

Our Ref: WPP0208-02

Administration  
Office of Climate, Licensing & Resource Use,  
Environmental Protection Agency,  
PO Box 3000,  
Johnstown Castle Estate,  
Co. Wexford.

29 September 2008

**Waterford Plating Company Ltd.**

**Article 11 Request for Further Information on Application for Review of the Integrated  
Pollution Prevention and Control Licence for a Surface Treatment Facility, Unit 605/606  
Northern Industrial Estate, Waterford.**

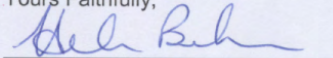
Dear Sir/Madam,

I refer to your letter dated 08 August 2008 (see attachments) in relation to information required in accordance with Article 11 (2) (b) (1) of the EPA (Licensing) Regulations 1994 to 2004.

I wish to also notify the Agency of a typo made in Attachment 1.8.2 Environmental Considerations & BAT, paragraph 2, where it was stated that <3.5 litres refers to the volume for solvent use in 2007; this was incorrect and should have stated <3,500 litres. The corrected attachment is included in this submission.

In accordance with the guidelines therein, I enclose an original and two hardcopies, and 2 CD-ROM copies of the further information in support of the IPPC licence review application lodged with the EPA on 13<sup>th</sup> June 2008. There are no geo-referenced files with this submission.

Yours Faithfully,



Helen Behan

Environmental Consultant  
Environmental Consultancy Services,  
Bord na Mona Environmental Ltd.

Mr Edward Roche  
General Manager  
Waterford Plating Company Limited  
Waterford Plating Company Ltd  
Unit 604/605/606  
Northern Industrial Estate  
Old Kilmeadan Road, Waterford



08 August 2008

Reg No: P0280-02

Dear Mr Roche

I refer to your application for an Integrated Pollution Prevention and Control licence, which was received on 13 June 2008.

I am to advise in accordance with Article 11(2)(b)(ii) of the EPA (Licensing) Regulations 1994 to 2004, that the following information is required in support of the application under Article 10 of the Regulations:

1. *Submit a copy of the accreditation or certification to quality standard EN ISO 9001:2000.*
2. *Describe the existing environment in terms of air quality with particular reference to ambient air quality standards.*
3. *Provide a statement whether or not emissions of main polluting substances (as defined in the Schedule of S.I. 394 of 2004) to the atmosphere are likely to impair the environment.*
4. *Give summary details and an assessment of the impacts of any existing or proposed emissions on the environment, including environmental media other than those into which the emissions are made.*
5. *Provide an air dispersion model of atmospheric emissions from the activity. When carrying out dispersion modelling, regard should be had to the "Guidelines for the Preparation of Dispersion Modelling Assessments for Compliance with Regulatory Requirements – an Update to Royal Meteorological Society Guidance" of similar guidelines from a recognised authority.*

**Note:** Any *telephone enquiries* in relation to the above should be directed to Suzanne Wylde at the number above.  
All *written communications and replies* should be directed to Sonja Smith, Office of Climate, Licensing, & Resource Use, EPA, PO Box 3000, Johnstown Castle Estate, County Wexford.

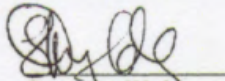
In addition to the above please also provide an updated non-technical summary to reflect the information provided in your reply.

The requested information should be submitted to the Agency within **8 weeks** of the date of this notice, in order to allow the Agency to process and determine your application.

In the circumstances, you should make immediate arrangements to have the required document(s) (1 signed original and 2 copies in hardcopy format, and 2 copies of all files in electronic searchable PDF format on CD-ROM) submitted to the Agency without delay. Your response to this request should be directed to Sonja Smith, Administration Officer, Office of Climate, Licensing & Resource use.

It should be noted that the eight-week period within which the Agency is to decide the proposed determination will commence on the day on which this notice has been complied with. If you have any further queries please contact Ms Suzanne Wylde at the number above.

Yours sincerely,



Suzanne Wylde  
Inspector  
Office of Climate, Licensing & Resource Use



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**Note:** Any *telephone enquiries* in relation to the above should be directed to **Suzanne Wylde** at the number above.  
All *written communications and replies* should be directed to Sonja Smith, Office of Climate, Licensing, & Resource Use, EPA, PO Box 3000, Johnstown Castle Estate, County Wexford.

## Waterford Plating Company Ltd. IPPC Licence Review

### List of Attachments & Contents RFI

<b>Attachment No.</b>	<b>Contents</b>
Attachment A.1 (RFI)	Non-technical Summary
Attachment I.1 (RFI)	Assessment of Atmospheric Emissions Air Dispersion Model Report ECS2980
Attachment I.8 (Rev 1)	Environmental Considerations and BAT  Copy of Accreditation Certificate to Quality Standard EN ISO 9001:2000

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## A.1 NON-TECHNICAL SUMMARY

### Description

Waterford Plating Company Ltd. is an independent trading company and operates a surface treatment facility located at the IDA Northern Industrial Estate in Waterford City. The facility operates under IPPC Licence Register No. P0280-01. The company was formed in 1991 and currently employs 16 permanent employees. The normal operating hours are between 8.00a.m. to 4.30p.m, Monday to Friday. Surface treatment activities are currently conducted within the leased Units 604/605/606 in the Northern Industrial Estate, covering a total area of 1382 m<sup>2</sup>. The installation is surrounded by light industrial units within Northern Industrial Estate.

Activities at Waterford Plating Company Ltd. associated with the surface treatment of metals include 1) electroplating coatings 2) non-electroplating coatings and 3) painting of components.

**Unit 605/606** is one large open area with offices and employee facilities located to the front of the building (east). Activities in Unit 605/606 involve the customer reception of components from sub-contractors, unloading/loading of components onto appropriate jigs; surface treatment in a series of vats; baking; wet spray painting; and ultra-violet curing. Chemicals and solvents are stored on storage racks or designated bunded storage rooms. Vats, which are lined up sequentially in order of surface treatments to be applied, generate wastewaters from rinses and spent electroplating or chemical conversion solutions. A specifically designed Wastewater Treatment Plant (WWTP) at the facility treats potential contaminants from the surface treatment process prior to discharge to Waterford City Council sanitary sewer.

**Unit 604** is an area that is currently used for the painting and drying of components using dry powder paints and wet spray paint. Unit 604 equipment includes one dry painting open booth, one wet/dry painting open booth and a large oven for baking. When painting and drying is completed, the components are returned into Unit 605/606 for quality control checks and packaging.

The facility operates under IPPC Licence Register No. P0280-01 under Class of Activity 12.3 *'The surface treatment of metals and plastic materials using and electrolytic or chemical process where the volume of the treatment vats exceeds 30 m<sup>3</sup>'* from the First Schedule of the Protection of the Environment Act 2003. The facility underwent an expansion plan which was completed in 2007. The expansion of Unit 605/606 involved incorporating old office space into a new production area, and new offices and canteen facilities were built onto the front of Unit 605/606. Presently, Waterford Plating Company Ltd. leases the adjacent Unit 604, into which one existing paint process (dry powder) and a new paint process (dry and wet) has been installed. These modifications have not impacted on the surface treatment processes undertaken in Unit 605/606.

It is the intention of Waterford Plating Company to decommission Unit 604 and transfer all activities and processes carried out in Unit 604 to a new extension leased by Waterford Plating Company Ltd. at the rear of Unit 605/605, which is referred to as Unit 655. The review of this IPPC licence is sought in relation to relocation of the existing emission point AE2-2 and the installation of a third emission point AE2-3 for a wet/dry painting booth in Unit 655. The proposed area for Units 605/606/655 is 1493 m<sup>2</sup>.

The process for the dry powder painting (AE2-2) will not change from the licensed activity, the air extraction and diameter of the stack will be consistent with the previous location.

The new paint booth (AE2-3) is a PSW3 meter no pump water wash spray booth, which removes wet or powder paint through a water scrubber and baffle prior to emission to atmosphere. The washing chamber is fitted with a centrifugal fan having a total capacity of 8600cfm.

The review of this IPPL licence is also sought in relation to the relocation of Emissions to Sewer Schedule 2 (i) monitoring reference point SE-1. This is due to the expansion of the office area in front of the building, the access point to the main foul sewer was restricted which resulted in the movement of the monitoring point approximately four meters from its original location.

The lease on Unit 604 expires in October 2008 and it is envisaged that the transfer of the painting processes to Unit 655 will take place during the summer shutdown 2008.

## Process

The main process at the facility involves the surface treatment of customer components, which can be aluminium, steel or zinc (electro-coated steel) by placement on jigs, barrels are not used at the facility. The surface treatment line contains solutions and rinses in vats which are lined up simultaneously for each type of surface treatment provided by Waterford Plating Company Ltd. The finish is dependant on the requirements stipulated by the customer.

Phosphate Coatings are processes of chemical conversion on a metal surface to produce a thin adherent phosphate compound coatings. The phosphate crystals formed on the surfaces of materials can be iron, zinc, or manganese phosphates. It is one of the most useful non-metallic coatings.

Aluminium Chromating Coatings are also processes of chemical conversion where chromated coatings are formed by the reaction of water solutions of chromic acid or chromium salts. The coatings can be applied to aluminium, zinc, cadmium, and magnesium. These coatings have good atmospheric corrosion resistance.

Cyanide Zinc plating is a process of using electrical current to coat an electrically conductive object with a relatively thin layer of metal. The primary application of electroplating deposits a layer of a metal having some desired property (e.g. abrasion, corrosion protection, aesthetic qualities) onto a surface lacking that property. Colour or clear passivation is a chemical treatment applied to the surface of a metal to improve corrosion resistance and appearance.

A mixture of paints are used in the process to apply a paint coating to the finished product from the surface treatment. Solvent based paints are used in the enclosed wet painting booth, where employees operating the spray guns wear air filter masks. Powder paints are sprayed on to components in an open booth with air extraction installed. Wet and dry paint operations take place in an open booth served by a water scrubber and baffle.

Waterford Plating Company Ltd. provides surface treatment to customer components which must comply with Directive 2002/95/EC of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical equipment. This Directive, from 1st July 2006, prohibited the use of Lead, Mercury, Cadmium, Hexavalent Chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE). For this reason, paints used at the facility in the wet and dry painting process must also comply with Directive 2002/95/EC. The paint suppliers certify the paint products conform to this Directive and do not contain the substances prohibited.

The use of hexavalent chromium (Cr(VI)), albeit for a small number of customers, is used in the cyanide zinc plating line. Hexavalent chromium (Cr(VI) compounds are a group of chemical substances that contain the metallic element chromium in its positive 6 valence (hexavalent) state. Occupational exposures to Cr(VI) occur during the production of stainless steel, chromate chemicals, chromate coating and chromate pigments, and the Cr(VI) compound has been considered as a potential occupational carcinogen.

To minimise the use of Hexavalent chromium (Cr (VI) compounds, two chrome free solutions have been introduced on the line for the chromate treatment of aluminium. The introduction of chrome free colour passivation on the zinc plating line was undertaken in August 2006. To date the use of Cr(VI) in clear chromating solutions has been fully changed over to the trivalent form Cr(III) by using the product Slotopas Z21/Blue/22. Approximately 95% of the process for colour chromating solutions using Cr (VI) has been changed to Cr(III) by using the product Slotopas G10. The remaining 5% of processing using a product containing Cr(VI) arises due to customer specification for component finishing. The product MacDermid Iridite LY-FPC which contains Cr(VI) is received to the facility in soluble liquid state and the maximum stock level at any one time is 25 litres. This small percentage of customers are exempt from compliance with Directive 2002/95/EC on Restriction of Hazardous Substances

### Operations

The facility is operated five days a week from 8a.m. to 4.30p.m. These hours are consistent throughout the year excluding Christmas and summer shutdown (August). There is no activity during night-time hours. Surface treatment is conducted throughout the daytime working period. Painting process is dependent on the finishing turn around of the surface treatment process and the type of paint required by the customer. Extraction fans at the painting booths area are ran continuously during the working day and powered off outside hours of operation.

The main consumables used during the operation of the plants will be natural gas and water. Electricity is used to heat process tanks, run dosing equipment and drying ovens. Electricity consumption in 2007 was 340 MWhrs, with an average of 452 MWhr over between 1999 and 2007.

