# Integrated Pollution Prevention and Control (IPPC)/Waste Licensing

## Review Form and Guidance Note

for the purposes of

EC Environmental Objectives (Surface Waters) Regulations 2009

| **EPA Reg. Nº:** *(Office use only)* | |
|---|---|

**Environmental Protection Agency**
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# INTRODUCTION

This Form is for the purposes of a review of an IPPC/Waste Licence in order to ensure that all authorisations under the *EPA Act 1992 to 2007* and the *Waste Management Acts 1996 to 2010* having discharges liable to cause water pollution are in compliance with the *EC Environmental Objectives (Surface Waters) Regulations 2009*.

While every effort has been made to ensure the accuracy of the material contained in the Review Form, the EPA assumes no responsibility and gives no guarantees, undertakings and warranties concerning the accuracy, completeness or up-to-date nature of the information provided herein and does not accept any liability whatsoever arising from any errors or omissions.

The Review Form and all supporting information shall be submitted to the Headquarters of the Agency in a format of a signed original, one hardcopy and two copies on CD-Rom. In cases where an Environmental Impact Statement (EIS) is required in support of the Review Form, a signed original, one hardcopy plus 16 copies (or 18 copies if the activity is within Energy sector) on CD-Rom shall be submitted.

All pages, including maps/drawings/plans, shall be no larger than A3 size. All files on CD-Rom shall be submitted in searchable PDF format and be no larger than 10MB each in size. All CD-Roms shall be labelled with the Licensee's name, Licence Register Number, address of the activity and name of the file (i.e. Review Form).

## CONTENTS

## SECTION A: GENERAL

A.1 Licensee

| | |
|---|---|
| **Name*:** | Wellman International Ltd |
| **Address:** | Mullagh |
| | Kells |
| | Co. Meath |
| | |
| **Tel:** | 046-9280200 |
| **Fax:** | 046-9280300 |
| **e-mail:** | jamescolthurst@wellman-intl.com |

* This should be the name of the Licensee which is current on the date this IPPC/Waste Licence Review Form is lodged with the Agency. It should be the name of the legal entity (which can be a limited company or a sole trader). A trading/business name is not acceptable.

**Name and Address for Correspondence**

Only documentation submitted by the Licensee and by the nominated person will be deemed to have come from the Licensee.

| | |
|---|---|
| **Name:** | Wellman International Ltd |
| **Address:** | Mullagh |
| | Kells |
| | Co. Meath |
| | |
| **Tel:** | 046-9280200 |
| **Fax:** | 046-9280300 |
| **e-mail:** | jamescolthurst@wellman-intl.com |

**Address of registered or principal office of Body Corporate (if applicable)**

| | |
|---|---|
| **Address:** | 1 Stokes Place |
| | St. Stephen's Green |
| | D.2 |
| **Company Register No.** | 31341 |
| **Tel:** | |
| **Fax:** | |
| **e-mail:** | |

## A.2 Location of Activity

| | |
|---|---|
| **Name:** | Wellman International Ltd |
| **Address*:** | Mullagh |
| | Kells |
| | Co. Meath |
| | |
| **Tel:** | 046-9280200 |
| **Fax:** | 046-9280300 |
| **Contact Name:** | James Colthurst |
| **Position:** | HS & E Officer |
| **e-mail:** | jamescolthurst@wellman-intl.com |

* Include any townland.

| | |
|---|---|
| **National Grid Reference (12 digit 6E,6N)** | 670463 785306 (ITM)<br>270527 285291 (IG) |

Location maps (no larger than A3), appropriately scaled, with legible grid references should be enclosed in **Attachment Nº A.2**. The site boundary must be outlined on the map in red colour.

Geo-referenced digital drawing files (e.g. AutoCAD files) in Irish Grid projection of the site boundary and overall site plan, including labelled emission points to surface water and their monitoring and sampling locations, are also required.

