Eden Green Environmental



Odour Assessment

Site: Swains Park, Park Road, Overseal, Derbyshire, DE12 6JS

Client

IG Elements

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1 Introduction

1.1 Overview

IG Elements (IGE) is applying for an Environmental Permit under the Environmental Permitting Regulations (EPR) and likely to require a Part B Environmental Permit in compliance with Solvent Emission Directive. IG Elements currently operating two sites within the South Derbyshire District Council (SDDC) area. This report assesses the odour impact of the Overseal Site located at Swains Park, Park Road, Overseal, Derbyshire, DE12 6JS (herein "the site").

Eden Green Environmental (EGE) was instructed by IGE to produce an Odour Assessment to assess the odour impact from a resin containing styrene. The assessment was carried out in accordance with the Institute of Air Quality Management's (IAQM) Guidance on the Assessment of Odour (2018)[1] and the Environmental Agency Horizontal Guidance 'H4 Odour Management' (2011)[2].

1.2 Site Settings and Existing Operation

The site is located within the authority of SDDC and the address is Swains Park, Park Road, Overseal, Derbyshire, DE12 6JS (Figure 1.1).

IGE is an offsite building component manufacturer producing glass-reinforced fibre composite building products such as bay window roof, preform surrounds for doorways and window openings, canopy, dormer and chimney.

The origin of odour from the proposed site is considered to be from the resin containing styrene.

Figure 1.2 shows the site layout where Unit 1 is Office and Main Factory, Unit 2 Storage and Unit 3 is used for Finishing and Expanding Foam. Products are delivered to client site using suitable HGVs.

The spray booths are operational between 06:30 – 14:30 Monday to Friday.

There are two spray booths within Unit 1 building and one spray booth within unit 3 building. All three spray booths are fitted with GALLITO Dry Filter systems.

GALLITO Dry Filter Spray booths are designed to provide an area for spraying product that will minimise the dispersion of overspray and fumes into adjoining areas. The booth works by extracting air through a filter face, and forcing that air out to atmosphere. The extracted air is replaced by air outside the booth. This replacement air is then extracted, and forms a continuous cycle, which sustains a set airflow through the booth. This continuous airflow has to be maintained for the booth to perform correctly. Hence, regular maintenance and filter replacement is carried out as per manufacturer recommended timescale to operate correctly. The extracted air

[1] IAQM (2018): 'Guidance on the Assessment of Odour for Planning'
[2] Environment Agency (2011): H4 Odour Management

is released through the associated stack (Figure 1.3 is presented to demonstrate a typical stack).