Natural gas used at the facility is in the form of piped natural gas supply from Bord Gáis and is used in the drying process in the dryer unit since 2007. Natural gas consumption in 2007 was 30,652m<sup>3</sup>.

The water supply from Waterford Corporation municipal supply is mainly required for surface treatment vats chemical solutions and rinsing vats. Water consumption has declined significantly since 1999 when it was at 10,881m<sup>3</sup> yr to 3231m<sup>3</sup> in 2006. This is due to new initiatives where recycling and recovering of rinsing solutions are reducing the volumes required for the surface treatment process.

There will be no significant increase in the usage of consumables or resources at Waterford Plating Company Ltd. due to the transfer of activities from Unit 604 into Unit 655. There is no storage of hydrocarbons at the facility.

### Emissions to Air

There are no point source atmospheric emissions from the surface treatment process for phosphate conversion coating, chromate conversion coating and cyanide zinc plating.

Painting operations arising from painting of components is carried out in three separate paint booths with stack and emission points as follows:

- Wet spray painting – emission point A2-1
- Dry powder painting – emission point A2-2
- Wet spray /dry powder painting – emission point A2-3

Pollutant parameters that may be present in the air emissions from these emission points is as follows:

- Particulates
- Volatile Organic Compounds

Note: Schedule 1 (ii) of IPPC Licence requires monitoring of Lead, Zinc, Chromium however, the paint products used at the facility do not contain these substances.

A total of 3,421 litres of solvent based paint & thinners was used at the facility in 2007.

An air dispersion model for the facility, *AERMOD* as agreed with the Agency, has been completed by Environmental Consultancy Services, Bord na Mona Environmental Ltd. The model utilised data for the existing stacks as shown in Drawing WPP280-01-Rev-06, and was modelled based on the proposed locations as detailed in the application lodged 13<sup>th</sup> June 2008.

The comprehensive evaluation of the potential impact of emissions from Waterford Plating Company Ltd. on ambient air quality has been completed. The predictions obtained from this assessment are in compliance with nation and EU standards and show that there will be no adverse impact from the plant on air quality.

It was found from the modelling that the proposed dry stacks A2-2 and A2-3 which currently stand at 4.28m and 5.18m respectively can remain at those stack heights. The proposed wet stack A2-1 however, will need to be increased to 9m. The proposed stack height for A2-3 is based on an assumption regarding the concentration of butyl acetate that will be present in the emission stream. All other inputs remain as proposed in licence review application. The model was also computed with an increase by 1,000nm<sup>3</sup>/hr in volumetric flows for each stack.

### Emissions to Surface Water

While there are no direct emissions to surface waters, SW1 discharges into the Northern Industrial Estate stormwater drain which discharges into the River Suir in Waterford. The stormwater does not undergo any form of treatment by Waterford Corporation. Currently, SW1 is monitored on a quarterly basis for COD concentration. The increase in the size of the proposed facility for this application will not add significant load on the stormwater drains.

### Emissions to Sewer

The WWTP at Waterford Plating Company has undergone an upgrade, which was completed in 2007. Wastewater from rinses and vat solutions are both biologically and chemically treated. The currently License requires the monitoring for the parameters aluminium, BOD, Chloride, Chromium, Chromium (VI), COD, Copper Cyanide Nitrate Oils, Fats & Grease, Phosphate (Total), Solids (Total Suspended), Sulphate, Surfactants as MBAS, and Zinc. Emissions to sewer at SE1 are monitored monthly. The daily limit is 100m<sup>3</sup>. The total volume discharge to sewer in 2007 was 2,768 m<sup>3</sup>.



## Emissions to Ground

There are no emissions to ground at the facility.

## Noise Emissions

The facility is located in a light industrial estate set in an urban environment in Waterford City. Activities at the facility are such that there is a low level of noise emitted and traffic movements associated with the facility are light. A noise survey was conducted as part of the application for IPPC Licence P0280-01 and it was found that noise levels varied between 54 dBA to 57 dBA. The noise limit at noise sensitive locations during daytime hours is 55dBA. There are residential areas within 500m of the facility. However, the area is predominantly industrial with a business centre located to the west. It is envisaged that the noise impact from activities at the facility will not cause nuisance to noise sensitive locations.

## Other emissions

There will be no onsite disposal of waste. Non-hazardous waste is in the form of general office waste cardboard packaging. Waste paint and paint sludge is collected in a carbiner at the facility and then collected for treatment and disposal by Rilta Environmental. Sludge from the WWTP is removed and disposed of accordingly. Scrap metal, including copper wire for the jigs is recycled with an approved scrap merchant. Waste cyanide drums are washed out at the facility, tested and recycled with Waste Metal Management Company.

## Best Available Techniques (BAT)

Waterford Plating Company Ltd. have been involved in the optimisation of electroplating activities to reduce the use of chemicals in conjunction with the Cleaner Greener Production Programme for which they have significantly reduced the mass loadings with recycling water initiatives. Their continued commitment to the best available techniques for the processes conducted on site whilst minimising the impact in the environment. Two BREF documents are considered for activities at the installation, which in turn have BAT documents as transposed by the Agency:

*BREF Reference document on Best Available Techniques for the Surface Treatment of Metals and Plastics (European Commission December 2006);*

*BREF Reference document on Best Available Techniques for Solvent Use in Coating, Cleaning and Degreasing (EPA August 2007);*

*Draft BAT Guidance Note on Best Available Techniques for Surface Treatment of Surface Treatment of Metals and Plastic Metals (EPA July 2007);*

*Draft BAT Guidance Note on Best Available Techniques for Solvent Use in Coating, Cleaning and Degreasing (EPA August 2007).*

The company operate to BAT for their activities at the site.

### Aspects relating to the existing IPPC Licence

Further to the installation and operation of the wet/dry paint booth, there are a number of issues with regard to the existing licence that it is proposed could be subject to change as part of this review.

Briefly the following changes to this licence are proposed:

- (i) Licence should reflect change in Emissions to Sewer pH from 6-9 to 6-10 based on correspondence with EPA.
- (ii) New emission point AE2-3 located in Unit 655 monitoring for particulates.
- (iii) Relocation of surface water sampling location due to construction of extension planning permission Ref fs2905.
- (iv) Propose to have surface water monitoring removed from licence as asbestos roof has been replaced in Unit 605/606 also, results show that there is no potential risk from storm water at the facility on the environment.
- (v) Wet and powder paints used at the facility are compliant with 2002/95/EC of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical equipment and do not contain Zinc, Lead and Chromium. Therefore, it is requested that monitoring of same for emission points A2-2 and A2-3 does not include these substances.
- (vi) Limits on Emissions to Sewer parameters: require the limit is based on mass emission basis as opposed to ELV.
- (vii) Propose reduction of emissions to sewer monitoring from monthly to quarterly. Chromium (VI), total chromium and cyanide to remain on a monthly monitoring bases or preferably reduced to bimonthly.
- (viii) Propose to raise the maximum volumetric flow on each Emission Refs AE2-1, AE2-2, and AE2-3 by 1000 nm<sup>3</sup>. The impact on the environment at the higher flow rates was demonstrated through the AERMOD air dispersion model, and it was shown that there was no adverse impact from the plant on air quality when stack heights modelled are complied with.

**ATTACHMENT I.1*****Item 2 Describe the existing environment in terms of air quality with particular reference to ambient air quality standards***

With respect to **Item 2** of the Request for Further Information, each EU member state manages and assesses its air quality in designated regions called air quality zones. Ireland has four air quality zones, which are defined by population, area and current air quality. Waterford is located within zone C. Zone C is comprised of 15 specified urban areas with populations greater than 15,000. The implications of this assessment are that within zone C, levels of PM<sub>10</sub> must be monitored continuously, levels of SO<sub>2</sub> can be assessed using a combination of measurement and monitoring and levels of CO, NO<sub>2</sub>, benzene and lead can be assessed using modelling or objective estimation techniques.

A study of air quality in Waterford was carried out by the EPA in 2000-2001 at Bolton Street near the city centre. Bolton Street is situated approximately 2.5 km from Waterford Plating Company Ltd. The monitoring site was located in a mixed residential/commercial district of Waterford city. Monitoring was done by a mobile unit containing continuous monitors for sulphur dioxide, nitrogen oxides, carbon monoxide and benzene. Continuous samples were also taken for particulates (PM<sub>10</sub>) and lead. Results were collected from 24<sup>th</sup> August 2000 to the 21<sup>st</sup> February 2001 and compared with the assessment thresholds in the air quality regulations.

The assessment found that concentrations of carbon dioxide, nitrogen dioxide, benzene and lead were below their respective lower assessment thresholds. Levels of sulphur dioxide exceeded the lower assessment threshold but not the upper assessment threshold while concentrations of PM<sub>10</sub> exceeded the upper assessment threshold for this pollutant.

A summary of the results recorded for the ambient air quality survey carried out in Bolton Street is given below. The maximum 8-hour mean for carbon monoxide was 2.6 mg/m<sup>3</sup>, which is in compliance with the limit (10 mg/m<sup>3</sup>). The 99.7-percentile of 1-hour average ground level concentrations of sulphur dioxide (350 µg/m<sup>3</sup>) was not exceeded during the measurement period. The mean hourly nitrogen dioxide value (23.5 µg/m<sup>3</sup>) during the measurement period was below the annual lower threshold for the protection of human health (26 µg/m<sup>3</sup>). The mean hourly value for benzene for the measurement period (0.7 µg/m<sup>3</sup>) is below the lower assessment threshold for the protection of human health (2 µg/m<sup>3</sup>). At 0.01 µg/m<sup>3</sup>, the concentration of lead is below the lower assessment threshold of 0.25 µg/m<sup>3</sup>.

The results from the assessment carried out at Bolton Street determined that the mean daily value for PM<sub>10</sub> was 32.4 µg/m<sup>3</sup>, and the 98-percentile for daily values was 73.4 µg/m<sup>3</sup>. The 24-hour limit value for the protection of human health (50 µg/m<sup>3</sup>)

was exceeded on ten occasions (10% of measured values) during the measurement period.

The survey also includes an assessment of the ambient concentrations of certain volatile organic compounds. The 98-percentile of hourly average ground level concentrations of toluene and ortho-xylene were 36.2  $\mu\text{g}/\text{m}^3$  and 5.2  $\mu\text{g}/\text{m}^3$  respectively.

***Item 3: Provide a statement whether or not emissions of main polluting substances (as defined in the Schedule of S.I. 394 of 2004) to the atmosphere are likely to impair the environment.***

With respect to **Item 3** of the Request for Further Information a comprehensive evaluation of the potential impact of emissions from Waterford Plating Company Ltd. on ambient air quality has been completed. The predictions obtained from this assessment are in compliance with national and EU standards and show that there will be no adverse impact from the plant on air quality.

***Item 4: Give summary details and an assessment of the impacts of any existing or proposed emissions on the environment, including environmental media other than those into which the emissions are made.***

With respect to **Item 4** of the Request for Further Information a comprehensive evaluation of the potential impact of emissions from Waterford Plating Company Ltd. on ambient air quality has been completed. The predictions obtained from this assessment are in compliance with national and EU standards and show that there will be no adverse impact from the plant on air quality.

Below is a synopsis of the main degradation routes of the main compounds found and subsequently modelled in this assessment. The main compounds from the plant and hence modelled in this assessment are suspended particulates, TA Luft II (mainly toluene) and TA Luft III (mainly butyl acetate). Emissions of these compounds are in such low concentrations that they are expected to have no negative impact on the environment.

Particulate matter can stay airborne for minutes or hours depending on wind velocity, topography and other factors. It can be transported distances less than 10km from its source and is generally deposited in local downwind areas. The main degradation route of toluene released to atmosphere from the plant is reaction with photochemically produced hydroxyl radicals. A half life of only one day will mean that degradation close to the facility will be expected. The main degradation routes of butyl acetate released to atmosphere from the plant is reaction with photochemically produced hydroxyl radicals. Butyl acetate is also readily biodegraded in soil. Some of the compound can leach into groundwater, where it is biodegraded.

