

For the Attention of
Environmental Protection Agency
Administration
Environmental Licensing Programme
Office of Climate, Licensing & Resource Use
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Co. Wexford

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Date: 9th May 2014

Dear EPA,

**Re: Murphy Environmental Hollywood Ltd. (MEHL), EPA Ref. W0129-03
Additional Unsolicited Information re. CRAMP, ELRA and Financial Provision**

In relation to the above Waste Licence Application, MEHL seeks to submit additional unsolicited information in relation to Closure Restoration and Aftercare Management Plan (CRAMP), Environmental Liabilities Risk Assessment (ELRA) and Financial Provision (FP).

Related information was submitted to the Agency on 21st May 2013 (Our ref. W0129-03/AI_Art16_210513a). The report enclosed is written with reference to new EPA guidance (2014) on assessing and costing environmental liabilities. The enclosed report acts to supersede and replace information submitted on 21st May 2013.

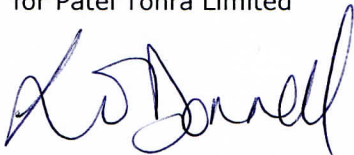
The assessment confirms that there is no FP liability at the pre-licensing stage. The Agency is invited to condition the requirement for FP to be in place to the satisfaction of the Agency, on a phased basis, in advance of commencement of each phase.

MEHL wishes to note that the company has invested heavily in the project to date, to include significant costs relating to initial site suitability assessment, consultancy fees, numerous site investigations, expert studies, application fees to An Bord Pleanála and the EPA, research, oral hearing, preparation of additional information for the licensing process. The success of the licence application W0129-03 is central to the company's business plan to sustain the operation of the facility and future jobs and economic activity. In the event of a positive decision on licence application W0129-03, MEHL will further develop its business plan to secure the necessary investment to develop the project. At all times, FP will be considered as a core component of the project development budget.

The information contained herein is deemed not to impinge on the non-technical summary of the Waste Licence Application or EIS; no revisions to drawings arise from the information contained herein. The content of the electronic files on the accompanying CD-ROM is a true copy of the original.

Please do not hesitate to contact us, should you require any further information or clarification.

Yours Sincerely
for Patel Tonra Limited



Louise O'Donnell
Director
Patel Tonra Ltd.

MEHL

**ELRA, CRAMP and Financial Provision
Assessment for Proposed Integrated Waste
Management Facility (W0129-03)**


May 2014


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Client Name:	MEHL
Client Address:	Hollywood Great, Nag's Head, Naul, Co. Dublin
Report Title:	ELRA, CRAMP and Financial Provision Assessment for Proposed Integrated Waste Management Facility (W0129-03)
Project Code:	MU0120

Project Manager (Name):	Louise O'Donnell
Project Manager (Sign):	
Project Manager (Date):	9 th May 2014

Approved by Project Director (Name):	Dr. Conor Tonra
Approved by Project Director (Sign):	
Approved by Project Director (Date):	9 th May 2014

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Notes/Comments:

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1.0 Introduction

1.1 About this Report

- 1.1.1 Patel Tonra Ltd., Environmental Solutions was commissioned by MEHL (Murphy Environmental Hollywood Limited) to assess the company's obligations for a proposed integrated waste management facility at Hollywood Great, Nag's Head, Naul, Co. Dublin, in relation to:
- Environmental Liability Risk Assessment (ELRA),
 - Closure, Restoration and Aftercare Management Plan (CRAMP), and
 - Financial Provision (FP)
- 1.1.2 The report was commissioned in January 2012 and a draft report was prepared for the attention of MEHL. The EPA requested information relating to CRAMP and ELRA in an 'Article 16' notice in July 2012, as detailed in **Section 1.4**. The May 2013¹ report was published to reflect the Article 16 notice and was submitted to the Agency on 21st May 2013. The EPA guidance in force at that time was: EPA (2006) *Guidance on Environmental Liability Risk Assessment, Residuals Management Plans and Financial Provision*.
- 1.1.3 The ELRA, CRAMP and FP assessment was reviewed and updated by Patel Tonra Ltd. in May 2014, in line with new guidance from the EPA (*Guidance on assessing and costing environmental liabilities*, 2014)² and was submitted to the Agency as unsolicited information under the licence application W0129-03. This report (May 2014) acts to supersede and replace the May 2013 report. The approach adopted herein is based on the EPA 2014 guidance.
- 1.1.4 The report is based on information pertaining to the proposed development as set out in the planning and waste licence applications (and related information)³, and accompanying Environmental Impact Statement (EIS). The report should be reviewed at the operational stage, as risk assessments etc. may vary as a result of detailed design/construction phases.
- 1.1.5 Patel Tonra Ltd., Environmental Solutions prepared the EPA Waste Licence Application for the MEHL integrated waste management facility, and acted as project managers for the planning application and EIS process.

1.2 ELRA and CRAMP Requirements

CRAMP = Closure, Restoration & Aftercare Management Plan
ELRA = Environmental Liabilities Risk Assessment
FP = Financial Provision

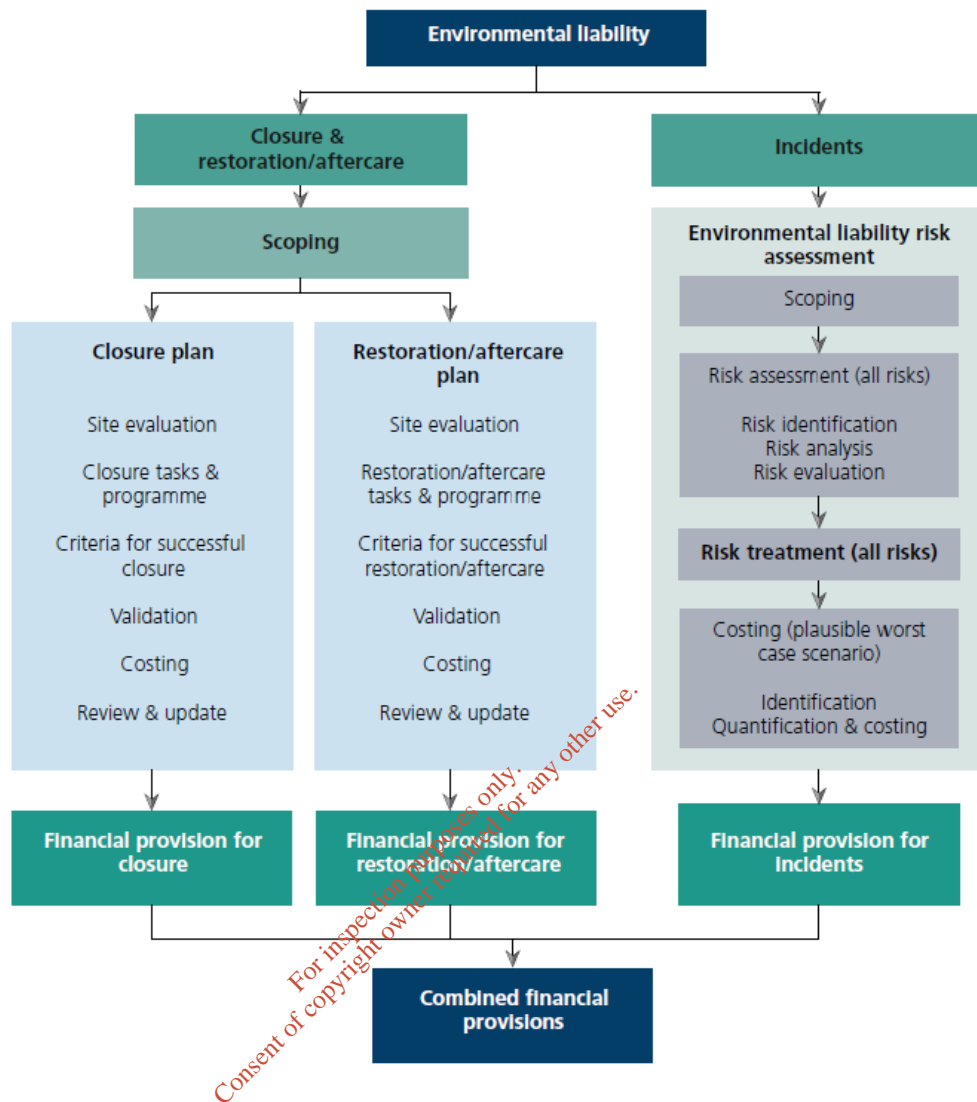
¹ Patel Tonra Ltd. (May 2013) *Preliminary ELRA, CRAMP and Financial Provision for Proposed Integrated Waste Management Facility (W0129-03)*

² EPA (2014) *Guidance on assessing and costing environmental liabilities* referred to as 'EPA 2014 guidance' throughout this report.

³ Now deemed to be an application under Industrial Emissions (IE) licensing (see **Section 1.4**)

CRAMP/ELRA: EPA Guidance

- 1.2.1 The EPA published *Guidance on assessing and costing environmental liabilities* in April 2014. EPA authorisations require closure plans, restoration/aftercare plans (e.g. CRAMPs) and environmental liabilities risk assessments (ELRAs) to be prepared to the satisfaction of and agreed with the EPA. The guidance presents a systematic approach for preparing these reports and sets the standard required to meet EPA requirements.
- 1.2.2 The EPA 2014 guidance presents the following definitions:
- **Closure** refers to relatively short-term measures necessary to close a site satisfactorily, including decommissioning and residuals management. **Closure plan** should be read accordingly.
 - **Restoration/aftercare** refers 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 rehabilitation, remediation, restoration, ongoing emissions control and monitoring. **Restoration/aftercare plan** should be read accordingly.
 - **Environmental liabilities risk assessment** refers to the assessment and costing of liabilities arising from incidents. Incident generally refers to a change of circumstances from the norm with actual or potential negative consequences. The IED refers to incidents and accidents, but for the purposes of this guidance the term 'incident' only is used, and is taken to include accidents within its meaning.
 - **Financial provision** refers to the putting in place of a financial instrument (such as an insurance, bond, guarantee or fund) to cover the costs of closure, restoration/aftercare or incidents. Other terms referring to essentially the same thing may be seen elsewhere such as financial security, financial guarantee and financial mechanism.
- 1.2.3 The approach for assessing and costing environmental liabilities is illustrated in **Figure 1.1**.

Figure 1.1: Assessing and costing environmental liabilities⁴

1.3 EPA Licence W0129-02

- 1.3.1 MEHL holds an EPA licence for the purpose of an inert landfill at Hollywood Great, Nag's Head, Naul, Co. Dublin (EPA Licence W0129-02). The site offers a strategically-located waste disposal facility for inert wastes and mildly contaminated soils.
- 1.3.2 The facility was first licensed by the EPA (as an inert landfill) in December 2002. The licensee was Murphy Concrete Manufacturing Ltd. Waste acceptance commenced in July 2003, following completion of the necessary infrastructural works.
- 1.3.3 W0129-02 was issued by the EPA in May 2008 to allow waste acceptance up to 500,000 tonnes per annum and to vary the landfill footprint of the facility (in line with the quarry footprint).

⁴ EPA (2014) *Guidance on assessing and costing environmental liabilities*, Figure 1.1

1.3.4 In October 2008, the licence transferred to *Murphy Environmental Hollywood Ltd.* (MEHL), following its establishment as a standalone limited company.

1.3.5 Under the terms of W0129-02, the licensee was required to complete and submit to the EPA assessments of (i) 'CRAMP' (Closure, Restoration & Aftercare Management Plan), (ii) ELRA (Environmental Liabilities Risk Assessment) and (iii) FP (Financial Provision). This report was completed in May 2010 (for the licence year 2009) on behalf of MEHL by Patel Tonra Ltd., Environmental Solutions.

CRAMP: Waste Licence W0129-02 Requirements

1.3.6 EPA Waste Licence W0129-02 states the following:

10.8 Closure, Restoration & Aftercare Management Plan (CRAMP)

10.8.1 The licensee shall prepare for agreement by the Agency, a fully detailed and costed plan for the closure, restoration and aftercare of the site or part thereof, including details of the final profile.

10.8.2 The plan shall be maintained and reviewed annually and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the prior agreement of the Agency.

10.9 The National Parks and Wildlife Service shall be consulted as part of the preparation of the CRAMP regarding the presence of peregrine falcon nests at the site. The Agency shall be notified of the outcome of this consultation.

10.10 The CRAMP shall include as a minimum, the following:

- *A scope statement for the plan.*
- *The criteria, including those specified in this licence, which define the successful closure and restoration of the facility or part thereof, and which ensure minimum impact to the environment.*
- *A programme to achieve the stated criteria.*
- *Where relevant, a test programme to demonstrate the successful implementation of the plan.*
- *Details of any proposed or required aftercare supervision, monitoring, control, maintenance and reporting requirements for the restored facility.*
- *Details of the costings for the plan and the financial provisions to underwrite those costs.*

10.11 A final validation report to include a certificate of completion for the CRAMP, for all or part of the site as necessary, shall be submitted to the Agency within three months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.

ELRA: Waste Licence W0129-02 Requirements

1.3.7 W0129-02 states the following in relation to ELRA:

Condition 12: Financial Charges and Provisions

12.2.1 The licensee shall as part of the AER provide an annual statement as to the measures taken or adopted at the site in relation to the prevention of environmental damage, and the financial provisions in place in relation to the underwriting of costs for remedial actions following anticipated events (including

closure) or accidents/incidents, as may be associated with the carrying on of the activity.

12.2.2 The licensee shall arrange for the completion, by an independent and appropriately qualified consultant, of a comprehensive and fully costed Environmental Liabilities Risk Assessment (ELRA), which addresses the liabilities from past and present activities. The assessment shall include those liabilities and costs identified in Condition 10 for execution of the CRAMP. A report on this assessment shall be submitted to the Agency for agreement within twelve months of date of grant of this licence. The ELRA shall be reviewed as necessary to reflect any significant change on site, and in any case every three years following initial agreement: review results are to be notified as part of the AER.

12.2.3 As part of the measures identified in Condition 12.2.1, the licensee shall, to the satisfaction of the Agency, make financial provision to cover any liabilities identified in Condition 12.2.2. The amount of indemnity held shall be reviewed and revised as necessary, but at least annually. Proof of renewal or revision of such financial indemnity shall be included in the annual 'statement of measures' report identified in Condition 12.2.1.

12.2.4 Unless otherwise agreed, any revision to that part of the indemnity dealing with restoration and aftercare liabilities (refer Condition 10.8.1) shall be computed using the following formula:

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

Where:

cost = Revised restoration and aftercare cost.

ECOST = Existing restoration and aftercare cost.

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 closure calculation/revision.

