







1MCo4 Main Works - Contract Lot S2

Dust and Emissions Management Plan - Waste Transfer and Treat Station - Ruislip Southern Sustainable Placement S2

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1 Introduction

- 1.1.1 Phase One of HS2 will provide dedicated high-speed rail services between London, Birmingham, and the West Midlands. It will extend for approximately 230km (143 miles). Just north of Lichfield, high speed trains will join the West Coast Main Line for journeys to and from Manchester, the North West and Scotland.
- 1.1.2 Phase One of HS2 is the first phase of a new high-speed railway network proposed by the Government to connect major cities in Britain. It will bring significant benefits for inter-urban rail travellers through increased capacity and improved connectivity between London, the Midlands, and the North. It will release capacity on the existing rail network between London, Birmingham and the West Midlands and so provide opportunities to improve existing commuter, regional passenger, and freight services.
- 1.1.3 The Materials Management Plan Framework (ref. HS2-HS2-EV-STD-000-000006) for the HS2 scheme sets out framework for materials reuse within the scheme. As part of the Materials Management Plan Framework the Ruislip Southern Sustainable Placement Waste Transfer and Treat Station (RSSP-WTS) will be used as an inert waste transfer station, operated by Skanska Costain STRABAG Joint Venture (SCSJV). Testing of TBM trial materials has indicated that Tunnel Boring Machine (TBM) materials will be suitable for placement as inert material, or non-waste material for engineering fill (with or without treatment).
- 1.1.4 In line with current waste legislation, the handling of excavated material at the site will need to be undertaken in line with the Environmental Permitting (England and Wales) Regulations 2016. The screening process for the proposed RSSP-WTS has identified the need for a Bespoke Permit application.
- 1.1.5 This Dust and Emissions Management Plan (DEMP) has been prepared for the Waste Ruislip Southern Sustainable Placement Waste Transfer and Treat Station (RSSP-WTS), operated by SCSJV. The RSSP-WTS facility will be used to transfer soil arisings from construction sites in the local area, this will comprise TBM arisings from West Ruislip Portal, which will be brought to the site via conveyor, or by road if the conveyor is unavailable. If required, incoming arisings will be treated to ensure that they possess the appropriate qualities for re-use as reinstatement materials, either as backfill in the following areas: Ruislip Southern Sustainable Placement (RSSP) and Cophall Tunnel (Cophall backfill). Once materials are treated at the RSSP-WTS facility, onward transport of treated materials will be via a return conveyor (preferentially, but

by haul road if the conveyor is unavailable) to Cophall backfill. Materials will be transported to RSSP to the south of the treatment area via dump trucks along haul roads (internal).

1.1.6 The DEMP has been produced in line with the requirements of the above Regulations to prevent pollution from emissions from site activities which may *"be harmful to human health or the quality of the environment, cause offence to a human sense, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment"*. In addition, the document has been produced in accordance with the requirements to *"manage dust, air pollution, odour and exhaust emission during the construction accordance with Best Practicable Means (BPM)"* as defined in the Code Of Construction Practice (CoCP) for the HS2 project. This DEMP is informed by the following industry and HS2 specific guidance:

- Code of Construction Practice (CoCP) [R1]
- Local Environmental Management Plan - Hillingdon [R2]
- The Air Quality Strategy [R3] and accompanying Hs2 Information Paper E31: Air Quality [R4];
- HS2 Air Quality Action Plan [R5]
- Technical Guidance Note (Monitoring) M17, Monitoring Particulate Matter in Ambient Air around Waste Facilities. 2014 [R9]
- The Example Dust Emissions Management Plan V10 Template provided by air.quality@environment-agency.gov.uk
- Guidance provided at <https://www.gov.uk/guidance/control-and-monitor-emissions-for-your-environmental-permit#emissions-that-do-not-have-set-limits>

1.1.7 The purpose of the DEMP is to identify potential receptors sensitive to dust and emissions, identify the potential sources of dust and emissions and detail the methods adopted to control dust and emissions generation.

1.1.8 The main sources of dust particularly during periods of dry weather, are likely to be from conveyor transfer points, movement of vehicles and machinery on haul roads and unloading and loading of waste including the movements of on-site machinery and vehicles.

1.2 Associated Documents

1.2.1 This report should be read in conjunction with the following documents:

- Environmental Permit Application Forms [R10];
- Non-technical summary [R11];
- Site Condition Report [R12];
- Site Operating Plan [R13];
- Management Systems and Procedures [R14];
- Noise and Vibration Management Plan [R15].

1.2.2 This document will be kept on site along with the other suite of permit documents.

1.3 Context

1.3.1 This DEMP provides details of the site-specific measures that will be employed on site in relation to the management of dust and emissions. It is based on the Environmental Permitting (England and Wales) Regulations 2016 requirements to prevent pollution from emissions from site activities as outlined above and the HS2 Air Quality Strategy [R3] which sets out the approach HS2 Ltd will follow to avoid, reduce, or mitigate emissions to air causing adverse effects on communities and to prevent air pollution.

1.3.2 As part of the Phase 1 Environmental Statement (ES), emissions from dust generating activities during the construction of the scheme were assessed using industry guidance produced by the Institute of Air Quality Management (IAQM). The dust impact assessment evaluated the risk of dust impact at West Ruislip rail head, which includes the RSSP-WTS facility (and areas including Harvil Road realignment and sustainable placement areas). This evaluated the potential impacts of dust generation associated with demolition, earthworks, construction, trackout and haul road at the location of the RSSP-WTS facility.

1.3.3 Emissions from road traffic during construction and operation of the scheme were assessed using a staged approach. Traffic data obtained from different receptors (roads) was screened using thresholds in the Design Manual for Roads and Bridges (DMRB) guidance [R16]. Sensitive receptors were then selected, and concentrations were calculated using the DMRB air quality screening tool spreadsheet.

- 1.3.4 Where the DMRB threshold values were not exceeded, no additional assessment was required as the impact to air quality was deemed minimal. If the threshold values had been breached then further quantitative assessment has been carried out. Receptors with potentially significant effects were further assessed using an atmospheric dispersion model.
- 1.3.5 The operation of the RSSP-WTS facility is required during the construction of HS2 only and as such forms part of the construction phase works. Following completion of the works, the RSSP-WTS facility will no longer be required in relation to the HS2 works.
- 1.3.6 The ES as amended predicted negligible magnitude of impact and no significant effects in relation to dust emissions during the construction of the project and the area of the RSSP-WTS facility. It is anticipated that with the use of appropriate mitigation measures, , impacts during the HS2 construction phase will be minimised or eliminated.
- 1.3.7 The implementation of the HS2 project will be undertaken in line with Environmental Minimum Requirements (EMRs) which *"will ensure that impacts which have been assessed and reported in the ES will not be exceeded...and...use reasonable endeavours to adopt mitigation measures that will further reduce any adverse environmental impacts..."*
- 1.3.8 The conclusion of the ES as amended is that there will be no significant effect on any receptors (residential, property-based, or ecological) along the route from dust generating activities during construction, with the provisions of the CoCP applied. Therefore, it is the EMR that dust emissions during construction should be minimised as far as reasonably practical and with the objective that no significant effects result.
- 1.3.9 The ES as amended indicated that traffic emissions during construction of the project are predicted to give rise to significant effects in relation to NO₂ concentrations in Greater London and PM₁₀ and NO₂ in Central London. It is not practical to enforce or limit a change in ambient pollution concentration arising from highway impacts at project level, because ambient concentrations change from day to day and year to year due to complex influences from other pollution sources in the area and meteorological conditions. Other pollution sources include non-project highway traffic, domestic and commercial heating and cooking, industrial emissions, and other transport (aircraft and shipping).
- 1.3.10 In order to manage significant impacts related to highway traffic changes and interventions, the Nominated Undertaker will put in place a management process to manage those impacts through measurement of air quality and

regular assessments of the air quality situation as affected by the construction of the scheme. Where significant effects are still predicted, action plans will be put in place with the objective of removing those significant effects. The current HS2 Action Plan [R5] summarises in one document all the air quality commitments to measure, avoid and reduce emissions and sets out the principle of monitor-review-assess. This management process is modelled on Defra Local Air Quality Management (for which the statutory duties of Local Authorities and London Boroughs are set out in Part IV of the Environment Act 1995), and the periodic reviews and action plans are envisaged as being similar to those produced in that process. This process comprises: measure – review – action plan. Baseline (pre-works) air quality monitoring will be required in locations where potential significant effects are predicted. Forecast baseline and with HS2 construction traffic flows will be reviewed and updated in these locations, if necessary.

1.3.11 These baseline measurements in relation to highway traffic emissions will be reviewed and an air quality assessment will be produced at an appropriate stage to determine whether significant effects are still predicted. Where significant effects are still predicted, the air quality monitoring should be continued, and an air quality action plan should be drawn up, with the objective of removing the significant effects, as soon as, and as far as practicable. The action plan should be presented at Transport Liaison Group meetings (as set out in the Route-Wide Transport Management Plan). The process of reviewing highway and air quality impacts should be repeated at appropriate intervals (e.g., annual, or biannual), until no significant effects are predicted or detected (as far as practicable), or two years after the completion of construction, whichever is the sooner. The monitoring, reviews, assessments, and action plans will be developed working with local authorities.

1.3.12 In summary, the RSSP-WTS facility will be operated during the construction phase of HS2 and as such the dust and emissions generated by its use were assessed as part of the ES, as amended (with specific reference to the potential dust generating activities mentioned in the ES at RSSP-WTS). The findings of the ES, as amended have identified that no significant impacts on receptors were identified from dust emissions provided the measures outlined in the CoCP are adopted. In relation to traffic emissions, significant effects have been identified and these will be managed by baseline monitoring, assessment, and action plans. The emissions from traffic assessment was based on predicted increase in traffic caused by the scheme, as such it is not directly relevant to works within the RSSP-WTS site. Nevertheless, the measures to control the impact from traffic emissions will be adopted scheme wide. The following document therefore presents the sources of dust and emissions at the RSSP-

WTS site, a review of pathway and potential receptors and provides details of the measures that will be adopted to mitigate these in order to prevent pollution from emissions in accordance with Environmental Permitting (England and Wales) Regulations 2016 and in line with the requirements set out in the CoCP and as part of the relevant HS2 EMRs.

