13. MONITORING AND SAMPLING

13.1 General

The monitoring and sampling of emissions from the facility are described in this chapter. Figures 13.1, 13.2, 13.3 and 13.4 indicated the monitoring point locations.

Monitoring to determine the following emissions will be undertaken:

- Emissions to air
- Emissions to sewer
- Waste emissions

Ambient monitoring will be undertaken of the following:

- Ground water
- Noise
- Odour.

13.2 Emissions to Air

13.2.1 Monitoring

The emissions to air are described in chapter 9. It is proposed to monitor the two main emission points from the waste to energy plant. These will be:

WTE A1 - Waste to energy plant main stack flue 1

WTE A2 - Waste to energy plant main stack flue 2.

The parameters to be monitored and the monitoring methods are listed in tables 13.1 and 13.2.

13.2.2 Monitoring Equipment Room

The instruments for the monitoring of the emissions will be housed in a dedicated room, adjacent to the stack, in the main process building of the waste to energy plant. The room will have a floor level of 22.7mOD, that is just under the roof, and will be accessible by a staircase from the main part of the process building. The room will be air conditioned to ensure that the instrumentation will be at the correct temperature and humidity. Refer to figure 13.1

13.2.3 Monitoring Equipment Calibration

All monitoring equipment will be calibrated by facility staff on a monthly basis, as part of the routine planned maintenance system. In addition, the equipment will be calibrated annually by an external consultant. There will be a maintenance contract in place with the monitoring equipment suppliers to ensure that if a problem occurs with an item of equipment, it will be remedied as soon as practicable.

13.2.4 Monitoring Equipment Interface with Plant Control System

The readings from the continuous measurement devices will be sent for processing to two separate systems, the plant computerised control system and to the emission registration software system. The plant operators will be able to view the monitoring data on the plant computerised control system, while the plant is in operation. The system will send an alarm when a parameter reaches a preset levels, which will be well below the emission limit for the parameter. Corrective actions will be initiated either by the computerised control system or the

operator. For example if the NO_x level rises the rate of injection of ammonia/urea will be adjusted manually or automatically.

The emission registration software system will be certified by an external body. In the system, the data from monitoring will be stored on hard disk and used to generate hourly, daily, monthly and annual average results, as appropriate.

13.2.5 Dioxin and Furan Monitoring

The AMESA or equivalent dioxin/furan monitoring system will be installed. This equipment is used for measuring dioxins/furans emissions in plants, which are required to comply with the German Environmental Regulation 17 BIm Sch V and TA Luft. The system will extract a volume stream constantly and isokinetically from the flue gases. Dioxins and furans will be collected on a cartridge filled with adsorbent resins. The system will operate automatically and will store all necessary data both internally and on a removable SRAM card. The cartridge and SRAM card will be sent for analysis to an accredited laboratory such as the new laboratory at UCC. Results for the PCDD/PCDF analysis will be presented as individual 2,3,7,8-containing congener concentrations, total homologue (tetra- to octa-) concentrations and I-TEQ values. Turn around times for samples will be approximately 10 to 15 working days.

13.3 Emissions to Sewer

The emissions to sewer are described in chapter 10 and the emission points are listed in section 10.5.

Two of the emissions will be from the facility's packaged sewage treatment plants. It is not proposed to monitor these emissions. Two of the emissions will be from the site storm water drainage system. It is proposed to monitor these emissions.

The two emission points to be monitored will be:

WTS SW1 - Storm water emission from the waste transfer station, administration building and community recycling park

WTE SW1 - Storm water emission from the waste to energy plant.

