

**HUNTSTOWN SOIL RECOVERY FACILITY  
NORTH AND WEST QUARRY, HUNTSTOWN,  
FINGLAS, DUBLIN 11**

**CLOSURE, RESTORATION AND AFTERCARE MANAGEMENT PLAN  
(CRAMP)**

Prepared for: Roadstone Limited



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## 1.0 INTRODUCTION

### 1.1 Huntstown Inert Waste Recovery Facility

The Environmental Protection Agency (hereinafter '*the Agency*' or '*EPA*') issued a waste licence to Roadstone Ltd. (hereinafter '*Roadstone*') in respect of an inert soil waste recovery facility at Huntstown Quarry, Finglas, Dublin 11 on 11<sup>th</sup> February 2015 (Ref. W0277-01).

The principal waste activity at the facility comprises backfilling of the North Quarry at Huntstown using imported inert soil and stone. The original waste licence provided for

- Backfilling of up to 7,295,000 tonnes (approximately 3,840,000m<sup>3</sup>) of naturally occurring waste materials, principally excess inert soil, stones and/or broken rock excavated on construction and development sites, to re-use in backfilling and restoring a large quarry void created by extraction of bedrock;
- Separation of any non-inert construction and demolition waste (principally metal, timber, PVC pipes and plastic) unintentionally imported to site and its temporary storage at a dedicated inspection and quarantine facility, prior to removal off-site to appropriately licensed waste disposal or recovery facilities;
- Restoration of the backfilled void (including placement of cover soils and seeding) and return to natural grassland habitat and
- Environmental monitoring of noise, dust, surface water and groundwater for the duration of the proposed site restoration works and for a short aftercare period.

A number of pre-commencement submissions in respect of the soil recovery facility, including a Closure, Restoration and Aftercare Management Plan (CRAMP) and Environmental Liabilities Risk Assessment (ELRA) were submitted to the Agency following the award of the original waste licence. These submissions were approved by the Agency and the Financial Provisions required on foot of these were put in place by Roadstone during September 2015. Backfilling and soil recovery activity commenced at the facility in October 2015.

An amended waste licence (Ref. No. W0277-02) was issued in September 2017 on foot of a waste licence review application submitted in November 2016 which provided for an increase in the annual rate of waste intake to the facility from 750,000 tonnes to 1,500,000 tonnes per annum. The amended licence also provided for an extension to the licensed area of the facility to include the former West Quarry and an increase in the overall waste intake / recovery capacity (to approximately 5,025,000m<sup>3</sup> or 9,550,000 tonnes).

### 1.2 Site Description

The licensed inert waste recovery facility is located entirely within the townlands of Huntstown and Kilshane, Co. Dublin, approximately 2.5km north-west of the Dublin suburb of Finglas and 2km north-west of the interchange between the N2 Dual Carriageway and the M50 Motorway. The plan extent of the lands owned by Roadstone Ltd. is outlined in blue on a map of the local area reproduced in Figure 1.

The existing waste licence facility is located entirely within a large active quarry complex and adjoining concrete production facilities operated by Roadstone Ltd. The waste facility covers an area of approximately 48.7 hectares (117.25 acres) and comprises a deep, almost full worked-out, limestone quarry (North Quarry), a shallow quarry which had previously been stripped of overburden material (West Quarry) and surrounding perimeter screening / overburden mounds, together with the site infrastructure required to operate the inert soil waste recovery facility. The existing site layout and all associated infrastructure are shown in Figure 2.

Prior to the award of the original waste licence in 2015, some backfilling and restoration and inert soil waste recovery had taken place at the northern end of the North Quarry under a Local Authority waste permit, in

the period from late 2002 to the end of 2003. At that time, a large volume of inert excavation spoil arising from construction of the Dublin Port Tunnel was imported and used to backfill the quarry void in that area.

The total volume of inert soil waste to be recovered at Huntstown under the terms of the current waste licence is 5,025,000m<sup>3</sup>, (equivalent to approximately 9,550,000 tonnes). It is estimated that 95,000 tonnes (approximately 50,000m<sup>3</sup>) of topsoil is available at on-site perimeter screening berms for incorporation into the final restored landform, following backfilling of the worked out North and West Quarries, and that approximately 20,00 tonnes of aggregate will be required to construct temporary haul roads across the facility, with the result that approximately 9,435,000 tonnes of waste soil material will have to be imported to the recovery facility from off-site locations to complete the quarry backfilling and restoration.

Ground levels across the licensed facility have been significantly disturbed by quarrying activities. The original ground levels around the North Quarry vary between approximately 62mOD and 66mOD (Malin) along the eastern face and between 80mOD and 85mOD along the western face. Existing ground levels immediately behind the quarry faces are locally 5m to 10m higher than surrounding ground due to the presence of perimeter screening mounds. The existing floor level at the North Quarry ranges from 38mOD to 39mOD on the eastern side and 23mOD to 24mOD on the western side. The quarry depth below original (surrounding) ground level therefore varies from 24m to 28m along its eastern face and from 57m to 62m along its western face.

The original ground levels around the West Quarry vary between approximately 85mOD to 87mOD (Malin) along the western face and between 83mOD and 85mOD along the eastern face. Existing ground levels immediately behind the western face are up to 5m higher than surrounding ground due to the presence of perimeter screening mounds along Kilshane Road and up to 10m higher on the eastern side on account of overburden mounds. Existing floor level in the West Quarry lie at approximately 81mOD to 82mOD and its depth from the original (surrounding) ground level is generally around 3m.

Within the overall licensed area, the area of the North Quarry to be backfilled has a plan footprint of approximately 11.2 hectares (27.0 acres), while that of the West Quarry is approximately 12.2 hectares (29.4 acres).

### 1.3 Planning Status - Former / Existing / Planned Activities

Excavation and blasting of limestone has been carried out across the Huntstown Quarry Complex for the past four decades, following grant of planning permission in or around 1973. A 10 year planning permission (Ref. No. 93A/1134 and P06F.092622) was granted in 1994 to continue quarrying and for production of related concrete materials. Planning permission for the existing construction and demolition waste recycling facility in the centre of the quarry complex was granted in 2002 (Ref. No. F02A/0602 and PL06F.200623). Planning permission was granted in 2004 for continuation of quarrying for a 10 year period (Ref. No. F03A/1430 and PL06F.206789).

The proposal to backfill the North Quarry and West Quarry with in-situ and imported inert soil and stones was part of the quarry restoration works which were previously notified and agreed with Fingal County Council in 2002 in accordance with Condition No. 17 of 1994 planning permission. These works were commenced in the 2002-2003 period, but progressed only intermittently after that time. Quarry backfilling works were previously controlled by a series of waste permits issued by Fingal County Council.

In August 2014, planning permission was secured for continuation of quarrying for a 20 year period (Fingal County Council Ref. No FW12A-0022, An Bord Pleanála Ref. No. 06F.241693). The overall development proposal, which was subject to EIA, also included provision for ultimate backfilling and restoration of both the North Quarry and West Quarry. As backfilling with inert waste soil is technically designated a waste activity under national waste management legislation, it was also necessary to obtain an EPA waste licence in respect of this activity.

The original (2014) planning permission limited the inert soil intake to the recovery facility to a maximum of 750,000 tonnes per annum. Planning permission was subsequently sought for an increase in the soil waste intake to 1,500,000 tonnes per annum and was finally approved in November 2016 (Planning Permission Ref. FW16A/0120)

Roadstone discharges dewatered groundwater and surface water run-off from the North Quarry and ponded surface water from the West Quarry, together with process water from aggregate washing and concrete production activities, via a series of existing settlement ponds to tributary streams of the Ward River. Discharge for non-waste activities at Huntstown is controlled by way of a licence issued by Fingal County Council in November 2011 (Ref WPW-F008-01). This superseded an earlier discharge licence issued by Dublin County Council in January 1987 (Ref. WPW/1/87).

## 1.4 Classes of Licensed Waste Activities

The waste licence issued to Roadstone by the Environmental Protection Agency (EPA) provides for the following licensed activities (as per the Fourth Schedule of the Waste Management Acts 1996-2014).

- Class R5 : Recycling / reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials (Principal Activity).
- Class R3 : Recycling / reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes) which includes gasification and pyrolysis using the components as chemicals and
- Class R13 : Storage of waste pending any of the operations numbered R1 to R12.

## 1.5 Licence Requirements

This Closure, Restoration and Aftercare Management Plan (CRAMP) is prepared in compliance with Condition 10.2 of the reviewed waste licence for an inert soil waste recovery facility at Huntstown Quarry, Finglas, Dublin 11 (Ref. W0277-02, issued September 2017).

### 10.2 Closure, Restoration and Aftercare Management Plan (CRAMP)

- 10.2.1 *The licensee shall maintain a fully detailed plan for the closure, restoration and aftercare of the facility or part thereof. The Licensee shall submit a revised CRAMP for agreement by the Agency within six months of the date of grant of the licence;*
- 10.2.2 *The plan shall be reviewed annually and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the agreement of the Agency.*
- 10.2.3 *The licensee shall have regard to the Environmental Protection Agency Guidance on Assessing and Costing Environmental Liabilities (2014) and, as appropriate, Guidance on Financial Provision (2015) when implementing Condition 10.2.1 above.*

## 1.6 Scope of this CRAMP

In preparing this plan, regard has been had to requirements outlined in Condition 10.3 of the Waste Licence which include the following as a minimum:

- *A scope statement for the plan;*
- *The criteria that define the successful closure, restoration and aftercare of the facility or part thereof, which ensures minimum impact on the environment;*
- *A programme to achieve the stated criteria;*
- *Where relevant, a test programme to demonstrate the successful implementation of the plan: and*

- *Details of the long term supervision, monitoring, control, maintenance and reporting requirements for the restored facility.*

The objective of this CRAMP is to ensure that on completion of inert soil waste recovery activities at Huntstown and following subsequent facility closure and restoration, the infilled quarry voids will be substantially re-integrated into the surrounding pastoral landscape, with much of the land restored to natural grassland habitat.