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

1.4 EPA Licence Application W0129-03

- 1.4.1 MEHL made an application for a waste licence to the EPA in December 2010 to develop an integrated waste management facility within the existing boundaries of its existing facility for the landfilling of non-biodegradable inert, non-hazardous and hazardous wastes, including waste-to-energy residues. The proposed development will allow the former quarry to be restored to a natural landform.
- 1.4.2 The proposed development involves the construction of: a) specially engineered landfill cells for inert, non-hazardous and hazardous wastes; b) a solidification plant with associated storage tanks and silos; c) a storage building; d) an administration office building; e) new weighbridges; f) car parking; g) an ESB substation/switch room; h) internal haul routes; i) surface water ponds and leachate management facilities; j) a temporary viewing platform for visitors from which the geology of the quarry faces can be viewed, and k) ancillary site works and landscaping. A new facility entrance is also proposed from the County Road LP1080.
- 1.4.3 At the Agency's request, MEHL completed an Industrial Emissions Directive (IED) Registration Form (14th August 2013), which indicated that the proposed activity, i.e. the activity or activities the subject of the MEHL waste licence application, is an IED activity. In accordance with Section 76A(6)(b) of the Waste Management Acts 1996 to 2013, the application is now being dealt with by the Agency under Part IV of the Environmental Protection Agency Acts 1992 to 2013.

Article 16 Requirements

1.4.4 The EPA issued a notice in accordance with Article 16(1) of the Waste Management (Licensing) Regulations on 11th July 2012. Item #5 related to CRAMP, ELRA and financial provision, as follows:

5.1 In accordance with section 53(1) of the Waste Management Acts 1996 to 2011, please furnish particulars in respect of the ability of Murphy Environmental Hollywood Limited to meet the financial commitments or liabilities that will be entered into or incurred in carrying on the proposed activity and provide evidence that Murphy Environmental Hollywood Limited will be in a position to make financial provision that is adequate to discharge these financial commitments. Specifically:

- a. *Prepare a fully detailed and costed Closure, Restoration and Aftercare Management Plan (CRAMP) for the facility, to include as a minimum the following:*
 - *A scope statement for the plan.*
 - *The criteria which define the successful closure and restoration of the facility or part thereof, and which ensure minimum impact to the environment.*
 - *A programme to achieve the stated criteria.*
 - *Where relevant, a test programme to demonstrate the successful implementation of the plan.*
 - *Details of the long-term supervision, monitoring, control, maintenance and reporting requirements for the restored facility.*
 - *Details of the costings for the plan and the financial provisions to underwrite these costs.*
- b. *Prepare a fully detailed and costed Environmental Liabilities Risk Assessment (ELRA) which addresses the liabilities and potential liabilities from past and proposed activities, including those liabilities and costs identified in the CRAMP. The assessment should include consideration of potential liabilities as may arise from legal actions alleging the supply of pyrite-containing stone.⁵ Provide evidence that the assessment was prepared or reviewed, and was found to be complete and accurate, by an independent and appropriate qualified consultant or expert.*
- c. *Provide a proposal for financial provision to cover any liabilities associated with the operation and identified in the ELRA (including closure, restoration and aftercare and unanticipated accidents, incidents and liabilities). Provide evidence that Murphy Environmental Hollywood Limited will be in a position to put such financial provision in place in the event that a waste licence is granted and prior to development works commencing.⁶*

⁵ Murphy Environmental Hollywood Ltd. has never been involved in the supply of quarry materials; therefore this item is not considered relevant in the context of this report.

⁶ Subject to agreement by the Agency, Financial Provision arrangements will be put in place, as outlined in **Chapter 5** of this report, which will be legally binding and will be demonstrated to the satisfaction of the Agency as being in place prior to the commencement of construction activities under the terms of any future Waste Licence W0129-03.

The preparation of the CRAMP and ELRA and evaluation of the amount and form of financial provision should have regard to Environmental Protection Agency guidance including Guidance on Environmental Liability Risk Assessment, Residuals Management Plans and Financial Provision (2006).

5.2 Provide information on the mechanism for setting landfill gate fees such that the requirements of section 53A of the Waste Management Acts 1996 to 2011 are met.

- 1.4.5 The May 2013⁷ report was submitted to the Agency (21st May 2013) in response to the Article 16 notice. The EPA guidance in force at that time was: EPA (2006) *Guidance on Environmental Liability Risk Assessment, Residuals Management Plans and Financial Provision*. The ELRA, CRAMP and FP assessment was reviewed and updated by Patel Tonra Ltd. in May 2014, in line with new guidance from the EPA (2014)⁸. This report (May 2014) acts to supersede and replace the May 2013 report.

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⁷ Patel Tonra Ltd. (May 2013) *Preliminary ELRA, CRAMP and Financial Provision for Proposed Integrated Waste Management Facility (W0129-03)*

⁸ EPA (2014) *Guidance on assessing and costing environmental liabilities*

2.0 CRAMP (Closure, Restoration, Aftercare Management Plan)

2.1 Approach

2.1.1 There are three steps to completing closure and restoration/aftercare plans⁹, as follows:

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

2.2 Scoping CRAMP

2.2.1 The report is prepared for MEHL for a proposed integrated waste management facility at Hollywood Great, Nag's Head, Naul, Co. Dublin. The application for the proposed development is subject to EPA assessment (EPA licence application ref. W0129-03).

2.2.2 Due to the nature of the proposed development, i.e. landfill for hazardous waste (*inter alia*), it has been deemed necessary to complete a restoration/aftercare plan for the site, as well as a closure plan.

2.2.3 The requirements of both plans, i.e. the closure plan and the restoration/aftercare plan, are addressed herein as a combined Closure and Restoration /Aftercare Plan, i.e. CRAMP.

2.2.4 During the operational lifetime of the landfill, restoration activities will be active on an ongoing and phased basis. The site will be subject to long-term monitoring in its aftercare phase.

2.3 CRAMP Requirements

2.3.1 Based on the combined requires for a closure plan and a restoration/aftercare plan, a CRAMP should contain the following elements:¹⁰

Table 1.1: Contents of CRAMP

Section	Contents
1. Introduction	<ul style="list-style-type: none"> ▪ Site description ▪ Activities ▪ Licence/permit details ▪ Closure scenarios covered in the plan ▪ Whether restoration/aftercare plan is also required

⁹ EPA (2014) *Guidance on assessing and costing environmental liabilities*, Section 2.2

¹⁰ EPA (2014) *Guidance on assessing and costing environmental liabilities*, Section 2.2, Tables 2.1 and 2.3

Section	Contents
2. Site Evaluation	<ul style="list-style-type: none"> ▪ Operator performance ▪ Environmental pathways and sensitivity ▪ Site processes and activities ▪ Inventory of buildings, plant and equipment ▪ Inventory of raw materials, products and wastes ▪ Maximum storage capacity for raw materials, products and wastes
3. Closure and Restoration/Aftercare Tasks and Programmes	<ul style="list-style-type: none"> ▪ Restoration tasks and programme ▪ Waste facility closure (e.g. landfill and extractive waste facilities) ▪ Plant and equipment decontamination requirements ▪ Plant and equipment decommissioning requirements ▪ Demolition (if necessary) ▪ Raw materials, products and waste disposal and/or recovery requirements ▪ Contaminated land treatment, removal and/or disposal ▪ Programme (Gantt chart or similar) and timeframes for delivery ▪ Aftercare tasks and programme
4. Criteria for Successful Closure and Restoration/Aftercare	<ul style="list-style-type: none"> ▪ A benchmark set of criteria to evaluate the success of closure ▪ Criteria for successful restoration/aftercare
5. CRAMP Validation	<ul style="list-style-type: none"> ▪ Environmental monitoring ▪ Closure validation audit ▪ Closure validation audit report ▪ Closure validation certificate ▪ Validation (restoration/aftercare)
6. CRAMP Costing	<ul style="list-style-type: none"> ▪ Plant and equipment decontamination costs ▪ Plant and equipment decommissioning costs ▪ Demolition costs ▪ Waste recovery or disposal costs ▪ Environmental monitoring costs ▪ Site security costs ▪ Validation costs ▪ Management and utility costs ▪ Costing (restoration and aftercare)

Section	Contents
7. CRAMP Review and Update	<ul style="list-style-type: none"> ▪ Proposed frequency of review ▪ Proposed scope of review ▪ Review and update (restoration and aftercare)
8. CRAMP Summary	<ul style="list-style-type: none"> ▪ Summary information

2.4 Introduction

Site Description

2.4.1 See **Sections 1.3** and **1.4**. A proposed site layout plan is attached in **Appendix 2.1**.

Site processes and activities

2.4.2 MEHL proposes to develop an integrated waste management facility within the existing boundaries of its existing facility for the landfilling of non-biodegradable inert, non-hazardous and hazardous wastes, including waste-to-energy residues. The proposed development will allow the former quarry to be restored to a natural landform.

2.4.3 The proposed development involves the construction of: a) specially engineered landfill cells for inert, non-hazardous and hazardous wastes; b) a solidification plant with associated storage tanks and silos; c) a storage building; d) an administration office building; e) new weighbridges; f) car parking; g) an ESB substation/switch room; h) internal haul routes; i) surface water ponds and leachate management facilities; j) a temporary viewing platform for visitors from which the geology of the quarry faces can be viewed, and k) ancillary site works and landscaping. A new facility entrance is also proposed from the County Road LP1080.

2.4.4 The design of the liner and capping systems for each landfill class varies according to international best practice and EPA guidance, and the requirements of EU Landfill Directive 1999.

2.4.5 The following classes of activity are proposed for the MEHL integrated waste management facility application:

Licensed Waste Disposal Activities, in accordance with the Third Schedule of the Waste Management Acts 1996 to 2010

- **Class 1: Deposit on, in or under land (including landfill):** This activity relates to the deposition of inert material.
- **Class 5: Specially engineered landfill, including placement into lined discrete cells, which are capped and isolated from one another and the environment:** This is the principal activity. It is proposed that the facility will accept a range of non-biodegradable waste streams which fall within the following classes of landfill: landfill for hazardous waste, landfill for non-hazardous waste and landfill for inert waste, as specified under the EU Landfill Directive (1999).
- **Class 7: Physico-chemical treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1 to 5 or paragraphs 8 to 10 of this Schedule (including evaporation, drying and calcinations):** This activity relates to the proposed Solidification Plant, which will pre-treat (by means of a solidification process) certain hazardous wastes prior to landfilling.

- **Class 13: Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced:** This activity includes temporary storage of incoming wastes pending Third Schedule, Class 7 activity; and the storage of unacceptable wastes in a designated area pending their dispatch to appropriate disposal facilities.

Licensed Waste Recovery Activities, in accordance with the Fourth Schedule of the Waste Management Acts 1996-2010

- **Class 3: Recycling or reclamation of metals and metal compounds:** This activity provides for the recovery of metal within wastes delivered to the facility.
- **Class 4: Recycling or reclamation of other inorganic materials:** This activity includes the recovery of inert material for use in site development and site restoration works.
- **Class 13: Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced:** This activity includes the storage of wastes for recovery purposes at this facility (e.g. stockpiles of soil) and the temporary storage of materials (e.g. metals), pending their dispatch to appropriate off-site recovery facilities.

2.4.6 It is proposed that the principal activity licensed under W0129-02 will remain the same for the purpose of the proposed development, i.e. Class 5, specially engineering landfill. The application proposes engineered landfill disposal capacity for non-biodegradable inert, non-hazardous and hazardous wastes. Third Schedule, Class 7 (physico-chemical treatment) is proposed for the purpose of operation of a solidification plant on site – this is the only additional class of activity proposed, which is not already licensed under W0129-02.

2.4.7 The W0129-03 application is now deemed to be an application which falls under the scope of Industrial Emissions (IE) licensing (see **Section 1.4**). The following IE classes apply:

Waste Activities in accordance with European Union (Industrial Emissions) (Licensing) Regulations 2013 (S.I. No. 137 of 2013), Industrial Emissions Directive (2010/75/EU) and First Schedule of the Environmental Protection Agency Acts 1992 to 2013

- **Class 11.1:** The recovery or disposal of waste in a facility, within the meaning of the Act of 1996, which facility is connected or associated with another activity specified in this Schedule in respect of which a licence or revised licence under Part IV is in force or in respect of which a licence under the said Part is or will be required;
- **Class 11.2(b):** Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day involving one or more of the following activities: (b) physico-chemical treatment;
- **Class 11.4(a):** Disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day involving one or more of the following activities: (iv) treatment of slags and ashes;
- **Class 11.5:** Landfills, within the meaning of section 5 (amended by Regulation 11(1) of the Waste Management (Certification of Historic Unlicensed Waste Disposal and Recovery Activity) Regulations 2008 (S.I. No. 524 of 2008)) of the Act of 1996, receiving more than 10 tonnes of

waste per day or with a total capacity exceeding 25,000 tonnes, other than landfills of inert waste;

- **Class 11.6:** Temporary storage of hazardous waste, (other than waste referred to in paragraph 11.5) pending any of the activities referred to in paragraph 11.2, 11.3, 11.5 or 11.7 with a total capacity exceeding 50 tonnes, other than temporary storage, pending collection, on the site where the waste is generated.

Seveso II Directive

- 2.4.8 Calculations show that the total inventory of Flue Gas Treatment (FGT) residue (ash) proposed to be accepted/temporarily stored at the MEHL Solidification Plant process is sufficient to qualify as a lower tier site. A notification has been made to the Health & Safety Authority under the European Communities (Control of Major Accidents involving Dangerous Substances) Regulations 2006.

Licence/permit details

- 2.4.9 See **Sections 1.3** and **1.4**.

Closure scenarios covered in the plan

- 2.4.10 The Closure Plan is proposed on the basis of full restoration of the landfill site, decommissioning of plant and equipment and aftercare monitoring at the facility.

Whether restoration/aftercare plan is also required

- 2.4.11 Due to the nature of the proposed development, i.e. landfill for hazardous waste (*inter alia*), it has been deemed necessary to complete a restoration/aftercare plan for the site, as well as a closure plan.

2.5 Site Evaluation

Operator performance

- 2.5.1 The facility has a good record of compliance under W0129-02. There is no compliance history under W0129-03 as the application remains at assessment stage.
- 2.5.2 MEHL has put in place an Environmental Management System (EMS) at the facility. The EMS is independently certified to ISO14001:2004 (since 2004). The EMS will be updated and extended to include the activities of the integrated waste management facility within its scope.

Environmental pathways and sensitivity

- 2.5.3 In accordance with W0129-02, MEHL is required to conduct regular monitoring to ensure that no environmental impact is occurring as a result of site operations. All monitoring reports are submitted to the EPA, and summaries are publicly available at www.mehl.ie. Monitoring of the following is conducted: noise, dust, surface water, groundwater, leachate and meteorology.
- 2.5.4 To-date, environmental monitoring results have generally been in compliance with licence and regulatory requirements. There have been exceedances for some metals (e.g. manganese and arsenic), associated with the geology of the site. A full record of all monitoring results is retained on site by MEHL, in the form of a Monitoring Database, which is updated quarterly.
- 2.5.5 The monitoring programme for the integrated waste management facility will be updated in line the requirements of any new licence which may be issued.

- 2.5.6 As a requirement of Regulation 9 of the EPA (Industrial Emissions) (Licensing) Regulations, 2013, MEHL submitted a Baseline Report to the Agency in March 2014. Regulation 9(n) of the aforementioned Regulations, states the following: *"provide, when requested by the Agency, in the case of an activity that involves the use, production or release of relevant hazardous substances (as defined in section 3 of the Act of 1992) and having regard to the possibility of soil and groundwater contamination at the site of the installation, a baseline report in accordance with section 86B of the Act of 1992"*.
- 2.5.7 The Baseline Report draws on extensive site investigation, analysis and information submitted to the Agency as part of the licence application process since December 2010. In addition, the facility has collected significant amounts of data through the operation of the licensed inert landfill (EPA ref. W0129-02), which are relevant as baseline groundwater reference conditions.

