As traffic moves across the facility thereafter, it will travel over a network of unpaved haul roads constructed of crushed stone / hardcore fill.

There is existing provision for employee / visitor car parking around the existing site offices, and for HGV's around the existing garage /workshop area, as indicated in the site layout plan in Figure 4-8-1B.

Traffic Control

Where appropriate, and subject to agreement / approval from the Local Authority, roadside notices will be placed along the existing local road network leading to the proposed inert waste facility to advise that HGV's will be turning on and off the road ahead.

All HGV traffic entering the facility will be required to pass over the proposed new weighbridge along the inbound lane, while all egressing HGV traffic will be routed across through the new / existing wheelwashes and existing weighbridge along the outbound lane.

Internally, within the waste facility, warning notices, direction signs and speed restriction signs will be erected where appropriate along the internal road network leading to and from active landfilling areas, the C&D waste recovery areas and/or the waste inspection and quarantine area.

Utilities and Services

Site staff at the waste facility will use existing toilet, hand washing and welfare facilities. Water is supplied to these facilities from an existing groundwater production well on-site, identified as the Water Supply Well in Figure 4-8-1A. Potable water is not sourced from this well however and bottled drinking water is delivered to the site on a regular basis, as required.

Water supplied to the wheelwash is recycled in a closed system and is topped up with water from the supply well or from the quarry sump as required. The wheelwash generates very little run-off and any it does either rapidly evaporates or infiltrates to ground. Water from the quarry sump is pumped to a water tank and used for dust suppression purposes.

Wastewater from the site offices and staff welfare facilities is piped to an existing on-site effluent treatment system. This system, which comprises an aeration treatment unit and two modular Puraflo system over a 300mm deep gravel bed and was previously approved by way of the 2016 quarry planning permission.

Electricity will provide the principal source of energy for office lighting and heating at the facility and will power any fixed plant or equipment. There is an existing connection to the electricity distribution network and a transformer at the quarry which will continue in service over the life of the proposed waste facility.

Although telephone lines run along the local road network leading to / from the proposed waste facility, it is envisaged that site-based staff overseeing waste activities will be contactable by mobile phone only and that email and broadband connections to the site office will be provided via a mobile (4G) network.

Given the lack of combustible waste materials at the facility, it is considered highly unlikely that a fire will break out during inert landfilling or C&D waste recovery operations. A range of fire extinguishers (water, foam and CO_2) will be kept at the site office / welfare facilities to deal with any localised small-scale fires which might occur. Additional fire-fighting capacity can be provided by storing water in a mobile bowser on unsealed hardstand areas surrounding the site offices / facilities.

Proposed C&D Waste Recovery / Recycling Shed

It is proposed to construct a large, roofed portal frame structure, open on two sides at the existing paved concrete (former blockyard) area to the west of the site access road. All future C&D waste processing, crushing and recovery / recycling activities will take place within this structure in order to reduce noise and fugitive dust emissions.

The proposed structure will be of portal frame steel construction and will have a plan footprint area of approximately 42m long by 36m wide, with the long axis orientated in an east-west direction. The structure height will vary from 10m at the haunch (top of sidewall column supports) to a maximum of 12m at the roof apex.

The supporting columns for the proposed C&D waste recovery / recycling shed will be founded on shallow (pad) foundations and will be cross braced along the long axis to provide lateral stiffness. The sides of the structure will comprise a concrete wall to 3.5m above ground, with the remainder of the side walls clad to haunch level by single skin steel wall panels supported on side rails. Roof panels will be carried on purlins. There will be further cross-bracing between structural frames at roof level to enhance lateral stiffness as required.

It is envisaged that once C&D waste recovery / recycling infrastructure is established at Ballinclare Quarry, mobile crushing plant will be brought to the facility periodically (when sufficient quantities of recyclable material has accumulated in external stockpiles).

During recycling campaigns, the crushing plant will be set up on the paved concrete floor within the proposed open-sided waste recovery shed. Recyclable C&D waste will be transferred from external stockpiles to the mobile crusher within the shed. Once crushed and processed, the recycled material (secondary aggregates) will be moved out of the shed to external stockpiles pending subsequent testing, sale and export off site.

C&D waste recovery / recycling activities will produce a particulate, granular aggregate conforming to standard industry specifications and End-of-Waste criteria set by the EPA. It is envisaged that they will most likely be re-used in road construction or for non-structural concrete production.

Surface water run-off from the shed roof and the existing paved concrete slab will be collected by surface water drains and/or channels around the perimeter of the slab and transferred across to the proposed on-site (passive) wetland treatment system to remove any potential sediment and treat any potential contaminants in the run-off.

Soil Washing / Aggregate Recovery Plant

At the outset of the project, a soil washing plant will be set up and commissioned in the former concrete / asphalt production yard in the south-eastern corner of the application site. This plant will effectively recover sand and gravel and produce recycled (secondary) aggregate from selected, more granular soil waste and claybound C&D waste intake imported to the facility.

The soil washing plant comprises a loading hopper, a number of soil screens in series with connecting conveyor systems, a primary wastewater treatment tank (thickener), a buffer tank holding sludge and recycled water, an elevated plate press and filter cake discharge area.

The soil washing plant comprises a number of separate connected elements of plant which are identified below. For each item of plant, outline details are provided below as to their function / role in the soil washing / aggregate recovery process:

- Feed Hopper : Accepts soil waste intake from front-end loaders. The hopper has extenable sides to facilitate charge filling to increase efficiency of waste input;

- Primary Scalping Screens : Removes any oversized materials within soil intake which is not suitable for processing by the washing plant;
- Feed Conveyors : A number of inclined electrically driven feed conveyors lift and drop sorted materials into various elements of processing plant placed in series;
- Log Washer : Paddles fitted to twin shafts of the log washer scrub the granular soil ./ soil bound C&D intake materials and transform it into a granular product suitable for screening into aggregates of various size grades. A slurry pump transfers fines to be sand recovery unit;
- Screens : Vibrating horizontal sizing screens to sort materials by particle size;
- Sand Recovery Unit : Sediment laden water from the modular log washer is passed through hydrocyclones were silt is removed from the sand. The sand slurry passes over a horizontal dewatering screen to produce two grades of market ready sand;
- Screen Decks : Vibrating inclined sizing screens to further sort materials by particle size;
- Stockpile Conveyors : A number of inclined electrically driven radial stockpile conveyors;
- Thickener (Primary stage water treatment) : Silt laden water from the sand recovery unit is pumped to the centre of the thickener to settle out. An integrated unit doses pre-mixed flocculent to the material to ensure rapid settlement. A thickened sludge is pumped from the base of the tank to the sludge buffer tanks whilst clarified water overflow is pumped to the recycled water buffer tank for recirculation back to the washing plant;
- Buffer Tank (Sludge): Settled sludge from the thickener is stored in the buffer tank to ensure a consistent feed to the elevated filter press. The sludge buffer tank features a set of agitators to ensure sludge consistency is maintained;
- Buffer Tank (Recycled Water) : Holds the recycled water recovered from the thickener and filter press for re-circulation back to the washing plant;
- Plate Filter Press : Slurry is pumped into the filter press from the sludge buffer tank. Solids build up on the filter cloth, forming the filter cake. The filtrate exits the filter plates through the corner ports, yielding clean filtered water which is pumped to the recycled water buffer tank. Once the cycle is complete the filter cake is released into the discharge area and the cycle is repeated;
- Filter Cake Discharge Area : The filter cake contains 85% dry solids and is picked up by a front end loader and transferred via haulage truck for disposal at the adjoining lined landfill facility.

Note that other industry standard methods / means of dewatering of the thickened sludge are also under consideration and may be implemented instead of the filter plate system outlined above.

There will be no surface water / groundwater emissions or off-site discharges arising from the proposed soil washing and aggregate recovery activities as all process water will be re-circulated within a closed loop system. As such, there is no requirement to make provision for treatment for any process water associated with the activity. Top-up water will be periodically required for the plant and will be provided from the on-site water management system. The proposed location and configuration of the soil washing / aggregate recovery plant is shown in Figure 4-8-1B.

All elements of the washing plant are either mobile or largely self-standing and can be readily lifted into place, assembled in-situ and relocated / removed as required. Most of the plant will be supported on the existing concrete slab which extends across the former production yard. Shallow concrete foundations will likely be required to support the elevated plate press which dewaters the thickened sludge to form a filter cake.

Lighting

Mobile lighting will be provided as required around the site offices / facilities / fixed plant and at the site entrance / access and around active inert landfill areas and the C&D waste recovery / recycling areas. Such lighting will be sufficient to permit safe operation of plant and machinery during early morning and late evening periods over winter months.

Equipment Storage

Mobile plant and equipment used in landfilling operations will be stored on hardstand areas within the waste facility. As site access can be restricted outside of working hours, it is not considered necessary to provide a dedicated, secure compound for plant and equipment within the site.

Storage for small items of plant and equipment, replacement parts, minor quantities of hydraulic oil and/or lubricants, storage of minor quantities of liquid (oil) waste, safety clothing and equipment will be provided in the existing garage / workshop at the northern end of the site access road, at the location shown on the site layout plan in Figure 4-8-1B.

In addition to providing for storage of potentially hazardous oils / waste liquids over spill pallets, internal bunding may also be provided to contain any potential leaks or spills of potentially hazardous oils or waste liquid.

Fuel and Oil Storage

Fuel will be stored in the existing bunded fuel storage tanks (capacity 53,000 litres) located along the back (eastern) wall of the garage / workshop at the northern end of the site access road. The bunds have a volume of at least 110% of the largest tank.

Refuelling of mobile plant and machinery at the proposed waste facility will generally take place over the existing concrete hardstanding area in front (east) of the fuel tank. Surface water run-off from the concrete hardstand area is captured by sub-surface drainage pipes and passed through an existing hydrocarbon interceptor before being discharged to ground via a soakaway / infiltration area. The existing interceptor will be cleaned out and fully serviced prior to commencement of waste activities at the facility.

On other occasions , and only when necessary, mobile plant will be refuelled directly by a fuel tanker over paved concrete surfaces. The location of the existing fuel tank, hardstand area and hydrocarbon interceptor are shown on the site layout drawing in Figure 4-8-1B.

Plant Maintenance

There is an existing workshop at the quarry available for routine servicing, maintenance and/or repair of plant and machinery. Oils and lubricants including waste materials will be stored under cover on pallets and bunds inside the workshop.

Some maintenance of plant may be undertaken over the paved concrete slab in front (east) of the fuel storage tanks, over the paved slab at the C&D waste recovery area or at the existing service pit along the eastern side of the existing site access road. More extensive or non-routine repair or maintenance of plant will take place at off-site locations.

Waste Inspection and Quarantine Facility

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).

Any soil and stone / C&D waste which is accepted for intake to the facility but is subsequently suspected to be non-inert and/or non-compliant with approved waste acceptance criteria will be transferred to the waste inspection and quarantine facility by HGVs for closer examination and/or follow-up testing.

Should subsequent inspection or testing identify any non-inert material which cannot be managed at the facility, it will be segregated and temporarily stockpiled and held within the shed pending collection and removal off site to an authorised waste disposal or recovery facility (by an authorised waste collector).

Provision will also be made for temporary storage of any separated non-inert construction and demolition waste (including metal, timber, plastic etc.) in skips at this facility prior to removal for off-site recovery or disposal at another authorised waste facility.

INERT LANDFILL DESIGN

The existing void at Ballinclare Quarry is approximately 70m deep at its deepest point, with sub-vertical faces around the perimeter. The quarry void is accessed via two haul roads, one from the centre and the other from the south eastern corner.

The requirements set out by the EPA Guidance for inert landfill sites are that the lining system should comprise the following :

- *Base and side wall mineral layer of minimum thickness 1m with a hydraulic conductivity less than or equal to 1x10^{-7}m/s or a 0.5m artificial layer of enhanced soil or similar giving equivalent protection to the foregoing*.

It is envisaged that the basal lining system will comprise a 1m thick layer of uncontaminated low permeability compacted soil. It is most likely to comprise pre-selected, excess well graded clayey glacial till, generated by construction activities across the wider region.

It is expected that the soils used for construction of the basal liner will typically be imported to site as engineering fill (ie. as a non-waste or by-product) rather than as waste and will be placed and compacted intermittently (on a campaign basis) in accordance with an engineering specification. Where acceptable and feasible to do so, filter cake / dewatered fines material from the soil washing plant could also be used for landfill lining purposes. The basal liner will have an upper formation level of approximately 38mOD and will be subject to verification testing to confirm that it achieves the target permeability required for an inert landfill in advance of any subsequent landfilling activity.

Around the perimeter of the existing quarry, a steepwall lining system will be installed progressively upwards from the lined quarry floor, against steep sections of the quarry face, as the landfilled waste also progresses upwards. Above the crest of the quarry faces, the flatter ground or shallow slopes will be trimmed and lined, in a similar manner to the base.

The steepwall lining system will comprise a minimum 2m wide clay liner installed immediately against the face of the quarry. As with the basal liner, the source soils for the sidewall liner are likely to be uncontaminated excess clayey glacial tills generated by construction activities and will be subject to similar placement and verification procedures.

A leachate drainage system (to collect and remove water percolating through the waste body) is not required for an inert landfill and as such, no provision is made for it at this facility.

Currently several stockpiles and a flooded sump (extending locally to approximately 22mOD) are present on the quarry floor. It is envisaged that the flooded sump will remain in place over the initial phases of landfill development. As the landfill activities progress toward this area however, the sump will be progressively backfilled with previously excavated rock in existing stockpiles, other excavated rock / stone across the quarry site, as well as soil imported from external greenfield sites (as non-waste or by-product). The intention is that these materials will be used to backfill the deeper bench / sump to create a level formation on which the engineered basal liner will be constructed, with an upper (formation) level at an elevation of approximately 38mOD.