2 The Site

2.1 Site Setting

- 2.1.1 The site is an area of semi-rural, former agricultural land located immediately north west of Ickenham and to the west of West Ruislip (London Borough of Hillingdon), centred around Grid Reference TQ06517 87233. The area of the site is roughly 10.5ha. The RSSP-WTS site is currently accessed via the Copthall South Office compound, which is accessed through a secured site entrance with security fencing along the western perimeter of the site off Harvil Road. This Copthall South Office includes concrete hardstanding, car parking and temporary office and welfare accommodation and small equipment storage containers.
- 2.1.2 The main storage and treatment area proposed as part of the RSSP-WTS facility will be located directly to the east of the Copthall South Office, in an area that is currently occupied by reworked ground. The RSSP-WTS permit boundary is designed so that it does not intercept the forested covert 'Copthall Covert' (1.5ha), which is an area of secondary semi-natural broad-leaved woodland. This covert is located directly south of the main storage and treatment area and the Copthall South Office compound. Adjacent to the Copthall Office Compound and West (of the storage bins area) from the permit boundary is an isolated residential dwelling 'Shorthill Cottage'. A 3.6m high hoarding is installed along the boundary with the adjacent Shorthill Cottage.
- 2.1.3 South of the main proposed treatment area for RSSP-WTS, the permit boundary narrows to the east so that it avoids the forested Copthall Covert. To the south of Copthall Covert, the permit boundary narrows to accommodate the haul road to the Ruislip Sustainable Placement Area (RSSP).
- 2.1.4 The Chiltern Main Line is located directly north of the permit boundary, beyond which is a pharmaceutical research facility and fields. To the west of the permit boundary and beyond the Copthall South Office compound is Harvil Road, beyond which industrial buildings are located including the Harefield Oil Depot. To the east of the site and further south along the eastern boundary is farmland associated with Brackenbury Farm (220m east) and Copthall Farm (250m south east), the latter of which is moated. Beyond the farmland to the east is Breakspear Road South and residential areas (315m south east).
- 2.1.5 In summary, the surrounding land uses are a mixture of agricultural, commercial, and industrial land uses. Additionally, there are several defined residential areas within 1000m proximity of the permit boundary.

2.2 Weather Conditions

- 2.2.1 The generation of dust is influenced by the prevailing weather conditions at the site. Precipitation will dampen existing dust preventing it becoming airborne and will increase the moisture content of placed materials reducing the potential dust generation during handling. Conversely windy, dry conditions will exacerbate dust generation. Based on regional climatic patterns it can be assumed that there will likely be periods of higher precipitation throughout certain periods of the year, due to weather variability. However a reliance on such conditions as a measure to mitigate against dust generation has not been assumed.
- 2.2.2 The predicted wind speed and direction data has been obtained from the nearby West Ruislip Portal site approximately 1.6 miles to the south east of the site. Met Office Virtual Met Mast data is included below for a measurement height of 10m above ground level and indicates a predominant wind direction from the south west with a typical speed in the range of 2-6m/s (see Figure 1). On this basis in relation to dust and emissions, those receptors located to the north and northeast are potentially more susceptible to adverse impacts.

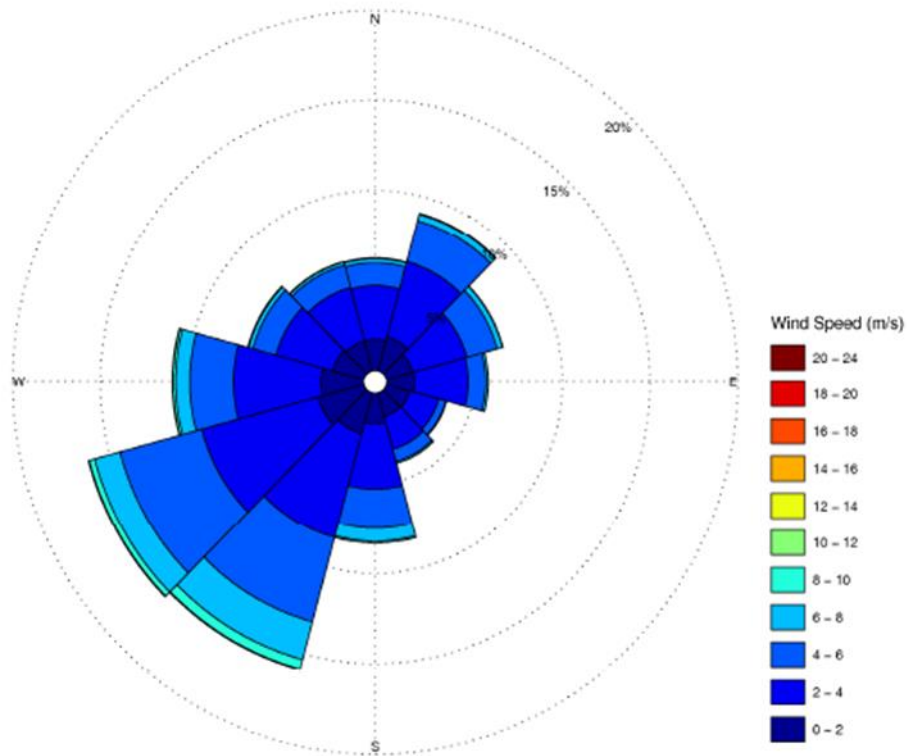


Figure 1 – Predicted Annual Average Wind Rose for West Ruislip Portal

2.3 Sensitive Receptors

- 2.3.1 A number of sensitive receptors with respect to dust and air quality have been identified within 1000m distance of the permit boundary, see Table 1. The site is located in the Hillingdon Air Quality Management Area (AQMA). The pollutant declared for this AQMA is nitrogen dioxide (NO₂) – annual mean.
- 2.3.2 Consideration of sensitive receptors includes environmental, ecological, and human receptors.
- 2.3.3 A number of Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation (SAC – statutory and non-statutory), Local Nature Reserves (LNRs), Scheduled Monuments and Listed Buildings are located within 1000m of the site area, see Table 1.
- 2.3.4 There are no National Parks, Areas of Outstanding National Beauty (AONB) or Ramsar sites within 1000m of the site area.

2.3.5 Sensitive human receptors, which includes adjacent residential properties and certain commercial enterprises (e.g., schools, GPs, and farms) are also considered below in Table 1.

Site Name	Designation	Approximate direction and closest distance from site boundary.
Fray's Valley	Local Nature Reserve	570m west
Fray's Farm Meadows	Site of Special Scientific Interest	670m south west
Denham Country Park	Local Nature Reserve	790m west
Denham Lock Wood	Site of Special Scientific Interest	880m south west
Non-Statutory Designations		
Source Protection Zone(s) I (Inner Protection Zone) and II (Outer Protection Zone)	Source Protection Zone	Site and north
Thames_SWSGZ4015, 4016_Cookham Teddington & Wey	Drinking Water Safeguard Zones (Surface Water)	Site and its surroundings
London Area Greenbelt	Green Belt	Site and its surroundings
Ickenham (Hillingdon)	Sites of Important Nature Conservation (GIGL)	Directly west
Brackebury Railway Cutting	Site of Borough Importance Grade 2.	50m north
Brackebury Farm moated site	Scheduled Monument	210m east
Brackebury Farmhouse	Grade II Listed Building	290m east
Copthall Farmhouse	Grade II Listed Building	330m south east
North Lodge	Grade II Listed Building	390m south
Newyears Green	Site of Borough Importance Grade 1, Ancient Woodland	400m north
West Ruislip Golf Course and Old Priory Meadows	Site of Borough Importance Grade 1	445m east
Mad Field Covert, Railway Mead, and the River Pinn	Site of Borough Importance Grade 2	460m east
Medieval moated site	Scheduled Monuments	495m south east
The Pinnocks Wood	Ancient Woodland	570m south west

Harefield Place	Grade II Listed Building	600m south west
Highway Farmhouse, Forecourt walls to South Highway Farmhouse and Barn and Shelter Shed to south east of Highway Farmhouse	Grade II Listed Buildings	840m to 880m north west
Colne Valley Regional Park	Public park	Site
Residential and sensitive commercial receptors		
Shorthill Cottage	Residential area	Directly north (of topsoil storage area) and west (of storage bins area) from the site
Ickenham residential properties	Residential areas	Large areas west, south, and east. Closest areas are 180m south west, 300m east
Harvil Farm	Farm/residential area	140m south west
Brackenbury Farm	Farm/residential area	190m east
Copthall Farm	Farm/residential area	210m south east
West London School of Guitar	School	240m south west
Dunster Cottage	Farm/residential area	740m north east
Ruislip and Newyears Green Farm Buildings	Farm/residential area	560m north east, 725m north west, 800m north west, and 900m north west
The Breakspear School	School	700m south east
Wallasey Medical Centre – Dr K Patel	Doctors Surgery	930m south east

Table 1 – Distances to selected, representative receptors (up to 1000m from site boundary)

2.4 Other Sources of Dust and Emissions

- 2.4.1 As well as considering the RSSP-WTS site as a potential source of dust and emissions, this report also considers local practices that may be a potential source of dust and emissions.
- 2.4.2 A review of the Envirocheck report obtained for the site and the MAGIC website has indicated the following potential sources (commercial ventures) of dust and emissions in the local area (see Table 2).

