Waste Licence Review Application W0167-02

Response to Article 13 Compliance

December 2009

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Article 13 Compliance

1. Non-Technical Summary

Question

Provide a non-technical summary of the Environmental Impact Statement (EIS).

Response

A non-technical summary of the 2006 EIS as submitted with the application was submitted to the EPA on the 23/7/09. Non-technical summaries of the revised 2009 EIS have been submitted with this Article 12 & 13 Compliance Response.

2. Update EIS

Question

Please update the relevant sections of the EIS, having regard to the following:

(a) Section 5.6 provides details of the previous flue gas treatment system design (authorised in licence W0167-01);

(b) Section 5.7 provides details of water supply (including volumes) which contradict information in the licence application;

(c) Section 5.7 provides details of solid waste residues which contradict information in the licence application (quantity of boiler ash and size of boiler ash storage silos);

(d) Section 5.16.2 refers to 20kV overhead electricity line;

(e) An updated Seveso assessment (dated 9th July 2008) is included in Appendix B.9 of the licence application;

(f) Chapter 7 Air Quality Study should be updated to reflect the information requested under Question 5 of the Article 12 Compliance Requirements above, and the updated model results (following correction of terrain data and the stack base elevation) provided in Appendix I.7 of the licence application.

(g) Any other necessary updates.

Response

The requested updates have been made as follows:

(a) Section 5.6 of the 2009 EIS describes the current flue gas treatment system design.

(b) Section 5.7 of the 2009 EIS includes updated information regarding water supply. The total anticipated water consumption based on detailed design figures has been reduced from 8.7m^3/h as given in Table D.1.a of the RWLA to 8.5m^3/h as shown in Table 5.3 of the 2009 EIS. A comparison of these tables is provided in Table 13.a below.

Table 13.a: Comparison of Water Consumption

Use	Quantity as per Table D.1.a of Application	Quantity as per Table 5.3 of 2009 EIS
Flue gas cleaning	6.5	3.3
Steam cycle		1.0
Drinking water	2.0	1.0
Cleaning & domestic supplies		3.0
Fire fighting	0.2	0.2
Total	**8.7**	**8.5**

A revised water balance is provided in Appendix 13.a.

(c) Section 5.7 has been revised in the 2009 EIS to align with the RWLA regarding solid waste residues. The quantity of boiler ash produced in the facility was revised down from 3,000tpa in the 2006 EIS to 1,000tpa in the RWLA in line with information from the supplier. However, this has since been adjusted back up to 3,000tpa in the 2009 EIS. Therefore, the figure for boiler ash production of 1,000 tpa provided in the RWLA is incorrect. As noted in the 2009 EIS, the boiler ash silo will have a capacity of 100m^3, which is the same as given in the RWLA.

(d) At the time of writing the 2006 EIS, the connection method for the plant as determined by ESB was unknown. A connection offer was only received prior to the RWLA for a 38kV connection. Section 5.16.2 of the 2009 EIS correctly refers to a 38kV underground electricity connection.

(e) The updated Seveso assessment and associated report have been included in Section 5 of the 2009 EIS.

(f) Chapter 7 of the 2009 EIS has been updated to reflect the revised building layout and revised terrain data in the 2009 EIS in response to Question 5 of Article 12 compliance. The stack base elevation as per Appendix I.7 of the RWLA was used in this model.

(g) The 2009 EIS has been generally amended to reflect changes submitted in the revised planning application to the site layout and main process building, as summarised in Section 1.1 of the 2009 EIS. Amendments that impact on the information submitted with the RWLA are summarised in Table 13.b below.

Drawings submitted for the Revised Waste Licence Application (Appendices B2, B3, B4, B5, D1, D2, D3, D5, D6, D7, D8, D9, D11, E1) have also been revised to reflect these changes and can be found in Appendix 13.b. A summary of the principle changes to these Drawings is provided in Table 13.c below.

Table 13.b: Changes impacting on the Licence Application

Attachment	Modifications
Application Form	B.3 Planning Authority: Indaver Ireland is seeking to revise planning permission PL17.219721 to reflect changes to the main process building layout and other minor modifications. Planning permission SA/901467 was granted on 10/11/09 and is included in Appendix 12.a of the Response to Article 12 Compliance. The 2009 EIS and Non-Technical Summary submitted as part of the planning package are included in this Article 12 and 13 Compliance submission.
	B.8 Seveso II Directive: The 2009 EIS now includes the SEVESO assessment update provided in Attachment B.8 of the RWLA.

Attachment	Modifications
Attachment A: Non-Technical Summary	Attachment A has been revised in Appendix 13.c to reflect changes made to the plant design and layout. All changes from the Attachment submitted with the RWLA have been highlighted.
Attachment B: General	Attachment B.1 & B.2: All drawings have been revised and are available in Appendix 13.b. Table 13.c describes the revisions to each drawing. A revised comparison of site layout (Table B.2.c of the Revised Waste Licence Application) is provided in Appendix 13.d.
	Attachment B.3: As noted, Indaver Ireland has received planning permission from Meath County Council for the changes to the main process building layout and other minor modifications.
	Attachment B.8: As noted, the 2009 EIS has been updated with the SEVESO assessment provided in Attachment B.8.
Attachment C: Management of the Facility	There are no changes proposed for the management of the facility.
Attachment D: Infrastructure & Operation	Attachment D.1.1: The main buildings or structures have been revised. The main amendments are: - The change in footprint and overall size of the main process building representing a reduction of 6% in footprint and a reduction of 9% in building bulk. - The replacement of the ash bunker with ash handling building, to be located adjacent to the main process building on the northern side. - The removal of the turbine building by situating the turbine inside the main process building and relocating the air condensers to the north east of the main process building. - The removal of the workshop and warehouse. - The replacement of the two underground uncontaminated water attenuation tanks with an above ground attenuation pond. This can be seen in the general layout drawing provided in 18081\WL\005.
	Attachment D.1.b-c: A revised drawing showing paved areas is provided in Drawing 18081\WL\005 in Appendix 13.b. The overall developed part of the site is still 6.8Ha but the effective hardstand area for drainage purposes has been reduced from 5.46Ha to 2.2Ha. This is partly due to the removal of the workshop and education centre.
	Attachment D.1.g: The location of the fuel oil storage vessels has moved from the turbine building to the west of the air condenser building. This is shown in Drawing 18081\WL\005.
	Attachment D.1.h-i: The waste quarantine area has been moved to the delivery area of the diesel tank, to facilitate the ash handling building. The revised location of the quarantine area is marked in Drawing 18081\WL\008. As outlined in response to Question 3.e to Article 12 Compliance, drainage for this area will be collected and treated separately to the main surface water drainage system.

Attachment	Modifications
Attachment D: Infrastructure & Operation	Attachment D.1.k: Changes to the sewage and surface water drainage systems are outlined in response to Questions 3 and 4 of Article 12 Compliance. In summary, the discharge rate has been increased to 36.2l/s, the attenuation capacity reduced to 1,900m^3 and the attenuation type modified to a pond. A Class I separator will be installed at the discharge point. There will also be two Puraflo systems rather than one, to service the main process building and the security building separately. Contaminated water will not be treated onsite but may be reused within the process.
	Attachment D.1.l: The 2009 EIS shows a 3% decrease in overall water consumption compared with the consumption submitted in the RWLA. Table 13.a compares water consumption figures. If a pre-treatment unit is developed onsite, the overall water demand will increase by approx. 7%. It is unlikely that a bottom ash recovery plant would result in any additional water demand. As noted in response to Question 4.a of Article 12 Compliance, water supply will include a connection to the mains for drinking water purposes only.
	Attachment D.1.m: The workshop and education centre will no longer be in a standalone building but will be integrated into the main process building (see Drawing 18081\WL\012). With the revised layout, the service yard will now provide access to the pump house and water tank, ash handling building, quarantine area, liquid waste discharge area, transformer compound and ESB substation, air condenser units, effluent treatment system for the main process building and storage tanks.
	Attachment D.1.n: Modifications to the layout of site accommodation in the main process building are shown in Drawing 18081\WL\012.
	Attachment D.1.t: The layout of the main process building has been modified. This is described in more detail in Section 1.1 of the 2009 EIS. The building will still comprise four main sections but these will be modified in size and shape. The turbine will no longer be in a separate building but will be incorporated in the main process building. The air condensers, previously on the turbine building, will be relocated to the north of the plant and will cover approximately 45m x 12m in floor plan. This is shown in Drawing 18081\WL\008. Finally, due to the availability of detailed design information, the quantity of boiler ash has been revised back to 3,000 tpa from 1,000 tpa noted in the RWLA.
	Attachment D.2.1: The main process steps have not changed. Figure D.2.a of the RWLA incorrectly showed ammonia addition at 45% concentration. As shown in Figure 5.7 in the 2009 EIS, this should read 25% concentration.
	Attachment D.2.2: It is now envisaged that sludges will be tipped directly into the bunker rather than being stored in a dedicated pit. This is described in more detail in the Response to Question 2.c in Article 12 Compliance. The quarantine area has also been relocated as discussed in Response to Question 3.e in Article 12 Compliance.
	Attachment D.2.3: The SNCR reagent has been confirmed as ammonia. It will also be possible to directly inject liquid wastes into the furnace as outlined in Appendix 13.e.
	Attachment D.2.5: The potential electrical output has been confirmed at 17.6MW, which is a 2.5% increase on the previous estimate of 17.2MW. This will give a net output of approximately 15.1MW to the national grid.

Attachment	Modifications
Attachment D: Infrastructure & Operation	Attachment D.2.7: Bottom ash will be conveyed to a bottom ash handling building rather than a bunker. This is described in more detail Section 5.6.11 of the 2009 EIS.
	Appendix D1-3,5,7,8,9,11: Drawings have been revised as per Table 13.c and Appendix 13.b.
	Appendix D6: The stormwater attenuation tank has been revised from a hydrocell construct to an above ground pond. Appendix D6 of the RWLA therefore no longer applies.
Attachment E: Emissions	Attachment E.1.1: The stack width of the main emissions point (A2-1) has been revised from 2m to 2.2m. The maximum 24 average flowrate has also been revised down from 204,000Nm^3/h to 147,000Nm^3/h with the average flowrate set at 134,000Nm^3/h as described in response to Question 5(a)(i) of Article 12 Compliance. This has reduced the efflux velocity from 17.8m/s to 16.4m/s (at 147,000Nm^3) as used in the revised model. The minimum efflux velocity, at 134,000Nm^3 is 14.95m/s. The emergency generator (A2-2) has also been relocated as shown in Drawing 18081\WL\008. This revised location was included in updated modelling in Section 7 of the 2009 EIS. The volume and nature of emissions from this generator have not changed as noted in Appendix 7.3 of the 2009 EIS.
	Attachment E.1.2: The SNCR reagent will be ammonia. The ammonia tank will not be located in the main process building but in the service yard adjacent to the air cooled condenser building. Refer to Drawing 18081\WL\008.
	Attachment E.2: Changes to surface water emissions are described in more detail in the Response to Question 4 of Article 12 Compliance and in Section 11 of the 2009 EIS. The main amendment is an increase to the discharge rate from 16.98l/s to 36.2l/s. The reference to a Class II full interceptor in Table E.2.a should read “Class I”.
	Attachment E.4.1: There will be two percolation areas rather than one for the two Puraflo systems installed. While expected emissions from the Puraflo brochure were provided in the Revised Waste Licence Application (Table E.4.a), design emissions have now been confirmed by the supplier as set out in Appendix 9.5 of the 2009 EIS which are B.O.D. of 20mg/l (rather than <15mg/l) and TSS of 30mg/l (rather than <15mg/l). These emissions are based on EPA wastewater treatment manuals. Details on percolation testing are available in Section 9.3 of the 2009 EIS and further information on the quality of discharge from the Puraflo systems is provided in Appendix 9.5 of the 2009 EIS. Drawing 18081\WL\006 shows the location of the two percolation areas.

Attachment	Modifications
Attachment E: Emissions	Attachment E.5.1: Appendix 13.f contains a summary of revisions to noise sources used in the 2009 noise modelling. The main changes include the relocation of noise emissions N2 – N6 (see Drawing 18081\WL\013) and the change in nature of emissions N4 (now grate cooling 1 & 2 rather than the fan turbine building), N5 (now the pumphouse rather than the compressor louver grid) and N6 (now the emergency generator rather than the cooling oven grid). The amendments will have no impact on traffic as outlined in Section 13.0 of the 2009 EIS.
	Appendix E1: A revised emissions drawing is provided in Drawing 18081\WL\013 of Appendix 13.b. The main changes are the relocation of: the two groundwater wells (AGW1-2 and AGW1-3), the emergency generator (A2-2), the odour monitoring points AA1-1 and AA1-2, noise emissions sources N2 – N6 and the ambient noise monitoring point AN1-3. Groundwater emission point (GW2) and monitoring point (MGW1-2) have also been added.
	Appendix E2: A revised point source emissions Table E.1(ii)(a) is provided in Appendix 13.g. As noted, the principle changes are to the stack diameter and volume to be emitted. A revised Table E.1(iii)(a) is provided in Appendix 12.c in the Response to Article 12 Compliance.
	Appendix E4: A revised minor emissions Table E.1(ii)(b) is provided in Appendix 13.h. As noted, the only change is the location of the generator.
	Appendix E5: A revised Table E.2(i) is provided in Appendix 13.i. Modifications include updated dry weather flow data as provided in Section 11 of the 2009 EIS and the volume to be emitted. This shows that the average daily emission has decreased (113m^3 to 48.5m^3) but the maximum emission per day and per hour have increased (3,127m^3 and 130m^3 respectively) in line with the QBAR method as described in response to Question 4.e of the 2009 EIS.
	Appendix E6: Revised groundwater emissions tables E.4(i) are provided for both emissions points in Appendix 13.j. As noted, the changes include an additional puraflo percolation area (GW2), modifications to the elevation of discharge and to the volumes to be emitted.
	Appendix E7: A revised noise emission Table E.5(i) has been provided in Appendix 13.k based on the data in Appendix 13.f. As noted, the location and nature of some noise emission sources has been modified.
	Appendix E8: Further information regarding traffic is provided in Section 13.0 of the 2009 EIS.
Attachment F: Control & Monitoring	Attachment F.1.1: Table F.1.a of the RWLA refers to a SNCR reagent which has now been specified as ammonia (25%).
	Attachment F.1.2: There will now be two rather than one groundwater emissions points at GW1 and GW2. The ash bunker will no longer be an underground structure requiring watertight design, since ash will be handled in a separate ash handling building.
	Attachment F.2.1: Parameters to be continuously monitored will also include ammonia (NH_3) as noted in Section 5.6.13 of the 2009 EIS. This will help to monitor and control the level of ammonia addition in the SNCR NO_x abatement system.

Attachment	Modifications
Attachment F: Control & Monitoring	Attachment F.2.2: The location of the ambient odour monitoring point AA1-1 and AA1-2 have changed as monitoring will no longer be carried out offsite (where access may be a problem). These are shown in Drawing 18081\WL\013.
	Attachment F.5: There will be an additional Puraflo sampling point to monitor emissions from the second Puraflo installation. This point is shown as MGW1-2 in Drawing 18081\WL\013. The monitoring regime will be identical to that outlined in Attachment F.5.1. The position of the ambient monitoring wells AGW1-2 and AGW1-3 has also been clarified. It is now expected that they will be located to downstream of the bunker, the main potential source of contamination. The proposed monitoring regime has not changed.
	Attachment F.6: The locations of the noise emitting equipment and hence the monitoring points for the first annual survey have changed with the revised site layout. (Drawing 18081\WL\013). The location of ambient noise monitoring point AN1-3 has also been relocated since monitoring will no longer be carried out offsite where access may be a problem.
	Appendix F.1: The SNCR reagent referred to in Table F.1 (A2-1) of the RWLA will be ammonia.
	Appendix F4: Table F.1 (GW1) of the RWLA applies to both emissions GW1 and GW2.
	Appendix F5: A revised Table F.2 (A2-1) has been included in Appendix 13.l to include ammonia monitoring.
	Appendix F8: A revised Table Ff (AA1) is provided in Appendix 13.m. This shows modifications to accessibility for monitoring point AA1-2.
	Appendix F9: Table F.2(SW1) of the RWLA refers to samples being taken from the inlet and outlet of the attenuation tank – this will now involve sampling from the inlet and outlet of the attenuation pond.
	Appendix F10: A revised Table F.2 has been included to show the two puraflo sampling points at GW1 and GW2 in Appendix 13.n.
	Appendix F12: A revised Table Ff has been included to show modifications to accessibility for monitoring point AN1-3, in Appendix 13.o.

Attachment	Modifications
Attachment G: Resources Use & Energy Efficiency	Attachment G.1: A residue solidification unit would require additional materials to operate that are not currently included in Table G.1.a. These are shown in the Response to Question 1.a of Article 12 Compliance. Some other reagents will no longer be required including trisodium phosphate and urea, and NaOH should read 30% and not 50% concentration. Some of the onsite storage capacities have been modified to reflect truck delivery capacities as shown in Table 13.2 of the 2009 EIS. All modifications are summarised in a revised Table G.1.a in Appendix 13.p.
	Attachment G.2: As noted, the electrical output has been increased from 17.2 to 17.6MW. Since the RWLA was submitted, additional clarifications have also been provided regarding the R1 calculation although these have not yet been formally agreed[1]. In the current guidance, auxiliary fuel should be split 50-50 between E_p and E_i and should not be multiplied by any conversion factors. These and other modifications are shown in a revised Table G.2.a in Appendix 13.q, based on guidance from CEWEP[2] in Appendix 13.r. Overall the changes result in an increase in the R1 efficiency of the Meath plant from 0.70 to 0.71. The gross efficiency as calculated in G.2.1.b of the RWLA is still the rounded figure 25% (25.4% vs. 24.8%) and the net efficiency has increased to 22% (21.8%) from 21% (21.2%). The only change to the energy balance described in Section G.2.1.c and illustrated in Figure G.2.a of the RWLA is the increased output from the turbine, from 17.2MW to 17.6MW. This correlates with Figure 5.8 of the 2009 EIS.
	Appendix G.4: The spreadsheet originally prepared for Indaver by Dr. Reinmann has been revised in Appendix 13.s. This has also been adjusted to reflect recent guidance on the R1 formula as provided in Appendix 13.r and outlined above.
Attachment H: Materials Handling	Attachment H.1: Further information regarding compliance with the pre-treatment guidance is provided in response to Questions 2b and 3b of Article 12 Compliance.
	Attachment H.4: Further information regarding ash handling is provided in response to Questions 1a and 1b of Article 12 Compliance.
	Appendix H3: The quantity of boiler ash included in Table H.1(i) of the RWLA should read 250 tonnes or 500m^3 per month. There are no other changes to this table.
	Appendix H4: Boiler ash quantities should, as above, read 250 tonnes or 500m^3 per month. Bottom ash handling will take place in the bottom ash handling building rather than the ash bunker. All other processes will remain the same.
Attachment I: Existing Environment & Impact of the Facility	Attachment I.1: Please refer to the response to Question 5 in Article 12 Compliance for a summary of updates to emissions modelling made in Section 7 of the 2009 EIS. An updated Table I.1.b from the RWLA showing results from this revised modelling is provided in Appendix 13.t.

