ENVIRONMENTAL STATEMENT
CHAPTER 9: AIR QUALITY

Land South of Rover Way, Cardiff CF24 5PH

Harsco Metals Group Limited

SLR Ref: 416.09604.00001
Version No: FINAL Issue 2
October 2019

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9.1.0 Introduction

9.1.1 This chapter of the Environmental Statement (ES) considers the impact of the proposed development on air quality. The proposed development has the potential to affect local air quality during construction and operation due to:

- dust and particulate matter emissions (PM_{10} and $PM_{2.5}$) generated during construction activities, for example, site clearance, stockpiling, materials transport and trenching;
- increases in nitrogen dioxide (NO_2)/ nitrogen oxides (NO_x), PM_{10} and $PM_{2.5}$ concentrations due to exhaust emissions arising from construction traffic and Non-Road Mobile Machinery (NRMM) plant;
- increases in NO_2/NO_x, PM_{10} and $PM_{2.5}$ concentrations due to exhaust emissions arising from traffic generated by the proposed development once operational;
- increase in NO_x and PM_{10} concentrations due to stack emissions (from emission point A5) associated with the operational phase; and
- increase in fugitive emissions (dust and odour) due to operational activities.

9.1.2 For both human and ecological receptors, air quality effects can occur as a result of direct exposure to pollution in ambient air, but also as a result of the deposition of pollutants on the surface of the ground and vegetation. Furthermore, effects may arise from the proposed development alone and cumulatively with other developments in the vicinity.

9.1.3 This chapter describes the assessment methodology, the baseline conditions at the Site and in the surrounding area, the mitigation adopted for the purposes of the assessment, and the impacts of the proposed development. It also provides a summary of the residual likely significant effects on taking into account national legislation. A summary of the likely significant effects on ecological receptors is provided in Chapter 12 (Ecology).

9.1.4 The chapter (and its associated figures and appendices) is intended to be read as part of the wider ES, with particular reference to Chapter 13 (Transport), Chapter 12 (Ecology) and Chapter 14 (Assessment of Cumulative Effects).

9.1.5 This Chapter has been revised and re-issued in November 2019 following feedback from Natural Resources Wales and Cardiff Council.

9.2.0 Methodology

Legislation, Guidance and Planning Policy

Legislation

9.2.1 The applicable legislative framework is summarised as follows. Full details of the key legislation are presented in the following paragraphs:

- UK Air Quality Strategy (AQS) 2007[1];
- Air Quality (Wales) Regulations 2010[2];
- Air Quality (Wales) (Amendment) (EU Exit) Regulations 2019[3];
- Air Quality Standard Regulations 2010[4];
- Environment Protection Act 1990[5];
- Environment Act 1995[6]; and
- Industrial Emission Direction (IED)[7].

UK Air Quality Standards and Objectives

9.2.2 The Government's policy on air quality within the UK is set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS). The AQS sets standards for nine key air pollutants that reflect levels of pollution thought to avoid or minimise risks to health or ecosystems. The associated air quality objectives are policy targets, expressed as maximum permissible outdoor concentrations of pollutants that take account of economic efficiency, practicability, technical feasibility and timescales. The objectives for the key pollutants considered in this assessment are given in Table 9-1.

9.2.3 The European Union's Ambient Air Quality Directive also sets assessment levels for ambient air, known in the Directive as 'limit values'. In contrast to the objectives in the AQS, the limit values are legally binding on EU Member States. For the pollutants of interest to the Proposed Scheme, the EU limit values are numerically identical to the UK's objectives.

9.2.4 Table 9-1 also includes the relevant, non-statutory, target concentrations for protected conservation areas referenced in the Environment Agency (EA) online guidance (refer to paragraph 9.2.5.

[1] Department for Environment, Food and Rural Affairs (Defra) and the Devolved Administrations (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2).

[2] The Air Quality (Wales) Regulations 2010 - Statutory Instrument 2010 No.1433

[3] The Air Quality (Wales) (Amendment) (EU Exit) Regulations 2019- Statutory Instrument 2019 No.390.

[4] The Air Quality Standards Regulations 2010- Statutory Instrument 2010 No. 1001.

[5] Environment Protection Act 1990 – Control of dust and particulates associated with construction (Section 79).

[6] Environment Act 1995 (1995)

[7] Industrial Emission Directive (2010) Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

Table 9-1: Air Quality Objectives and European Directive Limit Values

Pollutant	Objective/Limit Value (µg/m^3)	Measured As	Set for the Protection of
Nitrogen dioxide (NO_2)	200	1-hour mean not to be exceeded more than 18 times a year (99.79th Percentile)	Human Health
	40	Annual mean	
Particulate matter (PM_{10})	50	24-hour mean not to be exceeded more than 35 times a year (90.4 Percentile)	
	40	Annual mean	
Particulate matter ($PM_{2.5}$)	25	Annual mean	
Nitrogen Oxides (NO_x)	30	Annual mean	Ecosystems
	75$^{(A)}$	24-hour mean	
(A) the 24 hour NO_x objective is included in the EA online guidance but is not part of the air quality objectives detailed in the AQS			

Legislation for the Protection of Nature Conservation Sites

9.2.5 Sites of nature conservation importance at a European, national and local level, are provided environmental protection, including from atmospheric emissions by the legislation as indicated in Table 9-2.

Table 9-2: Legislation for the Protection of Nature Conservation Sites

Nature Conservation Sites	Legislation
European Sites Special Areas of Conservation (SAC) candidate Special Areas of Conservation (cSAC) Special Protection Areas (SPA) potential Special Protection Areas (pSPA) Ramsar sites Marine Protection Areas.	The Conservation of Habitats and Species Regulations (2010); known as the 'Habitats Regulations'
Sites of Special Scientific Interest (SSSI)	The Countryside and Rights of Way (CRoW) Act 2000
National Nature Reserves (NNR) Local Nature Reserves (LNR) local wildlife sites (LWS) ancient woodland (AW)	the Environment Act 1995; and the Natural Environment and Rural Communities Act (NERC) 2006.

Guidance

9.2.6 A summary of the publications referred to in the preparation of this Chapter is provided below.

- Local Air Quality Management Review and Assessment Technical Guidance[8] - The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their air quality review and assessment work.

- Land-use Planning & Development Control: Planning for Air Quality[9] - Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance that offers comprehensive advice on: when an air quality assessment may be required; what should be included in an assessment; how to determine the significance of any air quality impacts associated with a development; and, the possible mitigation measures that may be implemented to minimise these impacts.

- Guidance on the Assessment of Dust from Demolition and Construction[10] - This document published by the IAQM was produced to provide guidance to developers, consultants and environmental health officers on how to assess the impacts arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM_{10} impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measures appropriate to the level of risk identified.

- Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 Part 1, Air Quality (HA207/07)[11]. The DMRB considers a series of criteria on identifying "affected roads" as a result of changes to either the traffic flow or the road alignment, which have the potential to impact on air quality. It also includes distance criteria to identify ecological sites that require further assessment.

- Air Pollution Information Service website (APIS)[12] – This website provides background and indicative assessment levels for pollutant deposition and ammonia concentrations, termed critical loads, for use in air pollution impact assessments. The website is hosted by the Centre for Ecology and Hydrology and developed in partnership with the UK conservation agencies and regulatory agencies.

- EA: Risk assessments for specific activities, Environmental Permits[13] - The air emissions section of this Environment Agency (EA) Guidance (online) has been referred to in determining the significance of impacts and the assessment methodology.

- IAQM, Odour for planning guidance[14] - The guidance summarises the typical requirements and approaches for undertaking an odour assessment for planning applications to determine

[8] Defra (2016) Part IV The Environment Act 1995 and Environment (Northern Ireland) Order 2002 Part III, Local Air Quality Management Technical Guidance LAQM.TG16.

[9] Environmental Protection UK and Institute of Air Quality Management (Version 1.2 Updated January 2017). Land Use Planning & Development Control: Planning for Air Quality.

[10] Institute of Air Quality Management (Version 1.1 Updated June 2016). Guidance on the Assessment of Dust from Demolition and Construction.

[11] DMRB, Volume 11, Section3, Part 1, HA207/07 Air Quality.

[12] UK APIS, Website: www.apis.ac.uk

[13] Environment Agency. https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit (last update August 2016)

[14] IAQM Guidance on the assessment of odour for planning, Version 1.1, July 2018.

the potential amenity impacts. To facilitate the assessment of the significance of predicted odour exposure on amenity, the guidance defines receptor sensitivity and proposes 'odour effect descriptors' which combine the relative sensitivity of the receptors, the nature (or offensiveness) of the odour with quantitative predicted odour exposure levels.

- DEFRA, Process Guidance Note 3/15 (12), Statutory Guidance for roadstone coating[15] – The guidance sets out the Best Available Techniques for the sector, including applicable mitigation measures.

- IAQM, Guidance on the Assessment of Mineral Dust Impacts for Planning[16]. This guidance was designed specifically for the planning process. It sets out a structured methodology for the assessment of impacts from mineral dust and consideration of their significance.

- Welsh Government, Local Air Quality Management, Policy Guidance, June 2017[17] - details the approach that Local Authorities should follow in carrying out their functions under Part IV of the Environment Act 1995. It states that they should adopt the five ways of working set out in the Well-being For Future Generations (Wales) Act 2015.

- IAQM, A guide to the assessment of air quality impacts on designated nature conservation sites[18] - details the approach that should be followed in the assessment of the air quality impacts of development on designated nature conservation sites. The guide details the consideration that should be given to in-combination impacts from other projects and plans as well as the proposed development alone. Within the guide, IAQM acknowledges that EIA terminology does establish a difference in meaning between 'in-combination effects' and 'cumulative effects', however the document continues to use 'in-combination' to describe both. For the purpose of this ES chapter the distinction between 'in-combination effects' and 'cumulative effects' has been maintained (See Chapter 12 for further definition of these terms).

Policy

Planning Policy Wales (2018)

9.2.7 Planning Policy Wales (10th Edition)[19] sets out the land use planning policies in Wales. Section 6.7 'Air Quality and Soundscape" includes air quality specific policies, including:

- Paragraph 6.7.6 – *In proposing new development, planning authorities and developers must, therefore:*

  - *address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors;*

  - *not create areas of poor air quality or inappropriate soundscape; and seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate*

[15] DEFRA (2012). Process Guidance Note 3/15 (12). Statutory guidance for roadstone coating, September 2012

[16] IAQM (2016) Guidance on the Assessment of Mineral Dust Impacts for Planning. Institute of Air Quality Management, London. v.1.1, 2016.

[17] Welsh Government (2017). Local air quality management in Wales. Policy Guidance, June 2017

[18] IAQM (2019) A guide to the assessment of air quality impacts on designated nature conservation sites, Version 1.0, June 2019.

[19] Welsh Government (2018). Planning Policy Wales, Edition 10, December 2018

soundscape […]"

- Paragraph 6.7.10 – *"It will be important to identify wider mitigation solutions to reduce air and noise pollution and to avoid exacerbating problems in existing air quality management areas or noise hotspots through the provision of green infrastructure identified as part of Green Infrastructure Assessments, by the provision of electric vehicle charging infrastructure or through promoting the need to consider effective design solutions. Planning authorities should work closely with bodies such as the Public Service Boards in the preparation of their well-being plans and seek input from their own Environmental Health departments."*

- Paragraph 6.7.16 – *Relevant considerations in making planning decisions for potentially polluting development are likely to include:*

  - *location, including the reasons for selecting the chosen site itself;*

  - *impact on health and amenity;*

  - *effect of pollution on the natural and built environment and the enjoyment of areas of landscape and historic and cultural value; […]*

  - *resilience, including where there may be cumulative impacts on air or water quality which may have adverse consequences for biodiversity and ecosystem resilience;*

  - *the risk and impact of potential pollution from the development, insofar as this might lead to the creation of, or worsen the situation in, an air quality management area, a noise action planning priority area or an area where there are sensitive receptors; "*

Cardiff Local Development Plan 2016

9.2.8 In the Cardiff Local Development Plan[20], Policy KP18: Natural Resources states:

- *"In the interests of the long-term sustainable development of Cardiff, development proposals must take full account of the need to minimise impacts on the city's natural resources and minimise pollution, in particular the following elements: […] iii. Minimising air pollution from industrial, domestic and road transportation sources and managing air quality;"*

9.2.9 In addition, Policy EN13: Air, Noise, Light Pollution and Land Contamination states:

- *"Development will not be permitted where it would cause or result in unacceptable harm to health, local amenity, the character and quality of the countryside, or interests of nature conservation, landscape or built heritage importance because of air, noise, light pollution or the presence of unacceptable levels of land contamination.*

Planning for Health and Wellbeing Supplementary Planning Guidance (SPG) 2017

9.2.10 The SPG[21] was developed to help guide planners, developers and investors "*on how our environment and the planning decisions we make, impact health and wellbeing of the populations*".

9.2.11 Detailed Policy C6: Health identifies tackling health inequalities as a priority and identifies existing

[20] CC (2016). Cardiff Local Development Plan 2016-2026. Adopted Plan, January 2016.

[21] CC (2017). Planning for Health and Well-being. Supplementary Planning Guidance, Approved November 2017

air quality related policies in the LDF that also address health, quality of life and amenity.

