Attachment B.1 – Applicant & Operator Details

Although the applicant is Waterford City Council, the operator will be Anglian Water International (AWI), with everyday operations subcontracted to Celtic Anglian Water (CAW), which is a subsidiary of AWI. Details are provided below:

Celtic Anglian Water (CAW)
12 Riverwalk,
Citywest,
Dublin 24

Tel: 01 4691291
Fax: 01 4691291

AWI is part of the AWG (water services and infrastructure management) group and provides drinking water and wastewater services to the UK and Ireland.

CAW was established in 1998 to participate in the development of Ireland's water and wastewater infrastructure. CAW operates in the development of water and wastewater assets providing water supply, wastewater treatment, plant operation and maintenance services for both industrial and municipal clients.

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07/4084

Figure B.2 (1)

O.S. Map showing location of Facility

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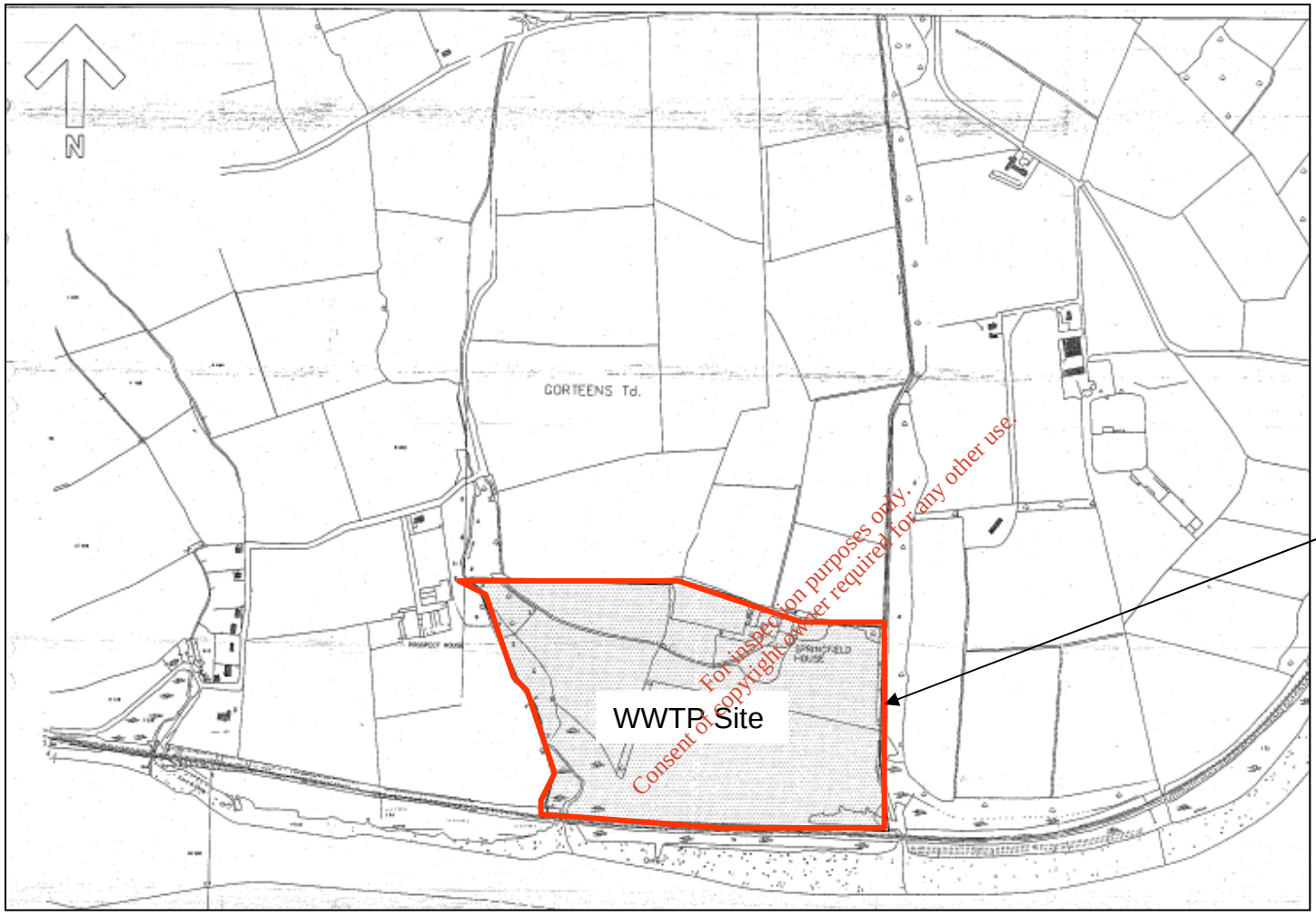

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Figure B.2 (2)

O.S. Map showing location of Facility

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COMHAIRLE CATHRACH PHORT LAIRGE

APPLICATION TO THE ENVIRONMENTAL PROTECTION AGENCY FOR A WASTE LICENCE

Notice is hereby given that Waterford City Council, Wallace House, Maritana Gate, Canada Street, Waterford is applying to the Environmental Protection Agency for a Waste Licence for the disposal and recovery of sewage sludge at the Waterford City Waste Water Treatment Plant at Gorteens, Co. Kilkenny (National Grid Reference: E 264747 N 112310).

The classes of activities applied for are as set out in Schedules 3 and 4 of the Waste Management Acts of 1996 to 2003 and are as follows:

Schedule 3 No. 6: Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1 to 5 or paragraphs 7 to 10 of this Schedule.

Schedule 4 No. 2: Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological processes).

The waste disposal activity, No. 6 of Schedule 3, is the principal activity. The total quantity of waste to be disposed or recovered will be 95,100 tonnes of sewage sludge per annum.

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Environmental Impact Statement: The waste licence application will be accompanied by the original Environmental Impact Statement (EIS) in accordance with Part III of the Waste Management (Licensing) Regulations, S.I. No. 395 of 2004. In addition, an update of relevant sections of the EIS will also be included with the application.

Copy of Application: A copy of the licence application and a copy of the EIS (including update) and such further information relating to the application as may be furnished to the Agency in the course of the Agency's consideration of the application shall, as soon as is practicable after receipt by the Agency, be available for inspection or purchase at:
The Environmental Protection Agency, PO Box 3000, Johnstown Castle Estate, Co. Wexford.
Lo Call 1890 335 599 Telephone: 053-9160600 Fax: 053-9160699
Email: info@epa.ie and at

Waterford City Council, Wallace House, Maritana Gate, Canada Street, Waterford.
Telephone Tel: 051-309900 Fax: 051-849763

Submissions in relation to the application may be made to the Environmental Protection Agency at its headquarters as described above.

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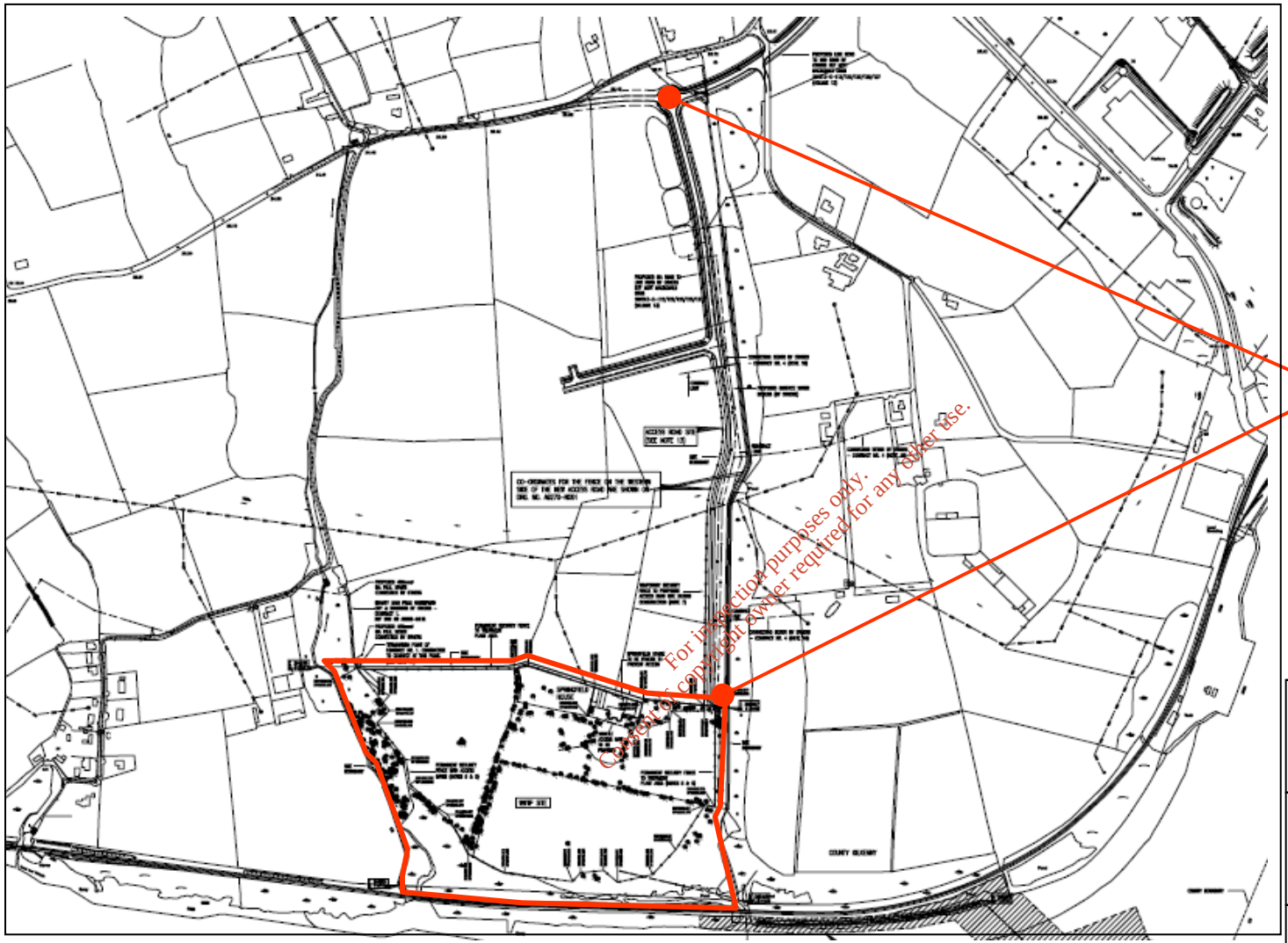

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Figure B.6(1)

Location of Waste Licence Application Site Notice

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Attachment B.7

Technical Description of Activities

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The sludge works requires a Waste Licence from the EPA. The licensable activity is the treatment of the sludge that is generated from the sewage that is treated at the facility. The principal and other activities (under Schedules 3 and 4 of the Waste Management Acts 1996 – 2003) are detailed in this section.

Principal Activity:

Schedule 3 No. 6
The principal activity (P) will be disposal, as per the Third Schedule, Class 6 of the Waste Management Acts (1996-2003):

> *No.6. Biological treatment not referred to elsewhere in this Schedule which results in final compounds or mixtures which are disposed of by means of any activity referred to in paragraphs 1 to 5 or paragraphs 7 to 10 of this Schedule.*

The facility will produce bio-cake as a waste product during the wastewater treatment process. This sludge will be collected on site in trailers/containers before being transported off-site. Under this activity class, the sludge will be disposed of to an EPA licensed landfill.

Other Activities:

Schedule 4 No. 2
The secondary activity will be recovery as per the Fourth Schedule, Class 2 of the Waste Management Acts (1996-2003):

> *No. 2. Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological processes)*

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The facility will produce bio-cake as a waste product during the wastewater treatment process. Dewatered 'class A' bio-cake will be recycled to off-site agricultural land by means of land-spreading, with full compliance with the Code of Good Practice regulating such activity. A specialist contractor will be appointed to oversee all aspects of haulage, nutrient management, soil sampling, farmer liaison and relevant local authority approval.

The landbank(s) will extend into neighbouring counties for agronomic reasons and details of the landbank(s) to be used will be provided prior to the activity commencing.

Summary of Maximum Tonnage
The maximum annual tonnage to be handled at the site is measured as the amount of primary sludge post picket fence thickener plus the surplus (activated) sludge post gravity belt thickener, over the lifetime of the site.

Maximum annual tonnage is expected to be **260.5 tonnes/day** or approximately **95,100 tonnes/year**. The maximum load year is expected to be reached by 2025.

The calculations are based on the assumption that the plant will run 365 days per year and assumes full load plus 20%, as required by the Contract Specification for the facility.

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The calculations are shown below:

Sources	% Solids	Tonnes/Day	Tonnes/Year
Primary Sludge	6	107.8	39,347
Surplus Sludge	5	152.8	55,753
Total Sludge	5-6	260.5	**95,100**
Total Bio-Cake (End Product)	23 (minimum)	41.1	15,002

Clarification of Activities

Although the principal activity nominated is 'disposal' under Schedule 3 of the Waste Management Acts 1996 – 2003, it is envisaged that within a short period of time, the majority of the sludge will be taken off-site for recovery, i.e. land-spreading.

It should be clarified that, as part of the planning conditions initially issued by Kilkenny County Council, a requirement to obtain an EPA Waste Licence, for the sludge treatment, was included. However, subject to Article 51 of the Waste Management Act 1996 (S.I. No. 10 of 1996), should the facility be operated by a Local Authority and the sludge be sent for recovery, then the facility would not require the Waste Licence. Therefore, in order to satisfy the planning requirement, and also satisfy the legislative requirements, the Waste Licence is being applied for with disposal as the principal activity (for which the facility does require a Waste Licence).

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Attachment C.1

Management & Operational Structure

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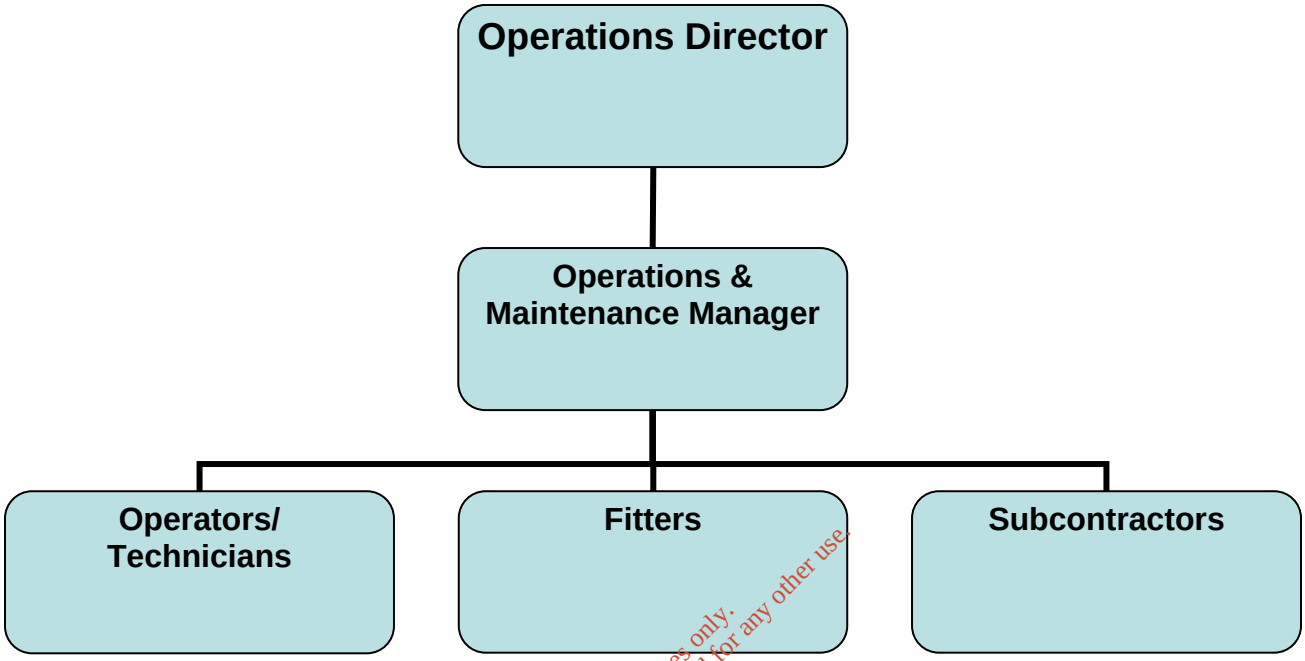
Organisational Chart



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CAW Management & Operational Structure

Operations Director, CAW
Name: Position not yet filled
10+ years water industry experience. Chartered scientist or Engineer.
Responsibilities: Client liaison, contract compliance, providing environmental & safety framework for delivering O&M (Operations and Maintenance) services to Waterford City Council (WCC).

Operations and Maintenance Manager (O&M), CAW:
Name: Position not yet filled
5+ years relevant experience. Technical qualification.
Responsibilities: Report to the Operations Director. Day to day management of the operations contract with WCC. Coach the local operations team in the delivery of their duties. Ensure training is provided and competence is maintained. Provide technical, financial and administrative support. Ensure O&M procedures are in place to ISO 9001, 14001, 18001. Thorough understanding of wastewater treatment processes, plant operations, environmental obligations, plant maintenance activities. Supervise operational staff, craftsmen & subcontractors, to ensure that treatment standards are met, planned plant maintenance is delivered, and breakdowns are promptly fixed. Buy spares parts & contracted services as required.

Report to Waterford City Council monthly on the contracts outputs. Respond to any complaints promptly. Action any remedies to keep plant compliant with effluent, sludge & odour standards.

Works Technicians:
Names: Position not yet filled
Operators & fitters will live locally, and be trained to CAWs in-house Production Qualification standards.
Responsibilities: Report to the O&M Manager. The technicians will undertake the day to day work of cleaning, optimizing, maintaining and monitoring the plant. Daily samples will be analysed to check plant performance. Records and logs kept of maintenance undertaken. Respond on standby to out of hours alarms from telemetry.

Once the permanent positions have been filled, the Agency will be informed of these personnel and any changes to management or staff will be notified to the Agency as, and when, it occurs.

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Attachment C.2

Waterford Wastewater Treatment Plant
Outline Environmental Management System (EMS)

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An EMS will be put in place at the Waterford WWTP (WWTP) in order to manage and control the possible environmental impacts of the facility. This will enable the operators of the WWTP to remain legally compliant, in relation to environmental legislation, and to choose best practice and cost effective operational practices for the facility. The EMS will be submitted to the EPA, as part of the Waste Licence requirements.

The WWTP EMS will incorporate procedures for pro-active management of environmental issues and liabilities.

The following is an outline of the Waterford WWTP. The EMS will be completed prior to commissioning of the facility and will be implemented when the facility becomes operational.

The EMS is structured as follows:

Environmental Policy
The environmental policy document contains the overall aims and principles of action with respect to the environment including compliance with all relevant regulatory requirements for the WWTP regarding the environment.

Schedule of Aspects and Impacts
This is a list of principal aspects and impacts that the WWTP could have in terms of the environment. The principle aspects and impacts associated with the facility are shown below:

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Aspects

- Resource consumption
- Waste generation (principally sludge)
- Wastewater Treatment
- Fuel use
- Chemical use

Impacts

- Discharges to Surface Water
- Discharges to Ground/Groundwater (from sludge spreading off-site)
- Air Emissions (Including Odour Emissions)
- Noise Emissions
- Flora and Fauna impacts (including estuarine ecology)

Legal Register
The Legal Register includes full copies of relevant environmental legislation, along with a summary of each, describing the obligations that are placed on the operators of the WWTP (AWI/Enpure) and therefore must be complied with. A full legal register will be compiled prior to commissioning of the WWTP.

Schedule of Objectives and Targets
The Schedule of Objectives and Targets, are the objectives that the WWTP will achieve over a number of years, with specific targets to be achieved on an on-going basis.

Provisional Objectives are as follows:

1. To reduce energy consumption

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2. To minimise the use of natural resources
3. To examine alternative waste recovery options for sludge cake from the facility

Specific Targets for each operational year will be confirmed and included in the EMS.

Structure and Responsibility

There will be specific roles and responsibilities established within the facility to manage, control and operate the EMS. These will be allocated by the time the WWTP is operational and the EPA will be informed of the specific personnel associated with each role. Personnel responsible for environmental issues will take charge of the EMS and its implementation and will report directly to the Operations Manager, who in turn will report to the Director of Operations.

Standard Operating Procedures

These are procedures that will be followed to ensure legal environmental compliance, to prevent and mitigate environmental pollution on site and to allow the environmental targets for the facility to be achieved e.g. energy-use reduction targets, waste recycling targets, etc.

Training Record

Training will be provided for employees and management at the facility in order to ensure the EMS is implemented and maintained correctly. Details of the training in relation to the EMS will be included in the full EMS.

Environmental Records

An environmental record system will be maintained as part of the EMS. These records will include data on the following:

- Energy consumption;
- Natural resource and raw material use;
- Waste generation, waste disposal and waste recovery/recycling;
- Emissions from the Facility (odour, air quality, noise & vibration etc)

Internal Environmental Audits

There will be procedures to follow for the purpose of conducting an internal environmental audit. This section of the EMS will contain audit reports and all related correspondence relating to the audits.

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Attachment C.3

Hours of Operation

(a) Proposed Hours of Operation:

The facility will be in operation 365 days per year, 24 hours per day. Normal operating hours are:

Monday – Friday	08:00 – 20:00
Saturday	08:00 – 16:00

However, all processes will not be in operation continuously.

(b) Proposed Hours of Waste Acceptance/Handling:

No solid waste will be accepted at the facility. Waste sludge cake will be collected from the facility during normal working hours, as indicated in C.3 (a).

(c) Proposed Hours of any Construction and Development Works at the facility and timeframes (required for landfill facilities):

Not Applicable

(d) Any other relevant Hours of Operation expected:

In case of emergencies arising at the facility, staff may be required during these times, if the need arises.

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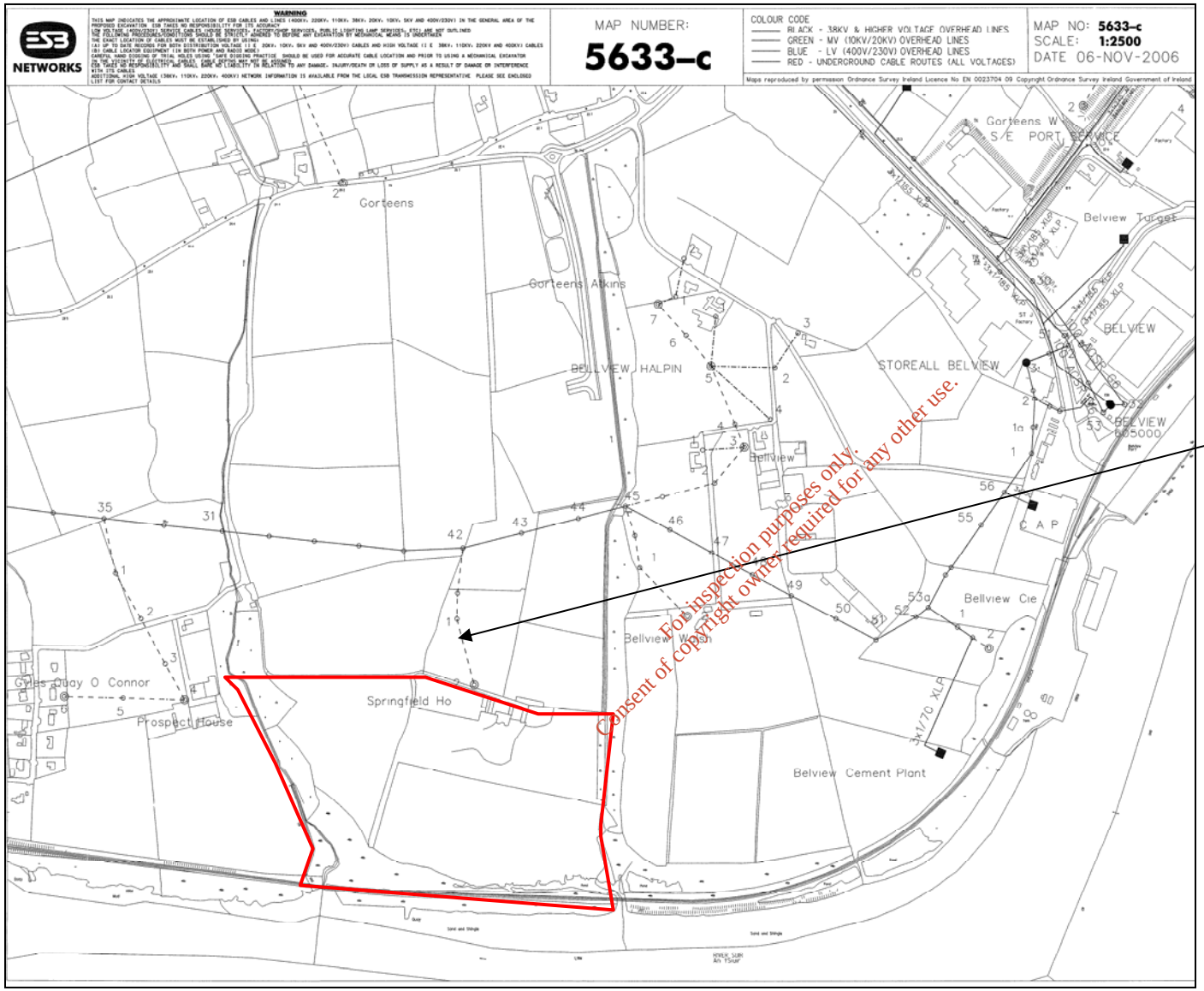

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Figure D.1.l.1

Indicative ESB layout

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Attachment D.1 – Site Infrastructure

(a) Site Security Arrangements (including gates and fencing)

The site fencing surrounding the plant is shown in Figure D.1 k(1). This will be a permanent security fence and runs around the perimeter of the site, with the exception of the eastern section of the site, where it is inside of the existing trees on the site and also to the south, where the fence is inland of the site boundary. This is to accommodate the proximity to the estuary.

The entrance gates from the access road to the facility are located at the northeast corner of the site, at Grid Ref. S6500 1244.

The site will be manned 24 hours a day, 7 days a week, i.e. when the site personnel are not on site, there will be site security present.

Springfield House (ruin) will be fenced off to prevent access. There will be a gated access provided for authorized personnel only.

(b) Design for Site Roads

Treatment plant roads have been designed to accommodate all vehicles proposed for the operation of the WWTP in accordance with the planning permission for the facility. All roads for the treatment plant are 5 m, with the exception of the road from the treatment works gate to the administration building, which will be 7 m wide.

Roads have been designed in accordance with NRA guidance 'Design Manual for Road and Bridge Works' and based on the ground conditions at the site and the traffic loading for the operational phase of the facility, which will consist of caretakers vehicles, sludge transport works and chemical delivery vehicles.

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(c) Design of Hardstanding Areas

The hardstanding area is comprised of the area that will drain to the swales and the area that will drain directly to the trunk sewer (see D.1 k). These areas are approximately 1860 m^2 and 12,327 m^2 respectively. The impermeable areas are shown in Figure D1.k (2).

(d) Plant

Plant Items are listed in Table D1.d (1).

(e) Wheel-wash

There is no wheel-wash on site, as there will be no waste delivered to the site by road, i.e. the only waste entering the site will be the wastewater by sewer. Trucks coming to collect bio-cake (sludge end product) will be empty and clean when entering the site.

(f) Laboratory Facilities

There will be no laboratory facilities on site. The Nominated Laboratory required under the Contract for the WWTP will be advised by the Operator prior to commissioning of the facility but will not be on the site. Provision may be made on the site for `local` testing facilities and if this occurs, details will be provided to the Agency.

(g) Design and Location of Fuel Storage Areas

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Fuel, which is diesel, stored on site will be for the generator and the boilers. Fuel for the boilers will only be required should there be a shortfall in the primary fuel source, i.e. biogas that will be generated from the digestion process.

The fuel storage tanks are located to the southwest of the site, adjacent to the Sludge Thickening, Dewatering and Digestion Control Building. The location of the fuel tanks is shown in Figure D1.k (3). The capacity of boiler fuel tank is 10,000 litres, containing 36 second fuel oil, and the capacity of the generator fuel tank is also 10,000 litres, containing 28 second fuel oil.

In addition, the generator will have a 'day tank', which will allow the generator to run off-line should it need to be tested etc, which will serve as a buffer system.

The tanks are located within a containment bund, constructed to BS 8007 or CIRIA 163, which will essentially provide a second layer of protection. This bund is designed to hold 20,000 litres, plus 25%, which will allow for rainwater ingress and ensure that no fuel is released to the ground or water.

(h) Waste Quarantine Areas

Not Applicable

(i) Waste Inspection Areas

Not Applicable

(j) Traffic Control

Traffic on site will be via a one-way system, with trucks and other vehicles entering the site at the northeast corner, and travelling in a clockwise direction around the site.

Traffic to the site, once constructed, is limited to plant personnel and visitors and also traffic associated with the operation of the plant. The administration building is located to the north of the facility and all visitors are required to park in the parking area adjacent to the building and report to reception.

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(k) Sewerage and Surface Water Drainage Infrastructure

Surface Water Runoff

There are SUDS (Sustainable Urban Drainage Systems) included in the design of the surface water drainage system. As per the Treatment Plant Road & Associated Services – Design Statement by Ryan Hanley (Consulting Engineers), the road runoff will be collected via a system of swales and gullies draining to a trunk surface water pipe. This then discharges to an existing stream at the southeast corner of the treatment works site.

The two swales will run along the northern edge of the roads to the north of the site, i.e. from the WWTP entrance gate to the administration building and from the administration building to the inlet works building.

The trunk sewer will convey water from the swales and from the remaining impermeable areas within the site.

Site surface water drainage drawings are included with this attachment. Figure D1.k (4) shows the layout of surface water collection network for the site and D1.k (5) shows the surface water drainage catchments.

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A Class 1 bypass interceptor will be installed upstream of the outfall (see Figure D1.k (4) to prevent any risk of hydrocarbon pollutants entering the receiving water, with a capacity to treat the flow from the impermeable areas draining to the sewer, i.e. 230 l/s.

Surface Water runoff from the area within the bunded area, i.e. the immediate area surrounding the treatment works, will be directed into the wastewater treatment works to the return liquors area. This will be returned to the top of the wastewater treatment works and re-enter the treatment system.

Foul water Drainage

Foul water will be produced from the toilets within the sludge building and from the administration building. This wastewater will be directed to the wastewater works via the return liquors area. Foul water from the administration building runs by gravity into Bellview Pumping station, which is located to the east of the admin building in the northeast corner of the site, where it becomes part of the main Bellview Pumping Station flow into the inlet works.

(l) All other Services

The only other service (apart from drainage, which is detailed in Section D.1(k)) is electricity. The electricity service drawing is included as Figure D.1.l.1. It has not yet been decided how the electricity supply will be directed through the site, and so the drawing shows an indicative route to the site.

There is no gas supply to the site and there is no water supply at present to the site.

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(m) Plant Sheds, Garages and Equipment Control

There are no other structures on site.

(n) Site Accommodation

Not Applicable

(o) Fire Control System (Including Water Supply)

Not Applicable

(p) Civic Amenity Facilities

Not Applicable

(q) Other Waste Recovery Infrastructure

Not Applicable

(r) Composting Infrastructure

Not Applicable

(s) Construction and Demolition Waste Infrastructure

Not Applicable

(t) Incineration Infrastructure

Not Applicable

(u) Any Other Infrastructure

Not Applicable

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Table D.1.d.1

WWTP Plant Items

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Item	Item	Duty No.	Standby No.	Purpose	Sludge Works (Licencable Activities)
1	Inlet Screens			To screen raw sewage flow	
2	Aerated Seperator			To de-grit the screened sewage	
3	Blowers			Deliver air to grit channel	
4	Stormwater Storage Tank	1		Storage of stormwater	
5	Stormwater Return Pumps	2		Return stored stormwater to treatment	
6	Jet Mixers (in Stormwater Tank)	1		To establish homogenous mix in stormwater tank	
7	Primary Settlement Tanks	2		Clarification of raw sewage	
8	Primary Sludge Pumps	2		Transfer primary sludge to picket fence thickener	
9	Selector Tank	1		Mixing and distribution of primary effluent and return activated sludge	
10	Selector Tank Mixer	1		To maintain homogenous mix in selector tank	
11	Aeration Tank	1		Treatment of activated sludge	
12	Aeration Tank Mixer	2		To achieve mixing at the surface level of the aeration lane	
13	Fine Bubble Diffusers (Aeration Equipment)			Diffuse air around aeration lane	
14	Settlement Tanks	4		Clarification of treated sewage	
15	RAS Sludge Pumps	4		Recirculation of activated sludge	
16	SAS Sludge Pumps	1		Transfer surplus activated sludge to thickener	
17	Picket Fence Thickener	1		Thicken primary sludge	
18	Gracity Belt Thickener	1		Thicken secondary sludge	
19	Sludge Blending Tank	1		Storage and mixing of thickened primary and secondary sludge	X
20	Primary Sludge Storage Tank	1		Storage of thickened primary sludge	X
21	Secondary Sludge Storage Tank	1		Storage of thickened secondary sludge	X
22	Heat Exchangers (Heating)	2		To heat raw thickened sludge	X
23	Pasteuriser Tank Mixer	3		Establish homogenous mix in tank	X
24	Heat Exchanger (Cooling)	1		To cool down pasteurised sludge	X
25	Pasteuriser Tank	1		Mixing and retention of heated sludge for pasteurising process	X
26	Anaerobic Digester	2		Disgestion of primary and secondary sludge before dewatering	X
27	Digester Tank Mixer	2		Establish homogenous mix in tank	X
28	Digested Sludge Storage Tank	1		Storage of digested sludge	X
29	Sludge Digestor Plant Relief Valve	1		To prevent under or over pasteruisation of digester	X
30	Belt Press	1		Dewater disgested sludge to 23% wt/wt solids	X
31	Biogas Holder	1		Store biogas from digestion process	X
32	Waste Gas Burner	1		To burn excess gas from digestion process	X
33	Digester Hot Water Boiler	1		Produce hot water for the pre-pasteurisation heat exchangers	X

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34	Liquor Return Sump	1		Storage of return liquors	X
35	Liquor Return Pump	1	1	Return liquors to primary treatment	X
36	Belview Catchment Inlet Sump	1	1	Transfer Belview catchment raw sewage to inlet works	
37	Odour Control Units	2		Reduce odour produced on site	
38	Washwater Pump	1	1	Transfer final effluent to distribution main	
39	Potable Water Booster Pumps	1	1	Boost pressure and transfer potable water to distribution	

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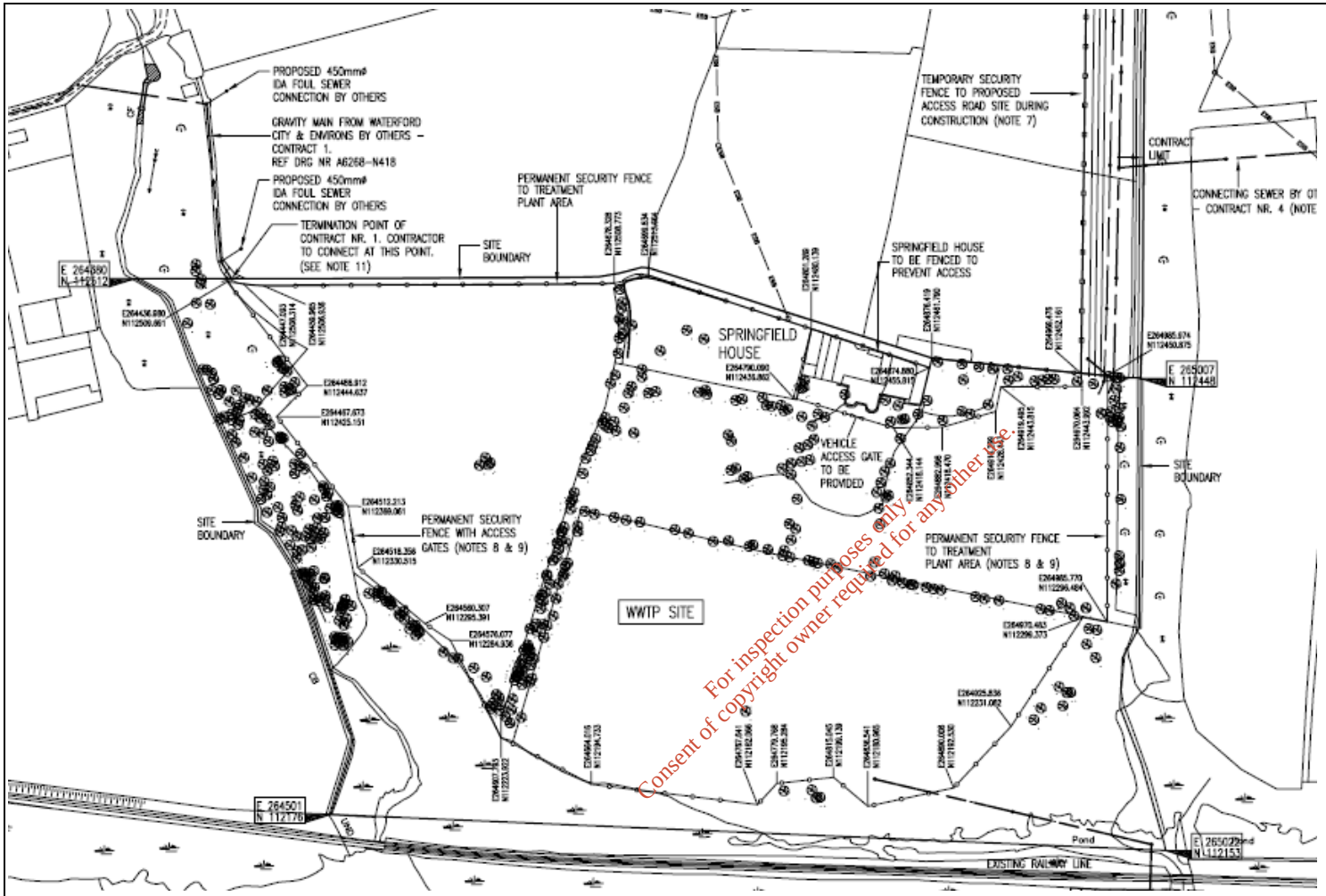

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Figure D.1.k.1

Site Security Fencing

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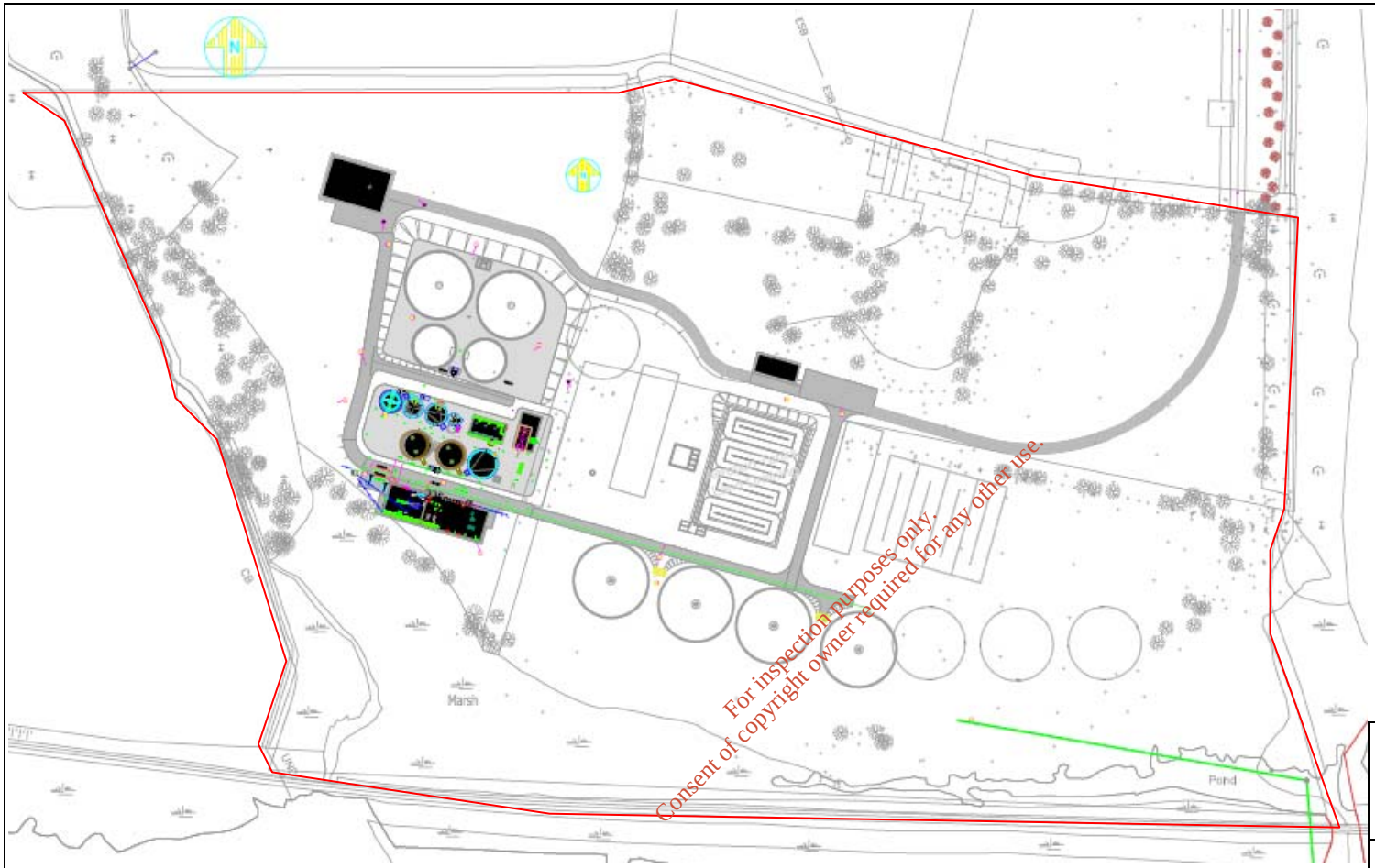

Impermeable Areas

Site Boundary

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Figure D.k.1.2

Impermeable Areas on the Site

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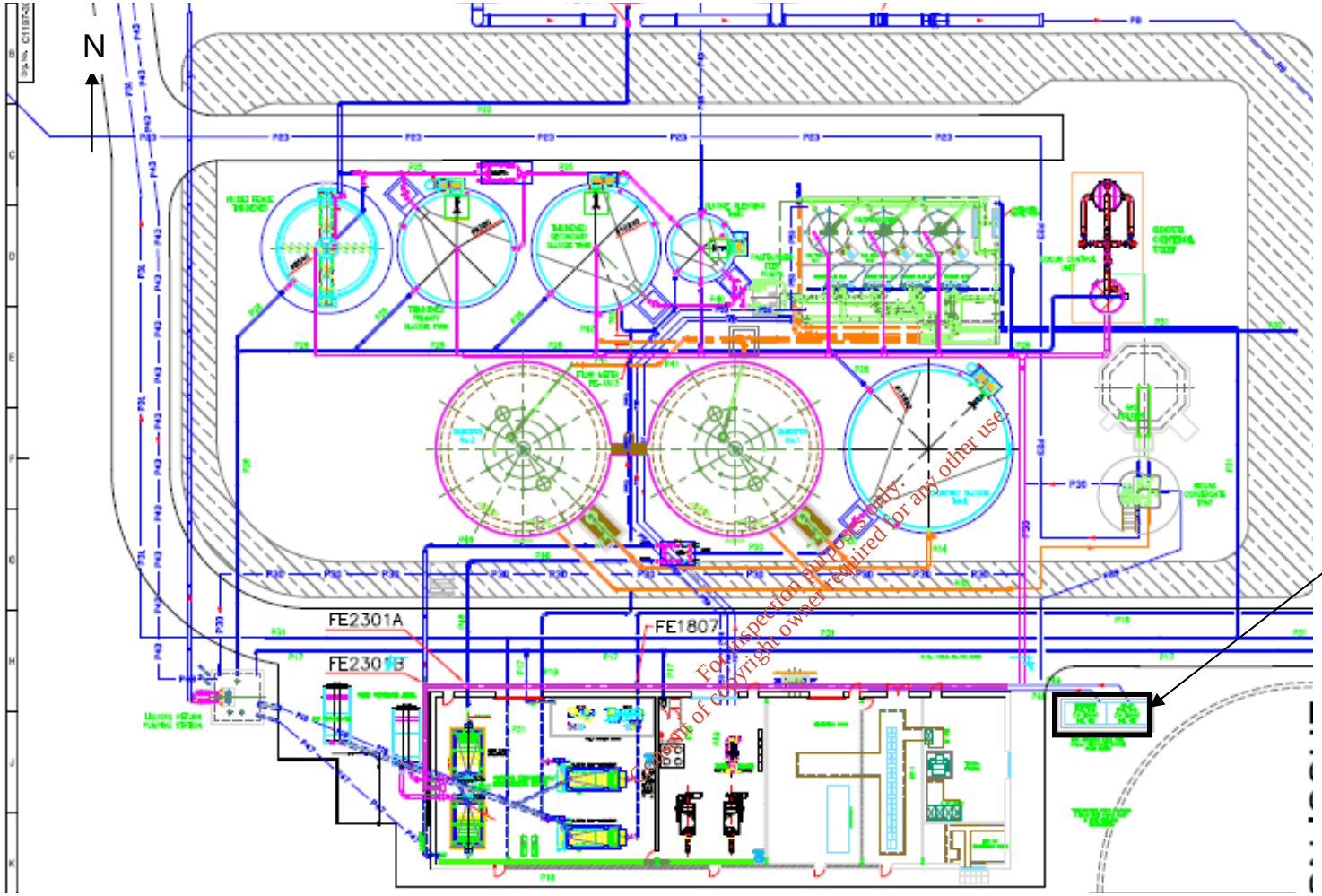

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07/4084D.1.k.3

Figure D1.k.3

Location of Fuel Tanks

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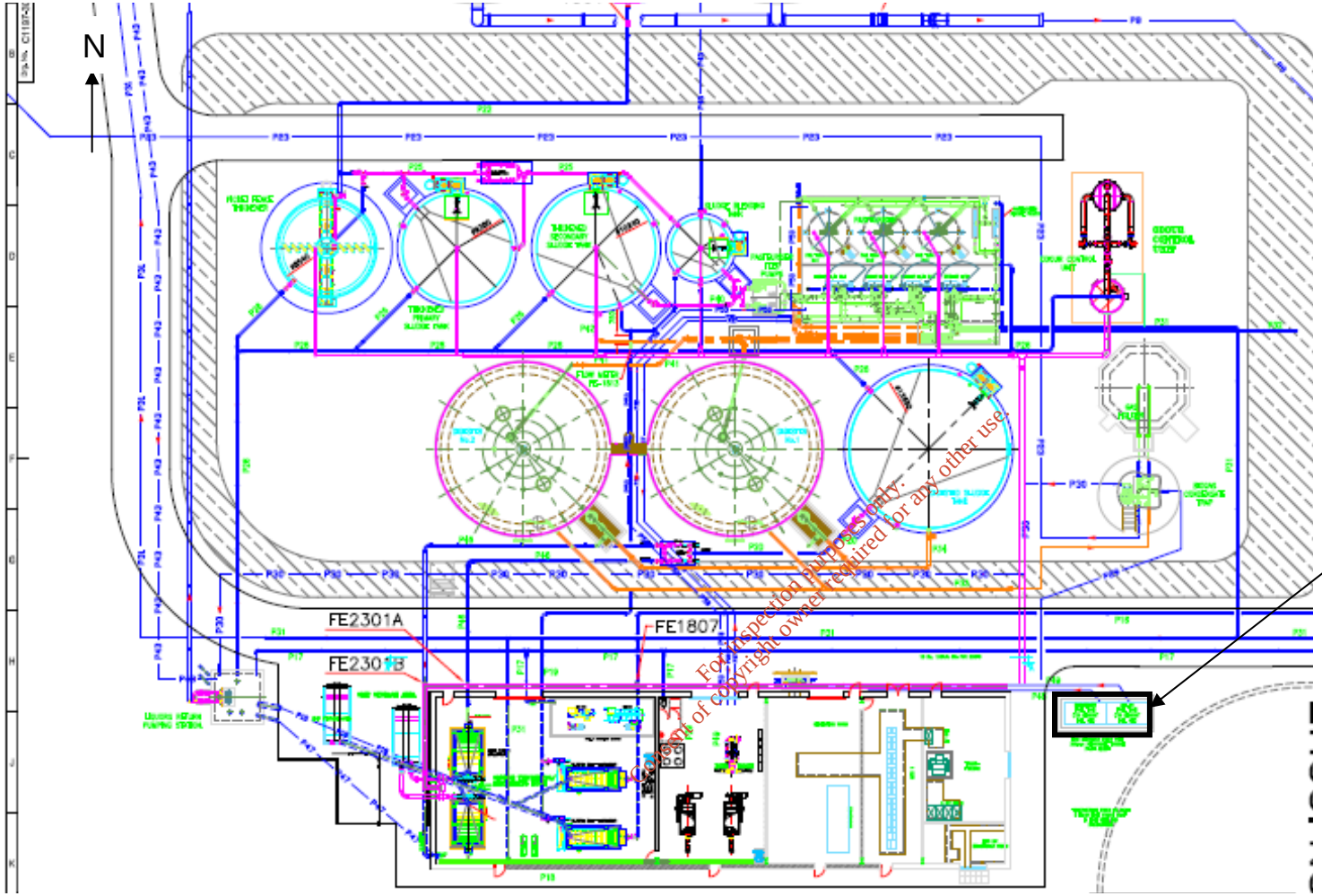

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Waterford WWTP Waste Licence Application

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07/4084D.1.k.3

Figure D1.k.3

Location of Fuel Tanks

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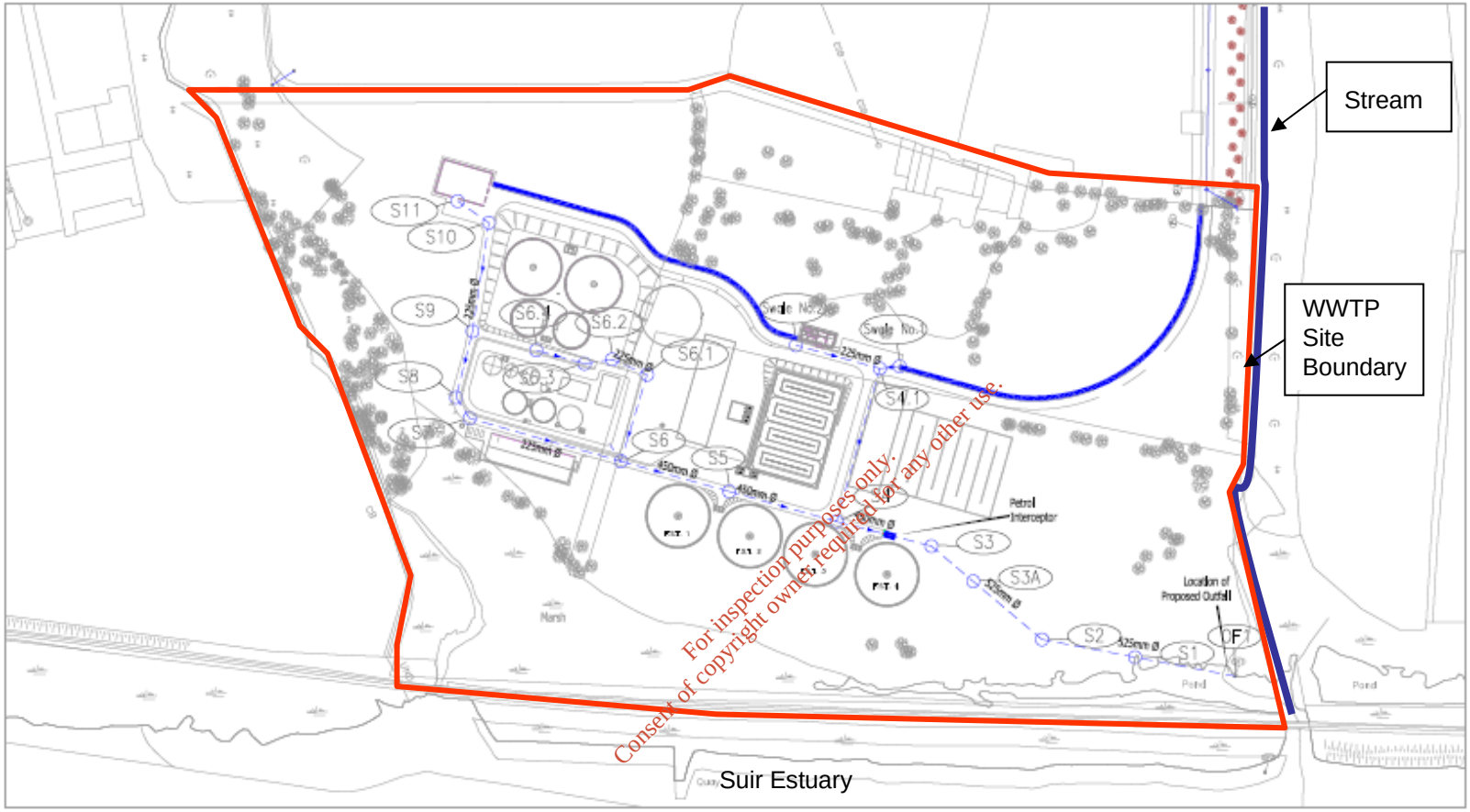

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LEGEND

Surface Water Sewer

Surface Water Swale

no.	mark	by	date
4	Public Revised		06/07

client: WATERFORD CITY COUNCIL

project: WATERFORD CITY WASTEWATER TREATMENT PLANT

description: Layout of Surface Water Collection Network

scales: 1:2,500

drawn: jr
checked: d
approved: mj

job no.: 1779

set no.:

date: May 2007

Ryan Hanley
consulting engineers

Sherwood House
Sherwood Avenue
Taylor's Hill
GALWAY

Figure D.1.k(4)

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Scale 1:2500

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Figure D.1.k.5

Surface Water Drainage Catchments on site

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Attachment D.2

Facility Operation

(a) List of Unit Operations

A plan drawing of the site (Fig.D.2.1) is provided, showing the location of all wastewater treatment activities and identifying all buildings and facilities.

