

# APPENDIX 5

## Revised EIS Sections

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## 7.0 WASTE ACCEPTANCE AND CHARACTERISATION

### 7.1 Introduction

The proposed restoration scheme at Walshestown, Punchestown, Naas, Co. Kildare provides for:

- i. Use of imported inert natural materials (principally excess soil, stones and/or broken rock excavated on construction sites) to backfill and restore a large existing void created by previous extraction of sand and gravel (ca. 85% to 90% of imported materials);
- ii. Recovery of imported inert construction materials (including stones, granular fill, concrete, blocks, bricks and ceramic tile) using crushing and screening equipment set up in a dedicated Inert Waste Processing Area (see Figure 8.4) to generate secondary (recycled) aggregate (ca. 10% to 15% of imported materials);
- iii. Recovery, using mobile screening and crushing plant, of any in-situ construction materials including soils, stones and other previously backfilled materials;
- iv. Separation of any non-inert construction and demolition waste unintentionally imported to Site (principally metal, timber, PVC pipes and plastic) prior to removal off-Site to appropriately licensed waste disposal or recovery facilities;
- v. Use of secondary aggregate to construct internal haul roads within the Application Site and to backfill existing groundwater ponds;
- vi. Export of secondary aggregate off-Site for re-use by others;
- vii. Phased restoration of the backfilled void and return to Eastern Transition Lands Character (including placement of cover soils and seeding);
- viii. Temporary stockpiling of topsoil and subsoil pending re-use as cover material for phased restoration of the Site; and
- ix. Infilling using inert materials imported from pre-approved external construction sites and secondary aggregate generated on-Site. No non-hazardous waste will be accepted at the Application Site. Non-inert construction and demolition wastes will be removed off-Site.

### 7.2 Types of Wastes to be Accepted

The types of materials to be used to restore the Walshestown Pit will be confined to inert dry waste arising mainly from civil engineering and building construction and demolition projects. The waste types acceptable for restoration purposes under any future Waste Licence will include inert materials such as stone & soils, glass, concrete, brick, tiles, ceramics, etc.

Putrescible household and commercial wastes (or 'black bag' waste) will *not* be acceptable at this Facility.

Inert waste is defined by the Landfill Directive (1999/31/EC) as: "*waste that does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm human health. The total leachability and pollutant content of the waste and the ecotoxicity of the leachate must be insignificant, and in particular not endanger the quality of surface water and/or groundwater*".

The types of waste proposed for acceptance are shown in Table 7.1.

In summary, all wastes used for the restoration of the Site will be considered inert and will meet the proposed leaching and total pollutant limit values indicated in Section 7.6. All wastes arriving at the Facility will be:

- From pre-authorized sites;
- Biologically stable, non-reactive and therefore, unlikely to produce emissions to generate landfill gas; and
- Not likely to cause instability in the restored areas after deposition at the Site.

The materials to be accepted at the Walshestown Facility will be sourced from wastes generated by construction, demolition and excavation projects in the Greater Dublin Area in the first instance, and in Leinster in general. All incoming material will undergo rigorous acceptance procedures to ensure that suitable materials are used for restoration purposes.

Non-inert materials that may be contained in loads delivered to the Site (such as wood, plastics, metals etc that are not removed at source) will be separated out and removed at the Inert Waste Processing Area, to be recovered/recycled or disposed by authorised and approved waste management contractors at appropriately authorised waste management facilities.

**Table 7.1 Inert Waste to be Accepted at the Facility**

<b>EWC code (#)</b>	<b>Description</b>	<b>Restrictions</b>
<b>01 04</b>	<b>Wastes From Physical and Chemical Processing of Non-Metalliferous Minerals</b>	
01 04 08	Waste gravel and crushed rocks (uncontaminated)	Testing required
01 04 09	Waste sand and clays (uncontaminated)	Testing required
01 04 12	Tailings and other wastes from washing and cleaning of non-metalliferous minerals	Testing required
<b>17 01</b>	<b>Concrete, Bricks, Tiles and Ceramics</b>	
17 01 01	Concrete	Selected C & D waste only (*). No testing required
17 01 02	Bricks	Selected C & D waste only (*). No testing required
17 01 03	Tiles and ceramics	Selected C & D waste only (*). No testing required
17 01 07	Mixtures of concrete, bricks, tiles and ceramics	Selected C & D waste only (*). No testing required
<b>17 05</b>	<b>Soil (including excavated soil from contaminated sites), Stones and Dredging Spoil</b>	
17 05 04	Soil and stones	Testing required
17 05 06	Dredging spoil	Testing required
<b>17 09</b>	<b>Other Construction &amp; Demolition Waste</b>	
17 09 04	Mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	Testing required
<b>20 02</b>	<b>Garden and park wastes</b>	
20 02 02	Soil and stones	Including topsoil and peat. Testing required

**Notes:**

(#) See EPA (2002) for full list of European Waste Catalogue (EWC) Codes

(\*) Selected construction and demolition waste (C & D waste): with low contents of other types of materials (like metals, plastic, soil, organics, wood, rubber, etc). The origin of the waste must be known.

— No C & D waste from constructions, polluted with inorganic or organic dangerous substances, e.g. because of production processes in the construction, soil pollution, storage and usage of pesticides or other dangerous substances, etc., unless it is made clear that the demolished construction was not significantly polluted (i.e. <100mg/kg for PAH, which is a key indicator parameter.)

— No C & D waste from constructions, treated, covered or painted with materials, containing dangerous substances in significant amounts.

### 7.3 Volume of Wastes to be Accepted

It is proposed to import ca. 2.4 million cubic metres of inert materials from Greenfield and Brownfield sites primarily from the Greater Dublin Area, as defined in the Regional Planning Guidelines 2004 to 2016. Using a conversion factor of 1.8 tonnes per cubic metre, this equates to ca. 4.3 million tonnes of inert materials. This equates to ca. 330,000 tonnes per year on average over a 13 year development. The actual amount imported in any year will depend on market forces. A summary of the proposed volume of waste, tonnage and timeline are highlighted in Table 7.2.

**Table 7.2 Inert Waste Volumes to be Accepted at the Facility**

Details	Revised Tonnages (September 2010)
Volumes	2.4 million m <sup>3</sup>
Tonnages	4.3 million tonnes
Tonnes per annum	330,000 tonnes

### 7.4 Source of Materials

Incoming inert materials will need to meet the engineering and environmental standards required in this restoration project. To ensure this, all incoming waste will be pre-approved before arriving on Site, and be subject to strict controls on-Site, to ensure that it is of sufficient quality so that it can be placed directly in the void area.

The Applicant intends to establish contact with major building and infrastructural developers in the Greater Dublin Area in order to source suitable, easily processed C&D and excavation wastes. The Facility operators will also approach Kildare County Council in order to be listed as an approved site for the acceptance of inert materials on County Council contracts.

It is the intention that the Facility will aim to accept waste from Contractors who practice the Construction Industry initiative aimed at prevention, minimisation and recycling of construction and demolition waste. Contractors and waste generators who support and practice this initiative are required to have a C&D waste management plan that facilitates waste segregation on site. Where this initiative is correctly implemented a significant proportion of unsuitable waste can be diverted from the Facility prior to delivery on site. The initiative will ensure qualitative prevention (reducing the hazards posed by construction and demolition waste) generating a more homogenous mix of waste, separating at source major contaminants and facilitating higher recovery potential of inert material.

It is anticipated that inert waste material from such sources will provide the majority of incoming waste into the Facility and thus ensure that a high quality material will be accepted. Incoming material from other sources will be subject to more rigorous investigation prior to acceptance. The intention is to not accept mixed C&D waste streams having a large proportion of non-inert materials that would require intensive sorting and separating processes. The proposed waste acceptance and approval procedures are outlined in Section 7.5.

## **7.5 Waste Acceptance Procedures**

Incoming material to the Walshestown Facility will be limited to the wastes listed in Table 7.1. Prior to acceptance of waste from a specific source, Basic Characterisation of the waste will be carried out in accordance with the Annex to Council Decision 2003/33/EC (Council Decision 2003). Inspection, documentation and control procedures will be implemented to ensure that only high-quality material will be accepted and processed.

Waste shipments will arrive by truck at the Facility Reception. Scheduled and documented shipments will be directed to the weighbridge where the load is weighed and visually checked by CCTV cameras. The Walshestown Facility will have established procedures for verification of waste. Subject to the waste being suitable, the Facility operator will sign a declaration and will give a copy to the waste contractor.

Any waste streams resulting from recovery or processing of material that do not meet the specification of the required restoration materials will be removed and disposed or recovered off-Site.

Records will be maintained on all consignments of waste, providing information on:

- The tonnage and European Waste Catalogue (EWC) Code for the waste materials imported and/or sent off-Site for disposal/recovery;
- The names of the agent and carrier of the waste, and their waste collection permit details, if required (to include issuing authority and vehicle registration number); and
- Details of the ultimate disposal/recovery destination facility for any rejected waste and its appropriateness to accept the consigned waste stream, to include its permit/licence details and issuing authority, if required.

## **7.6 Waste Characterisation**

The criteria and procedures for the characterisation and acceptance of waste at the proposed Facility will operate in general conformance with Council Decision 2003/33/EC (Council Decision 2003), procedures which include a series of tests based on the following hierarchy:



### **Level I - Basic Characterisation**

Basic Characterisation is the first step in the acceptance procedure and constitutes a full characterisation of the waste by gathering all necessary information for a safe disposal of waste in the long term. Basic information on the waste such as type and origin, composition, consistency and leachability will be collected.

The fundamental requirements for Basic Characterisation are listed in Section 1.1.2 of the Annex to Council Decision 2003/33/EC (Council Decision 2003).

Basic Characterisation will be carried out on the wastes prior to acceptance at the Walshestown Facility. In general, the waste contractor will be required to carry out Basic Characterisation and supply it to the Facility operator. Analysis testing will constitute laboratory testing for a range of parameters, to be specified in the Waste Licence, and will be in line with tables 2.1.2.1 and 2.1.2.2 of the Annex to the Council Decision 2003/33/EC (reproduced in this document as Table 7.3 and Table 7.4). Some wastes will not require testing, as indicated in Table 7.1, and in accordance with Section 2.1.1 of the Annex to Council Decision 2003/33/EC.

A target of at least one test per 2,000 tonnes of waste is proposed. Even if a consignment of waste from a source is less than 2,000 tonnes it will be subjected to Basic Characterisation testing.

### **Level II – Compliance Testing**

Level II Compliance Testing comprises periodical testing by simpler standard analysis and behaviour-testing methods to determine whether a waste complies with specific reference criteria. The tests focus on key variables and behaviours identified from Level I (Basic Characterisation) testing. Thus Level II (Compliance Testing) acts as an independent verification of Level I laboratory results.

Compliance testing will be conducted randomly for at least 1 in every 5,000 tonnes received over the weighbridge, even if a full Basic Characterisation test has already been carried out on that load. In addition one sample from each waste type/source will be tested. In the case that a Basic Characterisation has not already been carried out on the load in question, a complete testing schedule (at a frequency of 1 test per 2,000 tonnes) will be undertaken.

The compliance check will also include the following:

- Review of the Level I Basic Characterisation data;
- If appropriate, a review/audit of source site to ascertain the nature of waste being generated at that site and to ensure that it is unlikely to contain constituents or materials of concern; and

- Representative sampling and chemical analysis of waste to confirm key constituents of the waste stream indicated by the basic characterisation data.

If samples are taken for chemical analysis, they will be despatched to an INAB and UKAS-accredited laboratory for analysis. Level II checks will be documented and records retained on-Facility at the proposed Site offices.

### **Level III - On Site Verification of Wastes**

Level III constitutes rapid check methods to confirm that a waste is the same as that which has been subjected to Basic and Compliance testing and that which is described in any accompanying documents. This Level III will consist of a visual and odour inspection of a load of waste, first at the weighbridge and again at the tipping face. If any material is visible that is not permitted for disposal at the Facility, or does not match the description, the consignment will be deemed unauthorised and the Procedure for Rejected Waste Loads will be followed (see Section 7.8).

At the weighbridge a member of the Facility staff will conduct a visual inspection of every load of incoming waste, to the extent practical, for non-conforming waste and to confirm that the consignment matches the description of the waste provided. Where there is suspicion of non-conforming waste the weighbridge transaction will not be permitted to proceed and the load will be rejected. Visual and odour inspection will be recorded as satisfactory or otherwise at the weighbridge.

The load will again be inspected at the tipping face and any unacceptable waste will be removed and quarantined until it is shipped off-Site to an appropriate waste recovery or disposal facility. Also, if any materials such as steel or timber can be recovered/recycled it will be removed from the tipped load and contained in the quarantine area (covered shed) until such time that there is sufficient quantity of like material to be despatched to an appropriate and permitted waste recovery facility.

A further inspection will be made by the plant operators at the disposal face when the vehicle has unloaded.

## **7.7 Proposed Leaching and Total Pollutant Values**

Table 7.3 shows the leaching limit values applicable for waste acceptable at landfills for inert waste under Council Decision 2003/33/EC (Council Decision 2003). Leaching limits are calculated at liquid to solid ratios (L/S) of 2 l/kg and 10 l/kg for total release, and directly expressed in mg/l for C<sub>0</sub> (the first eluate of a percolation test at L/S = 0.1 l/kg). The Council Decision states that "Member States shall determine which of the test methods and corresponding limit values in the table should be used."

In addition to the leaching limit values, inert wastes must meet the additional limit values shown in Table 7.4.

Pursuant to Section 2.0 of the Annex to the Council Decision (Council Decision 2003), the Applicant proposes to use twice the leaching limit values, as shown in Table 7.5, and a value of 100 mg/kg for PAHs as shown in Table 7.6. The use of these higher limit values has been substantiated by a water impact assessment carried out by Golder (Section 12.0).

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**Table 7.3 Leaching Limit Values (Council Decision 2003/33/EC)**

Component	L/S = 2 l/kg	L/S = 10 l/kg	C <sub>0</sub> (percolation test)
	mg/kg dry substance	mg/kg dry substance	mg/l
As	0.1	0.5	0.06
Ba	7	20	4
Cd	0.03	0.04	0.02
Cr total	0.2	0.5	0.1
Cu	0.9	2	0.6
Hg	0.003	0.01	0.002
Mo	0.3	0.5	0.2
Ni	0.2	0.4	0.12
Pb	0.2	0.5	0.15
Sb	0.02	0.06	0.1
Se	0.06	0.1	0.04
Zn	2	4	1.2
Chloride	550	800	460
Fluoride	4	10	2.5
Sulphate	560 (*)	1000 (*)	1,500
Phenol index	0.5	1	0.3
DOC (**)	240	500	160
TDS (***)	2,500	4,000	-

- (\*) If the waste does not meet these values for sulphate, it may still be considered as complying with the acceptance criteria if the leaching does not exceed either of the following values: 1,500 mg/l as C<sub>0</sub> at L/S = 0.1 l/kg and 6,000 mg/kg at L/S = 10 l/kg. It will be necessary to use a percolation test to determine the limit value at L/S = 0.1 l/kg under initial equilibrium conditions, whereas the value at L/S = 10 l/kg may be determined either by a batch leaching test or by a percolation test under conditions approaching local equilibrium.
- (\*\*) If the waste does not meet these values for DOC at its own pH value, it may alternatively be tested at L/S = 10 l/kg and a pH between 7.5 and 8.0. The waste may be considered as complying with the acceptance criteria for COD, if the result of this determination does not exceed 500 mg/kg. (A draft method based on prEN 14429 is available).
- (\*\*\*) The values for total dissolved solids (TDS) can be used alternatively to the values for sulphate and chloride.

**Table 7.4 Limit Values for Total Content of Organic Parameters**

Parameter	Value mg/kg
TOC (total organic carbon)	30,000 (*)
BTEX (benzene, toluene, ethylbenzene and xylenes)	6
PCBs (polychlorinated biphenyls, 7 congeners)	1
Mineral oil (C10 to C40)	500
PAHs (polycyclic aromatic hydrocarbons)	Member States to set limit value

- (\*) In the case of soils, a higher limit value may be admitted by the competent authority, provided the DOC value of 500 mg/kg is achieved at L/S = 10 l/kg, either at the soil's own pH or at a pH value between 7.5 and 8.0

**Table 7.5 Proposed Leaching Limit Values to be met at Walshestown**

Component	L/S = 2 l/kg	L/S = 10 l/kg	C <sub>0</sub> (percolation test)
	mg/kg dry substance	mg/kg dry substance	mg/l
As	0.2	1	0.12
Ba	14	40	8
Cd	0.06	0.08	0.04
Cr total	0.4	1	0.2
Cu	1.8	4	1.2
Hg	0.006	0.02	0.004
Mo	0.6	1	0.4
Ni	0.4	0.8	0.24
Pb	0.4	1	0.3
Sb	0.04	0.12	0.2
Se	0.12	0.2	0.08
Zn	4	8	2.4
Chloride	1,100	1,600	920
Fluoride	8	20	5
Sulphate	1,120	2,000	3,000
Phenol index	1	2	0.6
DOC	480	1,000	320
TDS	5,000	8,000	-

**Table 7.6 Proposed Limit Values for Total Content of Organic Parameters to be met at Walshestown**

Parameter	Value mg/kg
TOC (total organic carbon)	30,000
BTEX (benzene, toluene, ethylbenzene and xylenes)	6
PCBs (polychlorinated biphenyls, 7 congeners)	1
Mineral oil (C10 to C40)	500
PAHs (polycyclic aromatic hydrocarbons) (*)	100

\* For determining the total of PAHs, seventeen PAH compounds will be added to a sum, as was provided for in the Murphy Environmental Hollywood Waste Licence W0129-02.

## 7.8 Procedure for Rejected Waste Loads

If any unauthorised waste is observed the procedure outlined below will be followed:

- The plant operators and/or another member of the Site staff must request verification of non-conformity from the delivery-vehicle driver;
- If reasonably practicable and safe to do so, non-conforming material must be reloaded onto the delivery vehicle and its driver advised that it must be delivered to a site licensed to accept such material;
- If non-conforming material cannot be reloaded, it must be moved away from the immediate operational area pending alternative arrangements for removal to an appropriately authorised facility;
- On discovery of unauthorised material, the Facility Manager must be contacted at once; and
- Should it be apparent or suspected that unauthorised material is dangerous, the area where it was deposited must be isolated and other delivery vehicles must be directed to off-load in another area until the dangerous material has been removed.

