Golder Associates

TRANSMITTAL

DATE 31 January 2012

PROJECT No. 09507150022.R02.A0

TO Ewa Babiarczyk
Environmental Protection Agency
Headquarters
PO Box 3000
Johnstown Castle Estate
Co. Wexford

FROM Conor Wall

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ACKNOWLEDGEMENT REQUIRED:

☐ YES (Please email / fax to Golder Associates) ☑ NO

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January 2012

APPLICANT : CEMEX (ROI) LTD

WL0254-01 - Article 16(1) Further Information Response - Walshestown Co. Kildare

Submitted to:
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APPENDICES

PREAMBLE

On behalf of Cemex (ROI) Ltd. (the Applicant), Golder Associates ("Golder") submitted a Waste Licence Application to the Environmental Protection Agency (EPA) in December 2008 (W0254-01). The site is located at Walshestown, Naas, Co. Kildare (the "Site"). On 3 June 2011, in accordance with Article 16(1) of the Waste Management (Licensing) Regulations, the EPA requested information from the Applicant in order to further process the waste licence application. A copy of the Article 16(1) request is contained in **Appendix 1** of this document.

Each of the 16 no. items highlighted in the Article 16(1) request are responded to in Sections 1.0 to 16.0 below (details of the request for information are highlighted in italics at the beginning of each section). In addition to the Article 16(1) further information request, we have also received an additional request on 9 August 2011 for information to update the application in accordance with the European Communities (Waste Directive) Regulations 2011. This additional request is addressed in Sections 17.0 and 18.0 of this document, and a copy of this request is also included in **Appendix 1**.

It is also worth noting that a meeting was held between the EPA, the Applicant and Golder in mid-July 2011, during which the content of the response to this Article 16(1) request was discussed. The following persons attended this meeting:

- Eva Babiarczyk (EPA)
- Brain Meany (EPA)
- Brian Downes (Cemex)
- Conor Wall (Golder)

There are 13 no. appendices (1 to 13 inclusive) to support this response.

1.0 ITEM 1

"Provide details of the restoration works that have been conducted in the southern part of the site. Provide information on who conducted these works and what materials, including amounts, have been deposited. Provide drawings showing the nature and location of these restoration works."

Response:

It is understood from the Applicant that quarrying activities were undertaken in the southern part of the Site in the 1990's. Following these activities the lands were graded back using existing overburden materials located on the Site i.e. stripped topsoils and subsoils. Since this reinstatement was undertaken, the lands have been in use for livestock grazing. All restoration works were completed by the Applicant.

It is important to state from the outset that no imported materials were ever placed (or suspected of being placed) on lands to the south of the Site. Notwithstanding this, and as discussed in a meeting with the Agency in mid-July 2011, it was agreed that a trial pitting exercise would be undertaken on the southern lands to confirm the type of material used for restoration.

Details on the outcome of this trial pitting exercise, and Figure 8.13 depicting the locations of the trial pits, are included in **Appendix 2** of this document.

2.0 ITEM 2

"Provide a drawing showing the location of the former silt lagoon on site."

Response:

An aerial photograph which outlines the former silt lagoon on Site is provided in **Appendix 3** of this document.

3.0 ITEM 3

"Describe the quantity, location, extent, depth and nature of previously deposited waste. Illustrate the location on a drawing. State whether the waste will be removed. If not, provide justification for this in the form of a risk assessment in accordance with the Agency Code of Practice on Environmental Risk Assessment for Unregulated Waste Disposal Sites."

Response:

Details of the previously deposited wastes were furnished to the EPA in the Article 14 submission dated 24th September 2011. Figure No. 8.11 (Rev. A), attached in **Appendix 4** of this document, delineates the approximate area which is understood by the Applicant to have been subject to restoration/land-raising activities under Waste Permit WPR71/2002 (highlighted in dashed green on Fig. 8.11).

It is noted that should the Agency grant a licence for this Facility, the waste materials contained in the area delineated on Drawing No. 8.11 **will be removed** in preparation of a liner for the Facility. The waste concrete will be recycled at the Inert Waste Processing Area located towards the front entrance of the Facility, and reused as secondary aggregate for development at the Facility (e.g. sub-base), subject to Agency approval. Further details of this activity are provided in Section 8.0 of the EIS. This was discussed with the Agency at our meeting held on mid-July 2011, where it was decided that an Environmental Risk Assessment was not necessary once the materials are to be removed.

Regarding quantities, based on an area of approximately 5,800 m^2 (Figure 8.11), and an estimated depth of 6.0 metres, this would equate to approximately 34,800 m^3 of waste material in the former permitted area. Using a conversion factor of 2.2, this equates to 76,560 tonnes. Once the materials are excavated, exact tonnages will be made available.

4.0 ITEM 4

"State how the LandSim model took the deposited waste into account. If not taken into account, and it is intended to leave the deposited waste in place, the model should be run again taking the deposited waste into account."

Response:

As highlighted in the previous section, the previously deposited waste concrete will be removed and recycled at the Inert Waste Processing Area located towards the front of the Facility and reused as secondary aggregate for development at the facility (e.g. sub-base). Therefore the LandSim model did not take the deposited waste into account as it was always envisaged that these waste materials would be removed to produce secondary (recycled) aggregates for the development of the Facility.

5.0 ITEM 5

"Provide drawings showing the location of the proposed landfill cells and their formation levels".

Response:

5.1 Introduction

The following sections contain an overview of the proposed works, in particular relating to the development of proposed landfill cells, formation levels and construction quality assurance procedures, as discussed with the EPA in mid-July 2011.

5.2 Development of Liner

Details of the proposed cell layout (Cells 1 to 7 inclusive) are depicted in Drawing WLA-04 (Rev. C), attached in **Appendix 5** of this document. Also included in this drawing are proposed formation levels for each cell, and associated recorded groundwater levels. As stated previously in the EIS, the base of the liner will be located greater than 1.0 metres above the winter high water table. Further details of water levels in relation to the proposed liner are provided in Section 7.0 of this document.

The liner will be a mineral liner that will comprise a layer of compacted clayey silt (i.e. a compacted clay liner – CCL) with a minimum thickness of 1.0 metres. The soil liner will have a co-efficient of permeability of less than or equal to 1 x 10^{-7} m/sec, both in the base and side slope. This is equivalent to the Landfill Directive default specification for the Geological Barrier in inert landfills.

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.

5.3 Construction Quality Assurance Procedures

The following construction quality assurance (CQA) procedure was previously submitted with the original Waste Licence Application under Section D.3 of the Application.

Response:

5.3.1 Liner Details

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 Facility dictates that a lining system on the base and 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 x 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.

5.3.2 Quality Assurance Plan for the Liner

A CQA plan will be developed during the final design of the liner prior to construction of the cells and at the time of preparation of the Specified Engineering Work proposals. The CQA plan will be developed based on the guidance provided by the EPA in its Manual on Landfill Design and forward to the EPA for approval prior to any actual site works.

A CQA/CQC testing programme for the liner materials will be carried out under the direction of Golder and will include:

- Moisture Content;
- Atterberg Limits;
- Particle Size Distribution;
- Compaction Characteristics;

- Co-efficient of Permeability;
- A level survey of the formation and completed levels of the CCL;
- Verification of the thickness of lifts and overall CCL;
- Field density tests on each lift;
- Triaxial permeability tests on re-compacted samples; and if possible
- Triaxial permeability tests on intact samples recovered from U100 tubes pushed into the CCL.

This testing programme will meet the requirements of the EPA Manual on Landfill Design (EPA, 2000). A CQA/CQC report will be issued following the completion of construction works for the approval of the EPA and prior to waste acceptance to the cell.

5.3.3 Third Party Supervision

The name, experience and qualifications of third parties will be provided following the design and tendering process for the works. It is noted that Golder have designed many landfill liners and tailings facilities for both Waste and IPPC licensed facilities in Ireland, included KTK Landfill, Ballynagran, Tara Mines, Aughinish Alumina, Galmoy and Lisheen Mines.

6.0 ITEM 6

"Provide monitoring results of water quality in Ponds A1, A2, A3 and B including screening for list I/II substances listed in the Council Directive on the production of groundwater against pollution caused by certain dangerous substances (80/68/EEC)".

Response:

6.1 Water Quality Monitoring (Sept. 2011)

Water quality monitoring at Ponds A1, A2, A3 and B was carried out at the Application Site on 2nd September 2011. Details of this sampling event are provided in **Appendix 6** of this document.

6.2 Previous Groundwater Quality Monitoring

During the EPA consultation meeting held in mid-July 2011, elevated parameters in the groundwater as highlighted in Section 12.3.13 of the EIS were discussed. Table 1 below is a summary of these elevated parameters previously reported. Likely potential sources are also discussed briefly, as requested by the Agency.

Table 1: Boreholes in which elevated parameters were found

Parameter	Borehole(s)
Potassium	BH6-07
Calcium	BH1-07, BH6-07, BH8-07
Cadmium	BH1-07, BH6-07
Orthophosphate	BH1-07, BHA, BHLawlor
Ammoniacal-nitrogen	BHA
Copper	BH6-07
Chromium	BH1-07, BH5-07, BH6-07
Manganese	All boreholes
Nickel	BH6-07
Lead	BH1-07, BH3-07, BH5-07
Zinc	BH1-07, BH6-07

Given that the Site is located in an intensive agricultural area, and is quite permeable due to the presence of sands and gravels in the overburden, the use of fertilisers, pesticides, herbicides and application of animal wastes can give rise to some of the exceedances observed above, in particular potassium, ammoniacal nitrogen and orthophosphate by way of example. Historical site operations such as the placement of wastes to the west of the Site under Waste Permit Ref. No. WPR 71/2002 may also have contributed to some of the exceedances in groundwater as observed.

However, as highlighted in Section 3.0 of this document, these previously deposited wastes will be removed in preparation of the installation of the compacted clay liner, therefore removing this as a potential source of groundwater pollution.

7.0 ITEM 7

"Describe how the landfill liner will be constructed in and around ponds A1, A2 and A3 given that these ponds might be a surface expression of groundwater. State the source of water in ponds A1, A2 and A3".

Response:

As previously outlined in Section 12 (Table 12.7) of the EIS, water levels in Ponds A1, A2 and A3 ranged between 137mOD and 139mOD during the period November 2007 to July 2008. Furthermore, it also has been reported in February 2007, that the winter water table in the ponds rose to 140.79mOD (Figure 8.8 of EIS). As highlighted in Figure 8.15 **Appendix 7**, site-won free draining and imported inert materials (subject to EPA approval) will be used to restore Ponds A1, A2 and A3 up to an approximate level of 142mOD, which is 1.0 metres above the highest recorded winter high water mark. In addition, the liner will be 1.0 metres in thickness, which will result in a minimum top of liner elevation of 143.0mOD in Cells 1, 2 and 3 where inert materials are to be placed at 143mOD (i.e. 2.0 metres above the highest recorded winter water mark). Details of the cell development, and associated formation levels are depicted in Drawing WLA-04 (Rev. C), **Appendix 5**.

It is further noted that the LandSim Model referred to in Section 12.0 of this document simulated an unsaturated zone of at least 1.0 metres will remain below the base of the liner at all times.

7.1 State Source of Ponds A1, A2 and A3

As stated previously in Section 12.3.11 of the EIS, towards the south of the Site the soils are unsaturated, with the groundwater table lying in the rock. Towards the north and west of the Site where the soils are thicker and the bedrock surface elevation drops, the groundwater table lies within the soils. Ponds to the northwest of the Site (A1/A2 and A3) are expected to be a surface expression of this groundwater table.

8.0 RESPONSE TO ITEM 8

"Provide drawings showing the design of the landfill liner. Provide the specification for the liner, including a liner proposed to be placed in the area of ponds A1, A2 and A3".

Response:

Sections 5.0 and 7.0 of this document provide details of the design of the landfill liner, and include details of the liner to be placed in the area of ponds A1, A2 and A3.

Additional information on the liner specification is provided on Figure 8.15, **Appendix 7**, which depicts a typical section through the proposed base and slope lining system.

9.0 RESPONSE TO ITEM 9

"Provide details of the proposed works to be carried out on all existing water bodies on the site. Provide details on elimination of groundwater from ponds A1, A2 and A3."

Response:

9.1 Liner Construction around Ponds A1, A2 and A3

The proposed initial drainage works, designed to protect groundwater, are described below and shown schematically on Figure 8.7 Rev. B (**Appendix 8**). Further information is available in Section 8.0 of the EIS. Steps 1 to 9 listed below correlate with Figure 8.7 Rev. B:

1) A new water feature will be excavated mid-way along the western boundary of the Site (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 beneath winter-high water table) southward along the western boundary to connect Ponds A1 and A2 with the new water feature;

3) 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;

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 (i.e. approx. 142mOD, Figure 8.15 **Appendix 8**);

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 i.e. Approx. 142mOD.

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).

Once the above 9 steps are complete, the slope and liner system will initially be constructed along the western boundary (Cells 1, 2 and 3), and will have a minimum top of liner elevation at approximately 143mOD (i.e. 2.0 metres above the winter water table of 141mOD) – See Section 7.0 of this document. At all times, a slope and liner system will be in place prior to the placement of inert fill materials.

10.0 ITEM 10

"Provide details of the construction of the New Water Feature. Provide a drawing showing cross section(s) through this feature. Describe the manner in which water pumped from ponds A1, A2 and A3 will discharge / percolate to ground from the New Water Feature."

Response:

10.1 Cross Sections of Proposed New Water Feature

Details on the construction of the New Water Feature are provided in Section 9.0 of this document, including a step-by-step account of how this feature will be constructed as each of the Ponds A1, A2, and A3 are dewatered. Detailed cross sections through the New Water Feature are also provided in **Appendix 9** of this document.

10.2 Discharges from New Water Feature

Water will progressively be pumped from A1, A2 and A3 in a sequential manner as highlighted in Section 9.0 of this document. The New Water Feature is expected to mimic the existing hydrogeological setting at A1, A2 and A3, and in other words, will be an expression of the groundwater table with expected levels varying between approximately 139mOD to 141mOD.

Once constructed, groundwater is expected to percolate through the New Water Feature from the upstream side (the east) to the downstream side (the west) and in an equivalent fashion to the existing ponds on Site. Surface water in the form of runoff will also be able to enter the New Water Feature (similar to existing ponds). Periods of increased 'run-off' volumes will be managed through the addition of an overflow pipe to Pond B which will ensure the water elevation in the New Water Feature is regulated to a maximum. It is expected that discharges to Pond B will only occur during sustained/heavy rainfall events when the ground cannot accept the rate of run-off volumes received.

It is worth noting that since the Site in its present state is uncapped, generally unvegetated and is largely represented by relatively permeable open ground, the water table at present may be un-characteristically high within the footprint due to the current elevated recharge or infiltration rates. Once the site is fully profiled and restored/capped and runoff is promoted, recharge to the footprint area is likely to be returned to a more 'baseline' condition or scenario. This may result in a slightly lower water table beneath the Site than in its present state. Certainly inputs to the New Water Feature are considered likely to be governed less by groundwater and more by surface water in the longer term when the Site is fully restored, than will initially be the case following construction.

11.0 ITEM 11

"Describe the circumstances in which water from the New Water Feature will overflow to Pond B and how the overflow will be controlled."

Response:

The final restoration surface contours are shown on Figure 8.3 Rev. B, **Appendix 10**. These have 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 2 below.

Table 2: Details of surface water catchments upon final restoration

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	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.

Storm water will be accommodated in the New Water Feature on the western boundary where further capacity to infiltrate to ground will occur through the base and sides, collecting surface water from Catchment Area I (Figure 8.3 Rev. B). In the event of an extreme rainfall event, the proposed contingency overflow pipe will be in place at an elevation of ca. 145 mAOD, which will discharge any surplus waters, only at the very peak of the hydrograph, into the New Water Feature to Pond B (Figure 8.12, **Appendix 9**).

It can be seen from the above details, that the bulk of the rainfall landing on the Site will be directed to ground, but with a potential outlet to surface water course as a safeguard only to prevent any potential for flooding on Site. No new water outside the existing catchment will be introduced to the Site footprint as a consequence of the proposal.

12.0 ITEM 12

"Describe how the discharge to groundwater from the New Water Feature and pond B will comply with all requirements of the Groundwater Directives (80/68EEC and 2006/118/EC) and the Environmental Objectives (Groundwater) Regulations, 2010. In particular, provide information on how Articles 4 and 5 of Directive 80/68/EEC will be complied with".

Response:

12.1 Introduction

In order to address compliance with Articles 4 and 5 of the Groundwater Directive 80/68/EEC, Golder Associates has made reference to the guidance document entitled *Hydrogeological Risk Assessments for Landfills and the Derivation of Groundwater Control and Trigger Levels* (Environment Agency (EA), 2003).