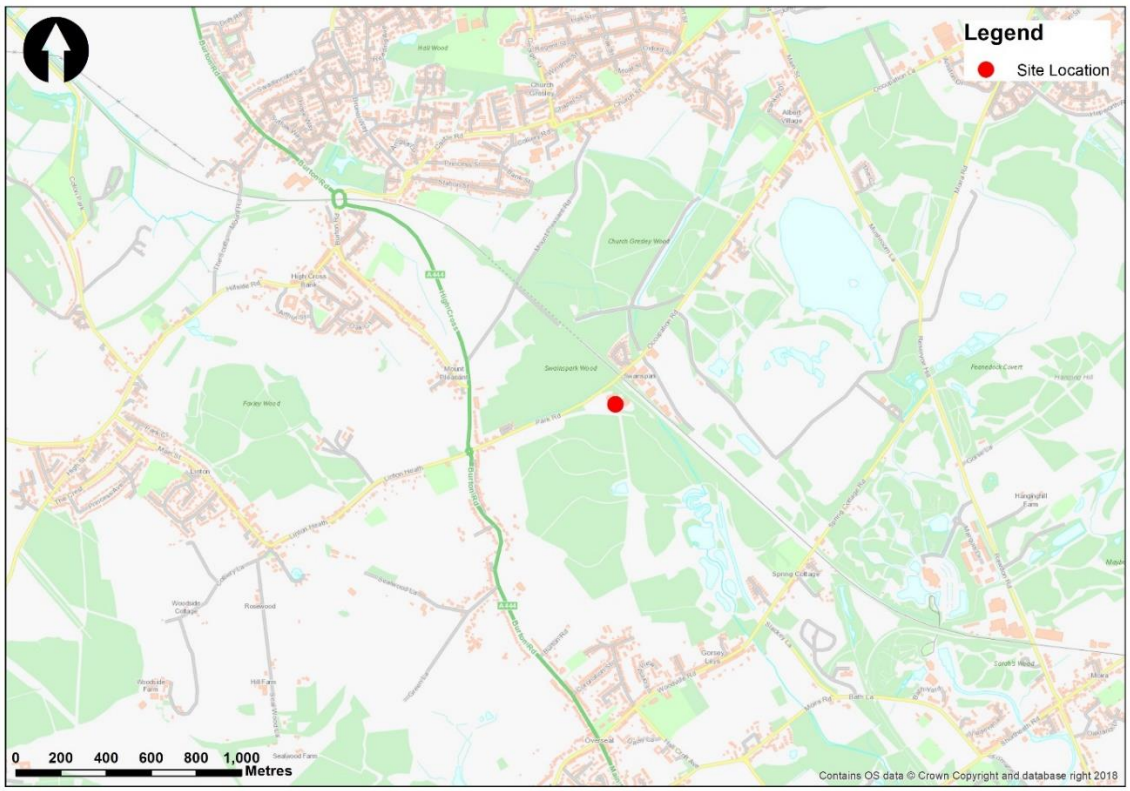


Figure 1.1: Site location

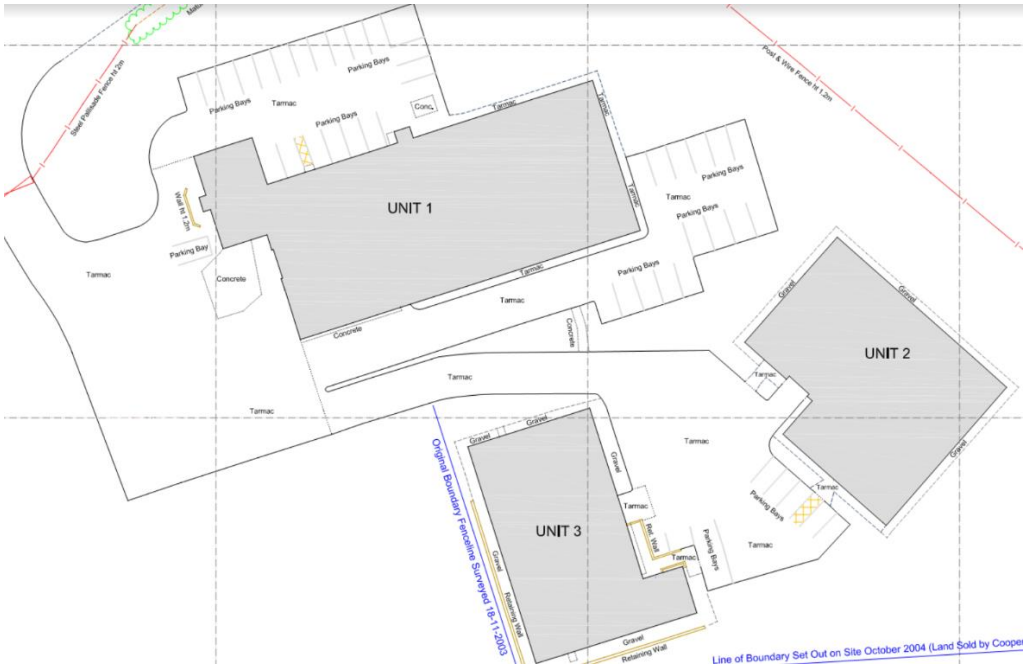


Figure 1.2: Site Layout

Figure 1.3: Example LEV Extraction Stack (Overseal site)

1.3 Typical Spray booth Operation Procedure

An example of the current practice of spray booth is shown in the Figure 1.4 to demonstrate the typical operational practice.