The European Landfill Directive (1999/31/EC) and the EPA Landfill Design Manuals do not require an inert landfill to have an upper low permeability barrier, also referred to as an engineered capping layer. Notwithstanding this, the likelihood is that the inert soil waste imported and placed at the proposed landfill at Ballinclare Quarry will predominantly comprise low permeability clayey till and will effectively behave as a capping layer in practice.

EPA guidance on Landfill Restoration and Aftercare advises that the final capping and restoration scheme for an inert landfill should comprise topsoil and subsoil, thickness dependent on after-use, but to a minimum combined depth of 0.65m. It has been assumed for conceptual design that a minimum of 150mm of topsoil and 850mm of subsoil will be used for the final restoration of the completed landform at Ballinclare Quarry.

Formation Levels and Phasing

Final formation levels on completion of the landfilling and restoration works vary on account of the sloped nature of the original, pre-quarrying landform, from approximately 90mOD at the northern boundary to approximately 55mOD to 60mOD along the southern boundary.

The final, restored landform at Ballinclare Quarry has been developed to produce a slightly domed landform that falls from the northern side of the site to the south eastern corner and is shown in the restoration plan in Figure 4-8-1C. Corresponding cross-sections are shown in Figure 4-8-1D.

It is envisaged that the existing quarry at Ballinclare will be restored in four phases. The landfilling works will progress initially across the deeper quarry void from west to east, in Phases 1 through 3, and turn southwards thereafter in Phase 4 to progress across the former processing / production area, as indicated in the phasing plan in Figure 4-8-1E.

Each landfill phase will be initially developed by placing a minimum 1m thick layer of low permeability material across the quarry floor to form the basal liner. The liner will not have to cover the whole basal area of any defined phase to allow the placement of inert soil and stone waste. A minimum area of liner would however have to be in place to ensure that there is sufficient space to allow HGV's / trucks and landfill plant to operate.

As the basal area fills with imported inert wastes, the installation of the basal liner would then progress in line with the importation of suitable low permeability materials. Once the basal extent of the phase has been reached, the installation of the steepwall liner to the walls would be progressed upwards and the open face of inert waste would then be sloped back at a suitable gradient (as shown in the phasing plan). For initial scheme development purposes, it is assumed that waste slopes no steeper than 1v:3h will be developed.

Such an approach reduces the volume of low permeability clay lining material required to be imported to the facility initially. During the operational life of the facility, the basal and sidewall lining systems may be installed as suitable clay soil is imported or, alternatively, it could be stockpiled, to be placed on a campaign basis either by site-based personnel or by a Contractor.

As indicated on the phasing drawing in Figure 4-8-1E, by working in this way, it will be possible to provide for progressive restoration of the former quarry void from an early stage in the proposed development. Early establishment of vegetation cover will improve the visual characteristics of the site and reduce the potential volume of suspended solids carried in surface water run-off.

In Phases 1 and 2, following installation of the basal clay liner, landfilling will progress vertically upward from the existing quarry floor level of 37mOD, with the steepwall clay liner being placed / installed upwards from the quarry floor, against existing quarry faces, typically a few metres (1-2m) ahead of inert waste soil and stone being placed against it. Once the quarry void has been filled to a level of approximately 55mOD to 60mOD, a sloped landform will be constructed thereafter, rising north and eastwards above this level to a maximum of around 90mOD, in line with the final restoration contours shown in Figure 4-8-1C (and the original landform which existed prior to the quarry development).

In Phase 3, landfilling will progress in a similar manner, but from a lower level which extends locally down to approximately 22mOD (at the deeper bench) up to approximately 55mOD to 60mOD. While the deeper excavation in this area will serve as a large sump to drawdown groundwater levels for the duration of Phases 1 and 2, during Phase 3, it will be necessary to install riser wells from the base of the excavation to facilitate continued dewatering around this area, the installation and operation of the groundwater collection system and control of groundwater uplift pressures beneath the basal liner.

The riser wells will continue in operation until such time as the weight of fill placed above the basal liner exceeds the potential uplift pressures acting on it. When decommissioned, the wells will be backfilled with bentonite to create an effective seal through the basal liner.

In Phase 4, landfilling will progress southwards across the former concrete / asphalt production area, following decommissioning of the soil washing plant. Landfilling will progress from the existing floor level of approximately 50mOD to a final restored level which falls from approximately 88mOD to 90mOD in the north to 55mOD in the south. Throughout this phase of landfill development, a sump at an existing low point in the south-eastern corner to collect surface water run-off.

The area around the existing sand storage shed on the southern limit of the landfilling area (which will be re-used as a waste inspection and quarantine shed for the duration of the on-site waste activities) will be last to be landfilled and restored.

Note that the phasing plan provided in Figure 4-8-1E is indicative and will need to be reviewed based upon anticipated input rates of inert soil and stone waste and the availability of low permeability material for construction of the engineered basal and sidewall liner systems.

Slope Gradients

Temporary side slopes in the sidewall liner and landfilled soils will be graded at an angle no steeper than 26° (approximately 1v:2h), sufficient to ensure no large-scale instability arises over the short-term. Ongoing assessment of slope stability will be undertaken at the landfill facility as landfilling progresses.

In the longer-term, once landfilling and final restoration works are complete, there will be no risk of instability, as the final ground surface will be graded to a relatively shallow slope, similar to the natural slope which existed prior to the quarry development. Permanent restored slopes on completion of the filling and restoration activities will be comparable to those on surrounding lands, generally shallower than 1v:5h (11°) and everywhere shallower than 1v:2h (26°).

Temporary access ramps in and out of active filling areas will be at a gradient of approximately 1v:10h. Temporary side slopes in soil will be constructed at gradients no greater (steeper) than 1v:2h in order to ensure stability.

Given that the bulk of the soil materials to be imported to site for landfilling and restoration purposes are likely to be relatively competent glacial tills, no long-term slope instability is anticipated to occur. This assertion is made in view of the fact that glacial till slopes of 1v:2h are routinely constructed for infrastructure projects across Ireland and are demonstrably stable.

Groundwater / Surface Water Management Infrastructure

When it was operational, the former quarry was effectively worked dry with very little inflow of groundwater ingress into the quarry void, consistent with the GSI classification of the diorite bedrock as a poor aquifer.

Since quarrying ceased and management of quarry water was suspended in 2016, the quarry void has been partially flooded. To enable the quarry to be re-engineered as a landfill, the quarry is currently being emptied of ponded water. When completed, a groundwater control system will have to be installed beneath the proposed clay liner system to ensure hydrostatic uplift pressures do not damage the proposed clay liner system. It is envisaged that the drainage system at the base of the quarry / inert landfill will comprise a herringbone system of granular drainage channels and that these will collect and direct any groundwater inflow to the sump at a low point on the quarry floor.

To prevent damage to the clay liner system, groundwater will need to be continually lowered by pumping from the sump until such time as any inert waste landfilling has reached a depth that overcomes the hydrostatic pressure of the surrounding groundwater table. By developing the quarry void from west to east, the existing deeper bench / sump in the quarry floor can be kept in use and maintained for as long as possible. Excess water collecting in the sump (and not diverted for use in soil washing or dust suppression) will be pumped to the proposed wetland treatment system (together with surface water run off in contact with inert waste materials) by a conventional pump.

As noted above, previous experience of operating the quarry is that the surrounding volcanic rock is relatively tight, with relatively limited volumes of groundwater flowing through it. The volume of groundwater likely to collect in the sump is therefore expected to be low, with the bulk of any water removed comprising infiltrating rainfall and/or surface water run-off over quarry void or on lands draining to it.

It is envisaged that low rise clay bunds will be constructed at the base of the (lined) active landfilling areas / cells in order to segregate surface water run-off / leachate from the active landfill area from that arising elsewhere across the quarry footprint. The run-off / leachate will collect in a dedicated sump and be monitored, managed and pumped separately to the water treatment facilities. It is however noted that any excess (i.e. unused) water / run-off collecting in the quarry sump (which has not been in contact with the imported inert wastes) will itself also need to be pumped and treated prior to off-site discharge, given the naturally elevated levels of arsenic which are recorded within it. A schematic layout of the surface water management system at the inert landfill and across the wider facility is shown in Figure 4-8-1F.

During the operational life of the landfill, the quarry sump will remain open until Phase 3 of landfilling commences, at which point a riser pipe will be installed progressively upwards to allow a submersible pump to access the sump and continually lift and remove any dewatered groundwater and surface water run-off (from non-landfill areas) collecting in it. Pumping will continue until such time as the overlying inert waste has achieved a height where the weight of waste exceeds the maximum uplift pressure from surrounding groundwater. At that point in time, pumping of

groundwater is likely to cease and the riser pipe will be decommissioned (most likely by backfilling it with bentonite).

Thereafter, within the Phase 3 footprint area, surface water ponds will be formed behind low rise clay bunds at the low point of the landfilling area to collect any surface water run-off directed to it from the active and/or restored landfill areas. Water collecting in these ponds will then be pumped across to the wetland treatment area for the duration of remaining landfill activity across this area.

Within the footprint of Phase 4, a surface water pond will similarly be formed behind clay bunds at the low point of the landfilling area. Surface water run-off over the basal liner and/or landfilled materials will be directed to and collected at this pond and will then be pumped across to the wetland treatment area for the duration of landfill activities across this area.

As the site is progressively restored, surface water ditches will be constructed as part of the restoration works to divert surface water run-off away from the backfilled landform, towards the wetland treatment area on the western side of the site.

Should it be necessary to ensure sufficient treatment capacity for run-off from active soil waste infill areas, provision is also made for an additional settlement / holding pond (separate to the wetland treatment area), to which run-off from restored areas (which has not been in direct contact with the landfilled inert wastes) can be diverted. The location of this separate, dedicated settlement pond is shown in Figure 4-8-1B.

Surface Water Treatment Infrastructure

At this waste facility, there will be a requirement to discharge water in the former quarry void off-site to the Ballinclare Stream and Potters River during the initial site establishment / construction phase. This is currently being undertaken under the terms of the existing quarry planning permission and a trade effluent discharge licence issued by Wicklow County Council (Ref. WPL116).

Dewatering of the quarry is ongoing at a rate close to the maximum permitted by the trade effluent discharge licence and is likely to be completed over many months. It is expected that off-site discharges will be at a lower rate during the landfilling / operational phase, which could extend for a minimum of 8 years to in excess of 17 years, dependent on the rate of inert soil / waste intake.

The approved water treatment system installed prior to commencement of quarry dewatering, includes a bespoke Siltbuster treatment system. This is necessary to treat naturally elevated levels of arsenic in the water collecting in the quarry void. As well as reducing arsenic concentrations, the unit also removes suspended solids from the water. The treatment system will remain in service for the duration of the quarry dewatering phase and for subsequent landfilling operations.

For this project, the term 'leachate' will be taken to apply to the slightly contaminated liquid that is potentially generated as influent rainwater and/or groundwater flows over or through the inert waste mass, picking up soluble and particulate matter as it moves to a low point at the base of the landfill.

Landfill leachates have varying compositions that reflect the types of wastes deposited and through which rainfall percolates. There is on-going generation of leachate from rainfall and groundwater sources over the operational life of a landfill. As a result of the containment provided by the basal and side liners, any leachate from the landfilled mass needs to be removed and treated prior to being discharged off-site.

Based on SLR's past experience, it is likely that the inert waste landfill at Ballinclare will generate leachate that will have little or no ammoniacal nitrogen, BOD and COD but could have *potentially* elevated concentrations of sulphate, reduced pH and detectable concentrations of metals. In

addition, as inert soil and stone from construction sites can often contain some road planings and other materials associated with road maintenance and construction, some hydrocarbons / organics could also be present.

Leachate may also be generated for a period after landfilling activities have ceased. Once landfilling activities are complete and covered with low permeability soils, the infiltration of rainfall and the volume of leachate generated will be reduced.

A number of potential leachate treatment and disposal options were considered for the proposed inert landfill and waste recovery facility at Ballinclare. Arising out of this review, it was considered that the most suitable option for treatment of a leachate which principally requires reduction of inorganic substances would be an on-site (passive) wetland treatment system.

When installed in parallel, wetland areas can be independently placed out of service to allow for remediation and replenishment of infiltration / substrate media whilst still allowing on-going treatment of leachate through an active bed.

As the inert landfill is not currently in existence at Ballinclare Quarry, some initial assumptions have had to be made about the likely quality of leachate that will be produced by the inert landfill and the volumes that will be generated over time. To this end, a number of worst-case scenarios were considered, both in terms of leachate quality (most problematic in terms of composition) and volume (highest generation volume).

For initial sizing purposes, it was assumed that the volume of leachate requiring treatment at the proposed waste facility will be limited by the progressive restoration of the landfill landform over its operational life. Thereafter, worst case scenarios have been considered both in terms of leachate quality (most problematic in terms of composition) and volume (highest generation volume).

The effectiveness of 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 of time (should it be necessary) before reverting to more standard modes of operation, therefore providing flexibility should leachate generation rates and chemical constituents change over time.

Based on the initial assessment and design, the proposed wetland treatment system at Ballinclare Quarry will comprise the existing approved treatment system plus

(i) A leachate reception tank : up to 50m^3, self-bunded storage tank with level controls.

(ii) A pump house : housed is a standard shipping container (6.0m x 2.4m x 2.6m) containing feed, discharge and chemical dosing pumps;

(iii) A wetland treatment system: comprising the following elements in series
   - (a) Anaerobic (biochemical reactor) wetland;
   - (b) Iron Sequestering Unit (ISU);
   - (c) Aerobic wetland.

(iv) Off-site discharge via existing ditch / drainage channel to the Ballinclare Stream and the Potters River further downstream.