Direction from boundary	Process	Approximate distance metres
West	Harefield Oil Terminal	100m
North east	MSD Animal Health and pharmaceutical research facility	220m
West	GBN Services - Skip Hire	230m
West	Thames Materials Ltd - Mobile screening and crushing of materials	230m
North	B.F.A. Recycling	640m
West	Hanson Ready-Mixed Concrete – concrete mixing	650m
North east	West Composting London	830m
North east	Country Compost Ltd, J Madden (Garages), Dassio Autocars, Crows Farm Storage Facility	950m

Table 2 – Identified sources of dust and emissions within 1000m of the site boundary

3 Operations at Waste Transfer Station

- 3.1.1 SCSJV commit to undertaking measures to reduce potential impacts on local air quality. Relevant mitigation and best practice measures will be employed on site; these are detailed in the following sections.
- 3.1.2 The site layout has been planned in order to locate machinery and dust-causing activities away from sensitive receptors, where reasonably practicable. Methods, such as active management of dust generation along the conveyor system, enclosure of the waste material storage areas and movement of waste material and machinery onsite provide a means of reducing the impacts of dust and emissions generation.
- 3.1.3 A Dust and Emission Risk Assessment (DERA) has been undertaken for the RSSP-WTS facility, see Appendix A. Pre-mitigation, the risk assessment concludes that the activities are likely to result in an overall medium dust/emissions risk. Subsequent to mitigation there is an overall low dust/emissions risk.

3.2 Site Activities and Proposed Infrastructure

- 3.2.1 The RSSP-WTS will receive Tunnel Boring Machine (TBM) spoil arisings via a conveyor system from the construction of Northolt Tunnels West via West Ruislip Portal. TBM arisings will be received by road in tipper lorries if the conveyor system is not operational for any reason. This material will be temporarily stored and treated within the extent of the RSSP-WTS. The material arisings are to be treated with additives (lime and ggbs) to ensure that they have suitable properties (geotechnical and chemical) for placement in the following areas: Ruislip Southern Sustainable Placement (RSSP) and Copthall Tunnel (Copthall backfill).
- 3.2.2 Following treatment at the RSSP-WTS facility, onward transport of treated materials will be via a return conveyor (or haul road) to Copthall backfill. Materials will be transported to RSSP to the south of the treatment area via dump trucks along haul roads (internal).
- 3.2.3 In order to facilitate the operational requirements of the RSSP-WTS facility, the following activities will take place, reference to specific plant is also made below:
- Under normal operation, untreated TBM material arriving at the facility will be routed into one of three pugmill mixing plants for treatment if

required, in order to achieve the appropriate material characteristics for backfill placement (e.g. desired moisture content for fill placement). Should the material already display suitable characteristics (e.g. material to be of a suitable consistency), then the material is to be routed directly for placement (RSSP), or back to Copthall backfill operations without entering the mixing plants for treatment.

- Storage of limed material prior to collection for placement in the RSSP will occur in the TBM arisings storage bins provided at the facility.
- Once the material treatment has been undertaken, a loading shovel and/or excavator will collect the material and load it into an Articulated Dump Truck (ADT) for transportation to RSSP along internal haul roads, or onto the return Copthall backfill conveyor.

3.2.4 A detailed description of the site layout and operating procedures is provided in the Site Operating Plan (1MCo4-SCJ_SDH-EV-PLN-SSo5_SL07-000016).

3.2.5 The Dust and Emissions Risk Assessment (DERA) has considered the potential impacts for all of the above activities, see Appendix A.

3.3 Waste Type and Quantity

3.3.1 The RSSP-WTS facility will receive approximately 1,250,000m³ of material from the Tunnel Boring Machine (TBM) arisings.

3.3.2 The storage capacity of the facility is the capacity of the muck bins – 30,000 m³. Note – this is 150,000 m³ less than on the original application form (Part B4 Table 1a) due to the exclusion of the stockpiling area from the permit application boundary.

3.3.3 The TBM material will arrive at the facility at a rate of between 500m³ to 3,000m³ per 24-hour day, dependent on the type of material the TBM is currently driving through. The amount of waste accepted daily will be dependent on the progress of tunnel boring machines. The average daily rate of material delivery from the TBM is anticipated to be within the region of 2,200 to 3,000m³ per day.

3.3.4 The waste codes (EWC¹) to be included in the permit are:

Waste Code	Waste Description
17 05 04	Soil and stones (TBM arisings)
19 03 07	Solidified waste (TBM arising solidified with lime addition)

3.3.5

3.4 Waste Deliveries to Waste Transfer Station

3.4.1 Features of the design of the proposed RSSP-WTS facility, which include proposed dust and emissions mitigation measures during the transportation of materials, are detailed in the Dust and Emissions Risk Assessment (DERA), see Appendix 1 and outlined below.

Controls measures during transportation of materials

3.4.2 Waste TBM arisings will be delivered to the RSSP-WTS facility via a two-way conveyor system, which will be enclosed along its length of travel within the extent of the permit boundary. Incoming wastes will be received via vehicular transport in the event that the conveyor system is not functioning.

3.4.3 The conveyor belt system will be enclosed for its length of travel within the site.

3.4.4 The conveyor belt system will have a suitable belt cleaning system (scrapers/brushes and watering) to prevent the build-up of dry friable materials on the conveyor.

3.4.5 The conveyor system will be regularly inspected and maintained in accordance with the manufacturer's instructions to ensure the belt cleaning system is working effectively and efficiently.

3.4.6 Drop heights from the conveyor to stockpiles will be kept to the reasonably practicable minimum.

3.4.7 The waste material storage area (muck bin storage area will) will comprise walls on western, northern, and eastern facades to roof level and the 7,850m² area will be roofed.

¹ European Waste Catalogue

- 3.4.8 Above the entrance of each bay of the muck storage building, a sprinkler system will be installed to suppress dust from vehicle and machinery movements to and from the building. Further details are provided in Appendix A4.
- 3.4.9 The TBM arisings inherently are not dry, and may be required to be limed to manage their consistency. They will not have been stored for long periods of time prior to arrival, and not prone to releasing dust.

Dust and Fugitive Emissions Control Measures during Road Transport of Waste

- 3.4.10 All road vehicle movements to the site will be prebooked, and allocated delivery sequencing to prevent queuing of vehicles at the site entrance on Harvil Road, or feeder roads.
- 3.4.11 Waste material road haulage vehicles will only be permitted to enter the site if sheeted.
- 3.4.12 All incoming HGVs will be required to have sheeted loads, in order to avoid the spillage of material or creation of dust outside the site.
- 3.4.13 Vehicles transporting materials will not be overloaded as they will only be from a HS2 site and strictly controlled by the originating on-site team (West Ruislip Portal).
- 3.4.14 A noticeboard summarising the site rules for visiting drivers is displayed in a prominent position at the site entrance and office area / entry to the RSSP-WTS facility. Copies of the site rules will be available for issue to visiting drivers.
- 3.4.15 The number of handling operations for materials will be kept to the minimum reasonably practicable.
- 3.4.16 All HGVs will meet Euro VI minimum emission standard and all LDVs will be Euro 6 diesel, or Euro 4 Petrol.
- 3.4.17 Vehicles and plant will be switched off and secured when not in use.
- 3.4.18 All road vehicles will be maintained in accordance with the manufacturer's instructions and hold a current MOT.
- 3.4.19 On site speed limit for any vehicle will be 5mph. Speed limit signage will be displayed at the site entrance and around the haul route and enforced by on-site traffic marshals.
- 3.4.20 The entrance / egress from / to Harvil Road is concrete impermeable slab. As such the surface will not generate dust itself. The cleanliness of surface will be maintained through regular use of a road sweeper. The road sweeper will be

available and deployed as required during all operational hours of the site. A supervised wheel wash is available at all times at the site entrance.

3.4.21 All waste haulage vehicles will be checked by the site entrance/exit Traffic Marshall and sent (and resent if necessary) through the wheel wash for further cleaning prior to the site egress at Harvil Road. A visual inspection of haul routes will be undertaken at regular intervals during the day and recorded. Any shortfalls in 'housekeeping' will be identified and rectified promptly. Similarly, repairs will be arranged and implemented, See Appendix A2, Visual Inspection Sheet.

3.4.22 Daily cleaning and suppression of dust on haul routes and tipping / loading areas will be carried out using a road sweeper (7t or larger) and / or large capacity vehicle pulled (HGV), or driven, water bowser.

3.4.23 The frequency of cleaning during the day will be proportionate for the purposes of suppressing dust emissions and preventing friable deposits on haul routes.

3.5 Waste Processing, Dust and Emission Controls

Control measures during the transfer of waste

3.5.1 As discussed in Section 3.4, the RSSP-facility will receive materials via an onward conveyor system (or by road). The materials will be temporarily stored on site in the designated treatment area, prior to onward transfer of the material as a waste. The waste will be clayey with a cohesive nature, with an estimated moisture content between 30-40%, and it is expected that much of this material will not in itself create significant dust arising. However, dust can arise from the physical operations associated with the transfer of waste.

3.5.2 The waste material storage area will comprise walls on western, northern, and eastern facades to roof level and the 7,850m² area will be roofed. Materials stored within the arisings bins will not be placed so that the height of the materials in the bins exceeds 3.3m, as to ensure that there is at least 0.5m between the top of the bin wall facades (3.8m height) and the top level of the arisings.

3.5.3 Materials exiting the RSSP-WTS facility for placement as reinstatement material at RSSP will be transported via internal haul road. Materials exiting the facility for onward transport and placement as Copthall Backfill will be transferred off-site via a returning mechanism on the conveyor system (or by haul road if the conveyor system is unavailable).

3.5.4 Drop heights from vehicles/NRMM involved in the transfer of materials on the site will be kept to the reasonably practicable minimum.