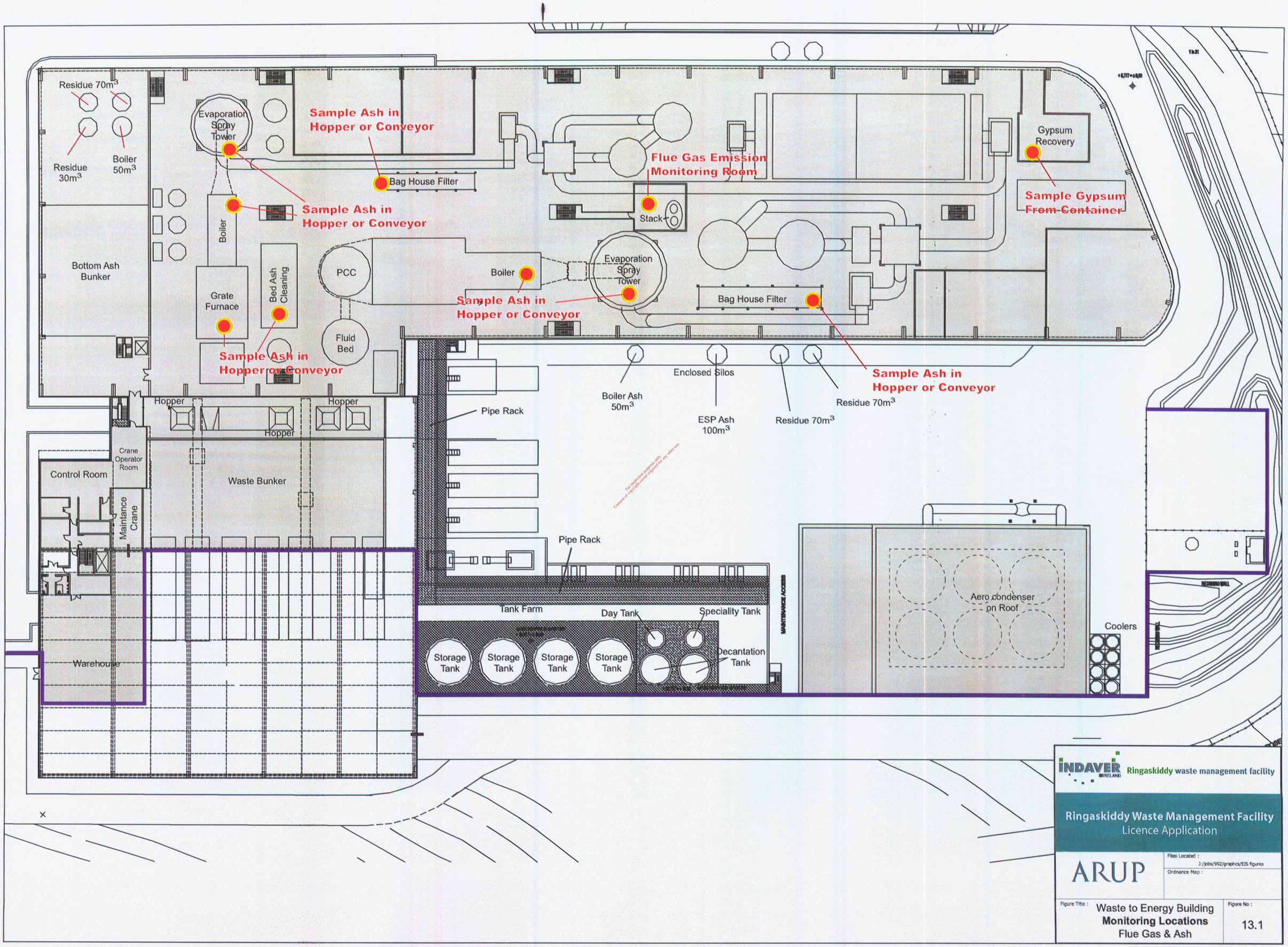
The emissions will be monitored continuously for TOC and pH. Monitoring chambers will be located close to the retention tanks. Refer to figures 13.2 and 13.3.

The TOC and pH levels are expected to be quite variable as, for example, heavy rain following a dry spell can lead to elevated levels of TOC due to the organic material such as leaves washing into the storm drains. For an initial period, it will be necessary to monitor the TOC and pH readings before setting alarm levels. The alarm levels will be agreed with the EPA.

Refer to tables 13.3 and 13.4 below for a summary of the monitoring of the emissions to sewer.

13.4 Waste Emissions

The waste emissions from the site are described and quantified in chapter 12. The bottom ash, cyclone/electrofilter ash, boiler ash and flue gas cleaning residues will be monitored on a fortnightly basis for the first two to three months after the plants become operational. When consistency, within a known range of variation, is demonstrated in the results, the frequency of testing for the full suite of parameters, will be reduced to once every six months for the first two years and once per year in subsequent years. The characterisation process will highlight



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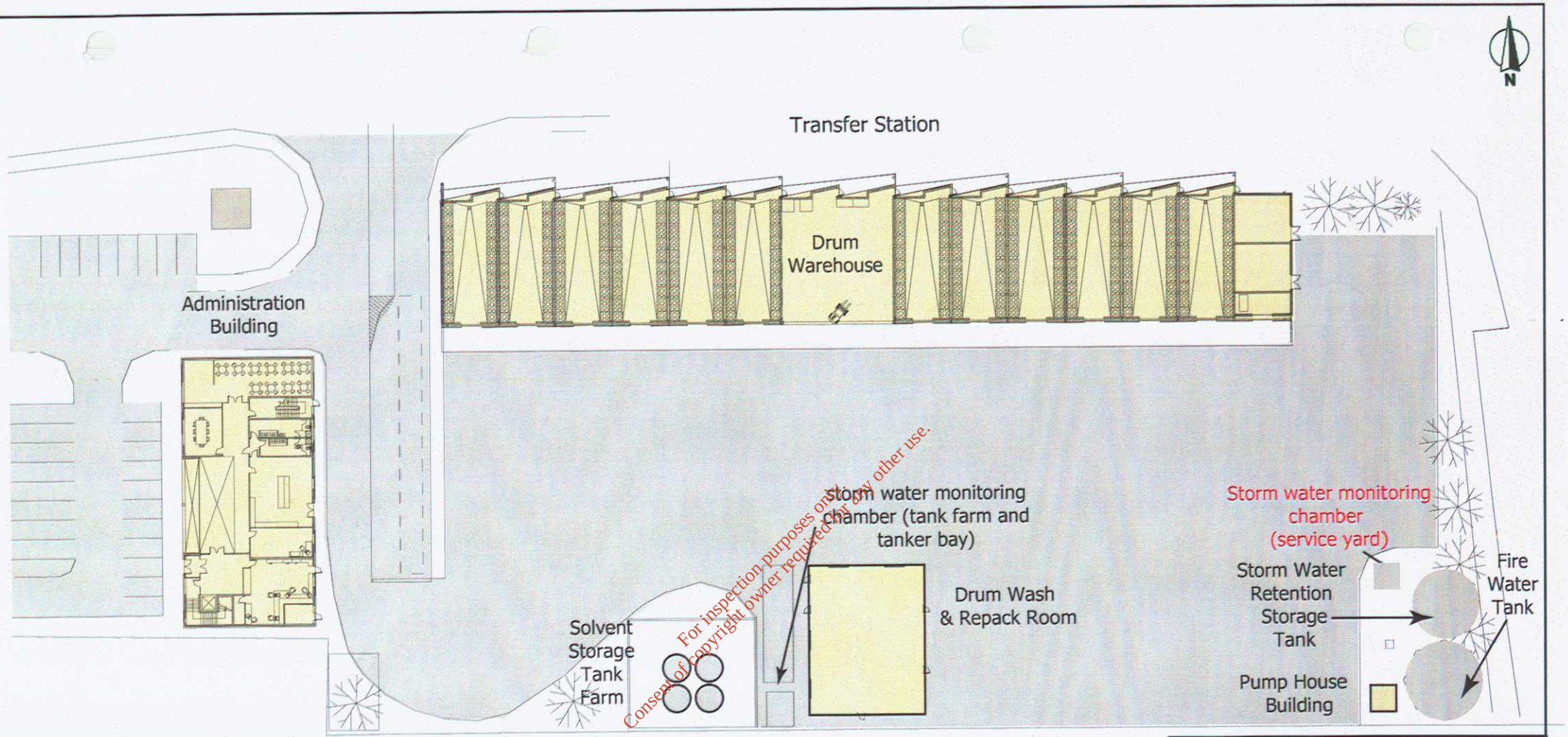
Ordnance Map :