Based on the assumption that the leachate flow rate is generated from a progressively capped / sealed inert landfill, the area of on-site wetland required at Ballinclare Quarry is assessed to be of the order of 3.8 hectares. The location and approximate dimensions of the proposed wetland treatment area is indicated in Figure 4-8-1B.

SITE PREPARATION WORKS

Prior to commencement of quarry landfilling / C&D waste recovery activities, the following site preparation works will be required :

- Securing existing site perimeter with additional fencing / planting as required;
- Dewatering of the quarry void prior to any basal lining / landfilling activities;
- Cutting and mulching of any existing scrub and vegetation across the proposed development footprint and off-site removal to authorised waste facilities (undertaken in phases prior to commencement of works in designated areas);
- Decommissioning and dismantling of any other legacy infrastructure from prior development (eg. production plant, metal, WEEE, additives etc.) and removal off-site to other Kilsaran production sites or authorised waste facilities (as case may be);
- Installation of new weighbridge, reconfiguration of site / weighbridge office, installation of the new wheelwash facility along the egress route leading off-site and re-establishment of staff welfare facilities and existing wheelwash facility;
- Minor repair / maintenance / upgrading works to existing bunded fuel storage area and concrete slab with sub-surface drainage to hydrocarbon interceptor and soakaway area;
- (Re-)commissioning of previously approved septic tank and wastewater treatment facilities;
- Excavation, clearance and levelling of existing ground at proposed wetland area and construction of the wetland treatment area;
- Construction of the proposed concrete portal frame structure (open on two sides) at the C&D waste recovery facility;
- Construction / installation of surface water drainage infrastructure between the landfill, C&D waste recovery / recycling shed and paved concrete stockpiling area and the proposed wetland area (in phases, as required to achieve water quality discharge limits);
- Installation and commissioning of the soil washing plant in the former concrete / asphalt yard in the south-eastern corner of the application site;
- Upgrading of internal access roads across the site leading to the inert landfill, C&D waste recovery /recycling shed, materials recovery facilities and wetland area;
- Establishment of environmental control and monitoring infrastructure.

Some or all of the proposed site establishment / pre-commencement works outlined above will likely be subject to prior agreement of the EPA, in accordance with standard conditions attaching to any waste licence issued in respect of the proposed waste facility.

WASTE OPERATIONS AND PROCEDURES

The proposed landfilling and restoration of the of the former quarry at Ballinclare using inert soil and stone and the proposed C&D waste recovery activities comprise the following classes of waste activity in accordance with the Waste Management Acts 1996 – 20211:

Permitted Classes of Waste Activity

The proposed landfilling and restoration of the of the former quarry void using inert soil and stone / particulate / sludge wastes and the proposed C&D waste recovery activities comprise the following classes of waste activity in accordance with the Waste Management Acts 1996 – 2019:

- *Class D1 : Deposit in, on or under land.* This activity principally provides for used of inert soil and stone / particulate / sludge waste to backfill the former quarry void.
- *Class D5 : Specially engineered landfill, (e.g. placement into lined discrete cells which are capped and isolated from each other and from the environment).* This is the principal waste activity at the facility and has regard to the requirement to provide basal and sidewall liners and a protective barrier around the quarry void.
- Class D15 *Storage pending any of the operations numbered D1 to D14 (excluding temporary storage (being preliminary storage according to the definition of "collection" in Section 5(l), pending collection on the site where the waste is produced. This provides for on-site storage of materials pending disposal to landfill*. This activity provides for stockpiling of inert wastes prior to placement and final disposal at the inert landfill.
- *Class R3 : Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes).* This activity applies to proposed importation and use of topsoil for use in the final restoration of the completed landfill.
- *Class No. R5 : Recycling and reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials.* This activity applies to the potential importation and use of soil and stones for construction of landfill liners and for processing / recycling of inert C&D waste to produce secondary (recycled) aggregate.
- *Class No. R12 : Exchange of waste for submission to any of the operations R1 to R11*. This activity provides for the segregation of intermixed C&D waste (prior to removal / transfer to authorised off-site waste recovery facilities).
- *Class No. R13 : Storage of waste pending any of the operations R1 to R12.* This activity will be limited to the temporary storage of imported waste for on-site recovery (eg topsoil) or transfer to authorised off-site waste recovery facilities (eg. segregated wood or metal).

Permitted Waste Intake

The extraction void at Ballinclare Quarry will be backfilled using only inert materials (and possibly some C&D waste / recycled aggregate for haul road construction) from external, pre-approved development sites which generally complies with the inert waste acceptance criteria set out in Section 2.1.2 of *Council Decision 2003/33/EC dated 19 December 2002 establishing criteria for the acceptance of waste at landfills.* It is envisaged that the following wastes (with their respective List of Waste (LoW) Codes) will be deposited on land and landfilled at the facility:

- 01 01 02 Waste from mineral non-metalliferous excavations
- 01 04 12 Tailings and other waste from washing and cleaning of minerals
- 01 04 08 Waste gravel and crushed rocks other than those mentioned in 01 04 07
- 01 04 09 Waste sand and clays
- 01 04 12 Tailings and other wastes from washing and cleaning of materials other than those mentioned in 01 04 07 and 01 04 11
- 01 04 99 Wastes not otherwise specified*
- 10 10 06 Casting cores and moulds which have undergone pouring*
- 17 05 04 Soil and stones other than those mentioned in 17 05 03;
- 17 05 06 Dredging spoil other than those mentioned in 17 05 05;

- 17 06 04 Insulation materials
- 17 09 04 Mixed construction and demolition wastes*
- 19 09 02 Sludges from water clarification*
- 19 09 04 Spent activated carbon*
- 20 02 02 Soil and stone from municipal facilities.

(* subject to licensing approval and prior written agreement by the EPA)

The inert waste landfill will accept both soil and stones (LoW Code 17 05 04) which could also be acceptable for intake at (unlined) soil recovery facilities or which may not be acceptable for intake to such facilities for failing to meet any existing or future Waste Acceptance Criteria published by EPA.

Non-waste (or by-product) material will also be accepted at the landfill and used in basal or side wall liners or construction of internal (separation) bunds within the inert landfill.

The Applicant intends to seek Agency approval by way of this waste licence application, for an increase in the waste acceptance criteria limits for a number of parameters to be permitted for waste intake for disposal at the inert landfill facility at the application site, as permitted by the above referenced Council Decision 2003/33/EC. Specifically, it seeks approval to

- Raise the maximum intake limit for **Sulphate, Chloride, Antimony, Selenium, Molybdenum, Arsenic** and **Total Dissolved Solids (TDS)** by up to three times the limit set in Section 2.1.2, as permitted by Section 2 of the Annex to EC Council Decision 2003/33/EC
- Raise the limit for **Total Organic Carbon** by up to twice the set limit in Section 2.1.2, as permitted by Section 2 of the Annex to EC Council Decision 2003/33/EC.

Extending the intake limits as proposed will permit the facility to accept waste intake for disposal which may contain elevated levels of sulphate and chloride if sourced from a site in a coastal environment or if it contains naturally elevated concentrations of some parameters (such as antimony, molybdenum or selenium) or is impacted by previous site development.

Increasing the waste intake limits, as proposed, will permit wastes which would otherwise have to be diverted to non-hazardous landfills to be accepted at the proposed inert landfill at Ballinclare and, as such, will relieve some of the current pressure on intake capacity being experienced at existing non-hazardous landfills.

The Agency has the Authority under the Landfill Directive and Council Decision 2003/33/EC to increase the proposed parameter concentrations as proposed on a site-specific basis if it can be demonstrated that the predicted emissions from the landfill facility will not present any increased level of risk to the local environment. A Quantitative Hydrogeological Risk Assessment prepared in respect of the proposed inert landfill development concluded that there will be no adverse impact on local groundwater quality as a result of such an increase in landfill waste intake concentrations. Accordingly, the proposed waste intake acceptance criteria for materials deposited at the inert landfill facility are therefore as indicated in Table 1 below;

Table 1
Waste Intake Acceptance Criteria to Landfill Facility

Parameter	L / S= 10 l/kg *mg/kg dry substance*	Total Pollutant Content *mg/kg dry substance*
Arsenic (as As)	1.50	
Barium *(as* Ba)	20	
Cadmium (as Cd)	0.04	
Total Chromium (as Cr)	0.50	
Copper (as Cu)	2.0	
Mercurv (as Hg)	0.01	
Molybdenum (as Mo)	1.50	
Nickel (as Ni)	0.40	
Lead (as Pb)	0.50	
Antimony (as Sb)	0.18	
Selenium (as Se)	0.30	
Zinc (as Zn)	3.43	
Chloride	2400	
Fluoride	10	
Sulphate	3000	
Phenol index	1.0	
Dissolved Organic Carbon (DOC)	1000	
Total Dissolved Solids (TDS)	1200	
Total Organic Carbon (TOC)		30,000.0
BTEX		6.0
PCB (7 congeners)		1.0
Mineral Oil (C10-C40)		500.0
Total PAH		100.0

Soils Containing Invasive Species Rhizome Material

The Applicant also intends to seek approval for disposal of soils containing rhizomes of a number of prescribed invasive species (including Japanese Knotweed, other knotweeds, Giant Hogweed and Himalayan Balsam) at designated disposal areas within the proposed engineered landfill cells. The management and handling of any impacted soil waste will be undertaken in accordance with a site-specific management plan which provides for its safe import and disposal at Ballinclare.

C&D Waste Intake for Recovery

Any C&D wastes which are listed in Section 2.1.1 of Council Decision 2003/33/EC dated 19 December 2002 establishing criteria for the acceptance of waste at landfills are assumed to be inert and will be accepted for recovery without prior testing at the C&D waste recovery facility. These wastes are denoted by the superscript ([a]) in the paragraph below.

Other C&D waste streams accepted for waste recovery in mixed consignments will be segregated during materials recovery and processing at the recovery facilities. All segregated wastes will be placed in stockpiles / dedicated bays / skips inside the recovery shed and/or inspection / quarantine shed and will be transferred off-site to appropriately authorised waste recovery or disposal facilities.

It is envisaged that the following wastes (with their respective List of Waste (LoW) Codes) will be accepted for recovery at the proposed C&D waste recovery / recycling facility at the existing paved area:

- 10 12 01 Waste preparation mixture before thermal processing;
- 10 12 06 Discarded moulds
- 10 12 08 Waste ceramics, bricks, tiles and construction products (after thermal processing)
- 10 13 11 Waste from cement-based composite materials other than those mentioned in 10 13 09 and 10 13 10
- 10 13 14 Waste concrete and concrete sludge
- 17 01 01[a] Concrete
- 17 01 02[a] Bricks
- 17 01 03[a] Tiles and Ceramics
- 17 01 07[a] Mixtures of concrete, bricks, tiles and ceramics
- 17 02 02[a] Glass
- 17-03 02 Bituminous mixtures other than those mentioned in 17 03 01

The following wastes (with their respective List of Waste (LoW) Codes) will be accepted for recovery at the soil washing plant at the former concrete / asphalt production yard:

- 01 04 08 Waste gravel and crushed rocks other than those mentioned in 01 04 07
- 01 04 09 Waste sand and clays
- 17 05 04 Soil and stones other than those mentioned in 17 05 03;
- 17 05 06 Dredging spoil other than those mentioned in 17 05 05;
- 17 05 08 Track ballast other than those mentioned in 17 05 07
- 17 09 04 mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03
- 19 12 09 Minerals
- 19 13 02 Solid wastes from soil remediation other than those mentioned in 19 13 01
- 20 02 02 Soil and stone from municipal facilities .

Some non-waste (or by-product) material could also be imported for processing at the soil washing plant, potentially including marine aggregates.

It is envisaged that compatible non-hazardous waste streams will be accepted periodically at the materials recovery facilities (as at other EPA licenced facilities), subject to prior agreement with the Agency. Any additional hon-hazardous waste intake agreed will be within the overall intake limit set by planning permission and any waste licence issued in respect of the proposed facility.

Other C&D waste streams accepted for waste recovery in mixed consignments will be segregated during materials recovery and processing at the recovery facilities. All segregated wastes will be placed in stockpiles / dedicated bays / skips inside the recovery shed and/or inspection / quarantine shed and will be transferred off-site to appropriately authorised waste recovery or disposal facilities.

Waste Intake and Acceptance Procedures

All inert soil / C&D waste materials will be transported to the waste facility at Ballinclare Quarry using heavy goods vehicles (HGVs). All (HGVs) importing wastes (or by-product) to the facility will be required to pass over the weighbridge which will be installed along the inbound lane of the existing access road into the site.

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

On arrival, HGV drivers carrying the inert waste materials will identify themselves to the facility manager (or an authorised assistant) before proceeding to the active landfilling area or the C&D waste recovery / recycling facilities as appropriate. Staff will take a copy of the delivery docket, record the time and date of arrival, the nature, origin and weight of the imported wastes, the customer / Client name, the truck licence plate number, the relevant waste collection permit details and any further details which may be required by the EPA waste licence. All records of waste intake will be maintained on site for waste tracking and auditing purposes.

Insofar as practicable, the source of each large consignment of soil imported to site for landfilling purposes shall be identified in advance and subject to basic characterisation testing to confirm that it is inert according to the criteria set by Council Decision 2003/33/EC. Ideally, characterisation testing will be undertaken in advance by customers, clients or sub-contractors forwarding soil and stone backfill materials to the facility.

Operating procedures at the proposed facility will require all wastes forwarded for landfilling and/or recovery purposes to be pre-sorted at source, inert and free any non-hazardous / hazardous domestic, commercial or industrial wastes. Any waste consignment arriving at the facility with such wastes intermixed with it will be deemed unacceptable for acceptance at the facility on the basis of a CCTV / visual inspection at the weighbridge and will be immediately rejected and re-directed off-site to an alternative authorised waste facility.