This EA document provides guidance on the requirements for groundwater risk assessment of landfills arising from implementing the EC Groundwater Directive (80/68/EEC) (Council of European Communities, 1980) and Landfill Directive (99/31/EC) (Council of European Communities, 1999). The guidance describes a tiered approach to hydrogeological risk assessment for landfill and sets out how Control and Trigger levels for groundwater (as required by the Landfill Directive) should be derived and used.

In Articles 4 and 5 the Groundwater Directive states that Member States shall take the necessary steps to:

a) *Prevent the introduction into groundwater of substances in List I (essentially now viewed as hazardous substances); and*

b) *Limit the introduction into groundwater of substances in List II (essentially now viewed as non-hazardous pollutants) so as to avoid pollution of this water by these substances.*

On behalf of the Applicant, Golder prepared a Conceptual Site Model (CSM), which detailed an assessment of the hydrogeological risks associated with the development (including LandSim modelling). This CSM was prepared in order to assess any risks posed to the groundwater and surface water facility for disposal/recovery of inert materials to restore the Walshestown Pit. A copy of the original LandSim Risk Assessment, submitted in December 2008, was included in Attachment I of the original Waste Licence Application.

Conceptually, waste will not be deposited at the Site any closer than 2m above the groundwater table (which includes at least a 1.0 metre unsaturated zone, and at least a 1.0m thick liner). In addition, the design concept presented in the application equates to an approximate average unsaturated zone across the Site of 10.0 metres in thickness (as identified in the site investigation). As a result of this 10.0 m unsaturated zone, it is confirmed that there will be no direct discharges of List I (hazardous substances) or List II (non-hazardous pollutants) to groundwater.

It was however recognised that leaching from the waste mass is likely to occur towards the groundwater table. Given this understanding, LandSim was used to predict concentrations of selected hazardous substances at the base of the unsaturated zone, following seepage through the liner and the unsaturated zone materials, and just prior to discharge to groundwater. This work was aimed at satisfying the need to demonstrate that hazardous substances would not enter groundwater. LandSim was also used to predict concentrations of selected non-hazardous pollutants (and the non listed chloride) in groundwater at the Site boundary, and following seepage from the waste mass, passage through the liner and unsaturated media, and dilution within the groundwater system. This work was aimed at satisfying the need to demonstrate that pollution of the water environment would be avoided.

12.2 Environmental Objectives (Groundwater) Regulations 2010

With respect to non-hazardous pollutants and non-listed substances in particular, the output of the LandSim model prepared in December 2008 was compared against water quality thresholds presented in the European Communities (Drinking Water) (No. 2) Regulations 2007 (S.I. No. 278 of 2007). Since then, the European Communities Environmental Objectives (Groundwater) Regulations 2010 (S. I. No. 9 of 2010) have come into force. Below is a summary of the threshold differences in the two legislative instruments for the substances (or groups of substances) previously simulated.

Table 3: Summary of regulatory threshold variations for water quality (mg/l)

Parameter	DWS used in December 2008 LandSim Model (Version B.1)	Environmental Objective (Groundwater) Regulations 2010 Columns 3/4
Cadmium	0.005	0.00375
Total Polycyclic Aromatic Hydrocarbons	0.0001	0.000075
Chloride	250	187.5
Nickel	0.02	0.015
Ammoniacal Nitrogen	0.23	0.175

It can be observed that the new Groundwater Regulations are more stringent than the thresholds previously used for comparison with the LandSim model output. On this basis it has been considered appropriate to re-run the model to take the recent lower standards into account and in this respect to ensure a robust application.

12.3 Revisions to LandSim Model (November 2011)

It is recommended that the following sub-sections are read in conjunction with the 2008 Water Impact Assessment report (which was submitted to support the application) which should clarify various aspects of the conceptual and LandSim model not covered here.

12.3.1 Inputs

A revised LandSim model has been run which has considered reduced source term concentrations to take into account the lower groundwater pollutant standards which are now acceptable. For the selected parameters governed by specific Waste Acceptance Criteria (Cadmium, nickel and chloride), up to twice the inert threshold leachate strengths have been simulated. With respect to PAHs, a leachate strength has been derived for naphthalene from a PAH waste concentration of 100mg/kg. This is the standard used within the UK as being acceptable at inert landfills (Environment Agency 2005) and this value has also been adopted at the Murphy Environmental inert landfill in Hollywood (Licence No. W0129-02). Ammonium is not listed in the Waste Acceptance Criteria, but it has been considered here for completeness to allow for a small amount of biodegradable material within the waste mass and perhaps in an effort to reflect the consequence of any 'rogue load'.

All other elements and inputs to the 2008 LandSim model submission remain unchanged. Table 4 below presents the revised source term simulated.

Table 4: Revised source term simulated in November 2011

	Contaminant Concentration (mg/l)				
	Min	**Likely**	**Max**	**PDF Format**	**Justification for PDFs**
Chloride[1]	92	460	920	Log Triangular	All max. concentrations are chosen as two times the max. C_0 leachate strength corresponding to the inert Waste Acceptance Criteria threshold. Min. concentrations are an order of magnitude lower than the maximum; and the most likely value selected is the max. inert leachate concentration (C_0 value).
Nickel[1]	0.024	0.12	0.24	Log Triangular	
Cadmium[1]	0.004	0.02	0.04	Log Triangular	
Naphthalene	0.026	-	0.26	Log uniform	Maximum value derived from leachate concentration from 100 mg/kg in waste. Min. value is an order of magnitude less than this.
Ammoniacal nitrogen	0.1	0.25	1	Log Triangular	Golder judgement allowing for a small amount of biodegradable material in the waste mass

[1] Max. concentrations taken as two times the inert C_0-concentrations as per Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC (2003/33/EC) (Council of the European Union, 2002).

12.3.2 Outputs

Table 5 below presents the compliance point relevant to the parameter status and the concentrations predicted.

Table 5: Compliance point relevant to the parameter status

Parameter	Environmental Objective (Groundwater) Regulations 2010 (mg/l)	Compliance point	50%ile		95%ile	
			Time to peak concentration (years)	Conc. (mg/l)	Time to peak concentration (years)	Conc. (mg/l)
Cadmium	0.00375	Base of unsaturated zone	12,216	0.0003	6,112	0.0017
Naphthalene	0.000075	Base of unsaturated zone	N/A	N/A	53	0.000000063
Chloride	187.5	Site boundary	33	134	30	181
Nickel	0.015	Site boundary	9,292	0.001	2,685	0.009
Ammoniacal nitrogen as N	0.175	Site boundary	254	0.08	139	0.128

N/A – not applicable

In all cases the 95%ile (can be viewed as 'worst case outputs') results are less than the water quality standards presented. The 50%ile results can be viewed as the most likely outputs.

It should be noted that the successful performance of any inert landfill, with respect to preventing unacceptable groundwater impacts, relies significantly upon both the effective management and regulation of waste acceptance practices. This is because the lining systems to be deployed in such sites are suitable only for specific and relatively favourable waste streams and leachate qualities. Waste acceptance testing is recommended to ensure the relevant x2 inert thresholds are achieved and maintained.

Periodic Hydrogeological Risk Assessment reviews should be conditioned within the licence to allow for consideration of waste acceptance data and on-going groundwater quality monitoring to help ensure the restoration performs in accordance with environmental expectations. Any unexpected upwards trends in pollution identified may be rectified during operations by strengthening waste acceptance criteria and/or following closure by increasing final capping measures to reduce leachate generation rates.

13.0 ITEM 13

"Provide a drawing showing the borehole and irrigation supply for the Punchestown racecourse is supplied from. Provide a symbol for this borehole."

Response:

It is understood that Punchestown Racecourse takes irrigation supply water from a borehole located on their lands, as highlighted in Drawing WLA-16 (Rev. D) attached in **Appendix 11**. This borehole has been given the symbol PN01.

14.0 ITEM 14

"Clarify the location of emission to groundwater GW8 and groundwater monitoring borehole BHA. Explain how GW8 and BHA will be monitored. State if boreholes BH9-09m BH10-09, BH11-09 and BH12-09 have already been constructed. Also provide a date for removal of boreholes BH5-07 and BH6-07."

Response:

Groundwater monitoring location GW8 is located within the New Water Feature (at the edge of this feature), as this water feature will be an expression of groundwater (Drawing WLA16 Rev. D, **Appendix 11**). This is a proposed groundwater monitoring location, and will be sampled using a surface water grab sampler. BHA is an existing groundwater monitoring location and is located towards the southern edge of the New Water Feature (**Appendix 11**). This monitoring location will be sampled using traditional groundwater sampling techniques such as a bailer, waterra tubing or sampling pump.

As outlined previously in Section 19.0 of the EIS, Table 19.1 provides details of the existing and proposed monitoring platform. BH9-09, BH10-09, BH11-09 and BH12-09 are proposed to be installed prior to the commencement of development.

Boreholes BH5-07 and BH6-07 will be removed prior to the commencement of the development.

15.0 ITEM 15

"Provide a drawing showing clearly all emissions to groundwater and groundwater monitoring locations. Use different symbols for emission points and monitoring locations. If there have been any new emissions points or monitoring locations installed provide their description and grid reference numbers".

Response:

Drawing No. WLA-16 Rev. D in **Appendix 11** of this document provides details on all groundwater emission points and monitoring locations, both existing and proposed. Below is a detailed list of these points and locations, their current status and GPS co-ordinates.

Table 6: Details of groundwater emission points and monitoring locations

Monitoring Location	Status	Easting	Northing
BH1-07	Existing	292612	215285
BH2-07	Existing	292616	215315
BH3-07	Existing	292790	214827
BH4-07	Existing	293194	215365
BH5-07	To be removed	n/a	n/a
BH6-07	To be removed	n/a	n/a
BH7-07	Existing	293317	215782
BH8-07	Existing	293305	215806
BH9-09	Propsoed	292617	215696
BH10-09	Proposed	292713	215977
BH11-09	Proposed	292930	215966
BH12-09	Proposed	293123	215973
BHA	Existing	292590	215402
BHLawlor	Existing	292254	215186
BHBally	Existing	291901	215434
PN-01	Existing	291742	215597
Emission Point	**Status**	**Easting**	**Northing**
GW1	Proposed	293140	215801
GW2	Proposed	293107	215761
GW3	Proposed	293208	215732
GW4	Proposed	293219	215712
GW5	Proposed	293169	215674
GW6	Proposed	293125	215637
GW7	Proposed	293245	215765
GW8	Proposed	292624	215458

16.0 ITEM 16

"Provide a drawing clearly showing all emissions to surface water and surface water monitoring locations. Use different symbols for emission points and the monitoring locations. If there have been any new emission points or monitoring locations installed provide their description and grid reference numbers. Describe compliance with the Environmental Objectives (Surface Waters) Regulations, 2009."

Response:

Drawing No. WLA-18 Rev. A in **Appendix 12** of this document provides details on all surface water emission points and monitoring locations, both existing and proposed. Below is a detailed list of these points and locations, their current status and GPS co-ordinates.

Table 7: Details of surface water emission points and monitoring locations

Monitoring Location	Status	Easting	Northing
ST01	Existing	293431	215641
ST02	Existing	292641	216094
Emission Point	**Status**	**Easting**	**Northing**
SW1	Proposed	293256	215872
SW2	Proposed	292619	215378
SW3	Proposed	292727	215110
SW4	Proposed	292660	214643

17.0 ITEM 17

"With reference to article 12(1)(f) of the Waste Management (Licensing) Regulations, provide a revised Table B.7.1 and Table H.1 (A) identifying the relevant classes of activity according to the Third and Fourth Schedules to the amended Waste Management Acts 1996 and 2011. (Amendment to the Acts was introduced by ~~regulation~~ Article 24 of the European Communities (Waste Directive) Regulations 2011)".

Response

The revised Section B.7 and Table H.1 are provided in **Appendix 13** of this document.

18.0 ITEM 18

"Provide information to address the requirements of article 12(1)(v) of the Waste Management (Licensing) Regulations, 2004, as amended, in relation to a description of how the waste Hierarchy in section 21A of the amended Waste Management Acts 1996 to 2011 is applied. Please have regards to the requirements of section 29(2A) of the amended Acts in addressing this item (Amendment to the regulations was introduced by ~~regulation~~ Article 57 and amendment to the Acts regarding sections 21A and 29(2A) by ~~regulations~~ Articles 7 and 14 respectively of the European Communities (Waste Directive) Regulations 2011)."

Response:

Section 21(A) of the Waste Management Act, as amended by Article 7 of the European Communities (Waste Directive) Regulations 2011, outlines the following waste hierarchy to be followed:

a) Prevention

b) Preparing for re-use

c) Recycling

d) Other recovery (including energy recovery); and

e) Disposal

Please find below a response to this Item with regard to how the proposed development at Walshestown will meet the intent of this waste hierarchy, as set out in Section 21(A) of the Act.

18.1 (a) & (b) Prevention/ Preparing for Re-Use

It is expected that the majority of inert waste materials arriving at the Facility (ca. 85%) will be source-segregated. By seeking source-segregated wastes before they arrive at the Walshestown Facility, it is envisaged that this will encourage the prevention of generating these soil wastes in the first place. As cost will be a major factor to consider for any future construction/demolition activity, and in particular the potential future cost of wastes being sent to a licensed facility, developers will consider this cost implication and try to prevent or limit any waste-arisings where possible

In addition, it is important to highlight that Section 26 of the European Communities (Waste Directive) Regulations 2011 now envisages that *'uncontaminated soil and other naturally occurring material excavated in the course of construction activities, where it is certain that the material will be used for the purpose of construction in its natural state on the site from which it was excavated' will be re-used on development sites.* As a result, it is envisaged that much of the *'soil and subsoil'* waste streams that have previously arisen from construction activities are likely to be re-used on the site that they were generated from. Thus this meets the re-use element of the hierarchy prior to any wastes arisings been sent to the Walshestown Facility.

18.2 (c) Recycling

It is expected that ca. 15% of the inert waste materials arriving at the facility will not be source-segregated, thus requiring processing prior to emplacement. As such, the proposed Inert Waste Processing Area will be used to sort/process loads, if necessary, of mixed inert waste arriving on Site. Thus this will meet the recycling element of the hierarchy once these mixed wastes arrive at the Walshestown Facility.

In addition, during the initial stages of development at the site, i.e. construction of liner, earth berms etc., where possible site-won materials will be recycled thus avoiding the need for importation of virgin or recycled materials from off-site sources.

18.3 (d) Other recovery activities

Other recovery activities proposed at the Walshestown Facility will include the processing of materials from both on-Site an off-Site sources, and used for engineering purposes on Site, thus avoiding the use of virgin materials. These recovery activities will include the following:

- Materials to be used for lining and capping will include 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. The Applicant fully endorses the National Waste Management policies (waste hierarchy) and intends to recover inert materials that have a beneficial use both on-Site and off-Site as a secondary aggregate. 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 of the EIS;

- 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 (secondary) aggregates for on-Site or off-Site use;

- The first zones to be restored on the site will be in the vicinity of Ponds A1, A2 and A3 – with these ponds being backfilled initially with native (recovered) Site-won free-draining natural materials and then imported materials where necessary; and

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

18.4 (e) Disposal

Source-segregated inert materials that have no onward use in their natural state on the site from which they are excavated, or that cannot be processed/recycled as secondary aggregates at in the Inert Waste Processing Area on the site (IWPA), will be disposed of at the Walshestown Site in order to restore the site. Ultimately it is envisaged that 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), (Section 16 of the EIS).

Further details of these prevention, reuse, recycling, recovery and disposal activities are included in Section 8.0 of the EIS, as revised in September 2010 (Rev. A5).

