

# JSPE

J Sheils Planning & Environmental Ltd

**Roadstone Ltd.**  
**Closure Plan & Environmental**  
**Liability Risk Assessment**  
**Garryhesta Pit**  
**Knockanemore, Ovens**  
**Co. Cork**  
**December 2018**

**J Sheils Planning & Environmental Ltd**

31 Athlumney Castle, Navan, Co Meath

Phone: Ireland +353 46 9073997

Mobile: John Sheils +353 87 2730087

Email: [johnsheils@jspe.ie](mailto:johnsheils@jspe.ie)

**CLOSURE PLAN & ELRA**

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

**DOCUMENT CONTROL SHEET**

|                        |   |
|------------------------|---|
| <b>Project No:</b>     | <b>JSPE_255</b>   |
| <b>Report Title:</b>   | <b>Closure Plan &amp; Environmental Liability Risk Assessment</b> |
| <b>Report Ref:</b>     | <b>JSPE_255_R05_Rev-01</b>  |
| <b>Report Status:</b>  | <b>Final</b>  |
| <b>Client Contact:</b> | <b>Patrick Gibney</b>   |
| <b>Client Company:</b> | <b>Roadstone Limited</b>  |

**Prepared By**

|                   |  |
|-------------------|--|
| <b>Signature:</b> |  |
| <b>Name:</b>      | <b>John Sheils (Managing Director)</b>   |
| <b>Company:</b>   | <b>J Sheils Planning &amp; Environmental Ltd</b>                                   |
| <b>Date:</b>      | <b>12/12/2018</b>  |

*Consent of copyright owner required for any other use.*

**Revision History**

| Issue No. | Date     | Details     |
|-----------|----------|-------------|
| 01        | 12/12/18 | Final Issue |
|           |          |             |

**Distribution**

| Copies |         | Party                           |
|--------|---------|---------------------------------|
| Hard   | Digital |                                 |
| 1      | 1       | Roadstone Limited               |
| 1      | 1       | Environmental Protection Agency |
|        |         |                                 |



**CONTENTS**

|             |  |           |
|-------------|--|-----------|
| <b>1</b>    | <b>INTRODUCTION</b>  | <b>5</b>  |
| <b>2</b>    | <b>SCOPING</b>   | <b>7</b>  |
| <b>3</b>    | <b>THE CLOSURE PLAN</b>  | <b>9</b>  |
| <b>3.1</b>  | <b>CLOSURE PLAN SUMMARY</b>  | <b>9</b>  |
| <b>3.2</b>  | <b>Closure plan Introduction</b>   | <b>10</b> |
| 3.2.1       | General description of the activity and site                                 | 10        |
| 3.2.2       | Commencement   | 12        |
| 3.2.3       | Authorisation and Revision   | 12        |
| 3.2.4       | Classes of Activities  | 12        |
| 3.2.5       | Closure requirements   | 12        |
| <b>3.3</b>  | <b>Site Evaluation</b>   | <b>13</b> |
| 3.3.1       | Operator Performance   | 13        |
| 3.3.1.1     | Site Investigations & Monitoring   | 14        |
| 3.3.2       | Environmental Pathways and Sensitivity                                       | 18        |
| 3.3.2.1     | Site Geology and Hydrogeology  | 19        |
| 3.3.2.2     | proximity to sensitive receptors, including humans                           | 23        |
| 3.3.2.3     | DESIGNATED SITES   | 25        |
| 3.3.2.4     | Emissions  | 25        |
| 3.3.3       | site processes and activities  | 26        |
| 3.3.4       | inventory of buildings, plant and equipment                                  | 27        |
| 3.3.5       | inventory of raw materials, products and wastes including Storage Capacities | 28        |
| <b>3.4</b>  | <b>Closure tasks and programmes</b>  | <b>30</b> |
| <b>3.5</b>  | <b>Criteria for successful closure</b>                                       | <b>31</b> |
| <b>3.6</b>  | <b>Closure plan validation</b>   | <b>32</b> |
| <b>3.7</b>  | <b>Closure plan costing</b>  | <b>33</b> |
| <b>3.8</b>  | <b>Closure plan review and update</b>  | <b>35</b> |
| <b>3.9</b>  | <b>Restoration &amp; Aftercare</b>   | <b>35</b> |
| <b>3.10</b> | <b>Future proofing costs</b>   | <b>35</b> |
| 3.10.1      | Contingency  | 35        |
| 3.10.2      | Cost profile   | 36        |
| 3.10.3      | Inflation/discounting  | 37        |
| 3.10.4      | Reviewing and updating costs   | 37        |

For inspection purposes only. Consent of copyright owner required for any other use.



|          |   |           |
|----------|---|-----------|
| 3.11     | <b>Financial Provision</b>                          | <b>38</b> |
| <b>4</b> | <b>INCIDENTS</b>                                    | <b>40</b> |
| 4.1      | <b>Introduction</b>                                 | <b>40</b> |
| 4.2      | <b>Scoping</b>                                      | <b>41</b> |
| 4.3      | <b>Risk assessment</b>                              | <b>42</b> |
| 4.3.1    | Risk identification                                 | 42        |
| 4.3.2    | Risk analysis                                       | 43        |
| 4.3.3    | Risk evaluation                                     | 45        |
| 4.4      | <b>Risk treatment</b>                               | <b>47</b> |
| 4.5      | <b>Costing</b>                                      | <b>49</b> |
| 4.5.1    | Identification of the plausible worst-case scenario | 49        |
| 4.5.2    | Quantification and costing                          | 49        |
| 4.6      | <b>Outcomes and next steps</b>                      | <b>50</b> |
| <b>5</b> | <b>REFERENCES</b>                                   | <b>52</b> |

## Tables

|           |   |    |
|-----------|---|----|
| Table 3-1 | Closure, Restoration and Aftercare Programme .....                | 31 |
| Table 3-2 | Estimate of Closure Plan Costs .....                              | 34 |
| Table 4-1 | Plausible Risk Identified for the Activity .....                  | 42 |
| Table 4-2 | Risk Classification Table - Likelihood (EPA 2014a) .....          | 43 |
| Table 4-3 | Risk Classification Table - Consequence (EPA 2014a) .....         | 43 |
| Table 4-4 | Risk Analysis .....   | 44 |
| Table 4-5 | Risk Evaluation .....   | 45 |
| Table 4-6 | Risk Matrix .....   | 46 |
| Table 4-7 | Statement of Measures .....                                       | 48 |
| Table 4-8 | Quantification and Costing of Plausible Worst-Case Scenario ..... | 50 |

## FIGURES

|            |  |    |
|------------|--|----|
| Figure 2-1 | Closure And Restoration/Aftercare Process (Source EPA 2014a) .....       | 7  |
| Figure 3-1 | Groundwater and Surface Water Sampling Locations .....                   | 15 |
| Figure 3-2 | Forms of Financial Instruments Acceptable to EPA .....                   | 38 |
| Figure 4-1 | Environmental Liability Risk Assessment Process (Source EPA 2014a) ..... | 40 |



**DRAWINGS**

| Ref. | Details                                  | Size | Scale    |
|------|--|------|----------|
| 1.1  | Site Location Map                        | A4   | 1:50,000 |
| 1.2  | Application Area Map                     | A3   | 1:5,000  |
| D01  | Site Plan - Existing Survey              | A3   | 1:2,500  |
| D02  | Site Layout/Reclamation Scheme - Phase 1 | A3   | 1:2,500  |
| D03  | Site Layout/Reclamation Scheme - Phase 2 | A3   | 1:2,500  |
| D04  | Final Reclamation Scheme - Phase 3       | A3   | 1:2,500  |
| D05  | Cross Sections (A to H)                  | A3   | 1:2,500  |

*For inspection purposes only.  
 Consent of copyright owner required for any other use.*



## 1 INTRODUCTION

Roadstone Limited., Fortunestown, Tallaght, County Dublin is applying to the EPA for a waste licence (LA001646) for the operation of its existing Garryhesta Quarry as a Soil Recovery Facility on lands at Garryhesta Townland, Knockanemore, Ovens, Co. Cork (National Grid Reference 152439E 069787N). The nature of the development is phased restoration of a sand and gravel pit using imported inert soil and stone and river dredging spoil. The proposed soil recovery facility including site infrastructure comprises c. 7.9 ha of the total landholding of 77.2 ha at Garryhesta (Refer to Drawings 1.1 & 1.2). The lands will be restored to beneficial after-use (agriculture wildlife habitat).

The proposed development consists of restoration of part (c. 6.7 ha) of existing quarry (QR19 06/11798 & PL04.225332) by importation of up to 300,000 tonnes per annum of inert soil and stones and river dredging spoil (EWC 17-05-04 and 17-05-06). The proposed land reclamation works will be subject to a waste management licence for a period of c. 8 to 10 years.

The proposed Soil Recovery Facility (SRF) will utilise the permitted quarry infrastructure including internal roads, site office, welfare facilities and other ancillaries to complete the works (Refer to Drawing D01 - Existing Site Survey Plan). A wheel wash and weighbridge will be provided as part of the proposed development and the existing workshop will be utilised as a quarantine area. A hard-stand with drainage to oil interceptor will also be provided as a designated refueling area. The total application area including the site infrastructure covers c. 7.9 ha of lands.

The development will be subject to the requirements of a waste management licence (Reg. No. TEMP00077-01 (Application Pending)) which is currently under consideration by the Environmental Protection Agency (EPA).

The proposed site layout is shown on the attached Site Layout Drawings D02 to D04.

The overall purpose of closure and restoration/aftercare is to ensure that the necessary measures are taken to avoid any risk of environmental pollution and, where pollution has been caused, to return the site to a satisfactory state.

The following plan has been prepared by J Sheils Planning & Environmental Ltd (JSPE) on behalf of the operators Roadstone Ltd. JSPE specialises in providing independent professional planning and environmental advice to the extractive and inert waste management industries. The principal, John Sheils is a qualified mining engineer, chartered minerals surveyor, with a post graduate diploma in environmental protection and professional



qualifications in quarry management. JSPE are professionally indemnified and governed by the RICS (Minerals and Waste Management Faculty) and Society of Chartered Surveyors codes of practice.

There are three steps to completing closure and restoration/aftercare plans:

- ▶ Step 1: Scoping
- ▶ Step 2: Closure
- ▶ Step 3: Restoration/aftercare

*For inspection purposes only.  
Consent of copyright owner required for any other use.*



## 2 SCOPING

This report has been prepared in accordance with “*Guidance on assessing and costing environmental liabilities 2014*” (EPA 2014a).

**Closure** and **closure plan** refer to relatively short-term measures necessary to close a site satisfactorily including decommissioning and residuals management. For many sites, there will be no environmental liabilities once closure, decommissioning and residuals management are completed, and so only a closure plan is required.

**Restoration/aftercare** and **restoration/aftercare plan** refer to longer term measures that are necessary where environmental liabilities remain following closure, e.g. contaminated soil and groundwater, landfills, extractive waste facilities, mines, quarries and soil recovery facilities. Measures may encompass activities such as remediation, rehabilitation, reinstatement, ongoing emissions control and monitoring.

It is noted that the guidance considers that both a Closure and Restoration/After Care Management Plan (CRAMP) may be required for soil recovery facilities. However, the guidance further states that in relation to soil and groundwater contamination, where it is relatively limited and will be addressed by short-term actions such as removal for treatment off-site, this can be addressed as part of the closure plan. A restoration/aftercare plan is **required only where the measures necessary are more complex and long-term**, e.g. installation of barriers, pump and treat, monitored natural attenuation.

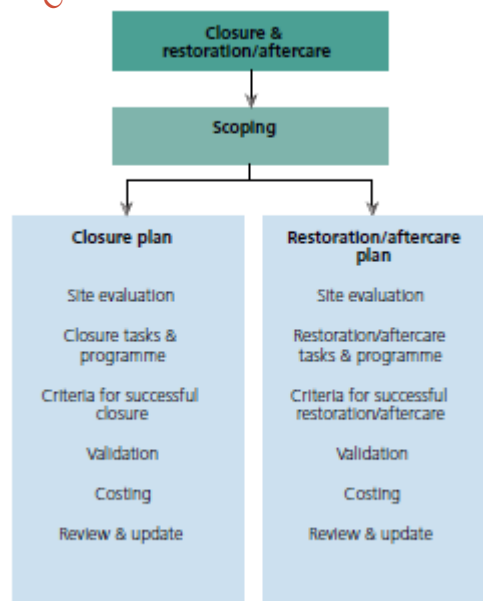


Figure 2-1 Closure and Restoration/Aftercare Process (Source EPA 2014a)





In this case only inert soils and stones and river derived dredging spoil will be acceptable for recovery at the facility for recovery and phased restoration of part of a sand and gravel pit to a landform that will be in keeping with the surrounding landscape.

Clean closure is envisaged such that all plant is safely removed for reuse or recycling, and all wastes are removed off site at the time of closure for appropriate recovery or disposal. Monitoring undertaken should demonstrate that there are no outstanding environmental issues.

There will be no on-going requirement for environmental monitoring after recovery operations have ceased.

An aftercare scheme will be implemented with the aim of bringing the restored soils (and hence land) into a condition which does not need to be treated differently from undisturbed land in the same use.

Roadstone propose to carry out the reclamation works in accordance with the Green, Low Carbon, Agri-environment Scheme (GLAS). i.e. Consideration will be given through the land reclamation scheme to conservation of arable grass margins, conservation of solitary bees, coppicing and planting of native trees and hedgerows, establishment of species rich hay meadow.

A final site-inspection 6 months after site closure will be carried out to ensure that the final site restoration scheme implemented is functioning and progressing as required.

It is evident from the above description given the relatively short-term measures necessary to close the site satisfactorily, that there will be no environmental liabilities once closure, decommissioning and residuals management are completed, and so only a **closure plan** is considered necessary.



### 3 THE CLOSURE PLAN

#### 3.1 CLOSURE PLAN SUMMARY

##### **Activity name and address**

Proposed soil recovery facility at a quarry in Knockanemore Townland, Ovens, Co. Cork, known as Garryhesta Quarry.

**Name of the licensee:** Roadstone Limited

**Licence application number; Reg No:** LA001646; TEMP00077 (Application Pending)

##### **Name and address of person/organisation who prepared the plan**

J Sheils Planning & Environmental Ltd, 31 Athlumney Castle, Navan, Co Meath.

##### **Classes of activity (to be) licensed and carried out;**

The principal activity is Class R 5 (P) of the Fourth Schedule of the Waste Management Act 1996, as amended (recycling/reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials). Other activities include Class R 13 of the Fourth Schedule (Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1)), pending collection, on the site where the waste is produced)).

##### **Risk category**

“Low” Determined from “*Guidance on assessing and costing environmental liabilities 2014*” (EPA 2014a).

##### **Scope**

Closure Plan (incorporating aftercare requirements)

##### **Overall closure costs**

The total closure and restoration/aftercare costs have been calculated as **€155,628** (not adjusted for inflation).

##### **Details of any previous closure plans**

Not Applicable

##### **Financial provision mechanism**

To be agreed with EPA following agreement on Closure Plan Costing.

##### **Review period for the closure and restoration/aftercare plans.**

The closure and aftercare requirements will be subject to annual review.



## 3.2 CLOSURE PLAN INTRODUCTION

The scoping exercise carried out in preparation of this Plan has determined that given the relatively short-term measures necessary to close the site satisfactorily, that there will be no environmental liabilities once closure, decommissioning and residuals management are completed, and so only a closure plan is considered necessary.

### 3.2.1 GENERAL DESCRIPTION OF THE ACTIVITY AND SITE

Roadstone Limited has applied to the Environmental Protection Agency for a waste licence for the restoration of part (c. 6.7 ha) of existing Garryhesta Quarry (QR19 06/11798 & PL04.225332) on lands at Knockanemore Townland, Ovens, Co. Cork. It is proposed that lands will be restored by importing of up to 300,000 tonnes per annum of inert soil and stones and river dredging spoil (EWC 17-05-04 and 17-05-06). (National Grid Reference: 152439E 569787N). The site has direct access to the N22, which is the National Primary Route connecting Cork with Tralee, via Ballincollig, Macroom and Killarney. The site location is shown on the Site Location Map Figure 1.1.

The proposed soil recovery facility including site infrastructure will comprise a c. 7.9 ha section of the existing quarry workings at Garryhesta, as shown by the Application Area Map Figure 1.2. The total landholding extends to c. 77.2 ha and is shown highlighted in blue. Thus, the proposed application site area (for infilling) will be confined to a relatively small section of the sand and gravel pit, much of which has already been worked out.