Figure Title : Waste to Energy Building **Monitoring Locations** Flue Gas & Ash

Figure No : 13.1



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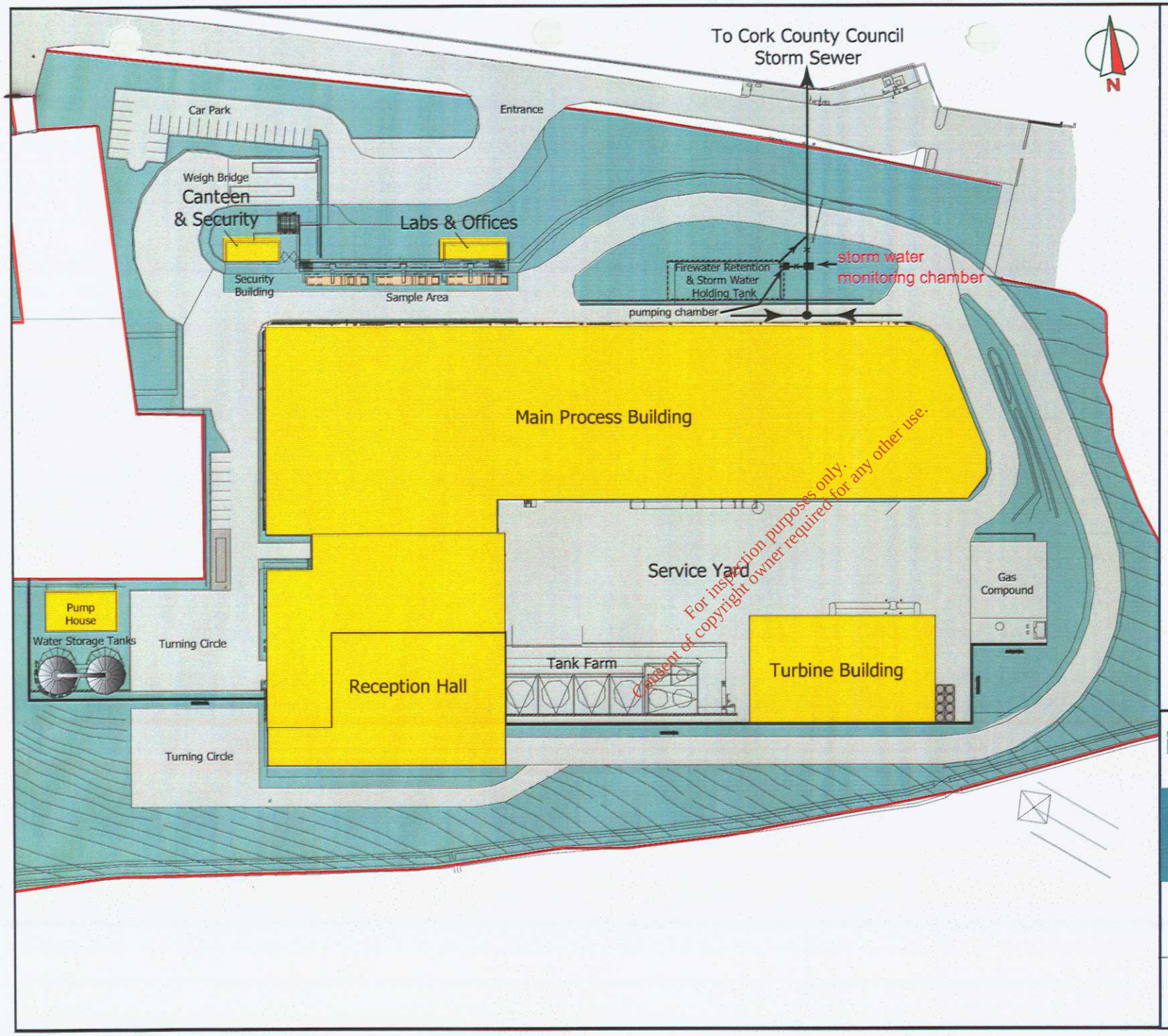
Ordnance Map :

Figure Title : Waste Transfer Station - Storm Water Monitoring Location

Figure No : 13.2



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Ordnance Map :

Figure Title : Waste to Energy Plant - Storm Water Monitoring Location

Figure No : 13.3

the critical parameters, which may be the leaching of lead, cadmium and chloride. Once the critical parameters are identified, testing for these will be undertaken every two months.