Report Signature Page

GOLDER ASSOCIATES IRELAND LIMITED

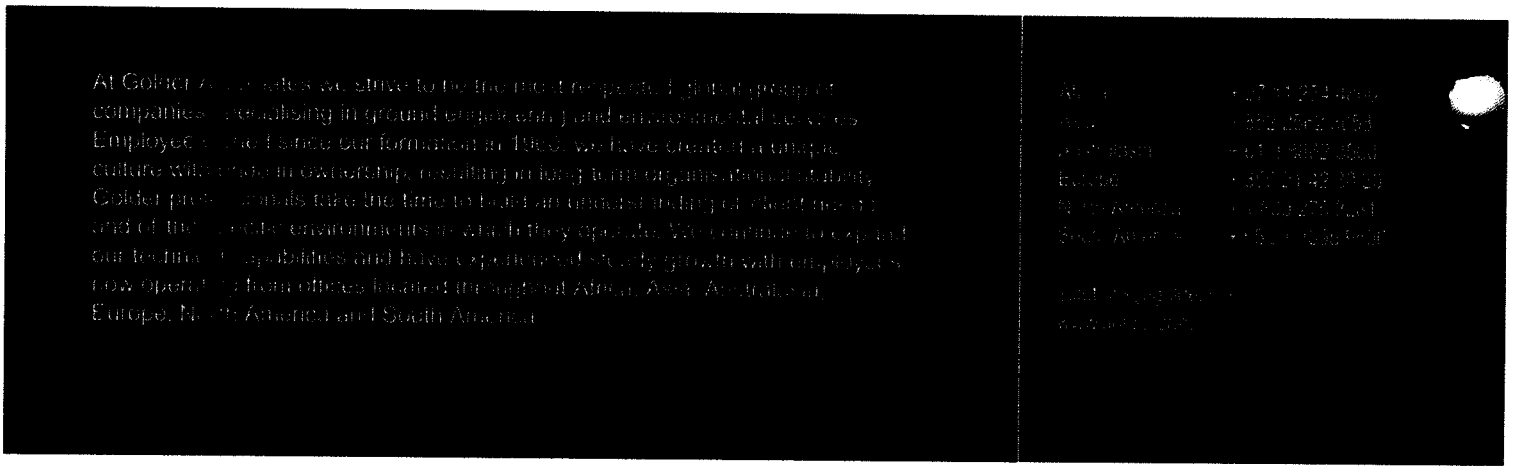
Conor Wall
Project Manager

Barry Balding
Reviewer

Date: 10 November 2011

Author: Conor Wall/BB/aw

Registered in Ireland Registration No. 297875
Town Centre House, Dublin Road, Naas, Co. Kildare, Ireland
Directors: M. Gilligan A. Harris (British)
VAT No.: 8297875W



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Golder Associates

APPENDIX 1

Article 16(1) Requests from EPA

07 JUN 2011

Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Headquarters, PO Box 3000
Johnstown Castle Estate
County Wexford, Ireland

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Lo Call 1890 33 55 99

Mr. Conor Wall,
Golder Associates Ireland Ltd.,
Town Centre House,
Dublin Road,
Naas
County Kildare.

3 June 2011

Reg. No. W0254-01

Re: Notice in accordance with Article 16(1) of the Waste Management (Licensing) Regulations

Dear Mr. Wall,

I am to refer to the above referenced application for a waste licence relating to a facility at Cemex (ROI) Limited, Walshestown, Blackhall, Tipperkevin and Bawnoge, Naas, Co. Kildare. The Agency is giving detailed consideration to the application and to complete this task the following information, particulars and evidence are required in accordance with Article 16(1) of the Regulations. Please provide the information as requested below.

ARTICLE 16(1) - FURTHER INFORMATION, PARTICULARS AND EVIDENCE

1. Provide details of the restoration works that have been conducted in the southern part of the site. Provide information on who conducted these works and what materials, including amounts, have been deposited. Provide drawings showing the nature and location of these restoration works.

2. Provide a drawing showing the location of the former silt lagoon on site.

3. Describe the quantity, location, extent, depth and nature of previously deposited waste. Illustrate the location on a drawing. State whether the waste will be removed. If not, provide justification for this in the form of a risk assessment in accordance with the Agency Code of Practice on Environmental Risk Assessment for Unregulated Waste Disposal Sites.

4. State how the LandSim model took the deposited waste into account. If not taken into account, and it is intended to leave the deposited waste in place, the model should be run again taking the deposited waste into account.

5. Provide drawings showing the location of proposed landfill cells and their formation levels.

6. Provide monitoring results of water quality in Ponds A1, A2, A3 and B including screening for list I/II substances listed in the Council Directive on the protection of groundwater against pollution caused by certain dangerous substances (80/68/EEC).

7. Describe how the landfill liner will be constructed in and around ponds A1, A2 and A3 given that these ponds might be a surface expression of groundwater. State the source of water in ponds A1, A2 and A3.

8. Provide drawings showing the design of the landfill liner. Provide the specification for the liner, including a liner proposed to be placed in the area of ponds A1, A2 and A3.

9. Provide details of the proposed works to be carried out on all existing water bodies on site. Provide details on elimination of groundwater from Pond A1, A2 and A3.

10. Provide details of the construction of the New Water Feature. Provide a drawing showing cross section(s) through this feature. Describe the manner in which water pumped from ponds A1, A2 and A3 will discharge/percolate to ground from the New Water Feature.

11. Describe the circumstances in which water from the New Water Feature will overflow to Pond B and how the overflow will be controlled.

12. Describe how the discharge to groundwater from the New Water Feature and pond B will comply with all requirements of the Groundwater Directives (80/68/EEC and 2006/118/EC) and the Environmental Objectives (Groundwater) Regulations, 2010. In particular, provide information on how Articles 4 and 5 of Directive 80/68/EEC will be complied with.

13. Provide a drawing showing the borehole the irrigation supply for the Punchestown racecourse is supplied from. Provide a symbol for this borehole.

14. Clarify the location of emission to groundwater GW8 and groundwater monitoring borehole BHA. Explain how GW8 and BHA will be monitored. State if boreholes BH9-09, BH10-09, BH11-09 and BH12-09 have been already constructed. Also provide a date for removal of boreholes BH5-07 and BH6-07.

15. Provide a drawing showing clearly all emissions to groundwater and groundwater monitoring locations. Use different symbols for emission points and monitoring locations. If there have been any new emission points or monitoring locations installed provide their description and grid reference numbers.

16. Provide a drawing clearly showing all emissions to surface water and surface water monitoring locations. Use different symbols for emission points and the monitoring locations. If there have been any new emission points or monitoring locations installed provide their description and grid reference numbers. Describe compliance with the Environmental Objectives (Surface Waters) Regulations, 2009.

In the case where any drawings already submitted are subject to revision consequent on this request for further information, a revised drawing should be prepared in each case. It is not sufficient to annotate the original drawing with a textual correction. Where such revised drawings are submitted, provide a list of drawing titles, drawing numbers and revision status, which correlates the revised drawings with the superseded versions. Your reply to this notice should include a **revised non-technical summary**, which reflects the further information you supply in compliance with the notice, insofar as that information impinges on the relevant non-technical summary.

Please supply the information in the form of a one original plus one copy within of **six weeks** of the date of this letter. In addition submit two copies of the requested information to the Agency in electronic searchable PDF format on CD-ROM. Please note that all maps and drawings should not exceed A3 in size.

Please note that the Agency is available to meet with the Applicant to discuss the licence application. Please also note that the application's register number is **W0254-01.** Please direct all correspondence in relation to this matter to Administration, *Licensing Unit, Office of Climate Change, Licensing & Resource Use, Environmental Protection Agency, Headquarters, PO Box 3000, Johnstown Castle Estate, County Wexford* quoting the register number.

Yours sincerely,

Ewa Babiarczyk
Inspector
Office of Climate Change, Licensing & Resource Use

10 AUG 2011

Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

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Mr. Conor Wall
Golder Associates Ireland Limited
Town Centre House
Dublin Road
Naas
County Kildare

09 August 2011 **Reg. No. W0254-01**

re: Notice in accordance with Article 16(1) of the Waste Management (Licensing) Regulations 2004, as amended

Dear Mr. Wall

I am to refer to the above referenced application for a waste licence relating to a facility at Cemex (ROI) Limited, Walshestown, Blackhall, Tipperkevin and Bawnoge, Naas, Co. Kildare.

Having regard to recently updated legislation and in accordance with Article 16(1) of the Regulations, please supply the information detailed below:

The following items are to be addressed to incorporate the requirements of the amended Waste Management Acts 1996 to 2011 and the European Communities (Waste Directive) Regulations 2011.

1. With reference to article 12(1)(f) of the Waste Management (Licensing) Regulations, provide a revised Table B.7.1 and Table H.1(A) (updated versions of which are attached and are also available in the 2011 waste licence application form at www.epa.ie) identifying the relevant classes of activity according to the Third and Fourth Schedules to the amended Waste Management Acts 1996 to 2011. (*Amendment to the Acts was introduced by regulation 24 of the European Communities (Waste Directive) Regulations 2011*). Please find attached a hardcopy of Table B.7.1 and Table H.1(A) for your information.
2. Provide information to address the requirements of article 12(1)(v) of the Waste Management (Licensing) Regulations, 2004, as amended, in relation to a description of how the waste hierarchy in section 21A of the amended Waste Management Acts 1996 to 2011 is applied. Please have regard to the requirements of section 29(2A) of the amended Acts in addressing this item. (*Amendment to the Regulations was introduced by regulation 57 and amendment to the Acts regarding sections 21A and*

29(2A) by regulations 7 and 14 respectively of the European Communities (Waste Directive) Regulations 2011).

Your reply to this notice should include a revised non-technical summary which reflects the information you supply in compliance with the notice, insofar as that information impinges on the non-technical summary.

Please supply the information in the form of a one (1) original plus one (1) copy in hardcopy format within 6 weeks of the date of this notice. In addition submit 2 copies of the requested information to the Agency in electronic searchable PDF format on CD-ROM. Please note that all maps/drawings should not exceed A3 in size.

Please direct all correspondence in relation to this matter to Administration, *Environmental Licensing Programme, Office of Climate, Licensing & Resource Use, Environmental Protection Agency, Headquarters, PO Box 3000, Johnstown Castle Estate, County Wexford* quoting the register number.

Yours sincerely,

Brian Meaney
Inspector
Environmental Licensing Programme
Office of Climate, Licensing & Resource Use

B.7 Type of Waste Activity, Tonnages & Fees

B.7.1 Specify the class or classes of activity in Table B.7.1, in accordance with the Third Schedule or Fourth Schedule to the Waste Management Acts 1996 to 2010, as amended by the European Communities (Waste Directive) Regulations, 2011, to which the application relates (check the relevant box(es) and mark the principal activity with a 'P').

Attachment B.7 should identify the principle activity and include a brief technical description of each of the other activities specified. **There can only be one principal activity.**

TABLE B.7.1 THIRD AND FOURTH SCHEDULES OF THE WASTE MANAGEMENT ACTS 1996 TO 2010

Waste Management Acts 1996 to 2010					
Third Schedule Waste Disposal Operations		**Y/N**	**Fourth Schedule Waste Recovery Operations**		**Y/N**
D 1	Deposit into or on to land (e.g. including landfill, etc.).		R 1	Use principally as a fuel or other means to generate energy: This includes incineration facilities dedicated to the processing of municipal solid waste only where their energy efficiency is equal to or above: - 0.60 for installations in operation and permitted in accordance with applicable Community acts before 1 January 2009, - 0.65 for installations permitted after 31 December 2008, using the following formula, applied in accordance with the reference document on Best Available Techniques for Waste Incineration: Energy efficiency = (Ep - (Ef + Ei)/ (0.97x(Ew+Ef) where— 'Ep' means annual energy produced as heat or electricity and is calculated with energy in the form of electricity being multiplied by 2.6 and heat produced for commercial use multiplied by 1.1(GJ/year), 'Ef' means annual energy input to the system from fuels contributing to the production of steam (GJ/year), 'Ew' means annual energy contained in the treated waste calculated using the net calorific value of the waste (GJ/year), 'Ei' means annual energy imported excluding Ew and Bf(GJ/year), '0.97' is a factor accounting for energy losses due to bottom ash and radiation.	
D 2	Land treatment (e.g. biodegradation of liquid or sludgy discards in soils, etc.).		R 2	Solvent reclamation/regeneration.	
D 3	Deep injection (e.g. injection of pumpable discards into wells, salt domes or naturally occurring repositories, etc.).		R 3	Recycling /reclamation of organic substances which are not used as solvents (including composting and other biological transformation	

				processes), which includes gasification and pyrolisis using the components as chemicals.	
D 4	Surface impoundment (e.g. placement of liquid or sludgy discards into pits, ponds or lagoons, etc.).		R 4	Recycling/reclamation of metals and metal compounds.	
D 5	Specially engineered landfill (e.g. placement into lined discrete cells which are capped and isolated from one another and the environment, etc.).		R 5	Recycling/reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials.	
D 6	Release into a water body except seas/oceans.		R 6	Regeneration of acids or bases.	
D 7	Release to seas/oceans including sea-bed insertion.		R 7	Recovery of components used for pollution abatement.	
D 8	Biological treatment not specified elsewhere in this Schedule which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 12.		R 8	Recovery of components from catalysts.	
D 9	Physico-chemical treatment not specified elsewhere in this Schedule which results in final compounds or mixtures which are discarded by means of any of the operations numbered D 1 to D 12 (e.g. evaporation, drying, calcinations, etc.).		R 9	Oil re-refining or other reuses of oil.	
D 10	Incineration on land.		R 10	Land treatment resulting in benefit to agriculture or ecological improvement.	
D 11	Incineration at sea (this operation is prohibited by EU legislation and international conventions).		R 11	Use of waste obtained from any of the operations numbered R 1 to R 10.	
D 12	Permanent storage (e.g. emplacement of containers in a mine, etc).		R 12	Exchange of waste for submission to any of the operations numbered R 1 to R 11 (if there is no other R code appropriate, this can include preliminary operations prior to recovery including pre-processing such as, amongst others, dismantling, sorting, crushing, compacting, pelletising, drying, shredding, conditioning, repackaging, separating, blending or mixing prior to submission to any of the operations numbered R1 to R11).	
D 13	Blending or mixing prior to submission to any of the operations numbered D 1 to D 12 (if there is no other D code appropriate, this can include preliminary operations prior to disposal including pre-processing such as, amongst others, sorting, crushing, compacting, pelletising, drying, shredding, conditioning or separating prior to submission to any of the operations numbered D1 to D12).		R 13	Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1)), pending collection, on the site where the waste is produced).	
D 14	Repackaging prior to submission to any of the operations numbered D 1 to D 13.				
D 15	Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1)), pending collection, on the site where the waste is produced).				

SECTION H MATERIALS HANDLING

H.1 Waste Types and Quantities – Existing & Proposed

Provide an estimation of the quantity of waste likely to be handled in relation to each class of activity applied for. This information should be included in Table H.1(a).

TABLE H.1(A). QUANTITIES OF WASTE IN RELATION TO EACH CLASS OF ACTIVITY APPLIED FOR

Waste Management Acts 1996 to 2010 3rd Schedule (Disposal) Operations			Waste Management Acts 1996 to 2010 4th Schedule (Recovery) Operations		
Class of Activity Applied For		Quantity (tpa)	Class of Activity Applied For		Quantity (tpa)
Class D 1			Class R 1		
Class D 2			Class R 2		
Class D 3			Class R 3		
Class D 4			Class R 4		
Class D 5			Class R 5		
Class D 6			Class R 6		
Class D 7			Class R 7		
Class D 8			Class R 8		
Class D 9			Class R 9		
Class D 10			Class R 10		
Class D 11			Class R 11		
Class D 12			Class R 12		
Class D 13			Class R 13		
Class D 14					
Class D 15					

In Table H. 1 (B) provide the annual amount of waste handled/to be handled at the facility. Additional information should be included in **Attachment H.1.** The tonnage per annum should be given of that expected for the life of the licence, with at least the next five years tonnages provided. For Landfill Review applications provide an estimate of the quantity of waste already deposited in (i) lined cells; (ii) unlined cells.

TABLE H.1(B) ANNUAL QUANTITIES AND NATURE OF WASTE

Year	Non-hazardous waste (tonnes per annum)	Hazardous waste (tonnes per annum)	Total annual quantity of waste (tonnes per annum)

APPENDIX 2

Results of trial pitting exercise

APPENDIX 2 – RESULTS OF TRIAL PITTING EXERCISE

RESPONSE TO ITEM 1 - DETAILS OF TRIAL PITTING EXERCISE UNDERAKEN AT SOUTHERN PART OF SITE ON 3 JUNE 2011

Further to an Article 16(1) information request issued by the EPA on 3 June 2011 regarding a waste licence application for lands at Walshestown, Naas, Co. Kildare, Item 1 if the request states the following:

> '*Provide details of the restoration works that have been conducted in the southern part of the site. Provide information on who conducted these works and what materials, including amounts, have been deposited. Provide drawings showing the mature and location of these restoration works'.*

A trial pit exercise was carried out on 1st September 2011. 8 No. trial pits were excavated to a maximum depth of ca. 4.2m below ground level (See Figure 8.13 attached for trial pit locations). It is understood that historically, excavated materials (silts/clays) which were deemed unsuitable for commercial use were moved around the Site and eventually levelled off to the levels which are on the Site today. It is further understood that all materials moved around the Site were native to the Site and no additional materials were imported from off-site sources.

The trial pits were dug by a 26 Tonne Komatsu tracked excavator. Each pit was excavated until the machine met greater resistance, indicating to the machine operator that natural ground had been attained. Each of the trial pits were visually inspected for waste materials and logged by a Golder Environmental Engineer. Table 1 below outlines the materials encountered at each trial pit location.