- 3.5.5 Vehicles/NRMM transporting materials within the site will not be overloaded
- 3.5.6 Movement of vehicles / NRMM around the site will be kept to the minimum reasonable for the effective and efficient operation of the site.
- 3.5.7 The number of handling operations of stockpiled waste materials will be kept to the minimum reasonably practicable.
- 3.5.8 Daily cleaning and suppression of dust in the muck storage bin area will be supplemented using a road sweeper (7t or larger) and / or large capacity vehicle pulled (HGV), or driven, water bowser.
- 3.5.9 The number of handling operations of stockpiled waste materials will be kept to the minimum reasonably practicable.
- 3.5.10 A visual inspection of operations within the muck storage bin area will be undertaken at regular intervals during the day and recorded. Any shortfalls in 'housekeeping' and effectiveness of dust suppression will be identified and rectified promptly. See Appendix A2, Visual Inspection Sheet Template and Section 4.1.5 detailing its use by the Site Supervisor.
- 3.5.11 On site speed limit for any vehicle/NRMM will be 5mph. Speed limit signage will be displayed at the site entrance and around the haul route and enforced by on-site traffic marshals.
- 3.5.12 The entrance / egress of the site and haul road that circles the waste material storage area (muck storage bins) will comprise an impermeable concrete slab.
- 3.5.13 The haul road routed south to the placement area will comprise course granular compacted materials.
- 3.5.14 A visual inspection of haul routes ('housekeeping' and repair) will be undertaken at regular intervals during the day and recorded. Any shortfalls in 'housekeeping' will be identified and rectified promptly. Similarly, repairs will be arranged and implemented. See Appendix A2, Visual Inspection Sheet Template and Section 4.1.5 detailing its use by the Site Supervisor.
- 3.5.15 Daily cleaning and suppression of dust on haul routes will be carried out using a road sweeper (7t or larger) and / or large capacity vehicle pulled (HGV), or driven, water bowser.
- 3.5.16 Manual jet washes (estimated inventory of 2-6, dependant on requirement for vehicles to access public highway) and sweeping facilities will be available on site for cleaning of small/limited areas where access for larger road sweeper and vehicular water bowsers is limited / prevented.

- 3.5.17 The frequency of cleaning during the day will be suitable for the purposes of suppressing dust emissions and preventing friable deposits on haul routes.
- 3.5.18 All HGV road vehicles and NRMM leaving the site will use the automated wheel-wash facility. All vehicle wheels will be subsequently checked and if necessary be resent through the wheel wash for further cleaning prior to the site egress at Harvil Road.
- 3.5.19 A noticeboard summarising the site rules for visiting drivers is displayed in a prominent position adjacent at the site entrance, and a complete set of rules will be displayed in the site office. Copies of the site rules will be available for issue to visiting drivers.
- 3.5.20 All road vehicle movements to the site will be prebooked and allocated delivery times to prevent queuing of vehicles at the site entrance off Harvil Road.
- 3.5.21 Movement of road vehicles around the site will be kept to the minimum reasonable for the effective and efficient operation of the site.
- 3.5.22 Vehicles will be switched off when not in use. All Light Duty Vehicles will meet Emission Standard Euro 6 (Diesel) and Euro 4 (Petrol).
- 3.5.23 All Heavy Good Vehicles (HGVs) will meet Emission Standard Euro VI.
- 3.5.24 Specific dust and emissions mitigation measures in relation to the conveyor system are discussed in Section 3.4.

Dust emissions from loading and storage of lime in silos and dosing of TBM arisings

- 3.5.25 Lime will only be stored on site within the designated silos.
- 3.5.26 Dust emissions from unloading road tankers shall be minimised by venting to the silo filter using a delivery tanker fitted with an on-board, truck-mounted relief valve and filtration system, and by connecting transfer lines first to the delivery inlet point and then to the tanker discharge point, and by ensuring delivery is at a rate which does not pressurise the silo.
- 3.5.27 Bulk lime tanker transfer lines will be securely connected to the silo delivery inlet point first, and then the tanker discharge point before the delivery commences. Materials will be delivered at a controlled rate, and the rate adjusted to prevent pressurisation of the silo.
- 3.5.28 Silos shall not be overfilled or over pressurised and there shall be an overfilling and over pressure warning alarm.

- 3.5.29 Deliveries will automatically stop where overfilling or over-pressurisation is identified.
- 3.5.30 Displaced air from pneumatic transfer shall pass through filtration prior to emission to air.
- 3.5.31 The filter systems will be regularly inspected and cleaned to prevent blockages and accumulation of powder in the filter system.
- 3.5.32 Lime dosing and thorough mixing of TBM arisings will be carried out within the dedicated pugmills

Non-Road Mobile Machinery (NRMM) Mobile Plant and Equipment

- 3.5.33 All relevant NRMM (with a power rating between 37-560kW will meet a minimum emission standard Stage IV*. (*IIIA for constant speed engines of any power i.e., generators). NRMM meeting emission standard Euro Stage V or using alternative low/zero emission technology (e.g. hydrogen or electric) will be preferred depending on market availability.
- 3.5.34 All NRMM will be operated in accordance with the manufacturer's written recommendations. All NRMM will use ultra-low-sulphur diesel or Hydrogenated Vegetable Oil (HVO). All NRMM will be switched off when not in use and not left idling.
- 3.5.35 Site speeds will be controlled to minimise possible dust entrainment (5mph). Appropriate instruction will be issued to all vehicle drivers.
- 3.5.36 SCSJV will compliance-check the emission standard of each machine and register it with HS2 prior to the machinery being deployed to site.
- 3.5.37 The machines anticipated to be typically used on site are listed in Table 3 below. A significant inventory is anticipated during the operation of the facility.

Description	Make	Model	EU Emission Stage
30/40Ton Excavator	CAT	336	Stage IV or V
30T DUMPTRUCK	Volvo	A30G	Stage IV or V
D6 Dozer	CAT	D6T	Stage IV or V
Tractor	John Deere	8R340	Stage IV or V
Loading Shovel	Volvo	L269H	Stage IV or V
13T or 19T Roller	Bomag	BW213/19	Stage IV or V

Table 3 – Typical mobile plant and equipment

4 Dust and Particulate (PM₁₀) Management

4.1 Responsibility for Implementation of the DEMP

4.1.1 The Site Supervisor, or his nominee, will exercise day-to-day control on site at all times. The Site Supervisor will have particular responsibility for ensuring full compliance with the requirements of the DEMP. Specifically, the Site Supervisor will assume control, either personally or by delegation to suitably trained and responsible staff, of:

- Vehicle movements;
- All loading, tipping and materials handling operations;
- Operation of dust suppression measures; and
- Inspection, cleaning and maintenance of all plant and equipment.

4.1.2 SCSJV operates an externally audited Environmental Management System (EMS) which is certified to ISO 14001:2015.

4.1.3 Staff at all levels will receive the necessary training EMS and instruction in their duties relating to the control of all operations and the potential sources of dust emissions. Particular emphasis will be given to dealing with plant malfunctions and abnormal conditions. Site staff will inform the Site Supervisor whenever visible dust emissions are observed or appear likely to occur, as a result of any site operation.

4.1.4 The continuing effectiveness of this dust management scheme will be reviewed regularly and at least every 6 months as part of the formal management plan review process in the context of a continually evolving HS2 project, changes in site operations, new technologies, site audits, monitoring results, local community complaints/enquiries and daily visual inspections.

4.1.5 Visual inspections of the site by the Site Supervisor or nominated representative will be undertaken at regular intervals; at least twice during the day (morning and afternoon). Visual inspections of the adjacent road (Harvil Road) at least once a week; or more when the onsite observations indicate the need. The findings of each visual inspection will be recorded on the Visual Inspection Sheet, see Appendix A2. Any shortfalls in 'housekeeping' and effectiveness of dust suppression will be identified and rectified promptly. The

outcome of any identified shortfalls in housekeeping and dust suppression will comprise, but not limited to, any of the following actions:

- Additional dust suppression (water) cannon(s) (dust cannons) being deployed
- Increased dust suppression
- Additional road sweeper circuit(s) / deployment
- Additional water bowser circuit(s) / deployment
- Manual jet wash being deployed
- Manual sweeping undertaken
- Surface repairs arranged / undertaken
- Repair / maintenance of dust suppression equipment; and/or
- Operation / activity being stopped.

4.2 Sources and Control of Fugitive Dust/Particulate Emissions

4.2.1 Dusts, fibres, and particulates are found in wastes with a fines content and soils. They are generated during periods of dry weather in combination with windy conditions.

4.2.2 The focus of the DEMP is to control dust generation and movement at source. The main potential sources of dust at the site are likely to be from site surfaces conveyor transfer points, movement of vehicles on haul roads and unloading and loading of waste.

4.2.3 The sources of potential dust and particulates generated by the waste transfer station are summarised below:

- Vehicles entering and/or leaving the site with uncovered loads, mud on wheels, and tracking dust on to or off the site;
- Offloading of material into the holding bays from the conveyor or vehicles;
- Loading of materials on to dump trucks and off-loading onto spoil mounds;
- Dust re-suspension from vehicular movement along internal haul roads and placement areas;

- Filling and storage of lime in silos
- Wind whipping of dust from spoil mounds or waste stored in bays;
- Site surfaces; and
- Particulate emissions from the exhaust of vehicles/plant/machinery on site.

4.2.4 The potential pathway for fugitive emissions from the sources listed above is predominantly by atmospheric dispersion. The following section provides an assessment of the Source-Pathway-Receptor Scenario at the site.

Table 4 Source-Pathway-Receptor Model.

Source	Pathway	Receptor	Type of impact	Where relationship can be interrupted
Mud	Tracking dust on wheels and vehicles, then mud dropping off wheels/vehicles when dry	Sensitive Receptors as identified in Table 1	Visual soiling, also consequent resuspension as airborne particulates	Limiting road transport by use of conveyor. Road vehicles will be used to bring in waste only when the conveyor is not operational for any reason. Remove mud before vehicles leave site. Long haul road round the site ensures residual mud drops off before vehicle reaches drop off point. Wheel wash following drop off. Road sweeper present to clear surfaces.
Offload of waste from conveyor or tipper lorries	Atmospheric dispersion	Sensitive Receptors as identified in Table 1	Visual soiling and airborne particulates	Tipper lorries are sheeted until the time of off-loading. Minimise source strength by means of low drop heights, Maximise shielding and containment profiling and shielding of piles from wind whipping, 3.75m high bund walls, and site hoardings. Damping down dry material before and during offload activities.
Load of waste to dump trucks and offloading onto spoil mounds	Atmospheric dispersion	Sensitive Receptors as identified in Table 1	Visual soiling and airborne particulates	Maximise shielding and containment. Minimise source strength by misting/water/barrier techniques. Damping down dry material before and during offload activities. Ensuring waste soil is damp via misting prior to handling. Handling material to prevent excessive residence time within bund and drying.
Filling and storage of lime in silos and dosing of TBM arisings	Atmospheric dispersion	Sensitive Receptors as identified in Table 1	Visual soiling and airborne particulates	Lime will only be stored on site within the designated silos. Silos shall not be overfilled or over pressurised and there shall be an overfilling and over pressure warning alarm. Displaced air from pneumatic transfer shall pass through filtration prior to emission to air. Lime dosing and thorough mixing of TBM arisings will be carried out within the dedicated pugmills
Dust resuspension	Atmospheric dispersion	Sensitive Receptors as identified in Table 1	Visual soiling and airborne particulates	Road sweeper and bowser carrying out regular circuits of haul routes to clear / dampen surfaces. Movement of machinery / vehicle around the site kept to the reasonably minimum. A speed limit of 5 mph is enforced on the site.
Wind whipping (stockpiled materials)	Atmospheric dispersion	Sensitive Receptors as identified in Table 1	Visual soiling and airborne particulates	Ensure stockpiles within contained bunded areas are below 0.5m from bund wall top. Clearly demarked line indicating maximum bund height on bund walls.