Primary Treatment

Ref.1	Works Inlet Building
Ref.2	Primary Settlement Tanks (2 no.)
Ref.3	Storm Tanks (2 no.)
Ref.4	Area for Future Development

Secondary Treatment

Ref.5	Selector Tank
Ref.6	Inclined Bubble Aeration (IBA) Tanks (4 no.)
Ref.7	Blowers (5 no.)
Ref.8	Final Settlement Tanks (4 no.)
Ref.9	Final effluent (FE) Sampling and Washwater Pumping Station
Ref.10	Picket Fence Thickener
Ref.11	Sludge Blending Tank
Ref.12	Gravity Belt Thickener
Ref.13	Pasteurisation System
Ref.14	Anaerobic Digestors (2 no.)
Ref.15	Sludge Holding Tanks (2 no.)
Ref.16	Digested Sludge Tank
Ref.17	Sludge Waste Containers

Other Buildings/Activities

Ref.18	Administration Building
Ref.19	Future U.V. Treatment

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(b.1) Overview of Processes at the WWTP

The overall process at the WWTP facility is outlined below. However, it should be noted that, for the purpose of this Waste Licence application, it is only the sludge treatment works (Refs 11-18), post Picket Fence Thickener, that is the licenceable activity.

Primary Treatment

Flow (sewage) arrives (via a system of pumped and gravity sewers) at the main Works inlet building (Ref.1). At the main works building, the sewage is firstly screened by three automatic screens prior to passing to grit traps. A manually raked screen is provided in a bypass channel around the automated screens. After the grit traps the sewage passes to a distribution chamber where the flow is split between the two primary settlement tanks (PST) (Ref. 2).

During storm conditions excess flow, which is beyond the capacity of the PSTs, passes to the two storm tanks (Ref. 3). When low flows are detected into the works,

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any storm water within the storm tanks is returned to the inlet works, just prior to the PST distribution chamber, for full process treatment. If storm flows exceed the capacity of the storm tanks (insert capacity of storm tanks) then the excess flows pass directly to the outfall. The storm tanks are cleaned by a jet mixer upon drain down.

Future area for development are indicated as Ref.4 on the accompanying drawing, Figure D.2.1.

Secondary Treatment

The settled sewage then flows to the secondary treatment process that comprises a selector tank (Ref. 5) and the energy-efficient Inclined Bubble Aeration, (IBA) process (Ref. 6). Air is supplied to the four IBA tanks via five blowers (Ref.7) operating on a duty/duty/duty/duty/standby basis, with a duty blower being dedicated to each tank. This arrangement allows the blowers to be switched on and off as the dissolved oxygen level within the tanks fluctuates, the activated sludge being kept in suspension by the flow inducers.

Four radial flow final settlement tanks (Ref 8) are provided to separate the activated sludge flocs from the mixed liquor to give a well-clarified, stable effluent, low in BOD and suspended solids. The settled effluent passes to the final effluent (FE) Sampling and Washwater Pumping Station (Ref. 9) prior to passing to outfall. A weir within this pumping station ensures that there is always effluent available for the sampler.

The Activated Sludge (RAS) is removed from the base of the Final Settlement Tanks (FST) and returned to the Selector Tank (ref 5) for mixing with the settled primary sewage, prior to introduction into the aeration tanks, thereby providing the continuous biological activated sludge process culture within the Works.

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Sludge Treatment

The total sludge treated at the site consists of indigenous primary sludge (from the Primary Settlement Tanks - Ref.2) and surplus activated sludge (from the Gravity Belt Thickener - Ref. 8). Primary sludge is thickened in a picket fence thickener (Ref. 10) before it is transferred to the sludge blending tank (Ref.11). Activated sludge is thickened in the sludge building (Ref.12) by gravity belt thickener (duty/standby provided) before it is transferred to the sludge blending tank.

The blended total sludge is pumped via positive displacement pumps to the pasteurisation system (Ref.13) for treatment. The pasteurisation system provides a retention time of 4 hours at 55 ^{0}C prior to feeding the anaerobic digesters (Ref.14) via a cooling system that ensures that mesophilic conditions are maintained within the digesters. Two sludge holding tanks are also provided (Ref. 15).

Biogas generated within the digester is stored in a gas holder to buffer out any peaks in gas production and is utilised to provide fuel to the boilers to heat the raw sludge.

The displaced digested sludge flows by gravity to a digested sludge tank (Ref.16). From here the digested sludge is pumped to one of two sludge dewatering belt press streams in the sludge building (Ref.12) to produce a cake of minimum 23% dry solids. Dewatered cake is loaded into trailers/containers (Ref. 17) prior to being removed from site.

Areas of the WWTP are odour-controlled. Odours from the Works Inlet building (Ref. 1) and PSTs (Ref. 2) are directed to one odour-handling unit and extractions from the Sludge Building and the sludge tanks (Ref.11 - 16) to a second odour handling unit.

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Flow diagrams of the overall processes are shown in Figures D.2.2 and D.2.3 and flow diagrams of the sludge treatment processes are shown in Figures D.2.4 and D.2.5.

Maximum sludge tonnages are shown in Table D.2.1.

Table D.2.1 Maximum Sludge Tonnages

Sources	% Solids	Tonnes/Day	Tonnes/Year
Primary Sludge	6	107.8	39,347
Surplus Sludge	5	152.8	55,753
Total Sludge	5-6	260.5	**95,100**
Total Bio-Cake (End Product)	23 (minimum)	41.1	15,002

There is a proposed future development at the facility, which includes ultra-violet light (U.V.) treatment for the treated effluent (Ref.19). U.V. treatment is a disinfection technique where the radiation of microorganisms interrupts normal DNA replication and organisms are killed or rendered inactive.

The treated effluent would enter the U.V. treatment works via an inlet pipe and pass through a series of U.V. banks. The effluent would then leave the works at a controlled rate through a weir penstock and into the outlet pipe. The location of this U.V. works is anticipated to be located in the southeastern section of the site. The flow diagram for the U.V. treatment works is shown in Figure D.2.6.

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Start-Up Period

It should be noted that there will be an intermediate period for the start-up of the WWTP. This will occur when discharge from the existing outfalls (that discharge into the Suir or tributaries of the Suir) is terminated and the discharge is re-directed through the new outfall (SW-02 for the purpose of this application) for the WWTP.

During this period, there may be little to no treatment of the wastewater as the plant is commissioned. This period will last no longer than 3-4 months and will constitute no change in the wastewater that is currently being discharged into the Suir River/Estuary, other than changing the discharge point. It will be a very short period before the wastewater undergoes increased levels of treatment and almost immediately the quality of the discharge will begin to improve.

Figure D.2.7 shows the existing outfalls and the new WWTP outfall. It can be seen from this diagram that there are a number of existing outfalls in close proximity to the new WWTP outfall; these are located at Maypark, Slievrue and two in the vicinity of King's Channel.

(b.2) Overview of Management & Maintenance Plans

General

The management of the facility will develop and implement the following procedures and information systems required for the operation and maintenance works. These include the following:

- Standard and Emergency Procedures (see Section J)
- Quality Assurance Management System
- Environmental Management Procedures (see Section C.2)

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The systems will include activity planning and performance monitoring, maintenance of programme and targets, and management of reports and procurement procedures.

The operation of the facility will be measured by a Performance Management System (PMS).

The performance of the facility will be monitored by flow measurement, sampling and laboratory analysis for wastewater, stormwater and sludge treatment. Information gathered from the monitoring will determine what improvements can be made to optimise the operation of the plant.

Monthly status reports will be submitted to the plant manager. An Operation and Maintenance Manual will be maintained and updated regularly, as will drawings, plant data and the facility safety file.

Standard procedures will be in place for the operation and maintenance of the facility. Internal compliance audits will be carried out at least annually, but may be increased if required.

Maintenance

For the maintenance of the facility, a Facility Management Plan will be prepared prior to operation of the facility (which will be, in part, based on the commissioning phase). The Plan will set out requirements for the management of the WWTP, including

- Buildings and site surrounds
- Landscaping
- Plant and Materials

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The classes of maintenance include:

(a) Full Operational Maintenance

- routine maintenance carried out by the operating contractor on a day-to-day basis
- Cleaning, lubricating and minor adjustment
- Scheduled maintenance including preventative and corrective maintenance
- Fault and breakdown repair and replacement of parts

(b) Standby Maintenance

- Planned and regular maintenance carried out by the operating contractor
- Cleaning, lubricating, periodic operation and minor adjustment

(c) Emission Sources

Odour Emissions

There will be odour emissions from the WWTP. Odours will be generated in the Works Inlet building and the Sludge Building (and associated tanks) and passed to 2 no. odour-control units (OCUs), which will mitigate the odours from these areas. Therefore there are two odour emission points.

Further details on this aspect are provided in Section E of this application.

Odour emission points are as follows:

OCU-01	OCU 1 - Works Inlet Building
OCU-02	OCU 2 - Sludge Building (and associated tanks)

Air Emissions (Other than Odour)

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There will be emissions to air from the hot water boilers, fed by the biogas from the anaerobic digestion process (or by diesel when biogas is not available) and also from the waste gas burner, which will burn off excess biogas. This is considered to be minor emissions due to the imperceptible volumetric flow (<5 m/sec) and therefore not an emission point.

Further details on this aspect are provided in Section E.1 of this application.

Air emission points are as follows:

A-01(a&b) Hot Water Boilers (Pasteurisation Process)

Noise
It is not expected that noise emissions will be an issue for the site. It is expected that the noise levels will be within the specification limits, although should it be found in operational experience that at any particular point where levels are exceeded, further noise attenuation/mitigation measures will be installed/implemented.

There are a number of noise emission sources, however these are not considered to be emission points. Further details on this aspect are provided in Section E of this application.

In the event of a malfunction or interruption of services, the CAW emergency procedures will be implemented. The general CAW procedures are described in Attachment J of this application and will be site specific.

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(d) Laboratory Activities

There will be no laboratory on site. The Nominated Laboratory required under the Operation Contract will be advised by the Operator but will not be on the site. Provision may be made on the site at a future date for `local` testing facilities only.

(e) Incineration Facility Information

Not Applicable

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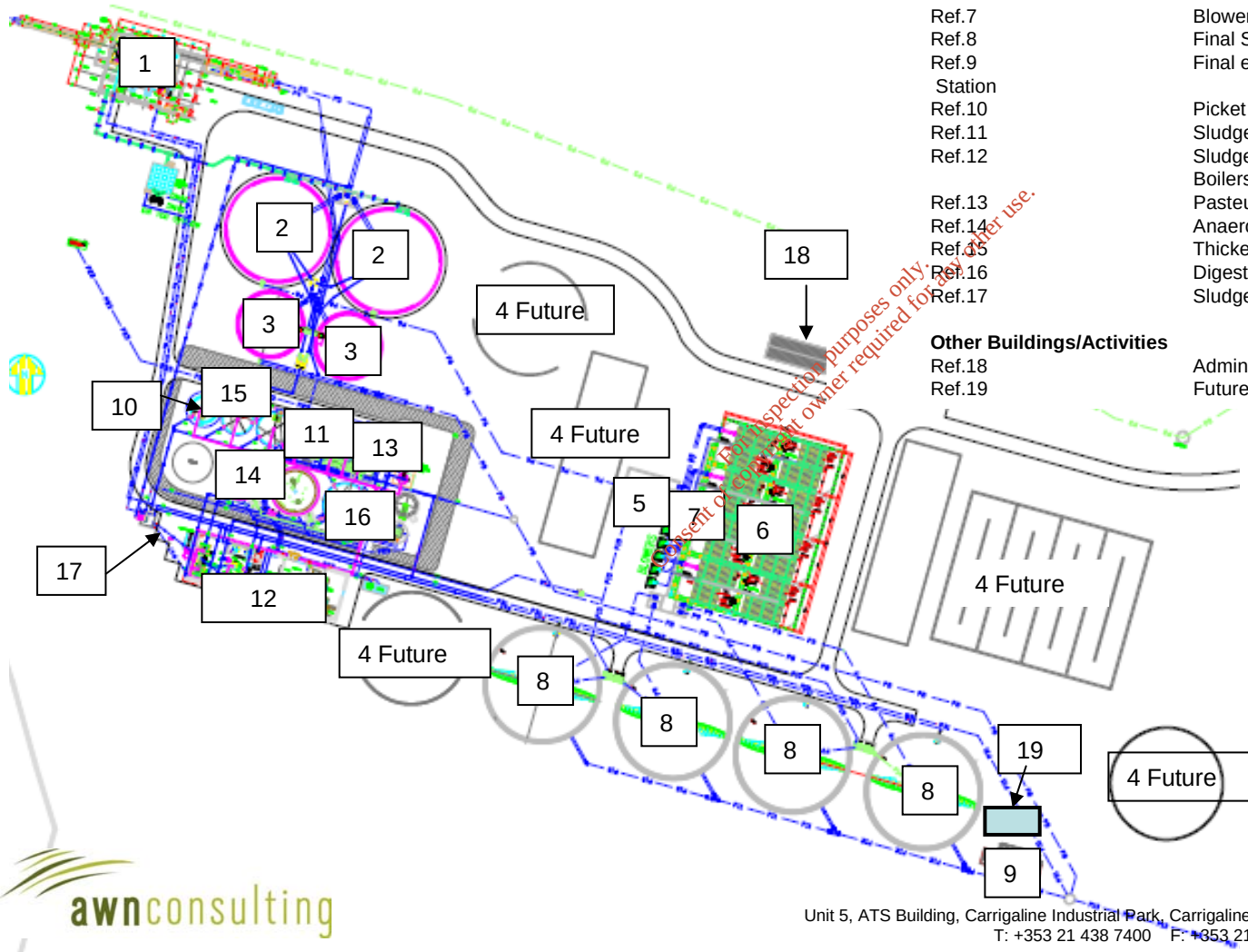

Primary Treatment

Ref.1	Works Inlet Building
Ref.2	Primary Settlement Tanks (2 no.)
Ref.3	Storm Tanks (2 no.)
Ref.4	Area for Future Development

Secondary Treatment

Ref.5	Selector Tank
Ref.6	Inclined Bubble Aeration (IBA) Tanks (4 no.)
Ref.7	Blowers (5 no.)
Ref.8	Final Settlement Tanks (4 no.)
Ref.9	Final effluent (FE) Sampling and Washwater Pumping Station
Ref.10	Picket Fence Thickener
Ref.11	Sludge Blending Tank
Ref.12	Sludge Building (Sludge Dewatering Belt Presses, Boilers, Generator, MCC, Electrical Switchgear)
Ref.13	Pasteurisation System
Ref.14	Anaerobic Digestors
Ref.15	Thickened Sludge Tanks
Ref.16	Digested Sludge Tank
Ref.17	Sludge Waste Storage Containers

Other Buildings/Activities

Ref.18	Administration Building
Ref.19	Future U.V. Treatment Location

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Waterford WWTP Waste Licence

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07_4084D.2.1

Figure D.2.1

Location of Plant and Activities on Site

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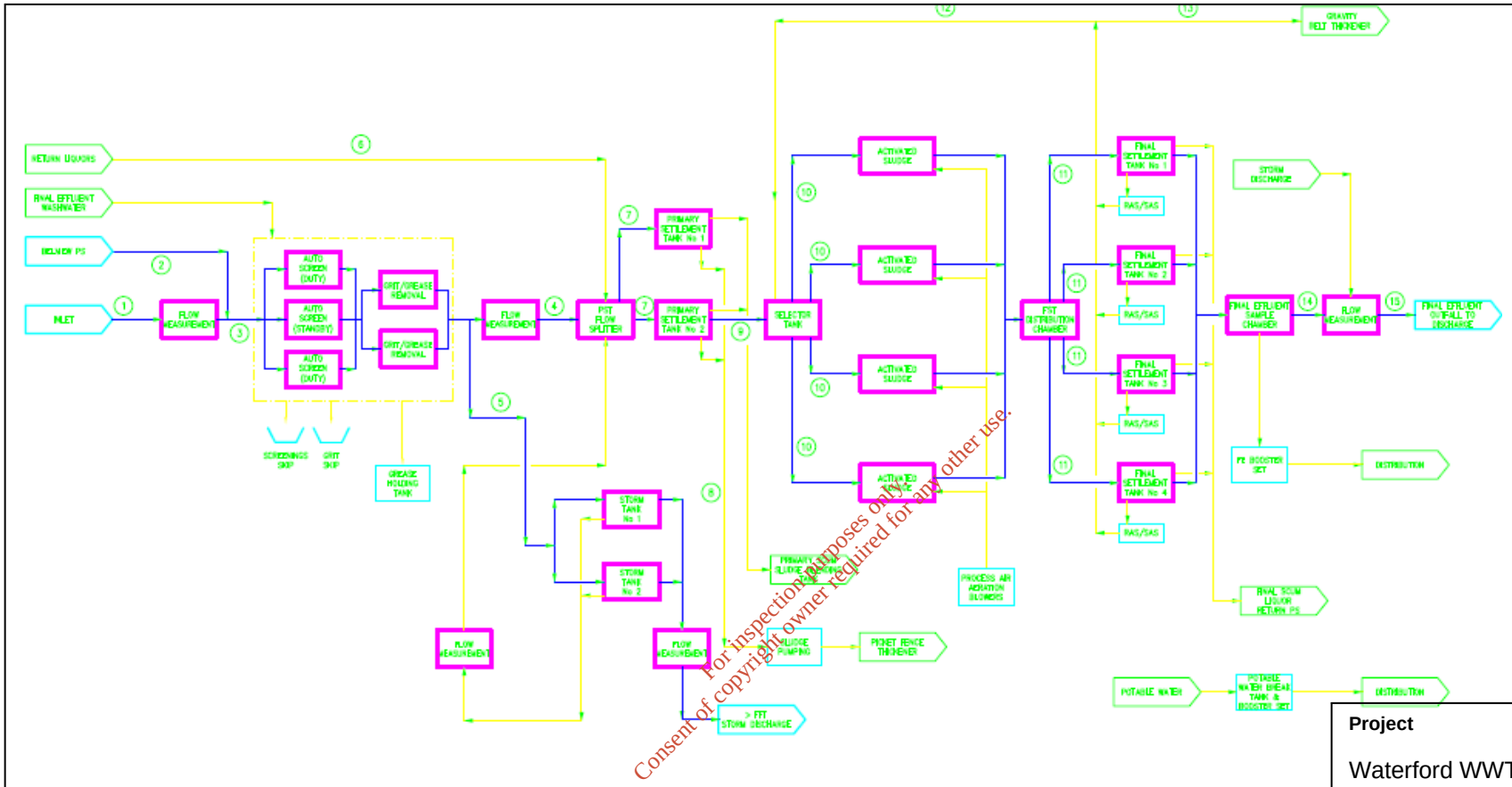

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Figure D.2.2

Overall Flow Diagram of the WWTP

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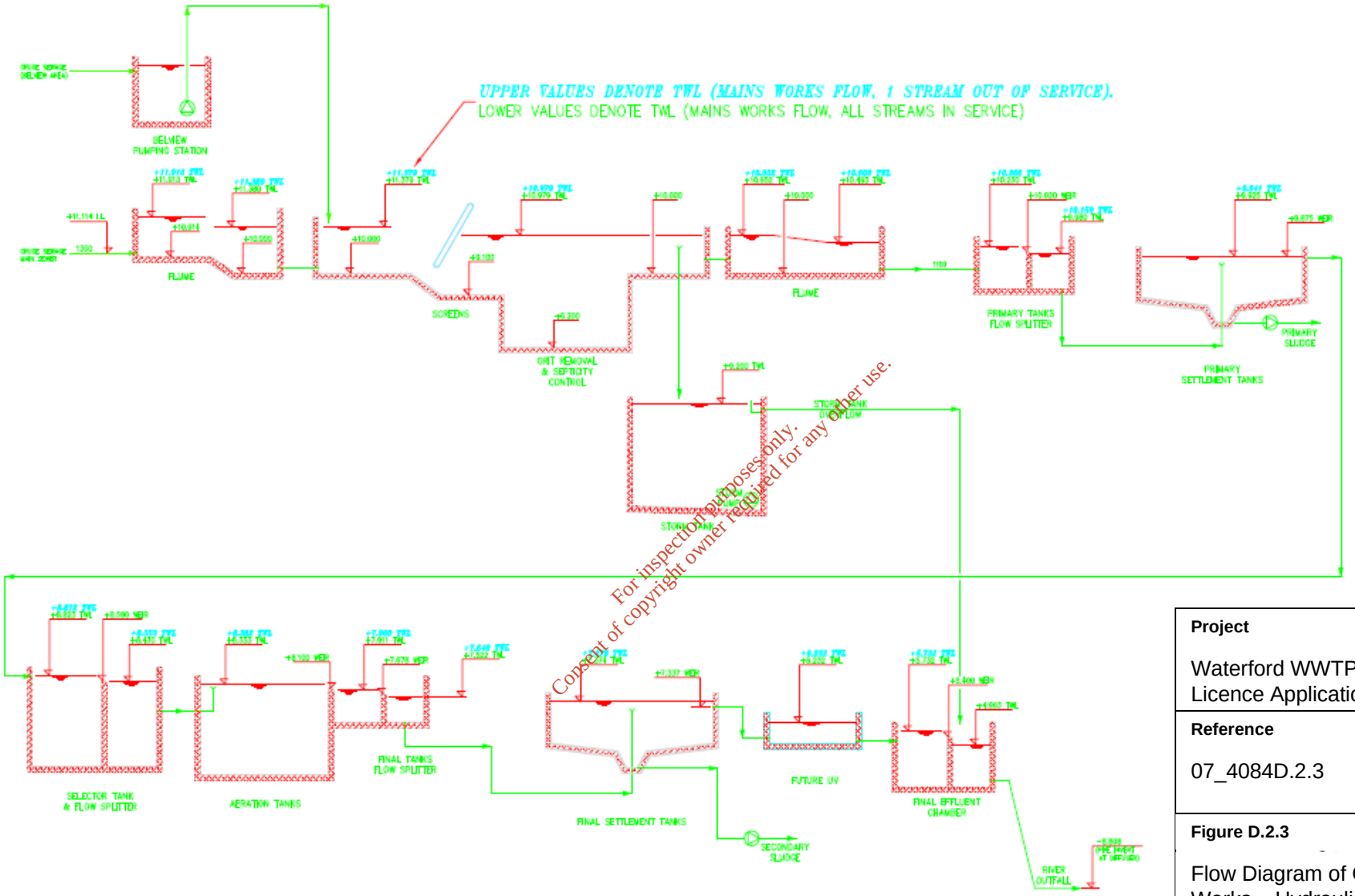

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07_4084D.2.3

Figure D.2.3

Flow Diagram of Overall Works – Hydraulic Works

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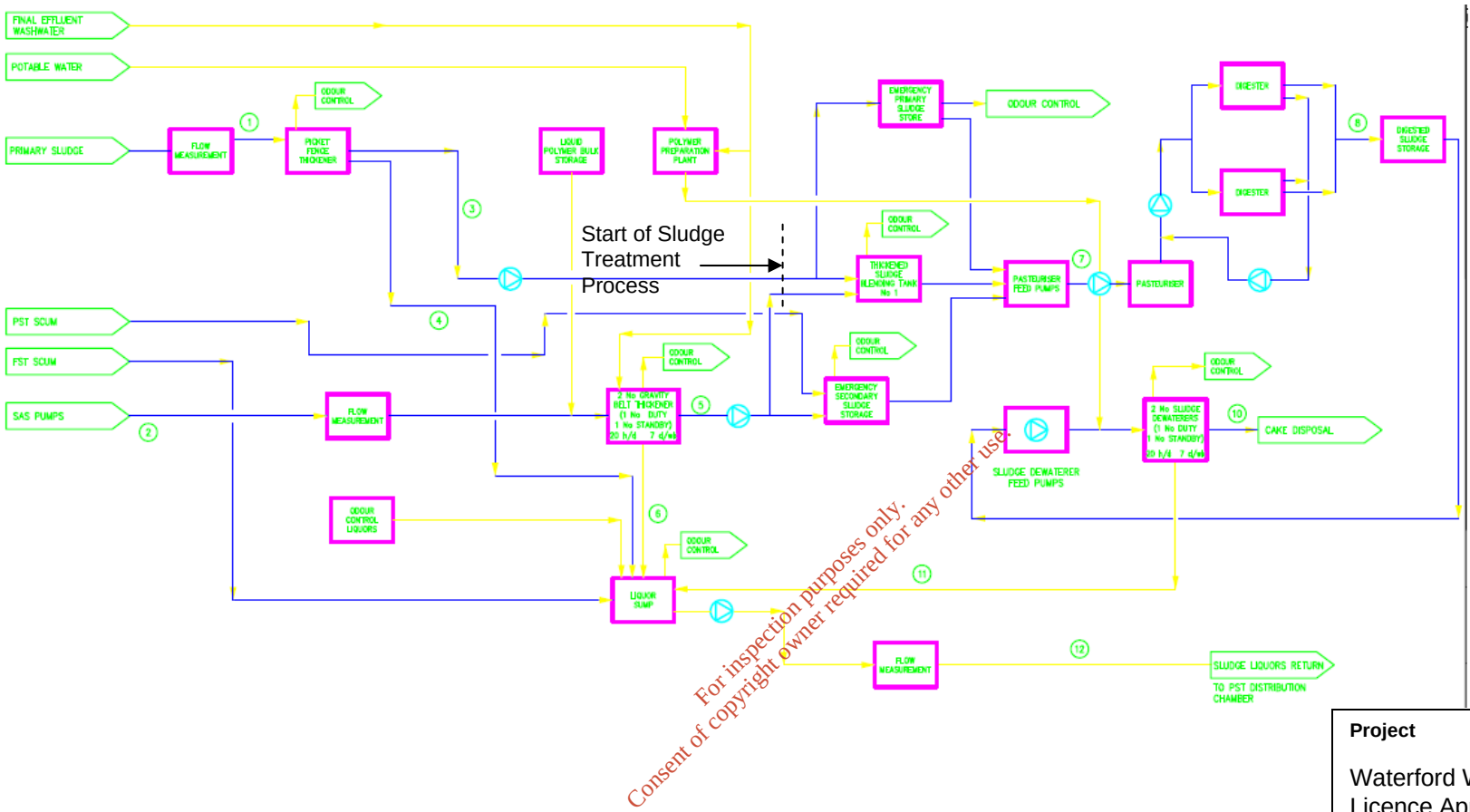

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Figure D.2.4

Flow Diagram of Sludge Works

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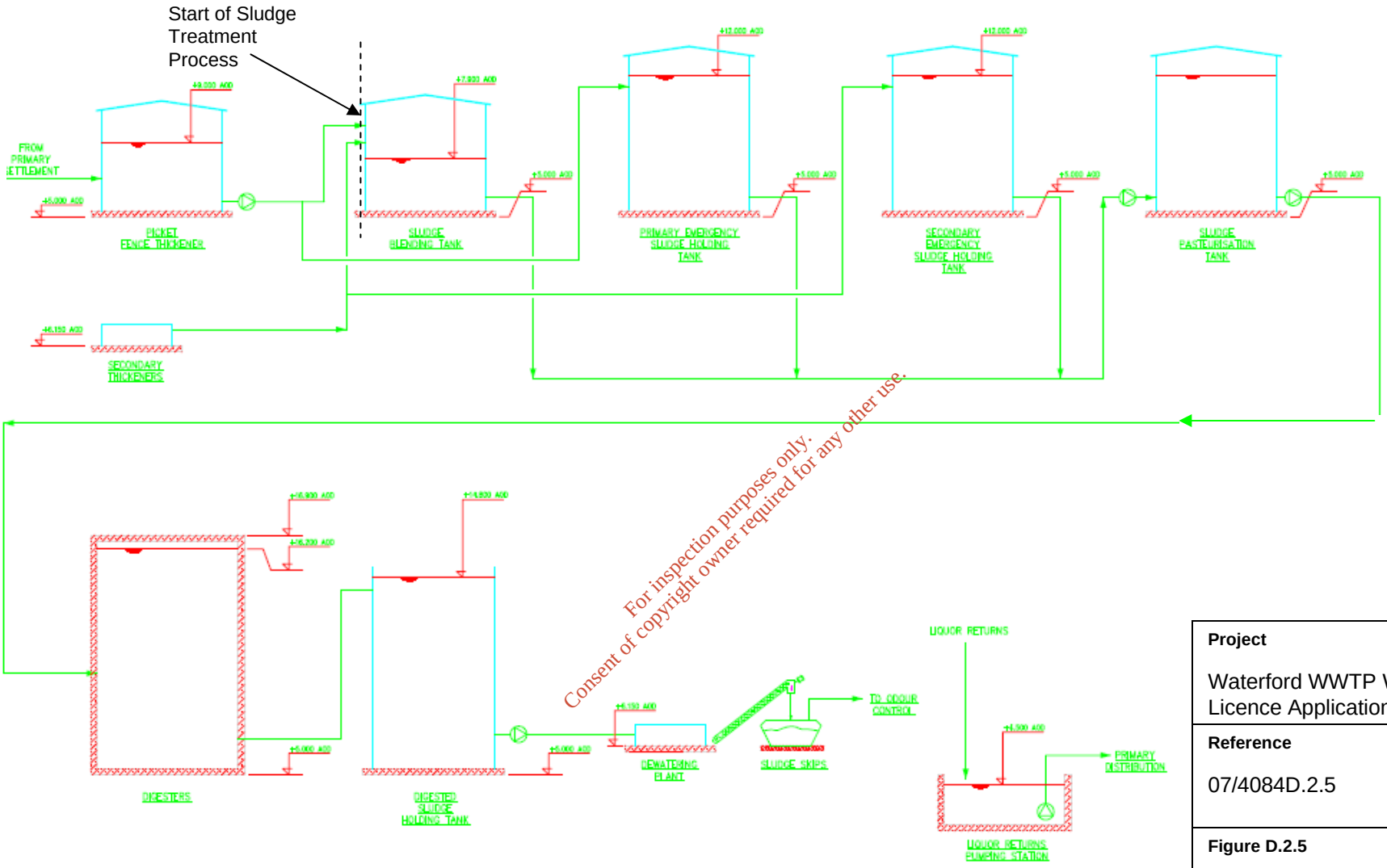

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Figure D.2.5

Flow Diagram of Sludge Works – Hydraulic Profile

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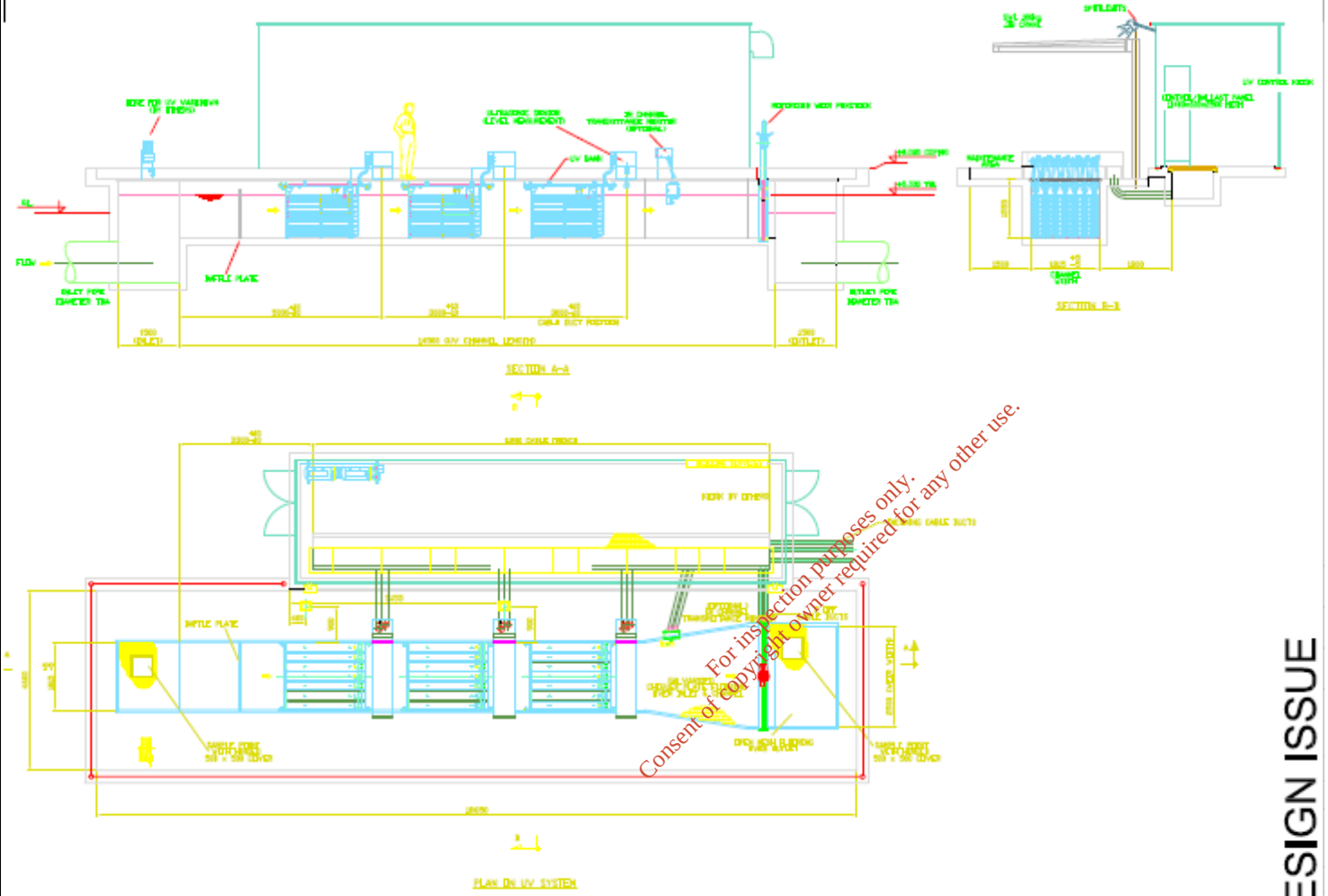

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Figure D.2.6

Diagram of Future U.V. Treatment Works

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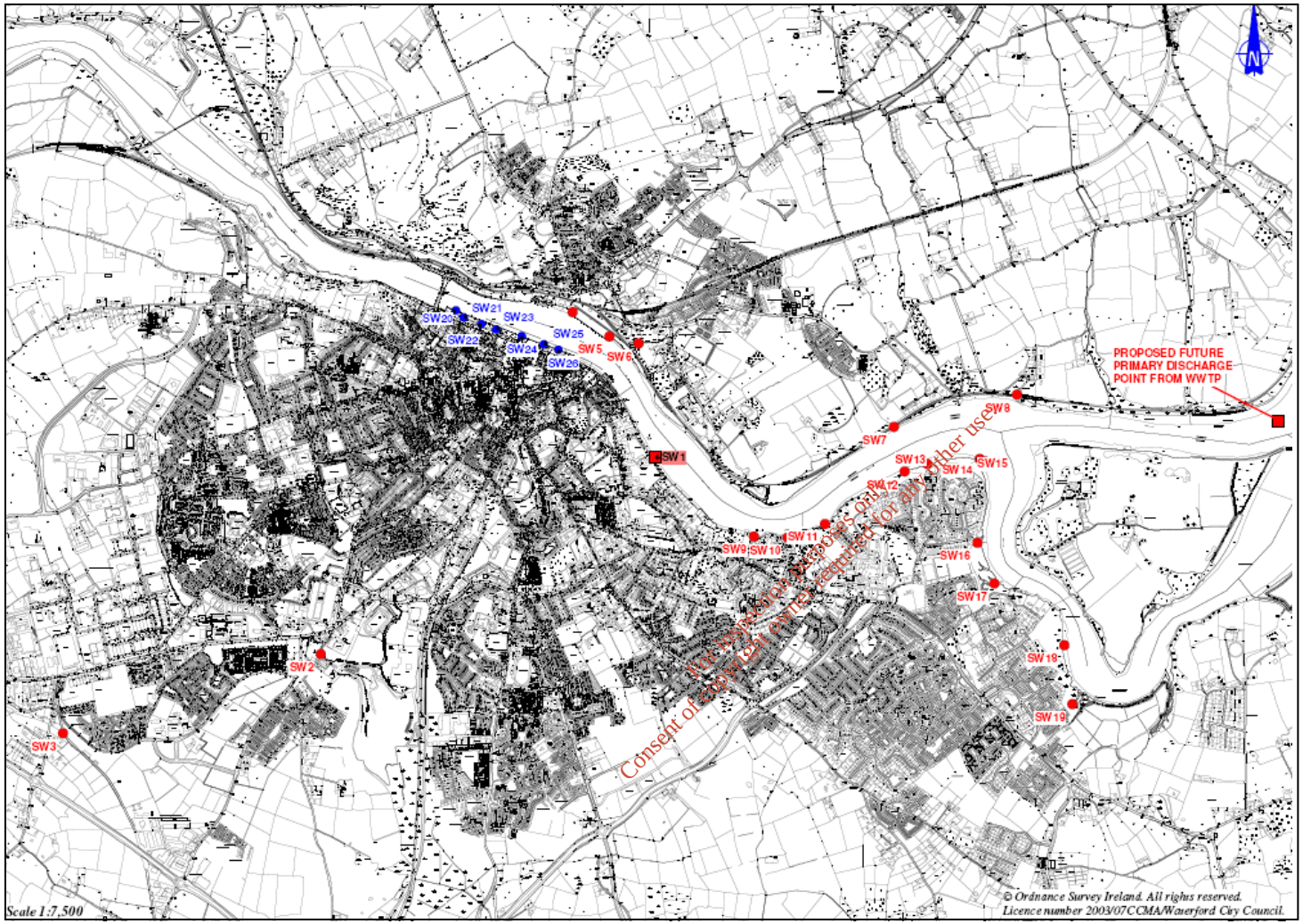

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Note: Figure taken from Map 11 – Attachment B.4.5 of Mott McDonald Wastewater Discharge Licence Application (Project 241198)

Project

Waterford WWTP Waste Licence Application

Reference

07/4084D.2.7

Figure D.2.7

Location of Existing and New Wastewater Outfalls

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Attachment E.1

Emissions to Atmosphere

Emissions to atmosphere are dealt with in this attachment. As can be seen from the headings below, the emissions to atmosphere will be:

- Odour
- Emissions from the boilers for the pasteurisation process (that utilizes biogas from the anaerobic digestion process)
- Emissions from the waste burner (that burns off excess biogas from the anaerobic digestion process)

These are detailed in Section E.1 (g).

(a) Composting Emissions
Not Applicable

(b) Particulates – waste storage/treatment/handling
Not Applicable

(c) Landfill Gas Emissions
Not Applicable

(d) Landfill Leachate Emissions
Not Applicable

(e) Infectious organisms/pathogens (clinical waste handling)
Not Applicable

(f) Thermal oxidizer Emissions
Not Applicable

(g) Other Emissions

Odour

The most odorous processes across the plant are generated within the inlet works and primary tanks and the sludge building, which will generate mainly hydrogen sulphide (H_2S). Although there are a number of areas where odour emissions are generated, there are only 2 no. point source emissions. The odour emission points are as follows:

OCU-01 Odour Control Unit for the Inlet Works and Primary Settlement Tanks (Stack Emissions)
OCU-02 Odour Control Unit for the Sludge Building (Stack Emissions)

The odour emission points are shown in Figures E.1.1 and E.1.2.

A number of minor sources of odour were also noted, however these are not considered to be odour emission points and have not been assigned emission point references. These emission sources are:

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- Belview pumping station
- Selector tanks distribution chamber
- Aeration lanes
- Storm tanks
- Final settlement tanks
- Digested sludge holding tank

The foul air from each of the main odour sources, i.e. the inlet works & primary tanks, and the sludge building, is each directed to an odour control unit (OCU1 and OCU2). The treated foul air is then released through a stack to the atmosphere.

An odour dispersion model has been generated to show the predicted resulting odour levels at the boundary and at receptors close to the site. This odour model has taken into consideration all the odour emission sources on the site and is included as Appendix 2.2 of the EIS Update report. Details of the mitigation measures to reduce odours from the site are provided in Section F of this application.

There are not expected to be any fugitive emissions during normal operating conditions.

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Air Emissions

The air emissions, will be from the boilers that heat the water for the pasteurization process. These boilers (2 no.) will utilize the biogas that is generated during the anaerobic digestion process. The biogas will be stored in a tank and used as required for the boilers. Air emission points are shown in Figures E.1(1) and E.1.2.

The excess biogas that is surplus to requirements will be burned off using an on-site gas burner. As this burner has no continuous volumetric flow (<5m/sec), and all hydrogen sulphide will be burned off, this is not considered to be an emission point and has been included as a minor emission.

The air emission points are as follows:

A-01(a)	Hot Water Boiler 1 for Pasteurisation Process
A-01(b)	Hot Water Boiler 2 for Pasteurisation Process

The main emissions from the Hot Water Boilers will be NOx and CO. Details of these emissions are outlined in Table E.1(ii) and E.1(iii). The waste gas burner will have emissions of H_2S which will be flared/burned off as outlined in Table E.1 (iv).

Bioaerosols

Wastewater treatment plants can be a source of airborne pathogens. Bioaerosols carry pathogens and molecules such as allergens and toxins. Allergenic reactions from exposure to allergens and toxins are possible.

However, it is not anticipated that bioaerosols from the aeration tanks will be an issue for the facility. It is standard practice in the water treatment industry not to cover aeration tanks as the air rising from the tanks is not malodorous

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(i.e. does not contain hydrogen sulphide). In addition, the aeration tanks for the facility are not located in close proximity to the rest of the plant.

The aeration tanks use the submerged system of aeration, rather than surface aeration and this further reduces the potential of bio-aerosol generation. Furthermore, the wastewater treatment plant will be running at optimum conditions, which will minimize the risk of generation of bioaerosols.

Therefore the aeration tanks are not considered to be an emission point.