Potential Impact on Natura 2000 Sites

- 2.5.8 The Environmental Liability Directive (2004/35/CE) considers environmental damage to water, land and *"damage to protected species and natural habitats, which is any damage that has significant adverse effects on reaching or maintaining the favourable conservation status of such habitats or species"*.
- 2.5.9 The EIS for the proposed integrated waste management facility at Hollywood included an Appropriate Assessment (Screening) under the European Communities (Natural Habitats) Regulations, 1997, as well as full Flora & Fauna studies under EIS requirements.
- 2.5.10 The EIS concluded that there will be no direct impacts on any designated areas for conservation, due to the distance (>2.5km) of the nearest designated conservation areas from the MEHL site.

Inventory of buildings, plant and equipment

- 2.5.11 Proposed site buildings are as follows:
- Solidification plant
 - Storage building
 - Administration office building
 - ESB substation/switch room
 - Maintenance (garage) building (existing)
- 2.5.12 Proposed plant/equipment items are as follows:
- Specially engineered landfill cells for inert, non-hazardous and hazardous wastes
 - Solidification plant - storage silos for input flue gas treatment residues (4 x 78 m³); storage tanks for acid (2 x 30m³ bunded acid tanks); cement storage silo (1 x 78 m³); mixing unit and related plant
 - Diesel storage tank (7,500 litre diesel tank for site machinery will be stored in a bunded and roofed storage area)
 - Weighbridges
 - Wheelwash
 - Car parking
 - New facility entrance
 - Internal haul routes

- Services and lighting
- Sewage and surface water drainage infrastructure
- Surface water ponds and leachate management facilities
- A temporary viewing platform for visitors from which the geology of the quarry faces can be viewed
- Various vehicles, e.g. loaders, bulldozers, rollers

Inventory of raw materials, products and wastes (including maximum storage capacities)

- 2.5.13 It is envisaged that the solidification process will use cement (or replacement binding materials, as appropriate), acid and water. 1 No. cement silo will be provided at the solidification plant, with capacity of 78m³; equivalent to approximately 117 tonnes. 2 No. bunded acid tanks will be provided at the solidification plant, with capacity of 2 x 30m³; equivalent to approximately 72 tonnes. Hydrochloric acid (HCl) is the preferred acid type.
- 2.5.14 It is proposed to install a 7,500 litre diesel tank for site machinery, to be stored in a bunded and roofed storage building. It is proposed to construct this building adjacent to the solidification yard. The existing fuel storage area will be decommissioned when the new fuel storage area has been installed.
- 2.5.15 Waste generation associated with operations of the proposed integrated waste management facility is anticipated to be minimal. General municipal-type waste and recyclables will be generated as a result of office and staff mess facilities. Small volumes of non-acceptable waste/recyclables may be required to be removed off-site, comprising materials removed from incoming C&D-type waste. Only permitted/licensed waste collectors and facilities, with EPA pre-approval, will be used for removal off-site.
- 2.5.16 It is proposed that leachate generated on-site will be re-used within the solidification plant, with excess to be removed off-site to an appropriately licensed facility, as required. A leachate tank of 499m³ is proposed for leachate from the hazardous cells and a leachate tank of 499m³ is proposed for leachate from the non-hazardous cells.

2.6 Closure and Restoration/Aftercare Tasks and Programmes

Restoration tasks and programme

- 2.6.1 The proposed development will effect the restoration of a worked-out quarry in keeping with the surrounding landscape, and in line with pre-quarrying levels. A phased restoration approach is proposed for the MEHL integrated waste management facility, which will allow the site to be restored progressively over the lifetime of the project. As part of the restoration process, as each cell is filled to required restoration levels, capping layers will be applied, in line with requirements for inert, non-hazardous and hazardous cells.
- 2.6.2 CRAMP implementation will be on the following basis:
- a) Restoration will be effected on an ongoing basis during the operational lifetime of the landfill, in line with the indicative phasing plan outlined below.
 - b) Closure activities upon cessation of waste activities and facility decommissioning at the facility's end-of-life.
 - c) Implementation of the aftercare management programme.

Phased Restoration during Operational Lifetime

- 2.6.3 A phased restoration approach is proposed for the MEHL integrated waste management facility, which will allow the site to be restored progressively over the lifetime of the project.
- 2.6.4 It is proposed to construct hazardous landfill cells (cell refs. H1, H2 and H3), non-hazardous landfill cells (cell refs. NH1 and NH2) and inert landfill cells (cell refs. IN1, IN2 and IN3). The hazardous waste cells will be sited in the northern part of the existing quarry. The non-hazardous cell will be located in the southern part of the site and the inert cells to the west (see Proposed Site Layout Drawing in **Appendix 2.1**).
- 2.6.5 The landfill will be constructed in four phases, as per the indicative phasing programme for the proposed development, see **Appendix 2.2**¹¹. Whilst it is noted that the indicative phasing programme is now dated (the year of commencement of the proposed development was identified as 2011), the timeline Year 0 to Year 25 remains constant.
- 2.6.6 The indicative phasing programme identified the following 4 No. (overlapping) phases :
- Phase 1: Year 0 – Year 5
 - Phase 2: Year 3 - Year 13
 - Phase 3: Year 11 - Year 23
 - Phase 4: Year 23 - Year 25
- 2.6.7 The actual phasing will depend on the volumes of appropriate waste generated over the lifespan of the project, which is influenced by a number of factors, including waste policy and economic conditions.
- 2.6.8 MEHL proposes that ongoing/ phased CRAMP activities during the operational lifetime of the landfill will be addressed under Specified Engineering Works (SEW)/ Construction Quality Assurance (CQA) processes and procedures, as prescribed by an EPA Waste Licence.
- 2.6.9 In line with the requirements of W0129-02 (or as may amended by any future EPA Licence), this would mean that restoration of cells/sub-cells would be subject to the following:
- A proposal to restore an area is submitted to the Agency for its agreement at least two months in advance of the intended date of commencement of restoration works.
 - Restoration works are supervised by an appropriately qualified person, and that person, or persons, shall be present at all times during which relevant works are being undertaken.
 - Following the completion of restoration works, a Construction Quality Assurance validation will be completed. The validation report will include:
 - A description of the works
 - As-built drawings of the works
 - Records and results of all tests carried out

¹¹ The phasing timeline was included as Appendix D.2.1 to the Waste Licence Application, December 2010

- Drawings and sections showing the location of all samples and tests carried out
- Name(s) of contractors/individual(s) responsible for undertaking the restoration works
- Records of any problems and the remedial works carried out to resolve those problems
- Any other information requested in writing by the Agency

2.6.10 It is proposed that draw-down of restoration funds (under Financial Provision) is also aligned to the SEW/CQA model, as further discussed in **Section 5.4**.

Waste facility closure

2.6.11 Upon cessation of waste activities at the facility, decontamination, decommissioning and demolition activities will be carried out, as detailed below.

2.6.12 Upon the completion of closure stages, an independent verification audit, certification of closure and report will be prepared and submitted to the Agency.

Plant or Equipment Decontamination Requirements

2.6.13 The items which may be required to be decontaminated (i.e. plant which has been in direct contact with hazardous wastes on-site) upon closure are:

- Silos at the solidification plant (4 No.)
- Acid tanks at the solidification plant (2 No.)
- Leachate holding tanks, diesel tanks and drains

Plant and equipment decommissioning requirements

2.6.14 Following decontamination, the above plant will be required to be decommissioned.

2.6.15 Mobile and fixed plant will be sold.

2.6.16 Offices and buildings will be cleared of their contents and sold for reuse/recovered.

Demolition

2.6.17 Site buildings (solidification plant, storage building, administration office building, electrical substation and maintenance building) will be demolished and sold for reuse/recovered.

2.6.18 Lighting standards and road pavements will be deconstructed and removed off-site for reuse/recovered.

Raw materials, products and waste disposal and/or recovery requirements

2.6.19 Strict waste acceptance criteria will be applied during the lifetime of the facility to ensure that only conforming wastes are accepted at the facility.

2.6.20 No significant waste volumes are anticipated upon site closure. Any municipal-type waste will be removed off-site in accordance with legal and regulatory requirements, as part of general operations.

Contaminated land treatment, removal and/or disposal

- 2.6.21 It is not anticipated that soil/spoil will be generated at part of site closure activities. There will be no contaminated ground or spoil that requires specialist treatment on cessation of activities at the facility. No residual materials will remain.

Final Restoration

- 2.6.22 During the final restoration, non-hazardous waste cell NH2 and inert waste cell IN1 will be capped and restored.
- 2.6.23 The maximum restored level will be 148mOD Malin near the existing entrance on the western boundary. Restoration levels will slope from the east and north of the highest point to match the surrounding ground levels and a typical slope of 1 in 10 is anticipated. It is proposed to restore the site to amenity/nature usage.
- 2.6.24 The position of both surface water drains and hedgerows on site mark the location of inert, non-hazardous and hazardous areas. This will assist with the identification of inert, non-hazardous and hazardous areas on site in addition to site survey records.

Programme and timeframes for delivery

- 2.6.25 The closure and final restoration programme will take in the order of 6 months to complete in full. Detailed delivery programmes will be developed in the post-licensing phase.

Aftercare tasks and programme

- 2.6.26 As the proposed activity includes the landfilling of hazardous wastes, upon cessation of operations, there will be remaining liabilities, which require a restoration and aftercare management plan.
- 2.6.27 It is anticipated that future after-use will be for low-impact amenity, nature area, or related uses. The Fingal County Development Plan (2011-2017) states the Council's vision for this area: "...In recognition of the amenity potential of these areas opportunities to increase public access will be explored".
- 2.6.28 The length of the aftercare period will vary from site to site; however, the holder of a landfill waste licence will be responsible for the aftercare of the site up until the date when the Agency accepts the surrender of the waste licence as specified under section 48 of the Waste Management Act, 1996.¹²
- 2.6.29 Aftercare management of the integrated waste management facility once the lands have been restored, grassed and planted, as appropriate, will include:
- Maintenance of grassland, hedges and planted areas
 - Inspections and surveys of the drains, surface water management and land surface
 - Maintenance of infrastructural installations, including pathways, access points and signposting, fencing and security
 - Monitoring

¹² EPA (1999) Landfill Manual: Landfill Restoration and Aftercare

- 2.6.30 The following pollution control systems will be maintained and protected during the aftercare period:
- the landfill capping system including drainage system
 - groundwater monitoring boreholes
 - leachate monitoring wells
 - hazardous cell leak detection points
 - surface water monitoring points
 - any other items required by the Agency
- 2.6.31 It is proposed that the aftercare programme at MEHL will be focused on a performance-based assessment of site conditions, i.e. using the aftercare monitoring programme to determine any potential facility-related environmental impacts. On the basis of favourable results of the aftercare the monitoring programme, it would be proposed to reduce the monitoring frequencies throughout the aftercare period, in line with after-care control and monitoring procedures specified by the Landfill Directive 1999.
- 2.6.32 The aftercare programme is proposed on the basis of:
- A five-year active aftercare management period, followed by: -
 - A five-year passive aftercare management period, followed by: -
 - Additional aftercare management period, as appropriate, depending on results of the performance assessment
- 2.6.33 Aftercare monitoring requirements will be agreed with the EPA as part of a final closure plan. The monitoring programme will be put forward on the basis of active, passive and additional aftercare phases outlined above. The monitoring programme should prove that no impact is occurring and, on that basis, the monitoring programme will be scaled back throughout the aftercare period. Monitoring will include:
- Meteorological
 - Groundwater levels
 - Groundwater composition
 - Leachate volume
 - Leachate composition
 - Surface water emissions – volume and composition
 - Topographical survey/reading of any settling behaviour of the level of the landfill body
- 2.6.34 It is proposed that annual meetings would be held between MEHL and all relevant interested parties, such as local community representatives, planning and local authorities, wildlife groups, etc. for 5 years post-closure, as a minimum. Depending on aftercare reporting and consultation with the Agency, this consultation period may be extended.

2.7 Criteria for Successful Closure and Restoration/Aftercare

Criteria to evaluate the success of closure

2.7.1 MEHL has established the following criteria for the successful closure of the facility:

- The site has been restored in a manner fitting the surrounding landscape; final capping, grassing and planting has been completed across all areas.
- Site buildings and related services and infrastructure have been decommissioned/demolished, as appropriate, and materials have been moved off-site for recovery.
- All plant and equipment has been safely decontaminated or decommissioned and removed off-site, as appropriate.
- Site security measures are in place.
- Leachate and surface water collection infrastructure has been checked and verified.
- Monitoring points have been checked and verified and an aftercare monitoring programme agreed.
- The Environmental Management System has been actively implemented during the closure period.
- All relevant site records, including monitoring data, have been managed appropriately retained in an off-site location.
- A Verification Audit / Certification has been independently completed on behalf of the operator and associated report submitted to the Agency.
- An aftercare maintenance programme agreed.
- Financial provision has been updated and agreed with the Agency.
- Other notice parties (e.g. the neighbouring community, the local authority) are informed of CRAMP status.

Criteria for successful restoration/aftercare

2.7.2 MEHL has established the following criteria for the successful restoration/aftercare of the facility:

- Site security measures are in place
- General upkeep and maintenance
- Maintenance of monitoring points
- Implementation of aftercare monitoring programme
- Aftercare reporting to EPA
- Management of Aftercare FP

2.8 CRAMP Validation

Environmental monitoring

2.8.1 Environmental monitoring of all media will be completed at the closure stage. Groundwater monitoring results will be compared against the Baseline Report (2014).

Closure validation audit, report and certificate

2.8.2 An independent verification audit will be completed to verify that all closure criteria have been adequately addressed and the closure phase will be agreed with the Agency. The independent audit will include a soil/groundwater investigation/verification by an appropriately-qualified and experienced hydrogeologist.

2.8.3 It is anticipated that the EPA will conduct its own post-closure audit of the facility also.

Validation (restoration/aftercare)

2.8.4 Aftercare reporting to the EPA will be conducted on an annual basis (or as may be required).

2.9 CRAMP Costing

2.9.1 The CRAMP has been costed on the basis of 'best estimates' available at the time of writing. Costs items are based on data/extrapolations included in the planning and licensing applications and accompanying EIS. Unit cost rates have been sourced from: (i) direct experience, (ii) published sources, or (iii) EPA information.

2.9.2 CRAMP costing estimates¹³ are included in **Appendix 2.3**.

- Plant and equipment decontamination costs
- Plant and equipment decommissioning costs
- Demolition costs
- Waste recovery or disposal costs
- Environmental monitoring costs
- Site security costs
- Validation costs
- Management and utility costs
- Costing (restoration and aftercare)

2.10 CRAMP Review and Update

2.10.1 The following scope and frequency of CRAMP review is proposed:

- CRAMP will be reviewed in line with licence requirements (typically once per annum as part of the annual reporting obligations).
- Progress on restoration of cells shall be reported annually as part of the Annual Environmental Report.
- CRAMP will be reviewed in the event of a significant amendment to site activities.
- CRAMP will be fully reviewed and updated every three years.
- FP will be reported annually, as a minimum.
- In the aftercare phase, aftercare reporting to the EPA will be conducted on an annual basis (or as may be required).

