

**PROPOSED FINAL RESTORATION
STRATEGY,
FFOS-Y-FRAN,
MERTHYR TYDFIL, WALES**

AIR QUALITY ASSESSMENT

**For: Richards, Moorehead & Laing Ltd and
Merthyr (South Wales) Ltd**

January 2025

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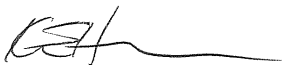
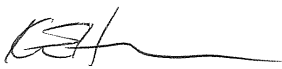
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PROPOSED FINAL FFOS-Y-FRAN RESTORATION STRATEGY

AIR QUALITY ASSESSMENT

For: Richards, Moorehead & Laing Ltd and Merthyr (South Wales) Ltd

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1 Introduction

1.1 General

- 1.1.1 The winning and working of coal has been undertaken at the Ffos-y-Fran surface coal mine in Merthyr Tydfil since 2007 under planning permission granted on Appeal in 2005 and subsequently revised on Appeal in 2011 (Appeal refs: A-PP 152-07-014 and APP/U6925/A/10/2129921). Under Condition 50 of the planning permission a Restoration Strategy has been agreed with the mineral planning authority, Merthyr Tydfil County Borough Council ('MTCBC'). The approved Restoration Strategy set out the sequence and phasing of the backfilling and reclamation of the coal mine and aftercare. An alternative scheme is now required to that already consented due to a number of factors including changes in the approach to sustainability and restoration practices, new planning policies and insufficient funds to achieve the original scheme.
- 1.1.2 Areas of the mine have subsequently been progressively restored under the agreed Strategy. Operational activities at the mine ceased in November 2023 and revised final restoration proposals (the 'Scheme') are now to be submitted by Richards, Moorehead & Laing Ltd ('RML'), on behalf of Merthyr (South Wales) Ltd ('MSW'), to MTCBC as required under Condition 52 of the planning permission.
- 1.1.3 In this following report the term 'Site' refers to the area that is subject to the existing planning permission. It therefore includes the areas that are to be subject to final restoration along with those areas that have already been progressively restored and are not to be subject to further earthworks as part of the Scheme. The term 'Works Site' has therefore been used to refer to the areas to be subject to major earthworks as part of the final restoration as detailed below in Section 4.
- 1.1.4 Smith Grant LLP (SGP) has been instructed to undertake an Air Quality Assessment (AQA) of the Scheme to inform the Environmental Impact Assessment (EIA) and Environmental Statement (ES) to be provided in support of the submission.

1.2 Scope and Objectives of the Report

- 1.2.1 The following report describes the AQA undertaken by Smith Grant LLP (SGP) in accordance with the brief agreed with the client. The assessment has been prepared with reference to the Planning Policy Wales (PPW) ¹ which is supplemented by mineral technical guidance in relation to coal². The AQA follows the frameworks described in Institute of Air Quality Management

¹ Welsh Government, Planning Policy Wales, Edition 12, published February 2024

² Welsh Government, Mineral Technical Advice Note (Wales) 2: Coal (MTAN2), published February 2009

(IAQM) guidance in relation to planning and air quality,³ and dust.^{4, 5} and makes reference to the draft technical planning guidance provided in relation to air quality⁶.

1.2.2 The AQA follows the scope as set out in the EIA Scoping Report⁷ and subsequent Scoping Opinion received from MTCBC⁸.

1.2.3 The report describes the methods used to assess the impacts, the baseline conditions currently existing at the Site and surroundings, the potential direct and indirect impacts of the development arising from aerial emissions, and the mitigation measures required to prevent, reduce, or offset the impacts.

1.2.4 The report provides summary information on the site location, site setting and Scheme as required to inform the AQA. Full details are provided elsewhere in the planning application documents, including the ES.

1.2.5 SGP is an environmental consultancy specialising in air quality assessments, particularly in relation to mineral extraction sites. The report author, Katrina Hawkins, Chairman, is a Member of the Institute of Air Quality Management (IAQM).

³ Institute of Air Quality (IAQM), Land-Use Planning & Development Control: Planning for Air Quality, v1.2, January 2017

⁴ Institute of Air Quality Management (IAQM), Guidance on the Assessment of Dust from Demolition and Construction. v2.2, January 2024

⁵ Institute of Air Quality Management (IAQM), Guidance on the Assessment of Mineral Dust Impacts for Planning, v1.1, May 2016

⁶ Welsh Government, Draft Technical Advice Note 11: Air Quality and Soundscape (TAN11), published 21/10/2022

⁷ Richards Moorehead & Laing, Ffos y Fran Final Restoration Strategy, Environmental Impact Assessment (EIA) Scoping Report, July 2024

⁸ Merthyr Tydfil County Borough Council, Proposed Ffos-y-Fran Final Restoration Strategy, The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017: Regulation 14 Scoping Request, ref: P/08/0316 FYF Scoping, dated 4th October 2024

2 Technical Context, Legislation and Planning Policy

2.1 Technical Context

2.1.1 The Scheme includes for the phased restoration of the former surface coal mine through the relocation of overburden, scree and soil material within the Site. Coal extraction and working has ceased at the Site.

2.1.2 Overburden and soil handling operations give rise to releases of airborne particulate matter (PM) (also referred to as 'dust'). The nature and quantity of airborne PM released at any one time will depend on a wide variety of factors including, but not limited to, the nature of the material being handled, the quantity of materials being handled, the handling processes incorporated and the weather conditions at the time of handling.

2.1.3 Airborne PM is made up of condensed phase (solid or liquid) particles suspended in the atmosphere and comes from both man-made and natural sources. It ranges in size from a few nanometres to around 100 micrometres (μm). The size of the particle influences the aerodynamic and gravitational effects that determine the distance it travels and how long it stays suspended in the air before settling on a surface.

2.1.4 The deposition and subsequent accumulation of dust on a surface can result in disamenity due to soiling (referred to as 'disamenity dust'). Dust soiling arises from the deposition of particulate matter in all size fractions but will be associated mostly with particulate matter greater than 30 μm . Dust accumulation may also affect sensitive habitats through direct impacts on vegetation and aquatic ecosystems from dust deposition and indirect impacts on fauna (e.g. on foraging habitats).

2.1.5 Smaller particles fall out of the atmosphere very slowly remaining suspended in the air for longer distances (referred to as 'suspended particulate matter'). Particles of aerodynamic diameter less than 10 μm (referred to as 'PM₁₀') correspond to the inhalable fraction of particulate matter and, depending on the nature and concentrations of the particles, can be associated with adverse health impacts. PM₁₀ includes both *fine* (those particles of less than 2.5 μm ; referred to as PM_{2.5}) and *coarse* (diameter between 2.5-10 μm ; PM_{2.5-10}) fractions of suspended particulate matter. These normally arise from different sources, and for quarries most of the suspended dust would be in the coarse fraction.

2.1.6 The use of diesel and petrol fuelled combustion engines for on-road transport, on-site non-road mobile machinery (NRMM) and on-site plant will also result in exhaust emissions. The principal emissions of interest are nitrogen oxides (NO_x; comprises nitrogen dioxide (NO₂) and nitric oxide (NO)) and PM₁₀ (including PM_{2.5}). NO itself is not considered harmful to human health. However, on release to the atmosphere it usually oxidises rapidly to NO₂ which is associated with adverse

effects on human health, causing inflammation of the lungs at high concentrations. Long term exposure to NO₂ can affect lung function and respiratory symptoms.

- 2.1.7 The legislative and planning policy context in relation to these potential aerial emissions are discussed further below in sub-sections 2.2-2.6. The impacts that may arise from these aerial emissions are discussed further in Sections 6 and 7.

2.2 Legislative Context

Air Quality Strategy

- 2.2.1 In January 2019 Defra published the **Clean Air Strategy**⁹ which outlined a comprehensive suite of actions required across all parts of Government to improve air quality and maximise public health benefits. This included national regulations to reduce emissions from domestic burning, industry and farming, alongside stronger powers, and an improved framework for local government to tackle more localised issues, as well as a commitment to set a legally binding target for PM_{2.5}.

- 2.2.2 Under the Environment Act 1995, as amended by the Environment Act 2021, the UK Government and the devolved executives are required to produce a national air quality strategy ('AQS') every 5 years. The AQS is to provide an over-arching strategic framework for air quality management in the UK setting out a framework to enable local authorities to contribute to long-term air quality goals and setting out standards, objectives, and measures for improving ambient air quality.

- 2.2.3 The **Clean Air Plan 2020**¹⁰ forms the current National Air Quality Strategy for Wales. Air quality objectives ('AQOs') previously published as part of the 2007 National Air Quality Strategy for Wales have also been retained within the current National Air Quality Strategy for Wales.

Air Quality Standards for Human Health

- 2.2.4 Ambient air quality standards in the UK have been established through the combination of transposition of European legislation and additional UK legislation and requirements. Following the departure of the UK from the EU the air pollution limits established under EU requirements remain in place having been enshrined in UK law, the principal legislation in Wales being the Air Quality Standards (Wales) Regulations 2010 (as amended) which implemented EU Directives 2008/50/EC and 2004/107/EC.

- 2.2.5 In addition, Part IV of the Environment Act 1995 imposes a duty on local authorities in the UK to review existing and projected air quality in their area. Any location likely to exceed the UK AQOs

⁹ UK Government, Clean Air Strategy, published 14 January 2019, <https://www.gov.uk/government/publications/clean-air-strategy-2019>

¹⁰ Welsh Government, The Clean Air Plan for Wales, published 6th August 2020, last updated 16th September 2024

must be declared an Air Quality Management Area (AQMA) and an Action Plan prepared and implemented, with the aim of achieving the objectives. This process is referred to as Local Air Quality Management (LAQM). The LAQM process is supported by national statutory policy¹¹ and technical guidance¹² provided by Defra. The standards and objectives relevant to the LAQM framework are prescribed through the Air Quality (Wales) Regulations 2000 and Air Quality (Wales) (Amendments) Regulations 2002.

2.2.6 The pollutants that must be assessed under the LAQM Framework include NO₂ and PM₁₀, but not currently PM_{2.5} which is recognised as a regional pollutant for which many sources are outside local authority control. Local authorities are however expected to reduce PM_{2.5} emissions from the sources that are within their control.

2.2.7 Under the 2019 Clean Air Strategy, new targets are to be established for PM_{2.5} by the devolved authorities. At the time of preparation of this AQA new targets have been established in England but not in Wales, although under the under the **Environment (Air Quality and Soundscapes) Wales Act 2024** a new PM_{2.5} target is to be set by February 2027.

2.2.8 The various air quality standards and targets have differing legal status and are handled differently within the framework of UK air quality policy. The current applicable air quality objectives and standards relevant to the Site and Scheme with regards to protection of human health are summarised in Table 2.1 below. These are referred to in this report as Air Quality Assessment Levels (AQALs).

Table 2.1: Relevant Air Quality Assessment Levels

Pollutant	AQAL	Averaging period
<i>To be currently achieved</i>		
NO ₂	40 µg/m ³	annual mean
	200 µg/m ³	hourly mean, not to be exceeded more than 18 times per annum
PM ₁₀	40 µg/m ³	annual mean
	50 µg/m ³	24-hour mean, not to be exceeded more than 35 times per annum
PM _{2.5}	20 µg/m ³	annual mean
	% reduction relative to average exposure indicator (AEI), dependant on initial concentration; to at least 10 µg/m ³	annual mean

¹¹ Defra, Local Air Quality Management, Wales Policy Guidance (PG)(W)(17)), June 2017

¹² Defra, Local Air Quality Management, Technical Guidance (TG22), August 2022

1: PM_{2.5} – responsibility for meeting the PM_{2.5} target sits with national government although Local Authorities are required to work towards reducing emissions / concentrations of particulate matter within their administrative area.

2.2.9 For the purposes of the AQALs ambient air refers to the outdoor air and excludes workplaces where members of the public do not have regular access. Advice is given in Defra guidance⁹ as to where the UK AQOs should apply as summarised below:

Table 2.2: Summary of where the AQOs should apply

Averaging period	Locations where the objective should apply
Annual mean	All locations where members of the public might be regularly exposed; including facades of residential properties, schools, hospitals, care homes etc
24-hour mean and 8-hr mean	All locations where the annual mean objectives apply together with hotels and gardens of residential properties
1-hour mean	All locations where the annual mean, 24-hour and 8-hour means apply; also kerbside sites, parts of car parks, bus stations and railway stations which are not fully enclosed and any outdoor locations where members of the public might reasonably be expected to spend 1 hour or longer.
15-min mean	All locations where members of the public may be reasonably exposed for a period of 15 minutes.

Note: the AQOs do not apply at building facades or other places of work where members of the public do not have regular access

Air Quality Standards to Ecological Sites

2.2.10 Additional statutory and non-statutory ambient air quality standards (termed Critical Levels) are also provided by the UK Air Quality Strategy and Environment Agency (EA) / IAQM guidance for the protection of vegetation and ecosystems to be applied at nature conservation sites. Applicable standards for this assessment are detailed in Table 2.3 below:

Table 2.3: Additional Non-Statutory Critical Levels for Protection of Vegetation and Ecosystems

Pollutant	Concentration (µg/m ³)	Measured as
nitrogen oxides (as NO ₂)	30	annual mean
	75 / 200 ¹	daily mean

1: The Critical Level is generally considered to be 75 µg/m³, but this only applies where there are high concentrations of SO₂ and this is not generally the situation in the UK

2.2.11 In addition, Critical Loads are provided for nitrogen nutrient and acidity deposition. These are dependent on the specific habitat and location and are provided in detail on the Air Pollution Information Service (APIS) website¹³. Any relevant Critical Loads to a specific nature

¹³ Air Pollution Information Service, www.apis.ac.uk

conservation sites or habitat feature are provided in the relevant sections of this assessment if applicable.

Ambient Dust Standards and Control

2.2.12 Deposition dust as such is not regulated as a pollutant under the above requirements. There are no UK statutory standards or recommended levels that define the point when deposited dust causes annoyance or disamenity ('disamenity dust') although standard 'custom and practice' thresholds are referred to.

2.2.13 Public concerns in relation to dust accumulation and soiling may be related to a range of factors including the nature of a site and locality and baseline levels. Controls of soiling and annoyance impacts are typically achieved through conditions within planning permissions and / or environmental permits requiring the implementation of a dust management plan to prevent amenity impacts. Deposited dust may also give rise to 'nuisance', as Statutory, private and public nuisance as defined in environmental law and insofar as nuisance relates to unacceptable effects of emissions.

Other Relevant Legislation

2.2.14 The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018 implemented EU regulations 2016/1628 and impose increasingly stringent emission limits to the engines of NRMM and power plant with the aim of progressively reducing the emissions and phasing out polluting equipment from 2019.

2.3 Planning Policy

2.3.1 Planning Policy Wales¹ sets out the Welsh Government's planning policies for Wales and how these are expected to be applied. Section 6.7 of the PPW is titled Air Quality and Soundscape and provides some guidance to local authorities on taking air quality into account in planning policies and decisions.

2.3.2 Section 6.7.5 states that *'the key planning policy principle is to consider the effects which proposed developments may have on air or landscape quality and the effects which existing air or soundscape quality may have on proposed developments.'*

2.3.3 Section 6.7.6 states: *'In proposing new development, planning authorities and developers must, therefore:*

- *address any implication arising as a result of its association with, or location with, 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 soundscapes.'*

- 2.3.4 Section 6.7.7 states: *'To assist decision making it will be important that the most appropriate level of information is provided and it may be necessary for a technical air quality and noise assessment to be undertaken by a suitably qualified and competent person on behalf of the developer.'*
- 2.3.5 Section 6.7.14 further states: *'Proposed development should be designed wherever possible to prevent adverse effects to amenity, health and the environment but as a minimum to limit or constrain any effects that do occur.'*
- 2.3.6 PPW is supplemented by Technical Advice Notes (TANs). **Minerals Technical Advice Note (Wales) 2: Coal (MTAN2)**¹⁴ which sets out detailed advice on the mechanisms for delivering the policy for coal extraction by MPAs and the coal mining industry. MTAN2 includes further advice on the sources and effects of dust from coal working (paragraphs 132-156) and Appendix K includes guidance on best practice to reduce potential impacts from dust.
- 2.3.7 **TAN 11** originally provided supplementary guidance on noise pollution but is in the process of being updated to include air quality. The draft revised **TAN 11 on 'Air Quality, Noise and Soundscape'**¹⁵ is currently undergoing review following public consultation.
- 2.3.8 The PPW and MTAN2 provide only limited guidance and do not go into detail on the mechanics of dust assessments for minerals planning applications. Reference is therefore also made to non-statutory guidance as discussed below.

¹⁴ Welsh Government, Minerals Technical Advice Note 2: Coal, January 2009

¹⁵ Welsh Government, Technical Advice Note 11: Air Quality, Noise and Soundscape (Consultation Document), issued: 21st October 2022

2.4 Local Planning Policy

2.4.1 MTCBC have adopted the **Replacement Local Development Plan**¹⁶ which sets out the current long-term vision and objectives for the area. **Policy EnW4 on Environmental Protection** from the plan states that:

‘Development proposals will be required to demonstrate they will not result in an unacceptable impact on people, residential amenity, property and / or the natural environment from either:

- Pollution of land, surface water, ground water and the air; [...]*
- Noise, vibration, dust, odour nuisance and light pollution; or*
- Any other identified risk to public health and safety.*

Where impacts are identified the Council will require applicants to demonstrate that appropriate measures have been incorporated to reduce, or minimise the impact identified to the lowest possible acceptable level. Planning conditions may be imposed or legal obligation entered into, to secure any necessary mitigation and monitoring processes.’