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

Emission Point Ref. N^{o}:	OCU-1
Source of Emission:	Odour Control Unit 1
Location :	Adjacent to Inlet Works
Grid Ref. (12 digit, 6E,6N):	E 264547 N 112429
Vent Details Diameter: Height above Ground(m):	 570 mm 10
Date of commencement:	Aug. 2008

Characteristics of Emission :

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(i) Volume to be emitted:			
Average/day	331,560 m^3/d	Maximum/day	331,560 m^3/d
Maximum rate/hour	54,000 m^3/h	Min efflux velocity	15.0 $m.sec^{-1}$
(ii) Other factors			
Temperature	Ambient Conditions ^{o}C(max)	Ambient Conditions ^{o}C(min)	Ambient Conditions ^{o}C(avg)
For Combustion Sources: Volume terms expressed as : ☐ wet. ☐ dry. $\%O_2$			

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

Periods of Emission (avg)	60 min/hr 24 hr/day 365day/yr

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

Emission Point Ref. N^{o}:	OCU-2
Source of Emission:	Odour Control Unit 2
Location :	Sludge Building
Grid Ref. (12 digit, 6E,6N):	E 264624 N 112338
Vent Details Diameter: Height above Ground(m):	 360 mm 8
Date of commencement:	Aug. 2008

Characteristics of Emission :

(i) Volume to be emitted:			
Average/day	121,008 m^3/d	Maximum/day	121,008 m^3/d
Maximum rate/hour	50,760 m^3/h	Min efflux velocity	14.1 $m.sec^{-1}$
(ii) Other factors			
Temperature	Ambient Conditions ^{o}C(max)	Ambient Conditions ^{o}C(min)	Ambient Conditions ^{o}C(avg)
For Combustion Sources: Volume terms expressed as: ☐ wet. ☐ dry. $\%O_2$			

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(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

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

Emission Point Ref. Nº:	A-01(a)
Source of Emission:	Hot Water Boiler 1
Location :	Sludge Building
Grid Ref. (12 digit, 6E,6N):	E 264576 N 112295
Vent Details Diameter: Height above Ground(m):	 300 mm 14.13
Date of commencement:	Aug. 2008

Characteristics of Emission :

(i) Volume to be emitted:			
Average/day	22464 m^3/d	Maximum/day	22464 m^3/d
Maximum rate/hour	936 m^3/h	Min efflux velocity	7 $m.sec^{-1}$
(ii) Other factors			
Temperature	°C(max)	°C(min)	90 °C(avg)
For Combustion Sources: Volume terms expressed as :	☐ wet.	X dry.	3-5 %O_2

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(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 365day/yr

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

Emission Point Ref. N^{o}:	A-01(b)
Source of Emission:	Hot Water Boiler 2
Location :	Sludge Building
Grid Ref. (12 digit, 6E,6N):	E 264580 N 112295
Vent Details Diameter: Height above Ground(m):	 300 mm 14.13
Date of commencement:	Aug. 2008

Characteristics of Emission :

(i) Volume to be emitted:			
Average/day	22464 m^3/d	Maximum/day	22464 m^3/d
Maximum rate/hour	936 m^3/h	Min efflux velocity	7 $m.sec^{-1}$
(ii) Other factors			
Temperature	^{o}C(max)	^{o}C(min)	90 ^{o}C(avg)
For Combustion Sources:			
Volume terms expressed as :	☐ wet.	X dry.	3-5 %O_2

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(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 365day/yr

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

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

Parameter	Prior to treatment(1)				Brief description of treatment	As discharged(1)					
	mg/Nm^3		kg/h			mg/Nm^3		kg/h.		kg/year	
	Avg	Max	Avg	Max		Avg	Max	Avg	Max	Avg	Max
Hydrogen Sulphide	28.82	28.82	0.40	0.40	Directed to Odour Control Unit 1	0.29	0.29	0.004	0.004	35.04	35.04

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

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

Emission Point Reference Number: ***OCU-2***

Parameter	Prior to treatment(1)				Brief description of treatment	As discharged(1)					
	mg/Nm^3		kg/h			mg/Nm^3		kg/h.		kg/year	
	Avg	Max	Avg	Max		Avg	Max	Avg	Max	Avg	Max
Hydrogen Sulphide	74.33	74.33	0.38	0.38	Directed to Odour Control Unit 2	0.74	0.74	0.0038	0.0038	33.288	33.288

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

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

Emission Point Reference Number: ***A-01(a)***

Parameter	Prior to treatment(1)				Brief description of treatment	As discharged(1)					
	mg/Nm^3		kg/h			mg/Nm^3		kg/h.		kg/year	
	Avg	Max	Avg	Max		Avg	Max	Avg	Max	Avg	Max
NO_X	100	100	0.094	0.094	None	100	100	0.094	0.094	823	823
CO	60	60	0.056	0.056	None	60	60	0.056	0.056	491	491

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

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

Emission Point Reference Number: ***A-01(b)***

Parameter	Prior to treatment(1)				Brief description of treatment	As discharged(1)					
	mg/Nm^3		kg/h			mg/Nm^3		kg/h.		kg/year	
	Avg	Max	Avg	Max		Avg	Max	Avg	Max	Avg	Max
NO_X	100	100	0.094	0.094	None	100	100	0.094	0.094	823	823
CO	60	60	0.056	0.056	None	60	60	0.056	0.056	491	491

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

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TABLE E.1(iv): EMISSIONS TO ATMOSPHERE - Minor /Fugitive

Emission point Reference Numbers	Description	Emission details[1]				Abatement system employed
		material	mg/Nm^{3} (2)	kg/h.	kg/year	
A-02	Waste Burner (Ground Flare Stack E264518 N112409). Vent diameter 1250 mm, Height above ground level 5.2 m	H_2S	283	Not Applicable	Not Applicable	None Required. Volumetric flow is <5 m/sec, and all H_2S is burned off

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1 The maximum emission should be stated for each material emitted, the concentration should be based on the maximum 30 minute mean.
2 Concentrations should be based on Normal conditions of temperature and pressure, (i.e. 0^{o}C101.3kPa). Wet/dry should be clearly stated. Include reference oxygen conditions for combustion sources.

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07_4084E.1.1

Figure E.1.1

Emission to Atmosphere Points (1)

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Scale 1:2500

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07/4084E.1.2

Figure E.1.2

Location of Points of Emissions to Atmosphere (2)

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Attachment E.2

Emissions to Surface Waters

The emissions to surface water will be from the surface water runoff, from impermeable parts of the site (external to the sludge treatment section of the works) and the final treated effluent that will be discharged from the site to the Suir Estuary.

E.2 (a) Surface Water Runoff

Surface water runoff will be from all impermeable areas of the site as detailed in Attachment D.1 of this application.

As per the Treatment Plant Road & Associated Services – Design Statement by Ryan Hanley (Consulting Engineers), the road runoff will be collected via a system of swales and gullies draining to a trunk surface water pipe. This then discharges to the confluence of an existing stream, which runs along the eastern boundary of the site and the River Suir, at the southeastern corner of the site.

The emission point is as follows:

SW-01 Surface Water Discharge from the WWTP Site

The discharge point, SW-01, is located at the southeast corner of the WWTP site and is shown in Figure E.2.1. Tables E.2.(i) and (ii) show the details of the surface water runoff.

The trunk sewer is a 225 mm diameter pipe and will take runoff from the swales that drain an impermeable area of 1860 m^2 (described in Attachment E.4) and from the remaining impermeable area of the site (12,327 m^2) through a series of gullies and drains. Surface water drainage drawings, including invert levels and pipe sizes, are included as Figures E.2.2 – E.2.6.

A Class 1 bypass interceptor will be installed upstream of the outfall (see Figure E.2.1) to prevent any risk of hydrocarbon pollutants entering the receiving water, with a capacity to treat the flow from the impermeable areas draining to the sewer, i.e. 230 l/s.

Surface Water runoff areas within the bunded area, i.e. the immediate area surrounding the sludge treatment works, will be directed into the wastewater treatment works to the return liquors area and not discharged to the surface water collection system. This surface water will be returned to the top of the wastewater treatment works via return liquors and re-enter the treatment system.

E.2 (b) Final Treated Effluent (FTE)

The final treated effluent (FTE) will be discharged through an outfall to the Suir Estuary, downstream of the WWTP. The emission point is as follows:

SW-02 Final Treated Effluent (Foulwater) Discharge

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The FTE will be undergo primary and secondary treatment and the quality of the FTE will be to a standard specified by the operating contract terms. These parameter limits are specified in the table below.

Parameter	Unit	Standard		Compliance Criteria	
		Target A	Target B	Target A	Target B
BOD	mg/l	25	50	No more than 3 daily samples per 60 days with a value for any one parameter or all parameters to be greater than the standards	No samples with a value for any one parameter to be greater than the standard
COD	mg/l	125	250		
Suspended Solids	mg/l	35	87.5		

The discharge point for the FTE is shown in Figure E.2.7.

During the initial start-up period (3-4 months) the existing wastewater discharges will gradually be re-directed to the new outfall from the WWTP. There will be no change in the volume or quality of the discharge at the start of this period, and gradually the effluent quality will improve as the WWTP processes are commissioned and come online.

It should be noted that Tables E.2 (i) do not state the flow rate in the receiving waters. The receiving waters in this case is the Suir Estuary, which is tidal where discharge point SW-02 is located. Therefore, and in consultation with the hydrometrics section of the EPA (Kilkenny), a representative flow rate is not determinable.

In addition, because of the tidal regime, and also because a previous modelling exercise has been carried out for the final treated effluent and the impact on the water quality of the Suir Estuary, the assimilative waste capacity has not been determined for the purpose of this application. For details of the modelling exercise and the resulting predicted impact on the Suir Estuary chemical and biological water quality, please refer to Appendix A of the Original EIS for the WWTP, included in Section B.3 of this waste licence application.

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

Emission Point: SW-01

Emission Point Ref. Nº:	SW-01
Source of Emission:	Surface Water Runoff
Location :	Southeast corner of WWTP site, at site boundary
Grid Ref. (10 digit, 5E,5N):	265022 112153
Name of receiving waters:	The Suir Estuary at the confluence of un-named Stream to east of Site and Suir Estuary
Flow rate in receiving waters:	Not Determined – Tidal Regime $m^3.sec^{-1}$ Dry Weather Flow Not Determined – Tidal Regime $m^3.sec^{-1}$ 95%ile flow
Available waste assimilative capacity:	(Refer to Appendix A in Original EIS, included in Section B.3) kg/day

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Emission Details:

(i) Volume to be emitted			
Normal/day	7,171.2 m^3	Maximum/day	20,995.2 m^3
Maximum rate/hour	873.2 m^3		

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

Periods of Emission (avg)	60 min/hr 24 hr/day 365 day/yr

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Emission Point: SW-02

Emission Point Ref. Nº:	SW-02
Source of Emission:	Final Treated Effluent
Location :	Middle of Suir Estuary, 500 m West-Southwest of WWTP Site
Grid Ref. (10 digit, 5E,5N):	265602 112078
Name of receiving waters:	Unnamed Stream, discharging to Suir Estuary
Flow rate in receiving waters:	Not Determined – Tidal Regime $m^3.sec^{-1}$ Dry Weather Flow Not Determined – Tidal Regime $m^3.sec^{-1}$ 95%ile flow
Available waste assimilative capacity:	(Refer to Appendix A in Original EIS, included in SectionB.3) kg/day

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Emission Details:

(i) Volume to be emitted			
Normal/day	35,704 m^3	Maximum/day	145,725 m^3
Maximum rate/hour	6071.875 m^3		

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

Periods of Emission (avg)	60 min/hr 24 hr/day 365 day/yr

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

Emission point reference number : SW-01

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	
Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

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Emission point reference number : SW-02

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	
Biological Oxygen Demand (BOD)	Not Applicable				25	50	0.89	324.85	Not Applicable
Chemical Oxygen Demand	Not Applicable				135	250	4.82	1759.3	Not Applicable
Suspended Solids	Not Applicable				35	87.5	1.25	456.25	Not Applicable

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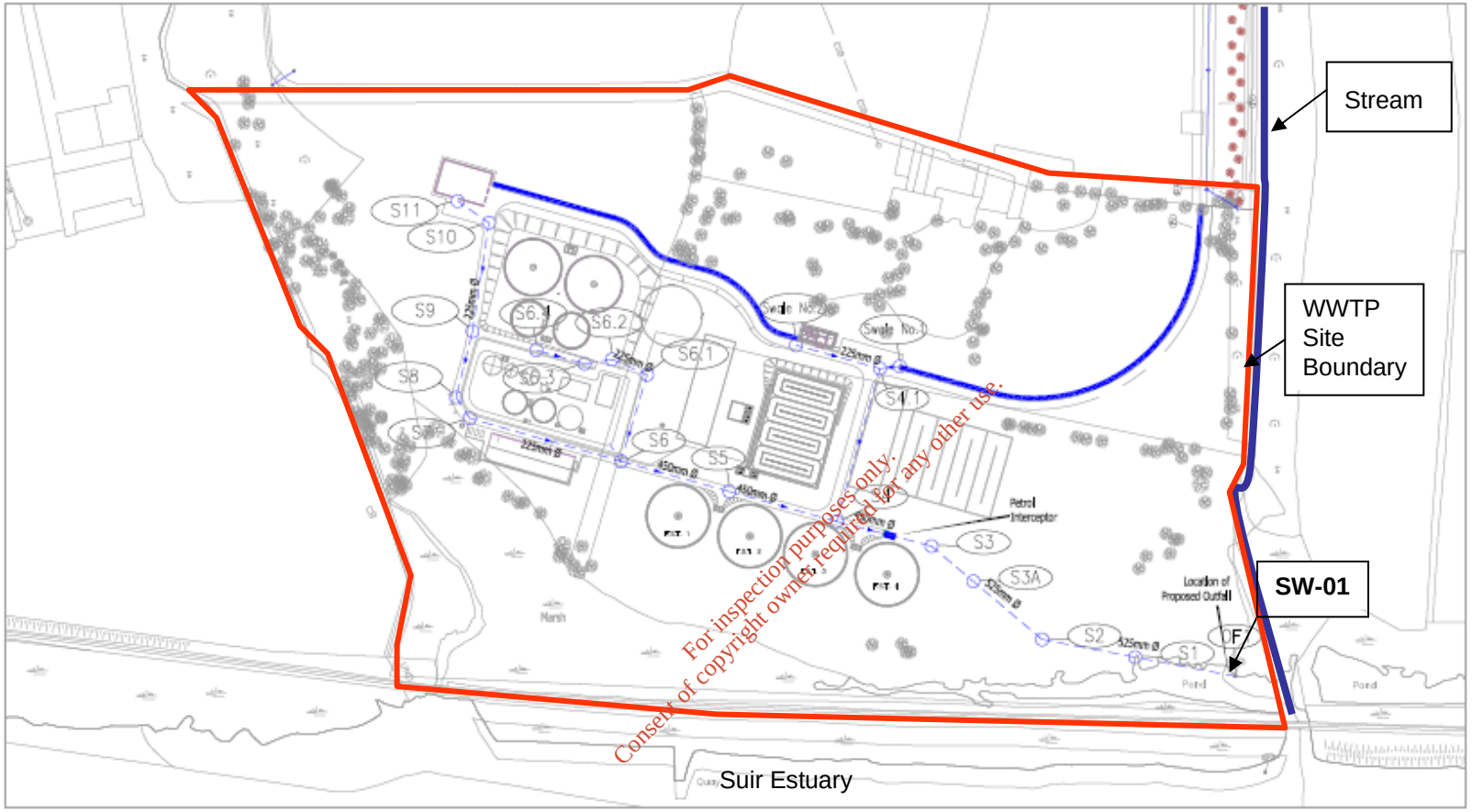

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LEGEND

Surface Water Sewer

Surface Water Swale

mark	by	date	Revision
A		06/07	Revised

client: WATERFORD CITY COUNCIL

project: WATERFORD CITY WASTEWATER TREATMENT PLANT

description: Layout of Surface Water Collection Network

scales: 1:2,500

drawn: jr
checked: d
approved: mj

job no.: 1779

set no.:

date: May 2007

Ryan Hanley
consulting engineers

Sherwood House
Sherwood Avenue
Taylor's Hill
GALWAY

Figure E.2(1)

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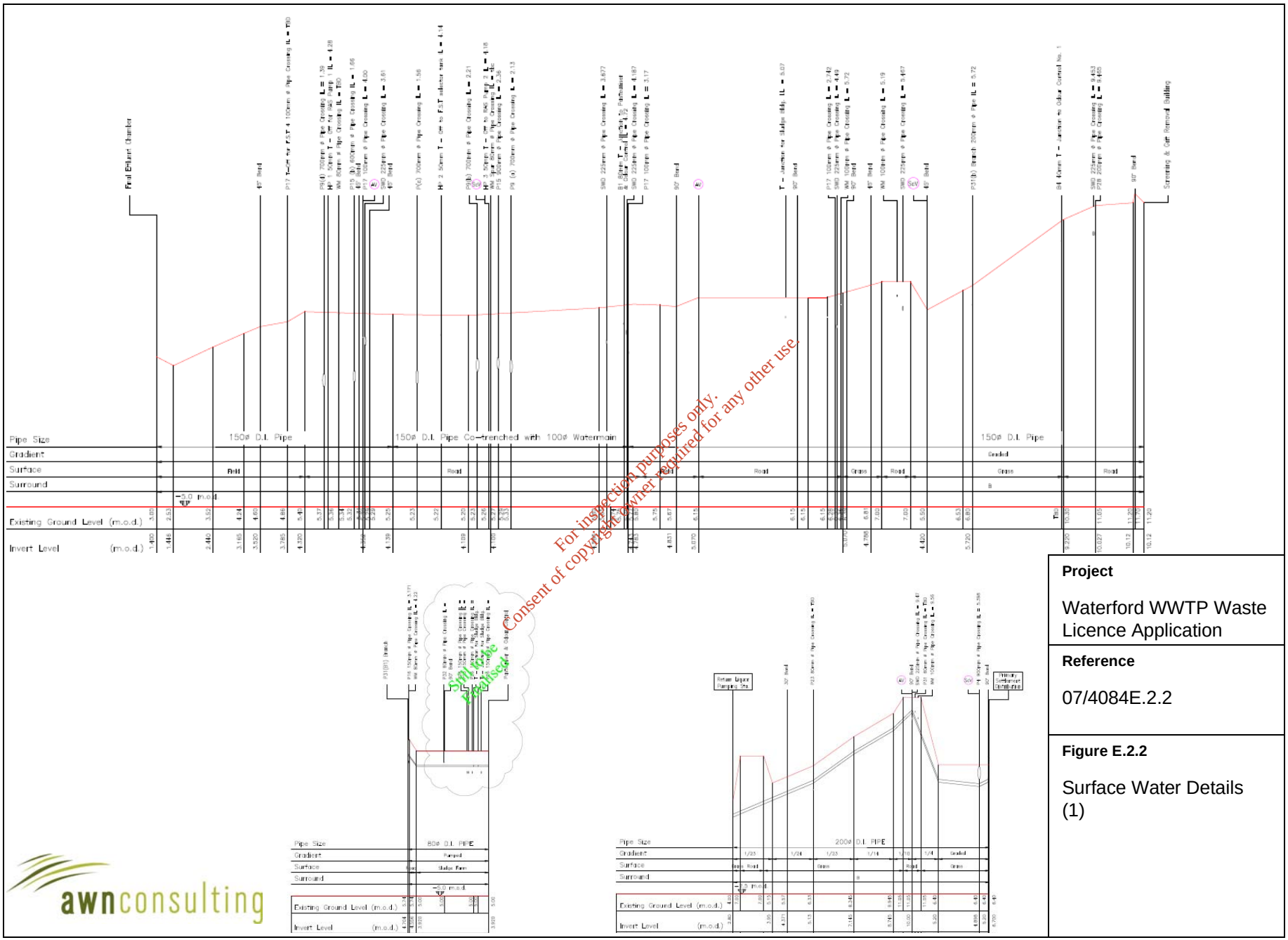

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Project

Waterford WWTP Waste Licence Application

Reference

07/4084E.2.2

Figure E.2.2

Surface Water Details (1)

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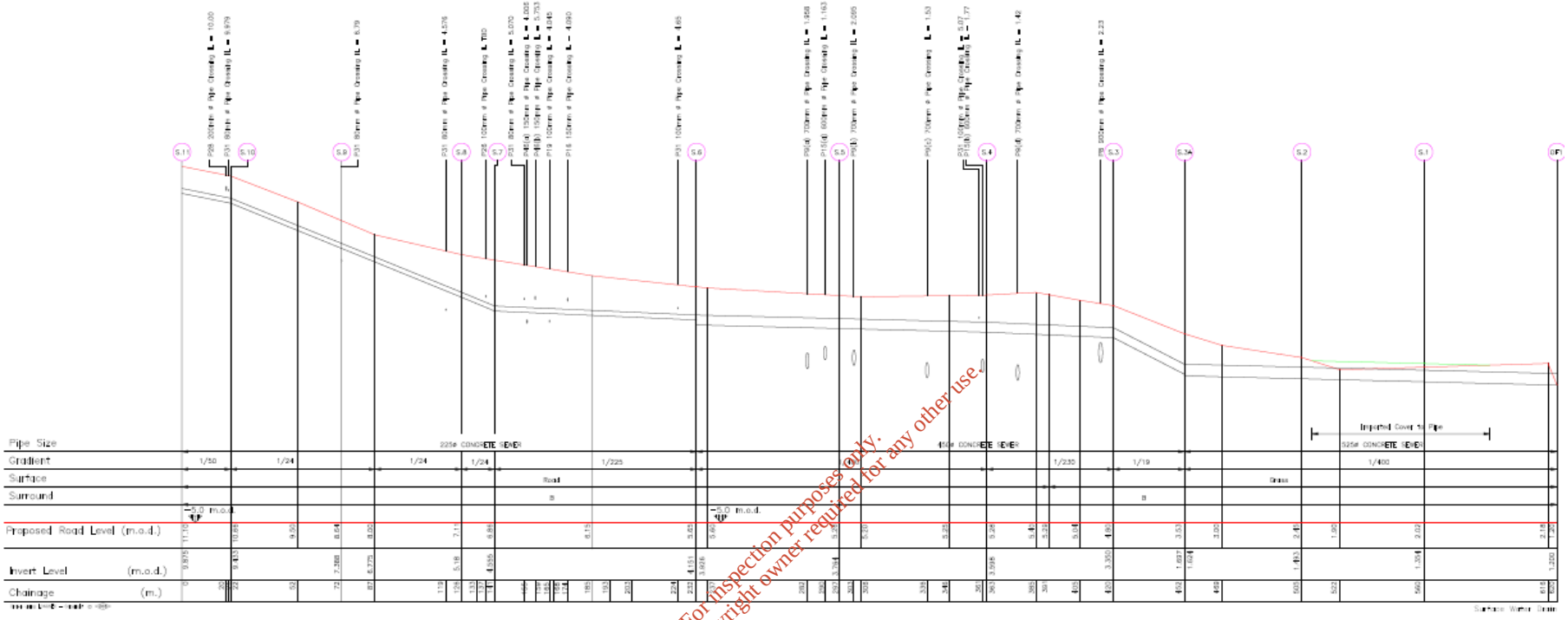

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07/4084E.2.3

Figure E.2.3

Surface Water Details (2)

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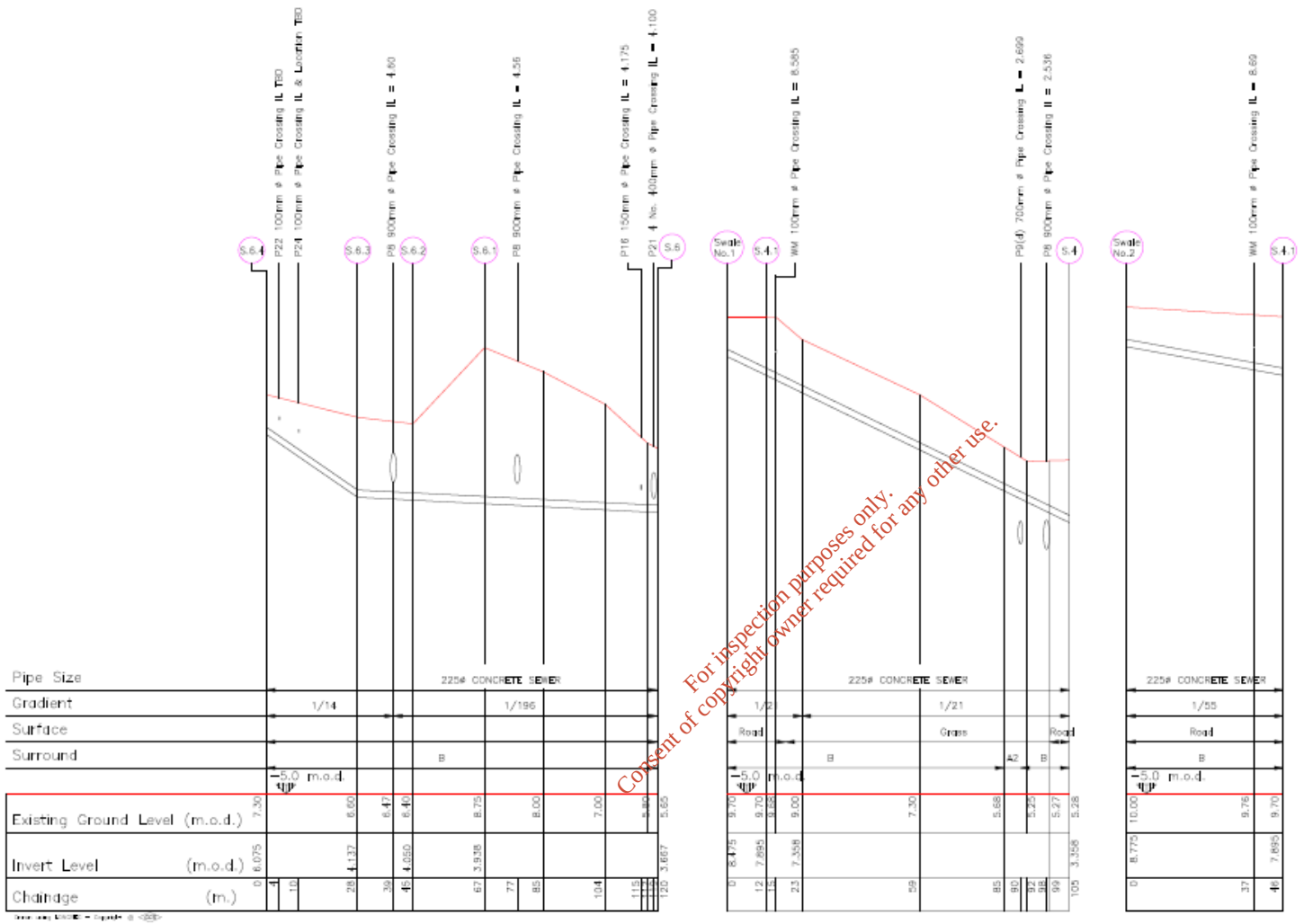

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Figure E.2.4

Surface Water Details (3)

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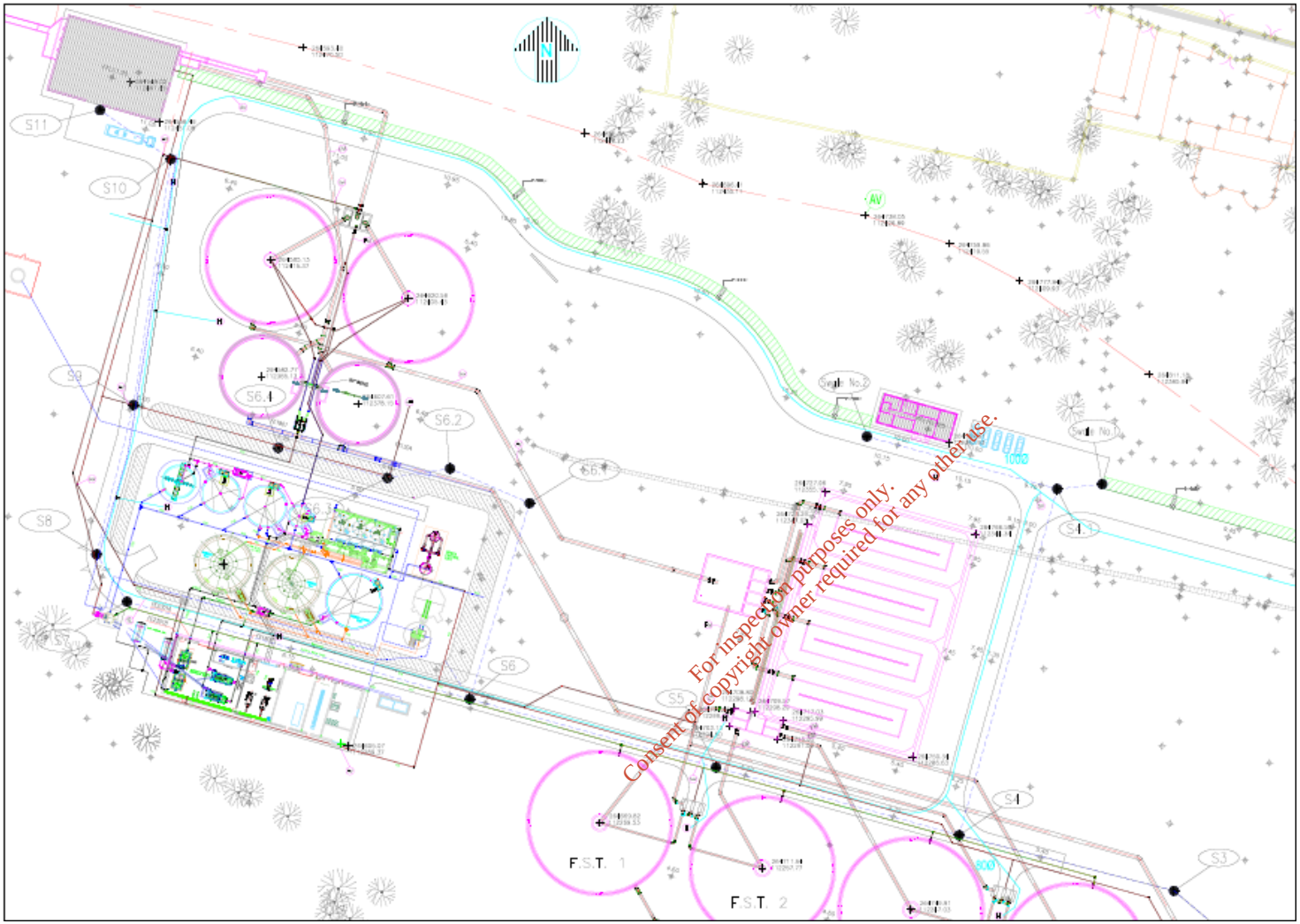

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LEGEND

- Proposed Process Pipework
- Surface Water Drain
- Manhole
- Hydrant (H)
- Sluice Valve (SV)
- Flow Meter (FM)
- Scour Valve (ScV)
- Air Valve (AV)
- Watermains

Scale 1:500

Project

Waterford WWTP Waste Licence Application

Reference

07/4084E.2.5

Figure E.2.5

Surface Water Drainage Details (5)

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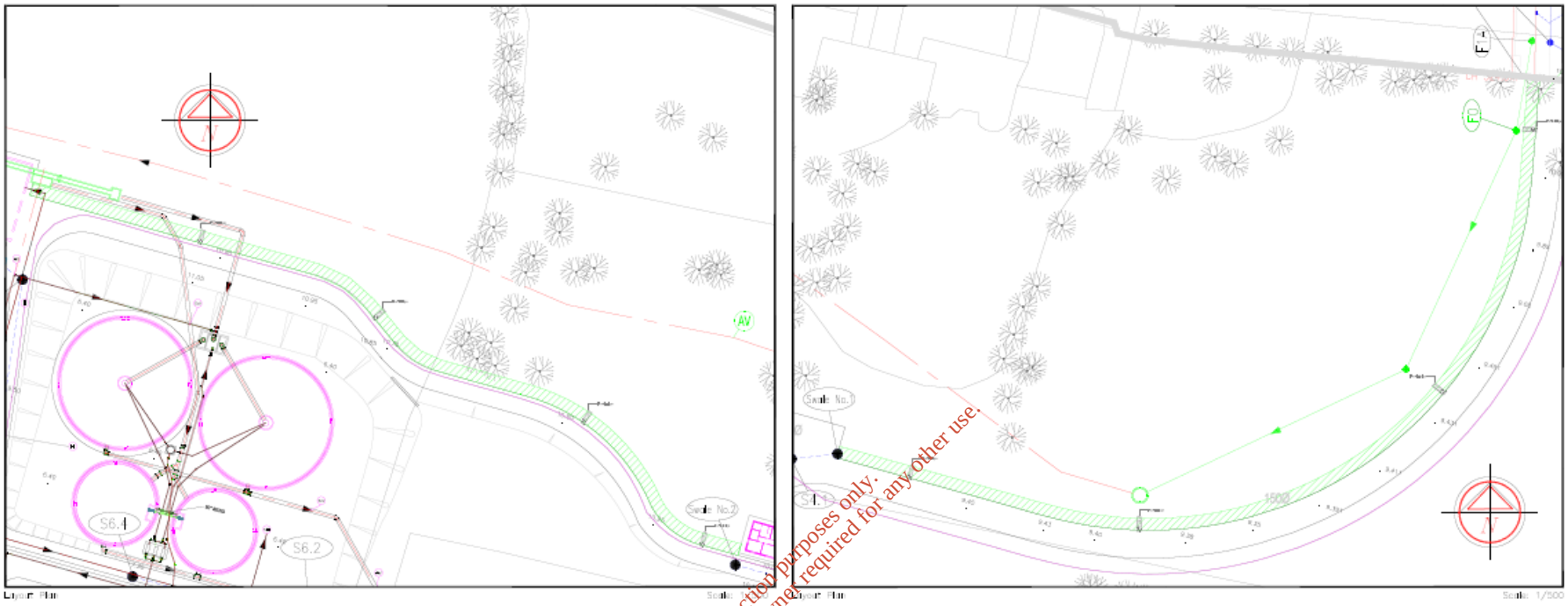

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Reference

07/4084E.2.6

Figure E.2.6

Surface Water Details (5) Swales

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Appendix E.2.7

Surface Water Drainage Calculations

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Extreme Rainfall Return Periods

Location: Waterford City

Average Annual Rainfall: 1002mm

Maximum rainfall (mm) of indicated duration expected in the indicated return period.

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Duration	Return Period (years)								
	1/2	1	2	5	10	20	30	50	100
1 min				1.8	2.0	2.4	2.6	3.0	3.4
2 min				3.0	3.5	4.1	4.6	5.1	5.9
5 min				5.4	6.3	7.5	8.3	9.3	10.7
10 min				7.8	9.1	10.9	12.1	13.7	15.9
15 min	4.9	6.2	6.9	9.4	11.5	13.9	15.4	17.7	21
30 min	6.7	8.4	9.4	12.7	15.4	18.5	20.5	23	27
60 min	9.0	11.2	12.5	16.7	20.0	24	26	30	35
2 hour	12.2	14.8	16.6	21.8	26	31	34	38	44
4 hour	17.0	20.5	22.5	29	34	39	42	47	54
6 hour	20.8	24.9	27	35	40	46	50	56	63
12 hour	27.4	33	35	45	52	59	64	71	80
24 hour	34	40	44	55	63	72	78	85	96
48 hour	43	50	55	68	77	88	94	103	116

Notes: Larger margins of error for 1, 2 ,5 and 10 minute values and for 100 year return periods

M560: 16.7 M52d: 64 M560/m52d: 0.26

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DRAINAGE MODEL

JOB NO.:	1779
CALULATED BY:	JR
DATE:	June 2007

CHECKED BY:	CAL
DATE:	June 2007

PIPE CAPACITY CALCULATION

MODIFIED RATIONAL LLYODS METHOD

STORM RETURN PERIOD (YEARS)	-
FRICTION FACTOR (mm)	0.6
MAXIMUM RATE OF RAINFALL (mm/Hr)	50
TIME OF ENTRY (mins)	3

START MH	FINISH MH	PIPE DIA. (mm)	FALL 1 IN	START INVERT (mOD)	FINISH INVERT (mOD)	LENGTH (m)	GRADIENT	VELOCITY (m/s)	TIME OF FLOW (mins)	TIME OF CONCEN. (mins)	RATE OF RAINFALL (mm/Hr)	IMPERM. AREA (m^2)	CUM AREA (m^2)	RATE OF FLOW* (l/sec)	PIPE FLOW (l/sec)	COMMENTS	% CAPACITY REMAINING
Swale	S4.1	225	28	8.475	7.895	16	0.0363	2.5	0.11	3.25	50.00	204	1232	7.83	99.23	PIPE ADEQUATE	92%
Swale	S4.1	225	52	8.775	7.895	46	0.0191	1.8	0.42	3.57	50.00	612	1440	13.50	71.89	PIPE ADEQUATE	81%
S4.1	S4	225	20	7.895	3.358	93	0.0488	2.9	0.53	4.10	50.00	399	3071	26.88	115.23	PIPE ADEQUATE	77%
S6.4	S6.3	225	20.1	6.075	4.684	28	0.0497	2.9	0.16	3.30	50.00	300	300	4.17	116.29	PIPE ADEQUATE	96%
S6.3	S6.2	225	29.2	4.684	4.102	17	0.0342	2.4	0.12	3.42	50.00	1827	2127	29.54	96.41	PIPE ADEQUATE	69%
S6.2	S6.1	225	173	4.102	3.975	22	0.0058	1.0	0.37	3.79	50.00	0	2127	29.54	39.19	PIPE ADEQUATE	25%
S6.1	S6	225	172	3.975	3.667	53	0.0058	1.0	0.89	4.69	50.00	0	2127	29.54	39.32	PIPE ADEQUATE	25%
S11	S10	225	49.8	9.875	9.433	22	0.0201	1.9	0.20	3.34	50.00	886	1645	12.30	73.69	PIPE ADEQUATE	83%
S10	S8	225	24	9.433	5.180	104	0.0409	2.7	0.65	4.00	50.00	496	2141	19.19	105.44	PIPE ADEQUATE	82%
S8	S7	225	24	5.180	4.555	15	0.0417	2.7	0.09	4.09	50.00	70	2211	20.17	106.44	PIPE ADEQUATE	81%
S7	S6	225	102	4.555	3.667	91	0.0098	1.3	1.18	4.32	50.00	1505	3716	20.91	51.15	PIPE ADEQUATE	59%
-	S6	225	100	5.000	4.950	5	0.0100	1.3	0.06	4.24	50.00	0	1909	10.74	51.79	PIPE ADEQUATE	79%
S6	S5	450	404	3.442	3.281	65	0.0025	1.0	1.08	5.77	50.00	267	11469	143.51	159.17	PIPE ADEQUATE	10%
S5	S4	450	398	3.281	3.115	66	0.0025	1.0	1.09	6.86	50.00	267	11736	147.22	160.42	PIPE ADEQUATE	8%
S4	S3	450	62.8	3.115	2.207	57	0.0159	2.6	0.37	7.23	50.00	169	14976	212.22	407.84	PIPE ADEQUATE	48%
S3	S3A	450	63	2.207	1.699	32	0.0159	2.6	0.21	7.44	50.00	0	14976	212.22	407.13	PIPE ADEQUATE	48%
S3A	S2	525	402	1.625	1.493	53	0.0025	1.1	0.80	8.24	50.00	0	14976	232.22	239.59	PIPE ADEQUATE	3%
S2	S1	525	396	1.493	1.354	55	0.0025	1.1	0.82	8.26	50.00	0	14976	232.22	241.38	PIPE ADEQUATE	4%
S1	O/F	525	390	1.354	1.200	60	0.0026	1.1	0.89	9.15	48.87	0	14976	232.22	243.28	PIPE ADEQUATE	5%

*A flowrate of 5 l/sec is been allowed from each of the 2 surface water swales and a flowrate of 20 l/sec has been allowed from the land drain around the aeration tank and the final settlement tanks respectively

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RYAN HANLEY

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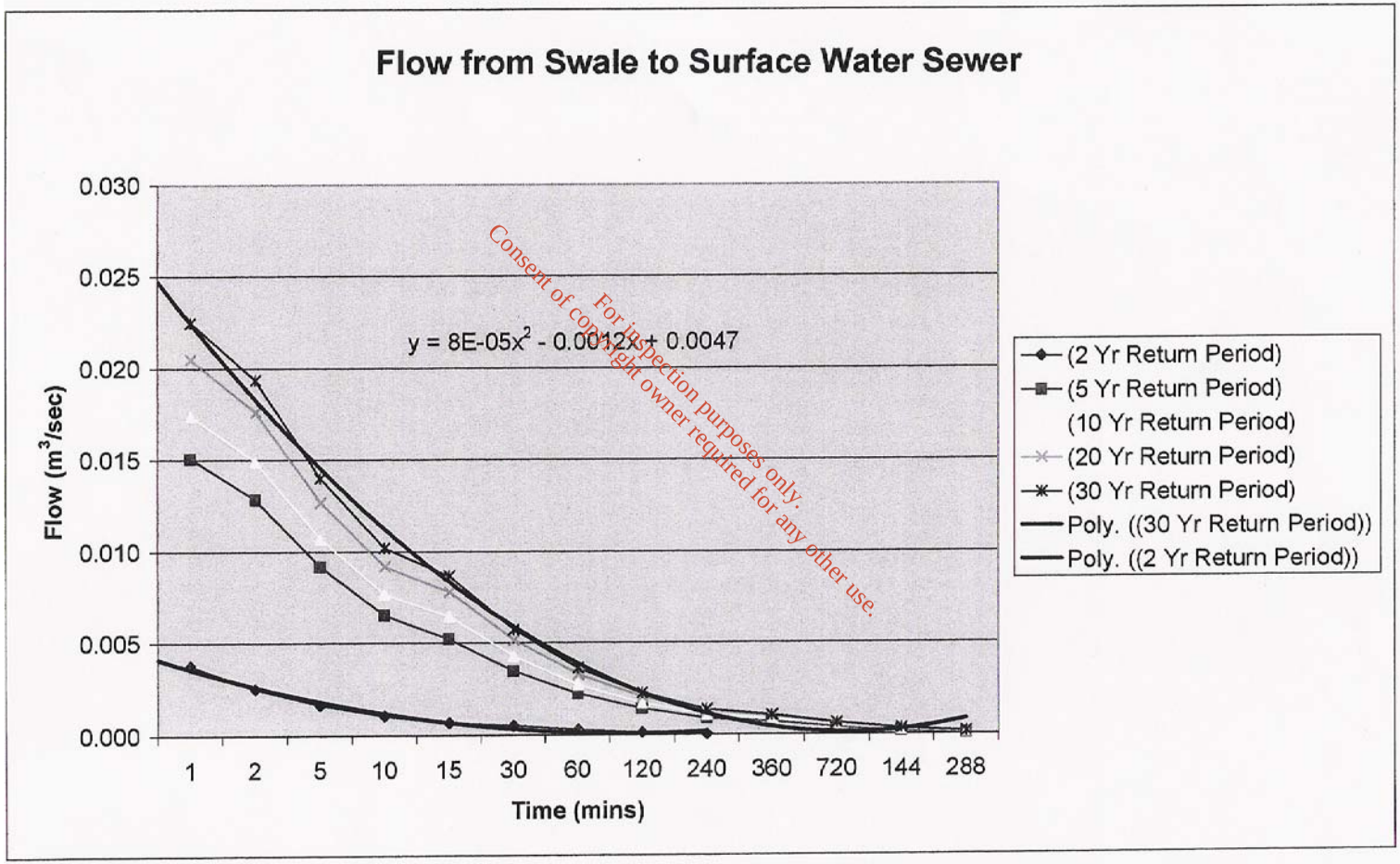

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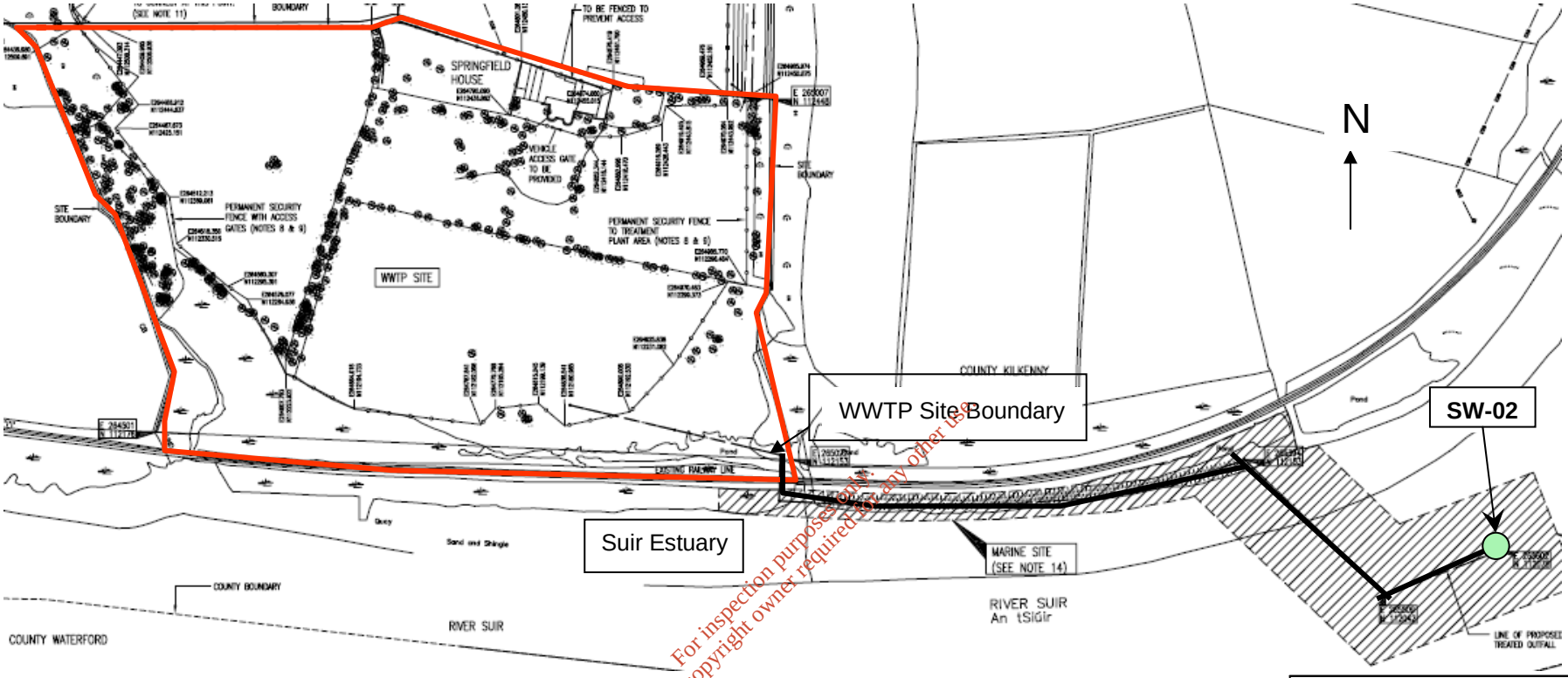

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07_4084E.2.8

Figure E.2(7)

Location of SW-02 (Outfall for Final Treated Effluent)

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Attachment E.4

Emissions to Ground Waters

The only emissions to ground waters will be from the surface water runoff from the roads, which will be directed into swales on the site and therefore not be a source emission.

The swales are a SUDS (Sustainable Urban Drainage Systems) component and are grassed depressions which lead surface water overland from a drained surface to a storage or discharge system. They are used for temporary storage, percolation of water into the ground (under suitable conditions), and for conveying water from one part of a site to another. The swales are utilised for mainly storage and conveyance purposes on this site.

The underlying soil is sandy clay with sandy gravelly clay in places (as per testing carried out and detailed in the following document 'Treatment Plant Road & Associated Services – Design Statement' by Ryan Hanley (Consulting Engineers). The underlying geology of the site is comprised of shales and siltstones which can be highly weathered in the upper layers and quite weak (information derived from Geological Survey of Ireland (GSI)). Therefore, there is potential for percolation into the soil environment.

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The two swales will run along the northern edge of the roads to the north of the site, i.e. from the WWTP entrance gate to the administration building and from the administration building to the inlet works building. The swales are shown in detail in Figure E.4(1) and the location of the swales is shown in Figure D.1.k(4) in the site infrastructure section of this application.

A trunk sewer will convey water from the swales (and from the remaining impermeable areas within the site) to a surface water discharge point (See Attachment E.2).

As the swales are only taking surface water runoff from the roads and impermeable areas in the northern portion of the site, an area of approximately 1860 m^2 (0.1 hectares), the emissions to ground are diffuse and expected to be insignificant. The clay environment will prevent a significant proportion of the runoff from permeating through to underlying bedrock or groundwater. Surface water runoff that does enter the ground will be attenuated by the relative thickness of soil and subsoil found during site investigations, i.e. a minimum of 3m depth.