## 7.9 Summary

A summary of the proposed Waste Acceptance Procedures is provided below:

1. The client will be requested to complete a query form detailing waste types, origin and potential contamination;
2. On the basis of this information, the Facility Manager will decide whether the waste is acceptable or whether a Level I Basic Characterisation testing is required;
3. Where Level I testing is required, results must be provided and approved prior to any waste arriving on Site;
4. In all cases clients must sign a Customer Service Agreement and submit a copy of a valid Waste Collection Permit;
5. Waste will be received on Site and relevant data will be stored on the weighbridge record system. The following details will be recorded:
  - Date
  - Name of carrier (and Waste Collection Permit No.)
  - Vehicle registration
  - Waste owner
  - Source and origin of waste (if appropriate, name of waste facility and licence/permit number)

- Description of waste
  - Waste type and EWC code
  - Type of process producing waste
  - Amount of waste (tonnes)
  - Name of person checking load
  - Existing data on the waste
  - Physical form
  - Colour/Odour
6. Level III On-Site verification will be conducted for all incoming loads at the weighbridge, to the extent possible;
  7. Level II Compliance Testing will be carried out for a random 1-in-5,000 tonnes arriving on Site; and
  8. If all details are satisfactory, the load is directed to the area on Site being restored, or to the waste recovery processing area, where it is subject once again to Level III On-Site verification.

### 7.10 References

Council Decision (2003) Establishing Criteria and Procedures for the Acceptance of Waste at Landfills (2003/33/EC).

EPA (2002) European Waste Catalogue *Environmental Protection Agency, Wexford.*

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## 8.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

### 8.1 Introduction

This section of the EIS describes the preliminary design of the various elements of the proposed development. It is proposed to accept, process, recover and use inert materials, including inert wastes, to restore a Site that includes extensive areas of worked out sand and gravel extraction, partially restored lands, silt ponds, processing plant, concrete batching plant and surface water ponds. This section of the EIS also describes the proposed construction, operation, management and closure of the Facility.

The proposed Facility will include 4 major elements:

- Reception Area where trucks carrying potential restoration materials will be received, checked in, and weighed;
- Inert Waste Processing Area (IWPA) to extract useful soils/fines and hardcore materials from inert waste streams arising at building and road works sites;
- A surface water management feature and screening berms on the western side of the Site, and screening berms on the northern side of the Site; and
- Zones where soils and like material will be placed on the ground to build up the surface contours to final design levels conceived by the project engineers, scientists and landscape architects.

The assumptions made in relation to the design of the Facility are provided in Section 8.2 below. The starting point for the design is the identification of the lands to be included in the development.

The boundary of the proposed Facility and the lands to be used for the development are shown on Figure 8.1. An aerial photograph (June 2004) which depicts the physical features at the Site is presented as Figure 8.2.

### 8.2 Design Assumptions

The assumptions made at the outset of the preliminary design process for the restoration works are outlined below:

#### **End Use of Site and Final Contour Plan**

The Applicant's intention is to continue to restore the worked out sand and gravel pit to create a landform that is in keeping with the rolling nature of the Eastern Transition Lands Character. The currently proposed end use will be agricultural with some passive recreational

features around the western boundary. Figure 8.3 shows a final contour plan for the restored site, developed by the landscape architects, ecologists, engineers and planners for the project in detailed consultation with Punchestown Racecourse, Kildare Co. Council and the Applicant.

#### **Types of Materials to be used to Complete the Restoration Works**

The types of materials to be used in the restoration works will be *inert* in accordance with the definitions provided in the Council Directive 99/31/EC, on the landfill of waste (Article 2).

#### **Hydrogeological Conditions and Constraints**

Section 12.0 of the EIS deals with the Site groundwater conditions in detail. Based on a review of the available groundwater monitoring data, groundwater flow beneath the Site in both the overburden and bedrock is generally toward the west-northwest.

The aquifer in the southeast corner of the Site has been classified by the GSI as having Extreme vulnerability because rockhead is at a high elevation (Figure 12.7). Therefore, in accordance with the precautionary principal, no materials will be placed in this area, and an appropriate exclusion zone has been applied. The remainder of the Site was classified by the GSI as having High vulnerability. However, the results of a ground investigation carried out by Golder indicate that there is a minimum of 10 m of glacial deposits (mainly silty sands) underlying the Site, indicating that a vulnerability rating of Moderate is more appropriate (see subsection 12.3.14).

#### **Ecological Conditions and Constraints**

During Site visits in 2007 and 2008 Golder ecologists observed lapwing on agriculturally improved wet grasslands on the southern part of the Site adjoining Pond B. The filling restoration works will be carried out in a manner such that the areas important to lapwing for nesting and foraging will be retained through appropriate mitigation measures.

#### **Footprint of Materials to be placed to Complete the Restoration Works**

The footprint of the materials to be placed on the Site, to enable its restoration, will be constrained by hydrogeological and ecological conditions and 100 m buffers defined around adjacent residences where possible. Also, through consultation with Management of the Punchestown Racecourse, there will be constraints placed on, and requirements made of, the proposed works to satisfy the needs of the Racecourse Management. The area in which materials will be placed to satisfy the various project requirements is shown on Figure 8.3.

#### **Engineered Containment and Control Requirements**

Imported materials will be placed on existing ground conditions, depicted on Figure 8.1, to enable construction of the landform as shown on Figure 8.3. As some of these materials will be considered wastes by definition, and therefore a waste licence will be required, the Best

Practice engineering requirements of the EPA will also need to be satisfied. Some of the EPA requirements that are expected, based on experience and guidance provided in the EPA Landfill Manuals on Site Design and Restoration and Aftercare (EPA 2000, EPA 1999), will include:

- Perimeter bunds or berms to control runoff, as required, and provide visual screening;
- Surface water management and silt settlement ponds;
- Internal drainage systems to handle runoff from the emplaced materials during the process of filling and undertaking the restoration works;
- An engineered base liner. The specification of the base liner will meet the minimum requirements prescribed by the EPA in Licences for inert waste landfills i.e. a mineral layer 1 metre thick and having a permeability of less than or equal to  $1 \times 10^{-7}$  m/sec;
- Perimeter drainage channels/infiltration trenches and contour drainage channels to convey run-off from the restored surface, to help ensure that there is no water ponding on the surface; and
- An engineered capping system comprising an inert soil layer at least 1 metre thick and including a minimum of 150 mm of growth medium e.g. topsoil.

#### **Infrastructure Requirements**

Ancillary works will be required, prior to placement of materials on the ground in engineered lined cells. These works will include: construction of access roads across the Site; drainage channels; and surface water management and silt settlement ponds. A wheel-wash will be provided to mitigate dust and mud impacts. A weighbridge and a waste reception check-in area will also be provided, to monitor the quantity of the different types of materials imported to the proposed Facility and also to record the quantity of any unsuitable or recoverable materials exported from the Facility. A waste quarantine area will also be provided to hold materials that are deemed to be inappropriate for processing and restoration and not meeting the acceptance criteria for restoration materials.

#### **Engineering Materials**

There will be a need to find a source of engineering materials to construct: screening bunds or berms; the low-permeability lining system in the engineered cells; and the capping system. All the required engineering materials may not be available within the Site and, consequently, some may need to be imported where necessary. It is expected, though, that most of the materials will come from the Site for these purposes, except the screening berms which may be formed from suitable imported clayey soils.

### **8.3 Overview of Proposed Development**

The Site to be restored is ca. 68.0 ha. The development Site will include buffer lands (where no works will be carried out), reception/entrance area, an Inert Waste Processing Area,



surface water management ponds, perimeter screening and landscaped berms, and engineered cells/zones where inert materials (soils) will be placed to restore the Site and recreate a new landform. The engineered Facility will have a number of elements and will be constructed in a number of stages. The principal elements are as follows:

- Facility Services and Infrastructure (Section 8.4)
- Initial Development/Restoration Works (Section 8.5)
- Ongoing Restoration Works (Section 8.6)
- Landscaping (Section 8.7)
- Monitoring Infrastructure (Section 8.8)

These various elements are discussed separately in the sub-sections indicated above.

In keeping with the requirements of the EPA in regard to licensed waste management facilities and Best Available Techniques (BAT), a range of services and infrastructure features will be provided at the Facility. Most of the infrastructure itemised below will be provided on a temporary basis and will be removed upon completion of the capping and final landscaping works.

Permanent Works will include:

- Drainage channels and surface water management ponds/infiltration basins for surface water run-off;
- Screening berms and embankments;
- Infiltration trenches for surface water run-off;
- Some of the access roads and tracks on the Site;
- Monitoring installations; and
- Security measures, which will mainly consist of stock proof fencing, security fencing and lockable gates.

Temporary Works will include:

- Site accommodation including general office (existing), canteen (existing), and weigh bridge office (existing);

- Paved entrance road and hard-standing areas for plant and construction materials and car parking;
- Weighbridge (existing);
- Wheel-wash facility for road-going vehicles;
- Fuel tanks and storage/load out areas (existing), to be modified and enhanced with bunding and fuel interceptor;
- Waste quarantine area;
- Inert Waste Processing Area with crushing and screening plant;
- Laboratory facilities (for materials/soils testing);
- Mobile crushing and screening plant; and
- Compound for plant and equipment.

Further details on these services and Facility infrastructure and the proposed restoration works are presented in the sub sections that follow.

#### **8.4 Facility Services and Infrastructure**

All of the proposed and/or Facility site services infrastructure are described in the following subsections and shown on Figures 8.4, 8.5 and 8.6.

##### **8.4.1 Site Security Arrangements Including Gates and Fencing**

There is already an appropriate gate and fencing at the entrance to the Facility; however, security around much of the perimeter is not sufficient for a licensed facility. Permanent security will be provided around the Facility itself by enhancing existing dense hedgerows, and installing 1.2 m high post-and-wire fencing where required.

#### **8.4.2 Site Access and Roads**

The Facility will be accessed from an existing entrance located on the Local Road L6042. Some minor cut-and-fill earthworks will be required to improve the surface of the haul roads throughout the Site, in preparation for the construction of the proposed landform for acceptance of inert materials.

All haul roads will be engineered and constructed of hardcore material and some of these will be surface treated, in particular at the entrance to the Facility.

#### **8.4.3 Hard-Standing Areas**

Hard-standing areas will comprise well-compacted granular fill (hardcore) or, in select areas, concrete and/or macadam surfaces. The purpose of the hardcore is to provide a lay-down area for materials and areas for parking vehicles. The concrete surfaced area will be for waste quarantine, and bunded areas for refuelling plant (Figures 8.4 and 8.5). The concrete-surfaced hard-standing areas will be removed upon completion of the project.

#### **8.4.4 Weighbridge**

A weighbridge currently exists on the Site and this will be maintained in position for the duration of the Restoration Project. This will allow weighing-in of incoming loads and weighing-out of any wastes which do not meet the acceptance criteria (described later) and are thus rejected and sent off-Site to other licensed facilities.

#### **8.4.5 Wheel-Wash**

A new purpose-built wheel-wash will be fed by a water supply borehole on-Site (see Figure 8.5). The wheelwash will be maintained for the duration of the Restoration Project and the effluent from the wheel wash will be recycled.

#### **8.4.6 Laboratory Facilities**

There will be a basic materials-testing laboratory on the Site to assess the fill materials used in construction of embankments, liner and the capping system.

#### **8.4.7 Fuel Storage Areas**

Diesel fuel and hydraulic oil will be stored on-Site in appropriately bunded areas. Two (2 No.) 5,000 litre diesel tanks are proposed, which will fuel all plant utilised for the duration of the Restoration Project. An appropriately bunded fuel load-out area, with fuel interceptor, will be provided (Figure 8.5). Mobile plant will be driven to the fuel load-out area for refuelling. A bunded fuel bowser will be used, as required, to fuel fixed plant.

#### **8.4.8 Waste Quarantine Areas**

In line with best-practice procedures, a waste quarantine area will be provided on-Site to hold, pending removal from Site, inappropriate wastes that are rejected at the Facility during waste placement. Two waste quarantine areas (contained, concrete, hard-standing areas) will be provided on-Site: it is proposed to use an existing shed in the inert waste processing area for quarantine of smaller waste items, and a concrete surfaced area for skips to quarantine rejected waste (Figure 8.5).

#### **8.4.9 Materials Inspection Areas**

All imported materials will be inspected as it is tipped in selected lined cells or fill zones. It will also be inspected when tipped in the Inert Waste Processing Area (Figure 8.5).

#### **8.4.10 Traffic Control**

The operator that is appointed to construct, operate and close the Facility will control traffic in and around the Site. Signage on Site will be used wherever required.

#### **8.4.11 Sewerage Infrastructure**

The foul sewage will be handled in the existing septic tank/percolation system (Figure 8.5) and, as required, approved temporary toilet blocks draining to a sealed holding tank. The tank will be pumped out by an approved contractor on an as-needed basis.

#### **8.4.12 Other Services**

The Facility will require power, telephone and a water supply.

There are single-phase and three-phase power supplies at the existing Cemex Facility. This will be utilised for the duration of the Restoration Project.

There are also telephone lines serving the existing Cemex Facility which again will be utilised for this project.

Fixed overhead pole lighting will be provided in the main reception area and office area/compound of the Site. This lighting will be removed upon completion of the project. Temporary mobile lighting will be used in the areas of major construction and earthworks. Power for this lighting will be provided by diesel generators.

There is mains water available at the gate of the existing Cemex facility, which will be utilised for potable water for the duration of the project. Water for dust suppression and wheel wash will be abstracted from an existing groundwater well on-Site, close to the

entrance to the Facility (Figure 8.5). This is an historical well, and if supply is found to be not suitable an alternative borehole will be drilled.

#### **8.4.13 Plant Sheds, Garages, and Equipment Compound**

Equipment will initially be parked on the Site in a compound that will be constructed just south of the inert waste processing area (Figure 8.5). Plant may also be parked within the base of the existing worked out sand and gravel pit. Major servicing/repairs of mobile plant will take place off-Site.

All liquid hydrocarbons handled on-Site will be carefully managed and contained in bunds.

#### **8.4.14 Site Accommodation**

There is an existing office/store alongside the weighbridge (Figure 8.5). The interior of this building will be refurbished and used. The interior of the existing offices and canteen to the east of the entrance at the Site will be refurbished and used during the land-restoration project.

#### **8.4.15 Inert Waste Processing Area (IWPA) and Plant**

The sources of materials to be used for berm construction, lining and capping will be from either on-Site or off-Site sources. Since it is possible that materials with mixed particle sizes may be available from within the Site footprint, or from off-Site sources, these materials will be screened and/or crushed as required to produce some of the berm-material requirements. Furthermore, the Applicant endorses National Waste Management policies and intends to recover inert materials that can be used off-Site in construction of roads and the manufacturing of concrete products. This is considered to be a suitable and sustainable concept that both the planning authority and the Agency support. As such, provision has been made for an inert waste processing area (IWPA) in which suitable and appropriate screening and crushing plant will be set up and operated in the northern part of the Site as shown on Figure 8.5.

The area set aside will include a 5 m high noise-attenuation berm, hardcore surface area and will be landscaped appropriately (Figures 8.5 and 8.6). Screening and crushing plant will be employed to process imported materials to produce recycled aggregates for on-Site or off-Site use.

It is expected that the majority of inert waste materials arriving at the Facility will be source-segregated, therefore will be emplaced directly in lined cells with no on-Site segregation/processing. However, it is expected that ca. 15% of the inert waste materials will not be source-segregated, thus requiring processing prior to emplacement. As such, the IWPA will be used to sort/process loads, if necessary, of mixed inert waste arriving on Site.

## 8.5 Initial Development/Restoration Works

Upon receipt of a waste licence and planning permission, and establishment of the infrastructure described in the preceding section of this EIS, the ongoing restoration works described herein, including importation of inert soil, will be undertaken concurrently with the construction of essential and enabling drainage works.

### 8.5.1 Existing Surface Water Drainage and Initial Drainage Works

#### 8.5.1.1 Existing Surface Water Drainage

As shown on Figure 8.1 there are 5 No. existing ponds on the Site labelled A1, A2, A3, B and C. To restore the Site ponds A1, A2 and A3 will be filled in. A new water feature will be constructed on the western boundary (Figure 8.3), as agreed with the Management of Punchestown Racecourse.

**Table 8.1: Existing Site Drainage Conditions – Details of Surface Water Catchments**

Catchment Area	Area (ha)	Description	Discharge Outlet/ Water Flows Toward
A	ca. 12.7	Bare soils, some made ground/hardcore in the eastern part	Infiltrates directly to ground or runs to Ponds A1, A2, A3 & infiltrates there; no external discharge.
B	ca. 6.0	Bare soils, minor recolonising vegetation	Infiltrates directly to ground or runs toward eastern corner; no external discharge.
C	ca. 2.4	Bare ground, some hard-standing areas	Runs toward Pond C, minor infiltration directly to ground. Pond C discharges after settlement to stream by road (tributary of Morell River).
D	ca. 22.2	Mostly grassed, some recolonising vegetation, some bare ground in western part	Infiltrates directly to ground or runs toward western corner; no external discharge.
E	ca. 23.7	Grassed, small amount of scrub along boundary with residence to east (area includes 2.8 ha beside residence); rushes to south of Pond B.	Infiltrates directly to ground or runs toward Pond B; no external discharge.
F	ca. 3.4	Grassed	Infiltrates directly to ground or runs toward south-western corner; some small runoff off-Site.

The existing surface water drainage on the Site can be subdivided into six (6 no) catchments labelled A to F on Figure 8.1. The size of each of these catchments, their ground surface and their discharge outlet, is described in Table 8.1. It can be seen from Table 8.1 that, in essence, little of the rainfall currently falling on the Site leaves the Site footprint.

