

ATTACHMENT D2 OPERATION OF WASTE FACILITIES

RESTORATION AND RECOVERY ACTIVITIES

The backfilling of the existing quarry void with inert soils and stone is deemed to constitute inert waste recovery through deposition for the purposes of land improvement or restoration. The proposed restoration scheme provides for direct use of the imported soil and stone, without further processing.

The proposed backfilling of the quarry void using inert soil comprises the following classes of waste activity in accordance with the Waste Management Acts 1996 – 2015:

- *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 final restoration of backfilled landform.
- *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 (Principal Activity).* This activity is limited to the recovery of inert soil and stone through deposition, for the purposes of improvement or development of land.
- *Class No. R13 (storage of waste pending any of the operations R1 to R12).* This activity will be limited to the storage of imported wastes for recovery purposes at the facility (e.g. stockpiles of inert soil).

It is envisaged that the following wastes (EWC codes) will be deposited (or recovered) at the facility :

- 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
- 20 02 02 Soil and stone from municipal facilities

Backfilling / Restoration Overview

Backfilling of the application site will progress upwards from the former quarry floor and on completion, the restored landform will merge into the surrounding landscape. An outline of the proposed restoration scheme and the final ground level contours is shown in Drawing D2-1. In addition to imported materials, some soil in existing screening berms and/or stockpiles across the existing site will be used to backfill the quarry. Cross-sections through the final landform are shown in Drawing 2-2.

All new, additional or replacement infrastructure required to facilitate the proposed waste recovery activities will be constructed and/or installed prior to commencement of the backfilling operations. Backfilling of the existing void will be undertaken in a number of 'lifts' from the existing quarry floor, typically ranging between 5m and 8m height.

On final completion of the restoration, a cover layer of subsoil and topsoil will be placed and graded across the backfilled mineral soil. This will then be rolled and seeded with grass in order to promote stability and minimise soil erosion and dust generation. A short aftercare period will follow in order to ensure that vegetation becomes well established and that any bare or exposed soils are re-seeded.

Thereafter, the restored lands will be left largely unattended, to be naturally recolonised by native vegetation. It is expected that over time, the infilled site will return to a heathland / grassland habitat, similar to that which originally existed prior to quarrying, and that the restored landform will ultimately merge into the surrounding local landscape.

Method and Safety Statements for Construction Works

Any additional infrastructure required at the application site, over and above that which is currently in place, will be constructed in accordance with a detailed construction method statement and health and safety plan prepared by Roadstone Ltd. and/or its external work Contractors.

Material Requirements

The only material requirements in respect of the proposed restoration scheme are the inert soil, stone and rock to be used in backfilling the existing quarry void. At the present time, it is considered that the principal sources of such materials over the lifetime of the waste recovery facility will be construction and development related activities in the South Dublin, Dun-Laoghaire-Rathdown and North Wicklow areas.

The total volume of backfilled soil required to create the restored landform is approximately 1,830,000m³. The backfilled materials will be subject to a degree of compactive effort (by tracked bulldozer) and materials placed at the bottom of the quarry will be further compacted by the weight of overlying material.

Assuming an average target compaction density of 1.8t/m³ for tonnage assessment purposes, and allowing for approximately 20,000 tonnes of suitable material on site, gives an overall import requirement for approximately 3,280,000 tonnes of inert soil and stone.

When the proposed waste recovery facility is operational, no construction and demolition waste (intermixed concrete, brick, pipes, metal, timber etc.) will be imported for backfilling purposes. Only 'virgin' aggregate will be imported to the recovery facility for construction of temporary haul roads across / over backfilled materials.

An estimate of the material quantities required to complete backfilling of the application site is provided below:

**Table D2-1
Material Requirements**

Material	Quantity (tonnes)	Source
Inert soil, stones and rock	3,230,000	Imported
Stockpiled soil	20,000	In-situ
Aggregate / Recycled Aggregate	10,000	Imported
Topsoil (150mm)	40,000	Imported

Material Balance

As noted above, approximately 12,000m³ (20,000 tonnes) of the inert materials required to backfill the quarry void may be sourced from existing soil stockpiles and/or screening berms around the application site. All remaining inert materials to be used in the restoration of the application site will be imported from external construction work sites.