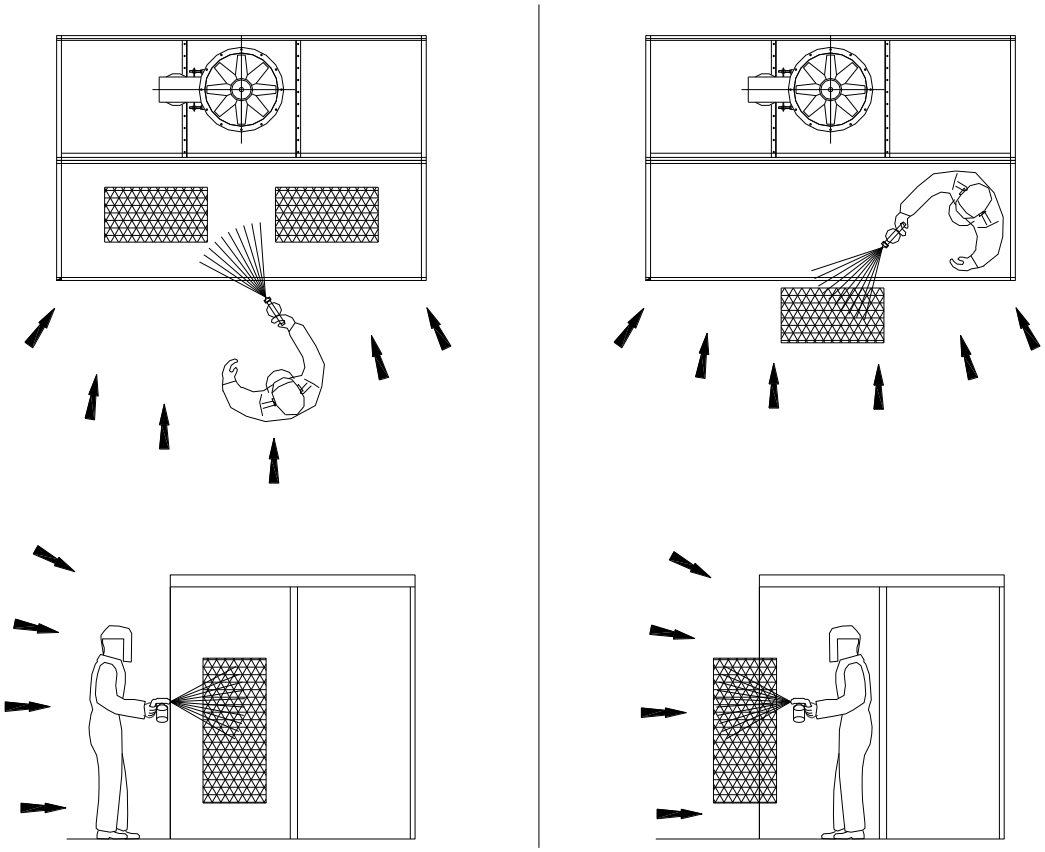


Figure 1.4: Spray booth operation

The operator is spraying with the product inside the booth. Spray is being directed at the product whilst being in the direction of airflow (see airflow arrows) and as such will be extracted by the booth. A turntables is available to assist in this process when turning is required to spray an entire product.

1.4 Key Pollutant – Odour

IAQM guidance defines odour as a mixture of many chemicals which interact to produce a 'smell'. While odour-free air refers to air containing no odorous chemicals, fresh air is usually perceived as air containing no chemicals or contaminants that could be 'unpleasant'.

While odour is not strictly speaking an air pollutant, certain combinations of chemicals can affect the human olfactory response (perception followed by psychological appraisal) and cause a loss of amenity. Perception of an odour can be subjective to the individual whether it is found as acceptable, objectionable or offensive.

Odour can be produced from a number of industries including food outlets, production, recycling, waste handling, vehicle respraying, power plants, traffic emissions, agriculture etc.

In order to assess the degree of odour pollution, the following factors are typically assessed:

- Frequency of detection;
- Intensity as perceived;
- Duration of exposure;
- Offensiveness; and
- Receptor sensitivity.

This development has the potential to produce odour during the coating activity of the glue based material for styrene.

2 Methodology

2.1 Overview

The most recent guidance for odour assessment and management is published by IAQM in July 2018. The IAQM guidance takes into account of the existing 2011 EA H4 guidance along with other best practice methodological approaches. Hence this odour assessment has been carried out using the latest guidance produced by the IAQM.

2.2 IAQM Guidance

IAQM recommends combining a number of assessment tools for odour studies which is unlike conventional air quality assessments. Some odour assessment tools are empirical - observing the current odour impacts or effects, by monitoring or by using community assessment techniques. In contrast, other tools make use of a "model" – a simplified version of the real situation – to predict what the impact might be. All odour assessment tools, whether models or empirical observations, have a degree of uncertainty associated with their estimates of impact.

The multi-tool assessment approach is summarised below by IAQM:

- Observational /Empirical: Monitoring (e.g. sniff tests) can give a measure of odour at specific locations under the conditions prevailing at the times and days of the sampling, but cannot cover all receptor locations under every meteorological condition over a typical year.

- Predictive: Qualitative, semi qualitative and modelling can assist with predicting the impact from and to a proposal. Qualitative assessments are risk-based assessments using source-pathway-receptor concepts. Semi-quantitative assessments are screening model for new proposals and dispersion modelling provides spatial and temporal coverage and the reasonableness of the estimates from the model can be compared with the observed (i.e. monitored) levels.

For the purpose of this assessment an observational method (Sniff Test) and a predictive method (Risk-based assessments using Source- Pathway-Receptor concept) was used. The qualitative risk-based assessment was used to identify the need for further consideration to carry out detailed dispersion modelling. Both these approaches are explained below in Section 2.3 and 2.4.

2.3 Sniff Test Sampling Procedure

The assessment has been carried out based on the IAQM Odour Sampling Guidance. IAQM suggests, monitoring using sniff test method can give a measure of odour at specific locations under the conditions prevailing at the times and days of the sampling, but cannot cover all receptor locations under every meteorological condition over a typical year.

The sensory test is carried out at each test location over a standard observation time, typically over 5 minutes. Testing carried out from locations affected by the least-intense odours, to avoid olfactory fatigue. For each test location, the start time of the observation period and the attributes of the odour over the observation period are recorded as follows:

i) The assessor breathes normally, inhaling ambient air samples through the nose at regular intervals (approximately every 10 seconds, to give 30 samples over typically a 5 minute observation period). However, where the odour levels are either constant or intense then the odour assessor should avoid olfactory fatigue/desensitisation by alternating each sample sniff of ambient air with a sniff of odour-free air from an ori-nasal face mask fitted with carbon filters.

ii) For each sample, the odour intensity (VDI scale, 0-6) is recorded.

iii) At the end of the observation period at the test location, the odour unpleasantness is noted down by classifying it as unpleasant, neutral (neither pleasant nor unpleasant) or pleasant. This assumes that at least some of the 30 samples were of intensity 3 or more ("i.e. the odour is at least "barely recognisable").

iv) The odour descriptor note: Odours can be objectively described using standardised categories and reference vocabulary. It is useful to provide odour assessors with standard descriptor terms, which are organised with similar terms in categories and groups either as a list or as an "odour wheel".

v) Next the pervasiveness/extent of the odour at this test location is assessed. This can be calculated as the percentage odour time, $t_{I\geq4}$, which is the number of samples where odour was recognisable divided by the total number of samples (i.e. 30). Note that "recognisable odour" is where the odour strength exceeds the recognition threshold and is definitely recognisable by the assessor, i.e. the assessor is capable of definitely identifying its quality/character, which corresponds to VDI[3] intensity of 4 or more.

vi) The average odour intensity, I_{mean}, over the test period is calculated and the maximum intensity observed is noted.