#### 8.5.1.2 Initial Drainage Works

The proposed initial drainage works, designed to protect groundwater, manage runoff and prevent silting of natural watercourses located downstream of the Application Site, are described below and shown schematically in Figure 8.7.

1. A new water feature will be excavated mid-way along the western boundary of the Site, to the depth of the winter-high water table (Figure 8.7 – View A).
2. When the new water feature is excavated an infiltration swale will be cut (through native soils and down to winter-high water table) southward along the western boundary to connect Ponds A1 and A2 with the new water feature.
3. The existing compound, the proposed location of the Inert Waste Processing Area (IWPA), will be dug out so as to accommodate the infrastructure required, and graded so that all runoff is directed to Pond C, the existing silt pond beside the Site entrance (Figure 8.5 shows the proposed layout of the IWPA).
4. Pond A3 will be pumped-out into the infiltration swale.
5. Concurrently with Step 4, Pond A3 will be backfilled with native Site-won free-draining natural materials to an elevation 1 m above winter-high water table.
6. A made ground cofferdam will be constructed across the inlet between Ponds A1 and A2 to allow pumping out of Pond A2 into the infiltration swale (Figure 8.7 – View B).
7. Pond A2 will be pumped-out into the infiltration swale.
8. Concurrently with Step 7, Pond A2 will be backfilled with native Site-won free-draining natural materials to an elevation 1 m above winter-high water table.
9. Pond A1 will be pumped out to the swale feature on the western boundary. Concurrently with pumping out, Pond A1 will be backfilled with native Site-won free-draining natural materials to an elevation 1 m above winter-high water table (Figure 8.7 – View C).

Drains/infiltration ditches will be constructed along the north and western boundary of the Site as necessary to prevent off-Site surface water runoff.

### **8.5.2 Perimeter and Internal Berms and Embankments**

The location of proposed berm construction is shown in Figure 8.4. A landscape and noise attenuation berm will be constructed on the northern/north-eastern side of the Site. Where necessary, a temporary 3 m high screen mound will be constructed along the eastern limits of the restoration operations to restrict views of the development from the rear of properties on the eastern boundary.

An internal visual screening berm will be constructed on the northern side of the proposed IWPA as shown on Figures 8.5 and 8.6.

Prior to commencement of restoration works in the southern part of the Site, a screening and noise attenuation berm will be constructed immediately north of Pond B in order to protect the area which is important to lapwing for nesting and foraging. A suitably qualified person or ecologist will be present during the construction of the berm, to oversee the works. The lapwing will be monitored during the breeding and non-breeding season during the restoration works.

A visual screening berm will be constructed along the western boundary, as agreed with the Management of Punchestown Racecourse, in conjunction with construction of the new water feature and infiltration trench and backfilling of ponds described in the previous section.

All internal earth-fill slopes will be formed at grades no steeper than 1V:2H. All outer slopes will be graded to 1V:2H or shallower. External slopes will be topsoiled, trimmed, and seeded as soon as possible after completion.

The embankments will be constructed from site-won materials or suitable imported material, which will include granular and cohesive materials.

## **8.6 Ongoing Restoration Works**

Source-segregated inert materials (ca. 85%) and on-Site processed and segregated inert wastes will be used at the Site to achieve a final restoration surface. The following is a detailed description of the design of the restoration works.

### **8.6.1 Overview of Design**

The potential extent of the placement of inert material and the proposed restoration levels for the restored landform are shown on Figure 8.3. Cross-sections of the completed landform are shown on Figure 8.8.



Excavation cuts and fills will be required to prepare the Site for lining materials and make it ready to accept imported soils etc. Earthworks construction will be ongoing over the life of landfilling activities on the Site.

The infill below the surrounding land surface will range between 3 and 30 metres deep. The maximum level of deposited inert materials will be 168 mAOD.

The edge of the lined area (footprint) of the inert Facility will be ca. 40 ha. Buffer lands will be available for fencing, environmental monitoring installations, Site roads, and surface water drainage systems. The buffer lands will also allow for provision of landscaping berms and other vegetation as previously described.

The buffer lands in the southern part of the Site will be retained as they provide important habitat for lapwing.

### **8.6.2 Lining System**

Areas upon which imported liner and materials will be placed will include a base and slope lining system. Best practice for facilities such as that proposed at the Walshestown Pit dictates that a lining system on the base side slopes will be a mineral liner that will comprise a layer of compacted clayey silt (i.e. a compacted clay liner – CCL) a minimum of 1 m thick. The soil liner will have a co-efficient of permeability of less than or equal to  $1 \times 10^{-7}$  m/sec. The existing ground surface will be graded and/or excavated to allow construction of the lining system. Suitable existing in-situ soils will be excavated and re-used to form the liner. Some imported materials may be required to form a liner meeting the specifications.

### **8.6.3 Phasing of Ongoing Restoration Works**

The conceptual plan for this Site is to develop the lined inert facility in distinct zones, as identified through a progressive filling and restoration colour system on Figures 8.9 and 8.10.

The southern part of the Site will be screened off prior to the commencement of restoration works (during the non-breeding bird season of 1 September to 1 March), in order to protect lapwing habitat.

The first zones to be restored will be in the vicinity of Ponds A1, A2 and A3 – with these ponds being backfilled initially with native Site-won free-draining natural materials and then imported materials.

Later zones will be backfilled in stages (bench-style). Restoration filling will occur behind the screening berm and continue until such time as it is necessary to start another stage or bench. Any previously unlined ground will be lined before it is filled over, so that as

benching progresses lining progresses. A schematic cross-sectional representation of this filling process is shown on Figure 8.10.

The final zone comprises the area of the proposed IWPA and adjoining hardstand. It is assumed for the purpose of this report that the IWPA and associated infrastructure and hardstand will be decommissioned. This area would then be filled and restored to ultimately produce a landform suitable for light agricultural grazing to maintain species rich grasslands, and in keeping with the surrounding landscape.

#### **8.6.4 Surface Water Management Works during and post completion of the Restoration Works**

During the restoration activities and upon completion of the landform there will be a need to manage runoff and prevent silting of natural watercourses located downstream of the Application Site. In order to take consideration of possible increased storm surges (and a possible 5% increase in annual precipitation) due to climate change, surface water management features will be designed to accommodate the volume of water expected in a 1-in-100 year storm of 60 minute duration plus 20% (i.e. 46.44 mm), as used by OPW in flood relief design works (pers. comm. Mr. Tony Smyth, 17 October 2008). The proposed surface water management works are described below.

A perimeter infiltration swale will be constructed at the foot of the screening berm around the northern and western Site perimeter to collect rainfall runoff and allow it to infiltrate to ground (Figure 8.4). Falls in this trench will be designed such as to feed water which does not infiltrate to ground toward the proposed new water feature on the western boundary.

To prevent ponding in contours on the restored surface and minimise infiltration to the backfilled body, temporary and/or permanent collector trenches will be constructed within zones, as required, to direct water to the perimeter infiltration trench.

Storm water will be accommodated in the new water feature on the western boundary where infiltration to ground will occur through the base and sides. Provision for overflow will be installed at an elevation of ca. 145 mAOD, with discharge being by means of a pipe to Pond B.

The final restoration surface contours are shown on Figure 8.3. It has been designed, and will be constructed, in such a way that rainfall will shed to the perimeter infiltration trench. The resulting surface water catchments are also shown on Figure 8.3, and their size, a description of their ground surface, and their discharge outlets, are given in Table 8.2. It can be seen from the table that, in essence, little of the rainfall landing on the Site in future will leave the Site footprint, therefore preserving the current water balance of the Site.

**Table 8.2: Proposed Site Drainage Conditions – Details of Surface Water Catchments**

Catchment Area	Area (ha)	Description	Discharge Outlet/ Water Flows Toward
G	ca. 3.6	Grassed	Runs off to surface water management Pond C
H	ca. 3.1	Grassed	Runs off to infiltration trench on northern and northeastern boundaries
I	ca. 25	Grassed	Runs off to the new water feature and infiltration trench on western boundary & infiltrates there; stormwater overflow at ca.145 mAOD to Pond B
J	ca. 11.8	Grassed (includes majority of area beside residence to east)	Runs off to constructed surface watercourse feature which feeds to new water feature on western boundary
K	ca. 17.6	Grassed	Some reduction in northern extent of existing catchment E (Figure 8.1 & Table 8.2), otherwise no change; infiltrates directly to ground or runs toward Pond B. No external discharge.
F	ca. 3.4	Grassed	No change: infiltrates directly to ground or runs toward south-western corner of Site; some small runoff off-Site

Note: total catchment area described above is 64.5 ha.

### 8.6.5 Capping System

Capping operations will be carried out on an on-going basis once final restoration levels are reached. The purpose of the cap will be to:

- Shed rainfall and minimize infiltration;
- Isolate inert materials from the terrestrial environment; and
- Ensure there is no dust from the Facility in the post-closure period.

The proposed capping system which will be completed over an area of ca. 40 ha is presented in Table 8.3 starting from the surface down.

**Table 8.3: Components of the Proposed Capping System**

Component	Nominal Thickness (mm)
Growth Medium	150
Subsoil	850

### 8.6.6 Material Requirements

The Site footprint and the existing and final restoration contours govern the volume of the material required to complete the restoration works. The final restoration contours are shown on Figure 8.3. The shape and height of the landform, which plateaus at ca.168 mAOD, have been designed based on input from the project engineers, scientists and landscape architects. Capping layers totalling one metre (including minimum 150 mm of growth medium with the balance subsoil) will be placed to complete the final surface of the landform.

The cut-and-fill requirements to form the western swale, new surface water feature, berms and IWPA are indicated in Table 8.4.

**Table 8.4 Earthworks Quantities**

Works	Volume Estimates (m <sup>3</sup> )	
	Cut	Fill
Initial Berm and Surface Water Pond/Swale	20,000	60,000
Inert Waste Processing Area	93,000	3,000
Total	113,000	63,000

The computed potential volume of the void formed by the existing and proposed ground levels on Figure 8.8 (as revised in September 2010) is approximately 2.4 million m<sup>3</sup>. This volume will include lining and capping layers.

The anticipated tonnage of inert materials that will be imported to fill this void is ca. 4.3 million tonnes, based on a post-settlement density of 1.8 tonnes/m<sup>3</sup>.

### **8.6.7 Detailed Restoration Master Plan**

The following concepts are included in the restoration master plan for the Walshestown Site (Figure 10.3):

- New water feature on the common boundary with Punchestown Racecourse. This water feature will also support wintering waterfowl; and
- Reconstruct Priests' Hill to provide viewing area for Herdsgarden Leap.

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## 8.7 Landscaping and Restoration

### 8.7.1 Introduction

Final restoration (planting) proposals have been developed on the basis of the following key objectives:

- Final end-use is to provide semi-natural grassland area;
- Encourage wide range of habitats for maximum ecological diversity and its value for wildlife;
- Integrate the final landform into the local landscape;
- To improve the visual quality of the existing Site for surrounding sensitive visual receptors, in particular views from the Punchestown Racecourse; and
- To deliver a high quality planting scheme of lasting benefit.

The plan is described under the following headings:

- Existing and Proposed Habitats (Section 8.7.2)
- Planting and Maintenance (Section 8.7.3) and
- Commitments to Habitat Creation and Retention (Section 8.7.4).

### 8.7.2 Existing and Proposed Habitats

Habitats on the Site vary in their ecological value, the highest value habitats being the wet grassland in the southern section of the Site, where lapwing, a Red listed species (Lynas *et al.*, 2007), forage and nest. Other habitats that are rated as high and locally important are the exposed sandy slopes which contain Sand martin colonies (an Amber listed species) and the mature hedgerows and treelines that edge the Site, as they serve as wildlife corridors linking to the surrounding landscape. The areas of calcareous grassland add diversity to the Site and provide valuable habitat for a variety of species such as orchids and invertebrates. The scrub is dominated by gorse patches and is considered of moderate value.

This Site was previously managed for agriculture, similar to the fields of the surrounding area. The planned restoration offers an opportunity to increase the nature diversity within the local landscape and establish habitats with a greater nature conservation value than the ones that previously existed on the Site. Proposed new habitats include semi-natural grassland, species-rich hedgerows, woodland and scrub areas, while retaining other habitats. These habitats are outlined below.

Proposed species mixes relating to each habitat are detailed in Section 8.7.3.1. The final restoration plan is presented on Figure 10.3.

Proposed nature conservation elements are as follows:

- Existing hedgerows and treelines will be retained where possible. It is vital that the retained hedgerows and treelines are not damaged during the construction/operational phases. A 3 m buffer will be fenced off between the hedgerow and the active restoration area in order to protect the integrity of the hedgerow and associated understorey.
- Creation of woodland using native species. Small clusters of native Ash trees will be planted on the slopes of the northwestern edge of the Site forming a link with the hedgerows bordering the Site. The trees will add to the diversity of the Site and provide habitat for tree and woodland species.
- Additional hedgerow and scrub will be planted. Hedgerow design will reflect the local type in both structure and species. Stock will be native and preferably local if possible. For stock-proofing a 4:1 hawthorn to blackthorn mix should be used. The species mix to be used in this case is detailed in Section 8.7.3.1.

The planted hedgerow along the northwest boundary of the Site will be managed to retain a box-like hedgerow of 3m. While other areas of planted hedgerow will be allowed to mature and will only need trimming every 10 to 15 years.

- Grassland creation with bare patches will be created. Areas of this habitat are to be created as part of the planned restoration, and managed appropriately for the development and maintenance of a species-diverse sward. It is envisaged that a combination of light seeding and natural regeneration will allow the establishment of species-diverse grassland. Areas of exposed stone and bare patches will be scattered across the grassland to create a mosaic of habitats for flora and fauna such as basking butterflies and moths as well as for other invertebrates. The grassland will be left to develop for two years and then grazed lightly to maintain a diverse sward.

An area of grassland will be fenced off in the northern part of the Site to allow meadow to develop, it is expected that this area will be grazed to some extent by rabbits, which are currently present on the Site. The different grazing patterns will promote greater diversity within this and other grasslands of the Site.

If grazing is not carried out then half of the area of grassland can be cut each winter (with cuttings removed to prevent additional nutrient input to the soil) to promote the development of short and tall swards, which provide good cover for faunal species (Gilbert & Anderson, 1998).

- Retention of wet improved grassland and pond. The area of wet improved grassland and Pond B which is edged by bare patches in the southern part of the Site will be

retained in order to protect the lapwing (a Red listed species). The area will be fenced off and screened by a berm in order to minimise disturbance to the lapwing and other birds using the area. The screening berm will be positioned during the non-breeding bird season (1 September to 1 March) in order to avoid disturbance of breeding lapwing.

Lapwing require two types of habitat – open ground for nesting (bare patches and scrapes) and wet pasture grassland for feeding. Key to successful chick-rearing is the close proximity of these habitats. The current management and grazing regime of the grassland along with the adjacent open bare patches appears ideal for lapwing.

- Creation of a new water feature A new water feature will be located on the western edge of the site to offer habitat for those waterfowl species currently using the water bodies on the Site. This pond will continue to be fed from groundwater and surface water. A long narrow ditch/swale will extend from the pond north ; its water levels will fluctuate and will add to the diversity of wetland habitat on the Site. It is likely that it will become colonised by rushes and provide habitat for species such as Snipe and Moorhen.

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### 8.7.3 Planting and Maintenance

#### 8.7.3.1 Plant Species

The plant species chosen for the restoration proposals have been based upon their ecological value, their occurrence in the locality and reliability of establishment under a variety of soil conditions. The proposed plant species would consist of native species of local provenance, where possible, but as a minimum, of Irish provenance. Transplant material of height range 300-600 mm, either cell grown or bare root stock, is most likely to be used.

#### **Hedgerow Mix (double staggered row with 7 no. plants per linear metre):**

<i>Crataegus monogyna</i>	Hawthorn	50%
<i>Prunus spinosa</i>	Blackthorn	25%
<i>Corylus avellana</i>	Hazel	10%
<i>Ilex aquifolium</i>	Holly	5%
<i>Rosa canina</i>	Dog Rose	5%
<i>Euonymus europaeus</i>	Spindle tree	5%

#### **Berms (soil stabilisation mix):**

<i>Agrostis stolonifera</i>	Creeping bent	30%
<i>Festuca rubra</i>	Red fescue	30%
<i>Trifolium pratense</i>	Red clover	25%
<i>Ranunculus repens</i>	Creeping buttercup	5%
<i>Lotus corniculatus</i>	Birds-foot trefoil	5%
<i>Leucanthemum vulgare</i>	Ox-eye daisy	5%

#### **Neutral Grassland seedmix:**

<i>Festuca rubra</i>	Red fescue	10%
<i>Cynosurus cristatus</i>	Crested dog's-tail	30%
<i>Holcus lanatus</i>	Yorkshire fog	6%
<i>Dactylis glomerata</i>	Coltsfoot	6%
<i>Agrostis capillaris</i>	Common bent	20%
<i>Anthoxanthum odoratum</i>	Sweet vernal-grass	5%
<i>Festuca pratensis</i>	Meadow fescue	2%
<i>Lotus corniculatus</i>	Common bird's-foot-trefoil	5%
<i>Plantago lanceolata</i>	Ribwort plantain	2%
<i>Trifolium pratense</i>	Red clover	2%
<i>Bellis perennis</i>	Daisy	2%
<i>Lathyrus pratense</i>	Meadow vetchling	2%
<i>Leucanthemum vulgare</i>	Oxeye daisy	5%
<i>Knautia arvensis</i>	Field scabious	2%
<i>Rhinanthus minor</i>	Yellow rattle	1%

### **Woodland - Clusters of Trees:**

Clusters of Ash *Fraxinus excelsiour* will be planted on the slopes of the northwestern corner of the Site. Trees will be planted at varying distances between 1.5m X 1.5m to 3m X 3m spacings. A total of five clusters of 10 trees in each will be planted.

#### **8.7.3.2 Planting Techniques**

##### *Trees and shrubs*

Tree and shrub species will be planted directly into previously prepared pits incorporating 30gms of approved slow release fertiliser per planting station. Trees and hedgerow planting will be protected by rabbit-proof guards and staked appropriately.