Importation of Construction Materials

Of the construction materials required to construct site infrastructure, hardcore, drainage stone and concrete will be sourced from the Applicant's quarries and concrete production facilities. Other elements, including portacabin offices, tanks, weighbridge, wheelwash and drainage infrastructure will be sourced from specialist suppliers and installed prior to commencement of backfilling activities.

Removal of Materials Off-Site

Any non-inert waste identified within the inert soils imported for recovery purposes will be separated and transferred to the waste inspection and quarantine facility pending removal to suitably licensed waste disposal or recovery facilities. The Applicant anticipates, on the basis of its experience operating similar waste recovery facilities in the Greater Dublin Area for many years, and that the quantity of such wastes will be low.

Small volumes of virgin aggregate will be used for construction of temporary haul roads at the restoration site. Any concrete, brick, timber, metal, pipes, skips, tiles or other construction and demolition / quarry waste currently held at the quarry site will be removed off-site to an authorised waste recovery or disposal facility.

Any construction and demolition waste inadvertently brought to site once recovery operations commence will be separated using mechanical plant and stockpiled at the waste quarantine area pending transfer off-site to an authorised construction and demolition waste recovery facility.

Any occasional metal waste encountered on site will be separated and placed in a skip pending removal off site to a permitted (or licensed) waste recovery facility. Any other non-inert waste (timber, plastic etc.) will also be separated and placed in a skip pending removal to a permitted (or licensed) waste disposal or recovery facility.

Only operators and/or haulage firms holding valid current waste collection permits will be engaged to transfer these waste streams to other waste disposal or recovery facilities.

Formation Levels and Gradients

The quarry void will be backfilled in several phases working upwards from the existing quarry floor level at c. 220mOD. Final formation levels on completion of the backfilling and restoration works vary on account of the sloped nature of the restored landform, from approximately 290mOD on the eastern side, to 250mD on the western side, as indicated on Drawing D2-1.

During site restoration works the upper surface of the backfilled materials will be graded so as to ensure surface water run-off falls to ponds / sumps at temporary low points within the quarry void as it is being backfilled. Water will be pumped from these temporary ponds / sumps via the proposed settlement ponds and hydrocarbon interceptor to the existing off-site drainage network leading to the Killough River.

Temporary access ramps into and out of active backfilling 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:1.5h in order to ensure stability. On completion, final gradients across the restored ground surface will be relatively shallow, typically of the order of 1v:5v or less.

Stability

Visual inspection and available site investigation data indicates that the area to be backfilled is underlain by intact competent bedrock. Backfilling of the quarry using in-situ and imported soils will not induce overloading or failure within the underlying rock. As the increase in loading of the rock will not exceed that which existed prior to extraction, no deep seated foundation failure is anticipated.

Temporary side slopes in backfilled soils will be graded at an angle no steeper than 35° (approximately 1v:1.5h), sufficient to ensure no large scale instability arises over the short-term. Ongoing assessment of slope stability will be undertaken at the application site as backfilling progresses.

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

Given that the bulk of the soil materials to be imported to site for 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.

Capacity and Lifespan

The estimated volume of material to be placed at the application site is approximately 1,830,000m³. Of this, a relatively small volume, estimated at no more than 12,000m³ will be sourced from on-site stockpiles, perimeter screening berms and general site levelling works required for the final restoration of the quarry. The remainder of the material will need to be imported.

The duration of backfilling activities at the quarry void will largely be dictated by the rate at which approximately 1,820,000m³ (3,280,000 tonnes) of externally sourced inert soil and stone is imported to the site. There are many factors which will influence this, including, but not limited to the:

- Availability of acceptable inert materials from construction 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, calculation of intake rates and duration is not an exact science. Over the short-to-medium term (the initial 5 years of operation), it is likely significant quantities of inert soil could be sourced from mixed residential and commercial development in the South Dublin, Dun Laoghaire Rathdown and North Wicklow areas.