APPENDIX 2 – RESULTS OF TRIAL PITTING EXERCISE

Table 1: Trial Pit Logs, Walshestown, September 1st 2011

Trial Pit No.	Depth (mbgl)	Description
TP01	0.0-1.2	Brown silt/clay. Contains boulders.
	1.2-2.8	Possibly natural ground, as above contains some grey coarse sand and gravel
TP02	0.0-2.4	Brown silt/clay, contains gravel, cobbles and boulders
	2.4-2.8	Brown to grey, possible natural ground, marl, difficult to progress with machine. Quite wet towards 2.8mbgl.
TP03	0.0-1.0	Brown silty, gravelly clay, contains cobbles, soft to progress with excavator
	1.0-4.20	Grey gravelly clay (marl). Water at 4.0m. Branch of tree dug up at 3.8m. Natural ground not established (excavator operator opinion)
TP04	0.0-1.0	Brown loose sand and gravel
	1.0-2.30	Dark grey clay (marl), contains boulders. Possibly natural ground.
TP05	0.0-0.30	Brown, loose topsoil, contains small amount of gravel.
	0.30-1.00	Orange silt, contains gravel. Likely natural ground.
TP06	0.00-0.30	Brown loose topsoil. Contains some sand and gravel.
	0.30-1.90	Brown boulder clay containing sand and gravel, possibly natural ground.
TP07	0.00-0.30	Brown topsoil containing gravel.
	0.30-1.00	Brown boulder clay
	1.00-1.60	Grey gravel, likely natural ground.
TP08	0.00-0.20	Brown topsoil.
	0.20-0.70	Brown boulder clay, contains silt, sand and gravel
	0.70-2.50	Grey brown marl, containing gravel, cobbles, boulders.

A photographic record of the trial pit exercise is provided overleaf.

APPENDIX 2 – RESULTS OF TRIAL PITTING EXERCISE

Figure 1: TP01

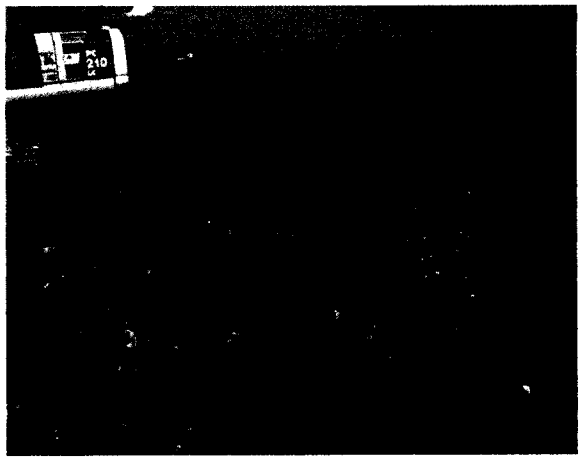

Figure 2: TP01 Soil Heap

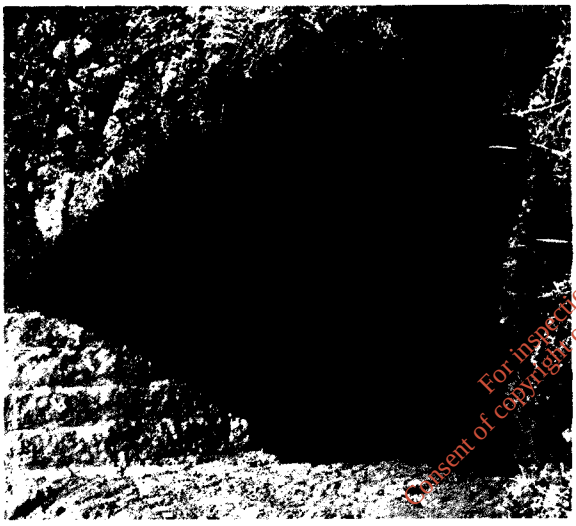

Figure 3: TP02

Figure 4: TP02 Soil Heap

Figure 5: TP03

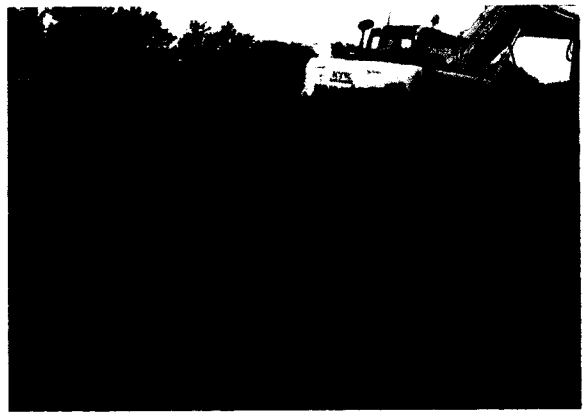

Figure 6: TP03 Soil Heap

Figure 7: TP04

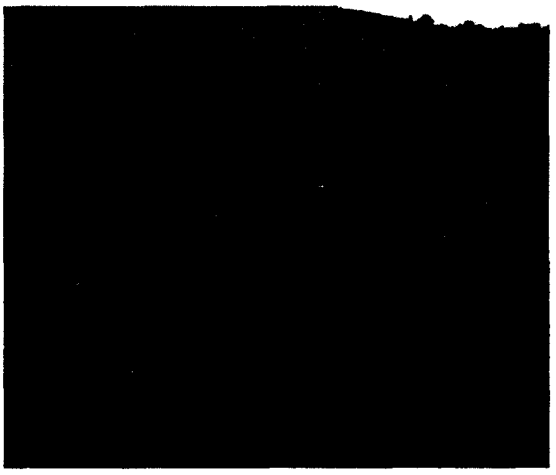

Figure 8: TP04 Soil Heap

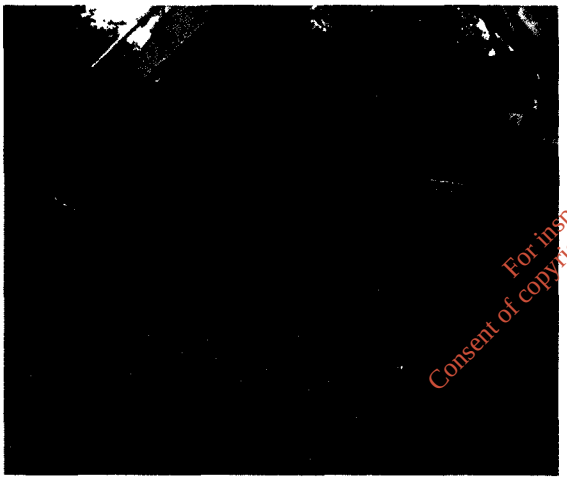

Figure 9: TP05 Soils I

Figure 10: TP05 Soils II

Figure 11: TP06

Figure 12: TP06 Soil Heap

Figure 13: TP07

Figure 14: TP07 Soil Heap

Figure 15: TP08

Figure 16: TP08 Soil Heap

No imported waste materials were identified during the trial pit exercise. Reworked soil materials were identified at most of the trial pit locations, however the materials were almost identical to the underlying natural soils, therefore the differentiation between reworked soils and natural soils was very difficult. In many of the trial pits the only indicator of the interface between natural soils and reworked soils was the degree of difficulty in excavating the trial pit at the various horizons (indicated by the excavator operator).

Caitríona Coyle,
Environmental Engineer

Conor Wall
Senior Consultant

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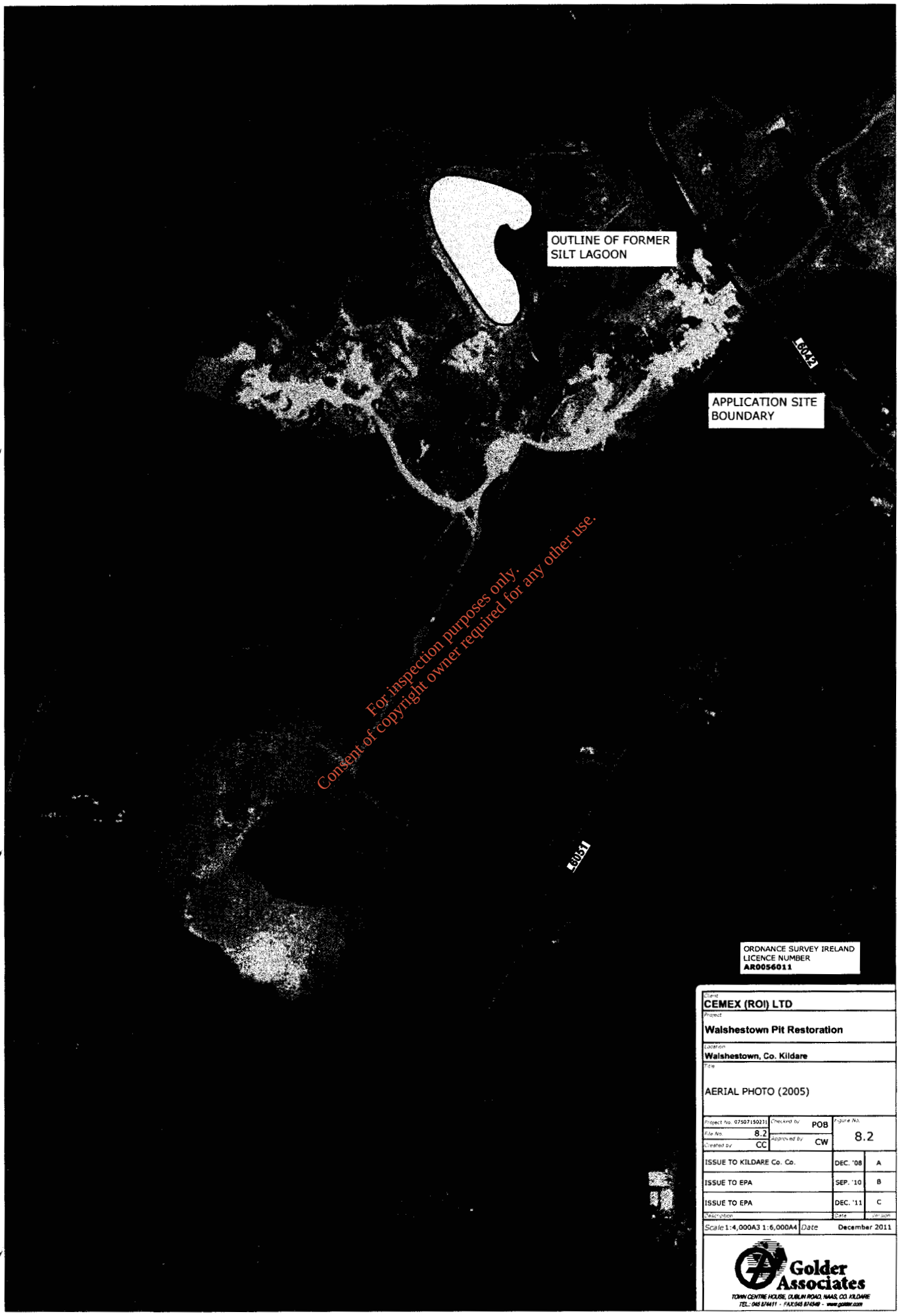
APPENDIX 3

Outline of former sit lagoon



Client: CEMEX (ROI) LTD

Project: Walshestown Pit Restoration

Location: Walshestown, Co. Kildare

Title: AERIAL PHOTO (2005)

Project No. 07507150231	Checked by: POB	Figure No.	
File No. 8.2	Approved by: CW	8.2	
Created by: CC			

Description	Date	Version
ISSUE TO KILDARE Co. Co.	DEC. '08	A
ISSUE TO EPA	SEP. '10	B
ISSUE TO EPA	DEC. '11	C

Scale 1:4,000A3 1:6,000A4 Date December 2011

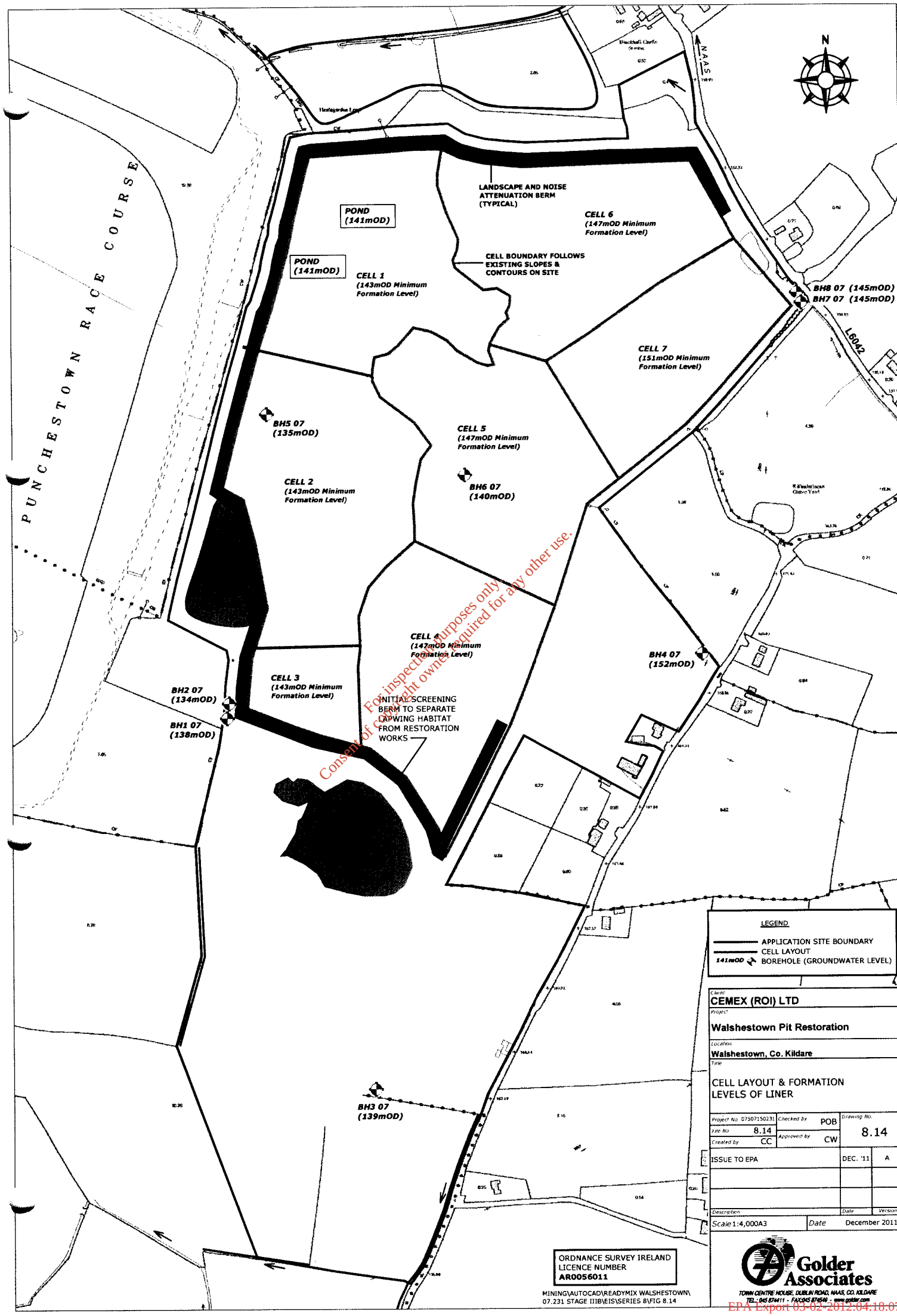
Golder Associates
TOWN CENTRE HOUSE, DUBLIN ROAD, NAAS, CO. KILDARE
TEL: 045 874411 - FAX:045 874549 - www.golder.com

APPENDIX 4

Figure 8.11 – Outline of previously deposited wastes at Walshestown under WPR71/2002

APPENDIX 5

Figure No. 8.14 (Rev. A) Cell layout and formation levels of liner



APPENDIX 6

Water quality in ponds A1, A2, A3 and B

APPENDIX 6 – WATER QUALITY RESULTS FOR PONDS

RESPONSE TO ITEM 6 - DETAILS OF WATER QUALITY IN PONDS A1, A2 AND A3

Further to an Article 16(1) information request issued by the EPA on 3 June 2011 regarding a waste licence application for lands at Walshestown, Naas, Co. Kildare, Item 6 if the request states the following:

> *'Provide monitoring results of water quality in Ponds A1, A2, A3 and B, including screening for list I/II substances listed in the Council Directive on the protection of groundwater against pollution caused by certain dangerous substances (80/68/EEC).'*

Samples were collected from each of the water bodies on the 1st September 2011. Samples were collected using appropriate containers, taking care to avoid cross contamination by using clean consumables and gloves at each sampling location. The samples were then packaged appropriately and sent to an accredited laboratory for analysis (Jones Environmental Forensics).

Each of the samples were tested for the following parameters in accordance with the Council Directive for List I/II Substances:

- Total metals: Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Lead, Molybdenum, Nickel, Phosphorus, Selenium, Silver, Tellurium, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc and Mercury;
- Volatile Organic Compounds;
- Semi-Volatile Organic Compounds;
- Pesticides;
- EPH;
- Mineral Oil;
- Fluoride;
- Nitrate as NO3;
- Orthophosphate as PO4;
- Total cyanide;
- Ammoniacal Nitrogen as NH3;
- Dibutylin, Tributylin, Triphenyltin;
- Electrical Conductivity; and
- pH.

A summary of the analytical results is presented in Table 1 overleaf. The full set of parameters tested is provided in the Certificate of analysis (attached to this report).