[1] Discussion is ongoing at an EU level and a workshop has been convening on this subject but many areas remain unclear
[2] Confederation of European Waste to Energy Plants who are following developments in this area

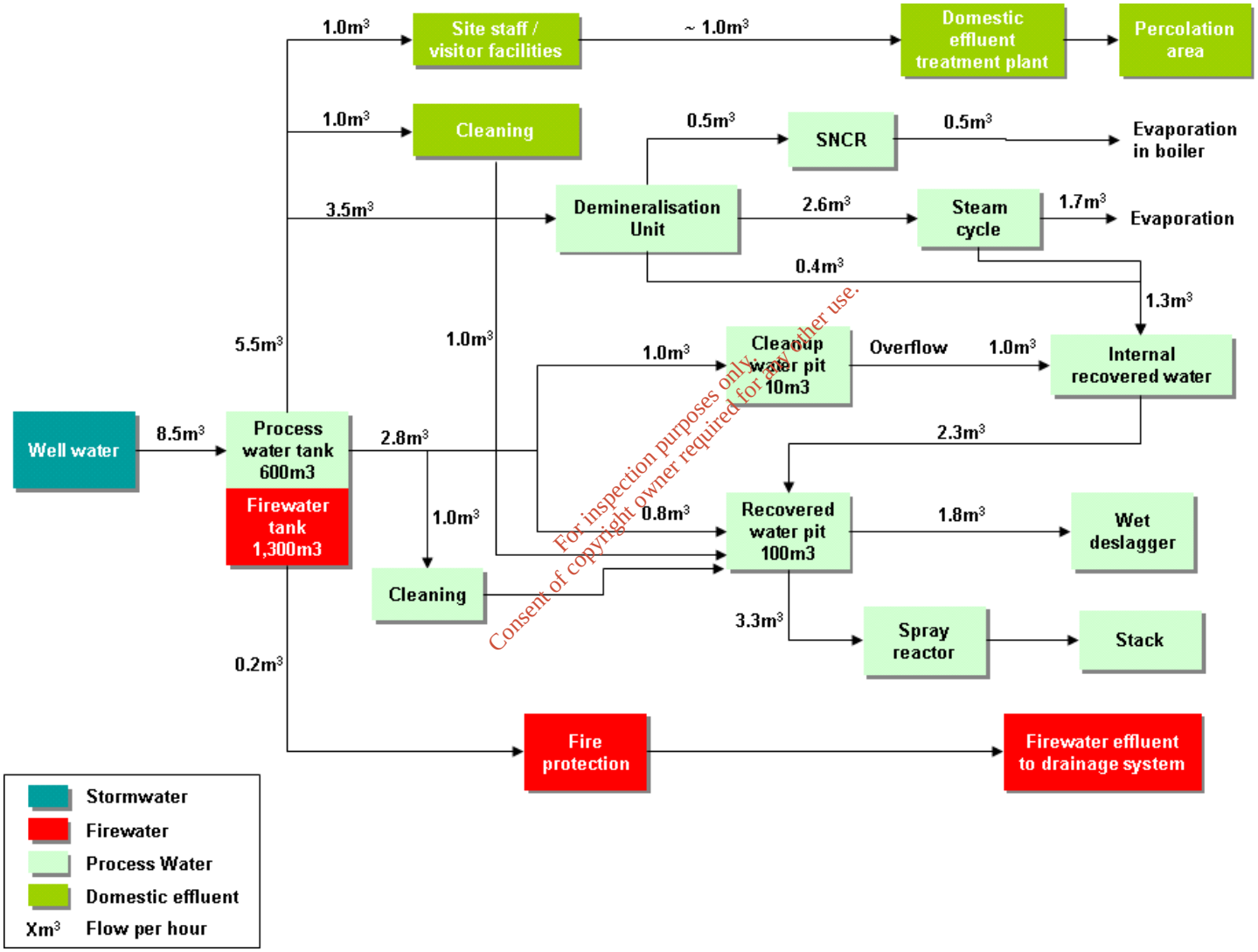
Attachment	Modifications
Attachment I: Existing Environment & Impact of the Facility	Attachment I.4: Two updated geotechnical reports including information on percolation testing have been provided in Section 9 and Appendices 9.1.2 and 9.1.3 of the 2009 EIS. The results of the percolation testing confirmed that an engineered percolation area would be required for the second Puraflo unit at the security building.
	Attachment I.6: Noise modelling was updated to reflect the revised positions of noise emission sources. A comparison of noise emissions between the 2006 and 2009 EIS is provided in Appendix 13.u. This shows that predicted noise emissions at the nearest sensitive receptors have decreased. There are no changes to Table 1.6(i) of Appendix I5 of the RWLA.
	Attachment I.7: The amendments will have no impact on ecology. Additional information from surveys conducted since the RWLA was submitted have been made available in Appendices 12.1 and 12.2 of the 2009 EIS.
	Appendix I6: An updated ecology chapter, including findings from the studies referred to above, is provided in Section 12 of the 2009 EIS.
	Appendix I7: As noted, updated air dispersion modelling is provided in Section 7 of the 2009 EIS.
Attachment J: Accident Prevention & Emergency Response	There are no changes proposed for accident prevention and emergency response.
Attachment K: Remediation, Decommissioning, Restoration and Aftercare	There are no changes proposed for the remediation, decommissioning, restoration or aftercare of the facility.
Attachment L: Statutory Requirements	Attachment L.1.3: As noted in response to Question 2.a of Article 12 Compliance, the acceptance of aqueous wastes would further enhance suitability to the anticipated characteristics of Irish waste (i.e. higher CV RDF/SRF) in line with BAT #1. While solid wastes and non-conforming wastes will still be stored separately sludges will now be stored with MSW in the bunker. This is still in line with BAT #8 and 9 because the chemical and physical characteristics of sludges and MSW allow safe storage and processing. If a bottom ash recovery facility or residue solidification unit were developed, these would impact positively on BAT compliance. Specifically, under *Generic BAT for all waste incineration*, compliance with BAT #12, 53 and 54 would be enhanced. The energy efficiency is now higher due to the selection of a more efficient turbine, which further contributes to BAT #26, 30 and 31. Additional measures to optimise the effectiveness of the SNCR reagent, in line with BAT #40, will be continuously monitoring of ammonia at the stack exit to detect slippage. While it is still not envisaged to pre-treat flue gas treatment residues onsite as explained for BAT #54, Indaver is applying to retain this option for reasons outlined in response to Question 1.a of Article 12 Compliance. The improved electricity efficiency (generating 0.66MWh/t MSW) now means that the facility will exceed the recommended range of 0.4 – 0.65 MWh/t in BAT#62. Of this approximately 0.57MWh/t will be exported to the national grid, increased from 0.55MWh/t.

Changes to the drawings are summarised in Table 13.c below.

Table 13.c: Changes to Drawings Submitted

Drawing	Modifications
Appendix B2: Site Ownership Plan	There are no changes to the Site Ownership Plan
Appendix B3: Site Plan	The site boundaries of the activity have not changed. However, the Site Plan drawing 15013\WL\002 in the RWLA shows the previous facility layout which has now changed. For completeness, a revised Site Plan drawing 18081\WL\002 is provided in Appendix 13.b.
Appendix B4: Location Map	The location of the facility and the surrounding details has not changed. However, as for the Site Plan drawing above, drawing 15013\WL\003 in the RWLA shows the previous facility layout which has now changed. For completeness, a revised Location Map 18081\WL\003 is provided in Appendix 13.b.
Appendix B5: Services Plan	The location and nature of underground services has not changed. However, drawing 15013\WL\004 in the RLWA shows the previous facility layout which has now changed. For completeness, a revised Services Plan 18081\WL\004 is provided in Appendix 13.b
Appendix D1: Site Layout	The site layout has been revised with changes to the main process building shape, addition of an ash handling building, removal of the turbine building and warehouse, redesign of the gatehouse, parking and stormwater attenuation and relocation of the air condensers, storage tanks, pumphouse and quarantine area. These modifications are summarised in Section 1.1 of the 2009 EIS. Drawing 151013\WL\005 has been revised to Drawing 18081\WL\005 in Appendix 13.b
Appendix D2: Site Entrance Drawing	The Site Entrance drawing 15013\WL\007 has been modified to show minor changes in the gate, which now comprises a single rolling panel, and to the design of the wall. Refer to Drawing 18081\WL\007.
Appendix D3: Plant Layout	The plant layout has been revised with changes to the process building shape and removal of the turbine building. Drawing 15013\WL\008 has been revised to Drawing 18081\WL\008 in Appendix 13.b.
Appendix D5: Site Drainage	Modifications to site drainage are outlined in response to Question 4 of Article 12 Compliance. The Site Drainage drawing 15013\WL\006 has been modified to Drawing 18081\WL\006 in Appendix 13.b
Appendix D7: Warehouse Layout	The warehouse has been incorporated into the main process building and the standalone building has been removed from the site layout. This is described in Section 1.1. of the 2009 EIS.
Appendix D8: Site Accommodation	The office building including the control room will be made 2m wider and an extra floor will be added to accommodate an education centre and provide additional space for visitors. The Site Accommodation Drawing 15013\WL\012 has been modified to Drawing 18081\WL\012 in Appendix 13.b.
Appendix D9: Plant Layout from End Showing Turbine Building	The turbine and generator have been incorporated in the main building and the air condensers have been relocated. The turbine building has therefore been removed. The revised Plant Layout Drawing 15013\WL\0010 is shown as Drawing 18081\WL\010 in Appendix 13.b
Appendix D11: Plant Layout from Side	The plant layout has been revised with changes to the shape of the main process building and removal of the turbine building. The revised drawing 15013\WL\009 is shown as Drawing 18081\WL\009 in Appendix 13.b
Appendix E1: Location of Emission Points	Some of the emission and monitoring points have been relocated as described in Table 13.b. The revised drawing 15013\WL\013 is shown as Drawing 18081\WL\013 in Appendix 13.b.

Appendix 13.a: Revised Water Balance (Figure D.1.c of RWLA)



Appendix 13.b: Revised Drawings

SITE PLAN SCALE 1:2500

REV.	DESCRIPTION.	BY.	APPR.	DATE.
B.	ISSUED FOR ARTICLE 12 & 13 COMPLIANCE.	GM	NK	16.10.09
A.	ISSUED FOR WASTE LICENCE	KKG	NK	12.05.08

CLIENT. INDAVER

INDAVER IRELAND
4 HADDINGTON TCE
DUN LAOGHAIRE
CO. DUBLIN
TEL: +353 1 2145830
FAX: +353 1 2807865

PROJECT.
70MW WASTE TO ENERGY FACILITY, CARRANSTOWN.

TITLE.
SITE OWNERSHIP MAP

Mc Elroy Associates
Consulting Engineers
72 Haddington Road, Ballsbridge, D4.
Tel: 660 9000 Fax: 660 9099
E Mail: info@mea.ie

DESIGNED:	CHECKED:	APPR'D:
NK	NK	NK
DRAWN:	DATE:	SCALE:
GM	AUG '09	1:2500 @ A3

DRG. No. 18081\WL\001 REV. B.

PROPOSED SITE PLAN SCALE 1:2500

B.	ISSUED FOR ARTICLE 12 & 13 COMPLIANCE.	GM	NK	16.10.09
A.	ISSUED FOR WASTE LICENCE	KKG	NK	12.05.08
REV.	DESCRIPTION.	BY.	APPR.	DATE.

CLIENT. INDAVER

INDAVER IRELAND
4 HADDINGTON TCE
DUN LAOGHAIRE
CO. DUBLIN
TEL: +353 1 2145630
FAX: +353 1 2807865

PROJECT.
70MW WASTE TO ENERGY FACILITY, CARRANSTOWN.

TITLE.
PROPOSED SITE PLAN

Mc Elroy Associates
Consulting Engineers
72 Haddington Road, Ballsbridge, D4.
Tel: 660 9000 Fax: 660 9099
E Mail: info@mea.ie

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DRAWN:	DATE:	SCALE:
GM	AUG '09	1:2500 @ A3

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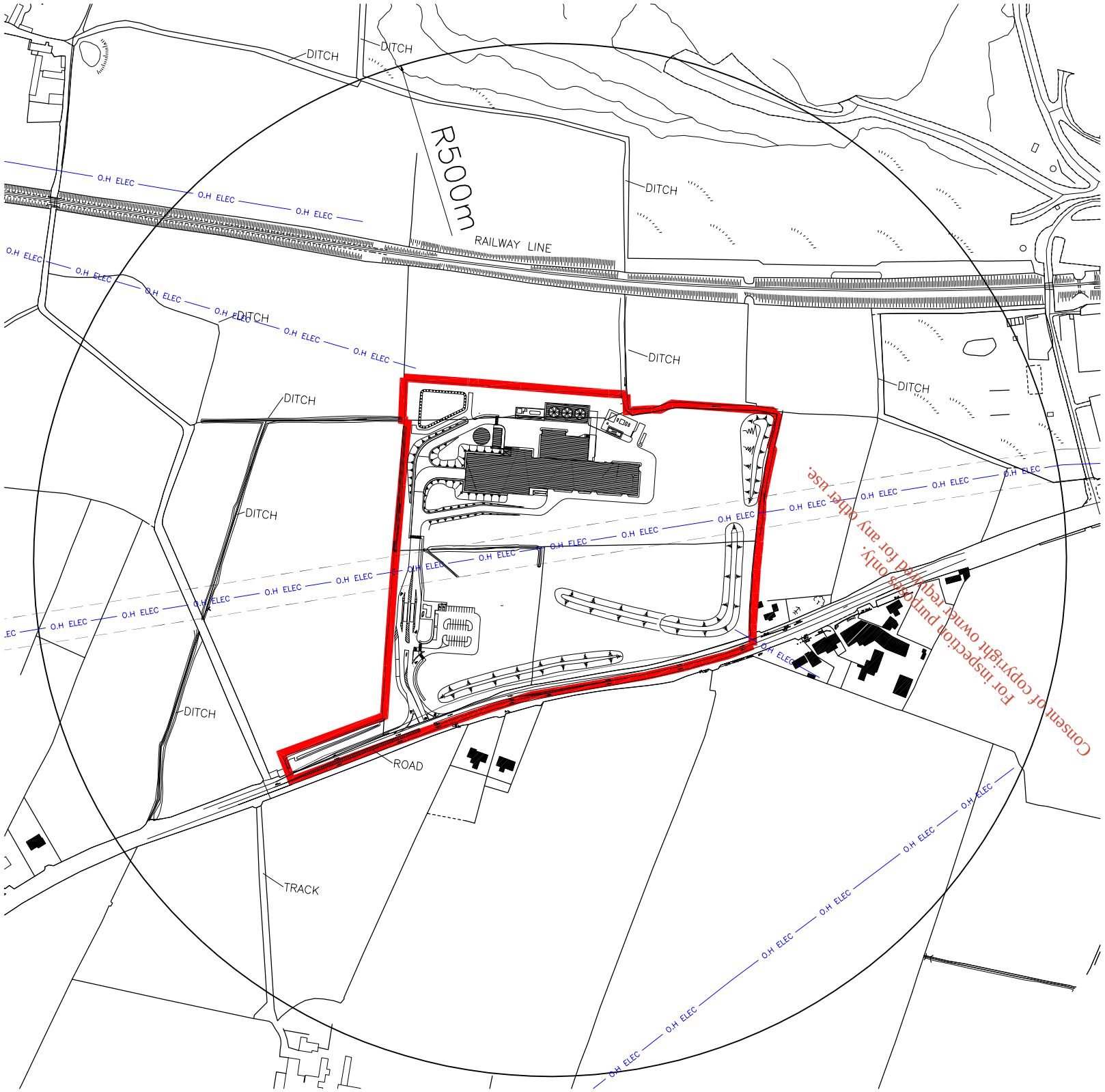

LOCATION PLAN SCALE 1:5000

REV.	DESCRIPTION.	BY.	APPR.	DATE.
B.	ISSUED FOR ARTICLE 12 & 13 COMPLIANCE.	GM	NK	16.10.09
A.	ISSUED FOR WASTE LICENCE	KKG	NK	12.05.08

CLIENT. INDAVER

INDAVER IRELAND
4 HADDINGTON TCE
DUN LAOGHAIRE
CO. DUBLIN
TEL: +353 1 2145830
FAX: +353 1 2807865

PROJECT.
70MW WASTE TO ENERGY FACILITY, CARRANSTOWN.

TITLE.
LOCATION MAP

Mc Elroy Associates
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72 Haddington Road, Ballsbridge, D4.
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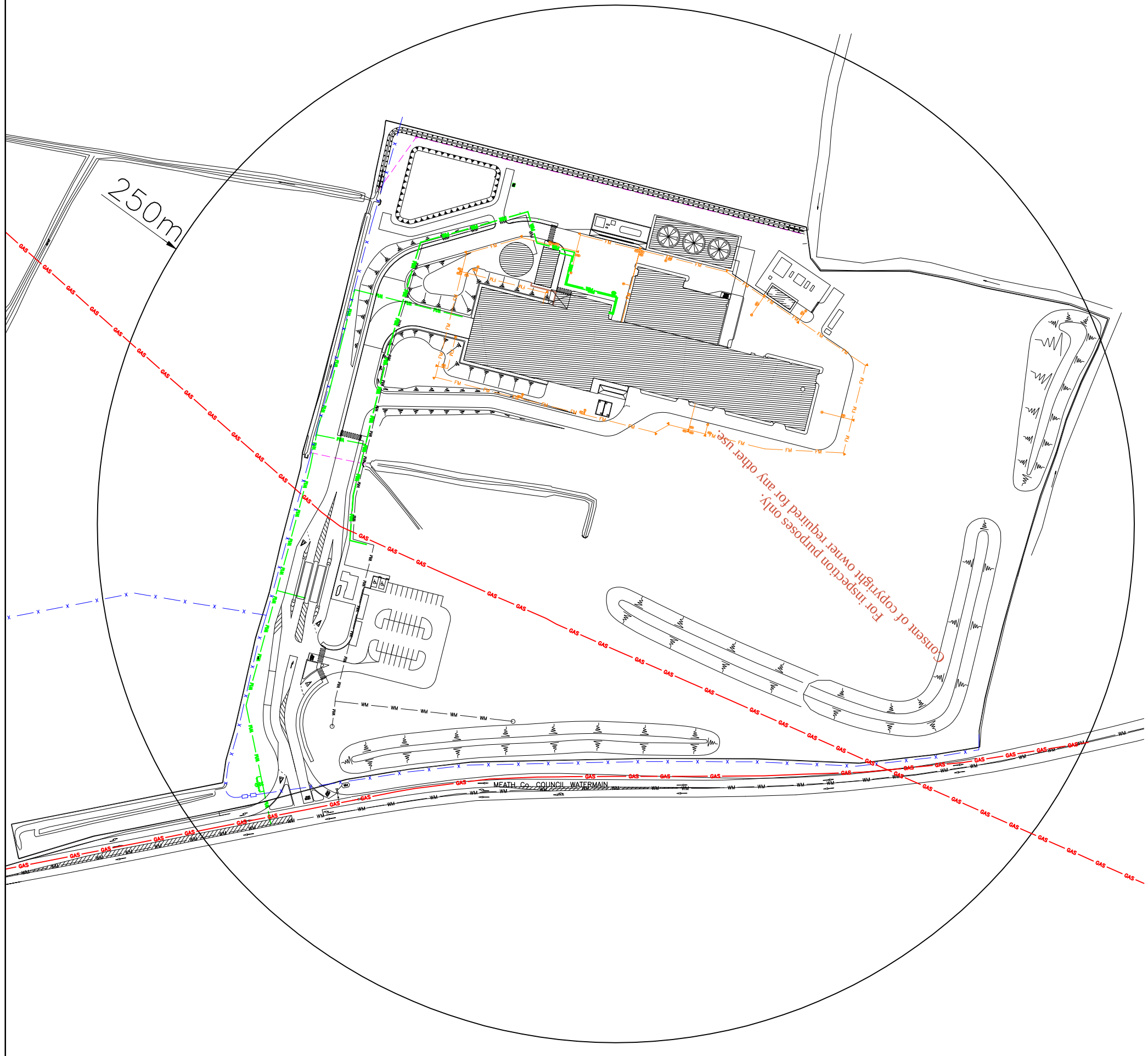
DESIGNED:	CHECKED:	APPR'D:
NK	NK	NK
DRAWN:	DATE:	SCALE:
GM	AUG '09	1:5000 @ A3

DRG.No. 18081\WL\003 REV. B.



LEGEND:

- WM — WM — EXISTING WATERMAIN
- WM — WM — NEW WATERMAIN
- GAS — GAS — EXISTING GAS MAIN
- X — X — EXISTING U/G ESB
- FM — FM — NEW FIRE MAIN
- NEW CULVERT

UNDERGROUND SERVICES PLAN SCALE 1:2000

REV.	DESCRIPTION.	BY.	APPR.	DATE.
B.	ISSUED FOR ARTICLE 12 & 13 COMPLIANCE.	GM	NK	16.10.09
A.	ISSUED FOR WASTE LICENCE	KKG	NK	12.05.08

CLIENT. INDAVER

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CO. DUBLIN
TEL: +353 1 2145630
FAX: +353 1 2807865

PROJECT.
70MW WASTE TO ENERGY FACILITY, CARRANSTOWN.

TITLE.
PROPOSED SITE SERVICES PLAN

Mc Elroy Associates
Consulting Engineers
72 Haddington Road, Ballsbridge, D4.
Tel: 660 9000 Fax: 660 9099
E Mail: info@mea.ie

DESIGNED:	CHECKED:	APPR'D:
NK	NK	NK
DRAWN:	DATE:	SCALE:
GM	AUG '09	1:2000 @ A3

DRG.No. 18081\WL\004 REV. B.

LEGEND

- SITE BOUNDARY LINE
- EXISTING LEVEL
- PROPOSED LEVEL
- PROPOSED BUILDING
- PROPOSED ASPHALT PAVEMENT
- PROPOSED ASPHALT PAVEMENT (50mm OVERLAY)
- PROPOSED CONCRETE PAVEMENT
- PROPOSED PERMEABLE PAVING
- PROPOSED CONCRETE FOOTPATH
- PROPOSED GRAVEL AREA
- PROPOSED HARDCORE AREA
- PROPOSED GRASSED AREA
- PROPOSED FALLOW AREA
- PROPOSED PRECAST CONCRETE ROAD KERB
- PROPOSED DROPPED KERB
- PROPOSED FENCE

2.4m CHAINLINK FENCE
SURFACE WATER ATTENUATION
AMMONIA STORAGE
DIESEL STORAGE
DELIVERY/QUARANTINE AREA
SITE BOUNDARY
AIR CONDENSER
38kV COMPOUND
WATER TANK
PUMP HOUSE
LOADING BAY
ASH HANDLING BUILDING
TIPPING HALL
WASTE BUNKER
FURNACE BOILER
TURBINE AND AUXILIARIES
FLUE GAS TREATMENT
PERCOLATION AREA
PURAFLOW EFFLUENT TREATMENT SYSTEM
EMERGENCY GENERATOR
3m HIGH PLANTED BERM
LIQUID WASTE UNLOADING AREA
STACK
EASTING=306331.940
NORTHING=270963.457
GAS
FOOTPATH
OVERHEAD 110kV CABLES
PERSONNEL GATE
SECURITY BUILDING/GATEHOUSE
PERCOLATION AREA
SINGLE DWELLING "PURAFLO" WASTEWATER TREATMENT SYSTEM
WEIGH BRIDGE
WORKS BUS
VISITOR COACH
CAR PARK
RECEPTION
TRUCK SIDING
EMERGENCY ACCESS ROUTE
SECURITY GATES
BURIED HIGH PRESSURE GAS MAIN
2.4m PALLISADE FENCE
TO DULEEK
SITE NOTICE LOCATION

SITE PLAN N.T.S.