The scope of this CRAMP comprises:

- a Site Evaluation, which presents details of its planning history and an inventory of existing mobile plant and fixed infrastructure;
- the Closure Considerations and Criteria for successful closure;
- an outline Closure Plan Costing and measures for the Closure Plan update, review, implementation and validation; and
- the Facility Restoration and Aftercare proposals, including a restoration and aftercare management costing.

The CRAMP has also been prepared in accordance with the recent EPA publication, *Guidance on Assessing and Costing Environmental Liabilities (2014)*.



## 2.0 SITE EVALUATION

### 2.1 Operator Performance

#### 2.1.1 Environmental Management Systems

Roadstone implements an Environmental Management System (EMS) at all its facilities in respect of its core quarrying and construction material production activities. In recent years it has extended the scope of the EMS to encompass inert soil / C&D waste recovery activities. A part of its EMS, Roadstone has developed standard procedures to address waste acceptance and handling activities, as well as an emergency response plan.

#### 2.1.2 Compliance History

As previously noted, the excavation and blasting of limestone has been undertaken at the Huntstown Quarry Complex for the past four decades, following grant of planning permission in or around 1973.

Neither Roadstone Ltd. nor any of its predecessor companies (which includes Roadstone Dublin, Roadstone Provinces and John A. Wood), has ever been convicted of any offence under the Waste Management Acts 1996-2014, the Environmental Protection Agency Act 2003 or the Air Pollution Act 1987.

The Huntstown quarry complex has largely operated in compliance with all permits and planning consents and Roadstone has not been subject to enforcement action by the Local Authority. A number of complaints and warning letters in respect of compliance with planning conditions were received by the company between 2007 and 2010 were subsequently addressed and/or resolved by the company.

#### 2.1.3 Incident History

A fuel leak / spill occurred during filling of diesel tanks in early 2013, overflowed at a downstream interceptor and impacted a lagoon to the south of the central infrastructure area (outside the proposed waste licence area). A specialist contractor was called to site to remove spilled fuel in lagoons or sumps of ponding at the ground surface. It also pumped out the ground around the fuel tank and interceptor outflow pipe.

Subsequent groundwater sampling and testing and a follow up site inspection and audit undertaken by AWN Consulting revealed that, following the site clean-up, there was no evidence of ground, surface water or groundwater contamination by hydrocarbons. A qualitative risk assessment undertaken by AWN also indicated that the spill presented a low risk to groundwater quality directly beneath the site and negligible risk to water supply boreholes, surface water bodies and site based personnel or visitors.

#### 2.1.4 Environmental Monitoring

Environmental monitoring of surface water, groundwater, noise and dust is undertaken at designated locations across the licensed facility, at the locations indicated in Figure 3.

There is an established programme of environmental monitoring in connection with ongoing rock extraction, aggregate processing and concrete production activity across the Huntstown Quarry Complex. This environmental monitoring programme complies with the requirements of existing planning permissions, waste permits and discharge licences issued by Fingal County Council in respect of established activities.

##### *Surface Water*

The inert soil recovery facility straddling the North Quarry and West Quarry at the northern end of the Roadstone landholding at Huntstown, lies entirely within the Ward River catchment, albeit just inside its southern boundary. There is no surface water watercourse located within the licensed facility and the nearest watercourses are artificial (man made) ditches and/or small tributary streams on the eastern side which flow north to the Ward River, which flows approximately 4km north of the facility.

Groundwater levels beneath the North Quarry are lowered by means of sumps in the floor of the quarry. Dewatered groundwater and surface water falling across the quarry footprint collect in a pond on western side of the quarry and are pumped to a drainage channel / watercourse at original ground surface level via an existing pipe network. Water pumped to this channel is routed via settlement lagoons to discharge to a tributary stream of the Ward River which runs northwards out of the licensed site.

The depth of overburden stripping and removal at the West Quarry is typically 2m-3m, some distance above the groundwater table which has been depressed by dewatering at the adjoining North Quarry. Although much of the rainfall over the West Quarry recharges into underlying rock, a small proportion of it runs over ground to ponds forming at low points and/or at closed depressions (which are likely to be self-sealed with fine silt and/or sediment). Surface water run-off collecting in these pond features is pumped north, across an internal haul road, to the North Quarry as required to prevent flooding. From there it is discharged off-site with other waters collected around the North Quarry.

Surface water sampling and testing is undertaken immediately downstream of the existing settlement lagoons, beyond the eastern face of the North Quarry (at location W4), and upstream of its discharge to the tributary stream of the Ward River (at location W1), as indicated in Figure 3. Surface water samples are tested for a wide range of physical and chemical parameters in order to assess water quality and detect possible contamination. Most recent surface water monitoring (for 2017) indicates that water discharge quality substantially complies with Emission Limit Values (ELV's) set by the EPA Waste Licence.

#### *Groundwater*

There are 6 No. groundwater monitoring wells installed across the Huntstown Quarry Complex. Of these, 3 No. (GW03, GW04 and GW05) are located in close proximity to the waste licence boundary, while 1 other (GW02) occurs at a short distance to the east.

The available groundwater quality data for groundwater at Huntstown indicates that it is of good status, with virtually all parameters analysed having ion concentrations lower than the Interim Guideline Values (IGV) set out in the EPA Publication 'Towards setting Guideline values for the Protection of Groundwater in Ireland'. The guideline value for chloride has been exceeded on occasion, but this may be due to proximity to seawater at the coast (12km away). All samples exceeded the guideline for hardness, which is not unusual for groundwater samples from limestone bedrock. Occasional recorded exceedances of guideline values for orthophosphate may be the result of fertiliser application on adjoining agricultural lands.

A septic tank installed to the east of the quarry site office and north of the existing blockyard currently services shared toilets, wash hand basins and sink units at the quarry. The treated effluent from the septic tanks discharges to groundwater via a percolation area. Much of the water demand in Huntstown and the surrounding area is met by a Local Authority mains supply.

#### *Dust*

Planning permissions for the ongoing rock extraction, aggregate processing and concrete production activities at Huntstown specify an emission limit value for dust deposition (at the site boundary) of 350 mg/m<sup>2</sup>/day (30 day composite sample) when measured using the conventional 'Bergerhoff' method.

Atmospheric emissions related to site activities are primarily associated with dust emissions associated with aggregate processing and exhaust emissions from traffic to and from the R135 Regional Road (the former N2) and heavy good vehicle (HGV) / truck movements on unpaved roads around the quarry complex.

Dust emissions are monitored using Bergerhoff dust gauges at three locations (D1, D3 and D4) around the licensed facility and at one location within the central infrastructure area (D2), all shown on Figure 3. Monitoring gauges are located closest to emission sources and/or potentially sensitive receptors beyond the Licensee's property boundary.

Dust deposition monitoring undertaken in 2014 indicated that dust deposition levels around the Huntstown Complex were generally low, with average measured dust deposition levels around the perimeter comfortably within the prescribed emission limit value of 350mg/m<sup>2</sup>/day.

### *Noise*

Planning permissions for associated established activities within Roadstone's landholding specify noise emission limit values of 55 dB(A) L<sub>Aeq</sub> at the property boundary during day-time hours, with a reduced limit of 45 dB(A) L<sub>Aeq</sub> during night-time hours.

Noise emissions are monitored on a quarterly (i.e. three monthly) basis at 4 No. locations across the Huntstown complex (designated N1 to N4), all of which are located beyond the licensed site boundary.

Noise surveys undertaken around the Roadstone landholding consistently indicate that noise levels are elevated above permissible limits on account of high background noise levels associated with high traffic volumes along the nearby M50 Motorway and N2 Dual Carriageway as well as frequent overhead plane movements in and out of Dublin Airport.

The principal noise impact associated with the operation of the inert soil waste recovery facility will be the increased noise generated by moving HGV trucks and/or earthworks equipment during daytime hours (07:00 to 19:00 hrs). No recovery operations or traffic movements will be undertaken at the recovery facility during either evening time (19:00 to 23:00 hrs) or night-time hours (23:00 to 07:00 hrs).

## 2.2 Environmental Pathways and Sensitivity

### 2.2.1 Geology

Topsoil was previously stripped from the site in order to facilitate the development of the North Quarry and Wet Quarry and is currently stockpiled in mounds across and around the existing site. Soil mapping suggests that the lands surrounding the Huntstown Quarry complex comprise well-drained soils which are suitable for a wide range of agricultural activity, generally grassland or tillage and some poorly drained soil which have more restricted uses, principally as seasonal grassland.

Site inspections indicate that the subsoil profile comprises Made Ground (principally soil disturbed or placed by human activity) over limited thickness of glacial till and/or rock. There is no evidence of soil contamination at the site.