The proposed site for backfilling using imported inert soil and stone is located on the north-western corner of the landholding. The pit proposed for infilling is approximately 430m in length and 150m in width with a depth of up to c. 31 m below the local natural ground level.

The pit is isolated from a second larger pit which exists on the east of the landholding. Extraction below the groundwater table has been undertaken at the larger pit on the east of the site. The floor of the larger pit is permanently under water.

Current pit floor levels at the application site vary between approximately 23 m and 26 m OD. Natural ground levels in the fields immediately to the west and south of the site are at approximately 54 and 52 m OD, respectively. The ground to the north of the site rises steadily to an elevation of over 120 m OD. A site survey plan (Drawing D01) is attached.

Roadstone, has operated sand and gravel pits at Garryhesta Pit, Classis Pit, Donovan's Pit and since the 1940's, as well as Dineen's Pit, Classis West and South in Ovens, County Cork more recently. The existing Classis Pit and Production Facility is currently being supplied with



aggregate (sand and gravel) from the adjacent and linked pits at Classis West and South via an existing conveyor belt.

The pit at Garryhesta operates at a production rate of up to c. 350,000 tonnes per annum (total output) depending on market demand.

The quarry operates under the terms and conditions imposed under Section 261 of the Planning & Development Act, 2000, as amended (Ref. QR19 06/11798 & PL04.225332).

Planning Permission (P.A. Ref No. 066387, PL 04.220318) was granted on 14/08/2008 for construction of 1.38km conveyor to transport material from the Garryhesta sand and gravel pit to the processing plant at Classis, Knockanemore, Ovens. Co. Cork.

The nature of the development is the phased restoration of a sand and gravel pit using imported inert soil and stone, and river dredging spoil (EWC 17-05-04 and 17-05-06).

It is proposed that circa 300,000 tonnes per annum of inert materials will be accepted (subject to market conditions) for backfill at the facility for restoration of the pit to beneficial after use. It is estimated that 1,276,043 m<sup>3</sup> (2,996,877 tonnes) of material is required for restoration and to develop the lands for beneficial use (agriculture use and wildlife habitat).

The proposed soil recovery facility including site infrastructure will comprise a c. 7.9 ha section of the existing quarry workings at Garryhesta, as shown by the Application Area Map Figure 1.2. The total landholding extends to c. 77.2 ha and is shown highlighted in blue. Thus, the proposed application site area (for infilling) will be confined to a relatively small section of the sand and gravel pit, much of which has already been worked out.

The proposed Soil Recovery Facility (SRF) will also continue to use the established quarry infrastructure located north centrally in the quarry site, including internal roads, site office, welfare facilities and other ancillaries (Refer to Drawing D01 - Site Plan - Existing Survey).

Land-use in the surrounding area is largely agriculture and quarrying with scattered rural pattern of residential dwellings along the N22 which runs immediately to the north of the site and along other local roads to the south and east of the site.

Access to the site will be gained through the existing entrance onto the N22. A wheel wash and weighbridge will be provided as part of the proposed development and the existing workshop will be utilised as a quarantine area. A hard-stand with drainage to oil interceptor will also be provided as a designated refueling area. Skips will be provided for removal of deleterious material (i.e. steel, timber, plastic). A hard-stand with drainage to oil interceptor will also be provided as a designated refueling area. Redundant structures, plant equipment and stockpiles will be removed from site on cessation of activity.



The site is well screened from outside views along the N22 by well-established planting (Refer to Figures 1.1 and 1.2 and Drawing D01).

---

### 3.2.2 COMMENCEMENT

Activities at the Garryhesta SRF will commence following grant of the waste licence by the Agency.

---

### 3.2.3 AUTHORISATION AND REVISION

It should be noted that the closure and aftercare requirements will be subject to annual review and compliance with relevant conditions attached to the waste licence.

---

### 3.2.4 CLASSES OF ACTIVITIES

The principal activity is Class R 5 (P) of the Fourth Schedule of the Waste Management Act 1996, as amended (recycling/reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials). Other activities include Class R 13 of the Fourth Schedule (Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1)), pending collection, on the site where the waste is produced)).

---

### 3.2.5 CLOSURE REQUIREMENTS

Closure and aftercare requirements specified in the waste licence granted for the proposed development will be considered as part of the annual review.



### 3.3 SITE EVALUATION

#### 3.3.1 OPERATOR PERFORMANCE

Roadstone Ltd. was originally founded by the Roche Brothers in the 1930's and became part of Cement Roadstone Holdings (CRH) plc in 1970, following the merger of Roadstone and Cement Ltd. The present-day company was formed in 2009 by the amalgamation of CRH's three construction materials businesses in Ireland, Roadstone Dublin Ltd., Roadstone Provinces Ltd. and John A. Wood Ltd. The company is Ireland's leading supplier of aggregates, construction and road building materials.

The Company operates eleven locations in Cork, Kerry and West Waterford, including quarries, gravel pits, blockyards, 'Ready Mixed Concrete' plants, blacktop plants, pipeworks, and D.I.Y. centres.

Although Roadstone's principal business interest is in rock extraction and manufacture of building materials and products, it is currently backfilling and restoring a number of former quarries using imported inert soil waste and operating construction and demolition waste recycling facilities at several of its locations across the State.

Roadstone is committed to achieving and maintaining industry leading environmental standards. To this end, the company has established, and actively implements, an inhouse Environmental Management System (EMS) at all its established waste recovery locations. The EMS has achieved external accreditation to ISO 14001 standard and is subject to audit on an annual basis. Roadstone envisages that an EMS will be developed and implemented for planned backfilling and restoration activities at Garryhesta.

Roadstone Ltd will implement an EMS for the facility subject to granting of the Waste Licence and in compliance with conditions attached to the Waste Licence. A key benefit of operating an EMS is to encourage a review of all processes on a site and their impact on the environment, and the assessment of how these impacts can be reduced. The operator will maintain a system of continuing improvement and strive to ensure it meets all environmental commitments and licence conditions. The operator will assume responsibility for the 'Environmental Management' of the facility and ensure that the proposed Environmental Management System, Environmental Objectives & Targets and the Environmental Monitoring Plan are fully implemented.

The EMS will include an 'Environmental Monitoring Programme' for the monitoring of water, dust and noise, and will be subject to compliance with any conditions attached to any decision to grant a Waste Licence for the facility including prioritising and scheduling of actions to be



taken. Details with respect to monitoring parameters and frequency of monitoring will be addressed within the EMS, being subject to agreement with the EPA. Material acceptance procedures, emergency preparedness & response, and complaints procedures will also be addressed. The monitoring programme results will be submitted to relevant regulatory authority on a regular basis, and therefore made available for inspection by interested parties.

### 3.3.1.1 SITE INVESTIGATIONS & MONITORING

Detailed geological and hydrogeological assessments were prepared as part of the Waste Licence application (Refer to Waste Licence Application Section 7) and the 2018 Environmental Impact Assessment Report (EIAR) for the site. The EIAR identifies the environmental risks associated with the Garryhesta site to allow an ELRA to be undertaken.

Hydro-Environmental Services (HES) were commissioned by JSPE to undertake an assessment of the potential impacts of the proposed infilling at Garryhesta on the receiving water environment.

Site investigation works included borehole drilling, soil sampling, groundwater and surface water sampling from monitoring locations.

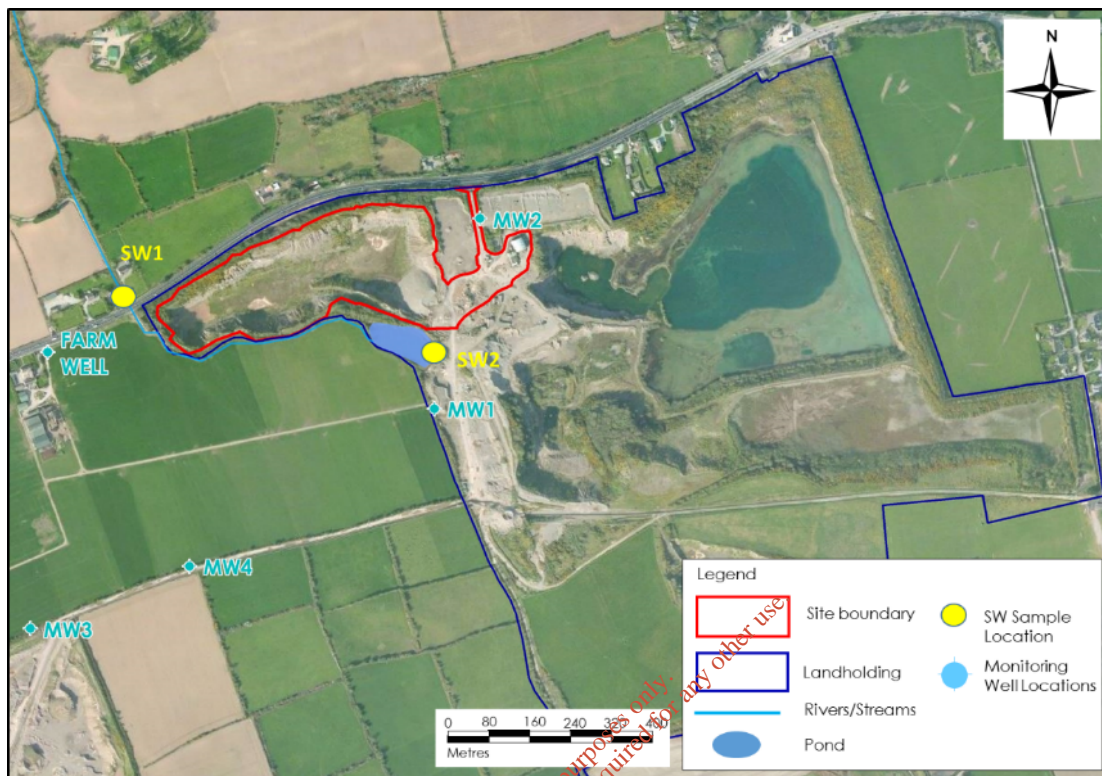
Pits up to 40m deep are seen at Garryhesta, with up to 30m depth of clean sediments exposed in the proposed area of the pit to be backfilled. The profile is dominated by alternating units of planar cross bedded sands and rounded to sub rounded, pebble to cobble gravels. Sand beds are up to 0.35m thick, and some silt beds of up to 80mm thick are present.

Drilling at the site was completed by Southern Pumps Drilling between 11<sup>th</sup> and 25<sup>th</sup> October 2017. Four (4 no.) groundwater monitoring wells were installed in the area of the proposed infill site (MW1 – MW4) to depths of approximately 36 and 40mbgl. The sand and gravel encountered during the drilling could typically be described as brown, dense, silty, sandy GRAVEL. The gravel was fine to medium in size while the sand was mainly coarse. The sand and gravel were typically found to be a mixture of mainly sandstone and siltstone. Bedrock (presumed) was only encountered at 1 no. monitoring well location (MW3), where rock was met at 35mbgl.

A layer of till like material comprising dark brown, slightly gravelly, sandy SILT/CLAY was found to overlie the sands and gravels in the area of the proposed infill pit (i.e. MW1 and MW2 locations only). The depth of the till like material was approximately 16m at both locations. This till like material was absent at monitoring well locations MW3 and MW4 which are located further to the southwest/south of the proposed infill pit. The GSI (2016) identifies the Quaternary sand and gravel deposits at Ovens as 'Hummocky Sand and Gravel'.



The following figure shows the location of Surface and Groundwater monitoring locations.



**Figure 3-1 Groundwater and surface water sampling locations**

The following provides a summary of site investigations.

- Site investigations were completed at the site in 2017 and 2018. These studies related to the entire site and comprised trial pitting and drilling of groundwater monitoring wells;
- The proposed development site is located in the Bride River Waterbody within the South Western River Basin District. The river water quality status (2010 – 2015) for the Bride River at the location of the proposed development is High. The waterbody is reported to have a risk result of “Not at Risk”.
- Surface water quality monitoring for the site is carried out in the local stream (SW1) and the pond (SW2). Monitoring results are presented in Section 4.4.3.9.1 of the EIAR. SW1 is located upstream of the proposed site and SW2 is located downstream of the site.
- There is no surface water connection between the proposed site and the River Bride and therefore the proposed development can have no influence on downstream flooding in the Bride River. The proposed development site is not located within any fluvial flood zone. There is no risk of pluvial flooding (i.e. rainfall ponding) at the site as





all rainfall landing in the pit percolates through the pit floor into the underlying sands and gravels. There is no runoff or surface water outfall from the proposed infilling area to the local stream and therefore the proposed development will not have any influence on flows or flood risk in the local stream.

- 2017 laboratory analysis of surface water did not detect any significant levels of pollutants in the samples besides elevated Ammonia N concentrations found in both January and February's samples, but not in the March samples. The source of ammonia is likely to be agricultural related. In comparison to the Environmental Objectives Surface Water Regulations (S.I. 272 of 2009) all results for ammonia N were below the "Good Status" threshold with 50% of the samples (3 no.) also been below the "High Status". All results for BOD were within the "High Status" range.
- In terms of groundwater bodies (GWB), the proposed site is located within the Ballincollig GWB and this groundwater body has been assigned a Good Status. This groundwater body is reported to be "Not at Risk".
- Based on the GSI mapping there are no groundwater protection zones for existing public water or group water schemes mapped within 7km of the proposed development site. The closest public supply to the site is the Coachford PWS (Public Water Supply) which exists approximately 7.5km to the northwest of the site. The site is not located within the Zone of Contribution (ZOC) of this source.
- The Farran GWS (Group Water Scheme) is located approximately 4.1km west-northwest of Garryhesta Quarry. The site is not located within the ZOC of this source.
- According to the GSI well database there is only 1 no. registered well within 500m of the proposed site and this well is located to the northeast of the site. This well is located on the valley side and therefore its groundwater catchment is likely to be elevated ground to the north of the well. There is likely to be no groundwater flow from the proposed side towards this source.
- A door to door well survey of dwellings in close proximity (300m of site boundary) was carried out on 27th January 2017. Only 1 no. private well was identified during the well survey and this is a farm which is located approximately 280m to the west of the site. This farm well is located up-gradient of the site. Sampling of this well was completed as part of the baseline groundwater quality monitoring.
- A CSM (Conceptual Site Model) of the site was developed. The proposed infill site is underlain by a Locally Important Sand and Gravel Aquifer. Based on surveys and groundwater level monitoring undertaken at the site to date, the groundwater level in



**Garryhesta SRF**

the area of the proposed infill site vary between approximately 21.286m OD (MW2 on 27/10/2017) and 26.3m OD (based on high level water marks on the pit sides). The lowest part of the pit floor is at approximately 23m OD. The groundwater levels recorded in October 2017 are normally representative of seasonally low levels, while the level of 26.3m OD is likely to be a peak winter groundwater level. The groundwater flow direction is to the east / northeast. The regional groundwater flow direction appears to be towards the River Lee. Groundwater quality / hydrochemistry appear also to be influenced by surface water runoff from the valley sides to the north of the proposed site. The site has a 'High' groundwater vulnerability rating.

- 2017 laboratory analysis of groundwater did not detect any significant levels of pollutants in the groundwater samples taken at the Garryhesta site. All metals (dissolved) were below the relevant groundwater threshold values with the exception of manganese in MW2 and this likely due to a variation in local geology or groundwater flow from the bedrock on the valley side to the north of the well location. Manganese is a naturally occurring groundwater mineral and dissolves readily in groundwater where DO levels are low. Nitrate is relatively elevated in MW2 and the Farm Well and this is likely due agricultural practices such as fertiliser / slurry spreading on the lands surrounding the site. Ammonia is also slightly elevated in MW2 compared to the other wells and the only obvious local source is possibly private septic tanks / wastewater treatment units at houses to the north of the site (upslope). All water samples recorded a BOD of less than 1mg/L which indicates an acceptable level of water quality.
- During infilling there will be no pathway for surface water to leave the site other than by recharging into groundwater.
- In terms of impacting on the groundwater vulnerability of the site, the importing of the inert fill will have a positive effect on the site in that the groundwater vulnerability rating will be lower. In terms of mitigation for groundwater quality protection it is proposed that infilling will only be undertaken when the groundwater level is at or below the base of the pit (i.e. infilling will not be completed during very wet periods when the pit floor becomes submerged in groundwater). Infilling of the site with inert soil and dredging spoil will pose a low risk to groundwater quality as no harmful contaminants should be present.
- Infilling of the site with inert soil and river dredging spoil should pose a low risk to groundwater quality regardless of the vulnerability rating as no harmful contaminants will be present. In addition, inert soil and stone and river dredging spoil will not contain either organic matter or liquids that will form a source of organic contaminants of



microbial pathogens, nor provide a substrate to feed microbial pathogens. Therefore, the potential impact to groundwater quality due to the deposition of inert infill material is considered to be indirect, negative, imperceptible, long term, low probability impact before appropriate mitigation measures are considered.