## SECTION B: EMISSIONS

### B.1 Emissions to Surface Waters

Describe the nature of emissions from the activity to receiving surface waters. Specify which of these emissions are process discharges and storm/surface water discharges.

Tables B.1(i) and B.1(ii) should be completed.

Please note that monitoring of the discharge(s) for the purposes of Table B.1(ii) shall be undertaken for the list of compulsory parameters listed in Table D.1(i). Where other relevant substances have been identified, during the Assessment of Impact on Receiving Surface Water requested under Section D.1 of this Review Form, monitoring of the discharge upstream and downstream for the relevant parameters shall also be included.

A summary list of the emission points, together with maps/drawings (no larger than A3) and supporting documentation should be included as **Attachment Nº B.1**.

### B.2 Tabular Data on Emission Points to surface water

Licensees should submit the following information for each emission point to surface water:

| Point Code | Easting | Northing | Verified | Emission |
|---|---|---|---|---|
| Provide label ID's (e.g. SW1, SW2*) | 6E-digit GPS Irish National Grid Reference | 6N-digit GPS Irish National Grid Reference | Y = GPS used<br>N = GPS not used | e.g. Ammonia (as N), Biochemical oxygen demand |

* SW = Surface Water

An individual record (i.e. row) is required for each emission point. Acceptable file formats include Excel, Access or other upon agreement with the Agency.

## SECTION C: CONTROL & MONITORING

**Describe the proposed technology and other techniques for preventing or, where this is not possible, reducing emissions from the installation/facility.**

### C.1 Treatment, Abatement and Control Systems

An overview/summary of treatment/abatement systems for effluent emissions should be included together with schematics as appropriate.

For each Surface Water Emission Point identified complete Table C.1 (i).

Supporting information should form **Attachment Nº C.1**.

Normal operation and variations for start-up and shutdown should be described. Anticipated malfunctions and known problems associated with the treatment should be highlighted.

Proposed monitoring to be undertaken for influent(s) to treatment plant, and in-treatment monitoring required for the management of the treatment plant should be detailed.

### C.2 Monitoring and Sampling Points

Identify monitoring and sampling points and outline proposals for monitoring emissions to surface water bodies.

Table C.2 (i) should be completed (where relevant) for emissions to surface water.

Where ambient environment monitoring is carried out or proposed, Table C.2 (ii) should be completed as relevant for each environmental medium and at least 12 samples should be taken at regular intervals.

Include details of monitoring/sampling locations and methods.

Supporting information should form **Attachment Nº C.2**.

### C.3 Tabular Data on Monitoring and Sampling Points

Licensees should submit the following information for each monitoring and sampling point:

| Point Code | Point Type | Easting | Northing | Verified | Pollutant |
|---|---|---|---|---|---|
| Provide label ID's | M=Monitoring S=Sampling | 6E-digit GPS Irish National Grid Reference | 6N-digit GPS Irish National Grid Reference | Y = GPS used N = GPS not used | e.g. Ammonia (as N), Biochemical oxygen demand |

An individual record (i.e. row) is required for each monitoring and sampling point. Acceptable file formats include Excel, Access or other upon agreement with the Agency.

Point source monitoring/sampling refers to monitoring from specific emission points (e.g. from a wastewater treatment plant). Ambient monitoring includes monitoring of river quality upstream/downstream of an effluent discharge.

## SECTION D: EXISTING ENVIRONMENT & IMPACT OF THE ACTIVITY

### D.1 Assessment of Impact on Receiving Surface Water

Describe the existing environment in terms of water quality with particular reference to environmental quality standards as specified within the *EC Environmental Objectives (Surface Waters) Regulations 2009 S.I. No. 272 of 2009*. Table D.1(i) should be completed as directed.

Indicate whether or not the activity complies with the requirements of the *EC Environmental Objectives (Surface Waters) Regulations 2009 S.I. No. 272 of 2009*.