##### *Semi-natural grassland*

The area to be developed as grassland will comprise subsoil (200mm depth) that will be cross-ripped and sown with a neutral grassland seedmix from indigenous seed sources; areas treated in this manner will become naturally colonised by species from adjacent plant communities (NRA, 2005). **No fertiliser or soil improver** will be used in the scrub or grassland areas.

Bare patches of ground will be left in places throughout the grassland area to create a habitat mosaic and to provide alternative habitat for invertebrates etc. as well as potential nesting areas for ground nesting bird species.

##### *Temporary berms*

Temporary soil berms will be planted with a light grass seedmix as outlined above, in order to stabilise the berms, prevent erosion of soil and also to prevent colonisation by pernicious weed species such as ragwort.

#### **8.7.3.3 Maintenance**

As a general practice, areas of planting will be maintained in good condition through inspection of rabbit spirals and the making good of any damage to them. Planted areas will be maintained where necessary and all failures or badly damaged plants will be replaced on an annual basis. Seeded areas will be monitored for pernicious weed growth and a consistent sward maintained for its nature conservation interest.

Newly created grassland will be allowed to develop over two years and thereafter some light winter grazing will be sufficient to maintain a diverse sward. Some spot treatment to control pernicious weeds may also be required.

The planted hedgerow along the northwestern boundary of the Site will be managed to retain a box-like hedgerow of 3m. While other areas of planted hedgerow will be allowed to mature and will only need trimming every 10 to 15 years.

#### 8.7.3.4 Long-term Management

The management objectives aim to create a mosaic of habitats comprising scrub, grassy verges along hedgerow and treelines, semi-natural grassland whose species composition reflects, as far as feasible, the character of similar semi-natural habitats.

The following objectives for each habitat type will be included in the management plan:

- Scrub – Some thinning will be necessary to improve the structure of the scrub; in some areas a dense thicket will be left;

Hedgerows – These will be managed by cutting and coppicing when necessary (between 1 September and end February); The planted hedgerow along the northwest boundary of the Site will be managed yearly to retain a box-like hedgerow of 3m. While other areas of planted hedgerow will be allowed to mature and will only need trimming every 10 to 15 years.

- Grassland – The grassland areas once established would, without any management, eventually become rank, lose species diversity and become colonised by scrub. Therefore management by light winter grazing is appropriate where indicated in this plan; and
- An area will be fenced off in the northern section of the Site to allow a wildflower meadow to develop, it is envisaged that this area will be maintained by grazing by the residential rabbit population (Figure 10.3).

#### 8.7.4 **Commitments to Habitat Creation and Retention**

This plan has detailed commitments to retain/enhance or create the following habitats:

- Retention, where possible of habitats on the Site including hedgerow, treelines, pond and wet agricultural grasslands (for lapwing and other bird species);
- Promotion of nature conservation and a diversity of habitats in the Site including creation of semi-natural neutral grassland with some bare areas, hedgerows, woodland, scrub and wet areas; and
- Monitoring of lapwing during the breeding and non-breeding season over the course of the restoration works.

## 8.8 Monitoring Infrastructure

During the initial construction of enabling work and the following restoration works air quality, groundwater, surface water and noise will be monitored.

All existing monitoring boreholes remaining after completion of the Facility will be retained. At least three down-gradient and two up-gradient monitoring boreholes in the overburden and bedrock will be provided (Figure 19.1).

Surface water quality will be monitored at a select number of locations downstream of the Facility.

## 8.9 Indicative Programme of Work

A preliminary programme for the works described above has been devised. The likely scale of the overall works programme is estimated at about 15 years. The programme from date of grant of permission is provided in Table 8.5.

**Table 8.5: Programme of Development Works at the Walshestown Pit**

Stage	Description	Duration (years)
1	Compliance Reporting	0.25
2	Preparatory Works – set up Site infrastructure and construct perimeter drainage systems and berms	0.75
3	Importation of Materials for Land Restoration	12.5
4	Final Capping and Drainage Works and Decommissioning	1.5
	<b>Total</b>	<b>15.0</b>

## 8.10 Management of the Facility

### 8.10.1 Overview

It is proposed to appoint a person with appropriate experience to oversee the construction, operation and closure of the Facility, including the decommissioning of all temporary works and restoration of all disturbed areas within the licensed Facility. The licensee will be

required by conditions of the Waste Licence to appoint a competent person to act as an overall Facility Manager. An Assistance Facility Manager will need to be named to stand in for the Facility Manager during holidays or in case of illness or other reasons of unavailability.

Monitoring of the Facility will be conducted by a person with appropriate experience.

At this early stage in the approval process it is not possible to provide details of designated staff at the proposed Facility. However, Table 8.6 sets out the competence requirements for the key staff.

### **8.10.2 Facility Management Personnel**

The following management structure (Table 8.6) describes the competence requirements of key staff during construction of the proposed facility.

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Table 8.6: Competence Requirements of Key Staff at the Proposed Facility

Name	Position	Based	Duties and Responsibilities	Experience / Qualifications
To be confirmed prior to works	Facility Manager	Site	Supervision of operations on Site, management of waste licence conditions, supervisor of Site engineering works and overall management of Site staff. Responsible for the day-to-day running of the Facility as per licence requirements. This includes the operation and control of all abatement systems on Site as per operational and environmental management procedures.	Suitable engineering or similar appropriate qualification. Minimum 5 years waste management experience. Safe Pass Programme FAS, Waste Management Training Programme, or equivalent.
To be confirmed prior to works	Assistant Facility Manager	Site	Back up person to the Facility Manager in the event of holidays, illness or other reasons of unavailability. Duties will be as indicated for the Facility Manager.	Suitable engineering or similar appropriate qualification. Safe Pass Programme FAS, Waste Management Training Programme or equivalent.
To be confirmed prior to works	Scientific Officer	Site	Responsible for on Site monitoring and reporting as per the frequency of the waste licence.	Appropriate Scientific Qualification.
To be confirmed prior to works	Weightbridge Operator	Site	Responsible for documentation of all material that arrives at the Site (inspection and recording) and the maintenance of the weighbridge to maintain accurate readings of incoming material.	Safe Pass Programme FAS.
To be confirmed prior to works	Facility Foreman	Site	Carry out daily Facility-related operations as per operational and management procedures.	Safe Pass Programme FAS, Waste Facility Operative Training Programme or equivalent.

### **8.11 Health and Safety**

Worked out sand and gravel sites such as the Walshestown Pit can present occupational safety and health risks for workers during restoration activities, as known and unknown safety hazards can be encountered at any stage of site works.

The Walshestown Facility will be designed and constructed in accordance with the requirements of relevant Irish Health & Safety Legislation. Strict safety management systems and a strong safety culture will be in place during the construction and operation of the Facility including the closure and aftercare phase. These systems will ensure compliance with relevant Irish legislation and safe working conditions on the Site.

A preliminary Health & Safety Plan will be developed during the design stage in accordance with the Safety and Health at Work (Construction) Regulations 2006. This will be further developed on appointment of the main contractor in advance of restoration activities commencing. The main contractor will assume the role of Project Supervisor Construction Stage (PSCS) as per the requirements of the aforementioned construction safety Regulations. The Health & Safety Plan will include details on Site arrangements for safety as well as specific information on Site risk assessments.

Employee safety training will focus on increasing Site specific hazard awareness, procedures and preventative measures to minimise the risk of a serious incident occurring. Personnel will be equipped with knowledge and skills to recognise the hazards present, how to assess and minimise the risk which will enable them to perform their duties in a manner that does not represent a safety hazard. All personnel on Site will have defined safety responsibilities and accountabilities.

Public safety will be addressed by restricting Site access during construction and operational phases.

The Applicant has a Corporate Safety Statement. A Site specific Safety Statement will be developed as per the requirements of the Safety Health & Welfare at Work Act 2005 and subsequent regulations. This document will detail the safety management on Site as well as provide a comprehensive hazard and risk assessment for all ongoing Site tasks and activities.

### **8.12 Hours of Construction, Operation and Other Restoration Work**

In keeping with EPA Guidance, activity operations shall be confined to the hours between 07.00 and 18.00, Monday to Friday inclusive (excluding Bank Holidays) or as may be agreed with the Planning Authority/EPA, and between 07.00 and 14.00 on Saturdays, with no activities being permitted on Sundays or public holidays.

### 8.13 Plant

It is anticipated that the following plant (Table 8.7) will likely be needed during the initial enabling works:

**Table 8.7: Potential List of Plant**

Plant	Size	Number
Tracked excavators	20 to 35 tonne	4 No.
Mini digger/JCB		2 No.
Tracked low ground pressure bulldozers	D4 and D6	2 No.
Dump trucks	Variety 5 to 25 tonne	6 No.
Compactors	18 tonne dead weight	2 No.
Tractor with water bowser, leachate bowser and fuel bowser		1 No.
Sump and centrifugal pumps	Variety	4 No.
Tower lights		6 No.
Mobile finger screen		1 No.
Mobile crusher		1 No.
Two-way or three-way split screener		1 No.

### 8.14 Waste Management Procedures

#### 8.14.1 Waste Reception

All wastes will be accepted via the Site entrance. Upon arrival, all delivery vehicles shall be directed to the Facility check-in office and weighbridge where the arrival of each load will be recorded. All documentation accompanying the waste and the waste carrier will be inspected, and the nature of the waste will be confirmed by the Weighbridge Operator/Check in Person. A waste transfer note containing the details of the load delivery time, date, tonnage, and carrier's details will be produced at the weighbridge.

An inspection of the haulier's consignment documents will be made by the Weighbridge Operator/Check in Person. If paper work is incomplete the Weighbridge Operator/Check in Person will retain the load until further information is provided. When the Weighbridge Operator/Check in Person is satisfied with the paper work and the origin of the wastes he/she will inform the driver of relevant Site Safety information and direct the driver to the tipping area.



### 8.14.2 Waste Handling Procedures

Restoration of the Site will be carried out in agreement with the EPA and in line with best practice. Restoration will be completed on a phased basis and will involve the filling of cells defined within each vertical stage in maximum 2 to 3-metre lifts with fill slopes no steeper than 1V:2H, to ensure the maximum slope stability. Phasing allows progressive filling and restoration to occur simultaneously. As shown on Figures 8.8 and 8.9 filling will progress in vertical stages and restoration will proceed from west to east. Each lift will be divided into cells in which surface water drainage will be managed. The size of cells will vary within any given vertical stage, but would typically be 1 to 2 ha in area.

Each landfill cell will be notionally subclassified into grids, identified by a unique reference number, in order to identify the specific deposition area of each waste load and build up a 3-D model of each landfill cell. The grid location of each incoming load will be recorded.

Waste will be deposited, inspected and spread in 2 to 3-metre lifts in each cell, with a bulldozer and compactor on Site ensuring waste is positioned and spread as required to ensure maximum cell stability.

### 8.14.3 Summary

A summary of the proposed waste placement procedure is provided below:

1. Cell construction will involve:
  - Preparation of the cell;
  - Laying of cell liner;
  - Testing of the cell liner; and
  - Validation that the cell meets EPA requirements.
2. The cell will be divided into sub-grids and an appropriate referencing system assigned (e.g. C1/D1 refers to cell 1, grid reference D, level 1);
3. Incoming loads will be directed to cell sub-grid;
4. Waste will be deposited by the delivery contractor;
5. Deposited waste will be spread and compacted;
6. Cell will be filled to a height of 3 m and then the next lift in the cell will be constructed until the entire cell has been filled; and
7. Upon completion of the final lift, capping will be applied and the cell restored.

## **8.15 Raw Materials, Substances Preparations and Energy**

### **8.15.1 Diesel**

The annual diesel consumption of the plant proposed for use at the Facility is not currently available as all plant has not been selected. Details will be provided to the EPA upon letting of the contract for the works.

### **8.15.2 Electricity**

Electricity consumption is not currently available as all plant has not been selected. Details will be provided to the EPA upon letting of the contract for the works.

### **8.15.3 Water**

The Site is connected to Kildare Co. Co. mains supply, and potable water will be obtained from this supply. Water for dust suppression and wheel wash will be abstracted from an existing groundwater well on-Site, close to the Facility entrance (see Figure 8.5). This is an historical well, and if supply is found to be not suitable an alternative borehole will be drilled.

### **8.15.4 Herbicides**

The Licensee will furnish to the EPA the nature and quantities of chemicals if and when they are used.

### **8.15.5 Energy Audits**

Energy audits will be undertaken at the Facility as part of the Environmental Management System (EMS) for the Facility. Reference to the appropriate guidance material and reporting of recommendations of the audit will be included in the Annual Environmental Report which will be a requirement under a Waste Licence issued by the Agency.

## **8.16 Potential Emissions from the Facility**

The potential emissions from the Facility during its construction and closure, and post-closure phases are to air, surface water, groundwater and land. The emissions and the environmental media potentially affected are outlined in Table 8.8.

These emissions, mitigation strategies and the potential residual environmental effects are discussed in the relevant sections of the EIS. Mitigation strategies have also been discussed in previous sub sections of Section 8.0.

**Table 8.8: Potential Emissions and Media Potentially Affected**

Potential Emission	Environmental Media Potentially Affected
Dust	Air
Noise from plant and vehicles on Site	Air
Leachate from wastes	Groundwater beneath the Site and adjoining surface water

## 8.17 Potential Environmental Nuisances

The following sections describe the relevant environment; nuisance and mitigation strategies to control or eliminate these nuisances.

### 8.17.1 Bird Control

Birds will not be attracted to the proposed Facility hence no mitigation strategies are required. If birds appear there are various techniques to prevent intrusion that will be considered and implemented as required.

### 8.17.2 Dust Control

In order to ensure that no dust nuisance occurs during any phases of the development a series of mitigation measures and good working practices will be implemented as part of a dust minimisation plan. These measures are outlined below:

- Site roads will be regularly cleaned and maintained as appropriate. Hard surface roads will be swept to remove mud and aggregate materials from their surface;
- Any un-surfaced roads will be restricted to essential Site traffic only. Furthermore, any road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions;
- Vehicles using Site roads will have their speed restricted, and this speed restriction will be enforced rigidly. On any un-surfaced Site road and on hard surfaced roads that Site management dictates speed will be restricted to 20km per hour;
- All vehicles exiting the Site will make use of a wheel wash facility, prior to entering onto public roads, to ensure mud and other wastes are not tracked onto public roads;
- Public roads outside the Site will be regularly inspected for cleanliness, and cleaned as necessary; and
- Water misting or sprays will be used as required if particularly dusty activities, (such as capping) are necessary during dry or windy periods.

In addition, the Waste Licence issued by the EPA may include additional measures and a requirement to monitor dust and particulates.

### 8.17.3 Fire Control

As the wastes are predominantly a mineral soil or broken rockfill, fires arising from these materials are not expected to be an issue or concern. In case of fire relating to offices, plant etc, standard fire prevention and control measures will be as follows:

- Emergency response contact numbers will be posted on prominent positions on the Site (fire service, police, ambulance and other agencies);
- A telephone system on the Site will ensure instant contact with the emergency services;
- A water supply (well or ponds) will be available on the Site;
- Fire hoses and extinguishers will be available on the Site;
- No burning of waste will be permitted on the Site; and
- There will be no unauthorised people allowed access to the Site and there will be a security company ensuring surveillance outside normal working hours.

### 8.17.4 Litter Control

Litter arising from the wastes to be received is not expected to be a problem as these wastes are expected to be predominantly mineral soils or broken rock. Litter from construction material packaging and the construction offices is a management responsibility and procedures will be put in place to deal specifically with these materials e.g. bins skips, refuse receptacles etc. Littering on the Site by anyone will not be tolerated and will result in disciplinary action. Litter management will include the operation of a litter patrol, which will inspect the Site boundaries and beyond daily and recover all wind-blown litter. All vehicles transporting waste on public roads will be required to have their loads covered.

### 8.17.5 Traffic Control

The entrance will allow movement of traffic into and out of the Site. Traffic signs will be used at the Site entrance and throughout the Site to control traffic. Speed limits will be imposed within the Facility. A traffic and transport assessment (TTA) is given in Section 9.0 and Appendix 4.

### 8.17.6 Vermin Control

Vermin control is not expected to be required as none of the wastes are putrescible. Vermin control is a management responsibility and procedures will be put in place to deal specifically with this issue if required. The Licensee will furnish to the Agency the nature and quantities of chemicals used if and when they are used.

### 8.17.7 Road Cleansing

Road cleansing is a management responsibility and procedures will be put in place to deal specifically with this issue. All lorries will go through a wheel-wash prior to exiting the Site. Road cleansing and sweeping will be carried out as required.

### 8.18 Closure, Restoration and Aftercare Management Plan

This is a requirement associated with holding a waste licence issued by the EPA. Licensees are required to compile what is known as a closure plan or Closure, Restoration and Aftercare Management Plan (CRAMP). The plan is usually given as a condition of the licence to be submitted within a certain timeframe.

In the case of the proposed restoration of the Walshestown Pit, the requirement for a Waste Licence is solely for restoration purposes and therefore the restoration of the Site is fully assessed throughout this report. However, the procedure for developing a CRAMP, in accordance with the "Guidance on Environmental Liabilities, Risk Assessment, Residuals Management Plans and Financial Provision", (EPA 2006) is considered in Table 8.9.

### 8.19 References

Council Directive (1999) on the landfill of waste. (99/31/EC)

EPA (2000) Landfill Manual: Landfill Site Design. *Environmental Protection Agency, Wexford.*

EPA (1999) Landfill Manual: Restoration and Aftercare. *Environmental Protection Agency, Wexford*

Gilbert, O. L., & Anderson, P. (1998). *Habitat Creation and Repair*. Oxford University Press.

Lynas, P., Newton, S.F. & Robinson, J.A. (2007). The status of birds in Ireland: an analysis of conservation concern 2008-2013. *Irish Birds* 8(2), 149-166.

NRA (2005). *A Guide to Landscape Treatments for National Road Schemes in Ireland*. National Roads Authority, Ireland.