- The potential on-site sources of contamination identified are not significant and the environmental risk posed to the identified receptors by these sources is considered to be low. Controls such as appropriate bunding and an effective environmental management plan, typically conditioned under a waste licence, will effectively manage the risks posed to groundwater and surface at the site;
- Based on the available environmental data, there has been no significant impact on the environment from the Garryhesta site. The expansion of the site through the importation of stone and soil-based fill material will not have a significant effect as they are composed of inert material that will not produce a contaminant leachate;
- Based on all available environmental data, the overall risk to groundwater and surface water from the proposed backfill activities is 'Low' and the will not affect the status of the local surface water body (Bride) and local groundwater bodies (Ballincollig GWB).

In order to assess ongoing water quality in this area of the site it is important to continue to monitor local groundwater and surface water quality to establish seasonal trends.

It is considered that following restoration and the mitigation measures incorporated in the design that there will be no significant effects in terms of Land, Soils and Geology. Due to the inert nature of the fill material, no significant residual impacts on the water environment are anticipated.

### 3.3.2 ENVIRONMENTAL PATHWAYS AND SENSITIVITY

Detailed geological and hydrogeological assessments were prepared as part of the Waste Licence application (Refer to Waste Licence Application Section 7 Emissions) and the 2018 Environmental Impact Assessment Report (EIAR) for the site.

With respect to closure and aftercare requirements the following provides a summary of the relevant information with respect to identifying environmental pathways and sensitivity which is addressed in more detail in the geological and hydrogeological assessment reports referred to above.



### 3.3.2.1 SITE GEOLOGY AND HYDROGEOLOGY

#### 3.3.2.1.1 Soils and Subsoils

Although the soils of the study area and wider area in the valley are identified as Lithosols in the Teagasc/EPA soil map of Ireland (EPA, 2016), R. Meehan identified the soils as dominantly Brown Podzolics, Acid Brown Earths with minor Groundwater Gleys in poorly drained hollows and gullies (JSPE, 2018).

The sands and gravels of the site probably represent glacial and glaciofluvial deposits that originated from the ice sheet on the upland and mountainous terrain to the west.

The dominant subsoil type at the site and surrounding area is Sands and Gravels derived from Devonian sandstone parent material (i.e., GDSs), with minor undifferentiated gravelly alluvium (A), which is developed as a wide ribbon along the course of the Bride River. Other notable subsoil types in the wider area are till derived from Devonian sandstones (TDSs), and exposed bedrock at surface (Rck).

In the Ovens area itself, the parent material for the glacial deposits is largely derived from Devonian and Carboniferous Sandstones and Shales, with smaller amounts of Carboniferous Limestone in places, particularly at depth. Within the Ovens locality, glacial till deposits occur on the ridges and uplands and are generally between 1-3m thick. The thicker glaciofluvial sediments occur on the valley floor, and can be up to 30m in thickness, forming relatively flat to gently undulating to hummocky topography. The GSI (2016) identifies the Quaternary sand and gravel deposits at Ovens as 'Hummocky Sand and Gravel'.

The Quaternary deposits on the floor of the Bride River Valley are therefore characterised by thick sequences of bedded and sorted, glaciofluvial, outwash sands and gravels. Pits up to 40m deep are seen at Garryhesta, with up to 30m depth of clean sediments exposed in the proposed area of the pit to be backfilled. The profile is dominated by alternating units of planar crossbedded sands and rounded to subrounded, pebble to cobble gravels. Sand beds are up to 0.35m thick, and some silt beds of up to 80mm thick are present.

Visual assessment of the soils within the quarry site suggests that the soils are shallow, naturally well drained, with no indication of waterlogged soils.

Four (4 no.) groundwater monitoring wells were drilled at the site between depths of approximately 36 and 40mbgl. The sand and gravel encountered during the drilling could typically be described as brown, dense, silty, sandy GRAVEL. The gravel was fine to medium in size while the sand was mainly course. The sand and gravel was typically found to be a



mixture of mainly sandstone and siltstone. Bedrock (presumed) was only encountered at 1 no. monitoring well location (MW3), where rock was met at 35mbgl.

A layer of till like material comprising dark brown, slightly gravelly, sandy SILT/CLAY was found to overlie the sands and gravels in the area of the proposed infill pit (i.e. MW1 and MW2 locations only). The depth of the till like material was approximately 16m at both locations. This till like material was absent at monitoring well locations MW3 and MW4 which are located further to the southwest/south of the proposed infill pit.

### 3.3.2.1.2 Bedrock Geology

---

Based on the GSI bedrock map of the area the application site is underlain by two separate bedrock formations. The southern half of the site is mapped to be underlain by Dinantian mudstones and sandstones while the northern half is mapped to be underlain by Devonian Old Red Sandstones (ORS). The remaining area of the overall landholding to the south of the site is mapped to be underlain by Dinantian pure unbedded limestones. During drilling of the on-site monitoring wells, bedrock (presumed) was only encountered in MW3, when rock was met at 35mbgl. There was no bedrock returns and therefore the bedrock type was unconfirmed.

### 3.3.2.1.3 Hydrology

---

The site is located in the catchment of the River Bride which is a sub-catchment of the River Lee within Hydrometric Area 19 (South Western River Basin District). The river water quality status (2010 – 2015) for the Bride River at the location of the proposed development is High. The waterbody is reported to have a risk result of “Not at Risk”.

The River Bride flows in an easterly direction approximately 1.5km to the south of the site. The River Bride then flows into the River Lee approximately 3km to the east of the site.

Surface water features in the vicinity of the site include a stream and small man-made pond. The stream rises on high ground to the northwest of the site and then flows along the western and southern boundary of the application site (i.e. proposed infill area) prior to flowing into a small man-made pond which exists immediately to the southeast of the application site. Local Drainage in the area is shown on Figure 3-1 above.

There is no visible surface water outfall from the pond and therefore all inflows to the pond via the stream appear to percolate down through the base of the pond into the underlying sand and gravels. The stream and pond appear to be perched on a layer of low permeability overburden (silts/clays) which overlies the sand and gravel deposits in this area.



There are no pathways for runoff from the application site towards the stream or pond as there is an embankment present along the southern and western boundaries of the application site. The embankment separates the application site from the stream and pond. As stated above the pit itself is up to 31m in depth and any rainfall that falls in the pit just percolates through the floor into the underlying sand and gravels.

The surface water level in the pond was measured at 49m OD (using dGPS) on 27th January 2017 which is approximately 26m above the pit floor of the application site. The discharge in stream was estimated to be approximately 0.004m<sup>3</sup>/s.

The stream which flows along the western and southern boundaries of the proposed site is small and no significant flood flows are anticipated. There is also an embankment in place that separates the proposed infilling site from the stream and pond. The flood risk posed to the proposed development site in respect of stream flooding is low. Also, there is no runoff or surface water outfall from the proposed infilling area to this local stream and therefore the proposed development will not have any influence on flows or flood risk in the local stream.

Any local ponding resulting from heavy rainfall infiltrates into the underlying sand and gravel deposits.

There is no surface water connection between the proposed site and the River Bride and therefore the proposed development can have no influence on downstream flooding in the Bride River.

#### 3.3.2.1.4 Hydrogeology

In terms of groundwater bodies (GWB), the proposed site is located within the Ballincollig GWB and this groundwater body has been assigned a Good Status. This groundwater body is reported to be "Not at Risk".

In the vicinity of the site the GWB comprises the following bedrock aquifer types:

- The Geological Survey of Ireland (GSI) has classified the pure unbedded limestones which are mapped to the south of the site, as a Regionally Important Karstified Aquifer (RKd). Faults and joints were enlarged by karstification as groundwater moved through the limestones (GSI, 2004)
- The mudstones and sandstones and Devonian Old Red Sandstones, which are mapped to underlie the application site itself, are mapped as a Locally Important Aquifer - LI (bedrock which is moderately productive only in local zones)

The sand and gravel deposits which overlie the bedrock in this area are classified as a Locally Important Gravel Aquifer (Lg). The total area of the gravel aquifer is approximately ~10.3km<sup>2</sup>.



The gravel aquifer extends approximately 11km to the west of Ballincollig and has a width of up to 2km.

On the day of the initial site survey (27/01/2017) there were several small ponded water areas noted on the pit floor of the proposed application site and these were measured at approximately 22.8m OD (using dGPS) which is just below the floor level of the deepest area of the pit. This is expected to be the groundwater level in the local sand and gravel aquifer below the pit.

However, there are water level erosion marks visible on the pit sides that indicate that the groundwater level can be as high as 26.3m OD. This is approximately 3.5m above the deepest floor level of the pit. The quarry operator stated that the groundwater level can temporarily rise above the level of the pit floor during very wet periods over winter. The water level marks currently visible on the pit sides reflect the maximum groundwater level that was present during the heavy rainfall events that occurred during late December 2015 and early January 2016. The groundwater level of 26.3m OD is therefore likely to be representative of an extreme storm event while the groundwater level of 22.8m OD measured in January 2017 is likely to be more representative of a typical winter groundwater level.

The groundwater flow direction is down the valley in an easterly / north-easterly direction towards the River Lee.

The lowest part of the pit floor is at approximately 23m OD. Water levels fluctuate seasonally in monitoring wells.

The mapped groundwater vulnerability rating for the site is classified as 'High (H)' by the GSI.

The vulnerability rating for the site has not changed with the previous extraction (of sand and gravel) that has been completed, as there is still expected to be >3m of high permeability subsoil over bedrock based on extraction records from the larger pit on the east of the landholding which was operated up to 7m below the groundwater table.

The presence of exposed groundwater/or ponding on the floor of the quarry should not be a major concern if appropriate backfilling is completed. While there is an exposure of the high winter groundwater table in the gravels above bedrock, this water has to travel down through the subsoil to enter the underlying bedrock aquifer, and the intermediate sand and gravel is a very efficient filter.

Backfilling the site with inert material could be viewed as a good approach to lowering the vulnerability rating, i.e. provide better aquifer protection in the long term, and proper landscaping and closure of the site will prevent dereliction and possible fly tipping.



Based on the GSI mapping there are no groundwater protection zones for existing public water or group water schemes mapped within 7km of the proposed development site. The closest public supply to the site is the Coachford PWS (Public Water Supply) which exists approximately 7.5km to the northwest of the site. The site is not located within the Zone of Contribution (ZOC) of this source. The Farran Group Water Scheme (GWS) is located approximately 4.1km west-northwest of Garryhesta Quarry. The site is not located within the ZOC of this source.

According to the GSI well database there is one (1) registered well within 500m of the proposed site and this well is located to the northeast of the site. This well is located on the valley side and therefore its groundwater catchment is likely to be elevated ground to the north of the well. There is likely to be no groundwater flow from the proposed side towards this source.

Only 1 no. private well was identified during the well survey and this is a farm which is located approximately 280m to the west of the site (refer to Figure 3-1 above) for the "Farm Well" location). This farm well is located up-gradient of the site. Sampling of this well was completed as part of the baseline groundwater quality monitoring which is described further below.

Groundwater quality monitoring was completed at the on-site monitoring wells (MW1 & MW2) and also at the farm well to the west of the site. The groundwater hydrochemistry is typical of a sand and gravel aquifer comprising Devonian sand and gravels (the sands and gravels are mapped to be underlain limestone and this bedrock is also likely to influence hydrochemistry in the sand and gravel aquifer).

2017 laboratory analysis of groundwater did not detect any significant levels of pollutants in the groundwater samples taken at the Garryhesta site. Refer to Section 3.3.1.1 above for details on Groundwater Monitoring results.

### 3.3.2.2 PROXIMITY TO SENSITIVE RECEPTORS, INCLUDING HUMANS

The proposed soil recovery facility including site infrastructure will comprise a c. 7.9 ha section of the existing quarry workings at Garryhesta, as shown by the Application Area Map Figure 1.2. The total landholding extends to c. 77.2 ha and is shown highlighted in blue. Thus, the proposed application site area (for infilling) will be confined to a relatively small section of the sand and gravel pit, much of which has already been worked out. The landholding is owned by the applicant Roadstone Limited.

Garryhesta Pit is located in the townland of Knockanemore between Ovens, Ballincollig and Cork City (1km, 5.5km and 13.5km, respectively to the east) and Macroon (19 km to the west).





The site is located in the valley of the Bride River, which is a prominent, long, narrow, geomorphic feature running roughly east-northeast to west-southwest in a geological structure known as the Cork Syncline. This area is characterised by a mixed land use pattern, albeit dominated by pasture and lesser non-irrigated land for tillage, with considerable area given over to mineral extraction. The nearest watercourse to the site is the Bride River, which flows roughly W-E approximately 1km south of the site.

Land-use in the surrounding area is largely agriculture and quarrying with scattered rural pattern of residential dwellings along the N22 which runs immediately to the north of the site and along other local roads to the south and east of the site. The site is well screened from outside views along the N22 by well-established planting (Refer to Figures 1.1 and 1.2).

There are no large residential settlements close to the site, with nearest large population centre being the town of Ballincollig c. 5.5 km to the east. The village of Farran is situated 2km to the west along the N22, while the village of Killumney is 2km to the southeast. Residential development consists of isolated farm dwellings and of owner occupied bungalow/houses along public roads (Refer to Figure 1.2 and Drawing D01).

The Applicant, Roadstone, has operated numerous sand and gravel pits in the Ovens area since the 1940s to present. Roadstone also manufactures a range of concrete products at its Classis facilities c. 4km from the site and employs a total of c. 100 people directly and indirectly in the area.

It is considered that as the proposed development is within an existing quarry that there will be an imperceptible impact on the human environment associated with construction activities.

The quarry has put in place a number of mitigation measures with respect to environmental management and monitoring to ensure that operations, including those of the proposed SRF, do not result in significant impacts on the surroundings, including the human environment.

The area has an established history of sand and gravel working, and these activities have co-existed with other land uses in the area, particularly intensive agriculture. On completion of site activities, the site of the quarry and SRF will be decommissioned and left safe and secure. Furthermore, the site will be reinstated in accordance with the approved quarry restoration scheme, and thus integrated back into the surrounding landscape with the attendant improvement to the visual amenity of the area.

The restoration of the site will result in a moderate positive effect in the medium term.

Mitigation measures are already in place at the site and included in the existing site Environmental Management System. Continual monitoring and measurement will ensure the



effective application of these mitigation measures and ensure that activity at the quarry including the SRF will not result in any significant environmental impact.

The development can be controlled and regularised in accordance with the scheme as outlined in this document, through continued environmental monitoring and by conditions imposed by the relevant regulatory authority. The proposal will have no significant and/or long-term effect on the human environment.

### 3.3.2.3 DESIGNATED SITES

The quarry site at Garryhesta, which includes the application site, is not included in any area with an ecological designation (NHA, cSAC or SPA). There are no Natura 2000 sites within 15km of the site. The nearest designated areas are Cork Harbour SPA (Site Code 4030), which begins downriver from the City and is joined by the Great Island Channel SAC (Site Code 1058) further to the east.

Screening for Appropriate Assessment was carried out with respect to the EPA Waste Licence Application and in preparation of the EIAR. It has been assessed that there is no likelihood of significant ecological effects from this development on any of the sites in the Natura 2000 network or on their conservation objectives. Thus, the further, more detailed, stages of appropriate assessment are not required.

### 3.3.2.4 EMISSIONS

The only waste to be accepted at the facility for recovery comprises inert “soils and stone” and “river dredging spoil”.

The main potential sources of emissions from an inert waste recovery facility would be from noise or dust associated with the movement, handling and placement of materials. Possible other emissions to the atmosphere would be from machinery exhaust fumes and also possible emissions to groundwater and/or surface water in the event of a fuel or oil spillage. Full descriptions of possible emissions means of abatement and treatment measures are contained in Section 7 (Emissions) of the Waste Licence Application and Section 4 of the EIAR which accompanied the application.

Clean closure is envisaged such that all plant is safely removed for reuse or recycling and all wastes are removed off site at the time of closure for appropriate recovery or disposal.

There will be no on-going requirement for environmental monitoring of emissions after recovery operations have ceased. It is proposed that groundwater monitoring is continued during the aftercare programme for a period up to the final site inspection.



An aftercare scheme will be implemented with the aim of bringing the restored soils (and hence land) into a condition which does not need to be treated differently from undisturbed land in the same use.