The Licensee should conduct an assessment of impact of discharge(s) from the installation/facility on receiving surface water. In undertaking this assessment the Licensee shall have particular regard to substances used in the manufacturing processes likely to result in discharges of those substances listed in the *EC Environmental Objectives (Surface Waters) Regulations 2009 S.I. No. 272 of 2009*. When completing any assimilative capacity calculations have regard to the Water Services Training Group *'Guidance to Applicant – Discharge to Surface Waters'* available at http://www.wsntg.ie/publications/index.asp and other standard guidance.

If the process discharges are to coastal, transitional waters or lakes, the assessment may require a modelling study. The modelling study shall include estimates on what the resultant concentrations of the permitted substances in the receiving water body will be upon discharge at the current licence limits.

Regardless of the receiving water body type, determine the maximum allowable discharge concentrations to achieve compliance with the 95%ile good status limits. N.B. If the discharge is to a water body that is already achieving high status, or if the discharge is to waters draining to the surface water bodies identified under the First Schedule of the *EC Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009*, compliance must be with 95%ile **high** status limits.

State distance from the process discharges to a nearest downstream water dependent Protected Area. Include the name and code of this Protected Area.

Full details of the assessment, including a copy of an Environmental Impact Statement if it was required for the purposes of obtaining planning permission(s), should be submitted as **Attachment Nº D.1.1**.

Where necessary, the Licensee should supply detailed information on the proposals to comply with the requirements of the *EC Environmental Objectives (Surface Waters) Regulations 2009 S.I. No. 272 of 2009* including a detailed timeframe for any proposed works in **Attachment Nº D.1.2**.

## D.2 Environmental Considerations and Best Available Techniques (BAT)

Describe, in outline, the main alternatives, if any, to the proposals contained in the Review Form.

Describe any environmental considerations which were made with respect to the use of cleaner technologies, waste minimisation and raw material substitution.

Describe the measures proposed or in place to ensure that:

(a) the best available techniques are or will be used to prevent or eliminate or, where that is not practicable, generally reduce an emission from the activity;

(b) no significant pollution is caused;

(c) waste production is avoided in accordance with *Council Directive 75/442/EEC of 15 July 1975 on waste*; where waste is produced, it is recovered or, where that is technically and economically impossible, it is disposed of while avoiding or reducing any impact on the environment;

(d) energy and other resources are used efficiently;

(e) the necessary measures are taken to prevent accidents and limit their consequences; and,

(f) the necessary measures are taken upon definitive cessation of activities to avoid any pollution risk and return the site of operation to a satisfactory state.

This section should present a statement on energy efficiency at the site to include, where appropriate, an energy audit with reference to the *EPA Guidance document on Energy Audits*. Licensees should have regard to Section 5 of the *EPA Acts 1992 and 2003* in selecting BAT and in particular the following:

- The use of low-waste technology;
- The use of less hazardous substances;
- The furthering of recovery and recycling of substances generated and used in the process and of waste where appropriate;
- Comparable processes, facilities or methods of operation, which have been tried with success on an industrial scale;
- Technological advances and changes in scientific knowledge and understanding;
- The nature, effects and volume of the emissions concerned;
- The commissioning dates for new or existing facilities;
- The length of time needed to introduce the BAT;
- The consumption and nature of raw materials, including water, used in the process and their energy efficiency;
- The need to prevent or reduce to a minimum the overall impact of the emissions on the environment and the risks to it;
- The need to prevent accidents and to minimize the consequences for the Environment; and,
- The information published by the Agency in the form of sectoral BAT Guidance documents and the relevant BREF documents published by the EC (available for download at http://eippcb.jrc.es/ and at www.epa.ie).