As mentioned in section 12.4, separate composite samples of the bottom ash, boiler ash, cyclone/electrofilter ash, flue gas cleaning residue and gypsum will be collected over a two-week period in sample containers. The samples will be sent to external consultants for compaction and drying. The samples will then be tested at an accredited laboratory: Refer to tables 13.5 to 13.3 for a summary of the solid residues monitoring.

The bottom ash samples will be taken from the conveyors carrying the ash to the ash bunker. Samples of cyclone/electrofilter ash, boiler ash and flue gas cleaning residues will taken from the conveyors carrying the ash to the storage silos or from the hoppers which collect the ash from the process equipment. Samples of gypsum will be taken from the container at the vacuum belt filter.

13.5 Groundwater monitoring

There will be no emissions to ground from the facility. Nevertheless, it is proposed to monitor the quality of groundwater under the site annually.

Development of the facility will involve major earthworks and the construction of substantial retaining walls. This work will alter the ground water regime under the site. Ground water wells will be installed, at locations to be agreed with the EPA, when the major site works have been completed and the new ground water flow has become established. Monitoring wells will be installed upstream and down stream of the location of the main process activities on site. Due to the complex site shape, it is expected that at least four monitoring wells will be required.

Table 13.14 summarises the groundwater monitoring proposed.

13.6 Noise monitoring

It is proposed to carry out annual noise monitoring at three noise sensitive locations. The locations are shown in figure 13.4.

Daytime (30 minute duration) and night-time (15 minute duration) measurements of LAeq, LA10 and LA90 will be taken.

13.7 Odour monitoring

It is proposed that site staff will carry out weekly odour assessment at various locations around the site.

Table 13.15 summarises the odour monitoring proposed.

Table 13.1: Emissions Monitoring and Sampling Points - Air Emissions

Emission Point Reference No.: **WTE A1 - Waste to energy plant main stack flue 1**

Parameter	Monitoring frequency	Accessibility of Sampling Points	Sampling method	Analysis method/ technique	Quality control used
Total Dust	Continuous	Direct access to monitoring room	SIGRIST photometer or similar (note 1)	(note 4)	Weekly internal control, calibration performed if deviation greater than 3%, annual external control
Total Organic Carbon	Continuous	Direct access to monitoring room	Flame ionisation detector	(note 4)	Weekly internal control, calibration performed if deviation greater than 3%, annual external control
Hydrogen Fluoride	Quarterly for first year, 6-monthly in subsequent years, in agreement with EPA	Direct access to monitoring room	Sampling and analysis by an accredited laboratory or internally by multi-component analyser (note 3)	NBN T95-501	Use of an accredited laboratory
Hydrogen Chloride	Continuous	Direct access to monitoring room	These parameters can be monitored using individual monitors or using a multi-component analyser (note 3)	(note 4)	Weekly internal control, calibration performed if deviation greater than 3%, annual external control
Sulphur Dioxide	Continuous	Direct access to monitoring room	ditto	(note 4)	ditto
Carbon Monoxide	Continuous	Direct access to monitoring room	ditto	(note 4)	ditto
Nitrogen Oxides NOx	Continuous	Direct access to monitoring room	ditto	(note 4)	ditto
Heavy metals: Cadmium, Thallium Mercury, Arsenic, Lead, Chromium, Cobalt, Copper, Manganese, Nickel and Vanadium	Quarterly for first year, one every 6 months in subsequent years, in agreement with EPA	Direct access to monitoring room	Sampling and analysis by an accredited laboratory	ISO 9096	Use of an accredited laboratory
Dioxins and furans	Continuous sampling with analysis every two weeks plus a bi-annual sample taken over a 6 to 8 hour period	Direct access to monitoring room	AMESA Dioxin monitoring system or similar (note 2)	Tüv-rapport 936/808017A 12/08/1997	
Oxygen	Continuous	Direct access to monitoring room			Weekly internal control, calibration performed if deviation greater than 3%, annual external control

Note 1: Dust emissions can be measured manually if required.
Note 2: Continuous sampling of dioxins will be carried out and analysed every two weeks. At least 20 representative monitoring results should be available per year.
Note 3: There will be back-up monitoring equipment in the form of mobile units or fixed laboratory.
Note 4 : according to German 17e BimSchV. And Flemish "Code of Good Practice" (VITO ref. MIM/R/32, 10/2001)