***Item 5: Provide an air dispersion model of atmospheric emissions from the activity. When carrying out dispersion modelling, regard should be had to the "Guidelines for the Preparation of Dispersion Modelling Assessments for Compliance with Regulatory Requirements – an Update to Royal Meteorological Society Guidance" or similar guidelines from a recognised authority.***

See Bord na Móna Environmental Ltd. Air Dispersion Model Report ECS2980 included under Attachment I.1.

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***AIR QUALITY ASSESSMENT USING  
DISPERSION MODELLING ON BEHALF  
OF WATERFORD PLATING COMPANY  
LTD.***

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**For the Attention of:**

Eddie Roche  
Waterford Plating Ltd.  
Unit 604/605/606  
Northern Industrial Estate  
Waterford

**Prepared by:**

Dr. Lorraine Nolan  
Environmental Consultant

**Reviewed by:**

Mr. Sean Creedon  
Senior Environmental Consultant

**Report No:** ECS2980  
**Date:** September 2008

### *Executive Summary*

Bord na Móna Environmental Technical Services was commissioned by Waterford Plating Company Ltd. to carry out a dispersion modelling assessment to predict ground level concentrations of suspended particulate matter, TA Luft II and TA Luft III compounds to determine the potential impact of these compounds on ambient air quality with reference to relevant air quality standards. Air quality standards are defined in legislation for the purpose of protecting human health, animal health, plants and vegetation and the environment. Compliance with these standards proves that emissions are not having a harmful effect on the environment.

Three scenarios were selected: existing, proposed and sensitivity. The existing scenario is based on inputs proposed in the IPPC licence application P0280-01 review. The proposed scenario optimises the input data with respect to best practise so that the resulting ground level concentrations are in compliance with legislative limits. A sensitivity analysis is carried out in the final scenario. Variations in meteorological data and emission rate data are used to test the models sensitivity to measurement uncertainties. For each scenario, the maximum potential emission rate is used to predict the maximum possible ground level concentrations of substances emitted from the facility under any type of operating condition. It is likely, therefore, that the ground level concentrations of substances modelled in this study are overestimated.

The results of this assessment show that the 98 percentile of 24-hour average ground level concentrations of suspended particulates for the existing scenario is  $165 \mu\text{g}/\text{m}^3$ , which is below the specific limit value set for suspended particulates ( $250 \mu\text{g}/\text{m}^3$ ) as cited in the Irish Air Quality Standards Regulations (S.I. No. 244 of 1987). The predicted value obtained from the proposed scenario is  $63 \mu\text{g}/\text{m}^3$ , which is well below the limit value. The results indicate that implementation of the proposed inputs will result in emissions that have no adverse impact on the air quality in the vicinity of the site.

The result for the predicted concentration of TA Luft II compounds for the existing scenario is 2.3 times higher than the limit of  $100 \mu\text{g}/\text{m}^3$ , which is the Danish C-value for toluene. At  $37.7 \mu\text{g}/\text{m}^3$ , the predicted ground level concentration of TA Luft II compounds from the facility for the proposed scenario is well within the limit and indicates that implementation of the proposed inputs will result in emissions that have no adverse impact on the air quality in the vicinity of the site.

The most stringent criterion for TA Luft III against which ground level concentrations are compared is butyl acetate. The limit for the 99-percentile of 1-hour average ground level concentrations for butyl acetate is  $47 \mu\text{g}/\text{m}^3$ . The predicted result obtained using the existing scenario is  $347 \mu\text{g}/\text{m}^3$ , which is 7.4 times the limit value. Optimisation of the input data means that in the proposed scenarios the 99-percentile of 1-hour ground level concentrations

of TA Luft III compounds (butyl acetate) are  $19.7 \mu\text{g}/\text{m}^3$  and  $29.3 \mu\text{g}/\text{m}^3$  respectively. The results indicate that implementation of the proposed inputs will result in emissions that have no adverse impact on the air quality in the vicinity of the site.

In conclusion, the results of the study demonstrate that there will be no adverse impact on ambient air quality in the vicinity of the plant and that no nuisance will be caused at receptors in the vicinity of the site as a result of emissions from the proposed facility.

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## 1.0 INTRODUCTION

As part of the EPA's Request for Further Information (dated 8<sup>th</sup> August 2008, Reg No: P0280-02) in relation to an application for an Integrated Pollution Prevention and Control Licence under principal class activity 12.3.0 for Waterford Plating Company Ltd. (received by the EPA on the 13<sup>th</sup> June 2008), Bord na Móna Environmental Technical Services was commissioned to carry out an air dispersion model of atmospheric emissions arising from activities at the Waterford Plating Company Ltd. facility. This assessment satisfies Item 5 of the EPA's Request for Further Information, which is detailed below:

*Item 5: Provide an air dispersion model of atmospheric emissions from the activity. When carrying out dispersion modelling, regard should be had to the "Guidelines for the Preparation of Dispersion Modelling Assessments for Compliance with Regulatory Requirements – an Update to Royal Meteorological Society Guidance" or similar guidelines from a recognised authority.*

This report presents the results of an air dispersion modelling assessment that was carried out to predict the impact on local air quality of the proposed emissions from the relocated stacks belonging to the Waterford Plating Company Ltd. facility. The substances chosen for modelling represent the main compounds present in the emissions. A number of scenarios are considered as part of this study and results are compared to the appropriate ambient air guideline limits. In addition, a sensitivity analysis has been carried out to test the sensitivity of the modelling methodology to uncertainties in the predictions.

## **2.0 EMISSIONS FROM WATERFORD PLATING COMPANY LTD.**

Potential emissions from the facility operation include fugitive and process emissions. Fugitive emissions can arise from tank surfaces, the hot air dryer and open booth painting operations. As part of the original licence application, a fugitive emissions study was undertaken to identify fugitive emissions arising from the plating line and dry spray booth at the installation. It was concluded that fugitive emissions at the facility were low and did not impact on the surrounding environment. In addition, the plan to substitute solvent based cleaners with non-solvent based alternatives will further reduce fugitive emissions at Waterford Plating Company Ltd.

The principal source of emissions to atmosphere from Waterford Plating Company Ltd. are from the wet spray booth A2-1, and the two dry powder paint booths A2-2 and A2-3. Emissions include particulate matter, TA Luft II volatile organic compounds (i.e. xylene, toluene, ethylbenzene, 2-methyl-1-methylethyl acetate, and cyclohexane) and TA Luft III volatile organic compounds (i.e. n-butylacetate, dichloromethane, ethyl acetate, 2-butanone, methyl isobutyl ketone and acetone). These compounds have been identified from material safety data sheets supplied by the client and supplemented with client correspondence and previous sampling that was carried out at the existing stacks. These substances are modelled to assess the impact of emissions from the plant on ambient air quality at and beyond the boundary of the site.

## **3.0 DISPERSION MODELLING METHODOLOGY**

### **3.1 Scope of Modelling Study**

The scope of the modelling study encompassed prediction of the impact on ambient air quality of the main emissions from the proposed stacks. This involved computation of predicted incremental contributions to ground level concentrations of substances over defined averaging intervals.

### **3.2 Assessment Criteria**

The criteria against which the predicted impact of plant emissions on ambient air quality was assessed are discussed here. Limits for suspended particulate matter are defined in the Air Quality Standards Regulations 1987 (S.I. 244 of 1987). These Air Quality Standards are based on the European Council Directive 80/779/EEC limit values. Limits are specified for the 98-percentile of the 24-hour average ground level concentrations of suspended particulates.

There are no national or EU limit values for xylene, toluene, ethylbenzene, 2-methyl-1-methylethyl acetate, cyclohexane, n-butylacetate, dichloromethane,

ethyl acetate, 2-butanone and acetone. The results of the predicted VOC emissions are compared to the Danish C-values cited in the Miljøstyrelsen: Guidelines for Air Emission Regulation, *Limitation of Air Pollution from Installations* (1992). These limits specify how much of each substance an installation can legally contribute to the atmosphere. The C-value is the total maximum permissible contribution from a single installation of one pollutant to the surrounding air, i.e. the ground-level concentration. The C-values are mean hourly concentrations not to be exceeded by more than 1% of any defined period of time, i.e. 99-percentile. These values are based on long term exposure.

The available ground-level concentration limits for suspended particulates and the volatile organic compounds are presented in Table 3.2.1.

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<b>TABLE 3.2.1: ASSESSMENT CRITERIA FOR AIR QUALITY IMPACT ASSESSMENT</b>			
<b>Parameter &amp; Standard</b>	<b>Averaging period</b>	<b>Limit Value (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Basis of application of the limit value</b>
<b>Particulate Matter</b> Irish AQS SI No. 244 of 1987 [1] and Council Directive 80/779/EEC	24-hour	250	<b>PROTECTION OF HUMAN HEALTH</b>  98%ile
<b>Toluene</b> Danish C-Value [2]	1-hour	400	Not to be exceeded more than 1% of any defined period (i.e. 99%ile)
WHO [3]	week	260	
<b>Ehylbenzene</b> Danish C-Value [2]	1-hour	500	Not to be exceeded more than 1% of any defined period (i.e. 99%ile)
<b>Xylene</b> Danish C-Value [2]	1-hour	100	Not to be exceeded more than 1% of any defined period (i.e. 99%ile)
<b>Butylacetate</b> Danish C-Value [2]	1-hour	47	Not to be exceeded more than 1% of any defined period (i.e. 99%ile)
<b>Dichloromethane</b> WHO [3]	24-hour	30,000	
<b>Acetone</b> Danish C-Value [2]	1-hour	400	Not to be exceeded more than 1% of any defined period (i.e. 99%ile)

**NOTE**

- [1] Irish Air Quality Standards Regulations, SI No. 244 of 1987
- [2] Miljøstyrelsen: Guidelines for Air Emission Regulation, *Limitation of Air Pollution from Installations* (1992).
- [3] Guidelines for Air Quality, WHO, Geneva, 1999

Based on the above emission limit values a dispersion modelling assessment was carried out to predict the maximum ground level impact on ambient levels of the selected parameters. The following sections outline the projected impact on air quality when using proposed emission limit values for the selected parameters.

## 4.0 DISPERSION MODELLING DESCRIPTION

### 4.1 Model Selection and Description

Dispersion modelling is a technique for calculating concentrations of pollutants that are the result of emissions. Several varying types of models exist depending on the type of application and dispersion equation used. The model chosen for this study was AERMOD.

AERMOD is a new generation air modelling system used to support regulatory and non-regulatory modelling requirements worldwide. The application is used to assess the impact of air emissions from industrial sources, and can predict pollutant concentrations from point, line, area, volume, and flare sources with variable emissions in all terrain regimes. AERMOD simulates essential atmospheric physical processes and provides refined concentration estimates over a wide range of meteorological conditions and modelling scenarios. The state-of-the-science dispersion modelling system includes:

- An advanced meteorological pre-processor to compute site-specific planetary boundary layer (PBL) parameters;
- Highly developed dispersion formulations that incorporate current PBL understanding and variables for both convective and stable boundary inversions;
- Enhanced treatment of plume rise and plume penetration for elevated inversions allowing for effects of strong updrafts and downdrafts that occur in unstable conditions;
- Improved computation of vertical profiles of wind, turbulence, and temperature;
- Sustained treatment of receptors in terrain ranging from flat to complex;
- Inhomogeneity of the atmosphere by calculating dispersion as a function of height; and
- A "dividing streamline" approach for computations in complex terrain.

The AERMOD Model accepts hourly meteorological data records to define the conditions for plume rise, transport, diffusion, and deposition. Depending on the location of the facility the appropriate meteorological data is chosen. The model also takes into account the local terrain surrounding the facility using the AERMET meteorological pre-processing facility. The AERMOD model estimates the concentration or deposition value for each source and receptor combination for each hour of input meteorology, and calculates user-selected short term averages. In addition, since most air quality standards are stipulated as averages or percentiles the AERMOD model allows further analysis of the results for comparison with these standards.

## 4.2 Terrain Description

AERMOD can be considered an "all terrain" model. It applies to all terrain situations, including flat terrain applications, as well as terrain above stack base (elevated terrain) and terrain above stack height (complex terrain). However, there is no distinction made in AERMOD between elevated simple terrain and complex terrain, as in the ISCST3 model. Instead, the AERMOD terrain algorithm provides a continuous treatment of terrain influences across the stack height demarcation. As a result, there is no need for intermediate terrain processing as performed in the ISCST3 model.