Roadstone propose to carry out the reclamation works in accordance with the Green, Low Carbon, Agri-environment Scheme (GLAS). i.e. Consideration will be given through the land reclamation scheme to conservation of arable grass margins, conservation of solitary bees, coppicing and planting of native trees and hedgerows, establishment of species rich hay meadow

Final site-inspection 6 months after site closure will be carried out to ensure that the final site restoration scheme implemented is functioning and progressing as required.

---

### 3.3.3 SITE PROCESSES AND ACTIVITIES

The nature of the development is the phased restoration of a worked-out sand and gravel pit using imported inert soil and stone and river dredging spoil.

The phased scheme for reclamation of the area is shown by Drawings D02 to D04. It is proposed that the restoration scheme will be completed using "Soil and Stones" and "River Dredging Spoil" imported to the site under the terms of an EPA Waste Licence.

The applicant is an experienced earthmoving contractor. Soils will be handled in accordance with accepted guidelines and good practice.

A bulldozer will be used to appropriately grade and compact the material to the desired profile as shown by the detailed plans and sections (Refer to Drawings D02 to D05). Typically, the soil will be placed in 2m lifts with fill slopes of a safe angle of repose of at least 1:2.

It is proposed to reclaim the lands to a condition / gradient suitable for agricultural. For restoration to agricultural use, the restored soil profile (capping) shall comprise 300mm topsoil over 1200-1350mm of subsoil.

Good quality indigenous or imported soil will be conserved wherever possible to provide the subsoil/top-soil capping.

Progressive restoration involving grass seeding of restored areas will be carried out on a phased basis to reduce the effects of soil erosion, windblown dust, to aid ground stabilisation and as an effective means of weed control. The final contours and topography for the site is shown by the Reclamation Scheme Drawing D04 and D05 (Cross Sections).



Once the topsoil is re-instated it will be seeded with a suitable mix of grasses suitable for pasture in order to quickly stabilise the topsoil. Once the grass sward has become established the restored farmland can be kept either as pasture or hay meadow.

Roadstone propose to carry out the reclamation works in accordance with the Green, Low Carbon, Agri-environment Scheme (GLAS). i.e. Consideration will be given through the land reclamation scheme to conservation of arable grass margins, conservation of solitary bees, coppicing and planting of native trees and hedgerows, establishment of species rich hay meadow.

It is anticipated that final restoration will be achieved within two years of completion of extraction operations. Final restoration will be to agriculture/secure wildlife habitat. A detailed planting and landscaping plan has been prepared as part of the application (Refer to Drawing D04). The perimeter overburden storage areas will be landscaped to form part of a woodland/ nature reserve area.

Redundant structures, plant equipment and stockpiles will be removed from site on cessation of the Waste Recovery activity.

The Environmental Management System shall remain in place and will continue to be actively implemented during the closure period.

---

#### 3.3.4 INVENTORY OF BUILDINGS, PLANT AND EQUIPMENT

Details of the site infrastructure are provided in Section 4 of the Waste Application.

The proposed Soil Recovery Facility (SRF) will utilise the permitted quarry infrastructure including internal roads, site office, welfare facilities and other ancillaries to complete the works (Refer to Drawing D01 Site Plan - Existing Survey). A wheel wash and weighbridge will be provided as part of the proposed development and the existing workshop will be utilised as a quarantine area. A hard-stand with drainage to oil interceptor will also be provided as a designated refueling area. The proposed facility site layout is shown by Drawings D02 to D04.

The boundaries of the site are secure being screened from outside views and nearest residences by perimeter hedgerows screening berms constructed as part of the quarry development. The existing quarry site access will be utilised by the proposed SRF.

A fixed water spray system has been installed to include the access road, all internal roads, any processing areas, storage yards / storage bays and bins. A mobile water browser is also provided in periods of dry or windy weather to cover locations where it is impractical or inappropriate to use a fixed water spray system.



Plant on site will consist of a bulldozer/excavator, tractor and bowser. All this plant is currently in use on site as part of the quarry operations. A road sweeper is also available for use on site and adjacent sections of the N22 at least on a weekly basis and/or if a spillage occurs.

A weighbridge will be located along the concrete paved road leading from the entrance and passing in front of the site office. Details with respect to truck loads, tonnages, type and character of inert materials being received will be recorded. All weighbridge records shall be retained on site. The provision of a weighbridge will ensure that no heavy goods vehicles serving the site will be overloaded.

The water supply for the site office is provided by the local mains. An overhead telephone line also serves the site office. Diesel will be used for the bulldozer/excavator.

No fuel will be stored onsite. A double skinned fuel bowser will be mobilised to site as required. A hard-stand with drainage to oil interceptor will also be provided as a designated refueling area (Refer to Drawing D02). Spill kits and materials used for treating hydrocarbon spills are available onsite. These materials are stored in the facility shed/workshop.

Material not suitable for recovery at the facility will be rejected either at the pre-approval stage, the onsite verification stage, or before recovery stage at the customers expense. If reloading cannot occur immediately, it will be separated and moved to the quarantine area. The existing workshop will be utilised as a quarantine area (Refer to Drawing D02).

There will be no major servicing of plant and machinery carried out on site apart from routine maintenance and running repairs. Plant and machinery used on site will be parked on the hard-standing area outside of normal operating hours.

### 3.3.5 INVENTORY OF RAW MATERIALS, PRODUCTS AND WASTES INCLUDING STORAGE CAPACITIES

The nature of the development is the phased restoration of a sand and gravel pit using imported inert soil and stone and river dredging spoil.

It is proposed that circa 300,000 tonnes per annum of inert materials will be accepted to site (subject to market conditions) as backfill to facilitate the restoration of the lands to beneficial after use.

An estimated that 1,276,043 m<sup>2</sup> (2,296,877 tonnes) of inert material is required to complete the restoration of the lands.

Only suitable material will be permitted to be accepted in the facility (i.e. inert soil and stones and river dredging spoil (EWC 17-05-04 and 17-05-06)).



**Garryhesta SRF**

Material not suitable for recovery at the facility will be rejected either at the pre-approval stage, the onsite verification stage, or before recovery stage at the customers expense. If reloading cannot occur immediately, it will be separated and moved to the quarantine area. Any non-natural materials in the consignment will be manually removed where possible and transferred to the appropriate waste skip for disposal at an appropriate facility (Refer to Drawing D02).

The potable water supply for the site office is from the local mains, while the wheelwash will be supplied by surface water from the quarry lagoon system. Water used for dust suppression is also sourced from the quarry lagoon. In Ireland rainfall occurs daily about 50% of the year. On days requiring dust suppression water usage would amount to 5 to 10m<sup>3</sup> per day.

An overhead telephone line serves the site office. An existing single-phase overhead electricity supply provides for lighting and heating of the office. Energy awareness notices will be posted around the site to ensure employees are aware of the need to conserve energy. Energy efficiencies will be achieved by using modern plant and equipment and servicing that equipment on a scheduled basis. Plant and equipment not in use will be shut off.

No fuel or oil will be stored on site. A double skinned fuel bowser will be mobilised to site as required. The only raw materials used on site are diesel, hydraulic oil and engine oil, which are used to operate diesel powered plant on site. As only an excavator/bulldozer will be used in the proposed SRF, the quantities of fuel oil used on site will be relatively small. The overall fuel use by on-site plant will amount to about 30,000 litres/annum.

A hard-stand with drainage to oil interceptor will also be provided as a designated refueling area (Refer to Drawing D02). Spill kits and materials used for treating hydrocarbon spills are available onsite. These materials are stored in the facility shed/workshop.



### 3.4 CLOSURE TASKS AND PROGRAMMES

This section details the plant, structures, equipment and other materials which require consideration as part of the closure process.

Clean closure is envisaged such that all plant is safely removed for reuse or recycling and all wastes are removed off site at the time of closure for appropriate recovery or disposal.

Redundant structures, plant equipment and stockpiles will be removed from site on cessation of recovery activity. Machinery and buildings will either be utilised on other sites or be sold as working machinery or scrap. In the case of machinery to be scrapped all contaminants will be removed, drained or flushed from all plant, tanks and pipelines. All residues containing fuels, oils and other contaminants will be removed off site for recovery or disposal.

No fuel or oil will be stored on site. A double skinned fuel bowser will be mobilised to site as required. Refueling will take place on the hard-standing area to be provided with drainage to oil interceptor.

Spill kits and materials used for treating hydrocarbon spills are available onsite. These materials are stored in the facility shed/workshop. The operator has put in place an emergency response procedure for hydrocarbon spills and appropriate training of site staff in its implementation.

Waste oils, batteries, scrap metal, etc. will be removed from site for recycling by approved licensed contractors. A licensed waste collection contractor will remove any domestic waste generated on site and requiring disposal to a licensed waste management facility. A record of all waste removal will be kept in the site office.

As such no special measures are considered necessary with respect to closure in relation to fuel and oil products.

Any hard-standing areas will be broken up and the material recovered at an appropriate Material Recovery Facility for use as secondary aggregates. The site access will be retained as agricultural access to the restored lands.

For the purposes of closure planning adequate provision has been included in the costings (Refer to Section 3.7 below).

It is expected that it will take up to six months to undertake the closure process and a further six months for Aftercare.



**Table 3-1 Closure, Restoration and Aftercare Programme**

| Activity  | Closure Period |   |   |   |   |   | Aftercare Period |   |   |   |   |   |
|---|----------------|---|---|---|---|---|------------------|---|---|---|---|---|
|   | 1              | 2 | 3 | 4 | 5 | 6 | 1                | 2 | 3 | 4 | 5 | 6 |
| Completion of Backfill  |                |   |   |   |   |   |                  |   |   |   |   |   |
| Environmental Validation Audit  |                |   |   |   |   |   |                  |   |   |   |   |   |
| Recovery/disposal of residual waste   |                |   |   |   |   |   |                  |   |   |   |   |   |
| Removal of hard standings & site infrastructure   |                |   |   |   |   |   |                  |   |   |   |   |   |
| Decommissioning of P&M  |                |   |   |   |   |   |                  |   |   |   |   |   |
| Noise & Dust Monitoring   |                |   |   |   |   |   |                  |   |   |   |   |   |
| Groundwater Monitoring  |                |   |   |   |   |   |                  |   |   |   |   |   |
| Trial Pitting/ EPA inspection   |                |   |   |   |   |   |                  |   |   |   |   |   |
| Final contouring, grading, cultivation, grass seeding   |                |   |   |   |   |   |                  |   |   |   |   |   |
| Inspection and enhancement of hedgerows if necessary  |                |   |   |   |   |   |                  |   |   |   |   |   |
| Application of Fertiliser, weed control as necessary,   |                |   |   |   |   |   |                  |   |   |   |   |   |
| Remediation of any localised areas of soil compaction and ponding of surface water as, and if, required |                |   |   |   |   |   |                  |   |   |   |   |   |
| Surrender of Licence  |                |   |   |   |   |   |                  |   |   |   |   |   |

Notes: 1. Periods shown are shown in Months

### 3.5 CRITERIA FOR SUCCESSFUL CLOSURE

Successful clean closure will be expected to be achieved when it can be demonstrated that there are no remaining environmental liabilities at the site. In practice this will require demonstration that the following criteria have been met:

- All plant safely decontaminated using standard procedures and authorised contractors.
- All Wastes handled, temporarily stored and disposed or recovered in a manner which complies with regulatory requirements.
- All relevant records relating to waste and materials movement and transfer or disposal will be retained throughout the closure process.
- It is proposed that on completion of backfilling operations that a number of trial pits will be opened to confirm the nature of the placed materials. All soils encountered will be





described in accordance with the British Standards Institution Code of Practice for Site Investigations (BS 5930:2015) which gives a geotechnical classification of the materials encountered, in particular bulk density, structure and textural characteristics. Bulk samples will be collected and retained for analysis from both topsoil and subsoil in each pit, should it be required. A log summary including photographic record of the trial pits will be kept. The results of the survey will be made available to the EPA. The EPA will also be invited to visit the site as part of the site inspection. The purpose of the inspection is to ensure that there is no soil or groundwater contamination at the site.

- The Environmental Management System shall remain in place and will continue to be actively implemented during the closure period.

### 3.6 CLOSURE PLAN VALIDATION

An Environmental Validation Audit of the site will be carried out following the announcement of closure and prior to actual decommissioning and closure operations taking place. The audit will devise an accurate inventory of all plant, equipment and wastes on the site. This inventory will be used as a benchmark against which successful decommissioning will be assessed.

It is proposed that the Environmental Validation Audit will be undertaken by JSPE and/or other independent Auditor to be agreed with EPA prior to the validation commencing.

The scope of the validation audit will be agreed in advance with the EPA and following approval, the chosen independent auditor will complete the validation audit. The completed validation audit report will be submitted to the EPA for approval.

The Environmental Management System including environmental monitoring (Surface and Groundwater only) shall remain in place and will continue to be actively implemented during the closure period.

The licence holder shall carry out such tests, investigation or submit certification, as requested by EPA in accordance with the waste licence to confirm that there is no risk to the environment.

As such a two-stage site inspection/investigation programme has been proposed with respect to closure (Refer to Table 3.1 above). As outlined above the results of the surveys will be made available to the EPA. The EPA will also be invited to visit the site as part of the site inspections.



### 3.7 CLOSURE PLAN COSTING

Clean closure is envisaged and the site will be restored in a progressive manner. A worst case scenario is considered that the lands subject to backfilling will be in a condition that will require final contouring grading, cultivation and grass seeding (i.e. c. 6.6 ha).

For the purposes of closure planning adequate provision has been included in the costings and this scenario is considered to represent a worst-case scenario in the event of cessation resulting from abandonment of the activity.

It is acknowledged that as a typical condition of any waste licence that the Agency may amend the licence at any time in certain circumstances in accordance with section 42B of the Waste Management Act 1996 as amended, to require, or not require as the case may be, the putting in place of a financial provision to incorporate costings for CRAMP and/or Environmental Liabilities Risk Assessment. This amendment may be implemented by the Agency in the event of an incident that creates a significant residual environmental liability or where the environmental risk profile changes on site.

The following Table 3-2 provides details with respect to the cost of restoration of the site.

For inspection purposes only.  
Consent of copyright owner required for any other use.



Table 3-2 Estimate of Closure Plan Costs

| Task/Description  | Quantity | Unit           | Rate  | Cost<br>€      | Source<br>(See Notes) |
|---|----------|----------------|-------|----------------|-----------------------|
| <b>Restoration of Hard Standing Area</b>  |          |                |       |                |                       |
| <i>Load, Haul, Place &amp; Grade topsoil (0.3m depth)</i>   | 19,800   | m <sup>3</sup> | €3.00 | 59,400         | JSPE                  |
| Landscaping/Seeding/Planting (Contractor)   | 10       | days           | 500   | 5,000          | EPA<br>2014a          |
| <b>Decontamination</b>  |          |                |       |                |                       |
| <i>Not considered necessary due to inert nature of waste materials.</i>   |          |                |       | 0              |                       |
| <b>Plant &amp; Machinery/ Prefabricated Office</b>  |          |                |       |                |                       |
| <i>To be sold/used on other Sites</i>   |          |                |       | 0              |                       |
| <b>Waste Disposal/Recovery</b>  |          |                |       |                |                       |
| Hard standing areas/concrete to be recovered for use  |          |                |       | 5,000          |                       |
| <b>Facility Security &amp; House keeping</b>  |          |                |       |                |                       |
| <i>Operative to be on site one day per week during 6 month aftercare period</i>   | 24       | days           | 150   | 3,600          | Roadstone             |
| <b>Management &amp; Utility Costs</b>   |          |                |       |                |                       |
| Management (Site Supervisor) – 25% time allocation  | 6        | Months         | 1,000 | 6,000          | EPA<br>2014a          |
| General Administration (2 days per month)   | 12       | days           | 300   | 3,600          | EPA<br>2014a          |
| 1 General operative   | 6        | Months         | 2,400 | 14,400         | Roadstone             |
| Insurance   |          | Unit           | 5,000 | 5,000          | Roadstone             |
| Power (six months)  | 10,000   | kWh            | 0.16  | 1,600          | EPA<br>2014a          |
| Fuel (six months)   | 15000    | litres         | 0.48  | 7,200          | Roadstone             |
| <b>Environmental Monitoring</b>   |          |                |       |                |                       |
| <i>Surface &amp; Ground water monitoring for aftercare period (2 rounds)</i>  | 14       | sample         | 150   | 2,100          | EPA<br>2014a          |
| <i>Report Prepared by Environmental Consultant</i>  | 2        | day            | 750   | 1,500          | JSPE                  |
| <b>Environmental Validation Audit</b>   |          |                |       |                |                       |
| <i>To be carried out following the announcement of closure and prior to actual decommissioning and closure operations taking place.</i> | 1        | unit           | 5,000 | 5,000          | EPA<br>2014b          |
| <b>Site Inspections</b>   |          |                |       |                |                       |
| Trial Pit programme on completion of backfilling remaining area (c. 6.6 ha)   | 22       | Unit           | 90    | 1,980          | EPA<br>2014a          |
| Soil Testing Laboratory Analysis  | 22       | Unit           | 300   | 6,600          | JSPE                  |
| Environmental Consultant (including Reporting)  | 3        | day            | 750   | 2,250          | JSPE                  |
| Final Inspection of site (6 months after completion of landscaping)   | 2        | day            | 750   | 1,500          | JSPE                  |
| <b>Surrender of Licence</b>   |          |                |       |                |                       |
| Fee for Surrender of a waste licence  | 1        | unit           | 6,000 | 6,000          | WML<br>Reg.s          |
| Consultancy Costs   | 5        | day            | 750   | 3,750          | JSPE                  |
| <b>Subtotal</b>   |          |                |       | 141,480        |                       |
| <i>Contingency (10%)</i>  |          |                |       | 14,148         |                       |
| <b>Total</b>  |          |                |       | <b>155,628</b> |                       |



### 3.8 CLOSURE PLAN REVIEW AND UPDATE

The Closure Plan will be reviewed and updated annually as part of the Annual Environmental Report submission to the EPA.