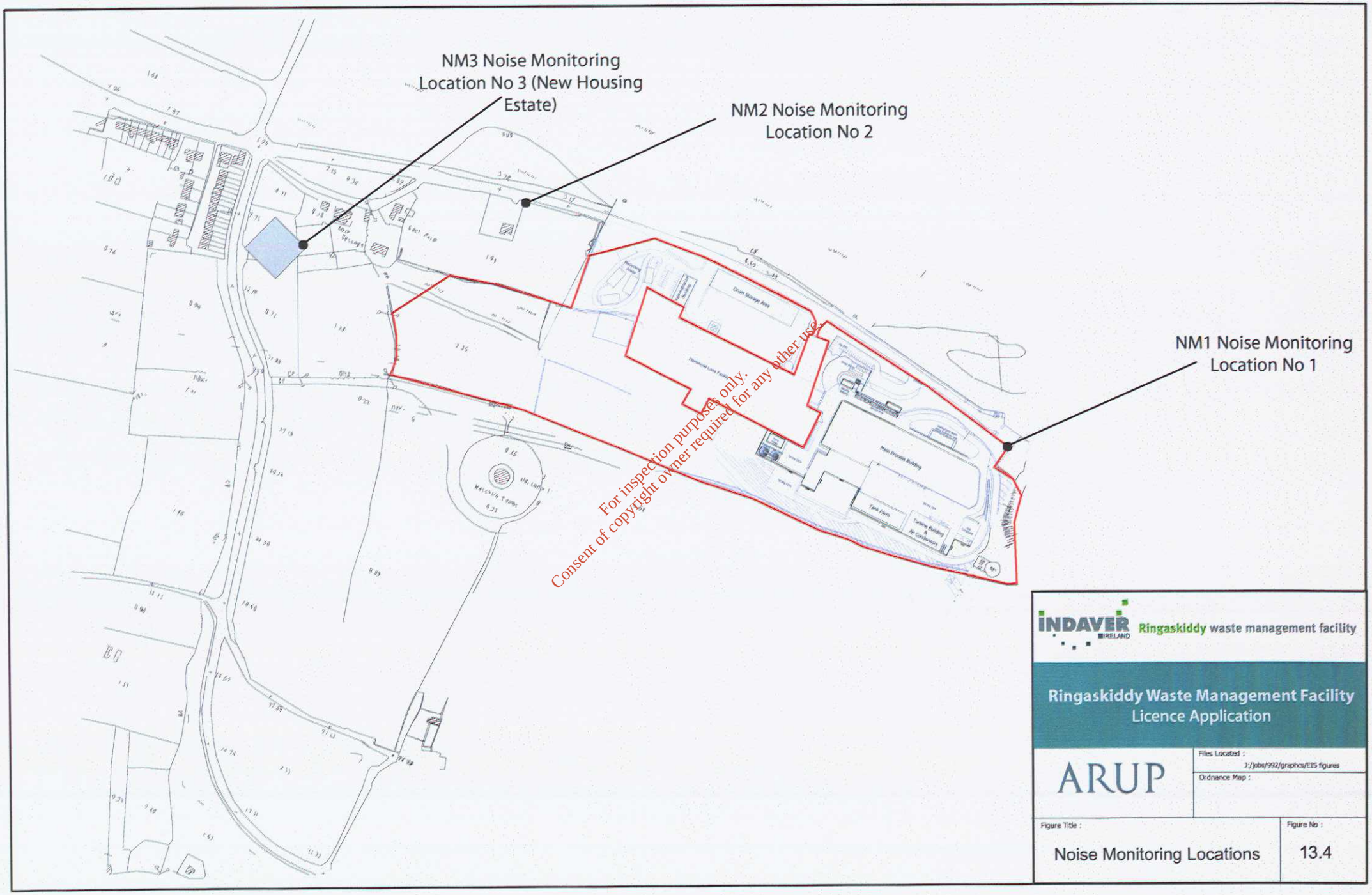

Table 13.2: Emissions Monitoring and Sampling Points - Air Emissions
***Emission Point Reference No.:* WTE A2 - Waste to energy plant main stack flue 2**

Parameter	Monitoring frequency	Accessibility of Sampling Points	Sampling method	Analysis method/ technique	Quality control used
Total Dust	Continuous	Direct access to monitoring room	SIGRIST photometer or similar (note 1)	(note 4)	Weekly internal control, calibration performed if deviation greater than 3%, annual external control
Total Organic Carbon	Continuous	Direct access to monitoring room	Flame ionisation detector	(note 4)	Weekly internal control, calibration performed if deviation greater than 3%, annual external control
Hydrogen Fluoride	Quarterly for first year, 6-monthly in subsequent years, in agreement with EPA	Direct access to monitoring room	Sampling and analysis by an accredited laboratory or internally by multi-component analyser (note 3)	NBN T95-501	Use of an accredited laboratory
Hydrogen Chloride	Continuous	Direct access to monitoring room	These parameters can be monitored using individual monitors or using a multi-component analyser (note 3)	(note 4)	Weekly internal control, calibration performed if deviation greater than 3%, annual external control
Sulphur Dioxide	Continuous	Direct access to monitoring room	ditto	(note 4)	ditto
Carbon Monoxide	Continuous	Direct access to monitoring room	ditto	(note 4)	ditto
Nitrogen Oxides NOx	Continuous	Direct access to monitoring room	ditto	(note 4)	ditto
Heavy metals: Cadmium, Thallium Mercury, Arsenic, Lead, Chromium, Cobalt, Copper, Manganese, Nickel and Vanadium	Quarterly for first year, 6-monthly in subsequent years, in agreement with EPA	Direct access to monitoring room	Sampling and analysis by an accredited laboratory	ISO 9096	Use of an accredited laboratory
Dioxins and furans	Continuous sampling with analysis every two weeks plus a bi-annual sample taken over a 6 to 8 hour period	Direct access to monitoring room	AMESA Dioxin monitoring system or similar (note 2)	Tüv-rapport 936/808017A 12/08/1997	
Oxygen	Continuous	Direct access to monitoring room			Weekly internal control, calibration performed if deviation greater than 3%, annual external control