Scoping Opinion

9.2.12 A summary of the scoping opinion comments relating to air quality are summarised in Table 9-3.

Table 9-3: Scoping Opinion

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within ES
Pages 20-24; Section 6.2	Section 6.2	*"I can confirm that I am satisfied by the devised approach and happy for the applicant to proceed with the outlined air quality assessment to examine construction and operational phase impacts of the proposal."*	Further Consultation with Cardiff Council ('CC') was undertaken to confirm changes to scope due to detailed project information.	Paragraph 9.2.12; Chapter 9 – Air Quality;
Pages 20-24; Section 6.2	Section 6.2	The Applicant needs to fully consider all the potential impacts on the features of the Severn Estuary SAC, SPA, Ramsar and SSSI in the Environmental Statement (ES). The potential for cumulative effects of the proposed development will also need to be considered. In particular, the potential for aerial emissions to cause pollution of the Severn Estuary during operation of the development will need to be considered. Therefore, a comprehensive air quality assessment will be required.	A series of screening assessments were undertaken to identify whether, considering the activities on Site, there is a need for detailed assessment of impacts on ecological receptors. Further Consultation with CC was undertaken to confirm changes to scope and to confirm that no detailed assessment of impacts on designated sites is required.	Paragraph 9.2.12; Chapter 9 – Air Quality; Chapter 13(Ecology); Chapter 14 (Assessment of Cumulative Effects)
Pages 20-24; Section 6.2	Section 6.2	We assume there will be a combustion process at the site. If so, it is important to know what the net rated thermal input in Megawatts (MWth) is, as this will determine the appropriate screening distance from the emission source. We advise the Applicant, once the MWth of the site is confirmed, to contact us to clarify the most appropriate screening distance for the air quality assessment.	No significant combustion sources are anticipated on Site. Further Consultation with CC was undertaken to confirm changes to scope due to detailed project information.	Paragraph 9.2.12; Chapter 9 – Air Quality; Appendix 9-3

Page & Paragraph No.	Scoping Opinion	Comments	Outcome	Reference within ES
Pages 20-24; Section 6.2	Section 6.2	*"The Environment Agency's guidance Risk Assessment for your Environmental Permit can be used to assess the impacts of emissions on designated sites. Although this guidance is designed for environmental permitting, the method described is appropriate for developments such as this one. A list of pollutants that need to be assessed is provided in this guidance."*	EA guidance was referenced in the assessment of impacts on designated sites.	Paragraph 9.2.12; Chapter 9 – Air Quality; Appendix 9-3
Pages 20-24; Section 6.2	Section 6.2	Impacts from dusts arising on designated sites should also be considered. Guidance on dust assessments are also from the Institute of Air Quality Management (IAQM)"-	A screening assessment of potential dust impacts on designated sites was undertaken.	Chapter 9 – Air Quality
Pages 20-24; Section 6.2	Section 6.2	*"The Applicant should also be aware of the Medium Combustion Plant Directive and the associated emission limit values that may apply to this process. Additional information is available from the IAQM and our website."*	The Medium Combustion Plant Directive (MCPD) NRW interim guidance states that "*Asphalt plants – where the gaseous products of combustion are used for drying and heating aggregates before inclusion in the asphalt as part of a manufacturing process;*" are excluded.	Not applicable

Additional Consultation

9.2.13 Further pre-application consultation with Specialist Enterprise Services at Cardiff Council ('CC') was undertaken to confirm changes to the scope in light of detailed project information becoming available. The revised scope was agreed with CC and a copy of the e-mail communication can be found in Appendix 9-5.

9.2.14 As can be noted from the communications within Appendix 9-5, this amendment to the proposed scope of work included the removal of the need for a detailed assessment of emissions of NO_2 from the main stack at the Site.

9.2.15 Following the initial submission of the ES, comments were received from Natural Resource Wales (NRW). The comments contained the following requirement: *"Requirement 1: Designated Sites – further information is required to determine if changes in air quality will avoid significant and adverse effects on the integrity of the Severn Estuary SAC/SSSI"*. In addition, the CC EHO also identified the need for a detailed assessment of potential air quality impacts on the Estuary. As such,

a detailed assessment of the air quality impacts on the Severn Estuary SAC/SSSI habitats, including the Atlantic Salt meadow feature, has been undertaken, after consultation with the CC EHO (a copy of the e-mail communication can be found in Appendix 9-5).

9.2.16 Additional comments were also received from NRW in November 2019 in regards to the assessment of combustion emissions of PM_{10} and NO_x from stack A5, the main stack on site associated with the combustion units. As a result detailed modelling of emissions of NO_x were undertaken to assess in combination impacts with traffic emissions associated with the site over the Severn Estuary SAC/SSSI habitats.

9.2.17 The dispersion modelling did not consider PM_{10} emissions from stack A5 as the existing screening assessment detailed within this chapter has demonstrated that potential impacts are not significant. In addition, emissions of PM_{10} from onsite activities, assessed as part of the operational dust assessment, are more significant than potential emissions of $PM_{10}$from stack A5, particularly in regards to short-term impacts. This coupled with existing significant sources of PM_{10}, such as the steelworks, that are located between the site and the closest residential areas to the site (450m to the north), it is reasonable to conclude that impacts from PM_{10} from the site are not significant. In summary, the existing qualitative assessment of emissions of PM_{10} from on-site activities and from stack A5 have demonstrated that no significant impacts are anticipated. Undertaking detailed dispersion modelling of emissions of PM_{10} is unlikely to alter the conclusions of the existing qualitative assessment, considering the stack height, the anticipated emission concentrations and the location of the nearest residential receptors.

Assessment Methodology

9.2.18 The following paragraphs detail the assessment methodology utilised for the construction and operational phase of the proposed development.

Study Area

9.2.19 The construction phase dust assessment is undertaken where there are: 'human receptors' within 350m of the site boundary, or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s); and/or 'ecological receptors' within 50m of the site boundary, or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s). It is within these distances that the impacts of dust soiling and increased particulate matter in the ambient air will have the greatest impact on local air quality at sensitive receptors. This is based on the IAQM '*Guidance on the Assessment of Dust from Demolition and Construction*'.

9.2.20 In terms of the study area considered for the operational phase assessment, this has been defined by the location of the roads that are likely to experience the greatest change in traffic flows or composition and receptors, including designated sites, in the vicinity of the operational activities on Site that can generate dust and odour.

9.2.21 The operational assessment considered sensitive ecological receptors within 200m from an affected road defined in the DMRB guidance, within 250m from the site boundary defined in the IAQM minerals guidance and within the distance criteria set out in the EA's online guidance that state that the following designated sites should be considered:

- Special Protection Areas (SPAs), Special Areas of Conservation (SACs) or Ramsar sites within 10km of the stack; and

- Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNR), Local Nature Reserves (LNR), Local Wildlife Sites (LWS) and Ancient Woodland (AW) within 2km of the stack.

Construction Phase – Dust

9.2.22 The assessment of construction dust has been undertaken with reference to IAQM '*Guidance on the assessment of dust from construction and demolition*'. The assessment of risk is determined by considering the risk of dust effects arising from four activities (demolition, earthworks, construction, track-out) in the absence of mitigation.

9.2.23 The assessment methodology considers three separate dust impacts with account being taken of the sensitivity of the area that may experience these effects. They include annoyance due to dust soiling, the risk of health effects due to an increase in exposure to PM_{10} and harm to ecological receptors.

9.2.24 The first stage of the assessment involves a screening to determine if there are sensitive receptors within threshold distances of the site activities associated with the construction phase of the proposed development. No further assessment is required if there are no receptors within a certain distance of the works; 350m for human receptors and 50m for designated ecological receptors.

9.2.25 The dust emission class (or magnitude) for each activity is determined on the basis of the guidance, indicative thresholds and expert judgement. The risk of dust effects arising is based upon the relationship between the dust emission magnitude and the sensitivity of the area. The risk of impact is then used to determine the mitigation requirements

9.2.26 Descriptors for magnitude of impact and impact significance used in this assessment of construction phase dust are as presented in Appendix 9-1.

Construction Phase – Traffic and Plant Emissions

9.2.27 In addition to impacts on local air quality due to on-site construction activities, exhaust emissions from construction vehicles and plant may have an impact on local air quality adjacent to the routes used by these vehicles to access the Site. As information on the number of vehicles and plant associated with the construction phase was not available at the time of writing, a qualitative assessment of their impact on local air quality has been undertaken using professional judgement and by considering the following:

- the number and type of construction traffic and plant likely to be generated by this phase of the proposed development;
- the number and proximity of sensitive receptors to the Site and along the likely routes to be used by construction vehicles; and
- the likely duration of the construction phase and the nature of the construction activities undertaken.

Operational Phase – Traffic Emissions

9.2.28 A screening assessment of potential impacts on human receptors from operational traffic has been undertaken with reference to the EPUK and IAQM indicative criteria, detailed below:

- a change of light duty vehicle (LDV)[22] flow of more than 500 annual average daily traffic (AADT) (outside an AQMA);
- a change of heavy duty vehicle (HDV)[23] flows of more than 100 AADT (outside an AQMA);
- a change of LDV flows of more than 100 AADT (within an AQMA); and/or
- a change of HDV flows of more than 25 AADT (within an AQMA).

9.2.29 The screening criteria have been used to identify whether the anticipated operational traffic requires further assessment in regards to impacts on human receptors or whether operational traffic effects on human receptors can be screened out.

9.2.30 A summary of the methodology applied to assess impacts from traffic emission on the Severn Estuary, is summarised below and it is presented in full in Appendix 9-6.

9.2.31 For the purposes of the assessment of potential impacts on the Severn Estuary detailed air dispersion modelling has been undertaken using the Cambridge Environmental Research Consultants (CERC) ADMS Roads v4.1 air dispersion model, following guidance provided in LAQM.TG(16) to predict annual mean concentrations of NO_x for the various scenarios. The model requires various input data, including emissions from each section of road (based upon vehicle flows and vehicle type), and the road characteristic (including road width and street canyon height, where applicable).

9.2.32 The following scenarios have been modelled:

- *'Do Minimum' scenario (DM): situation if the scheme is not taken forward (opening year 2023 and inclusive of anticipated traffic from local plan allocations);*
- *'Do Something' scenario (DS): situation if the scheme is taken forward (opening year 2023 and inclusive of anticipated traffic from local plan allocations); and*
- *'Do Something' scenario (DSC): situation if the scheme is taken forward and including cumulative developments (opening year 2023 and inclusive of anticipated traffic from local plan allocations).*

9.2.33 In addition to the above scenarios the modelled traffic exhaust concentrations of NO_x have been subject to verification in accordance with LAQM.TG(16).

9.2.34 The assessment considered the likely changes in air quality as a result of the proposals according to the scenarios detailed above, on ambient NO_x AQOs (refer to as Critical Levels) and on nitrogen and acid deposition (refer to as Critical Loads).

Operational Phase – Stack Emissions

9.2.35 The assessment of emissions of PM_{10} from the stack was undertaken following the screening approach detailed in EA's AERA guidance. The screening assessment was undertaken as part of the Environmental Permit variation application to NRW (Appendix 9-3) and was reported in the Main

[22] As defined by the design manual for roads and bridges (DMRB), and includes vehicles <3.5tonnes including cars and light duty vehicles.
[23] As defined by the design manual for roads and bridges (DMRB), and includes vehicles ≥3.5tonnes and includes heavy duty vehicles and buses

Installation Report[24]. The objective of the study was to assess the impact of potentially significant emissions against the relevant Air Quality Standards and Environment Assessment Levels (EALs) for the protection of human health and the environment.

9.2.36 Screening of NO_x emissions from stack A5 were also undertaken and presented in Schedule 5 Response[25]. Detailed dispersion modelling of NO_x emissions, utilising the ADMS 5 model, was undertaken to assess potential impacts over the Severn Estuary SAC/SSSI habitats and it is presented in Appendix 9-6.

9.2.37 The principal of the screening technique is based on dispersion factors for differing stack heights derived from atmospheric dispersion modelling. The method requires details of the pollutant emissions rate and effective release height. The predicted ground level concentration is then compared to the standards for air quality to determine if emissions are insignificant or whether detailed modelling is required.

9.2.38 In accordance with AERA guidance, emissions to air can be considered to be insignificant and not require further assessment if:

- the long term process contribution is <1% of the long term environmental standard; and
- the short term process contribution is <10% of the short term environmental standard

9.2.39 For process contributions that cannot be considered insignificant, the background concentrations are taken into consideration and the need for detailed modelling is determined against the following threshold criteria:

- maximum Process Contribution (long term) + background concentration >70% of the Environmental Assessment Level; or
- maximum Process Contribution (short term) > 20% of the difference between the short term environmental benchmark minus twice the long term background concentration.

Operational Phase - Dust

9.2.40 Dust is solid particulate matter in the size range of 1 – 75µm in diameter. This assessment examines the sources of dust associated with the operation of the roadstone coating process and makes reference to the IAQM minerals guidance. The assessment takes into account the prevailing meteorological conditions at the site; particularly the frequency of wind speeds capable of carrying airborne dust (i.e. greater than 5.5m/s)[26] and the frequency of rainfall considered sufficient to effectively suppress wind-blown dust emissions (i.e. greater than 0.2mm/day[27]) in assessing dust nuisance impacts.