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

Emission Point or Area:

Emission Point/Area Ref. N^{o}:	Not Applicable
Emission Pathway: (borehole, well, percolation area, soakaway, landspreading, etc.)	
Location :	
Grid Ref. (10 digit, 5E,5N):	
Elevation of discharge: (relative to Ordnance Datum)	
Aquifer classification for receiving groundwater body:	
Groundwater vulnerability assessment (including vulnerability rating):	
Identity and proximity of groundwater sources at risk (wells, springs, etc):	
Identity and proximity of surface water bodies at risk:	

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Emission Details:

(i) Volume to be emitted			
Normal/day	Not Applicable m^3	Maximum/day	Not Applicable m^3
Maximum rate/hour	Not Applicable m^3		

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

Periods of Emission (avg)	Not Applicable min/hr Not Applicable hr/day Not Applicable day/yr

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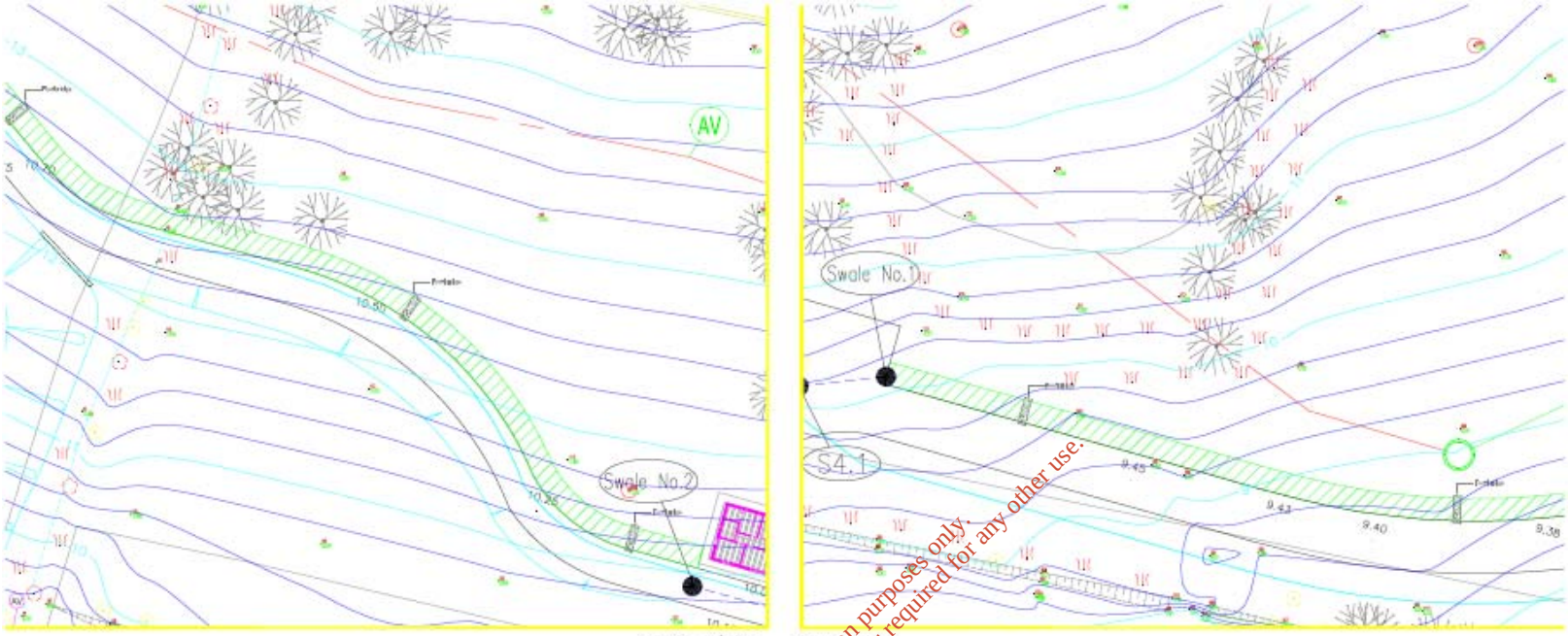

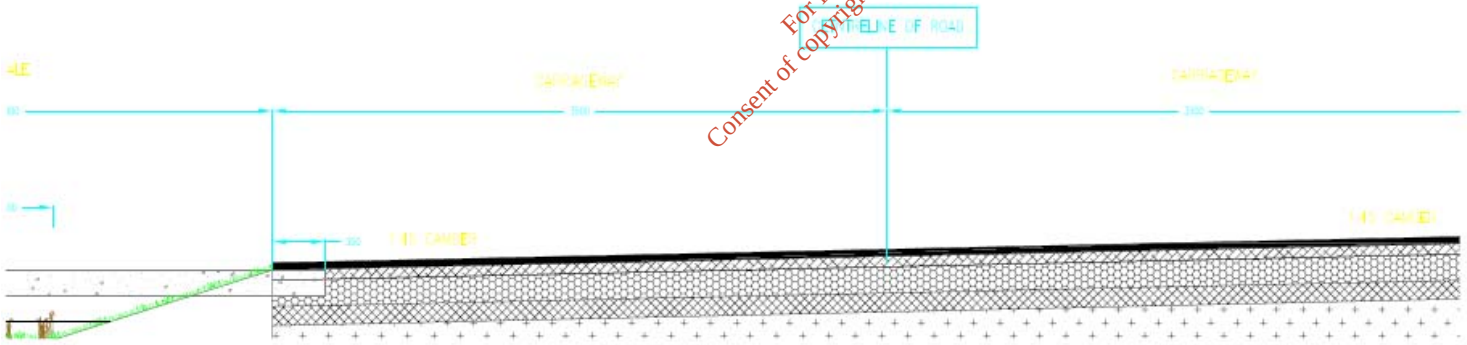

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07/4084E.4.1

Figure E.4.1

Details of Swales

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Attachment E.5

Noise Emissions

Noise emissions are dealt with in this attachment. A variety of mechanical plant items including pumps, fans, motors and compressors will be required to operate the site. Most of these items will have the potential to generate noise to some degree. Many of these are located outdoors on the site, however some are contained within buildings, which itself reduces the noise emission from these items.

The sound pressure levels for all significant items have been derived from manufacturers' data or from empirical formulae based on the electrical power rating for the item. These data were incorporated into a computer-based noise model used to predict the noise levels at nearby noise-sensitive locations. This is discussed fully in Section I6 of this Application.

Table E5(i) contains a complete listing of the noise sources included in the site noise model. The information is presented under the following headings:

- **Source** – a description of the item;
- **Location** – describes the general location of the item within the site;
- **Sound Pressure Level, (dB re.2x10^{-5}Pa)** – the overall A-weighted sound pressure level at 1m distance from the item;
- **Sound Pressure Level, (dB re.2x10^{-5}Pa) per Octave Band Centre Frequency (Hz)** – unweighted octave band sound pressure levels at 1m distance;
- **Impulsive or Tonal Qualities** – an indication as to whether the item of plant exhibits either impulsive or tonal characteristics (T – Tonal, I – Impulsive, no entry – plant does not exhibit either tonal or impulsive characteristics); and
- **Periods of Emission** – confirmation as the typical "on time" for each item of plant.

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While each item has the potential to operate intermittently as managed by the control system, the impact assessment assumes that all items operate simultaneously, in order to take account of the worst-case site noise levels.

Note also that most items have a 'standby' in case of failure of the duty item. The quantity of each item in Table E5 reflects only the number of 'duty' items in each case. For example, there are five process aeration blowers, but only four shall operate concurrently.

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

Source	Location	Equipment Ref. No.	Sound Pressure dB(A) at 1m distance	Octave bands (Hz) Sound Pressure Levels dB(unweighted) per band									Impulsive or tonal qualities	Periods of Emission
				31.5	63	125	250	500	1K	2K	4K	8K		
Belview Pump	Belview Pump House	1	83	72	73	74	76	76	79	76	72	66	None	24-hour
Grit Grease Blower	Inlet Works	10	70	77	77	77	72	67	62	57	55	62	None	24-hour
Storm Water Tank Pump (2 no.)	Storm Tank Yard	17,19	81	70	71	72	74	74	77	74	70	64	None	24-hour
Storm Water Mixer (2. no)	Storm Tank Yard	18,20	80	67	67	70	72	75	75	74	69	61	None	24-hour
Air Compressor	Sludge Building	106	95	95	92	92	91	94	97	97	95	92	None	24-hour
Process Air Blowers (4. no)	Aeration Tank Yard	32,35,38,41	70	77	77	77	72	67	62	57	55	62	None	24-hour
RAS Pump (4. no)	Final Settlement Tank Yard	59,60,62,63	80	69	70	71	73	73	76	73	69	63	None	24-hour
Sludge Mixers (3. no)	Sludge Tank Yard	80,81,82	75	62	62	65	67	70	70	69	64	56	None	24-hour
Pasteurisation Feed Pump	Sludge Tank Yard	83	80	69	70	71	73	73	76	73	69	63	None	24-hour
Pasteurisation Tank Mixer (3 no.)	Sludge Tank Yard	87,88,89	78	65	65	68	70	73	73	72	67	59	None	24-hour
Pasteurisation Outlet Pump	Pasteurisation Area	90	80	69	70	71	73	73	76	73	69	63	None	24-hour
Digester Outlet Mixer (2 no.)	Digester Area	93,94	75	62	62	65	67	70	70	69	64	56	None	24-hour
Digested Sludge Mixer	Digester Area	97	82	69	69	72	74	77	77	76	71	63	None	24-hour
Odour control unit Fan (2.no)	Inlet Works and Sludge Area	118, 120	80	87	87	87	82	77	72	67	65	72	None	24-hour
Final Effluent Washwater Pump	Final Effluent Chamber	123	86	75	76	77	79	79	82	79	75	69	None	24-hour
Liquors Return Pump	Liquors Return Pumping Station	133	82	71	72	73	75	75	78	75	71	65	None	24-hour

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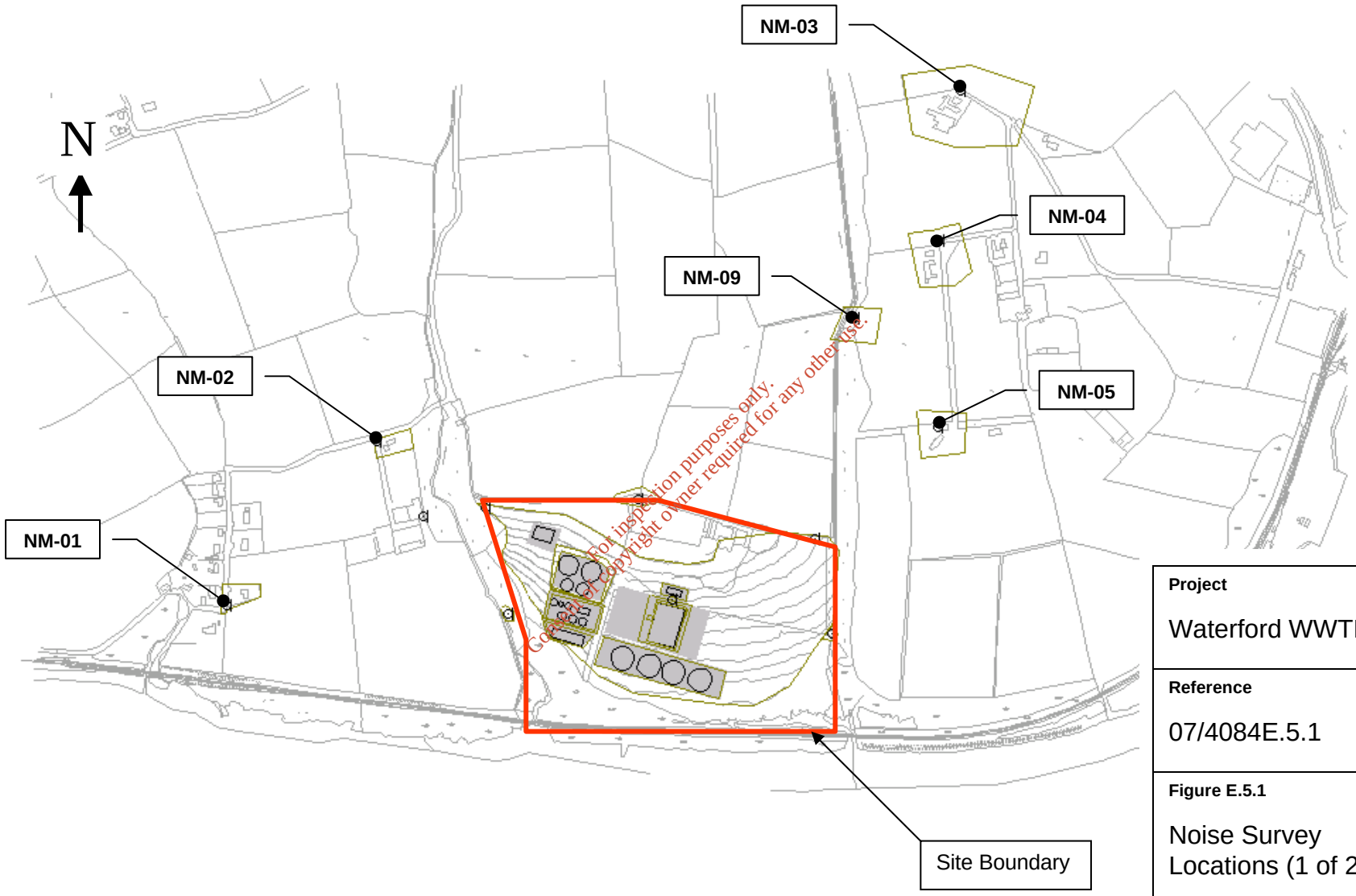

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07/4084E.5.1

Figure E.5.1

Noise Survey Locations (1 of 2)

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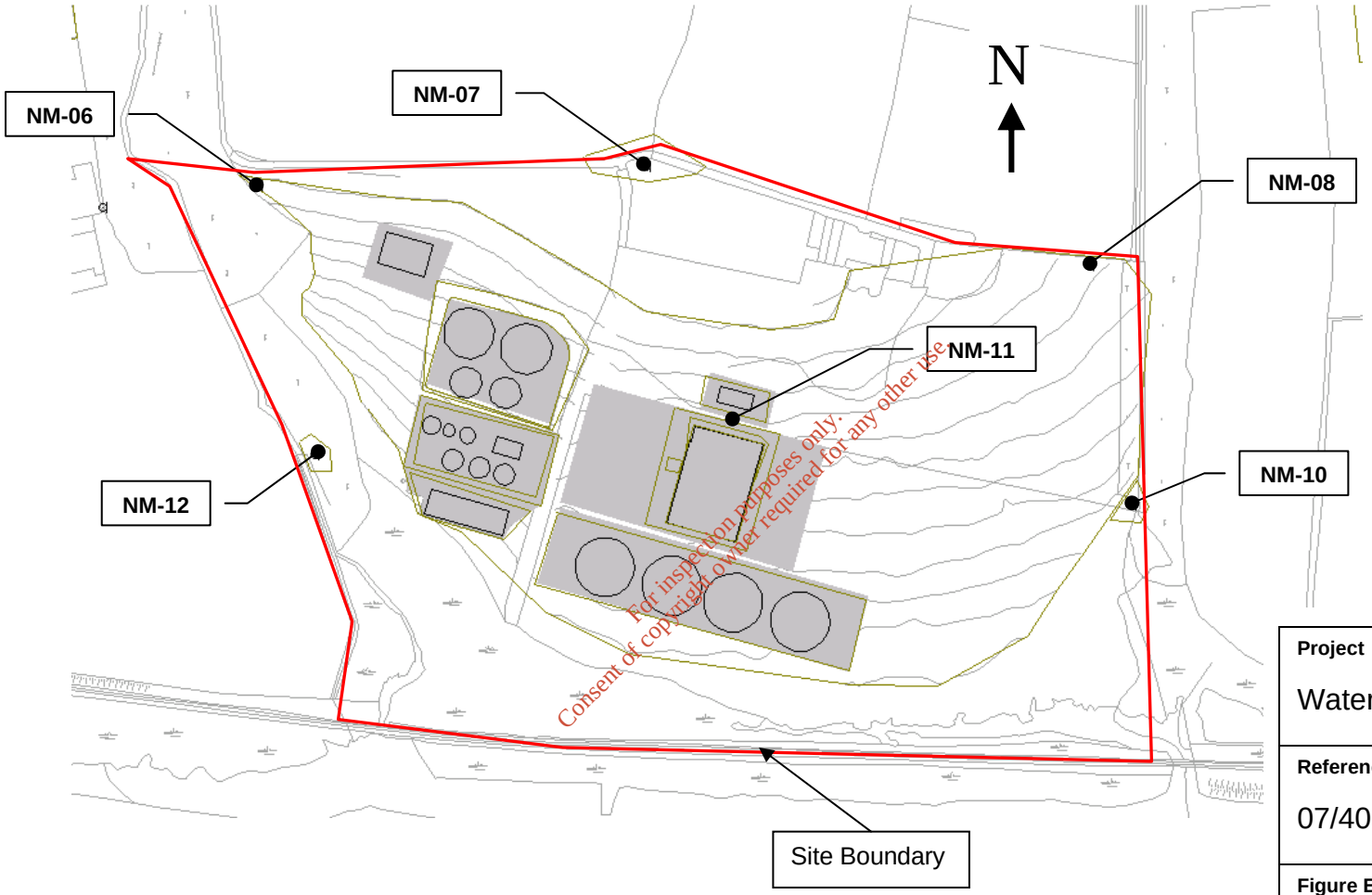

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07/4084E.5.2

Figure E.5.2

Noise Survey Locations (2 of 2)

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Attachment E.6

Traffic Control

Traffic on site will be via a one-way system, with trucks and other vehicles entering the site at the northeast corner, and travelling in a clockwise direction around the site.

Traffic to the site, once constructed, is limited to plant personnel and visitors and also traffic associated with the operation of the plant. This includes personnel working at the facility (4 employees maximum at any one time), deliveries of fuel, chemicals or other supplies to the facility, and waste collection vehicles. Deliveries of fuel is estimated to be a maximum of once a week, to the diesel fuel tanks in the southern part of the site. Delivery of chemicals to the facility are also estimated to be a maximum of once a week. There will be irregular deliveries of miscellaneous supplies also, such as stationary, and subsistence items to the administration building. All deliveries will be delivered as required, during normal business operating hours, Monday – Friday, 09:00 – 17:00.

Sludge bio-cake will collected approximately once a day, when the trailer that accepts the bio-cake is taken off-site, and an empty trailer is left in it's place. The trailers will be 20 m^3 trailers. Average volumes of sludge bio-cake produced will be 38.4 m^3/day (41.1 tonnes/day). The maximum number of trailers collecting sludge bio-cake, to be transported off-site, is 4 per day. Non-hazardous municipal waste and recyclable waste will be collected from the administration building a maximum of once per week. The collection vehicles will access the administration building via the entrance road using the same one-way system as all other vehicles.

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All delivery vehicles, or collection trailers, will operate during normal operating hours: Monday – Friday, 09.00 – 17:00 hours, as indicated in Attachment C.3 of this application. This will ensure that site personnel are present to supervise deliveries and collections. A summary of the traffic movements is presented below and the traffic flow is shown in Figure E.6.1.

The administration building is located to the north of the facility and all visitors are required to park in the parking area adjacent to the building and report to reception.

Traffic Movements

Deliveries

Chemicals –	1 x HGV per week
Diesel Fuel	1 x HGV per week
Miscellaneous -	1 x Non-HGV Truck per week (estimate)

Waste Collections

Sludge (Biocake) -	2 x HGV per day (average)
	4 x HGV per day (maximum)
Municipal (Non-Recyclable) Waste -	1 x HGV per week
Recyclable Waste -	1 x HGV per week

Note: HGV – Heavy Good Vehicle (also referred to as Large Goods Vehicle)

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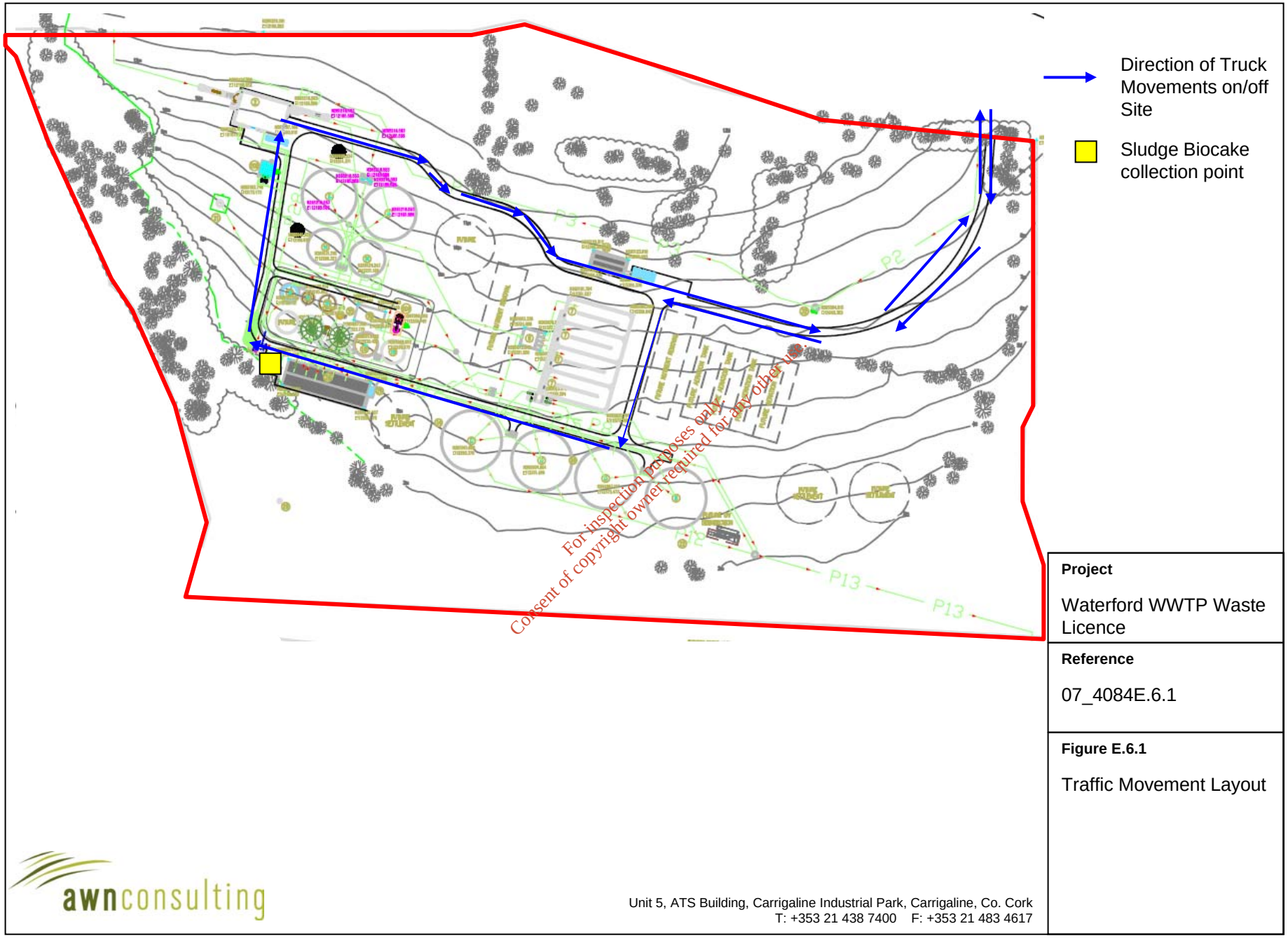

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07_4084E.6.1

Figure E.6.1

Traffic Movement Layout

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Attachment F.1

Treatment, Abatement and Control Systems

F.1(a) Emissions to Atmosphere (Including Odour)

The odours generated by the sludge treatment works and the inlet works (and primary settlement tanks) will be monitored to ensure that the maximum allowable odour emission rates are not exceeded.

The odour modeling to determine the maximum emission rates was carried out in accordance with the contract criteria for the facility (including incorporation of meteorological data, establishing sensitive receptors, location of buildings and topography and the odour generating plant/areas), and also according to existing guidance and standards.

It is proposed that ongoing odour monitoring is carried out bi-annually at the sensitive receptors, detailed in Section E.1. Provision has been made for monitoring of internal odour levels (hydrogen sulphide) as required.

There are 2 no. Odour Control Units (OCUs) within the facility, one for the sludge treatment works and one for the inlet works (and primary settlement tanks). A flow diagram is provided as Figure F.1.a.1 to show how the OCUs work within the facility and details are shown in Appendix F.1.a.2.

The odour control units are designed to extract odour from the specified areas according to the datasheets that are included with this attachment as F.1.a (2). The odour extraction from these areas will create a negative pressure in these areas so that no odour can escape. In addition, U-traps are provided on all drain points for the OCUs to further ensure that odours will not escape.

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The Odour Control Units are two stage systems (Bio-filter followed by Carbon Filter) and therefore (as assured by the design and build operator – Enpure) achieve very high efficiency (above 99% for H_2S). The odour isopleths for the odours generated from the WWTP, following abatement measures, are shown in Appendix 2.2 of the EIS Update report (MM/07/4083R01) compiled by AWN Consulting Ltd, that accompanies this application.

The emissions to atmosphere (excluding odour) are considered to be minor and therefore no abatement systems have been employed on site for the emissions from the boilers (that provide hot water for the pasteurization process) or waste gas burner.

Stack monitoring for each boiler stack will be carried out annually by a qualified environmental scientist/consultant.

F.1(b) Emissions to Surface Waters

As previously discussed, the site is designed so that the majority of surface water runoff from hard stand areas is directed, via gravity, to the designated stormwater drainage system.

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No specific treatment systems are employed with respect to the runoff of surface water to the Suir Estuary, however water quality monitoring will be undertaken as required by the Agency.

On-site monitoring of the WWTP will be undertaken on a daily basis. This includes flow readings as well as recording of temperature and pH of both the treated and untreated wastewater. BOD and COD will be monitored on a daily basis using a composite sampler.

Flow readings from the plant will be linked to the data collection system (SCADA) which allows total daily flows and other flow trends to be analysed and recorded, and any malfunctions or problems will be detected and addressed.

Sampling will be undertaken to enable calculation of the quality and quantity of flows discharged to the outfall. Laboratory sampling will be carried out at a nominated laboratory, which will not be on-site.

The samplers that will be used for the final treated effluent (FTE) are automatic and capable of collecting flow proportional composite samples.

The applicant has commenced a water quality monitoring programme for the Suir Estuary at a number of sampling points, which was agreed with the EPA on the 12th October 2007. This water quality monitoring programme includes monitoring at sampling points to show the water quality in areas where the existing outfalls are discharging to.

It is envisaged that this water quality monitoring programme will continue for the initial stages of the operation of the WWTP, i.e. for 2008. It is understood that further information on the monitoring programme will be contained in the wastewater discharge licence application for the new and existing outfalls.

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F.1(c) Emissions to Ground

As previously discussed, there are no direct emissions to ground at the site. The surface water runoff will be directed to swales, from which some water will percolate into the ground.

No specific treatment, abatement or control systems are employed with respect to this process.

F.1(d) Noise Emissions

Noise abatement measures include fitting the blowers at the aeration tanks with acoustic enclosures, which reduce the noise levels from 100dB(A) at 1m to 70dB(A) at 1m. The remaining plant items generate similar levels of noise to each other and are assessed in full in Sections E.5 and I.6. The noise assessment demonstrates that the predicted noise levels are below the EPA criteria for night-time noise and below the existing noise levels at noise-sensitive locations. Taking this into account, no further noise abatement measures are required.

It is proposed that ongoing noise monitoring is carried out annually at the sensitive receptors, detailed in Section E.5.

Ongoing management of noise levels will include regular maintenance of equipment to avoid any increase in noise emissions, for example, due to wear or imbalance of rotating parts. Where an item develops a fault which leads to increased noise levels at a boundary or noise-sensitive locations it will repaired or replaced.

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TABLE F.1: ABATEMENT / TREATMENT CONTROL

Emission point reference number *:* *OCU-1* *(Grid Ref:* E 264547 N 112429)

Control[1] parameter	Equipment [2]	Equipment maintenance	Equipment calibration	Equipment back-up
Hydrogen Sulphide	Odour Control Unit 1	According to equipment specification	As recommended by supplier	None

Control[1] parameter	Monitoring to be carried out[3]	Monitoring equipment	Monitoring equipment calibration
Hydrogen Sulphide	Bi-annual Odour Survey at Determined Monitoring Points (closest receptors and boundary)	Hand held Jerome 631-X H_2S analyzer for odour surveys	In the field - Sensor calibration with Jerome H_2S functional test kit Also regular calibration by manufacturer approved facility

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[1] List the operating parameters of the treatment / abatement system which control its function.
[2] List the equipment necessary for the proper function of the abatement / treatment system.
[3] List the monitoring of the control parameter to be carried out.

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TABLE F.1: ABATEMENT / TREATMENT CONTROL

Emission point reference number *:* *OCU-2 (Grid Ref:* E 264624 N 112338)

Control[1] parameter	Equipment [2]	Equipment maintenance	Equipment calibration	Equipment back-up
Hydrogen Sulphide	Odour Control Unit 2	According to equipment specification	As recommended by supplier	None

Control[1] parameter	Monitoring to be carried out[3]	Monitoring equipment	Monitoring equipment calibration
Hydrogen Sulphide	Bi-annual Odour Survey at Determined Monitoring Points (closest receptors and boundary)	Hand held Jerome 631-X H_2S analyser	In the field - Sensor calibration with Jerome H_2S functional test kit Also regular calibration by manufacturer approved facility

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[1] List the operating parameters of the treatment / abatement system which control its function.
[2] List the equipment necessary for the proper function of the abatement / treatment system.
[3] List the monitoring of the control parameter to be carried out.

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TABLE F.1: ABATEMENT / TREATMENT CONTROL

Emission point reference number *: A-01(a) Grid Ref:* E 264576 N 112295)

Control[1] parameter	Equipment [2]	Equipment maintenance	Equipment calibration	Equipment back-up
NOx	None	None	None	None
CO	None	None	None	None

Control[1] parameter	Monitoring to be carried out[3]	Monitoring equipment	Monitoring equipment calibration
NOx	In-situ stack monitoring at Boiler stack A-01(a)	Testo 350 electrochemical analysis fitted with gas-drying unit (or similar)	As required by equipment manufacturer spec.
CO	In –situ stack monitoring at Boiler stack A-01(a)	Testo 350 electrochemical analysis fitted with gas-drying unit (or similar)	As required by equipment manufacturer spec.

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[1] List the operating parameters of the treatment / abatement system which control its function.
[2] List the equipment necessary for the proper function of the abatement / treatment system.
[3] List the monitoring of the control parameter to be carried out.

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TABLE F.1: ABATEMENT / TREATMENT CONTROL

Emission point reference number *: A-01(b) (Grid Ref:* E 264580 N 112295)

Control[1] parameter	Equipment [2]	Equipment maintenance	Equipment calibration	Equipment back-up
NOx	None	None	None	None
CO	None	None	None	None

Control[1] parameter	Monitoring to be carried out[3]	Monitoring equipment	Monitoring equipment calibration
NOx	In-situ stack monitoring at Boiler stack A-01(b)	Testo 350 electrochemical analysis fitted with gas-drying unit (or similar)	As required by equipment manufacturer spec.
CO	In –situ stack monitoring at Boiler stack A-01(b)	Testo 350 electrochemical analysis fitted with gas-drying unit (or similar)	As required by equipment manufacturer spec.

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[1] List the operating parameters of the treatment / abatement system which control its function.
[2] List the equipment necessary for the proper function of the abatement / treatment system.
[3] List the monitoring of the control parameter to be carried out.

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TABLE F.1: ABATEMENT / TREATMENT CONTROL

Emission point reference number *:* *SW-1 (Grid Ref:* 265022 112153)

Control[1] parameter	Equipment [2]	Equipment maintenance	Equipment calibration	Equipment back-up
BOD	None	Not Applicable	Not Applicable	Not Applicable
COD	None	Not Applicable	Not Applicable	Not Applicable
Suspended Solids	None	Not Applicable	Not Applicable	Not Applicable
pH	None	Not Applicable	Not Applicable	Not Applicable
Hydrocarbons	Hydrocarbon Interceptors	Regular Inspection of interceptors	Not Applicable	Not Applicable

Control[1] parameter	Monitoring to be carried out[3]	Monitoring equipment	Monitoring equipment calibration
BOD	Manually taken samples will be analysed by an external accredited laboratory, approved by the Agency	Standard Laboratory	Standard Laboratory
COD	As Above	As Above	As Above
Suspended Solids	As Above	As Above	As Above
pH	On-Site pH meter	WTW-Water Meter or similar	As per manufacturers recommendations

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[1] List the operating parameters of the treatment / abatement system which control its function.
[2] List the equipment necessary for the proper function of the abatement / treatment system.
[3] List the monitoring of the control parameter to be carried out.

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TABLE F.1: ABATEMENT / TREATMENT CONTROL

Emission point reference number *:* *SW-2 (Grid Ref:* 265602 112078)

Control[1] parameter	Equipment [2]	Equipment maintenance	Equipment calibration	Equipment back-up
BOD	The WWTP, which is described in Section D.2 performs the abatement function –	As required by supplier/manufacturer specification	As required by supplier/manufacturer specification	Manually sampling at three-hourly intervals - results weighted according to flow to establish the equivalent daily total load
COD	As Above	As Above	As Above	As Above
Suspended Solids	As Above	As Above	As Above	As Above
pH	As Above	As Above	As Above	On-Site pH meter
Flow	As Above	As Above	As Above	Not Specified
Temperature	As Above	As Above	As Above	On-site temperature meter

Control[1] parameter	Monitoring to be carried out[3]	Monitoring equipment	Monitoring equipment calibration
BOD	Composite samples will be analysed by an external accredited laboratory, approved by the Agency.	Standard Laboratory	Standard Laboratory
COD	As Above	As Above	As Above
Suspended Solids	As Above	As Above	As Above
pH	Ongoing pH monitoring	On-Site pH meter	As per manufacturers recommendations
Flow	On-Site flow monitoring	Open channel flumes fitted with ultrasonic level device	As specified by equipment manufacturer
Temperature	On-Site temperature	On-Site temperature probe	As specified by equipment manufacturer

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[1] List the operating parameters of the treatment / abatement system which control its function.
[2] List the equipment necessary for the proper function of the abatement / treatment system.
[3] List the monitoring of the control parameter to be carried out.

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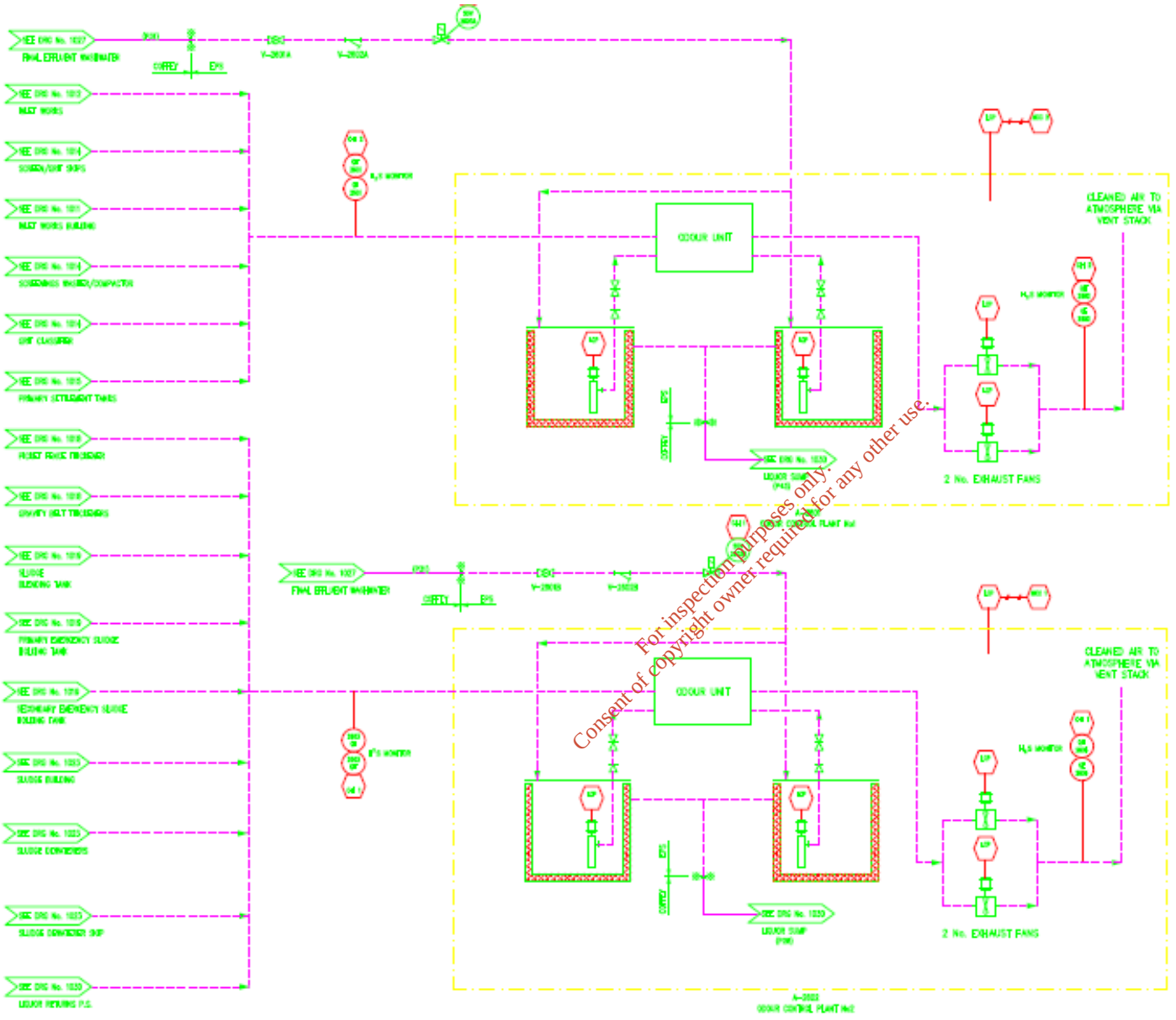

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Project

Waterford WWTP Waste Licence Application

Reference

07/4084F.1.a.1

Figure F.1.a.1

Flow Diagram for Odour Control Units

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Appendix F.1.a.2

Details of Odour Control Units

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PROCESS DESIGN CALCULATION

Contract Name : Waterford **Contract No:** C1197

Document Reference: 8419 **Title :** Odour Control Design

Revision	No. of Pages (Excluding Cover)	Date of Issue	Purpose of Issue	Originator	Checked	Approved
1	4	23/01/2007	Draft Issue	DGH	PB	
2	4	09/02/2007	Contract Issue	DGH		

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PURAC Contract No.	C1197
Contract Title	Waterford WwTW
PURAC Document No.	8419
Date	09/02/07
Revision	2

List Odour Control Unit Names	P&ID no.	Tag No.	Ave Odour concentration (OU_E/m^3)	Max Odour concentration (OU_E/m^3)	Ave H_2S conc (ppm)	Peak H_2S conc (ppm)	Air flowrate (m^3/hr)
Combined Treatment OCU	C1197-1026	TBC	0	0	0.0	0.0	0
			0	0	0.0	0.0	0
			0	0	0.0	0.0	0
Inlet Treatment OCU	C1197-1026	TBC	63533	63533	19.2	19.2	13815
Sludge Treatment OCU	C1197-1026	TBC	97976	97976	49.0	49.0	5042
			0	0	0.0	0.0	0
Other discharges			0	0	0.0	0.0	0
			72743	72743	27.1	27.1	18857
Check calc integrity			OK	OK	OK	OK	OK

Areas to be odour controlled Orange cells require input

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Process Area	Process Fluid	P&ID no. & GA no.	No.	Tag No(s):	Air extracted to:	Ave Odour concentration (OU_E/m^3)	Max Odour concentration (OU_E/m^3)	Converted average H_2S conc. (ppm)	Converted peak H_2S conc. (ppm)	Air flowrate (m^3/hr)
Pre-screen and post-grit channels	Raw Sewage	C1197-1012 & 2000/1	1	T-1201	Inlet Treatment OCU	131243	131243	39	39	388
Fine Screens including bypass	Raw Sewage	C1197-1012 & 2000/1	4	A-1201A/B/C & A-1202	Inlet Treatment OCU	81000	81000	24	24	704
Screenings Compactors	Raw Sewage	C1197-1014 & 2000/1	1	A-1401	Inlet Treatment OCU	80000	80000	40	40	32
Grit Classifier	Grit	C1197-1014 & 2000/1	1	A-1402	Inlet Treatment OCU	160000	160000	80	80	32
Grit Channel	Raw Sewage	C1197-1012 & 2000/1	2	T-1202A/B	Inlet Treatment OCU	65833	65833	20	20	1004
Preliminary Treatment Building	N/A	C1197-1012 & 2000/1	1		Inlet Treatment OCU	150	150	0	0	7247
Primary Sedimentation Tank	Screened Sewage	C1197-1015 & 2004	2	T-1501A/B	Inlet Treatment OCU	157664	157664	47	47	4407
Pasteuriser	Sludge	C1197-1020	3	T-2001A/B/C	Sludge Treatment OCU	630000	630000	315	315	246
Picket Fence Thickener	Primary Sludge	C1197-1018	1	T-1801	Sludge Treatment OCU	420000	420000	210	210	178
Secondary Sludge Thickener	Secondary Sludge	C1197-1018 & 2011	2	A-1802A/B	Sludge Treatment OCU	280000	280000	140	140	60
Sludge Building	N/A	C1197-1018 & 2011	1		Sludge Treatment OCU	800	800	0	0	3580
Emergency Primary Sludge Tank	Primary Sludge	C1197-1019	1	T-1903	Sludge Treatment OCU	315000	315000	158	158	276
Emergency Secondary Sludge Tank	Secondary Sludge	C1197-1019	1	T-1902	Sludge Treatment OCU	315000	315000	158	158	329
Sludge Blending Tank	Sludge	C1197-1019	1	T-1901	Sludge Treatment OCU	630000	630000	315	315	41
Sludge Dewaterer	Sludge	C1197-1023 & 2011	2	A-2301A/B	Sludge Treatment OCU	96000	96000	48	48	90
						0	0	0	0	0
Liquor Return PS	Sludge Liquors	C1197-1030	1	C-3001	Sludge Treatment OCU	78750	78750	39	39	240

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Ventilation, Odour Control and Declassification of Zoned Areas Calculations

PURAC Document No. 8419

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Revision 2

Orange cells require input

Process Area	Process fluid	No.	Vessel Shape	Working Dimensions / Details						Headspace / Gross Vessel Dimensions / Details						Process volume (per unit) m^3	Headspace / Gross volume m^3	Tank Perimeter (per unit) m	Cover Perimeter m	Actual Perimeter	Max fill rate or specified (per unit) m^3/hr
Pre-screen and post-grit channe	Raw Sewage	1	Rectangular	52.4	m length	1.8	m deep	1.5	m width	52.4	m length	0.5	m deep	1.5	m width	141.5	39.3	107.8		Perimeter	
Fine Screens including bypass	Raw Sewage	4	Rectangular	10	m length	2.2	m deep	2.2	m width	10	m length	1	m deep	2.2	m width	48.4	22.0	24.4		Perimeter	
Screenings Compactors	Raw Sewage	1	Other	4	m3 volume											4.0	4.0	N/A		N/A	
Grit Classifier	Grit	1	Other	4	m3 volume											4.0	4.0	N/A		N/A	
Grit Channel	Raw Sewage	2	Rectangular	10	m length	2.2	m deep	5.1	m width	10	m length	0.5	m deep	5.1	m width	112.2	25.5	30.2		Perimeter	400
Preliminary Treatment Building	N/A	1	Rectangular	29.3	m length	6.38	m deep	19.4	m width	29.3	m length	6.38	m deep	19.4	m width	3623.7	3623.7	97.4		N/A	
Primary Sedimentation Tank	Screened Sewage	2	Circular	32	m diam	3	m deep			32	m diam	1.37	m deep			2412.7	1101.8	100.5		Perimeter	
Pasteuriser	Sludge	3	Other	41	m3 volume											41.0	41.0	N/A		N/A	
Picket Fence Thickener	Primary Sludge	1	Circular	8.7	m diam	4.5	m deep			8.7	m diam	0.5	m deep			267.5	29.7	27.3		Perimeter	8
Secondary Sludge Thickener	Secondary Sludge	2	Rectangular	5.6	m length	0.75	m deep	1.2	m width	5.6	m length	0.75	m deep	1.2	m width	5.0	5.0	13.6		Cover	
Sludge Building	N/A	1	Rectangular	19.5	m length	6.38	m deep	14.4	m width	19.5	m length	6.38	m deep	14.4	m width	1790.1	1790.1	67.8		N/A	2
Emergency Primary Sludge Tan	Primary Sludge	1	Circular	9.38	m diam	5.6	m deep			9.38	m diam	2	m deep			387.0	138.2	29.5		Cover	
Emergency Secondary Sludge T	Secondary Sludge	1	Circular	10.2	m diam	5.6	m deep			10.2	m diam	2	m deep			461.2	164.7	32.2		Cover	
Sludge Blending Tank	Sludge	1	Circular	5.12	m diam	2.9	m deep			5.12	m diam	1	m deep			59.7	20.6	16.1		Cover	
Sludge Dewaterer	Sludge	2	Rectangular	5	m length	0.75	m deep	2	m width	5	m length	0.75	m deep	2	m width	7.5	7.5	14.0		Cover	
0	0	0	Rectangular		m length		m deep		m width		m length		m deep		m width	0.0	0.0	0.0		N/A	
Liquor Return PS	Sludge Liquors	1	Rectangular	3	m length	4	m deep	5	m width	3	m length	4	m deep	5	m width	60.0	60.0	16.0		Perimeter	240

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Ventilation, Odour Control and Declassification of Zoned Areas Calculations

PURAC Document No. **8419**

Date **09/02/2007**

Revision **2**

	Calculations for zoning declassification ventilation rate										Ventilation rates per unit m^3/hr								
Process Area	CH_4 rate of emission $m^3m^{-3}sec^{-1} \times 10^{-8}$	Air changes per hour	Temp °C	LEL %	Density kg / m^3	Grade of release	BS safety factor k	Gas production rate kg/s	Temperature corrected rate kg/s	Actual gas production rate kg/s	Rate 1	Rate 2	Rate 3	Rate 4	Safety Factor	Final rate per unit (Max X SF) m^3/hr	Choose flowrate per unit	Actual flowrate per unit m^3/hr	Actual air changes per hour (based on headspace)
Pre-screen and post-grit channel	6.9	8.0	20	5.3	0.72	Secondary	0.5	7.03E-06	5.35E-06	Corrected	388.1	1.1	N/A	314.4	0%	388.1	Max xSF	388.1	9.9
Fine Screens including bypass	6.9	8.0	20	5.3	0.72	Secondary	0.5	2.40E-06	1.83E-06	Corrected	87.8	0.4	N/A	176.0	0%	176.0	Max xSF	176.0	8.0
Screenings Compactors	0.0	8.0	20	5.3	0.72	Secondary	0.5	0.00E+00	0.00E+00	Corrected	N/A	0.0	N/A	32.0	0%	32.0	Max xSF	32.0	8.0
Grit Classifier	0.0	8.0	20	5.3	0.72	Secondary	0.5	0.00E+00	0.00E+00	Corrected	N/A	0.0	N/A	32.0	0%	32.0	Max xSF	32.0	8.0
Grit Channel	6.9	4.0	20	5.3	0.72	Secondary	0.5	5.57E-06	4.25E-06	Corrected	108.7	0.9	400.0	102.0	26%	502.0	Max xSF	502.0	19.7
Preliminary Treatment Building	0.0	2.0	20	5.3	0.72	Secondary	0.5	0.00E+00	0.00E+00	Corrected	N/A	0.0	N/A	7247.4	0%	7247.4	Max xSF	7247.4	2.0
Primary Sedimentation Tank	6.9	2.0	20	5.3	0.72	Secondary	0.5	1.20E-04	9.13E-05	Corrected	361.9	18.6	N/A	2203.6	0%	2203.6	Max xSF	2203.6	2.0
Pasteuriser	163.0	2.0	55	5.3	0.72	Secondary	0.5	4.81E-05	6.07E-05	Corrected	N/A	13.9	N/A	82.0	0%	82.0	Max xSF	82.0	2.0
Picket Fence Thickener	289.0	6.0	20	5.3	0.72	Secondary	0.5	5.57E-04	4.24E-04	Corrected	98.4	86.5	8.0	178.3	0%	178.3	Max xSF	178.3	6.0
Secondary Sludge Thickener	163.0	6.0	20	5.3	0.72	Secondary	0.5	5.91E-06	4.50E-06	Corrected	0.0	0.9	N/A	30.2	0%	30.2	Max xSF	30.2	6.0
Sludge Building	0.0	2.0	20	5.3	0.72	Secondary	0.5	0.00E+00	0.00E+00	Corrected	N/A	0.0	2.0	3580.2	0%	3580.2	Max xSF	3580.2	2.0
Emergency Primary Sludge Tank	289.0	2.0	20	5.3	0.72	Secondary	0.5	8.05E-04	6.13E-04	Corrected	0.0	125.2	N/A	276.4	0%	276.4	Max xSF	276.4	2.0
Emergency Secondary Sludge T	163.0	2.0	20	5.3	0.72	Secondary	0.5	5.41E-04	4.12E-04	Corrected	0.0	84.1	N/A	329.4	0%	329.4	Max xSF	329.4	2.0
Sludge Blending Tank	289.0	2.0	20	5.3	0.72	Secondary	0.5	1.24E-04	9.46E-05	Corrected	0.0	19.3	N/A	41.2	0%	41.2	Max xSF	41.2	2.0
Sludge Dewaterer	110.0	6.0	20	5.3	0.72	Secondary	0.5	5.94E-06	4.52E-06	Corrected	0.0	0.9	N/A	45.0	0%	45.0	Max xSF	45.0	6.0
0	0.0	2.0	20	5.3	0.72	Secondary	0.5	0.00E+00	0.00E+00	Corrected	N/A	0.0	N/A	0.0	0%	0.0	Max xSF	0.0	#DIV/0!
Liquor Return PS	110.0	2.0	20	5.3	0.72	Secondary	0.5	4.75E-05	3.62E-05	Corrected	57.6	7.4	240.0	120.0	0%	240.0	Max xSF	240.0	4.0

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Ventilation, Odour Control and Declassification of Zoned Areas Calculations

PURAC Document No. 8419

Date 09/02/2007

Revision 2

	OU concentration calculation						Final Calculated Odour, H_2S and airflow rates							
Process Area	Frechen data E_f (OU / s /m^2)	North data E_n (OU / s /m^2)	UKWIR value $OU_E.s^{-1}.m^{-2}$	Surface area per tank A (m^2)	Superficial air velocity V (m / s)	Emission rate E_{out} (OU / s)	Specified Odour concentration (OU_E / m^3)	Odour concentration (OU_E / m^3)	Chosen H_2S correlation factor ppb H_2S/OU_E	Direct H_2S correlation (ppm)	Factor of safety (peaking factor)	Odour concentration using SF (OU_E / m^3)	Estimated H_2S conc. using SF (ppm)	Total flow m^3/hr
Pre-screen and post-grit channels			180	78.6	0.001	14148		131243	0.3	39.4	1.0	131243	39.4	388
Fine Screens including bypass			180	22.0	0.002	3960		81000	0.3	24.3	1.0	81000	24.3	704
Screenings Compactors			180	N/A	N/A	N/A	80000	80000	0.5	40.0	1.0	80000	40.0	32
Grit Classifier			360	N/A	N/A	N/A	160000	160000	0.5	80.0	1.0	160000	80.0	32
Grit Channel			180	51.0	0.003	9180		65833	0.3	19.7	1.0	65833	19.7	1004
Preliminary Treatment Building				568.4	0.004	0	150	150	0.3	0.05	1.0	150	0.05	7247
Primary Sedimentation Tank			120	804.2	0.001	96510		157664	0.3	47.3	1.0	157664	47.3	4407
Pasteuriser			480	N/A	N/A	N/A	630000	630000	0.5	315.0	1.0	630000	315.0	246
Picket Fence Thickener			350	59.4	0.001	20806		420000	0.5	210.0	1.0	420000	210.0	178
Secondary Sludge Thickener			350	6.7	0.001	2352		280000	0.5	140.0	1.0	280000	140.0	60
Sludge Building				280.8	0.004	0	800	800	0.5	0.4	1.0	800	0.4	3580
Emergency Primary Sludge Tank			350	69.1	0.001	24186		315000	0.5	157.5	1.0	315000	157.5	276
Emergency Secondary Sludge Tank			350	82.4	0.001	28824		315000	0.5	157.5	1.0	315000	157.5	329
Sludge Blending Tank			350	20.6	0.001	7206		630000	0.5	315.0	1.0	630000	315.0	41
Sludge Dewaterer			120	10.0	0.001	1200		96000	0.5	48.0	1.0	96000	48.0	90
0.0				0.0	0.000	0		0	0.2	0.0	1.0	0	0.0	0
Liquor Return PS			350	15.0	0.004	5250		78750	0.5	39.4	1.0	78750	39.4	240
								72742.7		27.1		72742.7	27.1	18857

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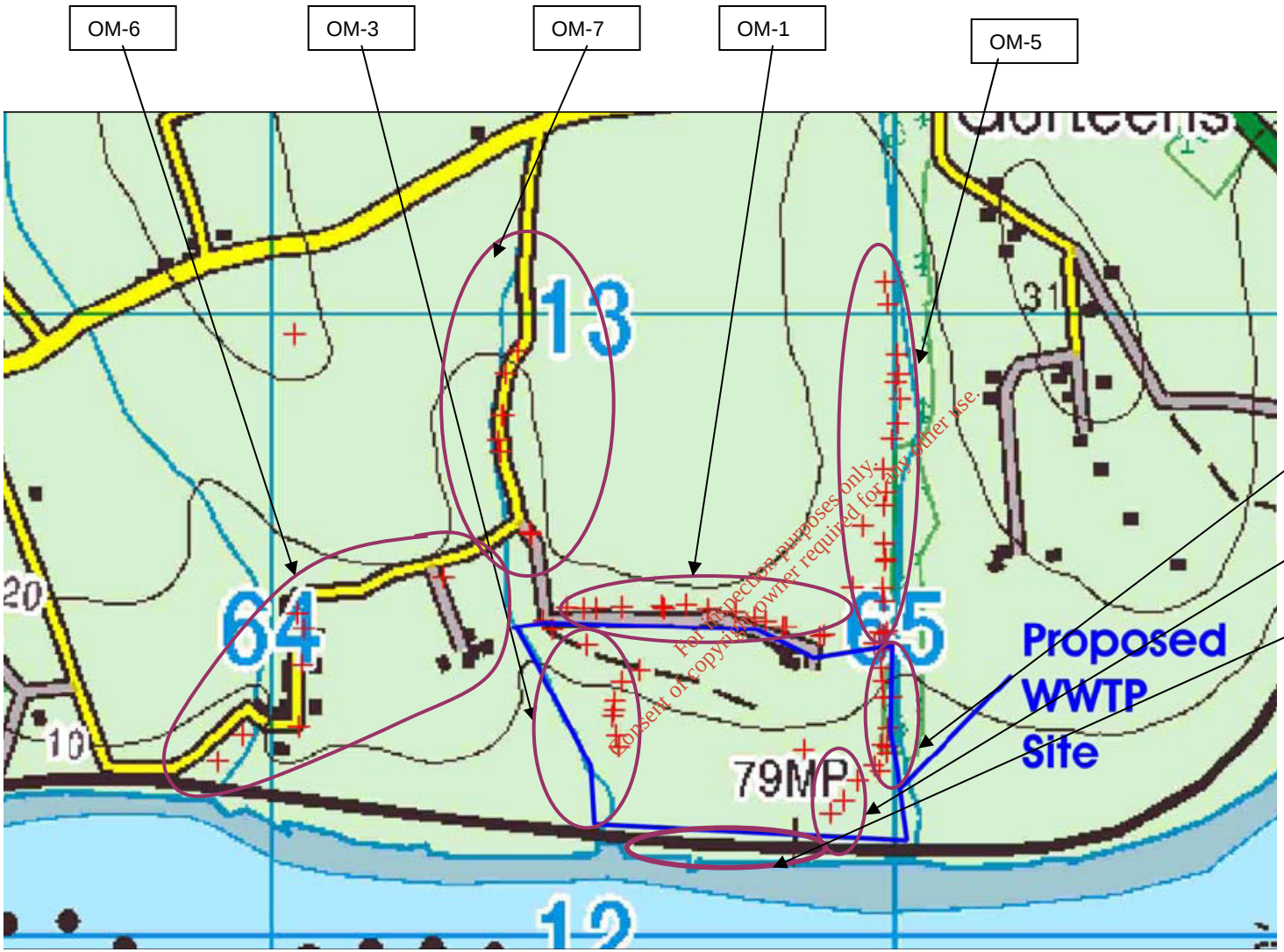

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Project

Waterford WWTP Waste Licence Application

Reference

07/4084F.2.1

Figure F.2.1

Odour Monitoring Areas

awnconsulting

Unit 5, ATS Building, Carrigaline Industrial Park, Carrigaline, Co. Cork
T: +353 21 438 7400 F: +353 21 483 4617

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Attachment F.2 – F.7

Environmental Monitoring Programme

F.2 Air & Odour Monitoring

Air Emission Monitoring

Monitoring of air emissions from the boilers is proposed on an annual basis, for NOx, and carbon monoxide (CO). It is not proposed to monitor SOx, as this is only produced when diesel oil is burned. As diesel will only be used in the rare occasions, i.e. when there is not sufficient biogas to fuel the boilers, there is no regular monitoring proposed for this parameter.