¹³ The 'NaDWaF' report provides a Restoration and Aftercare Cost for a hazardous landfill of €1.5 million. EPA (2010) *Technical and Economic Aspects of developing a National Difficult Waste Facility (NaDWaF)*, Page 14

2.11 Future-proofing Costs

2.11.1 Based on EPA guidance (2014), reference was made to Central Statistics Office Wholesale Price Index (WPI) data, detailed in **Table 1.2** below.

Table 1.2: Wholesale Price Index, 2013-2014¹⁴

	Price index (Year '10=100)	% Monthly Change	% Annual Change
Mar-14	99.3	-0.60%	-3.10%
Feb-14	99.9	-0.20%	-1.70%
Jan-14	100.1	0.40%	-1.50%
Dec-13	99.7	-2.10%	-2.20%
Nov-13	101.8	0.00%	-0.90%
Oct-13	101.8	-0.40%	-0.10%
Sep-13	102.2	-0.20%	0.50%
Aug-13	102.4	-0.20%	-1.40%
Jul-13	102.6	0.70%	-0.90%
Jun-13	101.1	-1.20%	0.40%
May-13	102.3	0.60%	1.90%
Apr-13	101.7	0.30%	1.90%
Mar-13	101.4	0.90%	1.10%
Feb-13	100.5	0.00%	0.20%
Jan-13	100.5	-0.30%	-0.40%
Average 2013	101.50	-0.16%	0.01%
Average Apr 2013 - Mar 2014	101.24	-0.24%	-0.59%

2.11.2 There have been only marginal shifts in inflation/deflation in the past 12-15 months; therefore the FP model has not applied an inflationary rate. This will be reviewed on an annual basis, in line with EPA guidance/licence requirements.

¹⁴ CSO website 30/04/14

2.12 CRAMP Summary

Item	Summary Details
Activity name:	Proposed integrated waste management facility
Activity address:	Hollywood Great, Nag's Head, Naul, Co. Dublin
Name of the operator:	Murphy Environmental Hollywood Ltd.
Licence/permit number:	W0129-03 (application)
Name and address of person/organisation who prepared the plan:	Patel Tonra Ltd., Environmental Solutions 3f, Fingal Bay Business Park, Balbriggan, Co. Dublin
Classes of activity licensed/permitted and carried out:	Proposed activities under IED: Classes 11.1, 11.2(b), 11.4(a), 11.5, 11.6
Risk category (RBME):	Category C2 for current W0129-02 activities; RBME not yet assessed for W0129-03
Scope (closure plan only or restoration/aftercare plan also):	Closure, Restoration and Aftercare Management Plan (CRAMP)
Overall closure costs:	See Appendix 2.3
Details of any previous closure plans:	This report supersedes and replaces the May 2013 report ¹⁵ .
Financial provision mechanism:	Combination of cash-based account and bond, as Appendix 5.5 .
Review period for the closure and restoration/aftercare plans:	Annual update; CRAMP will be fully reviewed and updated every three years.

¹⁵ Patel Tonra Ltd. (May 2013) *Preliminary ELRA, CRAMP and Financial Provision for Proposed Integrated Waste Management Facility (W0129-03)*

3.0 Environmental Liabilities Risk Assessment (ELRA)

3.1 Introduction¹⁶

3.1.1 Environmental liability risk assessment (ELRA) considers the risk of incidents occurring that could result in liabilities materialising, e.g. fire, fuel spillages. 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 risks.

3.1.2 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 as follows:

- scoping to determine the type of environmental liabilities to be covered;
- risk assessment including the following stages:
 - risk identification, i.e. the systematic identification of plausible risks, the sensitivity of the receiving environment (receptor) and the potential pathway for the activity to impact on the environment.
 - risk analysis consists of determining the likelihood and consequences for identified risk events.
 - risk evaluation is the ranking and presentation of risks to allow for prioritisation of the risk treatment programme.
- risk treatment is a process to mitigate risks, e.g. by removing the risk or minimising the likelihood or consequences; and
- identification, quantification and costing of a plausible worst case scenario for financial provision (FP).

3.2 Scoping

3.2.1 The scope of the ELRA covers environmental risks associated with the proposed integrated waste management facility, which could potentially lead to environmental liability. The ELRA also includes liabilities from past waste activities on site, i.e. those activities covered by EPA licences W0129-01 and W0129-02.

¹⁶ EPA (2014) *Guidance on assessing and costing environmental liabilities*, Section 3.1

- 3.2.2 In accordance with EPA guidance (2014), the purpose of ELRA is to identify and cost risks to the environment (surface water, groundwater, atmosphere, land, flora, fauna and human health). The ELRA does not include risks solely relating to health and safety, e.g. direct injury or death resulting from vehicular collisions. The ELRA analysis and costing excludes non-environmental costs, e.g. legal fees/penalties and business interruption.

3.3 Risk Assessment

Risk identification

- 3.3.1 ELRA risks were identified by Patel Tonra Ltd., Environmental Solutions, based on their detailed understanding of the project elements included in the proposed integrated waste management facility at MEHL. In addition, risk management workshops were held with Patel Tonra Ltd., the General Manager and Facility Manager of MEHL (at that time) on 2nd February 2012 and with the MEHL Manager and the company accountant on 1st May 2014.
- 3.3.2 Risks were identified on a process-based approach, i.e. all proposed activities were examined in relation to potential environmental risks.
- 3.3.3 As part of the 2014 review, and in light of EPA 2014 guidance, risks were considered on the basis of 'plausible incidents'.
- 3.3.4 A Risk Register (list of plausible risks) is included in **Appendix 3.1**.

Risk Analysis

- 3.3.5 Risk Classification Tables were applied, as per EPA 2014 guidance¹⁷. 'Likelihood' (likelihood of an event occurring) and 'consequence' (consequence of impact if the event occurred) were rated for each identified risk.
- 3.3.6 The likelihood and consequence ratings are combined to form a risk score for risk evaluation.
- 3.3.7 A Risk Analysis is included in **Appendix 3.2**.

Risk Evaluation

- 3.3.8 On the basis of the Risk Analysis, risks were tabulated in a Risk Matrix, included as **Appendix 3.3**.
- 3.3.9 The Risk Matrix is colour-coded to provide a broad indication of the critical nature of each risk. The Risk Matrix shows that there are no risks in the red or yellow/amber zones, which would require priority attention.

3.4 Risk Treatment

- 3.4.1 The risk treatment process involves the identification and prioritisation of management and mitigation measures to mitigate risks identified in the risk evaluation process, e.g. by removing the risk or minimising the likelihood or consequences. The output of the risk treatment stage is a *Statement of Measures* taken or adopted in relation to the prevention of impact to the environment.¹⁸

¹⁷ EPA (2014) *Guidance on assessing and costing environmental liabilities*, Section 3.3.2

¹⁸ EPA (2014) *Guidance on assessing and costing environmental liabilities*, Section 3.4

- 3.4.2 Management/mitigation measures have been considered, as outlined in the EIS/Waste Licence Application for the proposed integrated waste management facility; see Statement of Measures in **Appendix 3.4**. A risk management programme will be further explored at the post-licensing stage, and in line with MEHL's Environmental Management System.

3.5 Costing

Identification of the plausible worst case scenario¹⁹

- 3.5.1 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.
- 3.5.2 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. Where two or more risks are identified as having the maximum consequence, further analysis should be undertaken to identify the most significant of these for quantification and costing.
- 3.5.3 There may be links/domino-effects between individual risks, in which case a number of risks may need to be grouped to represent a plausible worst case scenario.
- 3.5.4 The likelihood is not taken into account in this analysis. Once a risk is considered plausible, it must be included in the risk assessment and the level of financial provision is based on the consequences alone.

Quantification and costing

- 3.5.5 The ELRA costing model for the plausible worst case scenario is included in **Appendix 3.5**.
- 3.5.6 The ELRA has been costed on the basis of 'best estimates' available at the time of writing. Costs items are based on data/extrapolations included in the planning and licensing applications and accompanying EIS. Unit cost rates have been sourced from: (i) direct experience, (ii) published sources, or (iii) EPA information.
- 3.5.7 The costing exercise has been prepared in line with EPA guidance (2014), with the exception of the following criterion: "*The costs should be based on the control measures in place at the time of reporting. Planned mitigation measures cannot be included in the risk assessment of calculations until these measure have been fully implemented*". In the context of a proposed development, where no risk yet exists, and no mitigation measures have been constructed/implemented, the ELRA exercise is a largely theoretical one, and it was deemed appropriate to include both risks and mitigation measures as outlined in the EIS and IE Licence Application. The ELRA should be reviewed at the operational stage, as risk assessments etc. may vary as a result of detailed design/construction phases.

3.6 Outcomes and Next Steps

- 3.6.1 The ELRA status shall be reported annually to the EPA through a statement of measures.
- 3.6.2 ELRA will be reviewed in the event of a significant amendment to site activities.
- 3.6.3 It is proposed that the ELRA will be reviewed and updated every three years.

¹⁹ EPA (2014) *Guidance on assessing and costing environmental liabilities*, Section 3.5.1

5.0 Financial Provision (FP)

5.1 Introduction

5.1.1 It is our understanding that the EPA intends to issue new guidance on Financial Provision (FP) in 2014. In the interim, a robust FP mechanism is outlined below, which will be subject to the agreement of the Agency in terms of specifics surrounding legal/contractual details.

5.2 Calculation of FP

5.2.1 The amount of financial provision required for the proposed MEHL integrated waste management facility (EPA application ref. W0129-03) has been determined using the CRAMP and ELRA assessment protocol outlined in this document.

5.2.2 **Appendix 5.1** summarises the financial provisions proposed for closure, restoration and aftercare liabilities relating to the proposed development.

Accrual of CRAMP/ELRA Liability (relative to the proposed development phases)

5.2.3 The projected accrual of CRAMP/ELRA through the lifetime of the proposed development has been estimated by Patel Tonra Ltd. on the basis of CRAMP/ELRA costings (**Chapters 3 and 4**), in conjunction with the indicative phasing programme for the proposed development, see **Appendix 2.2**.

5.2.4 The indicative phasing programme identified 4 No. (overlapping) phases (as **Section 2.6**). For the purpose of modelling the liability accrual, the following phases have been applied (**Table 5.1**) - any period of overlapping in the phases has been removed for the purposes of the modelling exercise. The key activities, vis-à-vis CRAMP and/or ELRA liability, arising during each phase have been identified.

Table 5.1: Phases of proposed development for the purposes of CRAMP/ELRA liability accrual

Phase #	Years	Active/Operational			
		Haz LF	Non-haz LF	Inert LF	SP
Phase 0	Pre-licensing ²⁰	☒	☒	☑	☒
Phase 1	Year 0 – Year 4	☑	☒	☑	☑
Phase 2	Year 5 - Year 12	☑	☑	☑	☑
Phase 3	Year 13 - Year 23	☑	☑	☑	☑
Phase 4	Year 24 - Year 25	☒	☑	☑	☒
Aftercare	Aftercare stage	☒	☒	☒	☒

Haz LF = hazardous landfill; Non-haz LF = non-hazardous landfill; Inert LF = inert landfill; SP = Solidification Plant

²⁰ This represents the current licence assessment phase and the period of time prior to the commencement of construction activities relating to the proposed development. Liability for existing inert landfilling is addressed by the current licence (W0129-02).

- 5.2.5 Each CRAMP line item was assigned to the relevant phase, i.e. the point in time at which the cost is likely to be incurred. See **Appendix 5.2**.
- 5.2.6 Each ELRA line item was assigned to the relevant phase, i.e. the point in time at which the potential ELRA liability commences. See **Appendix 5.3**.
- 5.2.7 Based on the above, the combined Financial Provision (CRAMP plus ELRA) accrual costs, relative to the proposed development phases are provided in **Appendix 5.4**.
- 5.2.8 **Appendix 5.4** confirms that there is no Financial Provision (FP) liability at the pre-licensing stage (Phase 0). The Agency is invited to condition the requirement for FP to be in place to the satisfaction of the Agency, on a phased basis, in advance of commencement of each phase.
- 5.2.9 'Option 1' (**Appendix 5.4**) shows the accrual of FP liability at the phase at which each liability item arises. The output from Option 1 shows a significant loading of FP liability at Phase 4 (closure). Similarly, 'aftercare costs' fall liable at the aftercare stage. This was deemed to be an undesirable option, in that the financial loading is heavily concentrated at the closure stage.
- 5.2.10 To minimise risk and manage FP liability throughout the lifetime of the proposed development, it was recommended that Phase 4 FP liability and Aftercare Stage FP liability should be front-loaded over Phases 1 to 3 ('Option 2' in **Appendix 5.4**). Option 2 means that the licensee is accumulating FP funds significantly in advance of the liability accruing, such that in the event of the licensee discontinuing licensed activities due to any unforeseen event, the Agency will have access to a substantial FP fund.
- 5.2.11 In relation to the exact timing of each phase, and the resulting FP liability, the licensing model currently applied for Specified Engineering Works (SEW) approval could act as an appropriate trigger mechanism for instigation of the next phase of FP. There is a licence requirement for the licensee to obtain SEW approval for the construction of a new landfill cell. The key triggers for each phase of development of the proposed integrated waste management facility (W0129-03) can be identified as follows:
- FP Liability, Phase 1: Construction of hazardous cell H1
 - FP Liability, Phase 2: Construction of hazardous cell H2 and/or non-hazardous cell NH1
 - FP Liability, Phase 3: Construction of hazardous cell H3
 - FP Liability, Phase 4: Construction of non-hazardous cell NH2
- 5.2.12 It is recommended that FP identified per phase in **Appendix 5.4** should be put in place prior to the commencement of that phase, e.g. for Phase 1, construction of hazardous cell H1 shall not be authorised by the Agency until Phase 1 FP is demonstrated as being in place.
- 5.2.13 It is recommended that Phase 1 FP should be put in place by the licensee prior to the commencement of construction activities relating to the proposed development. This is deemed to be a worst-case scenario, in that the majority of the FP liability arises only upon the commencement of waste acceptance.

5.3 Mechanism for FP

- 5.3.1 The Applicant proposes a combination of: (i) cash-based account, (ii) bond, and (iii) insurance as the FP mechanism; see **Appendix 5.5**. The percentage break-down will adjust throughout the lifetime of the proposed development, with the general outcome being that the cash-based account increases over time, with a resulting reduction in the amount of FP provision addressed by a bond. At all times, the sum of FP provision addressed by cash-based, bond and insurance will address the total FP liability for that phase of the development (**Appendix 5.5**).
- 5.3.2 ELRA liability will be addressed by insurance cover relating to the proposed development. In addition, the FP mechanism (**Appendix 5.5**) makes provision for a cash-based/bond fixed sum for ELRA.
- 5.3.3 **Appendix 5.6** demonstrates how the Operator will build up the cash-based FP fund during the operation of the facility, i.e. via the imposition of a 'FP levy' based on the tonnage of waste accepted during a given phase. The model applies a variable 'FP levy' for each of the waste stream categories: hazardous, non-hazardous and inert.
- 5.3.4 It is noted that the Agency intends to issue new guidance on Financial Provision (FP) in 2014 and that this issue is being actively managed by the Office of Environmental Enforcement (OEE) Legal Services team. The Applicant will subscribe to the Agency's requirements/mechanisms for FP at the appropriate juncture, i.e. the specific arrangements for 'ring-fencing' the FP fund. Legal and contractual details will be addressed and implemented prior to the commencement of construction activities under any amended Waste Licence W0129-03.