9.2.41 The IAQM guidance assesses the impacts of both airborne particles (PM_{10}) and deposited dust on human and ecological receptors. It presents a simple distance-based screening process to identify those mineral sites where the dust impacts are likely to be significant and require further

[24] Celsa Group (2019). Main Installation Report, Normal Variation (Asphalt Plant). Celsa, Manufacturing (UK) Ltd, Tremorfa New Melt Shop, Tremorfa Works, Rev 00 (July 2019)

[25] Celsa Group (2019). Schedule 5 Response, Normal Variation, Normal Variation (Asphalt Plant). Celsa, Manufacturing (UK) Ltd, Tremorfa New Melt Shop, Tremorfa Works, Permit Ref: EPR/TP3639BH (October 2019)

[26] IAQM (2016). Guidance on the Assessment of Mineral Dust Impacts for Planning, May 2016 (v1.1)

[27] Leeds University. Good Quarry. Available at: http://www.goodquarry.com/

assessment. Where a more detailed assessment is required, a basic assessment framework is presented which employs the Source – Pathway – Receptor approach to evaluate the risk of dust impacts and effects.

9.2.42 The IAQM uses a distance-based screening criteria for both airborne concentrations and deposited dust. It illustrates that dust impacts from sand and gravel sites, that best characterise activities on Site, are considered to occur mainly within 250m of the operations. In accordance with the IAQM methodology, if there are relevant receptors within 250m then a dust impact assessment for both dust deposition and PM_{10} will be required.

9.2.43 The IAQM method is a qualitative risk based approach based on the source-pathway-receptor conceptual model, i.e. the hypothetical relationship between the source (S) of the pollutant, the pathway (P) by which exposure might occur, and the receptor (R) that could be adversely affected. The key steps are:

- assess Site Characteristics and Baseline Conditions. Incorporates a review of baseline conditions including PM_{10} background and any existing dust deposition data; a description of site activities to inform the Source Term; and characterisation of the site setting in terms of the location and sensitivity of representative receptors, and meteorological conditions (wind patterns and rainfall);

- estimate Dust Impact Risk. The Dust Impact Risk for each representative receptor is determined from the Source Term (residual dust risk after embedded mitigation) and Pathway. The 'pathway effectiveness' is based upon the distance of the receptor from the dust source and the frequency at which it is down-wind from the source (factoring out the frequency of wet days); and

- estimate Likely Magnitude of Effect. The risk predicted at each representative receptor is considered together with the sensitivity of that receptor, to give the likely magnitude of the effect that will be experienced.

9.2.44 With respect to PM_{10} if background concentrations are <17µg/m^3, it is considered there is little risk of the process contribution from the Site causing an exceedence of the annual mean AQO. Where the background concentrations are >17µg/m^3 the process contribution should be estimated and the total predicted environmental concentration (process contribution +background) used to assess the potential significance of effects on the surrounding receptors.

Operational Phase - Odour

9.2.45 To assess the potential impacts associated with odour releases during the operational phase, a qualitative assessment has been undertaken in accordance with the Source-Pathway-Receptor conceptualised model using guidance published by the IAQM '*Guidance on the assessment of odour for planning'*.

9.2.46 A qualitative risk-screening assessment of dust generation potential for the construction activities has been carried out. This assessment considers:

- the potential magnitude of released odour;

- buffer distances between sources and receptors; and

- receptor sensitivity.

9.2.47 Descriptors for odour impact and effect used in this assessment of operational phase odour are from the IAQM Guidance and reproduced in Appendix 9-2 of this report.

Sensitivity Criteria

Dust and Odour

9.2.48 Appendix 9-1, 9-2 and 9-3 detail the construction dust, operational odour and operational dust assessment methodology respectively. They describe the sensitivity criteria used for receptors. A summary of the sensitivity of human receptors to dust and odour, based on the IAQM guidance documents for construction dust, odour and operational dust is presented in Table 9-4.

Table 9-4: Sensitivity of Receptors to Dust and Odour

Sensitivity	Indicative examples
High	• Residential dwellings • Museums • Long term car parks/car showrooms • Internationally designates ecological sites (i.e. SACs/SPAs/Ramsar)
Medium	• Parks • Places of Work • Nationally designated ecological sites (i.e. SSSI)
Low	• Playing fields • Farm land • Locally designated ecological sites (i.e. local nature reserves)

9.2.49 In regard to the sensitivity of ecological receptors to dust the following general rules apply:

- High sensitivity: international or national designations and the designated features that may be sensitive to dust;
- Medium sensitivity: locations where there is a particular important plant species where the sensitivity is uncertain or unknown; and
- Low sensitivity: locations with a local designation where the features may be affected by dust deposition.

9.2.50 The IAQM construction dust assessment methodology recommends that significance criteria are only assigned to the identified risk of dust effects occurring from a construction activity with appropriate mitigation measures in place. For almost all construction activities, the application of effective mitigation, should prevent any likely significant effects occurring to sensitive receptors and therefore the residual effect will normally be negligible.

Stack and Traffic Emissions

9.2.51 The sensitivity of human receptors and nationally and internationally designated sites (i.e. SSSI, SPAs, SACs, Ramsar) to emissions to air from vehicle exhausts, plant and stacks is considered high. The AQOs (see Table 9-1), according to DEFRA's LAQM.TG(16) guidance, should be assessed at locations where members of the public are likely to be regularly exposed for a period of time

appropriate to the averaging period of the objective. A summary of relevant exposure for the AQOs are shown below.

Table 9-5: Relevant Public Exposure

Averaging Period	AQO's should apply at:	AQO's don't apply at:
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-hour mean and 8-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	Any outdoor locations where members of the public might reasonably expected to spend one hour or longer.	Kerbside sites where public would not be expected to have regular access

Magnitude of Change (Impact)

Construction Phase – Dust

9.2.52 According to the IAQM construction dust guidance the dust emission class (or magnitude) for each construction activity is determined on the basis of the guidance, indicative thresholds and expert judgement. Appendix 9-1 presents the construction dust methodology in detail.

Operational Phase – Odour

9.2.53 According to the IAQM odour guidance the risk of odour exposure (impact) is defined based on effectiveness of the pathway and the source odour potential. Appendix 9-2 provides the operational odour assessment methodology in detail including how the pathway effectiveness and source potential is assigned and how they are combined to define the risk to odour exposure (see Table 9-2-4, Appendix 9-2).

Operational Phase – Dust

9.2.54 According to the IAQM minerals guidance the dust impact risk is defined based on the effectiveness of the pathway and the residual source emission. Appendix 9-3 provides the operational dust assessment methodology in detail including how the pathway effectiveness is assigned and how it is combined with the residual source emission to estimate dust impact risk (see Table 9-3-5, Appendix 9-3).

Operational Phase – Stack Emissions

9.2.55 The assessment of potential impacts from stack emissions for the operational phase was undertaken through a series of screening assessments. Therefore, no magnitude of change was assigned when assessing impacts on human receptors. Detailed dispersion modelling of NO_x emissions was undertaken to assess potential impacts over the Severn Estuary SAC/SSSI habitats and the results were combined with the model outputs of the traffic emission assessment. The magnitude of change assigned to the in-combination effects is described in paragraph 9.2.57.

Operational Phase – Traffic Emissions

9.2.56 In line with EPUK and IAQM guidance the traffic generated by the operational phase was first screened using the indicative criteria to screen out impacts on human receptors. This screening assessment considered the proposed development alone and other relevant plans and projects to capture potential cumulative impacts resulting from development trips. Cumulative development trips triggered the need for a detailed assessment of impacts from traffic emissions on the Severn Estuary designated nature conservation sites; as according to the IAQM nature conservation sites guidance, sites within 200m of an affected road (Rover Way in this case) require a detailed, quantitative assessment.

9.2.57 With regards to potential impacts over the Severn Estuary, the assessment has utilised the EA's AERA screening criteria, whereby an impact is considered to be insignificant when the process Contribution is 1% (or less) of the long term environmental standard and 10% (or less) of the long term environmental standard for the ecological site under consideration. The use of 1% of the Critical Load is also outlined within the IAQM's position statement[28] which suggests that 1% of the Critical Load should be used to determine either where further assessment is required or to screen out effects that are not likely to be significant.

Significance of Effect

9.2.58 The significance of effects for the elements (i.e. construction dust, operational dust and odour) considered in this assessment are assigned as follows:

- Construction dust: Appendix 9-1, Tables 9-1-5 to 9-1-8;
- Operational odour: Appendix 9-2, Table 9-2-4; and
- Operational dust: Appendix 9-3, Table 9-3-7.
- Operational traffic and stack emissions: Appendix 9-6 and Chapter 12 (Ecology).

9.2.59 In addition, the following general terms have been used to define the significance of the effects identified:

- **Substantial/Major effect**: where the proposed development could be expected to have a very significant effect (either positive or negative) on receptors. For human receptors it is defined as when predicted impacts are classed as substantial, based on the applicable criteria. For ecological receptors this is defined by the project ecologist and it is specific for each

[28] IAQM (2015). Position Statement: Mitigation of Development Air Quality Impacts;

designated site;

- **Moderate effect**: where the proposed development could be expected to have a noticeable effect (either positive or negative) on receptors. For human receptors it is defined as when predicted impacts are classed as moderate, based on the applicable criteria. For ecological receptors this is defined by the project ecologist and it is specific for each designated site.

- **Minor effect**: where the proposed development could be expected to result in a small, barely noticeable effect (either positive or negative) on receptors. For human receptors it is defined as when predicted impacts are classed as slight, based on the applicable criteria. For ecological receptors this is defined by the Project ecologist and it is specific for each designated site; and

- **Neutral/Negligible**: where no discernible effect is expected as a result of the proposed development on receptors. For human receptors it is defined as when predicted impacts are classed as slight, based on the applicable criteria. For human receptors it is defined as when predicted impacts are classed as negligible, based on the applicable criteria. For ecological receptors a negligible effect is based on IAQM's position statement[29] for nitrogen deposition and the DMRB Advise Note for annual NO_x.

Mitigation Hierarchy

9.2.60 An IAQM position statement recommends basic hierarchy principles for determining appropriate mitigation measures for a development scheme. These are as follows:

1. Preventing and Avoiding – the initial step should be to, if possible, prevent or avoid exposure to the pollutant by isolating or removing potential sources. The design process should take air quality into account;

2. Reduction and Minimisation – all options for avoiding exposure and preventing exposure should be implemented. Preference should be given to measures which are close to the potential source, then those which act on the pathway and finally measures close to the point of exposure; and

3. Off-setting – compensating for impacts associated with the new development by contributing to air quality improvements elsewhere.

9.2.61 This hierarchy for mitigation measures has been considered herein in the determination of mitigation measures required.

Effects Not Requiring Further Assessment

9.2.62 As detailed above, the following potential effects on air quality have been excluded from assessment given their requisite screening criteria:

- Construction phase traffic emissions: Information on traffic movements anticipated during construction works was unavailable for the completion of the Air Quality Assessment. However, given the scale of the proposals and timescales for construction, the proposed development is not anticipated to result in an increase in movements above the DMRB or the

[29] EPUK and IAQM, 'Land-Use Planning and Development Control: Planning for Air Quality'; v1.2 2017

EPUK and IAQM criterion. The duration of movements will be short-term in nature and are not considered further within the context of this assessment. Therefore, in accordance with the criterion presented within EPUK and IAQM guidance, additional road vehicle trips during the construction phase of the scheme "*can be considered to have insignificant effects*" on air quality.

- Construction phase NRMM[30] emissions: According to LAQM.TG(16) guidance, with the application of suitable control measures and site management, exhaust emissions from on-site NRMM are "*unlikely to make a significant impact on local air quality. In the vast majority of cases they will not need to be quantitatively assessed*". As such, the impacts and effects on air quality from on-site NRMM are considered to be not significant.

Limitations

9.2.63 As detailed information for the construction phase of the proposed development was not available professional judgement has been used in the completion of the construction phase assessment.

There is no detailed information on the distribution of operational traffic on the local road network. As a result and to ensure a worst case scenario it has been assumed that all operational traffic will travel Rover Way north. This is in line with the request from NRW and CC to consider the absolute worst case.

[30] mobile machines, transportable industrial equipment or vehicles which are fitted with an internal combustion engine and not intended for transporting goods or passengers on roads

9.3.0 Baseline Conditions

Current Baseline

9.3.1 CC has designated four AQMAs within their administrative area as part of their Review and Assessment work. The most relevant AQMAs are Stephenson Court AQMA and Cardiff City Centre AQMA, located approximately 2km and 2.8km northeast of the Site respectively. The AQMAs were designated due to exceedences of the annual mean AQS objective for NO_2.

9.3.2 CC in conjunction with Shared Regulatory Services have developed a citywide Clean Air Strategy (CAS) & Action Plan for Cardiff. The CAS & Action Plan sets out strategic measures to improve air quality with a focus on traffic derived NO_2.

9.3.3 The Site is located in a heavily industrialised area, where air quality is influenced by emissions from existing industrial facilities, including the Celsa Steel works, as well as traffic along Rover Way. The Welsh Water Waste Water Treatment Works (WwTW) is located approximately 250m west from the operational area of the Site.

9.3.4 According to CC 2018 Air Quality Progress Report[31], detailing the latest air quality monitoring in Cardiff, there are three automatic monitoring sites. However, as the Site is an industrial area, data from the automatic monitoring station are not considered relevant as they are located either at roadside locations in the city centre or at urban traffic/ urban background locations.

9.3.5 CC measures NO_2 concentrations with passive monitors (diffusion tubes) at 75 locations. There are three diffusion tubes located in relative proximity to the Site. A summary of the annual mean NO_2 concentrations recorded at these locations are presented in Table 9-6 and are the location of the tubes is shown in Figure 9-1.