Most of the Made Ground arises from historical and ongoing extractive activity, principally overburden removal and stockpiling or installation of fixed plant and infrastructure. The effect of this is that few areas of undisturbed soil or subsoil remain across the Huntstown Quarry complex.

The most recent geological map of the local area published by the Geological Survey of Ireland (GSI) indicates that rock around the licensed facility comprises limestones of the Lucan, Feltrim, Malahide and Tober Colleen Formations.

The GSI maps indicate that the geological contact between the Waulsortian Limestones of the Feltrim Limestone Formation and the Tober Colleen Formation is exposed in the roadway leading into the Central Quarry, to the south of the licensed facility and it has identified this feature for future designation as a Natural Heritage Area (NHA) on geomorphological / geological grounds.

### 2.2.2 Hydrology

The inert soil recovery facility straddling the North Quarry and West Quarry lies entirely within the Ward River catchment. Rain falling across the licensed facility either

- runs over unsealed ground into the existing quarry void and the sump on the eastern side of the quarry floor
- percolates down through the existing soil / rock at the ground surface as recharge to groundwater, at which point it joins groundwater flow toward the quarry face
- collects in surface water drainage infrastructure installed across the central infrastructure area where aggregate processing and concrete production activities are currently concentrated.

Groundwater levels beneath the North Quarry and West Quarry are lowered by means of sumps in the floor of the North Quarry. Surface water falling across the North Quarry, surface water pumped from the West Quarry and dewatered groundwater are collected in the sumps and pumped to an existing drainage channel at original ground surface level via an existing pipe network. Water pumped to this channel is routed via existing settlement lagoons to discharge to a tributary stream which runs northwards out of Roadstone's property, toward the Ward River. The Emission Limit Values for this discharge are set by Schedule B2 of the recently reviewed waste licence.

The northern portion of the Ward River (known as the Ballystrahan sub-catchment) is classified in the latest EPA assessment of Ireland's rivers (for years 2010-2012) as being of 'poor' status. The Ward River has a median quality (Q3) which is generally deemed to be unsatisfactory. Siltation by agriculture and urban wastewater discharges are likely to be the principal contributors to reduced water quality in the stream.

### 2.2.3 Hydrogeology

Bedrock aquifer maps indicate that the Huntstown Quarry complex straddles bedrock formations which are generally considered to be locally important karstified aquifers. Of the three bedrock formations exposed at Huntstown, both the Waulsortian and Malahide Formations are classified by the GSI as locally important aquifers, while the Tober Colleen Formation is classified a poor aquifer.

While there is groundwater seepage into the North Quarry, volumes vary seasonally and are typically low to moderate.

Groundwater vulnerability maps published by the EPA on its website ([www.epa.ie](http://www.epa.ie)) indicate that the licensed site is located in an area with high to extreme groundwater vulnerability status where rock is close to the surface. Groundwater vulnerability reflects the potential for rapid groundwater movement through subsoil deposits into the underlying bedrock aquifer. It is generally high or extreme where subsoil deposits are thin or absent and provide little or no attenuation for potential pollutants or contaminants.

Recent groundwater sampling and testing indicate that groundwater quality at the site is generally good, with established on-site activities shown to have had no significant impact on existing groundwater quality.

### 2.2.4 Sensitive Receptors

The principal sensitive receptors in the vicinity of the licensed facility comprise a number of private residential properties along the western property boundary, along Kilshane Road.

The receptor locations considered for ecological exposure are those which might be adversely affected by any form of environmental emission. For the purposes of assessment, the most sensitive ecological receptor is deemed to be the locally important aquifers beneath the site. Other receptors could include the tributary to the Ward River. There are no designated nature conservation sites within 2km radius of the licensed facility.

### 2.2.5 Pathways

The only surface water emission / monitoring point at the licensed facility is the discharge point downstream of the settlement ponds and hydrocarbon interceptor located above the eastern face of the North Quarry. All surface water run-off across the licensed facility is collected and passed through the

existing settlement ponds and drainage infrastructure prior to its ultimate discharge to the Ballystrahan stream, a tributary of the Ward River. The quality of this run-off can be adversely impacted if it comes into contact with loose sediment, hazardous materials or contaminated ground. Water quality is a key indicator of environmental performance and as such, the surface water management infrastructure is a critical environmental pathway for the licensed facility.

As noted previously, some rainfall across the licensed site percolates down through the existing unsaturated zone (in soil / rock close to the ground surface) and recharges to the underlying locally important aquifer. In the event that there is some surface contamination of near-surface soil or ground, this recharge can introduce contaminants to the groundwater body and have an adverse impact on its quality and resource potential. As such, groundwater recharge through the ground is another critical environmental pathway for the licensed facility.

Most noise and dust emissions from the waste recovery facility will be generated by HGV truck movements and by earthworks equipment (bulldozer) engaged in haulage and backfilling activities. There are no fixed (point) noise or dust emission sources at the facility. Air borne emissions of dust and noise transmission from the waste recovery facility have the potential to impact on the occupants of the nearest residential properties.

## 2.3 Site Processes and Activities

As previously indicated, a significant proportion of the licensed facility has been excavated out and is to be infilled under the terms of the waste licence. The quarry voids are still being dewatered of any incipient rainfall or groundwater inflows.

Rock excavated at Huntstown Quarry is used to produce concrete and blocks at the central infrastructure area adjacent to, and surrounded by, the licensed waste facility.

Although the extent of the licensed waste facility seeks to avoid conflict with other on-site activities (including concrete and block production areas), it includes access roadways and some shared infrastructure necessary for the soil waste recovery activities (including offices, wheelwash, maintenance garage, hardstand areas etc.).

At the present time, the waste recovery activity at Huntstown provides for

- Importation and acceptance of inert soil, stones and/or broken rock
- Placement and compaction of the imported materials in backfilling and restoring the quarry voids;
- Separation of any non-inert construction and demolition waste (principally metal, timber, PVC pipes and plastic) unintentionally imported to site;
- Transfer of any separated waste streams to the waste inspection and quarantine facility for temporary storage pending inspection, testing and potential removal to off-site waste disposal or recovery facilities;
- Stockpiling and storage of imported topsoil and/or subsoil pending re-use as cover material in the final stage of restoration to former ground level;
- Environmental monitoring of noise, dust, surface water and groundwater for the duration of the site restoration works and for a short aftercare period.

## 2.4 Site Inventory / Infrastructure

The established site facilities, mobile plant and fixed infrastructure at the waste recovery facility at Huntstown are listed below. Some of the site facilities and infrastructure are shared with the adjoining / co-located construction material production facility and have been in place for many years. The locations of the principal site facilities are shown on Figure 2.

- **Buildings:** site office, staff welfare facilities, canteen, plant maintenance building; waste quarantine shed, laboratory, weighbridge office.
- **Site Security:** security barriers at the existing site access point are manned by security staff on a 24 hour, 7 day a week basis.
- **Fixed Infrastructure:** paved / unpaved internal road network; paved employee and visitor parking areas, hardstanding, wheelwash; weighbridges, fuel / oil storage facilities;
- **Services:** overhead electricity wires, water supply pipes (connected to local authority watermain), septic tank and associated sewerage pipework serving welfare facilities;
- **Surface Water:** sumps, pipelines, drains, settlement ponds and hydrocarbon interceptor;
- **Plant and Machinery:** re-fuelling plant; mechanical excavators; bulldozers; pumps.

Assuming co-located production activities continue following cessation of waste recovery activities at Huntstown, much of this infrastructure (either existing or replaced) will remain in place and continue to be used after that time.

## 2.5 Inventory of Raw Materials, Product and Waste

Table 1 overleaf provides an inventory of the raw materials, products and waste stored at the recovery facility. Most of the materials stored are oils, fuels and lubricants required for ongoing maintenance and repair of plant and equipment used in recovery activities.

**Table 1**  
**Inventory of Raw Materials, Products and Waste**

Type	Storage Area	Storage Type	Maximum Storage Capacity	Measurement Unit
Road Diesel	External Tanks	Bunded Tank	40,000	Litres
Marked Diesel (Gasoil)	External Tanks	Bunded Tank	53,000	Litres
Diesel Engine Lubricant	Back Room in Maintenance Shed	Double Skinned Steel Tank	2,730 (600 gallon)	Litres
Hydraulic Oil	Back Room in Maintenance Shed	Double Skinned Steel Tank	2,730 (600 gallon)	Litres
Transmission Fluid	Back Room in Maintenance Shed	Double Skinned Steel Tank	1,365 (300 gallon)	Litres
Waste Oil	Back Room in Maintenance Shed	Double Skinned Steel Tank	2,730 (600 gallon)	Litres
Hydrocarbon Fluids and Gels	Maintenance Shed	Bunded Area or Bunded Tanks	200 litres	Litres

## 3.0 FACILITY CLOSURE

### 3.1 Closure Considerations

This closure plan envisages that the licensed waste facility will achieve a clean closure, such that, on cessation of waste recovery operations, plant and equipment are decommissioned, decontaminated and/or removed from the facility in order to ensure that the facility presents no risk of environmental pollution.