**Table 8.9: Summary Preliminary Closure Restoration and Aftercare Management Plan (CRAMP)**

Stage	Activity	Assessment
<b>Closure</b>	Wastes will be stopped from entering the Facility in Year 15.	The type of closure can be categorised as either a Clean Closure or a Non-Clean Closure.  Upon cessation of operations and subsequent decommissioning, there will be no remaining liabilities, thus this is considered a "clean closure".  On-going monitoring at the Site will be required as part of the closure process, for a limited period of 5 years post closure.
<b>Decommissioning</b>	The decommissioning of the Inert Waste Facility will take the form of the removal of the non-permanent infrastructure at the Site. All plant equipment and vehicle use will cease and the final capping will be checked.	The activity at the Site will cease except for the on-going medium-term monitoring (5 years).
<b>Restoration</b>	The restoration stage will be undertaken in conjunction with the closure and decommissioning stages. After placement of the capping layer, the subsoil and growth medium will be placed across the capped surface. The final restored levels are shown in Figure 8.3.  The restored surface will be developed into a variety of habitats to promote biodiversity, and will include a surface drainage system comprising French drains with perforated pipes. The area will be fenced by enhancing existing dense hedgerows and installing 1.2 metre high post-and-wire fencing where required.	The restoration process will be full and complete, leaving a landscaped finish and ultimately improving the condition of the area both visually and in terms of the reduced health and safety risks. More details on the landscape plan are given in Section 16.0.
<b>Aftercare Management Plan</b>	An aftercare management plan comes in the form of engineering works maintenance, landscape management and potential emission control. It is unlikely that the Facility would ever be surrendered or transferred, thus the responsibility of the aftercare will remain with the Licensee.	Monitoring for 5 years, annual grazing each September.

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## 10.0 FLORA AND FAUNA

*Section 1 (Introduction), Section 6 (Site Setting) and Section 8 (Description of the Proposed Development) of the EIS should be referred to before reading this section.*

### 10.1 Introduction

A detailed baseline ecological survey of the Site was undertaken on 15/04/08 and 12/06/08. Following on from this an impact assessment was carried out on the flora and fauna in relation to the proposed restoration plan. This assessment was conducted in accordance with 'EPA Guidelines on the Information to be contained in Environmental Impact Statements' (EPA, 2002), 'EPA Advice Notes on Current Practice' (EPA, 2003), and with reference to the 'Guidelines for Ecological Impact Assessment in the United Kingdom' (IEEM, 2006), and the Landscaping and Restoration Plan outlined in Section 8.7 of this document.

### 10.2 Methodology

A desktop review was conducted of all available published and unpublished information together with consultation with National Parks and Wildlife Services (NPWS) to identify key habitats and species that may be present, particularly those protected by legislation.

Walkover surveys of the Site were conducted on 14 April and 12 June 2008 to record the habitats and flora of the Site. Habitat Assessment follows Joint Nature Conservation Committee (JNCC) Phase One Habitat Survey methodology (JNCC, 1990, revised 2003) and the 'Habitat Survey Guidelines' (Draft 2, Heritage Council, 2005). Aerial photographs and site maps assisted the habitat survey. Fauna were recorded by sightings, signs of activities or dens/roosts.

Habitats are named and described following Fossitt (2000). Nomenclature for higher plants principally follows that given in Webb *et al.* (1996). Habitats are assessed according to the Site evaluation scheme contained in the 'Guidelines for Assessment of Ecological Impacts of National Roads Schemes' (NRA, 2006).

In relation to mammals, the survey was based upon sightings and signs of mammal activity during the habitat survey and also the identification of possible suitable habitats. The survey was carried out in the main bird breeding season (typically March to July).

Photographs taken during the surveys are given in Attachment 10.1.

## 10.3 Existing Environment

### 10.3.1 Ecological landscape of the Site

The proposed restoration site is located ca. 5 km southeast of Naas, along the road between Beggar's End Cross Roads and Walshestown, off the L6042. The ca. 68.0 ha Site comprises the existing quarry, processing areas, lagoons and agricultural fields to the south.

The Site is bordered by either treelines or hedgerow on all sides. There are three lagoons/ponds to the northwest of the Site (Pond A1/A2 and A3), one lagoon/pond to the south of the Site (Pond B) and a small silt settlement pond near the Site entrance (Pond C) (Figure 8.1). A large, dried-out silt lagoon occurs in the northern section of the Site; this area has started to become colonised by rushes (*Juncus* sp.) and colt's-foot (*Tussilago farfara*). There is a wet recolonising area in the northeast of the Site; this area was previously occupied by a silt-settlement lagoon. The area of the Site to the south of the quarry void comprises a mosaic of scrub, wet grassland, heath, bare ground and recolonising ground.

The surrounding land is mainly agricultural fields and quarries, with scattered residential housing. Punchestown Racecourse lies directly to the west of the Site.

### 10.3.2 Areas of nature conservation

The Site is located ca. 5 km northwest of Poulaphouca Reservoir, which is designated as both a pNHA (Site Code 000731) and an SPA (Site Code 004063), and ca. 5 km southwest of Red Bog, which is designated as an SAC (Site Code 000397) (Figure 10.1).

The SPA at Poulaphouca Reservoir is selected for the presence of an internationally important greylag goose (*Anser anser*) population, which is one of the largest in the country. The NPWS Site Synopsis for the SPA is included in Attachment 10.3.

The pNHA at Poulaphouca Reservoir is selected for the presence of the protected species red deer (*Cervus elaphus*), and sika deer (*Cervus nippon*), as well as records of the rare plant species basil thyme (*Acinos arvensis*), which is listed as vulnerable in the Red Data Book (Curtis & McGough, 1988). These species are protected under the Wildlife Act and Flora (Protection) Order, 1999. Site synopses for pNHAs are not currently available from the NPWS.

Red Bog SAC is designated for the presence of transition mire, a habitat listed on Annex I of the EU Habitats Directive. Protected species occurring in this SAC are identical to those listed previously for Poulaphouca Reservoir pNHA. The NPWS Site Synopsis for the SAC is included in Attachment 10.3.

The habitats present at the Site are detailed in Section 10.4 below.

## 10.4 Habitats

The habitats recorded at the Site are given in Table 10.1 and shown in Figure 10.2.

**Table 10.1 Habitats recorded at Walshestown**

HABITAT	HABITAT CODE
Dry calcareous and neutral grassland	GS1
Dry meadows and grassy verges	GS2
Wet grassland	GS4
Improved agricultural grassland	GA1
Scrub	WS1
Hedgerows	WL1
Treelines	WL2
Other artificial lakes and ponds	FL8
Exposed sand, gravel or till	ED1
Spoil and bare ground	ED2
Recolonising bare ground	ED3
Buildings and artificial surfaces	BL3

### Dry calcareous and neutral grassland GS1

Dry, species-rich calcareous grassland occurs to the north of the Site (Figure 10.2). Species commonly occurring in this area include bird's-foot trefoil (*Lotus corniculatus*), common spotted orchid (*Dactylorhiza maculata*), fragrant orchid (*Gymnadenia conopsea*), yarrow (*Achillea millefolium*) and lesser trefoil (*Trifolium dubium*), as well as yellow-wort (*Blackstonia perfoliata*), Yorkshire fog (*Holcus lanatus*), cock's-foot (*Dactylis glomerata*), creeping thistle (*Cirsium arvense*) and white and red clover (*Trifolium repens*, *T. pratense*). Photo 1 in Attachment 10.1 depicts this habitat at the Site.

### Dry meadows and grassy verges GS2

This habitat occurs in several areas on the Site, including a rank area towards the centre of the Site (Photo 2), and a dry grassy area which occurs on the slope by the processing area to the northeast of the Site.

The rank area towards the centre of the Site shows signs of previous grazing by cattle. There is evidence of patchy grazing of the area by rabbits. Species occurring in this area include creeping bent (*A. stolonifera*), cock's-foot (*Dactylis glomerata*), red fescue (*F. rubra*), perennial rye-grass (*L. perenne*), meadow-grass (*Poa* sp.), gorse (*U. europaeus*), white clover (*T. repens*), dandelion (*Taraxacum* agg.), tormentil (*P. erecta*) and common mouse-ear (*C. fontanum*).

An earthen bank separates the recolonising silt lagoon from the processing area. The top of the bank is lined with Leyland cypress (*x Cupressocyparis leylandii*), and the grassy slopes of the bank support a species-rich calcareous grassland, with quaking grass (*Briza media*) occurring in places, together with abundant creeping cinquefoil (*Potentilla reptans*), bird's-foot trefoil (*Lotus corniculatus*), and ribwort plantain (*Plantago lanceolata*). Insect diversity in this area was high, and is detailed in Section 10.6.

### **Wet grassland GS4/ Improved agricultural grassland GA1**

Wet grassland occurs in the fields to the south of the quarrying area (Photo 3), in the area surrounding the wet drain towards the centre of the Site, and around the edges of the lagoons in the north and south of the Site.

In the fields to the south of the currently disturbed area, the ground is quite wet underfoot and is primarily utilised as pasture, with cattle grazing the area during the June site visit. This area is classified as wet grassland, with elements of improved agricultural grassland. This area is used as nesting and foraging habitat for the Red listed bird species – lapwing. Clumps of gorse (*Ulex europaea*) are scattered throughout the area and soft rush (*Juncus effusus*), hard rush (*J. inflexus*), common sedge (*Carex nigra*) and glaucous sedge (*Carex flacca*) are frequent. Other species present include creeping bent (*Agrostis stolonifera*), meadow grass (*Poa* sp.), perennial rye-grass (*Lolium perenne*), red fescue (*Festuca rubra*), dandelion (*Taraxacum* agg.), creeping buttercup (*Ranunculus repens*), common mouse-ear (*Cerastium fontanum*), creeping thistle (*Cirsium arvense*), tormentil (*Potentilla erecta*), yarrow (*Achillea millefolium*), white clover (*Trifolium repens*), curled dock (*Rumex crispus*), lesser trefoil (*T. dubium*) and daisy (*Bellis perennis*).

The wet grassland surrounding the edges of the lagoons contains species including creeping bent (*Agrostis stolonifera*), hard rush and soft rush (*J. inflexus*, *J. effusus*), field horsetail (*Equisetum arvense*), creeping buttercup (*R. repens*) and willow (*Salix* sp.) saplings.

A wet, overgrown drain and adjacent damp earth bank occur towards the centre of the Site (Photo 4); these are colonised by field horsetail (*Equisetum arvense*) and lesser celandine (*Ranunculus ficaria*), with extensive moss cover.

### **Scrub WS1**

Scrub occurs in scattered clumps around the Site (Photo 5). The dominant species in the area of scrub toward the centre of the Site is gorse (*U. europaeus*), interspersed with grasses such as creeping bent (*A. stolonifera*) and cock's-foot (*Dactylis glomerata*), soft rush (*J. effusus*), nettle (*Urtica dioica*) and curled dock (*Rumex crispus*). There is some scrub encroachment on the slope of the field by the south western boundary of the Site; this also consists primarily of gorse (*U. europaeus*). Bullfinch (*Pyrrhula pyrrhula*) was noted foraging in this area during

the June visit, and may have been nesting nearby. Gorse scrub is also beginning to colonise the west-facing slopes of the lagoons to the north of the Site.

### **Hedgerows WL1**

Mature hedgerows occur along much of the boundary of the Site (ref. Photo 1). The main species occurring in the hedgerows are mature ash (*Fraxinus excelsior*), elder (*Sambucus nigra*) and hawthorn (*Crataegus monogyna*) trees, with gorse (*Ulex europaeus*), bramble (*Rubus fruticosus*), ivy (*Hedera helix*), nettle (*Urtica dioica*), curled dock (*R. crispus*), creeping buttercup (*R. repens*), creeping thistle (*Cirsium arvense*), herb-Robert (*Geranium robertianum*), sticky mouse-ear (*Cerastium glomeratum*), dandelion (*Taraxacum* agg.), fescues (*Festuca* sp.) and meadow grass (*Poa* sp.) in the understorey.

### **Treelines WL2**

Treelines occur along sections of the Site boundary, and also in areas within the Site itself. The majority of the northern boundary of the Site is planted with a screening treeline of Leyland cypress (*x Cupressocyparis leylandii*), as is the western boundary of the Site adjoining Punchestown Racecourse, and a further treeline of this species also occurs along the top of the earthen bank separating the recolonising silt lagoon from the processing area. A treeline along the northwestern boundary of the Site is composed of mature larch (*Larix* sp.) and other conifers, with mature elder (*Sambucus nigra*), hawthorn (*C. monogyna*), and poplar (*Populus* sp.). Another mature treeline that occurs along the western boundary contains mature blackthorn (*Prunus spinosa*) and crab-apple (*Malus sylvestris*).

A planted hawthorn (*C. monogyna*) hedgerow along the western boundary towards the southern area of the Site is interspersed with a planted treeline of field maple (*Acer campestre*).

The treeline which occurs at the western boundary of the southern extremity of the Site contains mature ash (*Fraxinus excelsior*), hawthorn (*C. monogyna*), blackthorn (*P. spinosa*), and elder (*S. nigra*); many of which are densely covered in ivy (*H. helix*). Dog rose (*Rosa canina*), bramble (*R. fruticosa*), creeping thistle (*C. arvense*) and nettle (*Urtica dioica*) occur in the understorey.

### **Artificial lakes and ponds FL8**

There are several water-filled lagoons/ponds on the Site. Three lagoons/ponds (Ponds A1/A2, and A3) occur to the north west of the Site (Photo 6). There is another large lagoon/pond, Pond B, to the south of the Site (Photo 7). There is a small former silt settlement pond, Pond C, adjacent to the Site entrance (Photo 8).

The lagoons towards the northwestern boundary of the Site, Ponds A1/A2 and A3, are edged by species including hard rush (*J. inflexus*), soft rush (*J. effusus*), bulrush (*Typha latifolia*), horsetail (*Equisetum* sp.), and willow (*Salix* sp.) saplings.

Pond B, the lagoon to the south of the Site, has been partially recolonised, and contains a man-made island at the western edge. This island has become colonised with a range of vegetation, including soft rush (*J. effusus*), glaucous sedge (*C. flacca*), red fescue (*F. rubra*), white clover (*T. repens*), creeping bent (*A. stolonifera*), cock's-foot (*D. glomerata*), tormentil (*Potentilla erecta*) and creeping buttercup (*R. repens*).

The small silt settlement pond at the Site entrance, Pond C, is currently disused and has become colonised with a variety of aquatic plant species including hard rush (*J. inflexus*), soft rush (*J. effusus*), yellow flag iris (*Iris pseudacorus*) and bulrush (*T. latifolia*).

### **Exposed sand, gravel or till ED1**

There is an exposed low (ca. 7ft) cliff face which was formerly quarried for sand to the west of the Site. Sand martins (*Riparia riparia*) are nesting throughout the cliff face (Photo 9). There are some grass and ruderal plant species growing in areas of this habitat, including dandelion (*Taraxacum* agg.) and creeping thistle (*C. arvensis*).

### **Spoil and bare ground ED2**

This habitat occurs in the northeast of the Site and in the disturbed area south of the lagoons (Photo 10). Species such as weld (*Reseda luteola*), ragweed (*Senecio jacobea*), colt's-foot (*Tussilago farfara*), dandelion (*Taraxacum* agg.) and common mouse-ear (*C. fontanum*) are beginning to colonise the area, however the vast majority of the area remains bare.

The exposed face of a heap of sand in the northeastern area of the Site has become colonised by nesting sand martin (*Riparia riparia*), an Amber listed bird species.

### **Recolonising bare ground ED3**

This habitat type occurs widely in the northeastern area of the Site (Photo 11). The former silt settlement pond in the northeast of the Site is colonised with a range of plant species, dominated by colt's-foot (*T. farfara*). The ground is wet underfoot in places and many of the species occurring in the wet grassland habitat recur in these areas, such as hard rush (*J. inflexus*), soft rush (*J. effusus*), glaucous sedge (*Carex flacca*), field horsetail (*Equisetum arvense*) and mosses.

The west-facing slopes by the lagoons to the northwest of the Site have become colonised by willow saplings (*Salix* sp.), some gorse (*U. europaeus*), meadow grass (*Poa* sp.), cock's-foot (*Dactylis glomerata*), colt's-foot (*T. farfara*) and bird's-foot trefoil (*Lotus corniculatus*).

The ground that runs between Ponds A2 and A3 to the northwest of the Site contains several plant species which are not found in other areas of the Site. These are columbine (*Aquilegia vulgaris*), pink crane's-bill (*Geranium versicolor*), and sycamore (*Acer pseudoplatanus*); which are likely to be garden escapes; and butterfly-bush (*Buddleja davidii*).

### **Buildings and artificial surfaces BL3**

Buildings and artificial surfaces within the Site include various structures around the grading machines and the Site offices (Photo 12), along with an access road, loading areas and parking areas. Swallows were observed to be nesting in the sheds by the processing elevator on both visits. A variety of plant species have colonised areas where substrate associated with processing works has accumulated, including colt's-foot (*T. farfara*), field horsetail (*Equisetum arvense*), cock's-foot (*Dactylis glomerata*), creeping thistle (*C. arvense*), and dandelion (*Taraxacum* agg.), as well as rushes (*J. inflexus*, *J. effusus*, *J. acutiflorus*) in areas where water has pooled.

## **10.5 Flora – Species of conservation importance**

NPWS ([www.npws.ie](http://www.npws.ie), mapviewer) hold records of the rare plant species basil thyme (*Acinos arvensis*) as being located in the same 10 km square (N19) as the Site. Details of this are listed in Attachment 10.3. The listed rare plant species occur in Rathmore, which is not in the vicinity of the Site. This species was not noted on Site during the Phase 1 survey.

## **10.6 Fauna - Species**

### **10.6.1 Mammals**

There were several sightings of mammals during the Site visits; these were Irish hare (*Lepus timidus hibernicus*) - four juveniles and three adults were sighted; and numerous rabbit (*Oryctolagus cuniculus*). There was evidence of rabbit (*O. cuniculus*) grazing at grassy areas throughout the Site, and there was a burrow entrance in one of the spoil heaps near the ruins by the quarried area.