5.4 Draw-down of FP

- 5.4.1 It shall be agreed that the EPA is the sole consent authority for authorising draw-down of CRAMP funds.
- 5.4.2 MEHL proposes that drawdown of financial provision sums during the operational lifetime of the landfill will be aligned with Specified Engineering Works (SEW)/ Construction Quality Assurance (CQA) processes and procedures, as follows:
- **Proposed restoration works and outline costings** - A proposal to restore an area ('SEW proposal') is submitted to the Agency for its agreement at least two months in advance of the intended date of commencement of restoration works. This is accompanied by an outline costing of the proposed works for the Agency's agreement²¹.
 - **Restoration works** - Restoration works will be completed and supervised by an appropriately qualified person, and that person, or persons, shall be present at all times during which relevant works are being undertaken.
 - **CQA Stage and drawdown of funds** - Following the completion of restoration works, a Construction Quality Assurance validation will be completed and made available for inspection by the Agency. Expenditure validation records for that phase of the restoration works will be made available for inspection by the Agency and it is proposed that a signed agreement will issue from the Agency for drawdown of funds²².
 - **Records of Financial Provision drawdown** - The licensee will maintain a model to note and record details of proposals made to EPA in relation to restoration works, date(s) of EPA approvals and actual draw-down details (dates and amounts).

²¹ It is proposed that standardised pro-forma documents be drawn up, which address any appropriate legal requirements.

²² It is proposed that standardised pro-forma documents be drawn up, which address any appropriate legal requirements.

5.5 S.53(A) Requirements re. setting of Landfill Gate Fees

5.5.1 The Landfill Directive and Section 53(A) of the Waste Management Act, 1996 (as amended) requires that the price charged for disposal of waste in a landfill must not be less than the total costs necessary for the three purposes set out in Section 53(A)(4).²³ These are:

- the costs incurred by the operator in the acquisition or development, or both (as the case may be), of the facility,
- the costs of operating the facility during the relevant period (including the costs of making any financial provision under section 53), and
- the estimated costs, during a period of not less than 30 years or such greater period as may be prescribed, of the closure, restoration, remediation or aftercare of the facility.

5.5.2 The licensee will ensure that the long-term aftercare of the facility (*inter alia*) will be considered and will be reflected in the charging structure during the operation of the facility.

5.5.3 MEHL will apply the EPA's bespoke landfill gate fees financial model for determining and reporting to the EPA compliance with Section 53(A).²⁴ The model will be completed and reported to the Agency prior to the acceptance of waste under any future revised Waste Licence W0129-03, and annually thereafter.

5.5.4 As W0129-03 proposals make provision for the acceptance of waste under three separate classes of landfill (inert, non-hazardous and hazardous), variable gate fees will apply, in line with the costs associated with the management and aftercare of different waste types.

5.5.5 It is noted that charging relates to the period of time from the date of commencement of waste disposal in the landfill to the predicted date of cessation of waste disposal in the landfill, but that costs include acquisition, development, closure, restoration, remediation and aftercare costs.²⁵ Details and records pertaining to costs, budgets and estimates will be fully documented by MEHL and independently verified, where necessary, in line with business and financial planning and management requirements.

5.5.6 In accordance with the EPA financial model, consideration of revenue and costs will include the following items (for example)²⁶:

- Operating costs:
 - Staff
 - Monitoring and control
 - Administrative costs
 - Resources (electricity and fuel)
 - Data management and reporting
- Acquisition and development costs:

²³ www.epa.ie (Apr. 2013)

²⁴ The relevant returns have already been made by MEHL under the requirements of W0129-02.

²⁵ EPA (2013) S.53(A) Financial Model 2013

²⁶ EPA (2012) Landfill gate fee workshop (EPA presentation of 1st March 2012)

- Land, roads, weighbridge, wheelwash, fencing, buildings, carpark
- Drainage, interceptors, settlement ponds/lagoons, oil separators
- Plant, machinery, vehicles
- Monitoring infrastructure
- Leachate tanks
- Services (surface water, foul water, watermain, power)
- Bunded oil storage
- Waste quarantine area
- Traffic management barriers
- CCTV
- Alarms
- Spill control equipment
- Lighting
- Cell construction/development costs
 - Excavation and replacement of soft materials
 - Grading to formation levels
 - Embankments
 - Basal liner system
 - Leachate collection layer
 - Side slope risers
 - Capping costs
 - Leachate costs
- Restoration and aftercare costs

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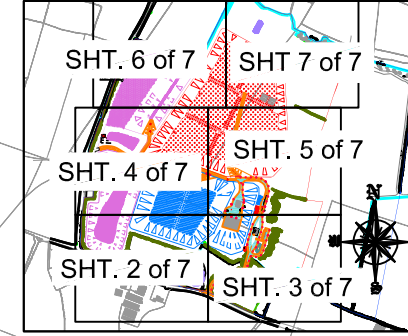
APPENDICES

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Appendix 2.1: Proposed Site Layout Drawing

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KEY PLAN :-

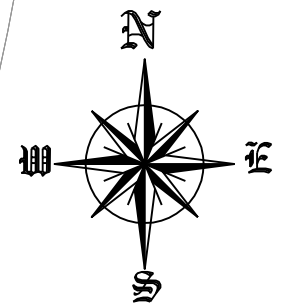
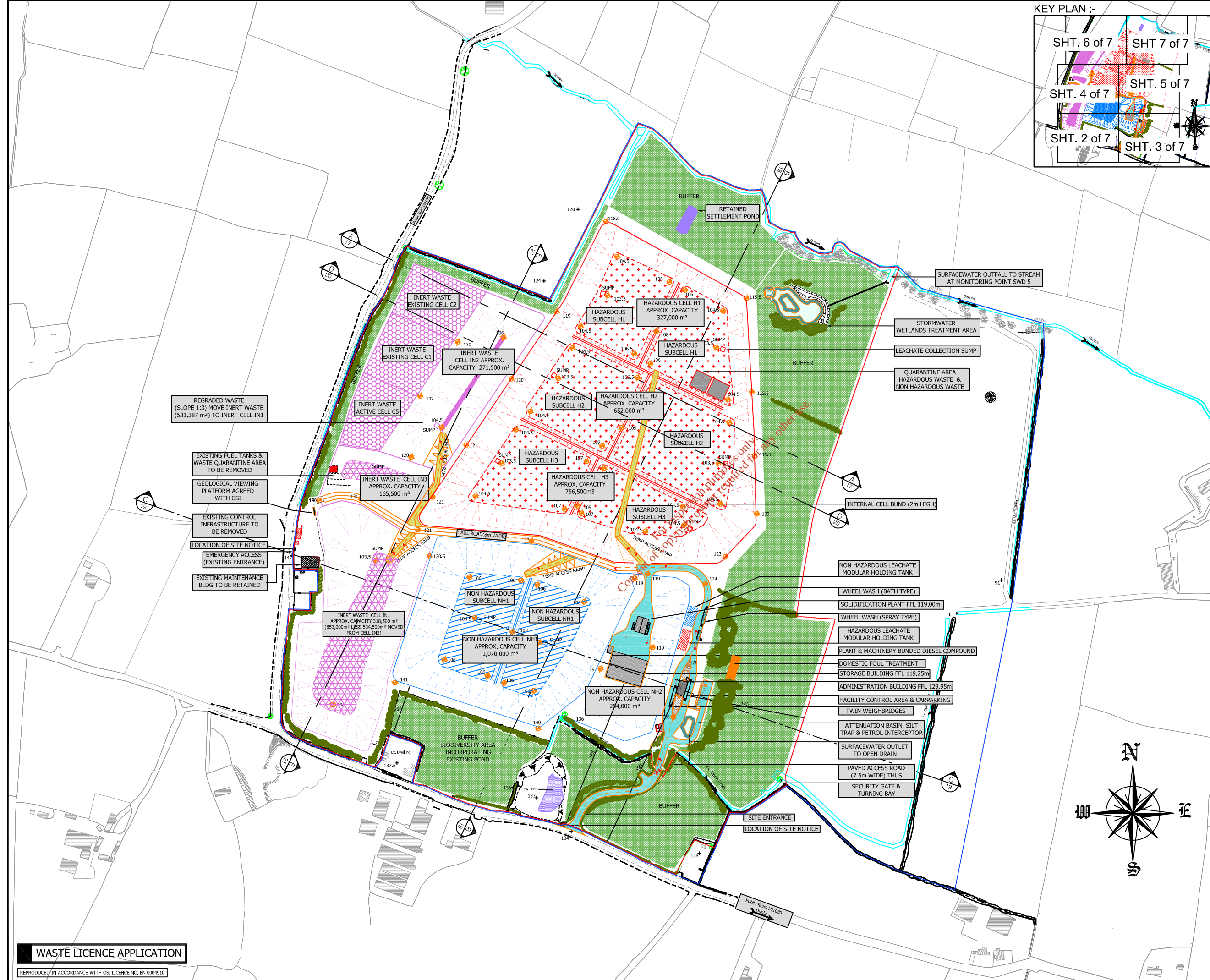


GENERAL NOTES:

ALL LEVELS RELATE TO MALIN HEAD ORDNANCE DATUM.
 ALL LEVELS TO BE CONFIRMED ON SITE BY MAIN CONTRACTOR PRIOR TO COMMENCEMENT.
 DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS.
 DO NOT SCALE THIS DRAWING - USE FIGURED DIMENSIONS ONLY.

LEGEND:-

	Ownership Boundary
	Proposed Planning & EPA Waste Licence Boundary
	Paved Hardstanding
	Location for Hazardous Cells
	Location for Non-Hazardous Cells
	Existing Inert Cells
	Location for Inert Cells
	Buffer Zone
	Traffic flow
	Embankment (Slope Direction)
	Level / Top of Liner
	Existing Ground Level Contour
	Existing Spot Level
	Existing Surface Water
	Existing Public Watermain Sluice Valve
	Existing Public Watermain Hydrant
	Existing Road Sign
	Existing Telephone Pole
	Existing Electrical Pole
	Existing Electrical Duct & Access Chamber
	Existing Access Gate
	Existing Fence (Various Types)
	Existing Masonary Wall
	Existing Hedgerow
	Leachate Drainage
	Surface Water Drainage



01	WASTE LICENCE APPLICATION	10.12.10	4 Projects
ver.	amendment	date,	Issued to,

Prepared For:

Client: **MEHL INTEGRATED WASTE MANAGEMENT FACILITY**

Location: **HOLLYWOOD GREAT, NAG'S HEAD, NAUL, CO. DUBLIN**

Title: **PROPOSED SITE LAYOUT (SHEET 1 OF 7)**

Project Name: PP	Drawing No.: 03	File Name:
Study Name: WLA	Version No.: 01	PP_WLA_03_01
Section:	Date: 10 Dec 2010	
WYG Job Number: C007831	SCALE: A1(1:2000)/A3(1:4000)	
Created By: CF	Reviewed By: JD	Signed Off By: HB

Prepared by:
 Old Bridge House,
 Strand Street,
 Athlone,
 Co. Westmeath.

 WYG (Engineering) Ireland Ltd.

ARUP **patel tonra** **MARAN PLANNERS**
 environmental solutions
 Chartered Town Planning Consultants

WASTE LICENCE APPLICATION

REPRODUCED IN ACCORDANCE WITH OSI LICENCE NO. EN 0004910

Appendix 2.2: Indicative Phasing Programme

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FIGURE 1: INDICATIVE PHASING PROGRAMME

Cell	Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Phase 1		1 (0-5)																									
Phase 2		2 (3-13)																									
Phase 3		3 (11-23)																									
Phase 4		4 (23-25)																									
H1	Construction	Grey	Grey				Grey																				
	Operation		Red	Red	Red	Red	Red																				
H2	Construction				Grey	Grey								Grey													
	Operation						Red	Red	Red	Red	Red	Red	Red	Red	Red												
H3	Construction												Grey	Grey	Grey											Grey	
	Operation														Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	
NH1	Construction							Grey	Grey																	Grey	
	Operation									Purple	Purple	Purple	Purple	Purple	Purple	Purple	Purple	Purple	Purple	Purple	Purple	Purple	Purple	Purple	Purple	Purple	
NH2	Construction																									Grey	
	Operation																									Grey	Purple
IN1	Construction	Grey	Grey																								Grey
	Operation		Green	Green	Green	Green																					Green
IN2	Construction									Grey																	
	Operation										Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	
IN3	Construction				Grey																						
	Operation					Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	
Inert Recovery Facility																											
Solidification Plant																											

Hazardous Operations	Red
Non-Hazardous Operations	Purple
Inert Operations	Green
Construction Works	Grey
Daily Operations	Yellow

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Appendix 2.3: CRAMP Costing

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**MEHL Proposed Integrated Waste Management Facility
EPA Industrial Emissions Licence Application W0129-03**

CRAMP Costs

#	Item	Units	Quantity (No. units)	Unit Rate	Cost	Source of Unit Rates/Comments
	CLOSURE					
1	Capping and restoration of landfill cells					
1.1	Capping and drainage: hazardous landfill cells	m2	86,046	€ 25	€ 2,168,359	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 2, €39.5/unit; LOWER RANGE - Project-specific costing €10.9/unit
1.2	Capping and drainage: non-hazardous landfill cells	m2	61,620	€ 23	€ 1,386,450	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 2, €35/unit; LOWER RANGE - Project-specific costing €10/unit
1.3	Capping and drainage: inert landfill cells	m2	81,906	€ 9	€ 696,201	Average of: UPPER RANGE - EPA 2014, Unit cost rates, €17/unit; LOWER RANGE - Cost-neutral based on MEHL experience
2	Decontamination					
2.1	Hazardous waste silos (4 x 78m3 capacity)	tonnes	4	€ 10,275	€ 41,100	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €12,650/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €7,900/unit
2.2	Acid tank (2 x 80m3 capacity)	tonnes	2	€ 10,275	€ 20,550	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €12,650/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €7,900/unit
2.3	Interceptor sludge (transport/disposal/recovery)	tonnes	1	€ 140	€ 140	EPA 2014, Unit cost rates, Table A3
2.4	Decontamination of leachate, diesel tanks, septic tank and general cleaning - Jet vac road tanker, 2-3 General Operatives	days	10	€ 1,385	€ 13,850	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €1,670/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €1,100/unit
2.5	Supervisor	day	4	€ 413	€ 1,650	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €490/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €335/unit
3	Decommissioning				€ -	
3.1	Hazardous waste silos (4 x 78m3 capacity)	tonnes	4	€ 17,000	€ 68,000	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €20,000/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €14,000/unit
3.2	Acid tank (2 x 80m3 capacity)	tonnes	2	€ 17,000	€ 34,000	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €20,000/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €14,000/unit
3.3	Decommissioning of leachate, diesel tanks, septic tank and general decommissioning - General Operatives (3 No.)	days	8	€ 1,800	€ 14,400	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €2,100/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €1,500/unit
3.4	Supervisor	day	4	€ 525	€ 2,100	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €600/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €450/unit
4	Demolition					

