Comhairle Cathrach Chorcaí Cork City Council

CITY HALL
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Kinsale Road Landfill Site
Landfill Office

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ISO 14001 ENVIRONMENT

Waste Licence: W 0012-02

Our Ref: 1372

Ms. Sonja Smith
Licensing Unit
Office of Climate, Licensing and Resource Use
EPA
Regional Inspectorate
Inniscarra
Co. Cork

13 May 2009

RE: **Cork City Council - Review of Waste Licence No. W0012-03 for Kinsale Road Landfill - Waste Transfer Station**

Dear Ms. Smith,

Please find enclosed Cork City Councils response to the Agencies Article 14 (2)(b)(ii) of the Waste management (Licensing) Regulations information request dated the 09th March 2009.

This response is in relation to an application for a waste licence review (Licence Reference No. W0012-03) to include a waste transfer station at Kinsale Road Landfill, Ballyphehane, Curraghconway, Inchisarsfield, South City Link Road, Cork. The following documentation has been included:

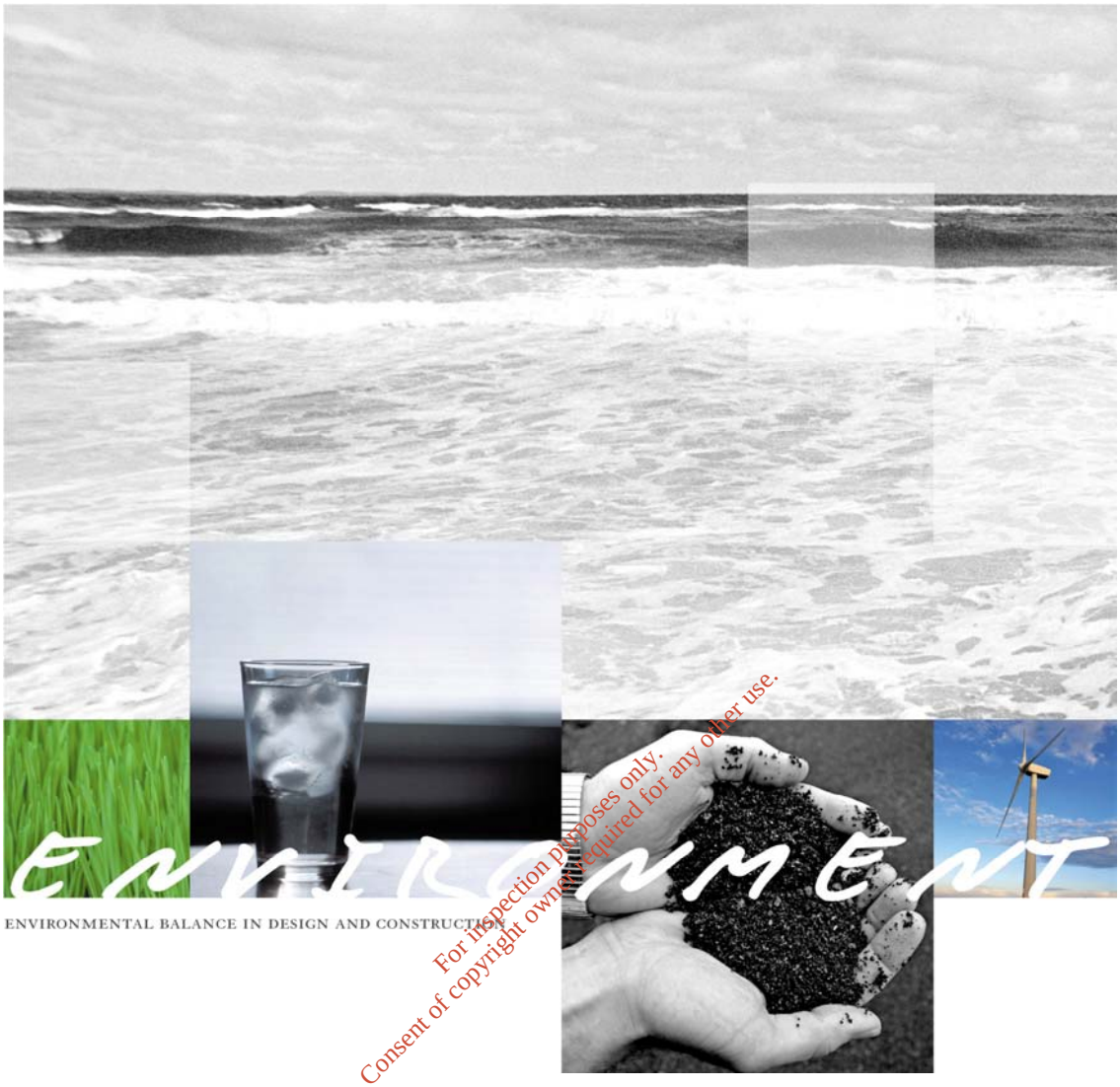
- 2 hard copies (1 original and 1 copy) of the further information
- 2 electronic pdf copies of the further information

The content of the electronic files on the accompanying CD-ROMs are true copies of the original further information.

Please forward any further correspondence in relation to this application to Mr. J.T. Moynihan, Administrative Officer, Environment Directorate, Cork City Council, City Hall, Cork.

Yours Sincerely

J.T. Moynihan
Administrative Officer
Environment Directorate,
Cork City Council



FURTHER INFORMATION REQUEST ON WASTE LICENCE REVIEW AT KINSALE ROAD LANDFILL - LICENCE REGISTER NO. W0012-03

CORK CITY COUNCIL

ORIGINAL

MAY 2009

FEHILY TIMONEY & COMPANY

FURTHER INFORMATION REQUEST ON WASTE LICENCE REVIEW AT KINSALE ROAD LANDFILL - LICENCE REGISTER NO. W0012-03

CORK CITY COUNCIL

COPY

MAY 2009

FEHILY TIMONEY & COMPANY

FURTHER INFORMATION REQUEST ON WASTE LICENCE REVIEW AT KINSALE ROAD LANDFILL - LICENCE REGISTER NO. W0012-03

REVISION CONTROL TABLE

User is Responsible for Checking The Revision Status Of This Document

Rev Nr.	Description of Changes	Prepared by	Checked by	Approved by	Date
B	Draft Issue to Client	COC	ME	ME	08/05/09
0	Issue to Client	CO'C	ME	ME	12/05/09

Client: Cork City Council.

Keywords: waste transfer station, emissions, hydrogeology, waste licence review.

Abstract: This report was prepared following a further information request by the Environmental Protection Agency (EPA). This report details the replies to the Article 12 Compliance requirements as requested by the EPA.

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APPENDICES

1. INTRODUCTION

This report is being prepared in response to a request for information by the Environmental Protection Agency (EPA) on the 09th of March 2009, under Article 12 of the Waste Management (Licensing) Regulations. Fehily Timoney & Co. (FTC) had previously prepared and submitted a waste licence review application for the development of a waste transfer station at Kinsale Road Landfill. This requested information is additional to the waste licence review application and this response should be read in conjunction that report.

The objective of this report is to answer the queries raised by the EPA (See EPA Letter in Appendix 1). The approach taken is that each of the EPA requested information is outlined and answered in turn.

2. INFROMATION REQUESTS AND REPLIES

2.1 Task 1 Clarify the selection criteria for the abatement system proposed to treat emissions to atmosphere from the waste transfer station

The air filtration unit proposed will consist of a dust filter followed by an activated carbon filter to remove odorous compounds.

In the selection process for this abatement system the *Draft BAT Guidance Notes for the Waste Sector: Transfer Activities (April 2003)* was consulted. This guidance note is intended to assist operators of waste facilities to determine Best Available Technology (BAT). Appendix 3 of this document outlines emission elimination and control techniques. This section outlines a control technique for dust such as the use of dust extraction system to remove dust and particulates from working areas/buildings. In the proposed waste transfer station, an extraction system and dust filter is proposed to collect any dust particles for within the building.

A number of control techniques have been outlined for odour, one of which includes – the use of an appropriate air filtration system with bio-filter to remove odour. While it is acknowledged that a biofilter medium is BAT through FTC's experience of odour control and following the EPA's recommendations at certain waste transfer station e.g. Ballyogan and Sarsfield Court, an activated carbon filter medium was chosen. An activated carbon filter can accept a wide range of VOC's and is efficient at VOC capture. Activated carbon filters are stable over time, can accept high spot concentrations, are simple to design and maintain and have higher removal efficiencies than those of biofilters.

While biofilters have high removal efficiencies, these efficiencies can only be continuously reached through proper maintenance of the filter. Maintenance would include the daily checking of moisture content of the system, off-gas temperature and back pressure, removal of disintegrated material etc. Therefore, there is a high level of maintenance required and specific knowledge required operating a biofilter correctly.

2.2 Task 2 Clarify the selection of the proposed stack height

The proposed stack height selected was c.11.5 m high. This is located on the western side of the building. Stack height is important in order to ensure efficient dispersion of pollutants. Minimum stack height is needed to prevent exhaust gas plume from being entrained in the wake of the nearby structures. All structures and terrain was examined within 5 times the lesser dimension of the height or width of nearby structures– this is based on good engineering practice.

The site administration building to the northeast of the proposed development is c 5.5 m high (20 m O.D), and to the east of the development the landfill terrain itself will, when fully capped, be approximately 23 m O.D. post settlement. The ground elevation at the stack base is c. 12.5 m O.D and with a stack height of 11.5 m this would give an overall release height of 24 m. As this terrain height is greater than 150 m away from the proposed stack, any released exhaust pollutants should be sufficiently dispersed before it reaches the landfill terrain. As part of the detailed design and specified engineering works report on the development, air dispersion modelling will be undertaken to ensure ambient air quality standards are not exceeded.

2.3. Task 3 Complete Tables E.1 (II)(iii) and (iv) of the application form in relation to the proposed emissions to atmosphere from the waste transfer station.

Tables E.1 (II)(iii) and (iv) in relation to proposed emissions to atmosphere have been completed and are included in Appendix 2.

2.4 Task 4 Clarify the provisions that are in place for response to emergency situations outside of normal working hours

Cork City Council has prepared this response. Cork City Council provides an out of hours on-call service to members of the public for emergency situations. In the event of an emergency situation arising at the landfill site the on-call co-ordinator has the contact details of the relevant management staff.
Each member of the management team has the contact details of all contractors associated with the site (Bioverda Power Systems, Site Capping Contractor, Waste Contractors etc.).

A full list of contractors associated with the operation of the site as well as emergency contact numbers is detailed in Appendix 3 - Emergency Contact Numbers of the Emergency Response Procedure for the site.

This document is available at the following locations on site:

- Weighbridge
- Security Hut
- Administrative Building
- GO Staff Canteen
- Civic Amenity Site Hut

2.5 Task 5 Clarify whether Planning permission is required in relation to the proposed development in the waste licence application

The proposed development includes for the construction of a 22,000 tonnes per annum waste transfer station. Therefore, the development is not subject to a Part 10 application as it is below the appropriate threshold of 25,000 tpa.

As the applicant is a local authority, the application would then fall under a Part 8 application. However, Article 80 Subsection 1 H (i) of the Planning and Development Regulations 2001 states that:

> *Subject to sub-article (2) and sub-section (6) of section 179 of the Act, the following classes of development, hereafter in this Part referred to as ''proposed development'', are hereby prescribed for the purposes of section 179 of the Act —*
>
> *(h) the use of land, or the construction or erection of any installation or facility, for the disposal of waste, not being—*
>
> *(i) development which comprises or is for the purposes of an activity in relation to which a waste licence is required or*

Therefore, the proposed development is exempt from planning as the site is operated under a waste licence.

Notwithstanding the foregoing the provision/construction of a Transfer Station would be subject to prior Council consideration and approval as with any major local authority capital project

2.6 Task 6 Clarify the class, specification and location of all existing and proposed interceptors and silt traps

There are two existing interceptors onsite. The class and specification of these interceptors are detailed below and the location of these interceptors is outlined on Drawing LW0900103-001 A in Appendix 4.

- A petrol & oil interceptor was recently installed to cater for surface water run-off in the northern section of the Contract 8 Access Road. The specification of this interceptor is a Klargester Class I Full Retention Separator NSFA 060.
- There is also an existing oil interceptor to serving the WEEE Slab compound. The specification of this interceptor is a Klargestor Class II Bypass Separator NSB 3.

As part of the waste transfer station, a silt trap/interceptor is proposed. Run-off from within the waste transfer station building will be discharged through this interceptor to the leachate treatment plant before being discharged to the Tramore Valley sewer. As the wastewater is being discharged to a sewer and not directly to surface water, a Klargestor Class II Bypass Separator NSB 3 or similar will be a sufficient specification in this location. The proposed interceptor location is also included in Drawing LW0900103-001 A in Appendix 4.

2.7 Task 7 Identify the location of the on-site wheel wash on a suitably scaled map

The location of the onsite wheel wash has been identified on a suitable scaled map LW0900103-002 A in Appendix 4.

2.8 Task 8 Clarify the total quantity of construction and demolition (C&D) waste to be accepted at the facility per annum. Provide a summary of the C&D processing activities that are to take place at the facility.

Cork City Council has prepared the following response:

Under the current waste licence W0012-02, Schedule A: Waste Acceptance, Cork City Council is permitted to accept a maximum of 300,000 tonnes of Construction and Demolition Waste per annum for recycling and recovery in addition to 100,000 tpa of soil which is used for daily cover, in site construction works and landfill restoration.

Cork City Council wishes to retain that condition under the proposed waste licence review. C&D processing actives will include screening/crushing of soils and rubble and the shredding of timber waste.

2.9 Task 9 Complete Table H.1(ii) as appropriate for waste to be accepted at the waste transfer station and for the C&D waste to be accepted.

Tables H.1 (ii) in relation to waste to be accepted at the waste transfer station and the C&D facility has been completed and is included in Appendix 2.

2.10 Task 10 Complete Tables E.2(i)and E2(ii) where applicable in relation to the emission to surface water via emission points SRP1, SRP2, SRP3, SRP4 and SRP5.

Tables E.2 (i) and E.2 (ii) in relation to emissions to surface water have been completed and are included in Appendix 2. There is no emission data available for SRP2 and SRP3. These points are within the reed bed system and are not considered emission points. SRP4 is an overflow outlet from the stormwater collection pond to the river. Cork City Council has stated that no overflow events have taken place to-date and hence the overflow has been zero.

SRP1 is the inlet to the stormwater pond and reed bed system. Monitoring data for this is included in Table E.2 (ii) as 'Prior to Treatment' data. SRP5 is the emission/discharge point to the Tramore River and monitoring data is included under the 'As Discharged' section of Table E.2 (ii).

2.11 Task 11 Complete Tables E.3(i) and E3(ii) in relation to the emission to sewer from the facility via emission point SD1. Clarify the reason for any proposed changes to the limitations specified in the existing waste licence

Tables E.3 (i) and E.3 (ii) in relation to emissions to sewer have been completed and are included in Appendix 2.

2.12 Task 12 Complete Tables F.2 to F.8 – Emissions monitoring and Sampling Locations of the licence application form as applicable. Complete Table Ff – Fugitive Environmental Monitoring and Sampling Locations, as applicable.

Tables F.2 to F.8 in relation to emissions monitoring and sampling locations for each environmental media has been completed and is included in Appendix 2.

2.13 Task 13 Provide a summary of the 2008 monitoring data for the dust monitoring, landfill gas monitoring, surface water monitoring and sewer discharge monitoring.

A summary of the 2008 monitoring data for dust, landfill gas, surface water and sewer discharge is provided in Appendix 5.

2.14 Task 14 Provide details of the florescent light bulbs accepted at the facility, update Table H.1.2 where applicable

The following details have been provided by Cork City Council:

Fluorescent light bulbs are accepted at the civic amenity site free of charge. They are stored in a ''coffin'' prior to collection by KMK metals. The fluorescent tubes are collected as part of the WEEE contract and are weighed out as waste electrical and electronic items.

Table 2.1: Hazardous Waste Types and Quantities

HAZARDOUS WASTE	DETAILED DESCRIPTION * Reference Should Be Made To The Relevant European Waste Catalogue Codes As Presented By Commission Decision 2000/532/EC	Tonnes Per Annum (Existing) 2008	(Tonnes Per Annum Proposed)
Waste Oil	13 00 00	8.06	12
Oil filters	Not Applicable	Not Applicable	Not Applicable
Asbestos		3.46	0
Paint and Aerosols	20 01 27 16 05 04	12.64	20
Batteries	16 06 00	8.74	12
Fluorescent Light Bulbs	20 01 21	4.00[1]	6
Contaminated Soils	Not Applicable	Not Applicable	Not Applicable
OTHER HAZARDOUS WASTE (APPLICANT TO SPECIFY)			
WEEE	20 01 35	703.44	1000

Note1 Estimated weight

2.15 Task 15 Provide an update in relation to the 'once-off' conditions included in the existing licence (W0012-02)

2.16 Task 16 In the case where the Office of Environmental Enforcement (OEE) of the Agency has agreed any variations or adjustments to the conditions of the existing licence (W0012-02), supply a schedule detailing these agreed variations and adjustments to the existing licence conditions.

The response to Tasks 15 and 16 have been prepared by Cork City Council and are presented below:

Cork City Council wishes to propose the following changes to the existing licence. Each condition and schedule of the licence has been reviewed and requested changes/deletions are indicated in the following manner:

- Suggested deletions are highlighted in Red.
- Suggested changes are highlighted in Yellow
- Agreed variations with the Agency are highlighted in Turquoise

The existing licence and the highlighted alterations are included in Appendix 6.

2.17 Task 17 Provide a summary of the leachate management system and the leachate conditioning plant treatment process

The management of leachate at Kinsale Road Landfill includes the collection, storage, treatment and disposal of leachate.

The leachate collection system is made up of a primary and a secondary system. The primary system consists of a long, deep cut-off trench surrounding the central part of the site. The main function of the trench is to prevent subsurface leachate from entering the Tramore and Trabeg Rivers. This deep trench discharges (via sumps and pumps) to the onsite leachate treatment plant. The secondary collection system consists of 5 leachate pumps situated in the waste body. These pumps can run manually or automatically with the SCADA system. The cell pumps discharge to the leachate treatment plant.

The leachate lagoon provides storage for leachate and additional storage for contaminated stormwater. The lagoon is divided into three cells, where cell 1 and 3 are for contaminated stormwater storage. Under normal circumstances stormwater is channelled to the reed beds prior to discharge to the Tramore River.

However, in the event of the stormwater being contaminated (post analysis), it is discharged to the treatment plant for disposal to the sewer and further treatment.

Cell 2 is for leachate storage and has a floating cover, which acts as an odour barrier. Cell 2 discharges to the leachate treatment plant. The leachate treatment plant is designed to strip dissolved methane from leachate prior to discharge to the Tramore sewer. The leachate stored in cell 2 of the lagoon is firstly discharged to a balancing tank and is then transferred to the methane stripping lanes (x2) at an approximate rate of 5.01 l/s. The stripping lanes consist of 4 chambers divided by baffled weirs. As the leachate flows through the chambers, it is aerated by disc membranes powered by two air blowers, one blower per lane. Anti-foam is added at the start of both lanes to prevent foaming of the leachate. The discharge from the lanes enters a gravel trap to prevent calcium and iron precipitation coating the discharge pumps and pipe work. The gravel trap then discharges to the sewer discharge chamber and is pumped to the Tramore sewer. The current EPA licence allows the plant to discharge 25,000 l/hr into the Tramore sewer.

There is also a temporary contaminated stormwater treatment plant along the south eastern part of the site. This plant is based on the main treatment plant design but with 4 times the capacity of the main plant and is fed with contaminated stormwater from the active area. Its construction consists of a HDPE lined pond with a concrete base containing 3 x 4 rows of 12 diffusers and a discharge pump with a 20 l/s capacity. The plant is fully automated and is controlled by the SCADA system. Cork City Council has permission from the Sanitary Authority (Cork County Council) to discharge 20 l/s to the sewer from this plant.

The leachate management system is automatically controlled and monitored using the SCADA system onsite. This includes the operation of the leachate pumps, leachate lagoon, treatment plant and sewer discharge. Parameters such as leachate levels, flow rates, methane headspace etc. are monitored through the SCADA system.

2.18 Task 18 Provide a summary of the further investigations proposed to examine the potential impact of leachate contamination to the east of the landfill, as highlighted in the Hydrogeological Assessment Report, submitted with the licence review application.

Cork City Council has prepared the following response:

Subsequent to the issues highlighted in the in the Hydrogeological Assessment Report that was submitted in January 2009; 5 No. boreholes have been drilled in the area to the east of the landfill site under the supervision of the Cork City Council personnel. Two wells have been drilled to 15 metres, two wells to 8 metres and the one to 5 metres below ground level. During the drilling phase, it was noted that the ground water is located at 14 metres below ground level with a perched water table at 3 – 5 metres below ground level.

Each of the wells has been sampled by landfill personnel at the following depths – 15m, 8m and 5m. The sample from the overburden wells (perched water table) showed ammonium values of 80 mg/l while the groundwater sample showed ammonium values of 40 mg/l. Pumping trials have been carried out on the wells to assess ground water recharge. Based on the results, a plan to remediate the situation is now been drawn up which may involve linking the wells in to the main leachate collection network. A detailed methodology will be sent to the Agency in due course for agreement.

2.19 Task 19 Provide a copy of the financial provisions in place under the existing licence (W0012-02) in relation to the restoration and aftercare of the facility

In recent years, Cork City Council has spent in excess of €20 million on infrastructural works and final capping works at Kinsale Road Landfill Site. In 2009, the City Council allocated a further budget of €3,331,500 for additional capital works, and it is envisaged that ongoing remediation works as well as aftercare monitoring requirements will be funded post closure from City Council funds and Government grants.

Appendix 1

Copy of EPA Letter for Request for Information

Received PR
24/3/09

4 Copies R

epa
Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

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Mr Michael O' Brien
Senior Engineer
Cork City Council
City Hall
Cork

09th March 2009

W0012-03

re: Notice in accordance with Article 14(2)(b)(ii) of the Waste Management (Licensing) Regulations

Dear Mr O'Brien

I am to refer to the above referenced application for a waste licence review relating to a facility at Ballyphehane, Curraghconway, Inchisarsfield, South City Link Road, Cork. Having examined the documentation submitted, I am to advise that the Agency is of the view that the documentation does not comply with Article 12 of the Waste Management (Licensing) Regulations.

You are therefore requested, in accordance with Article 14(2)(b)(ii) of the regulations, to take the steps and supply the information detailed below:

ARTICLE 12 COMPLIANCE REQUIREMENTS

Waste Transfer Station

1. Clarify the selection criteria for the abatement system proposed to treat emissions to atmosphere from the waste transfer station.
2. Clarify the selection of the proposed stack height for emission point A2-1.
3. Complete Tables E.1(ii), E.1(iii) and E.1(iv) of the application form in relation to the proposed emissions to atmosphere from the waste transfer station.
4. Clarify the provisions that are in place for response to emergency situations outside of normal working hours.
5. Clarify whether Planning Permission is required in relation to the proposed development included in the waste licence application.

Site Activities

6. Clarify the class, specification and location of all existing and proposed interceptors and silt traps.
7. Identify the location of the on-site wheel wash on a suitably scaled map.

8. Clarify the total quantity of construction and demolition (C&D) waste to be accepted at the facility per annum. Provide a summary of the C&D processing activities that are to take place at the facility.

9. Complete Table H.1(ii), as appropriate, for waste to be accepted at the waste transfer station and for the C&D waste to be accepted at the site.

10. Complete Tables E.2(i) and E.2(ii), where applicable, in relation to the emissions to surface water via emission points SRP1, SPR2, SPR3, SPR4 and SPR5.

11. Complete Tables E.3(i) and E.3(ii) in relation to the emission to sewer from the facility, via emission point SD1. Clarify the reason for any proposed changes to the limitations specified in the existing waste licence (W0012-02).

12. Complete Table F.2 to F.8 - *Emissions Monitoring and Sampling Location* of the licence application form, as applicable. Complete Table Ff - *Fugitive Environment Monitoring and Sampling Locations*, as applicable.

13. Provide a summary of the 2008 monitoring data for dust monitoring, landfill gas monitoring, surface water monitoring and sewer discharge monitoring.

14. Provide details of the fluorescent light bulbs accepted at the facility, update Table H.1.2 where applicable.

Update in relation to existing licence (W0012-02)

15. Provide an update in relation to the 'once-off' conditions included in the existing licence (W0012-02).

16. In the case where the Office of Environmental Enforcement (OEE) of the Agency has agreed any variations or adjustments to the conditions of the existing licence (W0012-02), supply a schedule detailing these agreed variations and adjustments to the existing licence conditions.

Landfill Leachate

17. Provide a summary of the leachate management system and the leachate conditioning plant treatment processes.

18. Provide a summary of the further investigations proposed to examine the potential impact of leachate contamination to the east of the landfill, as highlighted in the *Hydrogeological Assessment Report,* submitted with the licence review application.

Financial Provisions

19. Provide a copy of the financial provisions in place under the existing licence (W0012-02), in relation to the restoration and aftercare of the facility.

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

In the case where any drawings already submitted are subject to revision consequent on this request, a revised drawing should be prepared in each case. It is not sufficient to annotate the original drawing with a textual correction. Where such revised drawings are submitted, provide a list of drawing titles, drawing numbers and revision status, which correlates the revised drawings with the superseded versions.

Please supply the information in the form of a one (1) original plus one (1) copy in hardcopy format by **13th April 2009**. In addition please submit two (2) copies of the requested information in electronic searchable PDF format on a CD-ROM to the Agency. Please note that all maps/drawings should not exceed A3 in size.

Please note that the application's register number is **W0012-03**. Please direct all correspondence in relation to this matter to *Ms Sonja Smith, Licensing Unit, Office of Climate, Licensing & Resource Use, Environmental Protection Agency, Regional Inspectorate, Inniscarra, County Cork* quoting the register number above.

Yours sincerely,

Mr Stuart Huskisson
Inspector
Office of Climate, Licensing & Resource Use

Appendix 2

Completed Waste Licence Tables

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

Emission Point Ref. N^{o}:	A2-1
Source of Emission:	Activated Carbon Filter System
Location :	Eastern side of Waste Transfer Station
Grid Ref. (12 digit, 6E,6N):	E168026 N069578
Vent Details Diameter: Height above Ground(m):	 1.2 m 11.5 m
Date of commencement:	2010/2011

Characteristics of Emission:

(i) Volume to be emitted:			
Average/day	c. 472,770 m^3/d	Maximum/day	c. 630,360 m^3/d
Maximum rate/hour	c. 35,020 m^3/h	Min efflux velocity	6 * $m.sec^{-1}$ 3 ** $m.sec^{-1}$
(ii) Other factors			
Temperature	30 ^{o}C(max)	18 ^{o}C(min)	25 ^{o}C(avg)
For Combustion Sources: N/A Volume terms expressed as : ☐ wet. ☐ dry. _____%O_2			

Calculated Volumes based on 3 to 4 air changes per hour in accordance with BAT

* Operational hours –

** Non-operational hours – extraction system will be cut back to 50% capacity during these times

(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/hr 24 hr/day 365 day/yr

TABLE E.1(iii): MAIN EMISSIONS TO ATMOSPHERE - Chemical characteristics of the emission (1 table per emission point)

Emission Point Reference Number: ***A2-1***

Parameter	Prior to treatment[1]				Brief description of treatment	As discharged[1]					
	mg/m^3 (ou_e/m^3)		kg/h (or ou_e/hr)			mg/m^3 (oue/m^3)		kg/h (or ou_e/hr)		kg/year (or ou_e/yr)	
	Avg	Max	Avg	Max		Avg	Max	Avg	Max	Avg	Max
Odour (ou_e/m^3)	2000	3000	39,397,500	105,060,000	Carbon	300	500	5,909,625	17,510,000	5.18E+10	1.53E+11
Dust	5	10	0.10	0.35	Adsorption Filter	0.25	0.5	0.005	0.02	43.14	153.39

1. Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0^oC,101.3kPa). Wet/dry should be the same as given in Table E.1(ii) unless clearly stated otherwise.

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

Emission Point:

Emission Point Ref. N^{o}:	SRP5
Source of Emission:	Stormwater retention pond and reed bed system
Location :	South east boundary of the facility
Grid Ref. (10 digit, 5E,5N):	E168758 N 069210
Name of receiving waters:	Tramore River
Flow rate in receiving waters:	Data not available $m^3.sec^{-1}$ Dry Weather Flow Data not available $m^3.sec^{-1}$ 95%ile flow
Available waste assimilative capacity:	Data not available kg/day

Emission Details:

(i) Volume to be emitted			
Normal/day	c. 552 m^3	Maximum/day	c. 1,512 m^3
Maximum rate/hour	c. 63 m^3		

Note: this data has been estimated from the 2008 water balance surface water run-off calculations. Only the surface areas which drain to the stormwater pond were included in the estimate.

(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/hr 24 hr/day 365 day/yr

TABLE E.2(ii): EMISSIONS TO SURFACE WATERS - Characteristics of the emission (1 table per emission point)

Emission point reference number : SRP5

Parameter	Prior to treatment				As discharged				% Efficiency
	Max. hourly average (mg/l)	Max. daily average* (mg/l)	kg/day	kg/year	Max. hourly average (mg/l)	Max. daily average * (mg/l)	kg/day	kg/year	
Ammonia (NH4)		290.00	438	160,003		96	145	52,967	67
Chloride		425.00	642	234,487		179	271	98,760	58
BOD		255.00	385	140,692		64	97	35,311	75
COD		839.00	1,268	462,905		155	234	85,519	82
Suspended Solids		157.50	238	86,898		130 **	197	71,725	17
TOC		384.00	580	211,866		103	156	56,829	73

* Maximum data taken from 2005-2008 Monitoring data

** This is the maximum value recorded from 2005-2008 monitoring data. The EPA licence limit of 35 mg/l was only exceeded 3 times during this timeframe. The average suspended solid emission from 2005-2008 was 9 mg/l.

TABLE E.3(i): EMISSIONS TO SEWER(One page for each emission)

Emission Point:

Emission Point Ref. N^{o}:	SD1
Location of connection to sewer :	South west boundary of the facility
Grid Ref. (10 digit, 5E,5N):	E167926 N 069201
Name of sewage undertaker:	Cork County Council Sewer

Emission Details:

(i) Volume to be emitted			
Normal/day	250 m^3	Maximum/day	600 m^3
Maximum rate/hour	25* m^3		

* Licensed limit value

Note: In addition to the above, Cork City Council is permitted to discharge contaminated surface water to the sewer at a rate of 20 l/s (maximum 1,728 m^3/day)

(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/hr 24 hr/day 365 day/yr

TABLE E.3(ii): EMISSIONS TO SEWER - Characteristics of the emission (1 table per emission point)

Emission point reference number : ***SD1***

Parameter	Prior to treatment				As discharged				% Efficiency
	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	Max. hourly average (mg/l)	Max. daily average (mg/l)	kg/day	kg/year	
Ammonia (NH4)*		N/A	N/A	N/A		410	246	89,790	
BOD*		N/A	N/A	N/A		100	60	21,900	
Sulphate*		N/A	N/A	N/A		76	46	16,644	
Suspended Solids*		N/A	N/A	N/A		70	42	15,330	
Dissolved Methane **		N/A	N/A	N/A		1.8 ***	1.08	394	

* Maximum data taken from 2005-2008 Monitoring data
** Maximum data taken from 2007 and 2008 monitoring data
*** This is the maximum value recorded from 2007-2008 monitoring data. The EPA licence limit for dissolved methane is 0.2 mg/l.