On suspension or unplanned cessation of waste recovery activities,

- the landform within the quarry void will be graded, rolled and compacted to create a uniform stable surface (flat or at shallow slope angle);
- any temporary settlement ponds at the base of the filling area will be dewatered and infilled with inert soil and stone;
- all mobile plant and equipment associated with the backfilling, placement and compaction of backfilled materials will be removed off-site;
- any dedicated water pumping and transmission infrastructure (flexible piping carrying surface water run-off and dewatered groundwater) will be maintained in place and operated for a 36 month period following facility closure;
- the dedicated silt trap / hydrocarbon interceptor tank will be emptied and decontaminated; deposited silts will be removed from the wheelwash and the septic tank will be desludged. All wastes arising will be transferred off-site to appropriately licensed waste disposal or recovery facilities;
- any unused oil and fuel storage tanks will be emptied and decontaminated. Unused oil and fuel will be removed off-site and used elsewhere;
- any unused oils, greases, lubricants, chemicals stored in the maintenance shed will be removed off-site and re-used elsewhere. Other hazardous materials will be removed to appropriately licensed waste disposal or recovery facilities;
- any materials which are stored on site and found to exceed inert waste acceptance criteria will be transferred off-site by licensed waste contractors to a suitably licensed waste disposal or recovery facility;
- environmental monitoring will continue over the period of the closure works (note however that provision will be made for monitoring over a 36 month period following facility closure).
- attendance by security staff (with a patrolling vehicle) at the facility for a 36 month period following facility closure.

As much of the storage and maintenance infrastructure within the recovery facility is shared with the adjoining stone and concrete production activities, any storage tanks, drums, IBCs etc. holding fuel, oil or compounds (and related wastes) which could be required for the continued operation of those facilities will be retained and will not be decommissioned, demolished or removed off site.

### 3.2 Criteria for Successful Closure

The principal objective of the closure plan is to achieve clean closure of the site, with no residual risk of environmental pollution, particularly to soil or groundwater.

The principal criteria against which successful closure will be gauged are as follows:

- existing landforms within the quarry voids will be uniformly graded and stable;
- all dedicated mobile plant and equipment associated with the recovery activity (specifically backfilling, soil placement and compaction equipment) will have been decontaminated and/or removed off site;
- any potential pollutants and/or wastes associated with the recovery activity will have been removed off site.

### 3.3 Closure Plan Costing

The expected costs (present-day values), associated with the future closure of the waste recovery facility at the North Quarry and West Quarry at Huntstown, are outlined in Table 2 below. Note that the costs provided for assume a worst case scenario, where there is unexpected shut down of the facility, with no on-site activities or resources used to cover facility closure or environmental protection costs.



**Table 2**  
**Waste Recovery Facility Closure Costs**

ACTIVITY	QUANTITY	UNITS	RATE (€)	COST (€)	SOURCE
Remove all mobile plant (mechanical excavators and bulldozers) off site	Item	Sum	6,000	6,000	McCabes Mile River Ltd
Decommission waste recovery infrastructure					
Test sediments in settlement ponds / silt trap	8	No.	250	2,000	Chemtest
Excavate settlement pond sediments	1,000	m <sup>3</sup>	5	5,000	NRA Rates
Remove sediments to landfill facility (as cover)	1,000	m <sup>3</sup>	40	40,000	Greenstar
Empty hydrocarbon interceptor and tanker off-site (assume 5 tonnes sludge)	Item	Sum	2,000	2,000	Enva
Emptying and cleaning of oil and fuel storage tank (assume 5 tonnes sludge) and transfer of bottom sludge to off-site disposal/ recovery facility	Item	Sum	3,200	3,200	Enva
Removal of excess oils and lubricants from garage, workshop and external tanks and recovery at off-site facility	10	Tonnes	150	1,500	Rilta
Removal of other (solid / liquid) chemical wastes from laboratory / workshop and disposal or recovery off-site	5	Tonnes	150	750	Rilta

ACTIVITY	QUANTITY	UNITS	RATE (€)	COST (€)	SOURCE
De-silting of wheelwash and disposal of silt at off-site landfill facility (assume 5 tonnes solid waste)	Item	Sum	2,000	2,000	Enva
Emptying of septic tank and disposal of solid waste (10 tonnes) at off-site facility	Item	Sum	1000	1,000	Enva
Re-profile and grade upper surface of in-situ soils (at both former quarries) to create stable landforms and facilitate surface water drainage	234,000	m <sup>2</sup>	0.65	152,100	NRA / Landscape Contractors* / McCabes Mile River Ltd
Continued pumping of surface water run-off and dewatered groundwater from part backfilled quarry to settlement ponds / interceptor (upper bound energy consumption of 200,000 kWh/yr for 3 years)	600,000	kWh	0.125c / kWh	75,000	Electric Ireland
Off-site transfer and recovery / disposal of non-inert material	250	m <sup>3</sup>	100	25,000	Rilta
Environmental Monitoring of Noise, Dust, Water (Quarterly for 3 year period, incl. closure works)	12	No.	1,500	18,000	SLR IE
24 hour manned security cover (during works and/or following unexpected closure or abandonment)	Month	36	13,500	486,000	TOP Security
Provision of security patrolling vehicle	Month	36	800	28,800	TOP Security
Provision of utilities to security office (light / heat / water)	Month	36	500	18,000	Electric Ireland / Irish Water

ACTIVITY	QUANTITY	UNITS	RATE (€)	COST (€)	SOURCE
Closure Validation Report	Item	Sum	5,000	5,000	SLR IE
<b>Total Site Closure Cost (excl. VAT)</b>				<b>€871,350</b>	
15% Contingency (to address unforeseen issues / liabilities)				130,703	
<b>Total Site Closure Cost (excl. VAT)</b>				<b>€1,002,053</b>	

- \* O Brien Landscaping / Redlough Landscapes

### 3.4 Closure Plan Update and Review

As required by the waste licence conditions, this Closure Plan will be reviewed annually and updated where necessary to take account of any facility or process changes, licence changes, technology changes and costing changes (inflation). Details of the review will be included in the Annual Environmental Report (AER) submission to the EPA.

### 3.5 Closure Plan Implementation

Quarry backfilling activity is currently projected to be complete within the life of the existing planning permission (i.e. 20 years). If an average importation rate of 1,000,000 tonnes / year, is assumed, the expected remaining operational life of the waste recovery facility at Huntstown is approximately 7-8 years. In reality, the timeline for backfilling the quarry void is very dependent on the availability of inert soil and stone generated by off-site construction activity locally and will be subject to ongoing review and change.

The EPA will be given 2 months notice of any proposed temporary closure or suspension of activities and 6 months notice of the intended final closure date. Notice will be provided in accordance with prevailing guidance and it is anticipated that there will also be ongoing discussions with the EPA in respect of required closure procedures.

### 3.6 Closure Plan Validation

A validation report (including a Certificate of Completion in respect of the Closure Plan) will be submitted to the Agency within 3 months of completion of the works provided for above.

The validation audit will be undertaken by an independent, external environmental Consultant. The final validation report will include:

- an assessment of how the objectives of the Closure Plan have been achieved;
- final 'as-closed' drawings and photographs of the facility;
- results of short-term environmental monitoring undertaken over the closure works period (note however that provision is made for an extended monitoring period thereafter);
- a Certificate of Completion for the CRAMP.

## 4.0 FACILITY RESTORATION AND AFTERCARE

### 4.1 Facility Restoration

The waste recovery activities at Huntstown primarily provide for the backfilling of a quarry voids created by extraction of overburden soils and/or bedrock using imported inert soil and stone and some in-situ stockpiled soil. Backfilling of the quarry voids will facilitate restoration of the North Quarry and West Quarry to natural grassland habitat.

The operational life of the recovery facility is anticipated to be approximately 7-8 years and is ultimately contingent on the availability of inert soil waste from local development projects. On planned completion of the final phase of backfilling, much of the work required to achieve the final closure and restoration of the waste facility will already have been completed. It is expected that the final restoration of the waste recovery areas to natural grassland habitat will be completed within a period of 12 months following closure.

In addition to the closure tasks identified previously, the following works will be undertaken during the restoration and aftercare phase

- Progressive decommissioning of any site infrastructure used solely for waste recovery activities;
- Break up of any dedicated hard standing or paved surfaces using a hydraulic breaker;
- Classification testing of construction and demolition wastes;
- Removal of construction and demolition wastes off-site to appropriate construction and demolition waste recovery facilities;
- Final grading of the backfilled materials within the quarry void to create the approved restoration landform / slope;
- On-going water management of surface water run-off;
- Backfilling of settlement ponds and decommissioning of all dedicated on-site drainage infrastructure;
- Topsoiling and seeding of the final landform / slope to facilitate development of natural grassland habitat;
- Additional planting around the infilled quarry voids to separate the restored area from continuing concrete / block production activities.
- Attendance by security staff (with a patrolling vehicle) at the facility for the duration of the aftercare works.

Further details on the proposed final earthworks and tree planting are provided below.

### 4.2 Backfilling / Earthworks / Grass Seeding

The backfilling of the former quarry areas will proceed upwards, either continually at varying rates or on an intermittent (campaign) basis, as waste material is generated by local development works. In addition to imported materials, small volumes of soil stockpiled in existing berms around the quarry voids will also be used to backfill the former quarries.

The quarry voids will be backfilled in several phases working upwards from the existing quarry floor. Final formation levels on completion of the backfilling and restoration works will vary on account of the sloped nature of the restored landforms.