Table 9-6: CC Diffusion Tube Monitoring Results

Site	Classification	Distance from Site (m)	Annual Mean NO_2 Concentrations ($\mu g/m^3$)				
			2013	2014	2015	2016	2017
169	Urban Centre	950m to the southeast	18.1	16.3	18.4	16.2	16.2
172	Roadside	750m to the west	47.8	44.5	48.8	43.5	43.5
173	Roadside	850m to the west	33.3	28.4	28.7(A)	29.6	29.6
Notes (A) Data has been annualised according to the LAQM.TG(16) guidance.							

[31] CC (2018). 2018 Annual Air Quality Progress Report for Cardiff Council, August 2018

Figure 9-1: CC Diffusion Tube Locations

9.3.6 The annual mean concentrations recorded at tube 172 and 173, located on Ocean Way, do not represent relevant exposure but are indicative of annual mean NO_2 concentrations at roadside locations in the vicinity. It is evident that there are significant differences in recorded concentrations between these tubes, located on the opposite sides of same roundabout. Ocean Way roundabout experiences large number of HDVs and therefore concentrations recorded at these tubes are not representative of concentrations across the Site. However, it is reasonable to assume that annual mean NO_2 concentrations at the northern boundary of the Site, along Rovers Way and Tide Field Road roundabout will be in line with concentrations recorded at tube 173. Diffusion tube 169, is located in a built-up urban area and therefore is not representative of pollutant concentrations at the Site.

9.3.7 Background pollutant concentrations used in the assessment have been taken from the national maps provided on the DEFRA website[32], where background concentrations of those pollutants included within the AQS have been mapped at a grid resolution of 1x1km for the whole of the UK. Estimated concentrations are available for all years between 2017 and 2030. The maps assume that background concentrations will improve (i.e. reduce) over time, in line with the predicted reduction in vehicle emissions and emissions from other sources. However, there is currently some uncertainty over how representative the future predictions are. To address this uncertainty, it has been assumed that there will be no improvement to the baseline in future years.

9.3.8 Table 9-7 summarises the background of NO_2, PM_{10} and $PM_{2.5}$ for 2019 that were utilised in the assessment. All of the annual mean background concentrations are well below the relevant

[32]Available at: https://uk-air.defra.gov.uk/data/laqm-background-home [Accessed 20/05/2019]

objectives.

Table 9-7: Defra Background Maps

Grid Reference (X, Y)	Annual Mean Concentrations (µg/m^3)		
	NO_2	PM_{10}	$PM_{2.5}$
321500, 176500	16.1	14.6	10.2

9.3.9 In summary pollutant concentrations at the Site are likely to be in line with the relevant AQS objectives. Annual mean concentrations of NO_2 will be higher along Rover Way and Tide Fields Road, with concentrations dropping with distance from the road.

Meteorology

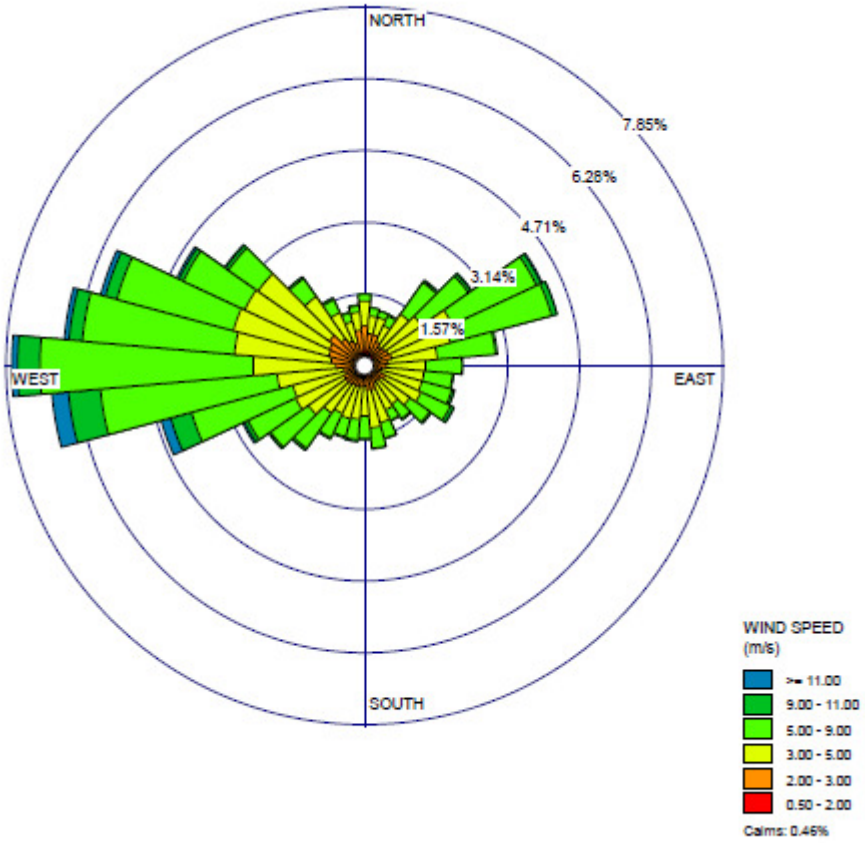
9.3.10 In relation to construction dust the generation, release and dispersion of fugitive dust are particularly dependent upon weather conditions and the nature of the handled material. The prevailing meteorological conditions at any site would be dependent upon many factors including its location in relation to macroclimatic conditions as well as more site specific, microclimatic conditions. The most important climatic parameters governing the emission and magnitude of impact of dust are:

- wind direction which determines the broad transport of the emission and the direction in which it is dispersed; and
- wind speed will affect ground level emissions by increasing the initial dilution of pollutants in the emission; it will also affect the potential for dust entrainment.

Wind Speed and Direction Data

9.3.11 A meteorological station considered representative of local site conditions with available data is Cardiff Airport, approximately 17km south-west of the Site. A 5-year wind rose covering the period 2012 – 2016 is presented in Figure 9-2.

Figure 9-2: Wind rose for Cardiff Airport Observation Station (2012-2016)



9.3.12 From Figure 9-2 it can be seen that the majority of winds are from the west, winds from these sectors occur for approximately 20% of the year. On this basis, locations in eastern sectors have the highest potential for impacts from any dust or odour emissions originating from the Site, to occur.

Rainfall

9.3.13 Relevant rainfall data applicable to the Site has been obtained from the Met Office website[33] of UK mapped climate averages for 1981-2010. The average annual rainfall >0.2mm/day for the area of the Site is 170 – 180 days per year, comprising approximately 50% of the year.

Receptors

9.3.14 The term 'sensitive receptors' includes any persons, locations or systems that may be susceptible to changes in abiotic factors as a consequence of the proposed development. These have been identified as human and ecological receptors that are sensitive to construction dust, operational dust and operational odour.

[33] , http://www.metoffice.gov.uk/public/weather/climate, Accessed 10/06/19

Construction Dust Receptors

9.3.15 The main receptors likely to be affected by the generation of construction dust are those existing receptors within approximately 350m of the proposed development site boundary and/or within 100m of the route(s) used by vehicles on the public highway, up to 500m from the site entrance(s). However, for those receptors sited in a downwind location from the development Site boundary, potential dust impacts can be witnessed at a distance of greater than 350m on occasion under worst case conditions.

9.3.16 Receptors that are identified as being potentially at risk from dust generation during the construction phase of the development are presented below in Table 9-8.

Table 9-8: Construction Dust Receptors

ID	Receptor	NGR (m)		Approximately distance (m) and direction from development boundary
		X	Y	
DR1	The Cardiff Motocross Centre MX	321689	176237	50 south

9.3.17 The dust sensitive receptor identified in Table 9-8 represents a worst-case location and has been chosen as the closest receptor to the site which may be affected by the generation of construction dust.

9.3.18 With regards to residential receptors in the vicinity of the proposed development, there are none with the 350m buffer zone, recommended within the IAQM guidance. The closest residential receptors are located as follows:

- Caravan site, 600m to the north east; and
- Willows Avenue, 400m to the north.

9.3.19 It should be noted that distances and directions have been based on the receptor location from the red line boundary for the Site. Reference should be made to Figure 9-3 for an illustration of the location of these receptors and buffer zones of receptors to potential construction phase dust, relative to the proposed development.

Operational Dust and Odour Receptors

9.3.20 Sensitive receptor locations are those where the public may be exposed to dust and odour potentially arising from the site during the operational phase. The most sensitive receptor locations with respect to dust and odour are residential dwellings where people generally expect a high level of amenity. Sensitivity to odour has been defined in accordance with the IAQM guidance, as presented in Appendix 9-2.

9.3.21 The surrounding area mainly comprises existing industrial and commercial activities to all sides. The nearest residential properties are approximately 400m to the north Site boundary on Willows Avenue. The location of these dust and odour receptors are shown in Figure 9-3 and summarised

below in Table 9-9.

Table 9-9: Operational Dust and Odour Receptors (Human Receptors)

ID	Receptor	Sensitivity to Odour	NGR (m)		Approximately distance (m) and direction from development boundary
			X	Y	
R1	SIMS Metal Yard	Low	321529	176276	20 east
R2	Cardiff Motocross Centre MX	Medium	321689	176237	50 south
R3	Celsa Steel Works	Low	321333	176390	100 north
R4	Caravan Site	High	321899	176750	600 north-east
R5	Residential properties – Willows Avenue	High	321069	176556	450 north
R6	Willows High School	High	321237	176648	500 north

Ecological Receptors

9.3.22 Air quality impacts associated with the construction and operational phase of the proposed development have the potential to impact on receptors of ecological sensitivity within the vicinity of the Site. The Conservation of Habitats and Species Regulations (2010) requires competent authorities to review planning applications and consents that have the potential to impact on European designated sites (e.g. Special Areas of Conservation (SAC)).

9.3.23 Construction dust guidance from the IAQM states that construction dust impacts at ecological receptors require assessment at locations up to 50m from a development boundary. The DMRB and 2019 IAQM guidance states that SACs including candidate sites, SPAs including potential sites, SSSIs and Ramsar sites within 200m of an 'affected roads' require a detailed assessment of the potential impact upon ambient air quality. The IAQM minerals guidance, applicable to the operational dust assessment, states that receptors within 250m from dust generating activities should be considered. In addition, the EA's AERA guidance states that assessment will need to consider SPAs, SACs or Ramsar sites within 10km of an installation and SSSIs, National Nature Reserves (NNR), Local Nature Reserves (LNR), Local Wildlife Sites (LWS) and Ancient Woodland (AW) within 2km of the installation.

9.3.24 A study was undertaken to identify any statutory designated sites of ecological or nature conservation based on the distance criteria detailed above. This was completed using the Magic web-based interactive mapping service[34], which draws together information on key environmental designations. A search within 50m of the development site boundary indicated no sensitive ecological receptors. Therefore, no impacts on ecological receptors, including the Severn Estuary,

[34] https://magic.defra.gov.uk/. Accessed on 11/06/2019.

from construction dust are anticipated.

9.3.25 When the impacts from the proposed development were considered in isolation, no sensitive ecological receptors were identified within 200m of any 'affected road' surrounding the proposed development. However, a review of relevant projects and plans indicated that potential Cumulative impacts would trigger the need for a detailed assessment of the air quality impacts on the Severn Estuary designated sites.

9.3.26 In addition, the designated habitats (SAC/SSSI/Ramsar) of the Severn Estuary are located within 250m (IAQM minerals guidance) from the Site boundary and therefore potential impacts from operational dust on the Estuary have been considered in this assessment. The Severn Estuary is considered to have a high sensitivity to dust due to the predominant features (tidal mudflats used by overwintering birds) of the habitat within 250m of dust generating activities.

9.3.27 A review of the magic website has identified the two SSSI within 2km of the Site and one Ramsar/SAC/SPA within 10km of the Site. They are summarised in Table 9-10. The identified ecological receptors are assumed to be highly sensitive as they are national and international designated sites.

Table 9-10: Ecological Receptors

ID	Receptor	Designation	Approximately distance (m) and direction from development boundary
E1	Severn Estuary	Ramsar/SAC/SPA/SSSI	200 south
E2	Gwent Levels – Rumney and Peterstone	SSSI	1,300 north-east
E3	Cardiff Beech Woods	SAC	10,000 north

Critical Levels and Critical Loads

9.3.28 The APIS website[35], a support tool for assessment of potential effects of air pollutants on habitats and species developed in partnership by the UK conservation agencies and regulatory agencies and the Centre for Ecology and Hydrology, has been used to provide information on current deposition rates and C_{Lo} for nutrient nitrogen (Table 9-11 and C_{Lo} functions for acidity (Table 9-12 of the Atlantic salt meadows habitat within the Severn Estuary SAC. In regards to ambient background NO_x concentrations, these were based on the latest Defra background maps. The Atlantic salt meadows and other habitats within the Severn Estuary SAC designation are not sensitive to acidity and therefore the Neutral grassland habitat which is most sensitive to acidity within the Severn Estuary SSSI designation was considered.