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

Emission Point Reference No(s). : AM1 Emission from Activated Carbon Filter

Parameter	Monitoring frequency	Accessibility of Sampling Points
Process Parameters		Specific sampling point will been designed with appropriate access
Flow	Bi -annually	
Temperature	Bi -annually	
Moisture	Bi -annually	
Pressure	Bi -annually	
Outlet		
Dust	Bi-annually	
Odour Units	Bi-annually	

TABLE Ff: FUGITIVE AIR ENVIRONMENT MONITORING AND SAMPLING LOCATIONS (1 table per media)

Monitoring Point Reference No: Odour – O1 - O10
Dust - D1 - D6
PM_{10} – S1 - S4

Parameter	Monitoring frequency	Accessibility of Sampling point
Dust	Quarterly	Specific sampling point have been designed with appropriate access
Odour	Quarterly	
PM_{10}	Quarterly at S1, S2 & S4 Continuous at S3	

TABLE F.3, F.5 & F.8: SURFACE WATER, GROUNDWATER & LEACHATE EMISSIONS MONITORING AND SAMPLING POINTS - (1 table per media)

Emission Point Reference No(s). : Surface Water – EM0. EM1, EM2,EM6, EM7, EM8, EM9, EM10, EM11
Groundwater – KC8, MWBR1,2 &7, OB1,2 &7, NW1, 2,3, 4, 5, 8, 9
Leachate – BH 1 - BH 5 PS1-PS9 and PS 5A
Ecological Monitoring – A-F

Parameter	Surface Water Monitoring frequency	Groundwater Monitoring frequency	Leachate Monitoring frequency	Accessibility of Sampling Points
Visual Inspection/Odour	Monthly	Quarterly	Quarterly	Specific sampling point have been designed with appropriate access
Groundwater Level	Not Applicable	Quarterly	Not Applicable	
Leachate Level	Not Applicable	Not Applicable	Continuous	
Ammoniacal Nitrogen	Quarterly	Quarterly	Annually	
BOD	Quarterly	Not Applicable	Annually	
COD	Quarterly	Not Applicable	Annually	
Chloride	Quarterly	Quarterly	Annually	
Dissolved Oxygen	Quarterly	Quarterly	Not Applicable	
Electrical Conductivity	Quarterly	Quarterly	Annually	
pH	Quarterly	Quarterly	Annually	
Total Suspended Solids	Quarterly	Not Applicable	Not Applicable	
Temperature	Quarterly	Quarterly	Quarterly	
Cadmium & other metals	Annually	Annually	Annually	
Cyanide (Total)	Not Applicable	Annually	Annually	
Fluoride	Not Applicable	Annually	Annually	
List I/II organic substances	Once -off	Annually	Once -off	
Mercury	Annually	Annually	Annually	
Sulphate	Annually	Annually	Annually	
Total Alkalinity	Annually	Annually	Not Applicable	
Total P /orthophosphate	Annually	Annually	Annually	
Total Oxidised Nitrogen	Annually	Quarterly	Annually	
Total Organic Carbon	Not Applicable	Quarterly	Not Applicable	
Residue on evaporation	Not Applicable	Annually	Not Applicable	
Biological Assessment	Annually	Not Applicable	Not Applicable	

Note: it is not proposed to change the monitoring undertaken under the existing waste licence

TABLE F.3 (b): STORMWATER RETENTION POND/REEDBED EMISSIONS MONITORING AND SAMPLING POINTS - (1 table per media)

Emission Point Reference No(s). : SRP1(Inlet), SRP5 (outlet)

Parameter	Monitoring frequency	Accessibility of Sampling Points
Inlet		Specific sampling point have been designed with appropriate access
Flow	Continuous	
TOC	Continuous	
pH	Continuous	
Conductivity	Continuous	
Suspended Solids	Weekly	
Ammonia	Weekly	
Outlet		
Flow	Continuous	
Visual Inspection	Daily	
Suspended Solids	Weekly	

TABLE F.4: SEWER EMISSIONS MONITORING AND SAMPLING POINTS - (1 table per media)

Emission Point Reference No(s). : SD1

Parameter	Monitoring frequency	Accessibility of Sampling Points
Flow	Continuous	Specific sampling point have been designed with appropriate access
BOD	Monthly (24 hour composite)	
Ammoniacal Nitrogen	Monthly (24 hour composite)	
Suspended Solids	Monthly (24 hour composite)	
Sulphates	Monthly (24 hour composite)	
pH	Continuous	
Methane	Weekly	

TABLE F.6: NOISE EMISSIONS MONITORING AND SAMPLING POINTS - (1 table per media)

Emission Point Reference No(s). : B1 – B4 & A1 – A4

Parameter	Monitoring frequency	Accessibility of Sampling Points
$L(A)_{eq}$ (30 minutes)	Annual	Specific sampling point have been designed with appropriate access
$L(A)_{10}$ (30 minutes)	Annual	
$L(A)_{90}$ (30 minutes)	Annual	
Frequency Analysis (1/3 Octave Band Analysis)	Annual	

TABLE F.9 (b): LANDFILL GAS EMISSIONS MONITORING AND SAMPLING POINTS - (1 table per media)

Emission Point Reference No(s). : Site Office and DP3 & DP4 and LG2, LG3, LG4, LG5, LG5A, LG6, LG6A, LG7, LG7A, LG8, LG8A, LG12-LG19, LG137-146, LG172-175

Parameter	Monitoring frequency	Accessibility of Sampling Points
Methane (CH4) %v/v	Monthly – Gas Wells Continuous – Site Office	Specific sampling point have been designed with appropriate access
Carbon dioxide (CO_2) %v/v	Monthly – Gas Wells Continuous – Site Office	Specific sampling point have been designed with appropriate access
Oxygen (O_2) %v/v	Monthly – Gas Wells Continuous – Site Office	Specific sampling point have been designed with appropriate access
Atmospheric Pressure	Monthly – Gas Wells	Specific sampling point have been designed with appropriate access
Temperature	Monthly – Gas Wells	Specific sampling point have been designed with appropriate access

TABLE F.9 (c): LANDFILL GAS INFRASTRUCTURE EMISSIONS MONITORING AND SAMPLING POINTS - (1 table per media)

Emission Point Reference No(s). : TV01

Parameter	Flare (enclosed) Monitoring frequency	Utilisation Plant Monitoring frequency	Accessibility of Sampling Points
Inlet			Specific sampling point have been designed with appropriate access
Methane (CH4) %v/v	Continuous	Weekly	
Carbon dioxide (CO_2) %v/v	Continuous	Weekly	
Oxygen (O_2) %v/v	Continuous	Weekly	
Total Sulphur	Annually	Annually	
Total Chlorine	Annually	Annually	
Total Fluorine	Annually	Annually	
Process Parameters			
Combustion Temperatures	Continuous	Quarterly	
Outlet			
CO	Continuous	Continuous	
NO_x	Annually	Annually	
SO_2	Annually	Annually	
Particulates	Not Applicable	Annually	
TA Luft Class, II, III organics	Not Applicable	Annually	
TOC	Annually	Not Applicable	
Hydrochloric acid	Annually	Annually	
Hydrogen fluoride	Annually	Annually	

TABLE H.1(ii) WASTE - Other Waste Recovery/Disposal

Waste material	EWC Code	Main source[1]	Quantity		On-site recovery/disposal[2]	Off-site Recovery, reuse or recycling	Off-site Disposal
			Tonnes / month	m^3 / month	(Method & Location)	(Method, Location & Undertaker)	(Method, Location & Undertaker)
Household and Commercial Municipal Solid Waste	15 01 06 – mixed packaging	Household waste collections by Cork City Council	c. 1,833	N/A	N/A	N/A	Bottlehill Landfill, Glashaboy North, Bottlehill, County Cork
	20 01 02 – glass						
	20 02 03 – other non-biodegradable waste						
	20 03 01 – mixed municipal wastes						
	20 03 02 – waste from markets						
	20 03 03 – street cleaning residues						
	20 03 07 – bulky waste						
	20 03 99 – municipal waste not otherwise specified						
	19 12 12 - other waste (including mixtures of materials) from mechanical treatment of waste other than those mentioned in 19 12 11						
	15 01 01 – paper and cardboard packaging						
	15 01 02 – plastic packaging						
	15 01 03 – wooden packaging						
	15 01 04 – metallic packaging						
	15 01 05 – composite packaging						
	15 01 07 – glass packaging						
	15 01 06 –mixed packaging						
	20 01 01 – paper and cardboard						
	20 01 02 - glass						
	20 01 38 – wood other that that mentioned in 20 01 37						

Waste material	EWC Code	Main source[1]	Quantity		On-site recovery/disposal[2]	Off-site Recovery, reuse or recycling	Off-site Disposal
			Tonnes / month	m^3 / month	(Method & Location)	(Method, Location & Undertaker)	(Method, Location & Undertaker)
Construction and Demolition Waste	17 01 01 – concrete	Members of the public and commercial customers	c. 25,000	N/A	Onsite reuse for construction of haul roads		
	17 01 02 - bricks						
	17 01 03 – tiles and ceramics						
	17 01 07 – mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06						
	17 02 01 – wood					Eirebloc Ltd., Lissarda, Co. Cork Weyerhauser Ltd., Clonmel, Co. Tipperary	
	17 05 04 – solid and stones other than those mentioned in 17 05 03				Onsite reuse for construction of haul roads		
	17 09 04 – mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03						
	17 01 01 – concrete						

1 A reference should be made to the main activity/ process for each waste.
2 The method of disposal or recovery should be clearly described and referenced to Attachment H.1

Appendix 3

Emergency Contact Numbers

Emergency Telephone List

	Contact Name	Telephone No.
Cork City Council Offices	During Working Hours	021 4966222
	Non-Working Hours	021 4966512
Senior Engineer Environment	Michael O'Brien	086 2549420
Facility Manager	John Twomey	086 1706878
Deputy Facility Manager	Kevin Ryan	086 8152765
Landfill Technicians	Cathy Healy Pat Foley ~~Fiona O' Connor~~	086 6079113 086 8152353 ~~086 3883664~~
Junior Foreman	Mick Reck	086 8597721
Bioverda	Martin Dvorak	087 2464362
Bioverda	Mick Murphy	087 6051000
Environmental Protection Agency	Dr. Brian Donlon	021 4875540
Environmental Protection Agency	Siobhán McDonnell	021 487 5540
Ravenstone Bird Control	Samanta Murphy	085 7869092
Irish Landfill Services	David Herbert	086 2593928
Emergency Services		999/112
Residents Association	Louise Cotter (Greenhills Estate)	021 4897389 (Home)
Cork City Council – Health & Safety Advisor	Donal O' Sullivan	086 6887212
Health & Safety Authority		1890 289389
Waste Contractors		
Greenstar	Tomás Healy	087 4103364
Rohu Waste Broker	Fred Rohu	087 2240132
Veolia Waste Services	Gavin Douglas	086 8102002
CTO	Aidan Stafford	087 9977022
Capping Contract Works – Martin O' Callaghan Ltd.	Declan Casey – Site Engineer for Martin O' Callaghan	086 8125557
Capping Contract Works – Resident Engineer (FTC)	Shane Kiely	087 6310935

Appendix 4

Drawings

EXISTING INTERCEPTOR 1

EXISTING INTERCEPTOR 2

PROPOSED INTERCEPTOR 3

SITE PLAN

Scale 1:4000

Scale 1:4000

N

Legend

- Licenced Boundray
- Proposed Waste Transfer Area
- Existing Interceptor
- Proposed Interceptor

Rev.	Drawn	Chkd	Appd	Date	Description
A	BOR	ME	DOS	12.05.09	ISSUE FOR APPROVAL

Revision History: A

Name of Client

CORK CITY COUNCIL

Name of Job

KINSALE ROAD LANDFILL
WASTE LICENCE REVIEW
- ARTICLE 12 RESPONSE -

Title of Drawing

LOCATION OF INTERCEPTORS / SILT TRAPS

Scales Used: 1:4000

This Drawing was printed to A3

Dwg. No.: LW0901103-001

Rev.: A

O:\ACAD\2009\LW09\01\103\LW0901103-001

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N

Legend

- Licenced Boundray
- Proposed Waste Transfer Area
- Wheel Wash

SOUTH CITY LINK ROAD

ED Boy

EXISTING WHEELWASH

Weighbridge

EXISTING 2.4m HIGH PALISADE FENCE

Site administration office

Main site entrance gates

Access road

Gate

Gate

WEEE slab

Fridge storage

Gas Plant

Gate

Gate

Portacabin

Flare

Gas generation plant

Main plant

City South Link Road

Existing 2.4m high palisade fence

Existing site security exit road

SITE PLAN
Scale 1:1000

0m 5.00m 10.00m 15.00m 20.00m 25.00m 30.00m 35.00m 40.00m 45.00m 50.00m
Scale 1:1000

Rev.	Drawn	Chk'd	Appr'd	DOS	
A	BOR		ME	Cork 12.05.09	ISSUE FOR APPROVAL
Revision History				Rev Origin / Date	Description
A					

Name of Client

CORK CITY COUNCIL

Name of Job

KINSALE ROAD LANDFILL
WASTE LICENCE REVIEW
- ARTICLE 12 RESPONSE -

Title of Drawing

LOCATION OF ON-SITE WHEEL WASH

Scales Used	This Drawing was printed to
1:1000	A3

Dwg. No.	Rev.
LW0901103-002	A

O:\ACAD\2009\LW09\01\02\LW0901103-002

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ORIGINAL DRAWING SIZE A1 - (841 x 594)

SCALE - VERTICAL

SCALE - HORIZ.

Appendix 5

Summary of the 2008 monitoring data for dust, landfill gas, surface water and sewer discharge

Landfill Gas

Buildings

Limits

The limits in the licence are 1% v/v (20% LEL) for methane and 1.5% v/v for carbon dioxide

Monitoring Details

Six buildings are monitored on a weekly basis.
The instrument used was the Gasdata GFM430 and the monitoring was carried out by the Landfill Technicians.

Summary of the Results

No methane was detected and only minute traces of CO2.
The Park and Ride had no methane shows.

Interpretation

No landfill gases are entering the buildings. The issues in the Park and Ride have been addressed by works on the leachate pumping sump and the flaring system. Duct and chamber sealing was carried out by the contractor during the period of maintenance in 2005. A fan extractor and stack were installed within the car parking area in 2006 as an additional safety measure. Continuous gas monitors have been installed in Park and Ride buildings.

Gas Monitoring Wells

Trigger Levels

These are 1.0 % v/v for methane and 1.5% v/v for carbon dioxide "measured in any service duct or manhole on at or immediately adjacent to the facility and/or at any point located outside the body of the waste."

Monitoring Details

The instrument used was the Gasdata GFM 430 and the monitoring was carried out by the Landfill Technicians.
The wells (DP) in the old landfill area across the South Link Road are into the body of the waste and were designed to check for gas generation not migration. DP1 and DP2 are not being monitored any more. They could not be expected to comply with the trigger levels. There are 15 other wells drilled around the periphery of the old landfill site across the South Link Road-137 to 175; these would most likely be drilled into some waste.

The wells to the north, east and south of the landfill LG1-LG19 are drilled into soil surrounding the landfill and are designed to check for migration of methane laterally to surrounding areas.
Due to shows of gas, in the eastern and north eastern periphery about fifty new wells off site in the green area between Greenhills and the landfill have been installed. Many of these new wells were designed to function as venting wells/monitoring wells. From 2005, the wells closest to the landfill periphery (LG) have been use as monitoring wells and the middle wells for venting purposes (two weeks venting and one week capped). Wells are drilled to different depths, have different sensitivities and there are local soil factors that make it difficult to assess trends and comparisons.

Monitoring Results (2007 Results in (brackets)

Old Landfill Area

Park and Ride

The 15 periphery wells that are monitored on a daily or weekly basis around the old landfill site across the south Link Road show the presence of gas on the odd occasion.
137 and 139 showed gas on occasion most linked to flare going down. 138 and 140 infrequent shows of gas. The wells 141-146 show very little gas-141 gave 5 shows due to flare going down (none last year). The wells 171-175, monitored weekly, showed no gas (2 last year in 175).
There are high levels of gas in DP3 but DP4 showed zero in 2008. These DP wells are drilled into waste and are not proper monitoring wells as defined in the license. Trials have shown that there is insufficient gas in this sector for power generation although gas is pulled for destruction by flaring. The Park and Ride building showed no evidence of gas in 2007.

Present Landfill Area

There are no shows of gas in the wells monitored in **southern** and **western** perimeters of the landfill.
There is one well showing very small amounts of gas in the **northern sector**, LG1, the range was 0-3%v/v.The possible reasons for the presence of gas in this well in the northern sector are the new positioning of the well, waste in the new well location and the influence of the interception trench.
In the **eastern sector** of the landfill, methane levels began exceeding trigger limits in 2002 and this led to increased monitoring on a daily and weekly basis in addition to the monthly monitoring normally undertaken up to then.
The interception trench (2004) and venting procedures have stabilised gas levels in the eastern perimeter wells and reduced if not eliminated gas shows in wells further east although the situation in LG9A and LG10A is anomalous.

Charts: Methane concentrations for 2008 at eastern landfill periphery wells LG5A , LG6A, LG7A, and LG8A are shown in charts 1-4(pages 4-6).The well labels increase in number from north to south e.g. LG5 is in north east corner and LG9 towards south east.
The general trend in all these wells is that gas levels are very variable with time. There are some indications that gas levels peak about April and also indications that levels increase after rain.
In 2008 LG5, 6 & 8 showed no methane.
In 2008 LG5A showed methane levels from 6.6-53% .LG6A showed methane levels from 2.6-34.2%. LG7A showed no methane. LG8A showed methane levels of 0-14.4%.

LG9, LG10 and LG11 have become inoperative and have been replaced by the new wells, LG9A and LG10A, these new wells are much closer to the landfill and may be contaminated by leachate. They are showing very high levels of gas and this needs further investigation. LG 11 had the highest shows of gas in this sector in the past.
Some of the new wells, with the tag A, drilled in proximity to the older wells generally show a stronger presence of gas than the older wells. This may be due to the greater depth drilled, the variability of the gas in the area, the sensitivity of the wells drilled or the soil disturbance.

There are very many other wells east of the LG5-11 line but these are being used for venting as well as monitoring so more variations in monitoring trends would be expected. Gas readings are taken following a few days and then a week of closure; the wells are then vented for three weeks.
There has been a steady decline in gas in these wells since 2004 and there is virtually no gas in these wells now.

The shallow gas wells in Greenhills Estate that are monitored on a monthly basis gave no show of gas. Other wells such as at Nemo Gate show no gas.

Interpretation

The wells to the south and west show no evidence of methane migration.
Gas concentrations in the eastern periphery wells declined to lower levels in 2005 and continued at the lower level in 2006, 2007 and 2008 although there are fluctuations. The decline could be due to the installation of the interception trench in late 2004 preventing the flow of gas eastward. It could also be due to the venting measures to the east. The wells east of the landfill periphery have reduced considerably in gas. The shallow gas wells in Greenhills were free of gas in 2008.
Since the beginning of 2005, there are slight shows of gas on the northern boundary. This may be due to the installation of the interception trench to the east or to local deposits of waste next to the monitoring well.

Interpretation of gas presence and passage through soil is inherently difficult and there are extraneous confounding factors such as atmospheric pressure, temperature, soil water saturation, biological processes or soil disturbance.

Measures to Control Gas

The analysis of trace components in the gas did not conclusively establish the origin of the gas. Consultants who examined the data suggested that the gas could be derived from the landfill, historical private waste deposits in the area east of the landfill or from the peat itself.

A programme of measures to control gas from the possible sources listed above is in place since early 2005. These measures incorporate an intensive monitoring regime at stations inside and outside the Landfill, suction and flaring of gas on 36 new wells constructed on the eastern periphery of landfill, a 700 metre long interception trench along the eastern periphery and vent pits.

The measures being taken are controlling the situation. The advice received was to initiate a slow and steady reduction.

The situation in LG9A and 10A needs further investigation and remedial works will follow further investigation.

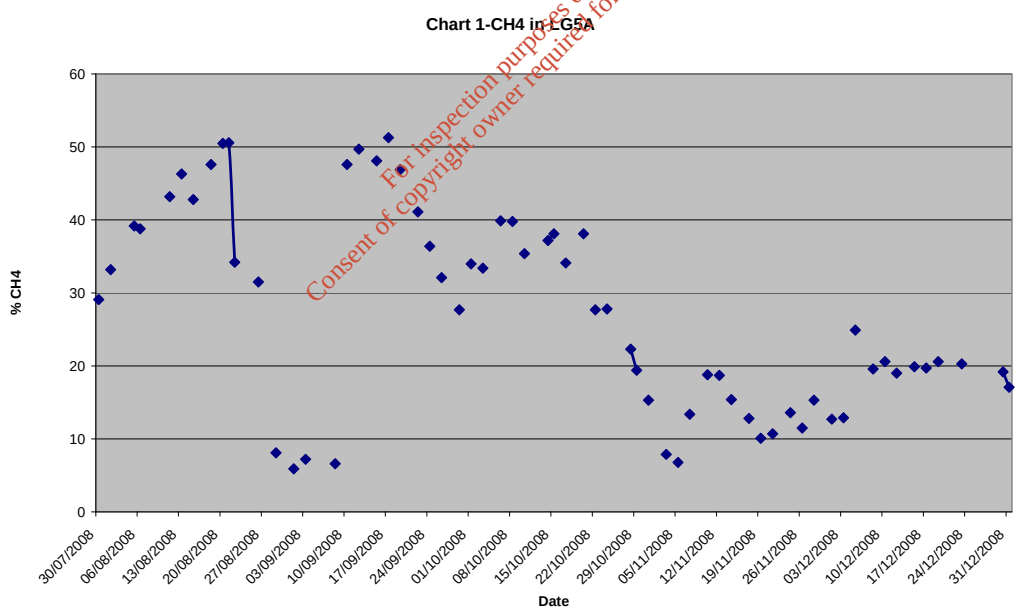


Chart 2 -CH4% in LG6A

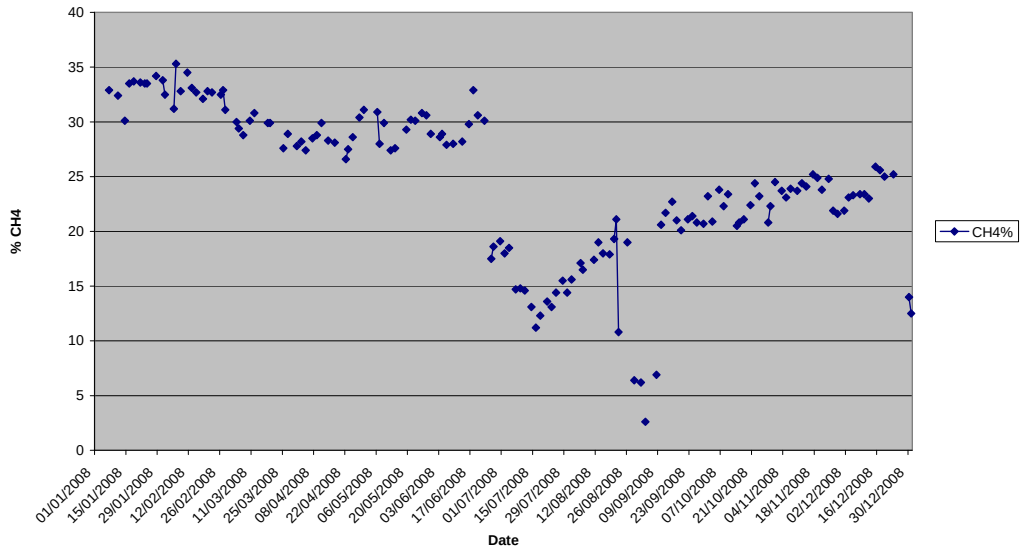
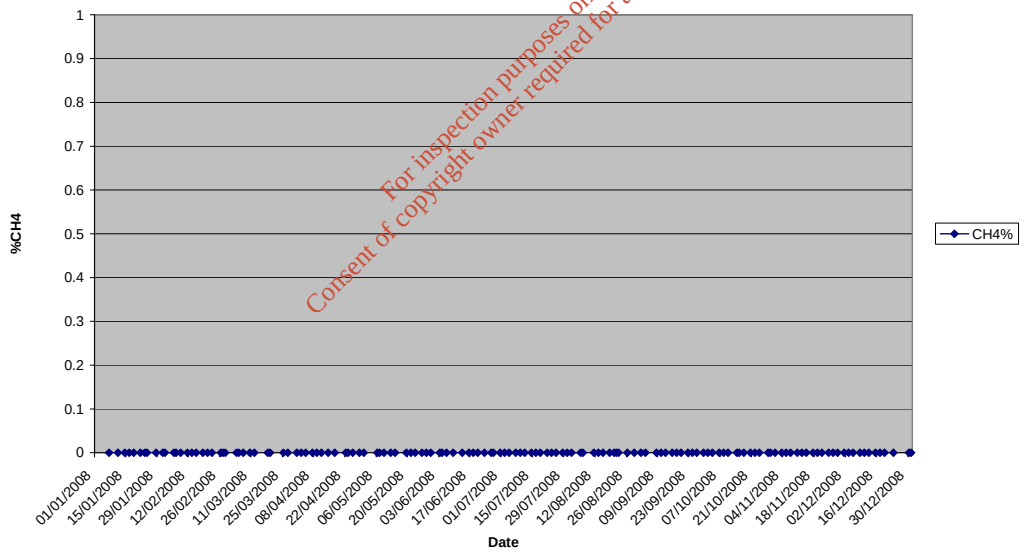
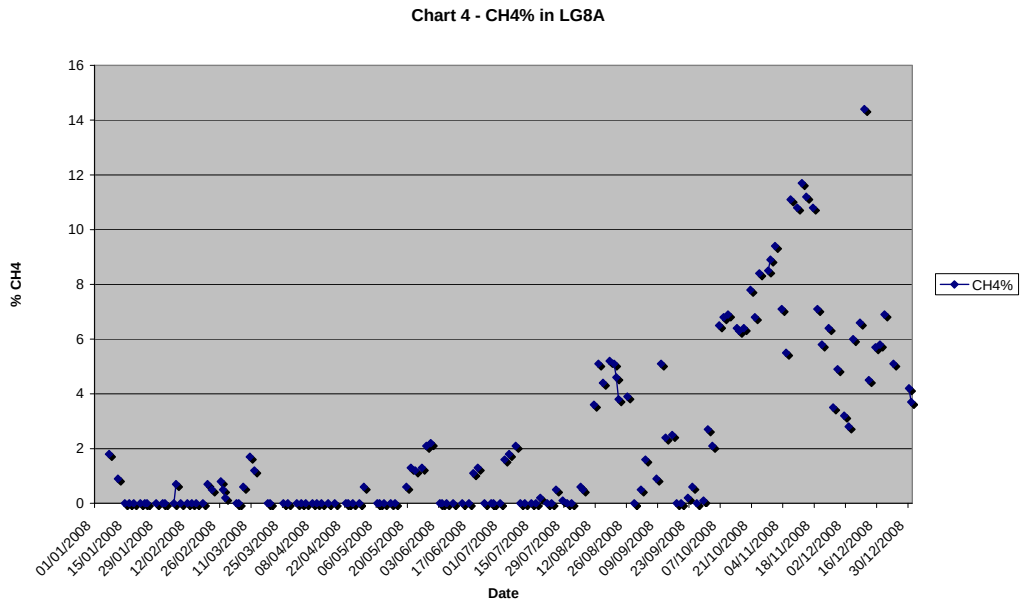


Chart 3 - CH4% in LG7A





Carbon Dioxide

The carbon dioxide levels were exceeded in most wells.
Where there is presence of carbon dioxide in preference to methane, it may be due to aerobic landfill conditions. The presence of oxygen will also be more noticeable in these wells (as is the case). Aerobic conditions are more likely to occur at shallow, uncapped landfill sites or any other condition that allows air into the refuse - such as at perimeter locations. Carbon dioxide has asphyxiate but no explosive properties.
The majority of the wells have increased levels of carbon dioxide in the summer time probably due to warmer conditions promoting microbiological activity.

Carbon dioxide levels varied from 0-6.3% for LG5, 0-5.3% for LG6 and 0-10.8% for LG8.
In 2008 LG5A showed carbon dioxide levels of 1.5-16.6%. LG6A showed dioxide levels of 6.9-13.1%. LG7A showed carbon dioxide levels of 0.6-5.0%. LG8A showed carbon dioxide levels of 0.8-17.2%.

Gas Combustion Plant Intake

There are no limits in the licence.
The instrument used was the Gasdata LMSX and the monitoring was carried out by the Landfill Technician on a weekly basis.
Methane concentrations varied from 30-56 (24-50) %v/v and CO2 concentrations 3-29 (10-30) %v/v.
Summer concentrations are generally higher than winter.

Emissions from Landfill Gas Combustion Plant

Monitoring Requirements

Inlet

Methane	weekly monitoring	as %v/v
Carbon dioxide	weekly monitoring	as %v/v
Oxygen	weekly monitoring	as %v/v
Total Sulphur	Annually	
Total Chlorine	Annually	
Total Fluorine	Annually	

Outlet

SO2	Annually
NOx	Annually
CO	Continuous
Particulates	Annually
TA Luft Cl I, II, III organics	Annually
HCL	Annually
HF	Annually

Carbon Monoxide Continuous Monitoring of the Burners TV01 and TV02

Limits for Carbon Monoxide Continuous Monitoring (last year results in brackets)

The limits in the licence are 1300 mg/m3 for 30-minute average and 650 for daily average.
The Agency by letter dated 17/07/03 has asked that concentrations exceeding 2800 mg/m3 for the 30-minute averages and concentrations exceeding 1400mg/m3 for the daily averages be regarded as incidents and reported.

TVO1
The 30-minute average varied from 0-14,156 (0—5634) mg/m3.
There were 9 exceedances (1) at engine start up.
Daily averages varied from 0-1032 (410-1134) mg/m3.

TVO2
The 30-minute averages varied from 0-2642 (0-2626) mg/m3.
There was no exceedance (0).
Daily averages varied from 0-831 (0-557) mg/m3.

TV02 was removed in October 2008.

Emission Limits on Outlet

The license limits on the emissions are as follows.

NOx as NO2	500 mg/m3
CO	650 mg/m3
Particulates	130 mg/m3
TA Luft CLI	20 mg/m3 (at mass flows>0.1kg/hr)
TA Luft CLII	100 mg/m3 (at mass flows>2 kg/hr)
TA Luft CLIII	150 mg/m3 (at mass flows>3 kg/hr)
HCL	50 mg/m3 (at mass flows>0.3kg/hr)
HF	5 mg/m3 (at mass flows>0.05kg/hr)

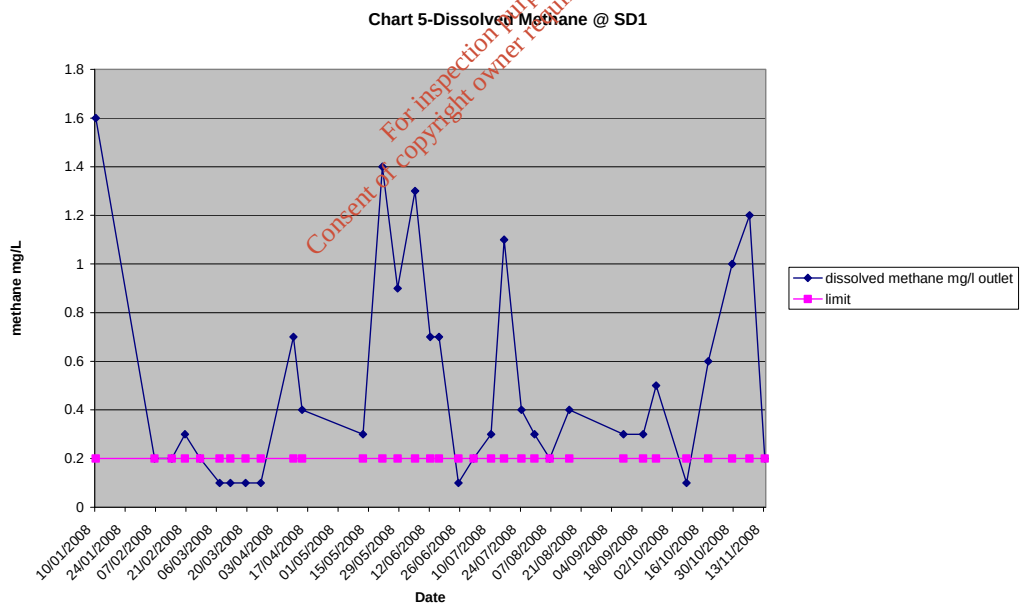
Monitoring Results

Report in Appendix.
All results in the exhaust from the engine TVO1 and landfill flare are within the emission limit values for the parameters CO, NOx, particulates, TNMVOC, TOC, HCl/HF and total flow. While no limits are given in license for SO2, results were low.
The Report estimates that the methane destruction in the landfill flare is 99%.

Emissions to Sewer

Methane (Results in brackets are for previous year)

Headspace and aqueous probe methane measurements that are automatic and continuous have now been discontinued because they are very inaccurate.
Grab samples sent to outside laboratories are also not accurate. A standard that was sent to an outside private laboratory was returned at 10% of the true value. This reflects the loss of the volatile gas in transit and is not a reflection on the accuracy of the outside laboratory.
The replacement monitoring system in operation is based on samples taken from the discharge and subjected to GC analysis in the Cork City Laboratory. The Cork City Council results show that the 34 (45) samples taken showed a range in concentration from 0.1-1.6 (03-1.2) mg/l. The limit in the Licence is 0.2mg/l and 20 (26) samples exceeded. The monitoring shows that the conditioning plant reduces methane concentrations by about 98% but will still not meet the limit. See Chart 5 (page 9).Additional measures are being considered for further methane reduction. This includes the recent installation of a baffle system in balance tank to increase aeration and the employment of Enviros to review the leachate treatment plant system.