It is estimated that the rate of importation of inert materials to the quarry void could average around 225,000 tonnes to 275,000 tonnes per annum, with a maximum intake of 300,000 tonnes per annum should large commercial developments or infrastructure works proceed within the surrounding catchment area at some stage over its operational life.

If an average importation rate was between 225,000 and 275,000 tonnes per annum, the expected operational life of the facility would be between 12 and 15 years. If however the rate of backfilling is less than anticipated, the recovery facility could be operational for up to 20 years.

WASTE ACCEPTANCE AND HANDLING

Only inert soil and stones shall be accepted at the application site. Inert materials shall be accepted at the site between 07.00 hours and 18.00 hours each weekday and 08.00 hours to 14.00 hours on Saturday. No materials shall be accepted at any other time including Sundays and Public Holidays.

Insofar as practicable, the source of each large consignment of soil imported to site for backfilling purposes shall be identified in advance and subject to basic characterisation testing to confirm that soils at that location can be classified as inert. Ideally, characterisation testing will be undertaken in advance by customers / clients / contractors intending to forward soil to the application site.

Operating procedures at the waste recovery facility will require all soil and stones forwarded for backfilling / recovery purposes to be pre-sorted at source, inert and free of construction or demolition waste or any non-hazardous / hazardous domestic, commercial or industrial wastes.

CCTV cameras mounted around the weighbridge and weighbridge office and will be used to inspect all consignments being imported to the recovery facility. Any waste materials that are deemed to be unacceptable for recovery at the facility on the basis of a visual inspection at the weighbridge will be rejected and directed to an alternative authorised waste facility.

All inert soils imported to the site will be unloaded (end-tipped) from trucks at the active backfilling area. It will be visually inspected by site personnel at that point to confirm that there is no intermixed construction or demolition, non-hazardous or hazardous waste placed within it.

If, following acceptance of waste, there is any subsequent grounds for concern about the nature of the wastes imported to site, it will be segregated and transferred to the waste inspection and quarantine area for closer inspection and classification. 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 and cannot be accepted and used for restoration purposes at this site, they will be removed off-site by permitted waste collectors to suitably permitted (or licensed) waste disposal or recovery facilities, as appropriate.

Any non-inert construction and demolition waste (principally metal, timber, PVC pipes and plastic) inadvertently imported to the site will be separated out and temporarily stored in skips at the waste quarantine area prior to removal off-site to appropriately permitted (or licensed) waste disposal or recovery facilities.

A representative sample shall be taken from one in every 100 loads of inert soil accepted at the facility and subjected to compliance testing which is less extensive than characterisation testing and focuses on key contaminant indicators. These data shall be used to confirm that the accepted soils are inert and comply with acceptance criteria. Compliance testing shall be undertaken by the Applicant.

An outline Waste Handling and Acceptance Plan for this waste recovery facility is provided in Appendix 2-1 of the Environmental Impact Statement which accompanies this waste licence application.

ENVIRONMENTAL MONITORING

General

When it was operational previously, there was an environmental monitoring programme in place at Calary Quarry. This monitoring complied with the requirements of conditions attaching to a planning permission obtained in February 2008 of foot of the Section 261 registration process (WCC Ref. 06/6189, An Bord Pleanála PL27 224400).

In addition, Roadstone Ltd. operates an environmental management programme to monitor and manage emissions from established waste recovery operations at other facilities. It is anticipated that limit values for environmental emissions arising from waste recovery activities at the application site will be similar to those applying at other 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 inert waste recovery facility.

Environmental sampling, monitoring and testing will generally be undertaken by the Applicant's in-house environmental staff as required. Records of environmental monitoring and testing will be maintained on-site and forwarded to the EPA as required under the terms of the waste licence.

Details of monitoring arrangements for dust, water and noise emissions from the proposed waste recovery facility are provided in Attachments F2 to F6 of this waste licence application and in Chapter 2 of the Environmental Impact Statement which also accompanies it. All proposed environmental monitoring locations for these environmental media are identified in Drawing D2-3. Details of other monitoring requirements at the proposed recovery facility are identified and discussed briefly below.

Ecological Monitoring

In the absence of any rare or protected species within the application site, it is considered that there is no requirement for ongoing ecological monitoring of other species during quarry backfilling and restoration operations.