APPENDIX 6 – WATER QUALITY RESULTS FOR PONDS

Table 1: Results for Chemical Analysis of Waters at Ponds A1, A2, A3 and B, Walshestown

Parameter	S.I. No. 9, 2010	EPA IGV	A1	A2	A3	B
Total Antimony (µg/l)	NGV*	NGV*	<2	<2	<2	<2
Total Arsenic (µg/l)	7.5	10	<0.9	1.7	<0.9	1.5
Total Barium (µg/l)	NGV*	100	18.4	13.7	43.6	22.0
Total Beryllium (µg/l)	NGV*	NGV*	<0.5	<0.5	<0.5	<0.5
Total Boron (µg/l)	750	1000	6	6	6	8
Total Cadmium (µg/l)	3.75	5	<0.03	<0.03	<0.03	<0.03
Total Chromium (µg/l)	37.5	30	<0.2	<0.2	<0.2	<0.2
Total Cobalt (µg/l)	NGV*	NGV*	<0.1	<0.1	<0.1	<0.1
Total Copper (µg/l)	1500	30	<3	<3	<3	<3
Total Lead (µg/l)	18.75	10	<0.4	<0.4	0.4	<0.4
Total Molybdenum (µg/l)	NGV*	NGV*	<0.2	0.3	0.5	0.5
Total Nickel (µg/l)	15	20	<0.2	0.5	1.1	1.6
Total Phosphorus (µg/l)	NGV*	NGV*	18.5	23.3	13.8	15.5
Total Selenium (µg/l)	NGV*	NGV*	<1.2	<1.2	1.7	<1.2
Total Silver (µg/l)	NGV*	NGV*	<5	<5	<5	<5
Total Tellurium (µg/l)	NGV*	NGV*	<5	<5	<5	<5
Total Thallium (µg/l)	NGV*	NGV*	<0.9	<0.9	<0.9	<0.9
Total Tin (µg/l)	NGV*	NGV*	<5	<5	<5	<5
Total Titanium (µg/l)	NGV*	NGV*	<5	<5	<5	<5
Total Uranium (µg/l) - *revised*	NGV*	9	<5	<5	<5	<10
Total Vanadium (µg/l)	NGV*	NGV*	<0.6	<0.6	<0.6	<0.6
Total Zinc (µg/l)	NGV*	100	6.7	6.3	7.6	15.7
Total Mercury (µg/l)	0.75	1	0.09	0.04	0.03	0.02
Pesticides(µg/l)	0.375	Variable	BDL**	BDL**	BDL**	BDL**
VOCs	Variable	Variable	BDL**	BDL**	BDL**	BDL**
SVOCs	Variable	Variable	BDL**	BDL**	BDL**	BDL**
EPH (C8-C40) (µg/l)	NGV*	NGV*	<10	<10	<10	<10
Mineral Oil (µg/l)	NGV*	10	<10	<10	<10	<10
Fluoride (mg/l)	NGV*	1	<0.3	<0.3	<0.3	<0.3
Nitrate as NO3 (mg/l)	37.5	25	<0.2	<0.2	<0.2	<0.2
Orthophosphate as PO4 (mg/l)	0.035	0.03	<0.03	<0.03	<0.03	<0.03
Total Cyanide (mg/l)	37.5	0.01	<0.01	<0.01	<0.01	<0.01
Ammoniacal Nitrogen as NH3 (mg/l)	NGV*	NGV*	0.02	0.02	0.02	0.04
Dibutyltin (µg/l)	NGV*	NGV*	<0.01	<0.01	<0.01	<0.01
Tributyltin (µg/l)	NGV*	NGV*	<0.01	<0.01	<0.01	<0.01
Triphenyltin (µg/l)	NGV*	NGV*	<0.01	<0.01	<0.01	<0.01
Electrical Conductivity (µS/cm)	800-1875	1000	230	206	288	232
pH	NGV*	6.5-9.5	8.27	8.19	7.44	8.03
Silica (mg/l)	NGV*	NAC	3	2.50	6	2.3

*No guideline value

** Below Laboratory Detection Limit

APPENDIX 6 – WATER QUALITY RESULTS FOR PONDS

The overall quality of the water was visually clear (field notes) and no discernible odours were recorded on the day of sampling.

No exceedances were recorded for any of the parameters tested when compared to S.I. No. 9 2010 and the EPA Interim Guideline Values for groundwater.

Caitríona Coyle,
Environmental Engineer

Conor Wall
Senior Consultant

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B.7 TYPE OF WASTE ACTIVITIES

The following 'revised' sections identify the types of activities related to the proposed Waste Management Facility, as amended by *Article 24 of the European Communities (Waste Directive) Regulations 2011) – SI No. 126 of 2011.*The principal activity relates to activity Class R5 of the Third Schedule (Disposal Operations).

B.7.1Third Schedule (Waste Disposal Activities)

Class D1 Deposit into or on to land (including landfill)

This includes the placement of inert materials

Class D5 (Principal Activity) - Specially engineered landfill (e.g. placement into lined discrete cells which are capped and isolated from one another and the environment (etc.) -

This is the principal activity and involves the construction of engineered cells for accepting processing and depositing of inert wastes. In this regard, inert wastes will be deposited in lined cells to produce a restored contoured landform that is in keeping with the character of the local landscape.

Class D15 Storage pending any of the operations numbered D1 to D14 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in Section 5(1)), pending collection, on the site where the waste is produced).

Wastes will stored in stockpiles within the lined cells or in inert waste processing areas prior to disposal on site in lined cells or off site in an appropriately permitted or licensed facilities.

B.7.2 Fourth Schedule (Recovery Operations)

Class R3 Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes), which includes gasification and pyrolisis using the components as chemicals.

The wastes accepted at the Facility for recovery at the Inert Waste Processing Area may from time to time contain organic material such as incidental wood, paper, cardboard and plastic. These materials will be removed from the imported wastes and stored in designated areas for recovery, recycling or discposal at appropriate facilities off-site.

Topsoil deemed to be waste from other external sites will be recovered at the proposed Facility for the purpose of restoration of the landform and external berms etc. as required.

Class R4 Recycling/reclamation of metals and metal compounds

The wastes that are imported to the Facility will include reinforced concrete and may also contain incidental metals. These materials will be removed from the imported wastes and stored on the site for further recovery and recycling off site.

Class R5 Recycling/reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials

This will involve processing on an annual basis of up to circa 15% of the maximum annual intake of waste accepted at the Facility. An area of the Site referred to as the Inert Waste Processing Area (IWPA) has been set aside for this purpose. The processed material will be used for restoration purposes or will be sold as secondary processed material. This class will also include the direct importation and recovery of waste soils that are used for engineering purposes such as perimeter bunds and the final capping layer which do no require processing in the IWPA.

Class R13 Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1)), pending collection, on the site where the waste is produced)

Waste will be stored in stockpiles prior to processing, recovery and re-use for engineering purposes on the site or offsite. It will also involve the storage of materials that may be found in imported waste after tipping. These materials will be stored pending results of testing and collection for transport to appropriate recovery facilities located off-site.

SECTION H MATERIALS HANDLING

H.1 Waste Types and Quantities – Existing & Proposed

Provide an estimation of the quantity of waste likely to be handled in relation to each class of activity applied for. This information should be included in Table H.1(a).

TABLE H.1(A). QUANTITIES OF WASTE IN RELATION TO EACH CLASS OF ACTIVITY APPLIED FOR

Waste Management Acts 1996 to 2010 3rd Schedule (Disposal) Operations [Note 1]		Waste Management Acts 1996 to 2010 4th Schedule (Recovery) Operations [Note 2]	
Class of Activity Applied For	Quantity (tpa) [Note 3]	Class of Activity Applied For	Quantity (tpa)
Class D 1 (includes the placement of inert materials)	280,500	Class R 1	
Class D 2		Class R 2	
Class D 3		Class R 3 (Recycling/reclamation of organic substances)	Quantity included in Class R5
Class D 4		Class R 4 (Recycling/reclamation of metals)	Quantity included in Class R5
Class D 5 (involves the construction of engineered cells for accepting, processing and depositing of inert materials	Quantity included in Class D1	Class R 5 (Recycling reclamation of other inorganic materials)	49,500
Class D 6		Class R 6	
Class D 7		Class R 7	
Class D 8		Class R 8	
Class D 9		Class R 9	
Class D 10		Class R 10	
Class D 11		Class R 11	
Class D 12		Class R 12	
Class D 13		Class R 13 (Storage of waste pending any of the operations numbered R1 to R12)	Quantity included in Class R5
Class D 14			
Class D 15 (Storage pending any of the operations numbered D1 to D14)	Quantity included in Class D1		
Total tonnes per annum	**280,500**		**49,500**
Total Accepted at the facility (per annum)	**330,000**		

Note 1: As highlighted in Section 7.0 of the EIS (Sept 2010), up to ca. 85% of the maximum annual intake of inert waste accepted at the facility will be used to backfill and restore a large existing void at the site.
Note 2: As highlighted in Section 7.0 of the EIS (Sept 2010), up to ca. 15% of the maximum annual intake of inert waste accepted at the facility will be recovered at the Inert Waste Processing Area to generate secondary (recycled) aggregate.
Note 3: Based on Revised Scheme September 2010 (submitted to EPA under Article 14 Response), maximum annual intake is proposed at 330,000 tonnes per annum.

Jones Environmental Laboratory

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Golder Associates Ltd
Town Centre House
Dublin Road
Naas
Co Kildare
Ireland

No.4225

Attention :	Caitriona Coyle
Date :	15th September, 2011
Your reference :	
Our reference :	Test Report 11/6329 Batch 1
Location :	WALSHESTOWN
Date samples received :	2nd September 2011
Status :	Final report
Issue :	1

Four samples were received for analysis on 2nd September, 2011, which was completed on 15th September 2011. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

J W Farrell- Jones CChem FRSC
Chartered Chemist

Jones Environmental Laboratory

Client Name: Golder Associates Ltd

Reference:

Location: WALSHESTOWN

Contact: Caitriona Coyle

JE Job No.: 11/6329

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HNO_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-8	9-16	17-24	25-32							LOD	Units	Method No.
Sample ID	POND-A1	POND-A2	POND-A3	POND-B									
Depth													
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G									
Sample Date	01/09/2011	01/09/2011	01/09/2011	01/09/2011									
Sample Type	Liquid	Liquid	Liquid	Liquid									
Batch Number	1	1	1	1									
Date of Receipt	02/09/2011	02/09/2011	02/09/2011	02/09/2011									
Total Antimony	<2	<2	<2	<2							<2	ug/l	TM30/PM14
Total Arsenic	<0.9	1.7	<0.9	1.5							<0.9	ug/l	TM30/PM14
Total Barium	18.4	13.7	43.6	22.0							<1.8	ug/l	TM30/PM14
Total Beryllium	<0.5	<0.5	<0.5	<0.5							<0.5	ug/l	TM30/PM14
Total Boron	6	6	6	8							<2	ug/l	TM30/PM14
Total Cadmium	<0.03	<0.03	0.03	<0.03							<0.03	ug/l	TM30/PM14
Total Chromium	<0.2	<0.2	<0.2	<0.2							<0.2	ug/l	TM30/PM14
Total Cobalt	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM30/PM14
Total Copper	<3	<3	<3	<3							<3	ug/l	TM30/PM14
Total Lead	<0.4	<0.4	0.4	<0.4							<0.4	ug/l	TM30/PM14
Total Molybdenum	<0.2	0.3	0.5	0.5							<0.2	ug/l	TM30/PM14
Total Nickel	<0.2	0.5	1.1	1.6							<0.2	ug/l	TM30/PM14
Total Phosphorus	18.5	23.3	13.8	15.5							<0.7	ug/l	TM30/PM14
Total Selenium	<1.2	<1.2	1.7	<1.2							<1.2	ug/l	TM30/PM14
Total Silver	<5	<5	<5	<5							<5	ug/l	TM30/PM14
Total Tellurium	<5	<5	<5	<5							<5	ug/l	TM30/PM14
Total Thallium	<0.9	<0.9	<0.9	<0.9							<0.9	ug/l	TM30/PM14
Total Tin	<5	<5	<5	<5							<5	ug/l	TM30/PM14
Total Titanium	<5	<5	<5	<5							<5	ug/l	TM30/PM14
Total Uranium	<10	<10	<10	<10							<10	ug/l	TM30/PM14
Total Vanadium	<0.6	<0.6	<0.6	<0.6							<0.6	ug/l	TM30/PM14
Total Zinc	6.7	6.3	7.6	16.7							<1.5	ug/l	TM30/PM14
Mercury Total by CVAF	0.09	0.04	0.03	0.02							<0.01	ug/l	TM61/PM38
VOC TICs	ND	ND	ND	ND								None	TM15/PM10
SVOC TICs	ND	ND	ND	ND								None	TM10/PM30

Jones Environmental Laboratory

Client Name: Golder Associates Ltd

Report : Liquid

Reference:

Location: WALSHESTOWN

Contact: Caitriona Coyle

JE Job No.: 11/6329

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-8	9-16	17-24	25-32							LOD	Units	Method No.
Sample ID	POND-A1	POND-A2	POND-A3	POND-B									
Depth													
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G									
Sample Date	01/09/2011	01/09/2011	01/09/2011	01/09/2011									
Sample Type	Liquid	Liquid	Liquid	Liquid									
Batch Number	1	1	1	1									
Date of Receipt	02/09/2011	02/09/2011	02/09/2011	02/09/2011									
Pesticides MS													
Organochlorine Pesticides													
Aldrin	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Alpha-BHC	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Beta-BHC	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Chlorothalonil	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
cis-Chlordane	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Dieldrin	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Endosulphan I	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Endosulphan II	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Endosulphan sulphate	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Endrin	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Gamma-BHC	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Heptachlor	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Heptachlor Epoxide	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Hexachlorobenzene	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Isodrin	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
o,p'-DDE	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
o,p'-DDT	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
o,p'-Methoxychlor	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
o,p'-TDE	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
p,p'-DDE	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
p,p'-DDT	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
p,p'-Methoxychlor	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
p,p'-TDE	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Pendimethalin	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Permethrin I	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Permethrin II	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Quintozene	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Tecnazene	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Telodrin	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
trans-Chlordane	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Triadimefon	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Triallate	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Trifluralin	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30

Jones Environmental Laboratory

Client Name: Golder Associates Ltd

Reference:

Location: WALSHESTOWN

Contact: Caitriona Coyle

JE Job No.: 11/6329

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HNO_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-8	9-16	17-24	25-32							LOD	Units	Method No.
Sample ID	POND-A1	POND-A2	POND-A3	POND-B									
Depth													
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G									
Sample Date	01/09/2011	01/09/2011	01/09/2011	01/09/2011									
Sample Type	Liquid	Liquid	Liquid	Liquid									
Batch Number	1	1	1	1									
Date of Receipt	02/09/2011	02/09/2011	02/09/2011	02/09/2011									
Pesticides MS													
Organophosphorus Pesticides													
Azinphos ethyl	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Azinphos methyl	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Carbophenothion	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Chlorfenvinphos	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Chlorpyrifos	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Chlorpyrifos-methyl	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Diazinon	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Dichlorvos	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Dimethoate	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Ethion	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Ethyl Parathion (Parathion)	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Etrimphos	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Fenitrothion	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Fenthion	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Malathion	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Methyl Parathion	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Mevinphos	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Phosalone	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Pirimiphos Methyl	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Propetamphos	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Triazophos	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM42/PM30
Benazolin	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
Bentazone	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
Bromoxynil	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
Clopyralid	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
4- CPA	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
2,4 – D	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
2,4 –DB	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
Dicamba	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
Dichloroprop	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
Diclofop	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
Fenoprop	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
Flamprop	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
Flamprop – isopropyl	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
Ioxynil	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
MCPA	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
MCPB	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
Mecoprop	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
Picloram	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
Pentachlorophenol	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
2,4,5 – T	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise

Jones Environmental Laboratory

Client Name: Golder Associates Ltd

Reference:

Location: WALSHESTOWN

Contact: Caitriona Coyle

JE Job No.: 11/6329

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HNO_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-8	9-16	17-24	25-32							LOD	Units	Method No.
Sample ID	POND-A1	POND-A2	POND-A3	POND-B									
Depth													
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G									
Sample Date	01/09/2011	01/09/2011	01/09/2011	01/09/2011									
Sample Type	Liquid	Liquid	Liquid	Liquid									
Batch Number	1	1	1	1									
Date of Receipt	02/09/2011	02/09/2011	02/09/2011	02/09/2011									
2,3,6 – TBA	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
Triclopyr	<0.1	<0.1	<0.1	<0.1							<0.1	ug/l	TM16/PM30
EPH (C8-C40)	<10	<10	<10	<10							<10	ug/l	TM5/PM30
Mineral Oil (Calculation)	<10	<10	<10	<10							<10	ug/l	TM5/PM30
Fluoride	<0.3	<0.3	<0.3	<0.3							<0.3	mg/l	TM27/PM0
Nitrate as NO3	<0.2	<0.2	<0.2	<0.2							<0.2	mg/l	TM38/PM0
Ortho Phosphate as PO4	<0.03	<0.03	<0.03	<0.03							<0.03	mg/l	TM38/PM0
Total Cyanide	<0.01	<0.01	<0.01	<0.01							<0.01	mg/l	TM89/PM0
Ammoniacal Nitrogen as NH3	0.02	0.02	0.02	0.04							<0.01	mg/l	TM38/PM0
Dibutyltin	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM94/PM48
Tributyltin	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM94/PM48
Triphenyltin	<0.01	<0.01	<0.01	<0.01							<0.01	ug/l	TM94/PM48
Electrical Conductivity @25C	230	206	288	232							<2	uS/cm	TM76/PM0
pH	8.27	8.19	7.44	8.03							<0.01	pH units	TM73/PM0
Silica	3.00	2.50	6.00	3.30							<0.01	mg/l	TM52/PM0