The layout and area of the site and the dimensions of the various plant items on site were taken from drawings provided by Waterford Plating Company Ltd. Topographical information was obtained from digitised Ordnance Survey Ireland data. Local terrain height data obtained from digitised OSI data were used as input data to ensure that terrain effects were evaluated in the Model. For the purpose of this modelling assessment flat terrain data was used.

Building downwash effects might be expected as a result of the proximity of on-site buildings to the stacks. These effects were modelled using the modelling facility, BPIP, which is part of the AERMOD software package.

## 4.3 Sources

The principal source of emissions to atmosphere at Waterford Plating Company Ltd. are from the wet spray booth A2-1, and the two dry powder paint booths A2-2 and A2-3. These emission points can be considered as point sources.

A point source is a source that releases effluent pollutants from a limited opening, such as a stack or vent. The AERMOD model uses a steady-state Gaussian plume algorithm for a point source.

## 4.4 Receptor Locations

The facility is situated in an industrial estate with some housing located east of the site. Since the impact of emissions is expected to be observed at close distances from the emission source, a fine grid, 1km by 1km centred on the emission sources, the stacks, was constructed with receptors located at 50m intervals.

### 4.5 Meteorological Data

The magnitude of potential impacts of emissions from the facility will be substantially influenced by the local meteorological conditions, in particular by wind speed and direction and also by precipitation rates. There is no continuous meteorological monitoring station located uniquely close to the site of the proposed development. However, comprehensive monitoring data is available from Rosslare station, which is located approximately 70 km east of the site. The meteorological data for four years, from 2002 to 2005, for Rosslare Station was used in the dispersion modelling assessment. A graphical depiction of the frequency of wind speed and wind direction for 2002-2005 is presented in Figure 4.5.1 below.

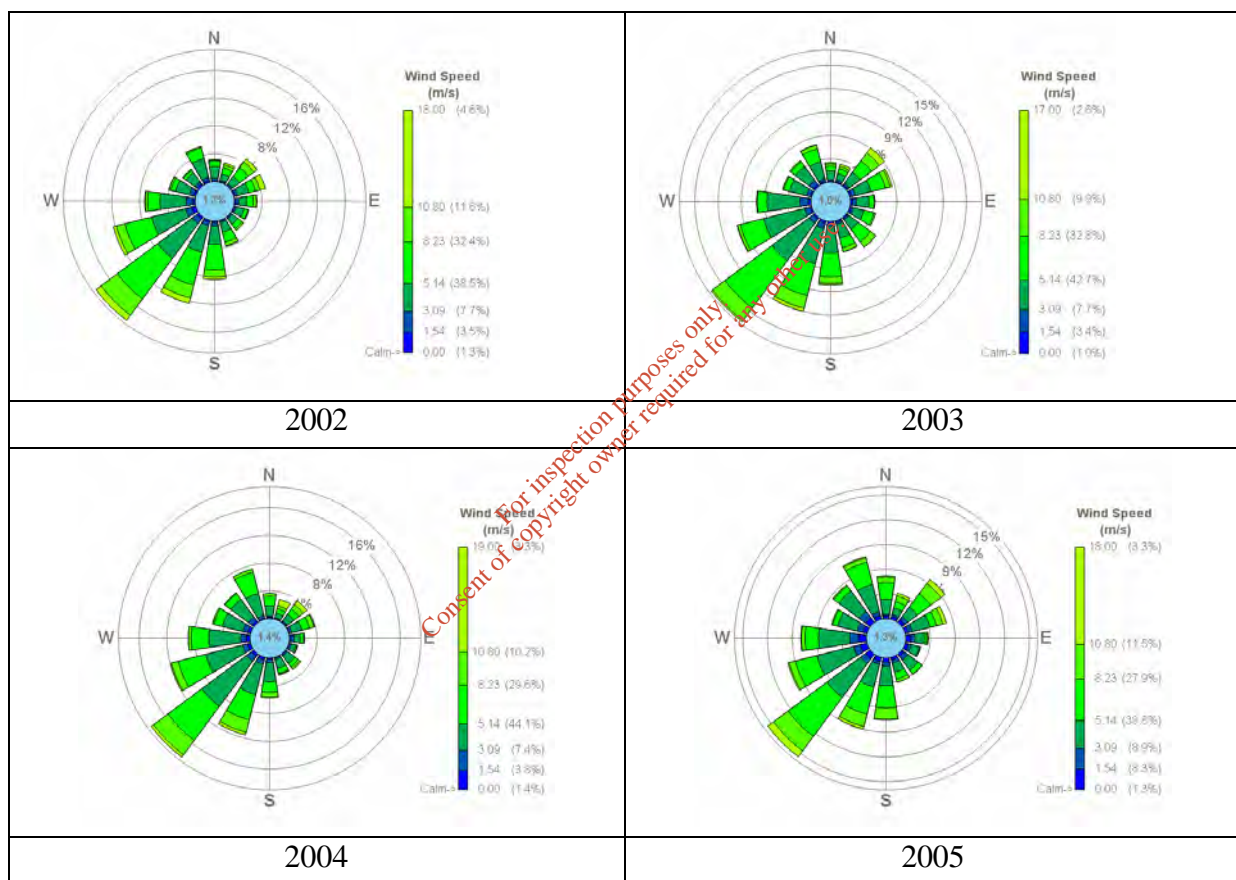


Figure 4.5.1 Windroses for Rosslare Meteorological Station 2002-2005



## 5.0 DISPERSION MODELLING ASSESSMENT

### 5.1 Introduction

A detailed modelling assessment of the proposed emission limit values was carried out to assess the impact on the surrounding locality. A number of scenarios were considered which are summarized below:

- ***Scenario No. 1 : Existing***

This modelling scenario uses input data proposed for the purposes of the IPPC Licence P0280-01 review. A summary of these inputs are given in Tables 5.2.1 to 5.2.3.

- ***Scenario No. 2 : Proposed***

This modelling scenario uses optimum input parameters consistent with good practice so that predicted ground level concentrations are within legal limits. A summary of these inputs are given in Tables 5.2.4 to 5.2.7.

- ***Scenario No. 3 : Sensitivity Analysis***

This modelling scenario tests the sensitivity of the modelling methodology to variations in input data. A summary of these inputs is given in Table 5.2.8.

## 5.2 Source Input Data

Tables 5.2.1 and 5.2.3 detail the input data used to model Scenario no. 1: Existing

**TABLE 5.2.1 INPUT DATA FOR SUSPENDED PARTICULATES – SCENARIO NO. 1**

Source	Co-ordinates	Base Elevation (m)	Mass Emission Rate (g/s) [1]	Mass Concentration (mg/Nm <sup>3</sup> ) [2]	Stack Height (m)	Stack Temperature (K)	Stack Velocity (m/s)	Stack Diameter (m)	Operating Hours [3]
A2-2	(258332,111843)	0	0.045	20	4.28	295.45	8.67	0.6	24 hrs/7days
A2-3	(258317,111841)	0	0.063	20	5.18	295.15	11.96	0.6	24 hrs/7days

**TABLE 5.2.2 INPUT DATA FOR TA Luft II – SCENARIO NO. 1**

Source	Co-ordinates	Base Elevation (m)	Mass Emission Rate (g/s) [1]	Mass Concentration (mg/Nm <sup>3</sup> ) [2]	Stack Height (m)	Stack Temperature (K)	Stack Velocity (m/s)	Stack Diameter (m)	Operating Hours [3]
A2-1	(258319,111869)	0	0.184	100	6.00	294.35	15.81	0.4	24 hrs/7days

**TABLE 5.2.3 INPUT DATA FOR TA Luft III – SCENARIO NO. 1**

Source	Co-ordinates	Base Elevation (m)	Mass Emission Rate (g/s) [1]	Mass Concentration (mg/Nm <sup>3</sup> ) [2]	Stack Height (m)	Stack Temperature (K)	Stack Velocity (m/s)	Stack Diameter (m)	Operating Hours [3]
A2-1	(258319,111869)	0	0.277	150	6.00	294.35	15.81	0.4	24 hrs/7days

An explanation of the notes is given at the end of this Section of the report

Tables 5.2.4 and 5.2.7 detail the input data used to model Scenario no. 2: Proposed

**TABLE 5.2.4 INPUT DATA FOR SUSPENDED PARTICULATES – SCENARIO NO. 2**

Source	Co-ordinates	Base Elevation (m)	Mass Emission Rate (g/s) [1]	Mass Concentration (mg/Nm <sup>3</sup> ) [2]	Stack Height (m)	Stack Temperature (K)	Stack Velocity (m/s)	Stack Diameter (m)	Operating Hours [3]
A2-2	(258317,111875)	0	0.045	20	4.28	295.45	8.67	0.6	24 hrs/7days
A2-3	(258316,111878)	0	0.063	20	5.18	295.15	11.96	0.6	24 hrs/7days

**TABLE 5.2.5 INPUT DATA FOR TA Luft II – SCENARIO NO. 2**

Source	Co-ordinates	Base Elevation (m)	Mass Emission Rate (g/s) [1]	Mass Concentration (mg/Nm <sup>3</sup> ) [2]	Stack Height (m)	Stack Temperature (K)	Stack Velocity (m/s)	Stack Diameter (m)	Operating Hours [3]
A2-1	(258319,111869)	0	0.184	100	9	294.35	15.81	0.4	24 hrs/7days

**TABLE 5.2.6 INPUT DATA FOR TA Luft III– SCENARIO NO. 2a**

Source	Co-ordinates	Base Elevation (m)	Mass Emission Rate (g/s) [1]	Mass Concentration (mg/Nm <sup>3</sup> ) [4]	Stack Height (m)	Stack Temperature (K)	Stack Velocity (m/s)	Stack Diameter (m)	Operating Hours [3]
A2-1	(258319,111869)	0	0.096	52.1	9	294.35	15.81	0.4	24 hrs/7days

**TABLE 5.2.7 INPUT DATA FOR TA Luft III– SCENARIO NO. 2b**

Source	Co-ordinates	Base Elevation (m)	Mass Emission Rate (g/s) [1]	Mass Concentration (mg/Nm <sup>3</sup> ) [5]	Stack Height (m)	Stack Temperature (K)	Stack Velocity (m/s)	Stack Diameter (m)	Operating Hours [3]
A2-1	(258319,111869)	0	0.143	77.68	9	294.35	15.81	0.4	24 hrs/7days

An explanation of the notes is given at the end of this Section of the report

**Note:**

[1] Calculations for the mass emission rate values (g/s) are based on volumetric flow rates ( $\text{Nm}^3/\text{hr}$ ) determined during a monitoring survey at stacks A2-1, A2-2 and A2-3 (dated 4<sup>th</sup> September 2007). Normalised results are referenced to 273.15K and 101.3kPa. All volumetric flow rates have been incremented by 1000  $\text{Nm}^3/\text{hr}$  and used in the calculation for mass emission rates (g/s). These values are considered to be the maximum mass emission rates possible and are used to estimate the predicted impact to ensure that predictions are conservative.

[2] Mass concentration is taken from the IPPC Licence Application. The concentration is an upper limit and thus the corresponding mass emission rate is considered to be overestimated. It is used to estimate the predicted impact to ensure that the predictions are conservative.

[3] Continuous operating hours as an upper limit are considered to result in overestimation. It is used to estimate the predicted impact to ensure that the predictions are conservative.

[4] The mass concentration is taken from the results of TA Luft III levels carried out during the monitoring survey for stack A2-1 (dated 4<sup>th</sup> September 2007). The most abundant TA Luft III compound found in this survey was butyl acetate with a concentration of 52.1  $\text{mg}/\text{Nm}^3$ . In addition, of all the TA Luft III compounds found and expected to be found in the emission stream of this stack, butyl acetate has the most stringent Danish C-value limit. The mass concentration for butyl acetate is thus used in the model and the resulting concentration that is predicted is compared with the Danish C-value for butyl acetate.