The air quality monitoring will be carried out by qualified personnel using approved equipment and methods. It is likely that the monitoring will be carried out using a flue gas analyzer. Temperature and flow readings will be recorded on-site as required by the Agency.

The air monitoring points will be the same as the emission points, i.e. A-01(a) and A-01(b). These are shown in Section E, Figure E.1.1.

The waste burner does not have a continuous flow (<5 m/sec) and therefore no monitoring is proposed.

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Odour Emission Monitoring

It is proposed to carry out odour monitoring at the odour monitoring locations identified in the baseline odour survey and also to identify 1 no. additional odour monitoring location area to the south of the site, i.e. along the banks of the Suir. Odour monitoring is carried out at a number of points within each location area to ensure a comprehensive result is achieved.

The odour monitoring locations are shown in the Table below and identified in Figure F.2.1. Grid references were not provided for the odour monitoring locations for the baseline survey, therefore once the first operational monitoring takes place in the vicinity of each baseline monitoring location, grid references will be determined and supplied to the Agency.

Odour Monitoring Locations

Ref.	Sampling/Monitoring Locations	Description
OM-1	Northern Boundary	Along the northern boundary of the site
OM-2	Eastern Boundary	Along the existing stream to the east of the site
OM-3	Western Boundary	Along an existing contour to the west of the site
OM-4	Southeastern Boundary	Along the southeastern boundary of the site - within the site
OM-5	Entrance Road	Along the new entrance road to the facility
OM-6	Western Sensitive Receptors	Beside existing dwellings to the west of the WWTP site
OM-7	Northern Sensitive Receptors	Along the existing roadway to the north of the site - leading to Springfield House (ruin)
OM-8	Southern Boundary	Directly south of site, along Suir riverbank

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Note OM-1 to OM-7 are baseline odour locations, OM-8 is proposed additional location

F.3 Surface Water Monitoring

The Final Treated Effluent (FTE) from the WWTP will be sampled on a daily basis from the composite on-site sampler, which is located at the FTE sampling chamber. Samples will be taken to an off-site accredited laboratory for analysis. The parameters are shown in the tables at the end of this section.

In addition, there will be surface water monitoring carried out upstream and downstream of the outfall for the Final Treated Effluent SW-02. However, these monitoring points have not yet been finalized and will coincide with the monitoring locations nominated as part of the wastewater discharge licence application.

There is ongoing monitoring being carried out by WCC of the Suir Estuary, which monitors the water quality of the existing outfalls. These surface water monitoring points are shown in the table below.

Waterford City Council Surface Water Quality Monitoring Locations on the Suir River & Estuary

Sampling Ref.	Sampling Location
Surface Water	
ML-1	Upstream SW4-SW5
ML-2	Downstream SW4-SW5
ML-3	Downstream SW1, Upstream SW7-SW13
ML-4	Downstream SW7-SW13
ML-5	Upstream SW14-SW19
ML-6	Downstream SW14 - SW19

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Waterford City Council has been carrying out water quality monitoring in the past number of months on the discharges from the 17 no. current wastewater outfalls/discharge points to the Suir Estuary. It is understood that this monitoring will continue for the remainder of 2008.

Surface water monitoring will be carried out downstream of Emission Point SW-01, on a quarterly basis. Parameters are outlined in the table for SW-01 at the end of this section.

F.5 Groundwater Monitoring

No groundwater monitoring is proposed.

F.6 Noise Monitoring

It is proposed to carry out day and night time noise surveys annually, which will be carried out at the monitoring locations carried out for the baseline noise survey. These include monitoring at 7 no. locations on-site and at the site boundary, and 5 no. locations at sensitive receptors, i.e. nearby dwellings (see tables below).

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Noise Monitoring Locations at Nearby Sensitive Receptors

Ref.	Description
NM-01	Residential Area to west of site
NM-02	Residence at top of road leading to Prospect House, 200m from northwest corner of site
NM-03	Residential Area to northeast, approx. 750m from northeast corner of site boundary
NM-04	Residential Area to northeast, approx. 500m from northeast corner of site boundary
NM-05	Nearest residence to northeast, approx. 250m from northeast corner of site boundary

Noise Monitoring Locations at Site Boundaries

Ref.	Description
NM-06	Northwest corner
NM-07	Midway along northern site boundary
NM-08	Northeast corner
NM-09	Adjacent to the eastern boundary stream, approx 250m from the northeast corner of the proposed site boundary
NM-10	Midway along eastern site boundary
NM-11	Centre of site
NM-12	Midway along western site boundary

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These monitoring locations are shown in Figures E.5.1 and E.5.2.

F.7 Meteorological Data

Due to the nature of the site, it is not proposed to carry out ongoing monitoring of the meteorological conditions at the site.

However, meteorological data will be obtained from the nearest weather stations for the purposes of both the odour monitoring and the noise monitoring, as the results of the monitoring may be significantly affected by weather conditions.

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TABLE F.2 to F.8 : EMISSIONS MONITORING AND SAMPLING POINTS - (1 table per media)

Emission Point Reference No(s). : OCU-1 & OCU-2

Parameter	Monitoring frequency	Accessibility of Sampling Points
Hydrogen Sulphide	Bi-Annual Survey	Stacks are accessible from site

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TABLE F.2 to F.8 : EMISSIONS MONITORING AND SAMPLING POINTS - (1 table per media)

Emission Point Reference No(s). : A-01 (a&b)

Parameter	Monitoring frequency	Accessibility of Sampling Points
NOx	Annually	Stack monitoring points for A-01 (a&b)accessible from within site – specialized qualified monitoring scientists or consultants required
CO	Annually	Stack monitoring points for A-01 (a&b) accessible from within site – specialized qualified monitoring scientists or consultants required

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TABLE F.2 to F.8 : EMISSIONS MONITORING AND SAMPLING POINTS - (1 table per media)

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

Parameter	Monitoring frequency	Accessibility of Sampling Points
Suspended Solids	Quarterly	Accessibility at confluence of Suir Estuary and stream to east of site
BOD	Quarterly	As Above
COD	Quarterly	As Above
pH	Quarterly	As Above
Conductivity	Quarterly	As Above
Temperature	Quarterly	As Above

Emission Point Reference No(s). : SW-2

Parameter	Monitoring frequency	Accessibility of Sampling Points
Suspended Solids	5 per week	Samples taken from composite sampler in the FTE sampling chamber
BOD	1 per week	As Above
COD	5 per week	As Above
pH	Daily	Sampled from FTE chamber

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

Monitoring Point Reference No : Not Applicable

Parameter	Monitoring frequency	Accessibility of Sampling point
Not Applicable	Not Applicable	Not Applicable

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Attachment G.1 – Raw Materials and Product

G.1(a) Raw Materials

Biogas from Anaerobic Digestors (to Fuel Boilers)

A raw material, which will be used to power the boilers (which provide hot water for the pasteurization process) is the biogas, which can also be described as a product, as it is produced by the anaerobic digestion process.

Biogas generated within the digestors will be stored and used as required. The breakdown of the biogas is shown in Table G.1(1). More information on the biogas is provided in Attachment G.2.

Table G.1(1) Breakdown of Biogas

Content		
Methane (CH_4)	60-65	%
Carbon Dioxide (CO_2)	30-35	%
Hydrogen Sulphide (H_2S)	0-2000	ppm
Calorific Value	22.5	MJ

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Fossil Fuels

Diesel fuel will be stored on site for the generator and the boilers. Fuel for the boilers will only be required should there be a shortfall in the primary fuel source, i.e. biogas and diesel will only be used in the event of an interruption of the electricity supply.

The capacity of boiler fuel tank is 10,000 litres, containing 36-second fuel oil, and the capacity of the generator fuel tank is also 10,000 litres, containing 28-second fuel oil.

Polyelectrolytes

Polyelectrolytes are used in the thickening and dewatering process of the sewage treatment. These are the only chemicals that will be used on site.

Two types are used for the WWTP:

1. PLF 1700Q (for sludge thickening)
2. PLF 2800Q (for sludge dewatering)

The polyelectrolyte will be in powder form and held in 2 no. hoppers, which will feed into tanks, for the preparation of the polyelectrolyte suspension (0.1% - 0.3%).

The volume that will be stored on site is approximately 2.4 tonnes per week.

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G.1(b) Products

The only product from the WWTP will be the sludge bio-cake produced at the final stage of the sludge treatment process. The sludge will meet a number of parameter limits, as per the Operating Contract for the facility. These are outlined in Table G.1(2).

Table G.1(2) Sludge Bio-Cake Parameters

Parameter	Unit	Conc.
Faecal Coliforms	MPN/gds	1000
Dry Solids Conc.	% (w/w)	2300
Metals		
Chromium	mg/kg	1200
Mercury	mg/kg	16
Copper	mg/kg	1000
Nickel	mg/kg	300
Zinc	mg/kg	2500
Cadmium	mg/kg	20
Lead	mg/kg	750

Approximately 41.1 tonnes/day (38.4 m^3/day) will be produced at the facility.

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Table G.1 Details of Process related Raw Materials, Intermediates, Products, etc., used or generated on the site

Ref. Nº or Code	Material/ Substance[1]	CAS Number	Danger[2] Category	Amount Stored (tonnes)	Annual Usage (tonnes)	Nature of Use	R[3] - Phrase	S[3] - Phrase
RM01	Biogas	Not Applicable	Not Applicable	200 m^3	Not Applicable	For Heating Boilers	Not Applicable	Not Applicable
RM01	Diesel Fuel	68334-30-5	Carcinogenic Category 3	17	As Required	Back-up Fuel for Boilers and Generators	R40-65	S2,24, 36,37, 43,62
RM03	Polyelectrolyte (PLF1700Q)	Not Applicable	Not Applicable	1.4	73	Thickening/Dewatering Sludge	Not Applicable	Not Applicable
RM04	Polyelectrolyte (PLF2800Q)	Not Applicable	Not Applicable	0.98	51	Thickening/Dewatering Sludge	Not Applicable	Not Applicable
P01	Sludge Biocake	Not Applicable	Not Applicable	20	7300	Waste Product	Not Applicable	Not Applicable

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

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Attachment G.2

Energy Efficiency

(a) Energy Requirements

The full list of plant for the WWTP that will require energy is detailed in Table G.2 (1). These items fall into the areas of the WWTP as follows:

- Preliminary treatment (screening and grit Removal)
- Primary treatment (primary settlement tanks)
- Secondary biological treatment (conventional activated sludge)
- Final clarification
- Primary sludge thickening (gravity consolidation tanks)
- Secondary sludge thickening
- Sludge treatment (pasteurisation and anaerobic digestion)
- Sludge storage
- Sludge dewatering
- Biogas utilisation and storage

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(b) Energy Supply

The energy supplied to the WWTP will be from three sources:
- Electricity (from National Grid)
- Biogas from the Digester
- Diesel Fuel

The predicted electricity demand for the everyday operation of the facility is shown in Table G.2 (1).

The total predicted energy use is summarised in Table G.2 (2). Electricity demand has been calculated based on the equipment power rating, rather than the predicted absorbed power (or 'Duty' power), i.e. the absolute maximum power demand at any one time is shown for the plant that will be in operation during everyday operation.

Table G.2 (2) Summary of Power Demand for WWTP

Operational Mode	kW
Equipment Power Rating (Maximum)	1333.1
Absorbed Power Rating (Duty)	730.7
Absorbed Power Rating (Standby)	242.6
Load on Generator (Maximum)	469.9
Absorbed Load on Generator (Duty)	402.3

The 'Standby' column in Table G.2 (1) shows the power demand of each plant item that would be required should one or more of the 'Duty' plant items be shut down for maintenance or repair, or other reasons. Duty and Standby plant items will not run together at any time. Table G.2(2) shows the total standby power for these plant items.

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The 'Load on Generator' power demand is also shown for both maximum power demand and predicted actual power demand, i.e. the power that will be required should the electricity supply be temporarily interrupted to the site. If this occurs, the plant will operate only using the plant absolutely necessary to keep operating. The plant will be powered from the generator in this case, which is diesel fuelled. Details of the diesel fuel tank for the generator is provided in Attachment D.1 – Site Infrastructure.

Biogas will be produced as a by-product of the digestion process.

(c) Energy Efficiency Measures

Energy efficiency measures that have been incorporated into the design of the facility, or that will be put in place as part of the operation of the facility, are outlined in this section.

Biogas from Anaerobic Digestors to Fuel Boilers

The boilers (which provide hot water for the pasteurization process) are designed to utilize the biogas (from the anaerobic digestion process) as the primary energy source for this process. Biogas generated within the digestors is stored in a gas holder, which has 200 m^3 capacity. The purpose of the gas holder is to buffer out any peaks in gas production.

The calorific value of the biogas is 22.5 MJ/kg. A breakdown of the biogas is shown in Table G.2 (3).

Table G.2 (3) Breakdown of Biogas from Anaerobic Digestion

Biogas Content		
Methane (CH_4)	60-65	%
Carbon Dioxide (CO_2)	30-35	%
Hydrogen Sulphide (H_2S)	0-2000	ppm

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The anaerobic digestion process will produce approximately 2208.3 MJ/hr, which is 0.6 MW. This 0.6 MW is then available to fuel the boilers. Should there be a shortfall in the amount of biogas available then gas oil (diesel) will be utilized to power the boilers. It is expected that the use of fossil fuel will be required only on rare occasions; the biogas is the primary fuel for the boilers.

Any excess biogas, which is not stored, will be burned-off. The waste burner will flare off any excess gas on-site as a safety precaution.

Secondary Treatment – Use of Blowers in secondary treatment

As part of the secondary treatment, the 5 no. blowers which supply air to the four IBA (Inclined Bubble Aeration) tanks operate on a duty/standby basis. The duty/standby system operates as follows: blowers are only turned on once the dissolved oxygen level within each tank (one blower per tank) drops below a certain level. Dissolved oxygen monitors are located in each of the IBA tanks, which allow the speed of each blower to be altered as the dissolved oxygen level within the tank fluctuates. The speed of the blowers is controlled by means of an inverter.

Use of Equipment/Plant

All pumps and plant items for the facility are on duty/standby system, whereby they will only be in operation "as required/on demand". Therefore, the supply is not constant and the energy used by the process is thus minimized.

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In addition, as detailed in Section G.2(c), if the electricity supply to the facility is interrupted, the facility will be powered by the generator, which is diesel fuelled. If this occurs, the diesel volume required will be reduced to the minimum required by only operating the plant necessary to keep the facility operating.

All plant items were selected based on a number of criteria, one of which was the efficiency of the motor/plant, in order to reduce the energy demand as much as possible.

Lighting Efficiencies

The lighting plan for the site was designed in order to reduce the amount of lighted areas required and to reduce the amount of time that artificial lighting is required within the WWTP buildings and across the overall site.

Some areas of lighting could not be reduced, either for security reasons, or for health and safety reasons (or both).

An energy audit has not been carried out for this facility, as it was not deemed necessary.

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Table G.1(1) WWTP Power Consumption

Item No:	Motor Tag No.	Description	Item Location	Equipment	Power Rating		Configuration	Load on Generator - Mimimum Operational Req.	Absorbed Power On Generator (Min. Req.)
				Power Rating	Abs. Duty (kW)	Stand By (kW)		kW	kW
1	M-1101A	Belview Pump 1	Belview Pumping Station	22.40	19.50		Duty	22.40	19.50
2	M-1101B	Belview Pump 2	Belview Pumping Station	22.40		19.50	Standby		
3	M-1204A	Inlet Screen 1 Drive 1	Inlet Works Building	3.00	3.00		Duty	3.00	3.00
4	M-1204B	Inlet Screen 2 Drive 1	Inlet Works Building	3.00	3.00		Assist	3.00	3.00
5	M-1204C	Inlet Screen 3 Drive 1	Inlet Works Building	3.00		3.00	Standby		
6	M-1207	Grit / Screening Washwater Sump Pump 1	Inlet Works Building	1.30	1.30		Duty		
7	M-1208	Grit / Screening Washwater Sump Pump 2	Inlet Works Building	1.30	1.30		Duty		
8	M-1205	Aerated Grit Channel 1 Surface Scraper	Inlet Works Building	0.55	0.55		Duty		
9	M-1206	Aerated Grit Channel 2 Surface Scraper	Inlet Works Building	0.55	0.55		Duty		
10	M-1203A	Grit & Grease Blower 1	Inlet Works Building	15.00	11.10		Duty	15.00	11.10
11	M-1201A	Blower 1 Enclosure Vent Fan 1	Inlet Works Building	0.41	0.41		Duty	0.41	0.41
12	M-1202A	Blower 1 Enclosure Vent Fan 2	Inlet Works Building	0.41	0.41		Duty	0.41	0.41
13	M-1203B	Grit & Grease Blower 2	Inlet Works Building	15.00		11.10	Standby		
14	M-1201B	Blower 2 Enclosure Vent Fan 1	Inlet Works Building	0.41		0.41	Standby		
15	M-1202B	Blower 2 Enclosure Vent Fan 2	Inlet Works Building	0.41		0.41	Standby		
16	N/A	Overhead Crane	Inlet Works Building	5	5.00		Duty		
17	M-1302A	Storm Tank 1 Pump	Storm Water Tank	13.10	11.70		Duty		
18	M-1301A	Storm Tank 1 Jet Mixer	Storm Water Tank	21.90	14.10		Duty		
19	M-1302B	Storm Tank 2 Pump	Storm Water Tank	13.10	11.70		Duty		
20	M-1301B	Storm Tank 2 Jet Mixer	Storm Water Tank	21.90	14.10		Duty		
21	M-1401	Screening Conveyor	Inlet Works Building	2.20	2.20		Duty	2.20	2.20
22	M-1404	Washer/Compactor	Inlet Works Building	5.50	5.50		Duty	5.50	5.50
23	M-1402	Grit Classifier Agitator	Inlet Works Building	0.37	0.37		Duty	0.37	0.37
24	M-1403	Grit Classifier Screw	Inlet Works Building	0.37	0.37		Duty	0.37	0.37
25	M-1501A	Primary Settlement Tank 1 Scraper	Primary Settlement Tank	3.00	3.00		Duty	3.00	3.00
26	M-1501B	Primary Settlement Tank 2 Scraper	Primary Settlement Tank	3.00	3.00		Duty	3.00	3.00
27	M-1502A	Primary Sludge Pump 1	Plinth Between Storm Water Tanks	2.20	2.20		Duty		
28	M-1502B	Primary Sludge Pump 2	Plinth Between Storm Water Tanks	2.20	2.20		Duty		
29	M-1502C	Primary Sludge Pump 3	Plinth Between Storm Water Tanks	2.20		2.20	Standby		
30		Building services	Inlet Works Building	30.00	30.00		Duty	30.00	30.00
31	M-1601	Submersible Mixer	ASP Selector tank	6.40	5.44		Duty	6.40	5.44
32	M-1604A	Process Air Blower 1	Sludge Thickening & Dewatering Building	110.00	77.40		Duty	110.00	77.40
33	M-1605A	Process Air Blower 1 Enclosure Fan 1	Sludge Thickening & Dewatering Building	0.41	0.41		Duty	0.41	0.41
34	M-1606A	Process Air Blower 1 Enclosure Fan 2	Sludge Thickening & Dewatering Building	0.41	0.41		Duty	0.41	0.41
35	M-1604B	Process Air Blower 2	Sludge Thickening & Dewatering Building	110.00	77.40		Duty		
36	M-1605B	Process Air Blower 2 Enclosure Fan 1	Sludge Thickening & Dewatering Building	0.41	0.41		Duty		
37	M-1606B	Process Air Blower 2 Enclosure Fan 2	Sludge Thickening & Dewatering Building	0.41	0.41		Duty		
38	M-1604C	Process Air Blower 3	Sludge Thickening & Dewatering Building	110.00	77.40		Duty		
39	M-1605C	Process Air Blower 3 Enclosure Fan 1	Sludge Thickening & Dewatering Building	0.41	0.41		Duty		
40	M-1606C	Process Air Blower 3 Enclosure Fan 2	Sludge Thickening & Dewatering Building	0.41	0.41		Duty		
41	M-1604D	Process Air Blower 4	Sludge Thickening & Dewatering Building	110.00	77.40		Duty		
42	M-1605D	Process Air Blower 4 Enclosure Fan 1	Sludge Thickening & Dewatering Building	0.41	0.41		Duty		
43	M-1606D	Process Air Blower 4 Enclosure Fan 2	Sludge Thickening & Dewatering Building	0.41	0.41		Duty		
44	M-1604E	Process Air Blower 5	Sludge Thickening & Dewatering Building	110.00		77.40	Standby		
45	M-1605E	Process Air Blower 5 Enclosure Fan 1	Sludge Thickening & Dewatering Building	0.41		0.41	Standby		
46	M-1606E	Process Air Blower 5 Enclosure Fan 2	Sludge Thickening & Dewatering Building	0.41		0.41	Standby		
47	M-1602A	Aeration Tank 1 Mixer	Aeration Tank	4.70	3.20		Duty	4.70	3.20
48	M-1603A	Aeration Tank 1 Mixer	Aeration Tank	4.70	3.20		Duty	4.70	3.20
49	M-1602B	Aeration Tank 2 Mixer	Aeration Tank	4.70	3.20		Duty	4.70	3.20
50	M-1603B	Aeration Tank 2 Mixer	Aeration Tank	4.70	3.20		Duty	4.70	3.20
51	M-1602C	Aeration Tank 3 Mixer	Aeration Tank	4.70	3.20		Duty	4.70	3.20
52	M-1603C	Aeration Tank 3 Mixer	Aeration Tank	4.70	3.20		Duty	4.70	3.20
53	M-1602D	Aeration Tank 4 Mixer	Aeration Tank	4.70	3.20		Duty	4.70	3.20
54	M-1603D	Aeration Tank 4 Mixer	Aeration Tank	4.70	3.20		Duty	4.70	3.20
55	M-1701A	Final Settlement Tank 1 Scraper	Final Settlement Tank	3.00	3.00		Duty	3.00	3.00

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56	M-1701B	Final Settlement Tank 2 Scraper	Final Settlement Tank	3.00	3.00		Duty	3.00	3.00
57	M-1701C	Final Settlement Tank 3 Scraper	Final Settlement Tank	3.00	3.00		Duty	3.00	3.00
58	M-1701D	Final Settlement Tank 4 Scraper	Final Settlement Tank	3.00	3.00		Duty	3.00	3.00
59	M-1702A	RAS Pump 1	Plinth Outside Final Settlement Tanks	13.10	11.10		Duty	13.10	11.10
60	M-1702B	RAS Pump 2	Plinth Outside Final Settlement Tanks	13.10	11.10		Duty	13.10	11.10
61	M-1702C	RAS Pump 3	Plinth Outside Final Settlement Tanks	13.10		11.10	Standby		
62	M-1702D	RAS Pump 4	Plinth Outside Final Settlement Tanks	13.10	11.10		Duty		
63	M-1702E	RAS Pump 5	Plinth Outside Final Settlement Tanks	13.10	11.10		Duty	13.10	11.10
64	M-1702F	RAS Pump 6	Plinth Outside Final Settlement Tanks	13.10		11.10	Standby	13.10	11.10
65	M-1703A	SAS Pump 1	Plint Beside RAS Pipe	3.40	3.00		Duty		
66	M-1703B	SAS Pump 2	Plint Beside RAS Pipe	3.40		3.00	Standby		
67		Building services		30.00	30.00		Duty	30.00	30.00
68	M-1801	Picket Fence Thickener	Picket Fence Thickener	0.37	0.37		Duty		
69	M-1807	Air Compressor	Sludge Thickening & Dewatering Building	4.00	4.00		Duty		
70	M-1804A	Gravity Belt Thickener 1 Belt Drive	Sludge Thickening & Dewatering Building	1.50	1.50		Duty		
71	M-1805A	Gravity Belt Thickener 1 Mixer	Sludge Thickening & Dewatering Building	1.10	1.10		Duty		
72	M-1806A	Gravity Belt Thickener 1 Ventilation	Sludge Thickening & Dewatering Building	0.16	0.16		Duty		
73	M-1803A	Thickened Sludge Pump	Sludge Thickening & Dewatering Building	1.50	1.25		Duty		
74	M-1804B	Gravity Belt Thickener 2 Belt Drive	Sludge Thickening & Dewatering Building	1.50		1.50	Standby		
75	M-1805B	Gravity Belt Thickener 2 Mixer	Sludge Thickening & Dewatering Building	1.10		1.10	Standby		
76	M-1806B	Gravity Belt Thickener 2 Ventilation	Sludge Thickening & Dewatering Building	0.16		0.16	Standby		
77	M-1803B	Thickened Sludge Pump	Sludge Thickening & Dewatering Building	1.50		1.25	Standby		
78	M-1802A	PFT Sludge Pump 1	Beside PFT Tank	4.00	4.00		Duty		
79	M-1802B	PFT Sludge Pump 2	Beside PFT Tank	4.00		4.00	Standby		
80	M-1901	Sludge Buffer/Blending Tank Mixer	Sludge Buffer/Blending Tank	3.50	2.98		Duty		
81	M-1902	Secondary Sludge Holding Tank Mixer	Secondary Sludge Holding Tank	8.70	7.40		Duty		
82	M-1903	Primary Sludge Holding Tank Mixer	Primary Sludge Holding Tank	8.70	7.40		Duty		
83	M-1904A	Pasteurisation Feed Pump 1	Sludge Area	11.00			Duty		
84	M-1904B	Pasteurisation Feed Pump 2	Sludge Area	11.00			Standby		
85	M-1905A	Pasteurisation Feed Pump Macerator 1	Sludge Area	3.00			Duty		
86	M-1905B	Pasteurisation Feed Pump Macerator 2	Sludge Area	3.00			Standby		
87	M-2001A	Pasteuriser Tank 1 Mixer	Pasturiser Area	5.50			Duty		
88	M-2001B	Pasteuriser Tank 2 Mixer	Pasturiser Area	5.50			Duty		
89	M-2001C	Pasteuriser Tank 3 Mixer	Pasturiser Area	5.50			Duty		
90	M-2002A	Pasteurised Outlet Sludge Pump 1	Pasturiser Area	11.00			Duty		
91	M-2002B	Pasteurised Outlet Sludge Pump 2	Pasturiser Area	11.00			Standby		
93	M-2101A	Digester 1 Mixer	Digester Area	7.50			Duty	7.50	7.50
94	M-2101B	Digester 2 Mixer	Digester Area	7.50			Duty	7.50	7.50
97	M-2201	Digested Sludge Holding Tank Mixer	Digested Sludge Holding Tank	21.00	17.85		Duty	21.00	17.85
98	M-2202A	Dewaterer Feed Pump 1	Sludge Thickening & Dewatering Building	3.00	2.60		Duty		
99	M-2202B	Dewaterer Feed Pump 2	Sludge Thickening & Dewatering Building	3.00		2.60	Standby		
100	M-2301A	Dewaterer 1 Belt Drive	Sludge Thickening & Dewatering Building	1.50	1.50		Duty		
101	M-2302A	Dewaterer 1 Mixer Drive	Sludge Thickening & Dewatering Building	0.75	0.75		Duty		
102	M-2304A	Dewaterer Sludge Pump 1	Sludge Thickening & Dewatering Building	7.50	6.90		Duty		
103	M-2301B	Dewaterer 2 Belt Drive	Sludge Thickening & Dewatering Building	1.50		1.50	Standby		
104	M-2302B	Dewaterer 2 Mixer Drive	Sludge Thickening & Dewatering Building	0.75		0.75	Standby		
105	M-2304B	Dewaterer Sludge Pump 2	Sludge Thickening & Dewatering Building	7.50		6.90	Standby		
106	M-2305	Air Compressor	Sludge Thickening & Dewatering Building	4.00	4.00		Duty		
107	M-2401A	Condensate Pump 1	Gas Holder Area	2.20			Duty		
108	M-2401B	Condensate Pump 2	Gas Holder Area	2.20			Standby		
109	M-2403A	Gas Booster 1	Gas Holder Area				Duty		
110	M-2403B	Gas Booster 2	Gas Holder Area				Standby		
111		Gas Burner Package	Gas Holder Area				Duty		
112	M-2501	Polymer Make Up Unit 1	Polyelectrolyte Make - Up package	1.00	1.00		Duty		
113	M-2502	Polymer Make Up Unit 2	Polyelectrolyte Make - Up package	1.00	1.00		Duty		
114	M-2501A	Polyelectrolyte Dosing pump 1 (for thickening unit)	Sludge Thickening & Dewatering Building	0.37	0.37		Duty		
115	M-2501B	Polyelectrolyte Dosing pump 1 (for thickening unit)	Sludge Thickening & Dewatering Building	0.37		0.37	Standby		
116	M-2502A	Polyelectrolyte Dosing pump 1 (for dewatering unit)	Sludge Thickening & Dewatering Building	0.75	0.75		Duty		
117	M-2502B	Polyelectrolyte Dosing pump 1 (for dewatering unit)	Sludge Thickening & Dewatering Building	0.75		0.75	Standby		
118	M-2601	Odour Control Unit 1 Fan 1	Inlet Works	22.00	22.00		Duty	22.00	22.00
119	M-2602	Odour Control Unit 1 Fan 2	Inlet Works	22.00		22.00	Standby		

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120	M-2603	Odour Control Unit 2 Fan 1	Sludge Area	7.50	7.50		Duty	7.50	7.50
121	M-2604	Odour Control Unit 2 Fan 2	Sludge Area	7.50		7.50	Standby		
122	M-2702A	Potable Water Booster Pump	Sludge Thickening & Dewatering Building	2.30	2.30		Duty	2.30	2.30
123	M-2701A	Final Effluent Washwater Pump 1	Final Effluent Chamber	37.00	37.00		Duty	37.00	35.00
124	M-2701B	Final Effluent Washwater Pump 2	Final Effluent Chamber	37.00		37.00	Standby		
125	M-2703A	Final Effluent Filter Motor	In Proximity of Final Effluent Chamber	0.25	0.25		Duty	0.25	0.25
126	M-2703B	Final Effluent Filter Motor	In Proximity of Final Effluent Chamber	0.25		0.25	Standby		
127	M-2801A	Boiler Water Circulation Pump 1	Boiler Room	11.00			Duty		
128	M-2801B	Boiler Water Circulation Pump 2	Boiler Room	11.00			Standby		
129		Boiler Package	Boiler Room	-			Duty		
130		Air Compressor Package	Boiler Room	3.00			Duty		
131	M-2901A	Ferric Sulphate Dosing Pump 1	Nutrient Removal Area	0.37			Duty		
132	M-2901B	Ferric Sulphate Dosing Pump 2	Nutrient Removal Area	0.37			Standby		
133	M-3001A	Liquors Return pump 1	Return Liquors Pumping Station	17.00	14.90		Duty		
134	M-3001B	Liquors Return pump 2	Return Liquors Pumping Station	17.00		14.90	Standby	17.00	14.90
135		Building services		10.00			Duty	10.00	10.00
136	M-3101A	Boiler Plant Fuel Oil Feed Pump 1	Fuel Oil Storage Area	2.20			Duty		
137	M-3101B	Boiler Plant Fuel Oil Feed Pump 2	Fuel Oil Storage Area	2.20			Standby		
Total				**1333.11**	**730.66**	**242.57**		**469.95**	**402.29**

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Attachment H

Materials Handling

H.1 - Waste Types and Quantities

See Tables H.1 (A-C) and H.1(ii) for waste types and quantities (hazardous and non-hazardous) to be handled at the site.

The wastes that will be produced at the site are as follows:
- Sewage Sludge (Primary and Secondary)
- Sludge Bio-Cake
- Grit
- Screenings
- Non-Hazardous Wastes from Administration/Staff Facilities (paper, cardboard, plastic, mixed-non-recyclable waste)

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H.2 - Waste Acceptance Procedures

Solid waste (non-hazardous or hazardous) will not be received on site, due to the nature of the facility. Therefore no procedures for checking waste loads as they arrive on site are necessary.

Waste will be generated on site (as shown in Tables in Section H.1).

H.3 - Waste Handling

Sludge Storage

Waste generated at the WWTP will be sludge. The sludge will undergo several stages involving thickening and dewatering before a final sludge bio-cake is produced for disposal or recovery off-site. The sludge will have a minimum of 23% dry solids content.

The sludge will be produced as described in detail in Section D.2 – Facility Operation. The standard operating procedures for the treatment of the sewage through to final effluent and sludge (the end products) will be followed. Dewatered sludge will be directed to trailers, located in a designated area adjacent to the sludge works. The conveyancing system to transport the sludge bio-cake is fully enclosed and there are mechanisms in place to purge the conveyancing system during downtime of the dewatering plant.

In the case of contaminated sludge, which may have been produced from contaminated influent, i.e. influent that contains materials which are not within the acceptance criteria for the inlet works, the CAW (operator) procedure for Contaminated Sludge, which is included in Section J – Accident & Emergency, will be followed. The contaminated sludge will be diverted to a standby sludge tank and the operations will change to the duty equipment.

The waste products, i.e. sludge bio-cake, screenings and grit, will be taken off-site. It is envisaged that the sludge will be sent for either disposal or recovery, with a view to

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almost all sludge being sent for recovery eventually. The sludge trailer will leave the site daily and transport the sludge to the end destination, either to landfill or to a suitable, approved landbank in as close proximity to the site as possible, to reduce transport distances.

Screenings and grit will be stored separately in small skips located adjacent to the sludge works. These will be taken off site as required by permitted waste contractors, and taken to EPA licensed sites or Local Authority permitted sites. Details of these sites will be made available to the Agency once the facility is operational and suitable disposal/recovery sites have been identified.

Sludge Record Keeping System

The sludge processed through each stage of the plant will be monitored by automatic monitoring and recording equipment. These records will be kept within the internal recording system for the facility.

Each load of sludge waste leaving the site will be logged and kept in the recording system which will be maintained by the WWTP operators. As a weighbridge is not provided at the facility, records from the waste contractor will be supplied to the operator and maintained on file at the facility. These records will be available for inspection by the Agency as required.

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Attachment H.4 - Waste Arisings

Under the Waste Management Acts 1996 to 2003 (Second Schedule, Part III) and the EU Commission Decision (2000/532/EC, Article 2), the wastes that will be produced at the facility are not considered to be hazardous.

Should it be suspected that any sludge being processed in the WWTP is contaminated, i.e. as described in Section H.3, it will be contained within the sludge holding tank. Suspected contaminated sludge will be sampled and analysed at the nominated laboratory. If the sludge is contaminated, it will be taken off-site for disposal by licensed contractors to an appropriate facility.

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TABLE H.1(i): WASTE - Hazardous Waste Recovery/Disposal

Waste material	EWC Code	Main source[1]	Quantity		On-site Recovery/Disposal (Method & Location)	Off-site Recovery, reuse or recycling (Method, Location & Undertaker)	Off-site Disposal (Method, Location & Undertaker)
			Tonnes / month	m^3 / month			
Not Applicable							

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[1] A reference should be made to the main activity / process for each waste.

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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)
Primary & Secondary Sewage Sludge (Non-Hazardous)	19 08 05	Wastewater Treatment Works	7925	8,005	On-Site Treatment, anaerobic digestion, pasteurization and dewatering	Not Applicable	Not Applicable
Sludge Bio-cake	19 08 05	Wastewater Treatment Works	1250.2	1168.4	On-Site Dewatering of sludge to produce 23% dry solids minimum bio-cake	Landspreading when possible	Disposal to Licenced Landfill
Grit	19 08 99	Wastewater Treatment Works	Not Available until commissioning phase complete	Not Available until commissioning phase complete	None	None	Disposal to Landfill
Screenings	19 08 01	Wastewater Treatment Works	Not Available until commissioning phase complete	Not Available until commissioning phase complete	None	None	Disposal to Landfill
Mixed Municipal Waste	20 03 01	Administration Building, bins around the facility	1	3.7	None	None	Disposal to Landfill
Paper/Card	20 01 01	Administration Building	0.5	2.8	None	Recycling	None

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Plastic	20 01 39	Administration Building	0.1	2.5	None	Recycling	None

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

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Attachment I.1

Existing Air Quality Environment

The Environmental Impact Statement for the development, which was produced in 1998, is supplied in full as part of Attachment B.3 of this Waste Licence Application. An update report to the EIS was carried out and is also included as part of Attachment B.3. The predicted air quality and odour impact for the facility is described in summary in this attachment (I.1), but Attachment B.3 should be referred to for the comprehensive impact assessment.

I1(a) Ambient Air Quality

The assessment of air quality (excluding odour) has been carried out using a phased approach as recommended by the UK DEFRA. In the current assessment, an initial scoping of possible key pollutants was carried out.

An assessment of the baseline air quality in the region of the proposed development has been carried out by reference to suitable EPA long-term monitoring data. Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent annual report on air quality entitled "Air Quality Monitoring Annual Report 2006" (EPA, 2007), details the range and scope of monitoring undertaken throughout Ireland.

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The assessment showed that existing baseline levels of NO_2, SO_2, CO, benzene, PM_{10} and $PM_{2.5}$ are below ambient air quality limit values in the vicinity of the proposed development.

I1(b) Predicted Impact

Air Quality

Wastewater is a potential source of methane (CH_4) when treated or disposed anaerobically (digested) if releases into the environment are likely, however in this instance anaerobic digestion followed by combustion of the methane to produce heat is proposed, and the risk of methane being released to the atmosphere is considered negligible. Wastewater can also be a minor source of nitrous oxide (N_2O) emissions. Carbon dioxide (CO_2) emissions from wastewater treatment are not considered in the *IPCC Guidelines* because these are of biogenic origin and are thus carbon neutral.

The assessment of baseline air quality in the region of the proposed development has shown that current levels of key pollutants are significantly lower that their limit values.

Due to the size, nature and location of the Waterford WWTP development, which will lead to a small increase in road traffic emissions, the proposed development is expected to have an imperceptible impact on air quality in terms of NO_2, SO_2, benzene and CO.

Particulate emissions from road traffic will also be insignificant due to the existing low levels of traffic and with a small increase in road traffic emissions envisaged as

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a result of this development. Particulate emissions due to the on-site activity will also be expected to be insignificant.

Climate

Greenhouse gas emissions, as a result of this development, will be imperceptible in terms of Ireland's obligations under the Kyoto Protocol. Any CH_4 which is formed through anaerobic digestion will be collected, stored and used as a fuel to heat the boilers for the pasteurization process.

I1(c) Background Odour Environment

A baseline odour survey was carried out by Bord na Mona in April 2007 at the site and surrounding area (Report Ref. ECS2363).

Hydrogen sulphide and meteorological measurements were made over a two day period in the vicinity of the WWTP site and also at selected sensitive receptors. Monitoring was carried out at over 75 locations on each day.

The hydrogen sulphide levels recorded during the baseline survey ranged from 2.33 parts per billion (ppb) to 4.00ppb for the first day of monitoring, and ranged from 5.00ppb to 9.00ppb on the second day of monitoring, giving an average of 4.62ppb for the overall survey. The ambient measurements were compiled and odour contour plots were generated. The Bord na Mona report determined that the levels measured during the survey were comparable to previous ambient background concentrations measured during sampling programmes carried out in Wales in 2003 and 2004.

It should be noted that whilst baseline odour surveys can give ambient odour levels for the time of the survey, they only represent the period of time in which the survey was performed, and other baseline odours may be present at different times of year, or depending on the meteorological conditions. It should also be noted that not all odour originating from the operation of a WWTP are from hydrogen sulphide emissions. However, only hydrogen sulphide was monitored for this baseline survey.

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I1(d) Predicted Impact

The WWTP will include a number of buildings and plant items that will operate 365 days per year. The areas of the facility where odour may be produced are the Belview Pumping Station, the storm tanks, the selector and aeration tanks, the final settlement tanks, the digested holding tank, the inlet works and preliminary treatment works and the sludge treatment works.

The odours from the inlet and primary treatment works and the sludge treatment works will be directed to 2 no. odour control units (OCU), each with a stack, from which treated air will be discharged.

Due to the nature of the activity, i.e. wastewater treatment, there is the potential to generate odours from the facility that are significant. There is a potential impact on the sensitive receptors, i.e. domestic dwellings, in the area surrounding the site. An odour dispersion model was generated to predict the direction and concentration of odours from the WWTP facility. The full odour model report is included in the Update to the EIS report (Ref. MM/07/4084R01), as Appendix 2.2.

Maximum odour concentrations at the site boundaries and the closest sensitive receptors were predicted, for both short-term and long-term periods, from the results of the model.

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The results showed that, under normal operating conditions, the isopleths (contours) corresponding to 3 ou_E/m^3 (95^{th} percentile, 1-hour average) and 5 ou_E/m^3 (95^{th} percentile, anytime) does not extend to, or beyond the site boundary.

Similarly, at the nearest receptors, i.e. domestic dwellings (being more distant from the site boundaries), the isopleth corresponding to 0.3 ou_E/m^3 (95^{th} percentile, 1-hour average) and 0.5 ou_E/m^3 (95^{th} percentile, anytime) does not extend to their location. The odour contour drawings are included in Appendix 2.2 of the EIS update.

Therefore, provided the odour abatement systems (Odour Control Units 1 & 2) are installed and operating to the design specification, there will be odours generated at the WWTP facility. however the impact will be long term - imperceptible at the nearest receptors.

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Attachment I.2

Surface Water Environment & Impacts

The Environmental Impact Statement for the development, which was produced in 1998, is supplied in full in Attachment B.3 of this Waste Licence Application. An update report to the EIS was carried out and is also included as part of Attachment B.3. The predicted impact of the facility on the surface water environment is described in summary in this attachment (I.2), but Attachment B.3 should be referred to for the comprehensive impact assessment.

I.2(a) Receiving Environment

There is a stream located to the west of the site, which enters the Suir Estuary south of the subject site. The stream takes field drainage from surrounding land and discharges into the Suir Estuary, which is the main hydrological body in the vicinity of the subject site, at the southeast corner of the site. No flow readings or monitoring data were available for the stream at the time of writing this report.

In terms of tidal water levels in the Suir Estuary, the mean high and low water spring values are 1.62m and -2.47m respectively.

The main receiving water in the vicinity of the site is the Suir Estuary, which flows in a east to west direction close to the southern boundary of the site.