Flow

Leachate is collected, conditioned and discharged to the sewer.
Potentially contaminated water not suitable for immediate discharge to river was formerly collected and discharged to the sewer but this now goes to the reedbeds.
The flow through the conditioning plant (6 inch line) varied from 0-26 (0-23) m3 per hour. There was one exceedance (0). The licence requirement is 25 m3/hr.
The cumulative flow, recorded by the Scada system, in 2008 was 68,000m3 (104,243) (122,627) (121,454) m3. The flow recorded was down this year due to several factors: clogging of pipe, breakdown of Scada for a month and two breakages of the line in December. The further capping of the landfill site might also be a factor.

pH

The pH results are from 6.6-8.7 (7.5-8.0). Licence requirement is 7-9.

24 Hour Composite Concentrations (Results in brackets are for previous year)

Samples are taken every month.
BOD values are always low, probably due to ammonia suppression in the test.
The ammonium results varied from 16-360 (130-360) mg/l. The limit for ammonium is 600mg/l for 95% of the samples. All the samples taken complied with the license.
The other parameters: pH, sulphate and suspended solids are well within the limits.

24 Hour Composite Loads

There are **no limits** in the licence.
Ammonium is the parameter that is of most concern all the other parameters are low in concentration and load.
The ammonium load in 2008 varied from 5-104 (11-125) kg/day.

Discharge from the Stormwater Retention/ Reed bed facility

Status

This facility has been constructed and reeds planted in 2004. It was commissioned in 2005

Results

Reedbed Discharge (Results in brackets are for previous year)

No sample from 16 (0 from 33) exceeded the suspended solids limit of 35 mg/l.
The ammonium values ranged from 0.6-11.8 (0.2-31) mg/l and BOD values ranged from 0.8-9 (2-24) mg/l.

Dust Deposition

Monitoring Locations

Dust
D1 is located towards the western perimeter on the present landfill.
D2 is located towards the northern perimeter.
D3 is located towards the eastern perimeter.
D4 is located towards the southern perimeter.
D5 is located in the old landfill across the South link Road.

Dust Monitoring Results

The five stations are monitored every quarter (20 samples/year)
The **limit** in the licence is 350mg/m2/day.
All samples well below limit of 350 mg/m2/day.
The stations are within the landfill and may not affect the outside environment.

Groundwater Monitoring

Limits

There are no limits on the licence.

Monitoring Locations

A map of the approximate locations is at the end of this section.
The groundwater flow is from west to east.

BR1 and OB1 are bedrock and overburden wells on the northern perimeter of the landfill.
BR2 and OB2 are located on the north-east perimeter.
BR3 and OB3 are located on the eastern perimeter (down gradient).
BR7 and OB7 are located on the southern perimeter. OB7 is located in area where refuse is being deposited and is contaminated with fresh leachate.

The wells NW1 to NW9 are designed to check the efficiency of the leachate collection system. NW1 is in the south west corner just north of the Tramore stream and just east of the South City Link. The wells move in numbered order, anti clockwise, to the north east corner (NW9). The wells are on the landfill side of the streams. The well NW9 has been re-drilled outside the collection drain in 2001.

Monitoring Details

All samples were taken and analysed by City Council laboratory personnel. The analysis for pesticides, PAH, organochlorines is undertaken in the U.K.

Monitoring Results and Discussion

Monitoring Results (Results in brackets are for last year)

Ammonium in Wells

Overburden Wells
The overburden wells show no pollution in OB1 and OB2 but very high ammonium levels in OB3, 5.5-440 (300-400) mg/l and less so in OB7, 4.7-52 (30-40) mg/l. These shallow wells are drilled into or very near the body of the waste and at peripheral locations and would be expected to show pollution.

Bedrock Wells

Groundwater to the southwest, west and north show no pollution but that to the north east shows a trace and the well to east (BR3) is heavily contaminated with ammonium concentrations in range 550-740 (300-400) mg/l. See table 1 below. This may be due to the well location in the area where there is insufficient pumping. New pumping wells have been installed here and trials are ongoing.

Table 1 – ammonia (mg/l)

Well	Quarter 1 05/03/08	Quarter 2 02/04/08	Quarter 3 17/09/08	Quarter 4 08/12/08
OB1	0.02	0.05	0.006	0.05
OB2	0.15	0.7	0.001	8.4
OB3	410	410	4.7	440
OB7	5.5	38	0.44	52
BR1	0.01	0.02	0.02	0.01
BR2	0.02	4.3	0.02	0.008
BR3	550	740	620	710
BR7	0.01	0.09	0.04	1.2
KC8	0.12	0.4	0.11	8.8

Annual Survey

The **Annual Survey** for a longer list of parameters for BR1 and BR7 did not show any concentration of concern. Heavy metals were at or below limits of detection (0.001 mg/l) and cyanide was below detection limit of 0.005mg/l. TOC varied 1-59 (1-102) mg/l. Pesticides were below detection.
PAH's were below detection.
High concentrations of potassium, sodium and alkalinity were also observed in BR3.

NW Wells

The wells NW1 to NW9 are designed to check the efficiency of the leachate collection system consisting of the collection drain and the sheet pile wall in front of NW 1 and 2.

Table 2 - The ammonia (mg/l) results for 2008 are in table below

well	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
NW1	0.07	27	14	30	17.7	31	14	-	29.5	20	20	22
NW2	0.08	31	0.2	40	14.8	33	6	-	31.4	27	10	49
NW3	1.2	37	5.1	37	15.1	36	28	-	42.6	35	20	39
NW4	0.07	14	11	50	14.9	42	34	-	25.2	22	40	70
NW5	0.04	0.03	0.007	3	0.05	1.0	0.07	-	0.03	0.05	0.008	0.5
NW6	120	160	96.8	110	70	77	170	-	120	95	200	210
NW7	0.45	0.22	0.005	112	64	7	180	-	137	10	200	130
NW8	2	5.5	0.007	30	6.3	30	4.8	-	24.7	20	20	30
NW9	0.15	0.1	0.002	0.13	0.1	0.15	0.07	-	0.05	0.06	0.009	0.05

Table 2 shows that ammonia concentrations are high particularly around NW6 and NW7.
The mean water well levels show no major change over the years.

Biological Surveys of Streams

Monitoring Locations

Tramore Stream
Sample sites listed in downstream order as follows.
Samples were taken at the beginning of the old landfill (E) roughly equivalent to EM1, just below the South City Link roughly EM2 (C), halfway along landfill near OB7 (D) and near EM6 (F) below all landfill and downstream of confluence with Trabeg.

Trabeg
Samples were taken at farthest possible upstream point although still in landfill near EM7 (A) and, before confluence with Tramore, near EM8 (B)

Monitoring Details

These surveys were undertaken by the Aquatic Services Unit at UCC in June. The Report is attached.
The licence conditions specify an annual kick sampling biological assessment of the Tramore and Trabeg streams. This was not possible for the Trabeg because of its structure.
Landfill leachate is now going to sewer and Carrigrenan treatment plant.

Interpretation

Biological quality is graded from Q1 (bad) to Q5 (good).

Tramore Stream

The Tramore site upstream of the landfill remained at Q2 level (moderately or seriously polluted). The sites within the landfill were of same quality to last year, Q1-Q2 which remain moderately or seriously polluted again in 2008. The downstream station on the Tramore shows the impact of the Trabeg in addition. The station had the same rating as last year (Q1-Q2).

Trabeg stream

The sites are unsuited to kick sampling and difficult to assign a Q rating. The upstream is probably Q1-2 and downstream not better than Q2. This is due to the influence of overflowing combined storm & sewer chambers further upstream of the Landfill Site.

Surface Water Monitoring

Limits

There are no limits on the licence.

Monitoring Locations

Tramore River:

The Tramore River flows to the south of the landfill.
EM0 is about one km upstream of all landfill.
EM1 is just upstream of the bridge on the Kinsale Road and just above all landfill.
EM9 is upstream of the bridge over the South Link Road - at the end of the old landfill across the South Link Road and just before the present landfilling area.
EM2 is at the beginning of the present landfill and just below the bridge over the South Link Road. It is almost in the same location as EM9.
EM10, as shown in the licence documents, has been moved from the point of confluence of the Tramore and Trabeg to about 20 yards upstream in the Tramore and has been renamed EM11. Sampling at a confluence is not good practice- samples taken could represent either the Tramore or the Trabeg or a varying mixture of the two. This EM11 site is also too near the landfill to ensure adequate mixing of the discharges and receiving waters. Mixing is not complete at this site and the sample may not always fully represent the dilution in the stream.
EM6 is about 300 yards downstream of the confluence of the Tramore and Trabeg. At this point, discharges from the landfill are adequately mixed with the receiving waters. This was the historical sampling point for the downstream sample. Possibly at times it may be affected by the back up of tidal waters but it remains the best option for a downstream sample

Trabeg Stream

EM7 and EM8 are on the Trabeg stream that skirts around the north and east of the landfill and then joins the Tramore. EM7 is upstream and EM8 is downstream.

Monitoring Details

The samples were taken and analysed by Cork City Council laboratory personnel
The stations are listed in downstream order (the first station- EM0 is furthest upstream)

Interpretation

Surface water monitoring is very variable with time and little significance can be placed on comparison between annual quarters.

Ammonium and BOD

There can be some contamination of the upstream waters on occasion and this has been noticed in the ecological report.
Because of the variability to be expected in surface waters there is no clear trend over the quarters.
See tables 3 & 4 below showing 2008 levels of BOD and Ammonia.
Tramore
Generally, upstream Tramore (EM1) has BOD values varying from 1-1.5 (0.5-1.3) mg/l in 2008 but in the past these have ranged up to 5.5 mg/l.
Downstream values (EM6-10) ranged from 1-3 (1.8-5.7) mg/l in 2008 but in the past have ranged up to 27mg/l.
Generally, EM1 has ammonium values ranging from 0.02-0.05 (<0.01-0.38) mg/l in 2008 but in the past have ranged up to 2mg/l.
Downstream values ranged from 0.01-0.04 (0.01-0.4) mg/l in 2008 but in past have ranged up to 22mg/l.
The waters upstream and downstream show little pollution although the very high values that occurred downstream in the past do not happen now. The ecological study show more evidence of pollution, upstream and downstream.
Trabeg
Generally, upstream Trabeg (EM7) have BOD values varying from 6-14 (4-7) mg/l in 2008 but in the past have ranged up to 14mg/l.
Generally downstream values (EM8) have BOD ranging from 8-12 (5-13) mg/l in 2008 but in past have ranged up to 13 mg.
EM7 has ammonium values varying from 0.01-0.08 (0.02-0.6) mg/l in 2008 but in the past have ranged up to 20 mg/l.
EM8 has ammonium values varying from 0.02-0.1 (0.04-0.6) mg/l in 2008 but in the past have ranged up to 37 mg/l.
The waters upstream and downstream show severe pollution (as also in ecological studies).

Table 3: BOD (mg/l)

Sampling Point	Quarter 1 05/03/08	Quarter 2 02/04/09	Quarter 3 17/09/08	Quarter 4 08/12/08
EM0	1.4	<1.0	<1	1.1
EM1	1.2	<1.0	<1	1.5
EM2	3.6	1.8	1.0	2.2
EM6	3.0	2.1	1.1	1.7
EM7	5.6	8.4	14.2	5.7
EM8	8.4	10.8	12.2	10.3
EM11	2.5	2.5	<1.0	2.2

Table 4 : AMMONIA (mg/l)

Sampling Point	Quarter 1 05/03/08	Quarter 2 02/04/09	Quarter 3 17/09/08	Quarter 4 08/12/08
EM0	0.02	0.04	0.024	0.15
EM1	0.02	0.05	0.024	0.11
EM2	0.02	0.05	0.025	0.03
EM6	0.01	0.04	0.019	0.04
EM7	0.01	0.04	0.08	0.06
EM8	0.02	0.04	0.1	0.05
EM11	0.01	0.04	0.021	0.05

Other Parameters

The more extended annual list of heavy metals, pesticides, PAH, organochlorines etc does not show any remarkable trend or concentrations. There is generally little difference between upstream and downstream values for these parameters.

Weekly Visual Inspections

Normally there is nothing unusual reported. The most common observation over the stretch of waters inspected is muddy. EM8 (downstream- Trabeg) is generally described as stagnant and greenish. Algae are occasionally observed at the downstream locations and this is not surprising because they are relatively stagnant, at the top of the tide.

EM7 (upstream in the Trabeg) displays sewage fungus indicating heavy pollution upstream of landfill.

Particulates and Odour

Particulates (Results for previous year in brackets)

Particulates as measured by the total suspended particulate parameter were below the EU limits and guide values in 2008 as in 2007.
Particulates as measured by the PM10 parameter are measured outside and within the landfill. There is a trigger level of 50 ug/m3 for boundary monitoring. It would not be possible to separate ambient levels and the contribution from the facility.
The station outside the landfill, where samples are being taken daily for PM10, had two days (one day) in the year when concentrations exceeded 50 ug/m3. There needs to be 35 daily samples exceeding the 50ug/m3 figure to breach the EU standard.
Within the landfill PM10 samples are taken quarterly and two samples (0) exceeded the 50 ug/m3 level.

Appendix 6

Edited/Altered Waste Licence

Headquarters
P.O Box 3000
Johnstown Castle Estate
County Wexford
Ireland

WASTE LICENCE
LANDFILL FOR NON-HAZARDOUS WASTE

Waste Licence Register Number: 12-2

Licensee: Cork City Council (formerly Cork Corporation)

Location of Facility: Kinsale Road Landfill, Ballyphehane, Curraghconway, Inchisarsfield, South City Link Road, Cork.

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DECISION & REASONS FOR THE DECISION

Reasons for the Decision

The Environmental Protection Agency (the Agency) is satisfied, on the basis of the information available, that the requirements of Section 40(4) of the Waste Management Act, 2001 have been complied with in respect of the application for a waste licence for the activities listed hereunder in Part I.

In reaching this decision the Agency has considered the application and supporting documentation received from the applicant, the submissions and objections received and the reports of its inspectors.

Part I Activities Licensed

In pursuance of the powers conferred on it by the Waste Management Act, 1996, the Agency, under Section 46(2) of the said Act hereby grants this Waste Licence to Cork City Council to carry on the waste activities listed below at Kinsale Road Landfill, Ballyphehane, Curraghconway, Inchisarsfield, South City Link Road, Cork, subject to twelve conditions, with the reasons therefor and the associated schedules attached thereto set out in the licence.

Licensed Waste Disposal Activities, in accordance with the Third Schedule of the Waste Management Act 1996

Class 1 Deposit on, in or under land (including landfill): - not relevant after 19th July 2009
This activity is limited to the disposal of the waste types specified in this licence up to a maximum of 100,000 tonnes per annum.

Class 2 Land treatment, including biodegradation of liquid or sludge discards in soils: - not relevant
This activity is limited to the disposal of non hazardous sludge at the landfill up to a maximum of 7,500 tonnes per annum.

Class 4 Surface impoundment, including placement of liquid or sludge discards into pits, ponds or lagoons:
This activity is limited to the operation of leachate and stormwater retention ponds.

Class 5 Specially engineered landfill, including placement into lined discrete cells which are capped and isolated from one another and the environment:
This activity is limited to the disposal of the certain wastes in exceptional circumstances into lined discrete cells.

Note: Following the closure of the landfill activity in July 2009, Class1, Class2 and Class 5 above will no longer apply to the facility.

Class 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:
This activity is limited to the operation of the leachate treatment plant.

Class 11 Blending or mixture prior to submission to any activity referred to in a preceding paragraph of this Schedule:
This activity is limited to the processing and mixing of construction and demolition waste prior to disposal at the facility.

Class 12 Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule:
This activity is limited to repackaging waste in an accident/emergency situation. Insert the following text to include the waste transfer station activities:

This activity is limited to repackaging of waste. This activity also includes the repacking of waste at the waste transfer facility prior to the transfer and submission of this waste to a waste disposal facility.

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

Licensed Waste Recovery Activities, in accordance with the Fourth Schedule of the Waste Management Act 1996

Class 2 Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes):
This activity is limited to the composting of green waste accepted subject to a limit of 1000 m^3 2,400 m^3 at any one time at the facility and the storage of waste oils at the civic waste facility.

Class 3 Recycling or reclamation of metals and metal compounds:
This activity is limited to the recovery of metal and metal compounds at the construction and demolition facility and at the civic waste facility.

Class 4 Recycling or reclamation of other inorganic materials:
This activity is limited to the recovery of inorganic materials at the construction and demolition facility and the storage of inorganic materials at the civic waste facility.

Class 10 The treatment of any waste on land with a consequential benefit for an agricultural activity or ecological system:
This activity is limited to the use of various suitable wastes as intermediate cover and in the closure/restoration stage of the landfill subject to the agreement of the Agency.

Class 11 Use of waste obtained from any activity referred to in a preceding paragraph of this Schedule:
This activity is limited to the use of processed wastes in roadways, drains etc. at the facility.

Class 12 Exchange of waste for submission to any activity referred to in a preceding paragraph of this Schedule:
This activity is limited to the possible exchange of waste being delivered to the facility in exchange for processed waste subject to the agreement of the Agency.

Class 13 Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced:
This activity is limited to the temporary storage of waste prior to inspection, recycling, recovery and /or reuse at the facility or elsewhere.

INTERPRETATION

All terms in this licence should be interpreted in accordance with the definitions in the Waste Management Act, (the Act), unless otherwise defined in this section.

Adequate lighting 20 lux measured at ground level.

Agreement Agreement in writing.

Animal waste Carcasses, offal, skins & hides, bones, excrement, blood and paunch.

Annually At approximately twelve monthly intervals.

Attachment Any reference to attachments in this licence refers to attachments submitted as part of the waste licence application.

Application The application by the licensee for this waste licence.

Appropriate facility A waste management facility, duly authorised under relevant law and technically suitable.

BAT Best Available Techniques (– include from Technical Amendment B- Copy in Appendix 7)

Biodegradable waste

Any waste that is capable of undergoing anaerobic or aerobic decomposition, such as food, garden waste, sewage sludge, paper and paperboard.

Condition A condition of this licence.

Construction and Demolition Waste

All wastes which arise from construction, renovation and demolition activities.

Containment boom A boom which can contain spillages and prevent them from entering drains or watercourses.

Cover material Bricks, crushed concrete, tarmac, earth, soil, sub-soil, stone, rock or other similar natural materials; or other cover material the use of which has been agreed with the Agency.

Daily Cover Is the term used to describe material spread (about 150mm if soil cover is used) over deposited waste at the end of each day. Synthetic materials may also be used. Its objective is to minimise odour, the amount of litter generated and to control flies and access to the waste by birds and vermin.

Where soils are used for daily cover, it is recommended that they be removed at the start of the day and subsequently reused as much as possible.

Daytime 0800 hrs to 2200 hrs.

Documentation Any report, record, result, data, drawing, proposal, interpretation or other document in written or electronic form which is required by this licence.

Drawing Any reference to a drawing or drawing number means a drawing or drawing number contained in the application, unless otherwise specified in this licence.

Emergency Those occurrences defined in Condition 9.4.

Emission Limits Those limits, including concentration limits and deposition levels established in *Schedule C: Emission Limits,* of this licence.

European Waste Catalogue (EWC)

A harmonised, non-exhaustive list of wastes drawn up by the European Commission and published as Commission Decision 94/3/EC and any subsequent amendment published in the Official Journal of the European Community.

Green waste Waste wood (excluding timber), plant matter such as grass cuttings, and other vegetation.

Hours of Operation The hours during which the facility is authorised to be operational. The hours of operation of a facility are usually longer than the hours of waste acceptance to facilitate preparatory and completion works, such as the removal and laying of daily cover. Different activities within the facility, such as the landfill and the civic waste facility, may have different hours of waste acceptance.

Hours of Waste Acceptance

The hours during which the facility is authorised to accept waste. Different activities within the facility, such as the landfill and the civic waste facility, may have different hours of waste acceptance.

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

Intermediate Cover Refers to placement of material (minimum 300mm if soil is used) for a period of time prior to restoration or prior to further disposal of waste.

Landfill Refers to the area of the facility where the waste is disposed of by placement on the ground or on other waste.

Landfill Gas Gases generated from the landfilled waste.

LEL (Lower Explosive Limit)

The lowest percentage concentration by volume of a mixture of flammable gas with air which will propagate a flame at 25$_o$C and atmospheric pressure.

Licence A waste licence issued in accordance with the Act.

Licensee Cork City Council (formerly Cork Corporation)

List I/II Organics Substances classified pursuant to EC Directives 76/464/EEC and 80/68/EEC.

Liquid Waste Any waste in liquid form and containing less than 2% dry matter. Any waste tankered to the facility.

Maintain Keep in a fit state, including such regular inspection, servicing and repair as may be necessary to adequately perform its function.

Monthly A minimum of 12 times per year, at approximately monthly intervals.

Night-time 2200 hrs to 0800 hrs.

Recyclable

Materials

Those waste types, such as cardboard, batteries, gas cylinders, etc which may be recycled.

Quarterly At approximately three monthly intervals.

Sample(s) Unless the context of this licence indicates to the contrary, samples shall include measurements by electronic instruments.

SCADA system Supervisory Control and Data Acquisition system.

Sludge The accumulation of solids resulting from chemical coagulation, flocculation and/or sedimentation after water or wastewater treatment with between 15% and 25% dry matter.

Specified Emissions Those emissions listed in *Schedule C: Emission Limits,* of this licence.

Specified Engineering Works

Those engineering works listed in *Schedule B: Specified Engineering Works,* of this licence.

Treated Sludge Sludge which has undergone biological, chemical or heat treatment, longterm storage or any other appropriate process so as significantly to reduce its fermentability and the health hazards resulting from its use.

Treatment Treatment means the physical, thermal, chemical or biological processes, including sorting, that change the characteristics of the waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery.

Trigger Level A parameter value specified in the licence, the achievement or exceedance of which requires certain actions to be taken by the licensee.

Waste Construction Materials containing Asbestos

EWC/HWL – 17 06 05*

Includes bonded asbestos, such as tiles, which are authorised for disposal at the facility.

White Goods Refrigerators, cookers, ovens and other similar appliances.

EPA Working Day Refers to the following hours: 0900 hrs to 1730 hrs Monday to Friday inclusive.

Working Face The area of the site in which waste other than cover material or material for the purposes of the construction of specified engineering works is being deposited.

PART II CONDITIONS

CONDITION 1 SCOPE OF THE LICENCE

1.1 Waste activities at the facility shall be restricted to those listed and described in Part I: Activities Licensed and authorised by this licence.

1.2 For the purposes of this licence, the facility is the area of land outlined in blue on Drawing No. 2001-011-08-01 Rev. C entitled Site Layout and Activity Boundary received on 7/12/01 (response to Agency's Article 14 notice) of the application. Any reference in this licence to "facility" shall mean the area thus outlined in blue.

1.3 This licence is for the purposes of waste licensing under the Waste Management Act, 1996 only and nothing in this licence shall be construed as negating the licensee's statutory obligations or requirements under any other enactments or regulations.

1.4 Municipal Waste, Commercial Waste and Industrial Waste may be recovered and disposed of at the facility subject to the maximum quantities and other constraints listed in *Schedule A: Waste Acceptance* of this licence and Condition 1.5.

1.5 Waste Disposal Restrictions

1.5.1 No hazardous wastes, liquid wastes, animal wastes, sewage sludge or septic tank waste shall be disposed of at the facility. Asbestos will only be allowed in accordance with Condition 5 of this licence. – following closure of the landfilling activities this condition will no longer apply

1.5.2 Whole used tyres (other than bicycle tyres and tyres with an outside diameter greater than 1400mm) shall not be disposed of at the facility from 16th July 2003. Shredded tyres shall not be disposed of at the facility from 16th July 2006. . – following closure of the landfilling activities this condition will no longer apply

1.5.3 No waste shall be accepted for landfilling at this facility after the final pre-settlement profile of the waste, as agreed under Condition 4.2, is reached.

1.6 Waste Acceptance Hours and Hours of Operation

1.6.1 The facility may only be operated during the hours of 6.45am to 7.00pm Monday to Friday; 6.45am to 6.00pm on Saturdays; and 7.00am to 10.00am on Sundays and Bank Holidays.

Landfill

1.6.2 Waste may only be accepted at the facility for disposal at the landfill between the hours of 8.00am to 6.00pm Monday to Friday; 8.00am to 5.00pm on Saturdays; and 7.00am to 9.00am on Sundays and Bank Holidays. . – following closure of the landfilling activities this condition will no longer apply.

Civic Waste Facility

1.6.3 Waste may only be accepted at the Civic Waste Facility between the hours of 8.00am to 6.00pm Monday to Friday; 8.00am to 5.00pm on Saturdays; and 7.00am to 9.00am on Sundays and Bank Holidays.

Waste Transfer Station

Waste will only be accepted at the Waste Transfer Station between the hours of 8.00 am to 6.00 pm Monday to Friday; 8.00 am to 5.00 pm on Saturdays. No waste will be accepted on Sundays or Bank Holidays.

1.7 The following shall constitute an incident for the purposes of this licence.

a) An emergency.

b) Any emission which does not comply with the requirements of this licence.

c) Any trigger level specified in this licence which is attained or exceeded.

d) Any indication that environmental pollution has, or may have, taken place.

e) The by-passing of the reedbeds from the stormwater retention pond in storm events.

f) Any breakdown in the landfill gas utilisation plant or enclosed landfill gas flare (if required).

1.8 Where the Agency considers that a non-compliance with any condition of this licence has occurred, it may serve a notice on the licensee specifying.

1.8.1 That only those wastes as specified, if any, in the notice are to be accepted at the facility after the date set down in the notice.

1.8.2 That the licensee shall undertake the works stipulated in the notice, and/or otherwise comply with the requirements of the notice as set down therein, within the time-scale contained in the notice.

1.8.3 That the licensee shall carry out any other requirement specified in the notice.

When the notice has been complied with the licensee shall provide written confirmation that the requirements of the notice have been carried out. No waste, other than that which is stipulated in the notice, shall be accepted at the facility until written permission is received from the Agency.

1.9 Every plan, programme or proposal submitted to the Agency for its agreement pursuant to any condition of this licence shall include a proposed timescale for its implementation. The Agency may modify or alter any such plan, programme or proposal in so far as it considers such modification or alteration to be necessary and shall notify the licensee in writing of any such modification or alteration. Every such plan, programme or proposal shall be carried out within the timescale fixed by the Agency but shall not be undertaken without the agreement of the Agency. Every such plan, programme or proposal agreed by the Agency shall be covered by the conditions of this licence.

The following text is recommended for Condition 1.10:

1.10 This licence is being granted in substitution for the waste licence granted to the licensee on 29th February 2002 (Register W0012-02).

Previous text - 2nd February 2000 and bearing the Waste Licence Register No. 12-1. This licence supercedes the previous waste licence (Register No. 12-1).

Insert Technical Amendment A to this condition (See Appendix 7) – which states:

1.11 Notwithstanding the requirements of any other condition of this licence the licensee may accept waste electrical and electronic equipment at the civic waste facility delivered to the facility from commercial retail premises.

REASON: To clarify the scope of this licence.

CONDITION 2 MANAGEMENT OF THE FACILITY

2.1 Facility Management

2.1.1 The licensee shall employ a suitably qualified and experienced facility manager who shall be designated as the person in charge. The facility manager or a nominated, suitably qualified and experienced, deputy shall be present on the facility at all times during its operation.

2.1.2 The Civic Waste Facility shall be supervised by an appropriately qualified and competent person at all times when waste is being accepted.

2.1.3 Both the facility manager and deputy, and any replacement manager or deputy, shall successfully complete both the FAS Waste Management Training Programme (or equivalent agreed with the Agency) and associated on site assessment appraisal within twelve months of appointment.

2.1.4 The licensee shall ensure that personnel performing specifically assigned tasks shall be qualified on the basis of appropriate education, training and experience, as required and shall be aware of the requirements of this licence.

2.2 Management Structure

2.2.1 Within three months from the date of grant of this licence, the licensee shall submit written updated details of the management structure of the facility to the Agency. Any proposed replacement in the management structure shall be notified in advance in writing to the Agency. Written details of the management structure shall include the following information:-

a) The names of all persons who are to provide the management and supervision of the waste activities authorised by the licence, in particular the name of the facility manager and any nominated deputies.

b) Details of the responsibilities for each individual named under a) above.

c) Details of the relevant education, training and experience held by each of the persons nominated under a) above.

2.3 Environmental Management System (EMS)

2.3.1 The licensee shall maintain an EMS. By 2nd August 2003, the licensee shall submit to the Agency for its agreement a proposal for the updating (where appropriate) of the documented EMS for the facility. Following the agreement of the Agency, the licensee shall establish and maintain such a system. The EMS shall be updated on an annual basis with amendments being submitted to the Agency for its agreement.

Insert Text - The licensee has submitted an EMS to the Agency. The EMS is updated and maintained on an annual basis with amendments being submitted to the Agency for its agreement.

2.3.2 The EMS shall include as a minimum the following elements:

2.3.2.1 Schedule of Environmental Objectives and Targets:-
The objectives should be specific and the targets measurable. The schedule shall address a five-year period as a minimum. The schedule shall include a time-scale for achieving the objectives and targets and shall comply with any other written guidance issued by the Agency.

2.3.2.2 Environmental Management Plan (EMP):-
The EMP shall include, as a minimum, the following: -

a) The items specified to be contained in an Environmental Management Plan in the Landfill Operational Practices Manual published by the Agency.

b) Methods by which the objectives and targets will be achieved and the identification of those responsible for achieving those objectives and targets.

c) Any other items required by written guidance issued by the Agency.

2.3.2.3 Corrective Action Procedures:-

The Corrective Action Procedures shall detail the corrective actions to be taken should any of the procedures detailed in the EMS not be followed.

2.3.2.4 Awareness and Training Programme:-

The Awareness and Training Programme shall identify training needs, for personnel who work in or have responsibility for the licensed facility.

2.4 Communications Programme

2.4.1 The licensee shall maintain a Communications Programme to ensure that members of the public can obtain information at the facility, at all reasonable times, concerning the environmental performance of the facility.

Resource Use and Energy Efficiency – (Inclusion of Technical Amendment B – (See Appendix 7)

2.5 Resource Use and Energy Efficiency

2.5.1 The licensee shall carry out an audit of the energy efficiency of the site within one year of the date of grant of this amendment. The audit shall:-

(i) identify all opportunities for energy use reduction and efficiency;
(ii) be carried out in accordance with the guidance published by the Agency -"Guidance Note on Energy Efficiency Auditing"; and
(iii) be repeated at intervals as required by the Agency.

The recommendations of the audit will be incorporated into the Schedule of Environmental Objectives and Targets under Condition 2.3.2.1 above.

2.52 The licensee shall identify opportunities for reduction in the quantity of water used on site including recycling and reuse initiatives, wherever possible. Reductions in water usage shall be incorporated into the Schedule of Environmental Objectives and Targets.

2.53 The licensee shall undertake an assessment of the efficiency of use of raw materials in all processes, having particular regard to the reduction in waste generated. The assessment should take account of best international practice for this type of activity. Where improvements are identified, these shall be incorporated into the Schedule of Environmental Objectives and Targets.

REASON: To make provision for the proper management of the activity on a planned basis having regard to the desirability of ongoing assessment, recording and reporting of matters affecting the environment.

CONDITION 3 FACILITY INFRASTRUCTURE

3.1 The licensee shall establish all infrastructure referred to in this licence as required by the conditions of this licence.

3.2 Specified Engineering Works

3.2.1 The licensee shall submit proposals for all Specified Engineering Works, as defined in *Schedule B: Specified Engineering Works*, of this licence, to the Agency for its agreement at least two months prior to the intended date of commencement of any such works. No such works shall be carried out without the prior agreement of the Agency.

3.2.2 All specified engineering works shall be supervised by a competent person(s) and that person, or persons, shall be present at all times during which relevant works are being undertaken.

3.2.3 Following the completion of all specified engineering works, the licensee shall complete a construction quality assurance validation. The validation report shall be made available to the Agency on request. The report shall include the following information:-

a) A description of the works.

b) As-built drawings of the works.

c) Records and results of all tests carried out (including failures).

d) Drawings and sections showing the location of all samples and tests carried out.

e) Daily record sheets/diary.

f) Name(s) of contractor(s)/individual(s) responsible for undertaking the specified engineering works.

g) Name(s) of individual(s) responsible for supervision of works and for quality assurance validation of works.

h) Records of any problems and the remedial works carried out to resolve those problems.

i) Any other information requested in writing by the Agency.