2.5 Environmental Permitting

2.5.1 A wide range of industrial, waste, and agricultural installations require an Environmental Permit to operate under the Environmental Permitting (England and Wales) Regulations 2007 and subsequent amendments (termed EPR). The aim of the permitting system is to prevent, and where that is not practicable, reduce, emissions to air, water, and land by potentially polluting and other installations. Permits are issued by either Natural Resources Wales (NRW) or the Local Authority depending on the nature and size of the facility.

2.5.2 Operations and installations that are controlled under a Permit are required to operate in such a way that a) all the appropriate preventative measures are taken against pollution, in particular through the application of best available techniques; and b) no significant pollution is caused.

2.5.3 EA guidance¹⁷ regarding developments requiring both a planning permission application and environmental permit application clarifies that when deciding on a planning application the authorities should a) be confident that the development will not result in unacceptable risks from pollution when considering if the development is an appropriate use of the land and b) not focus on controlling pollution where it can be controlled by other pollution regulations, such as EPR.

2.5.4 As a surface coal mine however a coal mining licence (ref: CA11/OP/95/0084/C) is held from the Coal Authority (now the Mining Remediation Authority) rather than an Environment Permit and MTCBC is the primary authority for the regulation of the former surface mine.

¹⁶ Merthyr Tydfil County Borough Council, Replacement Local Development Plan 2016-2031, adopted 29th January 2020.

¹⁷ Environment Agency (EA), Guidelines for developments requiring planning permission and environmental permits (England), 9th October 2013

2.6 National Best Practice and Guidance

- 2.6.1 The IAQM **Planning for Air Quality**³ document provides specific non-statutory guidance on air quality and the planning system for new development. The guidance provides indicative criteria in relation to changes in vehicle movements that would indicate the need for detailed assessment with regards to exhaust emissions.
- 2.6.2 The IAQM **Guidance on the Assessment of Mineral Dust Impacts for Planning**⁴ document provides specific non-statutory guidance on dust assessments on mineral sites. The guidance clarifies when a dust assessment is required and outlines a recommended methodology for carrying out impact assessments and determining the significance of impacts and effects. The guidance also sets out suggested approaches to mitigating emissions and impacts.
- 2.6.3 The IAQM **Guidance on the Assessment of Dust from Demolition and Construction**⁵ has produced supplementary planning guidance on the control of dust and emissions from construction and demolition. Parts of this guidance may also be applied to quarrying activities where these present similar risks of impacts, and the relevant guidance is referred to concerning mitigation measures.
- 2.6.4 The IAQM **Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites**¹⁸ provides specific non-statutory guidance in relation to the assessment of air quality impacts of development on designated nature conservation sites.
- 2.6.5 The Mineral Industry Research Organisation (MIRO) **Good Practice Guide: Control and measurement of Nuisance Dust and PM₁₀ from the Extractive Industries**¹⁹ provides further guidance for reducing dust from mineral extraction sites.

¹⁸ Institute of Air Quality Management (IAQM), Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites, version 1.1, May 2020

¹⁹ AEA, Report to the Mineral Industry Research Organisation (MIRO), Good practice guide: control and measurement of nuisance dust and PM10 from the extractive industries, Issue 1, February 2011

3 Assessment Methodology

3.1 Scope

3.1.1 The scope of the assessment was based on consideration of the Scheme and likely effects on the local environment as set out in the Scoping Report. The following matters have been considered in the assessment:

- Dust: potential effects of deposition dust and suspended particulate matter (PM₁₀ and PM_{2.5}) arising during the restoration phase; and
- Non-Road Mobile Machinery (NRMM) and combustion plant exhaust emissions: potential effects of exhaust emissions arising from machinery and plant during the restoration phase.

3.1.2 In undertaking the AQA, SGP carried out the following activities:

- visit to view the Site, current operations and surrounding area;
- review of existing permitted restoration scheme and revised restoration scheme proposals;
- review of baseline air quality data and local weather conditions;
- review of background site sensitivity and nature conservation sites;
- qualitative dust (including PM₁₀ and PM_{2.5}) assessment;
- qualitative screening assessment of NRMM and on-site power generation emissions;
- provision of recommendations for additional mitigation measures;
- assessment of residual impacts on human and ecological receptors and significance of effects.

3.2 Scoped Out Matters

3.2.1 The restoration proposals do not include for the importation or exportation of any materials to / from the Site. On-road vehicle movements associated with the Scheme would therefore be solely limited to staff and some visitor trips associated with deliveries and serving of equipment. Staff and maintenance vehicles will primarily be Light Duty Vehicles (LDVs; cars and vans) with the requirement for Heavy Goods Vehicle (HGV) access to the Site being rare. These movements would be as currently experienced during the current restoration and aftercare works and would be limited in number. The potential for emissions from these vehicles to result in significant adverse impacts and effects on human or ecological receptors is considered to be **negligible**. Further consideration has therefore been scoped out of the AQA. The Scheme includes for a period of aftercare on completion of the restoration works as required under the existing planning permission. There would not be any significant source of aerial emissions from the Site during the subsequent aftercare works and consideration of this phase is scoped out of the AQA.

3.3 Surveys and Information Sources

3.3.1 The baseline data has been primarily gathered through a desk top study and the site visit. In undertaking the assessment reference has been made to the following sources of information:

Table 3.1: Information Sources

Date and Reference	Author and Source	Purpose and Content
Background and Topographical Information		
Promap	Ordnance Survey	general mapping information including topographic data, ground features, rights of ways, communications etc
Aerial satellite imagery	Aerial photography (various)	site setting
www.magic.gov.uk	Multi-agency	web-based interactive map containing information on nature conservation areas
Air Quality Information		
2023 Air Quality Progress Report ²⁰	Merthyr Tydfil County Borough Council (MTCBC)	update of local authority air quality monitoring and assessment; details air quality data up until end 2022
www.uk-air.defra.gov.uk/aqma	Defra	details and maps of AQMAs throughout UK
www.laqm.defra.gov.uk	Defra	Local Authority air quality management support; background pollutant maps

Note: all information websites were accessed in November 2024

3.3.2 Information on the ecological setting of the site has been provided by the project ecological consultants, RML²¹. Information on previous air quality and dust monitoring undertaken during the operational works has been provided by MSW.

3.3.3 The site visit was undertaken by suitably qualified SGP personnel on 13th August 2024.

3.4 Consultations

3.4.1 An EIA Scoping Report was submitted by RML to MTCBC in relation to the Scheme⁷. This included a chapter prepared by SGP with an outline scope of work for the AQA to support the EIA. In the subsequent Scoping Opinion⁸ MTCBC advised that *'Sensitive receptors should be mapped, and the assessment methodology outlined in para 12.5 of the report [Scoping Report] should be comprehensive and detailed in terms of monitoring and mitigation for the duration of the scheme, in accordance with IAQM guidance documents for mineral dust impacts and demolition & construction dust.'*

²⁰ Merthyr Tydfil County Borough Council, 2023 Air Quality Progress Report, dated September 2023

²¹ Richards Moorehead & Laing, Ffos y Fran Final Restoration Strategy, Baseline Ecology report, 3274/11, March 2024

3.4.2 This AQA has been undertaken in accordance with the EIA Scoping Report and the subsequent MTCBC Scoping Opinion.

3.5 Assessment Methodology

3.5.1 The assessment of potential pollutant impacts considers the potential magnitude of a release (the source potential), the effectiveness of the pathway (i.e. dispersion of a pollutant towards a receptor), and the sensitivity of the receptor. The AQA therefore considers the boundaries of the Site and the working areas in relation to sensitive receptors and the control measures to be implemented, to assess the probability of significant adverse air quality impacts occurring during normal operations. Consideration is made of the orientation and distance of receptors to the Site and the prevailing weather conditions.

Dust Assessment

3.5.2 The dust assessment has been undertaken with reference to the IAQM guidance on mineral dust⁴ and construction dust⁵ appropriate modification for the specific proposed activities.

3.5.3 The assessment incorporates the consideration of dust mitigation measures, including physical measures incorporated within the overall development design, such as the proposed location of operations and provision of bunds, and standard good practice measures that are currently incorporated within the management and operation of the Site as part of normal working practice. The assessment is used to determine any additional measures that may be required to ensure any adverse impacts are mitigated to acceptable levels.

NRMM Assessment

3.5.4 The NRMM Assessment (including on-site plant) has been undertaken through reference to the IAQM guidance on air quality, planning, construction and nature conservation sites. The level of assessment was determined through an initial screening review taking into account the predicted number and locations of NRMM and on-site plant to be used during the Scheme.

Receptors

3.5.5 Receptors considered in this AQA comprise:

- human receptors: locations where a person or property may experience adverse impacts of airborne dust or exposure to ambient pollutants or odours (i.e. residential, leisure, amenity and sensitive commercial use); and,
- ecological receptors: where this refers to any sensitive habitat that may be affected by dust soiling or increased ambient pollution (e.g. locations with an international, national or local designation and sensitive habitat features).

3.5.6 The sensitivity of the receptors to potential impacts from aerial emissions, whether changes in pollutant concentrations or dust soiling, will be determined as detailed in the relevant guidance described above.

3.5.7 Further details on the selection of receptors and the methodology of the assessments as detailed in the relevant guidance is described in Appendix A.

3.6 Study Areas

3.6.1 The Study Area includes features likely to be at risk from possible direct and indirect impacts that may arise from the Scheme. Different Study Areas are adopted for different sources of aerial emissions due to the differing spatial extents at which likely significant effects could potentially arise. The Study Areas are summarised below.

3.6.2 The IAQM guidance on mineral dust⁴ advises that PM₁₀ needs to be assessed if there are sensitive human health receptors within 1km. To provide a conservative assessment therefore a search radius of 1km of the Site boundary has initially been applied in relation to human health receptors.

3.6.3 The IAQM guidance on mineral dust advises that adverse dust impacts are uncommon beyond 250m from 'sand and gravel' sites and beyond 400m from 'hard rock' quarries, as measured from the nearest dust generating activities. The IAQM guidance on construction activities⁵ advises an assessment distance of up to 250m of a site boundary and up to 50m of the route used by construction vehicles on the public highway up to 250m from a site entrance.

3.6.4 In this instance proposals are for the handling of overburden, scree and soils. 'No 'hard' rock' working involving extraction or processing is proposed as part of the Scheme. The proposed operations are more akin to construction earthworks and the Deposition Dust Study Area therefore extends up to 250m from the Works Area boundary.

NRMM

3.6.5 There is no specific guidance on the assessment of NRMM or assessment distances. As for on-road vehicles pollution concentrations would fall rapidly away from the source and a 200m assessment distance would be appropriate. The NRMM Study Area therefore extends up to 200m from the Scheme Boundary and edges of off-site roads to be used by construction plant accessing the Site during the construction phase.

3.7 Assessment of Significance

3.7.1 The resulting effects of aerial emissions are the consequences of the potential impacts, i.e. changes in pollutant concentrations and / or deposition, at receptors. IAQM guidelines do not provide a traditional matrix assessment of significant effects with regards to air quality. The

frameworks outlined in the guidance above and described in Appendix B provide methodologies for describing air quality impacts and resulting effects at individual receptors. These frameworks are therefore used as a starting point to assess the significance of predicted effects.

3.7.2 Where **negligible** impacts are predicted, the overall effects will be **not significant**. In general, where **slight** impacts at receptors are predicted the resulting effects would be considered to be **not significant**. **Moderate** and **substantial** impacts could result in **significant** effects. However, the judgement of the overall significance of the air quality effects of the proposals is informed by the predicted impacts and effects at individual receptors and takes into account a number of factors, such as, but not limited to:

- the existing and predicted future air quality in the absence of the proposed development;
- the extent of current and future population exposure to the predicted impacts and the severity of those impacts;
- how the predicted impacts of the revised scheme compare to the predicted impacts of the original scheme;
- whether the predicted impacts potentially result in failure to achieve compliance, or enhance compliance, with UK AQOs and national and / or local air quality action plans;
- whether the predicted impacts potentially result in the need for declaration of a new or extended AQMA, or removal of an existing AQMA;
- whether the predicted impacts potentially result in permanent or temporary damage, or improvements, to nature conservation sites of local, national or international importance and the geographical extent of those impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts.

3.8 Assumptions and Limitations

3.8.1 Baseline air quality data has been obtained through a review of existing information. Some recent MTCBC monitoring data and historic MSW monitoring data is available for the locality and which has been referred to.

3.8.2 Further reference has been made to predicted background information provided by Defra. The Defra data was last updated in November 2024 and is based on 2021 monitoring and modelling and predicted UK fleet composition and vehicle exhaust emissions factors. It provides the most up to date available data and predictions of current and future background pollutant concentrations.

4 Site Details and Proposed Development

4.1 Full descriptions of the existing Site and the Scheme are provided in the planning application and supporting documentation and only those aspects of relevance to the AQA are briefly summarised here.

4.2 Site Details and Existing Development

4.2.1 The Site comprises the former Ffos-y-Fran surface coalmine covering circa 400 hectares (ha) lying about 1.5km to the east of Merthyr Tydfil town centre. The Site is divided into a northern and southern area by a minor road (Bogey Road) that runs through the central section of the Site in an east-west direction.

4.2.2 As described in Chapter 3 of the ES the existing baseline conditions at the Site are taken as those existing at the end of the operational period of coal extraction at the end of November 2023.

4.2.3 The Site encompasses the following key features:

- **Overburden mounds OB1, OB2 and OB3:** formed during recent surface mining operations that commenced in 2007; current status of each being:
 - OB1: located in the northeast of the northern area;
 - OB2: located in the southeast of the northern area; partially vegetated;
 - OB3: located in the southern area of the Site; is the largest of the overburden tips containing approximately 24M m³ of material;
- **Pit Lake:** the main void which has naturally filled with water since cessation of the operational phase and removal of water pumps;
- **Phase 1 Restored Area:** area backfilled and previously restored to grassland; comprises about 62 ha in the western area of the Site;
- **Phase 2A Interim Restoration Area:** comprising Areas 2, 4, 4A, 5, 6, 7 and 8; although not completed as of the end of December 2023 restoration of this area is partially complete and does not form part of the Scheme; comprises about 54 ha to the east of the Phase 1 area;
- **Workshop Area:** area of workshop buildings and parking for on-site plant vehicles.

4.2.4 Other features of note at the former Ffos-y-Fran mine site are:

- **Cwmbargoed Disposal Point (CDP):** includes a former coal washery, railhead, offices and welfare facilities; continues to serve as the operational base of the Site and is currently occupied by the care and maintenance team; located to the east of OB3 and lies outside the Site boundary;
- **Central Ecological Area:** located between the northern and southern parts of the Site lying outside the Site boundary; now forms the Merthyr Common Site of National Importance (SINC).

4.2.5 Vehicular access and egress to / from the Site is gained via the CDP which is accessed off the Fochriw Road to the east. Access and egress to / from the northern part of the Site encompassing the void, Phase 1 and 2A, OB1 and OB2 is gained via an internal haul road from the CDP which crosses Bogey Road.

4.2.6 There is an established internal site speed limit across all internal haul roads within the Site.

4.2.7 The Phase 1 Restored Area is largely complete and restored to grassland with some minor earthworks required for final completion subject to further discussions with MTCBC. Restoration works have recently been undertaken / completed in the Phase 2A Interim Restoration Area. Restoration of these areas was achieved through the replacement of stripped soils and overburden generated during the surface mining operations. There has been no importation of material for infilling and restoration purposes.

4.3 Further Consented Restoration Works

4.3.1 The planning permission A-PP 152-07-014 and subsequent APP/U6925/A/10/2129921 included for an approved restoration scheme. Under approved strategy it is a requirement to submit and agree the final detailed plans in phases, prior to the completion of each defined phase.

4.3.2 Under the existing approved strategy the following works are required to achieve the final restoration profiles:

- Returning overburden in the overburden mounds OB1, OB2 and OB3 in the voids;
- Placement of sub-soils, topsoil and soil forming materials.

4.3.3 Phase 1 and Phase 2A have been undertaken in accordance with the approved restoration strategy and are now substantially complete. However, as described in the EIA Scoping Report⁷ the consented scheme would require filling the void with approximately 26 million cubic metres (m³) of on-site stored overburden material along with additional earthworks to achieve the consented final restoration contours across the wider Site.