The above procedure is then repeated at the next test location, remembering that the character of an odour mixture can change over distance, as the particular components may become diluted below their individual detection thresholds at different distances.

A record is kept of the meteorological conditions at the time of testing (including wind strength and direction, atmospheric stability category, barometric pressure, rainfall, temperature and humidity), together with information relating to the operations and activities being undertaken on site and in the surrounding area.

[3] Verein Deutscher Ingenieure (standards)

The odour intensity scale that is used for this assessment and the matrix to assess the odour exposure (neutral and unpleasant odours) at time and place of sampling is presented in table 2.1 and 2.2 Respectively.

Table 2.1: Odour intensity Scale

Odour Strength	Intensity Level	Comments
No odour/not perceptible	0	No odour when compared to the clean site
The Odour Detection Threshold (ODT) of 1 ouE.m-3 is somewhere between 0 and 1		
Slight/very weak	1	There is probably some doubt as to whether the odour is actually present
Slight/weak	2	The odour is present but cannot be described using precise words or terms
Distinct	3	The odour character is barely recognisable
VDI 3940 says that the recognition threshold intensity is generally 3-10 times higher than the ODT (i.e. 3-10 ouE.m-3)		
Strong	4	The odour character is easily recognisable
Very Strong	5	The odour is offensive. Exposure to this level would be considered undesirable.
Extremely Strong	6	The odour is offensive. An instinctive reaction would be to mitigate against further exposure.

Table 2.2: Matrix to assess the odour exposure (neutral and unpleasant odours) at time and place of sampling

		Percentage Odour Time (t_4) during the test				
		10%	11-20%	21-30%	31-40%	More than 41%
Average intensity (I_{mean})	6	Large	Very Large	Very Large	Very Large	Very Large
	5	Medium	Large	Large	Very Large	Very Large
	4	Small	Medium	Medium	Large	Large
	3	Small	Medium	Medium	Medium	Medium
	2	Small	Small	Medium	Medium	Medium
	1	Small	Small	Small	N\A	N\A

Notes: I_{mean} should be rounded to the nearest whole number.
The following overriding considerations affect the scoring of the odour annoyance impact:
if I_{mean} = 0, then the odour effect can for practical purposes be considered negligible; and
if I_{mean} = 1 but $tI_{\geq 4}$ = 0%, then the odour effect can for practical purposes be considered negligible.

2.4 Predictive Assessment Using Qualitative Risk Based Approach

IAQM guidance is limited to assessing the effect of odour on amenity and not on human health. For exposure to odour to occur, there must be an emission source to the atmosphere, a pathway for the odour to travel and a receptor that could experience adverse effects. Therefore, the IAQM guidance is based upon Defra's *Green Leaves III guidance*[4] which presents the Source-Pathway-Receptor (S-P-R) concept. The S-P-R concept presents the hypothetical relationship between the source (S) of the odour, the pathway (P) by which exposure might occur, and the receptor (R) that could be adversely affected.

An example framework for conducting odour assessments is laid out in Appendix A of IAQM guidance and has been followed for this assessment.

It is recognised that in order to assess the magnitude of odour effects from a site it is necessary to estimate the odour generating potential of the site activity. The source odour potential takes into account the scale of the odour release (magnitude), how inherently odorous the emission is and the relative pleasantness/unpleasantness of the odour (its hedonic tone). Using Table A1 (Appendix A) the source odour potential can be categorised as small, medium or large.

Secondly, the effectiveness of the pollutant pathway for odour through the air versus the dilution/dispersion of the odorous emissions in the atmosphere needs to be estimated. Factors which may increase dilution and/or dispersion of the odour through the pathway will reduce the odour concentration at the receptor, thereby reducing exposure. Factors which need to be considered in this step are presented in Table A1 (Appendix A). The pollutant pathway can be categorised as ineffective, moderately effective or highly effective using Table A1 (Appendix A).

From this, IAQM guidance suggest that the risk of odour exposure (impact) for each receptor may be evaluated by combining the source odour potential and the pathway effectiveness using Table A2 (Appendix A).

IAQM guidance recommend classifying each receptor in terms of its sensitivity. Indicative examples of low, medium, and high sensitivity receptors are given in Table A1 (Appendix A), and should be used in combination with professional judgement to assess the sensitivity of receptors to odour.