Note 1: Dust emissions can be measured manually if required.
Note 2: Continuous sampling of dioxins will be carried out and analysed every two weeks. At least 20 representative monitoring results should be available per year.
Note 3: There will be back-up monitoring equipment in the form of mobile units or fixed laboratory.
Note 4 : according to German 17e BimSchV. And Flemish "Code of Good Practice" (VITO ref. MIM/R/32, 10/2001)

Table 13.3: Emissions Monitoring and Sampling Points - Emissions to Sewer
***Emission reference point No.:* WTS SW 1- Storm water emission from the waste transfer station etc.**

Parameter	Monitoring frequency	Accessibility of sampling point	Sampling method	Analysis method / technique	Quality control
Visual inspection	Once per week	Sampling chamber adjacent to the discharge point	Not applicable	Not applicable	Not applicable
TOC	Continuous	Sampling chamber adjacent to the discharge point	On-line TOC meter with recorder		Calibration as specified by equipment supplier
PH	Continuous	Sampling chamber adjacent to the discharge point	pH meter/recorder		Calibration as specified by equipment supplier

Table 13.4: Emissions Monitoring and Sampling Points - Emissions to Sewer
***Emission reference point No.:* WTE SW 1- Storm water emission from the waste to energy plant**

Parameter	Monitoring frequency	Accessibility of sampling point	Sampling method	Analysis method / technique	Quality control
Visual inspection	Once per week	Sampling chamber adjacent to the discharge point	Not applicable	Not applicable	Not applicable
TOC	Continuous	Sampling chamber adjacent to the discharge point	On-line TOC meter with recorder		Calibration as specified by equipment supplier
PH	Continuous	Sampling chamber adjacent to the discharge point	pH meter/recorder		Calibration as specified by equipment supplier

Table 13.5: Emissions Monitoring and Sampling Points - Waste Emissions (one table per monitoring point)
Emission reference point/location No.: **Bottom ash**

Parameter	Monitoring frequency	Accessibility of sampling point	Sampling method	Analysis method / technique	Quality control
Composition: concentration of the following:-	Note 1	Grab sample from bottom ash conveyor	14 day composite grab sample	EN 13656	Use accredited laboratory
Arsenic				ENV 12506	
Barium				ENV 12506	
Cadmium				ENV 12506	
Chromium total				ENV 12506	
Copper				ENV 12506	
Mercury				ENV 13370	
Molybdenum				ENV 12506	
Nickel				ENV 12506	
Lead				ENV 12506	
Antimony				Note 2	
Selenium				DIN 38406-E12 (note 2)	
Zinc				ENV 12506	
Chloride				ENV 12506	
Fluoride				ENV 13370	
Sulphate				ENV 12506	
Total Organic Carbon				EN 13137	

Note 1: Sampling and testing frequency will be fortnightly for the full range of parameters, until consistency is demonstrated in the results. Testing for the full list of parameters will be undertaken every six months for the first 2 years and annually thereafter.
Note 2 Internationally recognised method

Table 13.6: Emissions Monitoring and Sampling Points - Waste Emissions (one table per monitoring point)
***Emission reference point/location No.:* Bottom ash**

Parameter	Monitoring frequency	Accessibility of sampling point	Sampling method	Analysis method / technique	Quality control
Leachability	Note 1	Grab sample from bottom ash conveyor	14 day composite grab sample	EN 12457/1-4 (note 2)	Use accredited laboratory
Concentration of the following in leachate:	Note 1	Grab sample from bottom ash conveyor	Leachate sample		Use accredited laboratory
Dissolved Organic Carbon	Note 1			EN 13370	Use accredited laboratory
pH	Note 1			EN 12506	Use accredited laboratory
Leachate – Heavy Metals	Note 1		Leachate sample		Use accredited laboratory
Arsenic				ENV 12506	
Barium				ENV 12506	
Cadmium				ENV 12506	
Chromium total				ENV 12506	
Copper				ENV 12506	
Mercury				ENV 13370	
Molybdenum				ENV 12506	
Nickel				ENV 12506	
Lead				ENV 12506	
Antimony (Sb)				ENV 12506	
Selenium				ENV 12506	
Zinc				ENV 12506	
Leachate - Salts					
Chloride				ENV 12506	
Fluoride				ENV 13370	
Sulphate				ENV 12506	

Note 1: Sampling and testing frequency will be fortnightly for the full range of parameters, until consistency is demonstrated in the results. Then one sample of leachate every 2 months will be tested for lead. Testing for the full list of parameters will be undertaken every 6 months for the first 2 years and annually thereafter.
Note 2: Depending on text method and the limit values, the Member State shall determine which of 4 leaching tests shall be required.