All inert soil and stone / particulate / sludge waste imported to the facility will be unloaded (end-tipped) from trucks at the active landfill area. In addition to visual / CCTV inspection at the weighbridge(s), it will be inspected again by site-based personnel to ensure that there is no non-hazardous or hazardous waste intermixed with it. Should any intermixed, non-inert waste be identified at this point, the entire consignment will be rejected and reloaded back onto the HGV / tipper truck and the haulier directed to remove it off-site to another authorised (ie. permitted or licensed) waste facility.

Should any non-inert or non-C&D waste be identified amongst incoming waste consignments at the C&D waste recovery areas, the entire waste consignment will also be rejected and reloaded onto the HGV / tipper truck and the haulier directed to remove it off-site to another authorised waste facility.

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 can be accepted at the facility or not. Suspect waste will be identified on the basis of visual inspection (unusual colour, intermixed wastes etc.) or by smell during waste placement, handling and/or processing / crushing. A detailed record will be kept of all such inspections.

Should detailed inspection and/or subsequent testing indicate that the quarantined materials are non-inert or cannot be accepted and used for landfilling and/or recovery / recycling purposes at the facility, they will be transferred off-site by to appropriately authorised waste facilities.

Any significant volumes of intermixed non-inert C&D waste (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 facilities.

A representative sample will be taken (in accordance with waste licence requirements) of waste materials accepted at the landfill facility and subjected to compliance testing (which will be less extensive than characterisation testing and will focussed on key contaminant indicators). These data shall be used to confirm that the accepted soils are inert / acceptable (according to Council Decision 2003/33/EC) and comply with approved waste acceptance criteria. Compliance testing shall be undertaken by the Applicant.

Processing and Recovery of C&D Wastes

The recovery / recycling of C&D waste will be carried out on an intermittent (or 'campaign') basis, according as waste material accumulates in unprocessed stockpiles and demand for recycled product dictates. The size of unprocessed waste stockpiles will therefore vary according to availability of C&D waste, the stage of recovery / recycling operations and/or the demand for the finished recycled aggregate products.

It is estimated that up to 6 months intake of (unprocessed) C&D waste could be stored at the recovery facility over at one time. This suggests a maximum waste stockpile height of between 6m and 8m.

Construction and demolition waste held in 'unprocessed' stockpiles is recovered by excavating it using a loading shovel / front–end loader and tipping it into a mobile crusher within the proposed recovery shed in order to produce recycled (secondary) aggregates of varying nominal size. Ultimately the processing requirements and production standards for the recycled aggregate will be required to comply with the requirements of a future (product specific) national End of Waste decision by the EPA . It is currently envisaged that recycled aggregates will most likely be supplied for road construction or for production of non-structural concrete.

The recovered / recycled aggregates will then be transferred by loading shovel / front-end loader from production stockpiles at the crusher to 'processed' (product) stockpiles at a separate outdoor stockpiling area, also on a hardstand surface. They will be stored on-site pending their subsequent sale and export off-site.

As with unprocessed waste, it is estimated that up to 6 months output of recovered / recycled aggregates could be stored at the recovery facility at any one time. This suggests a maximum processed stockpile height of between 6m and 8m.

The recovered / recycled (secondary) aggregate will be transferred from processed stockpiles to HGVs using a loading shovel / front-end loader on an ongoing, intermittent basis as internal company or external market demand for recycled aggregate products dictates.

As all imported C&D waste is required to be sorted and segregated at source, before being brought to the recovery facility, it is expected that only minimal sorting of waste materials other than separation of reinforcement from concrete and the removal of occasional inclusions of wood, metal, plastic, etc. will be undertaken at the recovery facility. Reinforcement separated from concrete will be stored in skips at the recovery area before being transferred to the quarantine facility and/or removed off site by an authorised waste collector.

Soil Washing / Aggregate Recovery

A proportion of more granular (ie. more sandy / gravelly) soil / claybound C&D intake to the waste facility at Ballinclare will be diverted from disposal at the inert landfill facility and submitted for recovery at the soil washing plant to be set-up in the south-eastern corner of the facility (at the former concrete / asphalt yard). All items in the plant assemblage will be connected to, and powered by, an electrical mains supply provided via the existing on-site transformers.

Selected soil waste intake will be fed by front end loaders from end-tipped stockpiles to the washing plant. Thereafter, the material will be washed and screened, in line with the process described previously. Small stockpiles of sand and gravel aggregate obtained from the washing / recovery process will build up at the end of conveyor arms and will be temporarily transferred to larger stockpiles around the former production yard, pending subsequent removal off-site by hauliers.

The recovered aggregates will be either be used directly on site to construct the groundwater control system (beneath the basal clay liner) at the adjoining landfill or at construction projects off-site. Otherwise, they will be transferred off-site to other Applicant locations and facilities, for re-use in the production of construction materials.

The estimated throughput at the soil washing plant could be up to 500,000 tonnes per annum and is ultimately dependent on the nature of the soil wastes imported to the facility. It is estimated that up to 60% of the throughput materials (ie. approximately 300,000 tonnes per annum) could ultimately be recovered for re-use as aggregate by the soil washing process, with the balance consigned, as pressed filter cake material or dewatered sludge material, for disposal at the adjoining inert landfill facility (or if acceptable, subject to testing, for use as landfill liner material).

At the present time, in order to minimise increases in HGV traffic across the existing public road network, it is envisaged that recovered aggregates will be taken off-site using a 'backloading' system whereby trucks delivering soil or C&D waste to the Ballinclare facility will pick up a consignment of recovered aggregate before departing the site and hauling it directly to a construction / development project or to one of the Applicant's off-site production facilities.

Soil washing activities will continue in operation up to the end of the Phase 3 landfilling activity, at which time the soil washing assemblage will be decommissioned and removed off site in order to facilitate the final phase of landfilling across the former concrete / asphalt production area. Any associated infrastructure or materials stockpiles will also be removed and the underlying concrete slab broken up and recycled at the adjoining C&D recovery facility.

General Waste Management

Waste oils, batteries, tyres, domestic waste and scrap metal will be stored on site in designated (bunded) storage areas at the existing workshop and will be collected and recycled or disposed of at authorised off-site waste facilities by approved waste contractors.

General office waste and food waste produced at the site office and canteen facilities will be minimised insofar as possible. Management systems will be established and implemented prior to commencement of inert waste intake to control and manage all potential waste streams, to avoid waste generation where possible and to maximise waste re-use or re-cycling opportunities thereafter.

The proposed inert landfill and C&D waste recovery facility will comply with all waste management responsibilities prescribed by conditions attached to any future grant of planning permission and/or EPA waste licence.

Intake Capacity and Expected Lifespan

The only materials required to landfill and restore the former quarry are inert soil, stone and rock (and other particulate soil-like / sludge wastes). At the present time, it is considered that the principal sources of inert waste intake over the life of the waste facility at Ballinclare Quarry will be construction sites in Counties Wicklow, Dublin and Wexford.

The total volume of inert soil required to create the restored landform is approximately 3,425,000m^3. The basal liner and landfill materials will be subject to a degree of compactive effort (by earthworks plant and a tracked bulldozer respectively) and materials placed at the bottom of the landfill will be further compacted by the weight of overlying materials.

An average target compaction density of 1.8tonnes/m^3 assumed for tonnage assessment purposes, suggests an import requirement for approximately 6,165,000 tonnes of inert soil and stones (comprising soil (clay) liner materials and inert wastes).

The duration of landfilling activities at the application site will largely be dictated by the rate at which approximately 6,150,000 tonnes of externally sourced inert soil and stone is imported. There are many factors which will influence this, including, but not limited to the:

- Availability of acceptable inert soil materials at construction / development sites;
- Prevailing economic climate and related construction industry output;
- Distance of construction projects from the facility (and scale of activity);
- Logistical / programming constraints at sites generating inert materials;
- Climatic conditions (reduced construction activity in wet weather) and
- Disruptions along the existing local and national road network.

In light of these and other variables, prediction of intake rates and volumes and timing of activities is not an exact science. Assuming the combined clay liner and inert waste intake of 6,165,000 tonnes is imported at the projected maximum intake rate of 750,000 tonnes per annum (and that all of it was directed to the landfill operation) would suggest that inert landfilling activities could be complete in a minimum of 8.2 years. Were the average intake rate to fall short of this level and to average 350,000 tonnes per annum, the duration of the inert landfilling activities could extend to approximately 17.6 years.

It is anticipated that the construction and demolition (C&D) waste recovery activities will continue for as long as the inert landfilling activities are ongoing across the former quarry void (in view of the economies of scale achieved in undertaking both activities at the one location). Provision is made in this licence application for a rate of C&D waste recovery of up to 100,000 tonnes per annum. As previously noted, any soil washing and aggregate recovery activities will cease in advance of the final phase of landfilling (Phase 4) across the former concrete / asphalt yard.

On completion of landfilling activities and final capping / restoration works, C&D waste recovery activities will cease, any associated infrastructure will be decommissioned and excess materials removed off site.

Traffic Movements

It is envisaged that the cumulative maximum annual intake of inert soil and stone / C&D waste at the proposed waste facility at Ballinclare will 800,000 tonnes per annum. The combined annual intake is equivalent to an average of

- 16,000 tonnes per week (assuming 50 weeks in a working year)
- 2,900 tonnes per day (assuming 5.5 days in a working week)
- 290 tonnes per hour (assuming 10 hours in a working day)

If it is conservatively assumed that each HGV / truck consignment travelling to the waste facility at Ballinclare has a carrying capacity of 20 tonnes, this suggests that at a projected maximum intake rate of 800,000 tonnes per annum, there will be 14 to 15 HGV / truck trips generated every hour by the waste activities at the proposed facility. This is equivalent to 28 to 30 individual HGV / truck movements in or out of the site every hour.

It is envisaged that processed C&D materials (recycled aggregates) produced at the crushing plant and soil washing plant will be exported off-site as part of the outbound / return leg of a round trip which imports soil and stone / C&D waste to the facility at Ballinclare Quarry.

Working Hours

Weekday operating hours for the proposed waste facility will be the same as those in the planning permission previously granted for quarrying activities at the application site (WCC Planning Ref. 14/2118) - between 08:00 hours and 18:00 hours, Monday to Friday. In line with the previous planning permission, it is envisaged that that loading / unloading of lorries will take place from 7am each working day.

Working hours on Saturday will be between 08.00 hours and 14.00 hours, limited to waste intake and handling on 10 No. Saturdays in any given year, with just maintenance work being undertaken on other Saturdays. The facility will be closed on Sundays and Public / Bank Holidays.

Employment

Kilsaran will provide the appropriate level of resourcing and staffing required to ensure the proposed waste facility complies with conditions attaching to planning and licencing consents.

The proposed landfilling / C&D waste recovery operations will require a minimum of four personnel to be based at the facility at all times during working hours and possibly up to eight or ten (depending on the number of ongoing activities). One individual will be nominated as the facility / site manager and will be required to

(i) check that the soil and stone / C&D waste being imported to the facility for landfilling or recovery / recycling has been pre-approved for intake and/or complies with waste acceptance criteria;

(ii) collate and maintain records of waste intake and

(iii) manage the environmental monitoring and reporting programme.

Three further individuals will be required to

(i) be in attendance at the weighbridge office to weigh HGV's in and out of the facility;

(ii) operate the site plant and equipment at the inert landfill facility on a full-time basis (such as a bulldozer or mechanical excavator) as required;

(iii) visually inspect and monitor the suitability of the inert soil and stone waste being accepted and placed at the facility;

(iv) oversee the intake of C&D waste at the waste recovery area on an ongoing basis; and

(v) manage the processing, handling and C&D recovery activities on an intermittent, campaign basis, as required;

(vi) oversee the dispatch of recycled aggregates off-site, to an ultimate end-use which is permitted by EPA End of Waste criteria.

These staff will be augmented and supported by Kilsaran in-house technical, managerial and environmental staff (based off-site) and by independent external consultants, as required.

In addition to the full-time site-based staff, operatives and drivers travelling to and from the proposed waste facility will have access to, and share, established staff welfare facilities at the site.

Laboratory Testing

Laboratory testing of soil, surface water, groundwater and soil water percolate will be undertaken off-site at an ILAB / UKAS accredited geo-environmental laboratory. Any validation testing and laboratory testing, required to confirm inert classification of waste soil / C&D wastes, will also be undertaken by the same laboratory. All samples taken on-site will be forwarded to the laboratory and test results will typically be forwarded to site within seven to ten working days.

It is not intended to store environmental monitoring equipment such as pH and temperature meters, conductivity meters, flow meters and dissolved oxygen meters at the site office. Any such equipment will be brought to site by an in-house environmental scientist and/or independent environmental consultant as and when required.

PROPOSED ENVIRONMENTAL CONTROLS

General

Several safeguards will be established to ensure that only acceptable inert waste materials are received and handled at the proposed waste facility. These will include the following;

- Ensuring all materials arriving on site are subject to a visual / CCTV inspection both prior to and during unloading;
- Ensuring that any unacceptable materials identified at the facility at the time of delivery are immediately returned to the source site and that any materials identified subsequently are separated and transferred off-site to an authorised waste disposal or recovery facility;
- Restricting or denying further use of the facility to any sub-contractor who persistently directs or carries unacceptable soil and stone waste to the recovery facility.

Details of existing and proposed surface water management systems at the existing quarry and at the proposed waste facility have been presented in preceding paragraphs of this report.

Noise Generation and Control

Once operational, the principal noise sources at the proposed waste facility will arise from

- ongoing (ie. almost continuous) grading and compaction of soil and stone across the former quarry / landfill footprint using a bulldozer and/or mechanical excavator,

- intermittent handling and processing of C&D waste and the movement of a front-end loader at the C&D waste recovery facility and
- movement of HGV lorries around the facility.