It is possible that mammal species that favour hedgerows/treelines such as hedgehog (*Erinus europaeus*), wood mouse (*Apodemus sylvaticus*), and pygmy shrew (*Sorex minutus*), may use the hedgerow and scrub within the Site. Rabbit remains to the south of the quarry were considered to be evidence of fox (*Vulpes vulpes*) feeding at the Site, and a strong fox scent was noted by the mature treeline along the western boundary of the Site, indicating a territory boundary.

Badger (*Meles meles*) setts have been previously noted at the Site. Badger prints were observed in the sand by the bridge towards the centre of the Site. Deer tracks were also observed in this area.



### 10.6.2 Birds

A variety of bird species were recorded nesting and/or feeding in the grassland and hedgerows of the Site and adjacent areas. These include lapwing (*Vanellus vanellus*) which were nesting on the Site, skylark (*Alauda arvensis*), meadow pipit (*Anthus pratensis*), blackbird (*Turdus merula*), wren (*Troglodytes troglodytes*), robin (*Erithacus rubecula*), and pied wagtail (*Motacilla alba*). Sand martin (*Riparia riparia*) breed on the Site, with multiple nests built into sandy cliff faces at the west of the Site, and in a sand heap in the northeast of the Site. Snipe (*Gallinago gallinago*) was flushed from the wet grassland to the south of the quarry. A number of wildfowl species were noted on the waterbodies of the Site, these included tufted duck (*Aythya fuligula*), little grebe (*Tachybaptus ruficollis*), mallard (*Anas platyrhynchos*), coot (*Fulica atra*), waterhen (*Gallinula chloropus*), and mute swan (*Cygnus olor*). The full Bird Survey report is provided in Attachment 10.2.

### 10.6.3 Reptiles and amphibians

No reptiles or amphibians were observed on the Site during the course of the survey. The water-filled lagoons on the Site provide suitable habitat for frogs (*Rana temporaria*) however, and the bare sandy areas that occur throughout the Site are potential basking sites for common lizard (*Lacerta viviparia*).

### 10.6.4 Invertebrates

Large numbers of heath snail (*Helicella itala*) were observed on the surface of the wet grassland areas of the Site. Common froghopper (*Philaenus spumarius*) was noted by the wet drain towards the centre of the Site. Numerous common blue butterfly (*Polyommatus icarus*) were observed during the June site visit. Seven-spot ladybird larvae (*Coccinella septempunctata*) occurred in large numbers on colt's-foot (*T. farfara*) leaves on the west-facing slopes of the lagoons to the north of the Site. Variable damselfly (*Coenagrion pulchellum*) was observed basking on a dead grass stem on the north-facing grassy slope to the northeast of the Site. It is likely that a range of other butterfly, damselfly and dragonfly species occur in season. The food-plants of butterflies such as small tortoiseshell (*Aglais urticae*) and painted Lady (*Vanessa cardui*) (nettle and thistle respectively) occur throughout the Site.

### 10.6.5 Fauna – Species of Conservation Importance

NPWS records ([www.npws.ie](http://www.npws.ie), mapviewer) show records of fauna species protected under the Wildlife Act and Flora (Protection) Order, 1999 in the 10km square (N19) in which the Site is located (Attachment 10.3). These are red deer (*Cervus elaphus*) and sika deer (*Cervus nippon*). None of the listed rare species were observed on the Site during this survey, although deer tracks were observed in sand by the bridge on Site. Several sightings of Irish

hare (*Lepus timidus hibernicus*) were made during the survey, and evidence of badger use of the Site was noted.

Attachment 10.2 gives details of the bird species present on the Site. Birds of conservation importance that are nesting and foraging on Site include;

**Lapwing:** A flock of at least 30 individuals was observed on a bare area of ground to the south of Pond B. At least 5 of these remained in a territorial position when the remainder of the flock were alarmed and took flight; direct evidence of the holding of breeding territory by lapwing in this area. The lapwing were also foraging in the wet pasture fields further south of the lagoon.

Amber listed species of moderate conservation concern, confirmed breeding/ holding territories on the site, include:

**Swallow:** These were observed to be nesting in the disused buildings at the northeast of the Site in the old processing facility, and several individuals were noted foraging throughout the Site.

**Sand martin:** A colony of six active burrows exists in a stockpile opposite the buildings in the processing area were noted. A second colony was observed on a low stockpile by a track towards the centre of the Site (Photo 1). A third colony was noted next to the lagoon in an exposed sandy face towards the centre of the Site. At least 40 burrows were counted in this colony, and at least 20 were active. Sand martin was observed foraging over the dried silt lagoon area, and the water-filled lagoons to the northwest of the Site.

**Starling:** A flock of starling (ca. 80 individuals) were present on the stockpiles abutting the processing machinery.

**Skylark:** Several pairs were noted holding territories in areas of the Site including the recolonising silt lagoon to the north of the Site, and in the wet grassland area towards the centre of the Site.

**Snipe:** Individual birds were flushed from long grass in the wet grassland area towards the south of the Site over winter months.

**Coot:** 6 individuals were noted on Pond A1/A2 to the northwest of the Site and at least one pair was nesting.

**Little grebe:** A pair (probably breeding) was observed on the largest water-filled lagoon towards the northwest of the Site.

## 10.7 Assessment

### 10.7.1 Habitats

**Table 10.2. Walshestown Site Evaluation using NRA Scheme**

HABITAT NAME	HABITAT CODE	RATING	IMPACT DURING WORKS	IMPACT AFTER MITIGATION
Dry calcareous and neutral grassland	GS1	C	Moderate negative	Neutral
Dry meadows and grassy verges	GS2	D	Moderate negative	Neutral
Wet grassland	GS4	B	Moderate negative	Neutral
Scrub	WS1	D	Minor negative	Neutral
Hedgerows	WL1	C	Neutral	Neutral
Treelines	WL2	C	Neutral	Neutral
Other artificial lakes and ponds	FL8	C	Moderate negative	Neutral
Exposed sand, gravel or till	ED1		Minor negative	Minor negative
Spoil and bare ground	ED2	E	Minor negative	Neutral
Recolonising bare ground	ED3	E	Minor negative	Neutral
Buildings and artificial surfaces	BL3	D	Minor negative	Neutral

The evaluation and assessment of each habitat at the Site is given in Table 10.2 and is based on the NRA Site Evaluation Scheme and Criteria for assessing the impact significance (Attachment 10.4).

The principal habitats within the Site are hedgerow and treelines, scrub, wet improved grassland and the lagoons from previous quarry activity. The ecological value of these habitats is rated as being of high value, and locally important, according to the NRA site evaluation scheme. The hedgerows within the Site provide refuge, feeding sites and corridors for the movement of animals and birds, and the water bodies are locally important for waterfowl. The remnant cliff faces are utilised as nesting areas by sand martins. The wet grassland areas are important feeding and breeding areas for birds including lapwing (red-listed on the Irish list of bird species of conservation concern), snipe and skylark, as well as providing habitat for hare and rabbit. There is evidence of badger, deer and fox activity on Site.

### **Dry calcareous and neutral grassland GS1**

The dry, species-rich calcareous grassland occurs to the north of the Site, between the Site boundary and the bare and recolonising area (Photo 1). Common spotted orchid (*Dactylorhiza maculata*), and fragrant orchid (*Gymnadenia conopsea*), are common in this area, as well as a range of other grass and herb species, and the area is also grazed by rabbit. It is thus considered to be of high ecological value and locally important.

Areas of this habitat are to be created as part of the planned restoration, and managed appropriately for the development and maintenance of a species-diverse sward. The area to be developed as grassland will be cross-ripped and sown with a seedmix of simple grasses including creeping bent (*Agrostis stolonifera*), red fescue (*Festuca rubra*) and sheep's fescue (*Festuca ovina*) from indigenous seed sources; areas treated in this manner will become naturally colonised by species from adjacent plant communities and the pre-existing soil seed bank over time (NRA, 2005). Once established, moderate grazing is the ideal means of management; otherwise half of the grassland can be cut each winter (with cuttings removed to prevent additional nutrient input to the soil) to promote the development of short and tall swards, which provide good cover for faunal species (Gilbert & Anderson, 1998).

The impact on this habitat during restoration works is considered to be moderate negative. However, it is anticipated that the restored habitat will exceed the current area of dry calcareous grassland on the Site; therefore the overall impact of the restoration activities on the Site is considered to be neutral.

### **Dry meadows and grassy verges GS2**

This habitat is located towards the centre of the Site and scrub area, and on the grassy slope to the northeast of the Site (Photo 2). The area of this habitat towards the centre of the Site comprises a rank, tussocky sward of low species diversity. It is of moderate ecological value and locally important, giving it a rating of D.

The area of this habitat which occurs on the grassy west-facing slope in the northeast of the Site is more diverse, containing species such as quaking grass (*Briza media*), creeping cinquefoil (*Potentilla reptans*), and supports a range of invertebrate species. This area is considered to be of high ecological value and locally important.

Although this habitat is likely to be lost during restoration activities (a moderate negative impact in the context of the Site), it will be encouraged to re-establish naturally in the vicinity of the retained treeline and hedgerow areas, creating a structurally diverse transitional habitat; this will reduce the overall impact to neutral.

### **Wet grassland GS4/ Improved agricultural grassland GA1**

This habitat occurs in the fields to the south of the Site (Photos 3, 4). There are several grass species and some sedges and rushes occurring in this area, as well as a range of broad-leaved herbs. A flock of lapwing (ca. 30 individuals) and skylark were recorded on Site breeding and foraging in this habitat. Lapwing is on the Red list of Bird Species of Conservation, and as such is considered globally threatened (Lynas et al., 2007). This area is thus considered to be of high ecological value and is rated as B.

This area will be retained in order to protect the lapwing and other bird species (Figure 10.3, Rev. B issued September 2010). The area will be fenced and screened during construction activities in order to keep disturbance to a minimum. Construction activities in relation to screening and fencing of this area will be restricted to times outside the bird breeding season.

Thus, the overall impact of restoration activities on this habitat is considered to be neutral.

### **Scrub WS1**

This habitat occurs in patches throughout the Site and consists primarily of gorse (*U. europaea*) (Photo 5). It is likely that this area provides habitat, refuge, and foraging opportunities for a range of fauna, thus it is considered to be of moderate ecological value and locally important, giving it a rating of D. These scrub areas will be lost during restoration, which is considered to be a minor negative impact. However, scrub habitat will be encouraged to develop as part of the restoration plan. The planting of native species woodland and scrub around the proposed wetland area as part of the planned restoration works will reduce the overall impact to neutral.

### **Hedgerows WL1, and Treelines WL2**

Mature hedgerow and treelines border the Site (Photo 1), with mature trees occurring throughout, and a range of scrub and herb species forming the understorey. These contain native tree species including ash, elder and hawthorn, which are considered to be of high ecological value. These hedgerows and treelines provide habitat, refuge, foraging opportunities and landscape connectivity for a range of mammals and birds. The habitat is of high value and locally important, giving it a rating of C.

The Leyland Cyprus treelines along the western boundary and between the processing area and the recolonising silt lagoons are to be removed as part of the planned restoration; this is a non-native tree species of limited ecological value, so the impact of its loss is considered to be neutral. All other hedgerows and treelines surrounding the Site are to be retained as they form the Site boundary, and native-species hedgerow will be planted within the Site as part of the restoration plan, thus the overall impact on these habitats is considered to be neutral.

### **Artificial lakes and ponds FL8**

There are three lagoons/ponds to the northwest of the Site (Pond A1/A2 and A3), one lagoon/pond to the south of the Site (Pond B) and a small silt settlement pond near the Site entrance (Pond C) (Figure 8.1). The larger lagoons support a range of waterfowl, several of which are breeding in these areas. These habitats are considered to be of high ecological value and locally important, giving them a rating of C.

Pond B to the south of the Site will be retained in order to protect the lapwing and other bird species (Figure 10.3, Rev. B issued September 2010). The area will be fenced and screened during construction activities in order to keep disturbance to a minimum. Impacts to this feature are therefore considered neutral. Regarding the reshaping of Pond A1, an alternative water feature will be reinstated reducing this impact to neutral also.

### **Exposed sand, gravel or till ED1**

This habitat occurs in the formerly quarried areas of the Site. Sand martins are nesting throughout the quarry, as a result these areas are considered to be of high ecological value and locally important, giving this habitat a rating of C. The loss of this habitat is considered to be a minor negative impact. Although this habitat will not be recreated as part of the restoration plan, other similar quarries in the vicinity of the Site are likely to provide alternative nesting sites for sand martin. Providing that restoration works in the vicinity of the colonies are undertaken outside of the sand martin breeding season, the overall impact on this habitat is considered to be minor negative.

### **Spoil and bare ground ED2**

This habitat occurs throughout the Site. It is sparsely vegetated with a few ruderal plant species and is typically considered to be of low ecological value – a rating of E, however it may provide suitable basking habitat for common lizard (*Lacerta vivipara*) and a range of invertebrates. During restoration works, there will be a temporary minor negative impact on this habitat. Patches of this habitat will be recreated throughout the semi-natural grassland as part of the planned restoration works; thus the overall impact on this habitat is considered to be neutral.

### **Recolonising bare ground ED3**

This habitat has occurred as a result of disturbance where quarrying activities formerly took place, and is transient in nature. Various ruderal plant species are recolonising the area and there are rabbit burrows in one of the spoil heaps. The habitat is considered to be of low ecological value yet locally important, giving it a rating of E. This habitat will be recreated during the process of Site restoration. Since this habitat is transient by nature, and high value

habitat is to be created at other areas of the Site as part of the restoration plan, the impact of the loss of this habitat is considered neutral.

### **Buildings and artificial surfaces BL3**

Buildings within the Site include various structures around the grading machines and the Site offices, along with an access road, loading areas and parking areas. Swallow (*Hirundo rustica*), which is on the amber list of Birds of Conservation Concern (Lynas *et al.*, 2007) was observed nesting in several of the buildings on Site. These buildings are thus considered to be of moderate ecological value, and are rated D. As some of the buildings will be retained and once removal of any buildings is carried out outside of the bird breeding season the impact is considered to be neutral.

The buildings on the Site offer potential roosting habitat for bats. All bat species in Ireland are strictly protected; a bat survey will be required to determine the presence or absence of bats prior to removal of the buildings; therefore until the bat survey is carried out, the buildings are rated as C (high ecological value, locally important). If the buildings are found to contain bats, a bat specialist must be present on Site during the removal of the buildings. The impact of the removal of the buildings on bats (should they contain them) can be significantly ameliorated by implementing the recommended mitigation measures of the bat survey.

## **10.7.2 Fauna**

### **10.7.2.1 Habitat Loss**

#### **Birds**

Habitat loss will be the main impact to the birds using the scrub, and exposed sandy cliff faces. The majority of the birds observed on the Site are relatively common species. A notable exception is a flock of breeding lapwing (*Vanellus vanellus*), which is on the red list of Birds of Conservation Concern in Ireland (Lynas *et al.*, 2007). Coot (*Fulica atra*), snipe (*Gallinago gallinago*), little grebe (*Tachybaptus ruficollis*), skylark (*Alauda pratensis*), starling (*Sturnus vulgaris*), swallow (*Hirundo rustica*) and sand martin (*Riparia riparia*) were observed on the Site, all of which are on the amber list of Birds of Conservation Concern in Ireland.

It is likely that most of these bird species will use alternative habitat created within the restored site. Pond B and the adjoining nesting and foraging habitat for lapwing will be retained and protected from construction activities in the southern part of the Site. The treelines and hedgerows being retained, together with the native hedgerow and woodland to be planted as part of the restoration, will provide extensive habitat for other birds. The retention and expansion of one of the larger lagoons at the northwest of the Site (Pond A1)

will provide alternative habitat for the waterfowl species, and the creation of a wetland area extending from the lagoon will provide habitat for snipe. The loss of the sandy cliff face will result in the loss of sand martin from the Site, however it is expected that these birds will relocate to similar habitat areas which are plentiful in the locality of the Site.

The main impact of habitat loss to bird species is therefore considered to be of low significance overall. This is based upon the understanding that any habitat removal or alterations will take place during 1 September to 1 March, i.e. outside the bird breeding season.

### **Mammals**

The removal of treelines, scrub and areas of long grass may impact some mammals including badger, fox, rabbit, hedgehog, wood mouse, brown rat and pygmy shrew. The removal of these during restoration works may result in some temporary loss of potential foraging habitat; however as alternative foraging habitat occurs within (treelines, scrub and hedgerow along the Site boundary) and outside of the Site, the significance of this habitat loss to these species during the restoration process is considered minor. It is anticipated that the overall impact of the planned restoration and habitat creation on mammal species will be neutral.

There is evidence of badger activity on the Site; therefore it is recommended that a badger survey be carried out prior to commencement of works on the Site and if necessary, appropriate measures according to standard guidelines should be undertaken prior to the commencement of works, in consultation with NPWS.

### **Bats**

The buildings and structures of the quarry have potential as bat roosting habitat. The removal of these as part of the restoration plan could potentially impact on possible roosts and cause fatalities if bats are present when works are carried out. As bats are legally protected, a bat survey will be carried out prior to removal of buildings on the Site, and any potential impacts will be ameliorated through appropriate mitigation, such as, the provision of bat boxes.

### **Amphibians and reptiles**

No amphibians or reptiles were recorded during the habitat survey, however the water-filled lagoons to the northwest of the Site provide suitable habitat for frog, and the bare slopes surrounding them are potentially good basking habitat for lizard. These lagoons are to be developed into a waterbody as part of the restoration plan. It is anticipated that the waterbody and its associated wet areas will provide spawning habitat for frogs, and bare areas scattered throughout the Site will provide suitable basking habitat for lizard. The overall impact of the planned restoration works on amphibians and reptiles is considered to be neutral.