[35] http://www.apis.ac.uk/

Table 9-11: Nitrogen Critical Loads and Current Loads

Site	Grid Reference (X, Y)	APIS C_{Lo} Class	NO_x Annual Mean (µg/m³)	C_{Lo} Range (kg N/ha/yr)	C_{Lo} Applied in Assessment (kg N/ha/yr)	Current Load (kg N/ha/yr)
Severn Estuary SAC	322044, 177084	Atlantic salt meadows	20.52	20-30	20	13.72

Table 9-12: Acid Critical Load Functions and Current Loads

Site	APIS C_{Lo} Class	C_{Lo} Function (k_{eq}/ha/yr)			Current Load (k_{eq}/ha/yr)	
		CLmaxS	CLminN	CLmaxN	N	S
Severn Estuary SSSI	Neutral grassland	4.13	0.223	4.568	0.9	0.26

Future Baseline

9.3.29 It is expected that, should the proposed development not proceed, the baseline conditions on-site in relation to local air quality will likely remain unchanged. There is the potential that some reduction in pollutant concentrations will occur due to the anticipated reduction in vehicle emissions as older, more polluting vehicles are replaced by cleaner vehicles.

9.3.30 Table 9-13 present the projected DEFRA background map pollutant concentrations for 2023. It indicates reduction in annual pollutant concentrations from the 2019 baseline year.

Table 9-13: 2023 Defra Background Maps

Grid Reference (X, Y)	Annual Mean Concentrations (µg/m³)		
	NO_2	PM_{10}	$PM_{2.5}$
321500, 176500	14.4	14.1	9.8
322500,177500 (Severn Estuary)	12.4	N/A	N/A

9.4.0 Assessment of Effects

Construction Phase Effects

9.4.1 Construction activities will include:

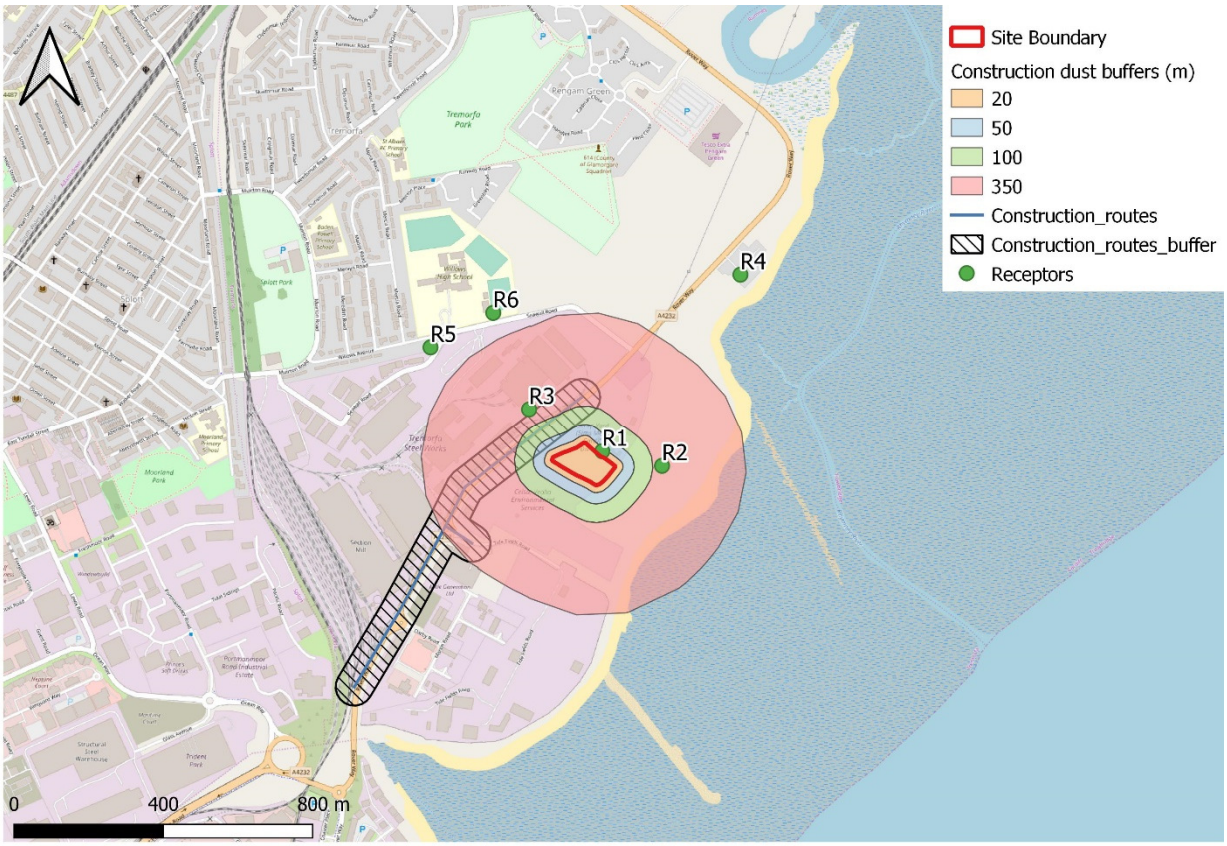
- material export and import;
- temporary stockpiling of materials;
- groundwork for foundations and services;
- construction of buildings;
- landscaping works;
- vehicle movements (with the potential to track-out material from site).

9.4.2 The following subsections present the potential for construction dust to occur and conclude with a determined emission class and risk category, from each of the categories identified by the IAQM Guidance.

Assessment Screening

9.4.3 As shown in Figure 9-3, there are 'human receptors' within 350m of the site but no designated habitat sites within 50m of the Site boundary or within 50m of the Site entrance up to 500m from the Site entrance. Therefore, an assessment of construction dust on ecological receptors (including the Severn Estuary) can be screened out from this assessment but an assessment of construction dust at human receptors is required. There are no sensitive ecological receptors within 50m of the Site boundary, or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s). Therefore, no impacts on the Severn Estuary are anticipated as a result of construction dust.

Figure 9-3: Construction Dust Buffers (Human Receptors)



Potential Dust Emissions Magnitude

9.4.4 The most significant potential source of dust emissions during construction would be the earthworks and construction activities. The entire earthworks and construction phase activities are anticipated to take approximately 18 weeks to complete.

9.4.5 Dust is potentially generated by the action of heavy vehicles (bulldozer, front-end loader, hydraulic excavator, and dump trucks), as well as by the movement of the vehicles on potentially dusty surfaces. Handling and storage of construction materials (aggregates/hard core), haulage across unsurfaced areas are also potential sources of dust generation. The potential dust emission magnitude for each activity is described in Table 9-14.

Table 9-14: Potential Dust Emission Magnitude

Activity	Comments	Dust Emission Magnitude
Demolition	The proposed development land is currently near land with a concrete block to the southeast. There are no significant demolition activities bar removing the concrete stand. Therefore, demolition has not been considered any further.	Not applicable
Earthworks	The proposals comprise a new asphalt plant with additional equipment to aid the processing of waste slag that will feed the plant and supplement the waste slag to be provided by existing operations by GR Plant Ltd (on behalf of Celsa) on the wider Celsa site.	Small

Activity	Comments	Dust Emission Magnitude
	The Site area is less than 2,500m^2 with assumed soil types representing a high-risk potential for suspension when dry due to small particle size. It is assumed that construction phase activities will occur under various weather conditions. For the purpose of this assessment and to provide a worst-case assumption, it has been assumed that earthworks associated with site preparation and landscaping would run concurrently with construction works.	
Construction	The total building volume associated with the proposed development is assumed to be between 11,300m^3. It is assumed that construction phase activities will occur over under various weather conditions. For the purpose of this assessment and to provide a worst-case assumption, it has been assumed that earthworks associated with site preparation and landscaping would run concurrently with construction works. Construction material is assumed to be standard concrete (breakup and laying), which has a high dust potential.	Small
Trackout	Construction vehicles will most likely access the site via the existing highway network off Rovers Way and Tide Fields Way. No details are available at the time of assessment on the number of additional HDV movements associated with construction works, however, given the scale and nature of works required, these are considered to be 'medium' (i.e. a maximum of between 10 and 50 HDV outward movements in any one worst-case day). Due to the size of the site the unpaved road length is considered to be between 50m and 100m.	Medium

Sensitivity of the Area

9.4.6 The sensitivity of the area takes account of a number of factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM_{10}, the local background concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

9.4.7 The sensitivity of the area and the factors considered are presented in Table 9-15.

Table 9-15: Sensitivity of the Area

Sensitivity to:	Comments	Sensitivity
Dust Soiling Impacts	The surroundings comprise industrial and commercial receptors that are classified as having a medium sensitivity to dust soiling. There are between 1 and 10 medium sensitivity receptors within 20m.	Low
Human Health Impacts	The background PM_{10} concentration for the 1km^2 grid square centred on the development (x321500, x176500) is estimated to be 14.6µg/m^3, based upon 2019 mapped background estimates (i.e. falls into the <24µg/m^3 class) and there are between 1 and 10 receptors within 50m.	Low

Risk of Impacts (Unmitigated)

9.4.8 The outcome of the assessment of the potential 'magnitude of dust emissions', and the 'sensitivity of the area' are combined in the table below to determine the risk of impact which is used to inform the selection of appropriate mitigation.

Table 9-16: Risk of Dust Impacts

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling Impacts	Not applicable	Negligible	Low	Negligible
Human Health Impacts	Not applicable	Negligible	Low	Negligible

Operational Phase Effects

Operational Phase Impact Assessment – Ecological Receptors

9.4.9 Modelling of impacts over the Severn Estuary has been undertaken to determine impacts on Critical Loads and Critical Levels, as presented within the following subsections. Reference should be made to Appendix 6.1 for full details of model inputs / treatments for the operational phase assessment of road traffic emissions.

9.4.10 Two separate scenarios were modelled for the 2023 development opening year. Scenario 1 (2023 DS - 2023 DM) incorporated the change in AADT from the proposed development alone. Scenario 2 (2023 DS + Cumulative development) - 2023 DM) incorporated the change in AADT from the proposed development and surrounding developments and plans (i.e. cumulative impacts).

9.4.11 Note that all 2023 sub scenarios are inclusive of local plan allocation contribution to traffic flows.

9.4.12 In addition dispersion modelling of NO_x emissions from stack A5 was also undertaken. Reference should be made to Appendix 6.1 for full details of model inputs / treatments for the operational phase assessment of stack emissions. The output of the traffic and stack dispersion modelling were combined and the total process contribution of NO_x from the site was calculated. The assessment of impacts over the Atlantic Salt Meadow habitat detailed below is also representative of potential impacts of the Severn Estuary SSSI.

Critical Levels

9.4.13 The contributions from additional development trips and emissions from stack A5 to the annual mean and 24-hour NO_x Critical Levels at the roadside boundary of the Atlantic Salt Meadow habitat is presented in Table 9-17 to Table 9-20. Note that annual mean background NO_x concentrations are based on 2023 Defra background maps. The 24-hour mean background NO_x concentrations are 2 x the annual mean. The DS scenario under Verified Modelled Road NO_x Contribution is inclusive of the contribution of emission of NO_x from stack A5.

Table 9-17: Maximum Impacts on Annual Mean NOx Critical Levels –Scenario 1

Receptor	Background NOx Concentration (µg/m³)	Verified Modelled NOx Contribution (µg/m³)		Annual Mean NOx Concentration (µg/m³)		Absolute Concentration Change (µg/m³)	Concentration Change as a % of Critical Level (%)	DS Concentration as a % of Critical Level (%)
		DM	DS	DM	DS			
Grid	17.1	20.7	20.9	37.9	38.1	+0.19	0.63	127
E1_1	19.2	11.5	11.6	30.7	30.8	+0.11	0.36	103
E1_2	19.2	7.63	7.70	26.8	26.9	+0.08	0.25	90
E1_3	17.2	9.08	9.17	26.2	26.3	+0.09	0.29	88
E1_4	17.2	21.1	21.3	38.2	38.4	+0.19	0.64	128

Table 9-18: Maximum Impacts on Annual Mean NOx Critical Levels –Scenario 2

Receptor	Background NOx Concentration (µg/m³)	Verified Modelled NOx Contribution (µg/m³)		Annual Mean NOx Concentration (µg/m³)		Absolute Concentration Change (µg/m³)	Concentration Change as a % of Critical Level (%)	DS Concentration as a % of Critical Level (%)
		DM	DS	DM	DS			
Grid	17.1	20.7	21.3	37.9	38.4	+0.54	1.81	139
E1_1	19.2	11.5	11.8	30.7	31.0	+0.31	1.02	118
E1_2	19.2	7.63	7.84	26.8	27.0	+0.21	0.69	105
E1_3	17.2	9.08	9.32	26.2	26.5	+0.24	0.81	99.5
E1_4	17.2	21.1	21.6	38.2	38.8	+0.55	1.83	140

Table 9-19: Maximum Impacts on 24-Hour Mean NOx Critical Levels –Scenario 1

Receptor	Background NOx Concentration (µg/m^3)	Verified Modelled NOx Contribution (µg/m^3)		24 Hour Mean NOx Concentration (µg/m^3)		Absolute Concentration Change (µg/m^3)	Concentration Change as a % of Critical Level (%)	DS Concentration as a % of Critical Level (%)
		DM	DS	DM	DS			
Grid	34.3	91.1	91.9	125	126	+0.86	1.14	168
E1_1	38.3	57.3	57.9	95.6	96.2	+0.58	0.77	128
E1_2	38.3	36.8	37.2	75.2	75.6	+0.42	0.56	101
E1_3	34.3	42.6	43.1	76.9	77.4	+0.47	0.62	103
E1_4	34.3	92.4	93.2	127	128	+0.87	1.15	170

Table 9-20: Maximum Impacts on 24-Hour Mean NOx Critical Levels –Scenario 2

Receptor	Background NOx Concentration (µg/m^3)	Verified Modelled NOx Contribution (µg/m^3)		24 Hour Mean NOx Concentration (µg/m^3)		Absolute Concentration Change (µg/m^3)	Concentration Change as a % of Critical Level (%)	DS Concentration as a % of Critical Level (%)
		DM	DS	DM	DS			
Grid	34.3	91.1	93.4	125	128	+2.30	3.07	170
E1_1	38.3	57.3	58.8	95.6	97.1	+1.49	1.98	129
E1_2	38.3	36.8	37.9	75.2	76.2	+1.03	1.38	102
E1_3	34.3	42.6	43.8	76.9	78.1	+1.17	1.56	104
E1_4	34.3	92.4	94.7	127	129	+2.33	3.11	172

9.4.14 Under Scenario 1, which considers the development alone, Table 9-17 presents that the total contribution of the development to annual mean NO_x concentrations is very low, at less than 1% increase of the annual mean NO_x Critical Level of 30µg/m^3 at all considered receptors, based upon the 2023 development opening year. Table 9-18 presents that the contribution to 24-hour mean NO_x concentrations is very low, at less than 10% increase of the annual mean NO_x Critical Level of 75µg/m^3 at all considered receptors, based upon the 2023 development opening year.