## SECTION E: STATUTORY REQUIREMENTS

### E.1 Best Environmental Practices – Compliance with Legislation

Demonstrate if the best environmental practices are in place for control of diffuse emissions from the installation/facility as set out in the following legislation:

(a) a specification prepared by the Agency in accordance with Section 5 of the *Environmental Protection Agency Act 1992* as amended by Section 7 of the *Protection of the Environment Act 2003*;

(b) the *Urban Waste Water Treatment Regulations 2001 (S.I. No. 254 of 2001)* as amended by the *Urban Waste Water Treatment (Amendment) Regulations 2004 (S.I. No. 440 of 2004)* or any future amendment thereof;

(c) the *European Communities (Good Agricultural Practice for Protection of Waters) Regulations 2009 (S.I. No. 101 of 2009)* or any future amendment thereof;

(d) the *Local Government (Water Pollution) Act, 1977 (Control of Cadmium Discharges) Regulations 1985 (S.I. No. 294 of 1985)*;

(e) the *Local Government (Water Pollution) Act, 1977 (Control of Hexachlorocyclohexane and Mercury Discharges) Regulations 1986 (S.I. No. 55 of 1986)*;

(f) the *Local Government (Water Pollution) Acts, 1977 and 1990 (Control of Carbon Tetrachloride, DDT and Pentachlorophenol Discharges) Regulations 1994 (S.I. No. 43 of 1994)*; and,

(g) measures or controls identified in a pollution reduction plan for the river basin district prepared in accordance with Part V of the *EC Environmental Objectives (Surface Waters) Regulations 2009 S.I. No. 272 of 2009* for the reduction of pollution by priority substances or the ceasing or phasing out of emissions, discharges and losses of priority hazardous substances.

## SECTION F: APPROVED ADJUSTMENTS & CONDITIONS

Where the Office of Environmental Enforcement (OEE) of the Agency has agreed any variations or adjustments to the conditions of the existing licence, the licensee must supply a schedule detailing these agreed variations and adjustments to the existing licence conditions. An updated, scaled drawing of the site layout (no larger than A3) providing visual information on such adjustments or variations where appropriate should be included.

In the case of once-off assessments/ reports required under conditions of the existing licence the licensee must supply a schedule detailing those assessments/ reports that have been completed and agreed with the Office of Environmental Enforcement (OEE) or as otherwise agreed.

**Attachment Nº F1** shall include the schedule of variations and/or adjustments together with the updated drawing.

| Condition No. | Existing Condition | Proposed Wording (where appropriate) | OEE Agreement Reference | Description |
|---|---|---|---|---|
| | | | | |

**Not Applicable to Wellman**

## SECTION G: DECLARATION

### Declaration

I certify that the information given in this Review Form is truthful, accurate and complete.

I give consent to the EPA to copy this Review Form for its own use and to make it available for inspection and copying by the public, both in the form of paper files available for inspection at EPA and via the EPA's website. This consent relates to this Review Form itself and to any further information, submission, objection, or submission to an objection whether provided by me as Licensee, any person acting on the Licensee's behalf, or any other person.

**Signed by:**_____ **Date:**_____
*(on behalf of the organisation)*

**Print signature name**:_____

**Position in organisation:**_____

*Company stamp or seal:*

# ANNEX 1: TABLES/ATTACHMENTS

**TABLE B.1(i): EMISSIONS TO SURFACE WATERS** (One page for each emission)

**Emission Point:**

| | |
|---|---|
| Emission Point Ref. No.: | SWDP1 |
| Source of Emission: | Mixture of treated effluent & storm water |
| Location : | Weir in river, beside pump house |
| Grid Ref. (12 digit, 6E,6N): | 271568E, 285147N |
| Name of receiving waters: | River Borora |
| Flow rate in receiving waters: | 0.04 $m^3.sec^{-1}$ Dry Weather Flow<br>0.075 $m^3.sec^{-1}$ 95%ile flow |

**Emission Details:**

| (i) Volume to be emitted | | | |
|---|---|---|---|
| Normal/day | 114$m^3$ | Maximum/day | 580$m^3$ (as per licence) |
| Maximum rate/hour | 25$m^3$ (as per licence) | | |