Justification needs to be given for the selected categorisation of the source odour potential, pathway effectiveness, and receptor sensitivity. This typically involves some degree of quantitative assessment supplemented by the professional judgement of the air quality practitioner.

The likely magnitude of odour effect at specific receptor locations may be determined by combining the risk of odour exposure with the specific receptor sensitivity, as in

[4] Defra (2011): Guidelines for Environmental Risk Assessment and Management (Green Leaves III)

Table A3 (Appendix A). The likely magnitude of odour effects may be classed as ‘negligible’, ‘slight adverse’, ‘moderate adverse’ or ‘substantial adverse’.

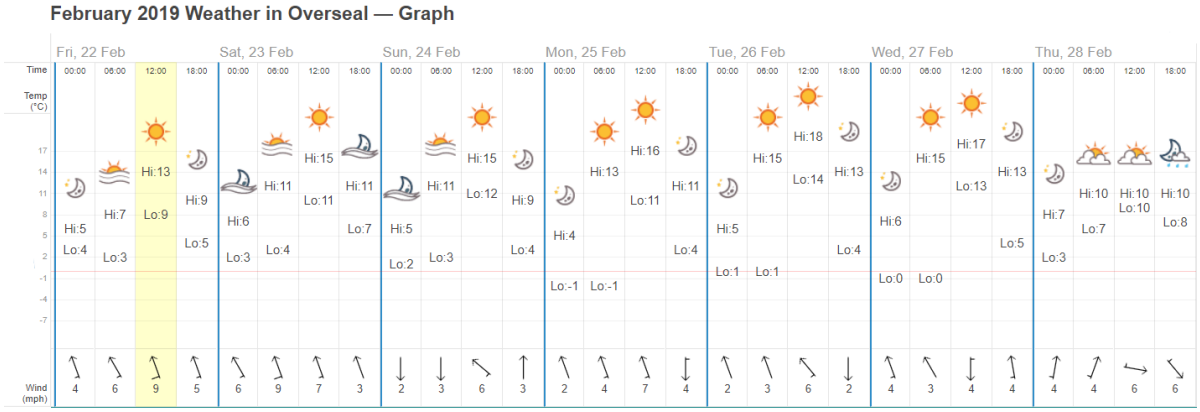
The final step for most assessments is to estimate the overall odour effect on the surrounding area as a result of the site, development or process. This assessment must take into account the different magnitude of effects at different receptors, and the total number of receptors that experience these different effects. IAQM guidance recommend the suggested descriptors for the total magnitude of odour effects, as reproduced in Table A3 (Appendix A). IAQM guidance suggest that “where the overall effect is greater than ‘slight adverse’, the effect is likely to be considered significant.”

3 Site Surveys

Initial site survey has been carried out on 26th February 2019 between 1200 to 1400 hours. During the site visit sniff tests have been carried out around the site and also at the nearby residential area located on Burton Road and Occupation Road (including the Albert Village Community Primary School). No offsite odour was noticed during the site visit.

The typical wind direction on 26th February was north westerly as shown in Figure 3.1 below.

Weekly Summary



Daily Summary

11:20		14 °C	Passing clouds.	6 mph	↖	48%	1033 mbar	N/A
11:50		15 °C	Passing clouds.	6 mph	↖	45%	1033 mbar	N/A
12:20		16 °C	Sunny.	7 mph	↖	42%	1032 mbar	16 km
12:50		16 °C	Sunny.	7 mph	↖	42%	1032 mbar	16 km
13:20		17 °C	Passing clouds.	6 mph	↖	39%	1032 mbar	N/A
13:50		17 °C	Sunny.	7 mph	↖	39%	1031 mbar	16 km
14:20		18 °C	Passing clouds.	6 mph	↖	40%	1031 mbar	N/A
14:50		17 °C	Passing clouds.	8 mph	↖	42%	1030 mbar	N/A

Figure 3.1 : Meteorological condition during the first site visit

A further site visit has been carried out on Friday 24th May between 1130-1230 hours and during the site walk over no unusual odour was witnessed. During the visit the wind direction was south westerly, hence, to visit was carried out at the residential area north of the proposed development as it was considered not necessary.

3.1 Site Observation

During the site walkover, the site conditions were found to be generally clean and tidy with no spillage or waste was noticed on the site stored inappropriately.

There was noticeable odour at the main carpark north of the Unit 1 building as shown in the Figure 4 below. This is likely to be due to the use of the emergency door located at the north side of the unit one workshop. This is likely to be used to access the car park. The odour in this area has the potential to be noticed from vehicles passing the park road adjacent to the main car park. There was also odour detectable at the entrances of other doors linked to the workshops when the doors were open.

Hence, it is advisable that the use of all doors directly linked to the workshop are kept shut at all-time practicable to avoid odour escaping the main workshop buildings.

It is also advisable that all spray booth operator are made aware of “bounce back” (air deflecting off the product) leaving the spray booth. If such issues do arise then a canopy extension is recommended.

Figure 3.2: Location of car park where odour was noticeable (Source: Google)

3.2 Sniff Test Results

Figure 3.3 below shows the sniff test location points within the site. Table 3.2 and 3.3 below presents the Sniff Test Results for survey 1 and survey 2.