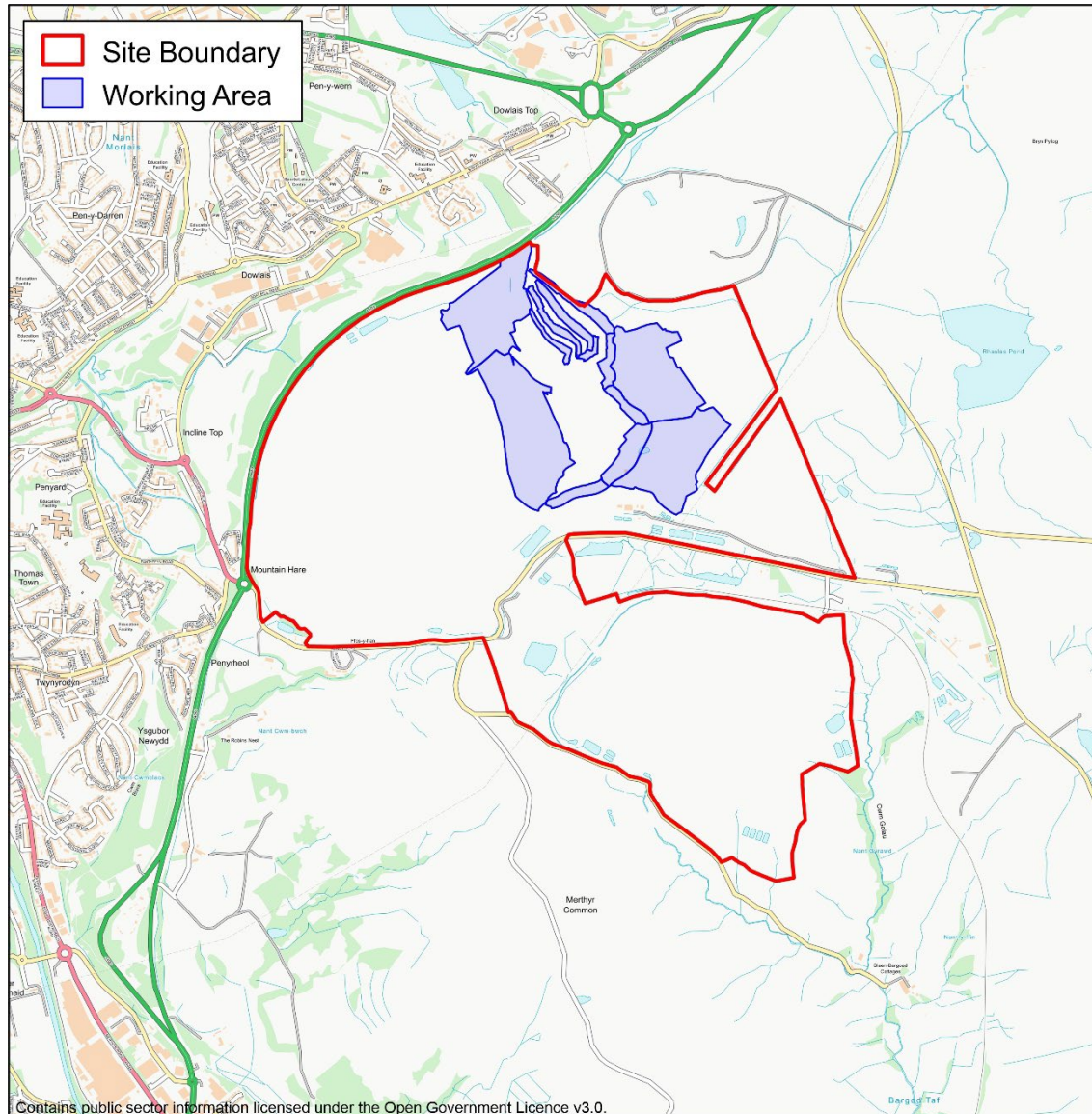
4.4 Proposed Revised Restoration Proposals

4.4.1 Proposals are to vary the current approved restoration strategy. The proposals briefly comprise:

- Selectively reduce the height of OB1 and re-profile the upper reaches;
- Re-profile the slopes leading down to the base of the void below the sidewalls and on the current western backfill slope;
- Retention of the existing pit lake within the void as a permanent body of water;
- Retention of overburden mounds OB2 and OB3 largely as currently other than some minor earthworks to soften the engineered profiles;
- Range of surface vegetation treatments, including to OB3;
- Retention of some of the existing haul road routes as narrow plateaus and grassed tracks.

- 4.4.2 The detailed phasing is provided in RML plans 3274-RML-DR-L-53A-D. Works to reprofile OB1 and the void would be undertaken across Sequence Areas 10-14 and 16 and would involve regrading weathered rock, scree and overburden. Area 16 also includes construction of an embankment for construction of a Byway Open to All Traffic (BOAT), stabilising an abandoned A4060 embankment and filling a pit next to the abandoned A4060 at the northern end of the void.
- 4.4.3 The location of the Working Area for OB1 and the void in relation to the wider Site is shown below in Figure 4.2.
- 4.4.4 These works would require the movement of circa 2.5M m³ of materials. Final restoration would be to a combination of grassland and waterbodies. As under the current consented scheme there would not be importation of any materials for restoration.
- 4.4.5 The final restoration strategy is to be implemented over a 2-to-3-year period. On completion the restored landform would be subject to a 5-year establishment maintenance period to enable grass seeding and tree planting to establish. This would include extensive lengths of fencing to prevent livestock and overgrazing of the grassland areas and damage to areas of planting.
- 4.4.6 All access would continue via the CDP. However, all NRMM associated with the earthworks would be parked at the Workshop Area with no access to the CDP required on a day-to-day basis. The majority of material is expected to be regraded using bulldozers with minimal requirements for excavation and haulage.
- 4.4.7 The working hours of the operations would be as per the current operations.

Figure 4.1: Location of Working Areas in relation to the Site



Note: Boundaries of the Working Areas are approximate. Refer to planning application documents for more detail.

4.5 Regulatory Controls

4.5.1 The existing planning permission for the Site includes several conditions that have either direct or indirect impacts on aerial emissions and management. In particular, Conditions 14, 15 and 16 specifically relate to dust and air quality as follows:

Dust Control

14: *The development hereby permitted shall not take place other than wholly in accordance with the dust suppression and air quality monitoring scheme approved by the Local Planning Authority in accordance with condition 14 of permission APP 152-07-014 and based on the measures set out in the 2003 Environmental Statement referred to in condition 6 of that permission.*

- 15: *The dust suppression measures to be employed shall use the Best Available Technology Not Entailing Excessive Cost for the monitoring and control of dust which may arise directly or indirectly as a result of site activities. In particular:*
- *A sufficient number of spraying units shall be provided and maintained in efficient working order so as to ensure that haul routes and other areas traversed by vehicles are kept damp during dry weather.*
 - *All spraying vehicles shall have an adequate water supply at all times.*
 - *There shall be regular and effective maintenance of haul roads.*
 - *The exhausts and through-body exhaust systems of all vehicles and other plant shall be fitted so as to prevent exhaust gases being emitted downwards.*
 - *Effective dust collection systems shall be fitted to all blast hole drilling machines before such machines are operated.*
 - *Prior to all blasting, all arisings from blast hole drilling shall be bagged and disposed of safely.*
 - *The tipping or removal of overburden shall cease temporarily or be relocated within the overburden storage area whenever the Local Planning Authority considers that wind strength and direction may result in a significant dust nuisance and notifies the site operator accordingly.*
 - *The construction of all baffle mounds shall cease temporarily or be relocated whenever the Local Planning Authority considers that the wind strength and direction may result in significant dust nuisance and notifies the site operator accordingly.*
 - *The site operator shall provide and maintain a sufficient number of vapour masts so as to ensure that an effective vapour screen can be produced at any point in the Site.*
 - *All baffle bunds shall be sealed and seeded as soon as practicable after they have been constructed in such a way as to minimise wind blown material from adversely affecting nearby dwellings.*

Air quality

16. *The development hereby permitted shall be monitored in accordance with the air quality monitoring scheme approved by the Local Planning Authority in accordance with condition 16 of permission APP 152-07-014.*

4.5.2 Condition 16 of APP 152-07-014 set out:

Condition 16

An air quality monitoring scheme shall be undertaken as approved in writing by the Planning Authority. This shall include:

- *Baseline monitoring to establish background levels of dust and particulates which must be carried out prior to commencement of operations.*
- *Dust monitoring to be carried out at suitably agreed locations within the community using dust deposition gauges or sticky pads to identify nuisance dust.*

- *A weather station shall be set up and operated for the duration of the project at Cwmbargoed DP to measure (a) rainfall; (b) wind speed; (c) wind direction; and (d) temperature. Such information to be made available to the Planning Authority on request*
- *PM₁₀ and PM_{2.5} monitoring to be undertaken using a methodology agreed in writing by the Planning Authority. Such monitoring to be carried out prior to commencement of works and continue for a minimum period of 12 months after coal winning commences. If it is established such monitoring is not required as a result of site activities after such a period, the monitoring shall then cease, subject to the written agreement of the Planning Authority.*

4.5.3 The required scheme and programme of measures to suppress dust and the monitoring programme for dust and airborne particles (PM₁₀ and PM_{2.5}) as required under Condition 14, 15 and 16 were set out in the Air Quality, Noise and Vibration Strategy ('AQVNS')²².

4.5.4 The Air Quality, Noise and Vibration Strategy formed part of the Environmental Management Plan ('EMP') that was required to be agreed with the MPA for each phase of the development under Condition 42 of the planning permission.

4.5.5 As operational works at the Site have now ceased various elements of the AQVNS are no longer employed. However, it is envisaged a revised EMP will be required for the final restoration strategy along with the employment of applicable dust suppression measures and monitoring as appropriate. These are discussed further in Section 8.

²² Peter Brett Associates, Ffos-y-Fran Land Reclamation Scheme, Air Quality, Noise and Vibration Strategy, Project Ref: 11992/3-4, January 2007

5 Site Setting and Baseline Conditions

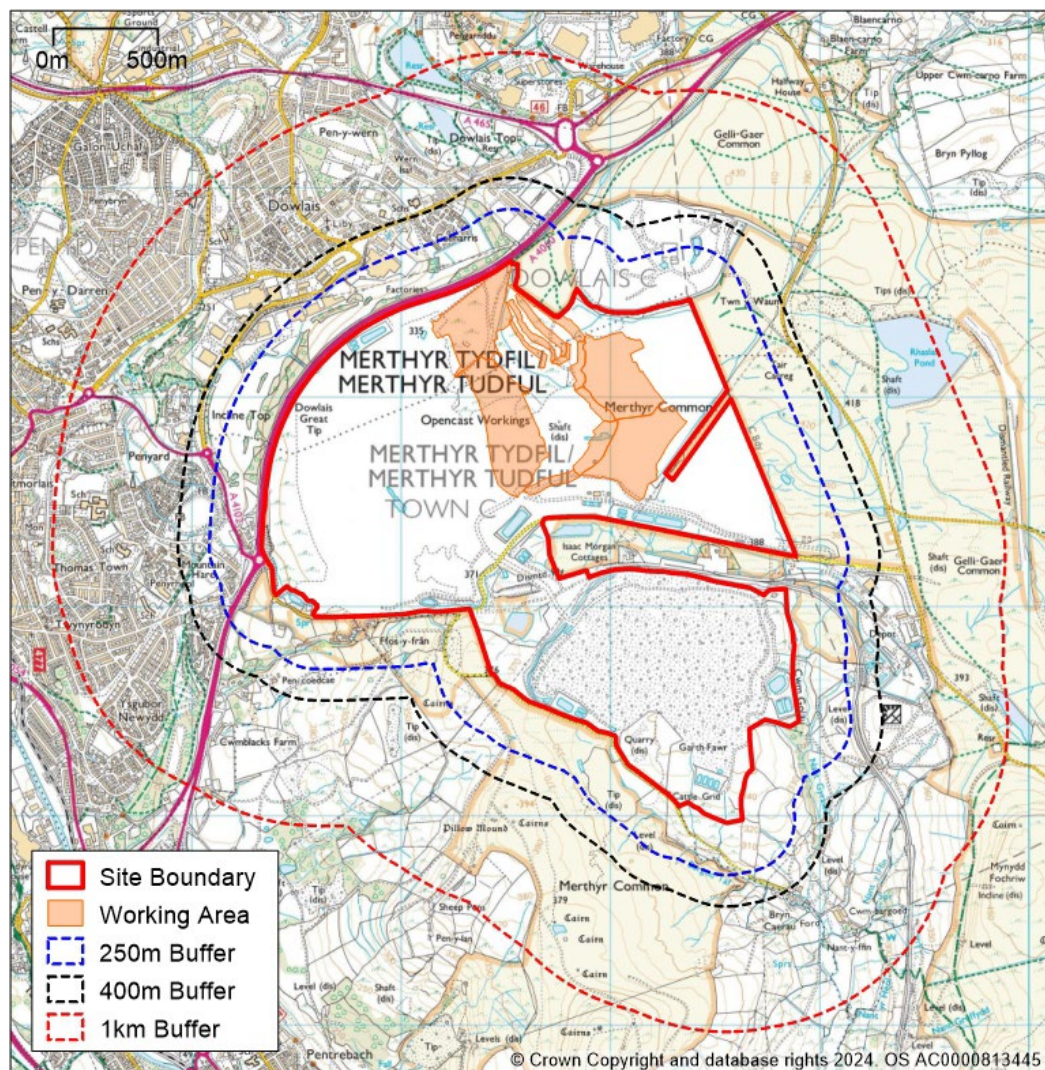
5.1 General Site Setting

5.1.1 Full details on the site setting and surrounds are set out in Chapter 3 of the ES and only the key aspects of relevance to the AQA are summarised here.

5.1.2 The Site lies to the immediate east / southeast of the A4060, beyond which lies the development of Merthyr Tydfil. To the northeast lies the Trecatti Landfill. The upland areas of Gelli-Gaer Common and Merthyr Common lie to the northeast beyond the landfill and to the east and the south of the Site.

5.1.3 The locations of the Site and Works Area in relation to the immediate surroundings are shown below in Figure 5.1.

Figure 5.1: Site Location (1:25,000 scale mapping base)



5.1.4 The nearest residential properties to the Site include those within Mountain Hare on the eastern edge of Merthyr Tydfil extending to about 40m to the west beyond the A4060 and at Ffos-y-Fran about 30m to the south off Bogey Road. Other properties within 250m of the Site include those within Dowlais and Dowlais Top in Merthyr Tydfil to the north and those within Incline Top in Merthyr Tydfil to the west. No high occupancy sensitive receptors have been identified within 250m of the Site, the closest being the Pilipala Day Nursery 330m to the southwest.

5.1.5 The sensitive human receptors within 1km of the Site are summarised in Table 5.1 below. Other human receptors within 1km of the Site are effectively subsumed by those listed in Tablex.

Table 5.1: Human Receptors within 1km of the Site

Name	Type	Distance and Orientation from the Site Boundary
Within 250m		
Mountain Hare, Merthyr Tydfil	Residential (community)	40m, W
Dowlais Top, Merthyr Tydfil	Residential (community)	190m, NNW
Dowlais, Merthyr Tydfil	Residential (community)	205m, NNW
Incline Top, Merthyr Tydfil	Residential (community)	285m, W
Ffos-y-Fran	Residential (community)	30m, S
Within 250m-400m		
Mountain Hare, Dowlais Top, Dowlais, Incline Top	Residential (community)	As above, to the west of A4060
Pen Coedcae	Residential (isolated)	325m, SSW
Within 400-1,000m		
Wider development of Merthyr Tydfil	Residential (community)	As above, to the west of the A4060
Cwmblacks Farm	Residential (isolated)	650m, SSW
Cwmbargoed, Nant-y-Ffan and Bryn Caerau	Residential (community)	460m, SE

5.1.6 A public footpath runs along the northeast boundary of the Site, between the Site and the Trecatti Landfill. Other public footpaths and areas of common land lie to the west and south.

5.2 Other Area Activities

5.2.1 Trecatti Landfill to the immediate north of the Site is an active landfill site operated by Biffa licenced to accept non-hazardous landfill site under an Environmental Permit issued by Natural Resources Wales ('NRW'; PPC Permit EA/EPR/RP3733PC).

5.2.2 Extensive construction works have been on-going to the north of the Trecatti Landfill associated with the Dowlais Top to Hirwaun stretch of the 'Heads of the Valley' road widening scheme, including the A4060 / A465 junction. These works commenced in 2021 and are due to complete by mid-2025.

5.2.3 Other activities in the locality that may be a source of dust and other aerial emissions, in addition to general road use, urban activities and agricultural activities, include a waste transfer station and scrap yard on the Pengarnddu Industrial Estate at Dowlais Top.

5.3 Topography

5.3.1 The topography is highly variable across the Site. OB1 extends to a height of 475m AOD and the void to a depth of circa 250m AOD. Land to the north falls to the A4060 at 330m AOD and to 325m AOD to the west.

5.4 Nature Conservation Sites

5.4.1 No statutory designated nature conservation sites have been identified within 1km of the Site although the central ecological area has been designated as a Site of Interest for Nature Conservation (SINC) by MTCBC (see below).

5.4.2 Several non-statutory designated nature conservation sites have been identified within 1km of the Site. Details are provided in the table below.

Table 5.2: Nature Conservation Sites within 1km of Site¹

Name	Designation	Distance & Orientation from Site Boundary
Statutory Nature Conservation Sites		
<i>none</i>		
Non-Statutory Nature Conservation Sites		
Tair Carreg Moor	SINC	0m, E
Merthyr Common South	SINC	0m, S
Merthyr Common Central (<i>Central Ecological Area</i>)	SINC	0m, S
Cwm Golau	SINC	175m, S
Glynmil	SINC	185m, S
Cefn Gelligar, West of Deri	SINC	480m, E
Nant Cwmlacs (ID: 16790)	Ancient Semi-Natural Woodland	120m S
Nant Cwmlacs (ID: 22397)	Restored Ancient Woodland	180m S
Woodland near Blaen-Bargoed Cottages (ID: 13656)	Ancient Semi-Natural Woodland	540m SE
Woodland near Nant-y-ffin (ID: 18405)	Ancient Semi-Natural Woodland	735m SE
Woodland west of Merthyr Common (ID: 10123 & 18406)	Ancient Semi-Natural Woodland	735m S
Woodland near Nant-y-ffin (ID: 13658)	Ancient Semi-Natural Woodland	775m SE

SINC – Site of Importance for Nature Conservation

1: For full details reference should be made to the RML Baseline Ecology Report²¹

5.4.3 Ecological features of note on the Site are described in the Ecological Baseline Report²¹ and include woodland, acid and marshy grassland, and aquatic habitat.

5.5 Air Quality Review

5.5.1 MTCBC has one active Air Quality Management Area (AQMA) within its' administrative area declared under the LAQM regime, details of which are summarised below.