Table 13.7: Emissions Monitoring and Sampling Points - Waste Emissions (one table per monitoring point)
Emission reference point/location No.: **Cyclone/electrofilter ash**

Parameter	Monitoring frequency	Accessibility of sampling point	Sampling method	Analysis method / technique	Quality control
Composition: concentration of the following:	Note 1	Grab sample from bottom ash conveyor	14 day composite grab sample	EN 13656	Use accredited laboratory
Arsenic				ENV 12506	
Barium				ENV 12506	
Cadmium				ENV 12506	
Chromium total				ENV 12506	
Copper				ENV 12506	
Mercury				ENV 13370	
Molybdenum				ENV 12506	
Nickel				ENV 12506	
Lead				ENV 12506	
Antimony				Note 2	
Selenium				DIN 38406-E12 (note 2)	
Zinc				ENV 12506	
Chloride				ENV 12506	
Fluoride				ENV 13370	
Sulphate				ENV 12506	
Total Organic Carbon				EN 13137	
Molybdenum				ENV 12506	

Note 1: Sampling and testing frequency will be fortnightly for the full range of parameters, until consistency is demonstrated in the results. Testing for the full list of parameters will be undertaken every six months for the first 2 years and annually thereafter.
Note 2 Internationally recognised method

Table 13.8: Emissions Monitoring and Sampling Points - Waste Emissions (one table per monitoring point)
***Emission reference point/location No.:* Cyclone/electrofilter ash**

Parameter	Monitoring frequency	Accessibility of sampling point	Sampling method	Analysis method / technique	Quality control
Leachability	Note 1	Grab sample from bottom ash conveyor	14 day composite grab sample	EN 12457/1-4 (note 2)	Use accredited laboratory
Concentration of the following in leachate:	Note 1	Grab sample from bottom ash conveyor	Leachate sample		Use accredited laboratory
Dissolved Organic Carbon	Note 1			EN 13370	Use accredited laboratory
pH	Note 1			EN 12506	Use accredited laboratory
Leachate – Heavy Metals	Note 1		Leachate sample		Use accredited laboratory
Arsenic				ENV 12506	
Barium				ENV 12506	
Cadmium				ENV 12506	
Chromium total				ENV 12506	
Copper				ENV 12506	
Mercury				ENV 13370	
Molybdenum				ENV 12506	
Nickel				ENV 12506	
Lead				ENV 12506	
Antimony (Sb)				ENV 12506	
Selenium				ENV 12506	
Zinc				ENV 12506	
Leachate - Salts					
Chloride				ENV 12506	
Fluoride				ENV 13370	
Sulphate				ENV 12506	

Note 1: Sampling and testing frequency will be fortnightly for the full range of parameters, until consistency is demonstrated in the results. Then one sample of leachate every 2 months will be tested for lead. Testing for the full list of parameters will be undertaken every 6 months for the first 2 years and annually thereafter.
Note 2: Depending on text method and the limit values, the Member State shall determine which of 4 leaching tests shall be required.

Table 13.9: Emissions Monitoring and Sampling Points - Waste Emissions (one table per monitoring point)
Emission reference point/location No.: **Boiler ash**

Parameter	Monitoring frequency	Accessibility of sampling point	Sampling method	Analysis method / technique	Quality control
Composition: concentration of the following:	Note 1	Grab sample from bottom ash conveyor	14 day composite grab sample	EN 13656	Use accredited laboratory
Arsenic				ENV 12506	
Barium				ENV 12506	
Cadmium				ENV 12506	
Chromium total				ENV 12506	
Copper				ENV 12506	
Mercury				ENV 13370	
Molybdenum				ENV 12506	
Nickel				ENV 12506	
Lead				ENV 12506	
Antimony				Note 2	
Selenium				DIN 38406-E12 (note 2)	
Zinc				ENV 12506	
Chloride				ENV 12506	
Fluoride				ENV 13370	
Sulphate				ENV 12506	
Total Organic Carbon				EN 13137	

Note 1: Sampling and testing frequency will be fortnightly for the full range of parameters, until consistency is demonstrated in the results. Testing for the full list of parameters will be undertaken every six months for the first 2 years and annually thereafter.
Note 2 Internationally recognised method

Table 13.10: Emissions Monitoring and Sampling Points - Waste Emissions (one table per monitoring point)
Emission reference point/location No.: **Boiler ash**

Parameter	Monitoring frequency	Accessibility of sampling point	Sampling method	Analysis method / technique	Quality control
Leachability	Note 1	Grab sample from bottom ash conveyor	14 day composite grab sample	EN 12457/1-4 (note 2)	Use accredited laboratory
Concentration of the following in leachate:	Note 1	Grab sample from bottom ash conveyor	Leachate sample		Use accredited laboratory
Dissolved Organic Carbon	Note 1			EN 13370	Use accredited laboratory
pH	Note 1			EN 12506	Use accredited laboratory
Leachate – Heavy Metals	Note 1		Leachate sample		Use accredited laboratory
Arsenic				ENV 12506	
Barium				ENV 12506	
Cadmium				ENV 12506	
Chromium total				ENV 12506	
Copper				ENV 12506	
Mercury				ENV 13370	
Molybdenum				ENV 12506	
Nickel				ENV 12506	
Lead				ENV 12506	
Antimony (Sb)				ENV 12506	
Selenium				ENV 12506	
Zinc				ENV 12506	
Leachate - Salts					
Chloride				ENV 12506	
Fluoride				ENV 13370	
Sulphate				ENV 12506	

Note 1: Sampling and testing frequency will be fortnightly for the full range of parameters, until consistency is demonstrated in the results. Then one sample of leachate every 2 months will be tested for lead. Testing for the full list of parameters will be undertaken every 6 months for the first 2 years and annually thereafter.
Note 2: Depending on text method and the limit values, the Member State shall determine which of 4 leaching tests shall be required.