9.4.15 Under Scenario 2, which considers cumulative impacts, Table 9-6-18 illustrates that the contribution from the development to annual mean NO_x concentrations varies across the receptors. The maximum impacts identified on the receptor grid and transect E1_3 and E1_4 exceed 1% of the annual mean NO_x Critical Level of 30µg/m^3. The grid location and transect E1_3 and E1_4 receptors that are exceeding 1% represent a point where the grid and transect overlap. Table 9-20 illustrates that the contribution to 24-hour mean NO_x concentrations is low, at less than 10% increase of the annual mean NO_x Critical Level of 75µg/m^3 at all considered receptors, based upon the 2023

development opening year.

9.4.16 The total annual mean NO_x concentration is predicted to exceed the Critical Level of 30µg/m^3 under both 'do-minimum' and 'do-something' of Scenario 1 and 2 at several of the maximum impact receptors; Grid, E1_1 and E1_4. This is considered to be a function of the proximity of the Severn Estuary designation to the kerbside of the road. In addition, the 24-hour mean NO_x Critical Level of 75µg/m^3 is predicted to be exceeded under both 'do-minimum' and 'do-something' of Scenario 1 and 2.

9.4.17 It is noted that the predicted annual mean NO_x contribution associated with additional development trips and emissions from stack A5 will reduce (below those presented within Table 9-17 to Table 9-20) at increasing distances from the roadside. Reference should be made to Appendix 9-6 for a presentation of the modelled annual mean NO_x concentration drop-off, as concentration change associated with additional development trips, within the Severn Estuary ecological designation. Figure 9-6-3 of Appendix 9-6 illustrates the geographical area where the process contribution for Scenario 2 is over 1% of the AQO. This area corresponds to 1,1327 m^2, (0.13 ha), corresponding to less than 0.01 % of the total area of the Severn Estuary classed as Atlantic Salt meadow (1,400 ha).

Critical Loads – Nutrient Nitrogen

9.4.18 The contributions from additional development trips and emissions from stack A5 to the Critical Loads for nutrient nitrogen deposition at the Severn Estuary Atlantic Salt Meadow habitat is presented in Table 9-21 and Table 9-22 for Scenarios 1 and 2 respectively.

9.4.19 It is noted that the process contribution (PC) presented is the maximum modelled concentration from each of the four considered transects and receptor grid.

Table 9-21: Maximum Impact on Critical Load for Nutrient Nitrogen Deposition –Scenario 1

Receptor	Relevant Nitrogen Critical Load Class	Lower Load (kg N/ha/yr)	Current deposition (kg N/ha/yr)	Process contribution (kg N/ha/yr)	PC as a % of Lower CL (%)
E1 Max	Atlantic Salt meadows	20	13.7	+0.02	0.09

Table 9-22: Maximum Impact on Critical Load for Nutrient Nitrogen Deposition –Scenario 2

Receptor	Relevant Nitrogen Critical Load Class	Lower Load (kg N/ha/yr)	Current deposition (kg N/ha/yr)	Process contribution (kg N/ha/yr)	PC as a % of Lower CL (%)
E1 Max	Atlantic Salt meadows	20	13.7	+0.05	0.27

9.4.20 The contribution to the Critical Loads for nutrient nitrogen is very low, at less than 1% increase of the nutrient nitrogen lower Critical Load at all considered receptors and ecological designations, based upon the 2023 development opening year scenarios (for both Scenario 1 and Scenario 2). In addition when considering current deposition and the contribution from the proposed development, committed development and local plan allocations, the lower Critical Load of 20kg N/ha/hr is not exceeded.

9.4.21 It is noted that the predicted contribution to the Critical Loads for nutrient nitrogen deposition associated with additional development trips will reduce (below those presented within Table 9-21 and Table 9-22) at increasing distances from the roadside.

Critical Loads – Acidity

9.4.22 The contributions from the development to the Critical Loads for nitrogen contribution to acid deposition at the roadside boundary of the Severn Estuary designation is presented in Table 9-23 and Table 9-24 for Scenarios 1 and 2 respectively.

9.4.23 It is noted that the process contribution presented is the maximum modelled concentration from each of the four considered transects and receptor grid.

9.4.24 The Atlantic Salt Meadows habitat defined under the Severn Estuary SAC designation is not sensitive to acid deposition and therefore the habitat most sensitive to acid deposition and defined under the Severn Estuary SSSI designation 'Neutral grassland' has been considered instead[36].

Table 9-23: Maximum Impacts on Critical Loads for Acidity Deposition –Scenario 1

Receptor	Terrestrial Habitat Information	CLmaxN (keq/ha/yr)	Current Load (keq/ha/yr)	Process contribution change (keq/ha/yr)	Change as a % of CLmaxN (%)
E1 Max	Neutral grassland	1.063	0.9	+0.001	0.13

Table 9-24: Maximum Impacts on Critical Loads for Acidity Deposition –Scenario 2

Receptor	Terrestrial Habitat Information	CLmaxN (keq/ha/yr)	Current Load (keq/ha/yr)	Process contribution change (keq/ha/yr)	Change as a % of CLmaxN (%)
E1 Max	Neutral grassland	1.063	0.9	+0.004	0.36

9.4.25 The contribution to the Critical Loads for nitrogen contribution to acid deposition is very low, at less than 1% increase of the acid Critical Load at all considered receptors and ecological designations, based upon the 2023 development opening year scenarios(for both Scenario 1 and Scenario 2). In addition when considering current deposition and the contribution from the proposed development, committed development and local plan allocations, the Critical Load of 1.06keq/ha/yr is not exceeded.

9.4.26 It is noted that the predicted contribution to the Critical Loads for nitrogen contribution to acid deposition associated with additional development trips will reduce (below those presented within Table 9-23 and Table 9-24) at increasing distances from the roadside.

Significance of Air Quality Impacts

[36] http://www.apis.ac.uk/

9.4.27 The unmitigated impact associated with the proposed development has been predicted in accordance with the stated assessment methodology. The following factors have been taken into account:

- increases in annual mean NO_x are less than 1% of the Critical Level across all of the Severn Estuary SAC when the impacts of the development are considered alone;
- increases in annual mean NOx are seen above 1% of the Critical Level at parts of the Severn Estuary SAC nearest to Rover Way when cumulative impacts are considered. The exceedances are limited to an area of 1,327 m^2 (<0.01 % of the Atlantic Salt designation). However, under both 'do-minimum' and 'do-something' scenarios the annual mean NOx concentrations at these receptors exceeds the annual mean Critical Level of 30µg/m^3;
- increases in 24-hour mean NO_x are less than 10% of the Critical Level across all of the Severn Estuary SAC when the impacts of the development are considered alone and cumulatively with the committed development;
- increases in nutrient nitrogen are less than 1% of the lower Critical Load across all of the Severn Estuary SAC/SSSI when the impacts of the development are considered alone and cumulatively with the committed development;
- increases in nitrogen contribution to acidity are less than 1% of the acid Critical Load across all of the Severn Estuary SAC/SSSI when the impacts of the development are considered alone and cumulatively with the committed development; and
- the total load (i.e. road traffic contribution change plus the current load) is not in excess of the nitrogen and acid Critical Load at any considered ecological receptors.

9.4.28 Furthermore, the IAQM's Position Statement on the Use of a Criterion for the Determination of an Insignificant Effect of Air Quality Impacts on Sensitive Habitats[37], states the following:

[…] it is the position of the IAQM that the use of a criterion of 1% of an assessment level in the context of habitats should be used only to screen out impacts that will have an insignificant effect.

9.4.29 Therefore, on the basis of the above, the overall effect on air quality and impacts at the considered ecological designation as a result of the additional development trips is considered to be 'insignificant'. The impacts from the cumulative assessment indicate that there are limited exceedences of the annual mean NO_x objective over an area 1,327 m^2 of the Atlantic Salt Meadow designation of the Severn Estuary. The assessment is considered conservative as it has assumed that all traffic from the proposed development and committed development travels on Rover Way (north). In addition a single model verification factor was applied across the modelled grid and transects, irrespective of their distance from the road. Although the extend of the exceedance is very limited (<0.01% of the area of Atlantic Salt Meadow habitat), annual mean NO_x concentrations from generated by the propose development will result in further exceedance of the threshold breached by the committed development (however negligibly). The impact of this is considered further in Chapter 11 (Ecology).

[37] http://www.iaqm.co.uk/text/position_statements/aq_impacts_sensitive_habitats.pdf - accessed June 2017.

Stack Emissions

9.4.30 As mentioned previously the screening assessment of stack emissions was undertaken as part of the environmental permit variation application and is presented in full in the Main Installation Report (Appendix 9-4). The following paragraphs present a summary of the screening assessment which utilised the EA's H1 tool. Table 9-25 details the H1 inputs, presented in Figure 10-2 of the Main Installation report in Appendix 9-4.

9.4.31 A screening of NO_x emissions using the H1 tool is presented in the Schedule 5 response to NRW, as discussed previously. The screening concluded that emissions of NO_x are screened out in regards to impacts on human receptors.

Table 9-25: H1- Air Emissions Inventory – Stage 1

Pollutant	PM_{10}		$PM_{2.5}$
Averaging Period	24-hour	Annual	Annual
Total Process Contribution (PC) (µg/m^3)	10.0	0.28	0.28
Limit Value (µg/m^3)	50	40	25
PC (as %age of EAL)	19.9	0.70	1.11
PC Insignificant?	NO	YES	NO

9.4.32 The Main Installation Report utilised background data from an automatic monitor in Cardiff centre. The Defra background map data are more representative of conditions at the Site and were therefore used in Stage 2 of the H1 presented in this Chapter, whereby the PEC (PC + Background) is considered against the relevant AQOs/EALs. Table 9-26 presents the outcome of Stage 2 of the screening assessment for the pollutant and averaging period that did not screen out as part of Stage 1.

Table 9-26: H1- Air Emissions Inventory – Stage 2

Pollutant	PM_{10}	$PM_{2.5}$
	24-hour	Annual
Background Concentration (B) (µg/m^3)	14.6$^{(A)}$	10.2
B+PC (µg/m^3)	24.6	10.5
B+PC (as %age of LT EAL)	-	41.9
ST EAL – BG^A (headroom)	25.5	-
PC as % of (ST EAL - BG)	78	-
Table note: (A) Following Defra LAQM.TG16 guidance the PM_{10} annual mean has been applied as the 24-hour mean background.		

9.4.33 On the basis of the AERA screening the following conclusions are reached:

- potential impacts of PM_{10} emissions on the annual mean Limit Value are insignificant;
- potential impacts of $PM_{2.5}$ emissions on the annual mean standard are insignificant given that the PEC is <70% of the Limit Value;
- potential impacts of PM_{10} emissions on the 24-hour mean standard are not insignificant and the screening approach indicates that detailed modelling may be required. However, given the precautionary dispersion factors applied, the background being circa 20% of the EAL i.e. almost 80% headroom beneath the Limit Value, and the absence of relevant exposure locations within 500m of the emission point, the risk of an exceedence of the Limit Value at a relevant exposure location is considered sufficiently low and no further assessment has been undertaken.

9.4.34 In addition, no impacts from stack emissions of PM_{10} on the Severn Estuary are anticipated, as ecological receptors are not considered sensitive to emissions of PM_{10} emissions.

Operational Dust

Dust Sources

9.4.35 The potential sources of dust from the proposed asphalt plant are considered to be from the transfer of aggregate by loading shovels from the stockpiles. Within the plant, aggregate material is mixed with a bitumen emulsion to use as a binding agent for the production of asphalt. Once this binding agent is mixed with the aggregate, there will be no potential for wind-entrained dust from the product.

9.4.36 The bulk materials used for the plant will be stored in specially constructed covered concrete storage bays. Material will be moved to the hoppers using a loading shovel that's will move up a small ramp. All hoppers will be sheeted at all sides to protect them from the elements.