Table 5.3: AQMAs within Vicinity of the Site

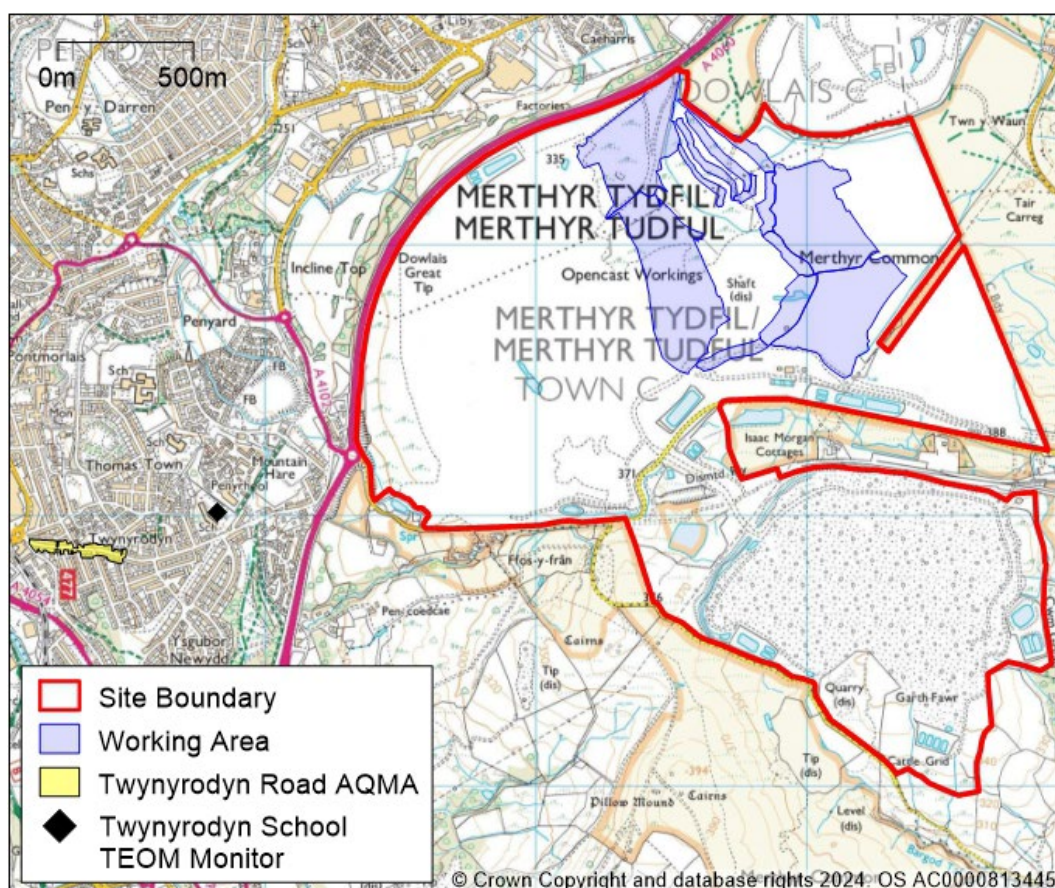
AQMA Name	Location	Pollutant(s)	Distance, Orientation ¹
Twynrodyn Road AQMA	Within Merthyr Tydfil - An area encompassing a number of properties from Tesco Roundabout to Gilfach Cynon	NO ₂ , annual mean	940m, SW

1: Distance and orientation from the Site

5.5.2 The AQMA was declared in 2017 due to high levels of NO₂ associated with traffic travelling uphill on Twynrodyn Road. The location of this AQMA in relation to the Site is shown in Figure 5.2.

5.5.3 Traffic on Pontmorlais High Street within the AQMA was reversed in May 2018. The MTCBC 2023 ASR reports that subsequent ambient air quality monitoring data has shown an improvement in air quality within the AQMA and annual mean NO₂ concentrations have been well within the AQO. The MTCBC 2023 ASR states that the AQMA will be considered for revocation in 2024 if there is consistent compliance with the AQO.

Figure 5.2: Local Air Quality Features



5.6 Predicted Background Air Quality Data

5.6.1 Defra publishes predicted background pollutant concentration maps for 1km x 1km grid squares across the UK. The maps are based on a combination of ambient monitoring and meteorological data along with modelling using information including the age and distribution of vehicles and emission factors.

5.6.2 The current maps were issued in 2024 and the predicted data is based on 2021 ambient monitoring and meteorological data. The maps incorporate revised information on the age and distribution of vehicles and emission factors and take into account existing local sources of emissions. Predicted data is provided by Defra for each year from 2021 to 2040.

5.6.3 The predicted pollutant concentrations (NO₂, NO_x, PM₁₀, and PM_{2.5}) for the grid squares in which the Site and nearest receptors are located for the baseline (2023) and current (2024) years are detailed in Appendix B. The range of concentrations is summarised in Table 5.3 below.

Table 5.4: Predicted Background Air Quality Data – Nitrogen Oxides and Particulate Matter

Location	Mean Pollutant Concentration (µg/m ³)			
	NO ₂	NO _x	PM ₁₀	PM _{2.5}
2023	4.66 – 7.99	5.81 – 10.28	9.37 – 10.98	5.88 – 6.61
2024	4.55 – 7.96	5.67 – 10.23	9.29 – 10.87	5.81 – 6.50
AQAL	40	30(v)	40	20

Data downloaded on 6th December 2024

(v) – established for the protection of vegetation

5.6.4 The predicted concentrations take into account existing sources of air emissions including the former surface mine and local road network (as based on 2021 monitoring and modelling). The average background NO₂, NO_x, PM₁₀ and PM_{2.5} concentrations for the grid squares in which the Site and nearest receptors are located are predicted to be substantially below the relevant AQALs in 2023 and 2024.

5.6.5 It should be noted that the data are effectively an average concentration across each 1 km square. The pollutant concentrations will therefore be higher close to any significant source, such as the nearby A4060 and A465.

5.7 Local Authority Monitored Air Quality

5.7.1 The most recent available air quality status report for MTCBC is the 2023 Air Quality Annual Status Report (ASR) which details monitoring data up until the end of 2022.

5.7.2 The MTCBC 2023 ASR states the Council carried out ambient air quality monitoring for NO₂ across its' administrative area in 2022 utilising a combination of automatic (continuous or real-time) and non-automatic (passive diffusion tubes) monitoring facilities. Full details of the monitoring considered of relevance to the Site is provided in Appendix B and summarised below.

- 5.7.3 Continuous monitoring for NO₂ has been undertaken by MTCBC for several years on Pontmorlais in Merthyr Tydfil, at a location about 1.35km to the west of the Site. The monitoring site forms a roadside location outside the AQMA. The monitor utilised is an ECC monitor and does not form an approved method for assessing compliance against the UK NO₂ AQOs¹². The MTCBC ASR does however state it has been used to see trends such as diurnal patterns and changes in patterns. The reported annual mean concentration for NO₂ in 2018 was 39.9 µg/m³, at the UK long-term AQO of 40 µg/m³. Much reduced annual mean concentrations were reported in 2019 and 2020 at 20.8 µg/m³ and 17.7 µg/m³ respectively (although potential implications of reduced traffic movements during the Covid-19 pandemic on 2020 data must be noted). The monitor was not operational for most of 2021 but the annual mean concentration for 2022 remained reduced at 24.7 µg/m³ (based on 40% data capture and annualization in accordance with Defra guidance).
- 5.7.4 Monitoring for NO₂ using passive diffusion tubes is undertaken by MTCBC at several locations across Merthyr Tydfil, the majority of which are within 2km of the Site. The closest is a 'roadside' location at Dowlais Upper, about 405m to the north of the Site. Annual mean NO₂ concentrations here, and at other locations in Merthyr Tydfil, including within the Twynroden AQMA, were well below the UK long-term AQO in 2022. As noted above in paragraph 5.6.3, subject to the results of on-going monitoring, MTCBC intended to revoke the AQMA in 2024. At the time of preparation of this AQA the AQMA is understood to remain.
- 5.7.5 Annual mean NO₂ concentrations in 2020 and 2021 are expected to have been affected by the impact of the Covid-19 pandemic on traffic movements²³. Indications are that roadside NO₂ and NO_x concentrations remain expected to decrease and it is considered unlikely that the majority of UK roadside locations are likely to experience concentrations above those experienced in 2019 at any point in the foreseeable future²⁴. The reported concentrations for 2022 in Table 5.5 are consistent with these expectations.

5.7.6 MTCBC does not undertake any monitoring for PM₁₀ or PM_{2.5} within its administrative area.

5.8 Additional Air Quality Monitoring

- 5.8.1 In accordance with the agreed Air Quality, Noise and Vibration Strategy monitoring for PM₁₀ and PM_{2.5} has been undertaken by MSW at Twynyrodyn Community Primary School, located about 550m to the east of the Site. The monitoring was undertaken using a Tapered Element Oscillating Microbalance (TEOM), an approved method recognised by Defra for assessing compliance against the UK PM₁₀ AQO¹², over an initial baseline period and the subsequent period of operational activities at the Site from 2007 to 2022. The monitor developed a fault in 2022 and no

²³ COVID-19: Following the outbreak of a global pandemic of the Coronavirus disease 2019 (COVID-19) due to the SAR-CoV-2 virus, the UK Government declared several restrictions on non-essential travel and movement during March 2020. Various restrictions remained in place during 2020 and 2021 with resulting implications on transport movements across the UK.

²⁴ Air Quality Consultants, Trends in UK NO_x and NO₂ Concentrations – May 2022 Update, 13.05.22

usable data has since been obtained. All results have been provided by MSW to MTCBC and reported in the MTCBC ASRs.

5.8.2 The results obtained for the 2016 to 2022 period are summarised below in Tables 5.5 and 5.6.

Table 5.5: Annual Mean PM₁₀ and PM_{2.5} Monitoring Results¹

Parameter	Annual Mean Concentration (µg/m ³)						
	2016	2017	2018	2019	2020 ¹	2021 ^{1,2}	AQO
PM ₁₀	8.41	11.02	8.7	8.8	9.4	10.3	40
PM _{2.5}	3.78	4.47	4.5	4.4	3.8	5.6	20

Data as presented in the 2012 and 2023 Merthyr Tydfil County Borough Council ASRs

1: Concentrations recorded in 2020 and 2021 expected to be affected by the implications of the COVID-19 pandemic on local traffic movements

2: Annual mean calculated using a redundant correction method, see MTCBC 2023 ASR.

Table 5.6: Daily Mean PM₁₀ Monitoring Results¹

Parameter	Number of PM ₁₀ 24-Hour Means > 50 µg/m ³ (Not to be exceeded more than 35x per year)					
	2016	2017	2018	2019	2020 ²	2021 ²
PM ₁₀	0	0	0	0	0	0

Data as presented in the 2021 and 2023 Merthyr Tydfil County Borough Council ASRs

1: UK Short-term AQO = Daily mean of 50 µg/m³ not to be exceeded more than 35 times per year.

2: Concentrations recorded in 2020 and 2021 expected to be affected by the implications of the COVID-19 pandemic on local traffic movements.

5.8.3 As shown in the above tables, there were no recorded any exceedances of PM air quality objectives in the years 2016-2021 throughout the period of operation at the surface coal mine. All annual mean PM₁₀ and PM_{2.5} concentrations and short-term PM_{2.5} concentrations were well below the relevant objectives.

5.9 Dust Monitoring Data

5.9.1 In accordance with the agreed AQNVS monitoring for dust has been undertaken by MSW at several locations around the Site. The monitoring was undertaken for an initial baseline period and over the subsequent period of operational activities at the Site from 2007 to 2023. Dust monitoring was carried out using DS100 Directional Dust monitors with samples being collected and analysed at 1-to-2-week intervals or following a dust complaint. Analysis was undertaken by DustScan which measured the following:

- Effective Area Coverage (EAC%) – the presence of dust irrespective of colour
- Absolute Area Coverage (AAC%) – the darkness (potential soiling ability) of dust.

5.9.2 Summary information on the monitoring and results obtained from the monitoring are provided in Appendix B.

5.9.3 The Dust Impact Risk assigned to each individual wind segment was predominantly low at the monitoring locations across the monitoring period.

5.10 Wind Speed and Direction

5.10.1 The most important meteorological parameters governing the atmospheric dispersion of pollutants are:

- wind direction: determines the broad direction of the transport of the emission;
- wind speed: affects the ground levels concentrations by determining the initial dilution of pollutants emitted;
- atmospheric stability: a measure of atmospheric turbulence and hence dispersion of pollutants.

5.10.2 The closest commercial meteorological monitoring stations to the Site are located at St Athan and Rhoose (Cardiff Airport), 38km and 39km to the south respectively, and Sennybridge 39km to the west-northwest. The St Athan and Cardiff stations are both located close to the Bristol Channel and show similar wind patterns, likely influenced by the proximity of the Channel. They are also both located at lower elevations to the Site, at 50m Above Sea Level (ASL) and 67m ASL compared to ~370m ASL at the Site.

5.10.3 The Sennybridge station is located to the north of the Brecon Beacons and is likely to be influenced by the proximity of this raised ground. However, being at an inland location at an elevation of 307m ASL, it is considered more comparable to the expected conditions at the Site to inform the assessment.

5.10.4 An annual wind rose for Sennybridge (for the years 2014 - 2023), as provided by ADM Ltd, a recognised meteorological data provider, are provided below in Figure 5.3. This depicts average wind speeds and directions over the relevant total monitoring period.

5.10.5 The data show the prevailing wind direction to be from sectors 180° through to 240°, i.e. southerly / south-westerly. This is slightly atypical of standard UK conditions, which are predominantly south-westerly. The data show that, as an annual average, winds blow from sectors 165° through to 255° about 44% of the time; i.e. predominantly south-westerly and consistent with typical UK conditions.

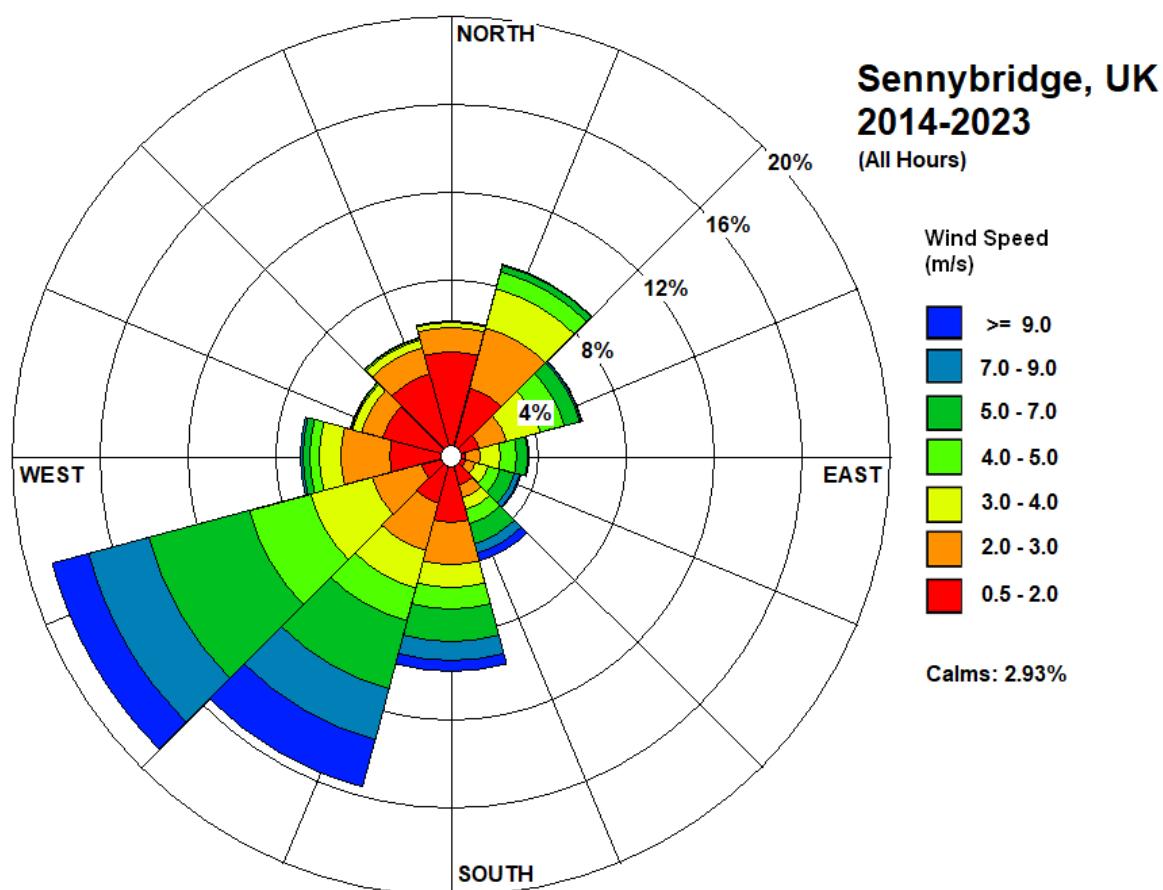
5.10.6 Winds greater than ~5 m/s blow from the southerly / south-westerly sectors for around 20% of the time annually. Wind speeds in excess of ~5 m/s are important as the onset of potentially significant airborne dust emissions due to wind-raising of loose dry dusts from bare ground and stockpiles.

5.10.7 The frequency of winds blowing from each sector are summarised below.

Table 5.7: Summary Wind Data, Sennybridge (2014-2023)

Direction		Annual Percentage Frequency (%)	
		All Wind Speeds	Wind Speeds >5 m/s
0°	(346 to 15)	6.14	0.01
30°	(16 to 45)	9.02	0.32
60°	(46 to 75)	6.17	0.81
90°	(76 to 105)	3.54	0.56
120°	(106 to 135)	3.33	0.98
150°	(136 to 165)	4.90	1.71
180°	(166 to 195)	9.76	2.83
210°	(196 to 225)	15.56	7.78
240°	(226 to 255)	18.80	9.31
270°	(256 to 285)	6.85	0.40
300°	(286 to 315)	4.76	0.03
330°	(316 to 345)	5.59	0.04
		94.42	24.78

Figure 5.3: Annual Windrose for Sennybridge (years 2014-2023)



5.11 Future Baseline

5.11.1 If the Scheme is not implemented, the Site would be required to be restored in accordance with the existing approved restoration scheme, with restoration to be completed by the end of 2030. As described above in sub-section 4.3 the agreed restoration scheme would involve a substantially greater quantum of earthworks, and hence also use of NRMM, with a corresponding greater risk of dust and aerial emissions than the proposed scheme.