				Profiling of spoil mounds. Road sweeper/bowser present to clear and dampen surfaces.
Vehicle exhaust emissions	Atmospheric dispersion	Sensitive Receptors as identified in Table 1	Airborne particulates	Ensure vehicles comply with HGV - Euro VI and LDV - Euro 6 (diesel)/Euro 4 (petrol) emissions standards. Regulatory controls and best-practice measures to minimise source strength.
Non-road Mobile machinery exhaust emissions	Atmospheric dispersion	Sensitive Receptors as identified in Table 1	Airborne particulates	Ensure machines comply with NRMM Emissions standard Stage IV minimum.

Table 5 List of Control Measures

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
Preventative Measures			
Containment within building	Creating a solid barrier between the source of dust and particulates and receptors is an effective method of control, provided that the building entrances and exits are well managed.	Very effective but needs to be implemented in combination with a range of dust suppression measures.	Integral to site design.
Dust Extraction System	Silo bag filtration for delivery and dosing of lime	Very effective	Integral to site design
Site / process layout in relation to receptors	Location of muck bin storage area and pugmills/silos is distant from nearby receptors. Lime dosing and thorough mixing of TBM arisings will be carried out within the dedicated pugmills.	Will be in combination with a range of other measures to reduce dust and particulate generation.	The site layout has been designed to minimise potential dust generation and limit impact to identified receptors.

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
Site speed limit, 'no idling' policy and minimisation of vehicle movements on site	Reducing vehicle movements and idling should reduce emissions from vehicles. Contractual requirement to use lower emission road vehicles and NRMM. Enforcement of a speed limit will help reduce re-suspension of particulates by vehicle wheels.	The site operating plan provides additional details on the speed limit for the site. No idling policy applies on this site.	Implemented as part of site operating procedures
Minimising drop heights for waste.	Minimising the height at which waste is handled should reduce the distance over which debris, dust and particulates could be blown and dispersed by winds. Enclosing processes will further reduce dispersion.	Implemented throughout site operation. Will be in combination with a range of other measures to reduce dust and particulate generation.	Implemented as part of site operating procedures
Good housekeeping	Having a consistent, regular housekeeping regime that is supported by management, will ensure site is regularly checked and issues remedied to prevent and remove dust and particulate build up.	Site operating plan provides details on required site and vehicle inspections, cleaning, maintenance. Site entrance and access road to be inspected daily to check cleanliness and a road sweeper / bowser will operate regular circuits throughout the day.	Housekeeping will form part of the daily routine and operation of the site.
Ceasing operation during high winds (as defined through met office weather warnings) and/or prevailing wind direction	Mobilisation of dust and particulates is likely to be greater during periods of strong winds and hence ceasing operation at these times may reduce peak pollution events.	Procedures will be in place when operations will cease	Daily visual inspections will inform decision by the site supervisor when works on site will be ceased due to high winds. Continuous real time dust will also aid decision making, especially if the site action level is breached.
Installed wheel wash	High pressure wash of vehicle wheels and undercarriage (including under body) using a series of jet sprays. All vehicles to use wheel wash on exiting the site. An Ecowash Excel	All road vehicles to use wheel wash and vehicles to drive through slowly on exit.	Wheel wash to be used by all exiting HGVs and NRMM

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
	<p>system is to be used - see Appendix C for details.</p> <p>The wheel wash timer is set to 15 seconds operation from activating the sensor which allows for the lorry to enter and ensure all wheels are washed before exiting. The wheel wash has a maintenance contract in place with an engineer's inspection/servicing every 3 months.</p>		
Easy to clean concrete impermeable surfaces	Site surfaces of the muck storage bin area are comprised of concrete. Hard surfacing ensures that these can be easily cleaned of debris.	Daily visual inspections for debris as detailed in the site operating plan. Ongoing maintenance of defects through life of site. Use of road sweeping on daily regular circuits.	Integral to site design
Minimisation of waste storage heights and volumes on site	Minimising the height at which waste is handled should reduce the distance over which debris, dust and particulates could be blown and dispersed by winds. Reducing storage volumes should reduce the surface area over which particulates can be mobilised.	Volumes of waste stored in each bund is defined in the Site Operating Plan and stockpiles will be managed to keep heights below 0.5m from wall top.	No trigger as these will be undertaken at all times
Reduction in operations (waste throughput, vehicle size, operational hours)	Reducing the amount of activity on site during, for example, windy weather including reduced machinery/vehicle movements and materials movements out of enclosed muck bins in combination with increased dust suppression should result in reduced emissions and re-suspension of dust and particulates from a site.	See ceasing operations (above) and the effectiveness of the wide range of other measures to reduce dust and particulate generation.	<p>Daily visual inspections will inform decision by the site supervisor when works on site will be reduced due to high winds.</p> <p>Continuous real time dust will also aid decision making, especially if the site action level is breached.</p>

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
Remedial Measures			
On-site sweeping	Sweeping of site and adjacent highways by road sweeper or similar.	Daily visual inspections of site haulage roads and entrance/exit roads by Site Supervisor or nominated person in line with the requirements of the Site Operating Plan.	Housekeeping will form part of the daily routine and operation of the site. Site entrance and internal haul routes road to be inspected daily to check cleanliness and a road sweeper / bowser will operate regular circuits throughout the day.
Site hoarding	Site hoarding 2.4m in general around site boundary (3.6m in some locations, as shown on layout plan).	Reduces wind speed across the site which indirectly controls the potential for dust and particulate emissions.	Integral to site design
Water suppression with mist sprays	Above the entrance of each bay of the muck storage building, a sprinkler system will be installed to suppress dust from vehicle and machinery movements to and from the building. Further details are provided in Appendix A4. This is to avoid fugitive dust emissions becoming air borne beyond the muck storage building.	Very effective at controlling point source emissions of dust and particulates. Uses less water than water bowser	Daily visual inspections of muck bin storage area by Site Supervisor or nominated person in line with the requirements of the Site Operating Plan.
Water suppression with bowser	Towable water bowser/bosers will be employed on site for damping down of site surfaces outside the reach of the mist sprayers (particularly the haul road). Moveable water cannons that will be fed by a water tank topped up by these mobile bowser(s) will also be	Highly water intensive and more likely to minimise dust and particulates on the ground that is at risk of being re-suspended rather than already airborne dust and particulates. Very effective at dampening down haul roads and large surface areas. Can also come with hose attachments and other attachments to increase its versatility.	Site to be inspected daily to check cleanliness and a road sweeper / bowser will operate regular circuits throughout the day.

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
	employed on site for dust suppression measures.		
Dust Cannons	Moveable water cannons that will be fed by a water tank topped up by mobile bowser(s) will also be employed on site for dust suppression measures predominately in the topsoil storage area.	Very effective at dampening down wide areas of spoil / made ground and great flexibility in deployment location. Water intensive	Site to be inspected daily dust cannons and determine the operating duration and location of cannons
Dust and particulate monitor with trigger alarm	Dust and particulate monitoring will be undertaken at the site. Installed and operational at the western site boundary of the site towards the nearest sensitive residential premises (approx. 100m to the west of the storage bins area and immediately north of the topsoil storage area).	Valuable early warning of increased/elevated PM10 levels A trigger/site action level of 75µg/m ³ (over a 5-minute average) is to be adopted.	Used throughout site lifetime in combination with daily visual inspections.

4.3 Water Availability

- 4.3.1 Water for dust suppression and the wheel wash is available from a high-pressured water main supply present on site and will also be supplemented using tractors and tankers that will retrieve the water from the onsite attenuation pond, and bowsers fed rainwater collection from roofs onsite.
- 4.3.2 There will be up to four (4) water cannons (Air Spectrum DC 32, DC50 or similar) on site, each with a 2,000 capacity water bowser/tank. These are portable and able to be deployed to risk areas on the pad with a 30 – 50m water throw. The cannons will be fed by a water tank topped up by a mobile bowser and operated based on daily visual inspections. The concrete haul road within the waste treatment area also has a mains fed sprinkler system along its length.
- 4.3.3 Should drought conditions restrict the water supply or amount of water available then the Site Supervisor will decide to reduce the operations on site or cease operations in order to comply with water usage restrictions.

4.4 Procedures to control operations that may have an adverse impact on the environment.

- 4.4.1 The Site Supervisor will be responsible for maintaining a check of dust from site activities in accordance with the Operating Plan. Visual inspections of the site will be undertaken at regular intervals; at least twice during the day (morning and afternoon) and once in the evening/night. Visual inspections of the adjacent road (Harvil Road) will be undertaken at least once a week; or more when the onsite observations indicate the need. The findings of each visual inspection will be recorded on the Visual Inspection Sheet, see Appendix A2. Any shortfalls in 'housekeeping' and effectiveness of dust suppression will be identified and rectified promptly. The outcome of any identified shortfalls in housekeeping and dust management will comprise, but not limited to, any of the following actions:
- Additional dust suppression (water) cannon(s) being deployed
 - Increased dust suppression
 - Additional road sweeper circuit(s) / deployment
 - Additional water bowser circuit(s) / deployment
 - Manual jet wash being deployed
 - Manual sweeping undertaken
 - Surface repairs arranged / undertaken
 - Repair / maintenance of dust suppression equipment; and/or

- Operation / activity being stopped.