During site restoration works, the upper surface of the backfilled materials will be graded so as to ensure surface water run-off falls to sumps at temporary low points. Water will be pumped from these temporary sumps as and when required to existing channels and settlement ponds / treatment

infrastructure at the original ground surface. Treated effluent will be discharged off-site to a tributary stream of the Ward 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:8v or less.

Topsoil and subsoil will be imported to the site on a continual basis and will not be used immediately in general backfilling of the quarry voids. The topsoil and subsoil will be stockpiled separately pending re-use toward the latter stages of the quarry backfilling works, when the top surface of backfilled ground approaches the finished ground levels envisaged by the restoration scheme.

The licence area will be restored on completion of backfilling operations to better merge into the surrounding suburban landscape. On attaining the planned final level, the final landform will be graded, rolled and compacted as provided for in the restoration plan. Thereafter a cover layer of subsoil and topsoil will be placed and graded across the backfilled area. It is likely that this cover will comprise up to 300mm of topsoil over subsoil, such that total thickness of topsoil and subsoil will be up to 1m.

The upper (ground) surface will then be rolled and seeded with grass in order to promote stability, minimise soil erosion and dust generation and establish a natural grassland habitat. The proposed restoration scheme also envisages that hedgerows will be planted across the restored area in an effort to re-establish some of the former field boundaries which pre-dated the development of the two quarries.

It is envisaged that the final restoration works across the waste recovery site will be completed within 9 to 12 months of facility closure and final cessation of waste recovery activities. Following seeding, the restored surface will be inspected at intervals in order to identify areas of bare soil or poorly established vegetation growth. In these areas, additional seeding will be undertaken as necessary to improve vegetation coverage.

In order to ensure that there is no long-term conflict with established / ongoing concrete production activities following completion of restoration works, the restored area will be largely be left as managed grassland and/or natural habitat.

### 4.3 Aftercare Management

On completion of facility closure and restoration works, provision will also be made for subsequent short-term environmental monitoring of air, surface water and groundwater to confirm that there is no evidence of soil or groundwater contamination. Established in-situ groundwater monitoring wells will be maintained and will continue in service.

It is expected that following the aftercare phase, there should be no constraints on future land use associated with soil or groundwater contamination or on future use of any structures remaining in-situ.

The process of surrendering the waste licence to the EPA will progress following the aftercare period so as to remove the legal encumbrance on title deeds to the restored lands.

#### 4.3.1 Short-Term Aftercare Management

The restoration aftercare management plan for the Huntstown waste recovery facility will comprise three principal short-term activities:

##### Environmental Monitoring

As previously stated, short-term environmental monitoring of air, surface water and groundwater (for up to 5 years) will be undertaken by the Licensee to ensure that no surface / groundwater contamination is present / emerging following closure of the waste recovery facility and completion of the restoration works.

### **Maintenance of Planted Hedgerows**

Following establishment of the hedgerow planting, it is envisaged that a programme of established maintenance will be required for a period of up to 24 months after the initial planting. This will be undertaken by a landscaping contractor and will include activities such as weed control, formative pruning and/or removal of deadwood, watering (as and if required) and adjustment of ties and stakes.

### **Maintenance of Grass Sward**

The aftercare of the grass sward will be as per grass supplier's instructions, consistent with the intended creation of a natural grassland habitat within the restored area. Initial maintenance following restoration after each phase of backfilling (principally cutting) will be overseen by the waste facility manager at Huntstown or by other designated Roadstone staff nominated by the manager.

After final restoration works have been completed and the aftercare period has elapsed, the land will be left as a natural grassland habitat.

### **4.3.2 Long Term Aftercare Management**

Given the inert nature of the soil and stone material used to backfill the quarry area and the proposed return of the backfilled areas to natural grassland habitat, it is considered that no long-term aftercare monitoring and maintenance will be required for the waste recovery facility at Huntstown.

## **4.4 Final Restoration and Aftercare Management Costs**

The expected cost, associated with the site restoration and aftercare management, are outlined in Table 3 overleaf.

**Table 3**  
**Restoration and Aftercare Costs (based on 5 Year Aftercare Period)**

ACTIVITY	QUANTITY	UNITS	RATE (€)	COST (€)	SOURCE
Breaking up of pavement and hard-standing surfaces (using hydraulic breaker),	200	m <sup>3</sup>	15	3,000	McCabes Mile River Ltd.
Validation testing to classify C&D waste	20	sample	150	3,000	SLR IE
Transfer C&D waste to off-site recovery facility (incl. haulage)	500	tonne	9	4,500	McCabes Mile River Ltd
Additional 2 year environmental monitoring (at quarterly intervals)	8	No.	1,500	12,000	SLR IE
Backfill settlement ponds	5,000	m <sup>3</sup>	5	25,000	NRA Rates
Final placement of topsoil (assumed to be previously imported and stockpiled on site) (up to 300mm)	23.4	ha	9,000	210,600	Landscape Contractors*
Surface water management costs (pumping from temporary sumps to settlement ponds for 1 year)	Item	Sum	36,000	36,000	McCabes Mile River Ltd.
Decommission / remove pumping equipment and flexible pipeline infrastructure (total length 2,000m)	Item	Sum	4,000	4,000	McCabes Mile River Ltd.
Empty interceptor and tanker waste off-site	Item	Sum	1,000	1,000	Enva
Surface preparation, grass seeding, ground repair and spraying	23.4	ha	6,000	140,400	Landscape Contractors*
Post and wire perimeter fencing	3,600	m	5	18,000	Landscape Contractors*



ACTIVITY	QUANTITY	UNITS	RATE (€)	COST (€)	SOURCE
Hedgerow Planting (Ground preparation, supply of plants and planting works)	3,600	m	5	18,000	Landscape Contractors*
24 months establishment maintenance for grassland / hedgerows	2	years	15,000	30,000	Landscape Contractors*
Preparation of Waste Licence Surrender Application	Item	Sum	4,000	4,000	SLR IE
Surrender of Waste Licence to EPA	Item	Sum	6,000	6,000	EPA
24 hour manned security cover (during restoration works)	Month	12	13,500	162,000	TOP Security
Provision of security patrolling vehicle	Month	12	800	9,600	TOP Security
Provision of utilities to security office (light / heat / water)	Month	12	500	6,000	ESB / Irish Water
<b>Total Restoration and Aftercare Cost (excl. VAT)</b>				<b>€693,100</b>	
15% Contingency (to address unforeseen issues / liabilities)				103,965	
<b>Total Restoration and Aftercare Cost (excl. VAT)</b>				<b>€797,065</b>	

- O'Brien Landscaping / Redlough Landscapes

#### 4.4.1 Closure Plan Costs

The anticipated cost of the planned facility closure following completion of projected soil intake is **€1,002,053** (present day value and incl 15% contingency), as outlined in Table 2 of this plan. As previously indicated, the plan envisages that the proposed waste recovery facility will achieve a clean closure, such that, following cessation of inert soil waste intake and recovery activities and the subsequent decommissioning / removal of plant and waste infrastructure from the facility, no remaining environmental liabilities will attach to restored areas of the site and/or areas where the principal waste recovery activities are located.

#### 4.4.2 Site Restoration and Aftercare Management Costs

The anticipated costs of the site restoration and aftercare management, outlined in Table 3 of this plan, comes to a total of **€797,065** (present day value and incl. 15% contingency). These costs are based on a projected 5 year aftercare management period, with no provision for long-term aftercare monitoring and maintenance thereafter.

### 4.5 Financial Provision

Subject to Agency approval and agreement, Roadstone Ltd. will make financial provision for the closure and restoration of the waste recovery facility at Huntstown by lodging an insurance company bond with the Agency, coupled with an agreement which will empower it to apply such security (or part thereof as may be required) to ensure the satisfactory completion of site restoration and aftercare works at Huntstown.

The initial amount of the bond will be agreed with the Agency on the basis of the assessments provided in this plan and will be adjusted as necessary each year thereafter to take account of ongoing review and revisions of the CRAMP.

## 5.0 REPORT CLOSURE

This report has been prepared by SLR Consulting Ireland (SLR) with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Roadstone Ltd. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