REV.	DESCRIPTION.	BY.	APPR.	DATE.
B.	ISSUED FOR ARTICLE 12 & 13 COMPLIANCE.	GM	NK	16.10.09
A.	ISSUED FOR WASTE LICENCE	KKG	NK	12.05.08

CLIENT. INDAVER

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FAX: +353 1 2807865

PROJECT.
70MW WASTE TO ENERGY FACILITY, CARRANSTOWN.

TITLE.
SITE PLAN

Mc Elroy Associates
Consulting Engineers
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Tel: 660 9000 Fax: 660 9099
E Mail: info@mea.ie

DESIGNED:	CHECKED:	APPR'D:
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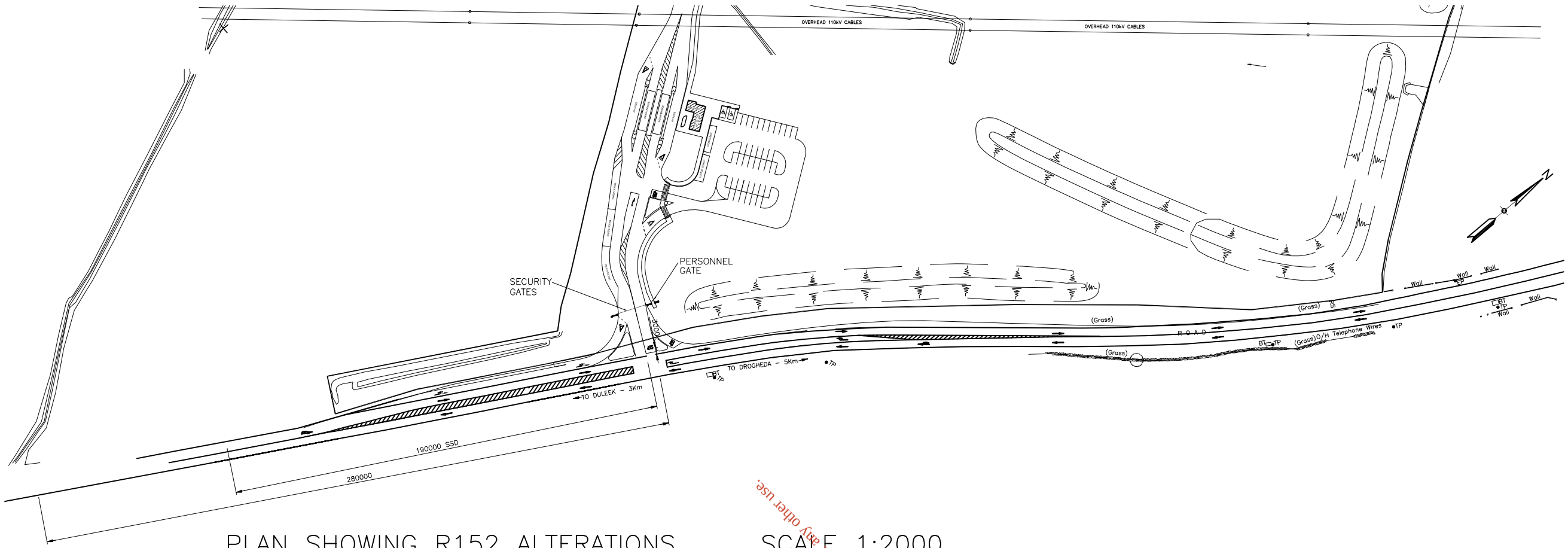
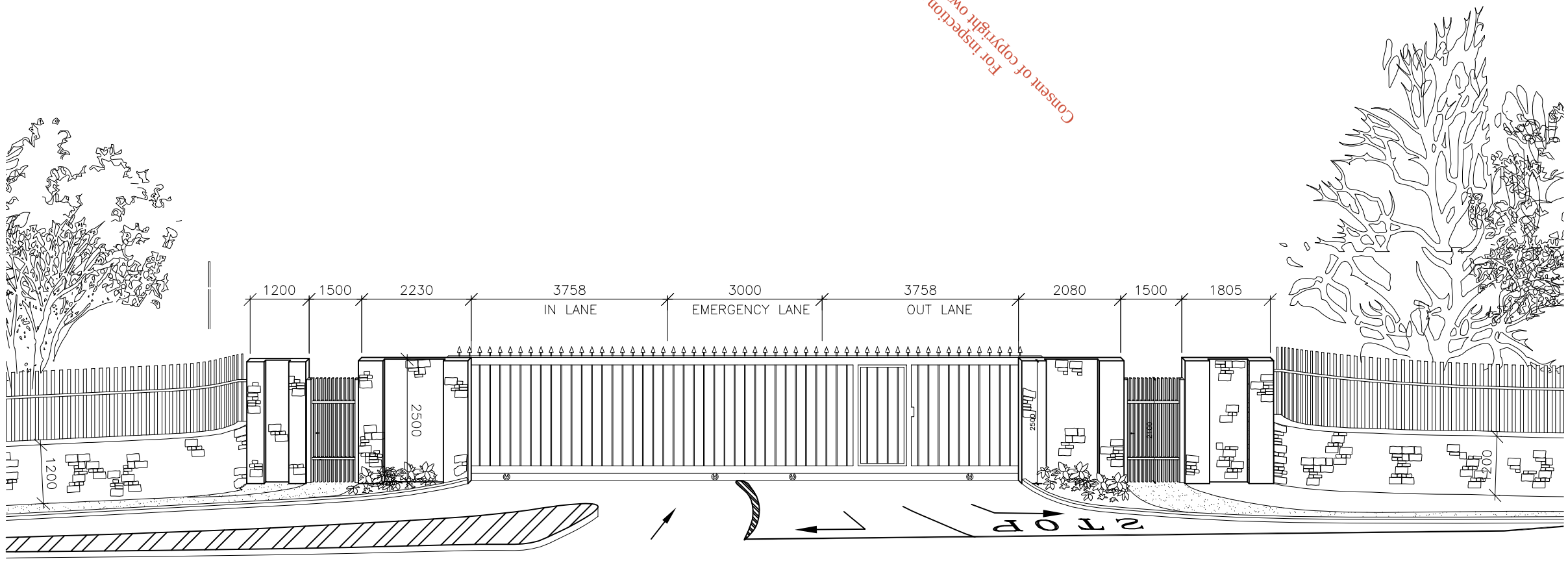
DRG. No. 18081\WL\005 REV. B.



PLAN SHOWING R152 ALTERATIONS SCALE 1:2000



SITE ENTRANCE ELEVATION SCALE 1:100

REV.	DESCRIPTION.	BY.	APPR.	DATE.
B.	ISSUED FOR ARTICLE 12 & 13 COMPLIANCE.	GM	NK	16.10.09
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CLIENT. INDAVER

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PROJECT.
70MW WASTE TO ENERGY FACILITY, CARRANSTOWN.

TITLE.
SITE ENTRANCE DETAILS WITH R152 ROAD REALIGNMENT DETAILS

Mc Elroy Associates
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DRG.No. 18081\WL\007 REV. B.

2.4m CHAINLINK FENCE

SITE BOUNDARY

38kV COMPOUND

AMMONIA STORAGE

DIESEL STORAGE

AIR CONDENSER

DELIVERY/QUARANTINE AREA

SURFACE WATER ATTENUATION

O/H PIPE RACK

PURAFLO SYSTEM

EMERGENCY GENERATOR

FOR DETAILS OF THIS AREA REFER TO DWG. CD\012.

WATER TANK

PUMP HOUSE

LOADING BAY

ASH HANDLING BUILDING

QUICKLIME CaO SILO

BOILER ASH SILO

FLUE GAS CLEANING RESIDUE SILO

MAINTENANCE MANAGER

ELECTRICAL & MSTR. OFFICE

MAINTENANCE WORKSHOP

LOBBY

LAV

HV ROOM

INSTRUMENTATION ROOM

ACTIVATED CARBON SILO

TIPPING HALL

WASTE BUNKER & ADMIN BUILDING

FURNACE

BOILER

STEAM CYCLE

TURBINE /GENERATOR

SPRAY REACTOR

BAGHOUSE FILTER

CLAY SILO

FLUE GAS CLEANING RESIDUE SILO

FLUE GAS CLEANING

INSPECTION AREA

$Ca(OH)_2$ SILO

LIQUID WASTE UNLOADING AREA

STACK
EASTING=306331.940
NORTHING=270963.457

OVERHEAD 110kV CABLES

TYPICAL PLAN VIEW N.T.S.

REV.	DESCRIPTION.	BY.	APPR.	DATE.
B.	ISSUED FOR ARTICLE 12 & 13 COMPLIANCE.	GM	NK	16.10.09
A.	ISSUED FOR WASTE LICENCE	KKG	NK	12.05.08

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PROJECT.
70MW WASTE TO ENERGY FACILITY, CARRANSTOWN.

TITLE.
MAIN PROCESS AND AIR CONDENSER BUILDINGS, PLAN VIEW

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Consulting Engineers
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Tel: 660 9000 Fax: 660 9099
E Mail: info@mea.ie

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NK	NK	NK
DRAWN:	DATE:	SCALE:
GM	AUG '09	N.T.S.

DRG.No. 18081\WL\008 REV. B.

B.	ISSUED FOR ARTICLE 12 & 13 COMPLIANCE.	GM	NK	16.10.09
A.	ISSUED FOR WASTE LICENCE	KKG	NK	12.05.08
REV.	DESCRIPTION.	BY.	APPR.	DATE.

CLIENT. INDAVER

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DUN LAOGHAIRE
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FAX: +353 1 2807865

PROJECT.
70MW WASTE TO ENERGY FACILITY, CARRANSTOWN.

TITLE.
PROPOSED SITE DRAINAGE LAYOUT

Mc Elroy Associates
Consulting Engineers
72 Haddington Road, Ballsbridge, D4.
Tel: 660 9000 Fax: 660 9099
E Mail: info@mea.ie

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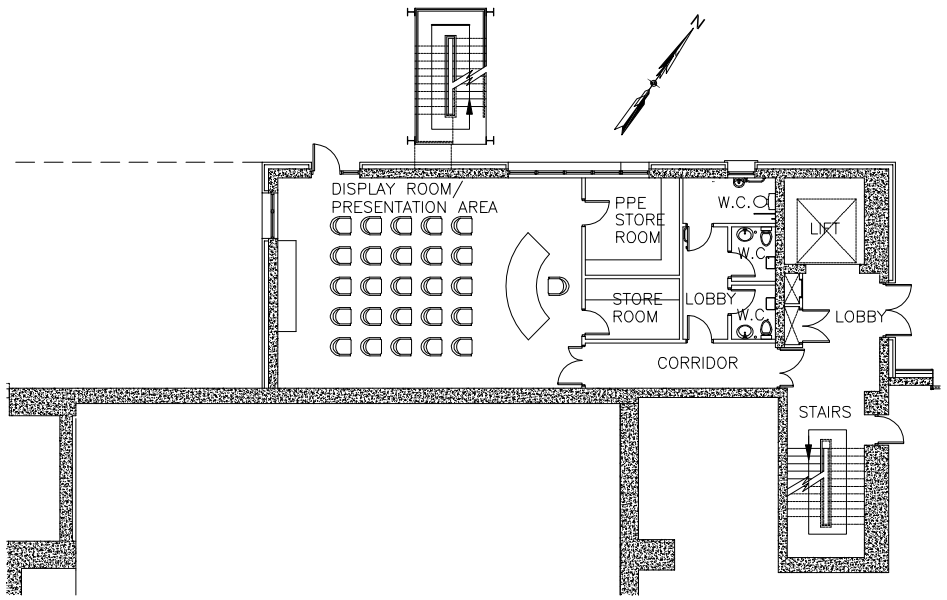
GM	AUG '09	N.T.S. @ A3

DRG.No. 18081\WL\006 REV. B.



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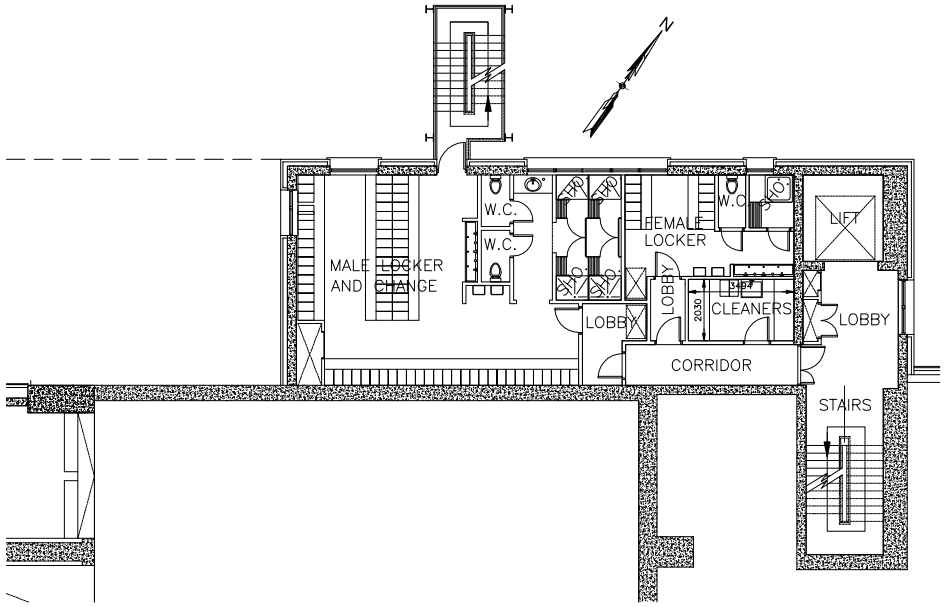

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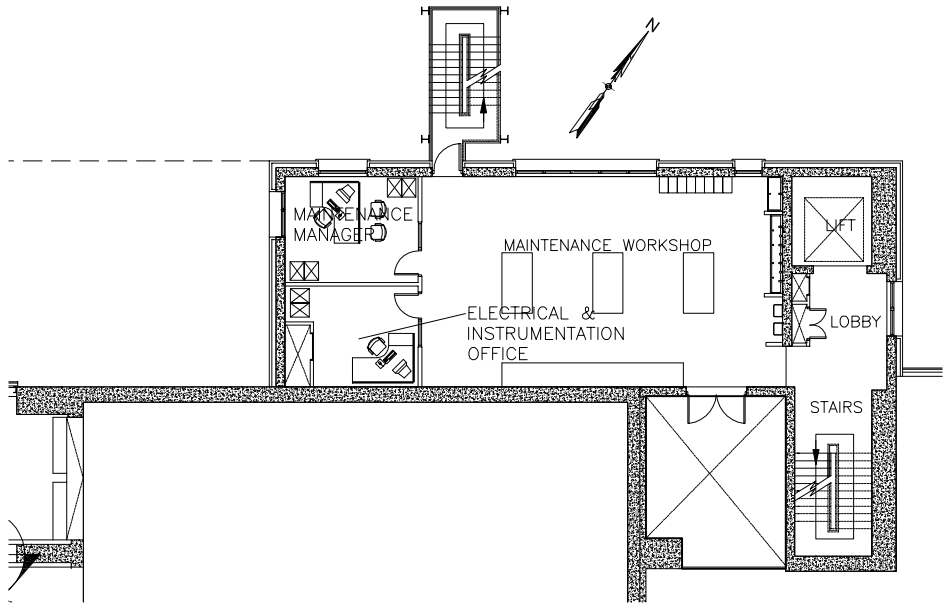

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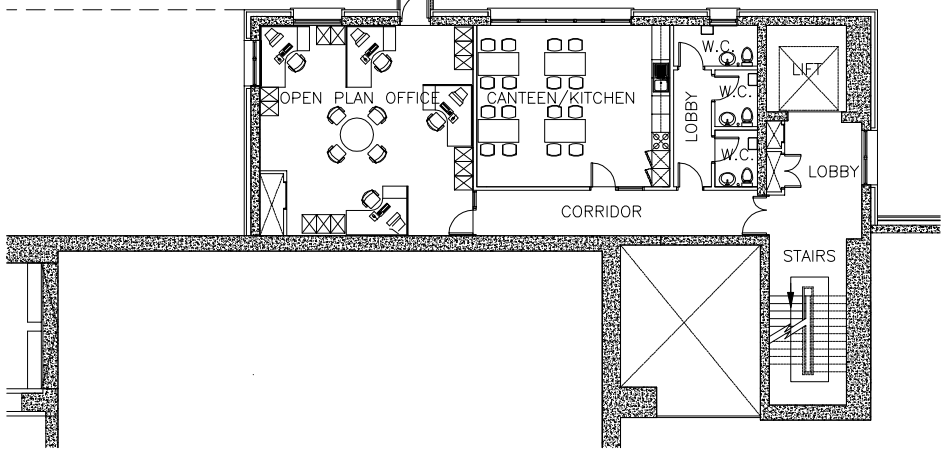

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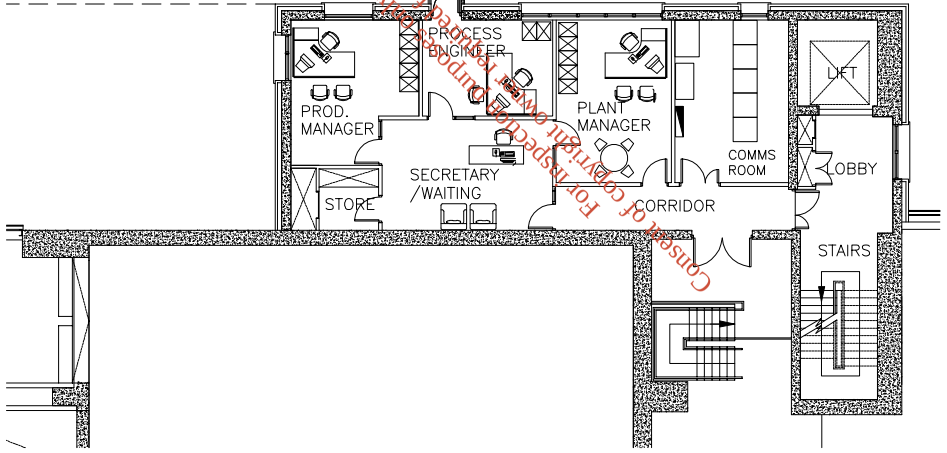

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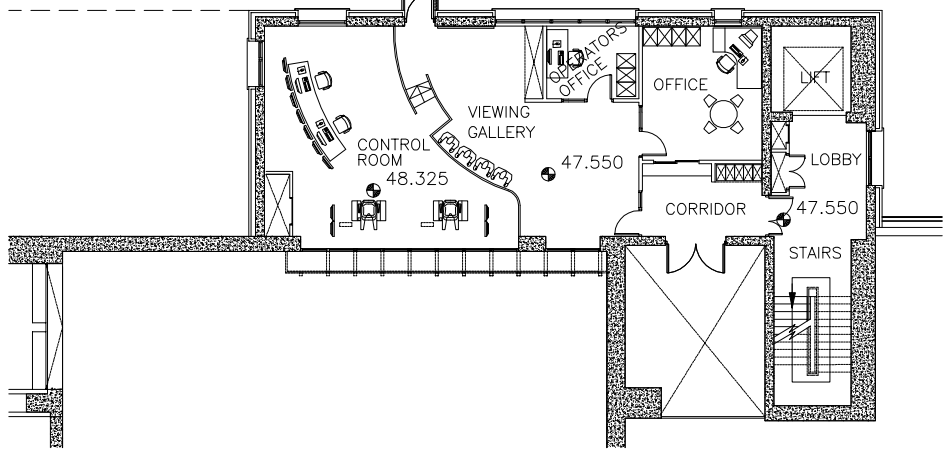

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SCALE 1:500

REV.	DESCRIPTION.	BY.	APPR.	DATE.
B.	ISSUED FOR ARTICLE 12 & 13 COMPLIANCE.	GM	NK	16.10.09
A.	ISSUED FOR WASTE LICENCE	KKG	NK	12.05.08

CLIENT. INDAVER

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4 HADDINGTON TCE
DUN LAOGHAIRE
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PROJECT.
70MW WASTE TO ENERGY FACILITY, CARRANSTOWN.