9.4.37 Vehicle access and egress to the site will be via the existing access off Tide Fields Road, via existing internal roads that will be surfaced with asphalt. Housekeeping measures will be applied to the wider operational site in accordance with the DEFRA Process Guidance Note (PG 3/15a(12)) for Roadstone Coating as part of the Permit conditions.

9.4.38 Concerning existing conditions and dust, the industrial nature of the surrounding area is considered to represent a large source of existing dust, as part of the established baseline. This includes those processes undertaken within the Celsa Steel Works of the permitted development rights.

Health Impacts of PM_{10}

9.4.39 The existing air quality in terms of annual mean PM_{10} has been assumed to be represented by DEFRA background maps. The predicted background PM_{10} concentrations is 14.6µg/m^3; based upon 2019 mapped background estimates as presented within Table 9-7.

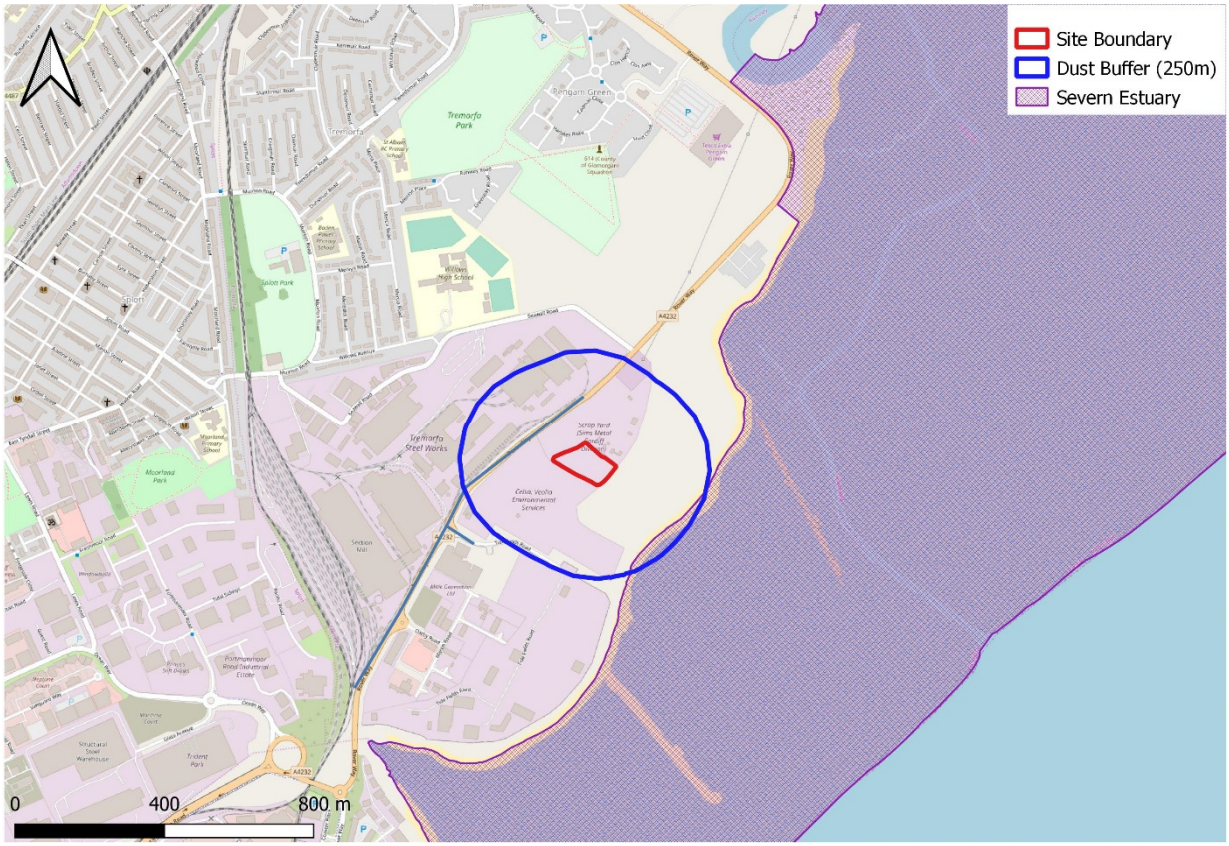
9.4.40 The baseline concentrations are considered to be representative within the area. Baseline levels are considered to be 'well below' the limit, with a large 'headspace' of 25.4µg/m^3. It is considered highly unlikely that the site will lead to an increase in PM_{10} to a level that would cause an exceedence of the AQO, particularly with the designed in mitigation measures. Any mitigation measures implemented to reduce dust soiling will also be effective at mitigating PM_{10}.

9.4.41 Therefore, in accordance with the IAQM minerals guidance no detailed assessment of potential health impact of PM_{10} need to be considered and impacts are considered not significant.

Assessment of Impact – Dust

9.4.42 The IAQM minerals guidance states that impacts from dust are unlikely beyond 250m from the site activities. There are no residential receptors within 250m from the Site boundary. Given the stand-off distance between the proposed Site and existing sensitive human receptors, the potential risk for dust impacts on human receptors is considered to be low. The Severn Estuary is located 230m south of the operational area of the proposed development and an assessment of potential impacts from dust is detailed in the following paragraphs.

Figure 9-5: Operational Dust Buffer (Severn Estuary)



Step 1 – Site Characteristics and Baseline Conditions

9.4.43 The location of the proposed development is presented in Figure 9-3 and a site layout is presented in Figure 3-1.

9.4.44 There are hedgerows and trees along the eastern boundary that provide a natural barrier to any potential wind-entrained dust and offer a degree of protection from dispersion of dust to the Cardiff Motocross Centre MX and Severn Estuary located south of the Site beyond the Cardiff Motocross Centre MX. These landscaping features represent a potential to intercept any airborne dust and encouraging deposition prior to reaching any receptors. Additionally, natural dust suppression would occur 50% of the time due to sufficient rainfall (greater than 0.2mm) preventing any dust from becoming airborne.

Step 2 – Estimation of Dust Impact Risk

Estimation of Source Emissions

9.4.45 It is evident form the site layout (Figure 3-1) that the site activities that are within 250n m from the Severn Estuary are the aggregate storage bays. Therefore, in accordance with the IAQM minerals guidance, the dust impact risk has been determined for the following operational activities:

- material handling;
- on-site transportation; and
- stockpiles & exposed surfaces.

9.4.46 The source emission magnitude of each activity is determined in the absence of operational dust control methods but incorporates designed in measures. Measures and controls applicable to the proposed operations that are incorporated as part of the proposed design are as follows:

- slag aggregate will be stored in specially constructed covered concrete storage bays;
- drop height of material transfer points and disturbance of stockpiles (mainly larger size aggregates) will be kept to a minimum;
- all raw materials would be reclaimed from the face of the stockpile only;
- all hoppers will be sheeted at all sides, ends and roof to protect them from the elements and minimise dust emissions;
- handling areas will be fitted with dust suppression sprays when required to reduce dust emissions;
- site roads would be swept regularly, and haul road dampened by water spray in dry conditions using a water bowser;
- all HGV's travelling on internal haul roads shall be subject to a speed limit of 10mph; and
- procedures would be put in place in the transport of raw material to minimise spillages, e.g. maximum fill levels.

9.4.47 Based upon both the proposed scheme and the designed-in / regulated control measures, the source emission for each activity has been determined for the area of operations considered as part of this assessment.

Table 9-27: Residual Source Emission Magnitude

Activity	Magnitude
Material Handling	Small
On-site transportation	Small

Activity	Magnitude
Stockpile and exposed surfaces	Medium

Estimation of Pathway Effectiveness

9.4.48 The effectiveness of the pathway is determined by the site specific factors of distance and direction of individual receptors relative to the prevailing wind direction.

9.4.49 The frequencies of wind directions from the proposed operational areas identified for assessment and distances from the source are calculated and determined using the IAQM matrices, as presented within Appendix 9-3.

Operational Odour

Odour Sources

9.4.50 The DEFRA Process Guidance Note (PG 3/15a(12)) for Roadstone Coating states that '*the overall aim should be that emissions are free from offensive odour outside the site boundary*'.

9.4.51 The process and handling of bitumen emulsion as part of the asphalt plant has the potential to generate odour. The bitumen will be stored and handled in accordance with the requirements of the Permit and Process Guidance Note in order to minimise the potential for odour generation and emission.

9.4.52 The asphalt product is manufactured through the blending of aggregate with the bitumen emulsion within an enclosed building, thus significantly reducing the potential for fugitive release of odour. In order to minimise emissions of fume and the associated odour, all bitumen and synthetic binder will be stored and handled within the appropriate temperature range for its grade.

9.4.53 As the asphalt processing column stack will be designed to ensure that process emissions are unlikely to cause significant adverse effects at receptors, this will similarly ensure satisfactory dispersion of residual odour from the stack.

9.4.54 The overall potential magnitude of odour generation considering the designed in mitigation measures and enclosed nature of the bitumen handling and asphalt manufacturing process is considered to be low. In accordance with the IAQM assessment methodology presented within Appendix 9-2, the proposed process is considered to represent a '*medium source odour potential*'.

Assessment of Impact – Odour

9.4.55 High wind speeds tend to lead to odour emissions being more rapidly dispersed and diluted due to turbulence, and low wind speeds inhibit the dilution of odours. Therefore, the incidence of low wind speed conditions of less than 2.4m/s[38] have been used to inform the odour risk assessment as presented. A wind rose is presented in Figure 9-2. Winds below 2.4m/s account for approximately 13% of the hours in the year. The prevailing winds are from western sectors (260 – 320 degrees).

9.4.56 As presented within Table 9-9, receptors of 'high' sensitivity to odour are located >450m from the

[38] Force 2 "light breeze"(IAQM minerals guidance)

boundary of the proposed development (R4, R5, R6). A receptor of 'medium' sensitivity (R2 - Cardiff Motocross Centre MX), is located approximately 50m from the Site boundary.

9.4.57 In accordance with the IAQM assessment methodology presented within Appendix 9-2, the proposed process is considered to represent a 'moderately effective pathway' for receptor R2, and an 'ineffective pathway' for all other considered receptors. Is it noted that the terminology of 'ineffective pathway', as defined in the IAQM guidance, refers to the remote distance from source to receptor and ineffective potential for odour impacts to be witnessed at the considered distance.

9.4.58 The Welsh Water WwTW is located approximately 250m west from the operational area boundary of the proposed asphalt plant. It is noted that no information on odour complains for the WwTw have been identified.

9.4.59 Guidance from the IAQM considers the source-pathway-receptor conceptual model for the assessment of potential odour impacts, as utilised as part of this assessment. Given the stand-off distance between the Site and sources of potential odour in the area, this is considered to be sufficient enough to ensure that the 'pathway' element of the conceptual model as an 'ineffective' pathway resulting in a 'negligible' likely cumulative odour effect. Therefore, potential cumulative impacts from odour are not considered to be significant.

9.4.60 A summary of the predicted likely odour effects at considered sensitive receptors, based upon the IAQM methodology as presented in Appendix 9-2, is presented in Table 9-28.

Table 9-28: Summary of Likely Odour Effect

Receptor	Source Odour Potential	Pathway Effectiveness	Odour Exposure	Receptor Sensitivity	Likely Odour Effect
R1	Medium	Ineffective Pathway	Low Risk	Low	Negligible Effect
R2	Medium	Moderate Pathway	Negligible Risk	Medium	Negligible Effect
R3	Medium	Ineffective Pathway	Negligible Risk	Low	Negligible Effect
R4	Medium	Ineffective Pathway	Negligible Risk	High	Negligible Effect
R5	Medium	Ineffective Pathway	Negligible Risk	High	Negligible Effect
R6	Medium	Ineffective Pathway	Negligible Risk	High	Negligible Effect

Cumulative Effects

9.4.61 The proposed development has the potential to contribute to cumulative effects with other proposed or planned developments in the study area.

9.4.62 Construction impacts are assessed up to 350m from dust generating activities. However, the relatively modest scale of the construction requirements for the Site implies that significant risks

are limited to a band within 50m of the boundary, in line with the distance buffers in the IAQM construction dust guidance. Committed developments at the Cardiff Motocross Centre MX and the SIMS Metal Recovery site are considered relevant as they are adjacent to the Site boundary. Construction impacts are temporary in nature and dependent on activities on any given day, the likelihood of activities coinciding at a single location is limited, considering the surrounding land uses and the lack of highly sensitive receptors. Any cumulative impacts that may exist are limited to prolonged exposure to risk of effects rather than heightened risk on any given day. In addition, it is anticipated that appropriate mitigation measures will be employed during the construction phases for both developments, further reducing the risk to exposure to construction impacts.

9.4.63 Operational impacts from stack emissions of PM_{10} from the proposed development have been screened out, following the EA guidance. The only committed development with direct emissions to air (including PM_{10}) is the proposed biomass power plant at the Cardiff Motocross Centre MX. Considering the location of the sensitive human receptors in the study area and the outcome of detailed modelling[39] of emission of PM_{10} from the proposed plant, it is unlikely that any cumulative effects will result in significant impacts on air quality. Regarding the Severn Estuary, as discussed previously, ecological receptors are not considered sensitive to emissions of PM_{10} and there is no PM_{10} AQO for the protection of ecosystems.

9.4.64 Cumulative effects from operational dust, odour and traffic emissions as a result of the SIMS Metal Recovery site are unlikely considering the development is limited to the construction of a new building.