3.3 Facility Notice Board

3.3.1 The licensee shall provide and maintain a Facility Notice Board on the facility so that it is legible to persons outside the main entrance to the facility. The minimum dimensions of the board shall be 1200 mm by 750 mm.

3.3.2 The board shall clearly show:-

a) The name and telephone number of the facility.
b) The normal hours of opening.
c) The name of the licence holder.
d) An emergency out of hours contact telephone number.
e) The licence reference number.
f) Where environmental information relating to the facility can be obtained.

3.4 Facility Security

3.4.1 Security arrangements shall be as detailed in Section D.1.as received 7/12/01 as part of the response to the Agency's Article 14 notice unless otherwise agreed with the Agency.
The base of the fencing shall be set in the ground.

3.4.2 The licensee shall remedy any defect in the gates and/or fencing as follows:-
a) A temporary repair shall be made by the end of the working day.
b) A repair to the standard of the original gates and/or fencing shall be undertaken within three working days.

3.5 Facility Roads and Hardstanding

3.5.1 Effective site roads shall be provided and maintained to ensure the safe movement of vehicles within the facility

3.6 Facility Office

3.6.1 The licensee shall provide and maintain an office at the facility. The office shall be constructed and maintained in a manner suitable for the processing and storing of documentation.

3.6.2 The licensee shall provide and maintain a working telephone and a method for electronic transfer of information at the facility.

3.7 Waste Inspection and Quarantine Areas

3.7.1 A Waste Inspection Area and a Waste Quarantine Area shall be provided and maintained at the facility.

3.7.2 These areas shall be maintained constructed and maintained in a manner suitable, and be of a size appropriate, for the inspection of waste and subsequent quarantine if required. The waste inspection area and the waste quarantine area shall be clearly identified and segregated from each other

3.7.3 Drainage from these areas shall be directed to the leachate collection system.

3.8 Weighbridge

3.8.1 The licensee shall provide and maintain a weighbridge at the facility.

3.9 Vehicle wash

3.9.1 The licensee shall provide and maintain a vehicle wash at the facility

3.10 Waste Water Treatment Plant.

3.10.1 The licensee shall provide and maintain a septic tank and percolation area at the facility for the treatment of wastewater arising on-site. Any percolation area shall satisfy the criteria set out in the *Wastewater Treatment Manual, Treatment Systems for Single Houses*, published by the Environmental Protection Agency.

3.11 Tank and Drum Storage Areas

3.11.1 All tank and drum storage areas shall be rendered impervious to the materials stored therein.

3.11.2 All tank and drum storage areas shall, as a minimum, be bunded, either locally or remotely, to a volume not less than the greater of the following:-

(a) 110% of the capacity of the largest tank or drum within the bunded area; or

(b) 25% of the total volume of substance which could be stored within the bunded area.

3.11.3 All drainage from bunded areas shall be diverted for collection and safe disposal.

3.11.4 All inlets, outlets, vent pipes, valves and gauges must be within the bunded area

3.11.5 The integrity and water tightness of all the bunds and their resistance to penetration by water or other materials stored therein shall be confirmed by the licensee and shall be reported to the Agency following its installation and prior to its use as a storage area.
This confirmation shall be repeated at least once every three years thereafter and reported to the Agency on each occasion.

3.12 Leachate Management Infrastructure

3.12.1 Leachate management infrastructure consisting of the following shall be maintained provided and maintained at the facility:
a) A leachate collection system for the collection of leachate generated at the facility which shall incorporate a leachate collection drain, sheet pile wall and a spur line on the eastern section of the collection drain and any other works agreed by the Agency.

b) A leachate conditioning plant and associated works.

c) Connection pipework to the Tramore River Valley sewer.

d) A compartmentalised leachate/contaminated stormwater storage lagoon for the storage of leachate/contaminated stormwater collected from the waste. The section of the lagoon storing leachate shall be covered with a floating cover capable of containing gases and odours.

e) SCADA system for the monitoring and management of leachate at the facility.

3.12.2 All tanks for the storage and/or treatment of leachate shall be fully enclosed except for inlet and outlet piping.

3.12.3 Prior to the placement of waste in Phases 1-5 as shown on Drawing 2001-011-08-018 Rev. B of the Application, a borehole shall be installed in each of Phases 1-5. This borehole shall be used for the abstraction of leachate. All leachate abstracted shall be directed to the leachate collection and treatment system.

3.13 Landfill Gas Management.

3.13.1 Landfill gas management infrastructure consisting of the following shall be provided and maintained at the facility:

a) a system for the collection and utilisation of the landfill gas as an energy source.

b) Within six months of the date of grant of this licence, a feasibility study on the utilisation of all landfill gas generated at the facility (including historical landfill areas) as an energy source shall be submitted to the Agency for agreement. Within twelve months of the date of grant of this licence.

b) All landfill gas generated at the facility shall either be utilised (if feasible) or flared.

c) The flare shall be of an enclosed type design and the combustion air supply shall be controlled so as to achieve a minimum temperature of 1000 ^{0}C and 0.3 seconds retention time at this temperature. Flare unit efficiency shall be tested once it is installed – this has been undertaken therefore this part of the condition no longer applies.

d) The design and operation of the landfill gas flare shall be agreed in advance with the Agency.

3.13.2 All buildings constructed on the facility shall have regard to the guidance given in the Department of Environment 1994 publication “Protection of New Buildings and Occupants from Landfill Gas” and any subsequent revisions.

3.13.3 The licensee shall maintain all gas wells, pipework, valves, pumps, flares and other infrastructure that form part of the landfill gas management scheme in a safe and fully operational manner.
3.14 Surface Water Management

3.14.1 Effective surface water management infrastructure shall be provided and maintained at the facility during construction, operation, restoration and aftercare of the facility. As a minimum, the infrastructure shall consist of the following:-

a) A system for the collection and diversion of run off arising from capped and restored areas such that contaminated water is prevented from discharging into surface water courses. This run-off shall be diverted to a stormwater retention pond and a reed bed system.

b) Control measures shall be incorporated into the design of the stormwater retention pond such that, if necessary, its contents can be isolated and discharged to the leachate management infrastructure or tankered off-site.

3.14.2 Within three months of the date of grant of this licence the licensee shall submit to the Agency for its agreement an updated management programme for the control of surface water runoff from the facility.- a surface water management programme is maintained at the facility therefore this condition no longer applies.

3.14.3 There shall be no interference with, draining of, or culverting of, the Tramore River or its banks without prior consultation with the Southwestern Regional Fisheries Board and subject to agreement with the Agency.

3.14.4 Recirculation of leachate or other contaminated surface water shall not be undertaken at the facility.

3.15 Construction and Demolition Waste Recovery Area.

3.15.1 Unless otherwise agreed with the Agency, the licensee shall provide and maintain a construction and demolition waste recovery area. Surface water run-off shall be diverted to a silt trap and oil interceptor prior to discharge from the facility.

3.16 Civic Waste Facility

3.16.1 Unless otherwise agreed with the Agency, the licensee shall provide and maintain a Civic Waste Facility. All waste types shall be collected and stored in appropriate containers or in appropriately bunded storage areas as necessary.

3.17 Compost facility

3.17.1 Unless otherwise agreed with the Agency, the licensee shall provide and maintain a green waste composting area at the facility. This area shall at a minimum comprise the following:

a) An impermeable concrete slab.
b) Collection and disposal of all run-off to the leachate collection system.

3.18 Monitoring Infrastructure

3.18.1 The licensee shall provide and maintain all monitoring infrastructure required by Condition 8.1.

3.18.2 Within one month of the date of grant of this licence, the licence shall install an effective permanent gas monitoring system in the site office. Insert text – 3.18.2 The licensee will maintain the permanent gas monitoring system in the site office.

3.18.3 Monitoring infrastructure which is damaged or proves to be unsuitable for its purpose shall be replaced within three months of it being damaged or recognised as being unsuitable.

REASON: To provide appropriate infrastructure for the protection of the environment.

CONDITION 4 RESTORATION AND AFTERCARE

4.1. The licensee shall restore the facility on a phased basis in accordance with agreed restoration and aftercare plan. Within six months of the date of grant of this licence, the licensee shall submit to the Agency for agreement a Restoration and Aftercare Plan to reflect changes due to the requirements of this licence. This plan shall include all historically landfilled areas and should include a schedule detailing the various stages of restoration, including timescales, for the facility.

4.2. Within three months of the date of grant of this licence, the licensee shall submit to the Agency for agreement a drawing showing the final pre-settlement profile of the waste at the facility. This drawing shall be based on the final post-settlement profile shown on Drawing No. 2001-011-08-023 Rev. B entitled "Waste Contour Plan (Post-Settlement)" of the application and shall take into account any requirements of this licence. This drawing shall be accompanied by details, including timescales, of the landfilling to achieve the final pre-settlement profile. – Final landfilling and pre-settlement profile will be achieved by July 2009 therefore this condition no longer applies.

4.3. Final Capping

4.3.1. The final capping shall consist of the following:

a) Top soil (150 -300mm).

b) Subsoils, such that total thickness of top soil and subsoils is at least 1m.

c) Drainage layer of 0.5m thickness having a minimum hydraulic conductivity of $1x10^{-4}$ m/s or an equivalent geosynthetic layer.

d) Compacted mineral layer of a minimum 0.6m thickness with a permeability of less than $1x10^{-9}$ m/s or a geosynthetic material (e.g. GCL) or similar that provides equivalent protection.

e) Gas collection layer of natural material (minimum 0.3m) or a geosynthetic layer.

f) Where tree planting is to be carried out above waste-filled areas, a synthetic barrier shall be used to augment the clay cap.

4.3.2 Reprocessed Construction and Demolition material may be used in the capping system as sub-soil, free-draining material and in the gas collection layer. The licensee shall submit evidence to the Agency that the reprocessed waste material is fit for the purpose that it is intended and this shall include references to any specific reference standards (eg BS, CEN, DETR) or guidance produced by the Agency. Following agreement with the Agency, this reprocessed waste material may be used in the capping system.

4.3.3 By 1st October 2002, Phases A and B as shown on Drawing 2001-011-08-018 Rev. A entitled "Filling and Final Capping Sequence" of the application shall be capped in accordance with Condition 4.3.1. By 1st October 2003, Phase C as shown on this drawing shall be capped in accordance with Condition 4.3.1. All other phases shall be permanently capped in accordance with Condition 4.3.1 within twelve months of the phases having been filled to the required level agreed under Condition 4.2. – This condition no longer applies.

4.3.4 Within twelve months of the date of grant of this licence, the licensee shall submit to the Agency a report on the structure of the cap of historically landfilled areas, Zone 1 and Zone 2 as shown in Drawing No. 2001-011-08-01 Rev. C entitled Site Layout and Activity Boundary received on 7/12/01 (response to Agency's Article 14 notice) of the application. Any modifications to the cap shall be carried out by the licensee within timescales specified by the Agency. – This condition no longer applies.

4.4. No material or object that is incompatible with the proposed restoration of the facility shall be present within one metre of the final soil surface levels.

4.5. Soil Storage

4.5.1. All soils shall be stored to preserve the soil structure for future use.

Restoration and Aftercare Plan – (Inclusion of Technical Amendment B)

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

REASON: To provide for the restoration of the facility

CONDITION 5 FACILITY OPERATION AND WASTE MANAGEMENT

5.1 Wastes shall not be deposited in any phase or part of the landfill without the prior agreement of the Agency. – Landfilling operations will cease at the facility in July 2009, at this time this condition will no longer apply.

5.2 Waste Acceptance and Characterisation Procedures

5.2.1 The licensee shall maintain detailed written procedures at the facility for the acceptance of waste (to distinguish between inert, non-hazardous and hazardous wastes) and for the handling of hazardous wastes.

5.2.2 Toxicity testing shall be performed on a minimum of two samples per annum for all industrial sludge/solids being accepted at the facility and the results included in the AER. – This waste will no longer be accepted at the facility therefore this condition does not apply.

5.3 All wastes shall be checked at the working face waste transfer station to ensure that they comply with the requirements of this licence. Any wastes not suitable for acceptance shall be removed for recovery or disposal at an appropriate alternative facility. Such waste shall be stored in the Waste Quarantine Area only. No waste shall be stored in the Waste Quarantine Area for more than three months.

5.4 Working Face

5.4.1 Unless the prior agreement of the Agency is given, the following shall apply at the landfill:-

a) Only one working face shall exist at the landfill at any one time for the deposit of waste other than cover or restoration materials.

b) The working face of the landfill shall be no more than 2.5 metres in height after compaction, no more than 25 metres wide and have a slope no greater than 1 in 3.

5.4.2 All waste deposited at the working face shall be compacted, using a steel wheeled compactor or other method agreed by the Agency, and covered as soon as is practicable and at any rate prior to the end of the working day.

5.4.3 The working face, or faces, shall each day at the end of the day, be covered with suitable material.

5.5 Daily and Intermediate Cover

5.5.1 Any cover material at any location within the facility which is eroded, washed off or otherwise removed shall be replaced by the end of the working day.

5.5.2 Appropriate cover material shall be placed across the whole landfill so that no waste, other than the following is exposed:-
a) Waste suitable for specified engineering works.
b) Waste on the working face during the operational hours of the facility.

5.5.3 All areas in Phases 1 to 5 as shown in Drawing No. 2001-011-08-018 Rev. B, other than those currently being used at the working face or finally capped in accordance with Condition 4.3 shall be covered with intermediate cover.

5.6 Landscaping.
5.6.1 Within three months of the date of grant of this licence, a landscaping plan shall be submitted to the Agency for agreement.

5.7 Operational Controls.

5.7.1 The landfill shall be filled in accordance with the phase sequence 1-5 as shown in Drawing No. 2001-011-08-018 Rev. B entitled "Filling and Final Capping Sequence" of the application. No waste shall be deposited in Phase 6 as shown on this drawing. – following closure of the landfilling activities this condition will no longer apply

5.7.2 All large hollow objects and other large articles deposited at the facility shall be crushed, broken up, flattened or otherwise treated. – following closure of the landfilling activities this condition will no longer apply

5.7.3 Wastes once deposited and covered shall not be excavated, disturbed or otherwise picked over with the exception of works associated with the construction and installation of the final cap, leachate and landfill gas collection systems or with the prior agreement from the Agency. – following closure of the landfilling activities this condition will no longer apply.

5.7.4 Completed areas of the landfill shall be profiled so that no depressions exist in which water may accumulate. Any depressions arising after profiling shall be rectified by the emplacement of suitable capping or restoration materials.

5.7.5 Scavenging shall not be permitted at the facility.

5.7.6 Gates shall be locked shut when the facility is unsupervised.

5.7.7 The licensee shall provide and use adequate lighting during the operation of the facility in hours of darkness.

5.7.8 Fuels shall only be stored at appropriately bunded locations on the facility.

5.7.9 All tanks and drums shall be labelled to clearly indicate their contents.

5.7.10 No smoking shall be allowed on the facility other than in buildings fitted with permanent gas monitoring systems.

5.8 Waste Handling

5.8.1 Sludge
5.8.1.1 Treated industrial non-hazardous sludge shall only be accepted at the facility between the hours of 8.30am and 2pm Monday to Friday inclusive. All sludge shall be covered immediately with other waste. – This waste will no longer be accepted at the facility therefore this condition does not apply.

5.8.2 Compost
5.8.2.1 In order not to be considered a waste, compost produced by the facility shall comply with the quality standards established in *Schedule F: Standards for Compost Quality* of this licence. Analysis of the compost shall be in accordance with the requirements of that Schedule.

5.8.3 Construction and Demolition Waste

5.8.3.1 Only construction and demolition waste or other inert material shall be accepted at this area. All loads shall be visually checked to ensure that no contamination exists. Materials which are capable or being recovered for reuse or recycling shall be extracted from the waste. Materials recovered in this way shall be stored temporarily in containers prior to removal.

5.8.3.2 All stockpiles shall be maintained so as to minimise dust generation.

5.8.4 Waste Construction Materials containing Asbestos

5.8.4.1 Only asbestos waste classified under EWC as *17 06 05** – construction materials containing asbestos may be disposed of at the facility.

5.8.4.2 From the date of grant of this licence, asbestos waste shall only be accepted at the facility for disposal subject to deposition being carried out in accordance with Council Directive 1999/31/EC on the Landfill of Waste and technical guidance issued by the European Commission

5.8.4.3 Asbestos waste must be double wrapped in heavy gauge plastic which is clearly labelled to indicate the presence of asbestos prior to its disposal.

5.8.4.4 Disposal of asbestos waste shall be into prepared bays or trenches of at least 2 metres in depth.

5.8.4.5 Deposited asbestos waste shall be covered immediately with at least 250mm of suitable material. At the end of the day, the waste shall be covered with a minimum of 500mm of suitable material.

5.8.4.6 No asbestos waste shall be present within 2.5 metres of the final surface levels.

This waste will no longer be accepted at the facility therefore Condition 5.8.4 does not apply.

5.9 Off-site Disposal and Recovery.

5.9.1 Waste sent off-site for recovery or disposal shall only be conveyed by a waste contractor agreed by the Agency.

5.9.2 All waste transferred from the facility shall only be transferred to an appropriate facility agreed by the Agency.

5.9.3 All wastes removed off-site for recovery or disposal shall be transported from the facility to the consignee in a manner which will not adversely affect the environment.

5.10 Civic Waste Facility.

5.10.1 The Civic Waste Facility shall only be used by private vehicles. The facility shall not be used as a transfer station for disposal of waste by commercial waste disposal contractors or local authority waste collection vehicles. Subject to the agreement of the Agency, skips shall be provided at an agreed location for the collection of waste from small litter bin collection and street cleaning vehicles.

5.10.2 All waste deposited in the Civic Waste Facility shall be either:-

a) Into a skip.

b) Into a receptacle for recovery.

c) In the case where inspection is required, into a designated inspection area.

5.10.3 Waste to be accepted at the Civic Waste Facility shall be limited to domestic waste, glass, beverage cans, textiles, paper and cardboard, plastics, timber, metals, tyres, garden waste, electronic goods, fluorescent tubes, waste oils, household hazardous waste, batteries, print/toner cartridges and

other waste types subject to the prior written agreement of the Agency. – This waste is not accepted at the facility.

5.10.4 Domestic waste delivered to the civic waste facility for disposal shall be deposited in skips for further transfer to a appropriate facility off site for recovery and/or disposal. shall be deposited at the working face prior to the end of the working day or removed offsite to an alternative facility agreed with the Agency.

5.10.5 Household hazardous wastes, batteries, waste oils and print/toner cartridges shall be stored in appropriately bunded storage areas. Fluorescent tubes shall be stored in an enclosed container in such a manner to prevent breakage.

5.10.6 The licensee shall assign and clearly label each container at the Civic Waste Facility to indicate their contents.

5.11 Leachate

5.11.1 The frequency of leachate removal/discharge from the leachate lagoon shall be such that a minimum freeboard of 0.75m shall be maintained in the leachate lagoon at all times.

5.11.2 Unless treated on the facility, leachate stored in the leachate storage lagoon shall be disposed of by tankering off-site in fully enclosed road tankers.

5.12 Maintenance

5.12.1 All treatment/abatement and emission control equipment shall be calibrated and maintained, in accordance with the instructions issued by the manufacturer/supplier or installer. Written records of the calibrations and maintenance shall be made and kept by the licensee.

5.12.2 All lagoon structures on the facility shall be inspected and certified fit for purpose every three years by an independent and appropriately qualified chartered engineer.

5.12.3 The licensee shall maintain, clearly label and name all sampling and monitoring locations.

5.12.4 The vehicle wash shall be inspected on a daily basis and drained as required. Silt, stones and other accumulated material shall be removed as required from the wheel-wash and disposed of at the working face or to a skip.

REASON: To provide for appropriate operation of the facility to ensure protection of the environment.

CONDITION 6 EMISSIONS

6.1. No specified emission from the facility shall exceed the emission limit values set out in *Schedule C: Emission Limits* of this licence. There shall be no other emissions of environmental significance.

6.2. The licensee shall ensure that the activities shall be carried out in a manner such that emissions do not result in significant impairment of, or significant interference with the environment beyond the facility boundary.

6.3. Landfill Gas

6.3.1. The following are the trigger levels for landfill gas emissions from the facility measured in any service duct or manhole on, at or immediately adjacent to the facility and/or at any other point located outside the body of the waste:-

a) Methane, greater than or equal to 1.0% v/v; or

b) Carbon dioxide, greater than or equal to 1.5% v/v.

6.3.2. The concentration limits for emissions to atmosphere specified in this licence shall be achieved without the introduction of dilution air and shall be based on gas volumes under standard conditions of:-

a) In the case of landfill gas flare:
Temperature 273 K, pressure 101.3 kPa, dry gas at 3% oxygen; and

b) In the case of landfill gas utilisation plant:
Temperature 273 K, pressure 101.3 kPa, dry gas at 5% oxygen.

6.3.3. Emission limits for landfill gas combustion products to atmosphere in this licence shall be interpreted in the following way:-

6.3.3.1. Continuous monitoring:-

a) No 24 hour mean value shall exceed the emission limit value.

b) 97% of all 30 minute mean values taken continuously over an annual period shall not exceed 1.2 times the emission limit value.

c) No 30 minute mean value shall exceed twice the emission limit value.

6.3.2.2. Non-Continuous Monitoring:-

a) For any parameter where, due to sampling/analytical limitations, a 30 minute sample is inappropriate, a suitable sampling period should be employed and the value obtained therein shall not exceed the emission limit value.

b) For all other parameters, no 30 minute mean value shall exceed the emission limit value.
c) For flow, no hourly or daily mean value shall exceed the emission limit value.

6.4 Emissions to Groundwater

6.4.1 Within six months of the date of grant of this licence, the licensee shall submit to the Agency for its agreement, groundwater monitoring trigger levels in accordance with the requirements of Council Directive 1999/31/EC for the groundwater monitoring boreholes NW3, NW7 and NW9.

In 2003 Cork City Council commissioned a report to assess trigger levels for ground water for wells NW 3, NW 7 and NW 9. A copy of this report is included in Appendix 8. In this report the following trigger levels were presented to the Agency:

Parameter	Units	Trigger Levels	
		NW 3 & NW 9	NW 7
Ammonia	mg/l	60	500
Electrical Conductivity	µS/cm	1,500	6,000
pH	pH	5.6 – 9	5.6 - 9
TOC	mg/l	100	200

The Agency agreed to these trigger values with alterations to NW9 for ammonia (5 mg/l) and TOC levels (35 mg/l). A copy of the Agencies agreement letter is included in Appendix 9. Cork City Council wishes to retain these trigger levels as listed above.

6.5 Emissions to Surface Water

6.5.1 No leachate or other contaminated surface water shall be discharged to the Tramore and Trabeg Rivers. No stormwater shall be discharged to the Tramore and Trabeg Rivers when its quality indicates that it exceeds the trigger levels specified in Condition 6.5.3 below.

6.5.2 No substance shall be discharged in a manner, or at a concentration which, following initial dilution causes tainting of fish or shellfish.

6.5.3 The licensee shall determine normal levels for ammonia, BOD, COD, chloride, conductivity, pH, TOC and temperature and trigger levels for TOC and conductivity for the water entering the stormwater retention pond (SRP1) prior to reed bed treatment.

Within six months of the date of grant of this licence, the applicant shall submit to the Agency for its agreement a proposal outlining the measures to be implemented when such trigger levels are reached. This proposal shall also take into account the water quality in the receiving waters upgradient of the landfill.

In 2003 Cork City Council commissioned a report to assign trigger levels for surface water. This report has been submitted to the Agency (dated 17/12/2003) and a copy of the report is included in Appendix 8.

Cork City Council has taken the recommendations within the report on board and is in the process of installing a flow measurement device on the Tramore River upstream of reed bed discharge. Proposed trigger levels to satisfy the requirements of Condition 6.5.3 shall be forwarded to the Agency following installation of the flow measurement device.

6.6 Trigger Level for PM_{10}.

6.6.1 The trigger level for PM_{10} from the facility measured at any location on the boundary of the facility is:-
a) PM_{10} greater than 50 µg/m_3 for a daily sample.

6.7 Emissions to Sewer

6.7.1 Unless otherwise agreed in advance with the Agency and the Sanitary Authority, the following shall apply for the discharge of leachate, which shall be via the leachate discharge point SD1 indicated on Drawing No. 9801127-06 Rev. F received 8/03/02 as part of the response to the Agency's Article 14 notice. There shall be no other discharge or emission to sewer of environmental significance.

6.7.2 No substance shall be present in emissions to sewer in such concentrations as would constitute a danger to sewer maintenance personnel working in the sewerage system, or as would be damaging to the fabric of the sewer, or as would interfere with the biological functioning of a downstream wastewater treatment works.

6.7.3 The licensee shall permit authorised persons of the Agency and the Sanitary Authority to inspect, examine and test, at all reasonable times, any works and apparatus installed, in connection with the discharge or emission, and to take samples of the discharge or emission.

6.7.4 No discharge or emission to sewer shall take place which might give rise to any reaction within the sewer or to the liberation of by-products which may be of environmental significance.

6.7.5 Non-trade effluent wastewater (e.g. firewater, accidental spillage) which occurs on-site shall not be discharged to the sewer without the prior authorisation of the Sanitary Authority.

6.7.6 The licensee shall submit monitoring results to the Sanitary Authority on an annual basis.

6.7.7 The licensee shall provide and maintain an inspection chamber in a suitable position in connection with each pipe through which the leachate is being discharged. Each such inspection chamber or manhole shall be constructed and maintained by the licensee so as to permit the taking of samples of the discharge

6.7.8 Emission limit values for emissions to sewer in this licence shall be interpreted in the following way:-

a) Continuous monitoring.
No flow value shall exceed the specified limit

b) Non-Continuous monitoring.
Eight out of ten consecutive results, calculated as daily mean concentration or mass emission values on the basis of flow proportional composite sampling shall not exceed 1.2 times the emission limit value.

c) No grab sample shall exceed 1.2 times the emission limit value.

6.8 Temporary Emissions of Dilute Leachate/Contaminated Stormwater to sewer

Discharge procedures for the discharge of dilute leachate or contaminated stormwater to sewer shall be in accordance with any written requirements of the Sanitary Authority.

REASON: To control emissions from the facility and provide for the protection of the environment.

CONDITION 7 NUISANCE CONTROL

7.1 The licensee shall ensure that vermin, birds, flies, mud, dust and litter do not give rise to nuisance at the facility or in the immediate area of the facility. Any method used by the licensee to control any such nuisance shall not cause environmental pollution.

7.2 The licensee shall ensure that the activities shall be carried out in a manner such that odours do not result in significant impairment of, or significant interference with amenities or the environment beyond the facility boundary.

7.3 The road network in the vicinity of the facility shall be kept free from any debris caused by vehicles entering or leaving the facility. Any such debris or deposited materials shall be removed without delay.

7.4 Litter Control

7.4.1 Litter fencing shall be provided, from the date of grant of licence, and maintained around the perimeter of the active tipping area.

7.4.2 All litter control infrastructure shall be inspected on a daily basis. The licensee shall remedy any defect in the litter netting as follows:-

a) A temporary repair shall be made by the end of the working day.

b) A repair to the standard of the original netting shall be undertaken within three working days.

Following the closure of the landfilling activities at the facility, these conditions will no longer apply.

7.4.3 All loose litter or other waste, placed on or in the vicinity of the facility, other than in accordance with the requirements of this licences, shall be removed, subject to the agreement of the landowners, immediately and in any event by 10.00am of the next working day after such waste is discovered.

7.4.4 The licensee shall ensure that all vehicles delivering waste to and removing waste and materials from the facility are appropriately covered.

7.5 Dust Control

7.5.1 In dry weather, site roads and any other areas used by vehicles shall be sprayed with water as and when required to minimise airborne dust nuisance.

7.6 Prior to exiting the facility, all waste vehicles (including vehicles leaving the Construction and Demolition area) shall use the vehicle wash.

7.7 Bird Control

7.7.1 Birds shall be prevented from gathering on and feeding at the facility by the use of birds of prey and/or other bird scaring techniques. The birds of prey and/or other techniques shall maintain their presence every day, from before dawn to after dark, until the waste activities cease and all the waste is capped to the written satisfaction of the Agency. The use of gas operated bird scaring devices is prohibited at the facility. - Following the closure of the landfilling activities at the facility, this condition will no longer apply.

REASON: To provide for the control of nuisances

CONDITION 8 MONITORING

8.1 The licensee shall carry out such monitoring and at such locations and frequencies as set out in *Schedule D: Monitoring* of this licence and as specified in this licence. Unless otherwise specified by this licence, all environmental monitoring shall commence no later than two months after the date of grant of this licence.

8.2 The licensee shall amend the frequency, locations, methods and scope of monitoring as required by this licence only upon the written instruction of the Agency and shall provide such information concerning such amendments as may be requested in writing by the Agency. Such alterations shall be carried out within any timescale nominated by the Agency.

8.3 Monitoring and analysis equipment shall be operated and maintained in accordance with the manufacturers' instructions (if any) so that all monitoring results accurately reflect any emission, discharge or environmental parameter.

8.4 The licensee shall provide safe and permanent access to all on-site sampling and monitoring points and to off-site points as required by the Agency.

8.5 Landfill Gas Monitoring

8.5.1 All landfill gas monitoring equipment, other than permanent monitoring systems within buildings, shall be certified as being intrinsically safe.

8.5.2 Within six months of the date of grant of this licence, the licensee shall submit a proposal to the Agency for agreement to monitor surface methane emissions from capped and uncapped areas. This proposal shall as a minimum contain the methologies to be used and the frequency of monitoring.

8.6 Wind sock

8.6.1 The licensee shall provide and maintain in a prominent location on the facility a wind sock, or other wind direction indicator, which shall be visible from the public roadway outside the site.

8.7 Topographical Survey

8.7.1 A topographical survey shall be carried out within one month of the date of grant of this licence. The survey shall include a measurement of the remaining available void space. It shall be repeated biannually thereafter. The survey shall be in accordance with any written instructions issued by the Agency. - Following the closure of the landfilling activities at the facility, this condition will no longer apply.

8.8 Stability Assessment

Within the six months of date of grant of this licence, and annually thereafter. The licensee shall carry out an annual stability assessment of the side slopes of the facility. Following completion of all restoration and aftercare works (i.e. construction of additional facilities at the site) a stability risk assessment will be submitted to the Agency in order to eliminate or reduce the need for this assessment.

8.9 Nuisance Monitoring

8.9.1 The licensee shall, at a minimum of monthly one week intervals, inspect the facility and its immediate surrounds for nuisances caused by litter, vermin, birds, flies, mud, dust and odours.

8.10 Capping materials stockpile

8.10.1 Within six months of the date of grant of this licence, the licensee shall provide a report to the Agency on the quantity of capping materials stockpiled at the facility. In the event that the stockpile fails to contain the requisite volume of capping materials for the next twelve months, the report required by this condition shall contain a proposal for the Agency's agreement for alternative sources of capping materials or for the utilisation of geosynthetic materials. - Following the closure of the landfilling activities at the facility and the final capping of the landfill, this condition will no longer apply.

REASON: To ensure compliance with the conditions of this licence by provision of a satisfactory system of monitoring of emissions

CONDITION 9 CONTINGENCY ARRANGEMENTS

9.1 In the event of an incident the licensee shall immediately:-

a) Identify the date, time and place of the incident.

b) Carry out an immediate investigation to identify the nature, source and cause of the incident and any emission arising therefrom.

c) Isolate the source of any such emission.

d) Evaluate the environmental pollution, if any, caused by the incident.

e) Identify and execute measures to minimise the emissions/malfunction and the effects thereof.

f) Provide a proposal to the Agency for its agreement within one month of the incident occurring to:-

a) Identify and put in place measures to avoid reoccurrence of the incident.

b) Identify and put in place any other appropriate remedial action.

9.2 The licensee shall maintain written Emergency Response Procedures (ERP) at the facility. The ERP shall address any emergency situations which may originate on the facility and shall include provision for minimising the effects of any emergency on the environment. This shall include a risk assessment to determine the requirements at the facility for fire fighting and fire water retention facilities. The Fire Authority shall be consulted by the licensee during this assessment.

9.3 The licensee shall have in storage an adequate supply of containment booms and/or suitable absorbent material to contain and absorb any spillage at the facility. Once used the absorbent material shall be disposed of at an appropriate facility.

9.4 Emergencies

9.4.1 All significant spillages occurring at the facility shall be treated as an emergency and immediately cleaned up and dealt with so as to alleviate their effects.