- 4.4.2 Should a complaint be received about dust or other emissions from the local community, the Site Supervisor will liaise with the SCSjv Community Engagement representative and follow the complaints procedure as outlined in Section 6.
- 4.4.3 Should a situation arise as a result of an incident and there is potential for dust or fugitive emissions to disperse offsite the Site Supervisor will follow the Incidents Procedure (Section 6).
- 4.4.4 All dust suppression and abatement equipment in use, will be maintained in accordance with the manufacturer's recommendations.
- 4.4.5 All dust monitoring equipment, it will be calibrated and maintained in accordance with the manufacturer's recommendations. Records of maintenance and calibration will be maintained by the Air Quality Specialist and Air Quality monitoring Contractors who manage the wider dust and air quality network on the SCS Main Works, see Section 5.
- 4.4.6 Assessment of compliance with the requirements of the DEMP will be carried out through regular audits by the site Environment Manager and/or Air Quality Specialist .

5 Monitoring of Dust, Fibres and Particulates

- 5.1.1 Monitoring and reporting will be undertaken in line with EA guidance, environmental permit conditions, industry best practice and as detailed within this DEMP.
- 5.1.2 One dust monitor is currently installed at the western site boundary of the site towards the nearest sensitive residential premises (approx. 100m to the west of the storage bins area and immediately north of the topsoil storage area).
- 5.1.3 The monitor forms part of a network of air quality and dust monitors around HS2 SCSJV sites in both the local area and along the wider HS2 route in London. The Air Quality Specialist who manages the monitoring network will liaise closely with the RSSP WTS Site Supervisor and site Environment Manager on monitored data and site dust management practices in general.
- 5.1.4 The dust monitor dedicated to monitoring PM₁₀ levels from operations at RSSP-WTS is an Osiris Airborne Particulate Monitors (automatic real-time monitors) (MCERTS Indicative Sira MC 090157/01).

Table 6 Osiris Monitor Specifications and Settings

Reference	Serial Number	Location	Date of Last Calibration	Parameters Monitored	Averaging Period	PM ₁₀ Site Action Level (µgm-3)
AQ050	TNO4174	Western site boundary towards nearest residential receptor on Harvil Road	22/06/2022	PM ₁₀	5 minutes	75

- 5.1.5 The monitor is serviced and calibrated according to the manufacturer’s specification and in line with EA and industry guidance and best practice, summarised as follows:
- All servicing is carried out by appropriately trained technicians and records of service visits held electronically. The wider SCS MWWC maintains an Air Quality Monitoring contract for the service, maintenance, and calibration of all the Osiris monitors.
 - Each monitor has its own service contract (renewed annually with the supplier) to ensure all calibrations are carried out annually and any repairs are undertaken swiftly.
 - Each monitor undergoes quarterly service, maintenance, flow check, adjustments where necessary and filter changes. Flow checks are undertaken with calibrated rotameters.
 - Data verification and ratification for PM concentration data is carried out by

appropriately trained and experienced personnel; and

- In the event of a fault with the monitor which is not possible to be repaired on site an inventory of replacement monitors is available at short notice.

- 5.1.6 Air Quality Monitoring Contractors installing and operating the monitors are trained in the set-up, service, maintenance operation and data collection of the instruments.
- 5.1.7 The instrument is operated as part of a wider network of instruments (40+ on the HS2 Main Works Civils Contract), in order that measurements and instrument performance may be regularly compared.
- 5.1.8 The data is transmitted from the measurement instrument to a web-based software system (AirQWeb provided by the suppliers) which collects, stores and displays the data on a secure site. The software retains a searchable database of results, allows downloading of results which can be opened in Excel and has the capability to prepare automated reports.
- 5.1.9 The monitoring PM₁₀ site action level is set at 75µg/m³ (over a 5-minute average), as a tool to provide near-real time feedback to the site team. If a trigger alert is received, immediate investigations will be undertaken, works will be paused, and the cause is investigated. If the trigger is deemed to be associated with on-site activities, the mitigation methods will be re-assessed, as appropriate, before activities recommence, see Section 6.1.
- 5.1.10 Monitoring data along with any trigger alert investigation will be downloaded and stored monthly. This will include the 5-minute averaged PM₁₀ data recorded over the monitoring period, any complaints received and outcome of the resulting investigation; any period in exceedance of the trigger alert level and the result of any investigations and identified source, and where the permitted waste operations have been found to be the source, any action taken to immediately resolve the issue and prevent a recurrence.

6 Complaints and Incident Management

6.1 Incident Response

6.1.1 The SCSJV has adapted its incident management procedures to align with the HS2 incident management process which, in summary includes:

- A three-tier response command structure (Gold, Silver, Bronze) to manage an incident. An outline summary of aligning incident levels to command response is provided within Figure 2 below. The most serious incidents, Levels 1 and 2, would be managed by either Silver or Gold Command. For Levels 3 and 4 incidents, corresponding response would predominantly be by Bronze Command.

	Incident Type	Response Route
Level 4*	Near misses, minor environmental incidents.	Contained and managed with site supervisor staff. No management response required.
Level 3*	Minor environmental incident	Usually Bronze (Manager and Supervisor Personnel)
Level 2*	Significant harm to the environment	Silver (Senior Project Management Personnel)
Level 1*	Extensive harm to the environment, reputational damage	Gold (Director Level Personnel)

Figure 1 Summary of Aligning Incident Response to Command Response

- A single process for the management of all events that constitute an incident, with defined levels to help frame the response – Levels 1 to 4 (Level 1 being the most serious incidents). Classification guidance is provided in Table 6 below.

Table 7 Incident Classification Guidance

Category	High Potential Event (Level 4)	Minor Incident (Level 3)	Significant Incident (Level 2)	Major Incident (Level 1)
Air Pollution	<p>Odour arising from site but not causing a complaint.</p> <p>Visible Dust not controlled on site that may cause a nuisance to the local community/roads.</p> <p>Large amount of visible smoke from vehicles/ plant.</p> <p>(if above results in a complaint or are repeat offences see Minor or Significant)</p>	<p>Odour arising from site resulting in a complaint to the site staff.</p> <p>Visible dust not controlled on site that results in a complaint from local community.</p> <p>Large amount of visible smoke from vehicles/ plant which results in a complaint to site staff.</p> <p>A measured dust exceedance of trigger level on site.</p>	<p>Excessive odour arising specifically from site activities causing a complaint and enforcement notice from the local authority / EA.</p> <p>Dust leaving the site which results in a complaint to the local authority / EA and subsequently, enforcement action in the form of written notice or threat of regulatory action.</p>	<p>Systematic or persistent failure to manage dust produced as a direct result of site activities.</p> <p>Dust produced on site goes unmanaged and leads to prosecution action.</p> <p>Burning materials on site leading to prosecution by enforcing authority.</p> <p>Persistent failure to manage vehicle emissions in line with the NRMM and HGV emissions standards with high risk of regulatory action.</p>

- A 24-hour, 365-day Help Desk, operated by HS2, to start the co-ordination of HS2’s response to an incident and to support the SCS JV. The help desk is the first point of contact (0207 944 6570) to HS2 for all Level 1 and 2 incidents on the programme. Details of this are signposted on the entrance board and found on the HS2 Website.; and
- An internal project, on-line incident reporting system (HORACE) that records the details of an incident and supports communications, investigation, and follow-up activities to avoid a recurrence.

Air Quality Specific incidents

Exceedance of dust trigger levels and Action Plan

- 6.1.2 Monitoring will be used to ensure the effectiveness of these onsite mitigation measures and demonstrate compliance with the EMRs.
- 6.1.3 The Osiris Airborne Particulate Monitors (automatic real-time monitors) (MCERTS Indicative Sira MC 090157/01) as described in Section 5 provide real time access to data and allow alerts (by text or email) to be sent to designated recipients when levels approach or exceed predetermined thresholds. A trigger action level of at $75\mu\text{g}/\text{m}^3$ (over a 5-minute average) has

been adopted for the site. Any exceedance, or potential exceedance, of the dust threshold will trigger an alert and subsequent investigation.

6.1.4 Recipients of trigger alerts will include the RSSP-WTS Site Supervisor, Environmental Manager/Advisor, Air Quality Specialist and, HS2 Air Quality Team.

6.1.5 On receipt of an alert the following process will be followed:

- the Site Supervisor (or a delegated representative) will investigate current and recent activities on site, as quickly as reasonably practicable, to ascertain if any visible dust is emanating from the site or if any activities are occurring on site that are not in line with the dust control measures;
- any identified causes of potential fugitive dust will be rectified and actions recorded in the site Trigger Exceedance Log, see Appendix A2. The response to any identified potential fugitive dust emissions will comprise, but not limited to, any of the following actions:
 - Operation/ activity being stopped
 - Additional dust suppression (water) cannon(s) being deployed
 - Increased dust suppression
 - Additional road sweeper circuit(s) / deployment
 - Additional water bowser circuit(s) / deployment
 - Manual jet wash being deployed; and / or
 - Manual sweeping undertaken.
- The site Environment Manager/ Advisor will help coordinate the investigation of any exceedances, the site team will consider the immediate cause of any exceedance and implement suitable control measures as detailed above. The AQ Specialist will provide monitoring data and interpretation to support the investigation.
- if the source of the incident cannot be identified as originating from the site operations, operations of other nearby construction sites and other activities will be investigated for potential causes of the trigger. Other sites' particulate matter monitoring data may be available to assist this investigation; and
- if the source of the trigger is not related to the site operations, the outcome of any investigation and associated actions will be recorded.