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

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

**TABLE B.1(ii): EMISSIONS TO SURFACE WATERS - Characteristics of the emission** (One table per emission point)

***Emission Point Reference Number: SWDP1****

| Parameter | Prior to treatment[1] | | | | As discharged[1] | | | | % 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 | |
| pH | N/A | 7.2 (max)<br>6.6 (ave) | N/A | N/A | N/A | 7.2 (max)<br>7.1 (ave) | N/A | N/A | N/A |
| Temperature | N/A | 20.1$^0$C (max)<br>19$^0$C (ave) | N/A | N/A | N/A | 18.5$^0$C (max)<br>16.8$^0$C (ave) | N/A | N/A | N/A |
| Electrical conductivity EC | N/A | 1500µS (max)<br>887µS (ave) | N/A | N/A | N/A | 1000µS (max)<br>804µS (ave) | N/A | N/A | N/A |
| Ammonia (as N) | N/A | 7.48 (max)<br>2.84 (ave) | N/A | N/A | N/A | 0.59 (max)<br>0.21 (ave) | N/A | N/A | N/A |
| Chemical oxygen demand | N/A | 4100 (max)<br>2276 (ave) | 467<br>259 | 170601<br>94704 | N/A | 1074 (max)<br>735 (ave) | 122<br>7.35 | 44530<br>2683 | 73.8% (based on max daily average) |
| Biochemical oxygen demand | N/A | 2474 (max)<br>1406 (ave) | 282<br>160 | 102943<br>58504 | N/A | 45 (max)<br>34.4 (ave) | 5.13 (max)<br>3.92 (ave) | 1872.5<br>1431 | 98% (based on max daily average) |
| Dissolved oxygen DO | N/A | 3.3(max)<br>1.76 (ave) | 138.7<br>0.2 | 0.137<br>73 | N/A | 10 (max)<br>5.5 (ave) | 1.14<br>0.63 | 416.1<br>229.9 | N/A |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Total Nitrogen (as N) | N/A | 26.0 (max)<br>14.58 (ave) | N/A | N/A | N/A | 3.5 (max)<br>2.52 (ave) | N/A | N/A | N/A |
| Nitrite (as N) | N/A | 0.079 (max)<br>0.02 (ave) | N/A | N/A | N/A | 0.017 (max)<br>0.008 (ave) | N/A | N/A | N/A |
| Nitrate (as N) | N/A | 121 (max)<br>60.3 (ave) | N/A | N/A | N/A | External | 96.2 (max)<br>34.4 (ave) | N/A | N/A |
| Total Phosphorous (as P) | N/A | 8.2 (max)<br>4.49 (ave) | N/A | N/A | N/A | 0.94 (max)<br>0.40 (ave) | N/A | N/A | N/A |
| Ortho Phosphate (as P) | N/A | 5.68 (max)<br>2.57 (ave) | N/A | N/A | N/A | 0.23 (max)<br>0.05 (ave) | N/A | N/A | N/A |

| Parameter | Prior to treatment[2] | | | | As discharged[2] | | | | % 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 | |
| Detergents (MBAS) | | | | | N/A | 0.65 (max)<br>0.28 (ave) | 0.07 (max)<br>0.03 (ave) | 25.5 (max)<br>10.95 (ave) | N/A |
| Oils, Fats, & Greases | | | | | N/A | 19.8 (max)<br>13.4 (ave) | 2.25 (max)<br>1.57 (ave) | 821.3 (max)<br>573.1 (ave) | N/A |
| Suspended Solids | | | | | N/A | 41 (max)<br>22.1 (ave) | 4.67 (max)<br>2.52 (ave) | 1595 (max)<br>919.8 (ave) | N/A |

**NOTE: RESULTS RELATE TO TRADE EFFLUENT & TREATED TRADE EFFLUENT ONLY I.E. RAIN WATER DILUTION NOT INCLUDED.**

**[1] RESULTS ARE BASED ON 12 SAMPLES TAKEN OVER A 3 WEEK PERIOD (27/06/11 – 15/07/2011)**
**[2] RESULTS ARE BASED ON 6 SAMPLES TAKEN OVER A 2WEEK PERIOD (23/11/11 – 01/12/2011)**