Table 13.11: Emissions Monitoring and Sampling Points - Waste Emissions (one table per monitoring point)
***Emission reference point/location No.:* Flue gas cleaning residues**

Parameter	Monitoring frequency	Accessibility of sampling point	Sampling method	Analysis method / technique	Quality control
Composition: concentration of the following:	Note 1	Grab sample from bottom ash conveyor	14 day composite grab sample	EN 13656	Use accredited laboratory
Arsenic				ENV 12506	
Barium				ENV 12506	
Cadmium				ENV 12506	
Chromium total				ENV 12506	
Copper				ENV 12506	
Mercury				ENV 13370	
Molybdenum				ENV 12506	
Nickel				ENV 12506	
Lead				ENV 12506	
Antimony				Note 2	
Selenium				DIN 38406-E12 (note 2)	
Zinc				ENV 12506	
Chloride				ENV 12506	
Fluoride				ENV 13370	
Sulphate				ENV 12506	
Total Organic Carbon				EN 13137	

Note 1: Sampling and testing frequency will be fortnightly for the full range of parameters, until consistency is demonstrated in the results. Testing for the full list of parameters will be undertaken every 6 months for the first 2 years and annually thereafter.
Note 2: Depending on text method and the limit values, the Member State shall determine which of 4 leaching tests shall be required.

Table 13.12: Emissions Monitoring and Sampling Points - Waste Emissions (one table per monitoring point)
***Emission reference point/location No.:* Flue gas cleaning residues**

Parameter	Monitoring frequency	Accessibility of sampling point	Sampling method	Analysis method / technique	Quality control
Leachability	Note 1	Grab sample from bottom ash conveyor	14 day composite grab sample	EN 12457/1-4 (note 2)	Use accredited laboratory
Concentration of the following in leachate:	Note 1	Grab sample from bottom ash conveyor	Leachate sample		Use accredited laboratory
Dissolved Organic Carbon	Note 1			EN 13370	Use accredited laboratory
pH	Note 1			EN 12506	Use accredited laboratory
Leachate – Heavy Metals	Note 1		Leachate sample		Use accredited laboratory
Arsenic				ENV 12506	
Barium				ENV 12506	
Cadmium				ENV 12506	
Chromium total				ENV 12506	
Copper				ENV 12506	
Mercury				ENV 13370	
Molybdenum				ENV 12506	
Nickel				ENV 12506	
Lead				ENV 12506	
Antimony (Sb)				ENV 12506	
Selenium				ENV 12506	
Zinc				ENV 12506	
Leachate - Salts					
Chloride				ENV 12506	
Fluoride				ENV 13370	
Sulphate				ENV 12506	

Note 1: Sampling and testing frequency will be fortnightly for the full range of parameters, until consistency is demonstrated in the results. Then one sample of leachate every 2 months will be tested for lead. Testing for the full list of parameters will be undertaken every 6 months for the first 2 years and annually thereafter.
Note 2: Depending on text method and the limit values, the Member State shall determine which of 4 leaching tests shall be required.

Table 13.15: Ambient Environment Monitoring and Sampling Points - Odour

***Monitoring Point Reference No.*: Various locations on site**

Parameter	Monitoring frequency	Accessibility of sampling point	Sampling method	Analysis method / technique	Quality control
Odour	weekly	Ground level at various site locations	Manual	Not applicable	

Table 13.13: Emissions Monitoring and Sampling Points - Waste Emissions (one table per monitoring point)
***Emission reference point/location No.:* Gypsum**

Parameter	Monitoring frequency	Accessibility of sampling point	Sampling method	Analysis method / technique	Quality control
Composition	Note 1	Grab sample from gypsum skip	14 day composite grab sample	EN 13656	Use accredited laboratory

Note 1: Sampling and testing frequency will be yearly.

Table 13.14: Ambient Monitoring and Sampling Points - Groundwater
***Emission reference point No.:* Groundwater monitoring wells**

Parameter	Monitoring frequency	Accessibility of sampling point	Sampling method	Analysis method / technique	Quality control
Visual inspection/odour	Annually	Monitoring wells with lockable covers	Pump or bailer	Standard methods, analysis by accredited laboratory	Use accredited laboratory
pH	Annually	Monitoring wells with lockable covers	Pump or bailer	Standard methods, analysis by accredited laboratory	Use accredited laboratory
Electrical conductivity	Annually	Monitoring wells with lockable covers	Pump or bailer	Standard methods, analysis by accredited laboratory	Use accredited laboratory
Temperature	Annually	Monitoring wells with lockable covers	Pump or bailer	Standard methods, analysis by accredited laboratory	Use accredited laboratory
Total hydrocarbons	Annually	Monitoring wells with lockable covers	Pump or bailer	Standard methods, analysis by accredited laboratory	Use accredited laboratory
Individual heavy metals	2-yearly	Monitoring wells with lockable covers	Pump or bailer	Standard methods, analysis by accredited laboratory	Use accredited laboratory