Jones Environmental Laboratory

Client Name: Golder Associates Ltd

SVOC Report : Liquid

Reference:

Location: WALSHESTOWN

Contact: Caitriona Coyle

JE Job No.: 11/6329

J E Sample No.	1-8	9-16	17-24	25-32							LOD	Units	Method No.
Sample ID	POND-A1	POND-A2	POND-A3	POND-B									
Depth													
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G									
Sample Date	01/09/2011	01/09/2011	01/09/2011	01/09/2011									
Sample Type	Liquid	Liquid	Liquid	Liquid									
Batch Number	1	1	1	1									
Date of Receipt	02/09/2011	02/09/2011	02/09/2011	02/09/2011									
SVOC MS													
Phenols													
2-Chlorophenol	<10	<10	<10	<10							<10	ug/l	TM16/PM30
2-Methylphenol	<10	<10	<10	<10							<10	ug/l	TM16/PM30
2-Nitrophenol	<10	<10	<10	<10							<10	ug/l	TM16/PM30
2,4-Dichlorophenol	<10	<10	<10	<10							<10	ug/l	TM16/PM30
2,4-Dimethylphenol	<10	<10	<10	<10							<10	ug/l	TM16/PM30
2,4,5-Trichlorophenol	<10	<10	<10	<10							<10	ug/l	TM16/PM30
2,4,6-Trichlorophenol	<10	<10	<10	<10							<10	ug/l	TM16/PM30
4-Chloro-3-methylphenol	<10	<10	<10	<10							<10	ug/l	TM16/PM30
4-Methylphenol	<10	<10	<10	<10							<10	ug/l	TM16/PM30
4-Nitrophenol	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Pentachlorophenol	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Phenol	<10	<10	<10	<10							<10	ug/l	TM16/PM30
PAHs													
2-Chloronaphthalene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
2-Methylnaphthalene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Naphthalene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Acenaphthylene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Acenaphthene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Fluorene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Phenanthrene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Anthracene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Fluoranthene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Pyrene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Benz(a)anthracene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Chrysene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Benzo(bk)fluoranthene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Benzo(a)pyrene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Indeno(123cd)pyrene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Dibenzo(ah)anthracene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Benzo(ghi)perylene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Phthalates													
Bis(2-ethylhexyl) phthalate	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Butylbenzyl phthalate	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Di-n-butyl phthalate	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Di-n-Octyl phthalate	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Diethyl phthalate	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Dimethyl phthalate	<10	<10	<10	<10							<10	ug/l	TM16/PM30

Please see attached notes for all abbreviations and acronyms

Jones Environmental Laboratory

Client Name: Golder Associates Ltd

SVOC Report : **Liquid**

Reference:

Location: WALSHESTOWN

Contact: Caitriona Coyle

JE Job No.: 11/6329

J E Sample No.	1-8	9-16	17-24	25-32								
Sample ID	POND-A1	POND-A2	POND-A3	POND-B								
Depth												
COC No / misc												
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G								
Sample Date	01/09/2011	01/09/2011	01/09/2011	01/09/2011								
Sample Type	Liquid	Liquid	Liquid	Liquid								
Batch Number	1	1	1	1								
Date of Receipt	02/09/2011	02/09/2011	02/09/2011	02/09/2011								

Please see attached notes for all abbreviations and acronyms

											LOD	Units	Method No.
SVOC MS													
Other SVOCs													
1,2-Dichlorobenzene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
1,2,4-Trichlorobenzene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
1,3-Dichlorobenzene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
1,4-Dichlorobenzene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
2-Nitroaniline	<10	<10	<10	<10							<10	ug/l	TM16/PM30
2,4-Dinitrotoluene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
2,6-Dinitrotoluene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
3-Nitroaniline	<10	<10	<10	<10							<10	ug/l	TM16/PM30
4-Bromophenylphenylether	<10	<10	<10	<10							<10	ug/l	TM16/PM30
4-Chloroaniline	<10	<10	<10	<10							<10	ug/l	TM16/PM30
4-Chlorophenylphenylether	<10	<10	<10	<10							<10	ug/l	TM16/PM30
4-Nitroaniline	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Azobenzene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Bis(2-chloroethoxy)methane	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Bis(2-chloroethyl)ether	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Carbazole	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Dibenzofuran	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Hexachlorobenzene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Hexachlorobutadiene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Hexachlorocyclopentadiene	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Hexachloroethane	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Isophorone	<10	<10	<10	<10							<10	ug/l	TM16/PM30
N-nitrosodi-n-propylamine	<10	<10	<10	<10							<10	ug/l	TM16/PM30
Nitrobenzene	<10	<10	<10	<10							<10	ug/l	TM16/PM30

Jones Environmental Laboratory

Client Name: Golder Associates Ltd **VOC Report :** Liquid

Reference:

Location: WALSHESTOWN

Contact: Caitriona Coyle

JE Job No.: 11/6329

J E Sample No.	1-8	9-16	17-24	25-32									
Sample ID	POND-A1	POND-A2	POND-A3	POND-B									
Depth													
COC No / misc													
Containers	V H HN N P G	V H HN N P G	V H HN N P G	V H HN N P G									
Sample Date	01/09/2011	01/09/2011	01/09/2011	01/09/2011									
Sample Type	Liquid	Liquid	Liquid	Liquid									
Batch Number	1	1	1	1									
Date of Receipt	02/09/2011	02/09/2011	02/09/2011	02/09/2011									
VOC MS											LOD	Units	Method No.
Dichlorodifluoromethane	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether	<1	<1	<1	<1							<1	ug/l	TM15/PM10
Chloromethane	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Vinyl Chloride	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Bromomethane	<1	<1	<1	<1							<1	ug/l	TM15/PM10
Chloroethane	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Trichlorofluoromethane	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,1-Dichloroethene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Dichloromethane	<3	<3	<3	<3							<3	ug/l	TM15/PM10
trans-1-2-Dichloroethene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,1-Dichloroethane	<3	<3	<3	<3							<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1	<1	<1	<1							<1	ug/l	TM15/PM10
Bromochloromethane	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Chloroform	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,1,1-Trichloroethane	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,1-Dichloropropene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Carbon tetrachloride	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,2-Dichloroethane	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Benzene	<1	<1	<1	<1							<1	ug/l	TM15/PM10
Trichloroethene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,2-Dichloropropane	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Dibromomethane	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Bromodichloromethane	<2	<2	<2	<2							<2	ug/l	TM15/PM10
cis-1-3-Dichloropropene	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Toluene	<2	<2	<2	<2							<2	ug/l	TM15/PM10
trans-1-3-Dichloropropene	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,1,2-Trichloroethane	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Tetrachloroethene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,3-Dichloropropane	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Dibromochloromethane	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,2-Dibromoethane	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Chlorobenzene	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Ethylbenzene	<2	<2	<2	<2							<2	ug/l	TM15/PM10
p/m-Xylene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
o-Xylene	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Styrene	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Bromoform	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Isopropylbenzene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4	<4	<4	<4							<4	ug/l	TM15/PM10
Bromobenzene	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,2,3-Trichloropropane	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Propylbenzene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
2-Chlorotoluene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
4-Chlorotoluene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
tert-Butylbenzene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
sec-Butylbenzene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
4-Isopropyltoluene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,3-Dichlorobenzene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,4-Dichlorobenzene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
n-Butylbenzene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,2-Dichlorobenzene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Naphthalene	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	102	105	105	99							<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	102	105	100	97							<0	%	TM15/PM10

Please see attached notes for all abbreviations and acronyms

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C

WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory . It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any analysis that may be compromised highlighted on your schedule/ report by the use of a symbol.

The use of any of the following symbols indicates that the sample was deviating and the test result may be unreliable:

$	Sample temperature on receipt considered inappropriate for analysis requested.
^	Samples exceeding recommended holding times.
&	Samples received in inappropriate containers (e.g. volatile samples not submitted in VOC jars/vials).
~	No sampling date given, unable to confirm if samples are with acceptable holding times.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

AQCs

Where AQC's fall outside UKAS/MCERTS criteria analysis is repeated if possible.

NOTE

Data is only accredited when all the requirements of our Quality System have been met. In certain circumstances where the requirements have not been met, the laboratory may issue the data in its final report if it believes that the validity of the data has not been conpromised but will remove the accreditation. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

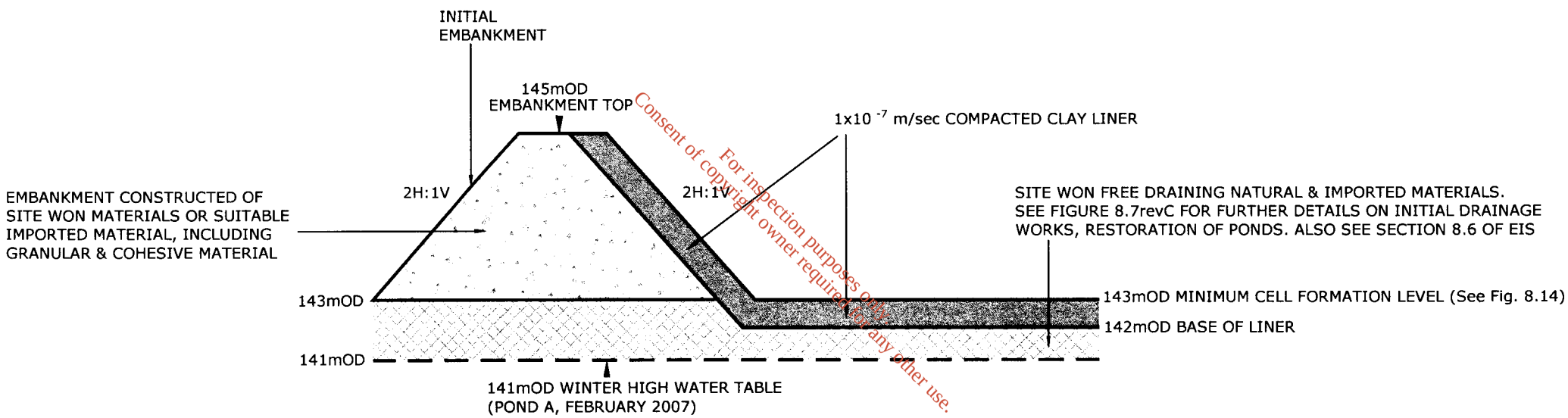
ABBREVIATIONS and ACRONYMS USED

#	UKAS accredited.
M	MCERTS accredited.
NAD	No Asbestos Detected.
NFD	No Fibres Detected
ND	None Detected (usually refers to VOC and/SVOC TICs).
SS	Calibrated against a single substance.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
W	Results expressed on as received basis.
+	Accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
DR	Dilution required.

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Solid Results expressed on Dry/Wet basis
TM5	EPH by GC-FID, modified USEPA 8015	PM30	Magnetic stirrer extraction			AR	
TM10	SVOC - Forensic scan including biomarkers by GC-MS	PM30	Magnetic stirrer extraction				
TM15	VOC - Target by GC-MS, modified USEPA 8260	PM10	VOC GC-MS				
TM16	SVOC - Target by GC-MS, modified USEPA 8270	PM30	Magnetic stirrer extraction				
TM27	SO4,Cl,NO3,NO2,F,PO4 by Dionex	PM0	No Preparation				
TM30	Metals by ICP-OES	PM14	Metals by ICP (Waters)				
TM38	SO4,Cl,NO3,NO2,F,PO4, Amm N2,ThioCN by Aquakem	PM0	No Preparation				
TM42	OC and OP Pesticides by GC-MS	PM30	Magnetic stirrer extraction				
TM52	Silica by Spectrophotometer	PM0	No Preparation				
TM61	Mercury - low level CVAF	PM38	Mercury CVAF				
TM73	pH in by Metrohm	PM0	No Preparation				
TM76	EC by Metrohm	PM0	No Preparation				
TM89	Cyanide by FIA	PM0	No Preparation				
TM94	Organo Tin	PM48	Organo Tin Extraction				

APPENDIX 7

Figure 8.15 Typical section through base and slope lining system



Client	CEMEX (ROI) LTD
Project	Walshestown Pit Restoration
Location	Walshestown, Co. Kildare
Title	TYPICAL SECTION THROUGH BASE & SLOPE LINING SYSTEM
Project No. 07507150231 / File No. 8.15	Checked by POB / Approved by CW / Figure No. 8.15
Created by CC	
ISSUE TO EPA	DEC. '11 A
Description	Date Version
Scale NTS	Date December 2011

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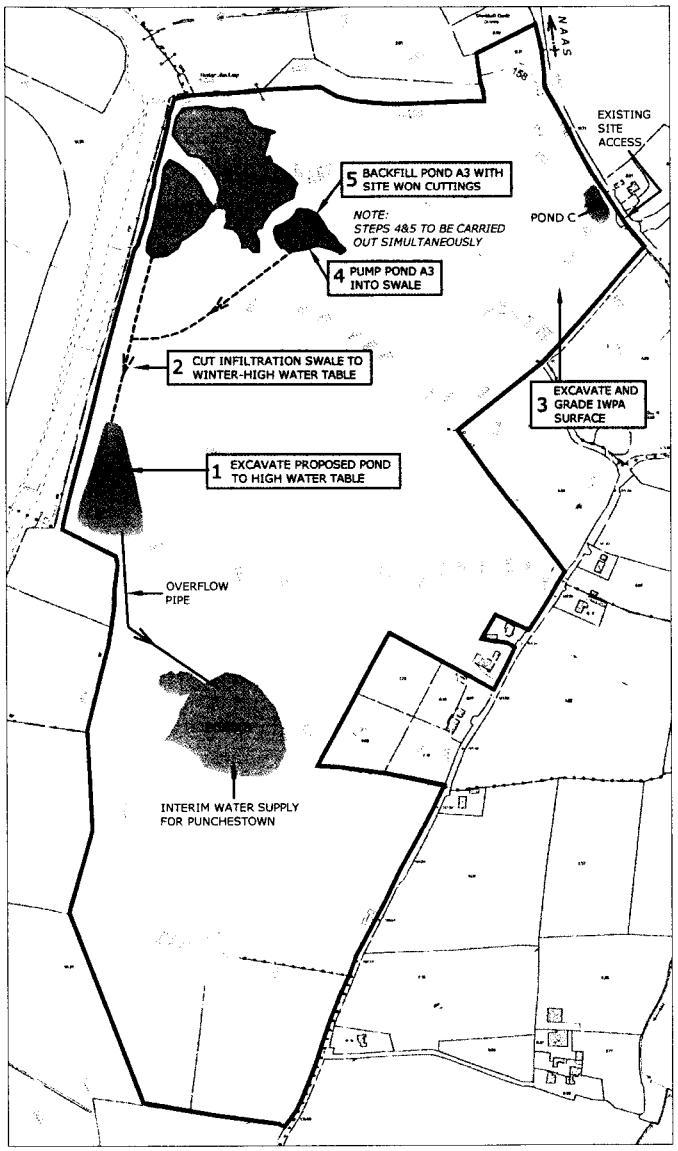
TEL.: 045 874411 - FAX:045 874549 - www.golder.com