## **FIGURES**

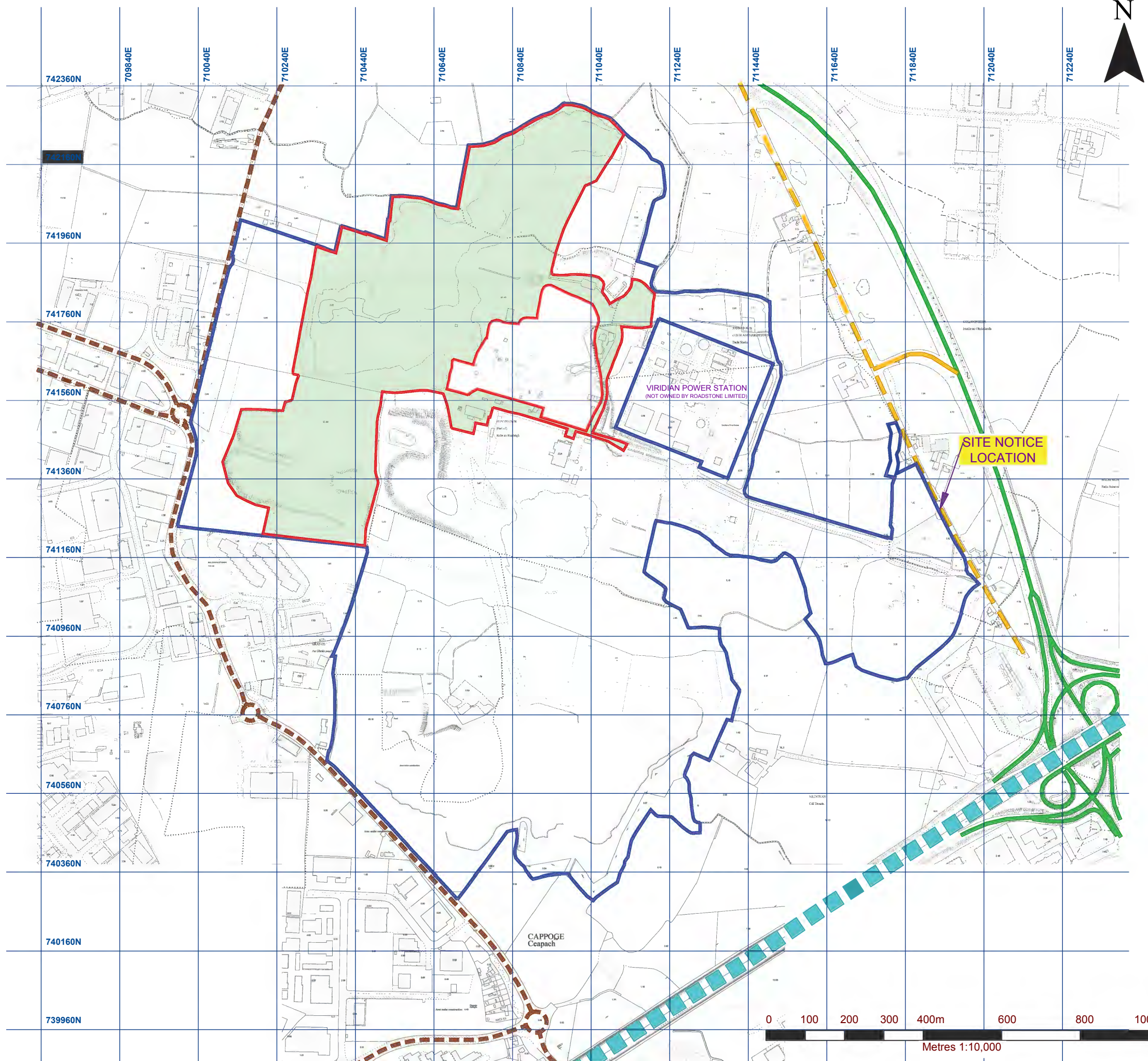
**Figure 1**  
**Site Location Map**

**Figure 2**  
**Existing Site Layout**

**Figure 3**  
**Environmental Monitoring Locations**

**Figure 4**  
**Restoration Proposals**

**Figure 5**  
**Restored Cross Sections**



**NOTES**

1. EXTRACT FROM 1:2,500 ORDNANCE SURVEY DIGITAL SHEET NO'S. 3062-A, 3062-B, 3062-C, 3062-D, 3063-A, 3063-C, 3130-A & 3130-B.

2. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000718 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

**LEGEND**

	ROADSTONE LIMITED LAND INTEREST (c. 200.3 ha)
	WASTE LICENCE AREA (c. 48.65 ha)
	N2 DUAL CARRIAGEWAY
	NORTH ROAD (R135)
	LOCAL ROAD
	M50 MOTORWAY

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**ROADSTONE LIMITED**  
 HUNTSTOWN - CRAMP

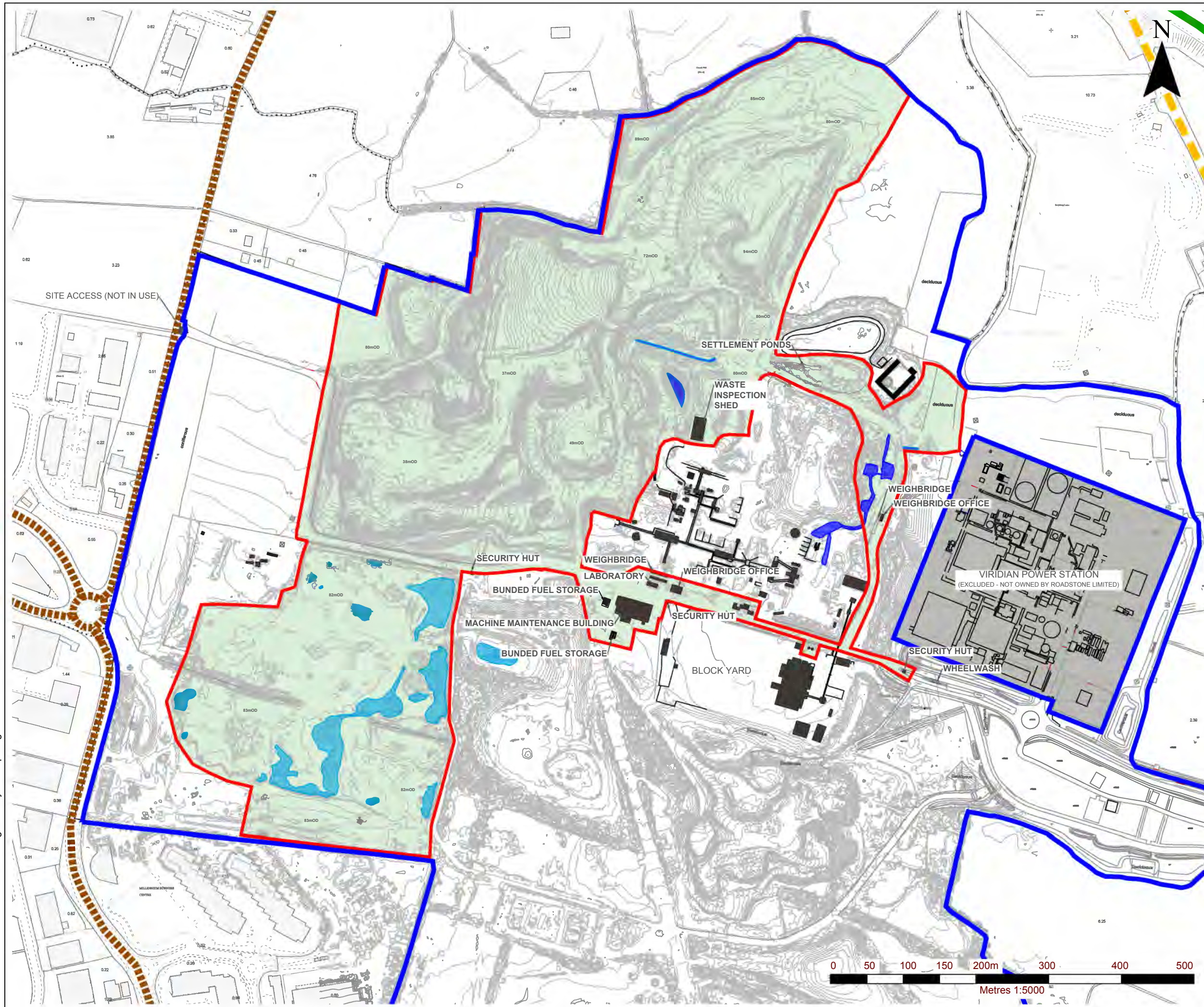
**HUNTSTOWN WASTE RECOVERY FACILITY**  
 CLOSURE, RESTORATION &  
 AFTERCARE MANAGEMENT PLAN

**SITE LOCATION MAP**

**FIGURE 1**

Scale: 1:10,000 @ A3 Date: MARCH 2018

0180.00123.18.CRAMP.FIG-2.Existing Site Layout Map.dwg



**NOTES**

1. EXTRACT FROM 1:2,500 ORDNANCE SURVEY DIGITAL SHEET NO'S. 3062-A, 3062-B, 3062-C, 3062-D, 3063-A, 3063-C, 3130-A & 3130-B.