[5] Butyl acetate represents 51.79% of all TA Luft III emissions found in the assessment carried out on stack A2-1 (dated 4<sup>th</sup> September 2007). Given that the total maximum mass concentration stipulated in the IPPC Licence application for TA Luft III compounds is 150  $\text{mg}/\text{Nm}^3$ , it can be determined that butyl acetate may be allowed to reach 77.68  $\text{mg}/\text{Nm}^3$  i.e. 51.79% of 150  $\text{mg}/\text{Nm}^3$ .

Tables 5.2.8 details the input data used to model Scenario no. 3: Sensitivity Analysis.

<b>TABLE 5.2.7 INPUT DATA FOR SCENARIO NO. 3</b>		
Source	All other input data	Input data used to test sensitivity of model
A2-1	See Table 5.2.6	Rosslare Met data 2002
A2-1	See Table 5.2.6	Rosslare Met data 2003
A2-1	See Table 5.2.6	Rosslare Met data 2004
A2-1	See Table 5.2.6	Rosslare Met data 2005
A2-1	See Table 5.2.6	Emission Rate

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## 6.0 DISPERSION MODELLING RESULTS

The results for the maximum predicted incremental additions to ground level concentrations of various substances emitted to atmosphere from the proposed stacks A2-1, A2-2 and A2-3 are presented in Table 6.1.1. The relevant Air Quality Standards are given to allow comparison with the predicted results.

<b>TABLE 6.1.1 DISPERSION MODELLING RESULTS</b>			
<b>Parameter and averaging period</b>	<b>Limit Value (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Predicted GLCs for various emission scenarios</b>	
		<b>Scenario No. 1 Existing (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Scenario No. 2 Proposed (<math>\mu\text{g}/\text{m}^3</math>)</b>
<b>Suspended Particulates</b>  <u>Irish AQS SI No. 244 of 1987 [1]</u> <u>Council Directive 90/779/EEC</u>  98 percentile of 24-hour average	250	165	63
<b>TA Luft II</b>  <u>Danish C Value [2]</u>  99-percentile of 1-hour average	100 [3]	231	37.7
<b>TA Luft III</b>  <u>Danish C Value [2]</u>  99-percentile of 1-hour average	47 [4]	347	19.7 [5] 29.3 [6]

### Note

[1] Irish Air Quality Standard Regulations, SI No. 244 of 1987

[2] Miljøstyrelsen: Guidelines for Air Emission Regulation, *Limitation of Air Pollution from Installations* (1992).

[3] The Danish C-value for toluene. This is the most stringent limit for TA Luft II compounds which are potentially present in the emissions from this facility

[4] The Danish C-value for butyl acetate. This is the most stringent limit for TA Luft III compounds which are potentially present in the emissions from this facility

[5] The ground level concentration obtained when an emission rate of 0.096 g/s is applied

[6] The ground level concentration obtained when an emission rate of 0.143 g/s is applied

The results of the sensitivity analysis test are presented in Table 6.1.2. The model is run using different Meteorological Data and emission rates to quantify model sensitivity.

<b>TABLE 6.1.2 SENSITIVITY ANALYSIS</b>			
<b>Parameter and averaging period</b>	<b>Limit Value (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Input Parameter to Test Sensitivity of Model</b>	<b>Scenario No. 3 Predicted GLCs (<math>\mu\text{g}/\text{m}^3</math>)</b>
<p><b>TA Luft III</b></p> <p><u>Danish C Value [1]</u></p> <p>99-percentile of 1-hour average</p>	47 [2]	<p>Rosslare Met Data 2002</p> <p>Rosslare Met Data 2003</p> <p>Rosslare Met Data 2004</p> <p>Rosslare Met Data 2005</p>	<p>19.65</p> <p>19.51</p> <p>19.45</p> <p>18.30</p>
		<p>Emission Rate 1 = 0.096 g/s</p> <p>Emission Rate 2 = 0.048 g/s</p>	<p>19.65</p> <p>9.83</p>

#### Note

[1] Miljøstyrelsen: Guidelines for Air Emission Regulation, *Limitation of Air Pollution from Installations* (1992).

[2] The Danish C-value for butyl acetate. This is the most stringent limit for TA Luft III compounds which are potentially present in the emissions from this facility

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## 7.0 ISOPLETHS

This section contains the graphical representations of pollutant distributions in the vicinity of the plant. For clarity, a list of these isopleths is provided below.

**Figure 7.1.1:** Isopleth showing 98-percentile of 24-hour average GLCs of suspended particulates emitted from the facility (Scenario No. 1: Existing)

**Figure 7.2.1:** Isopleth showing 99-percentile of 1-hour average GLCs of TA Luft II emitted from the facility (Scenario No. 1: Existing)

**Figure 7.3.1:** Isopleth showing 99-percentile of 1-hour average GLCs of TA Luft III emitted from the facility (Scenario No. 1: Existing)

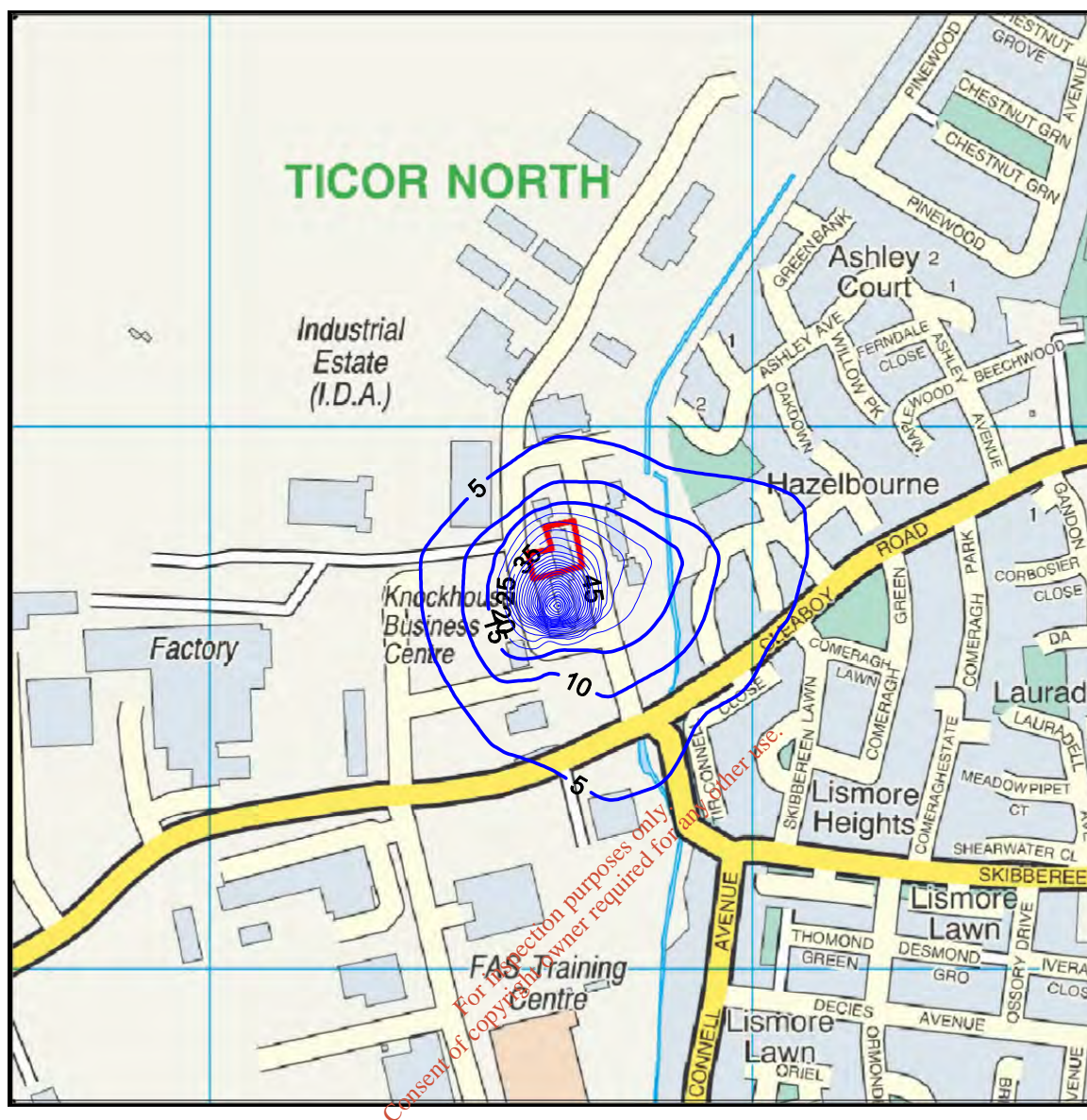
**Figure 7.4.1:** Isopleth showing 98-percentile of 24-hour average GLCs of suspended particulates emitted from the facility (Scenario No. 2: Proposed)

**Figure 7.5.1:** Isopleth showing 99-percentile of 1-hour average GLCs of TA Luft II emitted from the facility (Scenario No. 2: Proposed)

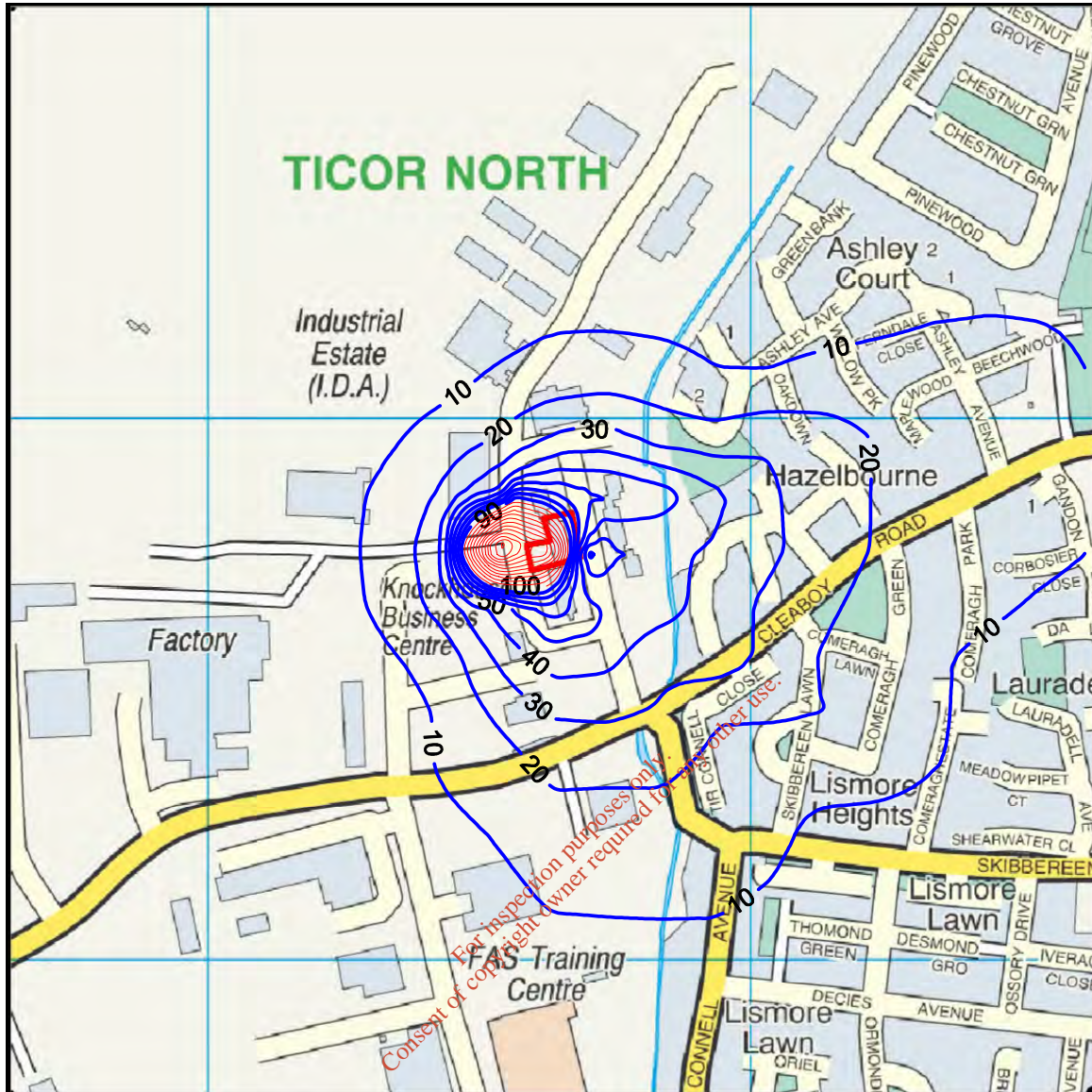
**Figure 7.6.1:** Isopleth showing 99-percentile of 1-hour average GLCs of TA Luft III emitted from the facility (Scenario No. 2: Proposed; mass concentration of 52.1 mg/Nm<sup>3</sup> applied)