TITLE.
MAIN PROCESS BUILDING OFFICE/STAFF FACILITEIS

Mc Elroy Associates
Consulting Engineers
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DESIGNED:	CHECKED:	APPR'D:
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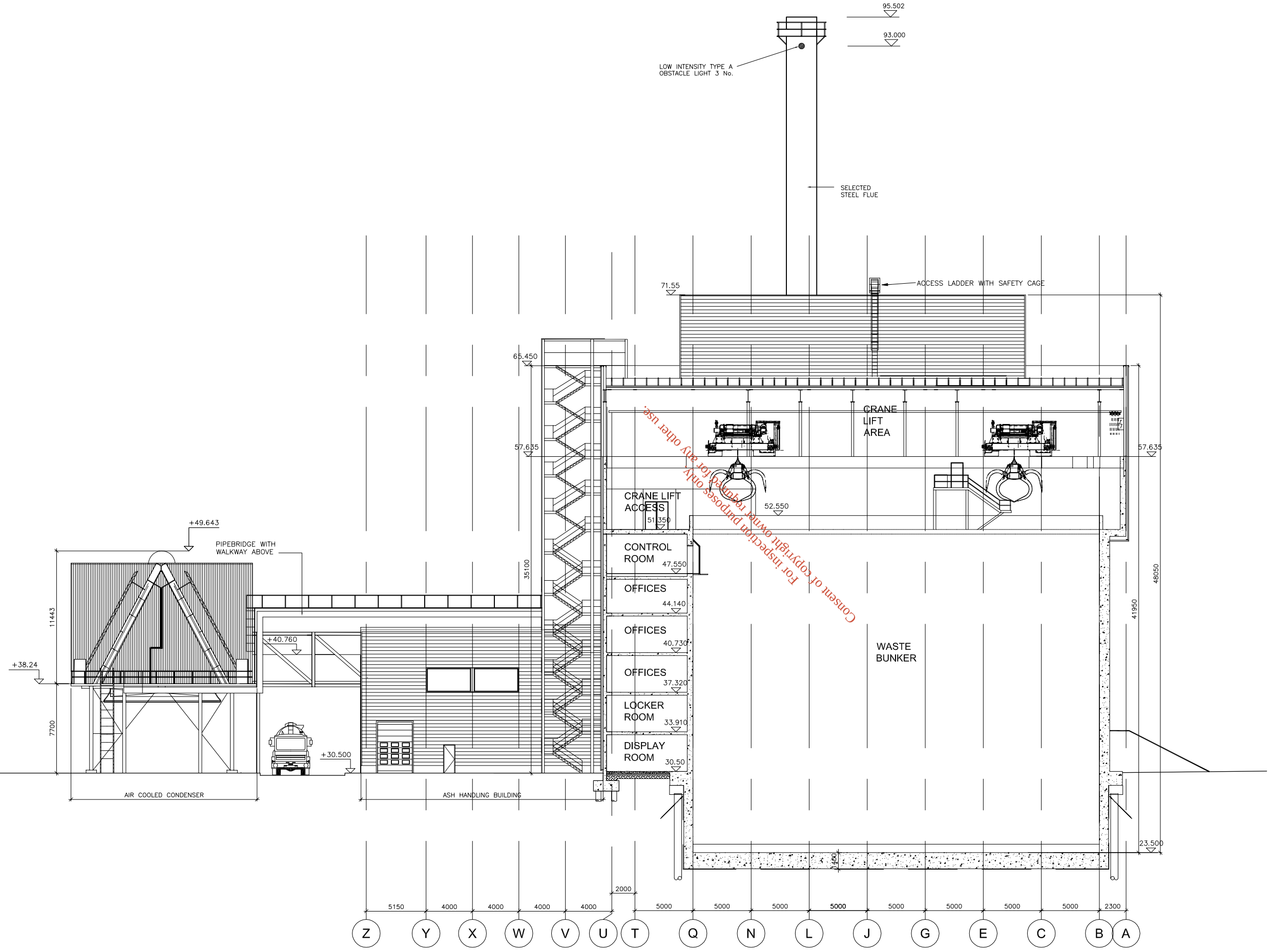
DRAWN: GM	DATE: AUG '09	SCALE: 1:250 @ A3

DRG.No. 18081\WL\012 REV. B.



TYPICAL SECTION N.T.S.

REV.	DESCRIPTION.	BY.	APPR.	DATE.
B.	ISSUED FOR ARTICLE 12 & 13 COMPLIANCE.	GM	NK	16.10.09
A.	ISSUED FOR WASTE LICENCE	KKG	NK	12.05.08

CLIENT.
INDAVER

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DUN LAOGHAIRE
CO. DUBLIN
TEL: +353 1 2145830
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PROJECT.
70MW WASTE TO ENERGY FACILITY, CARRANSTOWN.

TITLE.
MAIN PROCESS AND TURBINE BUILDINGS TYPICAL SECTION

Mc Elroy Associates
Consulting Engineers
72 Haddington Road, Ballsbridge, D4.
Tel: 660 9000 Fax: 660 9099
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NK	NK	NK
DRAWN:	DATE:	SCALE:
GM	AUG '09	AS SHOWN

DRG.No. 18081\WL\010 REV. B.

TYPICAL SECTION SCALE 1:200

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B.	ISSUED FOR ARTICLE 12 & 13 COMPLIANCE.	GM	NK	16.10.09
A.	ISSUED FOR WASTE LICENCE	KKG	NK	12.05.08

CLIENT.
INDAVER

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DUN LAOGHAIRE
CO. DUBLIN
TEL: +353 1 2145830
FAX: +353 1 2807865

PROJECT.
70MW
WASTE TO ENERGY FACILITY
CARRANSTOWN

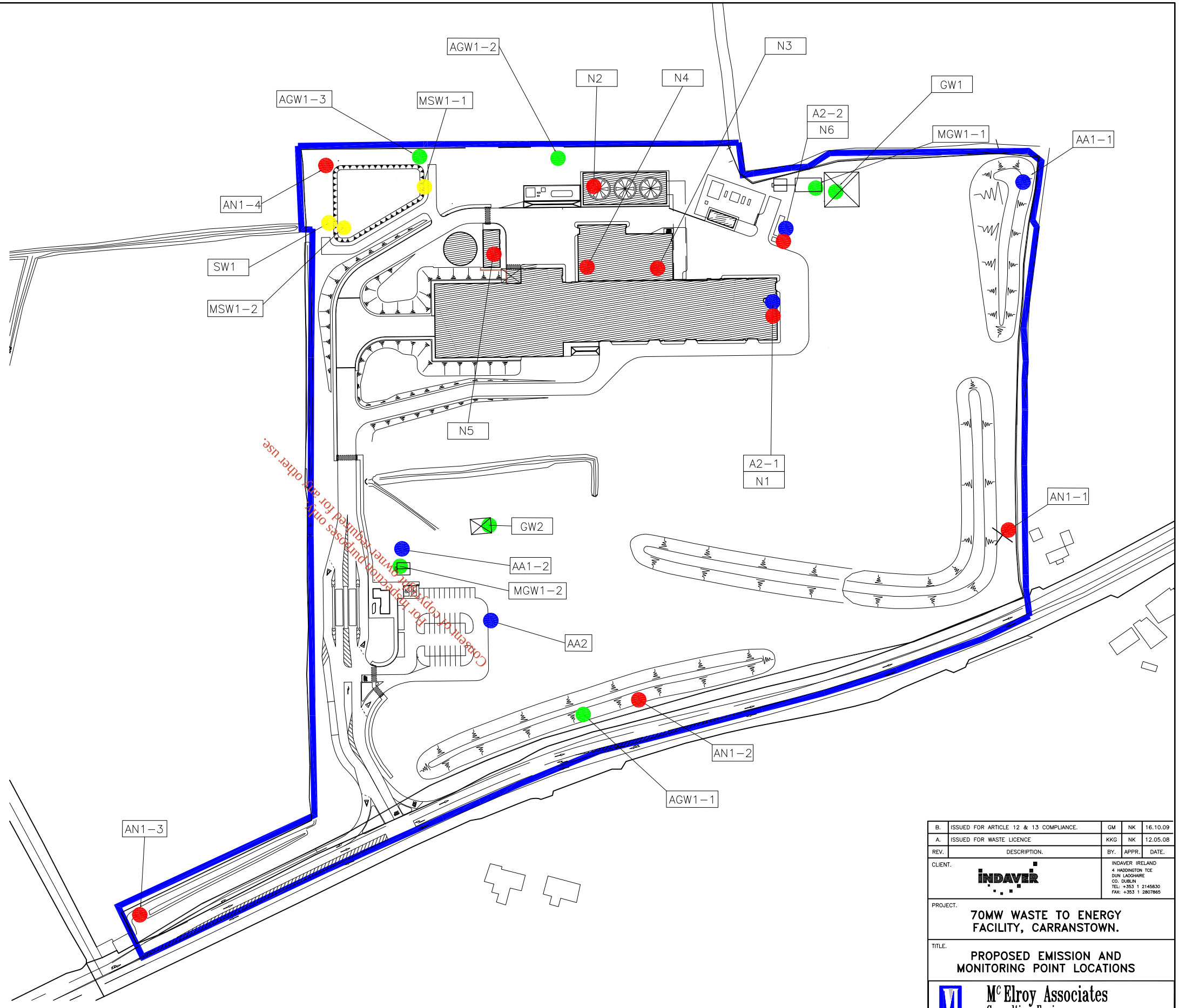
TITLE.
MAIN PROCESS BUILDING
AND TURBINE BUILDING
TYPICAL SECTION

Mc Elroy Associates
Consulting Engineers
72 Haddington Road, Ballsbridge, D4.
Tel: 660 9000 Fax: 660 9099
E Mail: info@mea.ie

DESIGNED: NK	CHECKED: NK	APPR'D: NK
DRAWN: KKG	DATE: AUG '09	SCALE: AS SHOWN.

DRG.No. 18081\WL\009 REV. B.

NAME	LABEL
A2–1	STACK AIR EMISSION/MONITORING POINT
A2–2	EMERGENCY GENERATOR AIR EMISSION
AA1–1	DOWNWIND ODOUR MONITORING
AA1–2	UPWIND ODOUR MONITORING
SW1	SURFACE WATER DRAINAGE OUTFALL EMISSION
MSW1–1	SURFACE WATER MONITORING CHAMBER 1
MSW1–2	SURFACE WATER MONITORING CHAMBER 2
GW1	GROUNDWATER PERCOLATION AREA EMISSION
GW2	GROUNDWATER PERCOLATION AREA EMISSION
MGW1–1	GROUNDWATER PURAFLO MONITORING CHAMBER
MGW1–2	GROUNDWATER PURAFLO MONITORING CHAMBER
AGW1–1	UPSTREAM GROUNDWATER MONITORING WELL
AGW1–2	DOWNSTREAM GROUNDWATER MONITORING WELL 1
AGW1–3	DOWNSTREAM GROUNDWATER MONITORING WELL 2
N1	STACK NOISE EMISSION
N2	AIR COOLED CONDENSOR NOISE EMISSION
N3	TURBINE COOLING NOISE EMISSION
N4	GRATE COOLING No's 1& 2 NOISE EMISSION
N5	PUMP HOUSE LOUVER NOISE EMISSION
N6	EMERGENCY GENERATOR LOUVRE NOISE EMISSION
AN1–1	AMBIENT NOISE MONITORING 1
AN1–2	AMBIENT NOISE MONITORING 2
AN1–3	AMBIENT NOISE MONITORING 3
AN1–4	AMBIENT NOISE MONITORING 4
AA2	WEATHER MONITORING STATION



REV.	DESCRIPTION.	BY.	APPR.	DATE.
B.	ISSUED FOR ARTICLE 12 & 13 COMPLIANCE.	GM	NK	16.10.09
A.	ISSUED FOR WASTE LICENCE	KKG	NK	12.05.08

CLIENT. INDAVER

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TEL: +353 1 2145830
FAX: +353 1 2807865

PROJECT.

70MW WASTE TO ENERGY FACILITY, CARRANSTOWN.

TITLE.

PROPOSED EMISSION AND MONITORING POINT LOCATIONS

Mc Elroy Associates
Consulting Engineers
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NK	NK	NK
DRAWN:	DATE:	SCALE:
GM	AUG '09	1:2000 @ A3

DRG.No. 18081\WL\013 REV. B.

Appendix 13.c: Revised Attachment A: Non-Technical Summary

Attachment A.1: Non-Technical Summary

A.1.1 Nature of Facility

Indaver Ireland is applying for a review of waste licence WL 167-1 to increase the capacity of the proposed waste-to-energy plant from 150,000 tonnes per annum to 200,000 tonnes per annum (tpa). The Environmental Protection Agency (EPA) has confirmed that this application constitutes a review rather than a new application, as shown in Appendix A1.

The increase in capacity is sought so that the facility can meet the requirements of the North East Region Waste Management Plan 2005-2010. This plan reviewed the quantities of waste arising since the previous plan was issued and increased the capacity of the thermal treatment plant to be developed for the region to between 150,000 and 200,000 tpa.

Other changes to the proposed development include the removal of the recycling centre and materials recovery facility in line with the original planning permission PL 17.126307 issued in 2003. The layout of the facility was also changed and new design features were included in line with best practice.

The revised facility will consist of a 70 Megawatt (MW) waste-to-energy facility for the acceptance of 200,000 tpa household, commercial and industrial non-hazardous waste.

The site for the proposed development is on lands in the townland of Carranstown, approximately 2.7km north east of Duleek in Co. Meath as shown in Figure A.1.a. The c.25 acre green-field site was chosen from a comprehensive site selection exercise due to its central location with respect to waste production, proximity to existing industrial activity, access to major access routes and access to systems for exporting electricity.

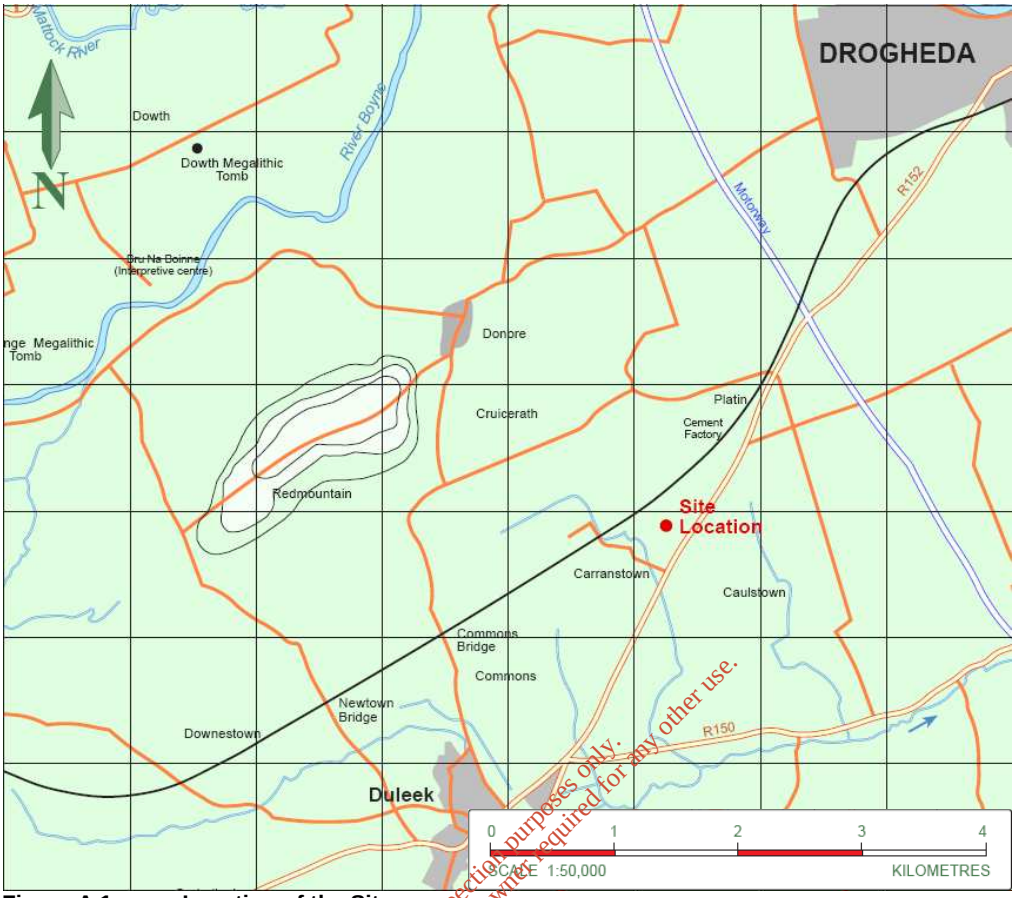


Figure A.1.a: Location of the Site

All modifications to the facility licensed in Waste Licence 167-1 are highlighted throughout this application. Since the turnkey contractor has been selected and the process design has been finalised since the completion of the Environmental Impact Statement[1], some uncertainties regarding for example the flue gas treatment system configuration have been addressed here. Furthermore, supplier information on the process and ancillary services has been added. This has provided more accurate figures on the operation of the plant, which may vary from the figures provided in the Environmental Impact Statement.

A.1.2 Developer Profile

Indaver Ireland is a wholly owned subsidiary of Indaver NV, and was established in 1999 to develop waste infrastructure in Ireland. The branch is currently developing two waste management projects including a municipal waste management facility in Meath (the subject of this application) and an industrial waste facility in Ringaskiddy, County Cork. Information on the Ringaskiddy project can be found on the website www.indaver.ie.

Indaver NV is a Flemish company specialising in integrated waste management. This includes providing advice on the prevention of waste as well as recycling, treating and disposing of household, commercial and industrial waste. Indaver employs over 800 people and has operations in seven European countries. In 2007, the company handled over 1.87 million tonnes of hazardous and non-hazardous waste in facilities like that shown in Figure A.1.b. Indaver NV's majority

[1] Submitted with this licence application, completed for planning application in 2005

shareholder is Delta NV, which is a holding company of the Government of the Netherlands. The remaining shares are held by a number of leading private companies in Flanders.

Figure A.1.b: Indaver NV facility in Flanders, Belgium

Indaver NV has been, and continues to be, an important contributor to the development of an integrated waste management system in Flanders. Twenty years ago, the vast majority of waste in Flanders was still being sent to landfill and there was a very low rate of recycling. Hazardous waste was being exported to other countries for disposal. The Flemish Government, in partnership with local industry, formed Indaver NV in 1985 to provide an integrated waste management strategy for Flanders and address the waste crisis. Today, Flanders has a recycling rate of over 70%, the highest of any region in the world, and is self sufficient in the disposal of residual and hazardous waste.

All of the company's facilities are licensed by the regulatory authorities in the region in which they operate. Indaver strives to have all its facilities accredited to the ISO 9001:2000 Quality Assurance System, the ISO 14001 Environmental Management System and the OHSAS 18001 Health and Safety Standard. The company was the first waste management company in Flanders (and among the first in Europe), to attain accreditation to the ISO 14001. These certifications are independently audited on a regular basis to ensure company compliance. An integral part of the above certifications is clear and regular communications with members of the public, customers, suppliers and regulatory authorities. Indaver is committed to permanent and open dialogue regarding environmental matters.

Figure A.1.c: Indaver Ireland Limited solvent blending facility in Dublin Port

Indaver's Irish activities also include Indaver Ireland Limited, which has over 30 years experience in waste management in Ireland. Indaver Ireland Limited has offices in Dun Laoghaire, Dublin Port and Cork, and employs approximately 110 people. Its activities include hazardous waste collection and management, solvent blending (as shown in Figure A.1.c), on-site services, total waste management and recycling centre operation. The company is accredited to ISO 9001:2000, ISO 14001, and OHSAS 18001, the internationally recognised quality, environmental and health and safety standards.

A.1.3 Classes of Activity

A number of activities will be carried out at the Meath waste management facility, which have different classifications under the Waste Management Act 1996. These classifications are listed below.

A.1.3.a Classes of Activity

The principal activity according to the Third Schedule of the Waste Management Act, 1996, as amended, will be:

8: Incineration on Land or at Sea

Other activities that will take place at the site under the Third Schedule of the Waste Management Act, 1996, include:

7. Physico-chemical treatment not referred to elsewhere in this Schedule (including evaporation, drying and calcination) which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1. to 10. of this Schedule (including evaporation, drying and calcination)

If hazardous waste landfill capacity become available in Ireland, a solidification plant may be installed to pre-treat flue gas treatment residues prior to disposal. Boiler ash would also be treated in this manner if classified as hazardous.

12. Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule.

This will take place if non-conforming waste materials are found in the reception area that require repackaging before being sent off site for disposal.

13. Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.

Ash will be temporarily stored on site before being sent off-site for disposal, if it is not intended for re-use. Non-conforming waste will also be temporarily stored in the waste quarantine area before being removed from site.

Other activities that will take place at the site under the Fourth Schedule of the Waste Management Act, 1996, include:

3. Recycling or reclamation of metals and metal compounds.

Ferrous metals will be recovered from the bottom ash and sent off site for recycling. As standards and markets develop, the facility may be retrofitted with systems for the reclamation of non-ferrous metals from bottom ash.

4. Recycling or reclamation of other inorganic materials.

As standards and markets develop, the facility may be retrofitted with systems for recycling or reclaiming other inorganic materials from bottom ash.

8. Oil re-refining or other re-uses of oil

The auxiliary burners may be operated on a reusable oil product.

9. Use of any waste principally as a fuel or other means to generate energy

Waste will be used as a fuel in the plant to generate electricity. The plant will produce approximately 17.2MW of electricity, of which 14.7MW will be exported to the national grid.

13. Storage of waste intended for submission to any activity referred to in a preceeding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.

Waste will be stored in the waste bunker before being used as a fuel. If intended for re-use, bottom ash will also be stored onsite temporarily.