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**LEGEND**

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	WASTE LICENCE AREA (c. 48.65 ha)
	N2 DUAL CARRIAGEWAY
	NORTH ROAD (R135)
	LOCAL ROAD
	SEMI-PERMANENT / EPHEMERAL PONDS IN WEST QUARRY (JUNE 2016)

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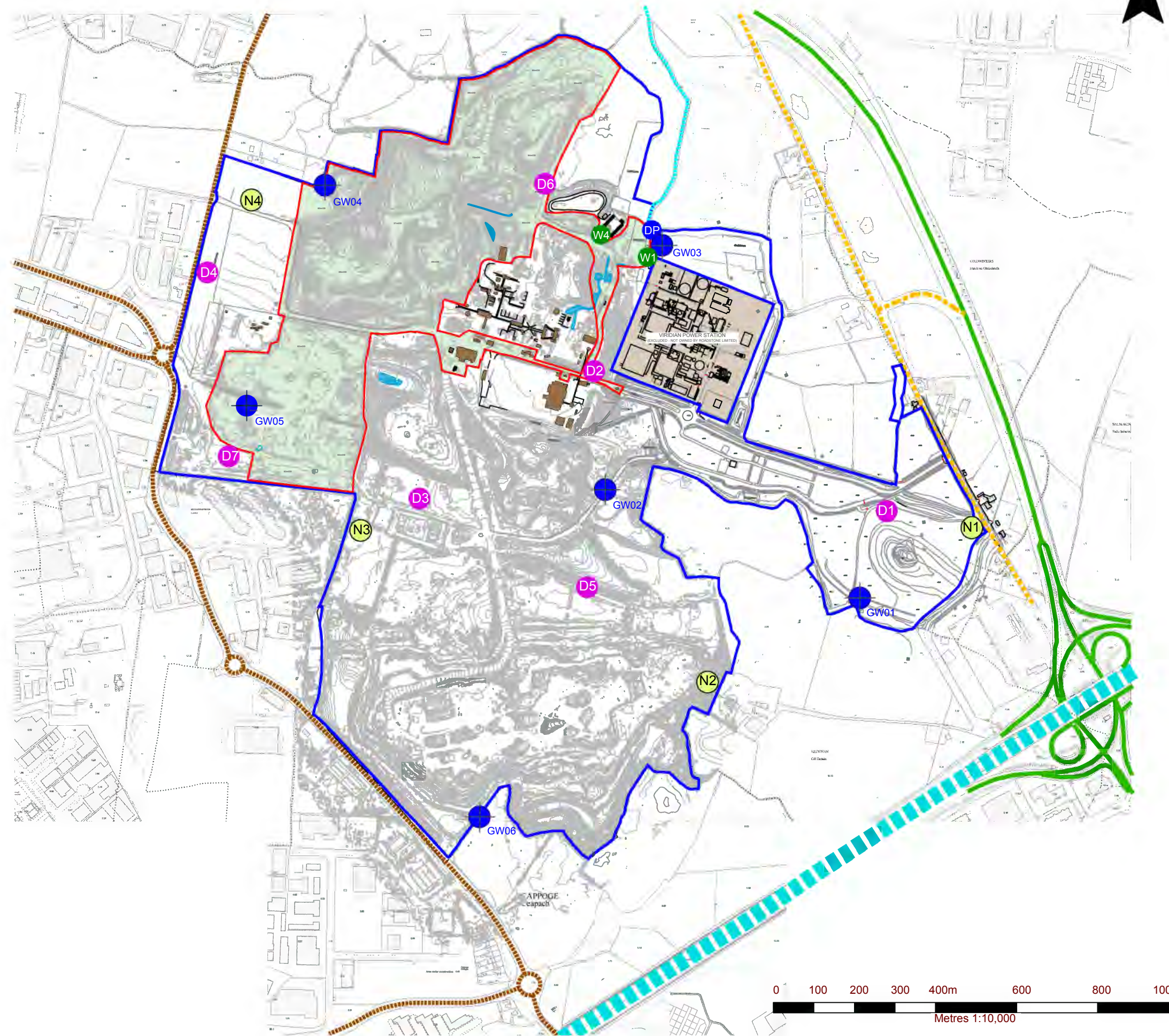
**ROADSTONE LIMITED  
HUNTSTOWN - CRAMP**

**HUNTSTOWN WASTE RECOVERY FACILITY  
CLOSURE, RESTORATION &  
AFTERCARE MANAGEMENT PLAN**

**EXISTING WASTE RECOVERY  
FACILITY LAYOUT**

**FIGURE 2**

Scale 1:5,000 @ A3 Date MARCH 2018



**NOTES**  
 1. EXTRACT FROM 1:2,500 ORDNANCE SURVEY DIGITAL SHEET NO'S. 3062-A, 3062-B, 3062-C, 3062-D, 3063-A, 3063-C, 3130-A & 3130-B.  
 2. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000718 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

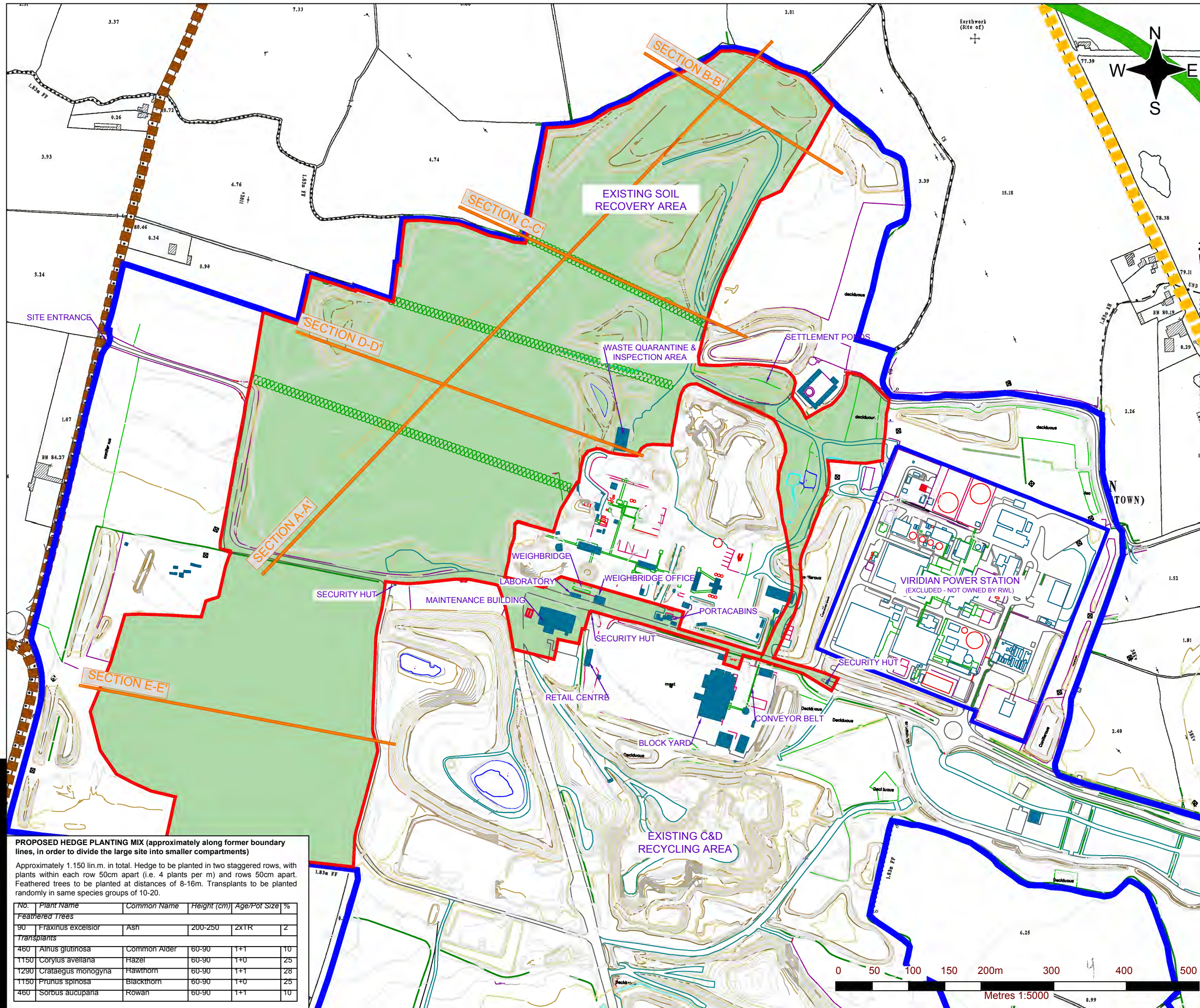
**LEGEND**

	ROADSTONE LIMITED LAND INTEREST (c. 200.3 ha)
	WASTE LICENCE AREA (c. 48.65 ha)
	N2 DUAL CARRIAGEWAY
	NORTH ROAD (R135)
	LOCAL ROAD
	M50 MOTORWAY
	NOISE MONITORING LOCATION
	SURFACE WATER MONITORING LOCATIONS
	DISCHARGE POINT
	GROUNDWATER MONITORING WELL LOCATION
	DUST MONITORING LOCATION

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**ROADSTONE LIMITED**  
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**HUNTSTOWN WASTE RECOVERY FACILITY**  
 CLOSURE, RESTORATION &  
 AFTERCARE MANAGEMENT PLAN  
**ENVIRONMENTAL MONITORING LOCATIONS**

**FIGURE 3**  
 Scale 1:10,000 @ A3  
 Date MARCH 2018



- NOTES**
1. EXTRACT FROM 1:2,500 ORDNANCE SURVEY DIGITAL SHEET NO'S. 3062-A, 3062-B, 3062-C, 3062-D, 3063-A, 3063-C, 3130-A & 3130-B
  2. ORDNANCE SURVEY IRELAND LICENCE NO. SU 0000715 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND
  3. TOPOGRAPHIC SURVEY PREPARED BY FUGRO BKS BASED ON MAY 2009 AERIAL PHOTOGRAPHY

- LEGEND**
- ROADSTONE LTD. LANDHOLDING (c. 201.8 ha)
  - WASTE LICENCE AREA (c. 48.65 ha)
  - N2 DUAL CARRIAGEWAY
  - NORTH ROAD (R135)
  - LOCAL ROAD
  - PROPOSED NATIVE HEDGE PLANTING
  - CROSS SECTION LOCATIONS

**PROPOSED HEDGE PLANTING MIX (approximately along former boundary lines, in order to divide the large site into smaller compartments)**

Approximately 1.150 lin.m. in total. Hedge to be planted in two staggered rows, with plants within each row 50cm apart (i.e. 4 plants per m) and rows 50cm apart. Feathered trees to be planted at distances of 8-16m. Transplants to be planted randomly in same species groups of 10-20.