9.4.2 No waste shall be burnt within the boundaries of the facility. A fire at the facility shall be treated as an emergency and immediate action shall be taken to extinguish it and notify the appropriate authorities.

9.4.3 In the event that monitoring of local wells indicates that the facility is having a significant adverse effect on the quantity and/or quality of the water supply this shall be treated as an emergency and the licensee shall provide an alternative supply of water to those affected.

9.4.5 In the event that monitoring of the slide slopes of the facility indicate that there may be a risk of slope failure this will be treated as an emergency.

Accident Prevention and Emergency Response – (Technical Amendment B)

9.5 The licensee shall, within twelve months of date of this amendment. The licensee has a documented Accident Prevention Policy in place, which will address the hazards on-site, particularly in relation to the prevention of accidents with a possible impact on the environment. This procedure shall be reviewed annually and updated as necessary.

9.6 The Emergency Response Procedure shall be reviewed annually and updated as necessary.

REASON: To ensure compliance with the conditions of this licence by provision of a satisfactory system of monitoring of emissions

CONDITION 10 RECORDS

10.1 The licensee shall keep the following documents at the facility office:-

a) The current waste licence relating to the facility.

b) The current EMS for the facility.

c) The previous year's AER for the facility.

d) All written procedures produced by the licensee which relate to the licensed activities.

10.2 The licensee shall maintain a written record for each load of waste arriving at the facility (including Construction and Demolition waste and topsoils/subsoils, Green Waste Compositing Facility and Waste Transfer Station), excluding those arriving at the Civic Waste Facility. The licensee shall record the following:-

a) The date.

b) The name of the carrier (including if appropriate, the waste carrier registration details).

c) The vehicle registration number.

d) The name of the producer(s)/collector(s) of the waste as appropriate.

e) The name of the waste facility (if appropriate) from which the load originated including the waste licence or waste permit register number.

f) A description of the waste including the associated EWC codes.

g) The quantity of the waste, recorded in tonnes.

h) The name of the person checking the load; and,

i) Where loads or wastes are removed or rejected, details of the date of occurrence, the types of waste and the facility to which they were removed.

10.3 Written Records.

The following written records shall be maintained by the licensee:-

a) The types and quantities of waste recovered and disposed of at the facility each year.
These records shall include the relevant EWC Codes.
b) All training undertaken by facility staff.
c) Results from all integrity tests of bunds and other structures and any maintenance or remedial work arising from them.
d) Details of all nuisance inspections.
e) The names and qualifications of all persons who carry out all sampling and monitoring as required by this licence and who carry out the interpretation of the results of such sampling and monitoring.
f) Maintenance records in accordance with the manufacturer's recommendations for the landfill gas utilisation plant and flare at the facility.

10.4 The licensee shall maintain a written record of all complaints relating to the operation of the facility. Each such record shall give details of the following:-

a) Date and time of the complaint.

b) The name of the complainant.

c) Details of the nature of the complaint.

d) Actions taken on foot of the complaint and the results of such actions.

e) The response made to each complainant.

10.5 A written record shall be kept of each consignment of leachate and/or contaminated stormwater removed from the facility. The record shall include the following:-

a) The name of the carrier.

b) The date and time of removal of leachate and/or contaminated stormwater from the facility.

c) The volume of leachate and/or contaminated stormwater, in cubic metres, removed from the facility on each occasion.
d) The name and address of the Waste Water Treatment Plant to which the leachate and/or contaminated stormwater was transported.

e) Any incidents or spillages of leachate and/or contaminated stormwater during its removal or transportation.

10.6 A written record shall be kept for each load of waste departing from the Civic Waste Facility and Waste Transfer Station
.
The following shall be recorded:-

a) The name of the carrier.

b) The vehicle registration number.

c) The destination of the waste (facility name and waste licence/permit number as appropriate).

d) A description of the waste (if recovered or rejected waste, the specific nature of the waste).

e) The quantity of waste, recorded in tonnes.

f) The name of the person checking the load.

g) The time and date of departure.

10.7 A written record shall be kept at the facility of the programme for the control and eradication of vermin and fly infestations at the facility. These records shall include as a minimum the following:-

a) The date and time during which spraying of insecticide is carried out.

b) Contractor details.

c) Contractor logs and site inspection reports.

d) Details of the rodenticide(s) and insecticide(s) used.

e) Operator training details.

f) Details of any infestations.

g) Mode, frequency, location and quantity of application.

h) Measures to contain sprays within the facility boundary.

REASON: To provide for the keeping of proper records of the operation of the facility

CONDITION 11 REPORTS AND NOTIFICATIONS

11.1 Unless otherwise agreed by the Agency, all reports and notifications submitted to the Agency shall:-

a) Be sent to the Agency's headquarters.

b) Comprise one original and three copies unless additional copies are required.

c) Be formatted in accordance with any written instruction or guidance issued by the Agency.

d) Include whatever information as is specified in writing by the Agency.

e) Be identified by a unique code, indicate any modification or amendment, and be correctly dated to reflect any such modification or amendment.
f) Be submitted in accordance to the relevant reporting frequencies specified by this licence, such as in *Schedule E: Recording and Reporting to the Agency* of this licence.

g) Be accompanied by a written interpretation setting out their significance in the case of all monitoring data.

h) Be transferred electronically to the Agency's computer system if required by the Agency.

11.2 In the event of an incident occurring on the facility, the licensee shall:-

a) Notify the Agency as soon as practicable and in any case not later than 10:00am the following working day after the occurrence of any incident.

b) Submit a written record of the incident, including all aspects described in Condition 9.1(ae), to the Agency as soon as practicable and in any case within five working days after the occurrence of any incident.

c) In the event of any incident which relates to discharges to surface/sewer water, notify the Southwestern Regional Fisheries Board as soon as practicable and in any case not later than 10:00a.m. on the following working day after such an incident.

d) Should any further actions be taken as a result of an incident occurring, the licensee shall forward a written report of those actions to the Agency as soon as practicable and no later than ten days after the initiation of those actions.

11.3 Waste Recovery Reports.

11.3.1 Within six months of the date of grant of this licence, a report examining waste recovery options shall be submitted to the Agency for its agreement. This report shall address methods to contribute to the achievement of the recovery targets stated in national and European Union waste policies and shall include the following:-

a) Proposals for the contribution of the facility to the achievement of targets for the reduction of biodegradable waste going to landfills as specified in the Landfill Directive.

b) Updated proposals regarding the utilisation of heat from the gas utilisation plant.

c) The feasibility of using landfill gas as a fuel for on-site vehicles.

11.4 Achievement of Final Profile

11.4.1 Within six months of the date of grant of this licence, the licensee shall submit to the Agency for its agreement, proposals for landfilling and restoration to achieve the final profile/height of the facility to the Agency for its agreement. - This report has been submitted to the Agency and therefore no longer applies.

11.5 Monitoring Locations

11.5.1 Within six months of the date of grant of this licence, the licensee shall submit to the Agency an appropriately scaled drawing(s) showing all the monitoring locations that are stipulated in this licence. The drawing(s) shall include the reference code of each monitoring point. An amended drawing shall be submitted as and when any changes to the monitoring locations are made under the terms of the licence.

11.6 Annual Environmental Report.

11.6.1 The licensee shall submit to the Agency for its agreement, by 2nd March 2003, and within one month of the end of each year thereafter, an Annual Environmental Report (AER).

11.6.2 The AER shall include as a minimum the information specified in *Schedule G: Content of Annual Environmental Report* of this licence and shall be prepared in accordance with any relevant written guidance issued by the Agency.

REASON: To provide for proper reports to and notifications to the Agency.

CONDITION 12 CHARGES AND FINANCIAL PROVISIONS

12.1 Agency Charges.

12.1.1 The licensee shall pay to the Agency an annual contribution of €31,050 or such sum as the Agency from time to time determines, towards the cost of monitoring the activity or otherwise in performing any functions in relation to the activity, as the Agency considers necessary for the performance of its functions under the Waste Management Act, 1996. The licensee shall in 2003 and subsequent years, not later than January 31 of each year, pay to the Agency this amount updated in accordance with changes in the Public Sector Average Earnings Index from the date of the licence to the renewal date. The updated amount shall be notified to the licensee by the Agency. For 2002, the licensee shall pay a pro rata amount from the date of this licence to 31st December. This amount shall be paid to the Agency within one month of the date of grant of this licence.

12.1.2 In the event that the frequency or extent of monitoring or other functions carried out by the Agency needs to be increased the licensee shall contribute such sums as determined by the Agency to defraying its costs.

12.2 Financial Provision for Closure, Restoration and Aftercare

12.2.1 The licensee shall from a date to be set by the Agency establish and maintain a fund, or provide a written guarantee, that is adequate to assure the Agency that the licensee is at all times financially capable of implementing the Restoration and Aftercare Plan required by Condition 4. The type of fund established and means of its release/recovery shall be agreed by the Agency prior to its establishment.

12.2.2 Any fund established shall be maintained in an amount always sufficient to underwrite the current Restoration and Aftercare Plan.

12.2.3 The licensee shall revise the cost of restoration and aftercare annually and any details of the necessary adjustments to the fund or guarantee must, within two weeks of the revision, be forwarded to the Agency for its agreement. Any adjustment agreed by the Agency shall be effected within four weeks of said written agreement.

12.2.4 Unless otherwise agreed any revision to the fund shall be computed using the following formula:-
Cost = (ECOST x WPI) + CiCC
Where:
Cost = Revised restoration and aftercare cost
ECOST = Existing restoration and aftercare cost
WPI = Appropriate Wholesale Price Index [Capital Goods, Building &
Construction (i.e. Materials & Wages) Index], as published by the
Central Statistics Office, for the year since last closure calculation/revision.
CiCC = Change in compliance costs as a result of change in site conditions, changes in law, regulations, regulatory authority charges, or other significant changes.

12.3 Sanitary Authority Charges

12.3.1 Sanitary Authority charges of €6,000 shall be payable to the Sanitory Authority directly on an annual basis. Sanitary Authority charges will increase from time to time in response to increased costs in providing drainage and monitoring.

12.4 Cost of landfill of waste.

12.4.1 The licensee shall ensure the costs in the setting up, operation of, provision of financial security and closure and after-care for a period of at least 30 years shall be covered by the price to be charged for the disposal of waste at the facility.

REASON: To provide for adequate financing for monitoring and financial provisions for measures to protect the environment.

SCHEDULE A : Waste Acceptance

A.1 Waste Acceptance

Table A.1 Waste Categories and Quantities for Disposal/Recovery at the facility.

Waste Type	**Maximum (tonnes per annum)**
Household & Commercial waste	22,000
Industrial non-hazardous sludge	1,500
Construction Materials containing asbestos - EWC 17/06/05*	500 Note 1
TOTAL FOR DISPOSAL	22,000
Construction & Demolition Waste	300,000 Note 2
Waste to be imported for restoration purposes	100,000
Green waste for composting	Note 3
Wastes accepted for storage at the civic waste facility prior to recycling, reuse or reclamation	5,000
TOTAL FOR RECOVERY	305,000

Note 1: Subject to restrictions in Condition 5.
Note 2: Construction and demolition waste may be accepted for recovery for use as daily cover, in site construction works and landfill restoration.
Note 3: Limited to 1000m^3 2,400m^3 at any one time.

SCHEDULE B : Specified Engineering Works

Specified Engineering Works
Final capping.
Installation of Landfill Gas Management Infrastructure.
Installation of Leachate Management Infrastructure.
Installation of Surface Water Management Infrastructure.
Any other works notified in writing by the Agency.

SCHEDULE C :Emission Limits

C.1 *Noise Emissions:* Measured at any noise sensitive location (A1 and A4 on Table D.1.1)

Day dB(A) L_{Aeq}(30 minutes)	**Night dB(A) L_{Aeq}(30 minutes)**
55	45

C.2 *Landfill Gas Concentration Limits:* (Measured in any building on or adjacent to the facility).

Methane	Carbon Dioxide
20 % LEL (1% v/v)	1.5 % v/v

C.3 *Dust Deposition Limits:* (Measured at the monitoring points indicated in Table D.1.1).

Level (mg/m² /day)[Note 1]
350

Note 1: 30 day composite sample with the results expressed as mg/m² /day.

C.4 *Surface Water Discharge Limits:* Measured at SRP5 (outlet from Reedbed No. 2).

Suspended Solids mg/l
35

C.5 Emission Limits Values for Landfill Gas Utilisation Plant/Enclosed Flare

Emission Point Reference numbers: TV01 and TV02 and outlet of enclosed flare (location to be agreed with Agency in advance).
Volume to be emitted: 3000m3/hr (unless results from modelling suggests otherwise)
Minimum discharge height: 5m (unless results from modelling suggests otherwise)

Parameter	**Flare (enclosed) Emission Limit Value** Note 1	**Utilisation Plant Emission Limit Value** Note 1
Nitrogen oxides (NO_x) 150 mg/m3 500 mg/m3		
CO	50 mg/m3	650 mg/m3 1400 mg/m3
Particulates	Not applicable	130 mg/m3
TA Luft Organics Class I (Note 2)	Not applicable	20 mg/m3 (at mass flows > 0.1 kg/hr)
TA Luft Organics Class II (Note 2)	Not applicable	100 mg/m3 (at mass flows > 2 kg/hr)
TA Luft Organics Class III (Note 2)	Not applicable	150 mg/m3 at mass flows > 3kg/hr)
Total organic carbon (TOC)	10 mg/m3	Not applicable
Hydrogen Chloride	50 mg/m3 (at mass flows > 0.3 kg/h)	50 mg/m3 (at mass flows > 0.3 kg/h)
Hydrogen Fluoride	5 mg/m3 (at mass flows > 0.05 kg/h)	5 mg/m3 (at mass flows > 0.05 kg/h)

Note 1: Dry gas referenced to 5% oxygen by volume for utilisation plants and 3% oxygen by volume for flares.
Note 2: In addition to the above individual limits, the sum of the concentrations of Class I, II and III shall not exceed the Class III limits.

This variation has been agreed with the Agency - see letter of agreement from EPA (ref. WL 12-2/GEN36RC) in Appendix 9.

C.6 Emission Limits for Leachate Being Discharged to Sewer

Emission Point Reference No.: SD1
Volume to be emitted: Maximum rate per hour: 25 m^3/hr

Parameter	Emission Limit Value Daily Mean Concentration (mg/l)
BOD	3,000
Ammoniacal Nitrogen (NH4-N)	Note 1 – 600 mg/l – letter from the Sanitary Authority to follow
Suspended solids	1,000
Sulphates (as SO4)	500
pH	6 – 9
Dissolved methane	0.2

Note 1: The ELV for ammonia shall be agreed with the Sanitary Authority and details of this agreement shall be submitted to the Agency.

SCHEDULE D: Monitoring

D.1 Monitoring Locations

Cork City Council wishes to propose the following changes to the monitoring locations

Landfill Gas within & outside waste

It is proposed to remove the following wells LG 1, LG 9A LG 10 and LG10A, 11AS and 11AD 11A (formerly LG 9, LG 10 and LG 11)) as investigations have shown that they are located within the waste body and therefore are not representative of their intended purpose. Existing wells nearby are deemed adequate.

LG 20 – LG 29: – these wells were removed during the construction of the Park & Ride facility and have been replaced by wells 137 -146, 172 – 175 located around the perimeter of the Park & Ride facility.

DP 1 – DP 6: - DP, 1, 2, 5 and 6 have been removed. DP 3 and DP 4 remain. When the development planned for the ''Blue Demons'' site takes place a proposal shall be made to the Agency to relocate the wells as required.

Landfill Gas Utilisation Plant & Enclosed Flare - TV 02 has been removed off site with the consent of the Agency.

Asbestos Fibres – remove as no longer relevant post closure.

Ground Water – add MWBR2 and remove BH 1 and BH 12 as these were located in the Park & Ride and have been removed during the development of the facility. It is proposed to remove the following wells OB 3, MWBR 3, NW 6 and NW 7 as investigations have shown that they are located within the waste body and therefore are not representative of their intended purpose. Existing wells nearby are deemed adequate.

Leachate – The leachate pump sumps are as follows:

PS 1, PS 2, PS 3, PS 4, PS 5, PS 5A, PS 6, PS 7, PS 8 and PS 9.

Proposed Additional Monitoring Locations for the Waste Transfer Station

Additional dust (D6) and odour monitoring (O10) has been proposed at the waste transfer facility. Also the air emissions from the activated carbon filter unit will also be monitored (AM1). In the event that the proposed waste transfer building is not constructed, monitoring will not be required at these locations under the waste licence.

D.2 Landfill Gas

Table D.2.1 Landfill Gas Monitoring Parameters, Frequency and Technique

Parameter	Monitoring Frequency		Analysis Method[Note1]/Technique[Note2]
	Gas Boreholes/ Vents/Wells	Site Office	
Methane (CH_4) % v/v	Monthly	Continuous	Infrared analyser/flame ionisation detector
Carbon dioxide (CO_2) %v/v	Monthly	Continuous	Infrared analyser/ flame ionisation detector
Oxygen(O_2) %v/v	Monthly	Continuous	Standard
Atmospheric Pressure	Monthly	-	Standard
Temperature	Monthly	-	Standard

Note 1: All monitoring equipment used should be intrinsically safe.
Note 2: Or other methods agreed in advance with the Agency.

D.3 Dust/PM_{10}/Odour Monitoring

Table D.3.1 Dust/PM_{10}/Odour Monitoring Frequency and Technique

Parameter	Monitoring Frequency	Analysis Method/Technique
Dust	Quarterly	Standard Method [Note 1]
Odour	Quarterly	See Note 2
PM_{10}	Quarterly at S1, S2 and S4 Continuous at S3	See Note 3

Note 1: Standard method VDI2119 (Measurement of Dustfall, Determination of Dustfall using Bergerhoff Instrument (Standard Method) German Engineering Institute). A modification (not included in the standard) which 2 methoxy ethanol may be employed to eliminate interference due to algae growth in the gauge.
Note 2: Odour measurements shall be by olfactometric measurement. Analysis for mercaptans, organic acids and hydrogen sulphide by standard methods.
Note 3: As described in prEN12341 or an equivalent agreed with the Agency.

D.4 Noise

Table D.4.1 Noise Monitoring Frequency and Technique

Parameter	Monitoring Frequency	Analysis Method/Technique
$L(A)_{EQ}$ [30 minutes]	Annual	Standard [Note 1]
$L(A)_{10}$ [30 minutes]	Annual	Standard [Note 1]
$L(A)_{90}$ [30 minutes]	Annual	Standard [Note 1]
Frequency Analysis(1/3 Octave band analysis)	Annual	Standard [Note 1]

Note 1: "International Standards Organisation. ISO 1996. Acoustics - Description and Measurement of Environmental noise. Parts 1, 2 and 3."

D.5 Surface Water, Groundwater and Leachate

Table D.5.1 Water and Leachate - Parameters / Frequency

Parameter	Surface Water Monitoring frequency	Groundwater Monitoring frequency	Leachate Monitoring frequency
Visual Inspection/Odour	Weekly Monthly	Quarterly	Quarterly
Groundwater Level	Not Applicable	Monthly Quarterly	Not Applicable
Leachate Level	Not Applicable	Not Applicable	Continuous
Ammoniacal Nitrogen	Quarterly	Quarterly	Annually
BOD	Quarterly	Not Applicable	Annually
COD	Quarterly	Not Applicable	Annually
Chloride	Quarterly	Quarterly	Annually
Dissolved Oxygen	Quarterly	Quarterly	Not Applicable
Electrical Conductivity	Quarterly	Quarterly	Annually
pH	Quarterly	Quarterly	Annually
Total Suspended Solids	Quarterly	Not Applicable	Not Applicable
Temperature	Quarterly	Quarterly	Quarterly
Cadmium & other metals	Annually	Annually	Annually
Cyanide (Total)	Not Applicable	Annually	Annually
Fluoride	Not Applicable	Annually	Annually
List I/II organic substances	Once -off	Annually	Once -off
Mercury	Annually	Annually	Annually
Sulphate	Annually	Annually	Annually
Total Alkalinity	Annually	Annually	Not Applicable
Total P /orthophosphate	Annually	Annually	Annually
Total Oxidised Nitrogen	Annually	Quarterly	Annually
Total Organic Carbon	Not Applicable	Quarterly	Not Applicable
Residue on evaporation	Not Applicable	Annually	Not Applicable
Biological Assessment	Annually	Not Applicable	Not Applicable

Table D.5.2 Monitoring of Stormwater Retention Pond/ Reed bed system

Location / Parameter	Monitoring Frequency	Analysis Method/Technique Note 2
Inlet to Stormwater Retention Pond - SRP1 (Note 1)		
Suspended Solids	Weekly Monthly	Gravimetric
Ammonia	Weekly Monthly	Standard Methods
SRP2, SRP3 (Note 3) - these points do not exist – the reedbeds function as a single system		
Suspended Solids	Weekly	Gravimetric
SPR4 – over flow facility from the stormwater pond has never been utilised		
SRP5(Note 3)		
Visual Inspection	Daily Weekly	Not Applicable
Suspended Solids	Weekly Monthly	Gravimetric

Table D.5..3 Monitoring of Emissions to Sewer – parameters/Frequency

Emission Point Reference Point No: SD1

Parameter	Monitoring frequency	Analysis Method/Technique
Flow	Continuous	Flow meter/recorder
BOD	Monthly (24 hour composite)	Standard Method
Ammoniacal Nitrogen	Monthly (24 hour composite)	Standard Method
Suspended Solids	Monthly (24 hour composite)	Gravimetric
Sulphates	Monthly (24 hour composite)	Standard Method
pH	Continuous	pH meter/recorder
Methane	Continuous Weekly	Gas Chromatography

With respect to table D 5.3, we request that the requirement for continuous monitoring of methane to sewer be removed from the licence as the use of the dissolved methane probe has proven unsuccessful. This has been replaced with a weekly grab sample in agreement with the Agency. A copy of the letter of agreement by the Agency is enclosed in Appendix 9.

D.6 Meteorological Monitoring

Table D.6.1 Meteorological Monitoring:
Monitoring Location: Data to be obtained from Cork Airport.

Parameter	Monitoring Frequency	Analysis Method/Technique
Precipitation Volume	Daily	Standard
Temperature (min/max.)	Daily	Standard
Wind Force and Direction	Daily	Standard
Evaporation	Daily	Standard
Evapotranspiration Note 1	Daily	Standard
Humidity	Daily	Standard
Atmospheric Pressure Note 1	Daily	Standard

Note 1: Monitoring frequency for these parameters may be decreased with the agreement of the Agency.

D.7 Landfill Gas Combustion Plant/Enclosed Flare

Location: Utilisation plant and enclosed flare (exact location of flare to be agreed with the Agency in advance).

Table D.7.1 Landfill Gas Utilisation Plant/Enclosed Flare Parameters and Monitoring Frequency

Parameter	Flare (enclosed) Monitoring Frequency	Utilisation Plant Monitoring Frequency	Analysis Method[Note1]/Technique[Note2]
Inlet			
Methane (CH_4) % v/v	Continuous	Weekly	Infrared analyser/flame ionisation detector/thermal conductivity
Carbon dioxide (CO_2)%v/v	Continuous	Weekly	Infrared analyser/ thermal conductivity
Oxygen (O_2) %v/v	Continuous	Weekly	Electrochemical/thermal conductivity
Total Sulphur	Annually	Annually	Ion chromatography
Total Chlorine	Annually	Annually	Ion chromatography
Total Fluorine	Annually	Annually	Ion Selective Electrode
Process Parameters			
Combustion Temperature	Continuous	Quarterly	Temperature Probe/datalogger
Outlet			
CO	Continuous	Continuous	Flue gas analyser/datalogger
NOx	Annually	Annually	Flue gas analyser
SO_2	Annually	Annually	Flue gas analyser
Particulates	Not applicable	Annually	Isokinetic/Gravimetric
TA Luft Class I, II, III organics	Not applicable	Annually	Adsorption/Desorption /GC/GCMS [Note 3]
TOC	Annually	Not applicable	Flame ionisation
Hydrochloric acid	Annually	Annually	Impinger / Ion Chromatography
Hydrogen fluoride	Annually	Annually	Impinger / Ion Chromatography

Note 1: All monitoring equipment used should be intrinsically safe.
Note 2: Or other methods agreed in advance with the Agency.
Note 3: Test methods should be capable of detecting acetonitrile, dichloromethane, tetrachlorethylene and vinyl chloride as a minimum.

D.8 Monitoring of Composting Process

Table D.8.1 Monitoring of Compost Process

Parameter	Monitoring[Note1] Frequency	Analysis Method/Technique
Moisture Content	Weekly	Standard
Temperature (min/max.)	Daily	Standard
Oxygen	Daily	Standard

Note 1: Unless otherwise agreed with the Agency

SCHEDULE E: Recording and reporting to the Agency

A number of reports and reporting frequencies are set out in Schedule E. These reports will remain as in the existing licence except for those highlighted below:

Report	Reporting Frequency	Report Submission Date
Monitoring of landfill gas	Quarterly Biannually	Ten days after the period being reported on
Landfill gas combustion products	Quarterly Biannually	Ten days after the period being reported on
Monitoring of Surface Water/ Groundwater/Leachate Quality	Quarterly Biannually	Ten days after the period being reported on
Monitoring of Compost Quality	Quarterly Biannually	Ten days after the period being reported on
Dust/PM10/Odour/ CO Monitoring	Quarterly Biannually	Ten days after the period being reported on
Slope stability monitoring	Biannually Annually however, following completion of all restoration and aftercare works (i.e. construction of additional facilities at the site) a stability risk assessment will be submitted to the Agency in order to eliminate or reduce the need for this assessment.	
Topographical/void space survey	Biannually Remove post closure	One month after the period being reported on

SCHEDULE F: Standards for Compost/Digestate Quality

Compost/digestate shall be deemed unsatisfactory if more than 25% of samples fail the criteria below. No sample shall exceed 1.2 times the quality limit values set. The following criteria (where they apply to compost) are deemed a quality standard for the use of compost as a soil improver and should not be deemed as criteria for fertiliser. In addition N, P, K, NH_4-N, NO_3-N, pH and dry matter content should also be measured.

1. **Maturity (Compost only) -** The state of the curing pile must be conducive to aerobic biological activity. Compost shall be deemed to be mature if it meets two of the following groups of requirements:
a) Respiration activity after four days AT_4 is < 10mg/O_2/g dry matter or Dynamic Respiration Index is < 1,000mgO_2/kg VS/h.
b) Germination of cress (*Lepidium sativum*) seeds and of radish (*Raphanus sativus*) seeds in compost must be greater than 90 percent of the germination rate of the control sample, and the growth rate of plants grown in a mixture of compost and soil must not differ more than 50 percent in comparison with the control sample.
c) Compost must be cured for at least 21 days and compost will not reheat upon standing to greater than 20°C above ambient temperature.
d) If no other determination of maturity is made, the compost must be cured for a six month period. In addition, offensive odours from the compost shall be minimal for the compost to be deemed mature.
e) Or other maturity tests as may be agreed with the Agency.

2. Trace Elements (Compost and Digestate) Note 1

Maximum Trace Element Concentration Limits Note 2

Parameters (mg/kg, dry mass)	Compost/Digestate Quality Standards Note 3		Stabilised Biowaste
	Class 1	Class 2	
Cadmium (Cd)	0.7	1.5	5
Chromium (Cr)	100	150	600
Copper (Cu)	100	150	600
Mercury (Hg)	0.5	1	5
Nickel (Ni)	50	75	150
Lead (Pb)	100	150	500
Zinc (Zn)	200	400	1500
Impurities >2mm Note 4	<0.5%	<0.5%	<3%
Gravel and Stones >5mm Note 4	<5%	<5%	-

Note 1: These limits apply to the compost just after the composting phase and prior to mixing with any other materials.
Note 2: The above alone should not be taken as an indication of suitability for addition to soil as the cumulative metal additions to soil should be first calculated.
Note 3: Normalised to 30% organic matter content.
Note 4: Compost must not contain any sharp foreign matter measuring over a 2 mm dimension that may cause damage or injury to humans, animals and plants during or resulting from its intended use.

3. **Pathogens (Compost and Digestate) -** Pathogenic organism content must not exceed the following limits:

Salmonella sp.	Absent in 50g	n=5
Faecal Coliforms	≤ 1000 Most Probable Number (MPN) in 1g	n=5

Where: n = Number of samples to be tested

4. **Monitoring (Compost and Digestate) -** The licensee shall monitor the compost/digestate product at least biannually and in the case of pathogens on a once-off basis. Within three months of the date of grant of this licence, the licensee shall submit to the Agency for its agreement, details of the sampling protocol, methods of analyses and sample numbers.

SCHEDULE G: Content of the Annual Environmental Report

Annual Environmental Report Content

Reporting Period.
Waste activities carried out at the facility.
Quantity and Composition of waste received, disposed of and recovered during the reporting period and each previous year.
Calculated remaining capacity of the facility and year in which final capacity is expected to be reached.
Methods of deposition of waste.
Summary report on emissions.
Summary of results and interpretation of environmental monitoring.
Resource and energy consumption summary.
Proposed development of the facility and timescale of such development.
Volume of leachate produced and volume of leachate transported / discharged off-site.
Report on development works undertaken during the reporting period, and a timescale for those proposed during the coming year.
Report on restoration of completed cells/ phases.
Results from testing of industrial non-hazardous sludge and solids accepted at the facility.
Site survey showing existing levels of the facility at the end of the reporting period.
Estimated annual and cumulative quantities of landfill gas emitted from the facility.
Estimated annual and cumulative quantity of indirect emissions to groundwater.
Meteorological report.
Annual water balance calculation and interpretation – up until capping of the facility has been completed
Report on the progress towards achievement of the Environmental Objectives and Targets contained in previous year's report.
Schedule of Environmental Objectives and Targets for the forthcoming year.
Full title and a written summary of any procedures developed by the licensee in the year which relates to the facility operation.
Tank, pipeline and bund testing and inspection report.
Reported incidents and Complaints summaries.
Review of Nuisance Controls.
Reports on financial provision made under this licence, management and staffing structure of the facility, and a programme for public information.
Report on training of staff.
Any other items specified by the Agency.

Insert Technical Amendment A and B in the licence.

Sealed by the seal of the Agency on this the 29th day of November, 2002

PRESENT when the seal of the Agency was affixed hereto:

_____

Iain Maclean, Director/Authorised Person

Appendix 7

Technical Amendments

Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Headquarters
P.O. Box 3000
Johnstown Castle Estate
County Wexford
Ireland

WASTE LICENCE
TECHNICAL AMENDMENT A

Licence Register Number:	12-2
Licensee:	Cork City Council
Location of Facility:	Kinsale Road Landfill, Ballyphehane, Curraghconway, Inchisarsfield , South City Link Road, Cork

Reasons for the Decision

The Environmental Protection Agency (the Agency) is satisfied, on the basis of the information available, that subject to compliance with the conditions of Waste Licence Reg. No. 12-2 granted on 29/11/2002, as well as any amendments noted herein, any emissions from the activity will comply with and not contravene any of the requirements of Section 40(4) of the Waste Management Acts 1996 to 2003.

Technical Amendment

In pursuance of the powers conferred on it by Section 42B(c) of the Waste Management Acts 1996 to 2003, the Agency amends Waste Licence Reg. No. 12-2, granted to Cork City Council, City Hall, Cork.

This technical amendment is limited to the following condition of Waste Licence Reg. No. 12-2.

Insert Condition:-

1.11 Notwithstanding the requirements of any other condition of this licence the licensee may accept waste electrical and electronic equipment at the civic waste facility delivered to the facility from commercial retail premises.

This amendment shall be cited as Amendment A to Waste Licence Register No. 12-2 dated 29/11/2002 (Shorthand: 12-2/A).

Sealed by the seal of the Agency on this the 9th day of August 2005

PRESENT when the seal of the Agency was affixed hereto:

Padraic Larkin, **Director/Authorised Person**

Archive

Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Headquarters
P.O. Box 3000
Johnstown Castle Estate
County Wexford
Ireland

AMENDMENT B TO WASTE LICENCE

Licence Register Number:	12-2
Licensee:	Cork City Council
Location of Facility:	Kinsale Road Landfill, Ballyphehane, Curraghconway, Inchisarsfield, South City Link Road, Cork.

Reason for the Amendment of Conditions

The Environmental Protection Agency has examined the terms of Waste Licence Reg. No. 12-2 as required by the provisions of Section 76(3)(a) of the Waste Management Acts 1996 to 2003, and determined that the licence can be brought into conformity with the provisions and requirements of Council Directive 96/61/EC by the exercise of the powers conferred by Section 76(4) of the Waste Management Acts 1996 to 2003.