5.11.2 The predicted pollutant concentrations (NO₂, NO_x, PM₁₀, and PM_{2.5}) for the grid squares in which the Site and nearest receptors are located for a future year (2031) are detailed in Appendix B. The range of concentrations is summarised in Table 5.8 below.

Table 5.8: Predicted Background Air Quality Data – Nitrogen Oxides and Particulate Matter

Location	Mean Pollutant Concentration (µg/m ³)			
	NO ₂	NO _x	PM ₁₀	PM _{2.5}
2031	3.99-7.66	4.95-9.82	8.93-10.46	5.48-6.24
AQAL	40	30(v)	40	20

Data downloaded on 6th December 2024

(v) – established for the protection of vegetation

5.11.3 The average background NO₂, NO_x, PM₁₀ and PM_{2.5} concentrations for the grid squares in which the Site and nearest receptors are located are predicted to be substantially below the relevant air quality objectives in 2031 and 2024.

6 Dust Assessment

6.1 General Observations

- 6.1.1 Airborne dust occurs when fine particles are disturbed and loosened by physical activity such as breaking, excavating, loading, tipping and transport. In addition, an airstream passing over such materials can give rise to airborne dust. It is generally accepted that wind speeds greater than ~5 m/s across loose fine materials can cause windblown dust emissions.
- 6.1.2 In calm conditions, any raised dust tends to settle out in the vicinity of the source. In windier conditions, the dust may be carried for a greater distance before settling out.
- 6.1.3 Large dust particles, greater than 30 µm, which constitute the greatest proportion of dust emitted from mineral workings will largely deposit within 100m of the source. Finer particles, which constitute a small proportion of the dust emitted from most mineral operations, are only deposited slowly, and can be transported by light winds. Their concentrations however decrease rapidly from the source due to dispersion and dilution.
- 6.1.4 The distance any generated dust will be carried therefore depends on the wind speed, the particle size, the topography of the site and its surroundings.

6.2 Incorporated Mitigation

- 6.2.1 The revised restoration strategy includes several in-design mitigation measures that serve to reduce the likelihood for the generation of dust. This is particularly of relevance when comparing to the consented restoration scheme. This includes the extent of the area to be subject to earthworks the nature of plant to be used and extend of internal haulage. These form embedded mitigation and are discussed further in Section 6.3.
- 6.2.1 The activities would continue to be regulated under the conditions as presently detailed in the existing planning permission, including Condition 18 requiring a scheme for the management and monitoring of dust. The historic measures employed during the coaling operations would be adapted as appropriate to the restoration works. This would include best practice measures such as minimisation of drop heights, retention of a site-wide speed limit and use of a water bowser for dust suppression when required. These are summarised below in Section 6.3 and Section 8.

6.3 Sources of Dust

- 6.3.1 Operations at the Site will primarily comprise the movement of existing soils, scree and overburden to achieve the required restoration levels.
- 6.3.2 There is no requirement for any soil stripping or storage. No processing of material, such as crushing or screening, is to be undertaken, other than minor stone reduction using a mericrusher

for grass seeding. No material is to be imported into site for restoration purposes or to be exported off-site and hence there would not be any off-site transportation.

6.3.3 Accordingly, the principal potential sources of airborne dust associated with the proposed operations will include:

- material handling, loading and tipping;
- internal site haulage;
- restoration; and,
- wind blow across bare ground and stockpiles.

Material Handling, Loading and Tipping

6.3.4 The majority of material is to be handled using bulldozers with limited requirements for excavation, transport, loading and tipping of mineral. The greatest risk of dust emissions is likely to be the dozing of scree materials down any steep drops and slopes. However, all works would be carried out at low speeds reducing the likelihood of any dust emissions.

6.3.5 Potential emissions would be minimised through the use of standard techniques such as minimising drop heights and use of dust suppression when necessary, particularly during periods of prolonged dry weather.

Transport: Internal Site Haulage

6.3.6 Internal site haulage can be the greatest source of fugitive dust at mineral sites due to the physical disturbance of particles by vehicle movements over bare soils or loose surfaces. However, internal haulage during the restoration works is to be limited substantially reducing this potential source of dust emissions. All NRMM utilised for the works would be parked overnight at the workshop with no internal haulage to / from the CDP.

6.3.7 Nevertheless, maintenance of the internal road surfaces and limitation of vehicle speeds will be important in minimising dust emissions related to vehicular transport onsite. The existing site-wide speed limit would be retained for the duration of the restoration works.

Stockpiles and Exposed Surfaces

6.3.8 During dry windy conditions, visible windblown dust can be raised from areas of open bare ground, including stripped and restored areas, stockpiles and other unsurfaced areas, particularly where the materials are loose or are disturbed by traffic or other operations.

6.3.9 The restoration works however would not create any additional exposed surfaces to existing and would serve to restore current exposed areas.

Restoration

6.3.10 Final restoration will include reinstatement of soils on OB1, OB2 and OB3. This work would also involve dozing operations carried out at slow plant speeds.

6.3.11 The handling of soils can result in a significant risk of dust emissions if these operations are carried out in dry windy conditions without damping down of surfaces.

6.3.12 Drop heights throughout all relevant operations will be minimised. Such minimisation is especially pertinent during soil stripping and overburden removal, construction of screening bunds and restoration activities in the vicinity of sensitive receptors.

Summary

6.3.13 The resulting principal dust sources, taking these measures into account, are summarised in table 6.1.

Table 6.1: Summary of Principal Dust Sources (with physical in-design and embedded management mitigation)

Source	Source Potential	Additional Mitigation Comment
site stripping / bund formation	<i>n/a – no soil stripping required</i>	
mineral extraction	<i>n/a - no mineral extraction to be undertaken</i>	
materials handling	<i>small / medium</i> – low numbers of plant operating, potential can increase in prolonged dry conditions if exposed surfaces dry out, potential <i>small</i> for majority of operations rising to <i>medium</i> for operations involving movement on steep slopes and drops	damping down of surfaces may be required; minimisation of drop heights
internal haulage	<i>small</i> – limited internal haulage required, majority of material to be dozed in-situ	retention of existing establishment of internal site speed limit (10mph); damping down of running surfaces may be required under dry conditions
mineral processing	<i>n/a - no mineral processing to be undertaken</i>	
off-site transport (Phase 1)	<i>n/a – no off-site transport required</i>	
soils placement	<i>small</i> - depending upon weather and soil moisture conditions; low	damping down of surfaces may be required depending upon weather conditions and soil

Source	Source Potential	Additional Mitigation Comment
	numbers of plant; to be seeded shortly after soils placement	moisture levels; similar to agricultural operations
wind-raised dust (erosion from stripped / bare surfaces)	<i>n/a – works do not include create additional bare surfaces but will serve to reduce dust generation potential from existing surfaces</i>	
wind-raised dust (from stockpiles / bunds)	<i>n/a - works do not involve creation of stockpiles and bunds</i>	

6.3.14 The resulting overall site generation Dust Source Potential, taking into account the physical in-design and outlined mitigation measures, is *medium* at most, with the dust source potential for each element typically being *small*.

6.3.15 Other activities at the site are considered likely to be relatively minor and insignificant sources of dust.

6.3.16 It is noted that these activities have a substantially reduced potential for dust generation compared to the operational activities undertaken between 2007 and until November 2023.

6.4 Disamenity Dust Impact Assessment

6.4.1 The probability of dust being carried towards the key potentially sensitive receptors (the '*pathway effectiveness*') has been assessed taking into account the distance from a source to a receptor, local topography and any screening that may be present to impede that pathway along with the prevailing wind direction to determine the likelihood of dust being propagated towards that receptor.

6.4.2 In practice, the probability of winds carrying dust may be reduced outside the summer months, when rainfall can be typically expected to suppress fugitive dust emissions over more than one third of the time.

6.4.3 Representative human receptors within 250m of the boundary of the Site are noted in the following table, together with their minimum distance and direction from the nearest potential principal sources of quarry emissions to the air and the presence of any screening between the receptor and the potential dust source:

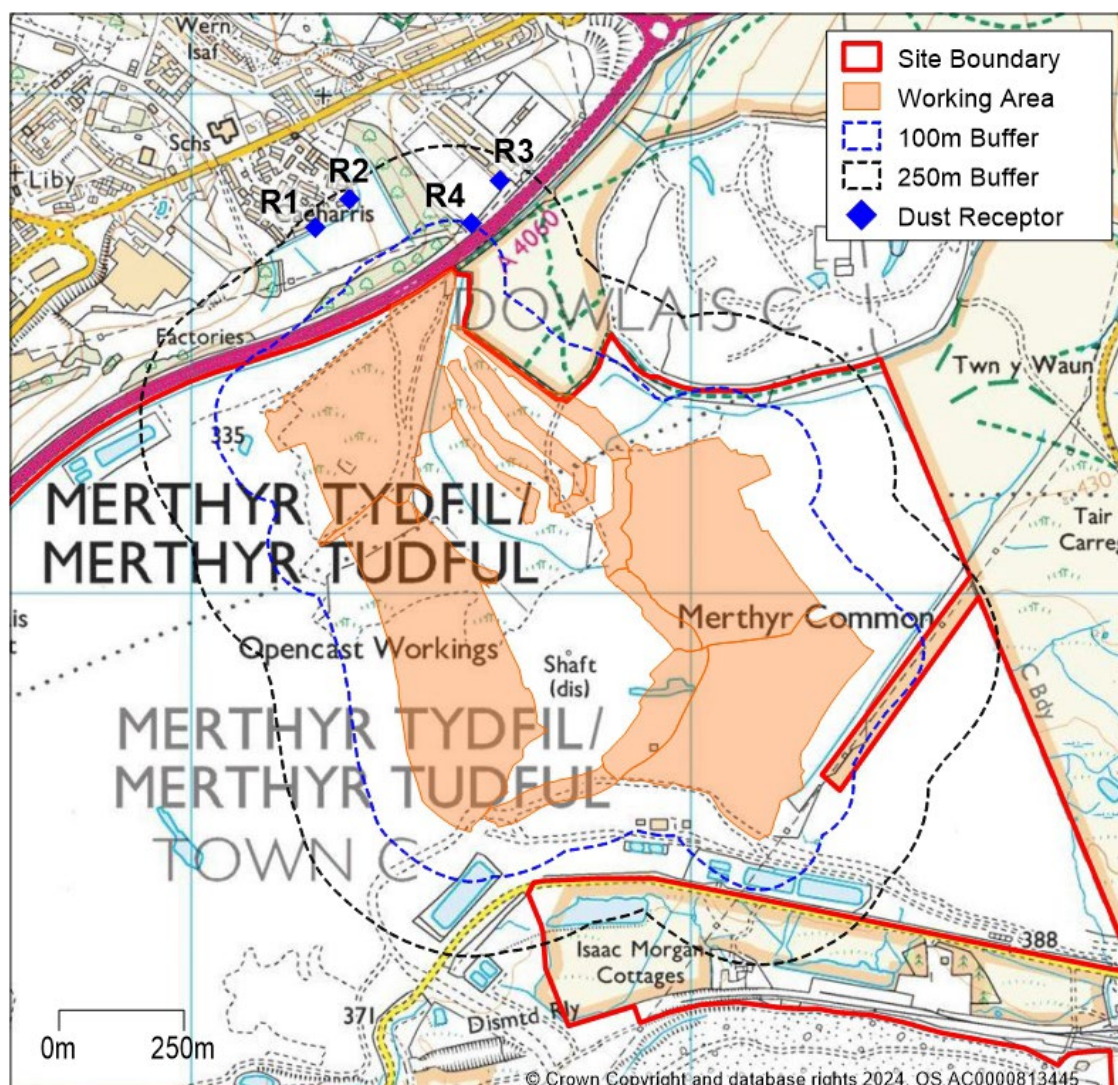
Table 6.2: Disamenity Dust Assessment - Representative Potentially Sensitive Receptors

Ref.	Receptor	Type	Distance, orientation ¹	Nearest potential source(s)	Screening
R1	Rhodfa Clesin, Dowlais	Residential (Urban Community)	210m N	Earthworks	Trees
R2	Calluna Close, Dowlais	Residential (Urban Community)	210m N	Earthworks	Trees
R3	Blaen Dowlais, Dowlais Top	Residential (Urban Community)	205m N	Earthworks	Topography
R4	Recreational Ground, Dowlais Top	Leisure	105m N	Earthworks	Topography

1: distance taken from Site boundary to receptor to nearest 5m; orientation from Site to receptor

6.4.4 The identified receptors are shown below in Figure 6.1. Other potentially sensitive receptors are either more than 250m distant from the Site boundaries or are effectively represented by the locations identified above.

Figure 6.1: Disamenity Dust Receptors - Human



6.4.5 The potential for disamenity dust impacts and effects due the physical site activities are provided in Appendix C. The maximum predicted impacts and effects at each receptor are summarised in Table 6.3 below:

Table 6.3: Maximum Estimated Risk of Disamenity Dust Impacts and Effects – from physical site activities

Ref.	Receptor	Residual pathway effectiveness	Receptor sensitivity	Maximum Risk of impacts	Maximum Potential Effect
R1	Rhodfa Clesin, Dowlais	Slightly Effective	High	Negligible	Negligible
R2	Calluna Close, Dowlais	Slightly Effective	High	Negligible	Negligible
R3	Blaen Dowlais, Dowlais Top	Slightly Effective	High	Negligible	Negligible

Ref.	Receptor	Residual pathway effectiveness	Receptor sensitivity	Maximum Risk of impacts	Maximum Potential Effect
R4	Recreational Ground, Dowlais Top	Slightly Effective	Low	<i>Negligible</i>	<i>Negligible</i>

6.4.6 The only operations within 250m of the nearest human receptors in Dowlais and Dowlais Top are those in the northern most area of the Site during Sequence Areas 11 and 16a. The resulting likely disamenity dust effects at the nearest human receptors from these activities, with the incorporation of appropriate mitigation as discussed above, are *negligible*.

6.4.7 All other proposed activities, including on OB1 and in the void, are over 250m from nearest human receptors.

6.4.8 The Scheme will not result in the creation of any areas of exposed surfaces to currently. In addition, the works would result in stabilisation and restoration of existing exposed surfaces ultimately resulting in beneficial effects due to wind blow dust across these surfaces.

6.4.9 The presence of the footpath that runs along the northeast Site boundary is noted. The footpath would lie downwind of the prevailing wind carrying any dust that may be generated onsite. The footpath would be most exposed during the earthworks works in Sequence Areas 11 and 16b. Any exposure along the footpath would also be short-lived and transient and the risk of disamenity dust effects is *negligible*.

6.4.10 The Scheme may also include some minor earthworks to OB2 and OB3. However, there are no human receptors within 250m of either of these overburden mounds and hence potential disamenity dust effects are *negligible*.

Overall Significance

6.4.11 The overall significance with regards to disamenity dust at human receptors is deemed ***not significant***.

6.5 Ecological Effects Assessment

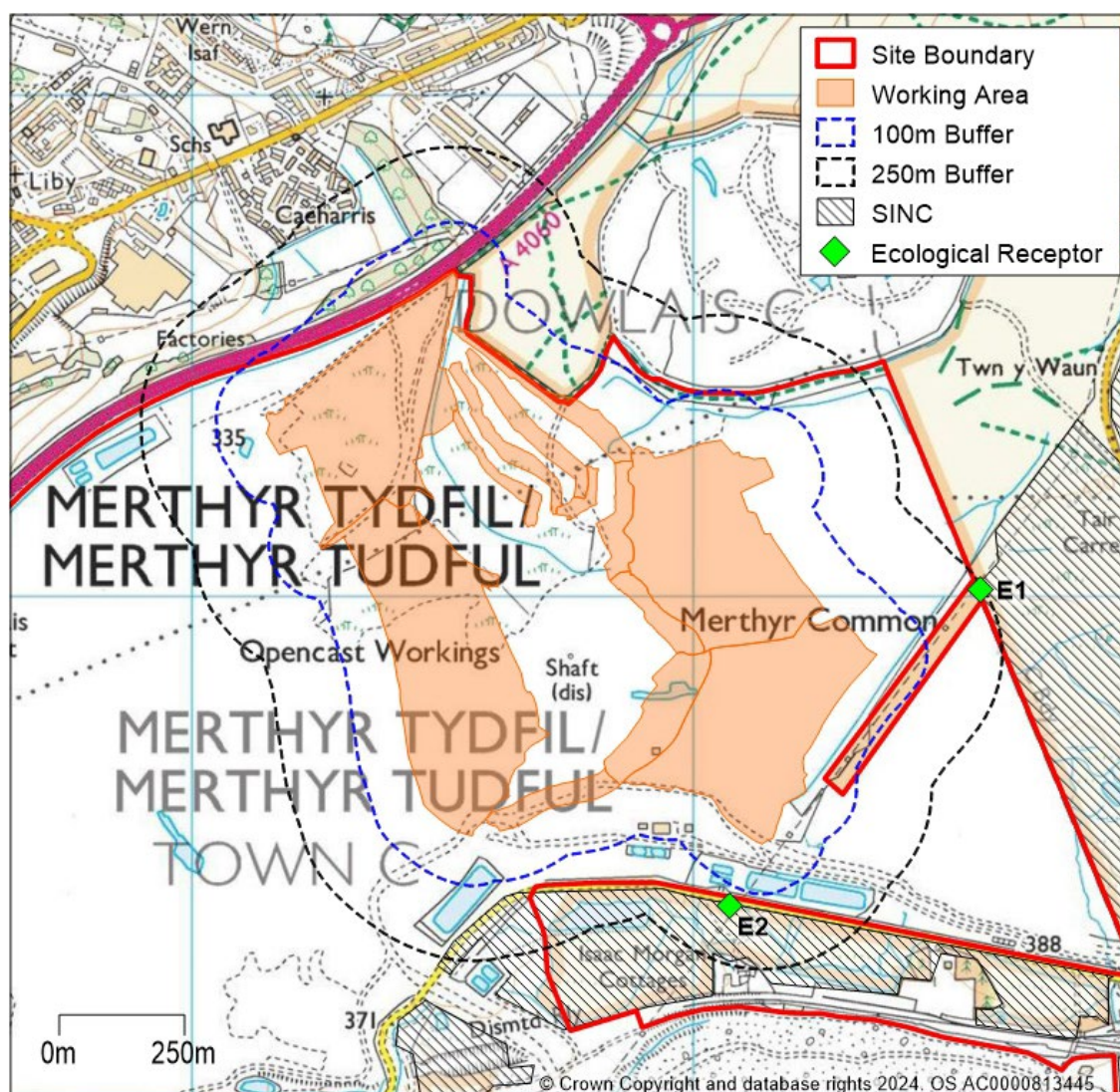
6.5.1 Several non-statutory nature conservation sites have been identified within 250m of the Site. Of these Tair Carreg Moor SINC and Merthyr Common Central SINC lie within 250m of the Works Area, as summarised below in Table 6.4 and shown in Figure 6.2.