The updated and reviewed Closure Plan will take account of any site or process changes, technology changes and costing changes.

### 3.9 RESTORATION & AFTERCARE

Following on from the scoping exercise (Refer to Section 2 above) it was determined given the relatively short-term measures necessary to close the site satisfactorily, that there will be no environmental liabilities once closure, decommissioning and residuals management are completed, and so only **a closure plan** is considered necessary.

However, an aftercare scheme will be implemented with the aim of bringing the restored soils (and hence land) into a condition which does not need to be treated differently from undisturbed land in the same use.

Roadstone propose to carry out the reclamation works in accordance with the Green, Low Carbon, Agri-environment Scheme (GLAS). Consideration will be given through the land reclamation scheme to conservation of arable grass margins, conservation of solitary bees, coppicing and planting of native trees and hedgerows, establishment of species rich hay meadow.

A final site-inspection 6 months after site closure will be carried out to ensure that the final site restoration scheme implemented is functioning and progressing as required.

Details (including costings) with respect to final restoration, aftercare and site inspection have been addressed as part of the closure plan above.

### 3.10 FUTURE PROOFING COSTS

#### 3.10.1 CONTINGENCY

The contingency is a specific provision for unplanned or unforeseeable items (e.g. mobilisation issues due to weather conditions, changes due to incomplete design information, changes in regulatory requirements) and provides an additional level of confidence in relation to the costing.



The closure requirements and costs for this activity are well defined, relatively straightforward and not subject to a large number of unknowns. In that context, a contingency of 10% is considered appropriate and is provided to allow for unplanned or unforeseeable items (Refer to Table 3.2 above).

As the activity moves towards closure and restoration/aftercare, the level of uncertainty should decrease, particularly as sections of the site are progressively restored. As a result, the level of contingency necessary may also decrease.

### 3.10.2 COST PROFILE

It is anticipated that final restoration will be achieved within two years of completion of extraction operations. Final restoration will be to agriculture/secure wildlife habitat. A detailed planting and landscaping plan has been prepared as part of the application (Refer to Drawing D04).

Progressive restoration involving grass seeding of restored areas shall be carried out on a staged basis to reduce the effects of soil erosion, windblown dust, to aid ground stabilisation and as an effective means of weed control. On completion of each phase of development final restoration including grading, seeding and landscaping will be carried out.

Clean closure is envisaged such that all plant is safely removed for reuse or recycling and all wastes are removed off site at the time of closure for appropriate recovery or disposal.

Redundant structures, plant equipment and stockpiles will be removed from site on cessation of recovery activity. Machinery and buildings will either be utilised on other sites or be sold as working machinery or scrap. In the case of machinery to be scrapped all contaminants will be removed, drained or flushed from all plant, tanks and pipelines. All residues containing fuels, oils and other contaminants will be removed off site for recovery or disposal.

Whilst it is planned to decommission and remove these facilities on completion of waste recovery activities at the site, for the purposes of closure planning adequate provision has been included in the costings and this scenario is considered to represent a worst-case scenario in the event of cessation resulting from abandonment of the activity.

On this basis it is considered that any financial provision required with respect to closure, restoration and aftercare should be based on the closure costs as detailed (Refer to Table 3.2 above).



### 3.10.3 INFLATION/DISCOUNTING

It is proposed to use the Appropriate Wholesale Price Index [Capital Goods, Building & Construction (i.e. Materials & Wages) Index], as published by the Central Statistics Office, for the year since last calculation/revision.

### 3.10.4 REVIEWING AND UPDATING COSTS

Closure and restoration/aftercare costs will be reviewed annually and any proposed amendments thereto notified to the EPA for agreement. It is proposed to adopt the following formula when updating costings:

$$\text{Revised Cost} = (\text{Existing Cost} \times \text{WPI}) + \text{CiCC}$$

where:

WPI = Appropriate Wholesale Price Index [Capital Goods, Building & Construction (i.e. Materials & Wages) Index], as published by the Central Statistics Office, for the year since last calculation/revision.

CiCC = Change in compliance costs as a result of change in site conditions, law, regulations, regulatory authority charges or other significant changes.

For inspection purposes only.  
Consent of copyright owner required for any other use.



### 3.11 FINANCIAL PROVISION

The document *Guidance on Financial Provision for Environmental Liabilities, Environmental Protection Agency (EPA) 2015* sets out broad guidance in relation to how the Environmental Protection Agency (EPA) anticipates it will approach financial provisions.

Financial provisions are, in broad terms, required to cover environmental liabilities that may occur during the operating life of a licensed facility or that may arise from or following the closure of a licensed facility.

The EPA's preference is for the use of established and low risk financial instruments, which are in line with the principles of being secure, sufficient and available when required. The type of financial instrument(s) accepted by the EPA will depend on the nature of the risk being covered.

The following forms of financial instrument are, in principle, acceptable to the EPA:

**Figure 3-2 Forms of Financial Instruments acceptable to EPA**

|                                   |   |
|-----------------------------------|---|
| <b>Secured fund</b>               | <ul style="list-style-type: none"> <li>• A secured fund with a first ranking fixed charge in favour of the EPA is suitable financial provision for all liabilities.</li> </ul>  |
| <b>On demand performance bond</b> | <ul style="list-style-type: none"> <li>• Perpetual and on-demand performance bonds are suitable financial provision for all liabilities. This is provided that the failure, on expiry, to renew or replace the bond with alternative financial provision is a clawdown event.</li> </ul>                                  |
| <b>Parent company guarantee</b>   | <ul style="list-style-type: none"> <li>• A parent company guarantee is suitable financial provision for most liabilities. It is not suitable to cover inevitable closure costs.</li> </ul>  |
| <b>Charge on property</b>         | <ul style="list-style-type: none"> <li>• A first ranking fixed charge on property in favour of the EPA is suitable financial provision for all liabilities. However, only a certain percentage of the property's value may be used towards the satisfaction of the licensee's financial provision obligations.</li> </ul> |
| <b>Insurance</b>                  | <ul style="list-style-type: none"> <li>• Environmental impairment liability insurance is suitable financial provision for potential liability from incidents arising on sites. This is provided the policy wording is acceptable to the EPA.</li> </ul>   |

It is acknowledged that as a typical condition of any waste licence that the Agency may amend the licence at any time in certain circumstances in accordance with section 42B of the Waste Management Act 1996 as amended, to require, or not require as the case may be, the putting in place of a financial provision to incorporate costings for CRAMP and/or Environmental



Liabilities Risk Assessment. This amendment may be implemented by the Agency in the event of an incident that creates a significant residual environmental liability or where the environmental risk profile changes on site.

Roadstone Ltd has estimated the closure and restoration/ aftercare requirements **(€155,628)**. Roadstone, if deemed necessary will put in place a secure fund, and/or on demand performance bond. The form and value of the financial provision being subject to agreement with the EPA.

*For inspection purposes only.  
Consent of copyright owner required for any other use.*





## 4 INCIDENTS

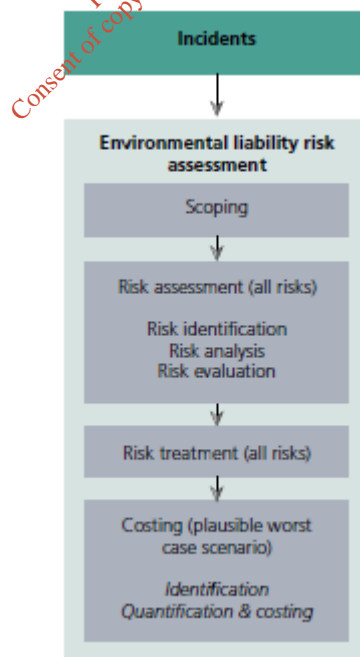
### 4.1 INTRODUCTION

Environmental liability risk assessment (ELRA) considers the risk of incidents occurring that could result in liabilities materialising, e.g. fire, fuel spillages. Proactive environmental risk management can both increase compliance and significantly reduce the potential for an incident. The result is a lower risk profile for an activity and a potentially lower cost in making financial provision. The two key objectives of the ELRA process are:

- to identify and quantify environmental liabilities focusing on unplanned, but possible and plausible events occurring during the operational phase; and
- to provide a mechanism to encourage continuous environmental improvement through the management of potential environmental risk.

The ELRA approach is a standard risk assessment that involves the assessment of the likelihood of occurrence of an event in combination with the consequences of that event. This is followed by the costing of the plausible worst-case scenario for the purposes of informing the level of financial provision (cover) necessary.

The ELRA procedure is illustrated by the following Figure 4.1.



**Figure 4-1 Environmental liability risk assessment process (Source EPA 2014a)**



## 4.2 SCOPING

The purpose of ELRA is to identify and cost risks to the environment (surface water, groundwater, atmosphere, land, flora, fauna and human health).

In this case only “soils and stone” and “river dredging spoil” is to be accepted at the facility for recovery and phased restoration of a sand and gravel pit to a contoured landform that will be in keeping with the surrounding landscape.

The main potential sources of emissions from a soil and stone waste recovery facility would be from noise or dust associated with the movement, handling and placement of materials. Possible other emissions to the atmosphere would be from machinery exhaust fumes and also possible emissions to groundwater in the event of a fuel spillage.

Clean closure is envisaged such that all plant is safely removed for reuse or recycling and all wastes are removed off site at the time of closure for appropriate recovery or disposal. Monitoring undertaken should demonstrate that there are no outstanding environmental issues.

There will be no on-going requirement for environmental monitoring of emissions after recovery operations have ceased. It is proposed that surface and ground water monitoring is continued during the aftercare programme for a period up to the final site inspection.

An aftercare scheme will be implemented with the aim of bringing the restored soils (and hence land) into a condition which does not need to be treated differently from undisturbed land in the same use.

Roadstone propose to carry out the reclamation works in accordance with the Green, Low Carbon, Agri-environment Scheme (GLAS). i.e. Consideration will be given through the land reclamation scheme to conservation of arable grass margins, conservation of solitary bees, coppicing and planting of native trees and hedgerows, establishment of species rich hay meadow.

A final site-inspection 6 months after site closure will be carried out to ensure that the final site restoration scheme implemented is functioning and progressing as required.

It is evident from the above description given the relatively short-term measures necessary to close the site satisfactorily, that there will be no environmental liabilities once closure, decommissioning and residuals management are completed.

It is considered that the site activity will require the ELRA to address liabilities from past and present activities.



## 4.3 RISK ASSESSMENT

### 4.3.1 RISK IDENTIFICATION

Key information required for the risk identification process on the site operation, performance and sensitivity has been provided in Section 3.2 & 3.3 of this report.

During the risk identification, all the processes on site were identified and the risks associated with each process were listed. The risk identification process was carried out by an experienced environmental consultant with over 25 years' experience in the extractive and inert waste management industries, consultation with the appointed hydrogeological consultants and the proposed facility manager. All potential causes of failure of the processes and the effect/impact on the environment were identified. All plausible risks identified are listed in Table 4.1.

**Table 4-1 Plausible risk identified for the activity**

| Risk ID | Process                    | Potential Risk   |
|---------|----------------------------|--|
| 1       | Fuel Storage               | Leakage of fuel during refuelling.   |
| 2       |                            | Accidental spillage of fuels and lubricants by construction plant placing the inert fill and other operational procedures. |
| 3       | Backfilling                | Leaching to groundwater from the infilled deposition areas.  |
| 4       | Waste Water Treatment      | Uncontrolled release of sewage.  |
| 5       | Waste Management Practices | Rogue load of contaminated material.   |
| 6       | Fugitive Dust Emissions    | Dust generation associated with placement of materials and/or recovery operations during prolonged periods of dry weather. |
| 7       | Noise Emissions            | Excessive noise emissions due to poor operational practice and implementation of abatement.                                |
| 8       | Traffic                    | Excessive speed can result in increases in noise, dust emissions.  |



### 4.3.2 RISK ANALYSIS

The risks above were assessed against likelihood and consequence as per Tables 4.2 and 4.3; the results are presented in Table 4.4.

**Table 4-2 Risk classification table - likelihood (EPA 2014a)**

| Rating | Likelihood |                                      |
|--------|------------|--------------------------------------|
|        | Category   | Description                          |
| 1      | Very Low   | Very low chance of hazard occurring  |
| 2      | Low        | Low chance of hazard occurring       |
| 3      | Medium     | Medium chance of hazard occurring    |
| 4      | High       | High chance of hazard occurring      |
| 5      | Very High  | Very high chance of hazard occurring |

**Table 4-3 Risk classification table - consequence (EPA 2014a)**

| Rating | Consequence |   |
|--------|-------------|---|
|        | Category    | Description   |
| 1      | Trivial     | No impact or negligible change to the environment           |
| 2      | Minor       | Minor impact/localised or nuisance                          |
| 3      | Moderate    | Moderate impact to environment                              |
| 4      | Major       | Severe impact to environment                                |
| 5      | Massive     | Massive impact to a large area, Irreversible in medium term |