**MEHL Proposed Integrated Waste Management Facility
EPA Industrial Emissions Licence Application W0129-03**

CRAMP Costs

#	Item	Units	Quantity (No. units)	Unit Rate	Cost	Source of Unit Rates/Comments
4.1	Solidification Plant	m3	3,472	€ 18	€ 62,494	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €20/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €16/unit
4.2	Offices	m3	926	€ 18	€ 16,673	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €20/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €16/unit
4.3	Storage building	m3	12,111	€ 18	€ 218,001	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €20/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €16/unit
4.4	Leachate holding tanks	m3	998	€ 18	€ 17,964	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €20/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €16/unit
4.5	Off-site recovery of rubble	m3	4,182	€ 2	€ 9,410	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €4.5/unit; LOWER RANGE - zero-cost, based on MEHL experience
4.6	Off-site recovery of bitumen material	m3	2,235	€ 3	€ 6,706	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €4.5/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €1.5/unit
4.7	Off-site recovery of metals	m3		€ -	€ -	Negative-cost (i.e. value accruing) based on market values.
4.8	Transportation costs (for off-site removal of rubble and bitumen material)	tonnes	9,626	€ 19	€ 180,494	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €60/unit *50% (50-km each-way trip assumed); LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €15/unit *50% (50-km each-way trip assumed)
5	Closure Procedures					
5.1	Verification Audit, Certification and Report to EPA	Item	1	€ 7,500	€ 7,500	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €10,000/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €5,000/unit
5.2	Surrender of EPA licence	Item	1	€ 22,500	€ 22,500	SI 284 of 2013, Class 11.2 hazardous waste disposal
6	Contingency - Closure		10%		€ 498,854.20	
	SUBTOTAL - CLOSURE				€ 5,487,396	
	AFTERCARE					
7	General maintenance and aftercare					
7.1	General ongoing maintenance and aftercare, Aftercare Years 1-5, Gen Operative	days per annum	52	€ 155	€ 40,300	Local rates applied; 1 day per week for Aftercare Years 1 to 5
7.2	General ongoing maintenance and aftercare, Aftercare Years 6-30, Gen Operative	days per annum	24	€ 155	€ 93,000	Local rates applied; 1 day per fortnight for Aftercare Years 6 to 30
8	Monitoring and reporting					
8.1	Environmental Monitoring and Reporting - Aftercare Years 1-5					

**MEHL Proposed Integrated Waste Management Facility
EPA Industrial Emissions Licence Application W0129-03**

CRAMP Costs

#	Item	Units	Quantity (No. units)	Unit Rate	Cost	Source of Unit Rates/Comments
8.1.1	Leachate monitoring	per sample	10	€ 70	€ 14,000	EPA 2014, Unit cost rates, Table 1, €70/unit. Quarterly x 5 years
8.1.2	Surface water monitoring	per sample	2	€ 135	€ 5,400	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €150/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €120/unit. Quarterly x 5 years
8.1.3	Groundwater monitoring	per sample	15	€ 145	€ 43,500	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €160/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €130/unit. Quarterly x 5 years
8.1.4	Sampling and reporting (all environmental media)	per event	4	€ 2,400	€ 48,000	Local rates applied; Quarterly x 5 years
8.2	Environmental Monitoring and Reporting - Aftercare Years 6-30					
8.2.1	Leachate monitoring	per sample	10	€ 70	€ 17,500	EPA 2014, Unit cost rates, Table 1, €70/unit. Annually x 25 years
8.2.2	Surface water monitoring	per sample	2	€ 135	€ 6,750	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €150/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €120/unit. Annually x 25 years
8.2.3	Groundwater monitoring	per sample	15	€ 145	€ 54,375	Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €160/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €130/unit. Annually x 25 years
8.2.4	Sampling and reporting (all environmental media)	per event	1	€ 60,000	€ 60,000	Local rates applied; Annually x 25 years
9	Contingency - Aftercare		10%		€ 38,282.50	
	SUBTOTAL - AFTERCARE				€ 421,108	
	Total Closure + Aftercare costs (including contingency, excluding VAT)				€ 5,908,504	

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Appendix 3.1: Risk Register (list of plausible risks)

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Risk Register (Plausible Risks)

Risk ID	Process	Potential risk	Potential environmental effect/impact
#01	Construction activities	Release of uncontrolled discharge / polluting substance to water	Pollution of surface water/groundwater/soil
#02	Weighbridge/reception area for incoming vehicles	Fuel spillage arising from vehicular accident/incident	Pollution of surface water/groundwater/soil
#03	Weighbridge/reception area for incoming vehicles	Hazardous waste spillage arising from vehicular accident/incident	Pollution of surface water/groundwater/soil
#04	Risk of fire incident	Emissions to air	Uncontrolled emissions to air
#05	Risk of fire incident	Firewater discharge	Pollution of surface water/groundwater/soil
#06	Solidification process	Hazardous waste spillage arising from silo failure/leaks	Pollution of surface water/groundwater/soil
#07	Solidification process	Hazardous waste spillage during unloading/delivery operations	Pollution of surface water/groundwater/soil
#08	Solidification process - air abatement system	Failure of ventilation/air filtration system	Uncontrolled emissions to air
#09	Landfill operations: hazardous landfill cells	Failure of cell liner/leachate release	Pollution of surface water/groundwater/soil
#10	Landfill operations: non-hazardous landfill cells	Failure of cell liner/leachate release	Pollution of surface water/groundwater/soil
#11	Landfill operations: inert landfill cells	Failure of cell liner/leachate release	Pollution of surface water/groundwater/soil
#12	Leachate management	Tank/pipeline failure/leak	Pollution of surface water/groundwater/soil
#13	Surface water management infrastructure	Failure of system - uncontrolled release of polluting substance	Pollution of surface water/groundwater/soil
#14	Wastewater management	Failure of on-site foul treatment system	Pollution of surface water/groundwater/soil
#15	Fuel storage (located at Solidification Plant)	Tank/bund failure/leaks	Pollution of surface water/groundwater/soil
#16	Fuel storage (located at Solidification Plant)	Fuel spillage during tanker unloading/delivery operations	Pollution of surface water/groundwater/soil
#17	Garaging and maintenance	Fuel/polluting substance spillage	Pollution of surface water/groundwater/soil
#18	Acid storage	Tank/bund failure/leaks	Pollution of surface water/groundwater/soil
#19	Acid storage	Spillage during tanker unloading/delivery operations	Pollution of surface water/groundwater/soil
#20	Weather	Flooding on site causing uncontrolled discharge	Pollution of surface water/groundwater/soil

Appendix 3.2: Risk Analysis

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MEHL Proposed Integrated Waste Management Facility
EPA Industrial Emissions Licence Application W0129-03

Risk Analysis

Risk ID	Process	Potential risk	Potential environmental effect/impact	Consequence [See notes]	estimated vol of polluting substance (m3)	Basis of consequence	Likelihood [See notes]	Basis of likelihood	Risk Score [See notes]
#01	Construction activities	Release of uncontrolled discharge / polluting substance to water	Pollution of surface water/groundwater/soil	2	<30	Low volume of potential material losses; non-hazardous or hazardous material; impact considered to be localised.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact.	2
#02	Weighbridge/reception area for incoming vehicles	Fuel spillage arising from vehicular accident/incident	Pollution of surface water/groundwater/soil	3	30-100	Medium volume of potential material losses, based on 100% capacity of 1 No. fuel tanker; hazardous material; impact considered to be moderate.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact.	3
#03	Weighbridge/reception area for incoming vehicles	Hazardous waste spillage arising from vehicular accident/incident	Pollution of surface water/groundwater/soil	3	30-100	Medium volume of potential material losses, based on 100% capacity of 1 No. ash tanker; hazardous material; impact considered to be moderate.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact.	3
#04	Risk of fire incident	Emissions to air	Uncontrolled emissions to air	2	-	Low volume of potential material losses; hazardous or non-hazardous emissions; impact considered to be localised.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact.	2
#05	Risk of fire incident	Firewater discharge	Pollution of surface water/groundwater/soil	3	-	Firewater volume calculations not yet detailed.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact.	3
#06	Solidification process	Hazardous waste spillage arising from silo failure/leaks	Pollution of surface water/groundwater/soil	3	30-100	Medium volume of potential material losses, based on 100% capacity of 1 No. ash storage silo; hazardous material; impact considered to be moderate.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact.	3
#07	Solidification process	Hazardous waste spillage during unloading/delivery operations	Pollution of surface water/groundwater/soil	3	30-100	Medium volume of potential material losses, based on 100% capacity of 1 No. ash tanker; hazardous material; impact considered to be moderate.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact.	3
#08	Solidification process - air abatement system	Failure of ventilation/air filtration system	Uncontrolled emissions to air	2	-	Low volume of potential material losses; hazardous or non-hazardous emissions; impact considered to be localised.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact.	2
#09	Landfill operations: hazardous landfill cells	Failure of cell liner/leachate release	Pollution of surface water/groundwater/soil	4	>100	High volume of potential release [see Note (1)]; hazardous material; impact considered to be severe in local environment, primarily associated with groundwater impact.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact.	4

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Risk Analysis

Risk ID	Process	Potential risk	Potential environmental effect/impact	Consequence [See notes]	estimated vol of polluting substance (m3)	Basis of consequence	Likelihood [See notes]	Basis of likelihood	Risk Score [See notes]
#10	Landfill operations: non-hazardous landfill cells	Failure of cell liner/leachate release	Pollution of surface water/groundwater/soil	4	>100	High volume of potential release [see Note (ii)]; non-hazardous material; impact considered to be severe in local environment, primarily associated with groundwater impact.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact.	4
#11	Landfill operations: inert landfill cells	Failure of cell liner/leachate release	Pollution of surface water/groundwater/soil	4	>100	High volume of potential release [see Note (iii)]; inert material; impact considered to be severe in local environment, primarily associated with groundwater impact.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact.	4
#12	Leachate management	Tank/pipeline failure/leak	Pollution of surface water/groundwater/soil	4	>100	High volume of potential release based on 100% capacity of leachate holding tank; hazardous or non-hazardous material; impact considered to be severe in local environment, primarily associated with groundwater impact.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact.	4
#13	Surface water management infrastructure	Failure of system - uncontrolled release of polluting substance	Pollution of surface water/groundwater/soil	3		Medium volume of potential release anticipated; hazardous or non-hazardous material; impact considered to be moderate.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact.	3
#14	Wastewater management	Failure of on-site foul treatment system	Pollution of surface water/groundwater/soil		<30	Medium volume of potential material losses, based on capacity of the system; non-hazardous material; impact considered to be minor.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact.	2
#15	Fuel storage (located at Solidification Plant)	Tank/bund failure/leaks	Pollution of surface water/groundwater/soil	2	<30	Low volume of potential material losses, based on 100% capacity of fuel storage tank; hazardous material; impact considered to be localised.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact.	2
#16	Fuel storage (located at Solidification Plant)	Fuel spillage during tanker unloading/delivery operations	Pollution of surface water/groundwater/soil	3	30-100	Medium volume of potential material losses, based on 100% capacity of 1 No. fuel tanker; hazardous material; impact considered to be moderate.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact.	3
#17	Garaging and maintenance	Fuel/polluting substance spillage	Pollution of surface water/groundwater/soil	2	<30	Low volume of potential material losses; hazardous or non-hazardous material; impact considered to be localised.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent	2

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Risk Analysis

Risk ID	Process	Potential risk	Potential environmental effect/impact	Consequence [See notes]	estimated vol of polluting substance (m3)	Basis of consequence	Likelihood [See notes]	Basis of likelihood	Risk Score [See notes]
#18	Acid storage	Tank/bund failure/leaks	Pollution of surface water/groundwater/soil	3	30-100	Medium volume of potential material losses, based on 100% capacity of 1 No. acid tank; hazardous material; impact considered to be moderate.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact	3
#19	Acid storage	Spillage during tanker unloading/delivery operations	Pollution of surface water/groundwater/soil	3	30-100	Medium volume of potential material losses, based on 100% capacity of 1 No. fuel tanker; hazardous material; impact considered to be moderate.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact	3
#20	Weather	Flooding on site causing uncontrolled discharge	Pollution of surface water/groundwater/soil	3	30-100	Medium volume of potential release anticipated; hazardous or non-hazardous material; impact considered to be moderate.	1	The facility has been designed in accordance with legislative provisions and best practice control procedures to prevent environmental impact	3

[NOTES]

CONSEQUENCE

Rating	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 local environment
5	Massive	Massive impact to a large area, irreversible in medium term

LIKELIHOOD

Rating	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

RISK SCORE

Consequence
x
Likelihood

Note (i): Potential volume of loss calculated on the basis of floor area of largest hazardous cell, H3 and leachate head at 1m. Drainage layer of 0.5m, with porosity of 30%; soil layer of 0.5m with porosity of 5%.

Note (ii): Potential volume of loss calculated on the basis of floor area of largest non-hazardous cell, NH1 and leachate head at 1m. Drainage layer of 0.5m, with porosity of 30%; soil layer of 0.5m with porosity of 5%.

Note (iii): Potential volume of loss calculated on the basis of floor area of largest inert cell, IN1 and leachate head at 1m; porosity of 5%.

Appendix 3.3: Risk Matrix

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Risk Matrix

		Risk ID #					
Likelihood	V. High	5					
	High	4					
	Medium	3					
	Low	2					
	V. Low	1		1, 4, 8, 14, 15, 17	2, 3, 5, 6, 7, 13, 16, 18, 19, 20	9, 10, 11, 12	
			Trivial	Minor	Moderate	Major	Massive
			1	2	3	4	5
			Consequence				

The plausible worst case scenario may be represented by the risk with the highest consequence rating, i.e. Risks #9, 10, 11 and 12.

Risk #9 was identified as the most significant of these for quantification and costing, and has been brought forward to the 'ELRA Costing' worksheet.

No linked/domino-effects were identified with reference to Risk #9.

Appendix 3.4: Statement of Measures

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**MEHL Proposed Integrated Waste Management Facility
EPA Industrial Emissions Licence Application W0129-03**

Statement of Measures

Risk ID	Process	Potential risk	Risk Score	Mitigation Measures to be taken [See Note]	Outcome	Action	Completion Date	Responsible Person
#01	Construction activities	Release of uncontrolled discharge / polluting substance to water	2	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#02	Weighbridge/reception area for incoming vehicles	Fuel spillage arising from vehicular accident/incident	3	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#03	Weighbridge/reception area for incoming vehicles	Hazardous waste spillage arising from vehicular accident/incident	3	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#04	Risk of fire incident	Emissions to air	2	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#05	Risk of fire incident	Firewater discharge	3	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#06	Solidification process	Hazardous waste spillage arising from silo failure/leaks	3	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#07	Solidification process	Hazardous waste spillage during unloading/delivery operations	3	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#08	Solidification process - air abatement system	Failure of ventilation/air filtration system	2	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#09	Landfill operations: hazardous landfill cells	Failure of cell liner/leachate release	4	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#10	Landfill operations: non-hazardous landfill cells	Failure of cell liner/leachate release	4	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#11	Landfill operations: inert landfill cells	Failure of cell liner/leachate release	4	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#12	Leachate management	Tank/pipeline failure/leak	4	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.