**Figure 7.7.1:** Isopleth showing 99-percentile of 1-hour average GLCs of TA Luft III emitted from the facility (Scenario No. 2: Proposed; mass concentration of 77.68 mg/Nm<sup>3</sup> applied)

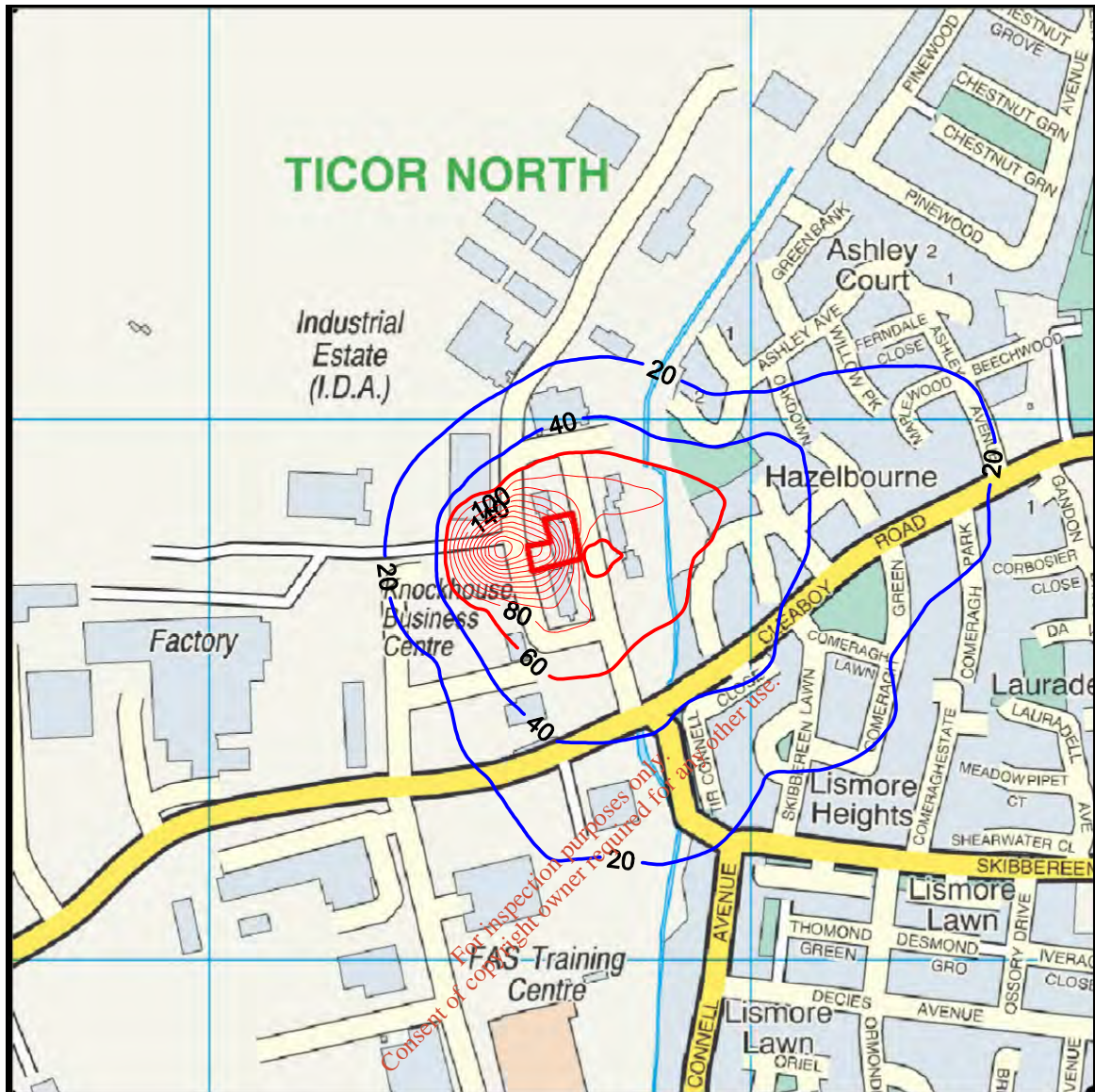




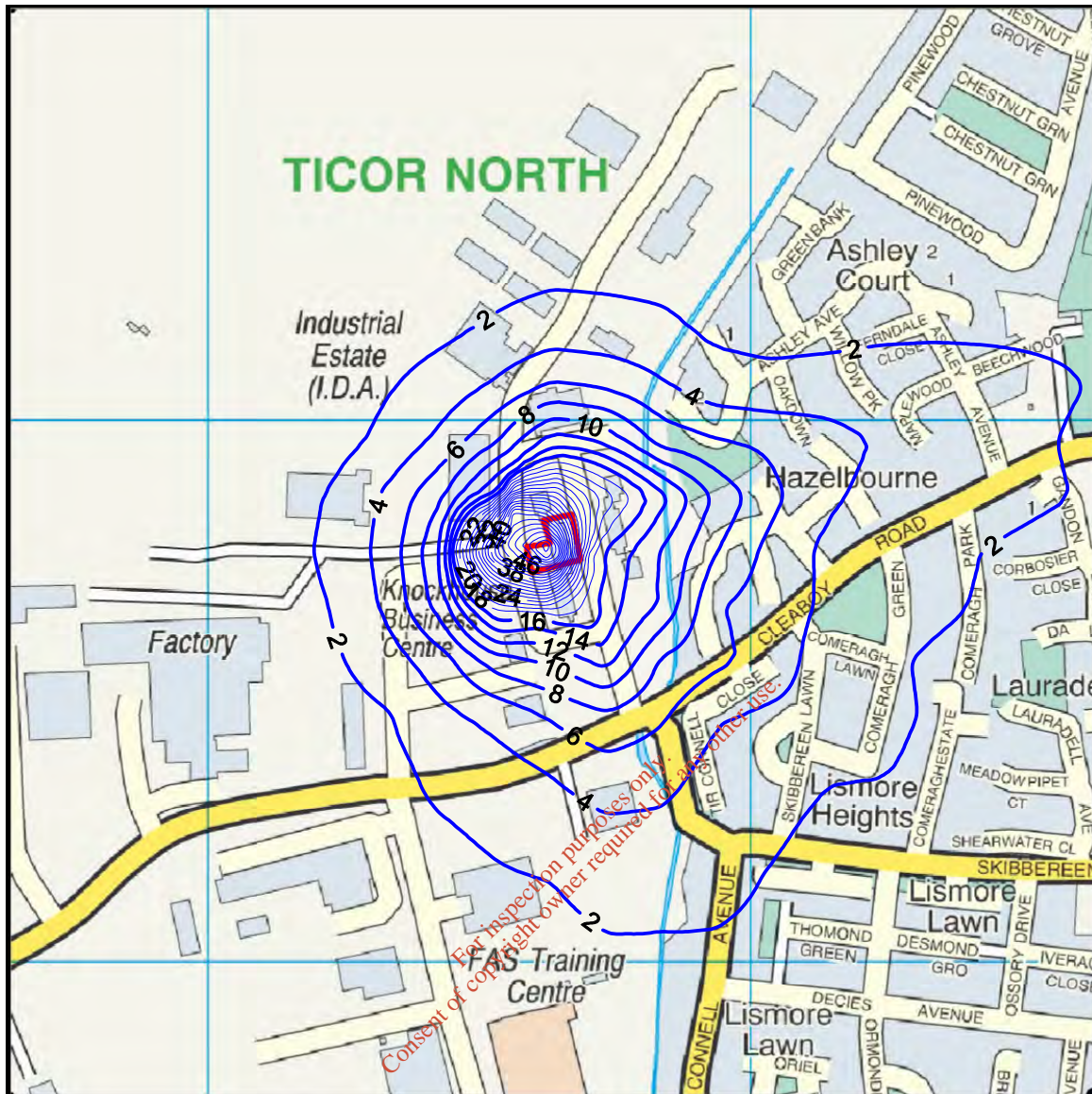
**Figure 7.1.1:** Isopleth showing 98-percentile of 24-hour average GLCs of suspended particulates emitted from the facility (Scenario No. 1: Existing)  
Concentration is given in  $\mu\text{g}/\text{m}^3$



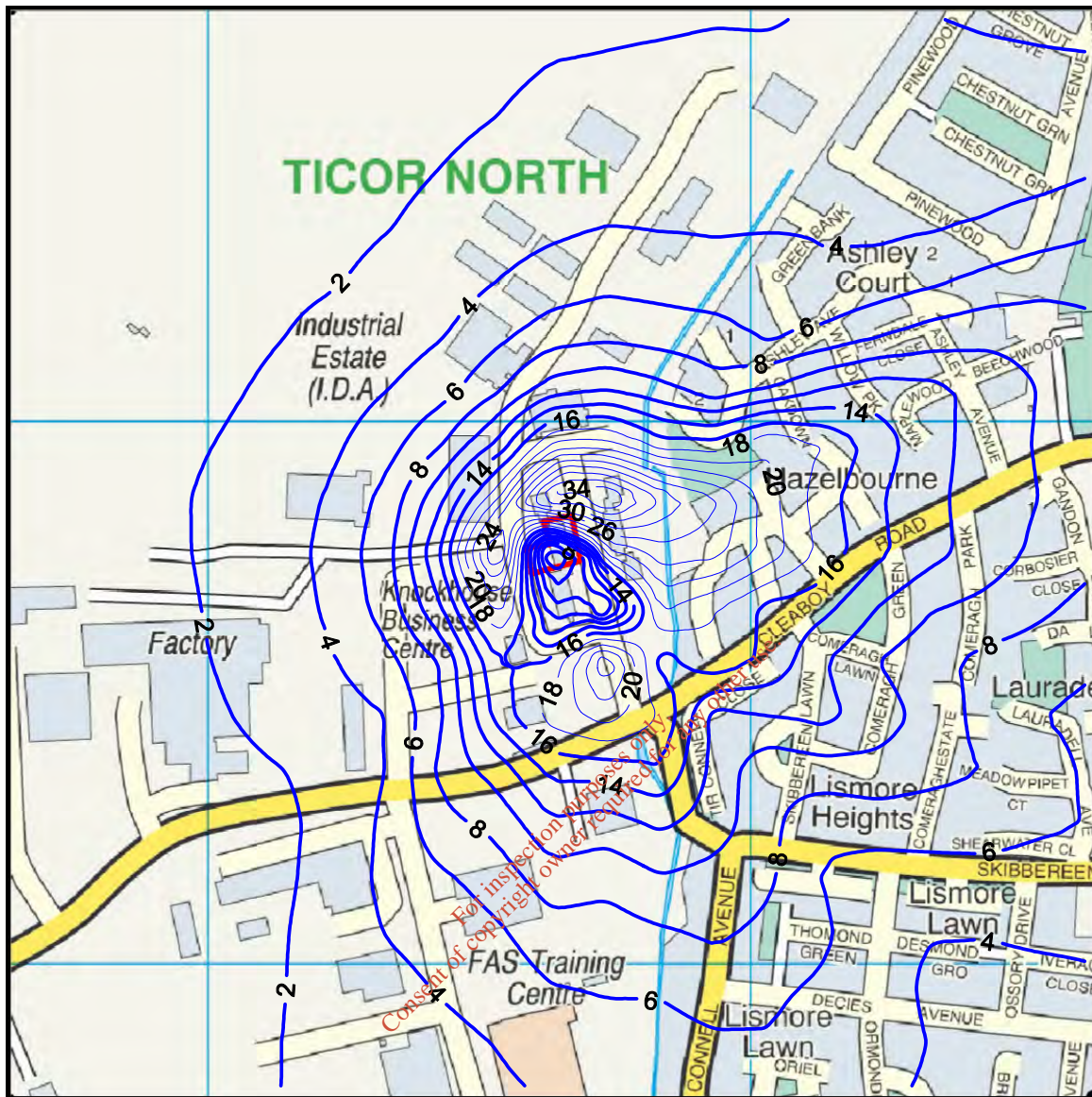
**Figure 7.2.1:** Isopleth showing 99-percentile of 1-hour average GLCs of TA Luft II emitted from the facility (Scenario No. 1: Existing)  
 Concentration is given in  $\mu\text{g}/\text{m}^3$