6.2 Complaints

- 6.2.1 HS2 operate the HS2 Public Help Desk 24 hours per day, 7 days a week, to manage all complaints, handle enquiries and co-ordinate incident response relating to RSSP-WTS and other HS2 sites. The SCSJV Community Engagement Team maintain a 24/7 contact with the helpdesk and are available to answer any queries or liaise with site supervisors for investigation and resolution of complaints.
- 6.2.2 The local community has been, and continues to be, kept informed of the complaints routes and process, among other matters, for a number of years through the following communication routes:
- Regular engagement events in the local area;
 - regular newsletters;
 - information sheets about planned works before they start; and
 - up-to-date information on our local community websites, called Commonplace.
- 6.2.3 Site security are briefed to direct those coming to the site to make a complaint to call the hotline, if this happens. The HS2 Helpdesk is the point of contact for community members, and they are encouraged to contact the Helpdesk to outline their concerns. This ensures that their concerns are logged and passed on to the correct team for investigation and response. Information is not collected on the gate to ensure responses and enquiries are dealt with efficiently and effectively whilst ensuring all personal information is handled appropriately.
- 6.2.4 The local engagement team at RSSP-WTS follow the below process to deal with enquiries and complaints:
- Enquiry(ies) or complaint(s) received via Helpdesk
 - Community Engagement representative contacts (mainly by phone) the Site Supervisor to notify them of the complaint(s)/ enquiry(ies) with a follow up email(s) to the Site Supervisor and other relevant colleagues such as Environment Manager or Air Quality Specialist where required
 - Investigation is carried out
 - Site Supervisor / relevant colleagues update the Community Engagement representative.
 - Community Engagement Representative updates the community member via phone / email to close out the enquiry or complaint.
 - Community Engagement representative updates the HS2 Helpdesk with formal notes and close out response

7 References

The following documents have been referred to in this report.

Reference	Title	Document Number
R1	HS2 Environmental Minimum Requirements Annex 1: Code of Construction Practice	LWM-HS2-EV-STA-000-000107
R2	Local Environmental Management Plan - London Borough of Hillingdon	P1S-HS2-EV-REP-S000-000007
R3	HS2 Air Quality Strategy	https://www.gov.uk/government/publications/hs2-air-quality-strategy
R4	HS2 Information Paper E31: Air Quality	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/672406/E31_-_Air_Quality_v1.5.pdf
R5	HS2 Air Quality Action Plan	https://www.gov.uk/government/publications/hs2-air-quality-action-plan
R9	Waste Transfer and Treat Station Permit Application Form - Ruislip Southern Sustainable Placement S2	1MCo4-SCJ_SDH-EV-FRM-SSo5_SL07-000011
R10	Non-Technical Summary	1MCo4-SCJ_SDH-EV-NOT-SSo5_SL07-000008
R11	Site Condition Report - Waste Transfer and Treat Station - Ruislip Southern Sustainable Placement S2	1MCo4-SCJ_SDH-EV-REP-SSo5_SL07-000009
R12	Site Operating Plan - Waste Transfer and Treat Station - Ruislip Southern Sustainable Placement S2	1MCo4-SCJ_SDH-EV-PLN-SSo5_SL07-000016
R13	Management Systems and Procedures - Waste Transfer and Treat Station - Ruislip Southern Sustainable Placement S2	1MCo4-SCJ_SDH-EV-PRO-SSo5_SL07-000004
R14	Noise and Vibration Management Plan - Waste Transfer and Treat Station - Ruislip Southern Sustainable Placement S2	1MCo4-SCJ_SDH-EV-PLN-SSo5_SL07-000015
R15	Highways Agency (2007), Design Manual for Roads and Bridges, Volume 11 Section 3, Part 1 GA 207/07 Air Quality	https://www.standardsforhighways.co.uk/dmrb

R16	Highways Agency (2007), Design Manual for Roads and Bridges, Volume 11 Section 3, Part 1 GA 207/07 Air Quality	https://www.standardsforhighways.co.uk/dmr
R17	Virtual Met Mast report for HS2 Route (OOC Station to Bromford Tunnel West Portal) 2014	
R18	Drainage Technical Report, MDL Code: TW-RSP-SSP	1MCo4-SCJ-EN-REP-SSo5_SL07-000027
R19	Technical Guidance WM3: Waste Classification - Guidance on the classification and assessment of waste. Version 1.1.GB. Jan 2021 (EU Exit Update)	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/948735/Waste_classification_technical_guidance_WM3.pdf

Appendix A - Dust Risk Assessment

Appendix A1. Fugitive Dust and Emissions Risk Assessment

What do you do that can harm			Assessing the risk(Unmitigated)			Managing the Risk	Residual Risk(mitigated)		
Hazard	Receptor	Pathway	Probability of exposure	Consequence	What is the overall risk?	Risk management	Probability of exposure	Consequence	What is the overall risk?
Exhaust emissions from road vehicle movements on site including entering and leaving the site.	Residents to the west on Harvil Road and to the East / Southeast on Breakspear Road	Air	Medium	Medium	Medium	<ul style="list-style-type: none"> All road vehicle movements to the site will be prebooked and allocated delivery times to prevent queuing of vehicles at the site entrance off Harvil Road All Light Duty Vehicles will meet Emission Standard Euro 6 (Diesel) and Euro 4 (Petrol). All Heavy Good Vehicles (HGVs) will meet Emission Standard Euro VI. All road vehicles will be maintained in accordance with the manufacturer's instructions and hold a current MOT. A noticeboard summarising the site rules for visiting drivers is displayed in a prominent position adjacent at the site entrance, and a complete set of rules will be displayed in the site office. Copies of the site rules will be available for issue to visiting drivers. Movement of road vehicles around the site will be kept to the minimum reasonable for the effective and efficient operation of the site. Vehicles will be switched off when not in use. 	Low	Low	Low
Exhaust emissions from on site Machinery (Non-road Mobile Machinery – NRMM)	Residents to the west on Harvil Road and to the East / Southeast on Breakspear Road	Air	Medium	Medium	Medium	<ul style="list-style-type: none"> All relevant NRMM (with a power rating between 37-560kW) will meet a minimum emission standard Euro Stage IIIB*and Stage IV* . *IIIA for constant speed engines of any power i.e. generators. NRMM meeting emission standard Euro Stage V or using alternative low/zero emission technology (e.g. hydrogen or electric) will be preferred depending on market availability. All NRMM will be operated in accordance with the manufacturer's written recommendations. On-site NRMM will be switched off and secured when not in use on site. 	Low	Low	Low

What do you do that can harm			Assessing the risk(Unmitigated)			Managing the Risk	Residual Risk(mitigated)		
Hazard	Receptor	Pathway	Probability of exposure	Consequence	What is the overall risk?	Risk management	Probability of exposure	Consequence	What is the overall risk?
						<ul style="list-style-type: none"> NRMM exhausts to be directed away from the ground and positioned at a height to facilitate appropriate dispersal of exhaust emissions. Movement of NRMM around the site will be kept to the minimum reasonable for the effective and efficient operation of the site. The use of diesel or petrol-powered generators will be reduced by using mains electricity or battery-powered equipment where reasonably practicable. All NRMM will use ultra-low-sulphur diesel or Hydrogenated Vegetable Oil (HVO). NRMM maintenance records will be kept on site and reviewed regularly. 			
Dust emissions from the waste delivery to site by the conveyor system	Residents to the west on Harvil Road and to the East / Southeast on Breakspear Road	Air	Medium	Medium	Medium	<ul style="list-style-type: none"> The conveyor belt system will be enclosed for its length of travel within the site. The conveyor belt system will have a suitable belt cleaning system (scrapers/brushes and watering) to prevent the build-up dry friable materials on the conveyor. The conveyor system will be regularly inspected and maintained in accordance with the manufacturer's instructions to ensure the belt cleaning and dust suppression systems are working effectively and efficiently. Drop heights from the conveyor to stockpiles will be kept to the reasonably practicable minimum. The waste material storage area (muck bin storage area) will comprise walls on western, northern and eastern facades to roof level and the 7,850m² area will be roofed. An automatic continuous real-time particulate monitor (PM10) (MCERTS indicative) will be installed and operational at the western site boundary towards the nearest sensitive residential premises (approx. 100m to the west of the storage bins area and immediately 	Low	Low	Low

What do you do that can harm			Assessing the risk(Unmitigated)			Managing the Risk	Residual Risk(mitigated)		
Hazard	Receptor	Pathway	Probability of exposure	Consequence	What is the overall risk?	Risk management	Probability of exposure	Consequence	What is the overall risk?
						north of the topsoil storage area. The monitors have a site action level set at 7.5µgm/m3 based on a 5-minute average, which if triggered will send an email alert to relevant site and project personnel and instigate cessation of work and investigation into the source of the trigger. Corrective action will be implemented before recommencement of site operations. The outcome of trigger alerts and investigation will be notified to EA, LB Hillingdon and HS2 as soon as practicable and within 48 hours. All monitoring data, trigger alert investigations and complaint investigations are reported on the www.gov.uk website.			
Dust emissions from loading and storage of lime /ggbs in silos and dosing of TBM arisings	Residents to the west on Harvil Road and to the East / Southeast on Breakspear Road	Air	Medium	Medium	Medium	<ul style="list-style-type: none"> Lime/ggbs will only be stored on site within the designated silos. Dust emissions from unloading road tankers shall be minimised by venting to the silo filter using a delivery tanker fitted with an on-board, truck-mounted relief valve and filtration system, and by connecting transfer lines first to the delivery inlet point and then to the tanker discharge point, and by ensuring delivery is at a rate which does not pressurise the silo. Bulk lime/ggbs tanker transfer lines will be securely connected to the silo delivery inlet point first, and then the tanker discharge point before the delivery commences. Materials will be delivered at a controlled rate, and the rate adjusted to prevent pressurisation of the silo. Silos shall not be overfilled or over pressurised and there shall be an overfilling and over pressure warning alarm. Deliveries will automatically stop where overfilling or over-pressurisation is identified. Displaced air from pneumatic transfer shall pass through filtration prior to emission to air. The filter systems will be regularly inspected and cleaned to prevent blockages and accumulation of powder in the filter system. 	Low	Low	Low