The Environmental Protection Agency is satisfied, on the basis of the information available, that subject to compliance with the conditions of Waste Licence Reg. No. 12-2 granted on the 29/11/2002 (as amended on 09/08/2005), as well as any amendments noted herein, any emissions from the activity will comply with and not contravene any of the requirements of Section 40(4) of the Waste Management Acts 1996 to 2003.

Amendment of Conditions

In pursuance of the powers conferred on it by Section 76(4) of the Waste Management Acts 1996 to 2003, the Agency amends Waste Licence Reg. No. 12-2, granted to Cork City Council, for a facility at Kinsale Road Landfill, Ballyphehane, Curraghconway, Inchisarsfield, South City Link Road, Cork.

This amendment is limited to the following conditions of Waste Licence Reg. No. 12-2.

Amendments

Interpretation

BAT Best Available Techniques.

To be inserted into the Interpretation of the existing licence.

Resource Use and Energy Efficiency

2.5 Resource Use and Energy Efficiency

2.5.1 The licensee shall carry out an audit of the energy efficiency of the site within one year of the date of grant of this amendment. The audit shall:-

(i) identify all opportunities for energy use reduction and efficiency;

(ii) be carried out in accordance with the guidance published by the Agency - "Guidance Note on Energy Efficiency Auditing"; and

(iii) be repeated at intervals as required by the Agency.

The recommendations of the audit will be incorporated into the Schedule of Environmental Objectives and Targets under Condition 2.3.2.1 above.

2.5.2 The licensee shall identify opportunities for reduction in the quantity of water used on site including recycling and reuse initiatives, wherever possible. Reductions in water usage shall be incorporated into the Schedule of Environmental Objectives and Targets.

2.5.3 The licensee shall undertake an assessment of the efficiency of use of raw materials in all processes, having particular regard to the reduction in waste generated. The assessment should take account of best international practice for this type of activity. Where improvements are identified, these shall be incorporated into the Schedule of Environmental Objectives and Targets.

To be inserted after Condition 2.4 of the existing licence.

Reason: ***To provide for the efficient use of resources and energy in all site operations.***

Accident Prevention and Emergency Response

9.5 The licensee shall, within twelve months of date of this amendment, ensure that a documented Accident Prevention Policy is in place, which will address the hazards on-site, particularly in relation to the prevention of accidents with a possible impact on the environment. This procedure shall be reviewed annually and updated as necessary.

9.6 The Emergency Response Procedure shall be reviewed annually and updated as necessary.

To be inserted after Condition 9.4 of the existing licence.

Reason: ***To provide for the protection of the environment.***

Restoration and Aftercare Plan

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

To be inserted after Condition 4.5 of the existing licence.

Reason: ***To provide for the restoration of the facility.***

These amendments should be read in conjunction with Waste Licence Reg. No. 12-2, granted on 29/11/2002 (as amended on 09/08/2005).

Sealed by the seal of the Agency on this the 11th day of October 2005

PRESENT when the seal of the Agency was affixed hereto:

Padraic Larkin, Director/Authorised Person

Appendix 8

Groundwater and Surface water Trigger Level Reports

KINSALE ROAD LANDFILL

WL 12-2

GROUNDWATER TRIGGER LEVEL DERIVATION

COPY

Prepared for:

Cork City Council,
City Hall,
Cork.

Prepared by:

Fehily Timoney & Co.,
Core House,
Pouladuff Road,
Cork.

August 2003

KINSALE ROAD LANDFILL

WL 12-2

GROUNDWATER TRIGGER LEVEL DERIVATION

User is Responsible for Checking The Revision Status Of This Document

Rev. Nr.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
0	Issue to Client	ODH	CJC		12/08/03

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1. INTRODUCTION

Cork City Council operates the Kinsale Road Landfill under EPA waste licence WL12-2. Condition 6.4.1 of the waste licence states:

> *"Within six months of the date of grant of this licence, the licensee shall submit to the agency for its agreement, groundwater monitoring trigger levels in accordance with the requirements of Council Directive 1999/31/EC for the groundwater monitoring boreholes NW3, NW7 and NW9."*

Following the initial submission, an extension was granted to provide

Within the Council Directive, the requirement for trigger levels is discussed in Annex III, which states that:

> *"Significant adverse environmental effects, as referred to in Articles 12 and 13 of this Directive, should be considered to have occurred in the case of groundwater, when an analysis of a groundwater sample shows a significant change in water quality. A trigger level must be determined taking account of the specific hydrogeological formations in the location of the landfill and groundwater quality. The trigger level must be laid down in the permit whenever possible.*
>
> *The observations must be evaluated by means of control charts with established control rules and levels for each downgradient well. The control levels must be determined from local variations in groundwater quality."*

The purpose of this report is to address the requirements of Condition 6.4.1. This was carried out by graphical representation of parameters for respective wells, and from these by determining control rules and levels for each downgradient well.

Fehily Timoney & Co. (FTC) compiled this report on behalf of Cork City Council.

2. DATA PRESENTATION

The groundwater monitoring wells specified under Condition 6.4.1 (NW3, NW7 and NW9) were monitored weekly under WL12-1 and are measured monthly under WL12-2. Monitoring at these wells is carried out for the leachate indicator parameters pH, Electrical Conductivity, TOC and Ammoniacal Nitrogen. Available results for monitoring obtained over the course of the past two years have been plotted on Figures 2.1–2.7. Figures are divided into two groups:

- Figures 2.1 to 2.4 are grouped by water quality parameter, to determine trends and to allow comparison between wells.

- Figures 2.5 to 2.7 are grouped by well, with ammonia, electrical conductivity and TOC shown on a figure for each well. This illustrates the consistency, or otherwise, of water quality parameters in each well. pH values are not included on these figures, since the pH range is relatively small.

Borehole locations and groundwater flow are illustrated on Figure 3.1.

Figure 2.1: Ammonia Concentrations

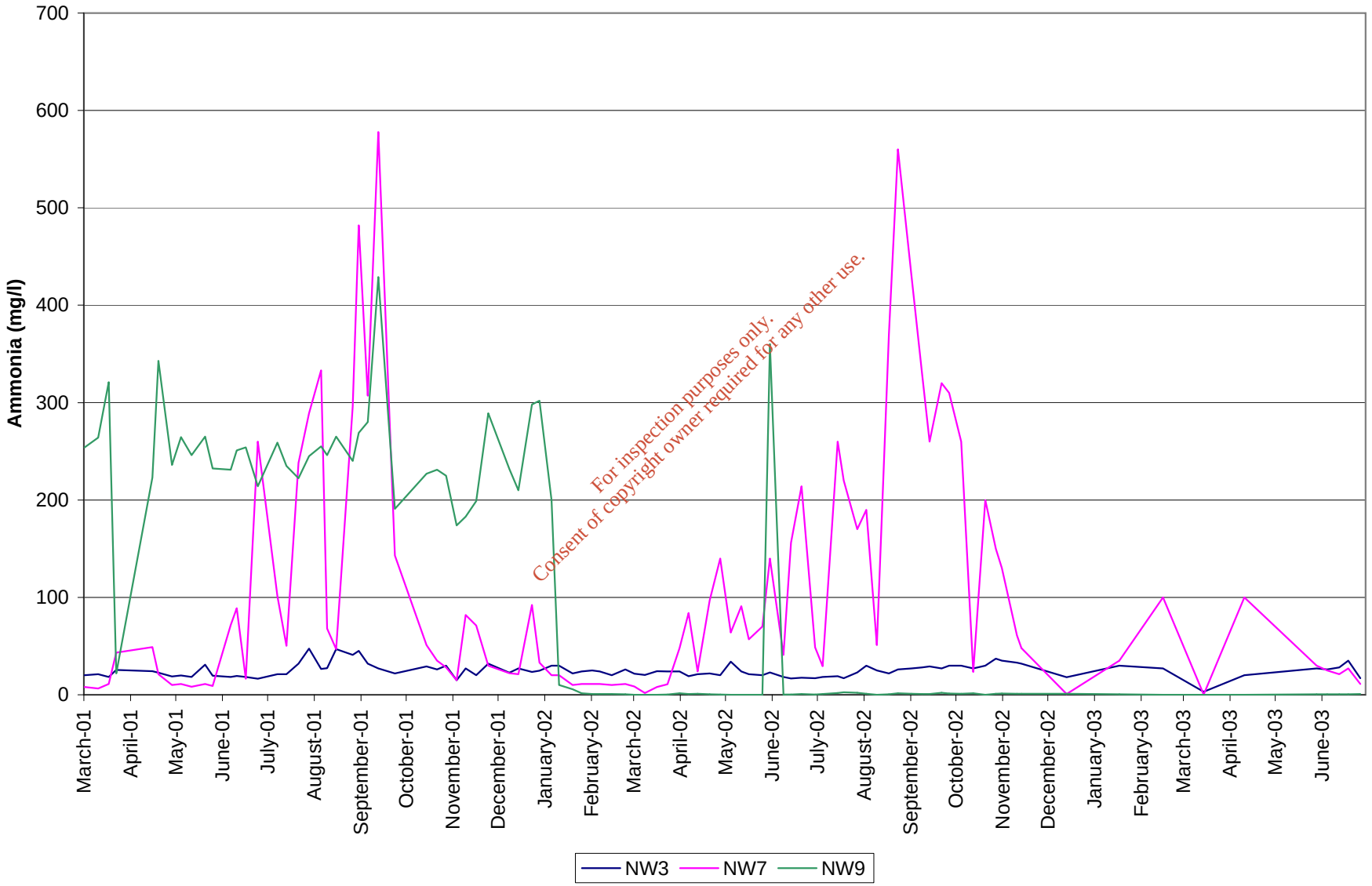


Figure 2.2: Electrical Conductivity Concentrations

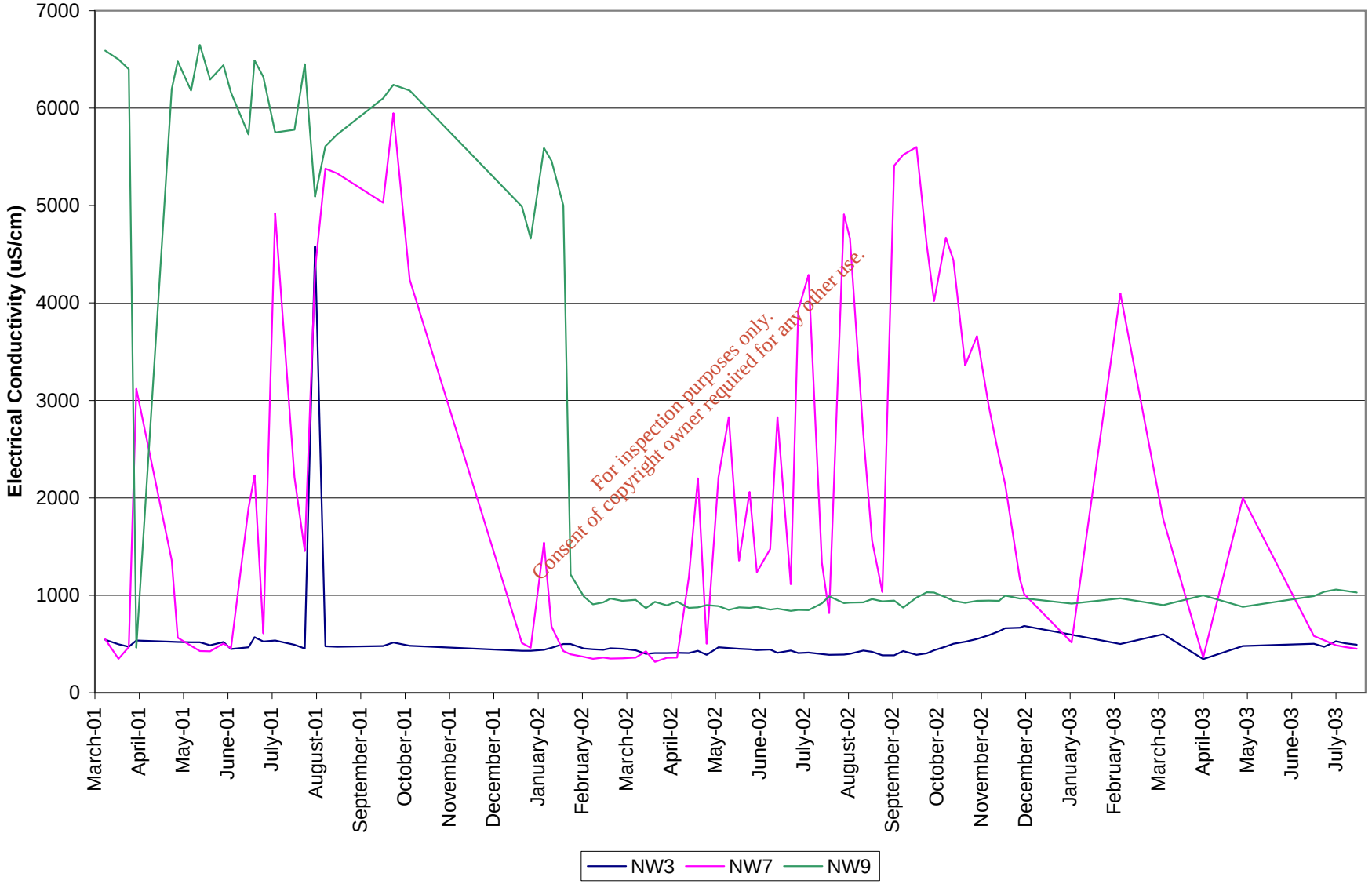


Figure 2.3: pH Concentrations

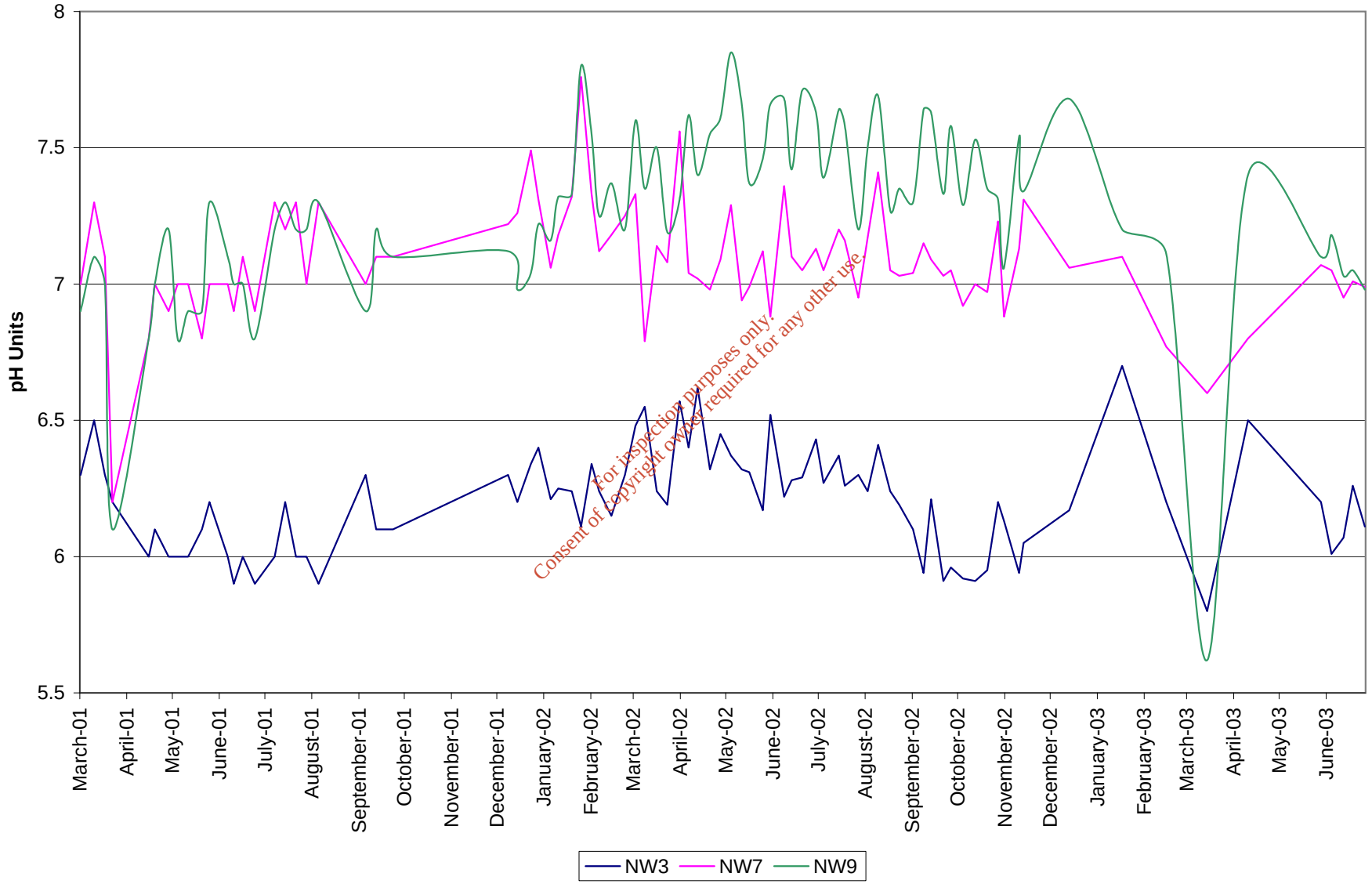


Figure 2.4: TOC Concentrations

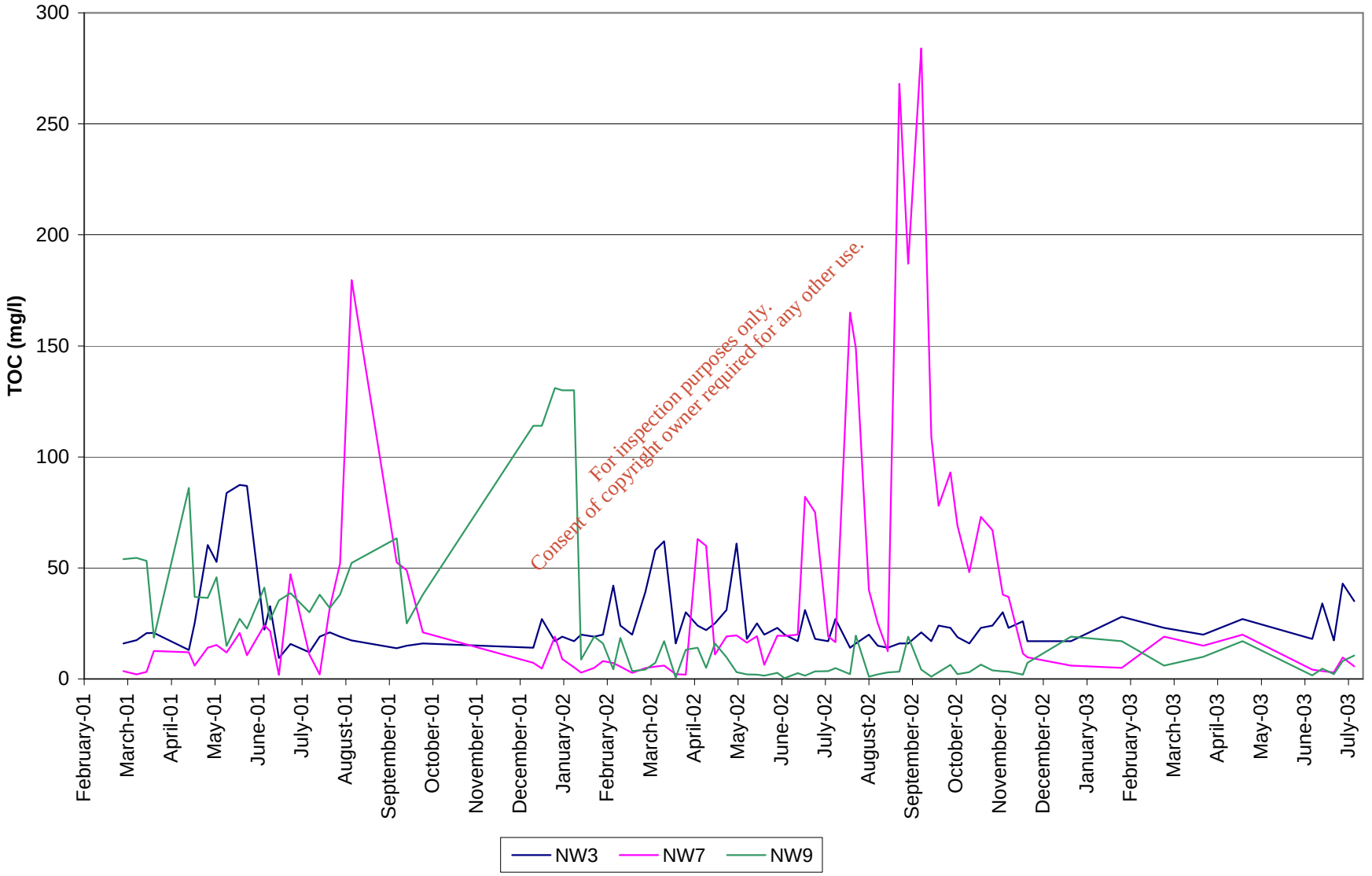


Figure 2.5: NW3 Parameters

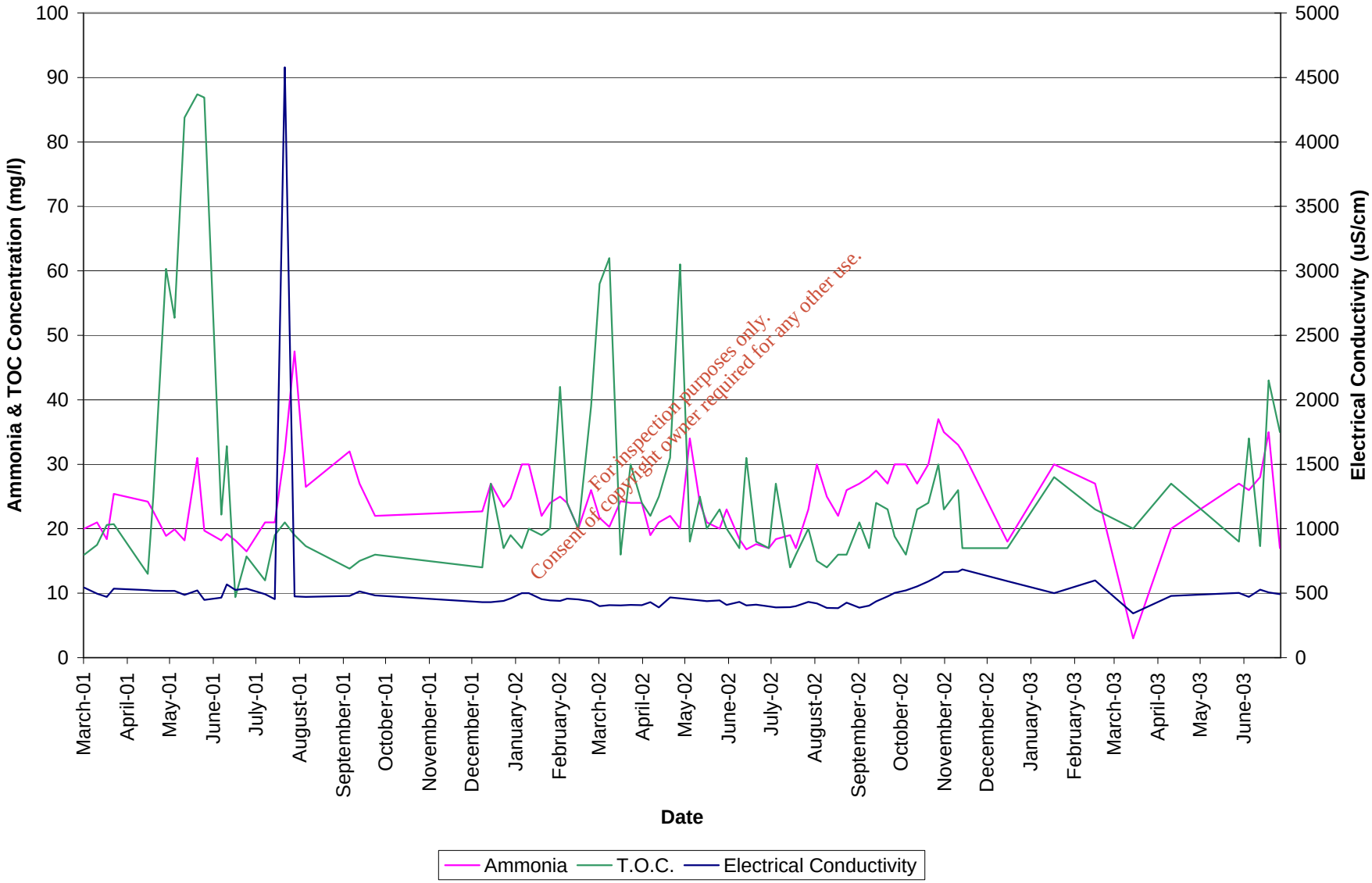


Figure 2.6: NW7 Parameters

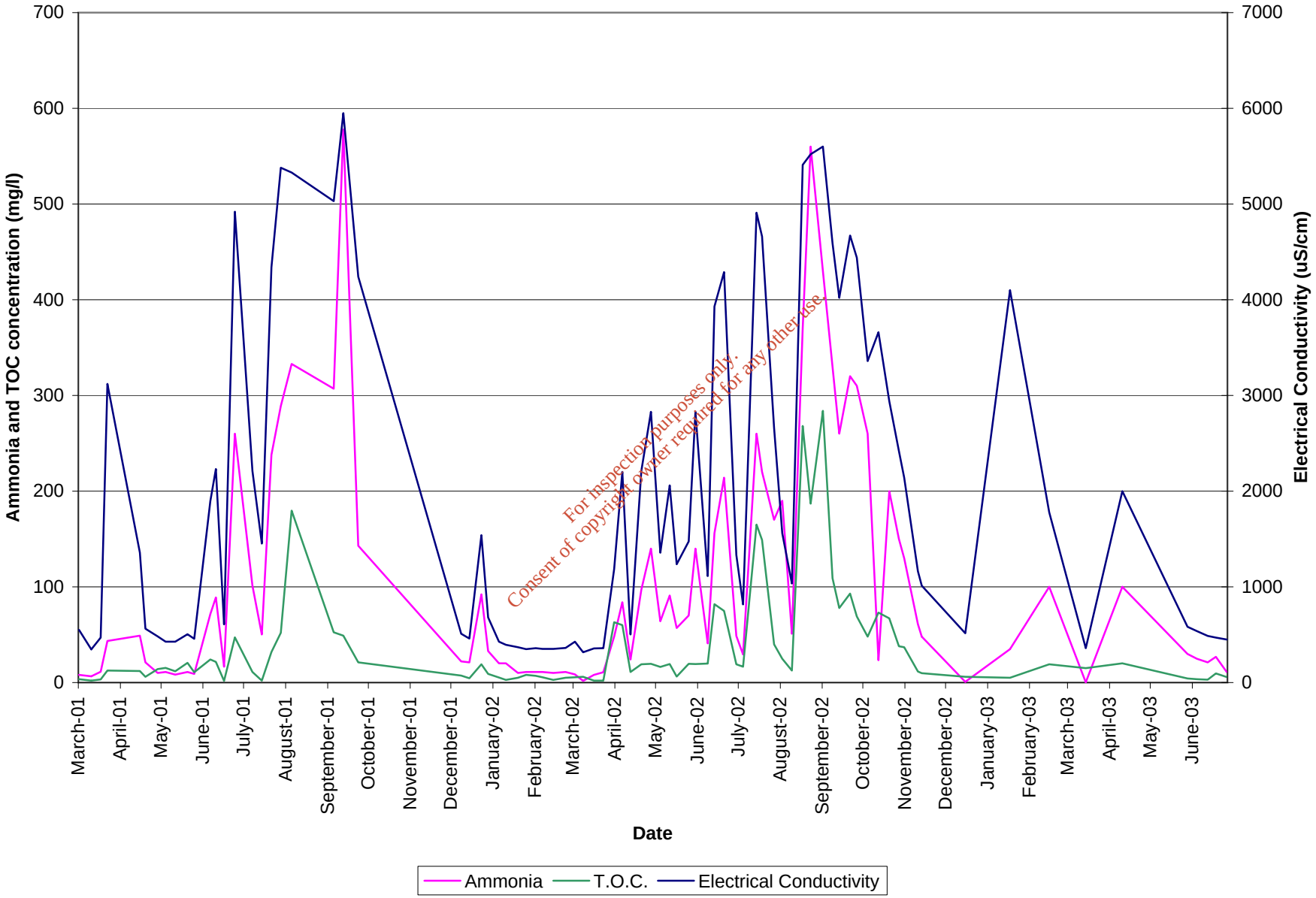
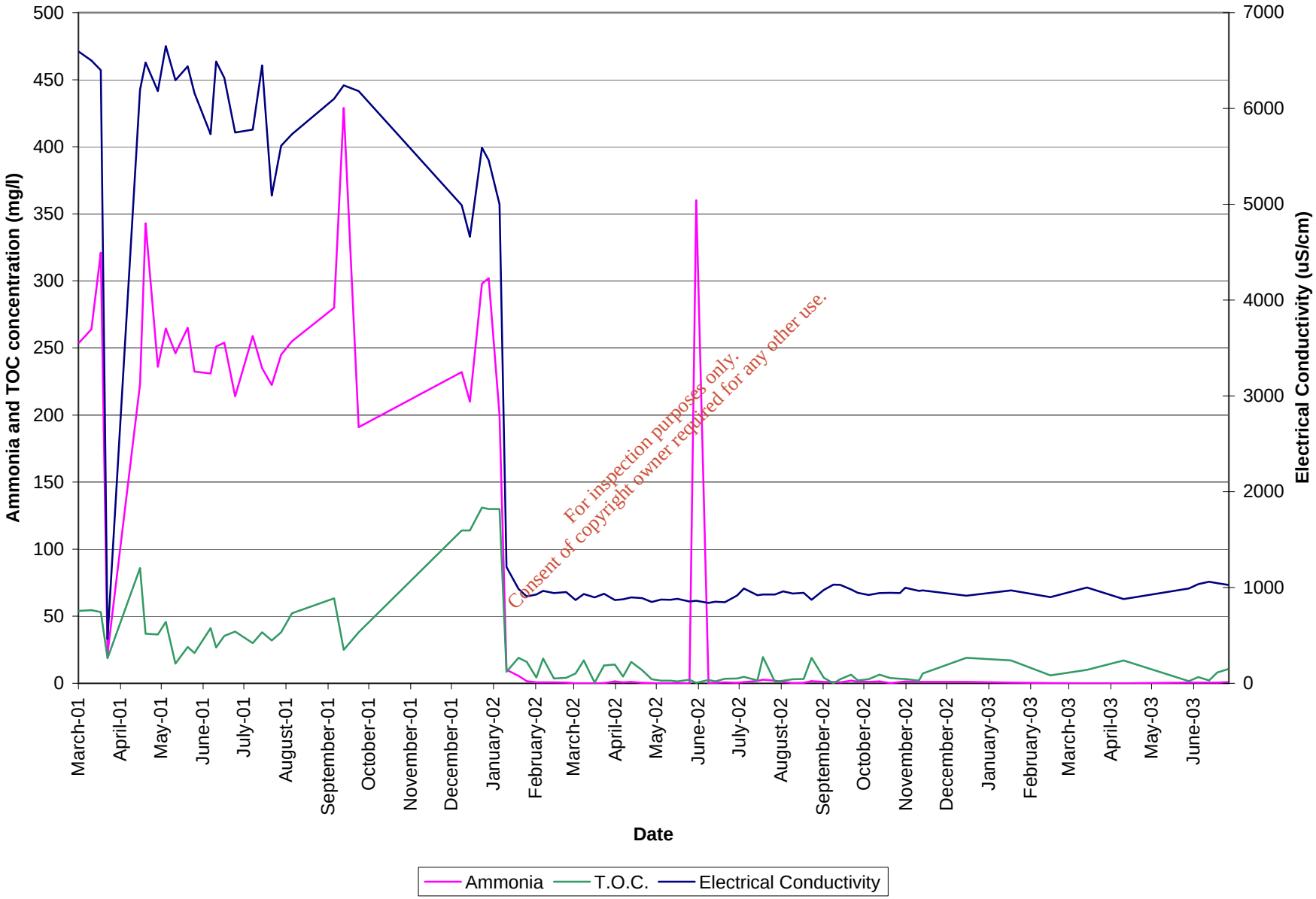


Figure 2.7: NW9 Parameters



3. INTERPRETATION AND CONCEPTUAL MODELLING

3.1. Monitoring Borehole NW3

This well is situated at the southern end of the site, in a peat area. As shown on Figure 3.1, with respect to groundwater flow direction, the well is downgradient of part of the landfill, but hydrologically separated from it by a leachate collection drain.