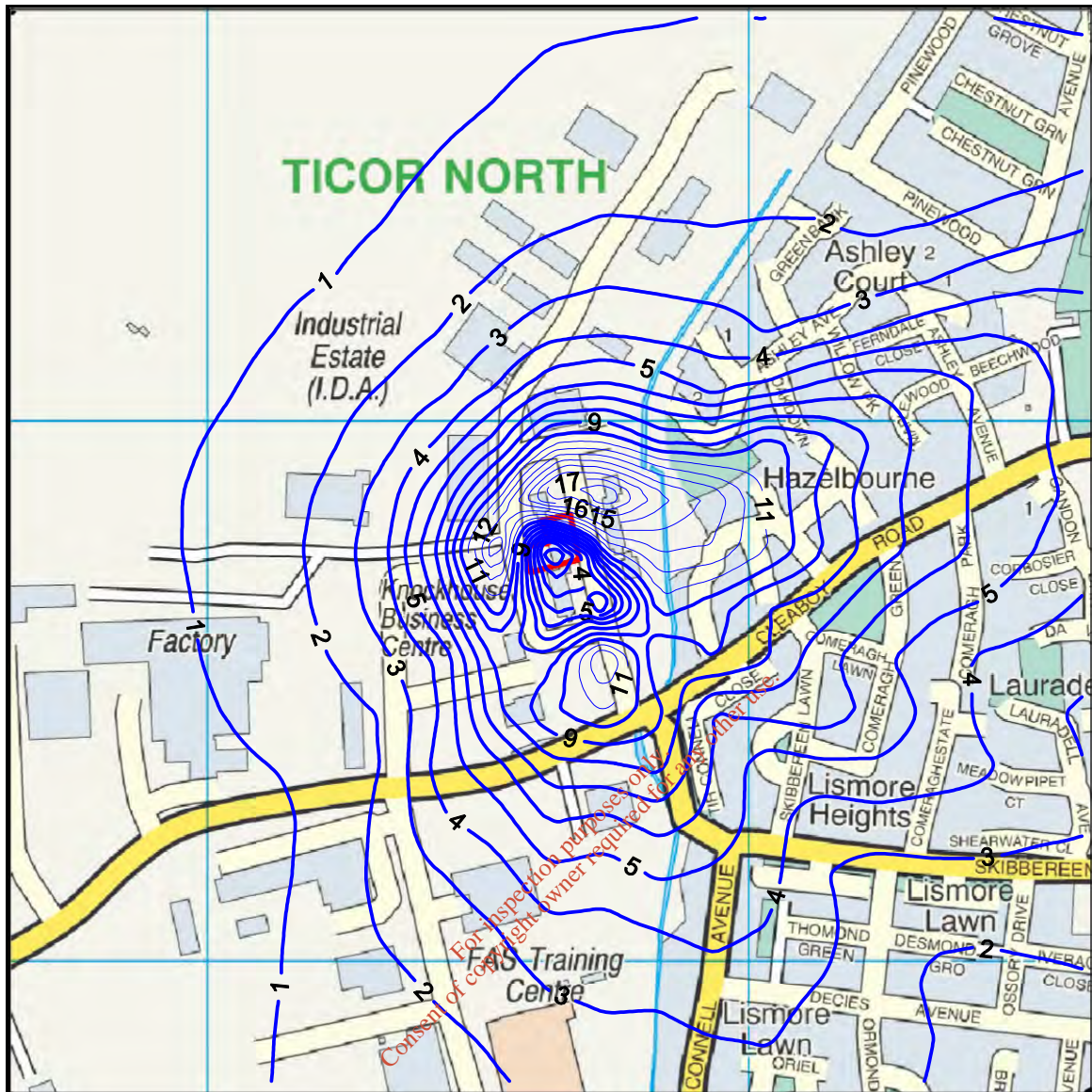
**Figure 7.3.1:** Isopleth showing 99-percentile of 1-hour average GLCs of TA Luft III emitted from the facility (Scenario No. 1: Existing)  
Concentration is given in  $\mu\text{g}/\text{m}^3$



**Figure 7.4.1:** Isopleth showing 98-percentile of 24-hour average GLCs of suspended particulates emitted from the facility (Scenario No. 2: Proposed)  
 Concentration is given in  $\mu\text{g}/\text{m}^3$

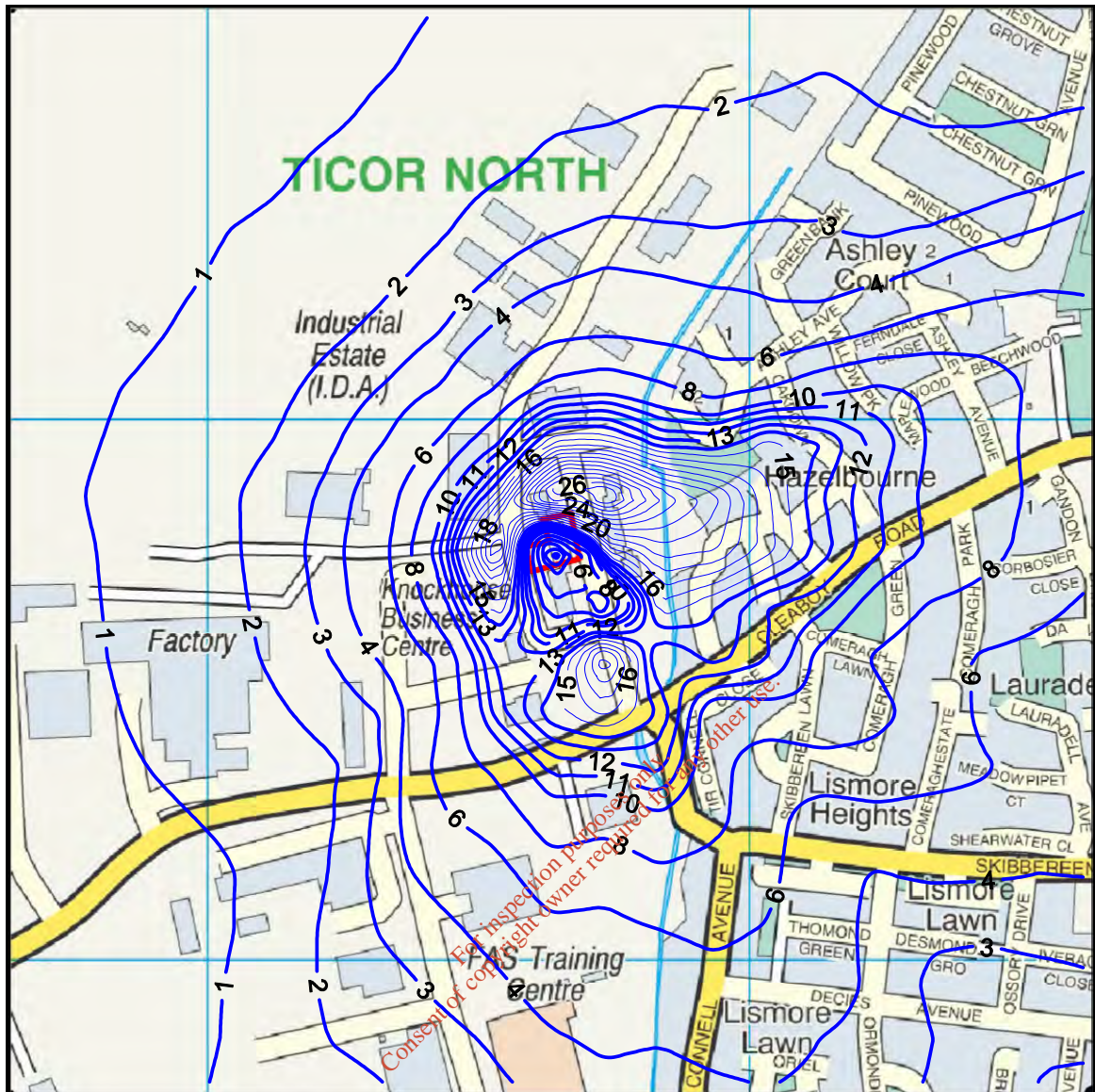


**Figure 7.5.1:** Isopleth showing 99-percentile of 1-hour average GLCs of TA Luft II emitted from the facility (Scenario No. 2: Proposed)  
 Concentration is given in  $\mu\text{g}/\text{m}^3$



**Figure 7.6.1:** Isopleth showing 99-percentile of 1-hour average GLCs of TA Luft III emitted from the facility (Scenario No. 2: Proposed; mass concentration of 52.1 mg/Nm<sup>3</sup> applied)

Concentration is given in µg/m<sup>3</sup>



**Figure 7.7.1:** Isopleth showing 99-percentile of 1-hour average GLCs of TA Luft III emitted from the facility (Scenario No. 2: Proposed; mass concentration of 77.68 mg/Nm<sup>3</sup> applied)  
Concentration is given in µg/m<sup>3</sup>

## 8.0 DISCUSSION

Following a request for further information by the Agency (dated 8<sup>th</sup> August 2008, Reg No: P0280-02), this report presents the results of an air dispersion modelling assessment that was carried out on behalf of Waterford Plating Company Ltd. As part of the expansion plan for the facility the paint plant and corresponding stacks will be relocated and a third spray booth and stack will be included. The dispersion model is used to predict ground level concentrations of potential emissions to atmosphere from the relocated spraybooth stacks A2-1, A2-2 and the third stack A2-3 to ensure compliance with relevant legislative limits.

Three scenarios were investigated. Scenario no. 1 is the existing configuration of stacks. This modelling scenario contains input data that was proposed for the purposes of the IPPC Licence P0280-01 review. Scenario no. 2 is the proposed configuration of stacks. Stack characteristics are optimised with respect to best practices so that ground level concentrations of substances emitted from the stacks comply with the relevant Air Quality Standards. A sensitivity analysis is carried out in scenario no. 3. Variations in meteorological data and emission rate data are used to test the model's sensitivity to measurement uncertainties.

The input data used in scenario no. 1 (existing) is summarised in Tables 5.2.1 to 5.2.3. The input data used in scenario no. 2 (proposed) is summarised in Tables 5.2.4 to 5.2.7. The substances that were modelled in both scenarios include particulate matter, TA Luft II volatile organic compounds and TA Luft III volatile organic compounds. These substances were chosen for assessment as they represent the main substances present in the emissions at the Waterford Plating Company Ltd. facility. The emission rates used were derived from measurements taken at the existing stacks. For each stack, the volumetric flow values were increased and used in the emission rate calculations so that the maximum potential emissions from each stack were obtained. The emission rate calculations are based on combining the maximum emission concentrations with the revised volumetric discharge. In addition to the emission rate parameter, the operational time of the stacks was assumed to be continuous to ensure that the resulting ground level concentrations of the emissions produced could be considered to present a worst-case scenario.

The mass concentrations used are based on the TA Luft values for dust, TA Luft II and TA Luft III compounds. Although these levels are unlikely to be routinely attained, they have been chosen for use in the dispersion model to represent a worst-case emissions scenario, thereby determining the maximum potential impact of plant emissions on ground level concentrations of various substances in the vicinity of the plant.



The main difference that exists between scenario no. 1 (existing) and scenario no. 2 (proposed) are the heights of stacks A2-1, A2-2 and A2-3. The stack heights used in scenario no. 1 (existing) are based on the heights of the existing stacks. In order to more effectively disperse the emissions, it was necessary to increase the heights of the stacks.

The following section compares the results of the ground level concentrations of each parameter modelled in scenario no. 1 (existing) to scenario no. 2 (proposed).