For survey 1, it was understood that the site location points 3 is next to an emergency access door, hence there is potential for odour to release when the door is used. It is recommended that the door to be kept shut at all time unless required to comply with the site emergency procedure.

Similarly, Location Point 6 had shutter open to allow material access at the time of sniff testing and therefore slight odour was noticeable.

During the second survey there was no odour noticeable during the site walk over for a reasonable length of time to be considered as significant.

Figure 3.3: Monitoring Location Point (Source: Google)

Table 3.1: Sniff Test Results (Survey 1)

Location Point	I_{mean}	Percentage odour time (tI≥4) during the test	Odour Effect
Point 1	0	NA	negligible
Point 2	0	NA	negligible
Point 3	3	10%	Small
Point 4	0	NA	negligible
Point 5	0	NA	negligible
Point 6	2	10%	Small
Point 7	0	NA	negligible

Table 3.2: Sniff Test Results (Survey 2)

Location Point	I_{mean}	Percentage odour time (tI≥4) during the test	Odour Effect
Point 1	0	NA	negligible
Point 2	0	NA	negligible
Point 3	0	NA	negligible
Point 4	0	NA	negligible
Point 5	0	NA	negligible

Location Point	I_{mean}	Percentage odour time (tI≥4) during the test	Odour Effect
Point 6	0	NA	negligible
Point 7	0	NA	negligible

4 Qualitative Odour Impact Assessment

4.1 Overview

As discussed above, the odour impact assessment has been carried out following the IAQM guidance. Key information from the guidance is presented in Appendix A. The assessment has been divided into sub-sections to explain the outcome of each part of the assessment and how it was determined.

4.2 Potential Receptors

The IGE site is located predominantly in an industrial area with other industrial businesses on the east of the site. There are a number of potential receptors that could be susceptible to odour emissions. The report has taken account of all existing receptors and committed developments.

The existing surrounding mixed-use receptors are considered to be 'medium' to 'High' sensitive to odours emission based on the criteria presented in Table A1 id Appendix A. The nearest residential development is approximately 600m west of the IGE site and there is no other committed development identified within lesser distance then approximately 600m. This distance is acting as a buffer zone between the site and the existing residential uses. No other committed development potential receptors were identified any closer then 600m from the site boundary.

Residential developments are classed as 'High' sensitive receptors where user can reasonably expect enjoyment of a high level of amenity. While the road and paths will be used by members of the public, these are considered to have a 'Low' sensitivity to odorous emissions as exposure will only be for a limited amount of time. The industrial receptors on the east of the site is considered to have a 'Medium' sensitivity.

4.3 Source Odour Potential

The site produces odour during the coating activity using from a resin containing styrene. Based on the Table A1 in Appendix A, assuming that all extraction systems are operational and the activities are carried out within enclosed building, the site is considered to have 'Medium' source odour potential.

There are a number of other industrial activities on the east of the IGE site which are all considered to be potential sources of odour.

4.4 Pathway Effectiveness

There are a number trees in the immediately vicinity of the site which will impact the dispersion of pollution from the stack release point. Hence, the pathway effectiveness is considered to be 'Moderately Effective' based on the Table A1 in appendix A.

4.5 Odour Exposure

The risk of odour exposure is calculated using the IAQM criteria summarised in Appendix A: Table A2. As stated above, the source odour potential was considered to be 'Small' and the pathway effectiveness was considered to be 'Moderately Effective'. Based on IAQM guidance, the odour exposure at the nearest receptors are considered to be 'Low Risk'.

4.6 Likely Odour Effect

The results of the odour impact assessment are summarised in

Table 4.1.

Table 4.1: Summary of likely odour effects at existing sensitive receptors

Receptor Details and Location	Source Odour Potential	Pathway Effectiveness	Odour Exposure	Receptor Sensitivity	Likely Odour Effect
Nearest 'Low' sensitive receptors – road users	Medium	Moderately Effective	Low Risk	Low	Negligible Effect
Nearest 'medium' sensitive receptors located east of the site	Medium	Moderately Effective	Low Risk	Medium	Negligible Effect
Nearest 'High' sensitive receptor located East and West of the site	Medium	Moderately Effective	Low Risk	High	Slight Adverse Effect

Based on the results above and the criteria in Table A2, the odour exposure is considered to be 'low Risk' for all receptors. Based on the IAQM guidance, the largest likely odour effect from the proposed development is considered to be of 'Slight Adverse Effect'. Based on the outcome of the odour impact assessment, it is recommended that a site specific Odour Management Plan (OMP) should be implemented in agreement with the Environmental Health Officer as part of the Environmental Permitting process in order to reduce and manage any potential odour impact. The OMP can be based on the recommended mitigation measures as presented in section 3.8.