3.1.1. Ammonia

Figure 2.1 shows values for ammonia at NW3, which were relatively stable for the period monitored (March 2001 to December 2002). Elevated background ammonia levels may be attributable to natural ammonia production by the bog, and/or proximity to the landfill. The average value was 26.5 mg/l.

3.1.2. Electrical Conductivity

Electrical conductivity is an indicator of the total salts content of groundwater. Figure 2.2 shows that NW3 was relatively stable apart from a peak of 4580 µS/cm in August 2001, which appears to be supported to a small extent by other parameters (See Figure 2.5). This peak was, however, an isolated incident. More recently, a minor, but consistent increase in electrical conductivity has been observed.

3.1.3. pH

A peat bog environment is typically acidic. Figure 2.3 illustrates pH levels at NW3, which indicates that the local bog environment had an influence on groundwater quality: pH was consistently lower than that of the other two wells (averaging 6.2, compared to 7.1 for NW7 and 7.3 for NW9). Small-scale fluctuations were observed over the course of the year, with a peak in April/May 2002, before returning to below 6 by September 2002.

3.1.4. TOC

Figure 2.4 shows TOC was relatively low, averaging 26 mg/l, but less stable than other values, which is probably a function of humic matter content related to the bog.

In general, groundwater monitoring at NW3 shows a strong correlation between ammonia levels and electrical conductivity. NW3 is located in peats, and these peats are influencing ammonia levels in the groundwater. A review of the results indicates that, post December 2001, more stabilised levels for each parameter were observed. This may be due to the presence of the leachate collection drain upgradient of this well.

3.2. Monitoring Borehole NW7

NW7 is located directly downgradient of the landfill with respect to groundwater flow, and although there is an intervening leachate collection drain, water quality varied significantly over the period examined. This may be due to the presence of additional landfill area between the collection drain and NW7 (see Figure 3.1).

3.2.1. Ammonia

Figure 2.6 shows values for ammonia peak in September/October of both 2001 and 2002, indicating an apparent cyclical pattern. Based on monthly weather data, degraded water quality appears to be associated with higher rainfalls, indicating a possible surcharging of groundwater. However, the impact of high rainfalls appears to have been mitigated somewhat during colder months. The average value for ammonia is 115 mg/l for NW7.

3.2.2. Electrical Conductivity

Figure 2.6 also shows that the electrical conductivity values recorded at this well vary widely, and follow the same cyclical pattern as for ammonia. The average value is 2,100 µS/cm.

3.2.3. pH

Figure 2.3 shows levels of pH are relatively consistent for the well, with an average value of 7.1, with occasional peaks and troughs. Compared to 2002 pH levels for NW9, which are considered to be background values, (see Figure 2.3), pH at NW7 is lower.

A review of the data and Figure 2.6 shows that, similar to NW3 and NW9, the levels of TOC, ammonia and electrical conductivity reduce to background levels after December 2001. However, post-April 2002, the levels of these parameters rise to the pre-December 2001 levels. The levels peak in September 2002 and are continuing to fall. Further monitoring at this well will confirm that this trend is continuing.

3.2.4. TOC

As with ammonia and electrical conductivity levels, TOC varies according to a cyclical pattern, with peaks at the same intervals (see Figure 2.6). The average value is 40 mg/l.

3.3. Monitoring Borehole NW9

NW9 is located to the north of the landfill, or cross-gradient of it, with respect to groundwater flow direction, and as with the other two wells, there is an intervening leachate collection drain between it and the waste body. This, however, is only the case post January 2002, when the original NW9, situated inside the leachate collection drain, was moved to outside it. This is reflected in the environmental monitoring data.

3.3.1. Ammonia

The ammonia levels for NW9 were elevated and fluctuate a good deal up to the end of January 2002, averaging 244 mg/l (see Figure 2.1). At this point, there was a marked improvement in the groundwater quality, as ammonia values fell to an average of 1.12 mg/l (excluding one perceived erroneous value of 360mg/l) for the remainder of the examined period. This improvement is supported by the values measured for other parameters (See Figure 2.7) and, as discussed, is due to the decommissioning of the original NW9, and the movement of it outside the leachate collection area.

3.3.2. Electrical Conductivity

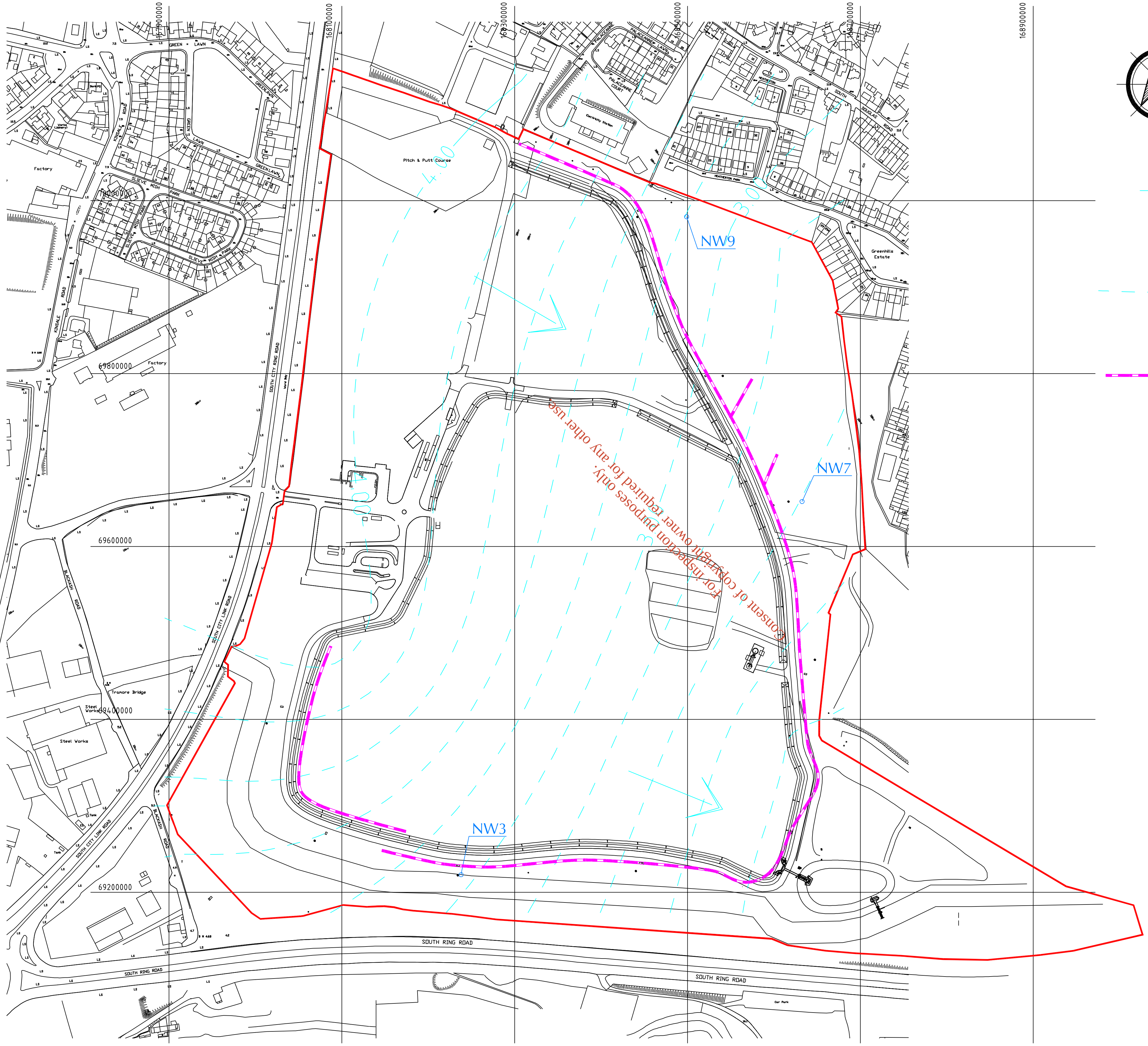
As with ammonia levels, the electrical conductivity levels for NW9 were elevated and fluctuated a good deal up to the end of January 2002, averaging 5,770 µS/cm (see Figure 2.2). At this point, there was again a marked improvement in the groundwater quality, with electrical conductivity falling to an average of 930 µS/cm for the remainder of the period examined.

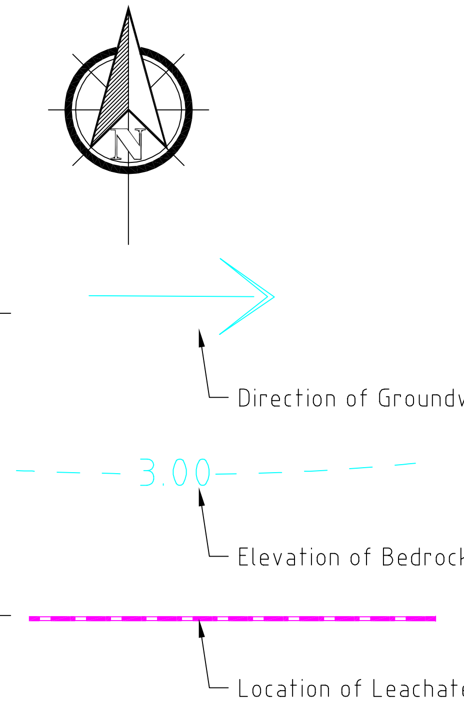
3.3.3. pH

pH levels were relatively low for the period March 2001 - January 2002, averaging 7.02. However, after this period, pH values rose to an average of 7.47 (see Figure 2.3). While no immediate impact on pH can be discerned, the interval to the end of January 2002 was chosen because this was when the well was moved outside the leachate collection drain, as discussed.

3.3.4. TOC

A similar trend as that observed for electrical conductivity and ammonia is observed for TOC, with an average of 55 mg/l to the end of January 2002, falling to an average of 6.5 mg/l in the period thereafter.





- Direction of Groundwater Flow
- 3.00 — Elevation of Bedrock Groundwater Surface
- Location of Leachate Collection Drain

Rev.	Drawn	Chk'd	Apprvd	Date	Description
A	SK			19.05.03	ISSUE FOR INFORMATION

Name of Client
CORK CITY COUNCIL

Name of Job
KINSALE ROAD LANDFILL
WL 12-2
RESPONSE TO CONDITION 4.6.1

Title of Drawing
GROUNDWATER
MONITORING LOCATIONS
WITH GROUNDWATER FLOW

Scales Used
A3-1:5000

Dwg. No.
2003-011-08-Figure 3.1

Rev.
A

FEHILY TIMONEY & COMPANY
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ORIGINAL DRAWING SIZE 841 x 594

NATURAL SCALE

4. TRIGGER AND CONTROL LEVEL DEFINITION

4.1. Setting Control and Trigger Levels

Interpretation of the data presented in this report has shown the following:

- Background hydrogeochemistry varies significantly between the three wells.
- Infrastructural works have improved groundwater quality at some areas of the site (e.g. protection of the area outside the leachate collection drain near the new NW9).
- Ongoing monitoring at NW7 has illustrated that while the levels of various analytes have risen post-April 2002, these levels have been continually reducing since September 2002 to background levels. Ongoing monitoring will confirm this.

The Landfill Directive implies that, in addition to the setting of trigger levels, control rules (or levels) must set for each borehole. According to the UK's Environment Agency draft guidelines[i] on the interpretation of this part of the Landfill Directive, the purpose of these control levels is "to draw attention of site management and the Agency to the development of adverse, or unexpected trends in the monitoring data. Such trends may result from failure of site engineering or management, or from variations between actual conditions and those assumed within the conceptual model. Control levels should be treated primarily as an early warning system to enable appropriate investigative or corrective measures to be implemented, particularly where there is potential for a trigger level to be breached."

Essentially, the aims of control levels are to:

- Highlight variations between assumed behaviour and observed conditions;
- Identify unambiguous adverse trends which are indicative of leachate impacts;
- Allow for variations in the natural water quality from baseline conditions;
- Give sufficient time to take corrective or remedial action **before** trigger levels are breached.

A trigger level is defined as the level at which significant adverse environmental effects have occurred. For the purpose of this project, trigger levels will be set at Drinking Water Standards[ii], where available, taking local conditions into account. Control levels will be set at values appropriate to the local hydrogeochemistry, as presented in Section 3.

4.2. Definition of Control Levels

As stated above, control levels are set at values appropriate to the local hydrogeochemistry. For the purpose of this project, **breach of a control level will be said to have occurred when two exceedences occur within four successive measurements.**

Based on examination of the data presented in Section 3 of this report, a proposed table of control levels is presented in Table 4.2.

At various points in the monitoring history of these wells, exceedences of all of these control levels have occurred. However, with the exception of NW7, these have been isolated. The monitoring history of NW7 shows instances of impact by the landfill, and the control levels will highlight severe instances of such pollution again.

These control levels should be regarded as temporary, and since remedial efforts are continuing, they should be reviewed on an annual basis and revised downwards as necessary.

It is also proposed to continue monitoring NW3 and NW9 on a monthly basis in accordance with waste licence 12-2. However, it is proposed to monitor NW7 on a weekly basis, since the monitoring data indicates that this well is most susceptible to variations in results.

4.3. Definition of Trigger Levels

For the purpose of this project, trigger levels will be set at Drinking Water Standards, where available, taking local conditions into account. In accordance with draft guidelines provided by the UK Environment Agency[i], the trigger levels for the selected parameters are set for the entire site, and not for specific monitoring locations. However, periodic contamination at NW7 means that interim trigger levels are required for this parameter, until remedial efforts allow it to come into line with the other two boreholes.

- Ammonia

The Drinking Water Standard[ii] for ammonia is 0.23 mg/l N. However, at the Kinsale Road landfill, groundwater chemistry is influenced by local peat deposits. As a result of the relatively low pH groundwater in boggy areas (such as at NW3), a reducing environment is created. This promotes the production of ammonia from organic matter, rather than nitrates. Therefore, baseline ammonia levels are expected to be higher for boggy areas, as is seen in NW3.

The variation in ammonia concentration over time observed at NW3 does not correspond to variations observed at NW7 (the chemistry of which is periodically influenced by the landfill), so it is assumed that NW3 is not influenced by the landfill. An ammonia trigger level of 60 mg/l is therefore proposed for NW3 and NW9. For NW7, where leachate impact is occurring periodically, an interim trigger level value of 500 mg/l is proposed, until such time as remedial measures are installed.

- Electrical Conductivity

It is proposed to set an overall trigger level of 1500 µS/cm (at 20°C) for the site. This corresponds to the Drinking Water Standard[ii]. While NW7 is presently often in excess of this value, until a satisfactory explanation and remediation occurs, an interim trigger level value of 6,000 µS/cm is proposed.

- pH

It is proposed to set an overall trigger level of $5.6 < pH < 9.0$ for the site. The Drinking Water Standard[ii] range is 6.0 – 9.0, however, a lower value of 5.6 is defined to accommodate the slightly acidic bog groundwater naturally found at NW3.

- TOC

The Drinking Water Standards[ii] do not set a maximum level for TOC, instead advising that 'no abnormal change' should take place. Analysis of existing environmental data suggests a TOC value of 100 mg/l to be appropriate. This takes into account the organic content input from peaty groundwater at NW3.

While NW7 is presently often in excess of this value, until a satisfactory explanation and remediation occurs, an interim trigger level value of 200 mg/l is proposed.

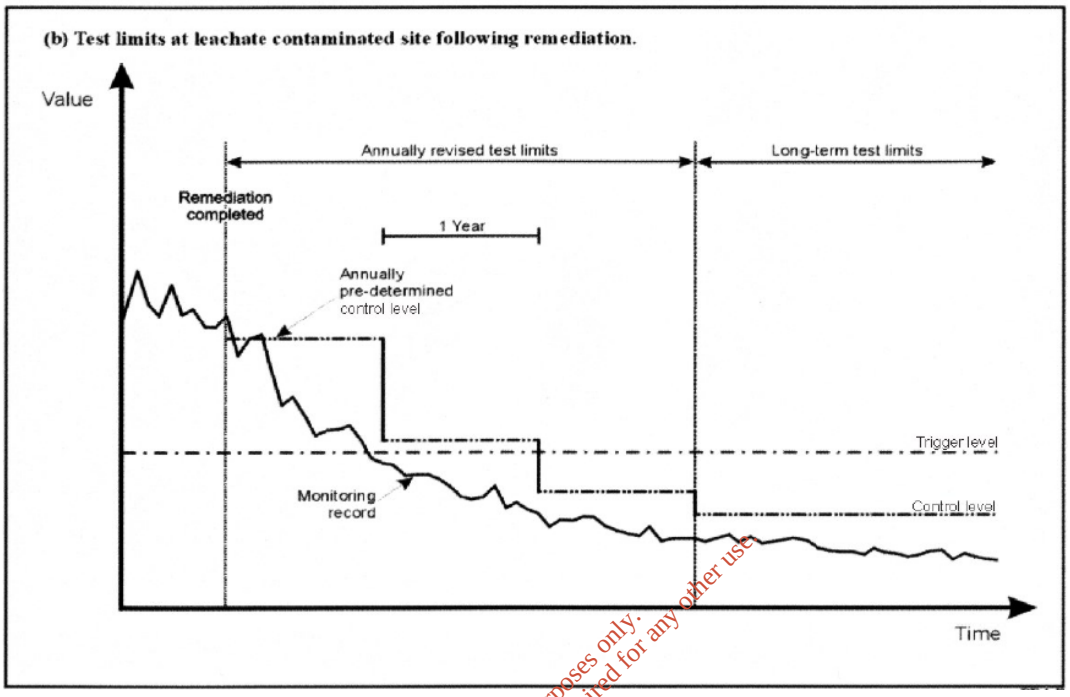
Table 4.1: Summary of Proposed Control and Trigger Levels

	Units	Control Levels			Trigger Levels*	
		NW3	NW7	NW9	NW3 & NW9	NW7*
Ammonia	**mg/l**	45	200	3	60	500*
Electrical Conductivity	**µS/cm**	750	4,000	1,200	1,500	6,000*
PH	**PH UNITS**	5.8 – 6.8	6.6 – 7.6	6.8 - 7.8	5.6 – 9.0	5.6 – 9.0
TOC	**mg/l**	80	150	25	100	200*

* Interim Trigger Levels for NW7

The Draft Guidelines on the setting of groundwater trigger levels by the UK Environment Agency[i] suggest a common-sense approach to areas of a site that are obviously contaminated, such as NW7. Figure 4.1, taken from p.47 of the document, illustrates the process that should be taken for future reviews of trigger levels at NW7, once remediation is complete.

Figure 4.1: General principals of control and Trigger levels for leachate-contaminated site (From UK Environment Agency, 2002)



These principles imply that exceedence of the trigger level is temporarily acceptable, once remedial measures are defined. Such improvements are currently being made at Kinsale Road Landfill, in the form of capping works and improved stormwater capture and treatment. However, definition of final trigger levels will not take place until the effects of completion of these infrastructural works are seen in groundwater monitoring data.

[i] Hydrogeological Risk Assessments for Landfills and the Derivation of Groundwater Control and Trigger Levels. Draft v1.12. Leeson, J., Edwards, A., Smith, J. W. N., Potter, H. A. B., & Bourn, M. May 2002. Downloadable from http://www.environment-agency.gov.uk/yourenv/consultations/298377/

[ii] European Communities (Quality of Surface Water Intended for the Abstraction of Drinking Water) Regulations, 1989 (SI No. 294 of 1989)

KINSALE ROAD LANDFILL

REGISTER NO: 12-2

TARGET LEVELS FOR SURFACE WATER

COPY

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December 2003

KINSALE ROAD LANDFILL

WL 12-2

TARGET LEVELS FOR SURFACE WATER

User is Responsible for Checking The Revision Status Of This Document

Rev. Nr.	Description of Changes	Prepared by:	Checked by:	Approved by:	Date:
A	Initial Draft	ME			05/11/03
B	Issued to Client	BR			09/12/03
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Keywords: Kinsale Road Landfill, surface water, trigger levels licence compliances, reed bed, assimilative capacity, receiving water.

Abstract: Fehily Timoney & Co. (FTC) on behalf of Cork City Council, has prepared this report in compliance with condition 6.5.3 of EPA waste licence 12-2. The report addresses the following items:

1. Normal levels for ammonia, BOD, COD, chloride, conductivity, pH, TOC and temperature for water entering the stormwater retention pond (SRP1) prior to reed bed treatment.

2. Target trigger levels for TOC and conductivity for the water entering the stormwater retention pond (SRP1) prior to reed bed treatment.

3. Measures to protect the receiving water (Tramore River) if target trigger levels are exceeded.

A number of information gaps were identified. The report made recommendations for the collection of outstanding data.

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1. INTRODUCTION

Cork City Council operates the Kinsale Road Landfill under EPA waste licence (Register No: 12-2). Condition 6.5.3 of the waste licence states:

> *"The licensee shall determine normal levels for ammonia, BOD, COD, chloride, conductivity, pH, TOC and temperature and trigger levels for TOC and conductivity for the water entering the stormwater retention pond (SRP1) prior to reed bed treatment. Within six months of the date of grant of this licence, the applicant shall submit to the Agency for its agreement a proposal outlining the measures to be implemented when such trigger levels are reached. This proposal shall also take into account the water quality in the receiving waters upgradient of the landfill."*

Fehily Timoney & Co. (FTC) on behalf of Cork City Council, has prepared this report in compliance with condition 6.5.3. The report addresses the following items:

4. Normal levels for ammonia, BOD, COD, chloride, conductivity, pH, TOC and temperature for water entering the stormwater retention pond (SRP1) prior to reed bed treatment.

5. Target trigger levels for TOC and conductivity for the water entering the stormwater retention pond (SRP1) prior to reed bed treatment.

6. Measures to protect the receiving water (Tramore River) if target trigger levels are exceeded.

2. SURFACE WATER MONITORING

As a condition of EPA waste licence 12-2, Cork City Council has carries out quarterly monitoring of surface water quality at nine locations as shown in Figure 2.1. Analytical data is available from January 2001 to October 2003.

The impact of the surface water runoff from the Kinsale Road landfill on the receiving water (Tramore River) can be evaluated by comparing analytical results upstream (EM2) and downstream (EM11) of the discharge from the landfill. At present there is no flow measurement device on the Tramore river. In the absence of flow data for the Tramore river it is difficult to determine its assimilative capacity.

A description of the monitoring locations is given in table 2.1 below.

Table 2:1: Surface Water Monitoring Locations

Name	Description	River	Distances from Landfill Outfall (metres)
EM0	1,100 m upstream of landfill at Ballyaduff Industrial Estate	Tramore	1,100 Upstream
EM1	420 m upstream of landfill above Tramore Bridge	Tramore	420 Upstream
EM9	200 m upstream landfill to the West Link Road	Tramore	200 Upstream
EM2	180 m upstream landfill to the East Link Road	Tramore	180 Upstream
EM7	150 m north of landfill on Trabeg River (Triburtary of Tramore River)	Trabeg	150 Upstream
EM8	Trabeg River just upstream of confluence of Tramore and Trabeg	Trabeg	20 Upstream
EM11	20 m downstream of outfall from Stormwater Pond and Reed Beds	Tramore	20 Downstream
EM10	50 m downstream of of outfall from Stormwater Pond and Reed Beds	Tramore	50 Downstream
EM6	450 m downstream of landfill on triburty to Tramore River	Tramore	450 Downstream

Quarterly monitoring at these locations is carried out for the following parameters:

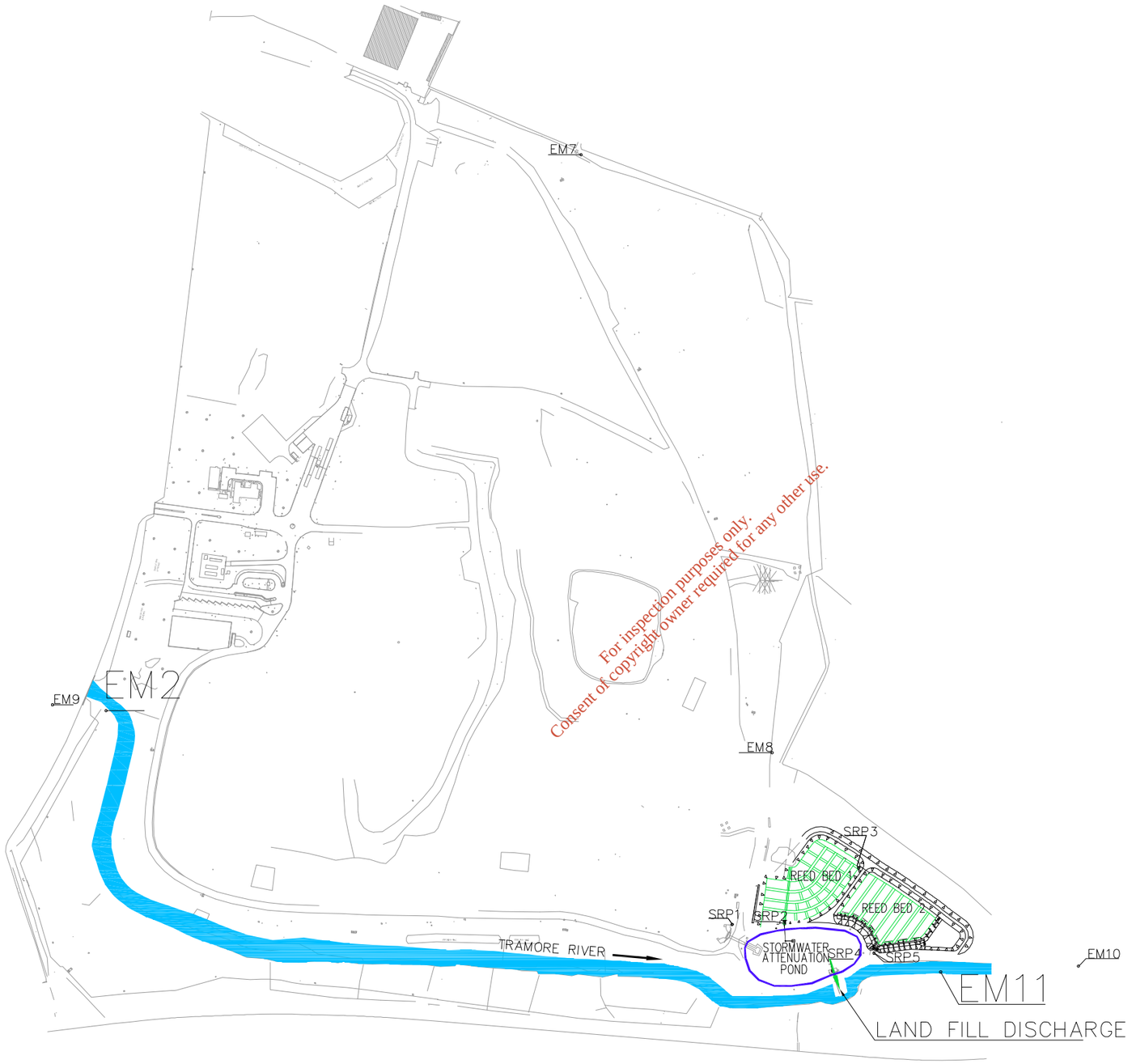
- Ammoniacal Nitrogen
- Biochemical Oxygen Demand (BOD)
- Chloride
- Chemical Oxygen Demand (COD)
- pH
- Dissolved Oxygen
- Electrical Conductivity
- Temperature
- Total Suspended Solids

Total organic carbon (TOC) monitoring is not conducted in the Tramore river, as it is not a licence requirement.

LEGEND

Surfacewater Monitoring Location
- EM0
- EM1
- EM2
- EM6
- EM7
- EM8
- EM9
- EM10
- EM11

Stormwater/Reed Beds Monitoring
- SRP1
- SRP2
- SRP3
- SRP4
- SRP5



Rev.	Drawn	Chk'd	Appd	Date	Description
A	MB	BR	BR	15-12-2003	ISSUE FOR APPROVAL

Name of Client
CORK CITY COUNCIL

Name of Job
SURFACE WATER TRIGGER LEVELS

Title of Drawing
SURFACE WATER MONITORING NETWORK

Scales Used
A3. 1–5000

Dwg. No. 2003–011–09–FIGURE 2.1

Rev. A

O:/ACAD/2003/011/09/FIG 2.1

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ORIGINAL DRAWING SIZE A1 - (841 x 594)

NATURAL SCALE 10 0 10 20 50 100mm

3. ANALYSIS OF AVAILABLE DATA

At present the stormwater from the Kinsale road landfill is discharged directly to the Tramore river without any treatment. To assess the existing impact if any of the landfill discharge, analytical data collected between January 2001 and September 2003 has been interpreted for the sampling station upstream (EM2) and downstream (EM11) of the landfill discharge.

In the first quarter 2002 a leachate cut off trench was constructed at the landfill site. It is clear from the available analytical results that this trench has been effective in reducing the quantities of stormwater entering the Tramore river.

3.1.1. Ammonia

Ammonia is generally present is natural waters, though in small amounts, as a result of microbiological activity which causes the reduction of nitrogen containing compounds.

Table 3:1: Ammonia Upstream and Downstream of Landfill Discharge

Sampling Date	EM2-Upstream (NH_4 mg/l)	EM11-Downstream (NH_4 mg/l)	Difference Upstream Vs Downstream (NH_4 mg/l)
January-01	6.3	4	-2.3
April-01	4.6	3.3	-1.3
July-01	16	8.8	-7.2
October-01	1.1	1.3	0.2
January-02	2.3	2.5	0.2
April-02	6	0.4	-5.6
July-02	3.4	0.01	-3.39
October-02	1	0.005	-0.995
January-03	0.04	0.03	-0.01
March-03	2	0.4	-1.6
June-03	4	1.7	-2.3
September-03	0.005	0.009	0.004
Average	**3.90**	**1.87**	**-2.02** Note 1
Minimum	**0.01**	**0.01**	**-7.20** Note 2
Maximum	**16.00**	**8.80**	**0.20** Note 3

Note 1: Average difference between EM2 and EM11.
Note 2: Minimum difference between EM2 and EM11.
Note 3: Maximum difference between EM2 and EM11.

Table 3.1 above shows that with the exception of two occasions, (October 2001 and January 2002) the concentration of ammonia upstream of the landfill discharge was higher that the concentration downstream of the discharge.

Between January 2001 and September 2003, the landfill discharge has decreased the ammonia concentration downstream of the landfill discharge by an average of 2 mg/l (>80% reduction of upstream value). This reduction is attributed to the dilution effect of the landfill discharge.

Since April 2002, the landfill discharge has increased the ammonia concentration on only one occasion (September 2003 + 0.004 mg/l NH_4). A strong statistical correlation (0.89) exists between the ammonia level upstream and downstream of the landfill discharge.

3.1.2. Biochemical Oxygen Demand

The five day biochemical oxygen demand (BOD_5) is an index of the degree of organic pollution in water. It may be defined as the amount of oxygen used for biochemical oxidation by a unit volume of water at a given temperature and for a given time (5 days). The BOD_5 is an index of the degree of organic pollution in water.

Table 3:2: BOD_5 Upstream and Downstream of Landfill Discharge

Sampling Date	EM2-Upstream (mg/l O_2)	EM11-Downstream (mg/l O_2)	Difference Upstream Vs Downstream (mg/l O_2)
January-01	1.2	2.2	1
April-01	7.5	3.7	-3.8
July-01	1	3	2
October-01	1.5	9.7	8.2
January-02	1.1	2.1	1
April-02	2.7	3	0.3
July-02	1.5	1.7	0.2
October-02	1.4	1	-0.4
January-03	2.3	3.1	0.8
March-03	1.5	1.1	-0.4
June-03	1.8	2.5	0.7
September-03	2	2.9	0.9
Average	**2.2**	**2.4**	**0.2**
Minimum	**1.0**	**1.0**	**-3.8**
Maximum	**7.5**	**3.7**	**2.0**

Table 3.2 above shows that the discharge from the landfill has a minimal impact on the quality of the receiving water downstream of the landfill. The result at EM11, taken in October 2001 appears to be a statistical outlier. If this value was removed from the dataset, the average impact of the landfill discharge over the last three years on the Tramore river would be an increase of 0.2 mg/l O_2.

On three occasions (April 2001, October 2002 and March 2003) the discharge from the landfill lowered the BOD_5 of the Tramore river. Based on the data in Table 3.2 above a weak (0.1) correlation exists between concentration of BOD_5 upstream and downstream of the landfill discharge. However, when the result from October 2001 is removed the correlation increase significantly (0.59).

3.1.3. Chemical Oxygen Demand

The chemical oxygen demand (COD) is the quantity of oxygen used in biological and non-biological oxidation of materials in water.