**MEHL Proposed Integrated Waste Management Facility
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Statement of Measures

Risk ID	Process	Potential risk	Risk Score	Mitigation Measures to be taken [See Note]	Outcome	Action	Completion Date	Responsible Person
#13	Surface water management infrastructure	Failure of system - uncontrolled release of polluting substance	3	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#14	Wastewater management	Failure of on-site foul treatment system	2	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#15	Fuel storage (located at Solidification Plant)	Tank/bund failure/leaks	2	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#16	Fuel storage (located at Solidification Plant)	Fuel spillage during tanker unloading/delivery operations	3	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#17	Garaging and maintenance	Fuel/polluting substance spillage	2	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#18	Acid storage	Tank/bund failure/leaks	3	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#19	Acid storage	Spillage during tanker unloading/delivery operations	3	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.
#20	Weather	Flooding on site causing uncontrolled discharge	3	As EIS/EPA licence application	Risk of uncontrolled release/impact on receiving environment minimised.	Detailed design and construction to be undertaken.	To be determined post-licensing.	To be nominated.

[NOTE] Please note mitigation measures specified in EIS/EPA licence application are too voluminous to reproduce here; please refer directly to relevant section of EIS/application.

Appendix 3.5: ELRA Costing Model

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MEHL Proposed Integrated Waste Management Facility
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ELRA Plausible Worst-case Scenario Quantification and Costing

Risk ID	#09
Process	Landfill operations: hazardous landfill cells
Potential risk	Failure of cell liner/leachate release
Potential environmental effect/impact	Pollution of surface water/groundwater/soil
Risk Score	4

Option 1: Pre-placed waste is retained in hazardous waste cell (filled to 33% capacity), inert fill imported to complete cell and cap

Tasks	Description	Units	Quantity (No. of units)	Unit Rate	Cost
Installation of additional boreholes	Pumping and monitoring wells	per well	5	€ 1,700	€ 8,500
Installation of lined holding area	Relating to pump and treat system	unit	1	€ 26,000	€ 26,000
Pump and treat groundwater and surface water	Pumping of groundwater and/or surface water to a central ground-level storage/treatment point; treatment by precipitation/ coagulation/ flocculation; treated effluent returned to cell surface and re-circulated.	per annum	3	€ 200,000	€ 600,000
Leachate Monitoring	19 No. monitoring points; once per week for 3 months; once per month for 1 year thereafter	per sample	56	€ 70	€ 31,920
Groundwater Monitoring	21 No. monitoring points; once per week for 3 months; once per month for 1 year thereafter	per sample	504	€ 145	€ 73,080
Surface Water Monitoring	5 No. monitoring points; once per week for 3 months; once per month for 1 year thereafter	per sample	120	€ 135	€ 16,200
Consultant costs	Cover every day for 3 months; 1 day per week for 1 year thereafter (daily rate for 1 No. consultant)	days	102	€ 700	€ 71,400
General Operative	2 x Gen Ops for 1 year full-time; 1 x Gen Op for 2 years half-time thereafter	per annum	3	€ 65,000	€ 195,000
Fill	Based on clean soil & stones to be imported to fill an estimated (66%) of the cell capacity of cell H3	m3	482444	€ 5	€ 2,412,220
Capping	Cover for cell H3 to cover 75% of cost, balance covered by CRAMP	m2	24500	€ 25	€ 617,387
TOTAL					€ 4,051,708
CONTINGENCY				40%	€ 1,620,683
TOTAL INCLUDING CONTINGENCY					€ 5,672,391

Source of Unit Rates
EPA 2014 Guidance, Table B8, €1,700/unit.
EPA 2014 Guidance, Table B8, €26,000/unit.
EPA 2014 Guidance, Table B8, €200,000/unit.
EPA 2014, Unit cost rates, Table 1, €70/unit.
Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €160/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €130/unit.
Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €150/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €120/unit.
Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €900/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €500/unit
Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 2, €70,000/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 2, €60,000/unit
Local rates applied.
Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 2, €39.5/unit; LOWER RANGE - McElroy €10.9/unit

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MEHL Proposed Integrated Waste Management Facility
EPA Industrial Emissions Licence Application W0129-03
ELRA Plausible Worst-case Scenario Quantification and Costing

Risk ID	#09
Process	Landfill operations: hazardous landfill cells
Potential risk	Failure of cell liner/leachate release
Potential environmental effect/impact	Pollution of surface water/groundwater/soil
Risk Score	4

Option 2: Pre-placed waste excavated from hazardous waste cell (filled to 33% capacity) and moved to alternative hazardous waste cell on site

Tasks	Description	Units	Quantity (No. of units)	Unit Rate	Cost
Installation of additional boreholes	Pumping and monitoring wells	per well	5	€ 1,700	€ 8,500
Installation of lined holding area	Relating to pump and treat system	unit	1	€ 26,000	€ 26,000
Pump and treat groundwater and surface water	Pumping of groundwater and/or surface water to a central ground-level storage/treatment point; treatment by precipitation/ coagulation/ flocculation; treated effluent returned to cell surface and re-circulated.	per annum	3	€ 200,000	€ 600,000
Leachate Monitoring	19 No. monitoring points; once per week for 3 months; once per month for 1 year thereafter	per sample	56	€ 70	€ 31,920
Groundwater Monitoring	21 No. monitoring points; once per week for 3 months; once per month for 1 year thereafter	per sample	504	€ 145	€ 73,080
Surface Water Monitoring	5 No. monitoring points; once per week for 3 months; once per month for 1 year thereafter	per sample	120	€ 135	€ 16,200
Consultant costs	Cover every day for 3 months; 1 day per week for 1 year thereafter (daily rate for 1 No. consultant)	days	102	€ 700	€ 71,400
General Operative	2 x Gen Ops for 1 year full-time; 1 x Gen Op for 2 years half-time thereafter	per annum	3	€ 65,000	€ 195,000
Excavation	Excavation of hazardous waste (33% of cell capacity) and replacing it in alternative hazardous waste cell on site	m3	241,222	€ 10	€ 2,412,220
Capping	Cover for cell H3 to cover 75% of cost, balance covered by CRAMP	m2	24500	€ 25	€ 617,387
TOTAL					€ 4,051,707
CONTINGENCY				40%	€ 1,620,683
TOTAL INCLUDING CONTINGENCY					€ 5,672,390

Source of Unit Rates
EPA 2014 Guidance, Table B8, €1,700/unit.
EPA 2014 Guidance, Table B8, €26,000/unit.
EPA 2014 Guidance, Table B8, €200,000/unit.
EPA 2014, Unit cost rates, Table 1, €70/unit.
Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €160/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €130/unit.
Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €150/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €120/unit.
Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 1, €900/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 1, €500/unit
Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 2, €70,000/unit; LOWER RANGE - EPA 2014, Unit cost rates, Table 2, €60,000/unit
Local rates applied.
Average of: UPPER RANGE - EPA 2014, Unit cost rates, Table 2, €39.5/unit; LOWER RANGE - McElroy €10.9/unit

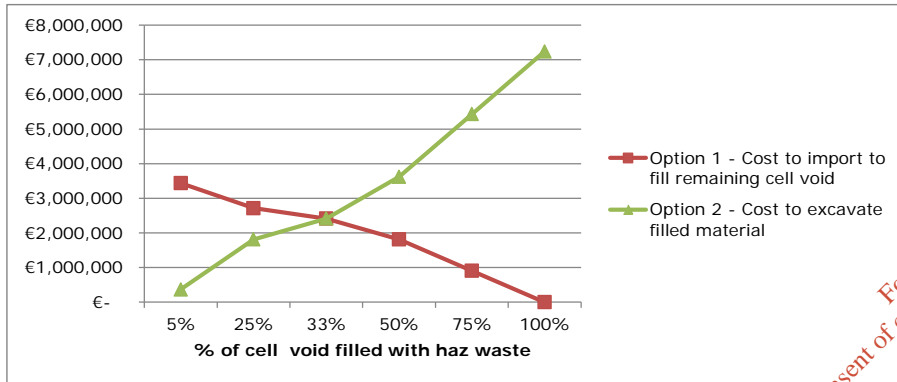
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ELRA Plausible Worst-case Scenario Quantification and Costing

Risk ID	#09
Process	Landfill operations: hazardous landfill cells
Potential risk	Failure of cell liner/leachate release
Potential environmental effect/impact	Pollution of surface water/groundwater/soil
Risk Score	4

OPTION 1 OR OPTION 2?

In considering Option 1 or Option 2, i.e. whether to retain the placed waste in-situ and import inert material to fill the remaining void, or to excavate the material and place in an adjacent hazardous waste cell (space permitting), the critical control factor would be the amount of waste already placed. The model below demonstrates the equilibrium point as being at 33.33% of cell filled.



% of cell filled	Option 1 - Cost to import to fill remaining cell	Option 2 - Cost to excavate filled material
5%	€ 3,437,414	€ 361,833
25%	€ 2,713,748	€ 1,809,165
33%	€ 2,412,220	€ 2,412,220
50%	€ 1,809,165	€ 3,618,330
75%	€ 904,583	€ 5,427,495
100%	€ -	€ 7,236,660

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Appendix 5.1: Financial Provision Summary

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Summary Financial Provision

Liability Type	Amount
Financial provision for closure	€ 5,487,396
Financial provision for aftercare	€ 421,108
Financial provision for incidents	€ 5,672,391
TOTAL (including contingency, excluding VAT)	€ 11,580,894

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Appendix 5.2: CRAMP Costs Accrual (relative to phases)

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MEHL Proposed Integrated Waste Management Facility
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CRAMP Costs Accrual relative to Phasing Plan

#	Item	Estimated Cost (median)	PHASE AT WHICH CRAMP LIABILITY ARISES						
			Phase 0	Phase 1	Phase 2	Phase 3	Phase 4	Aftercare	
	CLOSURE								
1	Capping and restoration of landfill cells								
1.1	Capping and drainage: hazardous landfill cells	€ 2,168,359	€ -	€ -	€ 705,600	€ 639,576	€ 823,183	€ -	€ -
1.2	Capping and drainage: non-hazardous landfill cells	€ 1,386,450	€ -	€ -	€ -	€ -	€ 1,386,450	€ -	€ -
1.3	Capping and drainage: inert landfill cells	€ 696,201	€ -	€ -	€ 83,071	€ 332,801	€ 280,330	€ -	€ -
2	Decontamination								
2.1	Hazardous waste silos (4 x 78m3 capacity)	€ 41,100	€ -	€ -	€ -	€ -	€ 41,100	€ -	€ -
2.2	Acid tank (2 x 80m3 capacity)	€ 20,550	€ -	€ -	€ -	€ -	€ 20,550	€ -	€ -
2.3	Interceptor sludge (transport/disposal/recovery)	€ 140	€ -	€ -	€ -	€ -	€ 140	€ -	€ -
2.4	Decontamination of leachate, diesel tanks, septic tank and general cleaning - Jet vac road tanker, 2-3 General Operatives	€ 13,850	€ -	€ -	€ -	€ -	€ 13,850	€ -	€ -
2.5	Supervisor	€ 1,650	€ -	€ -	€ -	€ -	€ 1,650	€ -	€ -
3	Decommissioning								
3.1	Hazardous waste silos (4 x 78m3 capacity)	€ 68,000	€ -	€ -	€ -	€ -	€ 68,000	€ -	€ -
3.2	Acid tank (2 x 80m3 capacity)	€ 34,000	€ -	€ -	€ -	€ -	€ 34,000	€ -	€ -
3.3	Decommissioning of leachate, diesel tanks, septic tank and general decommissioning - General Operatives (3 No.)	€ 14,400	€ -	€ -	€ -	€ -	€ 14,400	€ -	€ -
3.4	Supervisor	€ 2,100	€ -	€ -	€ -	€ -	€ 2,100	€ -	€ -
4	Demolition								
4.1	Solidification Plant	€ 62,494	€ -	€ -	€ -	€ -	€ 62,494	€ -	€ -
4.2	Offices	€ 16,673	€ -	€ -	€ -	€ -	€ 16,673	€ -	€ -
4.3	Storage building	€ 218,001	€ -	€ -	€ -	€ -	€ 218,001	€ -	€ -
4.4	Leachate holding tanks	€ 17,964	€ -	€ -	€ -	€ -	€ 17,964	€ -	€ -
4.5	Off-site recovery of rubble	€ 9,410	€ -	€ -	€ -	€ -	€ 9,410	€ -	€ -
4.6	Off-site recovery of bitumen material	€ 6,706	€ -	€ -	€ -	€ -	€ 6,706	€ -	€ -
4.7	Off-site recovery of metals	€ -	€ -	€ -	€ -	€ -	€ -	€ -	€ -
4.8	Transportation costs (for off-site removal of rubble and bitumen material)	€ 180,494	€ -	€ -	€ -	€ -	€ 180,494	€ -	€ -
5	Closure Procedures								

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**MEHL Proposed Integrated Waste Management Facility
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CRAMP Costs Accrual relative to Phasing Plan**

#	Item	Estimated Cost (median)	PHASE AT WHICH CRAMP LIABILITY ARISES					
			Phase 0	Phase 1	Phase 2	Phase 3	Phase 4	Aftercare
5.1	Verification Audit, Certification and Report to EPA	€ 7,500	€ -	€ -	€ -	€ -	€ 7,500	€ -
5.2	Surrender of EPA licence	€ 22,500	€ -	€ -	€ -	€ -	€ 22,500	€ -
6	Contingency - Closure	€ 498,854	€ -	€ -	€ -	€ -	€ 498,854	€ -
	SUBTOTAL - CLOSURE	€ 5,487,396	€ -	€ -	€ 788,671	€ 972,377	€ 3,726,349	€ -
	AFTERCARE							
7	General maintenance and aftercare							
7.1	General ongoing maintenance and aftercare, Aftercare Years 1-5, Gen Operative	€ 40,300	€ -	€ -	€ -	€ -	€ -	€ 40,300
7.2	General ongoing maintenance and aftercare, Aftercare Years 6-30, Gen Operative	€ 93,000	€ -	€ -	€ -	€ -	€ -	€ 93,000
8	Monitoring and reporting							
8.1	Environmental Monitoring and Reporting - Aftercare Years 1-5							
8.1.1	Leachate monitoring	€ 14,000	€ -	€ -	€ -	€ -	€ -	€ 14,000
8.1.2	Surface water monitoring	€ 5,400	€ -	€ -	€ -	€ -	€ -	€ 5,400
8.1.3	Groundwater monitoring	€ 43,500	€ -	€ -	€ -	€ -	€ -	€ 43,500
8.1.4	Sampling and reporting (all environmental media)	€ 48,000	€ -	€ -	€ -	€ -	€ -	€ 48,000
8.2	Environmental Monitoring and Reporting - Aftercare Years 6-30							
8.2.1	Leachate monitoring	€ 17,500	€ -	€ -	€ -	€ -	€ -	€ 17,500
8.2.2	Surface water monitoring	€ 6,750	€ -	€ -	€ -	€ -	€ -	€ 6,750
8.2.3	Groundwater monitoring	€ 54,375	€ -	€ -	€ -	€ -	€ -	€ 54,375
8.2.4	Sampling and reporting (all environmental media)	€ 60,000	€ -	€ -	€ -	€ -	€ -	€ 60,000
9	Contingency - Aftercare	€ 38,283	€ -	€ -	€ -	€ -	€ -	€ 38,283
	SUBTOTAL - AFTERCARE	€ 421,108	€ -	€ -	€ -	€ -	€ -	€ 421,108
	Total Closure + Aftercare costs (including contingency, excluding VAT)	€ 5,908,504	€ -	€ -	€ 788,671	€ 972,377	€ 3,726,349	€ 421,108