A.1.3.b Classes of Activity Modifications

The principle modifications to the classes of activity approved in WL 167-1 include the:

- Removal of all references to a recycling park and a materials recovery facility as these are no longer part of the development
- Revision of the Third Schedule activity 13, removing all references to gypsum as it is no longer produced in the facility
- Removal of the Fourth Schedule activity 2: Recycling or reclamation of organic substances which are not used as solvents
- Revision of the Third schedule activity 4, removing references to a materials recovery facility and giving consideration to the recovery of materials from bottom ash for reuse
- Removal of the Fourth Schedule activity 6: Recovery of components used for pollution abatement
- Addition of the Fourth Schedule activity 8: Oil re-refining or other re-uses of oil

A.1.4 Quantity and Nature of Waste

A.1.4.a Quantity and nature of waste

This application is being made for the treatment of up to 200,000 tpa in total of residual[2] household, commercial and non-hazarous industrial waste, sewage sludges and industrial sludges as shown in Table A.1.a. It is not possible at this stage to provide a detailed breakdown of the anticipated quantities of each waste type. The treatment of sewage sludge is provided for in case alternative outlets to landspreading are required.

Table A.1.a: Waste Types Accepted at the Facility

WASTE TYPE	TONNES PER ANNUM (proposed)
Household	0 – 200,000
Commercial	0 – 200,000
Sewage Sludge	0 – 10,000
Construction and Demolition	Not accepted
Industrial Non-Hazardous Sludges	0 – 10,000
Industrial Non-Hazardous Solids	0 – 50,000
Industrial Non-Hazardous Liquids	0 – 10,000
Hazardous waste	Not accepted

Waste will be accepted between 0800 and 1830 Monday to Friday inclusive and between 0800 and 1400 on Saturdays. The plant will operate 24 hours a day for approximately 7,500 hours per annum, depending on the energy content of the waste.

Deliveries will only be accepted at the facility from authorised carriers holding relevant waste collection permits. Frequent inspections of waste will be carried out to ensure that all contractors are in compliance with Indaver Ireland's waste acceptance criteria. Any non-conforming waste will be consigned to a designated waste quarantine area for removal from site.

A.1.4.b Modifications to Waste Acceptance

The principle modifications to the quantity and nature of waste approved in WL 167-1 include the:

- Removal of references to a materials recovery facility
- Increase in the maximum annual capacity of the waste-to-energy plant from 150,000 tonnes to 200,000 tonnes
- Provision for the acceptance of liquid non-hazardous wastes

[2] Whereby the waste has been pre-treated through source segregation and sorting as per the North East Region Waste Management Plan

A.1.5 Raw and Ancillary Materials

A.1.5.a Raw and ancillary material use

The main use of raw materials onsite will be in the flue gas treatment system, which will require hydrated lime ($Ca(OH)_2$), quicklime (CaO), expanded clay (Dioxorb), activated carbon, nitrogen gas (N_2) and a nitrogen oxides (NO_x) removal reagent ("SNCR" reagent) of ammonia solution. Raw materials will also be required for purifying water in the steam cycle. This involves the use of caustic soda (NaOH), hydrochloric acid (HCl) and ammonium solution (NH_4OH). Oils will be used as both a fuel in the auxiliary burners and diesel generator set and, in smaller quantities, as lubricants for equipment and coolant in transformers. Cement and acid (HCl) would also be used in a solidification process if solidification equipment is installed in the future.

The site will be connected to the 38kV distribution network, which will be used to export electricity during normal operations. Electricity will be imported from this network during startup and shut down. During normal operations the electrical demand of the site will be met with electricity from the generator. Approximately 8.7m^3 per hour of water will be extracted from a groundwater well onsite, which will be mostly used in the evaporating spray reactor, ash quench, steam cycle and staff/visitor facilities.

The combustion process will produce approximately 63,000 tpa residues in the form of bottom ash, boiler ash and flue gas cleaning ash. Ferrous metals and possibly other materials will be recovered from the bottom ash insofar as practicable and the remaining residues will be sent offsite for recovery and/or disposal.

A.1.5.b Materials Use Modifications

The principle modifications to the raw and ancillary materials approved in WL 167-1 include the:

- decrease in usage of ammonia, lime and limestone due to modifications to the flue gas treatment system
- increase in residues production in line with an increased throughput

A.1.6 Site Infrastructure and Operations

A.1.6.a Site Infrastructure

The proposed facility is designed to incinerate and recover energy from the residual fraction of non-hazardous household, commercial and industrial waste and sludges. It consists of an incineration plant with energy recovery (a "waste-to-energy" plant) and ancillary services.

The main buildings or structures on the site will include:

- The main process building with an adjacent ash handling hall
- An elevated platform for air cooled condensors
- A transformer compound and ESB substation
- A security building
- A water storage tank and pumphouse

- An attenuation pond

The main process building will be approximately 113m long, 51.5m wide at the widest point and 41.5m above ground at the highest point. The stack will be 65m tall. The general layout of the facility is shown in Figure A.1.d.

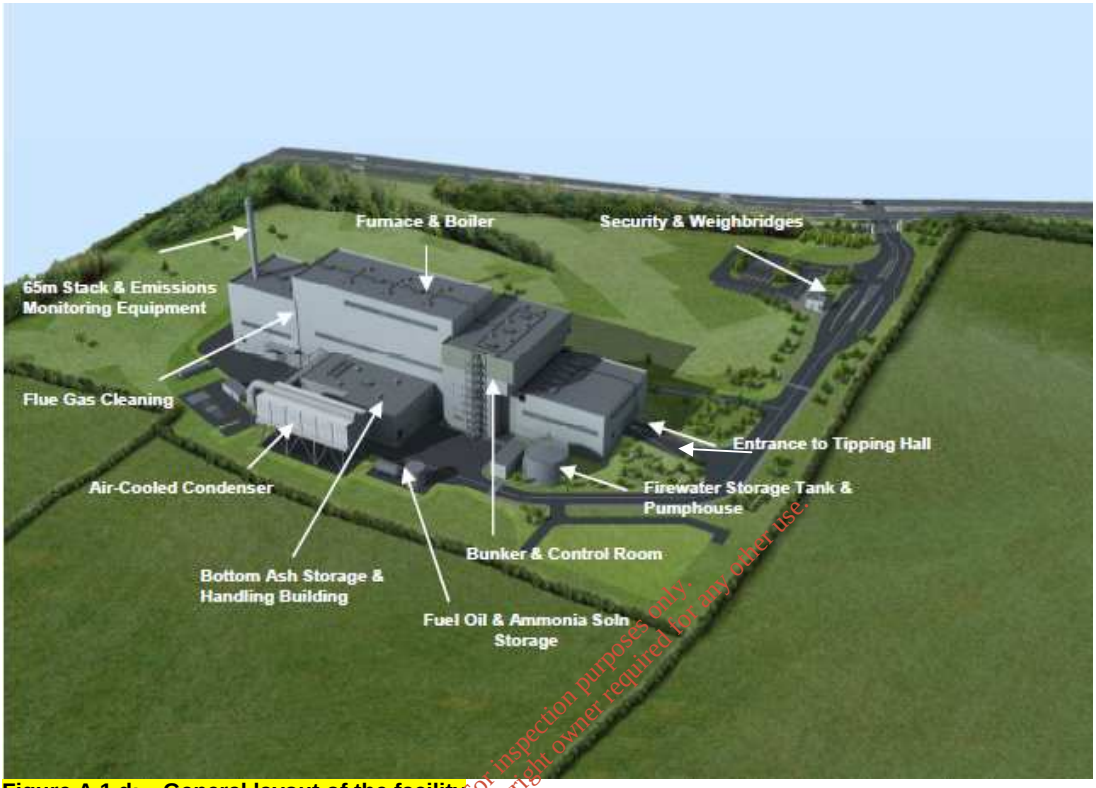


Figure A.1.d: General layout of the facility

A.1.6.b Site Infrastructure Modifications

The principle modifications to the site infrastructure approved in WL 167-1 include the:

- Waste to Energy Plant: modification to shape and realignment along the north-east boundary fence. The maximum height of the building has increased by approximately 10.5m and the length has increased by 30m. However, the width has reduced by 50m to make for a better fit within the site. The bottom ash bunker and handling plant have been replaced with a bottom ash handling building. The sorting plant and residue solidification unit from the main process building have been removed.
- removal of an administration building and community recycling park
- relocation of the water tank and pumphouse to the south
- relocation of the transformer compound to the north
- relocation of the main sewage treatment system to the east and addition of a second smaller sewage treatment unit
- removal of the warehouse and integration of visitor facilities into main process building

- relocation of the air condensers to a position adjacent to the ash handling building

A.1.6.c Process Description

The plant is based on conventional grate furnace technology with a horizontal steam boiler and an advanced flue gas treatment system designed to meet current emissions regulations. The plant will produce 17.6MW electricity of which approximately 15.1MW will be exported to the distribution network.

A schematic of the process is provided in Figure A.1.e.

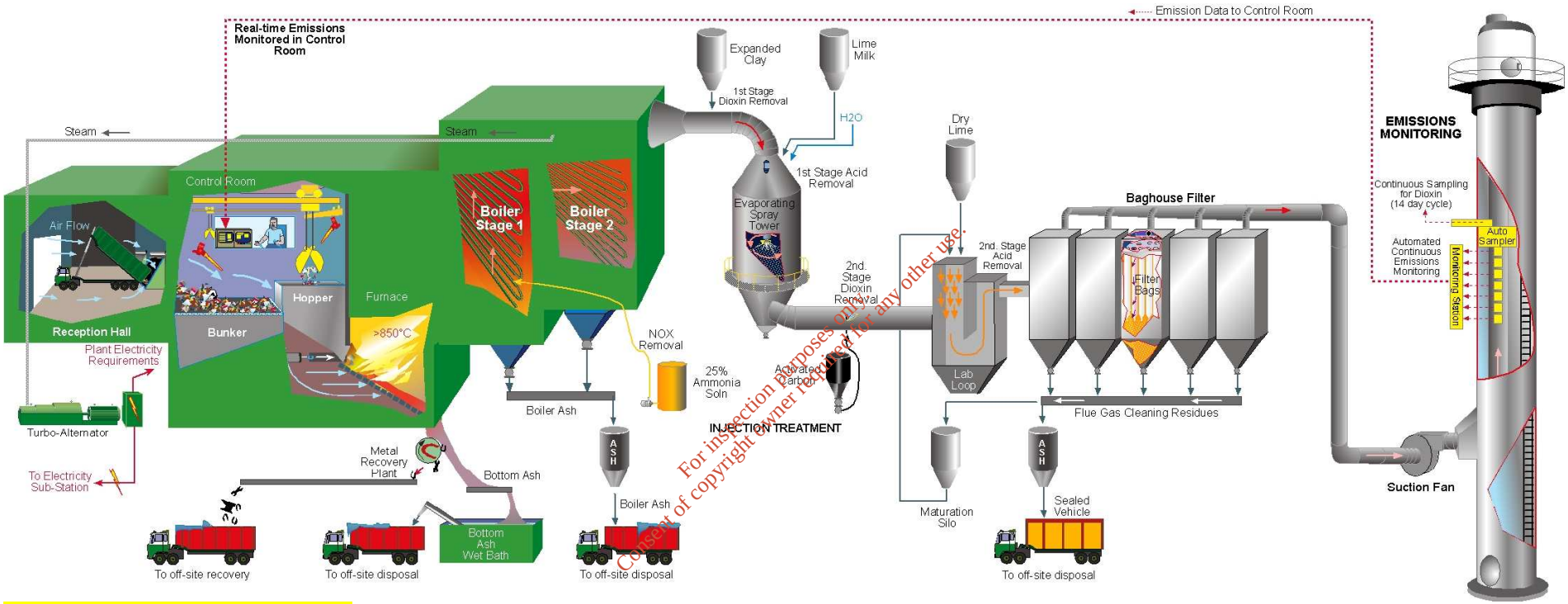


Figure A.1.e: Schematic of the process

Waste acceptance and handling

Deliveries will only be accepted at the facility from authorised carriers holding relevant waste collection permits.

All trucks entering the site will have to report to the weighbridge where they present documentation to staff in the gatehouse and are weighed. Details on all waste entering the facility will be recorded in a tracking system.

Trucks will then drive to the enclosed waste acceptance hall and discharge loads into the bunker through one of the five discharge chutes. Liquids will be directly injected via piping into the furnace from tankers connected at the side of the plant.

Frequent inspections of waste will take place in the reception hall to ensure all waste is in compliance with Indaver Ireland's waste acceptance criteria. All liquids will be tested at Indaver Ireland's laboratory at Dublin Port. Any non-conforming waste will be consigned to a waste quarantine area in the service yard where it will be held until alternative disposal arrangements are made. Bulky residual waste will be shredded in the acceptance hall before being discharged to the bunker.

Operators located in the control room overlooking the bunker will screen and mix the waste using overhead grab cranes. The blended waste is fed to the highest point in the furnace via hoppers, and forms a plug that isolates the furnace from the bunker. Liquids will be fed to the furnace via nozzles in the boiler.

The reception hall will be enclosed and maintained under negative pressure to ensure there are no odour or litter emissions. The bunker will have an approximate capacity of 5,600 tonnes, which will facilitate the storage of waste for a continuous feed of fuel to the furnace outside of waste acceptance hours. The average retention time of the waste in the bunker will be three days.

Moving Grate Furnace

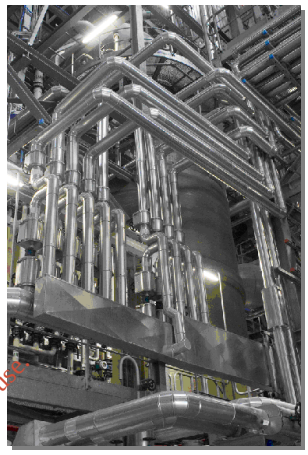
The waste in the hoppers will be fed to the furnace at a controlled rate by feeding rams. The furnace consists of a grate mechanism, which will promote complete and efficient combustion of waste through slow and continuous movement, mechanical breakup and effective air distribution.

The combustion of waste on the grate will produce both gases and solid residues. The gases will pass into a post-combustion chamber situated over the grate, where further combustion takes place. Bottom ash will be discharged at the end of the grate into a water bath or "wet de-slagger". The average residence time of waste in the furnace will be approximately one hour.

Oxides of nitrogen (NO_x) will be treated using Selective Non Catalytic Reduction (SCNR). This will involve injecting a SCNR reagent (ammonia or urea) at two levels into the post-combustion chamber.

The control system in the furnace will monitor a range of parameters, and make adjustments to the process to ensure complete combustion and that emissions limits are met.

Boiler



The boiler immediately follows the furnace and is designed to recover energy from hot flue gases to produce steam. In the process, the flue gases will be cooled from about 950°C to about 190°C. The total residence time of gases in the boiler will be approximately 30 seconds.

In order to comply with the EU Waste Incineration Directive 2000/76/EC, the boiler is designed to ensure that flue gases are maintained at 850°C for at least 2 seconds after the last air/fuel injection. Auxiliary burners will be used where necessary to ensure these conditions are met, for example during startup. The burners will not be in use under typical operation.

The velocity of gases in the boiler will be controlled to minimise dioxin formation and promote the deposition of boiler ash into a hopper for removal.

Electricity generation and Steam Cycle

Steam from the boiler at 40 bar and 400 °C will be sent to the steam turbine, which drives a generator set to give an electrical output of approximately 17.6MW. As approximately 2.5MW is required for use within the plant, the amount available for export to the national grid will be about 15.1MW.

To maximise energy recovery, steam leaving the turbine will be maintained at extremely low pressure by an air cooled condenser. Using air cooled condensers rather than cooling water reduces water consumption and avoids water discharge. The flow of steam through the cycle will be approximately 82 tonnes per hour at nominal load of 26.7 tonnes of waste per hour.

A small quantity of water will be purged constantly from the steam cycle and replaced with fresh makeup water from a water purification (demineralisation) plant. This “boiler blow down” will be recycled within the process plant.

Flue gas treatment system

The flue gas treatment system is designed to ensure emissions from the stack will be well below limits set by EU Directive 2000/76/EC. The system has been designed to produce no effluent and to minimise the consumption of water, reagents and energy.

The key stages of the treatment system include:

- A first dioxin removal stage, where expanded clay ("Dioxorb") is injected into a duct at the outlet of the boiler. Any dioxins and heavy metals are adsorbed into the clay for removal in the baghouse filter downstream.
- A spray drier absorber, which cools flue gases and injects lime slurry to react with acid gases such as HCl and SO_2. This forms reaction salts, which are also removed in the baghouse filter downstream.
- A second stage dioxin removal and acid gas treatment, which takes place in a reaction duct with the injection of activated carbon, recirculated and reactivated reagent from the baghouse filter and fresh lime absorbent (where necessary). This ensures that any remaining pollutants are captured.
- A high performance baghouse filter, to trap dust and heavy metals. The residue is shaken off the filters into dust collection hoppers. As it still contains some un-reacted lime, most of it can be reactivated and recycled into the reaction duct to minimise the amount of residue going for disposal.

- An induced draught fan and a stack equipped with continuous emissions monitoring systems. The fan maintains the flue gas system under constant pressure to ensure that all gases pass through the system. Treated gases will then leave the 65m stack at a temperature of 140°C.

The flue gas treatment system will be controlled using parameters measured at the stack, and if possible at the boiler exit.

Residues handling

Solid residues will be collected from three different process areas including:

- Bottom ash and grate siftings from the grate furnace. This will constitute the bulk of residue from the facility at 25% of waste input by weight or 50,000 tpa.
- Boiler ash from the boiler ash hopper. This will constitute about 1.5% of the waste input by weight or 3,000 tpa.
- Flue gas treatment residues from the spray drier absorber and baghouse filter hoppers. This will constitute about 5% of the waste input by weight or 10,000 tpa.

The bottom ash and grate siftings will be passed over a sieve to separate out oversized ash particles. Approximately 5,000 tpa ferrous metals will also be separated out for recycling. The remaining ash will be stored in an ash handling building. The water content of the grate siftings and bottom ash will be approximately 25%, which will minimise dust emissions during storage.

Boiler ash and flue gas cleaning residues will be stored in silos in the main process building before being sent offsite. The boiler ash and flue gas cleaning residue transport, storage and truck discharge mechanisms will be specially designed to minimise dust emission.

A.1.6.d Process Modifications

The principle modifications to the process approved in WL 167-1 include the:

- reconfiguration of the plant to have a single incineration line with a single furnace and boiler leading into a single flue gas treatment system,
- increased capacity of the waste bunker, furnace, boiler and flue gas treatment systems in line with the increased plant throughput,
- increase in electricity production from 14MW to 17.6MW,
- reconfiguration of the flue gas treatment system, including:
    - moving the first stage dioxin and heavy metals removal to upstream of the spray drier absorber and using expanded clay rather than activated carbon/lime,
    - the replacement of the wet scrubbing system/tail end cleaning with a second stage dioxin/heavy metals/acid gas removal in the reaction duct before the baghouse filter,
    - the removal of the reheat of gases prior to discharge, as the temperature of the gases at the end of the treatment system will be sufficiently high to avoid the formation of a visible plume
    - an overall increase in energy efficiency and decrease in reagent consumption.

A.1.6.e Compliance with the Waste Incineration Directive

The facility has been designed to comply with the Waste Incineration Directive 2000/76/EC by:

- Ensuring the facility design is suited to the types of waste to be accepted,
- Designing the plant for maximum energy efficiency in order to optimise electrical output,
- Minimising the generation of residues by designing the combustion process to be as complete as possible, minimising reagent use in the flue gas treatment system and other measures,
- Recovering metals from the bottom ash, and striving to recover and reuse as much as possible from the bottom ash where practicable. All disposal of residues will be to appropriate licensed facilities.

A.1.7 Section 40(4) of the Waste Management Act

Under the Waste Management Act 1996 to 2003, the Agency cannot grant a waste licence unless it is satisfied that the conditions outlined in Section 40(4) have been met. Compliance with these conditions is outlined in the following section.

A.1.7.a Impact of facility on environment and health

Emissions from the facility will not cause environmental pollution and will comply with all of the relevant standards including:

- General Operations Standards: The facility has been designed in line with the principles of Best Available Technology (BAT), the Waste Incineration Directive 2000/76/EC and health and safety standards.
- Air emissions and ambient quality standards: All emissions leaving the stack will be well below the limits set out in the Waste Incineration Directive 2000/76/EC. Air dispersion modelling shows that the cumulative impacts on air quality from the facility (factoring in neighbouring industries) will be well within Ambient Air Quality Standards set out in EU Directive 1999/30/EC, even at maximum or abnormal operating conditions.
- Human health standards for dioxins: The predicted worst-case impacts of dioxin and furan emissions on human health (based on a theoretical "Maximum At Risk Individual") are well below the values set in the EU Tolerable Weekly Intake standards for both worst case and abnormal operating condition scenarios.
- Effluent emission standards: The facility has been designed to prevent the unauthorised or accidental release of polluting substances to soil or groundwater in line with the EU Groundwater Directive 80/68/EEC and the Waste Incineration Directive 2000/76/EC. The only emission to ground will be treated sanitary effluent from staff and visitor facilities, which has been designed in line with EPA Guidelines on Wastewater Treatment Systems. Surface water emissions will consist of clean surface water runoff, which will be controlled in line with recommendations set out in the Dublin City Council Storm Water Management Policy and the Waste Incineration Directive 2000/76/EC. There will be no discharge of process effluent from the facility.
- Noise standards: Noise emissions from the facility will not exceed the standards set out in the EPA Guidelines on Noise.
- Protection of habitats standards: The facility will not have an adverse impact on any sites protected under the EU Habitats Directive 92/43/EEC or other areas within or near the site covered by a scientific or conservation designation as recognised by the National Parks and Wildlife Service.
- Residues standards: In line with the Waste Incineration Directive 2000/76/EC, dry residues will be stored in enclosed containers, bottom ash will comply with relevant limits and materials will be recovered from bottom ash insofar as practicable.