Table 6.4: Deposition Dust Assessment - Representative Potentially Sensitive Ecological Receptors

Ref.	Receptor	Type	Distance, orientation ¹	Nearest potential source(s)	Screening
E1	Tair Carreg Moor SINC	SINC	240m E	Earthworks – Sequence Area 14a & 14b on OB1	Topography
E2	Merthyr Common Central SINC	SINC	115m N	Earthworks – Sequence Area 14a & 14b on OB1	None

1: distance taken from Site boundary to receptor to nearest 5m; orientation from Site to receptor

Figure 6.2: Deposition Dust Receptors – Ecological



6.5.2 The potential for deposition dust impacts and effects due the physical site activities are provided in Appendix 6. The maximum predicted impacts and effects at each receptor are summarised in Table 6.5 below:

Table 6.5: Maximum Ecological Effects – from physical site activities

Ref.	Receptor	Residual pathway effectiveness	Receptor sensitivity	Maximum Risk of impacts	Maximum Potential Effect
E1	Tair Carreg Moor SINC	Ineffective	Low	<i>Negligible</i>	<i>Negligible</i>
E2	Merthyr Common Central SINC	Ineffective	Low	<i>Negligible</i>	<i>Negligible</i>

6.5.3 The resulting likely disamenity dust effects at the identified nature conservation sites are *negligible*.

6.5.4 The Scheme may also include some minor earthworks to OB2 and OB3 which both lie within 250m of the Tair Carreg Moor SINC and Merthyr Common Central SNIC. However, any such required works are expected to be limited and potential deposition dust effects are *negligible*.

6.5.5 In addition, through the implementation of best practice dust mitigation measures effects at other ecological features within the Site and close the work would be *negligible*.

6.5.6 The overall significance with regards to deposition dust at ecological receptors is ***not significant***.

6.6 Suspended Particulate Matter

6.6.1 PM₁₀ (including PM_{2.5}) will make up a small proportion of any emitted dust. Although PM₁₀ may travel distances of 1,000m or more, concentrations decrease rapidly on moving away from a source due to dispersion and dilution. Concentrations are expected to return to background concentrations within 250m of an earthworks operation and the IAQM guidance on construction dust provides a screening distance of 250m with regard to PM₁₀ and human health. However, given the presence of residential properties within the 1km screening distance of the Site, further consideration has been made of potential impacts associated with PM₁₀ (and PM_{2.5}).

6.6.2 IAQM guidance in relation to mineral operations⁴ advises that where existing background ambient PM₁₀ concentrations are less than 17 µg/m³ there is little risk that additional contributions from quarrying operations would lead to an exceedance of the long-term AQAL. Predicted background Defra PM₁₀ concentrations for the locality are in the range of 9.29-10.68 µg/m³ for 2024, well below 17 µg/m³. Monitoring undertaken by MSW at the Twynroden School over 2016 to 2021 during the coaling operations were in the range 8.41-11.02 µg/m³, again well below 17 µg/m³.

6.6.3 With reference to the separate IAQM guidance on construction dust⁵ the area sensitivity would be *low* (local PM₁₀ concentrations <24 µg/m³; 10-100 sensitive receptors within 100m of the Site). The resulting risk of dust impacts due to PM₁₀ would be described as *low*.

6.6.4 The possibility of future changes in PM_{2.5} targets as discussed above in Section 2.2.7 are noted. Defra background concentrations for the locality are in the range 5.81 to 6.72 µg/m³ and the monitoring data at Twynyrodyn School over 2016-2021 was in the range 3.78 to 5.6 µg/m³, all well below the current AQAL of 20 µg/m³, and below both the interim non-legal standard of 12 µg/m³ (for 2028) and legal target of 10 µg/m³ (to be achieved by 2040) recently implemented in England.

6.6.5 In addition, the proposed mitigation measures to manage fugitive dust emissions will similarly serve to reduce potential PM₁₀ (and PM_{2.5}) emissions.

6.6.6 In light of the above comments, and the implementation of mitigation measures that would minimise dust and hence PM₁₀ and PM_{2.5} generation, the risk of adverse impacts is *negligible*.

6.6.7 The overall significance with regards to PM₁₀ (and PM_{2.5}) is ***not significant***.

6.7 Mitigation

6.7.1 The Scheme would be operated in accordance with best practice measures as recently employed at the surface mine, and as required under the existing planning permissions. These measures would be adapted as necessary and applicable for the specific restoration operations. These measures are discussed further in Section 8.

7 Non-Road Mobile Machinery (NRMM) and On-Site Plant

7.1 General

- 7.1.1 The operation of non-road mobile machinery (NRMM) and on-site plant and during the operations would give rise to vehicle exhaust and combustion plant emissions. However, there would not be a substantial quantity of NRMM operating on the site at any one time and there would not be any on-site processing plant. The majority of the restoration (about 2.5M m³ of material) would be undertaken using dozers with NRMM expected to be limited to 7 tracked dozers (of differing sizes) at any one time. Some additional excavation works and internal haulage would be required (about 250,000 m³ of material) utilising an excavator, 5 articulated dump trucks and a tracked dozer. The excavation works would be limited to a period of 17.5 weeks.
- 7.1.2 The NRMM required for the Scheme would be substantially less than used until November 2023 during the coaling operations.
- 7.1.3 Under the Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018 (which implemented EU regulations 2016/1628) increasingly stringent emission limits, have been, and are being, applied to the engines of NRMM and power plant with the aim of progressively reducing the emissions and phasing out polluting equipment. The regulations set limits for CO, hydrocarbons, NO_x and for diesel engines, PM₁₀. Emissions from these engines are regulated before they are placed on the market with the maximum permitted exhaust emissions being stipulated as a function of power of the relevant engine. The regulations include several stages for the progressive reduction of emissions from Stage 1 which came in for new engines being placed on the market from 1996-1999 through to Stage V for new engines from 2019. As the equipment is replaced with new equipment a progressive reduction in emissions is achieved.
- 7.1.4 The emissions of SO₂ from NRMM is controlled through restrictions of sulphur content in fuel with regulations now requiring all diesel used in NRMM to be virtually sulphur free.
- 7.1.5 All NRMM would be mobile within the relevant working areas within the Site and would not result in continuous emissions for any substantial period of time at any location, including close to site boundaries. Internal haulage would be limited throughout the duration of the works, with the majority of activities involving the use of bulldozers within the working area. Human receptors lie at least 105m distant from the working areas and ecological receptors at least 115m.
- 7.1.6 The use of NRMM and on-site plant is not expected to result in significant adverse impacts at any location. Resulting effects would be ***not significant***.

8 Management and Mitigation Measures

8.1 Management and Mitigation Measures

8.1.1 The potential for fugitive dust generation during material handling operations can be readily controlled through the implementation of standard best practice in respect of dust control and site management, as detailed in the IAQM Guidance and employed historically at the Site.

8.1.2 The above dust assessment takes into account the in-design mitigation measures, both physical measures such as the use of bulldozers for the majority of the works, and standard management measures that would be implemented. Mitigation and monitoring measures would continue to be employed as required under Condition 15 of the existing planning permission, modified as applicable to the specific activities of the Scheme. In accordance with Condition 14 these would be set out in a detailed scheme to be agreed in advance of the commencement of the final restoration works with MTCBC. This would update and revise the current AQNVs, which would be focused on air quality.

8.1.3 The revised Air Quality Strategy ('AQS') would detail the management and control measures to be employed at the Site during the Scheme, along with procedures for monitoring, record keeping, responding to complaints, and training. Summary details of these measures are provided below.

8.1.4 Overall responsibility for the management and control of dust would lie with the Site Manager.

8.1.5 As an over-riding requirement, if any operations are identified as causing or likely to cause visible dust emissions across the boundary of the Site, those operations will be modified, reduced or suspended until effective remedial action can be taken or the meteorological and / or operational conditions giving rise to the emissions have moderated.

8.1.6 Measures to be employed would include:

- a water bowser would be provided and maintained in efficient working order so as to ensure that haul routes and other areas traversed by vehicles are kept damp during dry weather;
- an adequate supply of water would be maintained at all times for dust suppression;
- mobile plant would be regularly serviced and equipped with effective exhausts to prevent exhaust gases being emitted downwards;
- internal haul roads will be regularly and effectively maintained;
- vehicle speeds would be controlled on internal trafficked areas;
- drop heights would be minimised during all works;
- operations should be undertaken with due regard to weather conditions and type of material being handled in order to reduce dust generation
- restored areas will be grass seeded as soon as practicable.

8.1.7 Standard good practice for site haulage will include:

- the avoidance of abrupt changes in horizontal and vertical alignment by maintenance of the internal site roads;
- regular grading and compaction to maintain smooth well-drained surfaces;
- fitting site vehicles and plant with upswept exhausts and radiator fan shields; evenly loading vehicles to avoid spillages;
- regular spraying of internal site routes in dry conditions using a water bowser.

8.1.8 Any complaints shall be logged and investigated by reference to the current conditions, observation logs and weather records. Where substantiated evidence for the Site as a source of dust is found then further actions or modification to the working plans should be proposed and agreed with the MPA.

8.1.9 The mitigation of PM₁₀ (including PM_{2.5}) emissions will be achieved primarily by the means of the standard mitigation measures for general dust outlined above. Additional mitigation measures with respect to PM₁₀ and PM_{2.5} are not deemed necessary.

8.1.10 Full details will be set out in the AQS.

8.2 Monitoring

8.2.1 Condition 16 of the existing planning permission requires an air quality monitoring scheme, to include the monitoring of dust and particulates, as detailed above in Section 4. This existing monitoring scheme will be revised as appropriate for the Final Restoration activities.

8.2.2 Daily visual inspections of the site will be carried out by the Quarry Manager, or delegated trained personnel, at the start of operations and subsequently as necessary, particularly during dry windy weather, to ensure that all potential or actual dust sources are identified and treated promptly.

8.2.3 A dust monitoring scheme would be re-established at suitably agreed revised locations. Locations would focus on those relevant receptors within 250m of the Works Area and subject to access and safety considerations. Monitoring would be undertaken for dust deposition dust and directional dust subject to a methodology to be agreed with MTCBC.

8.2.4 In light on the nature of the proposed activities it is not considered that re-commencement of PM₁₀ and PM_{2.5} monitoring at Twynyrodyn School or elsewhere is required. This is subject to agreement with MTCBC.

9 Cumulative Assessment

9.1 Inter-Project Cumulative Assessment

RML has identified several other projects in the area with which an assessment of potential cumulative effects is required. These have been reviewed to identify those located within 1km of the Site, the initial study area of the PM₁₀ assessment.

9.1.1 The identified relevant projects are summarised below in Table 9.1, along with the potential for any cumulative air quality effects.

Table 9.1: Cumulative Assessment

Projects within ZOI	Timing and certainty	Cumulative effects
Land east of A4060 at Ffos y Fran Merthyr. Allocated employment land within the Defined Settlement Boundary.	This site will require a new road access from the A4060, which could make future development less likely. Development unlikely to occur concurrently with restoration.	If these any of these two developments occur, the effects will likely occur after the Ffos-y-Fran site is restored and revegetated.
Land at Goat Mill Road and west of the A4060. Allocated employment land within the Defined Settlement Boundary.	An area adjacent and readily accessible from the existing Goat Mill employment area (Goat Mill Road and the A4102).	Given distance and orientation from the proposed Works Area within the Site any cumulative air quality effects unlikely.
Former Ivor Street Works Regeneration Site	Located ~1km to the northwest, planning permission has lapsed.	
Policy to retain the Cwm Bargoed railway lines and railhead.	The existing facility has taken coal from Ffos-y-Fran, but the site could be redeveloped. The railway could be retained as a transport link.	With no clear indication of the future redevelopment of the coal facilities or the railway, it is not possible to indicate the nature of any cumulative effects. Given distance and orientation from the proposed Works Area within the Site any cumulative air quality effects unlikely.
Waste management facility: Trecatti site: area of search for future disposal facility	This site is currently in use as a waste management facility.	The current use and the proposed future use for waste management are likely to be similar and hence unlikely to be any additional cumulative effects from the two sites. Any new development at the waste management site would most likely be after completion of the Ffos y Fran site.

9.1.2 The Works Area is located in the northeast of the Site and there are limited human and ecological receptors within 250m of this area. In light of this, the nature of the works to be undertaken and incorporation of best practice mitigation measures, and the relatively short time period for the works (2-4 years) the potential for cumulative effects with any other projects in the area is *negligible*.

10 Summary and Conclusions

- 10.1 A revised Final Restoration Strategy (the Scheme) is to be submitted in relation to former Ffos-y-Fran surface coal mine at Merthyr Tydfil. The Scheme will primarily involve the reprofiling of overburden mound OB1 and the void through the relocation of about 2.5M m³ of materials with further minor earthworks and surface treatments across the wider Site. The Strategy is to be implemented over a 2-4year period followed by a 5-year establishment period to enable grass seeding and tree planting to establish.
- 10.2 The majority of the works would be undertaken using dozers with limited requirements for material excavation and internal haulage. There would be no material import or export during the works and hence no on-road HGV transport. In addition, there would not be any on-site processing activities. This serves to minimise the potential for the generation of dust and off-site migration during the works.
- 10.3 In addition, the operations would continue to be carried out in accordance with best management practices as recently employed at the existing site, adopted as appropriate to the specific restoration activities. These measures would be set out in an updated and revised Air Quality Strategy that would be agreed with the MPA in advance of commencement of the final restoration works.
- 10.4 Through the physical in-built mitigation measures, and the implementation of best practice mitigation measures, the risk of adverse impacts due to disamenity dust is considered to be *negligible* at all identified human and ecological receptors at most.
- 10.5 Fine particulates (PM₁₀ and PM_{2.5}) also make up a part of the fugitive and wind-blown dust and which can give rise to human health impacts. The measures that would be outlined within the AQS to minimise dust emissions will similarly serve to minimise PM₁₀ (and PM_{2.5}) emissions. The risk of adverse impacts due to PM₁₀ (and PM_{2.5}) are considered to be *negligible*. The provision of additional measures is not considered necessary to protect human health.
- 10.6 The resulting significance of dis-amenity, health (PM₁₀) and ecological effects resulting from fugitive dust emissions is **not significant**.
- 10.7 The works would require the use of non-road mobile machinery primarily in the form of 7 dozers. Additional machinery required during material excavation and internal haulage would be limited to a dump truck and excavator for an 8 week period. The main works areas are over 100m from nearest receptors and the risk of adverse impacts due to machinery and plant combustion emissions is considered to be *negligible* at all identified human and ecological receptors at most.

- 10.8 The overall residual effects associated with machinery and plant combustion emissions are considered to be **not significant**.
- 10.9 It should be noted that the risk of the generation of dust and aerial emissions, and hence of adverse impacts and effects, during the proposed Scheme is substantially less than that during the recent coaling works undertaken between 2007 and November 2023.
- 10.10 Furthermore, the risk of the generation of dust and aerial emissions, and hence of adverse impacts and effects, during the proposed Scheme is substantially less than that during the existing consented scheme which would require the movement of about 25M m³ of materials. If compared to consented scheme the proposals would therefore result in beneficial effects.