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Appendix 5.3: ELRA Costs Accrual (relative to phases)

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**MEHL Proposed Integrated Waste Management Facility
EPA Industrial Emissions Licence Application W0129-03**

ELRA Costs Accrual relative to Phasing Plan

Risk ID	Process	Potential Risk	Cost	PHASE AT WHICH ELRA LIABILITY ARISES					
				Phase 0	Phase 1	Phase 2	Phase 3	Phase 4	Aftercare
#09	Landfill operations: hazardous landfill cells	Failure of cell liner/leachate release	€ 5,672,391		€ 5,672,391	€ 5,672,391	€ 5,672,391	€ 5,672,391	€ 5,672,391
			€ 5,672,391	€ -	€ 5,672,391	€ 5,672,391	€ 5,672,391	€ 5,672,391	€ 5,672,391

Aftercare ELRA liability

Re. Aftercare ELRA liability, it is proposed that a sliding scale applies (subject to verification by ongoing monitoring and assessment), as follows:

ELRA Liability in Aftercare Phase	% of total ELRA liability on sliding scale	
Aftercare Year 1	100%	€ 5,672,391
Aftercare Year 2	95%	€ 5,388,771
Aftercare Year 3	90%	€ 5,105,151
Aftercare Year 4	85%	€ 4,821,532
Aftercare Year 5	80%	€ 4,537,912
Aftercare Year 10	55%	€ 3,119,815
Aftercare Year 19	10%	€ 567,239
Aftercare Year 20	0%	€ -
Aftercare Year 30	0%	€ -

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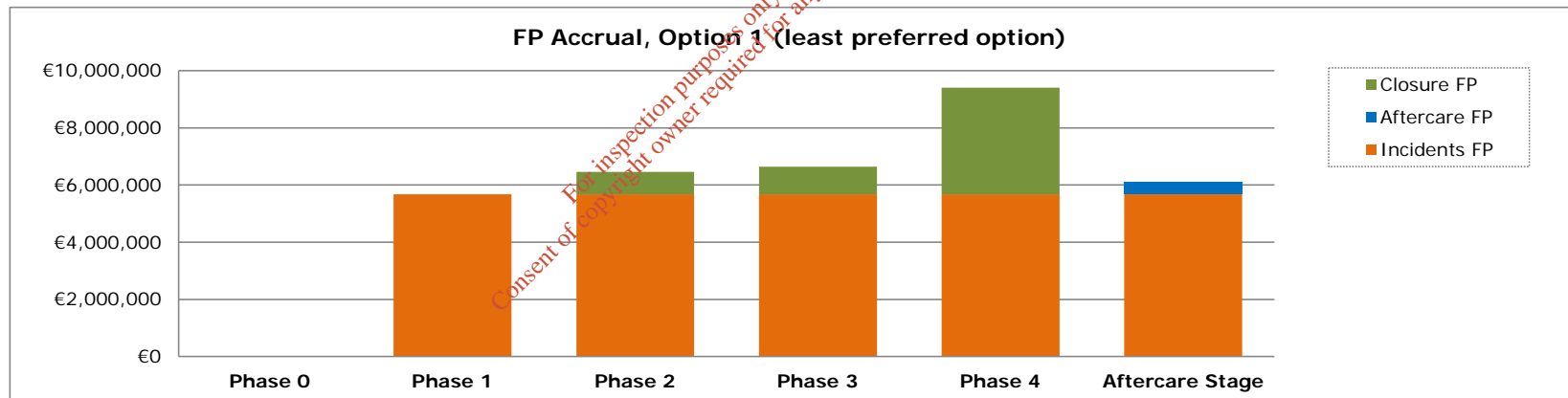
Appendix 5.4: Summary Financial Provision Accrual (relative to phases)

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**MEHL Proposed Integrated Waste Management Facility
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Summary Financial Provision Accrual relative to Phasing Plan**

Option 1: Phased FP Liability as and when arising

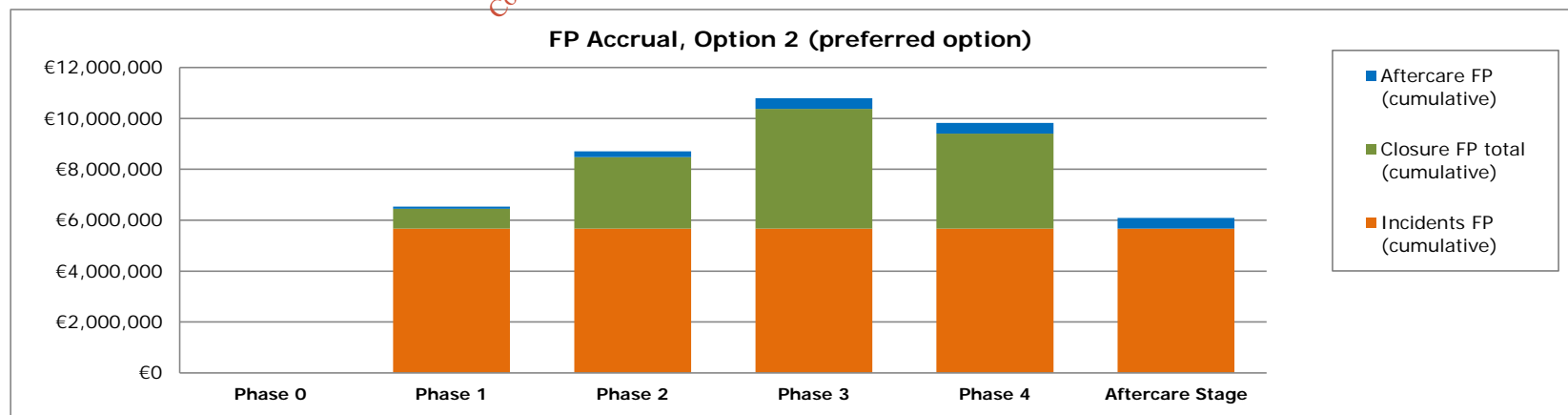
Liability Type	Phase 0	Phase 1	Phase 2	Phase 3	Phase 4	Aftercare Stage	Total Provision
	<i>Pre-licensing</i>	<i>Year 0-4</i>	<i>Year 5-12</i>	<i>Year 13-23</i>	<i>Year 24-25</i>	[Note 1]	
Closure FP	€0	€0	€788,671	€972,377	€3,726,349	€0	€5,487,396
Aftercare FP	€0	€0	€0	€0	€0	€421,108	€421,108
Incidents FP	€0	€5,672,391	€5,672,391	€5,672,391	€5,672,391	€5,672,391	€5,672,391
TOTAL	€0	€5,672,391	€6,461,061	€6,644,767	€9,398,740	€6,093,498	€11,580,894



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Summary Financial Provision Accrual relative to Phasing Plan**

Option 2: FP Liability with front-loading in Phases 1 to 3

Liability Type	Phase 0	Phase 1	Phase 2	Phase 3	Phase 4	Aftercare Stage	Total Provision
	Pre-licensing	Year 0-4	Year 5-12	Year 13-23	Year 24-25	[Note 1]	
Closure FP, Phases 0-3	€0	€0	€788,671	€972,377			€1,761,047
Closure FP, Phase 4 front-loaded [Note 2]	€0	€776,323	€1,242,116	€1,707,910			€3,726,349
Closure FP, draw-down [Note 3]	€0	€0		-€788,671	-€972,377	-€3,726,349	
Closure FP total (cumulative)	€0	€776,323	€2,807,110	€4,698,726	€3,726,349	€0	
Aftercare FP, front-loaded [Note 2]	€0	€87,731	€140,369	€193,008			€421,108
Aftercare FP (cumulative)	€0	€87,731	€228,100	€421,108	€421,108	€421,108	
Closure + Aftercare FP (cumulative)	€0	€864,053	€3,035,210	€5,119,833	€4,147,457	€421,108	
Incidents FP (cumulative)	€0	€5,672,391	€5,672,391	€5,672,391	€5,672,391	€5,672,391	€5,672,391
FP for Closure, Aftercare and Incidents (cumulative)	€0	€6,536,444	€8,707,600	€10,792,224	€9,819,847	€6,093,498	



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Summary Financial Provision Accrual relative to Phasing Plan

[NOTES]

NOTE 1: Aftercare ELRA liability is proposed on a sliding scale basis at -5% per annum (subject to verification by ongoing monitoring and assessment); see 'ELRA Accrual' worksheet (**Appendix 5.3**).

NOTE 2: FP for Phase 4 closure, and aftercare has been front-loaded, on the basis of an annual average based on the number of years per phase of development.

NOTE 3: As it is proposed to restore the site on a phased basis, it is proposed that CRAMP funds will be drawn down on an 'as required' basis, and in compliance with FP mechanism agreements.

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Appendix 5.5: Financial Provision Mechanism

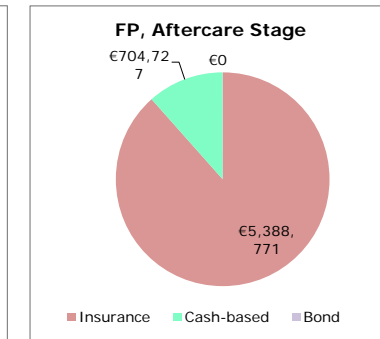
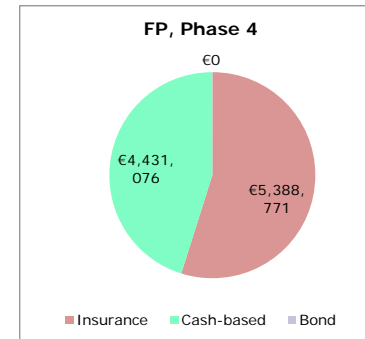
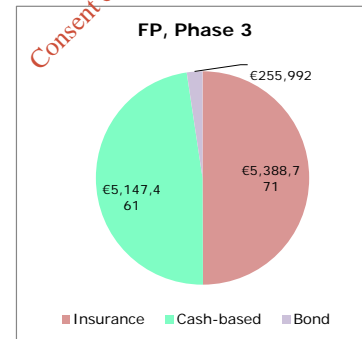
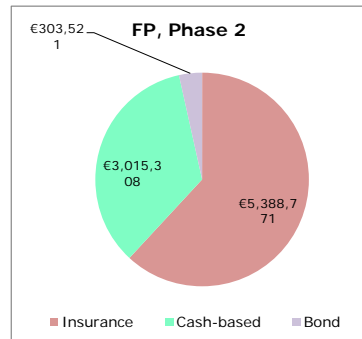
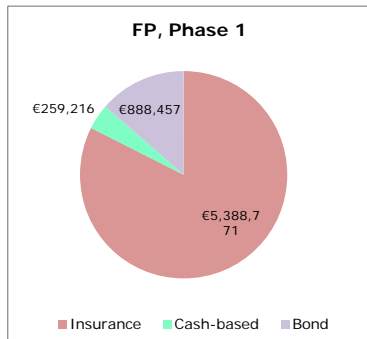
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**MEHL Proposed Integrated Waste Management Facility
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Financial Provision Mechanism

On the basis of Option 2, proposed FP mechanism as follows:

Liability Type	Mechanism	FP at commencement of each phase (cumulative)									
		Phase 1		Phase 2		Phase 3		Phase 4		Aftercare Stage [Note 1]	
		%	Amount	%	Amount	%	Amount	%	Amount	%	Amount
FP for closure and aftercare	Cash-based	30%	€259,216	90%	€2,731,689	95%	€4,863,842	100%	€4,147,457	100%	€421,108
FP for closure and aftercare	Bond	70%	€604,837	10%	€303,521	5%	€255,992	0%	€0.00	0%	€0
FP for incidents	Insurance	95%	€5,388,771	95%	€5,388,771	95%	€5,388,771	95%	€5,388,771	95%	€5,388,771
FP for incidents	Cash-based	0%	€0	5%	€283,620	5%	€283,620	5%	€283,620	5%	€283,620
FP for incidents	Bond	5%	€283,620	0%	€0.00	0%	€0	0%	€0	0%	€0
TOTAL FP CRAMP + ELRA	Insurance		€5,388,771		€5,388,771		€5,388,771		€5,388,771		€5,388,771
TOTAL FP CRAMP + ELRA	Cash-based		€259,216		€3,015,308		€5,147,461		€4,431,076		€704,727
TOTAL FP CRAMP + ELRA	Bond		€888,457		€303,521		€255,992		€0		€0
TOTAL			€6,536,444		€8,707,600		€10,792,224		€9,819,847		€6,093,498



NOTE 1: Aftercare ELRA liability is proposed on a sliding scale basis at -5% per annum (subject to verification by ongoing monitoring and assessment); see 'ELRA Accrual' worksheet (**Appendix 5.3**).

Appendix 5.6: Financial Provision 'Levy' (based on waste input rate per tonne)

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MEHL Proposed Integrated Waste Management Facility
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FP levy based on rate per tonne of waste accepted

Approx. Void Capacity as a result of change in formation level, Dec. 2013

	m3	t/m3	tonnes
Hazardous	1,623,200	1.75	2,840,600
Non Hazardous	1,289,892	1.75	2,257,311
Inert	701,698	2	1,403,396

Estimated tonnes per phase

	Phase 0	Phase 1	Phase 2	Phase 3	Phase 4	Aftercare
Hazardous	-	535,221	1,067,169	1,238,210	-	-
Non Hazardous	-	-	912,131	912,131	433,049	-
Inert	-	197,212	559,594	449,378	197,212	-

FP levy on waste accepted

	FP levy, rate per tonne				FP levy accrued by phase-end				
	Phase 1	Phase 2	Phase 3	Phase 4	Phase 0	Phase 1	Phase 2	Phase 3	Phase 4
Hazardous	€4.00	€2.00	€0.50	€0.50	€0	€2,140,884	€2,134,337	€619,105	€0
Non Hazardous	€3.00	€1.00	€0.25	€0.25	€0	€0	€912,131	€228,033	€108,262
Inert	€2.00	€0.50	€0.00	€0.00	€0	€394,425	€279,797	€0	€0
TOTAL FP LEVY, per phase					€0	€2,535,309	€3,326,265	€847,138	€108,262
TOTAL FP LEVY, cumulative					€0	€2,535,309	€5,861,574	€6,708,712	€6,816,974