The nearest noise sensitive properties to the proposed waste facility occur along the local road network, beyond the south-western and north-western site boundary.

The operation of the proposed waste facility includes provision for a number of mitigation measures with respect to noise, including:

- working below and behind existing quarry faces for much of the working life of the proposed landfill development;
- retaining existing boundary screening berms and boundary hedgerows to provide acoustic screening;
- undertaking all C&D waste processing activities within the confines of the proposed recovery shed at the C&D waste recovery area.

Noise levels attributable to the establishment and operation of the waste facility will not exceed those set out in the EPA's *Guidance Note for Noise In Relation to Scheduled Activities* which states that *"the noise level at sensitive locations should be kept below an L(AR, T) value of 55 dB(A) by daytime"* when measured at the nearest noise sensitive location or site boundary.

Dust Control

In dry, windy weather conditions, the operation of the proposed waste facility may give rise to dust blows across, and possibly beyond the waste facility. In order to control dust emissions, the following control measures will be implemented:

- water will be sprayed from a tractor drawn bowser on any dry exposed surfaces (exposed soil at landfill areas, haul roads, paved surfaces and hardstand areas);
- dust blows at the landfill area will be partially screened by the existing quarry faces and/or perimeter screening berms as filling progresses upwards;
- as the level of the landfilled material within the quarry approaches final surface levels, cover soils (subsoil and topsoil) will be placed and seeded with grass at the earliest practicable opportunity (on an ongoing basis) to minimise soil erosion and potential dust emissions;
- stockpiling of imported soil and stone will be minimized. Imported soil and stone waste will ideally be placed and compacted in-situ immediately after being imported to site. If and when temporary stockpiling of soil is required for lining and/or final restoration purposes, it will be placed as far as practicable from nearby residences;
- the area of bare or exposed soils will, insofar as practicable, be kept to a minimum. If excessive dust emissions arise from the landfill facility, consideration will be given to establishing temporary vegetation cover over exposed soil surfaces and/or stockpiles pending subsequent resumption of landfilling to final ground level;
- all C&D waste recovery activities (specifically crushing and processing into recycled aggregate) will take place within the proposed waste recovery shed;
- if excessive dust emissions arise along haul roads or around the C&D waste recovery facility, consideration will be given to the installation of sprinkler systems (if necessary) to suppress dust rise from vehicle movements and fugitive emissions from stockpiles;
- all HGV's exiting the site shall be routed through the new and existing wheelwash facilities in order to minimise transport of mud and/or soil fines by HGVs onto the public road network.

The amount of dust or fines carried onto the public road network will be further reduced by periodic sweeping of internal paved site roads and public roads, if required.

Bird and Vermin Control

As the inert wastes being imported, landfilled and/or recovered at the proposed facility are free of putrescible (food / kitchen) waste, site-based activities are unlikely to attract scavenging birds such as gulls and crows or vermin (rats). Accordingly, it is not intended to implement any specific bird or vermin control measures at the proposed waste facility.

Odour Control

Landfilling and recovery activities at the proposed facility will not give rise to odour nuisance as the soil and stone / C&D wastes being placed or recovered are inert and not biodegradable and as such will not emit any odourous gases. Accordingly, it is not intended to implement any specific odour control measures at the facility. In the unlikely event that any biodegradable waste is identified among imported materials, it shall be immediately removed to the waste inspection and quarantine area pending removal off-site to an authorised waste disposal or recovery facility.

Litter Control

As the inert soil and stones / C&D wastes being landfilled or recovered at the proposed facility will be largely free of litter, site activities are unlikely to give rise to problems with windblown litter. Accordingly, it is not intended to implement any specific litter control measures at the facility.

In the unlikely event that any litter waste is identified among imported materials, it shall be immediately removed to the waste inspection and quarantine shed pending removal off-site to an authorised waste disposal or recovery facility.

Invasive Species

An invasive species management plan will be prepared prior to commencement of landfilling operations at the facility. The plan will set out how the facility operator will establish, maintain and implement an invasive species prevention and eradication plan, to cover specific invasive species, including but not limited to Japanese Knotweed, Giant Knotweed and Bohemian Knotweed.

The invasive species plan will identify specific actions to prevent acceptance of intake with invasive species present in soil and stone and will provide for periodic surveys of filled areas for detection of invasive species. The plan will describe methods of plant detection and identification, identify remedial actions for eradication of invasive species (if necessary) and proposals for staff training on plant identification and eradication. It will also set out validation requirements to confirm absence of invasive species on completion of landfilling and restoration. The plan will be prepared in line with UK Environment Agency guidance: "*The Knotweed Code of Practice 2013*".

Fire Control

The inert soil and stone / C&D wastes being landfilled and recovered at the application site are free of flammable materials and biodegradable waste which could create a fire or explosion risk. Site activities will not therefore present a fire risk for the duration of the landfilling and C&D waste recovery activities. Accordingly, no specific fire control measures will be implemented at the application site.

Notwithstanding this, the following operational practices will be implemented in order to prevent the outbreak of fire at the facility:

(i) smoking outdoors, at the site office or staff welfare facilities will be prohibited;

(ii) any biodegradable or flammable waste identified or suspected in the waste materials accepted at the facility shall be immediately transferred to the waste inspection and quarantine shed pending removal off-site to an authorised waste facility; and

(iii) plant and equipment will be removed if they exhibit signs of overheating etc.

In the unlikely event that a fire does occur, the local fire stations in Rathdrum and/or Wicklow will be contacted and emergency response procedures will be implemented. Fire extinguishers (water and foam) will be provided at the site office to deal with any small outbreaks which may occur.

Landscape and Boundary Treatment

Prior to commencement of landfilling and C&D waste recovery activities, a survey of the entire site boundary will be undertaken and where necessary, new boundary fencing will be erected, existing fencing will be repaired and/or replaced and hedgerows will be strengthened or fortified by additional planting as required.

PROPOSED ENVIRONMENTAL MONITORING

General

Kilsaran will establish an environmental management programme to monitor and manage emissions from the proposed waste facility at Ballinclare Quarry. It is anticipated that limit values for environmental emissions arising from waste disposal and recovery activities at the facility will be similar to those applied to other EPA licenced facilities and that these will be reviewed and confirmed / amended by the EPA in the event that it decides to issue a waste licence in respect of the proposed waste facility at Ballinclare Quarry.

Environmental sampling, monitoring and testing will be undertaken by Kilsaran personnel and/or specialist contractors appointed by it. Records of environmental monitoring and testing will be maintained on-site and forwarded to the EPA and Wicklow County Council as required under the terms of any grant of planning permission and/or waste licence issued in respect of the proposed waste facility. Preliminary proposals for monitoring locations around the application site are presented in Figure 4-8-1G.

Dust Monitoring

Dust monitoring is established at 3 No. locations around the site boundary (designated D1, D2 and D3), shown in Figure 4-8-1G. It is envisaged that monitoring at these locations will continue for the duration of the on-site waste activities. Dust monitoring locations shall be reviewed on an ongoing basis and revised as and when necessary. The results of regular dust monitoring shall be submitted to the EPA and/or Wicklow County Council on a periodic basis for review and record purposes as required.

Noise Monitoring

Noise monitoring is established at 3 No. locations around the site boundary (designated N1, N2 and N3), shown in Figure 4-8-1G. It is envisaged that monitoring at these locations will continue for the duration of the on-site waste activities. Noise monitoring locations shall be reviewed on an ongoing basis and revised as and when necessary. The results of the noise monitoring shall be submitted to the EPA and/or Wicklow County Council on a regular basis for review and record purposes.

Surface Water Monitoring

During quarry dewatering, monitoring of surface water discharged off-site from Ballinclare Quarry will be undertaken on a daily and weekly basis, in line with the requirements of the existing trade effluent discharge licence (Ref. WPL116). This monitoring regime will continue until such time as it is superseded by an EPA Waste Licence in respect of the proposed waste facility at the quarry.

When the waste facility is operational, surface water will be monitored at any temporary surface water body / sump across the quarry footprint and at the discharge point to the drainage channel leading to the Ballinclare Stream, immediately downstream of the wetland to be installed to treat run-off emanating from the proposed inert landfill and C&D recovery facilities.

Occasional surface water sampling and testing will also be undertaken on samples taken from any other significant, temporary water body or pond which may be constructed or form naturally at low points across the application site.

It is also envisaged that surface water monitoring will also be undertaken along the Potters River, upstream and downstream of the discharge from the Ballinclare Stream, in accordance with the existing requirements of the Local Authority discharge licence (Ref. No WPL116). The existing, established surface water monitoring locations at and around Ballinclare Quarry (designated SW1, SW2, SW3a, SW3b and SW4) are shown on Figure 4-8-1G.

Testing of key chemical parameters is likely to be undertaken on water samples collected on a weekly basis, while testing of other chemical parameters will be undertaken on either a bi-annual or annual basis (depending on the test parameter involved), as may be required by any EPA Waste Licence issued in respect of the proposed waste facility.

The principal objective of surface water monitoring is to assess water quality and to confirm there is no contamination associated with waste activities on-site. Surface waters will be monitored for the duration of the landfilling and C&D waste recovery activities at the facility and for a limited closure and aftercare period thereafter.

Groundwater Monitoring

Three groundwater monitoring wells (designated GW1, GW2, GW3) were installed at Ballinclare Quarry in 2014 and have been monitored since that time. Groundwater well locations are shown in Figure 4-8-1G. Groundwater wells at the proposed waste facility will be sampled and tested on a regular basis for a range of physical and chemical parameters in order to assess water quality and confirm the absence of contamination by the proposed landfilling and waste recovery activities.

It is currently envisaged that the following programme of groundwater water monitoring will be implemented by Kilsaran at the proposed waste facility (subject to review and approval by the EPA in its determination of an application for a waste licence):

- Groundwater levels will be monitored at each of the 3 No. existing wells and at any groundwater pond in the central eastern floor area of the quarry;
- Limited groundwater quality testing will be undertaken on samples recovered from the 3 No. groundwater monitoring wells on a quarterly basis;
- More detailed groundwater quality testing (to include metals and a number of specified hazardous substances) will be undertaken on an annual basis.

The groundwater monitoring regime will remain in place for the duration of the landfilling and/or C&D waste recovery activities at the facility and for a limited closure and aftercare period thereafter.

Leachate and Landfill Gas Monitoring

In the absence of biodegradable waste amongst the inert soil and stone / particulate / sludge waste to be landfilled and used for quarry restoration purposes, no hazardous / organic leachate or landfill gas can be generated. Accordingly, in line with accepted design norms for inert landfills established by *Council Directive 1999/31/EC on the landfill of waste*, no provision has been made for leachate collection and treatment, nor for landfill gas management, at the proposed landfill facility.

As the materials being placed at the landfill are inert and, by definition, not biodegradable, they will not generate or emit odorous gases. The proposed landfilling and restoration activities will not therefore give rise to odour nuisance and accordingly, no provision has been made for odour monitoring at this facility. Site staff will report and record any odour emissions at the site in the highly unlikely event that a complaint is made about odours emanating from the facility.

Ecological Monitoring

Given the history of extractive activity at and around the application site at Ballinclare Quarry, it is currently envisaged that there will be no requirement for any ongoing ecological monitoring or reporting in respect of the proposed waste actives.

Meteorological Monitoring

No site-specific meteorological monitoring has been undertaken at Ballinclare Quarry. Temperature, rainfall, sunshine, wind speed and direction are all recorded at the weather station at Casement Aerodrome, at Baldonnel in South County Dublin, approximately 46km to the north-west of the application site. It is currently envisaged that representative meteorological data will be acquired from the existing weather station at Casement Aerodrome, as and when required.

Stability and Settlement Monitoring

Temporary slopes in the inert soil wastes at the landfill facility will be visually inspected on an ongoing basis, at least once a month, by site staff and a record will be kept of same. Should these inspections give cause for concern, an inspection of the affected area(s) will be undertaken by a qualified geotechnical engineer and measures will be implemented to address any instability identified.

Following completion of landfilling and restoration works, the former quarry footprint will be returned to long-term use as grass / scrub habitat. In view of proposed after-use and the expected minimal post-closure settlement of the inert soil mass, it is considered that post-closure stability and settlement monitoring of the backfilled landform will not be required.

POST-CLOSURE RESTORATION WORKS

Inert Landfill Facility

The principal waste activity which will be undertaken at Ballinclare Quarry is the landfilling and restoration of the lands within the former bedrock quarry. The existing quarry void will be restored to a landform which closely resembles that which pre-existed the quarry development and merges with the surrounding landscape.

As working areas are progressively landfilled to within 1 metre of the final ground level envisaged by the restoration scheme, a cover layer comprising 150mm of topsoil and up to 850mm of subsoil will be placed above the inert soil and stone waste.

The soil cover layer will initially be seeded with a grass mix in order to promote stability and minimise soil erosion and dust generation. Some hedgerows will also be planted to re-establish former field boundaries which were lost in order to facilitate the development of the quarry. The proposed final landform contours and planting scheme is indicated in the long-term restoration plan in Figure 4-8-1C.

On completion, it is expected that the backfilled quarry lands will be passively managed and that they will likely return to a long-term grassland / scrub habitat, and possibly some agricultural grassland use, similar to that which existed prior to quarrying.

Topsoil and subsoil will be imported to the site on a continual basis and shall not be used immediately in landfilling / restoring the former quarry. The topsoil and subsoil shall be stockpiled separately within the former quarry footprint, away from the active landfilling area and in such location and manner as not to create any temporary adverse visual impact or dust nuisance. These materials will then be used on an ongoing basis in the progressive restoration of the former quarry, as the upper surface of the landfill body approaches the proposed final ground level.