APPENDIX A

ASSESSMENT METHODOLOGIES

Appendix A

Air Quality Assessment Methodology

1. Dust Assessment

- 1.1 The assessment has been undertaken with reference to the IAQM qualitative framework for mineral dust ¹ and construction dust, assessments ². These frameworks use the source-pathway-receptor concept and take into account the size of source emissions (i.e. scale of the anticipated operations), the effectiveness of the pathway (i.e. dispersion of dust towards a receptor) through consideration of the frequency of winds and the distance of the receptor from the dust source, and the sensitivity of the receptor.
- 1.2 The IAQM guidance on mineral dust¹ advises that PM₁₀ needs to be assessed if there are sensitive receptors within 1km; reduced screening distances are applicable in relation to deposition dust and human and ecological receptors beyond which adverse impacts would not be expected. To provide a conservative assessment therefore an initial search radius of 1km of the Site boundary has been applied in relation to human health and ecological receptors³.
- 1.3 In relation to deposition (or dis-amenity) dust adverse impacts are uncommon beyond 250m from sand and gravel sites and beyond 400m from hard rock quarries, as measured from the nearest dust generating activities¹. The IAQM guidance on construction activities advises an assessment distance of 250m from a site boundary and up to 50m of the route used by construction vehicles on the public highway up to 250m from a site entrance².
- 1.4 Where there are no receptors within the relevant screening distance it can normally be assumed that a detailed disamenity dust assessment is not required. The risk of impacts would be *negligible* with **no significant** effects.
- 1.5 The proposed operations are more akin to construction earthworks and the Deposition Dust Study Area therefore extends up to 250m from the Site boundary and 50m from edges of roads used for traffic up to a distance of 250m from the access / egress point.
- 1.6 The size of the source emissions is categorised as *small*, *medium* or *large* for each relevant operational activity (taking into account designed-in mitigation). This takes into account the likelihood of the activity to generate dust emissions and the extent of the activity, e.g. large bare surfaces.

¹ IAQM (2016). *Guidance on the Assessment of Mineral Dust Impacts for Planning*, v1.1. Institute of Air Quality Management, London

² Institute of Air Quality Management (2024), *Guidance on the Assessment of Dust from Demolition and Construction*. v2.1.

³ Note: EA guidance on assessment of aerial emission impacts specifies an assessment radius of 10km for international nature conservation sites and 2km for SSSIs and local nature sites. This is however appropriate to point source emissions. A search distance of 1km is considered the maximum appropriate for this assessment.

- 1.7 The estimation of the pathway effectiveness considers the frequency of dusty winds and the distance of the receptor from the dust source. Examples are provided below:

Table 1.1: Categories of Frequency of Winds

Frequency	Criteria
Infrequent	Frequency of winds from the direction of the dust source are less than 5%
Moderately frequent	Frequency of winds from the direction of the dust source are between 5% and 12%
Frequent	Frequency of winds from the direction of the dust source are between 12% and 20%
Very frequent	Frequency of winds from the direction of the dust source are greater than 20%

Reference Table A3-2 of IAQM guidance

Table 1.2: Categories of Receptor Distance from Dust Source

Category	Criteria
Close	Receptor is <50m from dust source
Intermediate	Receptor is 50-100m from dust source
Distant	Receptor is 100-250m from dust source

- 1.8 Receptors beyond 250m are not assessed with regards to potential dis-amenity dust.
- 1.9 The effectiveness of the pathway (i.e. how effectively dust, and windblown dust, will be carried towards receptors) is based on the frequency of winds from the direction of the dust source and the distance of the receptor from the dust source, as follows:

Table 1.3: Pathway Effectiveness

		Frequency of potentially dusty winds			
		Infrequent	Moderately frequent	Frequent	Very frequent
Receptor distance	Close	slightly effective	moderately effective	highly effective	highly effective
	Intermediate	slightly effective	slightly effective	moderately effective	highly effective
	Distant	ineffective	ineffective	slightly effective	moderately effective

Reference Table A3-4 of IAQM guidance

- 1.10 The risk of dust impacts at each receptor is assessed taking into account the pathway effectiveness and the size of the source emissions, as detailed below:

Table 1.4: Estimation of Dust Impact Risk

		Size of source emissions		
		small	medium	large
Pathway effectiveness	Highly effective	low	medium	high
	Moderately effective	low	low	medium
	Slightly ineffective	negligible	low	low
	Ineffective	negligible	negligible	low

Reference Table 2 of IAQM guidance

- 1.11 The likely magnitude of a dust impact on the individual receptor will depend on its sensitivity: **low**, **medium** or **high**. Receptors may vary in their sensitivity to nuisance dust as follows:

Table 1.5: Example sensitivity of receptors to dust deposition

Sensitivity		
High	Medium	Low
people and property		
hospitals and clinics, schools dwellings and gardens long-term car parks car showrooms, hi-tech industries, food processing, sensitive horticultural land	places of work parks	farms short-term car parks playing fields footpaths
ecological / nature conservation		
international designation (e.g. SAC, Ramsar or SPA site)	national designated site (e.g. SSSI)	local designated site (e.g. local nature reserve)

- 1.12 The descriptors of the likely magnitude of a dust impact on the individual receptor, taking into account its sensitivity and the estimated dust impact risk, are as follows:

Table 1.6: Descriptors of Magnitude of Dust Impact Effects

		Receptor sensitivity		
		Low	Medium	High
Dust impact risk	High	slight adverse	moderate adverse	substantial adverse
	Medium	negligible	slight adverse	moderate adverse
	Low	negligible	negligible	slight adverse
	Negligible	negligible	negligible	negligible

Reference Table 3 of IAQM guidance

- 1.13** The assessment of the overall effect on the surrounding area and the significance of that effect takes into account the different effects at different receptors and number of affected receptors.

APPENDIX B

BASELINE CONDITIONS

AIR QUALITY ASSESSMENT: APPENDIX B

BASELINE AIR QUALITY INFORMATION

1. Existing Baseline Air Quality

- 1.1. Information on background air quality has been obtained through a review of Defra data, Merthyr Tydfil County Borough Council (MTCB) annual air quality reports and available monitoring data. Available data for the locality is presented below.

2. Air Quality Review

- 2.1. MTCBC has one active Air Quality Management Area (AQMA) within its' administrative area declared under the Local Air Quality Management (LAQM) regime, details of which are summarised below.

Table 2.1: AQMAs within Vicinity of the Site

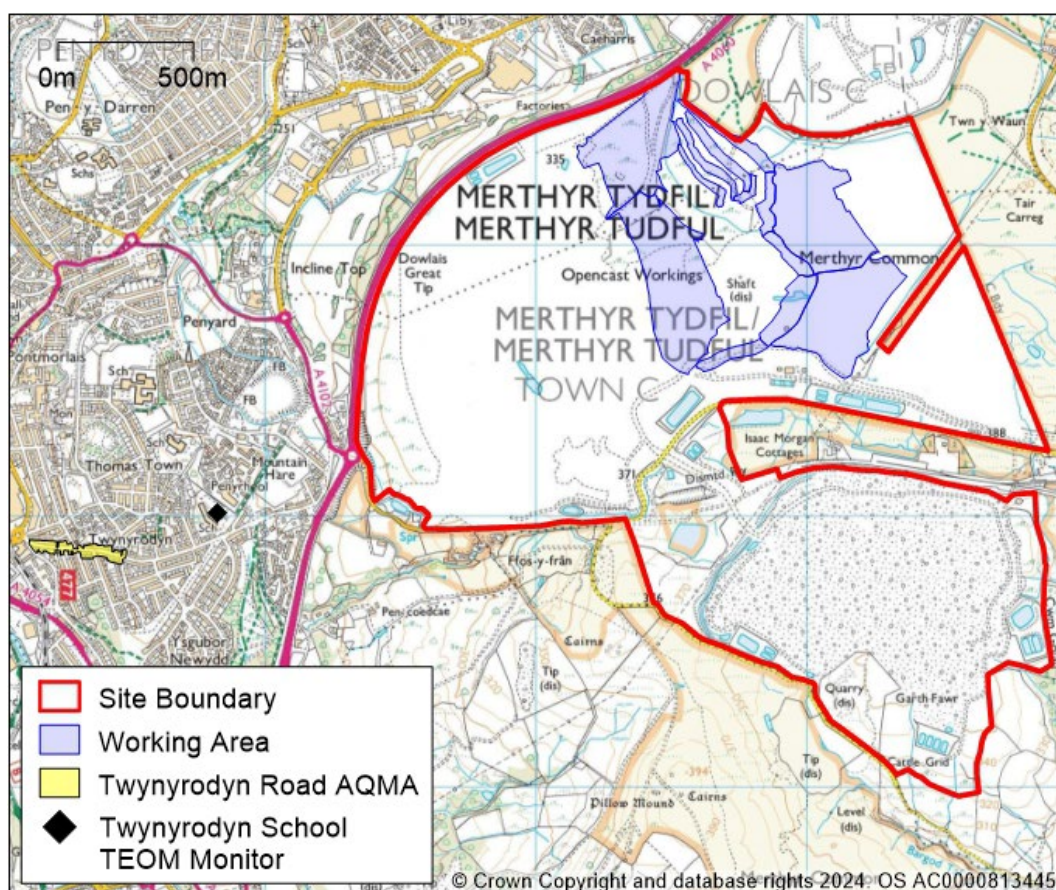
AQMA Name	Location	Pollutant(s)	Distance, Orientation ¹
Twynyroddyn Road AQMA	Within Merthyr Tydfil - An area encompassing a number of properties from Tesco Roundabout to Gilfach Cynon	NO ₂ , annual mean	940m, SW

¹: Distance and orientation from the Site

- 2.2. The AQMA was declared in 2017 due to high levels of NO₂ associated with traffic travelling uphill on Twynyroddyn Road within Merthyr Tydfil. The location of this AQMA in relation to the Site is shown in Figure 1.1.
- 2.3. Traffic on Pontmorlais High Street was reversed in May 2018 with the aim of diverting traffic from Twynyroddyn Road. The MTCBC 2023 Air Quality Annual Status report (ASR)¹ states that subsequent ambient air quality monitoring data has shown an improvement in air quality within the AQMA and annual mean NO₂ concentrations have been well within the UK Air Quality Objective (AQO). The MTCBC 2023 ASR states that the AQMA will be considered for revocation in 2024 if there is consistent compliance with the AQO. At the time of preparation of this air quality status report the AQMA is understood to remain in place.

¹ Merthyr Tydfil County Borough Council, 2023 Air Quality Annual Status Report, September 2023

Figure 1.1: Site Location in relation to AQMA



3. Background Air Quality Data

- 3.1. Defra publishes predicted background pollutant concentration maps for 1km x 1km grid squares across the UK. The maps are based on a combination of ambient monitoring and meteorological data along with modelling using information including the age and distribution of vehicles and emission factors.
- 3.2. The current maps were issued in 2024 and the predicted data is based on 2021 ambient monitoring and meteorological data. The maps incorporate information on the age and distribution of vehicles and emission factors and take into account existing local sources of emissions. Predicted data is provided by Defra for each year from 2021 to 2040.
- 3.3. Predicted NO₂, NO_x, PM₁₀, and PM_{2.5} data for the grid squares in which the Site and nearest receptors are located for the baseline year (2023), current year (2024) and a future year (2029) are detailed in the tables below.

Table 2.1: Predicted Background Air Quality Data – Nitrogen Oxides and Particulate Matter (2023)

Grid Square	Location	Mean Pollutant Concentration (µg/m³)			
		NO ₂	NO _x	PM ₁₀	PM _{2.5}
2024					
305500 205500	Twynyrrodyn School (N)	6.03	7.61	10.81	6.84
306500 205500	Site (southwest)	5.45	6.85	10.07	6.16
307500 205500	Site (south/centre)	4.88	6.09	9.37	5.88
308500 205500	Site (southeast)	4.66	5.81	9.75	5.89
305500 206500	Twynyrrodyn School (S)	6.01	7.58	10.65	6.85
306500 206500	Site (centre west)	5.61	7.04	10.35	6.27
307500 206500	Site (centre)	5.07	6.35	9.53	5.98
308500 206500	Site (centre east)	4.89	6.11	9.88	5.94
306500 207500	Site (northwest)	6.18	7.81	10.98	6.61
307500 207500	Site (north/centre)	5.65	7.11	10.35	6.22
308500 207500	Site (northeast)	7.99	10.28	9.97	6.24
objective (annual mean)		30 (v)	40	40	20 (12) ¹

Data downloaded on 4th December 2024

(v) – established for the protection of vegetation

1: Interim target of 12 µg/m³ for 2028

Table 2.2: Predicted Background Air Quality Data – Nitrogen Oxides and Particulate Matter (2024)

Grid Square	Location	Mean Pollutant Concentration (µg/m³)			
		NO ₂	NO _x	PM ₁₀	PM _{2.5}
2024					
305500 205500	Twynyrroddyn School (N)	5.83	7.34	10.68	6.72
306500 205500	Site (southwest)	5.29	6.63	9.98	6.07
307500 205500	Site (south/centre)	4.76	5.94	9.29	5.81
308500 205500	Site (southeast)	4.55	5.67	9.68	5.82
305500 206500	Twynyrroddyn School (S)	5.80	7.30	10.52	6.72
306500 206500	Site (centre west)	5.42	6.81	10.25	6.18
307500 206500	Site (centre)	4.95	6.20	9.44	5.90
308500 206500	Site (centre east)	4.78	5.98	9.80	5.86
306500 207500	Site (northwest)	6.01	7.58	10.87	6.50
307500 207500	Site (north/centre)	5.51	6.92	10.26	6.13
308500 207500	Site (northeast)	7.96	10.23	9.95	6.23
objective (annual mean)		30 (v)	40	40	20 (12) ¹

Data downloaded on 4th December 2024

(v) – established for the protection of vegetation

1: Interim target of 12 µg/m³ for 2028

Table 2.3 Predicted Background Air Quality Data – Nitrogen Oxides and Particulate Matter (2029)

Grid Square	Location	Mean Pollutant Concentration (µg/m³)			
		NO ₂	NO _x	PM ₁₀	PM _{2.5}
2029					
305500 205500	Twynyrrodyn School (N)	4.85	6.07	10.24	6.32
306500 205500	Site (southwest)	4.50	5.61	9.59	5.73
307500 205500	Site (south/centre)	4.17	5.18	8.93	5.48
308500 205500	Site (southeast)	3.99	4.95	9.32	5.49
305500 206500	Twynyrrodyn School (S)	4.83	6.03	10.08	6.32
306500 206500	Site (centre west)	4.58	5.71	9.86	5.83
307500 206500	Site (centre)	4.36	5.43	9.07	5.57
308500 206500	Site (centre east)	4.26	5.30	9.45	5.55
306500 207500	Site (northwest)	5.22	6.54	10.46	6.14
307500 207500	Site (north/centre)	4.83	6.04	9.89	5.80
308500 207500	Site (northeast)	7.66	9.82	9.92	6.24
objective (annual mean)		30 (v)	40	40	12 ¹

Data downloaded on 4th December 2024

(v) – established for the protection of vegetation

1: Interim target of 12 µg/m³ for 2028

3.4. The predicted concentrations take into account existing sources of air emissions including the former surface mine and local road network (as based on 2021 monitoring and modelling). The average background NO₂, NO_x, PM₁₀ and PM_{2.5} concentrations for the grid squares in which the Site and nearest receptors are located are predicted to be substantially below the relevant AQOs in 2023 and 2024.

3.5. It should be noted that the data are effectively an average concentration across each 1 km square. The pollutant concentrations will therefore be higher close to any significant source, such as the nearby A4060 and A465.

4. Local Authority Monitored Air Quality

4.1. MTCBC undertakes ambient air quality monitoring across its' administrative area utilising a combination of automatic (continuous) and non-automatic (passive diffusion tubes) monitoring facilities. The most recent available air quality status report for MTCBC is the 2023 Air Quality Annual Status Report (ASR) which details monitoring data up until the end of 2022.

Continuous (Automatic) Monitoring

4.2. Continuous monitoring for NO₂ has been undertaken by MTCBC for several years on Pontmorlais in Merthyr Tydfil, at a location about 1.35km to the west of the Site as detailed in Table 4.1. The monitoring site forms a kerbside location outside the AQMA.

Table 4.1: Automatic monitoring locations within 2km of the Site

Monitor ID	Location Name	Grid Reference	Type	Distance & Orientation from Site
ECC	98 Pontmorlais	304987 206411	Kerbside - NO ₂	1.35km W

Data as presented in the 2023 Merthyr Tydfil County Borough Council ASR

- 4.3. The monitor utilised is an ECC monitor. This is not an established technology and is not a recognised and standardised approach to measuring annual NO₂ concentrations, and hence does not form an approved method for assessing compliance against the UK NO₂ AQOs. The MTCBC ASR does however state it has been used to see trends such as diurnal patterns and changes in patterns.
- 4.4. The monitored annual mean NO₂ concentrations for the years 2018 to 2022 at the ECC monitoring location is provided in Table 4.2 below. As shown in the table, the ECC monitor did not record any exceedances of the annual mean NO₂ objective between 2018 and 2022. Although recorded concentrations were within 1% of the objective in 2018, they have significantly fallen from 2019 onwards.

Table 4.2: Annual Mean NO₂ Monitoring Results¹

Monitor ID	Annual Mean NO ₂ Concentration (µg/m ³)				
	2018	2019	2020 ²	2021 ³	2022 ⁴
ECC	39.9	20.8	17.7	-	24.7

Data as presented in the 2023 Merthyr Tydfil County Borough Council ASR

1: Current AQO = 40 µg/m³ as an annual mean.

2: Concentrations recorded in 2020 expected to be affected by the implications of the COVID-19 pandemic on local traffic movements.

3: Monitor not operational for much of 2021

4: Based on 40% data capture and annualization in accordance with Defra guidance

- 4.5. The ECC monitor also recorded hourly NO₂ concentrations, allowing for comparison to the hourly NO₂ objective. Results for the years 2018 to 2022 for hourly NO₂ monitoring at ECC are shown below in Table 4.3. As shown in the table, the ECC monitor did not record any exceedances of the hourly NO₂ objective between 2018 and 2022.

Table 4.3: Hourly Mean NO₂ Monitoring Results¹

Tube ID	Number of NO ₂ 1-Hour Means > 200 µg/m ³ (Not to be exceeded more than 18x per year)				
	2018	2019	2020 ²	2021 ²	2022
ECC	1	0	0	-	0

Data as presented in the 2023 Merthyr Tydfil County Borough Council ASR

1: Current AQO = Hourly mean of 200 µg/m³ not to be exceeded more than 18 times per year.