The Suir Estuary falls under the district area known as the Southeast River Basin District (SERBD). These districts have been put in place as part of the Water Framework Directive and through the SERBD project, water quality monitoring is carried out for the River Suir.

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Summary water quality data for the period 2005 – 2007 is shown in Table 1.2 (1).

Table I.2 (1) SERBD Water Quality Monitoring Data for Suir River & Estuary 2005-2007

Station No.	Location	DO	BOD	pH	Ammonia	Ortho-Phosphate	Nitrate	Total Coliforms	Faecal Coliforms
		% Sat	mg/l O_2	pH Units	mg/l N	mg/l P	mg/l N	Count	Count
		Surface						/100ml	/100ml
50	R. Suir at Waterford Br.	88.87	2.04	8.04	0.17	0.03	2.34	16895	2629
51.2	R. Suir at Abbeylands	90.20	1.55	7.98	0.19	0.03	2.24	18389	4552
53	Waterford Castle	83.47	1.82	7.98	0.22	0.03	1.44	9183	859
58	R. Suir at King's Channel	84.25	1.87	7.98	0.22	0.03	1.23	8317	1237
59	R. Suir at Belview Port	95.25	1.88	8.05	0.19	0.04	2.30	17618	1597
61	Estuary - Cheekpoint	92.24	2.05	8.07	0.15	0.03	1.54	6449	581

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The above water quality data in Table 4.2 was compared with water quality data included in the original EIS, which included EPA data gathered between 1993 and 1997 as shown in Table I.2(2).

Table I.2(2) EPA Water Quality Monitoring Data for Suir River & Estuary 1993-1995

Sampling Location	DO	BOD	pH	Ammonia	Ortho-Phosphate	Nitrate	Total Coliform	Faecal Coliform
	% Sat	mg/l O_2	pH Units	mg/l N	mg/l P	mg/l N	Count	Count
	Surface						/100ml	/100ml
Giles Quay	89.17	1.4	8.12	0.08	0.05	-	16850	22983
Little Island	91.5	1.35	8.13	0.006	0.04	-	-	-
King's Channel	91.83	1.15	8.15	0.06	0.04	-	-	-

Water quality monitoring data was also carried out by Waterford City Council in November 2007 (Table 1.2(3).

Table I.2(3) Waterford City Council Surface Water Quality Monitoring Data 2007

Sampling Ref.	Parameter														
	Total Nitrogen	Total Phosphorus	Suspended Solids	BOD	COD	Conductivity	pH	Cyanide	Ammonium	Nitrate	Nitrite	Phosphate	Sulphate	Phenol	Fluoride
	mg/l	mg/l	mg/l	mg/l	mg/l	uS/cm		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	mg/l
ML-1	<1	0.3	73	<3	19	19190	7.4	<5	0.269	<0.12	0.03	0.03	1207	<1.0	1210
ML-2	1	0.5	75	<3	30	21300	7.4	<5	0.433	<0.12	0.02	0.02	1260	<1.0	1050
ML-3	<1	0.6	101	<3	38	21700	7.4	<5	0.429	<0.12	0.02	0.04	1441	<1.0	1170
ML-4	<1	0.4	79	<3	34	23700	7.5	<5	0.635	<0.12	0.02	0.08	1728	<1.0	950
ML-5	1	0.3	166	<3	45	24500	7.5	<5	0.707	<0.12	0.02	0.02	1355	<1.0	1100
ML-6	<1	0.6	134	<3	60	26400	7.5	<5	0.822	<0.12	0.02	0.04	1981	<1.0	1260

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Table I.2(4) Waterford City Council Surface Water Quality Monitoring Locations

Sampling Ref.	Sampling Location
Surface Water	
ML-1	Upstream SW4-SW5
ML-2	Downstream SW4-SW5
ML-3	Downstream SW1, Upstream SW7-SW13
ML-4	Downstream SW7-SW13
ML-5	Upstream SW14-SW19
ML-6	Downstream SW14 - SW19

Overall, the available water quality data indicates that the water quality for the Suir Estuary has deteriorated slightly over a period of 10-15 years.

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The deterioration in water quality in the Suir Estuary is likely to be at least partially as a result of this increase of untreated wastewater discharge.

I.2(b) Predicted Impact of WWTP Facility

The construction works for the WWTP, the rising mains and outfall pipe from the WWTP will require dredging and trenching of the river. Temporary slight localised impacts on water quality will occur, as described in the original EIS. Construction methodologies have been put in place to ensure that the impacts from the construction phase are minimized.

The current water quality status of the River Suir appears to have deteriorated over the past 10-15 years. The cause of the deterioration is likely to have been due, at least in part, to the wastewater discharges from the 17 no. current outfalls in the area.

The hydrological modelling, included as Appendix A of the original EIS, indicates that the operation of the Waterford WWTP will result in a significant increase in water quality status on a local and regional scale.

It can be concluded that, whilst the baseline hydrological environment may have deteriorated in the past 10-15 years, based on available monitoring data, the predicted impact of the WWTP and associated outfall will have a significant positive impact on the water quality of the Suir River and Estuary.

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Attachment I.4

Ground & Groundwater Environment & Impacts

The Environmental Impact Statement for the development, which was produced in 1998, is supplied in full in Attachment B.3 of this Waste Licence Application. An update report to the EIS was carried out and is also included as part of Attachment B.3. The predicted impact of the facility on the surface water environment is described in summary in this attachment (I.2), but Attachment B.3 should be referred to for the comprehensive impact assessment.

I.4(a) Receiving Environment

The underlying geology of the site is comprised of shales and siltstones, which can be highly weathered in the upper layers and quite weak. The depth to bedrock ranges significantly in the area, ranging from 3.8 m BGL (Below Ground Level) to 16.6 m BGL in the vicinity of the site. Direction of groundwater flow appears to be from north to south, i.e. towards the River Suir.

The bedrock aquifer has been given a Groundwater Protection Zone classification by the GSI (as part of the Groundwater Protection Scheme for Co. Kilkenny) of Rf/M – Regionally Important of Moderate Vulnerability.

Well card data from the GSI Well Card Database (a record of wells drilled in Ireland) shows a number of wells within a 3 km radius of the WWTP site. From these records, the underlying bedrock in the area has been shown to be capable of yields ranging from moderate (40 – 100 m^3/day) to excellent (>400 m^3/day).

The IDA Park, located directly to north of the site, is currently installing a borehole within the IDA Park for the purposes of water supply for the area until a public water supply is put in place by the Local Authority. It is understood that the IDA has permission to abstract approximately 10,100 gallons per hour (GPH).

I.4(b) Predicted Impact of WWTP Facility

Emissions to groundwater are not expected during the construction or operational phase of the facility. A SUDS (Sustainable Urban Drainage Systems) will form part of the surface water drainage systems. Two no. swales, which will be located in the northern part of the site, will take surface water drainage from the impermeable road surfaces and direct them to the trunk drainage pipe that discharges to the stream to the east of the site.

Some runoff will permeate into the ground through the swales, reducing the volume of water that would need to be discharged to the stream. No negative impact on the ground environment from the surface runoff is predicted.

The water supply route for the WWTP has not yet been finalised. However, it is understood (based on information from the operator of the WWTP and the IDA) that the water supply will be obtained from an abstraction borehole within the IDA lands (that is currently under construction), adjacent to the WWTP site. A spur to the WWTP from the IDA water supply connection will be used for water supply, with assurance from the IDA that the required water supply is available. Therefore, there

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is no predicted impact on the groundwater environment assuming that the maximum yield of the abstraction well is not exceeded.

It is understood (based on informal discussions with Kilkenny County Council) that a piped water supply may be in place to serve the site by approximately 2010, which would negate the need for the water supply from the IDA Park borehole.

It can be concluded that, whilst the baseline hydrological environment may have deteriorated in the past 10-15 years, based on available monitoring data, the predicted impact of the WWTP and associated outfall will have a significant positive impact on the water quality of the Suir River and Estuary.

There is no predicted impact on the groundwater environment from the proposed development and its operations.

Table I.4(i) is not applicable and therefore has not been completed.

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Table I.4(i) GROUNDWATER QUALITY
(Sheet 1 of 2) Monitoring Point/ Grid Reference: _Not Applicable

Parameter	Results (mg/l)	Sampling method (composite etc.)	Normal Analytical Range	Analysis method / technique			
	Date	Date	Date	Date			
pH	Not Applicable						
Temperature	Not Applicable						
Electrical conductivity EC	Not Applicable						
Ammoniacal nitrogen NH_4-N	Not Applicable						
Dissolved oxygen DO	Not Applicable						
Residue on evaporation (180°C)	Not Applicable						
Calcium Ca	Not Applicable						
Cadmium Cd	Not Applicable						
Chromium Cr	Not Applicable						
Chloride Cl	Not Applicable						
Copper Cu	Not Applicable						
Cyanide Cn, total	Not Applicable						
Iron Fe	Not Applicable						
Lead Pb	Not Applicable						
Magnesium Mg	Not Applicable						
Manganese Mn	Not Applicable						
Mercury Hg	Not Applicable						
Nickel Ni	Not Applicable						
Potassium K	Not Applicable						
Sodium Na	Not Applicable						

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Attachment I.6

Existing Noise Environment

The Environmental Impact Statement for the development, which was produced in 1998, is supplied in full in Attachment B.3 of this Waste Licence Application. An update report to the EIS was carried out and is also included as part of Attachment B.3. The predicted noise impact for the facility is described in summary in this attachment (I.6), but Attachment B.3 should be referred to for the comprehensive impact assessment.

I.6(a) Existing Noise Environment - Ambient Noise Levels

Environmental Noise Survey

An environmental noise survey was conducted in 2007 by Bord na Mona in order to quantify the current existing noise environment. The survey was conducted in general accordance with ISO 1996: 1982: Acoustics – Description and measurement of environmental noise. Specific details are set out below.

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The surveys were conducted over the following periods

- Noise-Sensitive Locations: Daytime – 16:32hrs to 20:04 on 13 March 2007;
- Noise-Sensitive Locations: Night-time– 22:10hrs on 13 March to 00:14hrs 14 March 2007;
- Boundary Locations: Daytime – 17:53hrs to 20:03hrs on 14 March 2007;
- Boundary Locations: Night-time– 22:13hrs to 23:54hrs on 14 March 2007;

The weather during the daytime and night-time survey periods was dry and calm, with wind speeds below 5m/s at all times.

Choice of Measurement Locations

Twelve measurement locations were selected, five at nearby noise-sensitive receptors and seven in the vicinity of the site boundaries.

The locations are described below. The locations are shown in Figures E.5.1 and E.5.2.

Noise-sensitive locations

NM-01 Residential Area to west of site
NM-02 Residence at top of road leading to Prospect House, 200m from northwest corner of site
NM-03 Residential Area to northeast, approx. 750m from northeast corner of site boundary
NM-04 Residential Area to northeast, approx. 500m from northeast corner of site boundary
NM-05 Nearest residence to northeast, approx. 250m from northeast corner of site boundary

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Boundary Locations

NM-06 Northwest corner
NM-07 Midway along northern site boundary
NM-08 Northeast corner
NM-09 Adjacent to the eastern boundary stream, approx 250m from the northeast corner of the proposed site boundary
NM-10 Midway along eastern site boundary
NM-11 Centre of site
NM-12 Midway along western site boundary

Measured Noise Levels

The noise measured noise levels are presented in Table I.6 (i). A brief description of the audible sources at each location is given below.

Location NM-01

Audible noise sources at this location during daytime survey periods included occasional passage of cars, distant traffic and birdsong. Noise levels were in the range 49 to 51dB L_{Aeq} and 36 to 37dB L_{A90}.

During the night-time periods, distant traffic was the dominant source of noise. Measured noise levels were in the range 42 to 50dB L_{Aeq} and 34 to 35dB L_{A90}.

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Location NM-02

Audible noise sources at this location during daytime survey periods included occasional passage of cars, distant traffic and birdsong. Noise levels were in the range 42 to 49dB L_{Aeq} and 39 to 41dB L_{A90}.

During the night-time periods, water in a nearby stream was the dominant source of noise. Measured noise levels were in the range 40 to 41dB L_{Aeq} and of the order of 39dB L_{A90}.

Location NM-03

The dominant source of noise during daytime periods at this location was road traffic on the N29. A tractor passed close to the microphone position during the first measurement period. Other audible noise sources included Belview port and distant industrial noise. Noise levels were in the range 47 to 61dB L_{Aeq} and 41 to 44dB L_{A90}.

During the night-time periods, traffic on the N29 and activity at the port were the dominant sources of noise. Measured noise levels were in the range 41 to 49dB L_{Aeq} and 37 to 42dB L_{A90}.

Location NM-04

The dominant source of noise during daytime periods at this location was distant road traffic on the N29. A helicopter passed overhead during the first measurement period. Other audible noise sources included Belview port and bird song. Noise levels were in the range 46 to 52dB L_{Aeq} and 36 to 38dB L_{A90}.

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During the night-time periods, distant road traffic on the N29 and activity at the port were the dominant sources of noise. Measured noise levels were of the order of 40dB L_{Aeq} and in the range 32 to 35dB L_{A90}.

Location NM-05

The dominant source of noise during daytime periods at this location was distant road traffic on the N29. Distant train noise was audible during the second measurement period. Other audible noise sources included Belview port and bird song. Noise levels were in the range 37 to 44dB L_{Aeq} and 36 to 38dB L_{A90}.

During the night-time periods, distant road traffic on the N29 and activity at the port were the dominant sources of noise. Measured noise levels were of the order of 40dB L_{Aeq} and in the range 32 to 35dB L_{A90}.

Boundary Locations

Locations NM-06, NM-07, NM-08, NM-10, NM-11 and NM-12 were within the boundaries of the site. The main audible sources of noise included traffic accessing Belview Port and Waterford City traffic in the distance. Other sources included birdsong and water in flowing in streams.

Location NM-09 was along a local road leading to the site. Audible sources of noise during the daytime period at this location were a temporary generator at Springfield house and water in a nearby stream.

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Table I.6(i) Ambient Noise Survey

Daytime Noise Levels

	National Grid Reference (5N, 5E)	Sound Pressure Levels		
		L_{Aeq}	L_{A10}	L_{A90}
1. SITE BOUNDARY				
Location NM-06	264453, 112508	52	55	47
Location NM-07	264696, 112520	45	48	41
Location NM-08	264973, 112458	51	50	40
Location NM-09	265036, 112806	46	44	49
Location NM-10	264999, 112308	39	39	38
Location NM-11	264748, 112361	39	39	37
Location NM-12	264488, 112340	40	42	36
2. NOISE SENSITIVE LOCATIONS				
Location NM-01	264045, 112353	49 – 51	45 – 54	37 – 36
Location NM-02	264282, 112611	42 – 49	45 – 52	39 – 41
Location NM-03	265203, 113165	47 – 61	48 – 53	41 – 44
Location NM-04	265171, 112928	46 – 52	41 – 49	36 – 38
Location NM-05	265167, 112633	37 – 44	41 – 47	36 – 38

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Night-time Noise Levels

	National Grid Reference	Sound Pressure Levels		
	(5N, 5E)	L_{Aeq}	L_{A10}	L_{A90}
2. SITE BOUNDARY				
Location NM-06	264453, 112508	40	41	38
Location NM-07	264696, 112520	39	40	37
Location NM-08	264973, 112458	38	40	37
Location NM-09	265036, 112806	37	39	36
Location NM-10	264999, 112308	37	37	36
Location NM-11	264748, 112361	37	37	35
Location NM-12	264488, 112340	40	40	38
3. NOISE SENSITIVE LOCATIONS				
Location NM-01	264045, 112353	42 – 50	40	34 – 35
Location NM-02	264282, 112611	40 – 41	42	39
Location NM-03	265203, 113165	41 – 49	42 - 52	37 – 42
Location NM-04	265171, 112928	40	38 – 42	32 – 35
Location NM-05	265167, 112633	37 – 41	40 – 43	34

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I.6.2 Noise Impact Assessment

Noise Criteria

This section presents the noise level criteria used in this assessment. These have been chosen having regard to S.I. No. 787 of 2005 European Communities (Waste Water Treatment) (Prevention of Odours and Noise), and to previous pollution control licence applications prepared for other sites.

Typical IPPC Licence documents contain the following paragraphs on noise limits:

> *Noise from the activity shall not give rise to sound pressure levels ($L_{eq,15min}$) measured at the specified noise sensitive locations which exceed the limit value(s).*
>
> *Activities on-site shall not give rise to noise levels off-site, at noise sensitive locations, which exceed the following sound pressure limits ($L_{eq,15min}$)*
>
> *Daytime: 55 dB (A)*
> *Night-time: 45 dB (A)*
>
> *There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location.*

Note that as the WWTP site runs on a 24-hour basis, compliance with the night-time noise level condition has therefore been the main focus of this assessment.

Forecasting Methods

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Prediction calculations for process and building services plant have been conducted in accordance with ISO 9613:1996 *Acoustics – Attenuation of sound during propagation outdoors*. This is the calculation model implemented by Brüel & Kjær Type 7810 Predictor, the environmental noise modelling software used in the assessment.

Input Data

Sound pressure levels at 1m from each item have been used to form input data for the modelling software. This input data is presented in Table E5(i) of this Application.

Building layouts and heights for the site have been taken from information supplied by AWI/Enpure. Ground topography, geographical features and location data for noise-sensitive locations have been taken from survey information supplied by AWI/Enpure.

Predicted Noise Levels

The noise model has been used to predict noise levels at the various boundary and noise-sensitive locations. An additional location has been included which represents a recently granted planning application adjacent to Prospect House.

Table I.6(ii) presents the noise levels predicted at noise-sensitive locations and compares each to the EPA criterion for night-time noise. An additional assessment point has been added at the boundary of the nearby Prospect House site, as there is a recent grant of planning permission for a residence there.

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Table I.6(ii) Predicted Noise Levels at Noise-Sensitive Locations

	Sound Pressure Levels, dB(A)		
	Predicted Noise Level from Site	**EPA night-time criterion**	**Exceeds**
Location NM-01	27	45	No
Location NM-02	33	45	No
Location NM-03	21	45	No
Location NM-04	24	45	No
Location NM-05	29	45	No
Prospect House Boundary	37	45	No

The predicted noise levels range from 21dB(A) at NM-03 to 37dB(A) at the Prospect House boundary. Thus, noise levels at noise-sensitive locations are all within the night-time noise criterion.

Table I.6(iii) presents the predicted noise levels and compares them with the night-time L_{A90} values measured during the baseline noise survey.

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Table I.6(iii) Predicted Noise Levels at Noise-Sensitive Locations

	Sound Pressure Levels, dB(A)		
	Predicted Noise Level from Site	Measured night-time L_{A90} range	Difference
Location NM-01	27	34, 35	7-8dB below
Location NM-02	33	39	6dB below
Location NM-03	21	37, 42	>10dB below
Location NM-04	24	32, 35	>10dB below
Location NM-05	29	34	5dB below

Predicted noise levels at the locations in Table I.6(iii) are below the measured night-time L_{A90} values in all cases. It is therefore concluded that the overall impact on noise-sensitive locations will not be significant.

The EPA License Criteria refer to noise levels at noise-sensitive locations only. For completeness, the predicted noise levels for the boundary locations are also presented in Table I.6(iv) below.

Table I.6(iv) Predicted Noise Levels at Boundary Locations

	Sound Pressure Levels, dB(A)
Location NM-06	40
Location NM-07	37
Location NM-08	35
Location NM-09	25
Location NM-10	39
Location NM-11	45
Location NM-12	40

The predicted noise levels range from 25dB(A) at NM-09 along the local road leading to the site to 45dB(A) to NM-11 near the administration building.

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Attachment I.7

Existing Noise Environment

The Environmental Impact Statement for the development, which was produced in 1998, is supplied in full in Attachment B.3 of this Waste Licence Application. An update to the EIS report was carried out and is also included as part of Attachment B.3. The predicted impact on the ecology of the site and surrounding area is described in summary in this attachment (I.7), but Attachment B.3 should be referred to for the comprehensive impact assessment.

I.6(a) **Existing Flora & Fauna Environment**

There are proposed Natural Heritage Areas (pNHAs) near Island View and Belmont House covering salt marsh adjacent to the site. However these sites have been superseded by the designation of the entire channel of the River Suir as the Lower River Suir candidate Special Area of Conservation (cSAC) under the Habitats Directive. This extends from immediately south of Thurles, as far as the confluence with the Barrow/Nore immediately east of Cheekpoint, Co. Waterford (and many tributaries of the Suir).

The site, i.e. the River Suir & Suir Estuary) is a candidate SAC because of priority habitats listed in the Habitats Directive – alluvial wet woodlands and Yew Woodland, floating river vegetation, Atlantic salt meadows, Mediterranean salt meadows, old oak woodlands and eutrophic tall herbs, and also for the following species: Sea Lamprey, River Lamprey, Brook Lamprey, Freshwater Pearl Mussel, Crayfish, Twaite Shad, Atlantic Salmon and Otter. The CSAC is also of ornithological importance.

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The WWTP site overlaps with the cSAC boundary as the boundary extends half-way into the salt marsh to the north of the site, and runs parallel to the shoreline.

The King's Channel, less than 3km downstream to the south west is a proposed Natural Heritage Area under the Wildlife Act 1976 as amended in 2000.

There are several species in the vicinity of the site that are noted as nationally-rare including the Hard-rush hybrid (*Juncus x diffusus*) and the Hybrid Sea Couch (formerly called *Elytrigia x oliveri* and now called *Elytrigia x drucei*). Neither of these species is protected under the Flora Protection Order 1999.

There are a number of species records in the NPWS database for protected flora within the 10km x 10km square (S61) occupied by the site, which are detailed in the EIS and update to the EIS (Attachment B.3.3). However, whilst these species are protected by law, none of them have been recorded in the 1998 or 2008 ecological surveys of the site and surrounding area.

Habitats present on the site included hedgerows, wet grassland, agricultural grassland, wet woodland, salt marsh (Upper and Lower) and a freshwater stream.

I6(b) **Predicted Impact**

However none of the areas affected by construction of the plant appear to have significantly affected the salt marsh. The exception to this would be the construction

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of the hardcore road across the salt marsh at the eastern end of the site which encroaches a small degree upon the edge of the cSAC.

Of greater significance is the construction of the discharge pipe and the discharge itself. The permission to discharge may require the completion of an 'appropriate assessment' under Article 6 of the Habitats Directive. This type of assessment requires the competent authority to assess the impact of the development on the conservation objectives for the cSAC. The National Parks and Wildlife Service have prepared Conservation Management Plans for most cSACs which contain the Management Objectives for each site.

Under the Shellfish Waters Directive (79/923/EEC), there are forthcoming designations of Shellfish Waters. Cheekpoint is included as a site that will be designated in such a manner. In addition, the Live Bivalve Molluscs (Production Areas) Designation of 2006 designates Waterford Harbour as an area where molluscs may be taken for human consumption by hand and sets certain coliform limits on their content. The designations have not yet been confirmed and were not available for the purpose of this assessment.

The predicted impact on these designated sites is predicted to be positive, as the wastewater currently discharging to the Suir River & Estuary, will now undergo primary and secondary treatment at the WWTP, and therefore the overall water quality of the Suir River & Estuary will improve significantly.

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Attachment J – Accident & Emergency Procedures

CAW, who will be operating the WWTP, will implement accident and emergency procedures for events that may arise during the course of the operational phase of the WWTP.

CAW has existing standard procedures, which are implemented in all facilities operated by them. The procedures for the Ringsend Wastewater Treatment Plant, which CAW currently operate, are included here, as Attachment J.

Prior to commencement of operations of the facility, procedures for the Waterford WWTP at Gorteens, Co. Kilkenny will be finalised.

Training will be provided to all personnel in relation to the accident and emergency procedures on site.

These procedures will be reviewed and updated annually.

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The document is available electronically at Ringsend Wastewater Treatment Plant

1 Introduction

This plan sets out the Celtic Anglian Water framework for dealing with Emergencies through Policies and Procedures that should be activated in such situations.

The key objectives of the plan are to ensure:

- Rapid emergency mobilisation
- Safety and efficient organisation of repair and / or restoration activities
- Effective and early interaction with media and other relevant parties, which facilitates two-way communication of relevant information.

Each employee must establish unequivocal ownership of each of the many tasks required consistently to assure the Incident Preparedness, Incident Management and Incident Recovery.

These Policies and Procedures are mandatory.

A Site Safety Co-ordinator shall be appointed, and his role will be detailed in the various procedures.

The Emergency Procedures Section of the Integrated Management System gives full details of all necessary information pertaining to:

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- Safety
- Declaration of emergency
- Levels of alert / emergency
- MET Eireann information
- Monitoring of weather conditions
- Communications and public relations
- Contact Lists for staffing of incidents and external resources

To facilitate a structured and co-ordinated management of an emergency each site an emergency organisation structure will be put in place to utilise the above information and ensure that a speedy response can be activated.

CAW shall make adequate provision for ensuring that these Policies and Procedures are complied with.

2 Incident Preparedness

CAW shall produce, keep under review and revise on an annual basis contingency plans to ensure, where applicable, the continued provision of services and to guard against and deal with abnormal discharges into the environment.

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A training and exercise programme will be maintained to ensure that personnel are trained and competent to carry out their duties during incidents.

CAW shall have dedicated Emergency communication facilities that will notify all relevant groups of incidents.

CAW shall make provision for strategically stored stockpiles of emergency equipment and materials.

Caw shall each year provide a report demonstrating their conformance with national Legislation.

3 Contingency Planning

Contingency Plans will be prepared as required and shall incorporate the risks identified from Risk assessments, HAZOP's and Manufactures Operation & Maintenance manuals.

All contingency plans will be revised and updated as required on an annual basis.

Contingency plans shall be prepared to ensure continuity of essential services.

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4 Training & Exercises

A programme of awareness training awareness shall be in place to ensure that all persons who may be involved either directly or indirectly in an incident understand these policies and procedures.

Contractors shall receive awareness training on CAW emergency procedures to ensure that they understand their role in incident planning, management and response.

A record shall be maintained of all incident training carried out and be readily retrievable.

A database of employee incident related skills shall be produced and maintained in each area.

Site wide exercises shall be held to test each of the contingency plans.

Exercises to test the continuing suitability of site Emergency Gas plans must be held at regular intervals not exceeding 2 years.

Post exercise reports shall be produced and circulated for all level two and level three exercises. Lessons learnt shall be collated into the post exercise report and communicated company-wide.

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5 Emergency Plant and Equipment

CAW shall have strategically stored stockpiles of equipment to meet likely scenarios.

The O&M Manager will hold lists of the above equipment and materials.

All emergency equipment and materials will be stored and maintained in a state of readiness for deployment.

6 Incident Management

All incidents / events shall be handled in accordance with CAW policies and procedures.

A **Level 1 (unusual event)** incident is a 'day to day' incident where the problem is dealt with by the O&M Manager and site resources.
There is no media interest.

A **Level 2 (site alert)** incident is a local incident that can be managed with the resources available on the site but requires local co-ordination.
There is actual or potential media interest.

A **Level 3 (site emergency)** incident cannot be resourced from the site.
Off-site co-ordination is required.
There is significant media and/or public attention.

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If a major incident develops into a crisis, which could cause an actual or potential threat to CAW long-term viability as a company and it's ability to do business, a major incident strategy team will be formed.

All events and incidents shall be classified into Level 1,2 or 3, dependant upon the severity of the actual or potential incident.

All personnel involved in an incident or event shall keep an accurate written record of their actions as a legal requirement. All documents relating to any incident must be handed to the O&M Manager at the end of the incident.
The records will be kept for 20 years.

A record of deployment of resources, equipment and alternative supplies will be maintained throughout any incident escalating to a Level 2 or above.

7 Media Management

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The company shall establish timely and effective communication(s) with all appropriate parties involved in incidents or exercises, in particular the CAW Operations Director or nominated deputy shall be available for liaison with the Client, Employer's Representative and news media. The company shall produce and maintain media plans to enable the company to liase effectively and accurately with all media groups.

All incidents, which have already attracted, or may attract, media interest will be reported to the CAW Operations Director as soon as possible.

Any media statements issued shall have the approval of the Operations Director.

The CAW Operations Director will develop a media plan, which will be modified according to the development of the incident. Only media trained personnel will carry out interviews or communications.

8 Post Incident Recovery

Following all incidents, a post incident recovery team will be formed to ensure business continuity is achieved and to ensure return to normal operating parameters and regimes as soon as possible.

Any lessons learnt will be disseminated throughout the Company.

All information and records relating to an incident / event will be retained for future evidence / reference for a period of 20 years.They shall be stored and retained in such a way that they are readily retrievable and in a suitable environment to prevent damage, deterioration and loss.

A post incident review will be held after every incident (Level 2 or above) and a post incident investigation report produced.

The sequence of events leading to an incident, and any actions taken, must be reviewed and lessons learnt communicated. Incident reports will be reviewed at Joint Safety Committee Meetings and any necessary changes to Policies and Procedures discussed in order to prevent future incidents.

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Celtic Anglian Water

Title **Evacuation**	Doc No. RING-EM-PRO-071	Revision No. 003

The document is available electronically at Ringsend Wastewater Treatment Plant

This is a controlled copy of the document only if the Serial number is RED and printed on yellow paper.	Serial No:001

Author: Site Supervisor	**Document Owner: Ringsend O&M Manager**	**IMS Co-ordinator**
Name:	**Name:**	**Name:**
Date:		

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Flowchart

Site evacuation alarm sounded, verbal communication and mobile phone.

All staff evacuate except (see LWI for each area)

CAW Fire Marshall

- Without exposing themselves to risk, conduct a quick but thorough check of their area of responsibility to ensure the evacuation of all staff and visitors.
- When check is complete, proceed to the assembly point in the car park or Gate 2 next to the administration building.
- Dryer Fire Marshall to take sign in book from your workshop to assembly point and check against staff present .

All other staff and visitors

- Leave the site immediately and proceed to assembly point, (Assembly point 2 – gate 2 which is located at the Administration building car park , Assembly Point 3 – Gate 3 which is located at Dryer Gate) walk in an orderly manner as instructed by trained CAW Fire Marshall
- Do not stop to collect personal belongings.
- Do not take risks.
- Do not re-enter the site until told to do so by O&M Manager or his deputy.

Fire Marshall

- Ensure that Gate 2 and Gate 3 entrances to the site are clear.
- At the assembly point check and account for all staff and visitors and contractors as recorded in Site Entry Logbook, located in the administration building, and inform the emergency services immediately of any missing persons.
- Meets emergency services at the gate and hand over any information that is required.
- Complete an Incident Report Form.

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PURPOSE OF THIS ACTIVITY

The purpose of this activity is to ensure that the site is evacuated as quickly and as safely as possible, to avoid possible risk of injury due to a site emergency.

RESPONSIBILITIES

Everyone:

You will ensure that:-

- Upon discovery of any unusual event, the most Senior person on site is immediately informed. See Doc No: (LWI needed)
- Do not leave assembly point in the event of any emergency unless instructed to do so.

Person with most Authority:

You will ensure that: -

- The evacuation alarm is raised using Emergency Evacuation Procedure as a guideline.
- Authorisation is given to evacuate site following escalation of Incident.
- The evacuation alarm is raised using Doc. No.: *CAW-EP-LWI-071* as a guideline.
- In the event of the evacuation procedure being carried out, Maintenance Supervisor to reconcile personnel on assembly point register with logbooks to establish any missing persons.
- You ensure that entrance to the site is clear.
- You contact Emergency services with details of problem and any unaccounted personnel.
- Meet Emergency Services at gate and hand over logbooks.

Chief Fire Marshall:

You will ensure that: -

- All staff are trained in evacuation procedure.
- All contractors and visitors to be made aware of evacuation procedure during site safety induction.
- This document is reviewed on an annual basis.
- Regular practice drills with all staff are conducted (6 or 12 month minimum). (Suzanne to check)
- You participate in a review of any drills or emergency.
- Appoint people in charge of all areas of responsibilities of daily checks.

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Fire Marshall:

You will ensure: -

- Without exposing themselves to risk, conduct a quick but thorough check of their area of responsibility to ensure the evacuation of all staff and visitors.
- When check is complete, proceed to the assembly point and inform Person with most authority about status of area of their responsibility with the acceptation of see LWI -----.
- Log book, area is clear.

Other CAW Staff, Visitors and Contractors

You will ensure: -

- Immediate evacuation of the site to the assembly points following the running man signs to the assembly point as quickly and safely as possible.
- You do not stop to collect personal belongings if not readily accessible
- You do not put yourself at risk.
- You follow all Instructions provided by the most Senior Person on site.

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Team Leader:
You will ensure that:

- Evacuation routes are clear and marked at all times.
- Mobile telephone contact with your team to aid evacuation.

O&M Manager:
You will ensure that: -

- You conduct a review of any drills or emergency.
- Participation in review of this document is on a 6 monthly bases.
- You liaise with site safety manager so that all staff are fully aware and trained in this procedure.
- Logbooks for daily site attendance (visitors and staff) are available and used,
- You participate in a review of any drills or emergency.

Operations Director:
You will ensure that:-

- You liaise with any News media or relevant authority if required.

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celtic anglian water

FIRE PROCEDURE

On discovery of the fire...

- Activate the nearest fire alarm, alerting the Site Supervisor or Duty Operator.
- Contact the emergency services. Call 999 (9 for an outside line).
- If possible close all windows and doors in the vicinity of the fire.

On hearing the fire alarm...

All staff and visitors

- Should leave the building immediately using the nearest available exit and proceed to the assembly point in an orderly manner.
- **Do not** leave the Assembly Point.
- **Do not** stop to collect personal belongings if not readily accessible.
- **Do not** take risks.
- **Do not** re-enter the building until told to do so by the Site Supervisor or Duty Manager.

Site Supervisor or Duty Operator

- Should contact the emergency services if not already done so by dialling 999 or 112 (for outside line dial “9”).
- Take the visitors signing in book and board to the main assembly point.
- At the assembly point, check and account for all staff based in their area of responsibility and inform the emergency services immediately of any missing persons.
- All trained staff should, without exposing themselves to risk, conduct a quick but thorough check of their area of responsibility to ensure the evacuation of all staff and visitors.
- All doors and windows should be closed, without exposing any person to risk.
- When check is complete, proceed to the assembly point.
- Ensure that the entrance to the site remains clear at all times, do not allow anyone to leave the assembly point.

At all times, all staff

- Should ensure that their visitors have been signed in.
- Are responsible for their visitors , ensuring they are escorted around the site at all times.

Action to be taken out of hours

Any member of staff discovering a fire whilst in the building out of hours must:

- Activate the nearest fire alarm.
- Contact the Emergency Services on 999 or 112 (for outside line dial “9”).
- Wait outside at a safe distance in order to meet the Fire Service - do not lock the doors.
- When the Fire Service arrive advise them of the location of the fire.
- Give them as much information as possible.

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Title **Fire**	Doc No. CAW-EP-PRO-072	Revision No. 001

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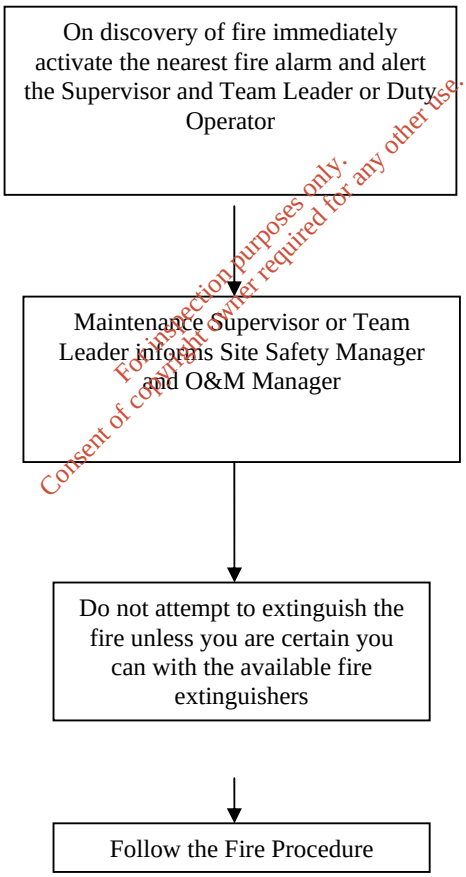
Author: Site Supervisor **Document Owner: Ringsend O&M Manager** **IMS Co-ordinator**

Name: **Name:** **Name:**

Date:

Flowchart



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Responsibilities:

O&M Manager:
You will ensure that: -

- You will give authorisation to evacuate site following escalation of Incident.
- You will designate Information Co-ordinator to liaise with News Media.
- You will take part in review of this document on a 6 monthly basis.

Site Safety Manager:
You will ensure that: -

- This document is kept up to date.
- All staff is fully aware of the location of this document and are trained in the correct procedure of how to evacuate all areas safely and are familiar with designated assembly areas.
- Drills are organised annually for this purpose and that all staff participates in these.
- A sweep of affected areas on site following escalation of Incident.
- You organise sealing off of affected areas to approx 300 feet around affected area prior to arrival of external agencies such as Fire Brigade and / or Gardai.
- You co-ordinate a roll call of affected staff after evacuation.
- An Investigation of the Incident is carried out after a senior member of the relevant external agency has given the all clear.

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Supervisor:
You will ensure that: -

- Staff is presented for training in this procedure.
- Staff training records are up to date.
- All staff is aware of the location of this procedure and fully understand it.
- Site Safety Manager is made aware of staff and or contractors that are on site but not yet been accounted for.
- A role call of staff and other affected persons on site such as contractors that have been accounted for following an evacuation.

Team Leader:
You will ensure that: -

- If Maintenance Supervisor is not available that His / Her role as outlined above is completed by the Team Leader on the day.

Operators:
You will ensure that:-

- You are fully conversant with this procedure.
- You are fully aware of all Emergency Exits
- Dependant on discipline that you are aware of isolation points for systems such as electricity, gas and chemicals.
- You take part in at least two drills per year.

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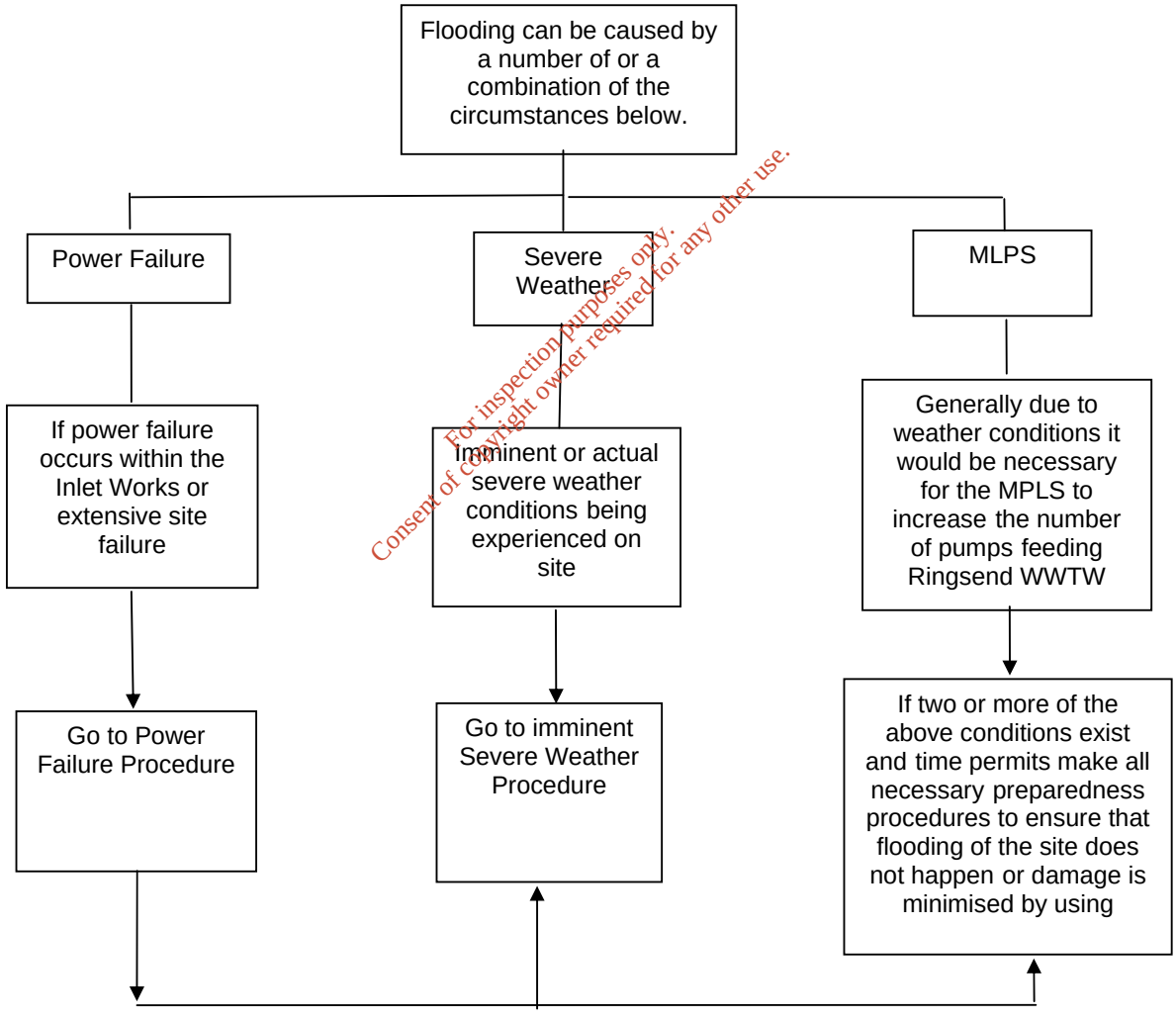
Author: Site Supervisor **Document Owner: Ringsend O&M Manager** **IMS Co-ordinator**

Name: **Name:** **Name:**

Date:

Flowchart



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PURPOSE OF THIS ACTIVITY:

The need to Evacuate premises can be called upon for any number of reasons, such as threat of fire, terrorist activities, gaseous releases or risk of flooding.

It is for the above reasons that every person on site should be familiar and totally conversant with the site Evacuation Procedures.

Flooding of this site is a serious and costly, both financially but also environmentally. The purpose of this procedure is not only to aid in the event of an incident but also to try if at all possible to prevent one occurring unnecessarily.

It is to ensure that the correct action is taken when dealing with a Power Failure, Imminent Severe Weather or a call from MLPS to take extra flow.

Power Failure

As the Inlet works is the most critical part of the plant, it is vital that the power supply to this is plant is available at all times.

At this present time the electrical system supplying this part of the works is incomplete, with regard to the 10Kv supply.

If the Power system fails during normal working hours, this shall be attended to by Electrical staff on site. If out of hours an On-Call rota will be used.

For complete procedure for Power Failures please see *RING-EP-PRO-076.*

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Severe Weather

Weather warnings are available Via the Internet or by contacting MET EIREANN (contact number in DBP-EP-LWI-005 or at **www.met.ie**)

Should a severe weather condition be experienced or forecast for the area surrounding the plant a number of actions should be taken including Staffing levels, Contractor activity, Emergency equipment, materials and supplies.

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MLPS

MLPS are required by contract to contact CAW's SCADA room if conditions with flows change due to weather problems, Maintenance on their works or if they need to increase the flow to this works for any reason.

At this point all other aspects of preparedness must be considered i.e. Contractor activity, Emergency equipment availability, staffing levels (if out of hours).

Handling News Media

It is of paramount importance that all inquiries from the News Media be directed to one individual appointed as spokesperson.

All other persons should be instructed not to discuss the situation with outsiders, especially the Media.

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Responsibilities:
Operations Director:
You will ensure that:-

- The news Media are liased with and correct and relevant information is passed onto them.

O&M Manager:
You will ensure that:-

- You will give authorisation to evacuate affected area and / or site following a flooding incident which is deemed to be dangerous to staff and / or contractors on site.
- You will provide information needed by Operations Director to liase with News Media.
- You will take part in a review of this document on a 6 monthly bases.
- You will organise sealing off of affected areas and clean up of any site spillage by designated company.

Site Safety Manager:
You will ensure that:-

- This document is kept up to date.
- All staff are fully aware of the location of this document and are trained in the correct procedure of how to use this Information.
- Drills are organised annually for this purpose and that all staff participates in these
- A sweep of affected areas on site following a Flooding Incident is carried out.
- You co-ordinate a roll call of affected staff after evacuation if required.

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- An Investigation of the Incident is carried out afterwards by a senior member staff

Supervisor:
You will ensure that:-

- Staff are presented for training in this procedure.
- Staff training records are up to date.
- All staff are aware of the location and are fully understand this procedure.
- Ensure that Site Safety Manager is made aware of Staff and or Contractors that are on site but have not yet been accounted for.
- A role call of staff and other affected persons on site such as contractors that have been accounted for following an evacuation.

Team Leader:
You will ensure that:-

- If Maintenance Supervisor is not available that His / Her role as outlined above is completed by the Team Leader on the day.

Staff members:
You will ensure that:-

- You are present for training in this procedure.
- You contact the O&M Manager or nominee if the evacuation due to flooding is out of hours.
- You comply with this procedure.

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Celtic Anglian Water

Title: **Gas Leak**	Doc No. RING-EM-PRO-074	Revision No. 001

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Author: Site Supervisor	**Document Owner: Ringsend O&M Manager**	**IMS Co-ordinator**
Name:	**Name:**	**Name:**
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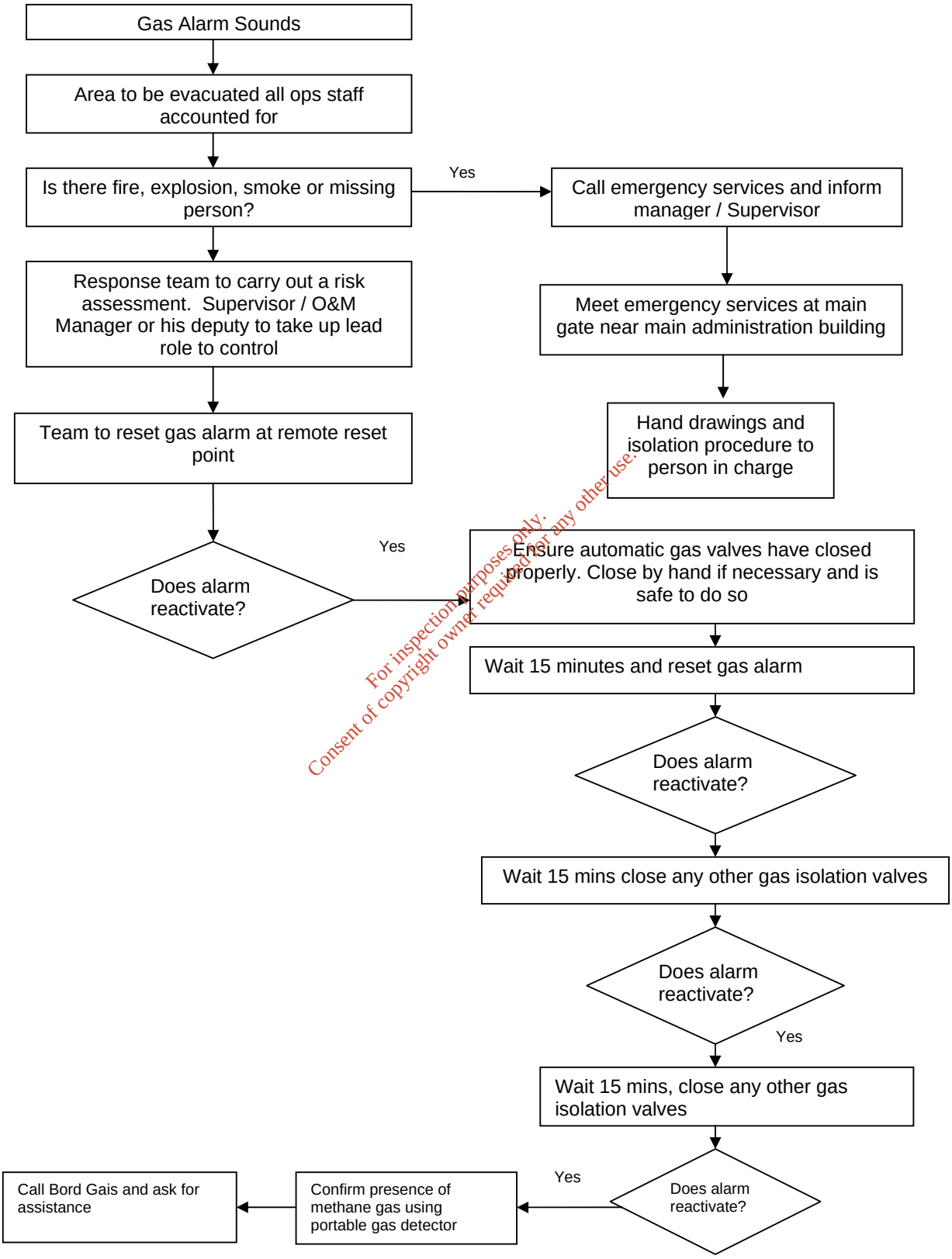

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PURPOSE OF ACTIVITY:

The purpose of this activity is to outline the correct procedure to be taken at this site in the event of a gas leak.