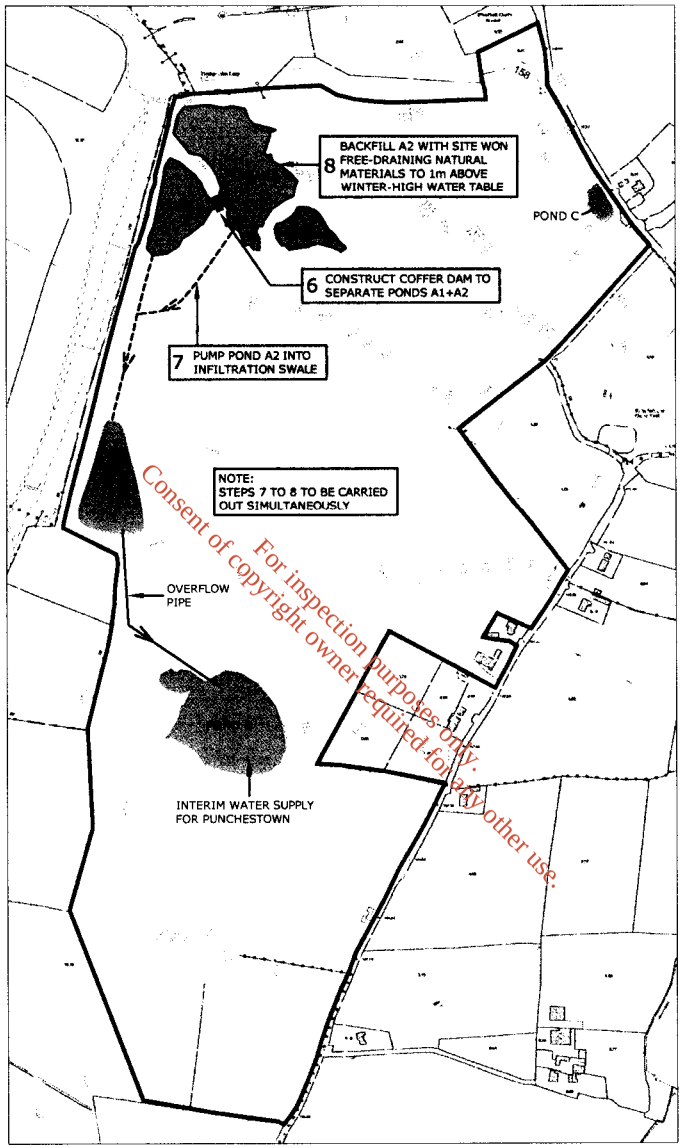
MINING\AUTOCAD\READYMIX WALSHESTOWN\07.231 STAGE IIIB\EIS\SERIES 8\FIG 8.15

APPENDIX 8

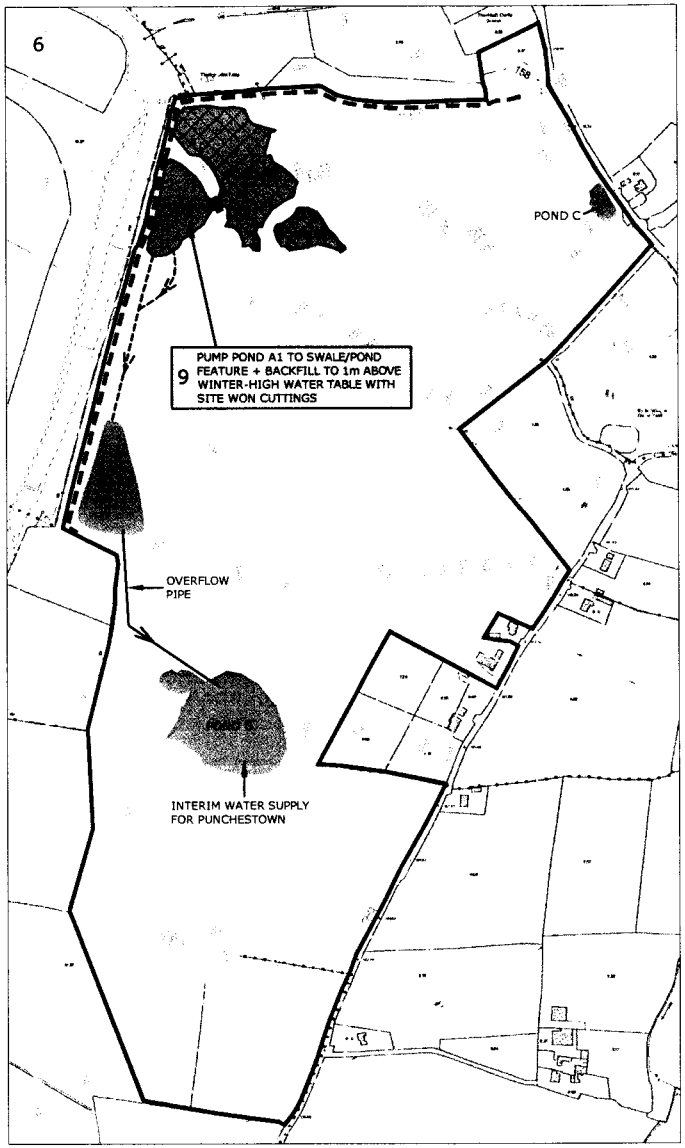
Figure 8.7 Rev. B Sequence of initial drainage works



INITIAL DRAINAGE WORKS - VIEW A



INITIAL DRAINAGE WORKS - VIEW B



INITIAL DRAINAGE WORKS - VIEW C

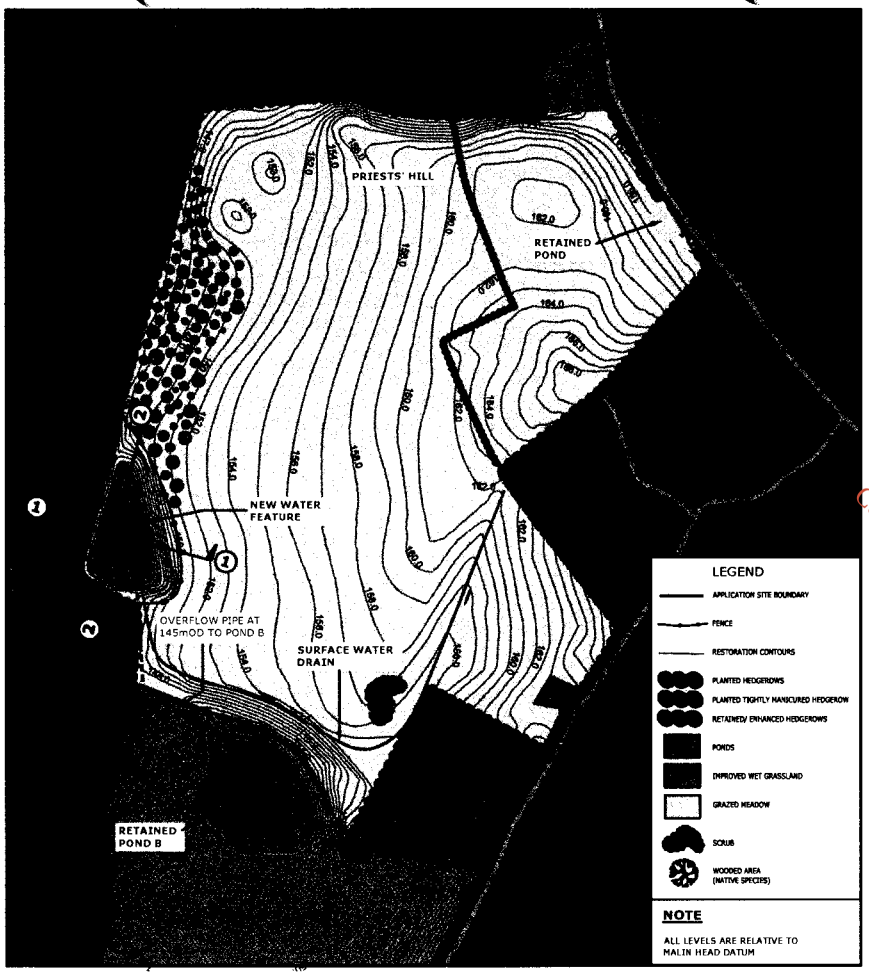
LEGEND

- APPLICATION SITE BOUNDARY
- EXISITNG SITE CONTOURS
- WATER BODY

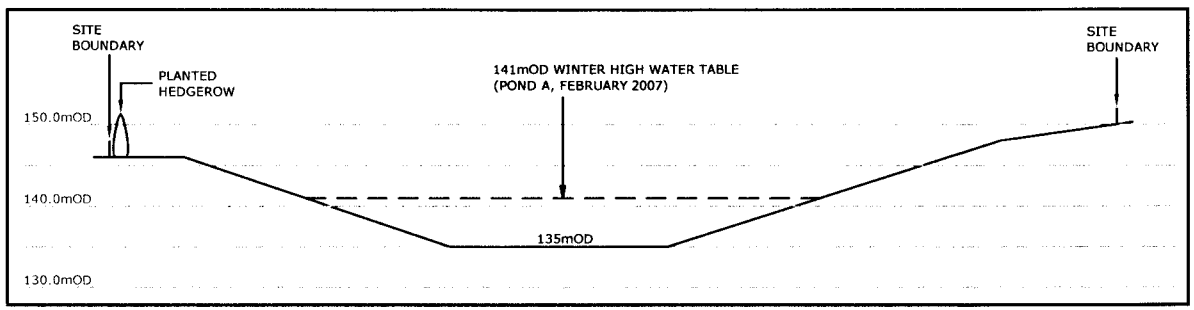
Golder Associates TOWN CENTRE HOUSE, DUBLIN ROAD, NAAS, CO. KILDARE TEL.: 045 874411 - FAX:045 874549 - www.golder.com	Client: CEMEX (ROI) LTD	Project number 07.5071.5.0231	Created by CC	Issue to	Date	Version	Title: SEQUENCING OF INITIAL DRAINAGE WORKS
	Location: Walshestown, Co.Kildare	File Location MINING\AUTOCAD\READYMIX WALSHESTOWN\07.231 STAGE III\B\EIS\SERIES 8\FIG 8.7revC	Checked by POB	ISSUE TO KILDARE Co. Co.	Dec.'08	A	Figure No. 8.7
	Project: Walshestown Pit Restoration	ORDNANCE SURVEY IRELAND LICENCE NUMBER AR0056011	Approved by CW	ISSUE TO EPA	Sep.'10	B	
				ISSUE TO EPA	Dec.'11	C	Scale N.T.S

APPENDIX 9

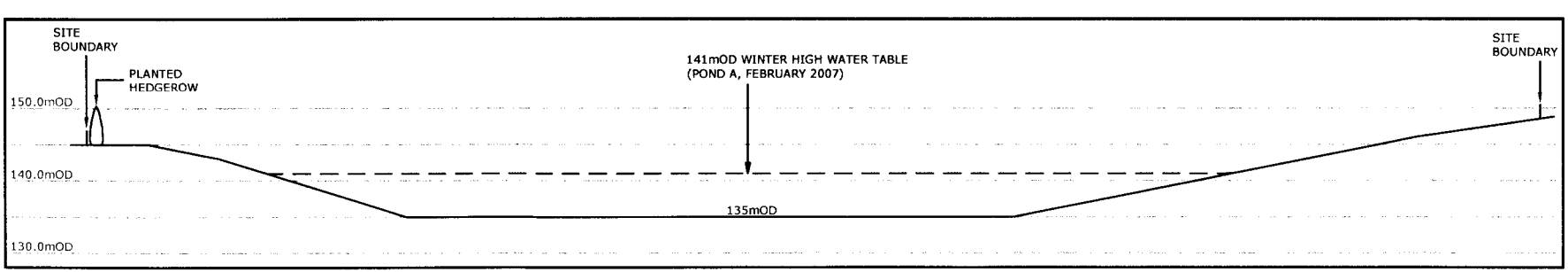
Figure 8.12 Rev. C Cross sections of new water feature



PROPOSED FINAL RESTORATION SURFACE
SCALE: 1/10,000 A4



SECTION 1
SCALE: 1/1,000 A4



SECTION 2
SCALE: 1/1,000 A4

Client	CEMEX (ROI) LTD
Project	Walshestown Pit Restoration
Location	Walshestown, Co. Kildare
Title	CROSS-SECTIONS OF NEW WATER FEATURE
Project No. 07507150231 / File No. 8.12 / Created by CC	Checked by POB / Approved by CW
Figure No.	8.12
ISSUE TO KILDARE Co. Co.	DEC. '08 — A
ISSUE TO EPA	SEP. '10 — B
ISSUE TO EPA	DEC. '11 — C
Description	Date — Version
Scale AS SHOWN	Date December 2011

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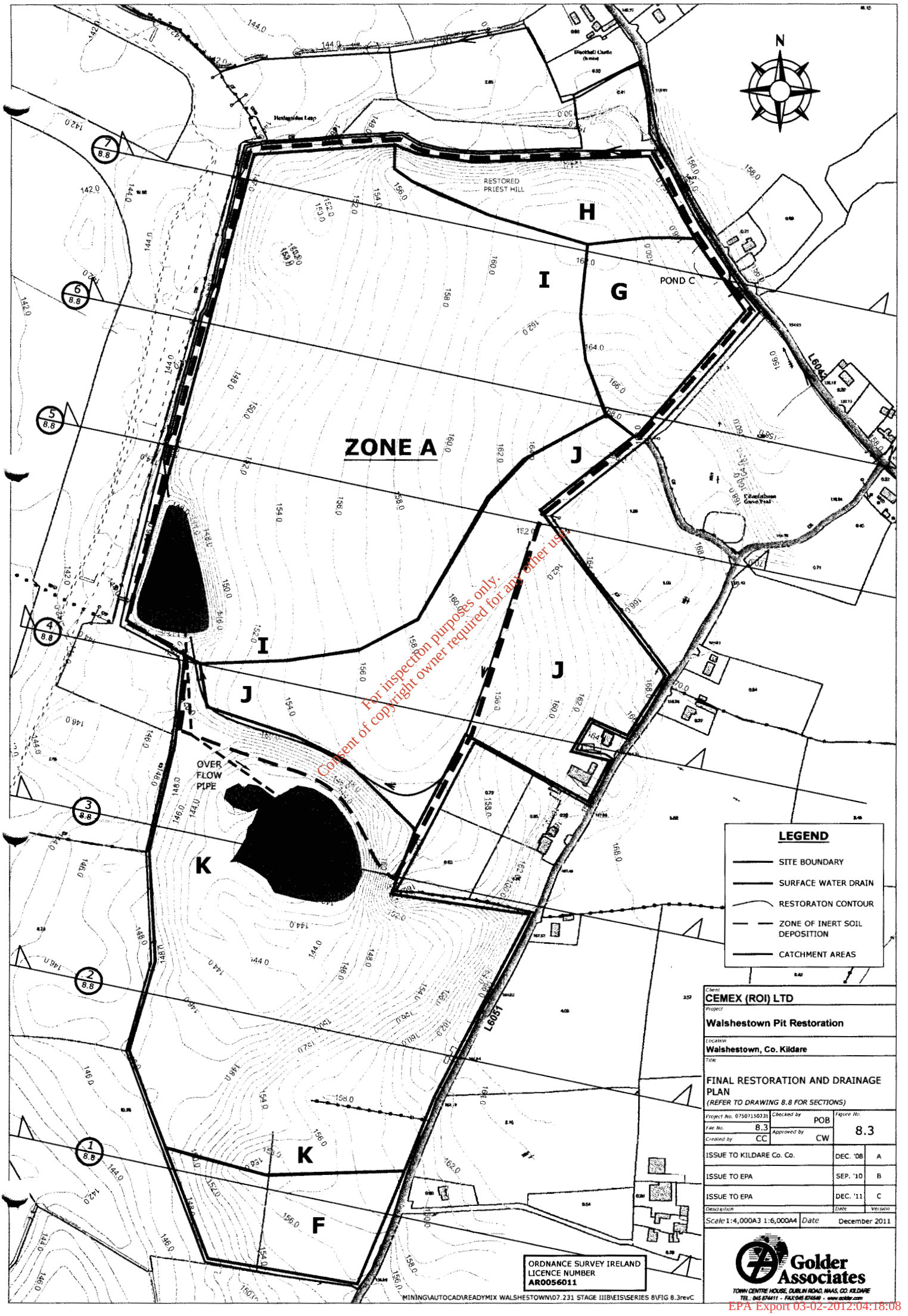
MINING\AUTOCAD\READYMIX WALSHESTOWN\07.231 STAGE IIIB\EIS\SERIES 8\FIG 8.12