Table 3:3: COD Upstream and Downstream of Landfill Discharge

Sampling Date	EM2-Upstream (mg/l O_2)	EM11-Downstream (mg/l O_2)	Difference Upstream Vs Downstream (mg/l O_2)
January-01	16	14	-2
April-01	28	28	0
July-01	18	45	27
October-01	12	35	23
January-02	3	17	14
April-02	5	4	-1
July-02	14	4	-10
October-02	17	16	-1
January-03	5	7	2
March-03	9	4	-5
June-03	7	5	-2
September-03	3	10	7
Average	**11**	**16**	**4**
Minimum	**3**	**4**	**-10**
Maximum	**28**	**45**	**27**

Table 3.3 shows that the discharge from the landfill has a slight impact on downstream water quality with regard to COD. On average the increase over the past three years has been 4 mg/l O_2. There has been a dramatic improvement since April 2002.

If the data from April 2002 to September 2003 is analysed it is evident that the discharge from the landfill improved the downstream water quality by an average of 1.4 mg/l. A statistical correlation of 0.55 exists between the upstream and downstream concentration of COD in the receiving water.

3.1.4. Chloride

Chloride exists naturally in all waters, the concentration varying widely and reaching a maximum in seawater. Natural levels in rivers and other fresh waters are usually in the range 15-35 mg/l Cl.

Table 3:4: Chloride Upstream and Downstream of Landfill Discharge

Sampling Date	EM2-Upstream (mg/l Cl)	EM11-Downstream (mg/l Cl)	Difference Upstream Vs Downstream (mg/l Cl)
January-01	35	35	0
April-01	28	30	2
July-01	52	38	-14
October-01	31	38	7
January-02	30	28	-2
April-02	29	25	-4
July-02	34	28	-6
October-02	17	21	4
January-03	24	25	1
March-03	23	22	-1
June-03	25	25	0
September-03	35	28	-7
Average	**30**	**29**	**-2**
Minimum	**17**	**21**	**-14**
Maximum	**52**	**38**	**7**

Table 3.4 above shows that the discharge from the landfill has a positive impact on the chloride concentration of the receiving water. On average over the last three years the discharge from the landfill has decreased the chloride concentration downstream of the landfill discharge by 2 mg/l Cl.

The chloride levels downstream of the discharge have remained relatively consisting over the last three years. A strong correlation (0.78) exists between the chloride levels upstream and downstream of the discharge from the landfill.

3.1.5. Conductivity

The conductivity of a water is an expression of its ability to conduct an electric current. As this property is related to the ionic content of the sample which in turn is a function of the dissolved (ionisable) solids concentration. An interrelationship exists between conductivity and temperature.

Table 3:5: Conductivity Upstream and Downstream of Landfill Discharge

Sampling Date	EM2-Upstream (Conductivity (uS/cm)	EM11-Downstream (Conductivity (uS/cm))	Difference Upstream Vs Downstream (uS/cm))
January-01	463	440	-23
April-01	442	422	-20
July-01	640	530	-110
October-01	426	500	74
January-02	410	420	10
April-02	470	422	-48
July-02	450	406	-44
October-02	266	290	24
January-03	391	382	-9
March-03	382	364	-18
June-03	417	393	-24
September-03	462	452	-10
Average	**435**	**418**	**-17**
Minimum	**266**	**290**	**24**
Maximum	**640**	**530**	**-110**

Table 3.5 above shows that the discharge from the landfill has a positive impact on the receiving waters. In ten of the twelve (83 %) samples analysed since January 2001, it is evident that the discharge from the landfill has reduced the conductivity in receiving water.

On average over the last three years the discharge from the landfill has reduced the conductivity in the Tramore river by 14 uS/cm . A strong (0.87) statistical relationship exists between the conductivity results observed upstream and downstream of the landfill discharge.

3.1.6. pH

By definition pH is the negative logarithm of the hydrogen ion concentration of a solution and it is a measure of weather the liquid is acid or alkaline. In waters with low dissolved solids, which consequently have a low buffering capacity, changes in pH induced by external causes may be quite dramatic.

Table 3:6: pH Upstream and Downstream of Landfill Discharge

Sampling Date	EM2-Upstream (pH unit)	EM11-Downstream (pH unit)	Difference Upstream Vs Downstream (pH unit)
January-01	7.49	7.56	0.07
April-01	7.66	7.7	0.04
July-01	7.4	7.6	0.2
October-01	8	7.92	-0.08
January-02	7.5	7.6	0.1
April-02	7.61	7.6	-0.01
July-02	7.55	7.27	-0.28
October-02	7.13	7.05	-0.08
January-03	7.01	7.66	0.65
March-03	7.27	7.4	0.13
June-03	7.5	7.66	0.16
September-03	7.76	7.7	-0.06
Average	**7.49**	**7.56**	**0.07**
Minimum	**7.01**	**7.05**	**-0.28**
Maximum	**8**	**7.92**	**0.65**

Table 3.6 above shows that the discharge from the landfill has an insignificant impact on the pH of the Tramore river. On average over the last three years the discharge from the landfill has raised the pH by an average of 0.07 pH units.

The pH values downstream of the discharge are within the range of 7.05 to 7.92 pH units. The most stringent guidelines available (Surface Water Regulations, 1989) stipulate the pH range for A1 waters must be between 5.5 and 8.5. As can be seen from Table 3.6 above the monitoring location downstream of the landfill discharge is within this limit.

A strong correlation (0.59) exists between the pH value upstream and downstream of the landfill discharge.

3.1.7. Temperature

The natural variation in temperature found in Irish surface waters is of the order of 25°C. Where biochemical reactions are concerned, as in the uptake of oxygen by bacteria, a rise of 10 °C in temperature leads to an approximate doubling of the rate of reaction. The primary interest in the temperature of surface waters is due to the inverse relationship between it and oxygen solubility.

Table 3:7: Temperature Upstream and Downstream of Landfill Discharge

Sampling Date	EM2-Upstream (°C)	EM11-Downstream (°C)	Difference Upstream Vs Downstream (°C)
January-01	9.5	7.3	-2.2
April-01	7.8	13.1	5.3
July-01	11.5	14.9	3.4
October-01	17.3	17.5	0.2
January-02	10	10.2	0.2
April-02	9.8	10	0.2
July-02	13.2	13.9	0.7
October-02	14	16.6	2.6
January-03	7	6	-1
March-03	11	8.7	-2.3
June-03	15	12.1	-2.9
September-03	20	18	-2
Average	**12.2**	**12.4**	**0.2**
Minimum	**7.0**	**6.0**	**-2.9**
Maximum	**20.0**	**18.0**	**5.3**

Table 3.7 above shows that the discharge from the landfill has no significant impact on the Tramore river. On average the temperature in the receiving water has been raised by 0.2 °C over the last three years.

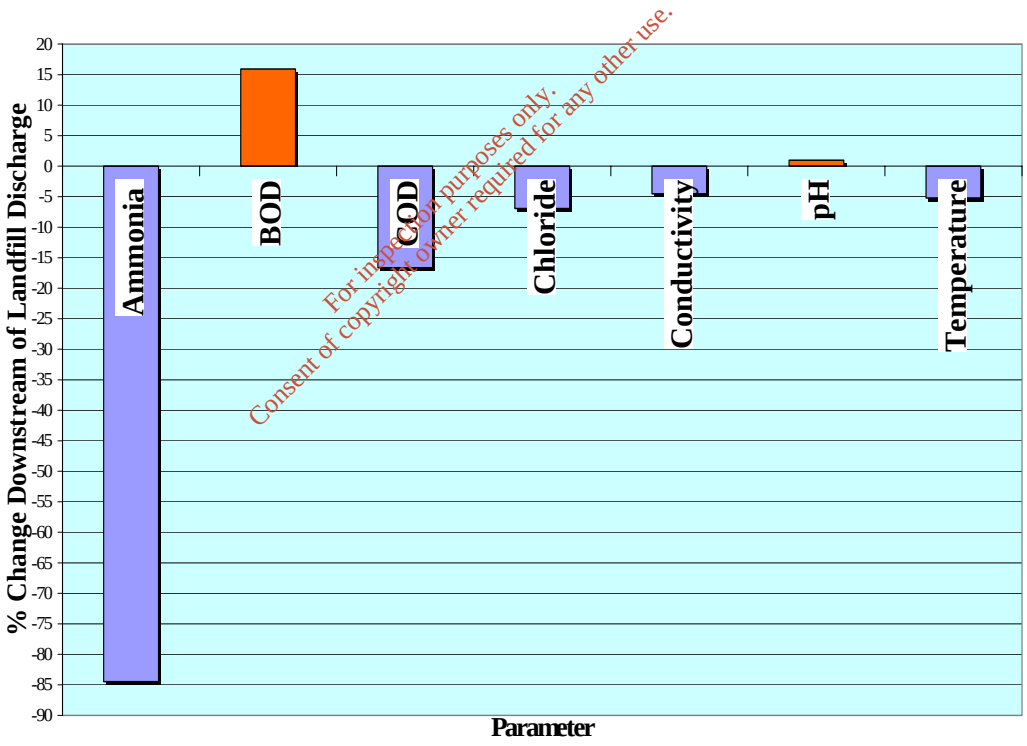
The discharge from the landfill has resulted in a temperature fluctuation of between –2.9 °C and + 5.3°C. A strong statistical correlation (0.79) exists between the temperature upstream and downstream of the landfill discharge.

3.1.8. Conclusion

When comparing surface water quality upstream (EM2) and downstream (EM11) of the surface water discharge from the Kinsale Road Landfill the following patterns emerge:

- The Tramore river is slightly polluted upstream of the landfill discharge (EM2).
- A significant improvement in the quality of the discharge from the landfill has occurred since April 2002
- Due to dilution, the surface water discharge from the landfill does not impact on the quality of the Tramore River as measured downstream of the discharge at EM11 (see figure 3.1 below).

Figure 3.1: Impact of Landfill Discharge on Tramore River (April 2002 to September 2003)



3.1.9. Surface Water Quality Standards

To date in Ireland the vast majority of water quality standards specify the quality of water for different uses, primarily the abstraction of water for human consumption.

Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (EU Water Framework Directive), has not stipuliated water quality standards for chemical pollutants.

The Water Framework Directive (WFD) is the most substantial piece of EC water legislation to date. It requires all inland and coastal waters to reach "good status" by 2015. This objective will be achieved by establishing a river basin district structure within which environmental objectives will be set, including ecological targets for surface waters. As yet a river basin management system has not been established for the southern region.

The defining of water quality objectives for the Tramore river is hampered by the fact that the river is neither a drinking water source, bathing water nor a salmonid river. The most stringent water quality legislation available for the receiving water is the Freshwater Fish Directive [78/659/EEC] employing the salmonid classification shown in Table 3.8 below.

Table 3:8: Comparison of Average Water Quality in Tramore River (Jan 01 to Sept 03) to Water Quality Standards

Parameter	Units	Upstream of Landfill Discharge (EM 2)	Downstream of Landfill Discharge (EM11)	Water Quality Standard
Ammonia	NH_4 mg/l	**3.9**	**1.87**	<0.04
BOD	mg/l O_2	2.2	2.4	<3
COD	mg/l O_2	11	16	< 40 Note 1
Chloride	mg/l Cl	30	29	250
Conductivity	uS/cm	435	418	1,000
pH	pH units	7.49	7.56	6.6 to 9.0
Temperature	°C	12.2	12.4	Not increased downstream by more that 1.5° C

Note 1: No value specified in Freshwater Fish Directive, therefore value obtained from Surface Water Regulations (1989).

Based on the average of the quarterly monitoring results (January 2001 to October 2003) from the Tramore river it can concluded that the concentration of ammonia is above the Freshwater Fish Directive [78/659/EEC] level employing the salmonid classification (<0.04 mg/l NH_4). However, this is not attributable to the landfill discharge. A review of the available results show that the discharge from the Kinsale Road landfill reduces the ammonia concentration in the receiving water by over 80%. This fact can be attributed to the dilution effect of the landfill discharge.

3.1.10. Recommendations

In order to determine the assimilative capacity of the Tramore river it is recommended that a flow measurement device is installed upstream of the landfill discharge and total organic carbon (TOC) be included in the existing quarterly monitoring run.

4. NORMAL LEVELS FOR DISCHARGES TO STORMWATER POND

Condition 6.5.3 of EPA waste licence 12.2, requires Cork City Council to "*determine normal levels for ammonia, BOD, COD, chloride, conductivity, pH, TOC and temperature for the water entering the stormwater retention pond (SRP1) prior to reed bed treatment. This proposal shall also take into account the water quality in the receiving waters upgradient of the landfill.*"

4.1.1. Reed Bed Efficiency

Limited analytical data exists for the stormwater entering the stormwater pond at SRP 1. It is therefore only possible to estimate normal levels for ammonia, BOD, COD, chloride, conductivity, pH, TOC and temperature in the water entering the stormwater pond at SRP 1. The efficiency of the stormwater/reed bed treatment system in the removal of pollutants from the water generated at the landfill are yet undetermined.

An estimate of the normal input levels to the stormwater pond and the removal efficiency of the stormwater/reed bed system is given in table 4.1 below:

Table 4:1: Estimated Normal Levels for Water Entering Stormwater Pond (SRP 1)

Parameter	Estimated Normal Input to Stormwater Pond	Estimated Removal Efficiency of Reed Bed
Ammonia	< 10 NH_3 mg/l	50
BOD_5	< 50 mg/l	90
COD	< 100 mg/l	80
Chloride	< 250 mg/l Cl	50
Conductivity	<1,750 µS/cm	50
pH	6-9pH units	Buffering Effect
TOC	< 75 mg/l C	25
Temperature	10-20 °C	Buffering Effect

The levels given in Table 4.1 are indicative of normal levels expected at the site. However, these levels will be reviewed annually.

A number of significant information gaps exist when attempting to establish normal levels for surface water quality entering the stormwater lagoon at the Kinsale Road landfill. Theses information gaps are listed below:

1 No flow records are available regarding the quantity of surface discharged to the stormwater pond

2 No flow records are available for the Tramore River

3 No monitoring data exists for the surface water swale delivering stormwater to the stormwater pond

4 The removal efficiency of the stormwater/reed bed system has not been established.

5 No data on TOC levels are available for the Tramore River

4.1.2. Conclusion

It is not possible establish normal levels as required by condition 6.5.3 of EPA waste licence 12-2 due to:

- a lack of monitoring data from the input to the stormwater pond
- a lack of flow data for the receiving water required to calculate a pollution mass balance
- the reed bed system will take a number of years to become fully established at the site. Until such time as the reed beds are fully established it is difficult to determine accurate figures regarding to the removal efficiency of possible pollutants from the stormwater generated at the landfill site.

4.1.3. Recommendations

It is recommended that:

- Regular monitoring for ammonia, BOD, COD, chloride, conductivity, pH, TOC and temperature be conducted on the water entering the stormwater pond at SRP 1.
- The estimated, normal levels for ammonia, BOD, COD, chloride, conductivity, pH, TOC and temperature should be reviewed annually. The most appropriate mechanism for this review is within the Annual Environmental Report (AER) for the facility.
- The efficiency of the reed bed to remove certain pollutants, particularly TOC, is carried out.

5. TARGET TRIGGER LEVELS

In EPA waste licence 12-2 a trigger level is defined a "A parameter value specified in the licence, the achievement or exceedance of which requires certain actions to be taken by the licensee". In establishing trigger levels, account must be taken of the quality in the receiving waters upgradient of the landfill.

5.1. Surface Water Catchment Areas

The landfill is divided into seven surface water catchment areas as shown in Figure 5.1.

The catchment areas within the landfill are:

1. Waste disposal -The surface run-off from the disposal area is collected by the stormwater swale and directed to the stormwater pond.

2. Clay stockpile - The surface run-off from the clay stockpile is collected by the stormwater swale and directed to the stormwater pond

3. Construction and demolition recycling facility - The surface run-off from the C & D facility is collected by two ditches, on the east side travelling from south to north and on the north side travelling from west to east. Prior to entering the swale this discharge passed through a petrol/silt interceptor.

4. Administration and civic amenity - The areas in and around the administration buildings have bitumen and concrete surfacing, storm run-off is collected by road gullies and directed towards the north-eastern corner for connection to the swale.

5. Buffer zones – Uncontaminated stormwater from the buffer zones discharges into the Tramore and Trabeg rivers.

SURFACE WATER CATCHMENT AREAS

- CLAY STOCK PILE
- WASTE DISPOSAL AREA
- BUFFER ZONES
- C&D RECYCLING
- ADMINISTRATION/CIVIC AMENITY

Rev.	Drawn	Chk'd	Appd	Date	Description
A	MB	BR	BR	15-12-2003	ISSUE FOR APPROVAL

Name of Client
CORK CITY COUNCIL

Name of Job
SURFACE WATER TRIGGER LEVELS

Title of Drawing
SURFACE WATER CATCHMENTS AT KINSALE ROAD LANDFILL

Scales Used
A3. 1–5000

Dwg. No. 2003–011–09–FIGURE 5.1 Rev. A

O:/ACAD/2003/011/09/FIG 5.1

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ORIGINAL DRAWING SIZE A1 - (841 x 594)

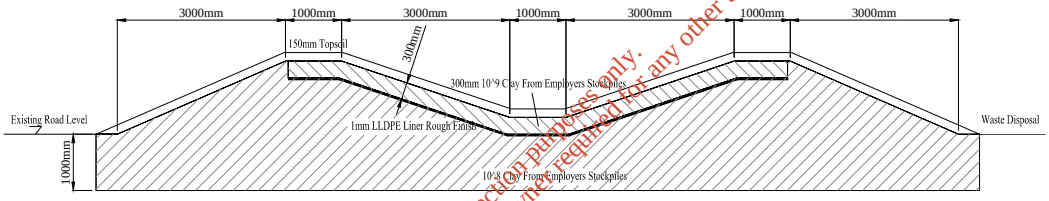
NATURAL SCALE 10 0 10 20 50 100mm

5.2. Stormwater Infrastructure

5.2.1. Stormwater Swale

The swale is a lined collection ditch for stormwater run-off. The swale has two barrier liners consisting of a layer of 1mm LLDPE liner and over laid with a 300 mm thick layer of engineered clay compacted to 98% dry density. A typical section through the swale is shown on Figure 5.2. The swale runs along the perimeter of the waste disposal area and the north-eastern perimeter of the clay stockpile as shown on Figure 5.1.

Figure 5.2: Section through Swale



5.2.2. Stormwater Pond & Reed Bed

Stormwater generated within waste disposal area, clay stockpile, administration area and the construction and demolition recycling area is conveyed to the stormwater pond via the surface water swale. Prior to discharge to the Tramore river the surface water is treated in the reed bed system.

Within the reed bed system surface water undergoes a biological treatment process which reduces/removes pollutants.

5.2.3. Leachate Retention Pond

The lagoon is divided into three cells, where cells 1 and 3 are for contaminated stormwater storage. Cell 2 is for additional leachate storage, it has a floating cover, which acts as an odour barrier. A facility exists to pump contaminated stormwater from the stormwater pond to the lagoon for discharge to Tramore sewer.

5.2.4. Petrol/Silt Interceptors

Petrol/silt interceptors have been installed at the wheel wash and at the surface run-off outfall from the C & D Recycling facility.

5.3. Impact on Receiving Waters

The assimilative capacity of the Tramore river can be defined as the amount of pollutant that can be discharged from the landfill without violating a specific target.

The impact of the landfill discharge can be defined in terms of the upstream and down stream water quality of the Tramore river.

Equation 1: $A^{uwq} + B^{lfd} = C^{dwq}$

Where

A^{uwq} = water quality upstream of landfill discharge ($kg/m^3/day$)

B^{lfd} = water quality of landfill discharge ($kg/m^3/day$)

C^{dwq} = water quality downstream of landfill discharge ($kg/m^3/day$)

In order to determine the impact of a discharge to surface water it is necessary to determine the concentration of the pollutant (mg/l) and the volume of the discharge (m^3) as shown in equation 2.

Equation 2: $kg/m^3/day = ((mg/l*10^{-6}) * (l/sec* 86.4))$

As stated previously no accurate flow data exists for either the Tramore river or the discharge from the landfill. In the absence of such information the most environmentally sound method of determining trigger levels is to define target trigger levels which will not impact on the surface water quality of the Tramore River.

The hypothesis for determining the target trigger levels for TOC and conductivity in the landfill discharge shall not increase the downstream concentration of the parameters by a stated factor of safety.

The following formula is used to determine the trigger levels.

Equation 3: A mg/l ^{P} = C mg/l $^{P+FOS}$

where:-

A mg/l ^{P} = Concentration of parameter upstream of discharge (mg/l)

C mg/l $^{P+FOS}$ = Concentration of parameter downstream of discharge (mg/l) + factor of safety. The factor of safety for TOC and conductivity shall will be a percentage of the upstream value.

Cork City Council has installed instrumentation (December 2003) to record flow, TOC, and conductivity at the inlet to the stormwater pond (SRP 1). In early 2004 a TOC analyser will be installed and commissioned at (SRP 5) the inlet from the reed bed system to the stormwater pond. Data from this instrumentation will be relayed back to the landfill SCADA system. The information obtained will be used to determine the efficiency of the reed bed and to determine the appropriate trigger levels.

5.3.1. Proposed Measures to be Implemented when Target Trigger Levels Reached

Flow rate, total organic carbon (TOC) and conductivity are monitored in the water entering the stormwater pond (SRP1). The stormwater pond discharges water to the reed bed system through a decanting arm. Three procedures can be implement depending on the quality of the stormwater entering the pond. Figure 5.3 shows a line diagram of the three procedures and these procedures are discussed below:

(I) Stormwater Quality: - Suitable for Discharge to the Tramore River.

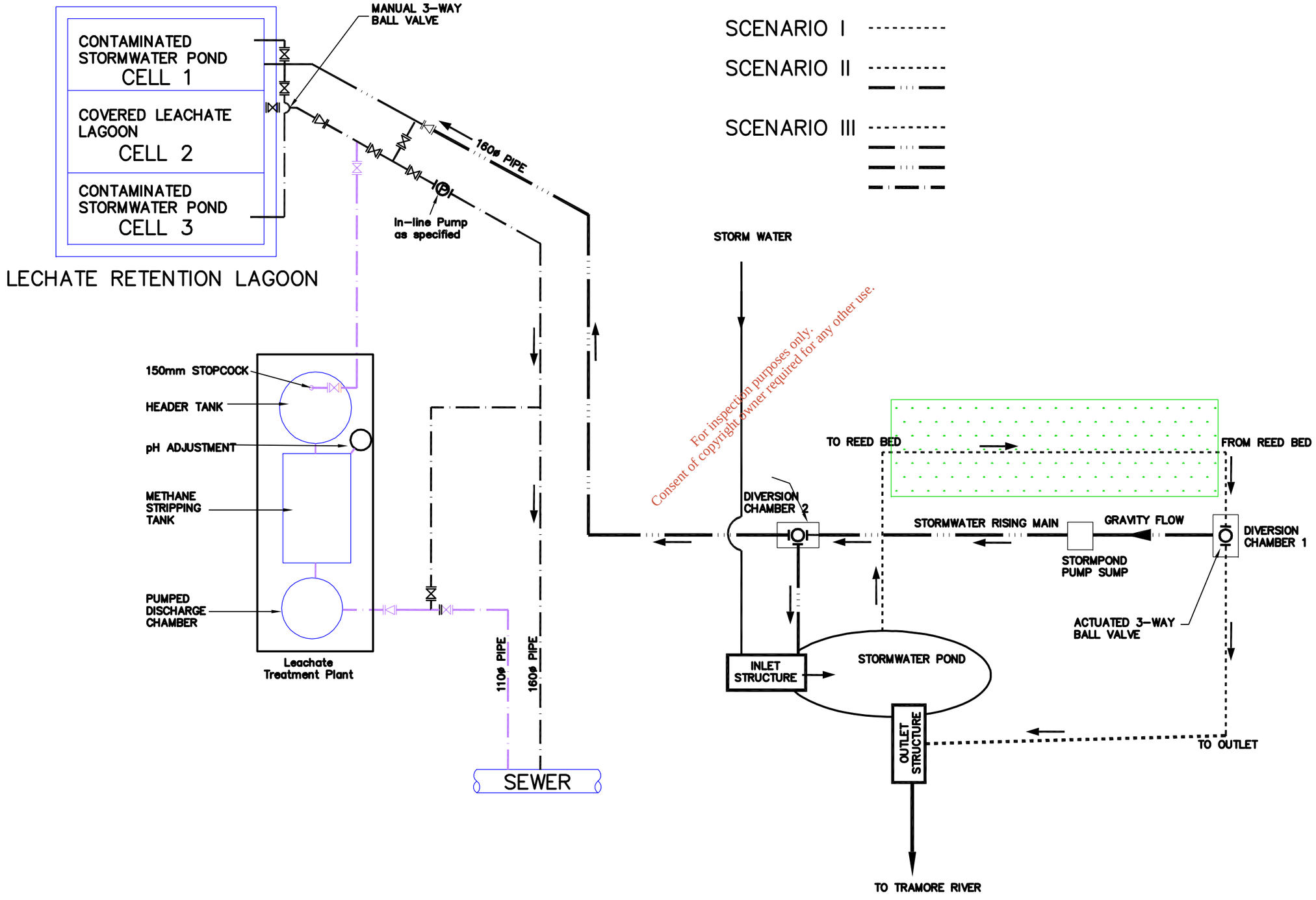
- Stormwater is siphoned via a decanting arm into the reed bed at 20 l/sec.
- The water is evenly distributed at the head of the reed bed and then flows east towards diversion Chamber 1.
- At diversion Chamber 1 the water is discharged to the Tramore River via the outlet structure.

(II) Stormwater Quality - Needs Recirculation through the Reed Beds

- At diversion chamber 1 an actuated valve diverts the stormwater into a pump sump.
- Its pumped back to the inlet structure via a second actuated valve in diversion Chamber 2.
- It must then flow through the reed bed until it is suitable for discharge to the Tramore River.

(III) Stormwater Quality - Suitable For Discharge to Tramore Sewer

- The stormwater is released into the pump sump by a manual butterfly valve.
- Its pumped through diversion Chamber 2 to the stormwater lagoons (Cell 1 & Cell 3)
- The contaminated stormwater is discharged to the Tramore Sewer Outfall at 20 l/sec.



Rev.	Drawn	Chk'd	Appd'd	Date	Description
A	MB	BR	BR	15.12.2003	ISSUE FOR APPROVAL

Name of Client: CORK CITY COUNCIL

Name of Job: SURFACE WATER TRIGGER LEVELS

Title of Drawing: FLOW DIAGRAMS OF STORMWATER MANAGMENT PROCEEDURE

Scales Used: NOT TO SCALE

Dwg. No.: 2003-011-09-FIG 5.3 Rev.: A

O:\acad\2003\011\09\DOC-SWTL_FIG 5.3

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5.3.2. Conclusion

In the absence of flow data and total organic carbon (TOC) for the Tramore river it is not possible to establish trigger levels for TOC and conductivity entering the stormwater pond.

5.3.3. Recommendations

It is recommended that:

- Flow measurement instrumentation is installed upstream of the landfill discharge on the Tramore river.
- Upon installation and commissioning of flow measurement instrumentation on the Tramore river, monthly sampling to be carried out at EM2 and EM11 for TOC and conductivity for a period of 12 months.
- Cork City Council include TOC analysis during quarterly surface water monitoring at EM2 (upstream of landfill discharge) and EM11 (downstream of landfill discharge).
- When sufficient monitoring and seasonal flow data becomes available Cork City Council will be in a position to submit trigger levels to the Environmental Protection Agency for approval.

Appendix 9

Copies of Variation Agreement Letters from the Agency

ENVIRONMENTAL PROTECTION AGENCY
An Ghníomhaireacht um Chaomhnú Comhshaoil

Administrative Officer,
Environment,
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City Hall,
Cork.

Regional Inspectorate
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County Cork
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Inis Cara
Contae Chorcaí
Éire

Email: info@epa.ie
Website: www.epa.ie

Date	Our ref.	Your ref.
17/07/03	WL 12-2/GEN36RC	

FAO Mr. Michael O' Brien SE, Mr. Liam Dromey (Manager, Kinsale Road Landfill)

Re: Landfill Gas Utilisation Plant

Dear Administrative Officer,

I refer to your correspondence dated 02/07/03 and received 08/07/03 in relation to Kinsale Road Landfill (WL 12-2).

This information is to the satisfaction of the Agency subject to the following:

1. Any 24 hour mean value greater than 1400 mg/m^3 CO and any 30 minute mean value greater than 2800 mg/m^3 CO is reported as an incident as per the licence.
2. All results are available for inspection at the facility office.

In relation to the operation of the landfill gas utilisation plant, the following shall be notified as an incident as per the licence:

- Any occasion where both engines TV01 and TV02 are not in operation simultaneously for a period greater than 1 hour.
- Any occasion where either engine TV01 or TV02 is not in operation for a period greater than 4 hours.

All records of engine downtime and maintenance should continue to be maintained at the facility office.

Yours sincerely,

Regina Campbell

Ms. Regina Campbell, Inspector
Environmental Management and Planning

17. Jul. 2003 14:32

ENVIRONMENTAL PROTECTION AGENCY
An Ghníomhaireacht um Chaomhnú Comhshaoil

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Administrative Officer,
Environment,
Cork City Council,
City Hall,
Cork.

Date	Our ref.	Your ref.
19/09/03	WL 12-2/AK59RC	

FAO Mr. Michael O' Brien SE, Mr. James Goulding (Kinsale Road Landfill)

Dear Administrative Officer,

I refer to your correspondence dated 13/08/03 in respect of Waste Licence 12-2.

Re: Construction Schedule for Surface Water Swale, Stormwater Pond and Reedbeds
The programme for the completion of works for the reed beds, stormwater pond and surface water swale is to the satisfaction of the Agency.

Re: Groundwater Trigger levels
Please note the following:

- The proposed control and trigger levels for monitoring points NW3 and NW7 are satisfactory.
- The control levels for monitoring point NW9 are satisfactory. The trigger level for ammonia should be set at 5mg/l and the trigger level for TOC should be set at 35mg/l for NW9.
- Any exceedance of the trigger levels should be reported to the Agency as an incident in accordance with Condition 11.2.
- The control levels and trigger levels should be revised annually.

Yours sincerely,

Regina Campbell

Ms. Regina Campbell, Inspector
Environmental Management and Planning

CORK CITY COUNCIL
ENVIRONMENTAL SECTION
22 SEP 2003
RECEIVED

CC. MOB, J. Goulding

10 YEARS
Guardians of the Environment

epa
Office of
Environmental
Enforcement

Environmental Protection Agency
Regional Inspectorate, Inniscarra
County Cork, Ireland
An Ghníomhaireacht um Chaomhnú Comhshaoil
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Lo Call: 1890 33 55 99

Administrative Officer,
Environment,
Cork City Council,
City Hall,
Cork.

15/03/04 Our Ref: 12-2/GEN42RC

FAO Mr. Michael O' Brien SE, Mr. James Goulding (Kinsale Road Landfill)

Dear Administrative Officer,

I refer to your correspondence dated 16/12/03 in relation to surface water trigger levels at Kinsale Road Landfill (WL12-2).

The recommendations on page 16 and page 24 of the report should be undertaken and an updated report with final proposed trigger levels for TOC and conductivity submitted to the Agency for agreement by 15/12/04.

In the intervening period, the following trigger levels should be applied at SRP1 (inlet to stormwater retention pond):

- Conductivity of 1,750µs/cm
- TOC of 75mg/l.
- pH of 6 –9

Yours sincerely,

Regina Campbell

Regina Campbell, Inspector
Office of Environmental Enforcement

- please note.
John
OR yard
J T moynihan AO
(1)
Cory J Twomey
(2) MOB

epa
Office of Environmental Enforcement

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Environmental Protection Agency
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Mr Michael O'Brien
Senior Engineer
Kinsale Road Landfill
Cork City Council
City Hall
Cork

6th March 2007

Our Ref: W0012-02/ap06mo

Dear Mr O'Brien

I refer to your report dated 27/10/06, received by the Agency on 01/11/06, in relation to the use of the capsum probe for continuous monitoring of dissolved methane at emission point SD1. The report sets out a proposal to discontinue the use of the probe.

I am to advise you that the proposal submitted is to the satisfaction of the Agency and you are hereby authorised to discontinue use of the probe.

The Agency reminds the licensee that emissions must conform to the emission limit values set out in Integrated Pollution Control licence (Reg. No. W0012-02).

Yours sincerely

M G Owens

Michael Owens
Office of Environmental Enforcement