On completion, any rainfall over the landfill footprint will either

(i) percolate directly into the backfilled soil mass (depending on the permeability and/or degree of saturation of the soil at the ground surface);

(ii) run-off over the ground surface to be collected by surface water channels which will carry it to the wetland area (and/or separate settlement pond, if required) on the western side of the application site, from whence it will be discharged off-site to the Ballinclare Stream and Potter's River.

Locally, in the south eastern corner of the landfill area, the final restored ground levels will be lower than at the discharge point to the Ballinclare Stream and cannot therefore drain to it under gravity. Accordingly, it is envisaged that surface water run-off from this area will collect at a swale / attenuation pond to be constructed close to the south-eastern boundary. Discharge from the swale will be to a minor (unnamed) stream which flows for 300m parallel to the L1157 Local Road and into the Kilmacurragh Stream, which in turn flows into the Potters River approximately 400m further downstream.

The long-term surface water management regime for the completed landfill, shown in Figure 4-8-1H, will be established incrementally over time, as landfill and restoration works proceed. On completion of the quarry landfilling and restoration works, any outstanding long-term site drainage works will be completed.

C&D Waste Recovery / Recycling Facility

At the present time, it is anticipated that C&D waste recovery activities will cease at Ballinclare Quarry following cessation of landfilling and restoration activities at the adjoining inert landfill facility.

On cessation of C&D waste recovery activities, any remaining stockpiles of unprocessed C&D waste will be crushed and added to processed waste stockpiles. These stockpiles will in turn be gradually run down as recycled (secondary) aggregate is sold to the market.

The waste recovery shed will be dismantled to ground / foundation level and, insofar as possible, all structural elements (steelwork, wall cladding wall panels etc.) will be recycled and/or recovered. All processing plant and machinery will be removed off-site and any related site infrastructure will also be decommissioned and/or removed off-site as appropriate.

Any paved or hardstanding surfaces around the C&D waste recovery area will be excavated in phases as space is freed up and will be processed / recovered on-site and sold to market. If a residual volume of processed aggregate remains at the end, it will be either be used in final restoration works around the application site or transferred to another C&D waste recovery facility off-site.

As the paved or hardstanding surfaces are excavated and recycled, a replacement cover layer comprising a combined 500mm of topsoil and mineral subsoil will be placed over exposed in-situ soil. This material will most likely be imported (as non-waste) from construction sites.

The upper surface of the reinstated ground around the recovery area will be graded so as to ensure that any surface water run-off falls to drainage channels which will run north-westwards, toward the wetland area. The area will then be seeded with a native grass mix and will most likely evolve to a seasonal grassland habitat over time.

Facility Closure Arrangements

Site Management and Supervision

Kilsaran will delegate responsibility for management of the final site restoration and closure works to a nominated individual or staff member and will ensure that this person has the necessary information and authority to direct and oversee the required restoration works, site closure and decommissioning activities and any aftercare activities (principally environmental monitoring and site maintenance works).

Long Term Site Safety and Security

All existing perimeter security features, site access and proposed upgrading / modifications thereto will remain in place following facility closure and expiry of any agreed aftercare period.

Existing perimeter berms, fencing and hedgerows will be surveyed again post facility closure and upgraded / enhanced where required. These works, combined with the securing and locking of the existing entrance gates will prevent any unauthorised third-party access to the facility.

Long Term Surface Water and Groundwater Management

The quarry at Ballinclare is located at an area which originally had very little (if any) overburden cover and based on site observations is known to be relatively impermeable (below a thin, near-surface weathered zone). It is therefore inferred that the original (pre-quarrying) regime at the site would have meant that there was relatively small amount of recharge to groundwater and that most rainfall ended up as run-off over the ground surface to the natural drainage network.

The material to be used to complete the backfilled landform will generally comprise clayey glacial till and will likely replicate the pre-development hydrology of the site and minimise post-closure infiltration into the backfilled inert landfill mass.

In the long-term, following closure, there will likely be no significant difference in infiltration characteristics between the original and restored landform and no requirement to attenuate any surface water run-off from the site.

In the short term however, immediately post-closure there could be some slight increase in the rate of run-off (relative to pre-development phase) while vegetative cover is establishing over the final landfill phase.

Following completion of landfilling and restoration works, the wetland area at the western end of the application site will remain in-situ and allowed to naturally evolve and re-wild, with no provision being made for any active long-term maintenance. The wetland will then effectively serve as a long-term soakaway, settlement lagoon and/or attenuation pond for any surface water run-off prior to its discharge off-site via the established drainage network to the Ballinclare Stream.

Post closure, the surface water management system at the landfill provides for a shallow scrape or swale to intercept surface water run-off from the restored landform and to direct it to the wetland area and / or a settlement lagoon on the western side of the site and to the Ballinclare Stream thereafter, as shown on Figure 4-8-1H.

Due to the topography of the proposed landform, it will not be possible to direct all the run-off from the restored landform to the wetland / proposed settlement lagoon by gravity and as such, the residual, southern flank will be drained to a swale along the southern boundary that will discharge to an existing stream which flows to the Kilmacurra Stream, as also shown on Figure 4-8-1H.

Decommissioning of Plant and Machinery

On completion of site operations, all mobile plant and equipment associated with backfilling and C&D waste recovery activities at Ballinclare Quarry will be removed off-site. Any dedicated site accommodation, infrastructure and/or services will also be progressively decommissioned, dismantled and/or removed off-site to authorised waste disposal or recovery facilities.

Aftercare and Monitoring

Some establishment maintenance will be carried out across the application site for a period of up to 3 years following final seeding / hedgerow establishment works, with a minimum of 3 maintenance visits per year (i.e. spring, summer and autumn). This work will principally comprise weed control, replacement planting where required and the adjustment/removal of tree ties and spiral guards.

Thereafter, the restored lands will either be returned to a local farmer and most likely passively managed. It is expected that over time, the restored landform will ultimately merge into the surrounding local rural agricultural landscape.

FIGURES

Figure 4-8-1A
Existing Site Layout

Figure 4-8-1B
Proposed Site Layout

Figure 4-8-1C
Restoration Surface and Landscaping Plan

Figure 4-8-1D
Restoration / Backfilling Cross Sections

Figure 4-8-1E
Landfill Phasing Plan

Figure 4-8-1F
Surface Water Management System – Operational Phase

Figure 4-8-1G
Environmental Monitoring Locations

Figure 4-8-1H
Long Term Surface Water Management Proposals

NOTES

1. EXTRACT FROM ORDNANCE SURVEY 1:2,500 / 1:5,000 MAP SERIES: 4137-B & 4137-D

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50248253 (C) ORDNANCE SURVEY IRELAND/ GOVERNMENT OF IRELAND

3. EXISTING SURVEY (MAY 2016) PROVIDED BY KILSARAN

LEGEND

- LANDHOLDING BOUNDARY (c. 36 Ha. / 89 acres)
- PLANNING APPLICATION AREA (c. 32.5 Ha.)
- PROPOSED INERT LANDFILL AREA (c. 17.0 Ha.)
- CONTOURS
- INTERNAL ACCESS TRACKS
- OVERHEAD LINES
- PUMPED WASTE WATER FROM SURFACE RUNOFF

N

CARRIGMORE

WCC COMPOUND

WATER SUPPLY WELL

DISCHARGE CHANNEL

SCREENING BERM

SETTLEMENT LAGOONS

TREATED WATER TO SETTLEMENT PONDS

BACK UP SETTLEMENT LAGOONS (IF REQUIRED)

WATER TREATMENT PLANT

Building

SCREENING BERM

CONCRETE YARD

EXISTING FLOOR LEVEL C. 37mOD

10m-wide Reservation strip

Stockpiling of Topsoils and Subsoils

QUARRY SUMP

DISCHARGE WATER FROM QUARRY SUMP

10m-wide Reservation strip

WORKSHOP

CANTEEN

BUNDED FUEL TANKS

TOILETS

PUMPING CHAMBER

WEIGHBRIDGE

SITE OFFICE

CAR PARKING AREA

WHEELWASH

DISTRIBUTION ROOM & CONTROL SWITCH GEAR (AGGREGATE PLANT)

TERTIARY TREATMENT UNIT (2 MODULE PURAFLO)

ESB SUBSTATION & SWITCHROOM

AERATION TREATMENT UNIT

CAR PARKING AREA

LABORATORY

TOILETS

1 INTERNAL TO LAB
1 EXTERNAL ACCESS

SAND STORAGE SHED

SITE ENTRANCE

A

A'

B

B'

0 80m 200

Metres 1:2500

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EXISTING SITE LAYOUT

FIGURE 4-8-1A

Scale	Date
1:2,500 @ A3	FEBRUARY 2023

00036.00080.0.16.Figure 4-8-1A Existing Site Layout.dwg

CARRIGMORE

DISCHARGE TO BALLINCLARE STREAM

INDICATIVE SURFACE WATER DITCH

WCC COMPOUND

RESTORED AREA

LAGOON

INDICATIVE SURFACE WATER DITCH

PHASE 1

TEMPORARY WASTE SLOPE

SCREENING BERM

INDICATIVE PROPOSED WETLAND TREATMENT AREA

PHASE 2

QUARRY SUMP

PHASE 3

PHASE 4

WATER TREATMENT PLANT

CONCRETE YARD

UNPROCESSED C&D STOCKPILES

WASTE RECOVERY SHED 42m X 36m

C&D WASTE STOCKPILES (PROCESSED)

PROPOSED WHEELWASH
CANTEEN
WORKSHOP
BUNDED FUEL TANKS
TOILETS
PUMPING CHAMBER
EXISTING WEIGHBRIDGE
EXISTING SITE OFFICE
PROPOSED WEIGHBRIDGE
CAR PARKING AREA
WHEELWASH

DISTRIBUTION ROOM & CONTROL SWITCH GEAR (AGGREGATE PLANT)
TERTIARY TREATMENT UNIT (2 MODULE PURAFLO)
ESB SUBSTATION & SWITCHROOM
AERATION TREATMENT UNIT

CAR PARKING AREA
LABORATORY
TOILETS
SAND STORAGE SHED

PROPOSED WASHING PLANT

SITE ENTRANCE

0 80m 200
Metres 1:3000

N

NOTES

1. EXTRACT FROM ORDNANCE SURVEY 1:2,500 / 1:5,000 MAP SERIES: 4137-B & 4137-D

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PROPOSED SITE LAYOUT

FIGURE 4-8-1B

Scale 1:3,000 @ A3

Date FEBRUARY 2023

00036.00080.0.16.Figure 4-8-1B Proposed Site Layout.r1.dwg

NATIVE HEDGE MIX

Two rows to be planted at 40cm centres with rows 40cm apart (i.e. 2.5 plants/m; approx. 1,250m in total = 3,125 plants). Transplants to be planted randomly with no more than 3 plants of the same species in one row. Feathered Transplants to be planted approximately every 8m, with a random allocation of alder and oak along the hedge, and to be maintained as hedgerow trees.

No.	*Plant Name*	*Common Name*	*Height (cm)*	*Age*	*%*
Transplants/Container Grown Shrubs					
340	Corylus avellana	Hazel	60-90	1+0	20
560	Crataegus monogyna	Hawthorn	60-90	1+1	25
225	Ilex aquifolium	Holly	60-80	2Lt	10
225	Prunus avium	Wild Cherry	60-90	1+0	10
340	Prunus spinosa	Blackthorn	60-90	1+0	20
225	Sambucus nigra	Elder	60-90	1+1	10
Feathered Transplants					
110	Alnus glutinosa	Common alder	175-200	2xTR	2.5
110	Quercus petraea	Sessile oak	175-200	2xTR	2.5

NOTES

ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50248253 (C) ORDNANCE SURVEY IRELAND/ GOVERNMENT OF IRELAND

LEGEND

- LANDHOLDING BOUNDARY (c. 36 Ha. / 89 acres)
- PLANNING APPLICATION AREA (c. 32.5 Ha.)
- PROPOSED INERT LANDFILL AREA (c. 17.0 Ha.)

RESTORATION MEASURES

- AREAS TO BE RESTORED TO GRASSLAND
- PROPOSED NATIVE HEDGEROWS
- WETLAND TREATMENT AREA TO BE RETAINED AS A WILDLIFE / BIODIVERSITY FEATURE

RESTORATION PROPOSALS

The inert landfill area at Ballinclare, Co. Wicklow will be restored to agricultural grassland, which is one of the beneficial afteruses recommended in the EPA Guidelines 'Environmental Management in the Extractive Industry' (2006).
The restoration will take place on a phased basis, in conjunciton with the phased filling activities. The below restoration elements will be implemented.

Retention of Existing Vegetation: All existing screening vegetation along the site boundaries, and most of the internal woodland areas and scrub vegetation will be retained.

Spreading of soil and grass seeding: The area to be grass seeded will be covered with approximately 350mm of subsoil and 150mm of topsoil on completion of each phase of the landfilling/ re-grading works. The material will be sourced from the material imported into the site, which will be stored in temporary stockpiles. Once the earthworks are complete the area will be grass seeded, using a suitable agricultural grass seed mix.

Hedge Planting: On completion of all earthworks, native hedges will be planted in the approximate locations of former boundary lines, to provide green corridors and break up the large site.

NOTES:

Earthworks: All soil handling to be carried out, as per current best practice guidance. Topsoil and subsoil to be handled separately.

Grass Seeding: Prior to any seeding works surface preparation and final cultivation will be carried out in accordance with current best practice. Seeding to take place whilst suitable weather conditions prevail. The sowing specifications will be as per the manufacturer's instructions.

Planting General: All proposed species are native.
All plants to be protected with spiral guards or alternatively with rabbit proof fencing. All plant handling, planting and establishment works will be carried out in accordance with current best practice and will take place in the appropriate planting season (e.g. bareroot planting: November to March only) and in favourable weather conditions. The planting will be carried out by a suitably qualified landscape contractor.