IAQM states, if there is a low likelihood (risk) of adverse odour effects, then a single assessment tool should be enough. Based on the qualitative assessment results and the results from the sniff testing assessment, no further consideration is required to produce a dispersion modelling of the stack release at this stage. It should be noted that all spray booths are already in operation with adequate filters with strict

maintenance regime in place as per manufacturer instruction. It should be also noted that currently there are no receptors within close proximity to the development and, therefore, there is currently an existing buffer of about 600m between the site and the nearest receptor. If commercial or residential receptors are being introduced in the future near the site, then this this should be assessed appropriately in terms of residential and commercial suitability of any such proposal in terms of odour as well as the impact on the existing Industrial IGE business could have as a result of potentially introducing new receptors.

Overall, the impacts from disamenity related to odour nuisance from the IGE site operation is considered to be not significant. This is based on the assumptions that the proposed mitigation measures suggested in section 6 will be implemented as an OMP and therefore the residual odour impact will be negligible. hence, based on IAQM guidance, the overall impact is considered to be ‘not significant’.

5 Assessment uncertainties

As mentioned above, all odour assessment tools, whether models or empirical observations, have a degree of uncertainty associated with their estimates of impact.

The sniff test technique can give a measure of odour at specific locations under the conditions prevailing at the times and days of the sampling, but cannot cover all receptor locations under every meteorological condition over a typical year.

The qualitative assessment is based on the current circumstances and the distance of nearest sensitive receptors. If these assumptions are to be changed then a new assessment may need to be carried out.

6 Proposed Mitigation Measures

An Odour Management Plan (OMP) should be prepared in agreement with the local authority EHO in order to adequately manage site activities during operation to avoid any odour nuisance. The recommended content of the OMP are:

- Essential Site Details
  - A process description, particularly describing odorous, or potentially odorous, activities or materials used (inventory)
  - Identification of all the release points for each of the activities (plan/map)
  - Identification of the sensitive receptors within the area of influence that could be impacted (plan/map)
  - A description of the meteorological conditions prevailing at the site, especially wind direction. A wind rose (from a nearby representative meteorological station or from site sensors if installed) is an ideal format. A site specific weather forecasting system may also assist with day to day site operation.
- Routine Controls Under Normal Conditions
  - A description of the routine mitigation/control measures that would be used day-to-day under normal operating conditions in the absence of any unusual risk factors. Examples of routine control measures include receipt, inspection, acceptance/rejection of materials, storage, containment, handling, treatment and timing of activities.
  - A list of the actions in detail and who is responsible for carrying them out.
- Reasonably Foreseeable Abnormal Conditions and Additional Controls
  - Identification of possible risk factors (e.g. adverse weather conditions) and anticipation of resonably foreseeable odour-related incidents and accidents (e.g., abnormal situations, spillages, power failure, breakdown of doors, equipment or abatement) and a listing of the consequences for odours of these risk factors.
  - A description of the additional measures (e.g. additional control measures and modifications to site operations, such as diverting odorous waste loads to facilities with less sensitive surroundings during adverse weather conditions) that will be applied during these periods to deal with these risks and any reasonably foreseeable incidents and accidents. It should be stated that if all the measures are shown not to be sufficient, then they will need to be tightened further or else, possibly ceasing/reducing odourous operations.
  - A list of the actions in detail and who is responsible for carrying them out
- Triggers for Additional Controls and Checks on Effectiveness

- A description of what would trigger this further action/additional measures, such as:
    - the results of planned routine checks/inspections/surveys on site;
    - the results of on-site measurements of process parameters and surrogate measurements for odour (e.g. pH, temperature, VOC, oxygen, etc) exceeding defined trigger levels;
    - other metrics, such as particular meteorological conditions (e.g. temperature above a certain value, wind blowing in a particular direction, or calms); and
    - odour monitoring on- and/or off-site, including:
        - odour complaints monitoring (which should be carried out for all sites);
        - monitoring carried out on-site, showing non-compliance with any emission limit values (ELVs) set for controlled point source releases (e.g. proxy VOC release); and
        - monitoring carried out off-site (e.g. by sniff testing, odour diary surveys, etc), showing non-compliance with any action levels for ambient odour levels.

- Management of Good Practice
    - A description of:
        - the roles and responsibilities of personnel on site (e.g. organisational chart); and
        - the training and competence of staff in odour-critical roles
    - Details of how the following will be carried out, and who has been assigned managerial and operational responsibilities for them:
        - implementing and maintaining the OMP;
        - responding to odour-related incidents and any elevated odour levels from the aforementioned checks/inspections/surveys, monitoring, or on receipt of complaints of odour nuisance; including carrying out investigations and taking appropriate remedial action to prevent recurrence;
    - planned maintenance and repair and the keeping of essential odour-critical spares;
    - regular review (at least once per year) of the effectiveness of odour controls - including the OMP itself – taking account of complaints, monitoring results, inspections, surveys and other information and

feedback received. This interval may be shorter if there have been complaints or relevant changes to your operations or infrastructure;

– engaging with your neighbours and communicating with relevant interested parties (e.g. local community and local authority) to provide necessary information and minimise their concerns and complaints, including methods used, content and frequency of communication; and

– keeping records of all activities and actions relating to odour and the OMP.