**Table 4-4 Risk Analysis**

| Risk ID | Process                    | Potential Risk   | Environmental effect  | Consequence Rating | Basis of Consequence   | Likelihood Rating | Basis of Likelihood   | Risk Score (Consequence x Likelihood) |
|---------|----------------------------|--|---|--------------------|--|-------------------|---|---------------------------------------|
| 1       | Fuel Storage               | Leakage of fuel during refuelling.   | Contamination of soil and groundwater due to release of hydrocarbons.                         | 3                  | Limited storage volume. Hazardous and persistent material.   | 1                 | All refuelling of site plant will take place on a concrete hardstanding area. Surface runoff from the hard standing will be directed to a silt trap with discharge to ground via a hydrocarbon interceptor. No fuel or oil will be stored on site. A double skinned fuel bowser will be mobilised to site as required.  | 3                                     |
| 2       |                            | Accidental spillage of fuels and lubricants by construction plant placing the inert fill and other operational procedures. | Contamination of soil and groundwater due to release of hydrocarbons.                         | 3                  | Limited storage volume. Hazardous and persistent material.   | 1                 | All refuelling of site plant will take place on a concrete hardstanding area. Surface runoff from the hard standing will be directed to a silt trap with discharge to ground via a hydrocarbon interceptor. No fuel or oil will be stored on site. A double skinned fuel bowser will be mobilised to site as required. Spill kits and materials used for treating hydrocarbon spills are available onsite. These materials are stored in the facility shed/workshop. The operator has put in place an emergency response procedure for hydrocarbon spills and appropriate training of site staff in its implementation.   | 3                                     |
| 3       | Backfilling                | Leaching to groundwater from the infilled deposition areas.  | Contamination of groundwater and/or surface water.  | 2                  | Material to be delivered in individual loads and therefore any contaminated loads would be of small quantities with minor localised impacts. | 2                 | Infilling of the site with inert soil and river dredging spoil should pose a low risk to groundwater quality regardless of the vulnerability rating as no harmful contaminants will be present. In addition, inert soil and stone and river dredging spoil will not contain either organic matter or liquids that will form a source of organic contaminants of microbial pathogens, nor provide a substrate to feed microbial pathogens. Therefore, the potential impact to groundwater quality due to the deposition of inert infill material is considered to be indirect, negative, imperceptible, long term, low probability impact before appropriate mitigation measures are considered. | 4                                     |
| 4       | Waste Water Treatment      | Uncontrolled release of sewage..   | Contamination of groundwater and/or surface water.  | 2                  | Failure to empty holding tank on routine basis.  |                   | There is no discharge of wastewater at the site as the existing welfare facilities are now serviced by a holding tank which is emptied on a routine basis by a certified waste collection contractor to an approved waste facility. The installation is in compliance with the EPA (2010), COP: Wastewater Treatment and Disposal Systems Serving Single Houses (p.e. < 10). The WWT system will be subject to a maintenance contract.  | 2                                     |
| 5       | Waste Management Practices | Rogue load or contaminated material.   | Contamination of soil, groundwater and/or surface water.                                      | 3                  | Material to be delivered in individual loads and therefore any contaminated loads would be of small quantities with minor localised impacts. | 3                 | Imported material to be inert "soil and stone" and "river dredging spoil". The likelihood of occurrence is medium without adequate inspection, acceptance and quarantine procedures being put in place.   | 9                                     |
| 6       | Fugitive Dust Emissions    | Dust generation associated with placement of materials and/or recovery operations during prolonged periods of dry weather  | Uncontrolled dust emission to air with potential for localised nuisance at nearest receptors. | 2                  | Localised, intermittent nuisance for nearby sensitive receptors.   | 3                 | Medium chance of occurring particulary in the absence of mitigation measures.   | 6                                     |
| 7       | Noise Emissions            | Excessive noise emissions due to poor operational practice and implementation of abatement measures.                       | Nuisance at noise sensitive receptors.  | 2                  | Localised, intermittent nuisance for nearby noise sensitive receptors.   | 3                 | Medium chance of occurring particulary during phases when restorator works are being carried out near noise sensitive receptors. Need to ensure mitigation measures are implemented and due consideration is given to timing and duration of restoration works.   | 6                                     |
| 8       | Traffic                    | Excessive speed can result in increases in noise and dust emissions.   | Nuisance at sensitive receptors due to noise and dust associated with traffic.                | 2                  | Localised, short duration nuisance for nearby receptors.   | 2                 | Low likelihood of occurrence due to existing traffic control measures including recessed entrance, weighbridge, surfaced access road, wheelwash, speed limit signs.   | 4                                     |



### 4.3.3 RISK EVALUATION

The purpose of risk evaluation is to assist in making decisions, using the outcomes of the risk analysis, identifying and prioritising the risks for risk treatment. Each of the risks is ranked to assist in the prioritisation of treatment (Refer to Table 4.5).

**Table 4-5 Risk evaluation**

| Risk ID | Process                    | Potential Risk   | Consequence Rating | Likelihood Rating | Risk Score (Consequence x Likelihood) |
|---------|----------------------------|--|--------------------|-------------------|---------------------------------------|
| 5       | Waste Management Practices | Rogue load or contaminated material.   | 3                  | 3                 | 9                                     |
| 6       | Fugitive Dust Emissions    | Dust generation associated with placement of materials and/or recovery operations during prolonged periods of dry weather  | 2                  | 3                 | 6                                     |
| 7       | Noise Emissions            | Excessive noise emissions due to poor operational practice and implementation of abatement measures.                       | 2                  | 3                 | 6                                     |
| 3       | Backfilling                | Leaching to groundwater from the infilled deposition areas.  | 2                  | 2                 | 4                                     |
| 8       | Traffic                    | Excessive speed can result in increases in noise and dust emissions.   | 2                  | 2                 | 4                                     |
| 1       | Fuel Storage               | Leakage of fuel during refuelling  | 3                  | 1                 | 3                                     |
| 2       |                            | Accidental spillage of fuels and lubricants by construction plant placing the inert fill and other operational procedures. | 3                  | 1                 | 3                                     |
| 4       | Waste Water Treatment      | Uncontrolled release of sewage.  | 2                  | 1                 | 2                                     |

The following risk matrix has been developed to allow the risks to be easily displayed and prioritised (Refer to Table 4.6). The consequence and likelihood ratings are used in the matrix with the level of consequence forming the x-axis and the likelihood forming the y-axis. The matrix is colour coded to provide a broad indication of the critical nature of each risk. The matrix provides a visual tool for regular risk reviews since the success of mitigation can be easily identified.



**Garryhesta SRF**

The risk matrix indicates that there are no risks in the red zone requiring priority treatment. There is one risk in the amber zone requiring treatment through mitigation or management action. All other risks are located in the green zone, indicating the need for continuing awareness and monitoring on a regular basis. However, assessment of the green zone risks has indicated that a number of these risks can be reduced through the implementation of mitigation measures. These risk treatment measures will be adopted where considered cost-effective to further reduce the risks.

**Table 4-6 Risk matrix**

|            |         |   |             |       |          |       |         |
|------------|---------|---|-------------|-------|----------|-------|---------|
| Likelihood | V. High | 5 |             |       |          |       |         |
|            | High    | 4 |             |       |          |       |         |
|            | Medium  | 3 |             | 6,7   | 5        |       |         |
|            | Low     | 2 |             | 3,8   |          |       |         |
|            | V. Low  | 1 |             | 4     | 1,2      |       |         |
|            |         |   | 1           | 2     | 3        | 4     | 5       |
|            |         |   | Trivial     | Minor | Moderate | Major | Massive |
|            |         |   | Consequence |       |          |       |         |

For inspection purposes only. Consent of copyright owner required for any other use.



#### 4.4 RISK TREATMENT

The output of the risk treatment process is the development of a statement of measures to be taken to minimise the environmental risk of the activity. The statement of measures is presented in Table 4.7, where a set of appropriate and achievable mitigation measures are assigned to each risk, with a risk owner responsible for the ongoing management of the risk and a timeframe for implementation of the risk mitigation measure.

Monitoring and review of the risk assessment process will be carried out to verify continuous improvement in the risk profile of the operation. This ongoing review will also facilitate the inclusion of new risks and the updating of existing risks based on implemented risk treatment.

At a minimum the ELRA process will be conducted in line with the licence requirements, but reviews will be carried out on a more regular basis in the event of major infrastructural changes on site or in light of incident investigation. All aspects of the ELRA management process will be recorded and traceable to ensure transparency in the decision-making process. Updates to the ELRA process will be communicated to the Agency via the facility AER.

For inspection purposes only  
Consent of copyright owner required for any other use.





Table 4-7 Statement of Measures

| Risk ID | Process                    | Potential Risk   | Risk Score | Mitigation Measures to be taken  | Outcome   | Action  | Date of Completion | Owner/ Contact Person |
|---------|----------------------------|--|------------|--|---|---|--------------------|-----------------------|
| 5       | Waste Management Practices | Rogue load or contaminated material.   | 9          | Put in place delivery, inspection & acceptance procedures. Designate quarantine area with drainage to Hydrocarbon Interceptor. Implement environmental monitoring programme.   | Reduced potential for importation of contaminated material; early detection on environmental pollution.   | Prepare SOP and ensure staff are trained.   | On Commencement    | Facility Manager      |
| 6       | Fugitive Dust Emissions    | Dust generation associated with placement of materials and/or recovery operations during prolonged periods of dry weather  | 6          | <ul style="list-style-type: none"> <li>In accordance with condition No. 14 of Planning Permission (QR19 06/11798 &amp; PL04.225332) a fixed water spray system has been installed to include the access road and internal roads.</li> <li>During dry weather the haul roads and tipping area will be sprayed with water to dampen any likely dust blows.</li> <li>A mobile water browser is provided in periods of dry or windy weather to cover locations where it is impractical or inappropriate to use a fixed water spray system.</li> <li>Consideration will be given to location of mobile plant so as to ensure that any principle dust sources cannot adversely affect sensitive off-site locations.</li> <li>A wheel wash facility will be installed on site and all vehicles required to pass through the wheel wash on exiting the site.</li> <li>Main site haulage routes within the site shall be maintained with a good temporary surface, as is the case at present.</li> <li>All internal roadways will be adequately drained, to prevent ponding.</li> <li>A road sweeper is available for use on site and adjacent sections of the N22 at least on a weekly basis and/or if a spillage occurs onto the public roadway.</li> </ul> | These measures are considered sufficient to ensure that dust emissions will remain below recognised thresholds for this type of development.  | Periodic review of dust mitigation measures                                       | On Commencement    | Facility Manager      |
| 7       | Noise Emissions            | Excessive noise emissions due to poor operational practice and implementation of abatement measures.                       | 6          | <ul style="list-style-type: none"> <li>The site benefits from an established mature planted screening berm along the site boundary with the N22 Primary Route.</li> <li>The provision of temporary screen banks to screen site activities from outside views as necessary.</li> <li>The existing designated internal haul roads will be utilised to manage traffic entering and leaving the site to ensure that site traffic is removed from nearest noise sensitive receptors.</li> <li>Internal haul road gradients will be kept as low as possible to reduce engine / brake noise from heavy vehicles.</li> <li>All machinery used will be CE certified for compliance with EU noise control limits.</li> <li>Regular maintenance of all plant and machinery is an integral part of site management and is important in helping to minimise noise impact.</li> <li>All plant and machinery is switched off when not in use.</li> <li>A noise management programme will be defined as part of the EMS.</li> </ul>  | These measures are considered sufficient to ensure that noise emissions will remain below recognised thresholds for this type of development.   | Periodic review of Noise mitigation measures                                      | On Commencement    | Facility Manager      |
| 3       | Backfilling                | Leaching to groundwater from the infilled deposition areas.  | 4          | <p>Put in place delivery, inspection &amp; acceptance procedures. Implement environmental monitoring programme. It is proposed that on-going groundwater monitoring is conducted. In terms of mitigation for groundwater quality protection it is proposed that filling will only be undertaken when the groundwater level is at or below the base of the pit (i.e. infilling will not be completed during very wet periods when the pit floor becomes submerged in groundwater). Mitigation measures relating to hydrocarbon/chemical spills and leaks are dealt with further below.</p>  | Infilling of the site with inert soil and river dredging spoil should pose a low risk to groundwater quality regardless of the vulnerability rating as no harmful contaminants will be present. In addition, inert soil and stone and river dredging spoil will not contain either organic matter or liquids that will form a source of organic contaminants of microbial pathogens, nor provide a substrate to feed microbial pathogens. Therefore, the potential impact to groundwater quality due to the deposition of inert infill material is considered to be indirect, negative, imperceptible, long term, low probability impact before appropriate mitigation measures are considered. | Prepare SOP and ensure staff are trained.   | On Commencement    | Facility Manager      |
| 8       | Traffic                    | Excessive speed can result in increases in noise and dust emissions.   | 4          | <p>Car parking including visitor parking will be provided at the site office.</p> <p>Trucks entering the site report to the site office where each load will be inspected as to its suitability to be recovered on site.</p> <p>The site entrance has also been designed to ensure that queuing for vehicles entering the site is accommodated within the curtilage of the site entrance.</p> <p>A wheel washing facility is to be provided for all outgoing vehicles.</p> <p>In the unlikely event that a spillage occurs, the applicant will ensure that spilled material is removed from the road surface in a safe and timely manner, as soon as they become aware of it, or are notified that a spillage has arisen.</p> <p>A weighbridge will be provided.</p> <p>Traffic direction signs, warning signs, speed limit signs are established throughout the site.</p>   | Reduced potential for air and noise emissions.  | Periodic review of traffic control measures. Complaints/ Incidents procedure.     | On Commencement    | Facility Manager      |
| 1       | Fuel Storage               | Leakage of fuel during refuelling  | 3          | No fuel or oil will be stored on site. A double skinned fuel browser will be mobilised to site as required. A hardstand with drainage to oil interceptor will also be provided as a designated refuelling area. Spill kits are also maintained on site and the Company will put in place an emergency response procedure for hydrocarbon spills, and appropriate training of site staff in its implementation.   | Reduced potential for spillage during refuelling operations.  | Provide spill trays and spill kits. Train staff on emergency response procedures. | On Commencement    | Facility Manager      |
| 2       |                            | Accidental spillage of fuels and lubricants by construction plant placing the inert fill and other operational procedures. | 3          | Hard standing with drainage to Hydrocarbon Interceptor. Spill kits will be maintained on site and the Company will put in place an emergency response procedure for hydrocarbon spills and appropriate training of site staff in its implementation. Regular maintenance of plant and machinery. Waste oils will be disposed of by a licensed waste contractor and removed off site. There will be no major servicing of plant and machinery carried out on site apart from routine maintenance and running repairs. Plant and machinery used on site will be parked on the hard-standing area outside of normal operating hours.  | Reduced potential for contamination of soils and groundwater.   | Provide spill trays and spill kits. Train staff on Emergency response procedures  | On Commencement    | Facility Manager      |
| 4       | Waste Water Treatment      | Uncontrolled release of sewage.  | 2          | There is no discharge of wastewater at the site as the existing welfare facilities are now serviced by a holding tank which is emptied on a routine basis by a certified waste collection contractor to an approved waste facility. The installation is in compliance with the EPA (2010), COP: Wastewater Treatment and Disposal Systems Serving Single Houses (p.e. <10). The WWT system will be subject to a maintenance contract.  | Reduce potential for contamination of groundwater.  | Review maintenance contract periodically  | On Commencement    | Facility Manager      |



## 4.5 COSTING

This section details the approach for calculating the level of financial provision (cover) required in relation to the risks identified by the ELRA process. The methodology for costing the level of financial provision necessary is based on costing the plausible worst-case scenario.

### 4.5.1 IDENTIFICATION OF THE PLAUSIBLE WORST-CASE SCENARIO

The plausible worst-case scenario refers to the plausible event that poses the maximum environmental liability, i.e. consequence, during the period to be covered by the financial provision.

The plausible worst-case scenario may be represented by the risk with the highest consequence rating. In that case, this risk should be the basis for financial provision and should be quantified and costed as detailed below.

The ELRA has not identified any risks resulting in a major consequence. The risk matrix (Refer to Table 4.6 above) indicates that there are no risks in the red zone requiring priority treatment. There is one risk (Risk ID 6) in the amber zone requiring treatment through mitigation or management action. All other risks are located in the green zone, indicating the need for continuing awareness and monitoring on a regular basis. However, assessment of the green zone risks has indicated that a number of these risks can be reduced through the implementation of mitigation measures.

As such the plausible worst-case scenario is taken to be the risk associated with the importation of a rogue load of contaminated material.

### 4.5.2 QUANTIFICATION AND COSTING

The plausible worst-case scenario (Risk ID 6) has been quantified and costed in Table 4.8.

The plausible worst-case scenario is predicted to involve:

- Importation of rogue loads (typically 20 tonne loads)
- For the purpose of a worst-case scenario we will assume that due to unforeseen circumstances there has been a breakdown in delivery, inspection and acceptance procedures for a working day resulting in up to 10 loads of non-hazardous material (suitable for disposal to Inert landfill) being placed in the backfill area.
- In addition to removal and/or quarantine pending removal of this material the following remedial measures have also been considered.



- Site visit/site investigation by Environmental Consultant to ensure that all contaminated materials have been removed.
- Testing of material.

**Table 4-8 Quantification and costing of plausible worst-case scenario**

| Task  | Description  | Quantity (No) | Measurement Unit | Unit Rate    | Cost  | Source (see notes) |
|---|--|---------------|------------------|--------------|-------|--------------------|
| Response to Risk ID 5: Importation of Rogue Loads | <b>Site Investigation</b>  |               |                  |              |       |                    |
|   | Environmental Consultant (including Reporting)   | 3             | day              | 750          | 2250  | 1                  |
|   | Trial Pits   | 4             | unit             | 90           | 360   | 2                  |
|   | <b>Remediation</b>   |               |                  |              |       |                    |
|   | Excavation of Soils  | 100           | m <sup>3</sup>   | 1.5          | 150   | 2                  |
|   | <b>Waste Disposal / Recovery</b>   |               |                  |              |       |                    |
|   | Disposal of non-hazardous soil (Gate Fee)  | 200           | tonne            | 20           | 4000  | 2                  |
|   | Transport of Solid non-hazardous (20 tonne loads, tonne assuming 100 km each-way trip)   | 200           | tonne            | 15           | 3000  | 2                  |
|   | <b>Waste sampling and analysis</b>   |               |                  |              |       |                    |
|   | Waste sampling and analysis (WAC suite as per tables 2.1.2 and 2.1.2.2 of Council Decision 2003/33/EC). Costs could be much higher if additional analysis is required. | 4             | sample           | 400          | 1600  | 2                  |
|   | Subtotal   |               |                  |              | 11360 |                    |
|   | Contingency (10)   |               |                  |              | 1136  |                    |
| <b>Total</b>                                      |  |               |                  | <b>12496</b> |       |                    |

Notes:

1. Cost provided by JSPE Ltd Planning & Environmental Consultants

2. Costs based on EPA Guidance on assessing and costing environmental liabilities - Unit cost rates for verification (EPA 2014)

Whilst due consideration has been given to the quantification and costing of the above plausible worst-case scenario; the operator proposes to put in place comprehensive delivery, inspection and acceptance procedures and management systems to ensure that such an eventuality will not arise.