A.1.7.b Application of Best Available Techniques

The facility has been designed in line with recommendations in the European IPPC Bureau Reference Document (BREF) on Best Available Techniques (BAT) for Waste Incineration and will be operated in line with Waste Licence conditions and the Waste Incineration Directive as required. Local factors have been taken into account in the design such as the requirements to produce no process effluent and to minimise water consumption.

A.1.7.c Compliance with the Waste Management Plan

One of the reasons for re-applying for planning permission and for a review of the waste licence was to extend the capacity of the facility in line with the 2005-2010 *North East Region Waste Management Plan*. This plan states that, to achieve its goal of thermally treating 39% municipal waste arising:

It is an objective of the Plan to develop a Thermal Treatment Plant with a capacity of 150,000 to 200,000 tonnes per annum by 2007. A licence has already been obtained for the development of a facility at Carranstown in County Meath.

It is therefore submitted that the scale and nature of the facility is consistent with the requirements of the Waste Management Plan for the North East Region.

It is noted that Indaver has made a submission on the foot of planning permission PL 17.219721 for minor amendments. The application was lodged with Meath County Council in September under reference number SA/901406.

A.1.7.d Fit and Proper Person

Indaver Ireland has never been convicted of any offence under the Waste Management Act 1996 to 2003, the EPA Act 1992 and 2003, the Local Government (Water Pollution) Acts 1997 and 1990 or the Air Pollution Act 1987 or any other environmental legislation in the 30 years it has operated in Ireland either as Indaver Ireland or as Minchem Environmental Services Ltd.

Staff responsible for operations and management of the facility will be suitably qualified and will receive specialist training at existing waste-to-energy plants owned and operated by the parent company, Indaver NV, in Flanders, Belgium. Staff based in Indaver NV will also provide support to management, operations and quality, environment, safety and health staff based in Ireland.

Indaver NV has over 20 years experience in waste management and waste-to-energy facility operations. In 2007, the company handled over 1.87 million tonnes of waste throughout Europe.

At its largest facility in Flanders, Belgium, over 700,000 tonnes MSW, industrial wastes and sludges are treated annually. This facility has both grate furnace and fluidised bed furnace plants to cater for different waste types. Indaver NV also operates a waste-to-energy facility for hazardous waste with both static and rotary kilns, giving the company a broad range of experience in materials management and waste-to-energy technologies.

A.1.7.e Meeting Financial Commitments and Liabilities

Indaver NV has been operating since 1985 and is in a strong financial position to invest in waste management infrastructure in Ireland. Due to its extensive operations and continual expansion, it is also in a position to understand and meet any financial commitments or liabilities incurred by the activity relating to this application.

Indaver NV's global insurance policy includes public liability, product liability, legal expense and environmental liability and onsite cleanup costs. The Meath waste management facility will be covered under this global scheme.

Furthermore, in line with planning condition 28 of PL 17.219721, Indaver Ireland will lodge a bond with the planning authority to secure final restoration measures if required (under the terms of condition 27) and will enter an agreement empowering the planning authority to apply this security or part of it to the satisfactory completion of any part of the restoration plan.

A.1.7.f Efficient use of Energy

Energy efficiency has been taken into account wherever possible in order to maximise electricity exports from the facility. Such measures include:

- Minimising flue gas heat losses by ensuring that the temperature in flue gas treatment components decreases from the boiler to the stack, optimising flue gas flow and primary/secondary air distribution and using flue gas condensation at the boiler exit.
- Pre-heating primary air and boiler feedwater with waste heat.
- Ensuring the thermal conversion efficiency of the boiler is greater than 80%.
- Selecting a highly efficient turbine for the maximum extraction of energy.
- Minimising onsite demand by selecting equipment with low energy demand.

In addition to these design considerations, the efficient use of energy and resources is one of the 11 key objectives in the Indaver Improvement Plan. This plan covers all facilities and includes objectives such as regular electrical inspections, energy efficiency audits and running awareness campaigns.

A.1.7.g Noise Emissions

Noise emissions from the facility will not exceed the limits given in the EPA Guidelines on Noise. The limits set out in these Guidelines reflect EPA policy, developments in legislation, licensing requirements and BAT.

A.1.7.h Waste Management Act Compliance Modifications

The principle modifications to the plant's compliance with the Waste Management Act Section 40(4)(a) to (g) as approved in WL 167-1 include the:

- Addition of further measures in line with BAT to improve the plant's energy efficiency, reduce residue production and reduce water and energy consumption
- Increase in capacity of the plant in line with the 2005 – 2010 North East Regional Waste Management Plan
- Improvement in the energy efficiency of the flue gas treatment system

A.1.8 Nature of Emissions from the Facility

It is one of Indaver's core values to operate in a way that is safe, socially responsible and sustainable with minimal impact on activities and surroundings. This includes avoiding any release, disposal or emission that might harm the environment. Compliance with national and European regulations will be achieved as a minimum expectation.

A.1.8.a Air emissions

There will be one main emission point at the stack through which the treated flue gases will be discharged. This will mostly consist of carbon dioxide (CO_2) and water vapour but may also contain a number of substances regulated by EU and Irish legislation.

The process has been designed to ensure typical emission concentrations for all pollutants are well below the limits specified in the Waste Incineration Directive (2000/76/EC). This Directive specifies the most stringent emissions limits of any industry.

There will also be one minor emission source from the emergency generator, which will only be run in the unlikely event that there is no alternative power source for the plant. It is anticipated that the total annual operation of this generator will not exceed 12 hours per year.

There will be no fugitive or uncontrolled emissions to air from the facility.

A.1.8.b Surface Water Emissions

The process has been specifically designed to minimise the use of water and to ensure that there is no process effluent discharge. All drainage water from the main process building will be recirculated within the plant.

There will be one emission source from the drainage system, which will consist of non-contaminated surface water runoff collected from roofs and hardstand areas. This will discharge to a drainage ditch at the western corner of the site at a rate controlled by a hydrobrake system, which will mimic a discharge from agricultural land. Two monitoring stations will detect any contamination and divert it to a separate storage tank, or if this is full, shut off all discharge from the system. A Class I full retention separator for petrol like substances will also be installed at the discharge point.

The undeveloped area of the site will continue to drain naturally to existing drainage ditches. Waters draining from these areas will not come into contact with any potential contamination from the plant.

A.1.8.c Emissions to Sewer

There will be no emissions to sewer. All sanitary effluent from staff and visitor facilities will be treated onsite in two separate Puraflo treatment systems, which will discharge a treated effluent to ground as described below.

A.1.8.d Groundwater Emissions

There will be two minor emissions to ground, which will consist of treated sanitary effluent from staff and visitor areas. The emissions will be discharged into the overburden via engineered percolation areas, following treatment in Puraflo Liquid Effluent Treatment Systems.

This system provides a combination of physical, chemical and biological treatment of the wastewater in a biofibrous medium. It is common to development located in areas with no public sewer facilities such as golf clubs and is certified by the Irish Agrement Board.

There will be no fugitive or uncontrolled emissions to ground or groundwater.

A.1.8.e Noise Emissions

There are six potential sources of continuous noise, all from process equipment at various points in the plant. The stack and air cooled condensers are the most significant continuous sources of noise as they are located externally. These will always be operated below the EPA noise limits.

Traffic noise was found to have little impact on overall noise from the site and is therefore not considered to be a significant emission.

A.1.8.f Other Nuisances

To limit nuisances such as vermin, dust emissions and litter, all deliveries, handling and storage activities will take place in fully enclosed environments, the main process building will be maintained under negative pressure and the facility will be kept clean and tidy at all times. Roads, parking areas and service yards will be paved to minimise the potential for dust emissions. Measures for limiting the impact of traffic movements on the road network include road widening and the provision of a ghost island junction to facilitate a turning lane.

The facility is considered to be normal fire risk since the likely fuel source, the waste, has a high moisture content and a slow natural burn rate. The entire plant will be designed for and provided with adequate fire protection and detection systems consistent with the requirements of the Building Regulations, the Code of Practice for Fire Safety in Buildings BS5588 and in consultation with Indaver's insurers. The system will include smoke/heat detectors, an alarm system, onsite storage of water for fire fighting purposes and manual call points.

A.1.8.g Emissions Modifications

The principle modifications to emissions from the facility as approved in WL 167-1 include the:

- increase in total emissions from the stack in line with the increased throughput. However, expected emissions remain well within EU Waste Incineration Directive (2000/76/EC) emissions limit values.
- storage of consumables in a separate room of the main process building to better contain any emissions that could arise.
- increase in the discharge of surface water runoff to the drainage ditch, as collected waters will no longer be recirculated within the plant. Sufficient attenuation capacity has been provided to ensure the discharge rate will mimic the existing site runoff.

- inclusion of two monitoring chambers to monitor surface water flows and ensure any discharge is strictly uncontaminated.
- change in noise emissions location and volume due to the revised layout of the facility and updated information on equipment. Most expected equipment noise emissions have decreased.

A.1.9 Impacts of Emissions from the Facility

A.1.9.a Air Emissions

Air emissions from the stack will be controlled through both process optimisation and physical / chemical treatment in the flue gas treatment system. These systems have been designed to ensure emissions will be significantly lower than the limits set out in the EU Waste Incineration Directive (2000/76/EEC).

To limit fugitive emissions from the facility, the main process building will be maintained under negative pressure. The storage, treatment and handling operations for waste, consumables and residues will be carried out in enclosed environments with filters or closed loop loading systems fitted where necessary. The storage area for consumables, boiler ash and flue gas treatment residues will be isolated from the main process building to contain any emissions that may arise from this area.

To study the impacts of air emissions from the stack, detailed air dispersion modelling was carried out using the United States Environmental Protection Agency regulatory model, AERMOD. This is in line with recommendations outlined in the Waste Incineration Directive (2000/76/EC).

Throughout the study, a worst case approach was taken for all input assumptions including emissions, background concentrations and weather conditions. The study demonstrated that all substances emitted from the facility will meet the most stringent ambient air quality standards for the protection of human health and the environment, even where the plant is operating at maximum or abnormal operating conditions.

An odour impact assessment also found that all predicted ground level concentrations will be lower than the recommended EPA limit even during a worst-case meteorological year.

An assessment of the potential worst-case impact of dioxin and furan emissions on an individual living near the site (Maximum At Risk Individual) due to inhalation and ingestion was also conducted. This found that the proposed facility would have no significant impact on dioxin and furan intake even considering worst case scenario exposure levels.

A.1.9.b Surface Water Emissions

The surface water discharge will consist only of clean surface water runoff and will mimic existing discharge rates from the site. There will be no discharge of process effluent to surface water.

The monitoring stations or fire alarm system will automatically divert any potential contamination or will shut off the discharge from the system. All potentially polluting substances will be stored within the main process building and provided with adequate containment. Substances stored in the yard areas will be fully bunded.

As a result, the proposed facility will not have any negative impact on surface waters.

A.1.9.c Groundwater Emissions

There will be no fugitive emissions from the facility to ground or groundwater. All areas where potentially polluting materials are handled are either indoors or in bunded, contained and hardstand areas. The waste bunker and spill tank will be fitted with a double containment system to ensure that any leaks are collected and removed. The contaminated water storage tank will also be fitted with extra containment. All bunkers and attenuation tanks will be integrity tested to confirm they are watertight.

The only emissions to ground will be treated domestic sewage. These will discharge into the overburden via two percolation areas. There will be no other discharge to ground from the facility.

The planned groundwater extraction for domestic and process water requirements will not have any negative impacts on the aquifer.

A.1.9.d Noise Emissions

To limit noise emissions, key items of equipment will be provided with acoustic insulation and located within the main process building.

Due to these and other measures, noise modelling found that operational noise impacts will not exceed EPA recommended limits offsite. Predicted noise levels due to vehicle movements onsite were found to be within recommended criteria and will not have a negative impact on the local community. The predicted noise increase from additional traffic using public roads was estimated at less than 1dB and was therefore considered to be imperceptible.

Anti-vibration mounts will be installed on all plant with the potential to generate significant levels of vibration, which will ensure vibration from operations is not significant.

A.1.9.e Impacts on Ecology

The main impacts of the development on the ecology of the site will be the removal of arable crop land, improved agricultural grassland and a number of hedgerows in the area. With the recommended mitigation measures, there will be no negative impact on the ecology of the site or surrounding area. Such measures included for example maintaining the existing network of hedgerows and treelines wherever possible, scheduling tree felling for the spring or autumn months, planting native species and putting in place a bat box scheme.

Overall, it was found that the proposed landscaping of the site may result in a net gain in biodiversity value of the site.

A.1.9.f Impact Modifications

The principle modifications to mitigation measures and impacts as approved in WL 167-1 include the:

- increase in most of the predicted emissions concentrations at ground level (apart from NO_2) due to an increase in the stack height, and revised figures for flue gas volume and exit speed. These changes outweighed the impact of changing assumed emissions from the stack to half hourly average values based on 100% rather than 97% levels as per Annex V of Directive 2000/12/28, which gave a more conservative estimate.
- increase in the overall quantity of surface water discharged, and an increase in the rate of discharge calculated in line with the methodology specified in the Greater Dublin Strategic Drainage Study.
- addition of information on noise modelling, which was not previously conducted.

A.1.10 Monitoring and Sampling

A.1.10.a Air Monitoring and Sampling

Continuous monitoring on stack emissions will measure, in line with the EU Directive 2000/76/EC, the following parameters:

- Total dust
- Total Organic Carbon (TOC)
- Hydrogen Chloride (HCl)
- Hydrofluoric Acid (HF)
- Sulfur dioxide (SO_2)
- Oxides of nitrogen (NO_x)
- Carbon Monoxide (CO)
- Temperature
- Oxygen (O_2)

Measurements will be relayed to the plant computerised control system and the emission registration software system where operators will be able to view the results.

Grab samples will also be taken from the stack on a quarterly basis to monitor for heavy metals and their compounds. These will be taken and measured by an external accredited laboratory. Furthermore, although not required by EU or Irish legislation, a dioxin sampling system will be installed. This will enable the collection of dioxin samples over a fortnightly period for analysis in an independent laboratory.

Ambient odour monitoring will be carried out at two locations on an annual basis. It is also proposed to carry out an instantaneous olfactometric (smell) assessment at various locations within the site on a weekly basis.

A.1.10.b Surface Water Monitoring and Sampling

Surface waters pass through two monitoring chambers before being discharged, which will measure for the parameters required by the EPA and the drainage division of Meath County Council.

A.1.10.c Groundwater Monitoring and Sampling

The emission of treated domestic effluent to ground will be monitored on a quarterly basis from sampling chambers located at each of the discharge points. Samples will be analysed for Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD) and Total Suspended Solids (TSS).

It is also proposed to carry out groundwater monitoring at three wells on the site, in line with EPA guidelines. Samples will be collected twice a year for analysis by external consultants for a range of pollutants specified by the EPA.

A.1.10.d Noise Monitoring and Sampling

Noise monitoring will be carried out at the main sources of noise as part of the first annual noise survey. Every year thereafter, noise monitoring will be carried out at four locations on and near the site. Daytime (30 minute duration) and night time (15 minute duration) noise measurements will be taken at each of the monitoring points.

A.1.10.e Meteorological Monitoring and Sampling

A meteorological monitoring station will be installed to monitor wind speed and direction and atmospheric pressure on a continuous basis. Precipitation volume and temperature will also be monitored on a daily basis. All measurements will meet World Meteorological Organisation Standards and Recommendations.

A.1.10.f Monitoring and Sampling Modifications

The principle modifications to monitoring and sampling as approved in WL 167-1 include:

- Changes to the naming system for emissions and monitoring points, in line with Waste Licensing Guidance Notes
- The addition of two monitoring chambers in the surface water drainage system. There was previously no monitoring proposed for surface water emissions.
- The addition of a second sampling chamber at the puraflo discharge point next to the security building.
- Changes to the location of equipment to be monitored as part of the first annual noise survey, with the revised plant layout.
- Identification of a potential location for the meteorological monitoring station

A.1.11 Waste Arisings

A.1.11.a Handling of Waste Arising

Bottom ash is typically non-hazardous and will consist mostly of inert materials such as glass, sand, metal pieces and stones. Approximately 5,000 tpa ferrous metals will be extracted from the bottom ash for recycling, which will be sent off-site to an appropriate and licensed recycling facility. It is currently envisaged that in the short term, the remainder of the bottom ash will be sent to a non-hazardous landfill. The volume of ash produced by a waste-to-energy plant requires significantly less landfill capacity to dispose of than sending MSW directly to landfill. In addition, due to the inert nature of the ash, it will have a less adverse impact than untreated waste, which is currently being landfilled.

However, should the appropriate standards be devised for the reuse of bottom ash components in the construction industry, Indaver will explore options for the further treatment and reuse of bottom ash. For this reason, Indaver is seeking to retain the option to develop a bottom ash recovery facility onsite in the future.

Boiler ash is also expected to be non hazardous, and will be sent for non-hazardous disposal. If test results show that the material is hazardous, it will be sent for hazardous waste disposal with the flue gas treatment residues.

It is expected that the flue gas treatment residues will be classified as hazardous waste. In the absence of hazardous waste landfill capacity in Ireland, this material will be exported for disposal in an appropriately licensed facility. It is not envisaged to solidify or otherwise pre-treat these residues prior to export as this would only increase their overall mass and volume, thereby increasing the environmental impact of their transport. Indaver Ireland has over 20 years experience of sourcing suitable outlets, both in Ireland and abroad, for the disposal of hazardous waste. Indaver also operates its own hazardous waste landfill in Antwerp, Belgium.

It is anticipated that hazardous waste landfill capacity will be developed in Ireland in the medium to long term. For this reason, Indaver is seeking to retain the option to install pre-treatment equipment for flue gas treatment residues to prepare them for landfill, where necessary.

Other wastes arising from the facility will include only minor quantities of waste from facility operations and staff and visitor facilities.

A.1.11.b Waste Arising Modifications

The principle modifications to waste arising as approved in WL 167-1 include the:

- increase in quantities of residues arising in line with the increased throughput of the facility. The overall quantity of residues produced has increased by approximately 25,000 tpa and the quantity of ferrous metals to be recovered has increased by approximately 2,900 tpa.
- consideration of new information available on acceptance criteria for landfill and for reuse opportunities for bottom ash residues

A.1.12 Accident Prevention and Emergency Response

It is the policy of Indaver Ireland to attach the greatest importance to the health and safety of all persons employed on and indirectly affected by site activities.

A.1.12.a Accident Prevention and Emergency Response

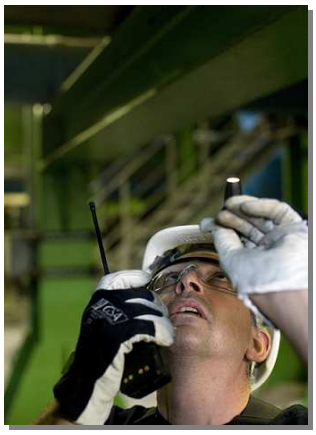
The facility has been designed in accordance with internationally recognised health and safety standards, design codes, legislation, good practice and experience.

To improve safety and minimise the risk of emergency situations, the plant design will include:

- manual and automatic controls
- a comprehensive interlock system which can automatically shut down the plant in a safe manner in the event of equipment failure or dangerous situations arising
- fire detection and fighting systems
- backup systems for pumps, control systems, power supply and instruments.

The plant will be operated in line with Indaver Ireland's Quality, Environmental, Safety and Health (QESH) system which is accredited to the quality standard ISO 9001, the environmental standard ISO 14001 and the safety standard OHSAS 18001.

Hazard and operability studies will be conducted to systematically identify hazards and draw up a comprehensive set of standard operating procedures for the plant to help minimise the risk of accident/emergency situations arising. Indaver's experience of successfully operating similar plants in Belgium will allow potential hazards to be easily identified. Wherever possible, Indaver will strive to minimise human interaction in safety critical operations in order to eliminate the potential for "human factors" to initiate or exacerbate major accidents at the site.



The facility will be well maintained and cleaned at all times. A preventative maintenance system will also be put in place, which will incorporate routine checks and maintenance of key equipment to ensure they remain in good working order.

A Site Emergency Plan will be prepared before the plant is commissioned. This will set out the response measures to be taken by personnel in the event of an emergency. Measures will be designed to ensure maximum protection for site employees, visitors and people in other premises near the site to limit damage to property and minimise the impact on site operations and on the environment.

The Site Emergency Plan will have four basic components:

- prevention, involving identification of potential hazards and taking measures to remove the hazard or reduce the potential for the hazard and its adverse effects

- preparedness including emergency planning, training, drill and exercise programmes
- response, addressing the immediate and short term effects of an emergency
- recovery, involving the restoration of site services and systems to normal status.

Through recruitment, training, performance management, employee development and succession planning, Indaver Ireland aims to ensure that all members of staff are in possession of the knowledge, skills and experience necessary to perform their jobs to a satisfactory standard.