Appendix A : IAQM: Guidance on the Assessment of Odour for Planning Methodology

Table A1: Examples of risk factors for odour source, pathway and receptor sensitivity based on IAQM (2018)

Source Odour Potential	Pathway Effectiveness	Receptor
Factors affecting the source odour potential include: • The magnitude of the odour release (taking into account odour-control measures) • How inherently odorous the compounds are, • The unpleasantness of the odour.	Factors affecting the odour flux to the receptor are: • Distance from source to receptor • The frequency (%) of winds from the source to receptor (or, qualitatively, the direction of receptors from source with respect to prevailing wind) • The effectiveness of any mitigation/control in reducing flux to the receptor • The effectiveness of dispersion/ dilution in reducing the odour flux to the receptor topography and terrain.	For the sensitivity of people to odour, the IAQM recommends that the air quality practitioner uses professional judgement to identify where on the spectrum between high and low sensitivity a receptor lies, taking into account the following general principles:
Large Source Odour Potential Magnitude – Larger Permitted processes of odorous nature or large STWs; materials usage hundreds of thousands of tonnes/m^3 per year; area sources of thousands of m^2. The compounds involved are very odorous (e.g. mercaptans), having very low Odour Detection Thresholds (ODTs) where known. • Unpleasantness – processes classed as "Most offensive" in Table 5; or (where known) compounds/odours having unpleasant (-2) to very unpleasant (-4) hedonic score. • Mitigation/control – open air operation with no containment, reliance solely on good management techniques and best practice.	**Highly Effective Pathway for Odour Flux to Receptor** • Distance – receptor is adjacent to the source/site; distance well below any official set-back distances. • Direction – high frequency (%) of winds from source to receptor (or, qualitatively, receptors downwind of source with respect to prevailing wind). • Effectiveness of dispersion/dilution – open processes with low-level releases, e.g. lagoons, uncovered effluent treatment plant, landfilling of putrescible wastes.	**High Sensitivity Receptor - Surrounding land where:** • Users can reasonably expect enjoyment of a high level of amenity; and • The people would reasonably be expected to be present here continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Examples may include residential dwellings, hospitals, schools/education and tourist/cultural.

Source Odour Potential	Pathway Effectiveness	Receptor
Medium Source Odour Potential • Magnitude – smaller Permitted processes or small Sewage Treatment Works (STWs); materials usage thou- sands of tonnes/m^3 per year; area sources of hundreds of m^2. • The compounds involved are moderately odorous. • Unpleasantness – processes classed in H4 as "Moderately offensive"; or (where known) odours having neutral (0) to unpleasant (-2) hedonic score. Mitigation/control – some mitigation measures in place, but significant residual odour remains.	**Moderately Effective Pathway for Odour Flux to Receptor** • Distance – receptor is local to the source. Where mitigation relies on dispersion/dilution – releases are elevated, but compromised by building effects.	**Medium Sensitivity Receptor– Surrounding land where:** • Users would expect to enjoy a reasonable level of amenity, but wouldn't reasonably expect to enjoy the same level of amenity as in their home; or • People wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. Examples may include places of work, commercial/retail premises and
Small Source Odour Potential • Magnitude – falls below Part B threshold; materials usage hundreds of tonnes/m^3 per year; area sources of tens m^2. • The compounds involved are only mildly odorous, having relatively high ODTs where known. • Unpleasantness – processes classed as "Less offensive" in H4; or (where known) compounds/odours having neutral (0) to very pleasant (+4) hedonic score. • Mitigation/control – effective, tangible mitigation measures in place (e.g. BAT, BPM) leading to little or no residual odour.	**Ineffective Pathway for Odour Flux to Receptor** • Distance – receptor is remote from the source; distance exceeds any official set-back distances. • Direction – low frequency (%) of winds from source to receptor (or, qualitatively, receptors upwind of source with respect to prevailing wind). • Where mitigation relies on dispersion/ dilution – releases are from high level (e.g. stacks, or roof vents >3m above ridge height) and are not compromised by surrounding buildings.	**Low Sensitivity Receptor**– surrounding land where: • The enjoyment of amenity would not reasonably be expected; or • There is transient exposure, where the people would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Examples may include industrial, farms, footpaths and roads.

Table A2: Risk of odour exposure (impact) at the specific receptor location based on IAQM (2018)

		Source Odour Potential		
		Small	**Medium**	**Large**
Pathway Effectiveness	Highly Effective Pathway	Low Risk	Medium Risk	High Risk
	Moderately Effective Pathway	Negligible Risk	Low Risk	Medium Risk
	Ineffective Pathway	Negligible Risk	Negligible Risk	Low Risk

Table A3: Likely magnitude of odour effect at the specific receptor location based on IAQM (2018)

Risk of Odour Exposure	**Receptor Sensitivity**		
	Low	**Medium**	**High**
High Risk of Odour Exposure	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
Medium Risk of Odour Exposure	Negligible Effect	Slight Adverse Effect	Moderate Adverse Effect
Low Risk of Odour Exposure	Negligible Effect	Negligible Effect	Slight Adverse Effect
Negligible Risk of Odour Exposure	Negligible Effect	Negligible Effect	Negligible Effect