In light of observations made in the course of the ecological baseline assessment, the application site will be checked for any signs of possible nesting peregrine falcons before works in respect of the recovery facility commence at the site. Where evidence of nesting is recorded, the Applicant will adhere to guidance provided by Notice Nature guideline - *Wildlife Habitats and the Extractive Industry* for the avoidance of disturbance to any breeding peregrine falcon. This will include the establishment of a suitable buffer and no working zone up to a minimum of 150m from the nest site, allowing birds which may be nesting on quarry faces to be left undisturbed until chicks have fledged.

Leachate and Landfill Gas Monitoring

In the absence of biodegradable waste amongst the inert materials used to backfill and restore the application site, no leachate or landfill gas can be generated and accordingly no provision has been made for leachate or landfill gas monitoring at this facility.

Meteorological Monitoring

At the present time, no meteorological monitoring is undertaken at the application site. It is understood that temperature, rainfall, sunshine, wind speed and direction are recorded at the weather station at Casement Aerodrome, at Baldonnell in south County Dublin, approximately 25km 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 if required.

Odour Monitoring

As the materials being placed or recovered at this site are not biodegradable and do not therefore emit odorous gases, the site restoration and recovery activities will not give rise to odour nuisance. Accordingly, no provision has been made for odour monitoring at this facility. Site staff will report, record and investigate any odour emissions at the site in the highly unlikely event that a complaint is made about odours emanating from the site.

Stability and Settlement Monitoring

Temporary slopes in the backfilled soils (and existing quarry faces) 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 restoration works and closure of the facility, stability and settlement monitoring will be undertaken as and if required by the grant of planning permission / waste licence.




CONTINGENCY ARRANGEMENTS

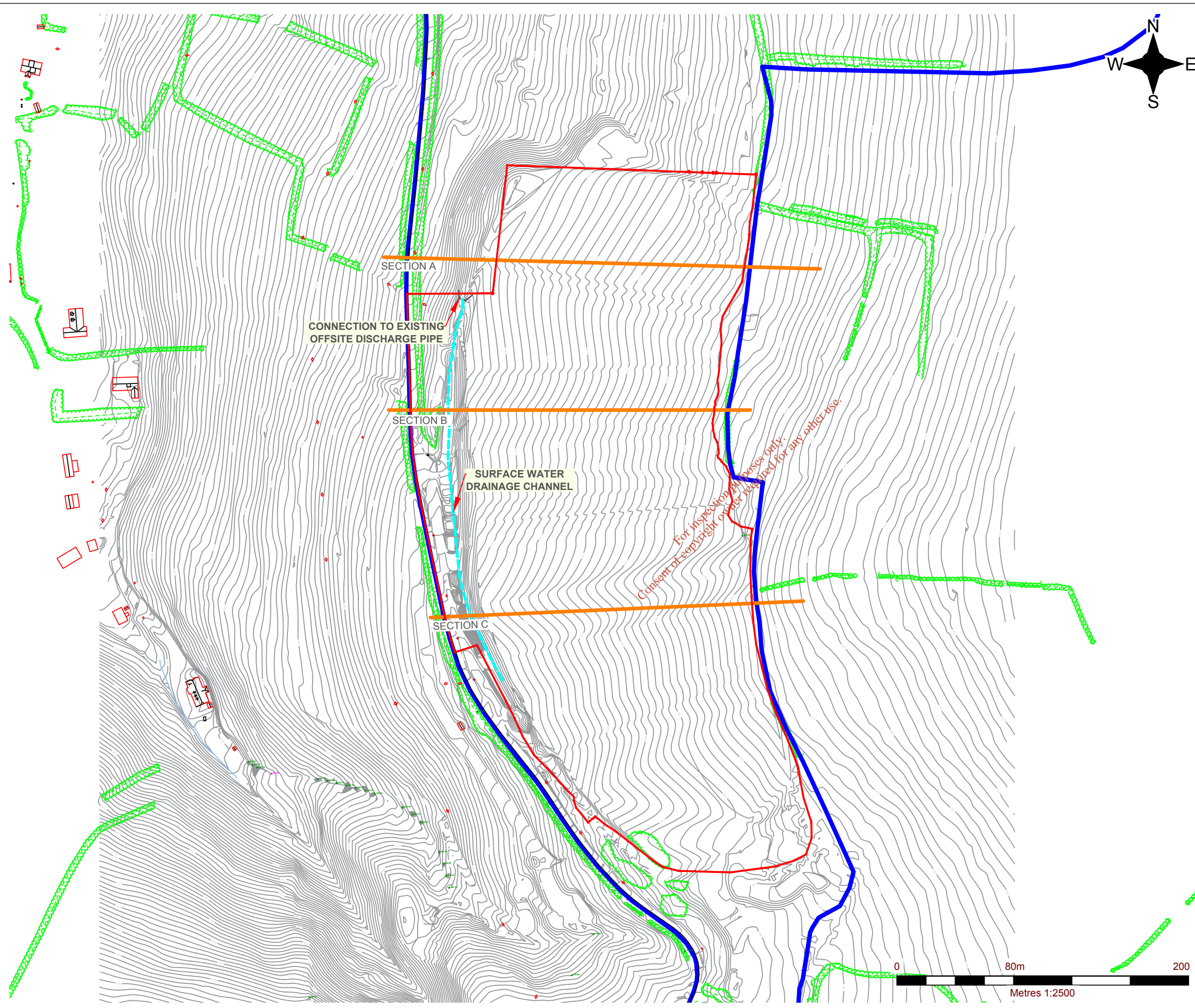
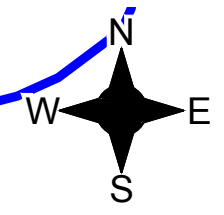
Details of existing contingency arrangements at the application site are provided in the contingency plan, a copy of which is provided in Appendix 2-2 of the Environmental Impact Statement which accompanies this waste licence application.