A.1.12.b Accident Prevention and Emergency Response Modifications

The principle modifications to accident prevention and emergency response measures as approved in WL 167-1 include the:

- inclusion of up to date regulations in determining measures for the safe and operation design of the facility

A.1.13 Closure, Restoration and Aftercare

A.1.13.a Closure, Restoration and Aftercare Measures

The total lifespan of the plant is currently anticipated to be 30 years but this can be extended with maintenance and replacement of equipment. Should circumstances arise whereby it becomes necessary to shut down the facility, Indaver will provide the EPA with a detailed decommissioning plan for its approval before the commencement of any works.

This will include measures to avoid any pollution risk and return the site of operation to a satisfactory state. The absence of materials stored or landfilled onsite will mean that an aftercare management plan is not required.

A.1.13.b Closure, Restoration and Aftercare Modifications

There are no modifications to closure, restoration or aftercare provisions as approved in WL 167-1.

A.1.14 Definitions and Abbreviations

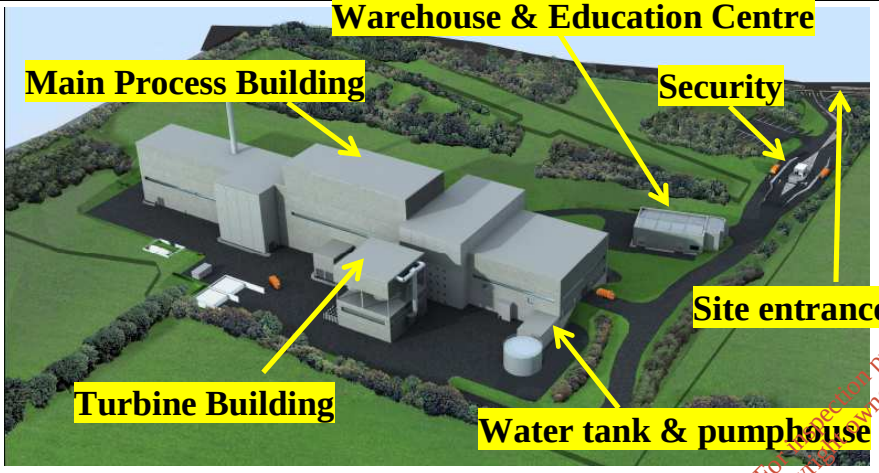
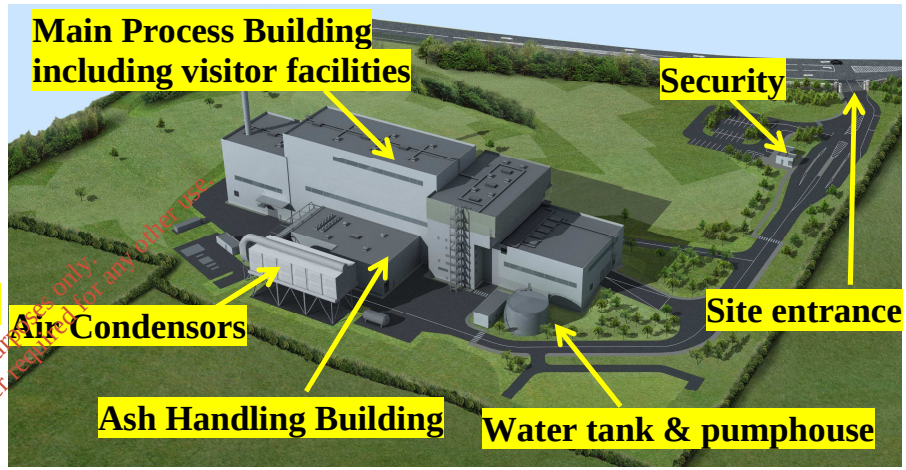
BAT	Best Available Techniques
BREF	European IPPC Bureau Reference Document
dB	decibel (noise)
EWC	European Waste Catalogue
HAZOP	Hazard and Operability
HSA	Health and Safety Authority
l/s	litres per second
MARI	Maximum At Risk Individual

MJ	Megajoules
MSW	Municipal Solid Waste, including household and commercial waste and street sweepings
MW	Megawatt (of energy)
NCV	Net Calorific Value
PAH	Poly Aromatic Hydrocarbons
PEC	Predicted Emissions Concentration (at ground level)
PVC	Poly vinyl chloride
QESH	Quality, Environmental, Safety and Health
SNCR	Selective Non-Catalytic Reduction
TOC	Total Organic Carbon
tpa	tonnes per annum
tph	tonnes per hour
UPS	Uninterruptible Power Supply

Nominal load	typical operating load
Waste-to-energy	Incineration with energy recovery

Appendix 13.d: Site Layout Revision

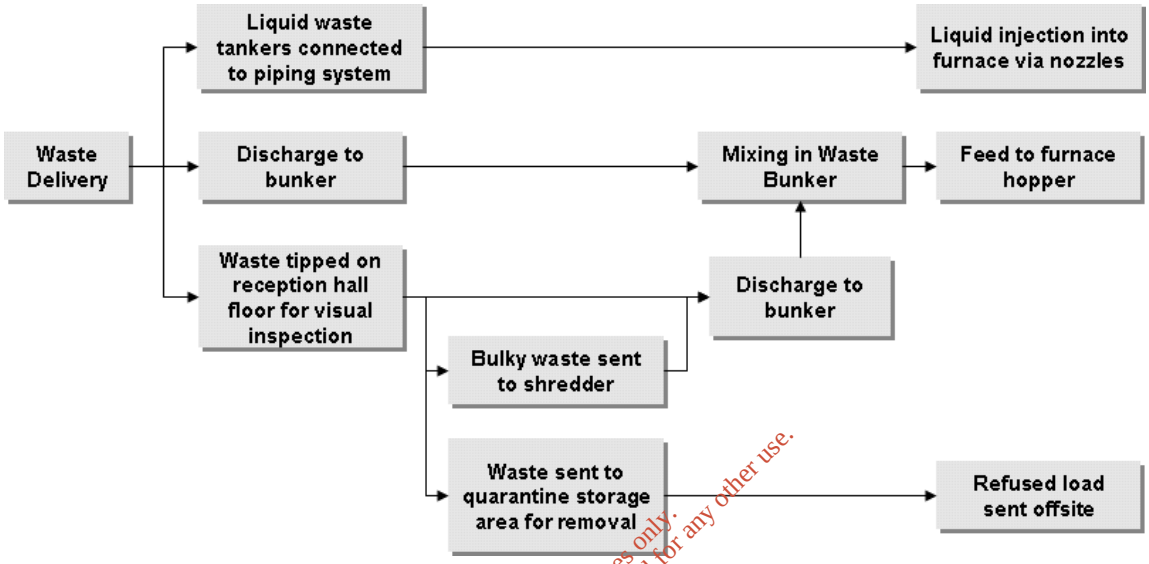
Table B.2.c: Comparison of Site Layout

Site Layout in RWLA	Revised Site Layout as Outlined in Articles 12 & 13 Submission
	

Appendix 13.e: Description of Liquid Injection to Boiler

Attachment D.2.2 Waste Acceptance and Handling

In addition to the waste acceptance and handling operations described in the RWLA, a direct injection system will be installed to facilitate the acceptance of liquid wastes.



Revised Figure 2.D.b: Waste Acceptance and Handling Process Flow

Attachment D.2.2.a Process Description

The same acceptance procedures will apply for liquid wastes as for solid wastes including prior authorisation, confirmation of permitting and presentation of documentation at the gatehouse. Laboratory analysis will also accompany the liquid waste deliveries to verify the composition.

After passing the weighbridge and gatehouse, liquid tankers will drive to a designated unloading area at the side of the main process building as shown in Drawing 18081\WL\008. Tankers will connected to the unloading pump using flexible hoses and couplings. The liquids will be pumped from the tankers via piping to a nozzle in the furnace where they will be injected into the furnace above the grate.

The tankers will remain in the unloading area until fully discharged.

Attachment D.2.2.b Process Control

The pumping rate to the furnace will be dictated by the operators in the control room in function of the standard process parameters within the furnace. Standard safety features will be employed to ensure that there is no risk of flame back flow from the furnace to the tanker. As all of the liquid wasted handled will be non-hazardous, there will not be a need for a nitrogen blanketing system during unloading operations.

Attachment D.2.2.c Abnormal Conditions

Abnormal operating conditions would include a blockage in the line/nozzle to the furnace or a leak/spill in the tanker unloading area.

If there is a blockage in the line then the liquids cannot be pumped to the furnace but this will have no impact on the burning of municipal solid waste in the furnace and the blockage can be removed while the plant is running.

The unloading area will be designed to contain any leaks or spills from tankers. Hence any spillage will be contained in this area and will be cleaned up by the emergency response team on site. As the liquids will be non-hazardous they will not pose any risk to people in the immediate area, the environment or those performing the spill cleanup.

Attachment E.1.2 Fugitive Emissions

There will be no fugitive emissions from the unloading of liquid waste tankers.

Attachment E.5 Noise Emissions

There will be no significant noise emissions associated with this activity. The pumping equipment will be small and will only be audible in the immediate vicinity of the unloading area.

Attachment F Abatement Systems and Monitoring

There will be no additional monitoring requirements associated with this activity.

Attachment H.2 Waste Acceptance

The scheduling and reporting procedures for liquid wastes are the same as those for solid wastes. The only addition will be the requirement for laboratory analysis of each liquid waste load upon acceptance.

The arrival and unloading of trucks will be different for liquid wastes as described above. Tankers will be directed to a dedicated contained area on the southern side of the main process building where they will be connected to pipework that will pump the liquid waste contents to a nozzle for injection into the furnace. Visual waste inspection will not be required as the waste will be accompanied by a laboratory analysis. It is unlikely that liquid wastes would require quarantine at the Meath site since laboratory testing should detect any non-conformance issues prior to the tanker delivery to Meath.

Attachment H.3 Waste Handling

A separate waste handling procedure will be developed for liquid waste handling as part of a suite of procedures to be developed for the site. This will describe the handling requirements related to:

- connection of the tankers to pipework for direct injection into the furnace and
- the operation of this injection system.

Appendix 13.f: Description of changes to noise sources

Nine noise sources in total are identified as follows (note Table references on this drawing refers to the original EIS):

1. Chimney Stack – Sound Power Level as Per Table 8.9 EIS. Height @ 95.5m

2. Turbine Cooling No. 1 & No. 2 – As per Turbine Cooling No, 1 & No. 2 Sound Power Levels as per Table 8.9 EIS. Height @ 42.875m

3. Grate Cooling No. 1 & No. 2 – As per Table 8.9 EIS (Cooling Grid Oven No. 1 & No. 2) Height @ 42.875m

4. AHU Accommodation Block – 55dB(A) at 1m distance from the unit.

5. ACC Unit – As per specification, noise not to exceed 55dB(A) at 90m from equipment. Actual sound power level 106dB(A) @ 1m from equipment, height as previous EIS.1

6. Emergency Fire Water Pumps – 85dB(A) at 1m distance from the unit. The fire pump will only operate in an emergency fire situation but will be run for test proposes on a regular (possibly weekly) basis. The pumps will be located in a pump house, there will be intake louvers in the walls of the pumphouse, these louvers may have to be treated acoustically if the noise breakout through the louvers is excessive.

7. Diesel Generator – 95dB(A) @ 1m from equipment in a purpose built enclosure @ ground level.

8. CA Compressors – as per Table 8.9 EIS (Grid Compressors 1, 2, 3) Height @ 43.750m.

9. Turbine – 92dB(A) at 1m from equipment – height @ 30.5m

Table A13.i below (i.e. Table 5.2.6 of the 2009 EIS) compares the noise source data contained within the 2009 EIS against the nine sources identified.

Table A13.e: Noise source data as per 2009 EIS

Description	Octave Band Centre Frequency (Hz)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Chimney Stack	82	89	92	79	75	69	70	70	94
Turbine Cooling No. 1	64	69	72	83	80	77	72	64	86
Turbine Cooling No. 2	64	69	72	83	80	77	72	64	86
Grate Cooling No. 1	69	74	77	81	80	76	71	63	86
Grate Cooling No. 2	69	74	77	81	80	76	71	63	86
Pump House Louvres[2]	59	73	78	79	82	82	85	71	89
Generator Louvres[3]	50	65	81	90	94	95	97	83	101

[2] This spectrum and overall noise level has been calculated based on a sound pressure level of 85dB(A) at 1m from the emergency fire pumps, 3 pumps in operation, a pump house with a reverberation time of some 2 seconds, a volume of some 700m3 and the presence of standard weather louvers in the building envelope with associated areas of 6m2.

[3] This spectrum and overall noise level has been calculated based on a sound pressure level of 95dB(A) at 1m from the generator unit, a generator house with a reverberation time of some 2 seconds, a volume of some 115m3 and the presence of standard weather louvers in the building envelope with associated areas of 6m2.

The remaining sources identified but not contained within the above table are commented on in the following sections:

1. AHU Accommodation Block – Based on the supplied noise data the emissions from this source are not considered significant in terms of the overall emissions from the site.

2. ACC Unit – this source was considered in the noise model but omitted from the Table 5.2.6 of the EIS in error. Table A2 below presents a revised Table 5.2.6 which includes the ACC source data utilised in the noise model. Subsequent discussions clarified the noise level associated with the ACC unit was a sound power level of 97.5dB(A).

Table A13.ii: Corrected Noise source table

Description	Octave Band Centre Frequency (Hz)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Chimney Stack	82	89	92	79	75	69	70	70	94
Turbine Cooling No. 1	64	69	72	83	80	77	72	64	86
Turbine Cooling No. 2	64	69	72	83	80	77	72	64	86
Grate Cooling No. 1	69	74	77	81	80	76	71	63	86
Grate Cooling No. 2	69	74	77	81	80	76	71	63	86
Pump House Louvres[4]	59	73	78	79	82	82	85	71	89
Generator Louvres[5]	50	65	81	90	94	95	97	83	101
ACC	82	87	88	88	93	91	83	80	98

3. CA Compressors – these units are highlighted as within the building. Once consideration was given to the sound insulation offered by the building envelope the noise impact of these sources off site was not significant in terms of the overall site noise emissions.

4. Turbine – this units is highlighted as within the building. Once consideration was given to the sound insulation offered by the building envelope the noise impact of this source off site was not significant in terms of the overall site noise emissions.

Appendix 13.g: Revised Emissions Table E.1(ii)(a)

TABLE E.1(ii)(a) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. N^{o}:	A2-1
Source of Emission:	Waste to energy plant (stack)
Location :	Main process building - See drawing 18081\WL\013 in Appendix 13.b.
Grid Ref. (12 digit, 6E,6N):	306331E, 270963N
Vent Details Diameter: Height above Ground(m):	 2.2m 65m
Date of commencement:	Hot commissioning[3] of the facility will commence in the second quarter of 2011.

Characteristics of Emission :

(i) Volume to be emitted:			
Average/day	3,216,000Nm^3/d[4]	Maximum/day[5]	3,527,995 Nm^3/d
Maximum rate/hour	147,000 Nm^3/h	Min efflux velocity	14.95 m/sec [6]
(ii) Other factors			
Temperature	150^{o}C(max)	130^{o}C(min)	140^{o}C(avg)
For Combustion Sources: Volume terms expressed as : ☐ wet. ✓ dry. 11 %O_2			

(iii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)[7]	60 min/h 24 h/day 318 day/y

[3] i.e. when waste is first introduced into the furnace
[4] Based on a maximum annual average flowrate of 134,000 Nm^3/h.
[5] Based on a maximum 24 hour average flowrate of 147,000 Nm^3/h. Note emissions at this flowrate are only representative of potential maximum daily emissions and not annual emissions.
[6] At conditions on exit of stack e.g. actual exit temperature, 6.6% O_2 and wet
[7] Based on an average of 7,500 hours operation per year

Appendix 13.h: Revised Minor Emissions Table E.1(ii)(b)

TABLE E.1(ii)(b) MAIN EMISSIONS TO ATMOSPHERE (1 Page for each emission point)

Emission Point Ref. N^{o}:	A2-2
Source of Emission:	Emergency Generator
Location :	Main process building - See drawing 18081\WL\013 in Appendix 13.b.
Grid Ref. (12 digit, 6E,6N):	306347E, 270099N
Vent Details Diameter: Height above Ground(m):	 0.25m 3m
Date of commencement:	Hot commissioning[8] of the facility will commence in the second quarter of 2011.

Characteristics of Emission :

(i) Volume to be emitted:			
Average/day	0 m^3/d	Maximum/day	3,656 m^3/d
Maximum rate/hour	3,656 m^3/hr	Min efflux velocity	20.7 m/sec
(ii) Other factors			
Temperature			150^{o}C(avg)
For Combustion Sources: Volume terms expressed as : ☐ wet. ✓ dry. 11 %O_2			

(iii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	60 min/h 1 h/day 12 day/y

[8] i.e. when waste is first introduced into the furnace

Appendix 13.i: Revised Table E.2(i)

TABLE E.2(i): EMISSIONS TO SURFACE WATERS (One page for each emission)

Emission Point:

Emission Point Ref. No:	SW1
Source of Emission:	Surface water drainage outfall
Location :	Wet drain to west of site- See drawing 18081\WL\013 in Appendix 13.b.
Grid Ref. (10 digit, 5E,5N):	30612E, 27086N
Name of receiving waters:	River Nanny
Flow rate in receiving waters:	0.01 m^3/s Dry Weather Flow 0.06 m^3/s 95%ile flow
Available waste assimilative capacity:	Not Available

Emission Details:

(i) Volume to be emitted			
Normal/day[9]	45m^3	Maximum/day[10]	3,128m^3
Maximum rate/hour[11]	130.3m^3		

(ii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	The period or periods during which surface water will be discharged will depend on rainfall patterns and cannot be defined exactly. The normal volumetric emission per day given above assumes a continuous discharge based on annual average rainfall.

[9] Flow will depend on rainfall periods but for the purposes of this assessment, the normal flow is averaged over the year's rainfall (updated) of 805mm and a non-permeable collection area of 22,000m^2
[10] Based on maximum discharge rate of 36.2 litres per second
[11] Based on maximum discharge rate of 36.2 litres per second

Appendix 13.j: Revised Table E.4(i)

TABLE E.4(i): EMISSIONS TO GROUNDWATER (1 Page for each emission point)

Emission Point or Area:

Emission Point/Area Ref. N^{o}:	GW1
Emission Pathway: (borehole, well, percolation area, soakaway, landspreading, etc.)	Percolation area
Location :	Northern margin of site- See drawing 18081\WL\013 in Appendix 13.b.
Grid Ref. (10 digit, 5E,5N):	30638E, 27101N
Elevation of discharge: (relative to Ordnance Datum)	29.0m OD
Aquifer classification for receiving groundwater body:	Rkd (regionally important , diffuse karst aquifer, good development potential)
Groundwater vulnerability assessment (including vulnerability rating):	M (moderate)
Identity and proximity of groundwater sources at risk (wells, springs, etc):	Table 10.2 of the 2009 EIS identifies wells within a 3km radius of the site. This shows there are 2 domestic wells 600m to the west of the site, 5 domestic wells 1 to 1.5km to the south-east and 1 domestic well to the north. Other wells are further than 2.5km from the site.
Identity and proximity of surface water bodies at risk:	River Nanny (tributary), 180m from site River Boyne 3.5km from site

Emission Details:

(i) Volume to be emitted			
Normal/day	0.75 m^3	Maximum/day	1.5 m^3
Maximum rate/hour	0.06 m^3		

(ii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	60 min/h 24 h/day 365 day/y

TABLE E.4(i): EMISSIONS TO GROUNDWATER (1 Page for each emission point)

Emission Point or Area:

Emission Point/Area Ref. N^{o}:	GW2
Emission Pathway: (borehole, well, percolation area, soakaway, landspreading, etc.)	Percolation area
Location :	Adjacent to security building – see Drawing 18081\WL\013 in Appendix 13.b.
Grid Ref. (10 digit, 5E,5N):	30617E, 27089N
Elevation of discharge: (relative to Ordnance Datum)	32.6m O.D
Aquifer classification for receiving groundwater body:	Rkd (regionally important , diffuse karst aquifer, good development potential)
Groundwater vulnerability assessment (including vulnerability rating):	M (moderate)
Identity and proximity of groundwater sources at risk (wells, springs, etc):	Table 10.2 of the 2009 EIS identifies wells within a 3km radius of the site. This shows there are 2 domestic wells 600m to the west of the site, 5 domestic wells 1 to 1.5km to the south-east and 1 domestic well to the north. Other wells are further than 2.5km from the site.
Identity and proximity of surface water bodies at risk:	River Nanny (tributary), 180m from site River Boyne 3.5km from site

Emission Details:

(i) Volume to be emitted			
Normal/day	0.23m^3	Maximum/day	0.45 m^3
Maximum rate/hour	0.02m^3		

(ii) Period or periods during which emissions are made, or are to be made, including daily or seasonal variations (*start-up /shutdown to be included):*

Periods of Emission (avg)	60 min/h 24 h/day 365 day/y

Appendix 13.k: Revised Noise Emission Table E.5(i)

Table E.5(i): NOISE EMISSIONS - Noise sources summary sheet

Source	Emission point Ref. No	Grid Reference	Equipment Ref. No[12]	Sound Pressure[1] dBA at reference distance	Octave bands (Hz) Sound Pressure[1] Levels dB(unweighted) per band									Impulsive or tonal qualities	Periods of Emission
					31.5	63	125	250	500	1K	2K	4K	8K		
Stack	N1	30633E, 27096N	N/A	94	-	82	89	92	79	75	69	70	70	None	Continuous
Air Cooled Condensers	N2	30626E, 27104N	N/A	98	-	82	87	88	88	93	91	83	80	None	Continuous
Turbine Cooling	N3	30628E, 27099N	N/A	86	-	64	69	72	83	80	77	72	64	None	Continuous
Grate Cooling	N4	30625E, 27100N	N/A	86	-	69	74	77	81	80	76	71	63	None	Continuous
Pump house louver	N5	30621E, 27102N	N/A	89	-	69	73	78	79	82	82	85	71	None	Continuous
Emergency generator	N6	30635E, 27010N	N/A	101		50	65	81	90	94	95	97	83	None	Continuous

1. For items of plant sound power levels may be used.

[12] Equipment reference numbers will be made available to the EPA once the Piping and Instrument Diagrams (P&ID) have been completed as part of the detailed design phase.