No.	Plant Name	Common Name	Height (cm)	Age/Pot Size	%
<b>Feathered Trees</b>					
90	Fraxinus excelsior	Ash	200-250	2XTR	2
<b>Transplants</b>					
460	Alnus glutinosa	Common Alder	60-90	1+1	10
1150	Corylus avellana	Hazel	60-90	1+0	25
1290	Crataegus monogyna	Hawthorn	60-90	1+1	28
1150	Prunus spinosa	Blackthorn	60-90	1+0	25
460	Sorbus aucuparia	Rowan	60-90	1+1	10

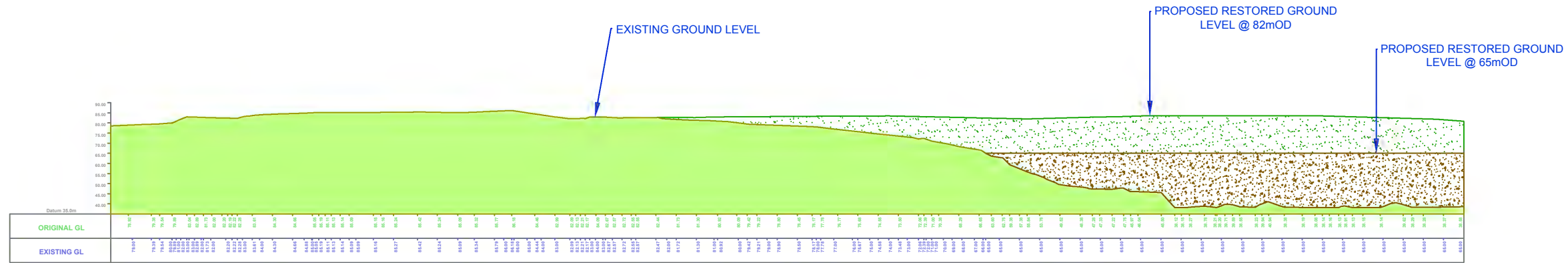
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**ROADSTONE LIMITED  
 HUNTSTOWN - CRAMP  
 HUNTSTOWN WASTE RECOVERY FACILITY,  
 CLOSURE, RESTORATION &  
 AFTERCARE MANAGEMENT PLAN  
 RESTORATION PROPOSALS**

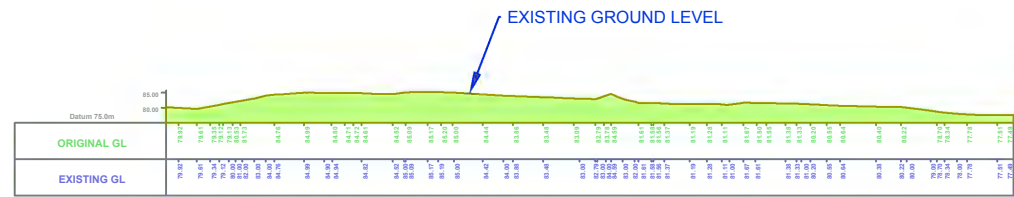
**FIGURE 4**

Scale 1:5,000 @ A3 Date MARCH 2018

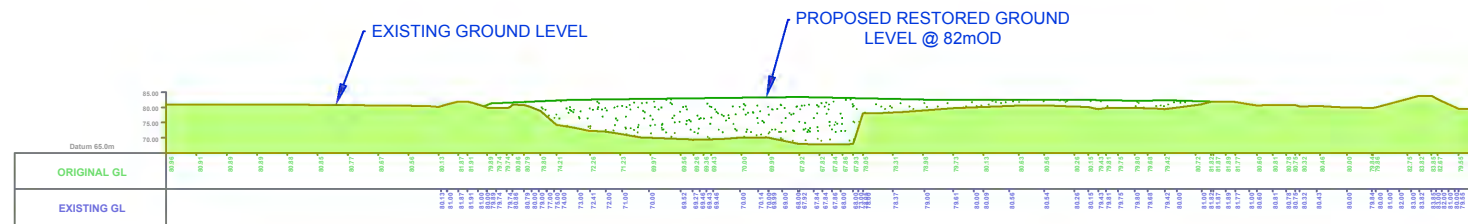




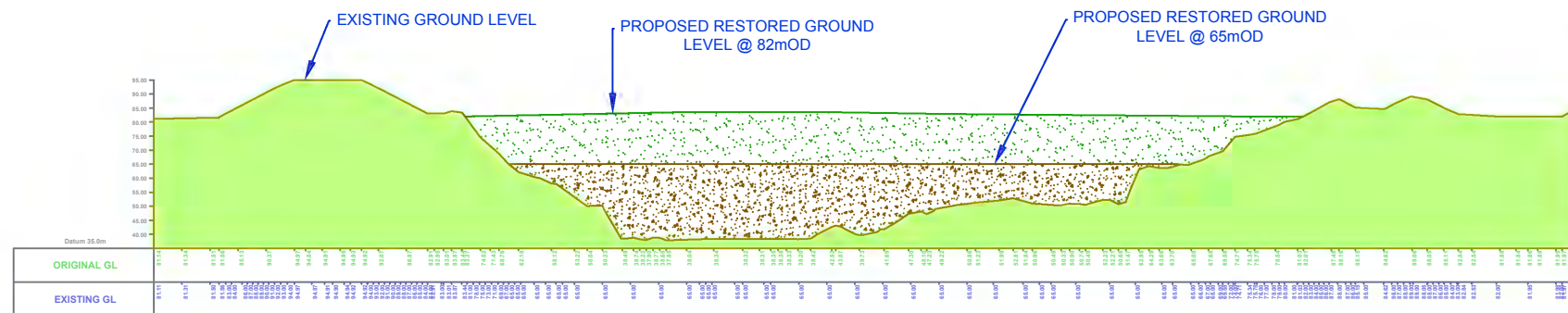
Section A - A'



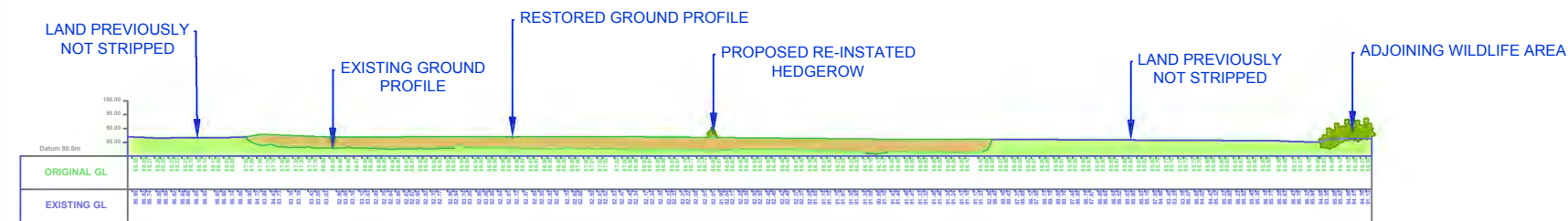
Section B - B'



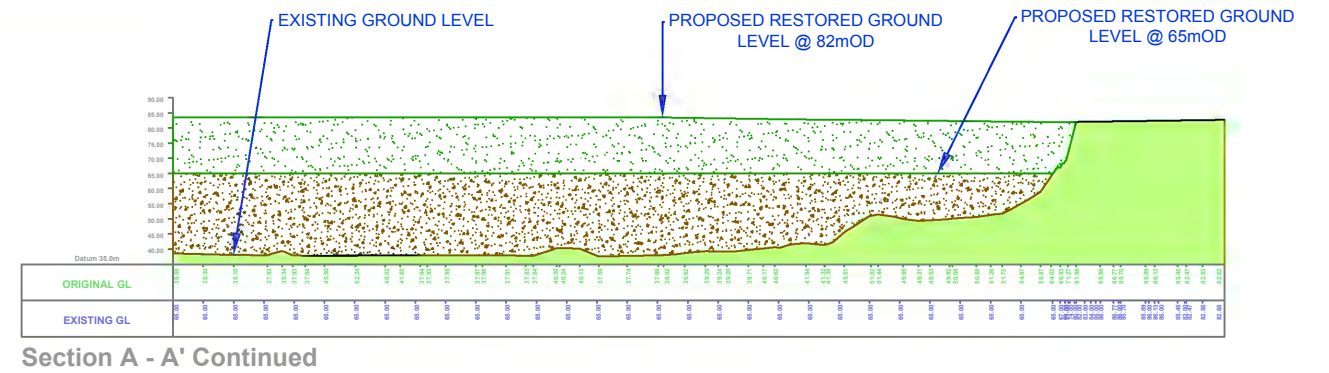
Section C - C'



Section D - D'



Section E - E'



Section A - A' Continued

REFER TO FIGURE 4 FOR SECTION LOCATIONS



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**ROADSTONE LIMITED  
 HUNTSTOWN - CRAMP**  
**HUNTSTOWN WASTE RECOVERY FACILITY,  
 CLOSURE, RESTORATION &  
 AFTERCARE MANAGEMENT PLAN**  
**RESTORATION CROSS SECTIONS**

**FIGURE 5**

Scale: 1:2,500 @ A3      Date: MARCH 2018

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#### EXETER

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#### GUILDFORD

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