Natural gas is used in to power the CHP Boilers and Thermal Drying Plant, along with a supply of bio-gas stored in a large containment unit on-site. Due to the quantities of gas on-site the significance of a gas leak cannot be over emphasised.

If there was an uncontrolled release of gas we would evacuate the immediate and surrounding areas by activating Evacuation Procedure.

TABLE OF DEFINITIONS:

Bio-gas	Gas formed by the anaerobic digestion of sludge
CHP	Combined heat and power

Responsibilities:
Operations Director:
You will ensure that:-

- The news Media are liased with and correct and relevant information is passed onto them.

O&M Manager:
You will ensure that: -

- Authorisation is given to evacuate site following escalation of Incident.
- Participation in review of this document is on a 6 monthly bases.
- Ensure that this document is kept up to date.
- Ensure that all staff are fully aware of the location of this document and are trained in the correct procedure of how to evacuate all areas safely.

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Team Leader/Maintenance Supervisor/Electrical Engineer
You will ensure that: -

- Staff are presented for training in this procedure.
- Staff training records are up to date.
- All staff are aware of the location and are fully understand this procedure.
- A role call of staff and other affected persons on site such as contractors has been taken following an evacuation.
- Ensure that Site Safety Manager is made aware of Staff and or Contractors that are on site but have not yet been accounted for.

Staff members:
You will ensure that:-

- You are present for training in this procedure.
- You contact the O&M Manager or nominee if the evacuation is out of hours.
- You comply with this procedure.

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Celtic Anglian Water

Title: **Imminent Severe Weather**	Doc No. RING-EM-PRO-075	Revision No. 001

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Author: Site Superviso ordinator **Document Owner: Ringsend O&M Manager** **IMS Co-**

Name: **Name:** **Name:**

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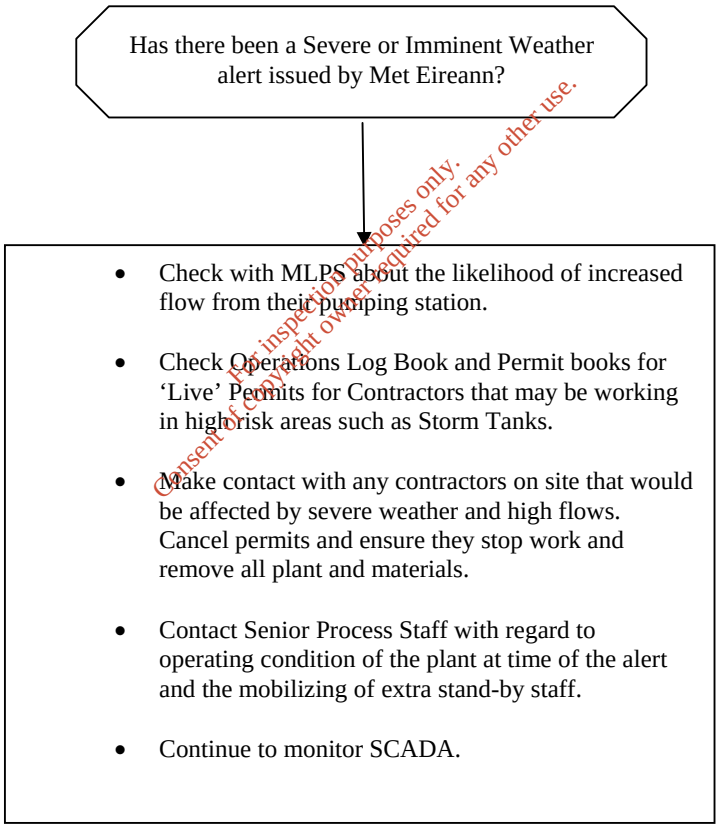

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MLPS

MLPS are required under contract to contact CAW's SCADA room if conditions with flows change due to weather problems, maintenance on their works, or if they need to increase the flow to this works for any reason.

Contact must be made should flows need to be increased above 3.4 m^3 / sec.
At this point all other aspects of preparedness must be considered i.e Contractor activity, Emergency equipment availability, staffing levels (if out of hours).

A designated procedure is available in the SCADA Control room to follow for this circumstance.

RESPONSIBILITIES
O&M Manager:
You will ensure that:-

- You co-ordinate the mobilization of all available staff in the event of weather conditions deteriorating any further.
- You keep Operations Manager informed of operations at the plant.
- You take part in review of this document on a 6 monthly bases.
- You give authorisation to evacuate affected area and / or site following a flooding incident due to Severe Weather conditions which is deemed to be dangerous to staff and / or contractors on site.
- Will co-ordinate information needed by Operations Director to liase with News Media.
- Organise sealing off of affected areas and clean up of any site spillage by designated company.

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Site Safety Manager:
You will ensure that:-

- Ensure that this document is kept up to date.
- Ensure that all staff are fully aware of the location of this document and are trained in the correct procedure of how to use this Information.
- Drills are organised annually for this purpose and that all staff participates in these
- Co-ordinate a roll call of affected staff after evacuation if required.
- An investigation of the incident is carried out afterwards by a senior member staff.

Maintenance Supervisor:
You will ensure that:-

- Staff are presented for training in this procedure.
- Staff training records are up to date.
- Co-ordinate availability of Emergency materials, equipment and supplies for use during severe weather conditions.
- All staff are aware of the location and are fully understand this procedure.
- Ensure that Site Safety Manager is made aware of Staff and or Contractors that are on site but have not yet been accounted for.
- A role call of staff and other affected persons on site such as contractors that have been accounted for following an evacuation.

Team Leader:
You will ensure that:-

- If Maintenance Supervisor is not available that His / Her role as outlined above is completed by the Team Leader on the day.

Operational Staff:

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You will ensure that:-

- You are fully conversant with the Operational Procedures that control the plant.
- You are fully aware about how to activate this procedure.

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Title: Power Failure	Doc No. RING-EM-PRO-076	Revision No. 001

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Author: Site Supervisor **Document Owner: Ringsend O&M Manager** **IMS Co-ordinator**

Name: **Name:** **Name:**

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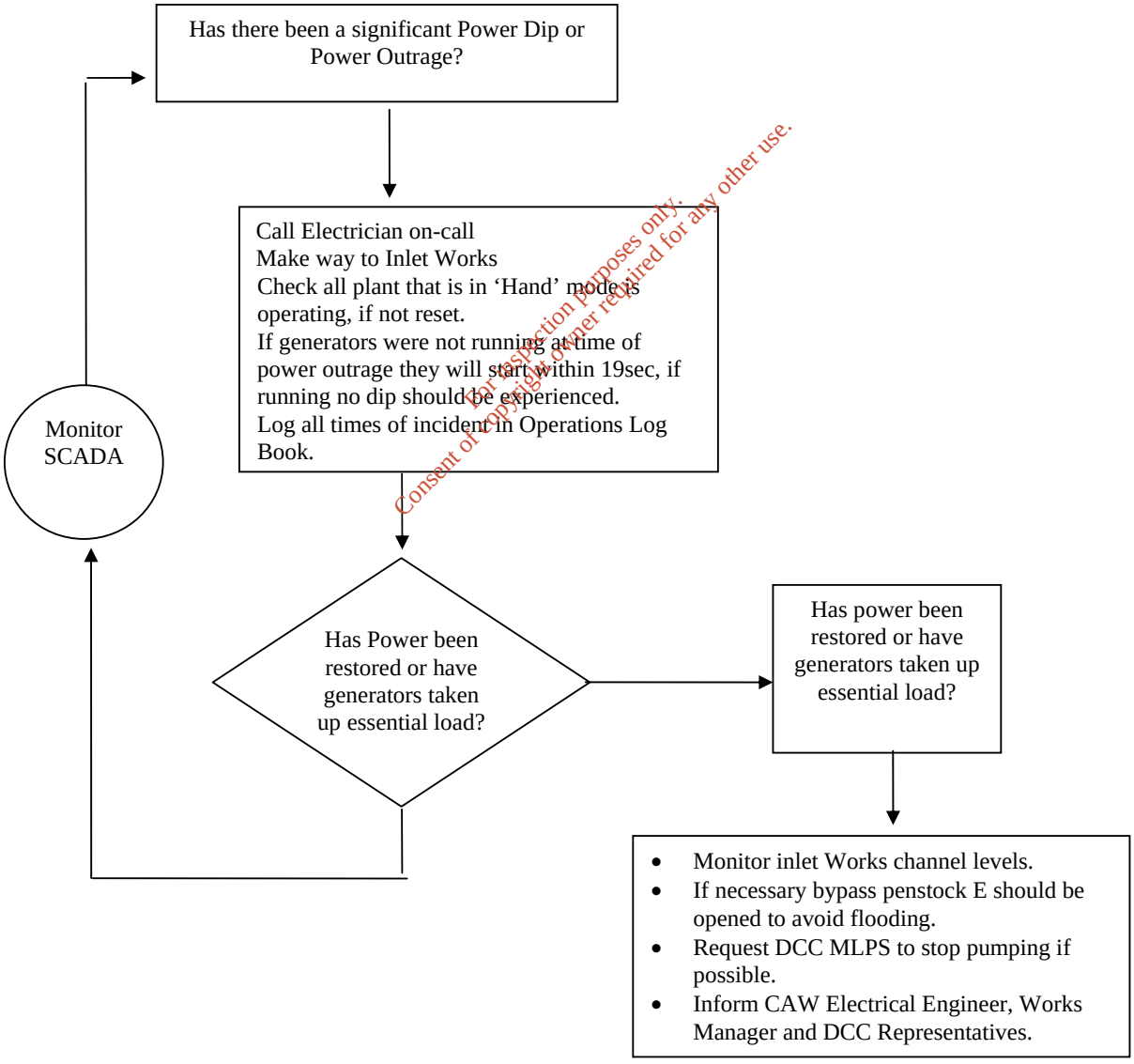

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PURPOSE OF ACTIVITY

Power Failure

10kv Power Failure

- As the Inlet works is the most critical part of the plant it is vital that the power supply to the inlet works is available at all times.
- At present the electrical system supplying the inlet works is incomplete with regard to the 10Kv supply.
- If the Power system fails during normal working hours the on-site electrical staff, or alternatively the on-call rota staff will be responsible.

Low Voltage Power Failure

Our Low Voltage (LV) system is quite small at present. MCC 22 in the sludge gallery is being fed by a permanent cable.

On-site Electricians will deal with all responses to 10kv and LV issues during normal hours and an on-call rota is in place to cover out of hours and holiday periods.

SCADA and PLC's

Our SCADA monitoring system allows operators to monitor plant activity remotely. If a problem occurs with this system a number of Technicians are on 24hr call to deal with any issues that may arise. The On-Call Rota is left in the SCADA Room.

RESPONSIBILITIES

O&M Manager:

You will ensure that:-

- Will give authorisation to evacuate affected area and / or site following a flooding incident caused by an extensive power failure if this is deemed to be dangerous to staff and / or contractors on site.
- Will Inform the Operations Manager of the situation at the plant.
- Will take part in a review of this document on a 6 monthly bases.
- Organise sealing off of affected areas and clean up of any site spillage by designated company.

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Site Safety Manager:

You will ensure that:-

- Ensure that this document is kept up to date.
- Ensure that all staff are fully aware of the location of this document and are trained in the correct procedure of how to use this Information.
- Drills are organised annually for this purpose and all staff participate in these
- A sweep of affected areas on site following a flooding Incident is carried out.
- Co-ordinate a roll call of affected staff after evacuation if required.
- An Investigation of the Incident is carried out afterwards by a senior member staff

Maintenance Supervisor:

You will ensure that:-

- Staff are presented for training in this procedure.
- Staff training records are up to date.
- All staff are aware of the location and are fully understand this procedure.
- Ensure that Site Safety Manager is made aware of Staff and or Contractors that are on site but have not yet been accounted for.
- A role call of staff and other affected persons on site such as contractors that have been accounted for following an evacuation.

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Team Leader:
You will ensure that:-

- If Maintenance Supervisor is not available that His / Her role as outlined above is completed by the Team Leader on the day.

Operations Staff:
You will ensure that:-

- Continually monitor SCADA and note any changes in the Electricity supply
- Call On-Call electrician if a problem occurs
- Make way to Inlet Works and ensure that all plant operating in hand is running or has been reset following a power dip.

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Celtic Anglian Water

Title **Dealing with Contaminated Influent.**	Doc No. RING-EM-PRO-078	Revision No. 001

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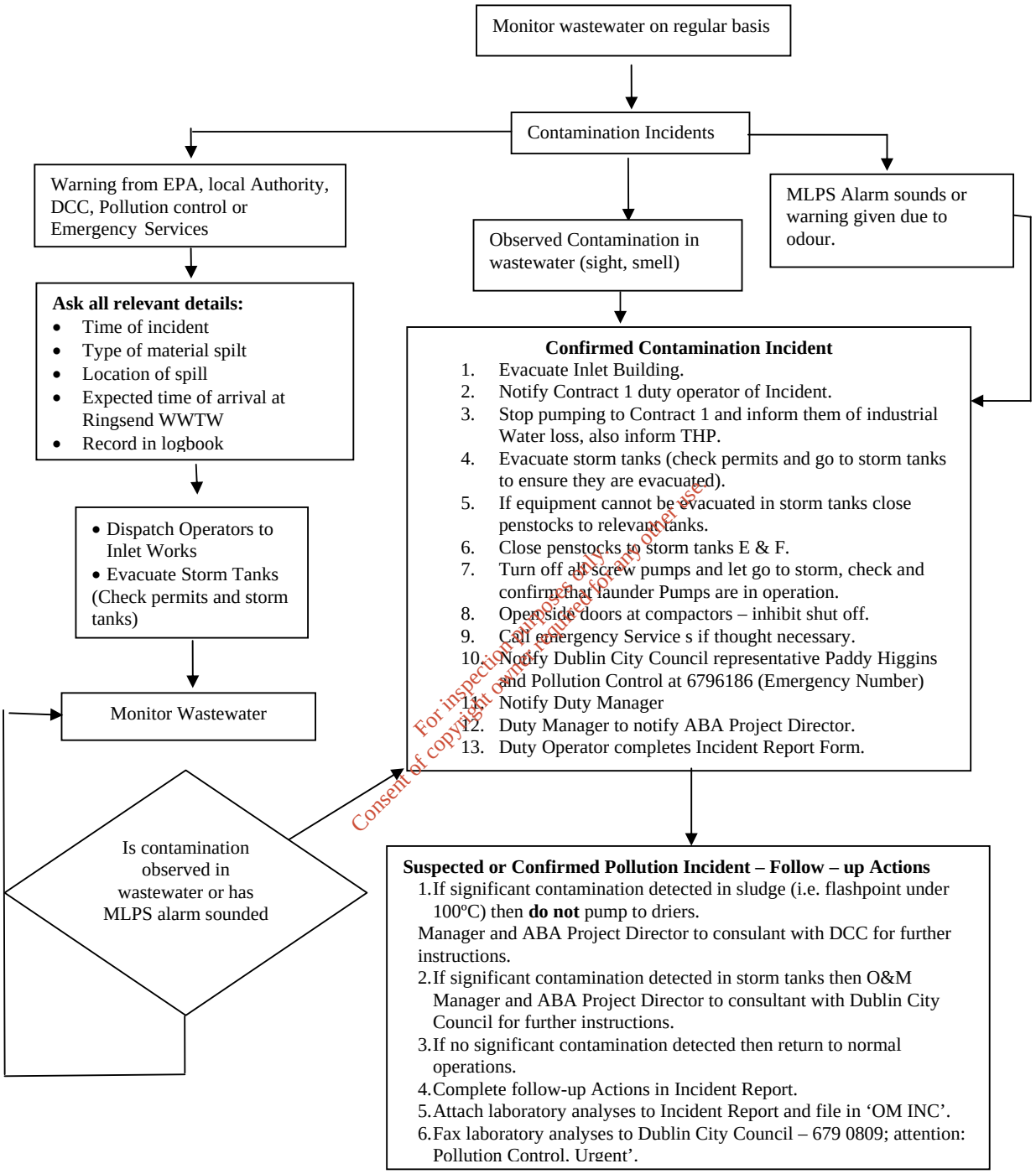

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PURPOSE OF ACTIVITY

The purpose of this activity is to ensure that persons, the environment, mechanical and electrical plant and the treatment processes are protected from contaminants entering the waste water treatment plant from the Main Lift Pumping Station (MLPS), the Dodder Valley, Dun Laoghaire or a tanker discharge. The presence of hydrocarbon fuel in sewage can pose a real threat to our safety and the continuation of our process. Everyone on site should be familiar with this emergency procedure.

TABLE OF DEFINITIONS

Oil	Flammable fuel which is very noticeable as it floats on the water surface
Petrol	Highly flammable fuel. Notable strong odour
Diesel	Vehicle fuel oil. Flammable with notable smell and appearance on the water surface

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RESPONSIBILITIES

O&M Manager:

You will ensure that:-

- You, or your deputy, will agree with Dublin City Council the actions if contamination is confirmed and ensure all operations personnel are instructed accordingly.
- The O&M Manager will participate in a review of this document after 6 months.
- The O&M Manager will report the incident to Dublin City Council and the Operations Director

Site Emergency Coordinator:

You will ensure that:-

- This document is kept up to date.
- All staff are fully aware of the location of this document and are trained in the correct procedure of how to use this document.
- Staff training records are up to date.
- Co-ordinate a roll call of affected staff after evacuation.

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Maintenance Supervisor and Team Leaders:

You will ensure that:-

- Staff are presented in training for this procedure.
- Staff training records are kept up to date.
- All staff are aware and fully understand this procedure.
- Should report the incident to the O&M Manager as soon as practicable.
- Should insure that an incident report is completed.

Staff Members:

You will ensure that:-

- You are fully trained in this procedure.
- You are aware of the evacuation and exit routes from any area you are working in.
- You comply with this procedure.
- You carry out the activities detailed in this procedure and accompanying flow diagram.

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Celtic Anglian Water

Title Dealing with Contaminated Sludge	Doc No. RING-EM-PRO-079	Revision No. 001

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Author: Site Supervisor **Document Owner: Ringsend O&M Manager** **IMS Co-ordinator**

Name: **Name:** **Name:**

Date:

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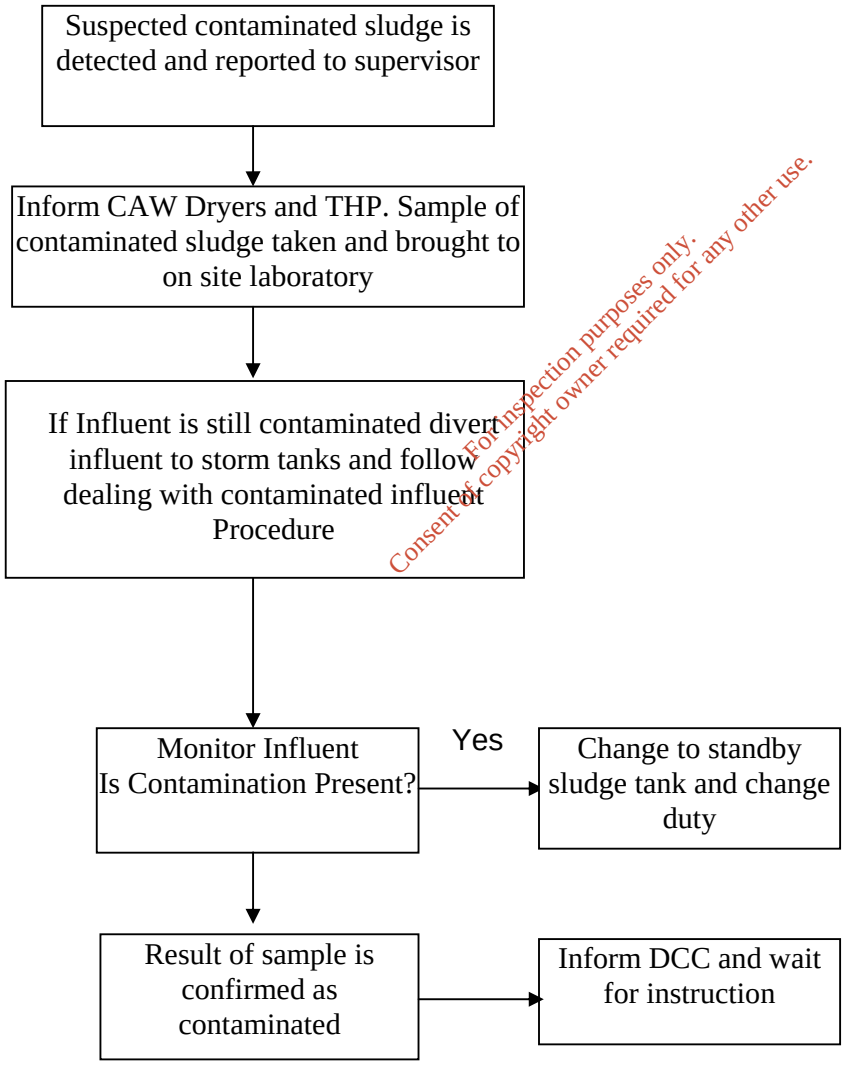

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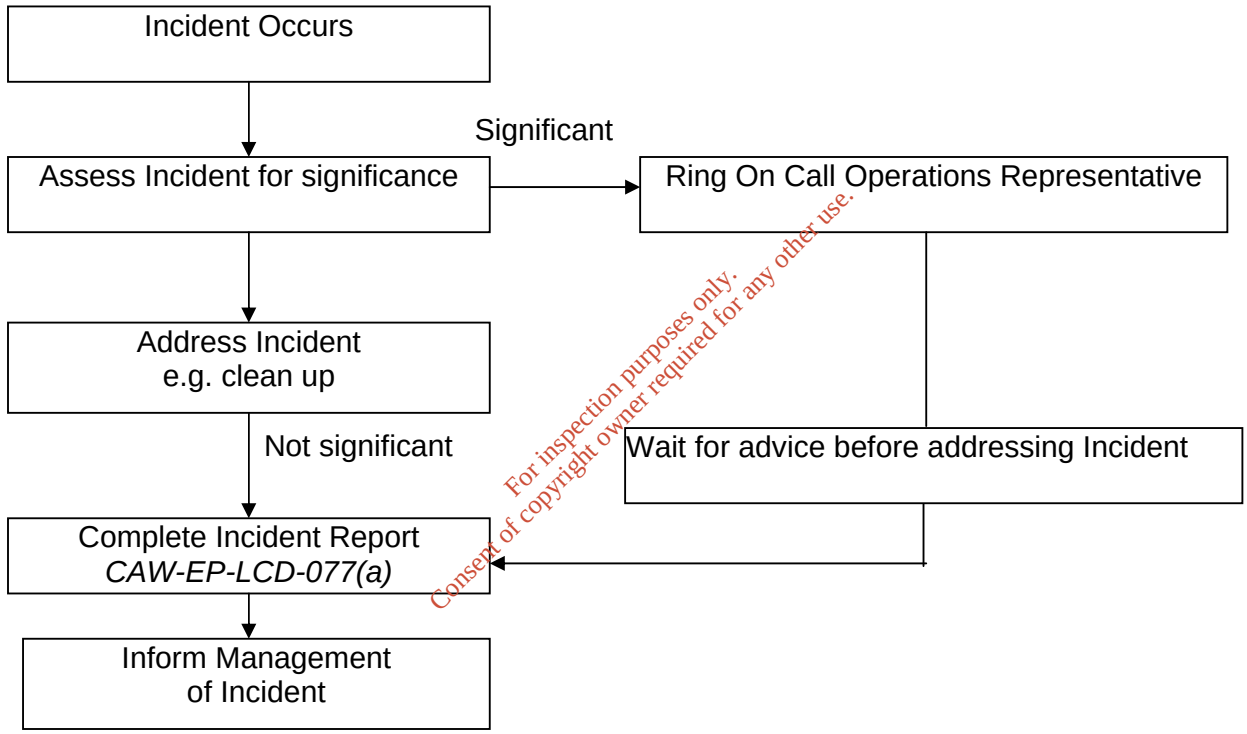
Name: **Name:** **Name:**

Date:

Flowchart



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SIGNIFICANT

- If authorities need to be involved
- If Pollution offsite
- If Health and Safety are compromised
- If media are involved
- If in doubt call Operations Representative

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Gas Leak

Author: Site Supervisor	**Document Owner: Ringsend O&M Manager**	**IMS Co-ordinator**
Name:	**Name:**	**Name:**
Date:		

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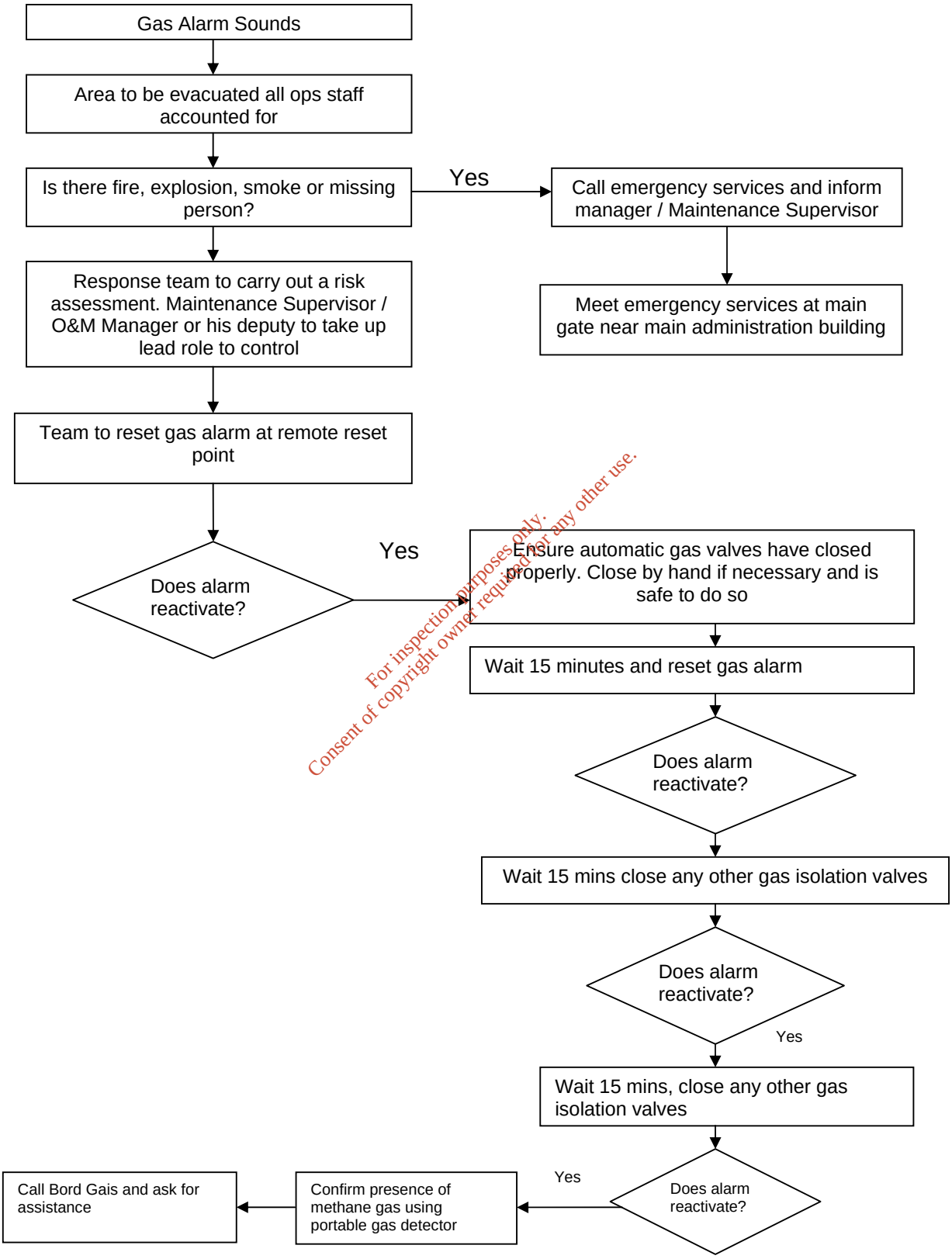

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PURPOSE OF ACTIVITY:

The purpose of this activity is to outline the correct procedure to be taken at this site in the event of a gas leak.

Natural gas is used in to power the CHP system, along with a supply of bio-gas stored in a large containment unit on-site. Due to the quantities of gas on-site the significance of a gas leak cannot be over emphasised.

If there was an uncontrolled release of gas we would evacuate the immediate and surrounding areas by activating Evacuation Procedure

Responsibilities:
Operations Director:
You will ensure that:-

- The news Media are liased with and correct and relevant information is passed onto them.

O&M Manager:
You will ensure that: -

- Authorisation is given to evacuate site following escalation of incident.
- Participation in review of this document is on a 6 monthly bases.
- Ensure that this document is kept up to date.
- Ensure that all staff are fully aware of the location of this document and are trained in the correct procedure of how to evacuate all areas safely.

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Maintenance Supervisor:
You will ensure that: -

- Staff are presented for training in this procedure.
- Staff training records are up to date.
- All staff are aware of the location and are fully understand this procedure.
- A role call of staff and other affected persons on site such as contractors has been taken following an evacuation.
- Ensure that Site Safety Manager is made aware of Staff and or Contractors that are on site but have not yet been accounted for.

Team Leader:
You will ensure that: -

- If Maintenance Supervisor is not available that His / Her role as outlined above is completed by the Team Leader on the day.

Staff members:
You will ensure that:-

- You are present for training in this procedure.
- You contact the O&M Manager or nominee if the evacuation is out of hours.
- You comply with this procedure.

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Attachment J – Accident & Emergency Procedures

CAW, who will be operating the WWTP, will implement accident and emergency procedures for events that may arise during the course of the operational phase of the WWTP.

CAW has existing standard procedures, which are implemented in all facilities operated by them. The procedures for the Ringsend Wastewater Treatment Plant, which CAW currently operate, are included here, as Attachment J.

Prior to commencement of operations of the facility, procedures for the Waterford WWTP at Gorteens, Co. Kilkenny will be finalised.

Training will be provided to all personnel in relation to the accident and emergency procedures on site.

These procedures will be reviewed and updated annually.

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The document is available electronically at Ringsend Wastewater Treatment Plant

1 Introduction

This plan sets out the Celtic Anglian Water framework for dealing with Emergencies through Policies and Procedures that should be activated in such situations.

The key objectives of the plan are to ensure:

- Rapid emergency mobilisation
- Safety and efficient organisation of repair and / or restoration activities
- Effective and early interaction with media and other relevant parties, which facilitates two-way communication of relevant information.

Each employee must establish unequivocal ownership of each of the many tasks required consistently to assure the Incident Preparedness, Incident Management and Incident Recovery.

These Policies and Procedures are mandatory.

A Site Safety Co-ordinator shall be appointed, and his role will be detailed in the various procedures.

The Emergency Procedures Section of the Integrated Management System gives full details of all necessary information pertaining to:

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- Safety
- Declaration of emergency
- Levels of alert / emergency
- MET Eireann information
- Monitoring of weather conditions
- Communications and public relations
- Contact Lists for staffing of incidents and external resources

To facilitate a structured and co-ordinated management of an emergency each site an emergency organisation structure will be put in place to utilise the above information and ensure that a speedy response can be activated.

CAW shall make adequate provision for ensuring that these Policies and Procedures are complied with.

2 Incident Preparedness

CAW shall produce, keep under review and revise on an annual basis contingency plans to ensure, where applicable, the continued provision of services and to guard against and deal with abnormal discharges into the environment.

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A training and exercise programme will be maintained to ensure that personnel are trained and competent to carry out their duties during incidents.

CAW shall have dedicated Emergency communication facilities that will notify all relevant groups of incidents.

CAW shall make provision for strategically stored stockpiles of emergency equipment and materials.

Caw shall each year provide a report demonstrating their conformance with national Legislation.

3 Contingency Planning

Contingency Plans will be prepared as required and shall incorporate the risks identified from Risk assessments, HAZOP's and Manufactures Operation & Maintenance manuals.

All contingency plans will be revised and updated as required on an annual basis.

Contingency plans shall be prepared to ensure continuity of essential services.

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4 Training & Exercises

A programme of awareness training awareness shall be in place to ensure that all persons who may be involved either directly or indirectly in an incident understand these policies and procedures.

Contractors shall receive awareness training on CAW emergency procedures to ensure that they understand their role in incident planning, management and response.

A record shall be maintained of all incident training carried out and be readily retrievable.

A database of employee incident related skills shall be produced and maintained in each area.

Site wide exercises shall be held to test each of the contingency plans.

Exercises to test the continuing suitability of site Emergency Gas plans must be held at regular intervals not exceeding 2 years.

Post exercise reports shall be produced and circulated for all level two and level three exercises. Lessons learnt shall be collated into the post exercise report and communicated company-wide.

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5 Emergency Plant and Equipment

CAW shall have strategically stored stockpiles of equipment to meet likely scenarios.

The O&M Manager will hold lists of the above equipment and materials.

All emergency equipment and materials will be stored and maintained in a state of readiness for deployment.

6 Incident Management

All incidents / events shall be handled in accordance with CAW policies and procedures.

A **Level 1 (unusual event)** incident is a 'day to day' incident where the problem is dealt with by the O&M Manager and site resources.
There is no media interest.

A **Level 2 (site alert)** incident is a local incident that can be managed with the resources available on the site but requires local co-ordination.
There is actual or potential media interest.

A **Level 3 (site emergency)** incident cannot be resourced from the site.
Off-site co-ordination is required.
There is significant media and/or public attention.

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If a major incident develops into a crisis, which could cause an actual or potential threat to CAW long-term viability as a company and it's ability to do business, a major incident strategy team will be formed.

All events and incidents shall be classified into Level 1,2 or 3, dependant upon the severity of the actual or potential incident.

All personnel involved in an incident or event shall keep an accurate written record of their actions as a legal requirement. All documents relating to any incident must be handed to the O&M Manager at the end of the incident.
The records will be kept for 20 years.

A record of deployment of resources, equipment and alternative supplies will be maintained throughout any incident escalating to a Level 2 or above.

7 Media Management

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The company shall establish timely and effective communication(s) with all appropriate parties involved in incidents or exercises, in particular the CAW Operations Director or nominated deputy shall be available for liaison with the Client, Employer's Representative and news media. The company shall produce and maintain media plans to enable the company to liase effectively and accurately with all media groups.

All incidents, which have already attracted, or may attract, media interest will be reported to the CAW Operations Director as soon as possible.

Any media statements issued shall have the approval of the Operations Director.

The CAW Operations Director will develop a media plan, which will be modified according to the development of the incident. Only media trained personnel will carry out interviews or communications.

8 Post Incident Recovery

Following all incidents, a post incident recovery team will be formed to ensure business continuity is achieved and to ensure return to normal operating parameters and regimes as soon as possible.

Any lessons learnt will be disseminated throughout the Company.

All information and records relating to an incident / event will be retained for future evidence / reference for a period of 20 years.They shall be stored and retained in such a way that they are readily retrievable and in a suitable environment to prevent damage, deterioration and loss.

A post incident review will be held after every incident (Level 2 or above) and a post incident investigation report produced.

The sequence of events leading to an incident, and any actions taken, must be reviewed and lessons learnt communicated. Incident reports will be reviewed at Joint Safety Committee Meetings and any necessary changes to Policies and Procedures discussed in order to prevent future incidents.

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Celtic Anglian Water

Title **Evacuation**	Doc No. RING-EM-PRO-071	Revision No. 003

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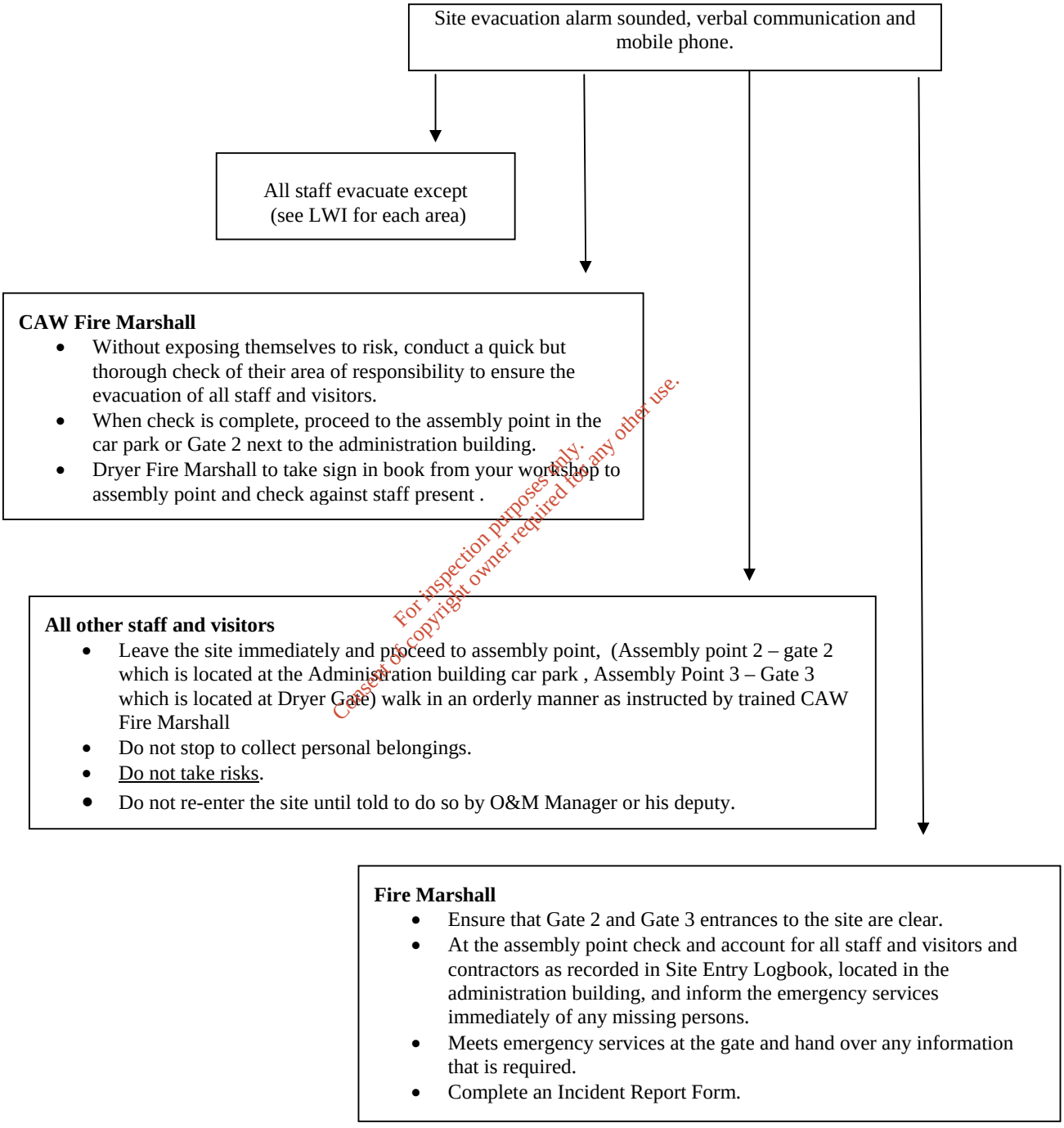
Flowchart



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PURPOSE OF THIS ACTIVITY

The purpose of this activity is to ensure that the site is evacuated as quickly and as safely as possible, to avoid possible risk of injury due to a site emergency.

RESPONSIBILITIES

Everyone:

You will ensure that:-

- Upon discovery of any unusual event, the most Senior person on site is immediately informed. See Doc No: (LWI needed)
- Do not leave assembly point in the event of any emergency unless instructed to do so.

Person with most Authority:

You will ensure that: -

- The evacuation alarm is raised using Emergency Evacuation Procedure as a guideline.
- Authorisation is given to evacuate site following escalation of Incident.
- The evacuation alarm is raised using Doc. No.: *CAW-EP-LWI-071* as a guideline.
- In the event of the evacuation procedure being carried out, Maintenance Supervisor to reconcile personnel on assembly point register with logbooks to establish any missing persons.
- You ensure that entrance to the site is clear.
- You contact Emergency services with details of problem and any unaccounted personnel.
- Meet Emergency Services at gate and hand over logbooks.

Chief Fire Marshall:

You will ensure that: -

- All staff are trained in evacuation procedure.
- All contractors and visitors to be made aware of evacuation procedure during site safety induction.
- This document is reviewed on an annual basis.
- Regular practice drills with all staff are conducted (6 or 12 month minimum). (Suzanne to check)
- You participate in a review of any drills or emergency.
- Appoint people in charge of all areas of responsibilities of daily checks.

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Fire Marshall:

You will ensure: -

- Without exposing themselves to risk, conduct a quick but thorough check of their area of responsibility to ensure the evacuation of all staff and visitors.
- When check is complete, proceed to the assembly point and inform Person with most authority about status of area of their responsibility with the acceptation of see LWI -----.
- Log book, area is clear.

Other CAW Staff, Visitors and Contractors

You will ensure: -

- Immediate evacuation of the site to the assembly points following the running man signs to the assembly point as quickly and safely as possible.
- You do not stop to collect personal belongings if not readily accessible
- You do not put yourself at risk.
- You follow all Instructions provided by the most Senior Person on site.

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Team Leader:
You will ensure that:

- Evacuation routes are clear and marked at all times.
- Mobile telephone contact with your team to aid evacuation.

O&M Manager:
You will ensure that: -

- You conduct a review of any drills or emergency.
- Participation in review of this document is on a 6 monthly bases.
- You liaise with site safety manager so that all staff are fully aware and trained in this procedure.
- Logbooks for daily site attendance (visitors and staff) are available and used,
- You participate in a review of any drills or emergency.

Operations Director:
You will ensure that:-

- You liaise with any News media or relevant authority if required.

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celtic anglian water

FIRE PROCEDURE

On discovery of the fire...

- Activate the nearest fire alarm, alerting the Site Supervisor or Duty Operator.
- Contact the emergency services. Call 999 (9 for an outside line).
- If possible close all windows and doors in the vicinity of the fire.

On hearing the fire alarm...

All staff and visitors

- Should leave the building immediately using the nearest available exit and proceed to the assembly point in an orderly manner.
- **Do not** leave the Assembly Point.
- **Do not** stop to collect personal belongings if not readily accessible.
- **Do not** take risks.
- **Do not** re-enter the building until told to do so by the Site Supervisor or Duty Manager.

Site Supervisor or Duty Operator

- Should contact the emergency services if not already done so by dialling 999 or 112 (for outside line dial “9”).
- Take the visitors signing in book and board to the main assembly point.
- At the assembly point, check and account for all staff based in their area of responsibility and inform the emergency services immediately of any missing persons.
- All trained staff should, without exposing themselves to risk, conduct a quick but thorough check of their area of responsibility to ensure the evacuation of all staff and visitors.
- All doors and windows should be closed, without exposing any person to risk.
- When check is complete, proceed to the assembly point.
- Ensure that the entrance to the site remains clear at all times, do not allow anyone to leave the assembly point.

At all times, all staff

- Should ensure that their visitors have been signed in.
- Are responsible for their visitors , ensuring they are escorted around the site at all times.

Action to be taken out of hours

Any member of staff discovering a fire whilst in the building out of hours must:

- Activate the nearest fire alarm.
- Contact the Emergency Services on 999 or 112 (for outside line dial “9”).
- Wait outside at a safe distance in order to meet the Fire Service - do not lock the doors.
- When the Fire Service arrive advise them of the location of the fire.
- Give them as much information as possible.

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Title **Fire**	Doc No. CAW-EP-PRO-072	Revision No. 001

The document is available electronically at Ringsend Wastewater Treatment Plant

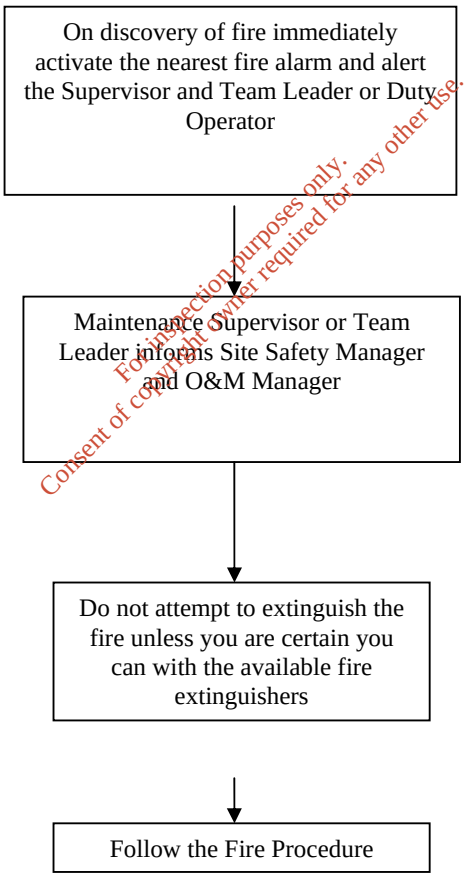
This is a controlled copy of the document only if the Serial number is RED and printed on yellow paper.	Serial No:001

Author: Site Supervisor **Document Owner: Ringsend O&M Manager** **IMS Co-ordinator**

Name: **Name:** **Name:**

Date:

Flowchart



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Responsibilities:

O&M Manager:
You will ensure that: -

- You will give authorisation to evacuate site following escalation of Incident.
- You will designate Information Co-ordinator to liaise with News Media.
- You will take part in review of this document on a 6 monthly basis.

Site Safety Manager:
You will ensure that: -

- This document is kept up to date.
- All staff is fully aware of the location of this document and are trained in the correct procedure of how to evacuate all areas safely and are familiar with designated assembly areas.
- Drills are organised annually for this purpose and that all staff participates in these.
- A sweep of affected areas on site following escalation of Incident.
- You organise sealing off of affected areas to approx 300 feet around affected area prior to arrival of external agencies such as Fire Brigade and / or Gardai.
- You co-ordinate a roll call of affected staff after evacuation.
- An Investigation of the Incident is carried out after a senior member of the relevant external agency has given the all clear.

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Supervisor:
You will ensure that: -

- Staff is presented for training in this procedure.
- Staff training records are up to date.
- All staff is aware of the location of this procedure and fully understand it.
- Site Safety Manager is made aware of staff and or contractors that are on site but not yet been accounted for.
- A role call of staff and other affected persons on site such as contractors that have been accounted for following an evacuation.

Team Leader:
You will ensure that: -

- If Maintenance Supervisor is not available that His / Her role as outlined above is completed by the Team Leader on the day.

Operators:
You will ensure that:-

- You are fully conversant with this procedure.
- You are fully aware of all Emergency Exits
- Dependant on discipline that you are aware of isolation points for systems such as electricity, gas and chemicals.
- You take part in at least two drills per year.