## **Invertebrates**

Invertebrate activity was observed on the Site during the June visit, this activity was concentrated on the northwestern-facing grassy slope (planted with Leyland Cyprus along the top) in the northeast of the Site; and in the rank, tussocky grassland area towards the centre of the Site. These areas will be lost temporarily during restoration works; however similar habitats will be recreated as part of the planned restoration of the Site. These and other planned diverse habitats will provide habitat, refuge, and foraging opportunities for a range of invertebrate species, and the proposed waterbody will provide breeding opportunities for invertebrate species with aquatic stages in their life-cycles, such as dragonflies. The overall impact of the planned restoration works on invertebrates is thus considered to be neutral.

### **10.7.2.2 Noise**

#### **Birds**

Sensitivity to noise disturbance varies amongst bird species. Most bird species present on the Site are accustomed to disturbance due to quarrying activities within the Site and the surrounding area. The main impact will occur during the construction phase, and thus will be temporary. It is likely that the impact of noise will be reduced as a result of the restoration of the Site to a wildlife-focussed end-use. The impact of noise on birds on the Site is therefore considered to be of low significance, with an overall neutral-positive impact post restoration.

#### **Mammals**

Animal response to noise is a function of many variables, including characteristics of the noise and duration, life history characteristics of the species, habitat type, season and current activity of the animal, sex and age, previous exposure and whether other physical stressors (e.g. hunger) are present. As the area has been quarried for a number of years, it is likely that mammals utilising the area have become accustomed to the noise and activities of the quarry and adjacent quarries. The main impact will occur during the construction phase and as such will be temporary in nature and the planned wildlife end-use of the Site will eliminate noise impact on mammals at the Site. Thus the effect of the planned restoration on noise impact on mammals at the Site will be neutral-positive.

### **10.7.2.3 Dust, sediments and other emissions**

#### **Flora and Invertebrates**

Smothering by dust can interfere with photosynthesis and transpiration of plants and thus growth rates and seed rates etc. Dust can harm invertebrates indirectly by eliminating their habitat or food plants or by making them unavailable, and directly by being toxic or by causing mechanical damage. The effect of dust depends on the prevailing winds and the

transport distance is related to particle size. Providing that the recommended measures of the dust minimisation plan (as outlined in Section 14.0) are adhered to, the overall impact on flora and invertebrates is considered to be neutral.

### 10.7.3 Sites of conservation importance

The Site is located within 5 km of Poulaphouca Reservoir, which is designated both as an SPA and an NHA; however it is not within its watershed catchment. The Site synopsis for Poulaphouca Reservoir is included in Attachment 3. The proposed restoration plan at Walshestown will not impact Poulaphouca Reservoir SPA.

## 10.8 Mitigation

### 10.8.1 Site run-off

All surface water collected from the operating site drainage will be treated in a sustainable manner prior to discharge to minimise the impact on water quality and prevent habitat degradation. Treatment will be designed with adequate storage capacity and in a manner to facilitate maintenance.

The following measures are critical for preserving water quality and aquatic habitats:

- Fuels, oils, greases and hydraulic fluids will be stored in bunded compounds well away from the water body. Refuelling of machinery, etc., will be carried out in bunded areas or off-site where necessary;
- Run off from machine service areas will be controlled to prevent entry to the watercourse;
- Run off from the Site will only be routed to a watercourse via suitably designed and sited settlement ponds/filter channels/interceptors;
- Settlement ponds will be inspected daily and maintained regularly; and
- Measures will be taken to prevent sediments from entering the lagoon planned for retention and the stream which feeds it.

### 10.8.2 Dust

Dust minimisation measures will be implemented and are outlined in Section 14.5, these include the following:

- Site roads will be regularly cleaned and maintained and any site roads with the potential to give rise to dust will be regularly watered, as appropriate during dry and/or windy conditions;
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind;
- Water misting or sprays will be used as required, particularly during dusty activities and/or during dry or windy periods; and
- Ensure that all plant and machinery on site are suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum.

### 10.8.3 Habitats

The planned restoration makes provision for the retention and enhancement of existing habitats, together with the creation of new diverse areas. Specific actions being undertaken include:

- The scrub and hedgerows along the borders of the Site will be retained, to maintain connectivity with the wider landscape;
- The majority of the Site will be managed for the creation of a species-diverse, semi-natural grassland with a mosaic of bare patches throughout;
- The creation of a water feature along the western edge of the Site with surrounding vegetation to increase its attractiveness to wildlife;
- Any vegetation removal will be carried out between September 1<sup>st</sup> and March 1<sup>st</sup>, i.e. outside the bird nesting period; and
- The wet pasture fields and associated Pond B in the southern section of the Site will be retained for lapwing and other bird species. This area will be screened off from the rest of the Site during construction activities. The current grazing regime of the pasture fields appears ideal for the maintenance of this habitat.

An outline of the proposed restoration plan is depicted in Figure 10.3, Rev. B. (September 2010).

#### 10.8.4 Landscaping

Any landscaping/planting for screening will include the planting of native species only. The planted areas will be linked to existing areas of vegetation to enhance habitat linkages.

#### 10.8.5 Summary of mitigation measures

- The treelines and hedgerows along the border of the Site will be retained (exception: non-native Leyland Cypress trees along western boundary to be removed as agreed with Punchestown Racecourse management);
- The majority of the Site will be managed for the development of species-rich grassland, with wet grassland and waterbodies in the west of the Site;
- A badger survey will be carried out prior to commencement of works; if badgers are found to be present on site appropriate mitigation guidelines will be followed in consultation with NPWS;
- A bat survey will be carried out prior to buildings removal, and appropriate guidelines followed if they are found to be present on site, in consultation with Bat Conservation Ireland and NPWS;
- Vegetation removal will be restricted to 1 September to 1 March;
- Sediment and pollution control measures will be installed;
- Dust minimisation measures will be implemented;
- The wet pasture fields and associated Pond B in the southern section of the Site will be retained for lapwing and this area will be screened off from the Site prior to construction activities commencing on Site. The screening will be put in place during 1 September to 1 March to avoid disturbance of lapwing during the breeding season;
- Native species will be planted in areas where hedgerows and woodland are to be created/enhanced; and
- A long-term management plan for the Site as outlined in the restoration plan will be implemented.

#### 10.9 Residual

There will be some temporary loss of habitat during the restoration process. However, animals and birds present on the Site are accustomed to some disturbance and are likely to use

some of the retained habitats and to move to similar ones that are common in the surrounding landscape during the restoration works, and are expected to return to the habitats created as part of the planned restoration works. It is anticipated that the habitats created as part of the restoration works will encourage the return of many species to the Site and that in the long-term there will be little residual effect. Once the recommended mitigation measures are implemented, the overall impact of the proposed restoration plan on flora and fauna at the Site will be positive.

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## **16.0 LANDSCAPE AND VISUAL IMPACT (REVISED FROM DEC.2008)**

*Section 1 (Introduction), Section 6 (Site Setting), Section 8 (Description of the Proposed Development) and Section 10 (Flora & Fauna) of the EIS should be referred to before reading this section.*

### **16.1 Introduction**

This section of the EIS is a summary of the anticipated landscape and visual impacts of the proposed restoration of Walshestown Pit (the 'Site') from initial Site establishment, during the operational period and through to final restoration and Site closure. The location of the Site is shown in Figure 16.1.

The following assessment has been conducted in accordance with current guidance, namely Guidelines for Landscape and Visual Impact Assessment, (Second Edition); 2002, (The Landscape Institute and Institute of Environmental Management and Assessment.)

A desk-based study was carried out to gather information on the existing landscape and visual resource, planning context and planning designations. Information has been gathered from the following sources:

- Ordnance Survey (Ireland) coloured maps with contours;
- Aerial photography;
- Kildare County Development Plan 2005-2011; and
- Landscape Character Assessment, CAAS Environmental Services Ltd, 2003.

This assessment was prepared during May 2008; however consideration is also being given to potential impacts during the winter period. The assessment describes the following:

- The location, the Site and the existing landscape context;
- The evaluation of existing landscape quality and sensitivity to the proposed development;
- The predicted impact on landscape character as a result of phased infilling together with consideration of mitigation measures, both during the short and medium term and on final Site restoration;
- The visual impact of the development from key receptors and the sensitivity of those receptors for each development phase; and
- The degree of compliance with planning policy related to landscape.

### **16.2 Site Context**

The Application Site falls within the townland boundaries of Walshestown, Blackhall, Bawnoge and Tipperkevin, Co Kildare. The Site is equidistant between the towns of Naas which is situated ca.5 km to the northwest and Blessington to the southeast. Immediately to

the north of the Site is the local primary road, Reference L6042, from which access to the Site is gained.

The proposed development consists of phased infilling principally within an area of land that had previously been worked for sand and gravel, the reserve of which is now exhausted. The unrestored working areas and plant Site area amounts to ca. 40 hectares with the remaining ca.28 hectares having been previously restored and currently used for grazing. It is proposed to infill the Site at an average of 330,000 tonnes per annum over a 13 year period.

The proposed development will comprise the following:

- Importing inert materials;
- Handling and screening of inert materials where necessary in the inert waste processing area;
- Recovery of soils from on-Site or off-Site sources for the purposes of using these materials for final restoration;
- Backfilling the Site with available on-Site and imported inert materials;
- Re-contouring the Site generally to re-instate the landform back to a rising landform which merges with the surrounding topography and landscape; and
- Final restoration of the Site and the removal of all plant and machinery.

Site establishment works will be carried out at the outset to minimise infilling impacts and progressive restoration will be undertaken in parallel with infill development works.

### **16.3 Landscape Baseline Conditions**

#### **16.3.1 Description of Site**

The Application Site largely comprises of land which has been previously worked for sand and gravel. Some of the unrestored areas of the Site have become vegetated with pioneer species typical of recolonising ground. Access to the Site is from the L6042 road which leads directly into the plant Site, which was previously used for the processing of sand and gravel from the Site and is now non-operational. A concrete batching plant remains on the Site along with a weighbridge and office. Lands to the south of the Site have been restored and are used for grazing. There are three sizeable water bodies on Site (ponds A1/A2, A3 and B), these have been created by previous quarrying activities. Surrounding the Site on all boundaries are mature hedgerows and some hedgerow trees. The western and northern Site boundaries are defined by a single line of Cypress and Larch trees respectively. (It is noted that since this LVIA was carried out, these trees have since been removed by Punchestown Management in agreement with Cemex personnel).

Grazing of hedgerows and trees is in evidence along hedgerow boundaries, where access by stock is possible.

The following native tree and shrub species have been noted on Site; ash (*Fraxinus excelsior*), elder (*Sambucus nigra*) and hawthorn (*Crataegus monogyna*) trees, with gorse (*Ulex europaeus*), bramble (*Rubus fruticosus*), ivy (*Hedera helix*), nettle (*Urtica dioica*), curled dock (*R. crispus*), creeping buttercup (*R. repens*), creeping thistle (*Cirsium arvense*), herb-Robert (*Geranium robertianum*), sticky mouse-ear (*Cerastium glomeratum*), dandelion (*Taraxacum* agg.), fescues (*Festuca* sp.) and meadow grass (*Poa* sp.) in the understorey.

### 16.3.2 Landscape Context

A Landscape Character Assessment (LCA) for Kildare County was undertaken by CAAS Environmental Services Ltd in October 2003 and is included as a supporting document in the County Development Plan 2005-2011. The purpose of the LCA is to identify and describe the landscape character of each part of the County, its capacity to accept change (or to absorb development without disproportionate effects) and to produce a series of policies to guide development in each type of landscape. The landscape of Kildare County has been divided into seventeen Character Units within this document.

The Site is situated within the Landscape Character area identified as “The Eastern Transition Lands” and described as follows:

*This transitional landscape character unit, located between the uplands and lowlands to the east of the County is characterised by undulating topography.....The fields are generally of medium size and regular pattern, with commonly maintained hedgerows. Gorse and natural vegetation occur at some areas of this unit.*

*The terrain gently rises from the lowland areas to the hilltops of the eastern Kildare Uplands (Chapter 19 of the of the Development Plan). The land undulates through a series of hilltops, the main ones being: Old Killkullen Hill (179 mAOD), Bullhill (174 mAOD), Mullacash Hill (171 mAOD), Nine Tree Hill (168 mAOD) and Carrighill (166 mAOD). The elevated vantage points along the local roads provide long distance views of the Kildare lowlands. The skyline to the east of this unit is defined by the eastern uplands, distant views including the neighbouring Wicklow Mountains, define the extent of visibility. The Hilltops of the Chair of Kildare Hills partially define the skyline to the west.*

#### **Critical Landscape Factors are as follows**

- Undulating Topography

*Undulating topography which characterises this unit, provides a physical shielding within the lee of the hills and thus, can conceal relatively large new features on the lower lying lands. Furthermore, the dynamic and complex nature of undulating land encloses local vistas, rendering development unobtrusive on the overall landscape.*

- Slopes

*Sloping land often provides an area with its character and intensifies the visual prominence of any feature over greater distances. The gentle slopes of the hills in this character unit start to define the visual boundary of the adjacent lowland areas (further defined by the Eastern Uplands) and provide an increased potential for development to penetrate the ridgelines when viewed from local roads and villages in the area.*

- Low Vegetation

*The grassland, tillage fields and generally low hedgerows of this area are usually uniform in appearance, failing to break up vistas, and allowing long distance visibility. Existing well maintained hedgerows partially screen the lowest land parcels. Nevertheless, the commonly low vegetation proves unable to visually absorb new development.*

- Shelter Vegetation

*Shelter vegetation is represented at some stretches of this unit by coniferous plantations and the presence of scattered trees that grow on field hedgerows. In a similar manner to undulating topography, shelter vegetation has a shielding and absorbing quality in landscape terms. It can provide a natural visual barrier and also adds to the complexity of a vista, breaking it up to provide scale and containment for built forms.*

High amenity areas are identified in the LCA i.e. those areas which have high outstanding natural beauty and/or a unique interest value. The Site does not fall within any high amenity areas identified within the LCA, the nearest proposed Natural Heritage site is at Redbog, situated ca. 5 km away to the northeast. The Site is also not within the sphere of influence of any Protected Views and Scenic Routes.

Habitats on Site consist primarily of recolonising bare ground, dry calcareous and neutral grassland, dry meadows and improved wet agricultural grassland.

The Site is not affected by any of the following environmental and landscape designations:

- National Heritage Areas;
- Special Areas of Conservation (SACs); or
- Special protection Areas (SPAs).

With regard to archaeology, the only item of interest within the Application Site is the proposed continuation of a possible trackway (KD024-32) 'The Pilgrims Walk' through the southern part of the Site. The continuation of this feature is included in the Final Restoration Plan (Section 10 and Figure 10.3).

With regard to tree preservation orders, these are identified on the Development Plan maps, but are all located in excess of 3 km away from the Site. The Site is also not within any of the High Amenity Views and Prospects identified in the LCA to be protected within Policy 9.45 of the current County Development Plan, Volume 1.

Figure 16.2 shows the Site in the context of local land use. Agricultural land within the study area is principally pastoral land, used both for grazing and silage. Development consists of a scattering of dwellings along local roads. There are a small number of scattered woodland copses located throughout the study area consisting mainly of deciduous trees. Deciduous tree cover consists mainly of hedgerow trees which appear in studded form along field boundary lengths, and as dense wooded lines. Field boundaries are primarily mixed hedgerows with a low percentage of walled boundaries. Field patterns and scale are varied throughout the study area.

### 16.3.3 Topography, Geology and Hydrology

The Site rises from approximately 145 mAOD at the northwestern boundary rising to 169 mAOD in the east. The eastern Site boundary runs parallel to a ridgeline trending northeast to southwest. This ridgeline is further defined by a local road, mature hedgerow and a small number of residential properties several of which overlook the Site. Other significant hills and ridges within the study area are located ca. 2 km to the east within the Eastern Uplands, such as Slieveroe Hill rising to 332 mAOD.

The basic bedrock geology for this area of Kildare County consists of fine grained greywacke, siltstones and shales (Carrighill Formation). Geological information described in this section is based on the Geological Survey of Ireland publication, Sheet No. 16. Additional detailed information has been taken from ground investigations carried out to assess the geological and hydrogeological conditions of the Application Site.

Figure 16.3 shows the Site location, landform/topographical analysis of the study area and its surroundings. Figure 16.4 depicts the existing site conditions (aerial photograph taken in 2004 which reflects current status).

There are very few watercourses and ditches in the area, the nearest watercourse being a small stream feature located to the north of the Site.

Overburden across the Site and its environs consists of hard, silty boulder clay overlain with fluvioglacial sands and gravels that have typically been removed during previous pit operations.

#### 16.3.4 Local Landscape Character

The Site is situated within the Landscape Character Area identified as “The Eastern Transition Lands” . A rural landscape dominated by pastoral fields in a variety of scales, generally of irregular shape, and enclosed by mixed hedgerows and blocks of plantation woodland. Landform consists of undulating ridges affording to both open and enclosed views. Views are generally more open to the west and restricted by the eastern uplands to the east. Punchestown Racecourse and associated buildings to the west of the Site have a strong visual presence in the landscape. The buildings are large scale and form a landmark within the surrounding area. Residential properties are low in density and located in close proximity to the local roads.

#### 16.3.5 Planning Policy Context

This section describes landscape designations and components of the physical landscape within the study area which have been, or may be, affected by the development proposals. We have reviewed the most relevant guidance documents related to landscape and visual impacts of this development and taken them into consideration.

Documents reviewed are as follows:

- Planning and Development Act 2000;
- Landscape and Landscape Assessment: Consultation Draft of Guidelines for Planning Authorities (June 2000); and
- Kildare County Development Plan 2005-2011.

The relevant Policy Statements within the Kildare County Development Plan are as follows:

##### *Transition Areas*

*TA 1 To maintain the visual integrity of areas, which have retained a dominantly undisturbed upland character.*

*TA 2 To recognise that the lowlands are made up of a variety of working landscapes, that are critical resources for sustaining the economic and social well-being of the County.*

*TA 3 To continue to permit development that can utilise existing infrastructure, whilst taking account of local absorption opportunities provided by the landscape, landform and prevailing vegetation.*

*TA 4 To continue to facilitate appropriate development in an incremental and clustered manner, where feasible, that respects the scale, character and sensitivities of the local landscape, recognising the need for sustainable settlement patterns and economic activity within the County.*



## 16.4 Methodology

Two separate methodologies have been used to assess landscape and visual impacts; these are described below.