Appendix 13.I: Revised Emission Monitoring Table F.2 (A2-1)

TABLE F.2 (A2-1) : EMISSIONS MONITORING AND SAMPLING POINTS - (1 table per media)

Emission Point Reference No(s). : A2-1

Parameter	Monitoring frequency[13]	Accessibility of Sampling Points
NO_x (as NO_2)	Continuous	The sampling points will be located at a high level on the stack connecting to the monitoring equipment located at ground level. Both points and equipment will be located within the main process building and will be accessible at all times by internal grate walkways.
Dust	Continuous	As above
SO_2	Continuous	As above
HCl	Continuous	As above
HF	Continuous	As above
PCDD/F	Continuous sampling with analysis every 2 weeks as well as bi-annual sample taken over 6 – 8 hour period	As above
Heavy metals[14], Cd & Tl, Hg	Quarterly	As above
TOC	Continuous	As above
CO	Continuous	As above
NH_3	Continuous	As above

[13] All monitoring and sampling periods will be in line with EU Directive 2000/76/EC
[14] Heavy metals includes Sb + As + Pb + Cr + Co + Mn + Ni + V

Appendix 13.m: Revised Ambient Air Monitoring Table Ff (AA1)

TABLE Ff (AA1): Fugitive ENVIRONMENT MONITORING AND SAMPLING LOCATIONS (1 table per media)

Monitoring Point Reference No : AA1-1

Parameter	Monitoring frequency	Accessibility of Sampling point
Odour	Annual	AA1-1 is located at the site boundary and is easily accessible (See Drawing 18081\WL\013 in Appendix 13.b)

Monitoring Point Reference No : AA1-2

Parameter	Monitoring frequency	Accessibility of Sampling point
Odour	Annual	AA1-2 is now located near the carpark and is easily accessible (See Drawing 18081\WL\013 in Appendix 13.b)

Appendix 13.n: Revised Groundwater Monitoring Table F.2

TABLE F.2 (GW1) : EMISSIONS MONITORING AND SAMPLING POINTS - (1 table per media)
Emission Point Reference No(s). : GW1

Parameter	Monitoring frequency	Accessibility of Sampling Points
BOD	Quarterly	Samples will be taken from the sampling chamber, accessible from the raised bank surrounding the Puraflo module as shown in Drawing 18081\WL\013 in Appendix 13.b.
COD	Quarterly	As above
TSS	Quarterly	As above

TABLE F.2 (GW2) : EMISSIONS MONITORING AND SAMPLING POINTS (1 table per media)
Emission Point Reference No(s). : GW2

Parameter	Monitoring frequency	Accessibility of Sampling Points
BOD	Quarterly	Samples will be taken from the sampling chamber, accessible from the raised bank surrounding the Puraflo module as shown in Drawing 18081\WL\013 in Appendix 13.b.
COD	Quarterly	As above
TSS	Quarterly	As above

Appendix 13.o: Revised Ambient Noise Monitoring Table Ff(AN1)

TABLE Ff (AN1): Fugitive ENVIRONMENT MONITORING AND SAMPLING LOCATIONS (1 table per media)
Monitoring Point Reference No : AN1-1, AN1-2, AN1-3, AN1-4

Parameter	Monitoring frequency	Accessibility of Sampling point
L_{aeq} L_{10} L_{A90} Frequency analysis (1/3 octave band analysis)	Annual	Monitoring points are located on or within the site boundary and are easily accessible (See Drawing 15013\WL\013 in Appendix 13.b)

Appendix 13.p: Revised Table G.1.a showing Raw, Product and Ancillary Materials

Table G.1.a: Raw, Product and Ancillary Materials, Substances, Preparations, Fuels and Energy Used or Produced by Activity

Ref. Nº or Code	Material/ Substance[1]	CAS Number	Danger[2] Category	Amount Stored (tonnes)	Annual Usage (tonnes)	Nature of Use	R[3] - Phrase	S[3] - Phrase
M1	Ammonia solution (NH_4OH) (24.9%)	1336-21-6	Corrosive, dangerous to the environment	1	30	Boiler feedwater additive	34	(1/2), 26, 36/37/39, 45, 61
M2	Ammonia solution (NH_4OH) (24.9%)	1336-21-6	Corrosive, dangerous to the environment	66	400	SNCR reagent	34	(1/2), 26, 36/37/39, 45, 61
M3	Activated carbon	7440-44-0	N/a	35	122	Flue gas treatment	N/a	22, 24/25
M4	Expanded clay (Dioxorb)	1305-62-0	Irritant	35	122	Flue gas treatment	38, 41	22, 24, 25
M5	Hydrated lime ($Ca(OH)_2$)	1305-62-0	Irritant	46	1,000	Flue gas treatment	41	26, 39
M6	Quick lime (CaO) (95%)	1305-78-8	Irritant	85	2,647	Flue gas treatment	41	26,39
M7	NaOH (30%)	1310-73-2	Corrosive	5	26	Demineralisation	35	(1/2),26, 37/39, 45
M8	HCl (30%)	7647-01-0	Corrosive	5	29	Demineralisation	34, 37	(1/2)26, 45
M9	HCl (30%)	7647-01-0	Corrosive		1,100	Pre-treatment of flue gas treatment residue	34, 37	(1/2)26, 45
M10	Light Fuel Oil	68334-30-5	Harmful, dangerous to the environment, Flammable	34	300	Auxiliary firing in furnace	10, 51/53, 65, 66, 67	16,24, 29/35, 61, 62
M11	Diesel oil	68334-30-5	Harmful, dangerous to the environment, Flammable	6.8	15	Fuelling onsite vehicles	40, 65, 52/53	24, 36/37, 43, 62
M12	Hydraulic Oil	Mixture	Harmful	0.9	5	Lubrication of moving parts	N/a	N/a

Ref. Nº or Code	Material/ Substance[1]	CAS Number	Danger[2] Category	Amount Stored (tonnes)	Annual Usage (tonnes)	Nature of Use	R[3] - Phrase	S[3] - Phrase
M13	Oil free of Polychlorinated biphenyl (PCB)	63148-62-9	N/A	7.3	0	Transformers	N/A	N/A
M14	Electricity import	N/A	N/A	N/A	2,380 MWh[15]	Provide site load in event of shutdown	N/A	N/A
M15	FGT-residues	Mixed, need analysis on a case by case basis	Harmful to aquatic organisms, may cause long term effects in the aquatic environment	126	10,000	Products of flue gas treatment process	R52/53	N/A
M16	Boiler ash	Mixed, need analysis on a case by case basis	Harmful to aquatic organisms, may cause long term effects in the aquatic environment	50	3,000	Products of waste combustion	R52/53	N/A
M17	Bottom ash residue	Mixed, need analysis on a case by case basis	N/A	1,600	50,000	Products of waste combustion	N/A	N/A
M18	Cement	65997-15-1	Irritant	30	1,650	Pre-treatment of flue gas treatment residue	36 / 37 / 38	24/25/26, 36/37/39

Notes: 1. In cases where a material comprises a number of distinct and available dangerous substances, please give details for each component substance.
2. c.f. Article 2(2) of SI Nº 77/94
3. c.f. Schedules 2 and 3 of SI Nº 77/94

[15] Anticipated to be no more than 980 hours per year at 2.48MW

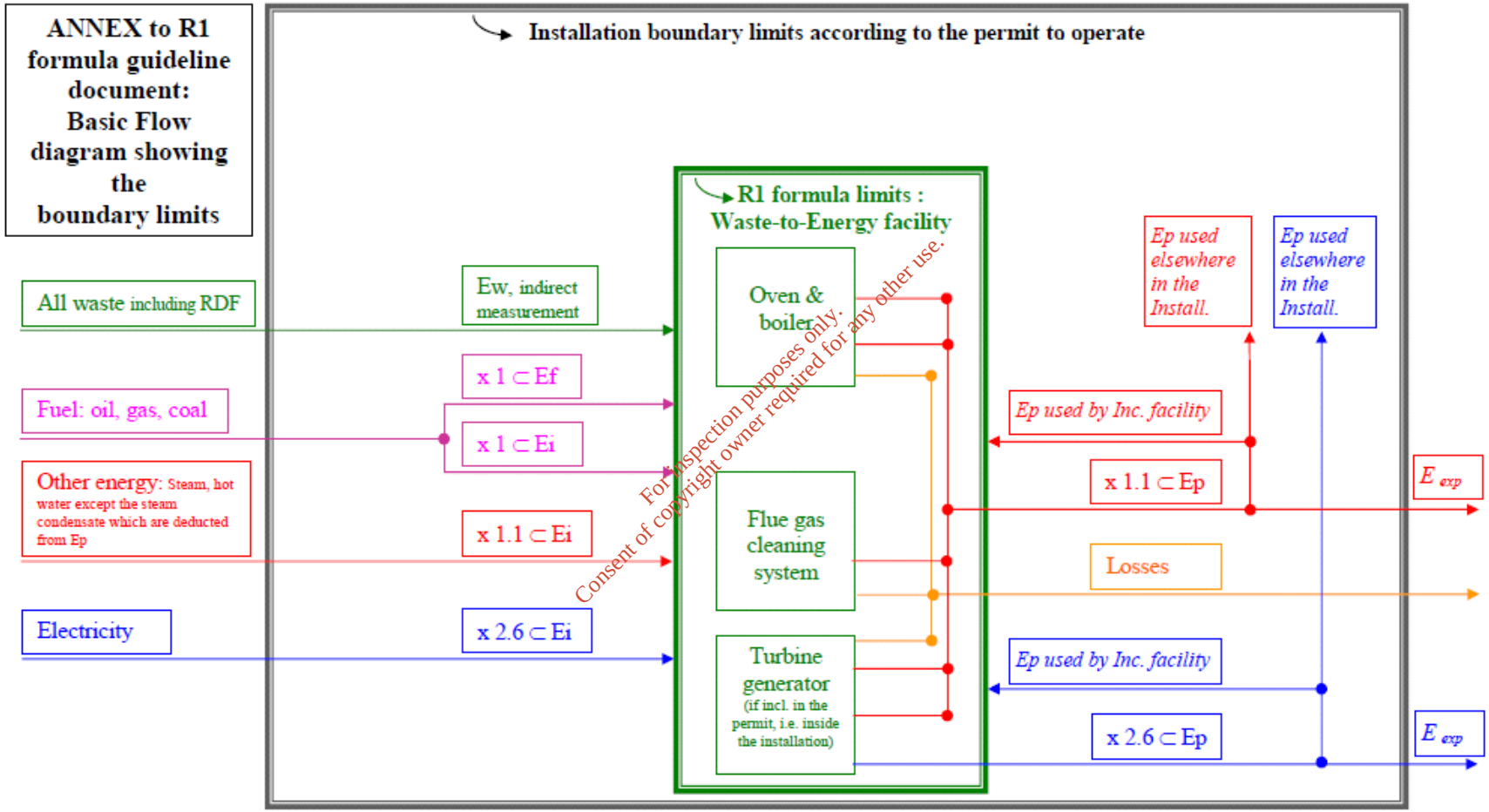
Appendix 13.q: Revised Table G.2.a on R1 Calculation

Table G.2.a: Parameters used in R1 calculation

Parameter	Value used[1]	Comment
E_p	(17.6MW x 2.6) + (2.7MW x 1.1) = 48.69	The total electricity production from the plant is 17.6MW. Approx. 2.7MW steam is also produced and circulated within the plant for pre-heating combustion air, SNCR injection and other requirements.
E_f	0.44MW x 50% = 0.22	50% of the auxiliary fuel is used during normal operations - the remainder is used during startup so does not contribute to the production of steam.
E_i	(0.08MW x 2.6) + (0.44MW x 50%) = 0.43	Approx. 0.08MW electricity and the remaining 50% of the auxiliary fuel is used for startup. Imported electricity is multiplied by the conversion factor 2.6.
E_w	69.3MW	The total heat input to the boiler from the waste is 69.3MW

[1] Units are 1 MWh/h

Appendix 13.r: Guidance on R1 Formula from CEWEP



Appendix 13.s: Revised Spreadsheet of R1 Calculations

Determination of the R1-Factor in accordance to the Draft of the Waste Framework Directive (WFD) (status Dec. 2005)

WtE plant Meath-Ireland — **Part A**

calculation period 1 hour, estimated annual operation hours 8000- 8200 h/a

#	description	identification in R1 formula	data	unit	remarks and basis of calculation
1	calculation period		1	hour	
2	total input of waste		26.67	ton	planning data
3	heat value of waste (NCV)		9.35	GJ/ton	planning data
4	energy input by waste	Ew	249.3645	GJ	2*3
5		Ew	69.3	MWh	2*3/3,6
6	energy demand of primary fuels (imported) **steam/WW producing** e.g. for start up and shut down		0.792	GJ	planning data
7			0.220	MWh	6/3,6
8	energy demand of primary fuels (imported) **not steam/WW producing** e.g. for start up and shut down, heating up of flue gases (fabric filter, SCR) and boiler for heating up purposes		0.792	GJ	Planungsdaten
9			0.220	MWh	8/3,6
10	energy demand of **imported electricity**		0.288	GJ	planning data
11			0.0800	MWh	10/3,6
12	exported electricity		15.120	MWh	planning data
13	selfdemand of produced electricity		2.480	MWh	planning data
14	exported heat/steam/WW		0.000	MWh	planning data
15	selfdemand of produced steam/heat/WW e.g. for heating of plant buildings, sootblowing, SNCR injection, heating up of combustion air and/or flue gases, evaporation of scrubber wastewater		2.667	MWh	planning data

Determination of the R1-Factor in accordance to the Draft of the Waste Framework Directive (WFD) (status Dec. 2005)

WtE plant Meath-Ireland — **Part B**

calculation period 1 hour, estimated annual operation hours 8000- 8200 h/a

16	equivalence factor for electricity		2.6	[-]	given for R1-calculation by WFD
17	equivalence factor for heat/steam/WW		1.1	[-]	given for R1-calculation by WFD
18	0,97 factor for taking into account losses of energy e.g. by bottom ash, blow down water, radiation of heat, organic content in residues and so on		0.97	[-]	given for R1-calculation by WFD
19	energy demand of primary fuels (imported) **steam/WW producing** as equivalent	Ef	0.220	Mwhequ	17*7
20	energy demand of primary fuels (imported) **not steam/WW producing** as equivalent	Ei	0.220	Mwhequ	17*9
21	imported electricity demand as equivalent (not steam/WW producing)	Ei	0.208	Mwhequ	16*11
22	sum of imported energy **not steam/WW producing** as equivalent	ΣEi	0.428	Mwhequ	20+21
23	exported electricity as equivalent	Ep	39.312	Mwhequ	16*12
24	selfdemand of produced electricity as equivalent	Ep	6.448	Mwhequ	16*13
25	exported heat/steam/WW as equivalent	Ep	0.000	Mwhequ	17*14
26	selfdemand of produced steam/heat/WW as equivalent	Ep	2.934	Mwhequ	17*15
27	sum of utilized energy as equivalent	ΣEp	48.69	Mwhequ	SUM (23:26)
28	sum of utilized energy minus total imported energy as equivalent (as numerator of the R1 equation)	ΣEp-(Ef+ΣEi)	48.046	Mwhequ	27-19-22
29	0,97 out of the sum of delivered energy by waste (equivalent=1) minus steam/WW producing energy as equivalent (as denominator of the R1 equation)	0,97*(Ew+Ef)	67.403	Mwhequ	18*(5+19)
30	**R1-Factor in accordance to the Draft of the Waste Framework Directive (WFD) (status Dec. 2005)**	(ΣEp-(Ef+ΣEi))/ (0,97*(Ew+Ef))	**0.713**	[-]	28 : 29

Appendix 13.t: Revised Table I.1.b Comparing PEC Results

<table>
<tr><th>Aspect</th><th>Difference</th></tr>
<tr><td>I.1.2</td><td>Air dispersion modelling was revised in the 2009 EIS to reflect changes to the building layout, volume flows and other changes outlined in Section 7.1.2. This is compared against modelling submitted in the RWLA and in the 2001 EIS. The differences between 2001 and RWLA data mostly relate to the change in stack height (from 40m to 65m) and exit temperature, which balanced out the increase to plant throughput. The main difference between the RWLA and the 2009 figures is that in the latter, the half hourly average values used for the process contribution to dust, TOC, HCl, HF, SO_2 and NO_x were based on 100% rather than 97% levels as per Annex V of Directive 2000/12/28. This assumes higher emissions and therefore represents a more conservative approach. As shown, all PEC estimates remain well below the standard even in these worst case scenarios.
<table>
<tr><th>Emission (Maximum value)</th><th>PEC[16] 2009 EIS</th><th>PEC in RWLA</th><th>PEC 2001</th><th>Standard ($\mu g/m^3$)</th></tr>
<tr><td>NO_2 – annual mean</td><td>21.2 $\mu g/m^3$</td><td>21.0 $\mu g/m^3$</td><td>18 $\mu g/m^3$</td><td>40[17]</td></tr>
<tr><td>NO_2 – 99.8th %ile of 1-hour means</td><td>104.5 $\mu g/m^3$</td><td>55.0 $\mu g/m^3$</td><td>85 $\mu g/m^3$</td><td>200[14]</td></tr>
<tr><td>SO_2 – 99.7th %ile of 1-hr means</td><td>34.4 $\mu g/m^3$</td><td>14.0 $\mu g/m^3$</td><td>60 $\mu g/m^3$</td><td>350[14]</td></tr>
<tr><td>SO_2 – 99.2th %ile of 24-hr means</td><td>10.9 $\mu g/m^3$</td><td>5.9 $\mu g/m^3$</td><td>24 $\mu g/m^3$</td><td>125[14]</td></tr>
<tr><td>PM_{10} - 90.5th %ile of 24-hr means</td><td>37.3 $\mu g/m^3$</td><td>20.2 $\mu g/m^3$</td><td>21.9 $\mu g/m^3$</td><td>50[14]</td></tr>
<tr><td>PM_{10} – annual mean</td><td>20.1 $\mu g/m^3$</td><td>20.1 $\mu g/m^3$</td><td>20.5 $\mu g/m^3$</td><td>50[14]</td></tr>
<tr><td>TOC – annual mean</td><td>0.78 $\mu g/m^3$</td><td>0.77 $\mu g/m^3$</td><td>N/A[18]</td><td>5[14]</td></tr>
<tr><td>HCl maximum – 98th %ile of 1-hr means</td><td>5.19 $\mu g/m^3$</td><td>0.80 $\mu g/m^3$</td><td>6.7 $\mu g/m^3$</td><td>100[19]</td></tr>
<tr><td>HF maximum – 98th %ile of 1-hr means</td><td>0.35 $\mu g/m^3$</td><td>0.09 $\mu g/m^3$</td><td>0.69 $\mu g/m^3$</td><td>3.0[16]</td></tr>
<tr><td>PCCD/PCDF – maximum annual average</td><td>0.0288 – 0.0468 pg/m^3</td><td>0.0287 – 0.0467 pg/m^3</td><td>0.033 – 0.051 pg/m^3</td><td>-</td></tr>
<tr><td>Hg – maximum annual mean</td><td>0.0014 $\mu g/m^3$</td><td>0.0013 $\mu g/m^3$</td><td>0.0074 $\mu g/m^3$</td><td>1.0[20]</td></tr>
<tr><td>Cd & Tl - maximum annual mean</td><td>0.0014 $\mu g/m^3$</td><td>0.0013 $\mu g/m^3$</td><td><0.013 / <0.024 $\mu g/m^3$</td><td>0.005[21]</td></tr>
</table></td></tr>
</table>

[16] Predicted Emissions Concentration at ground level, including background levels, traffic, cumulative impacts and modelled plant emissions concentrations (see for example Table 7.15 of the 2009 EIS)
[17] Directive 2008/50/EC
[18] TOC PEC cannot be compared due to different averaging periods used
[19] TA Luft Emission Standard
[20] WHO Ambient air quality guideline limit
[21] Council Directive 2004/107/EC

	Arsenic - maximum annual average[22]	0.0014 µg/m^3	0.0014 µg/m^3	<0.0108 / <0.0208 µg/m^3	0.006

[22] Arsenic was the metal emitted at the most significant level relative to its annual average limit value and thus was the metal reported in Section 7 of the EIS.

Appendix 13.u: Comparison of Noise Emissions

Location	Daytime Predicted L_{Aeq} (dB)		Night time Predicted L_{Aeq} (dB)	
	2006 EIS	2009 EIS	2006 EIS	2009 EIS
R1	33	28	33	28
R2	37	33	37	33
R3	34	28	34	28
R4	33	25	33	25
R5	30	22	30	22