### **Suspended Particulate Matter**

The modelling results for airborne particulate matter for both the existing and proposed scenarios are presented in Table 6.1.1. Isopleths showing the concentrations of suspended particulates in the vicinity of the site are presented in Figures 7.1.1 and 7.4.1. The results are compared with the 98 percentile of 24-hour average ground level concentrations of suspended particulates, as defined in S.I. No. 244 of 1987. At  $165 \mu\text{g}/\text{m}^3$ , the value obtained from scenario no. 1 (existing) complies with the limit value of  $250 \mu\text{g}/\text{m}^3$ . The predicted value obtained from scenario no. 2 (proposed) is  $63 \mu\text{g}/\text{m}^3$ , which is below the limit value. Implementing the inputs used in the modelling runs it is envisaged that there will be no adverse impacts on air quality in the vicinity of the site as a result of suspended particulate emissions. In addition, no breach in Irish or European Air Quality Standards will occur.

### **TA Luft II**

TA Luft II compounds found in the emission stream of A2-1 are based both on MSDS sheets provided by the client and measurements taken from the existing stack. These include xylene, toluene, ethylbenzene, 2-methyl-1-methylethyl acetate, and cyclohexane. The modelling results for TA Luft II concentrations for both the existing and predicted scenarios are presented in Table 6.1.1. Isopleths showing the concentrations of TA Luft II in the vicinity of the site are presented in Figures 7.2.1 and 7.5.1. There are no national or EU limit values for these compounds so results are compared with Danish C-values. The most stringent criterion for TA Luft against which ground level concentrations are compared is toluene. The limit for the 99-percentile of 1-hour average ground level concentrations for toluene is  $100 \mu\text{g}/\text{m}^3$ . The result for the predicted concentration of TA Luft II compounds for the scenario no. 1 (existing) is 2.3 times higher than the specific limit for toluene. This indicates that the existing scenario may result in significant ground level impacts. At  $37.7 \mu\text{g}/\text{m}^3$  for scenario no. 2 (proposed), the predicted ground level concentration of TA Luft II compounds from the facility is well within the limit and indicates that implementation of the proposed inputs will result in emissions that have no adverse impact on the air quality in the vicinity of the site.

### TA Luft III

TA Luft III compounds found in the emission stream of A2-1 are based both on MSDS sheets provided by the client and measurements taken from the existing stack. These include n-butylacetate, dichloromethane, ethyl acetate, 2-butanone, methyl isobutyl ketone and acetone. The modelling results for TA Luft III concentrations for both the existing and predicted scenarios are presented in Table 6.1.1. Isoleths showing the concentrations of TA Luft III in the vicinity of the site are presented in Figures 7.3.1 and 7.6.1 and 7.7.1.

There are no national or EU limit values for these compounds so results are compared with Danish C-values. The most stringent criterion for TA Luft III against which ground level concentrations are compared is butyl acetate. The limit for the 99-percentile of 1-hour average ground level concentrations for butyl acetate is  $47 \mu\text{g}/\text{m}^3$ . The predicted result obtained using the scenario no. 1 (existing) is  $347 \mu\text{g}/\text{m}^3$ . This predicted ground level impact significantly exceeds the specific ambient air quality limit value for butyl acetate. However, it should be noted that this is a significant overestimation of the specific impact of this compound based on the assumption that the composition of the TA Luft III emission stream is 100% butyl acetate.

Stack emission measurements indicate that, at 51.8%, the concentration of butyl acetate in the emission stream from the existing stack A2-1 is significantly higher than all the other TA Luft III compounds found. At 3.6%, 0.5% and 3.3% respectively, the contribution of acetone, isopropanol and 1-methoxy-2-propanol are much lower than butyl acetate. The compound which is found in most abundance after butyl acetate is methyl isobutyl ketone. However the contribution of this compound to the emission stream is approximately half that of butyl acetate. In addition, there is no defined limit for the ground level concentration for methyl isobutyl ketone. In addition, since the processes and raw materials used at spraybooth associated with the proposed stack A2-1 are to remain consistent with the existing situation, it can be considered unlikely that the ratio and composition of TA Luft III compounds will alter considerably. Therefore, the emission rates used in the proposed scenarios for TA Luft III are based on mass concentration values for butyl acetate calculated from measurements made at the existing stack.

Two proposed modelling scenarios were carried out to assess the ground level concentrations of TA Luft III compounds (butyl acetate) in the vicinity of the company. In the first proposed scenario, the emission rate used was calculated using a mass concentration value of  $52.1 \text{ mg}/\text{Nm}^3$ . This mass concentration was determined from measurements made of butyl acetate on the existing stack A2-1. The predicted 99-percentile of 1-hour ground level concentrations of TA Luft III compounds (butyl

acetate) arising from this scenario was  $19.7 \mu\text{g}/\text{m}^3$ . This value is well within the Danish C-value for butyl acetate. In the second proposed scenario the emission rate used was calculated using a mass concentration value of  $77.68 \text{ mg}/\text{Nm}^3$ . This figure is based on the assumption that the percentage contribution of butyl acetate to the overall emission remains constant. Applying a worst case scenario where the TA Luft III emission levels are at the maximum allowable levels of  $150 \text{ mg}/\text{Nm}^3$  and using the percentage composition of 51.7% results in an overall concentration of  $77.68 \text{ mg}/\text{Nm}^3$  as the worst case emission level. In this assessment, the 99-percentile of 1-hour ground level concentrations of TA Luft III compounds (butyl acetate) was  $29.3 \mu\text{g}/\text{m}^3$ , which is well within the specified criteria. This study shows that implementation of the proposed inputs will result in emissions that do not have a significant impact on the ambient air quality in the vicinity of the site.

### Sensitivity Analysis

In addition to modelling the existing and proposed scenarios for the facility, two additional scenarios were examined to evaluate the sensitivity of the model to varying input data. Table 6.1.2 presents the results of scenario no. 3 (sensitivity analysis). A set of runs were conducted to test the effect of varying the meteorological data on the results. Four separate runs were carried out using meteorological data for Rosslare Station for the years 2002, 2003, 2004 and 2005. Analysis of the data show no discernable difference between each of the results obtained. The standard deviation is low at 0.54. This indicates that the variation of the set of results obtained is low and hence the variation in meteorological data does not have a significant impact on ground level predictions.

A model run was also executed to evaluate the effect of halving the emission rate. The outcome of halving the emission rate result is halving the predicted ground level concentration. The results show that there is no significant difference between the predicted and expected results derived from the two data sets and again indicates that the modelling predictions are consistent.

### Conclusions

To satisfy the request for Further Information a comprehensive evaluation of the potential impact of emissions from Waterford Plating Company Ltd. on ambient air quality has been completed. The predictions obtained from this assessment are in compliance with national and EU standards and show that there will be no adverse impact from the plant on air quality.

## I.8 ENVIRONMENTAL CONSIDERATIONS AND BAT

### I.8.1

Waterford Plating Company Ltd is committed to protecting the environment. BAT and BREF documents call for responsible environmental management of facilities. The installation implements BAT where possible. Environmental Management Programmes are implemented to meet BAT requirements and include:

- Environmental Policy
- Housekeeping/maintenance in place to minimise specific environmental risks
- Minimising environmental impacts where a process is re-evaluated whilst ensuring product quality between the customer and operator
- Optimise surface treatment process
- Analysis of vat solutions to ensure chemical usage is kept to a minimum
- Rinsing regimes are continuously assessed
- Responsible storage of chemicals in bunded areas
- Monitoring of utility inputs
- Waste minimisation
- Materials recovery

### I.8.2

Waterford Plating Company Ltd is constantly assessing alternatives to current raw materials that may have an impact on the environment:

#### 1.8.2.1 Cyanide

The facility is currently assessing methods to phase out the use of cyanide products in the cyanide zinc plating with the use of non-cyanide zinc plating. This is a target and objective as laid out in the environmental management programme

#### 1.8.2.2 Solvent based paints

Arising from specific customer requisitions, the facility is at liberty to comply with the design specifications of the component. Currently c. 90% of wet paints used are solvent based. However, <3,500 litres of solvent based paints were used in 2007. Every effort is made to minimise release of VOCs to the environment, by means of an enclosed booth and abatement systems. The operator is committed to encouraging customers to re-design their finish requirements where solvent based paints can be replaced with water based paints.

#### 1.8.2.3 Heavy Metals in Paints

Waterford Plating Company Ltd. is obliged to comply with Directive 2002/95/EC on the 'Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment', since a large makeup of their client base is for computer component parts. This 'RoHS' directive prohibits the placing on the market of electrical and electronic equipment containing lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PDBE). To this end all paint products that are used at Waterford Plating Company Ltd. on electrical and electronic equipment must comply with this directive and do not contain heavy metals.

#### 1.8.2.4 Chromium VI

To minimise the used of Hexavalent chromium (Cr (VI) compounds, two chrome free solutions have been introduced on the line for the chromate treatment of aluminium. The introduction of chrome free colour passivation on the zinc plating line was undertaken in August 2006. To date the use of Cr(VI) in clear chromating solutions has been fully changed over to the trivalent form Cr(III) by using the product Slotopas Z21/Blue/22. Approximately 95% of the process for colour chromating solutions using Cr (VI) has been changed to Cr(III) by using the product Slotopas G10. The remaining 5% of processing using a product containing Cr(VI) arises due to customer specification for component finishing. The product MacDermid Iridite LY-FPC which contains Cr(VI) is received to the facility in soluble liquid state and the maximum stock level at any one time is 25 litres. This small percentage of customers are exempt from compliance with Directive 2002/95/EC on Restriction of Hazardous Substances.

#### 1.8.4 Cleaner Greener Programme

Waterford Plating Company Ltd is committed to reducing contaminants and in 2006 completed a programme on a recycling initiative where the recycling of water used in the cooling of plating tanks through swills was undertaken with the extension of the swill plumbing to include on the line cleaner swills.

#### 1.8.5 Waste Minimisation and recovery

Non-hazardous waste is in the form of general office waste cardboard packaging. Waste paint and paint sludge is collected in a can at the facility and then collected for treatment and disposal by Rilta Environmental. Sludge from the WWTP is removed and disposed of accordingly. Scrap metal, including copper wire for jigs is recycled with an approved scrap merchant. Waste cyanide drums are washed out at the facility, tested and recycled with Waste Metal Management Company.

#### 1.8.6 WWTP Upgrade

The design of the WWTP meets the requirements of the BAT Guidance note for the Surface Treatment of Metals and Plastic Sector July 2007 where a combination of flocculation, precipitation and settlement ensure the maximum removal of contaminants from the wastewater. It has been demonstrated in Attachment E.3 that the WWTP removal efficiency of contaminants is adequate.

#### 1.8.7 Minimise waste generation

It is policy, where practical, in the case where larger volumes are required for process in larger containers to reduce the number of smaller drums, such as 25L drums which in turn must be disposed of.

#### 1.8.8 Asbestos Roof

The asbestos roof on Units 605/606 has been replaced with a Kingspan roof. The asbestos roof was disposed of accordingly.

#### 1.8.9 Packaging

To minimise the production of packaging waste, Waterford Plating Company Ltd. reuses customers packaging when components finishes have been completed.



National Standards Authority of Ireland

# Certificate of Registration of Quality Management System to I.S. EN ISO 9001:2000

The National Standards Authority of Ireland certifies that

## Waterford Plating Company Ltd

Unit 605/606  
Northern Industrial Estate  
Waterford

has been assessed and deemed to conform with the provisions of the above standard in respect of the scope of operations given below.

### Scope of Registration

The provision of zinc plating, aluminium chromating, wet and powder paint application for the computer, medi-care communication and engineering industries



Registration Number:	19.3321
Original Registration:	13 November 2001
Last Amended on:	30 August 2007
Remains valid until:	23 December 2010



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Signed:

Patrick Breen – Director of NSAI Client Services

NSAI is a partner of IQNet – the international certification network ([www.iqnet-certification.com](http://www.iqnet-certification.com))  
The validity of this certificate is maintained through on-going surveillance inspections.

Issued on 03 September 2007

National Standards Authority of Ireland, Glasnevin, Dublin 9, Ireland