APPENDIX 10

Figure 8.3 Rev. B - Final restoration and drainage plan

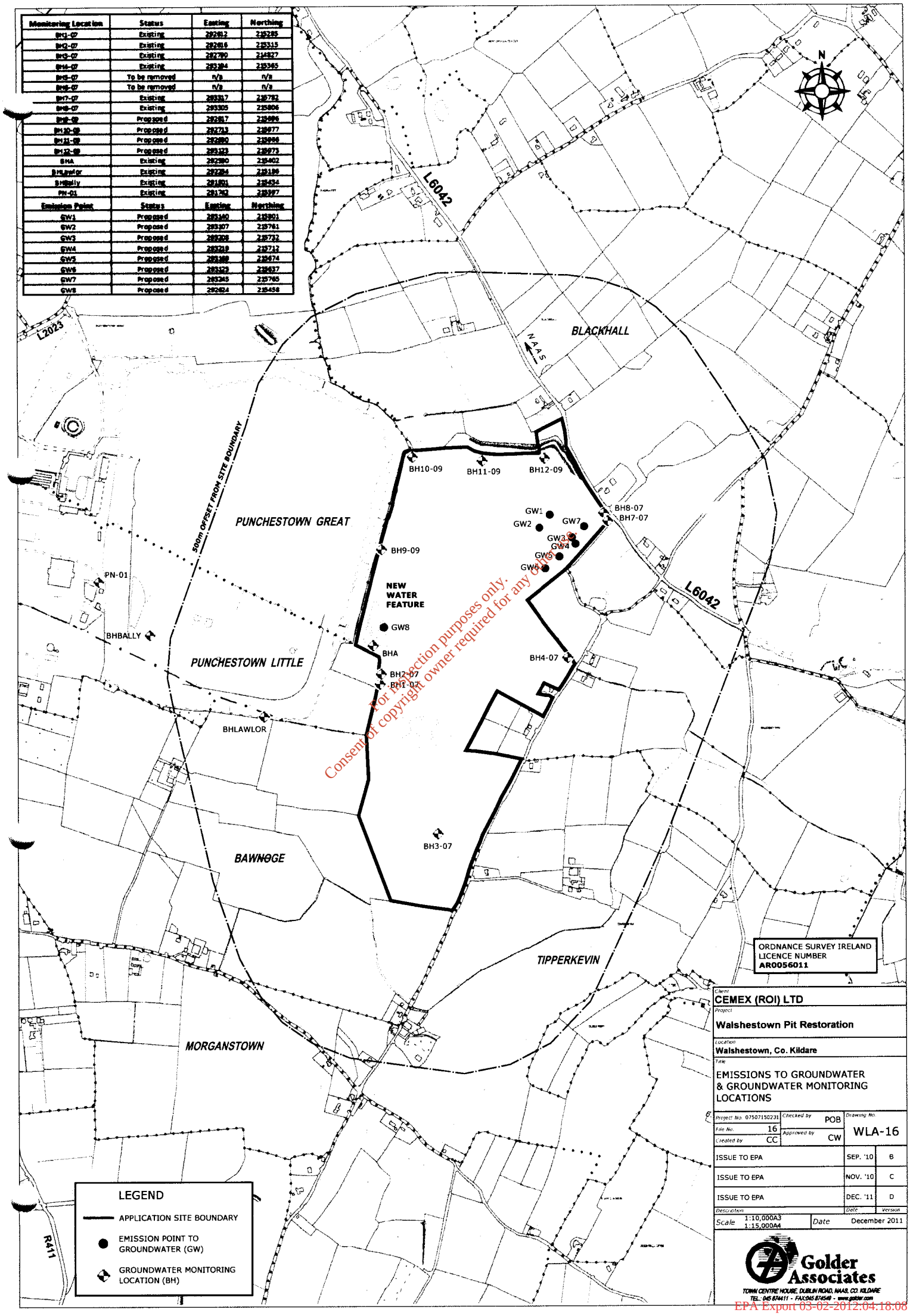


APPENDIX 11

Drawing No. WLA-16 Rev. D – Emissions to groundwater and groundwater monitoring points

Monitoring Location	Status	Easting	Northing
BH1-07	Existing	282812	215285
BH2-07	Existing	282816	215315
BH3-07	Existing	282790	214827
BH4-07	Existing	283184	215345
BH5-07	To be removed	n/a	n/a
BH6-07	To be removed	n/a	n/a
BH7-07	Existing	283317	215782
BH8-07	Existing	283305	215806
BH9-09	Proposed	282817	215896
BH10-09	Proposed	282713	215877
BH11-09	Proposed	282880	215996
BH12-09	Proposed	283123	215873
BHA	Existing	282980	215402
BHLawlor	Existing	282284	215196
BHBally	Existing	281891	215434
PN-01	Existing	281742	215997

Emission Point	Status	Easting	Northing
GW1	Proposed	283160	215801
GW2	Proposed	283107	215761
GW3	Proposed	283208	215732
GW4	Proposed	283219	215712
GW5	Proposed	283189	215674
GW6	Proposed	283123	215637
GW7	Proposed	283245	215765
GW8	Proposed	282824	215458



LEGEND

- APPLICATION SITE BOUNDARY
- EMISSION POINT TO GROUNDWATER (GW)
- GROUNDWATER MONITORING LOCATION (BH)

ORDNANCE SURVEY IRELAND
LICENCE NUMBER
AR0056011

Client: **CEMEX (ROI) LTD**

Project: **Walshestown Pit Restoration**

Location: **Walshestown, Co. Kildare**

Title: EMISSIONS TO GROUNDWATER & GROUNDWATER MONITORING LOCATIONS

Project No. 07507150231	Checked by POB	Drawing No.	
File No. 16	Approved by CW	WLA-16	
Created by CC			

Description	Date	Version
ISSUE TO EPA	SEP. '10	B
ISSUE TO EPA	NOV. '10	C
ISSUE TO EPA	DEC. '11	D

Scale 1:10,000A3 1:15,000A4 | Date December 2011

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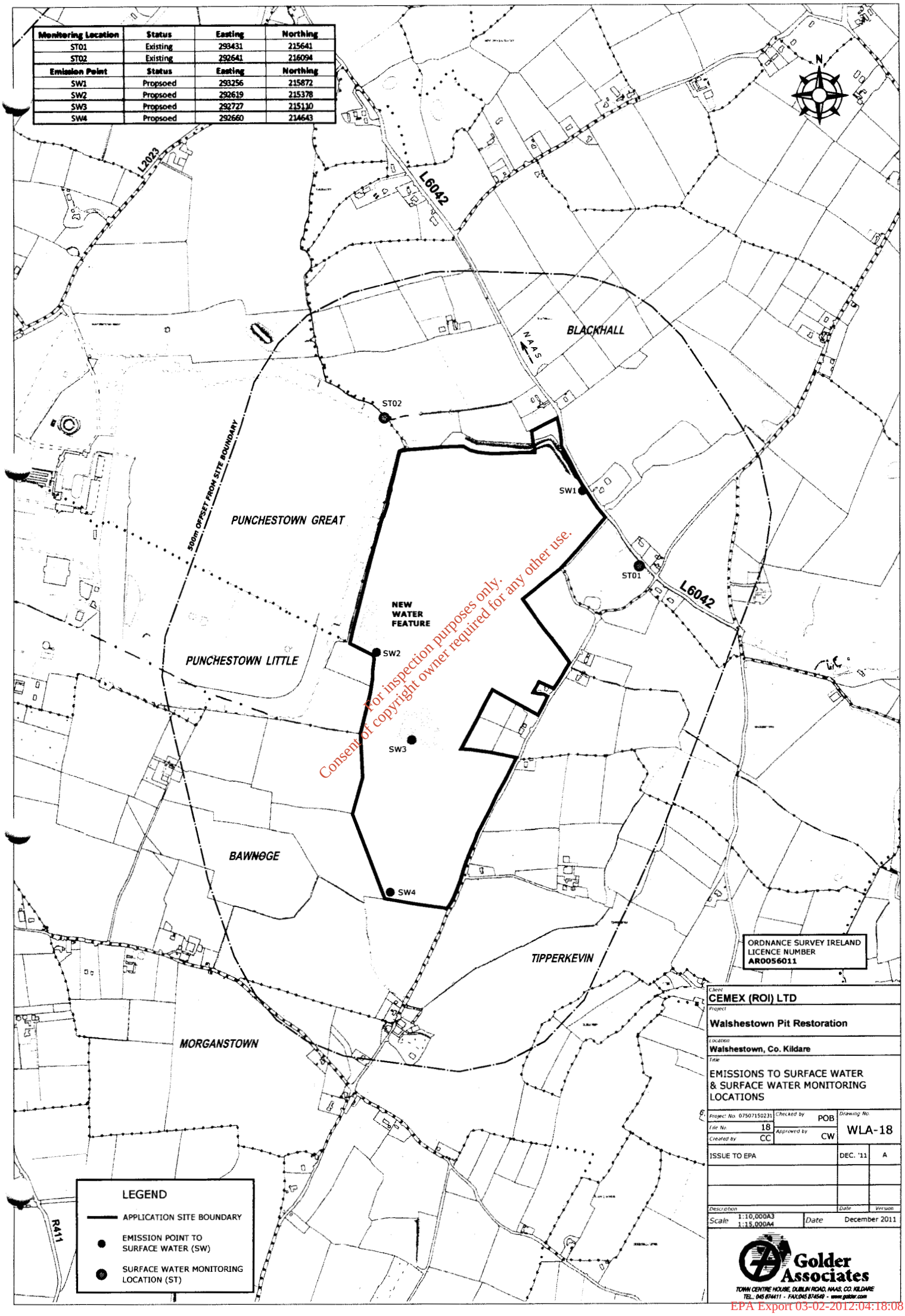
APPENDIX 12

Drawing No. WLA-18 Rev. A – Emissions to surface water and surface water monitoring points

Monitoring Location	Status	Easting	Northing
ST01	Existing	293431	215641
ST02	Existing	292641	216094
Emission Point	**Status**	**Easting**	**Northing**
SW1	Propsoed	293256	215872
SW2	Propsoed	292619	215378
SW3	Propsoed	292727	215110
SW4	Propsoed	292660	214643



ORDNANCE SURVEY IRELAND
LICENCE NUMBER
AR0056011

Client: **CEMEX (ROI) LTD**

Project: **Walshestown Pit Restoration**

Location: **Walshestown, Co. Kildare**

Title: EMISSIONS TO SURFACE WATER & SURFACE WATER MONITORING LOCATIONS

Project No. 0750715023	Checked by POB	Drawing No.	
File No. 18	Approved by CW	WLA-18	
Created by CC			

Description	Date	Version
ISSUE TO EPA	DEC. '11	A

Scale 1:10,000A3 1:15,000A4 | Date December 2011

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APPENDIX 13

Revised Section B.7
Revised Table H.1

B.7 TYPE OF WASTE ACTIVITIES

The following 'revised' sections identify the types of activities related to the proposed Waste Management Facility, as amended by *Article 24 of the European Communities (Waste Directive) Regulations 2011) – SI No. 126 of 2011.*The principal activity relates to activity Class R5 of the Third Schedule (Disposal Operations).

B.7.1Third Schedule (Waste Disposal Activities)

Class D1 Deposit into or on to land (including landfill)

This includes the placement of inert materials

Class D5 (Principal Activity) - Specially engineered landfill (e.g. placement into lined discrete cells which are capped and isolated from one another and the environment (etc.) -

This is the principal activity and involves the construction of engineered cells for accepting processing and depositing of inert wastes. In this regard, inert wastes will be deposited in lined cells to produce a restored contoured landform that is in keeping with the character of the local landscape.

Class D15 Storage pending any of the operations numbered D1 to D14 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in Section 5(1)), pending collection, on the site where the waste is produced).

Wastes will stored in stockpiles within the lined cells or in inert waste processing areas prior to disposal on site in lined cells or off site in an appropriately permitted or licensed facilities.

B.7.2 Fourth Schedule (Recovery Operations)

Class R3 Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes), which includes gasification and pyrolisis using the components as chemicals.

The wastes accepted at the Facility for recovery at the Inert Waste Processing Area may from time to time contain organic material such as incidental wood, paper, cardboard and plastic. These materials will be removed from the imported wastes and stored in designated areas for recovery, recycling or discposal at appropriate facilities off-site.

Topsoil deemed to be waste from other external sites will be recovered at the proposed Facility for the purpose of restoration of the landform and external berms etc. as required.

Class R4 Recycling/reclamation of metals and metal compounds

The wastes that are imported to the Facility will include reinforced concrete and may also contain incidental metals. These materials will be removed from the imported wastes and stored on the site for further recovery and recycling off site.

Class R5 Recycling/reclamation of other inorganic materials, which includes soil cleaning resulting in recovery of the soil and recycling of inorganic construction materials

This will involve processing on an annual basis of up to circa 15% of the maximum annual intake of waste accepted at the Facility. An area of the Site referred to as the Inert Waste Processing Area (IWPA) has been set aside for this purpose. The processed material will be used for restoration purposes or will be sold as secondary processed material. This class will also include the direct importation and recovery of waste soils that are used for engineering purposes such as perimeter bunds and the final capping layer which do no require processing in the IWPA.

Class R13 Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage (being preliminary storage according to the definition of 'collection' in section 5(1)), pending collection, on the site where the waste is produced)

Waste will be stored in stockpiles prior to processing, recovery and re-use for engineering purposes on the site or offsite. It will also involve the storage of materials that may be found in imported waste after tipping. These materials will be stored pending results of testing and collection for transport to appropriate recovery facilities located off-site.

SECTION H MATERIALS HANDLING

H.1 Waste Types and Quantities – Existing & Proposed

Provide an estimation of the quantity of waste likely to be handled in relation to each class of activity applied for. This information should be included in Table H.1(a).

TABLE H.1(A). QUANTITIES OF WASTE IN RELATION TO EACH CLASS OF ACTIVITY APPLIED FOR

Waste Management Acts 1996 to 2010 3rd Schedule (Disposal) Operations Note 1		Waste Management Acts 1996 to 2010 4th Schedule (Recovery) Operations Note 2	
Class of Activity Applied For	Quantity (tpa) Note 3	Class of Activity Applied For	Quantity (tpa)
Class D 1 (includes the placement of inert materials)	280,500	Class R 1	
Class D 2		Class R 2	
Class D 3		Class R 3 (Recycling/reclamation of organic substances)	Quantity included in Class R5
Class D 4		Class R 4 (Recycling/reclamation of metals)	Quantity included in Class R5
Class D 5 (involves the construction of engineered cells for accepting, processing and depositing of inert materials	Quantity included in Class D1	Class R 5 (Recycling reclamation of other inorganic materials)	49,500
Class D 6		Class R 6	
Class D 7		Class R 7	
Class D 8		Class R 8	
Class D 9		Class R 9	
Class D 10		Class R 10	
Class D 11		Class R 11	
Class D 12		Class R 12	
Class D 13		Class R 13 (Storage of waste pending any of the operations numbered R1 to R12)	Quantity included in Class R5
Class D 14			
Class D 15 (Storage pending any of the operations numbered D1 to D14)	Quantity included in Class D1		
Total tonnes per annum	**280,500**		**49,500**
Total Accepted at the facility (per annum)	**330,000**		

Possibly amend.

Note 1: As highlighted in Section 7.0 of the EIS (Sept 2010), up to ca. 85% of the maximum annual intake of inert waste accepted at the facility will be used to backfill and restore a large existing void at the site.
Note 2: As highlighted in Section 7.0 of the EIS (Sept 2010), up to ca. 15% of the maximum annual intake of inert waste accepted at the facility will be recovered at the Inert Waste Processing Area to generate secondary (recycled) aggregate.
Note 3: Based on Revised Scheme September 2010 (submitted to EPA under Article 14 Response), maximum annual intake is proposed at 330,000 tonnes per annum.

SECTION H MATERIALS HANDLING

H.1 Waste Types and Quantities – Existing & Proposed

Provide an estimation of the quantity of waste likely to be handled in relation to each class of activity applied for. This information should be included in Table H.1(a).

TABLE H.1(A). QUANTITIES OF WASTE IN RELATION TO EACH CLASS OF ACTIVITY APPLIED FOR

Waste Management Acts 1996 to 2010 3rd Schedule (Disposal) Operations [Note 1]		Waste Management Acts 1996 to 2010 4th Schedule (Recovery) Operations [Note 2]	
Class of Activity Applied For	Quantity (tpa) [Note 3]	Class of Activity Applied For	Quantity (tpa)
Class D 1 (includes the placement of inert materials)	Quantity included in Class D5	Class R 1	
Class D 2		Class R 2	
Class D 3		Class R 3 (Recycling/reclamation of organic substances)	Quantity included in Class R5
Class D 4		Class R 4 (Recycling/reclamation of metals)	Quantity included in Class R5
Class D 5 (involves the construction of engineered cells for accepting, processing and depositing of inert materials	280,500	Class R 5 (Recycling reclamation of other inorganic materials)	49,500
Class D 6		Class R 6	
Class D 7		Class R 7	
Class D 8		Class R 8	
Class D 9		Class R 9	
Class D 10		Class R 10	
Class D 11		Class R 11	
Class D 12		Class R 12	
Class D 13		Class R 13 (Storage of waste pending any of the operations numbered R1 to R12)	Quantity included in Class R5
Class D 14			
Class D 15 (Storage pending any of the operations numbered D1 to D14)	Quantity included in Class D5		
Total tonnes per annum	**280,500**		**49,500**
Total Accepted at the facility (per annum)	**330,000**		

Note 1: As highlighted in Section 7.0 of the EIS (Sept 2010), up to ca. 85% of the maximum annual intake of inert waste accepted at the facility will be used to backfill and restore a large existing void at the site.
Note 2: As highlighted in Section 7.0 of the EIS (Sept 2010), up to ca. 15% of the maximum annual intake of inert waste accepted at the facility will be recovered at the Inert Waste Processing Area to generate secondary (recycled) aggregate.
Note 3: Based on Revised Scheme September 2010 (submitted to EPA under Article 14 Response), maximum annual intake is proposed at 330,000 tonnes per annum.