#### 4.6 OUTCOMES AND NEXT STEPS

Implementation of the results of the ELRA will be reported to the EPA annually through a statement of measures included with the facility AER. The ELRA will be reviewed as necessary to reflect any significant changes on site, and in any case every three years.

The financial provision has been based on the plausible worst-case scenario as detailed above. This is the maximum liability that may be incurred and as such, financial provision is calculated as **€12,496** based on this event.

Environmental Impairment Liability (EIL) Insurance is, in principle, an acceptable financial instrument for potential liabilities from incidents. EIL Insurance must cover "the full costs of responding and remedial measures if an incident occurs at a licenced facility". (EPA 2016).



Roadstone Ltd has in place adequate Pollution Liability insurance with respect to the Garryhesta Facility.

Any cover for the licenced facility/activity (to the amount determined by ELRA) will be ring-fenced from the cover for the other elements of the business (e.g. other sites or off-site transport activities). The cover for environmental response and remedial measures (to the amount determined by ELRA) will be ring-fenced from the cover for other liabilities (while still extending to clean-up of the Licensee's property and third party property).

*For inspection purposes only.  
Consent of copyright owner required for any other use.*



## 5 REFERENCES

1. Guidance on assessing and costing environmental liabilities, Environmental Protection Agency (EPA) 2014a
2. Guidance on assessing and costing environmental liabilities - Unit cost rates for verification, Environmental Protection Agency (EPA) 2014b
3. Guidance on assessing and costing environmental liabilities - Frequently asked questions, Environmental Protection Agency (EPA) 2014c
4. Guidance on Financial Provision for Environmental Liabilities, Environmental Protection Agency (EPA) 2015
5. Guidance on financial provision for environmental liabilities - Additional guidance on environmental impairment liability insurance, Environmental Protection Agency (EPA) 2016

*For inspection purposes only.  
Consent of copyright owner required for any other use.*

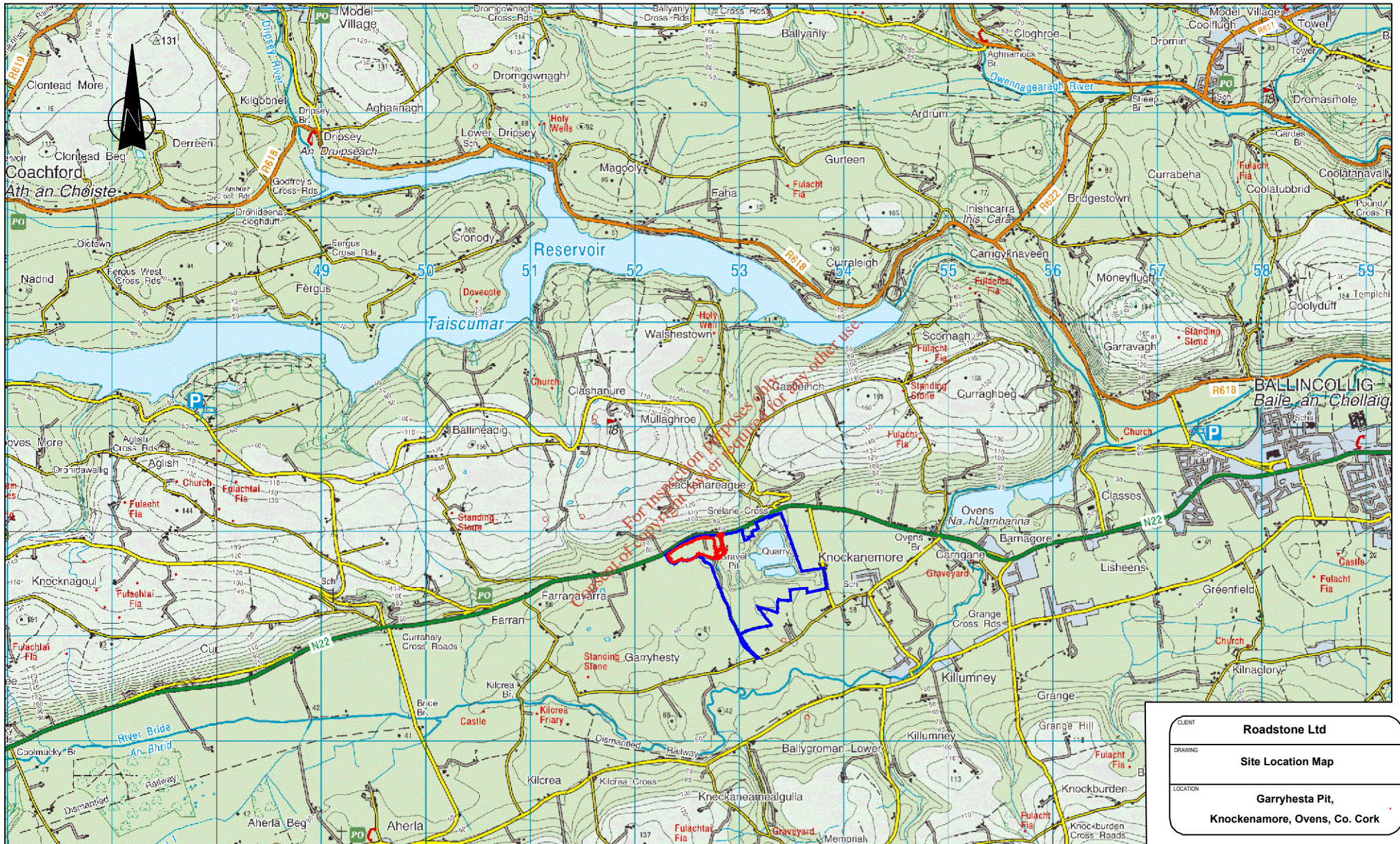


## Drawings

| Ref. | Details                                  | Size | Scale    |
|------|--|------|----------|
| 1.1  | Site Location Map                        | A4   | 1:50,000 |
| 1.2  | Application Area Map                     | A3   | 1:5,000  |
| D01  | Site Plan - Existing Survey              | A3   | 1:2,500  |
| D02  | Site Layout/Reclamation Scheme - Phase 1 | A3   | 1:2,500  |
| D03  | Site Layout/Reclamation Scheme - Phase 2 | A3   | 1:2,500  |
| D04  | Final Reclamation Scheme - Phase 3       | A3   | 1:2,500  |
| D05  | Cross Sections (A to H)                  | A3   | 1:2,500  |

For inspection purposes only  
Consent of copyright owner required for any other use.





Ordnance Survey Ireland Licence No. AR 0071917 © Ordnance Survey Ireland and Government of Ireland

**Legend**

- Proposed Soil Recovery Facility (SRF) Application Area (c. 7 ha)
- Landholding (77.2 ha)

**NOTES:**

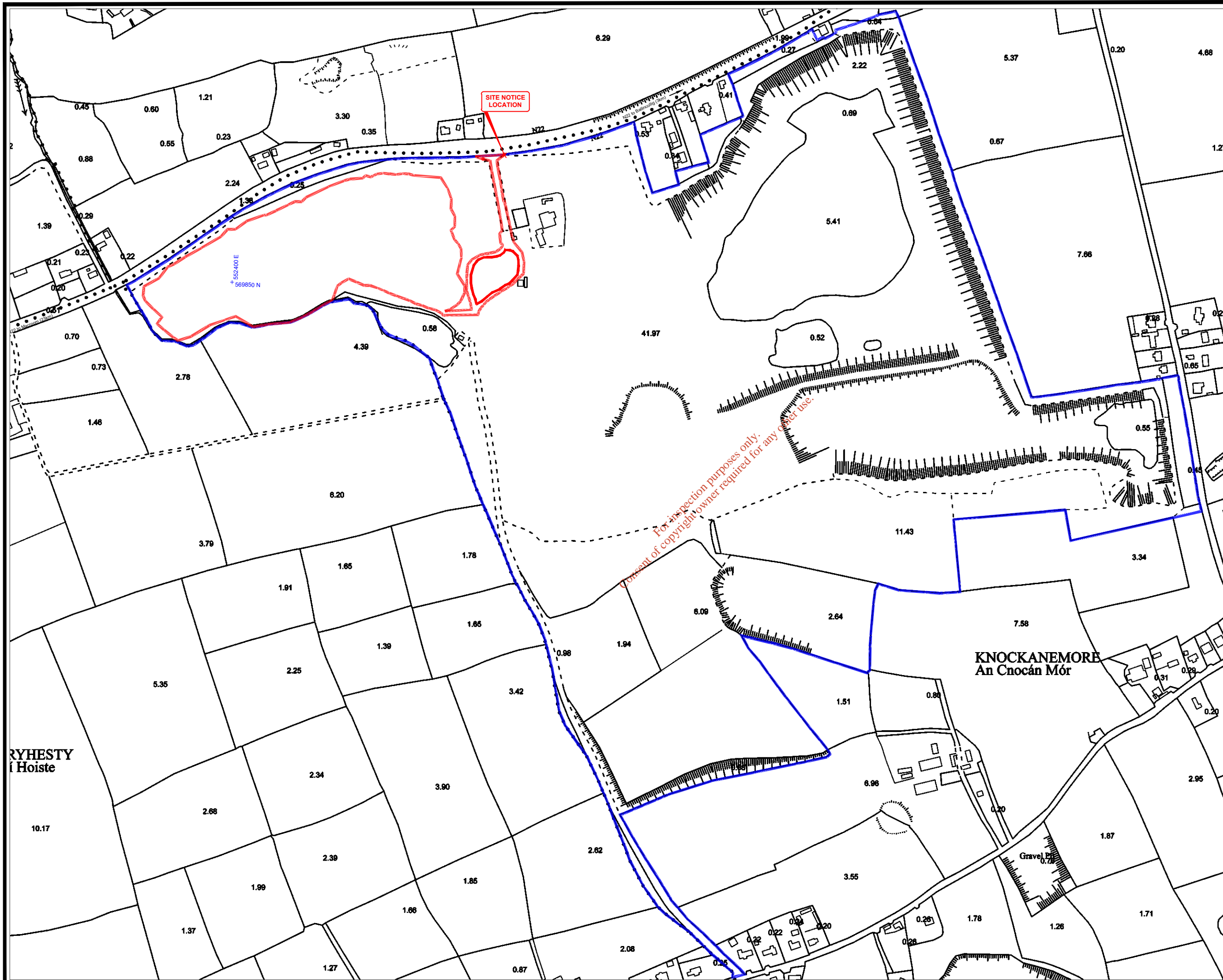
1. All Dimensions in metres (m)
2. Elevation Levels - metres Above Ordnance Datum (mAOD)
3. Extract from 1:50,000 OSI Discovery Series Map No. 80, 86 & 87

31 Athlumney Castle,  
Navan, Co Meath  
Phone: 046 9073997  
Email: johnsheils@jspe.ie  
Web: jspe.ie

J SHEILS PLANNING & ENVIRONMENTAL LTD

|          |   |
|----------|---|
| CLIENT   | <b>Roadstone Ltd</b>                                    |
| DRAWING  | <b>Site Location Map</b>                                |
| LOCATION | <b>Garryhesta Pit,<br/>Knocknamore, Ovens, Co. Cork</b> |

|            |                    |            |                  |
|------------|--------------------|------------|------------------|
| Drawn by   | <b>John Sheils</b> | Scale      | <b>1: 50,000</b> |
| Checked by | <b>John Sheils</b> | Job No.    | <b>JSPE 255</b>  |
| Date       | <b>14/08/17</b>    | Figure No. | <b>1.1</b>       |
|            |                    | Rev.       | <b>0</b>         |



Legend

- ▬ Proposed Soil Recovery Facility (SRF) Application Area (c. 7 ha)
  - ▬ Landholding (77.2 ha)
  - +
- Irish Transverse Mercator (ITM) geographic coordinates

Scale 1:5,000



Ordnance Survey Ireland Licence No. AR 0071917  
© Ordnance Survey Ireland and Government of Ireland

Map Series:  
1:5000  
6424 REVISION DATE = 27-Mar-2015  
SURVEY DATE = 31-Jul-2000  
6379 REVISION DATE = 27-Mar-2015  
SURVEY DATE = 31-Jul-2000  
Projection:  
ITM

- NOTES:
- All Dimensions in metres (m)
  - Elevation Levels - metres Above Ordnance Datum (mAOD)
  - For Planning Purposes Only. Do not scale for setting out.



**JSPE**  
31 Athlumney Castle,  
Navan, Co Meath  
Phone: 046 9073997  
Email: johnsheils@jspe.ie  
Web: jspe.ie

**J SHEILS PLANNING & ENVIRONMENTAL LTD**

|          |  |
|----------|--|
| CLIENT   | <b>Roadstone Ltd</b>                                     |
| DRAWING  | <b>Application Area Map</b>                              |
| LOCATION | <b>Garryhesta Pit,<br/>Knockenamore, Ovens, Co. Cork</b> |

|            |                    |            |                 |
|------------|--------------------|------------|-----------------|
| Drawn by   | <b>John Sheils</b> | Scale      | <b>1: 5,000</b> |
| Checked by | <b>John Sheils</b> | Job No.    | <b>JSPE 255</b> |
| Date       | <b>14/08/17</b>    | Figure No. | <b>1.2</b>      |
|            |                    | Rev.       | <b>0</b>        |





For inspection purposes only  
Consent of copyright owner required for any use

Ordnance Survey Ireland Licence No. AR 0071918 © Ordnance Survey Ireland and Government of Ireland

**Legend**

- |                              |   |  |
|------------------------------|---|--|
| Applicants Ownership         | Pit Area to be restored using imported inert Soil & Stones. | Residential Property (within 250m)                     |
| Application Area (c. 7.9 ha) | Concrete Surface  | Buildings/Structures                                   |
| Pit Area                     | Track   | Contours (mAOD)  |
| Scrubland                    | Quarry Stockpiles   | Spot Levels (mAOD)                                     |
| Agricultural Land            | Ponds   | Irish Transverse Mercator (ITM) geographic coordinates |
| Rough Pasture                | Recolonisation of Shallow Ponds                             |  |
| Restored Silt Beds           |   |  |
|                              | D1 Dust Monitoring Points                                   | N1 Noise Monitoring Points                             |
|                              | N4 Noise Monitoring Points                                  | MW1 Groundwater Monitoring Points                      |
|                              | MW2 Groundwater Monitoring Points                           | SW1 Surface Water Monitoring Points                    |
|                              | Cross Sections (Refer to Drawing D05)                       | Distance of Structures from Boundaries of Site         |
|                              | Hedgerow  | Gate   |
|                              | Fence   |  |
|                              | Water Level (mAOD) on 27/01/2017                            |  |

**Map Series:**  
1:5000  
6424 REVISION DATE = 27-Mar-2015  
SURVEY DATE = 31-Jul-2000  
6379 REVISION DATE = 27-Mar-2015  
SURVEY DATE = 31-Jul-2000  
**Projection:**  
ITM