**NOTE: RESULTS FOR BAT PARAMETERS (PHENOLS, MINERAL OIL AND CYANIDE) ARE CONTAINED IN TABLE FOUND IN ATTACHMENT D.2**

**TABLE C.1(i): ABATEMENT/TREATMENT CONTROL**

***Emission Point Reference Number: SWDP1***

| Control [1] parameter | Equipment [2] | Equipment maintenance | Equipment calibration | Equipment back-up | Monitoring to be carried out [3] | Monitoring equipment | Monitoring equipment calibration |
|---|---|---|---|---|---|---|---|
| Nutrient Balancing of Influent | Balance Tank with Aerator & Pumps | Inspected regularly as part of preventative maintenance schedule | N/A | Back up aerator and pump | Visual inspection | N/A | N/A |
| Oxygen level in aeration basin | Aerator in aeration basin | Inspected regularly as part of preventative maintenance schedule | N/A | Spare aerator and gearbox | Continuous oxygen monitoring | Dissolved Oxygen probe | Calibrated annually |
| Desludging biotower, aeration basin | Belt hydropress | Maintained in accordance with Maintenance preventative maintenance schedule | N/A | A range of spare components are carried for the hydropress | N/A | N/A | N/A |
| Flow rate from effluent treatment plant | Duty & stand-by pumps sump pumps, biotower pumps, sludge return blower to aeration basin | Maintained in accordance with Maintenance preventative maintenance schedule | N/A | Spare sump pumps and high level alarm, biotower pumps, alarm on sludge return blower | High level | High level probe that activates alarm in the event of level increases | Checked weekly |

[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.

**TABLE C.2(i): EMISSIONS MONITORING AND SAMPLING POINTS** (One table per monitoring point)

***Emission Point Reference Number: SW1 – Effluent Treatment Plant V-Notch Weir***

| Parameter | Monitoring frequency | Accessibility of Sampling Points | Sampling method | Analysis method/ technique |
|---|---|---|---|---|
| Flow | Continuous | Easily Accessible | In line | Flow meter/recorder |
| pH | Continuous | Easily Accessible | In line | PH Electrode/Meter and Recorder |
| $CBOD_5$ | Weekly | Easily Accessible | Grab Sample | Standard Method |
| COD | Weekly | Easily Accessible | Grab Sample | TOC Meter/Standard Method |
| Suspended Solids | Weekly | Easily Accessible | Grab Sample | Gravimetric |
| Oils, Fats & Greases | Weekly | Easily Accessible | Grab Sample | Standard Method |
| Total Ammonia (as N) | Monthly | Easily Accessible | Grab Sample | Ion Selective Electrode |
| Total Ortho-Phosphate (as P) | Monthly | Easily Accessible | Grab Sample | Standard Method |
| Total Heavy Metals | Annually | Easily Accessible | Grab Sample | Atomic Absorption/ICP |
| Acute Toxicity | Every 3 Years | Easily Accessible | 24 hour flow proportional composite sample | Standard Method |

**TABLE C.2(ii): AMBIENT ENVIRONMENT MONITORING AND SAMPLING POINTS** (One table per monitoring point)

***Monitoring Point Reference Number:*** SW2 Upstream of Discharge SWDP1 in the River Borora

| Parameter | Monitoring frequency | Accessibility of Sampling point | Sampling method | Analysis method/ technique |
|---|---|---|---|---|
| As per results | Once off for IPPC review application | Easily Accessible | Grab sample | Standard Methods |

**Table D.1(i) RECEIVING WATER SURFACE WATER QUALITY**

***Monitoring Point/Grid Reference:*** **Upstream Monitoring Point (Code (SW2)**

[1] At least 12 samples should be taken at regular intervals.