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Title: **Flooding**	Doc No. RING-EM-PRO-073	Revision No. 001

The document is available electronically at Ringsend Wastewater Treatment Plant

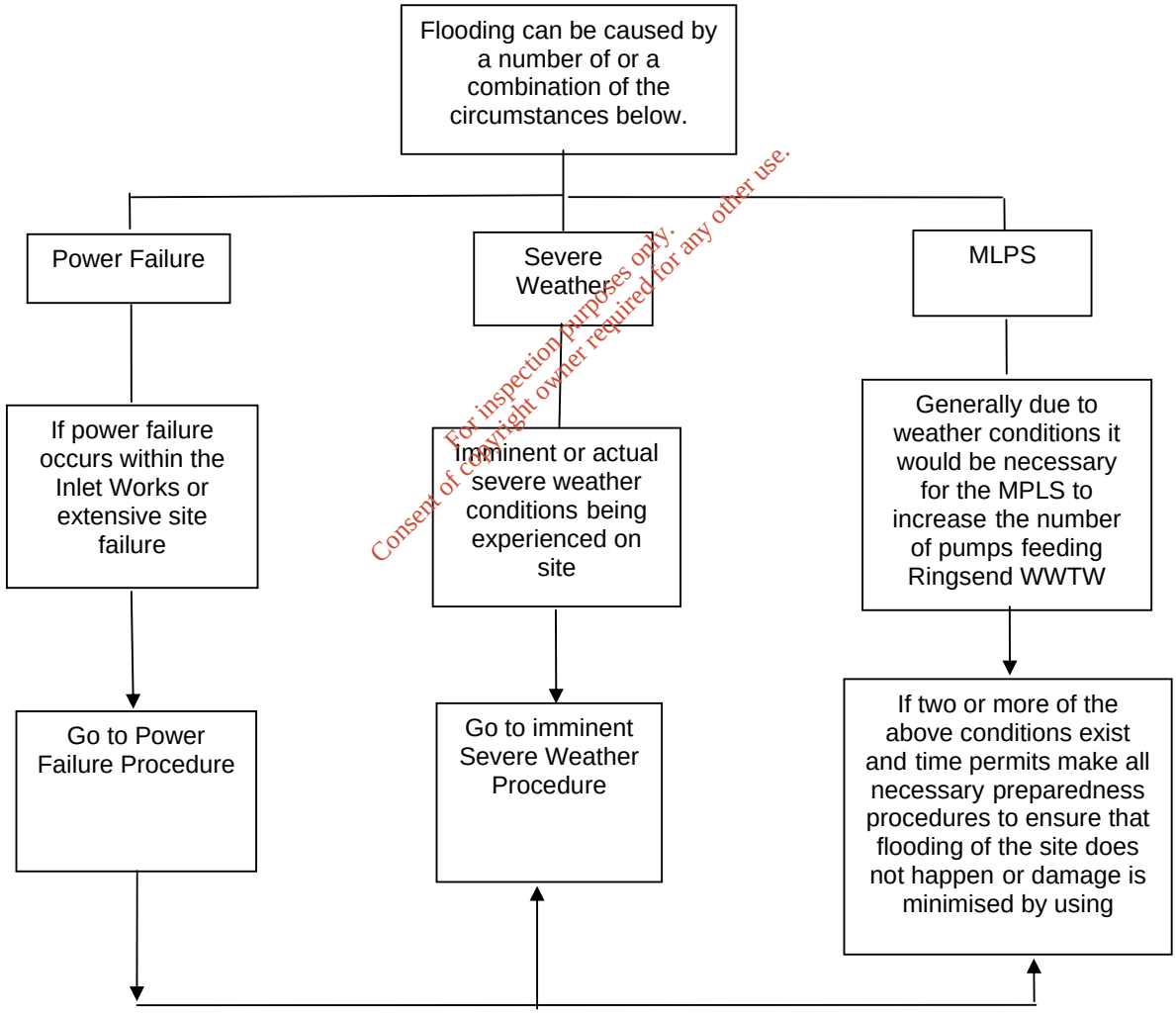
This is a controlled copy of the document only if the Serial number is RED and printed on yellow paper.	Serial No:001

Author: Site Supervisor **Document Owner: Ringsend O&M Manager** **IMS Co-ordinator**

Name: **Name:** **Name:**

Date:

Flowchart



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PURPOSE OF THIS ACTIVITY:

The need to Evacuate premises can be called upon for any number of reasons, such as threat of fire, terrorist activities, gaseous releases or risk of flooding.

It is for the above reasons that every person on site should be familiar and totally conversant with the site Evacuation Procedures.

Flooding of this site is a serious and costly, both financially but also environmentally. The purpose of this procedure is not only to aid in the event of an incident but also to try if at all possible to prevent one occurring unnecessarily.

It is to ensure that the correct action is taken when dealing with a Power Failure, Imminent Severe Weather or a call from MLPS to take extra flow.

Power Failure

As the Inlet works is the most critical part of the plant, it is vital that the power supply to this is plant is available at all times.

At this present time the electrical system supplying this part of the works is incomplete, with regard to the 10Kv supply.

If the Power system fails during normal working hours, this shall be attended to by Electrical staff on site. If out of hours an On-Call rota will be used.

For complete procedure for Power Failures please see *RING-EP-PRO-076.*

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Severe Weather

Weather warnings are available Via the Internet or by contacting MET EIREANN (contact number in DBP-EP-LWI-005 or at **www.met.ie**)

Should a severe weather condition be experienced or forecast for the area surrounding the plant a number of actions should be taken including Staffing levels, Contractor activity, Emergency equipment, materials and supplies.

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MLPS

MLPS are required by contract to contact CAW's SCADA room if conditions with flows change due to weather problems, Maintenance on their works or if they need to increase the flow to this works for any reason.

At this point all other aspects of preparedness must be considered i.e. Contractor activity, Emergency equipment availability, staffing levels (if out of hours).

Handling News Media

It is of paramount importance that all inquiries from the News Media be directed to one individual appointed as spokesperson.

All other persons should be instructed not to discuss the situation with outsiders, especially the Media.

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Responsibilities:
Operations Director:
You will ensure that:-

- The news Media are liased with and correct and relevant information is passed onto them.

O&M Manager:
You will ensure that:-

- You will give authorisation to evacuate affected area and / or site following a flooding incident which is deemed to be dangerous to staff and / or contractors on site.
- You will provide information needed by Operations Director to liase with News Media.
- You will take part in a review of this document on a 6 monthly bases.
- You will organise sealing off of affected areas and clean up of any site spillage by designated company.

Site Safety Manager:
You will ensure that:-

- This document is kept up to date.
- All staff are fully aware of the location of this document and are trained in the correct procedure of how to use this Information.
- Drills are organised annually for this purpose and that all staff participates in these
- A sweep of affected areas on site following a Flooding Incident is carried out.
- You co-ordinate a roll call of affected staff after evacuation if required.

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- An Investigation of the Incident is carried out afterwards by a senior member staff

Supervisor:
You will ensure that:-

- Staff are presented for training in this procedure.
- Staff training records are up to date.
- All staff are aware of the location and are fully understand this procedure.
- Ensure that Site Safety Manager is made aware of Staff and or Contractors that are on site but have not yet been accounted for.
- A role call of staff and other affected persons on site such as contractors that have been accounted for following an evacuation.

Team Leader:
You will ensure that:-

- If Maintenance Supervisor is not available that His / Her role as outlined above is completed by the Team Leader on the day.

Staff members:
You will ensure that:-

- You are present for training in this procedure.
- You contact the O&M Manager or nominee if the evacuation due to flooding is out of hours.
- You comply with this procedure.

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Celtic Anglian Water

Title: **Gas Leak**	Doc No. RING-EM-PRO-074	Revision No. 001

The document is available electronically at Ringsend Wastewater Treatment Plant

This is a controlled copy of the document only if the Serial number is RED and printed on yellow paper.	Serial No:001

Author: Site Supervisor	**Document Owner: Ringsend O&M Manager**	**IMS Co-ordinator**
Name:	**Name:**	**Name:**
Date:		

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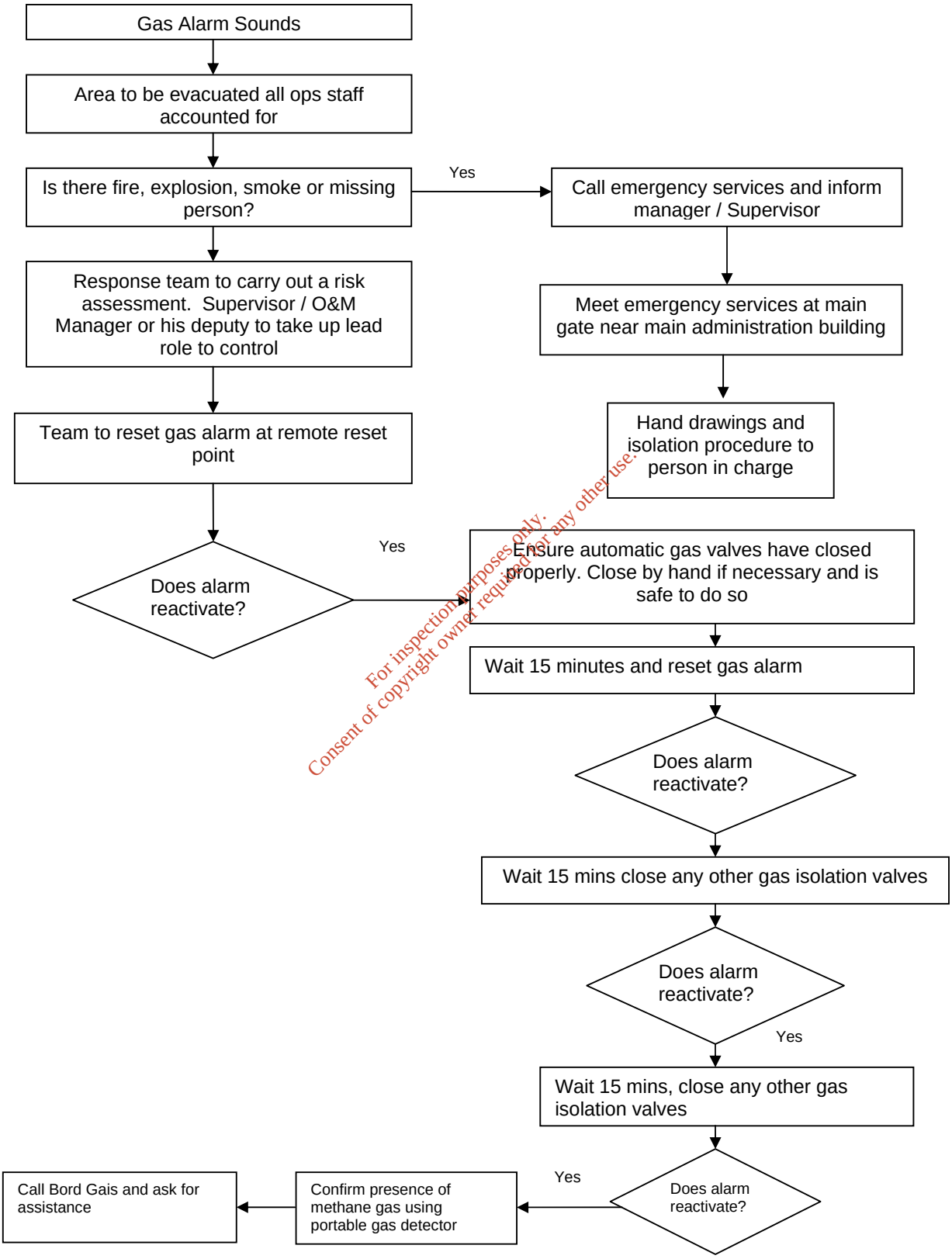

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PURPOSE OF ACTIVITY:

The purpose of this activity is to outline the correct procedure to be taken at this site in the event of a gas leak.

Natural gas is used in to power the CHP Boilers and Thermal Drying Plant, along with a supply of bio-gas stored in a large containment unit on-site. Due to the quantities of gas on-site the significance of a gas leak cannot be over emphasised.

If there was an uncontrolled release of gas we would evacuate the immediate and surrounding areas by activating Evacuation Procedure.

TABLE OF DEFINITIONS:

Bio-gas	Gas formed by the anaerobic digestion of sludge
CHP	Combined heat and power

Responsibilities:
Operations Director:
You will ensure that:-

- The news Media are liased with and correct and relevant information is passed onto them.

O&M Manager:
You will ensure that: -

- Authorisation is given to evacuate site following escalation of Incident.
- Participation in review of this document is on a 6 monthly bases.
- Ensure that this document is kept up to date.
- Ensure that all staff are fully aware of the location of this document and are trained in the correct procedure of how to evacuate all areas safely.

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Team Leader/Maintenance Supervisor/Electrical Engineer
You will ensure that: -

- Staff are presented for training in this procedure.
- Staff training records are up to date.
- All staff are aware of the location and are fully understand this procedure.
- A role call of staff and other affected persons on site such as contractors has been taken following an evacuation.
- Ensure that Site Safety Manager is made aware of Staff and or Contractors that are on site but have not yet been accounted for.

Staff members:
You will ensure that:-

- You are present for training in this procedure.
- You contact the O&M Manager or nominee if the evacuation is out of hours.
- You comply with this procedure.

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Title: **Imminent Severe Weather**	Doc No. RING-EM-PRO-075	Revision No. 001

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Author: Site Superviso ordinator **Document Owner: Ringsend O&M Manager** **IMS Co-**

Name: **Name:** **Name:**

Date:

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Has there been a Severe or Imminent Weather alert issued by Met Eireann?

- Check with MLPS about the likelihood of increased flow from their pumping station.
- Check Operations Log Book and Permit books for 'Live' Permits for Contractors that may be working in high risk areas such as Storm Tanks.
- Make contact with any contractors on site that would be affected by severe weather and high flows. Cancel permits and ensure they stop work and remove all plant and materials.
- Contact Senior Process Staff with regard to operating condition of the plant at time of the alert and the mobilizing of extra stand-by staff.
- Continue to monitor SCADA.

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MLPS

MLPS are required under contract to contact CAW's SCADA room if conditions with flows change due to weather problems, maintenance on their works, or if they need to increase the flow to this works for any reason.

Contact must be made should flows need to be increased above 3.4 m^3 / sec.
At this point all other aspects of preparedness must be considered i.e Contractor activity, Emergency equipment availability, staffing levels (if out of hours).

A designated procedure is available in the SCADA Control room to follow for this circumstance.

RESPONSIBILITIES
O&M Manager:
You will ensure that:-

- You co-ordinate the mobilization of all available staff in the event of weather conditions deteriorating any further.
- You keep Operations Manager informed of operations at the plant.
- You take part in review of this document on a 6 monthly bases.
- You give authorisation to evacuate affected area and / or site following a flooding incident due to Severe Weather conditions which is deemed to be dangerous to staff and / or contractors on site.
- Will co-ordinate information needed by Operations Director to liase with News Media.
- Organise sealing off of affected areas and clean up of any site spillage by designated company.

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Site Safety Manager:
You will ensure that:-

- Ensure that this document is kept up to date.
- Ensure that all staff are fully aware of the location of this document and are trained in the correct procedure of how to use this Information.
- Drills are organised annually for this purpose and that all staff participates in these
- Co-ordinate a roll call of affected staff after evacuation if required.
- An investigation of the incident is carried out afterwards by a senior member staff.

Maintenance Supervisor:
You will ensure that:-

- Staff are presented for training in this procedure.
- Staff training records are up to date.
- Co-ordinate availability of Emergency materials, equipment and supplies for use during severe weather conditions.
- All staff are aware of the location and are fully understand this procedure.
- Ensure that Site Safety Manager is made aware of Staff and or Contractors that are on site but have not yet been accounted for.
- A role call of staff and other affected persons on site such as contractors that have been accounted for following an evacuation.

Team Leader:
You will ensure that:-

- If Maintenance Supervisor is not available that His / Her role as outlined above is completed by the Team Leader on the day.

Operational Staff:

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You will ensure that:-

- You are fully conversant with the Operational Procedures that control the plant.
- You are fully aware about how to activate this procedure.

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Author: Site Supervisor **Document Owner: Ringsend O&M Manager** **IMS Co-ordinator**

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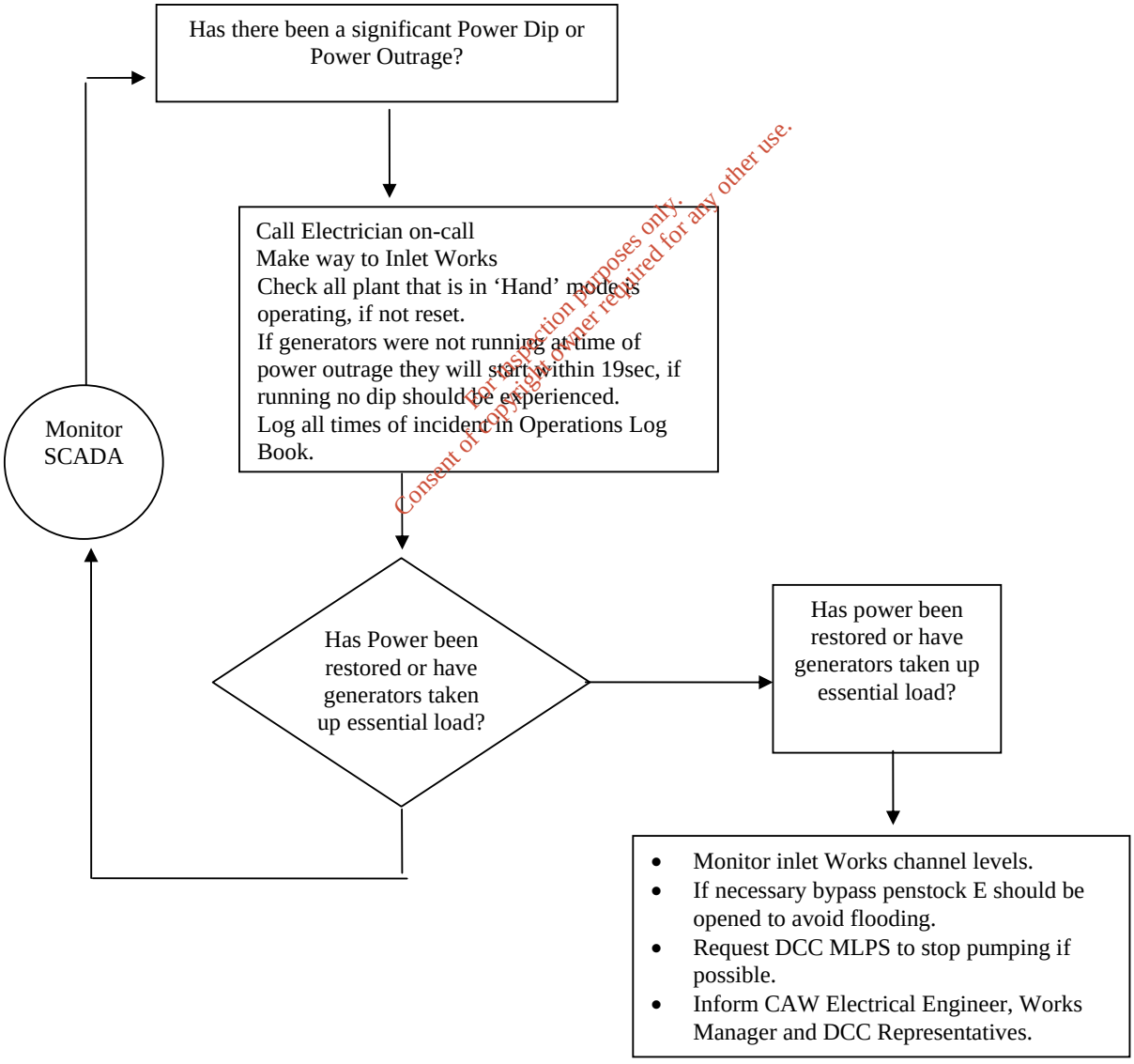

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PURPOSE OF ACTIVITY

Power Failure

10kv Power Failure

- As the Inlet works is the most critical part of the plant it is vital that the power supply to the inlet works is available at all times.
- At present the electrical system supplying the inlet works is incomplete with regard to the 10Kv supply.
- If the Power system fails during normal working hours the on-site electrical staff, or alternatively the on-call rota staff will be responsible.

Low Voltage Power Failure

Our Low Voltage (LV) system is quite small at present. MCC 22 in the sludge gallery is being fed by a permanent cable.

On-site Electricians will deal with all responses to 10kv and LV issues during normal hours and an on-call rota is in place to cover out of hours and holiday periods.

SCADA and PLC's

Our SCADA monitoring system allows operators to monitor plant activity remotely. If a problem occurs with this system a number of Technicians are on 24hr call to deal with any issues that may arise. The On-Call Rota is left in the SCADA Room.

RESPONSIBILITIES

O&M Manager:

You will ensure that:-

- Will give authorisation to evacuate affected area and / or site following a flooding incident caused by an extensive power failure if this is deemed to be dangerous to staff and / or contractors on site.
- Will Inform the Operations Manager of the situation at the plant.
- Will take part in a review of this document on a 6 monthly bases.
- Organise sealing off of affected areas and clean up of any site spillage by designated company.

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Site Safety Manager:

You will ensure that:-

- Ensure that this document is kept up to date.
- Ensure that all staff are fully aware of the location of this document and are trained in the correct procedure of how to use this Information.
- Drills are organised annually for this purpose and all staff participate in these
- A sweep of affected areas on site following a flooding Incident is carried out.
- Co-ordinate a roll call of affected staff after evacuation if required.
- An Investigation of the Incident is carried out afterwards by a senior member staff

Maintenance Supervisor:

You will ensure that:-

- Staff are presented for training in this procedure.
- Staff training records are up to date.
- All staff are aware of the location and are fully understand this procedure.
- Ensure that Site Safety Manager is made aware of Staff and or Contractors that are on site but have not yet been accounted for.
- A role call of staff and other affected persons on site such as contractors that have been accounted for following an evacuation.

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Team Leader:
You will ensure that:-

- If Maintenance Supervisor is not available that His / Her role as outlined above is completed by the Team Leader on the day.

Operations Staff:
You will ensure that:-

- Continually monitor SCADA and note any changes in the Electricity supply
- Call On-Call electrician if a problem occurs
- Make way to Inlet Works and ensure that all plant operating in hand is running or has been reset following a power dip.

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Celtic Anglian Water

Title **Dealing with Contaminated Influent.**	Doc No. RING-EM-PRO-078	Revision No. 001

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Author: Site Supervisor **Document Owner: Ringsend O&M Manager** **IMS Co-ordinator**

Name: **Name:** **Name:**

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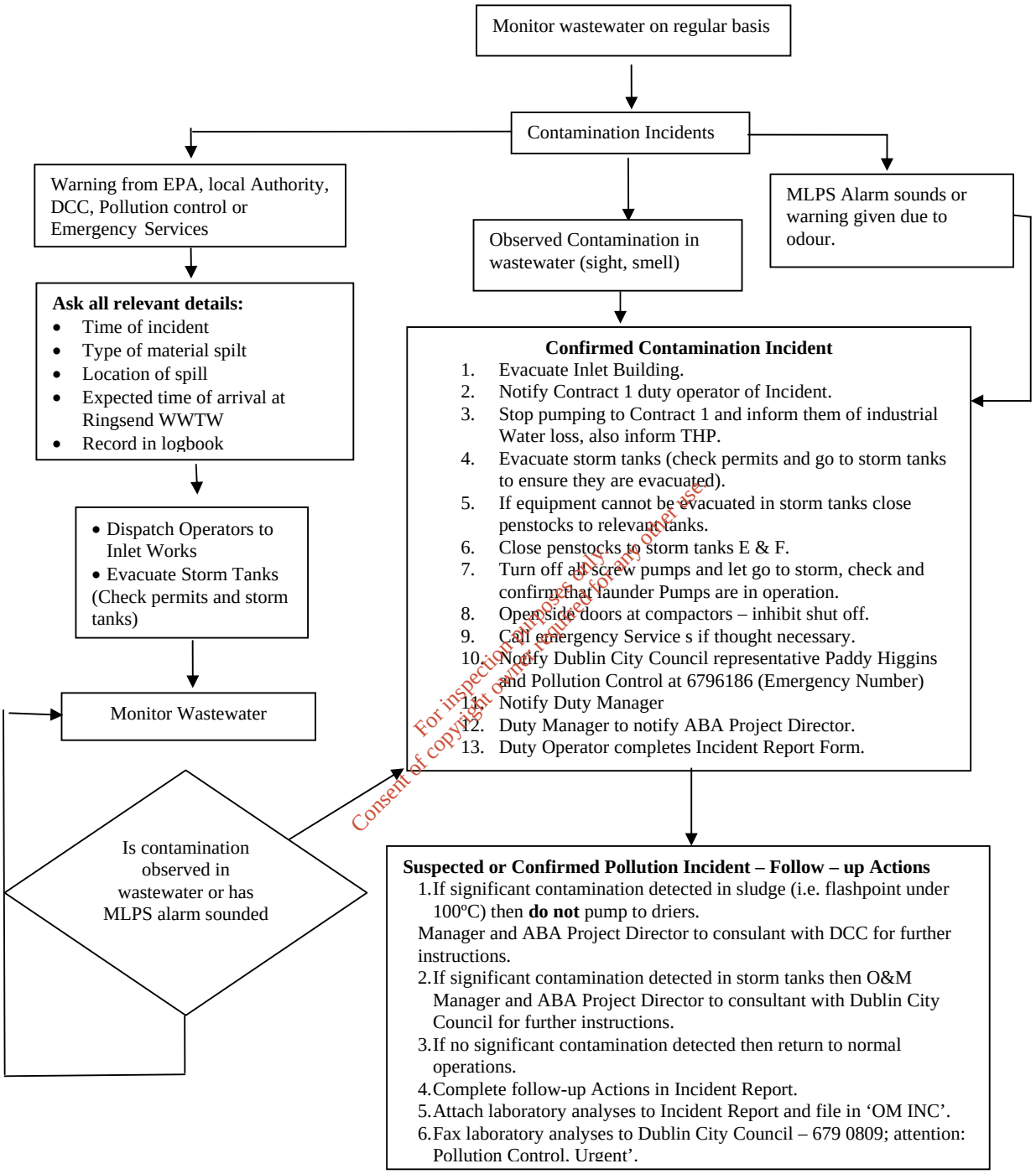
Flowchart



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PURPOSE OF ACTIVITY

The purpose of this activity is to ensure that persons, the environment, mechanical and electrical plant and the treatment processes are protected from contaminants entering the waste water treatment plant from the Main Lift Pumping Station (MLPS), the Dodder Valley, Dun Laoghaire or a tanker discharge. The presence of hydrocarbon fuel in sewage can pose a real threat to our safety and the continuation of our process. Everyone on site should be familiar with this emergency procedure.

TABLE OF DEFINITIONS

Oil	Flammable fuel which is very noticeable as it floats on the water surface
Petrol	Highly flammable fuel. Notable strong odour
Diesel	Vehicle fuel oil. Flammable with notable smell and appearance on the water surface

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RESPONSIBILITIES

O&M Manager:

You will ensure that:-

- You, or your deputy, will agree with Dublin City Council the actions if contamination is confirmed and ensure all operations personnel are instructed accordingly.
- The O&M Manager will participate in a review of this document after 6 months.
- The O&M Manager will report the incident to Dublin City Council and the Operations Director

Site Emergency Coordinator:

You will ensure that:-

- This document is kept up to date.
- All staff are fully aware of the location of this document and are trained in the correct procedure of how to use this document.
- Staff training records are up to date.
- Co-ordinate a roll call of affected staff after evacuation.

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Maintenance Supervisor and Team Leaders:

You will ensure that:-

- Staff are presented in training for this procedure.
- Staff training records are kept up to date.
- All staff are aware and fully understand this procedure.
- Should report the incident to the O&M Manager as soon as practicable.
- Should insure that an incident report is completed.

Staff Members:

You will ensure that:-

- You are fully trained in this procedure.
- You are aware of the evacuation and exit routes from any area you are working in.
- You comply with this procedure.
- You carry out the activities detailed in this procedure and accompanying flow diagram.

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Celtic Anglian Water

Title Dealing with Contaminated Sludge	Doc No. RING-EM-PRO-079	Revision No. 001

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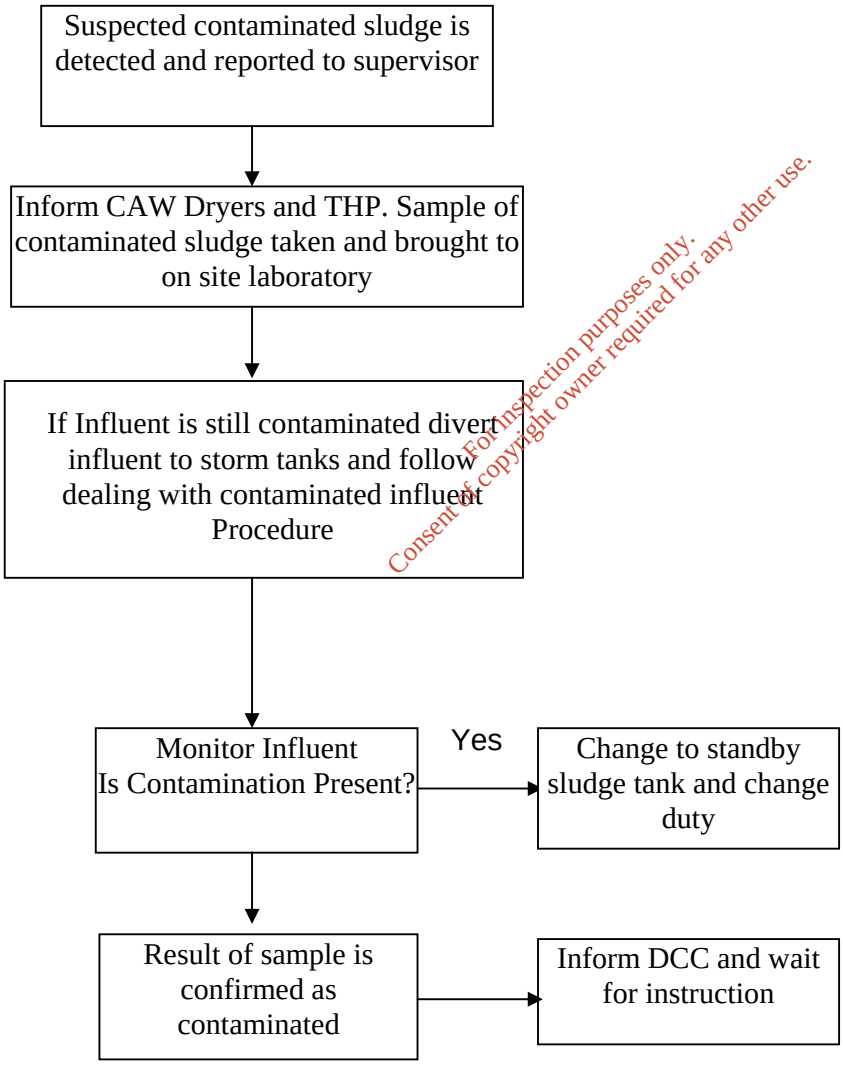
Author: Site Supervisor **Document Owner: Ringsend O&M Manager** **IMS Co-ordinator**

Name: **Name:** **Name:**

Date:

Flowchart



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Title **Out of Hours Incidents**	Doc No. RING-EP-PRO-080	Revision No. 001

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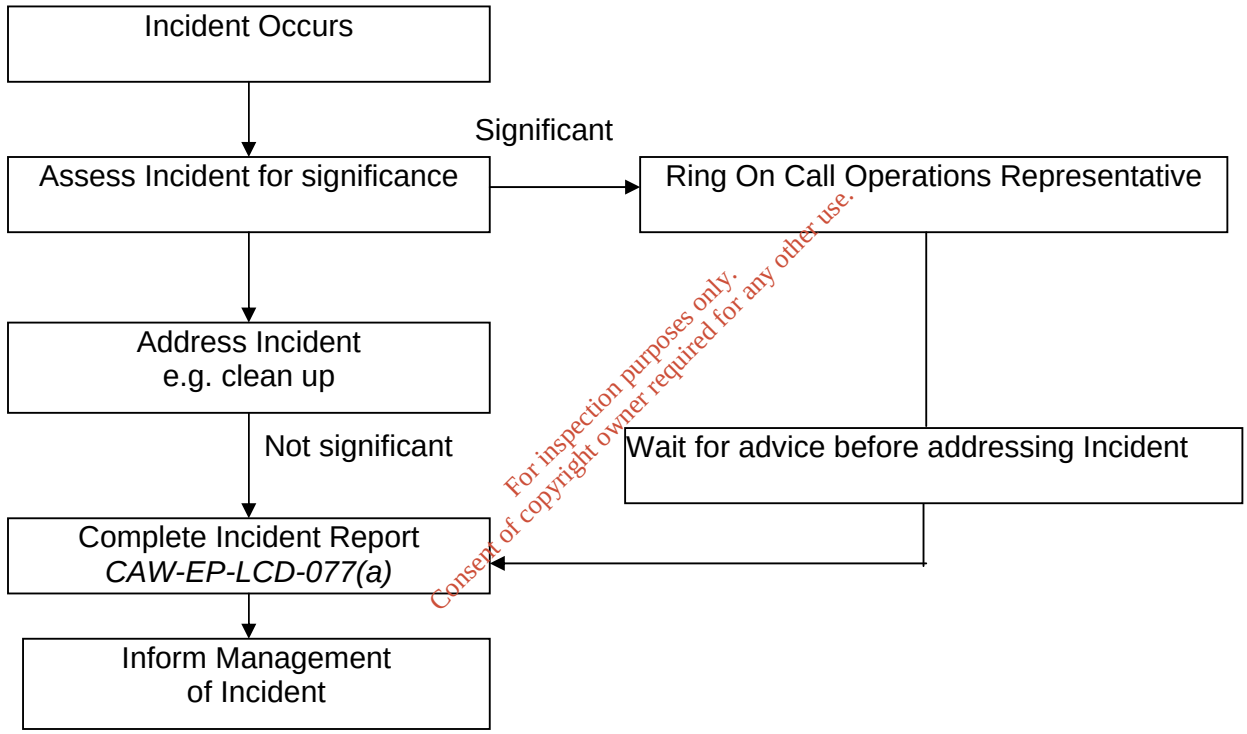
Author: Site Supervisor **Document Owner: Ringsend O&M Manager** **IMS Co-ordinator**

Name: **Name:** **Name:**

Date:

Flowchart



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SIGNIFICANT

- If authorities need to be involved
- If Pollution offsite
- If Health and Safety are compromised
- If media are involved
- If in doubt call Operations Representative

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Gas Leak

Author: Site Supervisor	Document Owner: Ringsend O&M Manager	IMS Co-ordinator
Name:	Name:	Name:
Date:		

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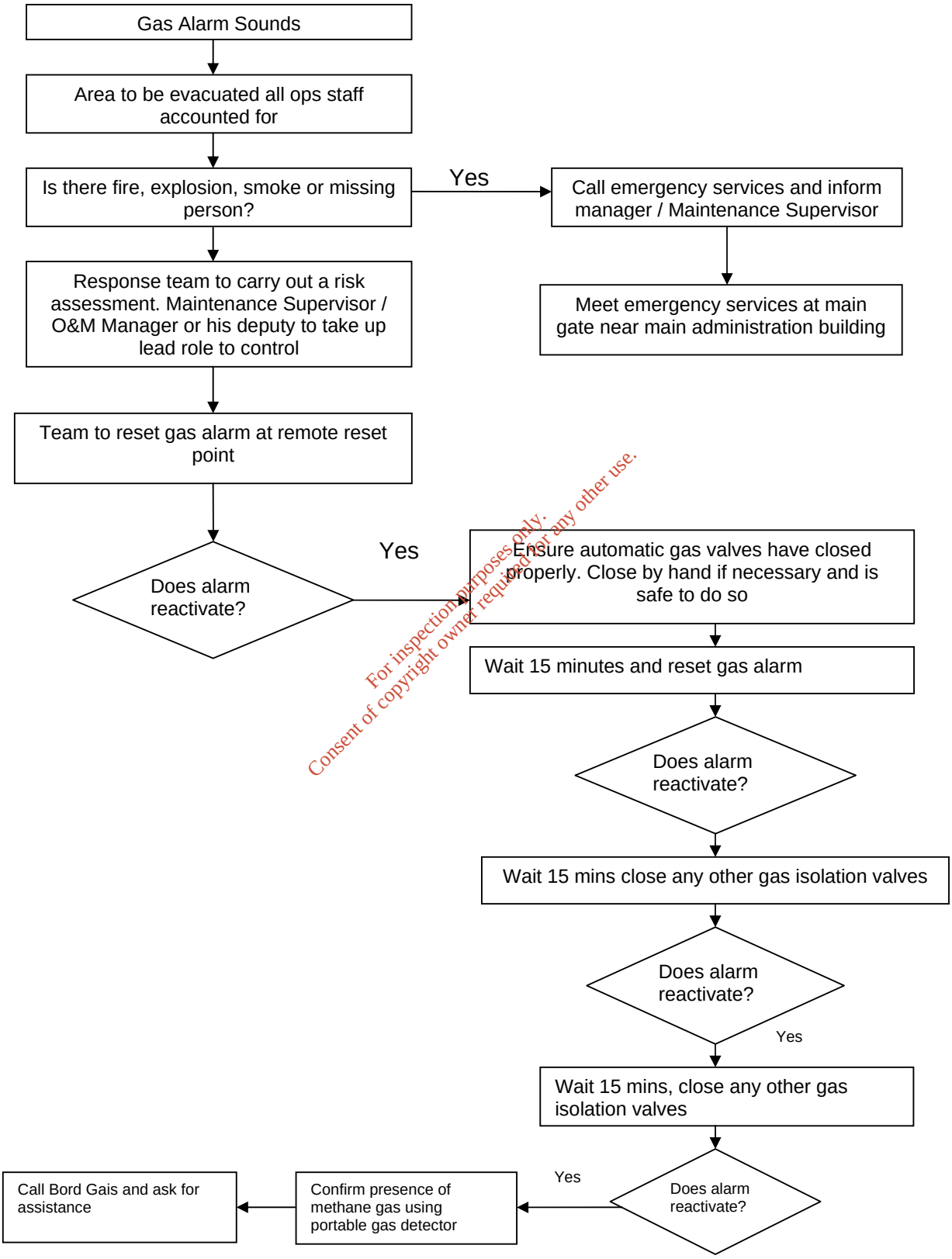

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PURPOSE OF ACTIVITY:

The purpose of this activity is to outline the correct procedure to be taken at this site in the event of a gas leak.

Natural gas is used in to power the CHP system, along with a supply of bio-gas stored in a large containment unit on-site. Due to the quantities of gas on-site the significance of a gas leak cannot be over emphasised.

If there was an uncontrolled release of gas we would evacuate the immediate and surrounding areas by activating Evacuation Procedure

Responsibilities:
Operations Director:
You will ensure that:-

- The news Media are liased with and correct and relevant information is passed onto them.

O&M Manager:
You will ensure that: -

- Authorisation is given to evacuate site following escalation of incident.
- Participation in review of this document is on a 6 monthly bases.
- Ensure that this document is kept up to date.
- Ensure that all staff are fully aware of the location of this document and are trained in the correct procedure of how to evacuate all areas safely.

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Maintenance Supervisor:
You will ensure that: -

- Staff are presented for training in this procedure.
- Staff training records are up to date.
- All staff are aware of the location and are fully understand this procedure.
- A role call of staff and other affected persons on site such as contractors has been taken following an evacuation.
- Ensure that Site Safety Manager is made aware of Staff and or Contractors that are on site but have not yet been accounted for.

Team Leader:
You will ensure that: -

- If Maintenance Supervisor is not available that His / Her role as outlined above is completed by the Team Leader on the day.

Staff members:
You will ensure that:-

- You are present for training in this procedure.
- You contact the O&M Manager or nominee if the evacuation is out of hours.
- You comply with this procedure.

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Attachment K

Aftercare, Decommissioning and Restoration

The WWTP has an expected life-span of approximately 50 years. When the facility reaches end-of-life, WCC (or operators acting on their behalf) will aim to rehabilitate the site, as close as possible to its original condition at the time of commencing operations. The overall objective of this exercise would be to achieve clean closure of the site with no residual liabilities or constraints.

There is no formal Residuals Management Plan currently in place for the site however the following tasks would be implemented as part of any decommissioning activities undertaken:

- All materials used, generated and/or stored on site to be consumed, as much as possible, before closure of the operation. Unused materials to be returned to suppliers where possible. Surplus material to be disposed of in accordance with current legislation and accepted procedures.

- All equipment/machinery to be cleaned and decontaminated in accordance with accepted procedures at time of closure, then removed from site and stored, sold, recycled, reused or otherwise disposed of as appropriate.

- On-site building to be subject to a final maintenance check, and if remaining on-site, to be locked and arrangements made for regular security monitoring to prevent unauthorised entry. If demolition of the existing structures is required, this will be carried out in accordance with accepted practice.

- Environmental audit to be carried out following announcement of closure and prior to actual decommissioning taking place. Purpose of the audit is to identify environmental management requirements during and after decommissioning, including any monitoring required. Requirements of all existing licences/permits at the time of decommissioning to be complied with.

- Costs associated with decommissioning (including remediation, restoration and aftercare) to be identified and appropriate finances made available, prior to any decommissioning works commencing.

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Attachment L – Statutory Requirements

Waste Management Acts 1996 & 2003

Section 40(4) of the Waste Management Act 1996 to 2003 states that the Agency shall not grant Waste Licence for an activity unless it is satisfied that certain criteria have been met with regards to:

(a) Emissions from the facility
(b) Environmental pollution caused by the operations at the facility

Details of the Waterford WWTP operations and associated activities, emissions and management strategies, along with the abatement and mitigation measures for the operation of the facility, are provided in documentation within various sections of this application.

The abatement and pollution prevention measures include:
- Odour abatement units
- Interceptors on surface water drains
- Implementation of SUDS design to reduce surface water runoff
- Covering of specific plant to reduce noise levels
- Sampling and monitoring programmes to prevent potential pollution of water, air or ground

The Waste Licence, once issued by the EPA, will specify relevant emission limits and performance criteria for the site.

The WWTP operators will review these against existing (and future) data, and where required, a program will be implemented (over and above that already in place) to ensure ongoing compliance. This will include ongoing reference to relevant BAT guidance (where relevant).

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Other guidance published by the EC, EPA or other recognised party, specific to individual environmental parameters (eg: EPA Guidance Note for Noise in relation to Scheduled Activities) will also be consulted.

Council Directive 96/61/EC concerning integrated pollution prevention and control

The facility will also comply with the requirements of Council Directive 96/61/EC concerning integrated pollution prevention and control. In particular, the items referred to in Annex IV of the Directive have been taken into consideration and the facility will meet these requirements whilst in operation.

The considerations included in Annex IV area are as follows:
1. The use of low-waste technology;
2. The use of less hazardous substances;
3. The furthering of recovery and recycling of substances generated and used in the process, and of waste, where appropriate;
4. Comparable processes, facilities or methods of operation which have been tried with success on an industrial scale;
5. Technological advances and changes in scientific knowledge and understanding;
6. The nature, effects and volume of the emissions concerned;

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7. The commissioning dates for new or existing facilities;
8. The length of time needed to introduce the best available technique;
9. The consumption and nature of raw materials (including water) used in the process and their energy efficiency;
10. The need to prevent or reduce to a minimum the overall impact of the emissions on the environment and the risks to it;
11. The need to prevent accidents and to minimize the consequences for the environment.

In terms of low waste technology, the facility has been designed to treat and dewater the waste insomuch as possible, thereby reducing the sludge bio-cake to a minimum (at least 23% solids). The facility will generate biogas from the anaerobic digestion process, which will be harnessed and used as an energy source.

The operators of the plant have substantial experience in wastewater treatment and have used processes and methods of operation that will be the most successful at industrial scale and the design of the plant uses the most current technology to achieve the best possible results. Resource use has been considered. This includes assessing the minimum energy required to operate the plant, the minimum amount of materials used in the treatment process and reducing the water use.

All emissions have been examined and appropriate mitigation measures and abatement systems have been included in the overall facility design to reduce the impacts on the environment.

Appropriate accident and emergency procedures will be implemented at the site, in accordance with best practice and relevant legislation.

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Other Environmental Legislation

- Air Quality Standards Regulations 2002
- Council Directive relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air (1999/30/EC)
- Council Directive relating to limit values for benzene and carbon monoxide in ambient air (2000/69/EC)

- European Communities (Waste Water Treatment)(Prevention of Odours and Noise) Regulations 2005 (S.I. No. 787 of 2005)

- Drinking Water Directive (98/83/EC)
- Water Framework Directive (2000/60/EC)
- Bathing Water Directive (71/160/EC)
- Groundwater Directive (2006/60/EC)
- Decision No. 2455/2001/EC – Established list of priority substances in the field of water policy and amending Directive 2000/60/EC
- EC (Drinking Water) Regulations S.I. No. 439 of 2000
- EC (Quality of Water intended for Human Consumption)(Amendment) Regulations S.I. No. 177 of 2000
- Quality of Bathing Waters (Amendment) Regulations S.I. No. 22 of 2001
- EC (Water Policy) Regulations S.I. No. 722 of 2003
  (Amended by S.I. No. 413 of 2005)
- EC (Quality of Shellfish Waters) Regulations S.I. No. 268 of 2006

- Wildlife Act 1976

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- Wildlife (Amendment) Act 2000
- EC Habitats Directive 92/43/EEC
- EC Birds Directive 79/409/EEC
- European Communities (Natural Habitats) Regulations 1997 (amended 2005)
- Shellfish Waters Directive (79/923/EEC)
- Flora Protection Order 1999
- Live Bivalve Molluscs (Production Areas) Designation, 2006

The above legislation has also been considered. Operations at the site are not currently or proposed to have an adverse effect on the aspects of the environment to which they refer.

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Attachment L. 2 – Fit & Proper Person

Not Applicable, as the applicant is a Local Authority. However, included is information on the operators of the WWTP, CAW, who will operate the WWTP on behalf of the applicant, Waterford City Council (WCC) for a prescribed period of time. Financial details have not been provided, as WCC will be providing the finances required to run the WWTP.

Below is a list of the wastewater treatment works, which CAW have, or will be operating, within Ireland or the UK.

Ringsend Waste Water Treatment Works

Location	Dublin 4, County Dublin, Ireland
Completion	Works constructed [1998 to 2005]. The plant was formally opened in June 2003 O&M new works April 2005

,

Key Data:

Throughput – 414 000 Ml/day – (1.7 million PE)

Main Process Units:

Preliminary Treatment;
Screening and Grit Removal
Primary Treatment;
Primary Sedimentation, using lamella plate settlement technology
Secondary Treatment;
SBR technology to achieve COD/BOD removal and partial nitrification.
Tertiary Treatment
UV disinfection
Sludge Treatment
Sludge generated from the primary and secondary stages is treated by thickening, hydrolysis, digestion and thermal drying. The dried product is recycled to agriculture.
Odour Control
Via a centralised OCU

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The entire treatment process at Ringsend is totally natural. Oxygen from the air is used to treat the wastewater and heat is used to treat the sludge. The outputs from the treatment works are:

- Clean water
- Biofert (fertiliser)
- Energy

Over 50% of the energy needed to run the plant is generated from the sludge treatment.

Clapham Water Treatment Works

Location	East Anglia, England
Completion	Works constructed 1950s, extended 1994/95

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Key Data:
Throughput – 27 Ml/day
Main Process Units:
- Raw water storage
- Pre-ozonation
- Chemical dosing
- Clarification – 3 hopper bottomed clarifiers
- Filtration – 4 ASG rapid gravity filters (RGF)
- Secondary ozonation
- Secondary filtration – 6 GAC adsorbers
- Chlorination
- Chlorine contact tank and Clean water storage

Clapham Water Treatment Works is designed to treat water to a potable standard from the Great Ouse River at approximately 15-27 MLD.

Clapham takes its water directly from the river. Water is abstracted by pumping to a raw water reservoir at a variable rate. As a means of early warning Clapham uses a river intake protection systems based around the use of a fish monitor which indicates the quality of water through behavioural patterns of Rainbow Trout.

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Grafham Water Treatment Works

Location	East Anglia, England
Completion	New works completed 1993

Key Data:
Throughput – 395 Ml/day
Main Process Units:
- Raw water storage – Grafham reservoir
- Pre-ozonation prior to splitting flow between new works and old
- Old Works stream
  - Chemical dosing
  - Clarification – total 24 hopper bottomed clarifiers
  - Filtration – 18 rapid gravity filters
- New Works stream
  - Chemical dosing
  - Clarification – Pulsator clarifiers
  - Filtration – 12 ASG rapid gravity filters
- Combined streams
- Secondary ozonation
- Secondary filtration – 16 bioflow GAC adsorbers
- Chlorination
- Clean water storage

The treatment works receives its raw water directly from the Low Lift (dam) pumping station. The pumping station extracts the water from the open top reservoir (lake) and pumps it via a dual inlet piping system to the pre-ozonation building. Ozone gas is bubbled through the water in three parallel streams from porous diffusers.

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Pitsford Water Treatment Works

Location	East Anglia, England
Completion	Works constructed 1950s, extended 1994/95

Key Data:

Throughput – 50 Ml/day

Main Process Units:

Raw water storage – Pitsford Reservoir
Pre-ozonation
Chemical dosing
Clarification – 8 hopper bottomed clarifiers
Filtration – 8 ASG rapid gravity filters (RGF)
Secondary ozonation
Secondary filtration – 7 GAC adsorbers
Chlorination
Chlorine contact tank and Clean water storage

Duston Mill WB abstract water from the River Nene and pumps it into the Impounding reservoir at Pitsford. From the Draw-off tower within the impounding reservoir water gravitates to 3 Raw water pumps boost water to the inlet of the Primary Ozone Tank.

Although Pitsford Water Treatment Works is designed for a treated water output of 50 TCMD, it's normal flow rate of 43, with a peak of 45 TCMD.

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Wing Water Treatment Works

Location	East Anglia, England
Completion	Works constructed 1977, extended 1990 and 1994/95

Key Data:

Throughput – 270 Ml/day

Main Process Units:

Raw water storage – Rutland Water
Primary microstrainers
Pre-ozonation
Chemical dosing
Clarification – 3 pulsator clarifiers
Filtration – 12 rapid gravity filters (RGF)
Secondary ozonation
Secondary filtration – 9 GAC adsorbers
Chlorination
Clean water storage
Wastewater recovery from RGFs and GAC.
Sludge thickening – 2 picket fence sludge thickeners and 3 plate presses

Wing Works is designed to produce a normal output flow rate of 228 t/c/m/d (2638.8 l/sec) and a maximum of 285 t.c.m.d. (3293.6 l/sec). The plant operates automatically with most parameters controlled by dedicated controls and by the PLC. Chlorine dosing equipment at the Empingham P.S. allows chlorine to be dosed as and when required into the raw water to kill off freshwater mussels & other micro- organisms. The Microstrainer is normally in service between March and November.

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