**Scale 1:2,500**

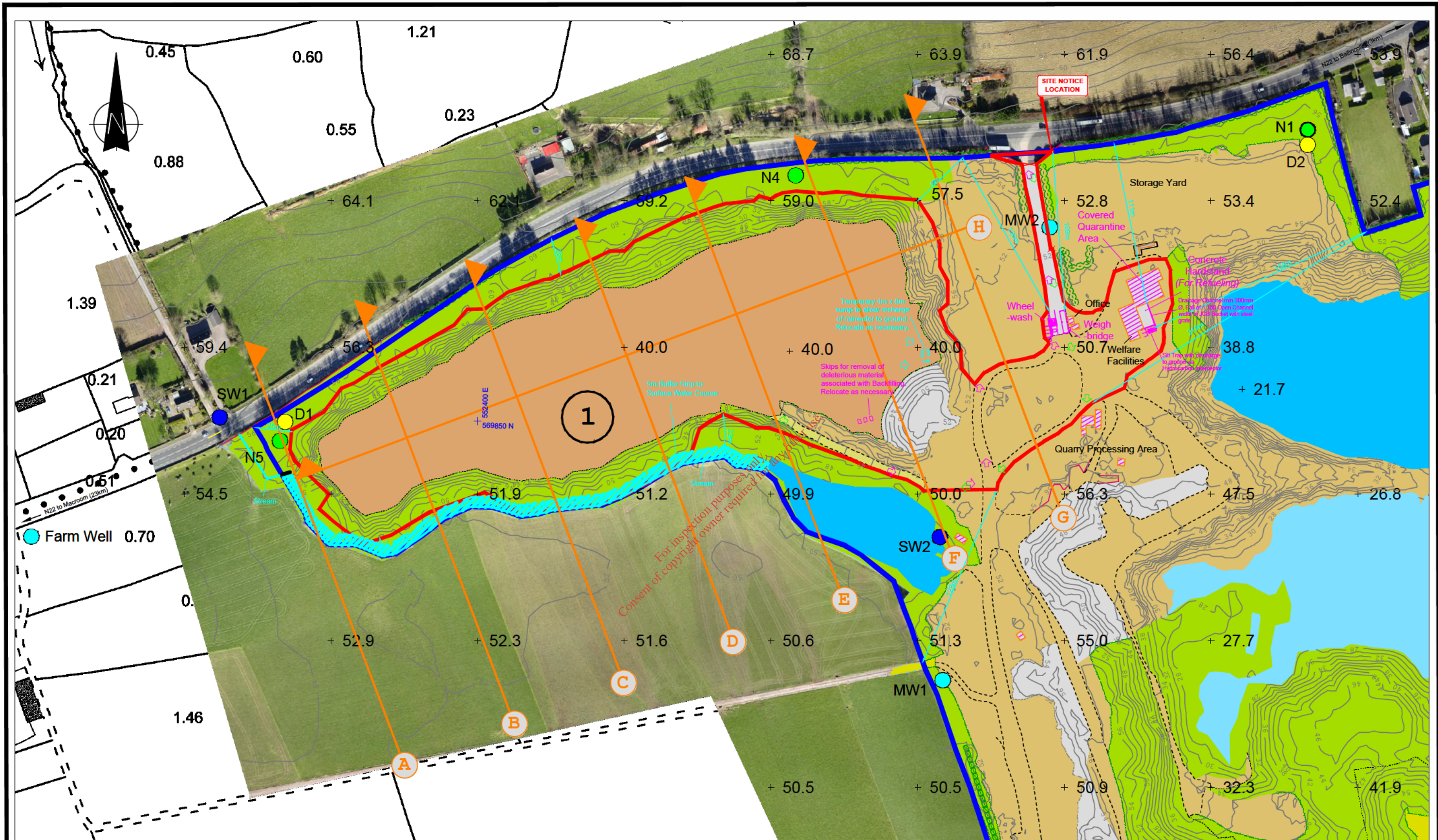
- NOTES:**
- All Dimensions in metres (m)
  - Elevation Levels - metres Above Ordnance Datum (mAOD)
  - For Planning Purposes Only. Do not scale for setting out.
  - Survey derived from point-cloud survey (03/2016)

**JSPE**  
31 Athlumney Castle,  
Navan, Co Meath  
Phone: 045 3073957  
Email: johnsheils@jspe.ie  
Web: jspe.ie

**J SHEILS PLANNING & ENVIRONMENTAL LTD**

|          |  |
|----------|--|
| CLIENT   | <b>Roadstone Ltd</b>                                     |
| DRAWING  | <b>Site Plan - Existing Survey</b>                       |
| LOCATION | <b>Garryhesta Pit,<br/>Knockenamore, Ovens, Co. Cork</b> |

|            |             |            |          |
|------------|-------------|------------|----------|
| Drawn by   | John Sheils | Scale      | 1 2,500  |
| Checked by | John Sheils | Job No.    | JSPE 255 |
| Date       | 01/11/18    | Figure No. | D01      |
|            |             | Rev.       | 0        |



Ordnance Survey Ireland Licence No. AR 0071918 © Ordnance Survey Ireland and Government of Ireland

**Legend**

- |                              |   |  |  |
|------------------------------|---|--|--|
| Applicants Ownership         | 5m Buffer Strip to Surface Water Course                         | Direct Surface Water Runoff to Temporary Sump          | D1 Dust Monitoring Points                      |
| Application Area (c. 7.9 ha) | Phase 1 restored using imported inert Soil & Stones to 40m AOD. | Residential Property (within 250m)                     | N1 Noise Monitoring Points                     |
| Pit Area                     | Concrete Surface  | Buildings/Structures                                   | MW1 Groundwater Monitoring Points              |
| Scrubland                    | Track   | Backfill Phasing                                       | SW1 Surface Water Monitoring Points            |
| Agricultural Land            | Quarry Stockpiles   | Contours (mAOD)  | Cross Sections (Refer to Figure 3.4)           |
| Rough Pasture                | Ponds   | Spot Levels (mAOD)                                     | Distance of Structures from Boundaries of Site |
| Restored Silt Beds           | Recolonisation of Shallow Ponds                                 | Irish Transverse Mercator (ITM) geographic coordinates | Water Level (mAOD) on 27/01/2017               |
|                              |   | Traffic In   |  |
|                              |   | Traffic Out  |  |
|                              |   | Hedgerow   |  |
|                              |   | Fence  |  |
|                              |   | Gate   |  |

**Map Series:**

1:5000  
 6424 REVISION DATE = 27-Mar-2015 SURVEY DATE = 31-Jul-2000  
 6379 REVISION DATE = 27-Mar-2015 SURVEY DATE = 31-Jul-2000

**Projection:**

ITM

Scale 1:2,500



**NOTES:**

- All Dimensions in metres (m)
- Elevation Levels - metres Above Ordnance Datum (mAOD)
- For Planning Purposes Only. Do not scale for setting out.
- Survey derived from point-cloud survey (03/2016)
- Waste Management Infrastructure to be provided shown in purple

**JSPE**  
 31 Athlumney Castle, Navan, Co Meath  
 Phone: 046 3073397  
 Email: johnsheils@jspe.ie  
 Web: jspe.ie

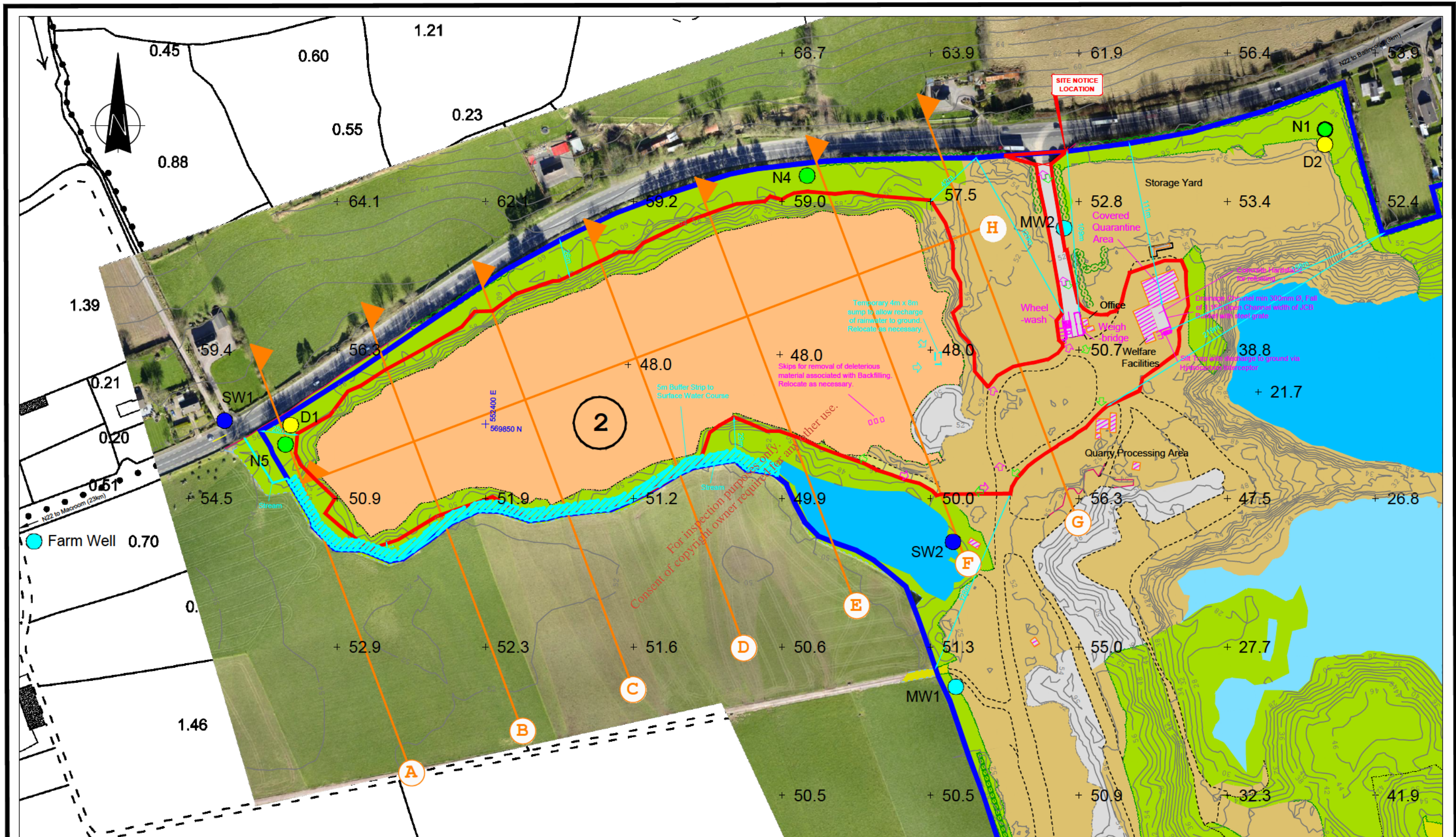
**J SHEILS PLANNING & ENVIRONMENTAL LTD**

**Client: Roadstone Ltd**

**Drawings: Site Layout/Reclamation Scheme Phase 1**

**Location: Garryhesta Pit, Knockenamore, Ovens, Co. Cork**

|                                  |                            |
|----------------------------------|----------------------------|
| Drawn by<br><b>John Sheils</b>   | Scale<br><b>1 2,500</b>    |
| Checked by<br><b>John Sheils</b> | Job No.<br><b>JSPE 255</b> |
| Date<br><b>01/11/18</b>          | Figure No.<br><b>D02</b>   |
|                                  | Rev.<br><b>0</b>           |



Ordnance Survey Ireland Licence No. AR 0071918 © Ordnance Survey Ireland and Government of Ireland

**Legend**

|                             |   |  |
|-----------------------------|---|--|
| Applicants Ownership        | 5m Buffer Strip to Surface Water Course                         | Direct Surface Water Runoff to Temporary Sump          |
| Application Area (c. 7.0ha) | Phase 2 restored using imported inert Soil & Stones to 48m AOD. | Residential Property (within 250m)                     |
| Pit Area                    | Concrete Surface  | Buildings/Structures                                   |
| Scrubland                   | Track   | Backfill Phasing                                       |
| Agricultural Land           | Quarry Stockpiles   | Contours (mAOD)  |
| Rough Pasture               | Ponds   | Spot Levels (mAOD)                                     |
| Restored Silt Beds          | Recolonisation of Shallow Ponds                                 | Irish Transverse Mercator (ITM) geographic coordinates |
|                             | Traffic In  | Dust Monitoring Points                                 |
|                             | Traffic Out   | Noise Monitoring Points                                |
|                             | Hedgerow  | Groundwater Monitoring Points                          |
|                             | Fence   | Surface Water Monitoring Points                        |
|                             | Gate  | MW1  |
|                             |   | SW1  |
|                             |   | Cross Sections (Refer to Figure 3.4)                   |
|                             |   | Distance of Structures from Boundaries of Site         |
|                             |   | 11m  |
|                             |   | + 21.7 Water Level (mAOD) on 27/01/2017                |

**Map Series:**  
 1:5000  
 6424 REVISION DATE = 27-Mar-2015 SURVEY DATE = 31-Jul-2000  
 6379 REVISION DATE = 27-Mar-2015 SURVEY DATE = 31-Jul-2000  
 Projection: ITM  
 Scale 1:2,500

**NOTES:**

- All Dimensions in metres (m)
- Elevation Levels - metres Above Ordnance Datum (mAOD)
- For Planning Purposes Only. Do not scale for setting out.
- Survey derived from point-cloud survey (03/2016)
- Waste Management Infrastructure to be provided shown in purple

**J SPE**  
 31 Athlumney Castle, Navan, Co Meath  
 Phone: 046 9073397  
 Email: johnsheils@jspe.ie  
 Web: jspe.ie

**J SHEILS PLANNING & ENVIRONMENTAL LTD**

**CLIENT**  
**Roadstone Ltd**

**DRAWING**  
**Site Layout/Reclamation Scheme Phase 2**

**LOCAT ON**  
**Garryhesta Pit, Knockenamore, Ovens, Co. Cork**

|                                  |                             |
|----------------------------------|-----------------------------|
| Drawn by<br><b>John Sheils</b>   | Scale<br><b>1 2,500</b>     |
| Checked by<br><b>John Sheils</b> | Job No.<br><b>JSP E 255</b> |
| Date<br><b>01/11/18</b>          | Figure No.<br><b>D03</b>    |
|                                  | Rev.<br><b>0</b>            |



For inspection purposes only  
Consent of copyright owner required for any other use

Ordnance Survey Ireland Licence No. AR 0071918 © Ordnance Survey Ireland and Government of Ireland

| Legend |   |
|--------|---|
|        | Applicants Ownership  |
|        | Application Area (c. 7.9 ha)  |
|        | Pit Area  |
|        | Scrubland   |
|        | Agricultural Land   |
|        | Rough Pasture   |
|        | Restored Silt Beds  |
|        | Creation and/or retention of 10-metre-long x 1 to 2 m high South-facing banks along the boundary with the N22 road and the establishment of native plant species in hedges and field margins. |
|        | Final Profile of lands to be restored using imported inert Soil & Stones.   |
|        | Concrete Surface  |
|        | Track   |
|        | Quarry Stockpiles   |
|        | 5m Buffer Strip to Surface Water Course   |
|        | Recolonisation of Shallow Ponds   |
|        | Residential Property (within 250m)  |
|        | Buildings/Structures  |
|        | 5m Buffer Strip to Surface Water Course   |
|        | Contours (mAOD)   |
|        | Spot Levels (mAOD)  |
|        | Irish Transverse Mercator (ITM) geographic coordinates  |
|        | Traffic In  |
|        | Traffic Out   |
|        | Groundwater Monitoring Points   |
|        | Surface Water Monitoring Points   |
|        | Cross Sections (Refer to Figure 3.4)  |
|        | Distance of Structures from Boundaries of Site  |
|        | D1 Dust Monitoring Points   |
|        | N1 Noise Monitoring Points  |
|        | MW1 Groundwater Monitoring Points   |
|        | SW1 Surface Water Monitoring Points   |
|        | Cross Sections (Refer to Figure 3.4)  |
|        | Distance of Structures from Boundaries of Site  |
|        | + 21.7 Water Level (mAOD) on 27/01/2017   |

Map Series:  
1:5000  
6424 REVISION DATE 27 Mar 2015 SURVEY DATE 31 Jul 2000  
6379 REVISION DATE 27 Mar 2015 SURVEY DATE 31 Jul 2000  
Projection:  
ITM  
**Scale 1:2,500**

**NOTES:**

- All Dimensions in metres (m)
- Elevation Levels metres Above Ordnance Datum (mAOD)
- For Planning Purposes Only. Do not scale for setting out.
- Survey derived from point cloud survey (03/2016)
- Waste Management Infrastructure to be provided shown in purple

31 Ailthunney Castle,  
Navan, Co Meath  
Phone: 046 9073997  
Email: johnsheils@jspe.ie  
Web: jspe.ie

**J SHEILS PLANNING & ENVIRONMENTAL LTD**

|          |  |  |
|----------|--|--|
| CLIENT   | <b>Roadstone Ltd</b>                                 |  |
| DRAWING  | <b>Final Reclamation Scheme (Phase 3)</b>            |  |
| LOCATION | <b>Garryhesta Pit, Knockenamore, Ovens, Co. Cork</b> |  |

|            |             |            |          |
|------------|-------------|------------|----------|
| Drawn by   | John Sheils | Scale      | 1 2,500  |
| Checked by | John Sheils | JOB No.    | JSPE 255 |
| Date       | 01/11/18    | Figure No. | D04      |
|            |             | Rev.       | 0        |