NOTES

1. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000716 (C) ORDNANCE SURVEY IRELAND & GOVERNMENT OF IRELAND
2. TOPOGRAPHIC SURVEY SUPPLIED BY EUROPEAN AIR SURVEYS

LEGEND

	ROADSTONE LIMITED LAND INTEREST (c.25.4 Hectares)
	PLANNING APPLICATION AREA (c.9.1 Hectares)
	PROPOSED SURFACE WATER DRAINAGE CHANNEL



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**ROADSTONE LIMITED
WASTE LICENCE APPLICATION**

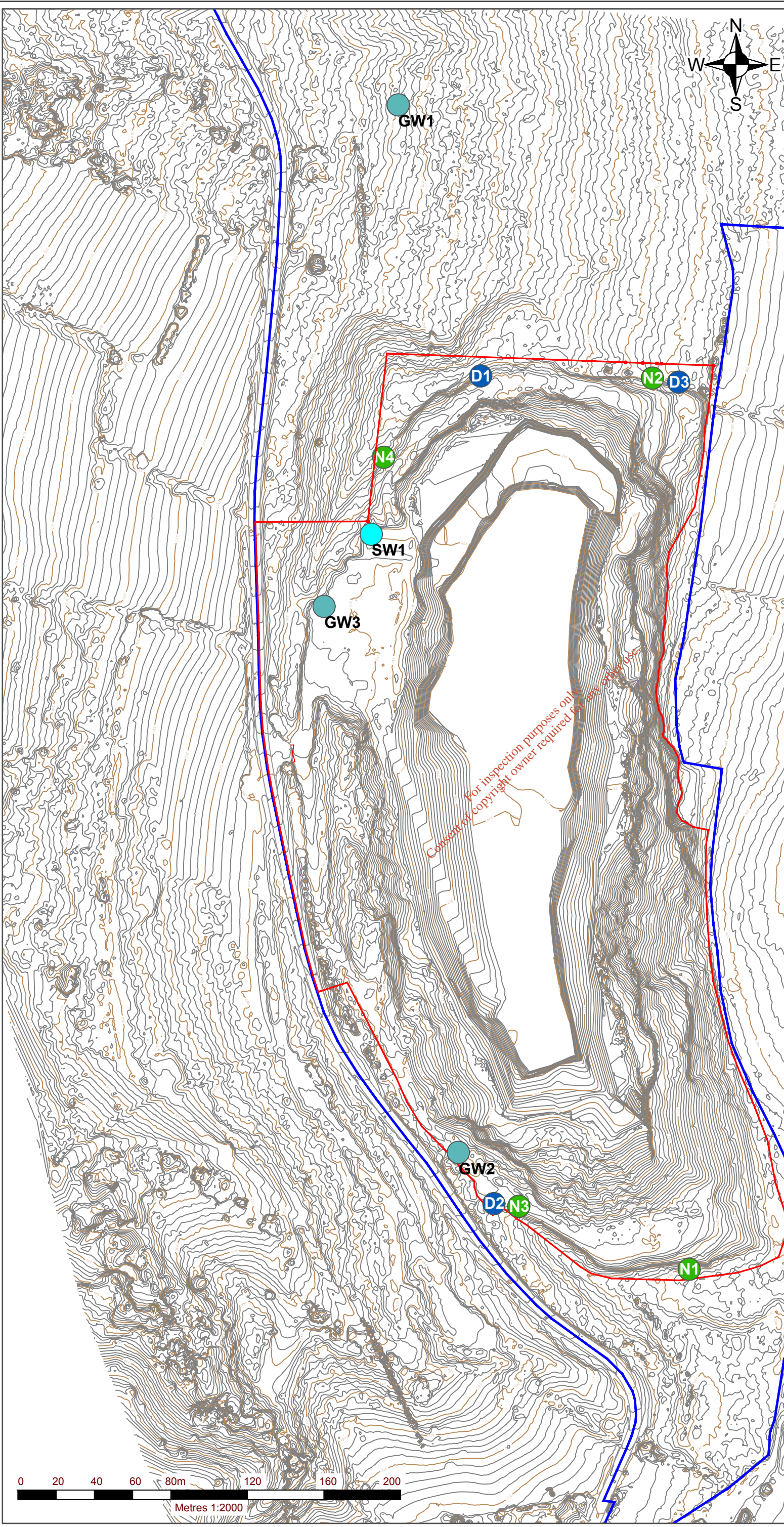
**INERT SOIL WASTE RECOVERY FACILITY
CALARY QUARRY,
KILMACANOGE, CO. WICKLOW**

FINAL RESTORATION SURFACE

DRAWING D2-1

Scale 1:2,500 @ A3 Date JUNE 2016

00180.00109.0.D2-1.Final Restoration Surface.dwg



NOTES

1. 'Orthomosaic produced from Aerial Photography flown February 2015 by SLR Consulting Ireland (IAA Permit No. 04/2015) www.slrconsulting.com Tel. +353-1-2964667. Orthomosaic produced using Ground Control Points; Related to Irish Transverse Mercator Coordinate System and OS Malin Head Level Datum.

The accuracy of the orthomosaics and the digital elevation models (DEM) strongly depends on the flight height, lighting conditions, availability of textures, image quality, overlap, and type of terrain. Contours / 3D data relates to the surface model and not terrain levels. Typical accuracies: E: 0.05 m; N:0.05 m; Levels: 0.30 m.

All Dimensions and Levels are to be checked on site.

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2. Ordnance Survey Ireland Licence No. SU 0000716(C) Ordnance Survey Ireland & Government of Ireland

LEGEND

	ROADSTONE LIMITED LAND INTEREST (c.25.4 Hectares)
	PLANNING APPLICATION AREA (c.9.1 Hectares)
	NOISE MONITORING LOCATION
	DUST MONITORING LOCATION
	GROUNDWATER MONITORING LOCATION
	SURFACE WATER MONITORING LOCATION

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00180.00109.0.D2-3.Environmental Monitoring Locations.dwg

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**ROADSTONE LIMITED
WASTE LICENCE APPLICATION**

**INERT SOIL WASTE RECOVERY FACILITY
CALARY QUARRY,
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ENVIRONMENTAL MONITORING LOCATIONS

DRAWING D2-3

Scale 1:2,000 @ A3	Date JUNE 2016
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