Aftercare: Establishment maintenance will be carried out for 2 years following each stage of the planting works (minimum 3 maintenance visits per year; i.e. spring, summer and autumn). This will include weed control, replacement planting where required and the adjustment/removal of tree ties and spiral guards.

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KILBRIDE (N11), CO. WICKLOW

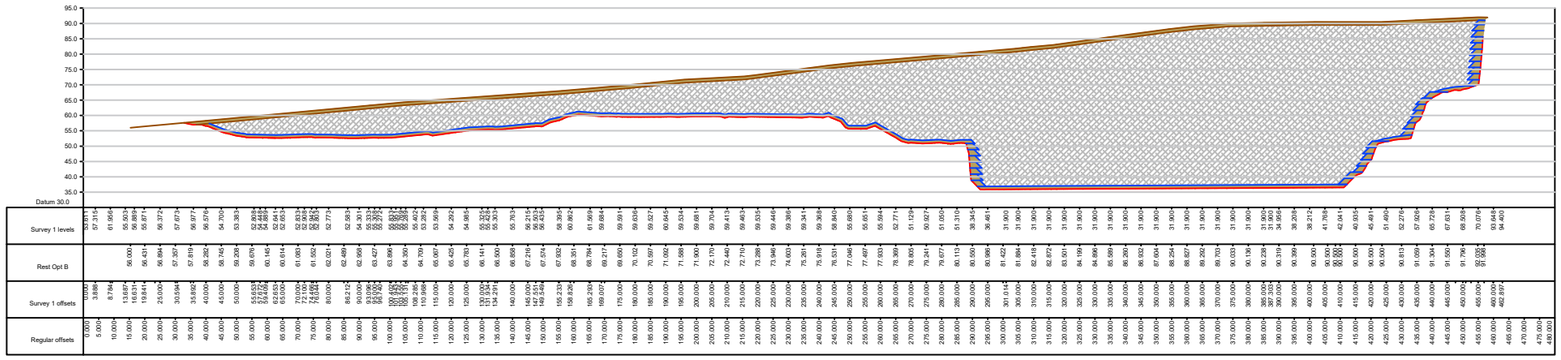
RESTORATION SURFACE AND LANDSCAPING PLAN

FIGURE 4-8-1C

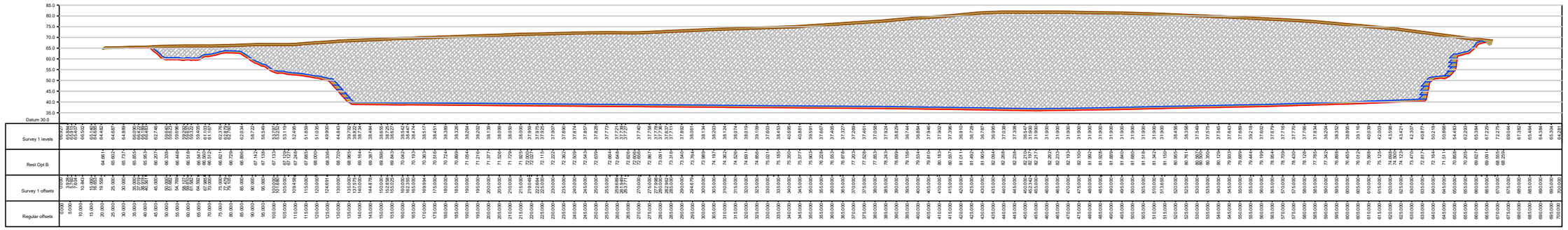
Scale: 1:2,500 @ A3

Date: FEBRUARY 2023

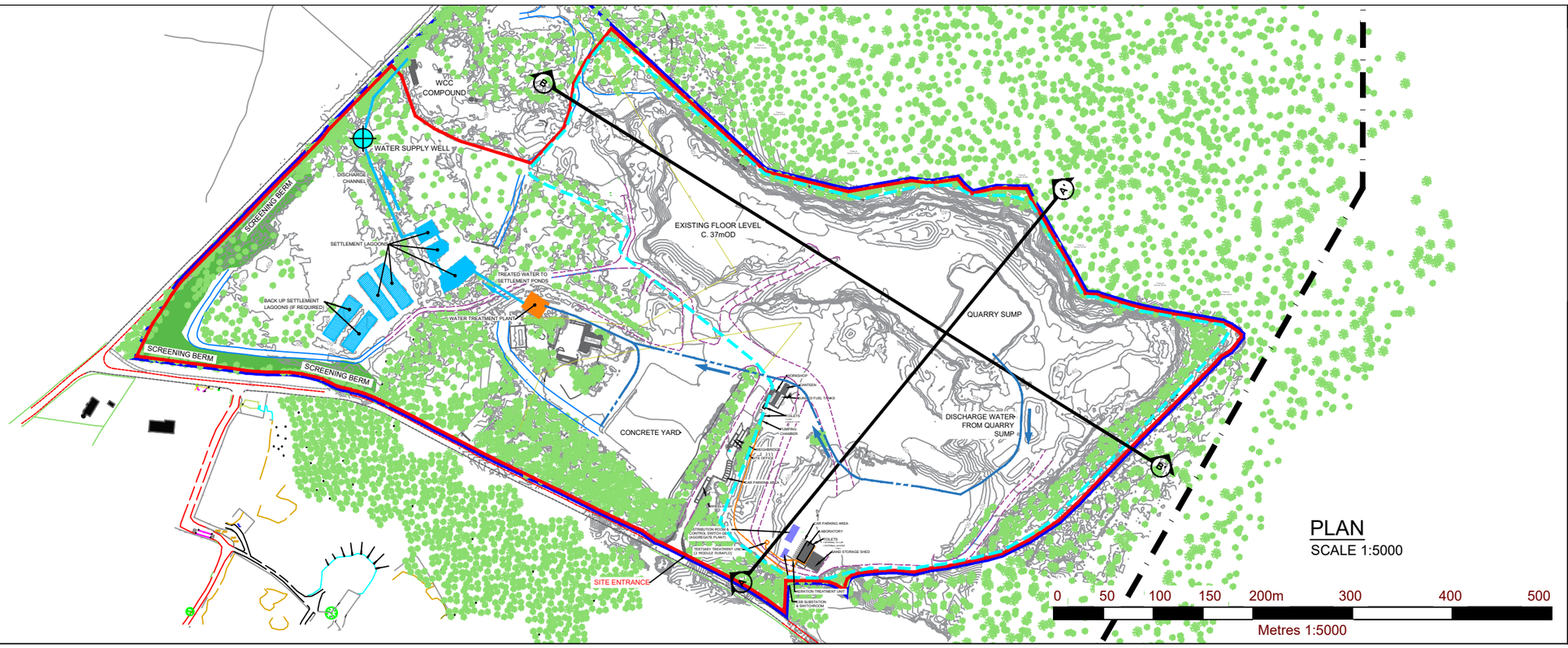
00036.00080.0.16.Figure 4-8-1C Restoration Surface and Landscaping Plan.dwg



SECTION A
SCALE 1:2000



SECTION B
SCALE 1:2000



LEGEND - SECTIONS

- EXISTING LEVELS
- PROPOSED FORMATION LEVELS
- PROPOSED FINAL RESTORATION LEVELS
- PROPOSED BASAL AND SIDEWALL LINING
- ENGINEERED MINERAL LINER
- INERT WASTE / SOILS
- RESTORATION SOILS

NOTES

1. EXTRACT FROM ORDNANCE SURVEY 6 INCH MAPPING WW030 & WW0311

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50248253 (C) ORDNANCE SURVEY IRELAND/ GOVERNMENT OF IRELAND

3. EXISTING SURVEY (MAY 2016) PROVIDED BY KILSARAN

LEGEND - PLAN

- LANDHOLDING BOUNDARY (c. 36 Ha. / 89 acres)
- PLANNING APPLICATION AREA (c. 32.5 Ha.)
- INERT PROPOSED LANDFILL AREA (c. 17.0 Ha.)

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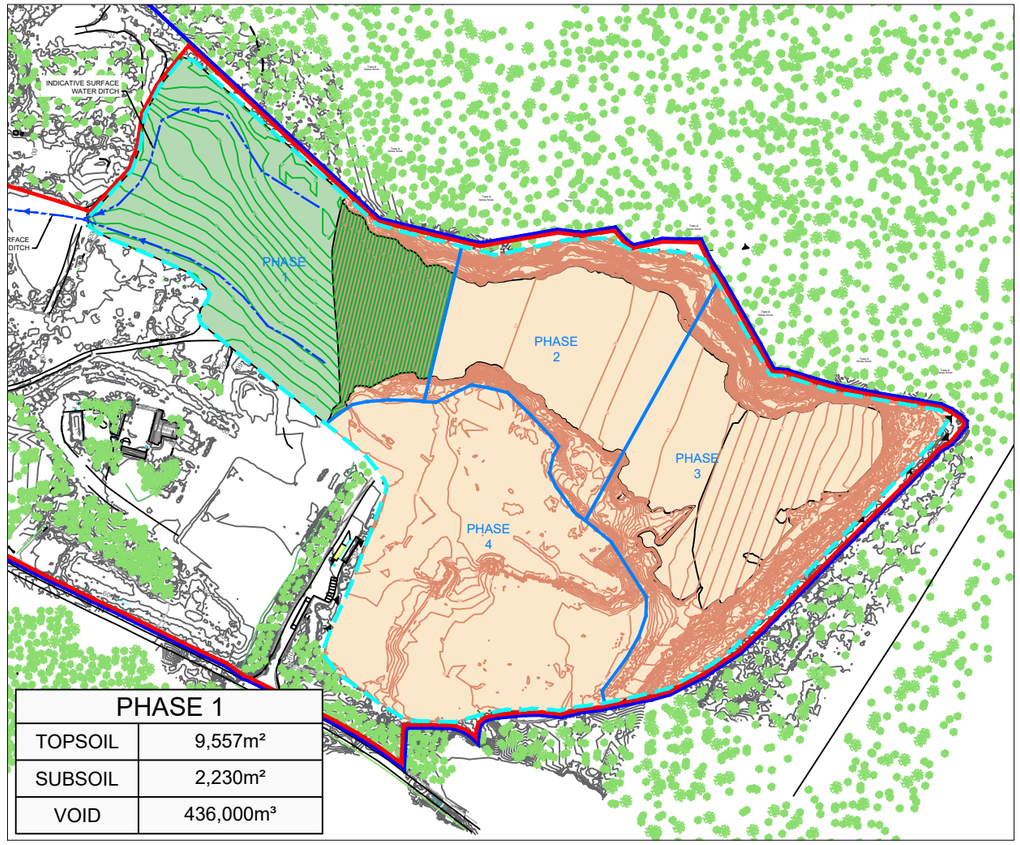
KILBRIDE (N11), CO. WICKLOW