| Parameter | Results [1] (mg/l) | | | | | | | | | | | | Sampling method (grab, drift etc.) | Normal Analytical Range | Analysis method/ technique |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 27/06 | 28/06 | 29/06 | 30/06 | 01/07 | 04/07 | 05/07 | 06/07 | 07/07 | 08/07 | 11/07 | 12/07 | | | |
| pH | 7.0 | 7.2 | 7.7 | 7.3 | 7.3 | 7.2 | 7.4 | 7.3 | 7.3 | 7.2 | 7.4 | 7.2 | Grab | 7.0-7.7 | pH meter |
| Temperature | 15.9 | 15.6 | 14.1 | 16.0 | 15.3 | 15.9 | 16.8 | 15.9 | 15.0 | 15.2 | 16.0 | 14.1 | Grab | 14.1-16.8 | Temperature probe |
| Electrical conductivity EC | 390 | 310 | 340 | 380 | 340 | 280 | 395 | 375 | 310 | 250 | 400 | 200 | Grab | 200-400 | Conductivity meter |
| Ammonia (as N) | <0.01 | .0117 | <0.01 | 0.016 | <0.01 | <0.01 | <0.01 | 0.015 | .0539 | 0.022 | .0124 | <0.01 | Grab | <0.01-0.0539 | Standard method |
| Chemical oxygen demand | 4 | 1 | 3 | 3 | 2 | 2 | 2 | 1.2 | 6 | 6 | 1 | 20 | Grab | 1-20 | Standard method |
| Biochemical oxygen demand | 3.2 | 2.2 | 1.8 | 5.2 | 4.7 | 1.2 | <1 | 1.4 | 2.6 | 3.0 | 3.6 | 5.0 | Grab | <1 -5.2 | Standard method |
| Dissolved oxygen DO | 11.0 | 10.1 | 9.2 | 7.2 | 9.1 | 8.2 | 7.8 | 8.9 | 6.2 | 7.1 | 7.2 | 8.6 | Grab | 6.2-11 | Standard method |
| Total Nitrogen (as N) | 2.2 | 2.0 | 1.9 | 1.9 | 1.6 | 1.6 | 1.6 | 0.9 | 1.1 | 0.9 | 1.1 | 1.4 | Grab | 0.9-2.2 | Standard method |
| Nitrite (as N) | .078 | <.005 | 0.04 | <.005 | 0.04 | 0.024 | <.005 | 0.033 | 0.033 | <.005 | <.005 | <.005 | Grab | <0.005-0.078 | Standard method |
| Nitrate (as N) | 9.82 | 38 | 9.3 | 59.4 | 9.3 | 7.8 | 12.5 | 6.85 | 16.6 | 74.8 | 101.8 | 15.9 | Grab | 6.85-101.8 | Standard method |
| Total Phosphorous (as P) | .25 | .68 | .22 | .056 | <.05 | <.05 | .13 | <.1 | <.1 | <.1 | <.1 | <.1 | Grab | <0.1- 0.68 | Standard method |
| OrthoPhosphate (as P) | <.1 | <.1 | <.1 | <.1 | <.1 | <.1 | <.1 | .17 | 1 | .23 | .16 | .35 | Grab | <0.1- 0.35 | Standard method |

[1] At least 12 samples should be taken at regular intervals.

**Table D.1(i) Continued**

| Additional Parameters | Results [1] (mg/l) | | | | | | Sampling method (grab, drift etc.) | Normal Analytical Range | Analysis method/ technique |
|---|---|---|---|---|---|---|---|---|---|
| | 23/11 | 24/11 | 25/11 | 29/11 | 30/11 | 01/12 | | | |
| Suspended Solids | 24 | 60 | 13 | 13 | 16 | 20 | Grab | 13 - 60 | Standard method |
| Oils, Fats & Greases (OFG's) | 13.5 | 20.7 | 8.6 | 10.3 | 2.8 | 3.0 | Grab | 2.8 – 20.7 | Standard method |
| Detergents | 0.33 | <0.21 | <0.21 | <0.21 | <0.21 | <0.21 | Grab | <0.21 – 0.33 | Standard method |