2: Concentrations recorded in 2020 expected to be affected by the implications of the COVID-19 pandemic on local traffic movements.

3: Monitor not operational for much of 2021

Passive (Diffusion Tube) Monitoring

- 4.6. Monitoring for NO₂ using passive diffusion tubes is undertaken by MTCBC at several locations across Merthyr Tydfil, the majority of which are within 2km of the Site. The closest is a 'roadside' location at Dowlais Upper, about 405m to the north of the Site. Information on these monitoring locations is provided in Table 4.4 below and the locations provided in Figure 4.1.

Table 4.4: Diffusion tube monitoring locations within the 2km of the Site

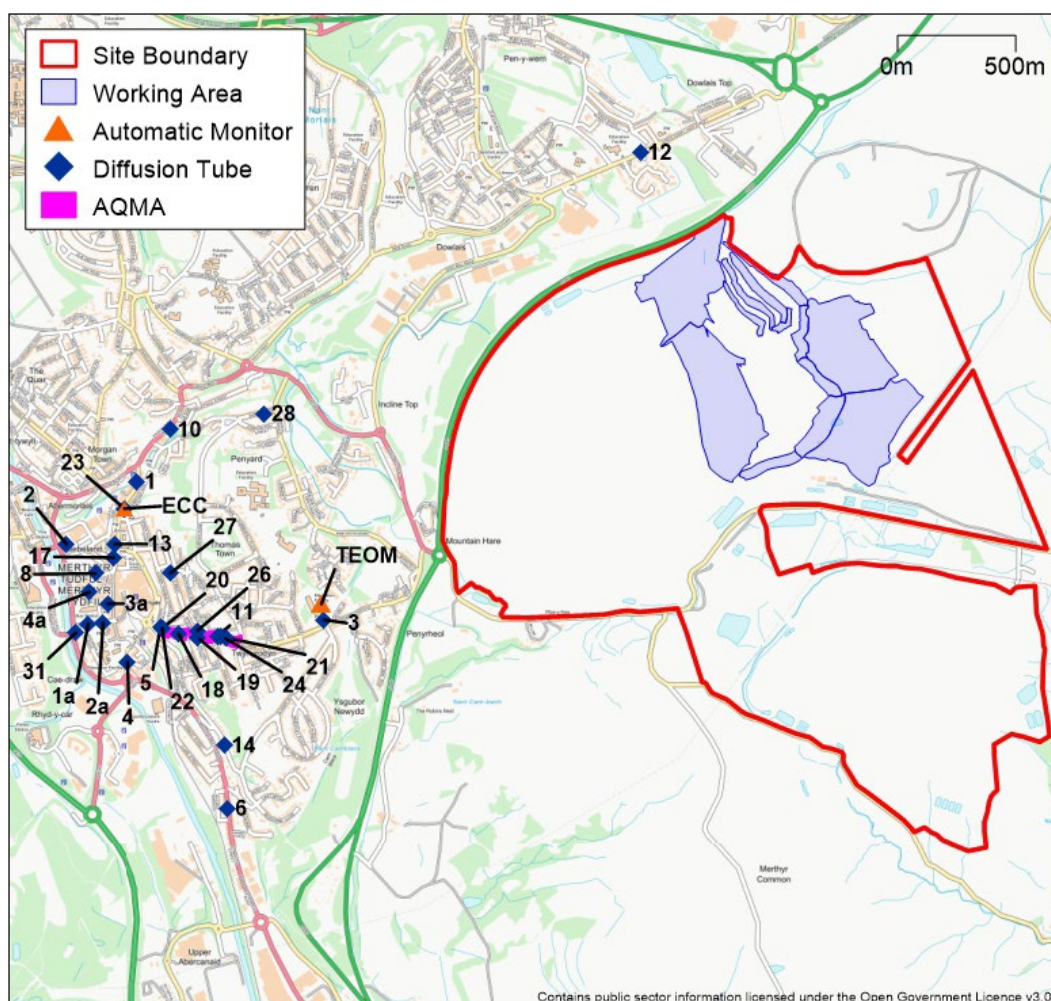
Monitor ID	Location Name	Grid Reference	Type	Distance & Orientation from Site
12	Dowlais Upper	307171 207915	Roadside	405m N
3	Twynyrodyn Community Primary School	305832 205941	Suburban	580m W
28	48 Darren View	305579 206811	Suburban	810m W
24*	64 Gilfach Cynon	305415 205863	Roadside	1.00km W
21*	51 Twynyrodyn Road	305394 205871	Roadside	1.02km W
11*	11 Alexandra Terrace Lamppost	305382 205872	Roadside	1.03km W
26	6 Windsor Terrace	305296 205895	Suburban	1.11km W
19*	40 William Street	305299 205865	Roadside	1.11km W
27	4 Somerset Place, Union Street	305182 206138	Suburban	1.16km W
14*	55 Twynyrodyn Road	305410 205410	Roadside	1.18km W
18*	91 Twynyrodyn Road	305217 205880	Roadside	1.19km W
10	11 Park Place, Penydarren Road	305180 206744	Roadside	1.19km W
20*	17 Court Terrace	305149 205906	Roadside	1.24km W
22*	15 Arfryn Terrace	305147 205906	Roadside	1.24km W
5	1 Alma Street	305140 205910	Roadside	1.25km W
1	Imperial Hotel	305042 206524	Roadside	1.30km W
6	11 Mardy Terrace, Plymouth Street	305426 205144	Roadside	1.34km W
23	98 Pontmorlais	304987 206411	Urban Centre	1.35km W
13	110 High Street	304947 206261	Urban Centre	1.39km W
17	119 High Street Corner	304942 206204	Urban Centre	1.39km W
4	15 Lower High Street	305001 205763	Urban Centre	1.43km W
3a	High Street Chapel	304917 206009	Urban Centre	1.44km W
8	Victoria Street Taxi Rank	304866 206137	Urban Centre	1.47km W
2a	Picton House, Swan Street	304898 205929	Urban Centre	1.48km W
4a	Graham Way, River Walk	304840 206058	Urban Centre	1.51km W
1a	Swan Street, Lamppost	304835 205924	Roadside	1.54km W

Monitor ID	Location Name	Grid Reference	Type	Distance & Orientation from Site
2	Civic Centre	304743 206261	Urban Background	1.59km W
31	Caedraw Flats Downpipe	304782 205886	Roadside	1.60km W

Data as presented in the 2023 Merthyr Tydfil County Borough Council ASR

* Located within the Twynyrodyn Road AQMA

Figure 4.1: Locations of MTCBC Air Quality Monitoring



- 4.7. The monitored annual mean NO₂ concentrations for the years 2018 to 2022 at the diffusion tube monitoring locations are provided below in Table 4.2.

Table 4.5: Annual mean NO₂ concentrations at diffusion tubes within 2km of the Site

Monitor ID	Annual Mean NO ₂ Concentration (µg/m ³)				
	2018	2019	2020 ¹	2021 ¹	2022
12	23.3	22	17.6	21	21.3
3	10.7	11.1	8.4	8.5	9.2
28	-	16.2	12.2	14.6	13.7

Monitor ID	Annual Mean NO ₂ Concentration (µg/m ³)				
	2018	2019	2020 ¹	2021 ¹	2022
24*	23.7	23.8	17.4	16.8	16.7
21*	47.0	38.2	25.7	33.0	30.4
11*	40.3	35	24.6	29.7	28.5
26	17.7	16.8	12.6	14.0	14.4
19*	20.3	19.1	14.8	16.3	16.4
27	-	13.1	10.7	10.9	11.1
14*	39.6	33.2	24.7	29.1	26.9
18*	26.3	24.1	18.9	20.9	21.0
10	-	30.7	26.1	28.8	31.0
20*	29.4	25.9	20.2	24.1	23.8
22*	29.2	26	18.5	21.7	22.9
5	18.1	22.3	13.8	16.5	15.6
1	20.8	23.1	21.4	25.9	25.8
6	17.3	25.3	18.8	19.9	19.0
23	-	18.3	14.5	17.6	17.1
13	-	21.7	19.4	23.0	22.2
17	-	18.9	14.8	17.3	19.6
4	29.3	24.9	19.1	21.8	23.2
3a	-	-	-	14.1	13.4
8	20.4	18.8	15.1	15.1	14.5
2a	-	-	-	14.9	14.2
4a	-	-	-	11.8	11.2
1a	-	-	-	19.6	18.8
2	15.2	16.6	11.7	12.4	12.8
31	-	22.1	13.8	17.4	17.5

Data as presented in the 2023 Merthyr Tydfil County Borough Council ASR

Highlighted cells indicate exceedances.

¹Concentrations recorded in 2020 and 2021 expected to be affected by the implications of the COVID-19 pandemic on local traffic movements.

* Located within the Twynrodyn Road AQMA

- 4.8. As shown in the table, there were two exceedances of the UK long-term air quality objective (AQO) of 40 µg/m³ for annual mean NO₂ concentration in 2018, both within the Twynrodyn Road AQMA. No other exceedances of the NO₂ annual mean threshold were recorded at any location in 2018.
- 4.9. Annual mean NO₂ concentrations in the Twynrodyn Road AQMA, and at other locations in Merthyr Tydfil, have remained below the AQO since 2018. Concentrations at all locations, including within the Twynrodyn AQMA, were well below the UK long-term AQO in 2022. As noted

above in paragraph xx, subject to the results of on-going monitoring, MTCBC intended to revoke the AQMA in 2024. At the time of preparation of this AQA the AQMA is understood to remain.

4.10. Annual mean NO₂ concentrations in 2020 and 2021 are expected to have been affected by the impact of the Covid-19 pandemic on traffic movements². The long-term implications of the pandemic on behavioural changes and resulting traffic movements are presently unknown. However, indications are that roadside NO₂ and NO_x concentrations remain expected to decrease and it is considered unlikely that the majority of UK roadside locations are likely to experience concentrations above those experienced in 2019 at any point in the foreseeable future³. The reported concentrations for 2022 in Table 4.5 are consistent with these expectations.

4.11. MTCBC does not undertake any monitoring for PM₁₀ or PM_{2.5} within its administrative area.

5. Additional Air Quality Monitoring

5.1. In accordance with the agreed Air Quality, Noise and Vibration Strategy (AQNVS) in relation to the Ffos-y-Fran Reclamation Scheme⁴ monitoring for PM₁₀ and PM_{2.5} has been undertaken by Merthyr (South Wales) (MSW) during the surface coal mine operations.

5.2. The monitoring was undertaken at Twynyrodyn Community Primary School, located about 550m to the east of the Site using a Tapered Element Oscillating Microbalance (TEOM), an approved method recognised by Defra for assessing compliance against the UK PM₁₀ AQO. It was undertaken over an initial baseline period and the subsequent period of operational activities at the Site from 2007 to 2022. The monitor developed a fault in 2022 and no usable data has since been obtained. All results have been provided by MSW to MTCBC and reported in the MTCBC ASRs.

5.3. The results obtained for the 2016 to 2022 period are summarised below in Tables 5.1 and 5.2.

Table 5.1: Annual Mean PM₁₀ and PM_{2.5} Monitoring Results¹

Parameter	Annual Mean Concentration (µg/m ³)						
	2016	2017	2018	2019	2020 ¹	2021 ^{1,2}	AQO
PM ₁₀	8.41	11.02	8.7	8.8	9.4	10.3	40
PM _{2.5}	3.78	4.47	4.5	4.4	3.8	5.6	20

Data as presented in the 2012 and 2023 Merthyr Tydfil County Borough Council ASRs

1: Concentrations recorded in 2020 and 2021 expected to be affected by the implications of the COVID-19 pandemic on local traffic movements

² COVID-19: Following the outbreak of a global pandemic of the Coronavirus disease 2019 (COVID-19) due to the SAR-CoV-2 virus, the UK Government declared several restrictions on non-essential travel and movement during March 2020. Various restrictions remained in place during 2020 and 2021 with resulting implications on transport movements across the UK.

³ Air Quality Consultants, Trends in UK NO_x and NO₂ Concentrations – May 2022 Update, 13.05.22

⁴ Peter Brett Associates, Ffos-y-Fran Land Reclamation Scheme, Air Quality, Noise and Vibration Strategy, Project Ref: 11992/3-4, January 2007

2: Annual mean calculated using a redundant correction method, see MTCBC 2023 ASR.

Table 5.2: Daily Mean PM₁₀ Monitoring Results¹

Parameter	Number of PM ₁₀ 24-Hour Means > 50 µg/m ³ (Not to be exceeded more than 35x per year)					
	2016	2017	2018	2019	2020 ²	2021 ²
PM ₁₀	0	0	0	0	0	0

Data as presented in the 2021 and 2023 Merthyr Tydfil County Borough Council ASRs

1: UK Short-term AQO = Daily mean of 50 µg/m³ not to be exceeded more than 35 times per year.

2: Concentrations recorded in 2020 and 2021 expected to be affected by the implications of the COVID-19 pandemic on local traffic movements.

- 5.4. As shown in the above tables, there were no recorded any exceedances of PM air quality objectives in the years 2016-2021 throughout the period of operation at the surface coal mine. All annual mean PM₁₀ and PM_{2.5} concentrations and short-term PM_{2.5} concentrations were well below the relevant objectives.

6. Dust Monitoring Data

In accordance with the agreed AQNVS monitoring for dust has been undertaken by MSW at several locations around the Site. The monitoring was sited near to dwellings / schools that represented those parts of the settlements around the site that lie closest to the site boundary.

- 6.1. The monitoring was undertaken for an initial baseline period and over the subsequent period of operational activities at the Site from 2007 to 2023.
- 6.2. Dust monitoring was carried out using DS100 Directional Dust monitors with samples being collected and analysed at 1-to-2-week intervals or following a dust complaint. The passive dust gauges collect fugitive dust coming from 360° around the gauge (directional dust) and dust depositing from the air on a horizontal surface (deposition dust).
- 6.3. Analysis was undertaken by DustScan for the following for both directional and depositional dust:
- Effective Area Coverage (EAC%) – the darkness (potential soiling ability) of dust;
 - Absolute Area Coverage (AAC%) – the presence of dust irrespective of colour.
- 6.4. The results were reported by DustScan with reference to the matrix in Table 6.1 to provide an informal risk of the potential for the risk of annoyance and nuisance due to directional and deposited dust at each monitoring point

Table 6.1: Assessment Matrix for Directional¹ and Deposition Dust Annoyance Risk

		AAC: dust coverage				
		Level 0 <80%/interval	Level 1 80-95%/interval	Level 2 95-99%/interval	Level 3 99-100%/interval	Level 4 100% over 45%/interval
EAC; dust soiling	Level 0 <0.5%/day	very low	very low	very low	low	medium
	Level 1 0.7-0.7%/day	low	low	low	medium	high
	Level 2 0.7-<2.0%/day	medium	medium	medium	high	high
	Level 3 2.0-<5.0%/day	high	high	high	high	very high
	Level 4 ≥%	very high	very high	very high	very high	very high

1: directional dust reported as % at 15° segments

2: interval = period of monitoring

6.5. A review of the dust monitoring data shows that Dust Impact Risk assigned to both directional and deposition was typically very low / low at the monitoring locations across the monitoring period.

APPENDIX C

DUST IMPACT ASSESSMENT

Appendix A.i: Disamenity Dust Assessment

ID	Representative Receptor	Type	Receptor Sensitivity	Distance to Site Boundary (m)	Dust Source Potential	Distance to Source (m)	Distance Description	Orientation from Source	Range of wind directions that effect receptor (°)	Sum of %frequency of winds to receptor	Frequency Description (all winds)	Pathway Effectiveness	Screening	Residual Pathway Effectiveness	Risk of impact / Exposure	Magnitude of Dust Effect
Earthworks in northern part of Site																
R1	Rhodfa Clesin	Residential (Urban Community)	High	210	Small	215	Distant	WNW	150, 180	14.66%	Frequent	Slightly Effective	trees	Slightly Effective	Negligible	Negligible
R2	Calluna Close	Residential (Urban Community)	High	210	Small	210	Distant	WNW, NNW	150, 180	14.66%	Frequent	Slightly Effective	trees	Slightly Effective	Negligible	Negligible
R3	Blaen Dowlais	Residential (Urban Community)	High	205	Small	210	Distant	N, NE	210	15.56%	Frequent	Slightly Effective	none	Slightly Effective	Negligible	Negligible
R4	Recreational Ground	Leisure	Low	105	Small	105	Distant	N, NE	210	15.56%	Frequent	Slightly Effective	none	Slightly Effective	Negligible	Negligible
Earthworks on slopes & drops in void																
R1	Rhodfa Clesin	Residential (Urban Community)	High	210	Medium	>250m										
R2	Calluna Close	Residential (Urban Community)	High	210	Medium	>250m										
R3	Blaen Dowlais	Residential (Urban Community)	High	205	Medium	>250m										
R4	Recreational Ground	Leisure	Low	105	Medium	>250m										

Appendix A.ii:Ecological Dust Assessment

ID	Representative Receptor	Type	Receptor Sensitivity	Distance to Site Boundary (m)	Dust Source Potential	Distance to Source (m)	Distance Description	Orientation from Source	Range of wind directions that effect receptor (°)	Sum of %frequency of winds to receptor	Frequency Description (all winds)	Pathway Effectiveness	Screening	Residual Pathway Effectiveness	Risk of impact / Exposure	Magnitude of Dust Effect
E1	Tair Carreg SINC	SINC	Low	0	Small	240	Distant	E	270, 300	11.61%	Moderately Frequent	Ineffective	none	Ineffective	Negligible	Negligible
E2	Merthyr Common Centr	SINC	Low	0	Small	115	Distant	S	330, 0	11.73%	Moderately Frequent	Ineffective	none	Ineffective	Negligible	Negligible