RESTORATION / BACKFILLING CROSS SECTIONS

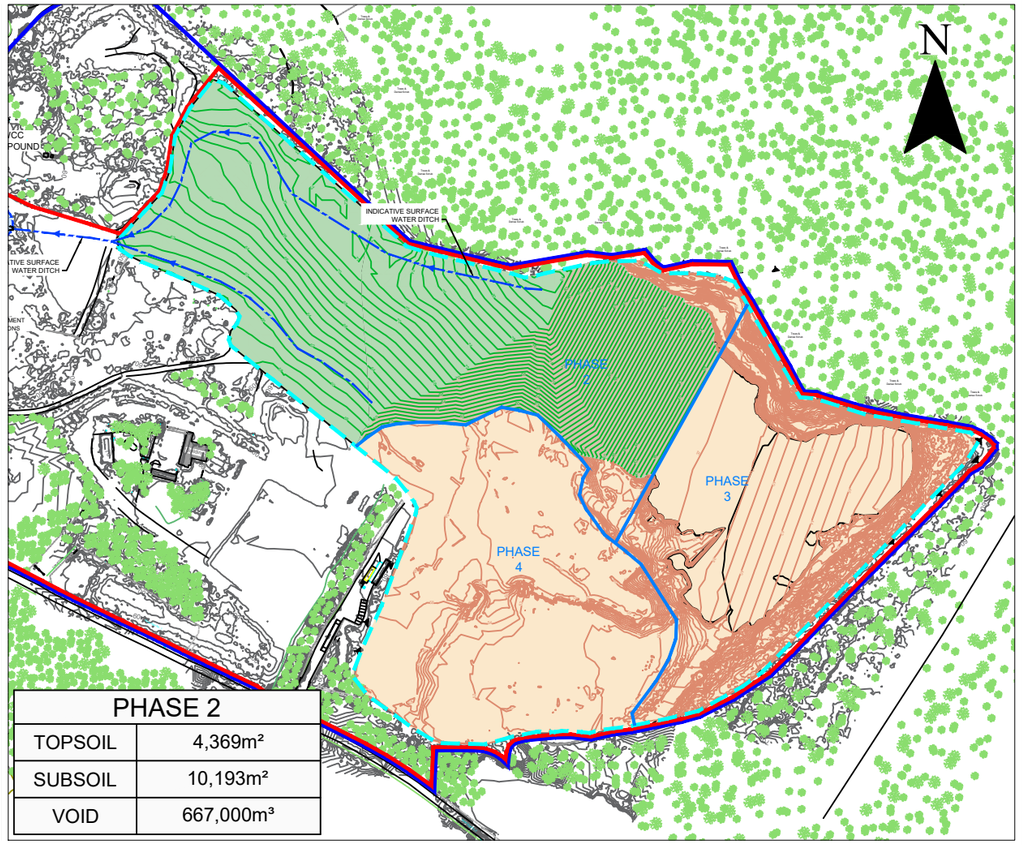
FIGURE 4-8-1D

Scale	Date
AS SHOWN @ A3	FEBRUARY 2023

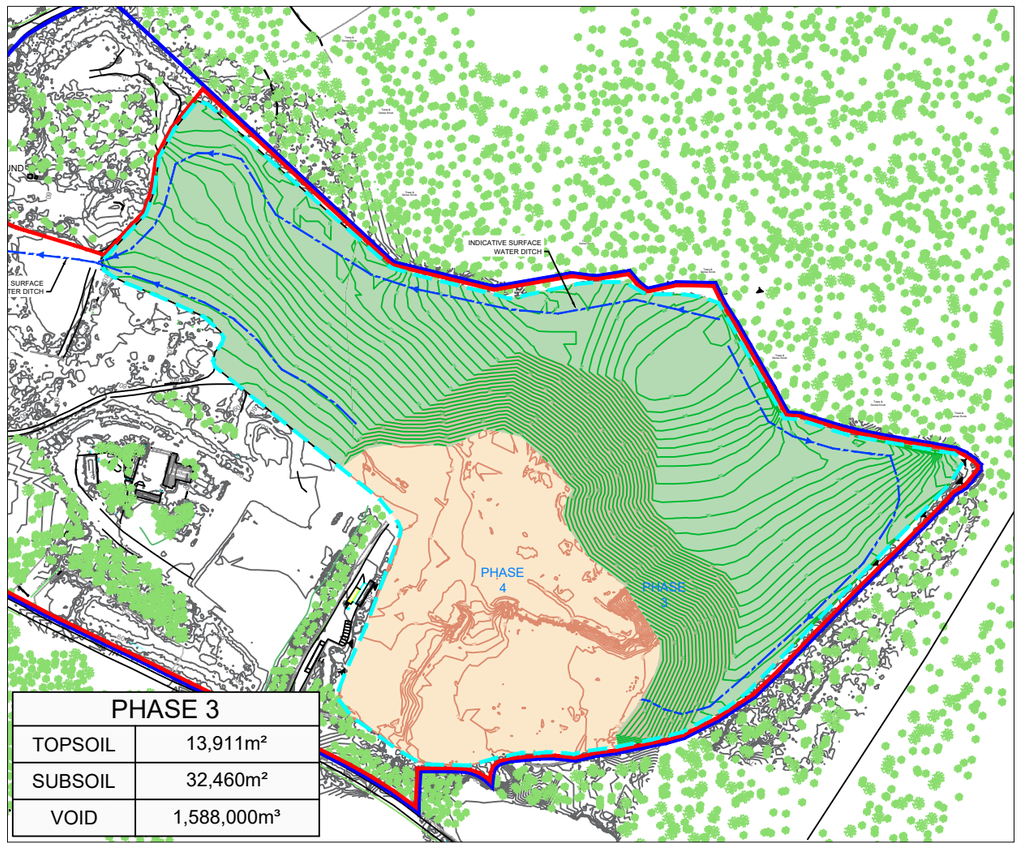
00036.00080.0.16.Figure 4-8-1D Restoration-Backfilling Cross Sections.dwg



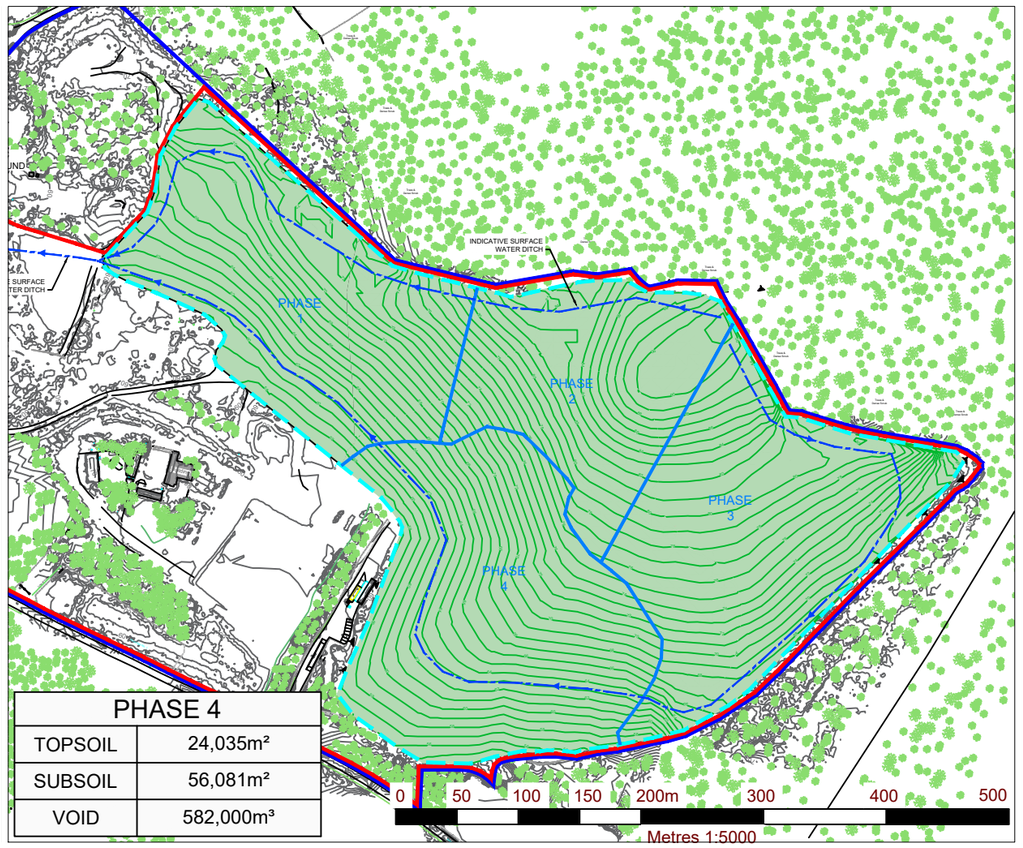
PHASE 1	
TOPSOIL	9,557m²
SUBSOIL	2,230m²
VOID	436,000m³



PHASE 2	
TOPSOIL	4,369m²
SUBSOIL	10,193m²
VOID	667,000m³



PHASE 3	
TOPSOIL	13,911m²
SUBSOIL	32,460m²
VOID	1,588,000m³



PHASE 4	
TOPSOIL	24,035m²
SUBSOIL	56,081m²
VOID	582,000m³

NOTES

1. EXTRACT FROM ORDNANCE SURVEY 6 INCH MAPPING WW030 & WW0311

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- PROPOSED FORMATION LEVELS RECOVERY AREA
- RESTORED AREA
- TEMPORARY WASTE SLOPE

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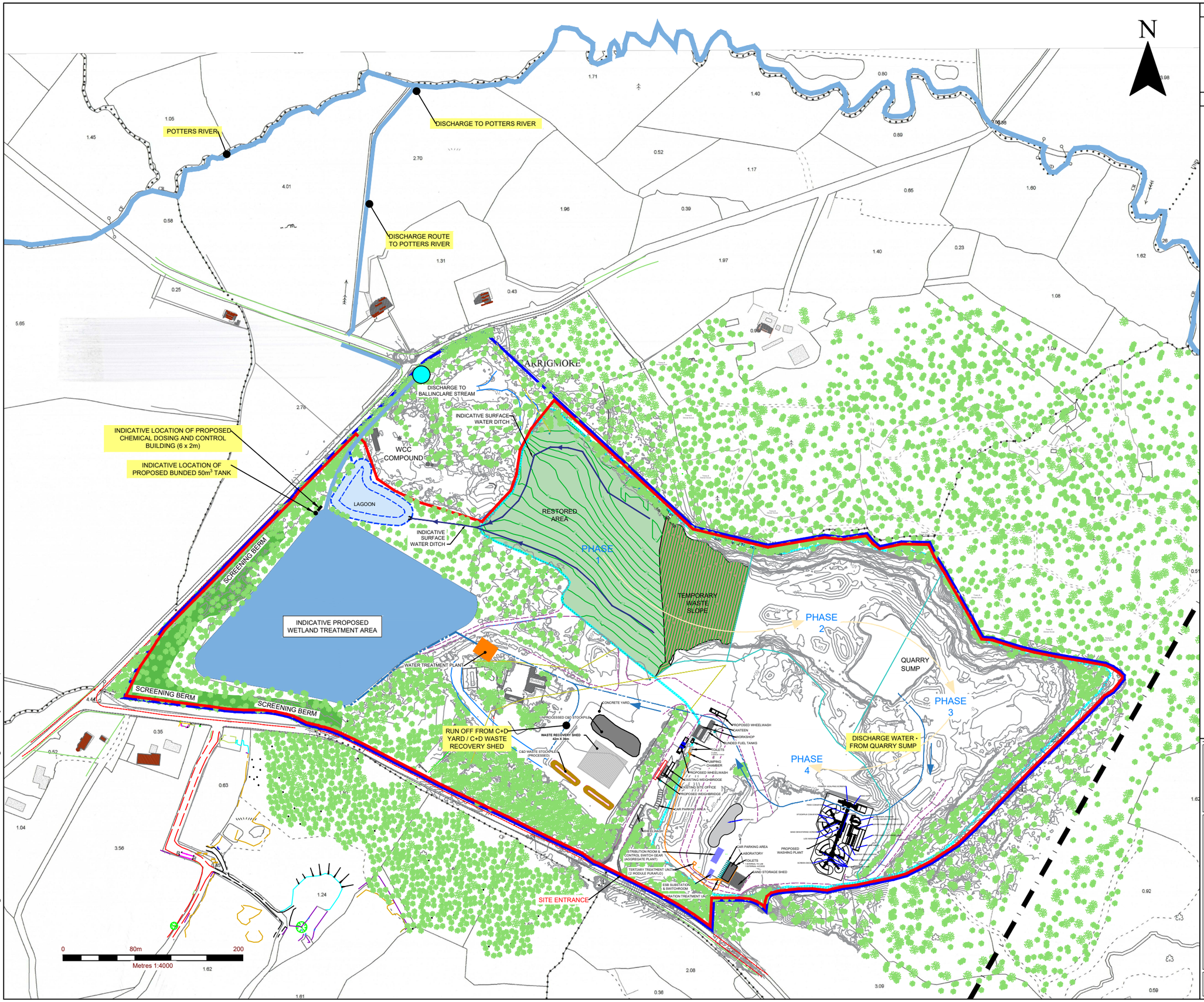
LANDFILL PHASING PLAN

FIGURE 4-8-1E

Scale: 1:5,000 @ A3

Date: FEBRUARY 2023

00036.00080.0.16.Figure 4-8-1E Landfill Phasing Plan.dwg



NOTES

1. EXTRACT FROM ORDNANCE SURVEY 1:2,500 / 1:5,000 MAP SERIES: 4137-B & 4137-D

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50248253 (C) ORDNANCE SURVEY IRELAND/ GOVERNMENT OF IRELAND

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SURFACE WATER MANAGEMENT SYSTEM OPERATIONAL PHASE

FIGURE 4-8-1F

Scale	Date
1:3,000 @ A3	FEBRUARY 2023

00036.00080.0.16.Figure 4-8-1F Surface Water Management System-Op Phase

NOTES

1. EXTRACT FROM ORDNANCE SURVEY 6 INCH MAPPING WW030 & WW0311

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50248253 (C) ORDNANCE SURVEY IRELAND/ GOVERNMENT OF IRELAND

3. EXISTING SURVEY (MAY 2016) PROVIDED BY KILSARAN

LEGEND

- LANDHOLDING BOUNDARY (c. 36 Ha. / 89 acres)
- PLANNING APPLICATION AREA (c. 32.5 Ha.)
- PROPOSED INERT LANDFILL AREA (c. 17.0 Ha.)
- D1 DUST MONITORING LOCATIONS
- N1 NOISE MONITORING LOCATIONS
- SURFACE WATER MONITORING LOCATIONS
- GROUNDWATER MONITORING LOCATIONS

SW3B SW4 SW1 SW2 GW3 GW1 GW2 N1 D1 D3 N3 D2 N2

ARRIGMORE KILMACURRA WEST

SETTLEMENT LAGOONS

BACK UP SETTLEMENT LAGOONS (IF REQUIRED)

CONCRETE YARD

SITE NOTICE LOCATION @ SITE ENTRANCE

Church (Site of)

Quarry

0 50 100 150 200m 300 400 500

Metres 1:5000

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ENVIRONMENTAL MONITORING LOCATIONS

FIGURE 4-8-1G

Scale 1:5,000 @ A3

Date FEBRUARY 2023

00036.00080.0.16.Figure 4-8-1G Environmental Monitoring Locations.dwg

NOTES

1. EXTRACT FROM ORDNANCE SURVEY 6 INCH MAPPING WW030 & WW0311

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LEGEND

- LANDHOLDING BOUNDARY (c. 36 Ha. / 89 acres)
- PLANNING APPLICATION AREA (c. 32.5 Ha.)
- 8.0 CONTOURS - RESTORED
- PERIMETER CUT-OFF DITCH
- CUT-OFF DITCH CATCHMENT BOUNDARY
- WETLAND

N

WCC COMPOUND

LAGOON

SCREENING BERM

WETLAND TREATMENT AREA TO BE RETAINED AS A WILDLIFE FEATURE

SCREENING BERM

NORTH DITCH 1

NORTH DITCH 2

SOUTH DITCH 3

SOUTH DITCH 4

CONCRETE YARD

SOUTH DITCH 1

SOUTH DITCH 2

NORTH DITCH 2

SWALE

EXISTING SITE ENTRANCE

OUTFALL TO EXISTING STREAM

1 2 3 4 5 6 7 8 9 10 11 12

0 80m 200

Metres 1:2500

00036.00080.0.16.Figure 4-8-1H Long Term Surface Water Management Proposals.dwg

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LONG TERM SURFACE WATER MANAGEMENT

FIGURE 4-8-1H

Scale 1:2500 @ A3

Date FEBRUARY 2023