What do you do that can harm			Assessing the risk(Unmitigated)			Managing the Risk	Residual Risk(mitigated)		
Hazard	Receptor	Pathway	Probability of exposure	Consequence	What is the overall risk?	Risk management	Probability of exposure	Consequence	What is the overall risk?
						<ul style="list-style-type: none"> Dosing and thorough mixing of TBM arisings will be carried out within the dedicated pugmills. 			
Dust emissions from stockpile management within the muck storage bin area	Residents to the west on Harvil Road and to the East / Southeast on Breakspear Road	Air	Medium	Medium	Medium	<ul style="list-style-type: none"> The height of waste material stockpiles will always be at least 0.5m below the top of the 3.8m walls. Drop heights from vehicles/NRMM involved in the transfer of materials on the site will be kept to the reasonably practicable minimum. Vehicles/NRMM transporting materials within the site will not be overloaded. Above the entrance of each bay of the muck storage building, a sprinkler system will be installed to suppress dust from vehicle and machinery movements to and from the building to avoid fugitive dust emissions becoming airborne beyond the building. Daily cleaning and suppression of dust in the muck storage bin area will be supplemented using a road sweeper (7t or larger) and / or large capacity vehicle pulled (HGV), or driven, water bowser. The number of handling operations of stockpiled waste materials will be kept to the minimum reasonably practicable. A visual inspection of operations within the muck storage bin area will be undertaken at regular intervals during the day and recorded. Any shortfalls in 'housekeeping' and effectiveness of dust suppression will be identified and rectified promptly. 	Low	Low	Low
Dust emissions from road vehicles and NRMM movements on site including	Residents to the west on Harvil Road and to the East / Southeast on	Air	Medium	Medium	Medium	<ul style="list-style-type: none"> Tipper lorries arriving at site carrying TBM arisings will be sheeted, until unloading. On site speed limit for any vehicle/NRMM will be 5mph. Speed limit signage will be displayed at the site entrance and around the haul route and enforced by on-site traffic marshals. 	Low	Low	Low

What do you do that can harm			Assessing the risk(Unmitigated)			Managing the Risk	Residual Risk(mitigated)		
Hazard	Receptor	Pathway	Probability of exposure	Consequence	What is the overall risk?	Risk management	Probability of exposure	Consequence	What is the overall risk?
entering and leaving the site via Harvil Road.	Breakspear Road					<ul style="list-style-type: none"> The entrance / egress of the site and haul road that circles the waste material storage area (muck storage bins) will comprise an impermeable concrete slab. The haul road routed south the placement area will comprise course granular compacted materials. A visual inspection of haul routes ('housekeeping' and repair) will be undertaken at regular intervals during the day and recorded. Any shortfalls in 'housekeeping' will be identified and rectified promptly. Similarly, repairs will be arranged and implemented. Daily cleaning and suppression of dust on haul routes will be carried out using a road sweeper (7t or larger) and / or large capacity vehicle pulled (HGV), or driven, water bowser. Manual jet washes (estimated inventory of 4-6) and sweeping facilities will be available on site for cleaning of small/limited areas where access for larger road sweeper and vehicular water bowsers is limited / prevented. The frequency of cleaning during the day will be suitable for the purposes of suppressing dust emissions and preventing friable deposits on haul routes. All HGV road vehicles and NRMM leaving the site will use the automated wheel-wash facility. All vehicle wheels will be subsequently checked and if necessary be resent through the wheel wash for further cleaning prior to the site egress at Harvil Road. An automatic continuous real-time particulate monitor (PM10) (MCERTS indicative) will be installed and operational at the western site boundary towards the nearest sensitive residential premises (approx. 100m to the west of the storage bins area and immediately north of the topsoil storage area. The monitors have a site action level set at 75µgm-3 based on a 5-minute average, which if triggered will send an email alert to relevant site and project personnel and instigate cessation of work and investigation into the source of the 			

What do you do that can harm			Assessing the risk(Unmitigated)			Managing the Risk	Residual Risk(mitigated)		
Hazard	Receptor	Pathway	Probability of exposure	Consequence	What is the overall risk?	Risk management	Probability of exposure	Consequence	What is the overall risk?
						<p>trigger. Corrective action will be implemented before recommencement of site operations. The outcome of trigger alerts and investigation will be notified to EA, LB Hillingdon and HS2 as soon as practicable and within 48 hours. All monitoring data, trigger alert investigations and complaint investigations are reported on the www.gov.uk website.</p> <ul style="list-style-type: none"> • Movement of vehicles / NRMM around the site will be kept to the minimum reasonable for the effective and efficient operation of the site. • Drop heights from excavators to vehicles/NRMM involved in the transport of materials between stockpiles and road haulage vehicles or NRMM will be kept to the reasonably practicable minimum. • The number of handling operations of stockpiled waste materials will be kept to the minimum reasonably practicable. 			

Appendix A2 Visual Inspection Template

Appendix A3 Trigger Exceedance Log

Appendix A4 STA Facility Roof and Dust Sprinkler System

STA Facility Roof

The STA Facility is fully roofed with DESSA Flex PVC heavy duty (610 gsm) sheeting to support dust containment within the building.



Figure 1 – STA Construction – roof installation (May 2023)

Sprinkler System

The front of the facility building is fitted with a sprinkler system. Water is supplied by pipework running across the length of the entrance to the bays.

Mains water supply for dust suppression is available at all times. Mains water is used to ensure there is no risk of contamination to the sprinkler (misting) system.

The mounting and range of the sprinkler system is shown in Figure 2 below.

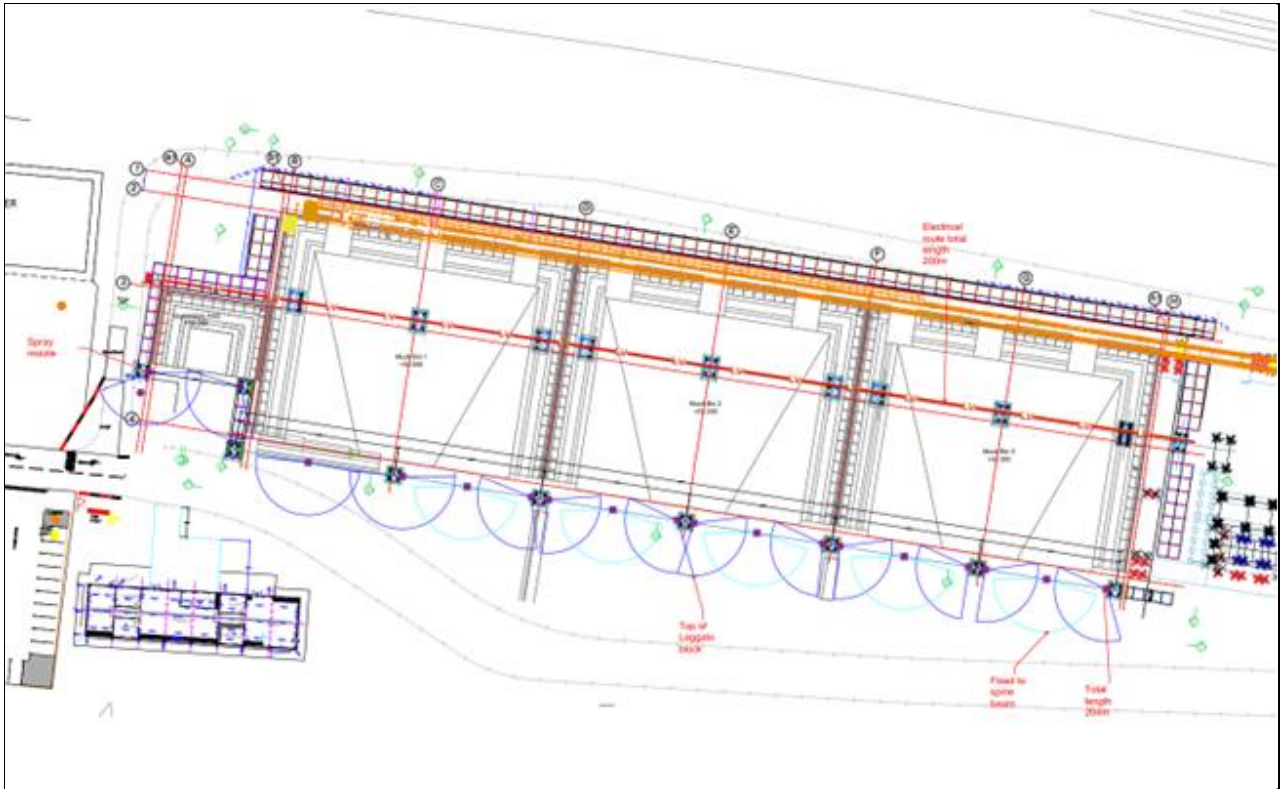


Figure 2 – Sprinkler System mounting and range

Operation of the Sprinkler System

A visual inspection of operations within and around the muck storage bin building will be undertaken by Site Supervisor or nominated representative at regular intervals during the day and recorded. Any shortfalls in 'housekeeping' and effectiveness of dust suppression, including the sprinkler system, will be identified and rectified promptly.

As detailed earlier within the body for the DEMMP, the waste will be clayey with a cohesive nature, with an estimated moisture content between 30-40%, and it is expected that much of this material will not in itself create significant dust arising. However, dust can arise from the physical operations associated with the transfer of waste. Typically, in and around the muck storage bin building this involves the movement of plant and machinery.

In the addition to the sprinkler system, daily cleaning and suppression of dust in the muck storage bin area will be supplemented using a road sweeper (7t or larger) and / or large capacity vehicle pulled (HGV), or driven, water bowser.

Furthermore, the haul road running parallel to the front of the facility building also has a sprinkler suppression system fitted in order to damp-down the haul road, again it use informed by the visual inspections.

Appendix B – Drawing References

Please see:

1MCo4-SCJ_SDH-LS-DGA-SSo5_SL07-711019

1MCo4-SCJ_SDH-LS-DGA-SSo5_SL07-711020

1MCo4-SCJ_EN-SKE -SSo5_SL07-650028

1MCo4-SCJ_EN-SKE -SSo5_SL07-650029

1MCo4-SCJ_EN-SKE -SSo5_SL08-000048