9.4.65 As discussed in Paragraph 9.4.10 there is the potential for cumulative effects to arise as a result of traffic emissions. The Cardiff Motocross Centre MX proposed biomass plant presents an example of this. A review of the air quality assessment submitted for planning concluded that the traffic generated by the proposed biomass plant (AADT of 310 LDVs and 50 HDVs) does not exceed the EPUK and IAQM criteria for individual road links (i.e. <500 LDVs and <100 HDVs AADT). The combined increase in traffic for the proposed biomass plant and the proposed development is an AADT of 330 LDVs and 138 HDVs. Therefore, exceeding the EPUK and IAQM criteria and triggering the need for a detailed assessment of air quality impacts on human receptors.

9.4.66 With regards to cumulative impacts on the Severn Estuary from traffic and stack emissions, detailed dispersion modelling was undertaken and it is presented in Section 9.4.0. The impacts from the cumulative assessment indicate that there are limited exceedences of the annual mean NO_x objective over an area 1,327 m^2 of the Atlantic Salt Meadow designation of the Severn Estuary. The assessment is considered conservative as it has assumed that all traffic from the proposed development and committed development travels on Rover Way (north). In addition a single model verification factor was applied across the modelled grid and transects, irrespective of their distance from the road. Although the extent of the exceedance is very limited (<0.01% of the area of Atlantic Salt Meadow habitat), annual mean NO_x concentrations from traffic and stack emissions generated by the propose scheme will result in further exceedance of the threshold breached by the committed development (however negligibly). The impact of this is considered further in Chapter 11 (Ecology).

9.4.67 Cumulative effects due to operational dust and odour are unlikely considering the nature of activities at the proposed biomass plant. Cumulative effects on the Severn Estuary are presented in Appendix 9-6.

[39] Air Quality Consultants (2017). Air Quality Assessment Rover Way Biomass Power Plant, Cardiff

9.5.0 Mitigation

9.5.1 This section presents any mitigation measures required during the construction and operational phases of the development in order to reduce the potential impact of the predicted effect.

Construction Phase Dust

9.5.2 In accordance with the IAQM guidance, no additional mitigation beyond that required by legislation is required. In order to control potential impacts, the mitigation measures presented within Table 9-18 are proposed.

Table 9-29: Construction Dust Mitigation Measures

Site Application	Mitigation Measures
General Dust Management	Record all dust and air quality complaints and take appropriate measures to reduce emissions
	Record any exceptional; incidents that cause dust off site.
	Undertake daily visual inspection of dust soiling and dust generation and record in site log
	Ensure an adequate supply of water is available onsite for effective dust suppression
	Use enclosed chutes and conveyors and cover skips
	Minimise drop heights from conveyors, loading shovels and other material handling equipment
	Impose a site speed limit of 10mph on unpaved haul roads
	Ensure all vehicles engines are switched off when stationary
	Plan site layout so machinery is located away from receptors as far as possible
	Erect solid barriers around dusty activities or the site boundary
	Enclose specific operations where there is a high potential for dust production
	Avoid site runoff of water or mud
	Keep site fencing, barriers and scaffolding clean using wet methods
	Remove material that have the potential to produce dust from the site as soon as possible
Earthworks	Re-vegetate earthworks and soil stockpiles to stabilise surfaces as soon as practicable

Site Application	Mitigation Measures
	Cover stockpiles if not vegetated and only remove in small areas during work
	Avoid Double Handling of material
	Cease operations during high winds in the direction of sensitive receptors
Construction	Avoid scabbling (roughing of concrete surfaces) if possible
	Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out
Trackout	Use water assisted dust sweepers on the access and local roads to removed tracked out material is necessary
	Avoid dry sweeping large areas
	Ensure vehicles entering and leaving sire are covered to prevent escape of materials during transport
	Access gates to be located at least 10m from receptors where possible

9.5.3 Potential dust effects during the construction phase are considered to be temporary in nature. The impacts are determined to be temporary as they will only potentially occur throughout the construction phase and short-term because these will only arise at particular times when certain activities and meteorological conditions for creating the level of magnitude predicted combine.

9.5.4 However, the application of the above dust control and mitigation measures, it is considered that impacts at all receptors will be '*not significant*' in accordance with the IAQM guidance.

Operational Phase Dust

9.5.5 The DEFRA Process Guidance Note (PG 3/15a(12)) for Roadstone Coating states that *"the aim should be to prevent any visible airborne emission from any part of the process. This aim includes all sites regardless of location. Monitoring to identify the origin of a visible emission should be undertaken and a variety of indicative techniques are available"*.

9.5.6 Therefore, a number of control measures will be required to be implemented as part of the Site's Permit in order to ensure that the operation of the site does not have the potential for dust emissions beyond the site boundary. The asphalt plant will be permitted as a Directly Associated Activity (DAA) to the new Melt Shop Permit (EPR/TP3639BH).

9.5.7 The asphalt plant is internally enclosed, thus minimising the potential for dust emission and any dust collected internally within the process is fed back into the mixing process. The bulk materials used for the plant will be stored in specially constructed covered concrete storage bays. In addition, the surrounding yard and handling areas will be fitted with dust suppression sprays when required to reduce dust emissions.

9.5.8 Vehicle access and egress to the site will be via the existing access off Tide Fields Road, via existing

internal roads that will be surfaced with asphalt. Housekeeping measures will be applied to the wider operational site in accordance with the DEFRA Process Guidance Note (PG 3/15a(12)) for Roadstone Coating as part of the Permit conditions. Therefore, the potential for dust emissions from vehicle movements on-site is considered to be low.

9.5.9 The following mitigation would also be applied to the operation of the site as dust control measures:

- use water-assisted dust sweeping onsite and on local roads if required, to remove as soon as practicable any material tracked out of the site;
- finished product is removed from site in sheeted HDVs;
- storage areas with vehicle movements should be kept clean and in good repair;
- no vehicles should track over deposited sweepings;
- vehicle speeds restricted to 10mph around the site;
- reduce drop heights at all times;
- water suppression available to dampen down storage area;
- ensure wash down area is kept clean at all times;
- no idling of vehicles; and
- dust monitoring through visual inspection by responsible member of staff.

Operational Stack

9.5.10 The AERA concluded that impacts from stack emissions on human receptors are screened out and therefore no additional mitigation is required. In addition the assessment of impact on the Severn Estuary from emissions of NO_x from stack A5 and additional traffic from the development, concluded that the development alone will not result in significant impacts. Therefore no additional mitigation is required.

Operational Odour

9.5.11 The assessment of odour emissions indicated that odour emission is insignificant and therefore no additional mitigation measures are required. Note that a number of control measures in line with DEFRA Process Guidance Note (PG 3/15a(12)), would be implemented as part of the Site's Permit in order to ensure that the operation of the site does not have the potential for odour emission to occur beyond the site boundary

9.6.0 Residual Effects

Construction Phase

9.6.1 The sensitivity of the industrial and commercial receptors, relevant to the construction phase, is medium and the magnitude of change, following mitigation, is negligible. Therefore, there is likely to be a direct, temporary, short- term residual effect on the identified receptors of negligible significance following the implementation of mitigation measures.

Operational Phase

9.6.2 The sensitivity of the residential receptors is high and the magnitude of change, following mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long- term residual effect on the identified receptors of negligible significance following the implementation of mitigation measures.

9.6.3 The sensitivity of the industrial and commercial receptors is medium and the magnitude of change, following mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long- term residual effect on the identified receptors of negligible significance following the implementation of mitigation measures.

9.6.4 The sensitivity of the ecological receptors is high and the magnitude of change, following mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long- term residual effect on the identified receptors of negligible significance following the implementation of mitigation measures.

9.7.0 Summary of Effects

9.7.1 A summary of effects during the construction and operational phase is presented in Table 9-19.

9.7.2 A qualitative assessment of the potential dust impacts during the construction of the proposed development was undertaken. Through good practice and implementation of appropriate mitigation measures, it is expected that the release of dust would be effectively controlled and mitigated. All construction dust impacts are considered to be temporary and short-term in nature. In addition, potential construction dust impacts on the Severn Estuary were screened out as not significant. Therefore, there is likely to be a direct, temporary, short- term residual effect on the identified receptors of negligible significance following the implementation of mitigation measures.

9.7.3 Due to the low additional number of HDV trips during the construction phase of the development, there is predicted to be a neutral impact on air quality from road vehicle exhaust emissions. Potential impacts on the Severn Estuary from construction phase traffic and plant emissions have been screen out as not significant. Therefore, there is likely to be a direct, temporary, short- term residual effect on the identified receptors of negligible significance. This also applies to potential impacts from construction plant equipment.

9.7.4 A screening assessment of operational phase NO_2 and PM_{10} from stack emissions was completed following the Environment Agency's online guidance. The screening assessment concluded that there is no need for detailed assessment as impacts on human receptors are not significant. The Severn Estuary is not considered sensitive to emissions of PM_{10}. Detailed dispersion modelling of NO_x stack emissions over the Severn Estuary indicated that the contribution from the proposed development (including the contribution from traffic emissions associated with the development) is not significant. Therefore, there is likely to be a direct, permanent, long- term residual effect on the identified receptors of negligible significance from stack emissions.

9.7.5 A qualitative assessment of operational phase dust soiling was undertaken in accordance with the Institute of Air Quality Management (IAQM) minerals guidance. Potential dust impacts on human receptors were screened out as there were no receptors within 250m from the Site boundary and existing PM_{10} concentrations were below the threshold defined in the IAQM guidance. An assessment of dust impacts on the Severn Estuary was undertaken and impacts were not significant. Therefore, there is likely to be a direct, permanent, long- term residual effect on the identified receptors of negligible significance from operational dust.

9.7.6 Impacts on local air quality from operational traffic emissions were screened out of further assessment as traffic generated by the proposed development would be below the Environmental Protection UK and the IAQM criteria and therefore considered to be neutral. Potential impacts on the Severn Estuary from operational phase traffic emissions (NO_x) were assessed quantitatively and combined with predicted contribution from stack A5. The assessment concluded that the contribution from the proposed development (including the contribution from stack A5) is not significant. Therefore, there is likely to be a direct, permanent, long- term residual effect on the identified receptors of negligible significance from operational traffic.

9.7.7 A qualitative assessment of potential odour impacts during the operational phase was undertaken, in accordance with the IAQM source-pathway-receptor model. Due to the designed in mitigation measures, as required under the Permit requirements, and distance between source and existing receptors, impacts from odour are considered to be 'not significant'. Therefore, there is likely to be a direct, permanent, long- term residual effect on the identified receptors of negligible significance

from operational odour.

Table 9-30: Summary of Effects for Air Quality

Effect	Receptor	Significance of effect prior to mitigation (A)	Summary of mitigation	Residual Effect
Construction Phase				
Changes in dust emissions from construction activities	Commercial receptors (DR1)	**Negligible to Minor** / - / T / D / ST	- Implementation of IAQM measures	**Negligible** / - / T / D / ST
Changes in pollutant concentration from emissions of NO_x, PM_{10}, and $PM_{2.5}$ from traffic and plant	N/A as impacts screened out	**Negligible** / - / T / D / ST	- good housekeeping and maintenance of plant	**Negligible** / - / T / D / ST
Operational Phase				
Changes in pollutant concentration from stack emissions of NO_x and PM_{10}	N/A as impacts screened out	**Negligible** / - / P / D / LT	- no further mitigation is required	**Negligible** / - / P / D / LT
Changes in pollutant concentration from emissions of NO_x and particulate matter (PM_{10} and $PM_{2.5}$) from traffic and stack A5	Severn Estuary	**Negligible** / - / P / D / LT	- no further mitigation is required	**Negligible** / - / P / D / LT
Changes in odour emissions from operational activities	Commercial receptors (R1, R2, R3) Residential Receptors (R4, R5, R6)	**Negligible** / - / P / D / LT	- implementation of measures in line with PG 3/15a (12) - good housekeeping	**Negligible** / - / P / D / LT
Changes in dust emissions from operational activities	Severn Estuary	**Negligible to minor** / - / P / D / LT	- implementation of measures in line with PG 3/15a(12 - good housekeeping	**Negligible** / - / P / D / LT
Note: (A): + / - = Positive or Negative P / T = Permanent or Temporary, D / I = Direct or Indirect, ST / MT / LT = Short Term, Medium Term or Long Term N/A = Not Applicable				

9.8.0 Conclusions

9.8.1 This chapter presents the findings of the air quality assessment, which addresses the potential air quality impacts during both the construction and operational phases of the proposed development. For both phases the type, source and significance of potential impacts have been identified, and the measures that should be employed to minimise these proposed. The methodology followed in this study was discussed and agreed with the Environmental Health Officer of Cardiff Council.

9.8.2 The assessment concludes that both the construction and operational phases residual effects are negligible. Potential impacts on the Severn Estuary were considered not significant for both the construction and operational phase when considered alone. The assessment concluded that the proposed development will have a negligible effect on the Severn Estuary. With regards to cumulative impacts on the Severn Estuary from traffic and stack emissions, the cumulative assessment indicated that there could be limited exceedences of the annual mean NO_x objective over an area 1,327 m^2 of the Atlantic Salt Meadow designation of the Severn Estuary. The impacts on ecology are considered in Chapter 11 (Ecology).

9.8.3 Therefore, it is considered that air quality and odour do not represent a material constraint to the development proposals, which conforms to the policies contained within the Cardiff Local Development Plan 2006 and Planning Policy Wales.

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