### 16.4.1 Methodology for Assessment of Landscape Impacts

In defining the landscape impact significance, Tables 16.1 and 16.2 below have been used as guides. First the 'sensitivity' of the landscape resource and 'magnitude' of change that the proposed works will cause is assessed from Tables 16.1 and 16.2. This is then carried forward to Table 16.3 to help identify the 'significance' of landscape impacts on a scale of substantial, moderate or slight magnitude. The tables are only used as guides and it is up to the Landscape Architect carrying out the assessment to determine the final significance impact threshold of each effect based on professional judgement and experience. This exercise was carried out by Mr Barrie Gannon, Senior Landscape Architect (Golder Associates UK Ltd [GAUK]).

**Table 16.1: Sensitivity Classification of Landscape Resource**

Sensitivity of Landscape Resource	
Landscape of particularly distinctive character, susceptible to relatively small changes e.g. National Park.	<b>High</b>
Landscape with relatively ordinary characteristics reasonably tolerant of changes.	<b>Medium</b>
Landscape with few features of value or interest, potentially tolerant of significant change.	<b>Low</b>

**Table 16.2: Magnitude Classification of Landscape Resource**

Magnitude of Change	
Substantial change in landscape characteristics over an extensive area, ranging to very intensive change over a more limited area. Permanent, long term.	<b>Substantial</b>
Moderate change in landscape component over a wide area and/or moderate change in localised area.	<b>Moderate</b>
Discernable but slight change in any landscape component. Short term, temporary.	<b>Slight</b>
Virtually imperceptible change. Insignificant scale to affect the integrity of the landscape component.	<b>Negligible</b>

**Table 16.3: Impact Significance (The Relationship Between Sensitivity and Magnitude)**

	Low Sensitivity	Medium Sensitivity	High Sensitivity
<b>Substantial Magnitude</b>	Moderate impact	Substantial impact	Substantial impact
<b>Moderate Magnitude</b>	Slight impact	Moderate impact	Substantial impact
<b>Slight Magnitude</b>	Slight impact	Slight impact	Moderate impact
<b>Negligible Magnitude</b>	Negligible impact	Slight impact	Slight impact

Note: Landscape impacts could be adverse or beneficial.

## 16.4.2 Methodology for Assessment of Visual Impacts

Visual impact is the result of a change in view from receptors such as residential property, public rights of way, and land with public access, roads and offices. Residential properties are considered the most sensitive receptors to changes in view whereas road users are the least sensitive as their experience is transient. The magnitude of impact is assessed according to the scale of the effect, which will depend largely upon the size and type of the development and the distance of the receptor from the Site. The significance of visual impact depends upon the sensitivity of the receptor and the magnitude and duration of the effect.

Tables 16.4 and 16.5 were used as guides in determining the visual impact significance thresholds. First the *sensitivity* and *magnitude* were assessed from Tables 16.4 and 16.5. This was then carried forward to Table 16.6 to identify the *significance* of visual impacts. It was then judged by the GAUK Landscape Architect whether the significance of visual impact is *adverse* (negative) or *beneficial* (positive).

**Table 16.4: Sensitivity of Visual Receptors**

Sensitivity of Visual Receptor	
Residential properties less than 1 km from the development with direct views from ground floor and first floor windows towards the development. Public Rights of Way less than 1 km from the development with direct views.	<b>High</b>
Residential properties over 1 km from the development or with more restricted views towards the development. Public Rights of Way more than 1 km from the development, or with restricted views. Local side roads and lanes. Sporting and recreational facilities, allotments.	<b>Medium</b>
Offices, commercial developments and industrial sites. Main roads and rail routes.	<b>Low</b>

**Table 16.5: Classification of Magnitude of Visual Receptors**

Magnitude of Impact (Scale)	
The majority of viewers affected/major changes over a large proportion of the view.	<b>Substantial</b>
Many of the potential viewers affected/major changes over a smaller proportion of the view/moderate change in view/partial view.	<b>Moderate</b>
Few viewers affected/minor change in view/glimpsed view.	<b>Slight</b>
Indiscernible change in the view.	<b>Negligible</b>

**Table 16.6: Significance of Impact (Relationship Between Sensitivity and Magnitude)**

	Low Sensitivity	Medium Sensitivity	High Sensitivity
Substantial Magnitude	Moderate	Substantial	Substantial
Moderate Magnitude	Slight	Moderate	Substantial
Slight Magnitude	Slight	Slight	Moderate
Negligible Magnitude	Neutral	Neutral	Slight

## 16.5 Predicted Landscape Impacts

The predicted impacts of the development on the landscape have been assessed during initial Site establishment, phased restoration and on final restoration/Site closure.

The Site is located in the Eastern Transition Lands as described in Section 16.3.2.

The main effects on the landscape will be:

- i. Construction of a screen mound principally along the Site's western boundary between Punchestown Racecourse, together with associated planting and development of a new water feature;
- ii. Seeding and greening the Site's eastern slopes to further reduce adverse views from Punchestown Racecourse by planting with rapid establishment grassland species;
- iii. Construction of internal access roads, inert waste processing area, and additional screening berms;
- iv. Progressive phased restoration;
- v. Removal of all machinery and buildings on final restoration; and
- vi. Completion of final restoration works, post closure.

Landscape effects consist of the changes in the landscape, its character and quality that might result from the proposed development. The effect that these changes have on the landscape reflects the **sensitivity** of that landscape to change and the **magnitude** of that change.

The significance of landscape impacts reflects the sensitivity of the landscape to change and the magnitude of those changes. The results of this assessment are presented in Table 16.7 below.

Table 16.7: Assessment of Landscape Effects

Development Activity	Effect upon landscape resource	Sensitivity	Magnitude	Significance of landscape impact	Mitigation
1 Construction of screen mound to the western boundary	Long term change to landform and land use	Medium	Moderate	Moderate adverse	This feature is being introduced to screen views from Punchestown Lands. The mound will be seeded and planted with native woodland species to increase its screening potential.
2 Construction of screen mound round inert waste processing area	Medium term change to landform and land use	Medium	Moderate	Moderate adverse	This feature is being introduced to screen views of the inert waste processing area. The mound will be planted as above.
3 Extension of a large open water body	Introduction of a water feature into the landscape	Medium	Moderate	Moderate adverse or neutral	Gently shelving water edge profile will be developed for public safety, visual enhancement and habitat creation benefit.
4 Construction of internal access road	Medium term change to landform and land use	Medium	Moderate	Moderate adverse	Construction of screen mound and associated planting will obscure Site activities.
5 Phased restoration	Permanent landtake	Medium	Moderate	Moderate beneficial	Disturbed areas of land minimised and new habitats created at the earliest opportunity.
6 Removal of all machinery and buildings on final restoration	Removal of alien features in the landscape	Medium	Moderate	Moderate beneficial	Removal of alien features.
7 Completion of final restoration works, post closure	Removal of temporary screen mounds and alien features, enhancement of Site conservation and bio-diversity	Medium	Moderate	Moderate beneficial	Removal of alien features and some restoration back to former agricultural uses.

### **16.5.1 Summary of Predicted Landscape Impacts**

The proposed restoration of the Walshestown Pit will principally result in a final landform that will be in keeping with the landscape character of this area (Eastern Transition Lands) as described in the LCA of Kildare County Development Plan 2005-2011. Fields of similar size of those to the east will be created within a gently falling landform from east to west. The fields will be defined by hedgerows together with hedgerow trees. The more open landform of the Punchestown lands which abuts the Site's western edge will be visually connected by the proposed water feature with open areas of water being generally uncommon in the area.

## **16.6 Visual Baseline Conditions**

### **16.6.1 Existing Visual Amenity**

A visual analysis was carried out in May 2008 to assess the overall Site when weather conditions and visibility were good. Viewpoints into the Site were considered and viewpoints selected and used in the photomontage predictions of likely visual impacts.

Views are generally more limited to the north, east and south of the Site due to intervening topography, hedgerows and scattered woodland blocks; Figure 16.2 shows the key receptor locations.

The visual receptors identified in Figure 16.2 (A to D inclusive) were visited in May 2008 when all deciduous trees and hedgerows were in full leaf and therefore, restricted views, presenting a best case in limiting views of the Site. An assessment was made of all the visual impacts of the Site's infill development proposals from initial establishment to final restoration. Distance of visual receptors from the proposed development varies from 50 m to 1 km. Photomontages have been produced to illustrate the visual effect the proposals would have from the viewpoint of these visual receptors. This was done for the three principal development phases.

In total, four visual receptors have been assessed in terms of how they might be visually affected by the different phases of the proposed development (A to D). Each visual receptor was assessed on the perceived visual impact the proposed development would have upon it in terms of its effects on property and/or recreational amenity. A list of potential receptors that have been considered as part of this assessment follows.

### Residential Receptors A – Properties along L6042 road north of the Site

- Establishment Phase:
  - Screen mounding and planting will be carried out to north eastern margins of the Site to restrict views of the proposed inert waste processing area. Construction of the perimeter screen mounding works will be ca. 300 m away at its nearest location to these properties and its impact is considered to be **substantial adverse** during this phase of development.
- Operational Phase:
  - During the operational infilling phase the impact is considered to be **slight adverse**. Views of the proposed waste processing area will be substantially screened.
- Final Restoration/Post Closure:
  - On final restoration and post closure all processing plant, screen mounding and some temporary planting will be removed; the likely impact is considered to be **moderate beneficial**.

### Residential Receptors B - Properties to the east of Site situated on western side of local access road

#### Establishment Phase:

- If necessary, construction of a temporary screen mound along the eastern limits of the restoration operations will be constructed in consultation and agreement of the land owners to restrict views of the development from the rear of these properties on a temporary basis if they so wish only.. Seeding works on the temporary screen mound will also be carried out. Impact is considered to be **moderate adverse**.
- Operational Phase:
  - During the Site operational phase, views of the lower level restoration operations are likely. These infilling operations will take place sequentially with progressive restoration following on to minimise the disturbance-footprint at any one period in time. Impact is considered to be **moderate adverse**.
- Final Restoration/Post Closure:
  - On final restoration and post closure, all temporary screen mounding and some temporary planting will be removed if it was constructed with the agreement of the landowner only; the likely impact is considered to be **moderate beneficial**.

### **Residential Receptors C - Properties to the east of Site situated on the eastern side of local access road**

- Establishment Phase:
  - All construction works in advance of restoration operations are likely to be obscured due to intervening topography and hedgerows. Impact is therefore considered to be **neutral**.
- Operational Phase:
  - During the Site Operational Phase the additional on Site planting and 'gapping-up of hedgerows' will mature and further screen the development. Impact is therefore considered to be **slight beneficial**.
- Final Restoration/Post Closure:
  - On final restoration and post closure, all temporary screen mounding and some temporary planting will be removed; the likely impact is considered to be **slight beneficial**.

### **Recreational Receptor D – Views from Punchestown Racecourse Establishment Phase:**

- Views from the racecourse Grandstand and public circulation areas to the Site's western boundary are all open and not obscured by topography. Major earthworks carried out to form a permanent screen mound will be planted with grass species. Impact is considered to be **substantial adverse**.
- Operational Phase:
  - During the operational restoration phase impact is likely to be **neutral to moderate adverse** as land raising continues above the screen mound crest line. The back slope along the eastern boundary will be seeded in the establishment (Figures 8.4 and 8.9) phase to further reduce potential impacts from Punchestown Racecourse. Additional temporary screening measures will also be put in place.
- Final Restoration/Post Closure:
  - On completion of final restoration and post closure, all temporary screen mounding will be removed, with all remaining planted and grassed areas being mature. Impact is considered to be **moderate beneficial**.

## **16.7 Predicted Visual Impacts**

A visual screening berm will be constructed along the western boundary to screen views from Punchestown lands. An internal visual screening berm will also be constructed on the

northern side of the proposed Inert Waste Processing Area. Only if required by the residents a temporary screen mound will be constructed along the eastern limits of the restoration operations to restrict views of the development from the rear of the properties of residential receptors B. External slopes, in particular along the eastern boundary will be covered with topsoil, trimmed and seeded with suitable grasses during the Site establishment works to reduce potential visual impacts from users at Punchestown (Figures 16.5 and 16.6 – Conceptual Restoration Filling Plan and Final Restoration Plan).

A summary of the visual impacts from receptors, using the methodology described in Section 16.4, is summarised in Table 16.8. The receptor locations are shown in Figure 16.2.

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Table 16.8: Visual Receptors and Impact Assessment

Ref	Receptor Type	Distance from full boundary	Sensitivity of Visual Receptor (Table 16.4)	Magnitude of Change (Table 16.5)	Significance of Visual Effect during infilling (Table 16.6)	Mitigation and Restoration	Residual Impact (Final Restoration/Site Closure)
A	Residential Properties along the L6042 Road north of Site	150 m approx	High	Moderate	Substantial adverse	Screen mounding and woodland planting	Moderate beneficial
B	Residential Properties east of Site	50 m approx	High	Moderate	Substantial adverse	Temporary screen mounding if required by residents	Moderate beneficial
C	Residential Properties to the east of Site	100 m approx	High	Moderate	Substantial adverse	Temporary screen mounding if required by residents	Moderate beneficial
D	Recreational receptors at Punchestown Racecourse	Varies 800 m approx	Medium	Negligible	Substantial adverse	Screen mounding woodland planting and greenery of eastern slopes	Substantial beneficial

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### 16.7.1 Summary of Visual Impacts

The proposed development will have *substantial (short to medium term) adverse* impact on a small number of residential receptors during early establishment and operational phases (i.e. during first 3 years). Substantial adverse impact on views from Punchestown will also occur until the screening berms are constructed. This is primarily due to the fact that visually the Site will change relatively little during the operational phases. Despite the fact that screen mounding and planting will be put in place, some views of the restoration operations will be evident throughout the restoration process.

The main elements of final restoration/post closure include the decommissioning and demolition of the plant and all built structures, restoring the open nature of the landscape. When combined with the areas of woodland planting, wetland and grassland creation the Site will take on a far more aesthetically pleasing form, as a result the visual impact moves from *substantial adverse* to *moderate/substantial beneficial*.

### 16.8 Landscape Proposals and Mitigation

Restoration proposals have been developed on the basis of the following key objectives:

- To allow for an end use that is appropriate to the Site's location;
- To integrate the final landform into the local landscape and in keeping with the transitional landscape character of the area;
- To maximise ecological diversity of the Site and its value for wildlife;
- To provide a land use that complements and enhances the use of Punchestown Racecourse; and
- To deliver a high quality restoration scheme that is sustainable and of lasting benefit.

The proposed Restoration Concept is illustrated in Figures 16.5 and 16.6 (Rev. B, Sept. 2010). Please see Section 8.7 for the detailed landscape and restoration plan. The rural location of the Site, within a predominantly agricultural landscape, lends itself to a mixed end use of agriculture, wetlands and nature conservation elements. The proposed after-use will seek to extend and enhance the existing setting and adjacent land uses associated with Punchestown Racecourse, which is of national importance. These proposals will also be of significant benefit to local residences. Proposed hedgerows will be recreated using native Irish species listed as occurring in Kildare in the Hedgerow Survey of Kildare (Kildare Heritage Series No.1). Ecologically sound principles will be applied to the creation of new habitats to increase and enhance the existing ecological diversity of the locality.

Land uses, current and proposed, as a percentage of the Site area are summarised in Table 16.9.

**Table 16.9: Land Use Impact**

Land Use	Existing		Proposed	
	Ha	%	Ha	%
Agricultural land/Species Rich Grassland	23.1	34.0	39.0	57.4
Trees/hedgerows	0.1	0.1	6.0	8.8
Water bodies	3.3	4.8	3.0	4.4
Bare ground and hard surfaces	31.8	46.8	0	0 <sup>Note1</sup>
Unmanaged grassland and scrub	9.7	14.3	20.0	29.4
<b>Total</b>	<b>68.0</b>	<b>100.0</b>	<b>68.0</b>	<b>100.0</b>

Note 1 Some small patches of bare ground will be left in the unmanaged grassland and scrub areas to allow for lapwing nesting.

## 16.9 Conclusions

The ca. 68.0 hectare Site lies within a transitional landscape comprising agricultural pasture land together with the adjacent nationally important Punchestown Racecourse. The Site is not within a designated or nationally protected landscape area nor has it any other designations attached to it. The infill development will, physically change the topography of the Site by creating a landform which rises gently from west to east, which is considered in keeping with the landscape character of this area (Eastern Transition Lands) as described in the LCA of Kildare County Development Plan 2005-2011. The final restoration will also reinstate fields of similar shape, size and composition to those surrounding the Site (Section 8.7).

Visual impacts are significant from the recreational receptors at Punchestown Racecourse in the short term during early Site establishment, these impacts will reduce once screen mounding is in place and perimeter planting becomes established. Seeding and greening of the eastern slopes, where necessary (Figures 8.4 and 8.9), will further reduce potential impacts from the Punchestown aspect.

Visual impacts are limited to a few residential properties around the Site and to road users gaining local access. A progressive restoration programme will provide a mixed end use of grazing and nature conservation elements including a new water feature along the western boundary and associated wetland area. Adjoining and visually linking the Site with Punchestown, fields divided by species-rich hedgerows will be created (Figure 16.6).

The impact on landscape character during early establishment and operational phases (i.e. during first 3 years) is predicted to be moderate adverse to substantial adverse, but due to the mitigation measures included in the proposed restoration/final closure scheme the overall impact on landscape character (after completion) is predicted to be moderate beneficial.

The proposals include restoration of the entire Site; which will improve the immediate setting and surrounding landscape. A combination of grassland establishment and planting of hedgerows/hedgerow enhancement will significantly improve the integration of the Site into the surrounding landscape. The use of native plant species will help to reinforce this

integration. The creation of a new water feature will add diversity for the wildlife and add to the mosaic of habitats of the Site.

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