PARTICULATES RISK ASSESSMENT DORRINGTON QUARRY LANDFILL SITE AND NON-HAZARDOUS WASTE TREATMENT FACILITY

1. INVENTORY OF DUST EMISSIONS TO AIR

The main dust emissions to air from Dorrington Quarry landfill and the associated treatment by screening and crushing will be generated by the use of mobile plant and transport, ground works (such as inert recycling, engineered barrier lining works, and restoration activities) on site and to some extent the delivery of waste to the site and despatch of stone and soils from site. The majority of dust emissions will be area and fugitive emissions.

Bund Construction, Engineering Works and Restoration

Fugitive emissions of particulates will be generated during the construction of screening bunds, crushing and screening of soils, placement of the clay engineered geological barrier and restoration engineering works.

The closest cell construction and landfilling will be from houses will be approximately 25 metre from the permit boundary principally. The remainder of residential development and properties are currently over 50 metres from the recycling area and are generally upwind.

A tree-screening belt is well developed between D1,D2 and D3 and the site. All three sites also have gardens between the houses and the site.

The Company will operate a series of dust mitigation measures to reduce the potential for dust emission. A water bowser will be used when required to wet the excavated material and control dust during landfilling and used for damping down any wastes that are thought to need it in the recycling area. Drop heights can be controlled by matching appropriately sized excavator and dump trucks.

All crushers will be supplied with water for dust suppression. The Company proposed to consider “industry standard” matching for effective production with minimum environmental impact. The correct matching of machines will also help to prevent overloading of dump trucks and hence additional dust emissions.

Soil emplacement will be undertaken in phases on a localised basis with material brought from stock and spread using low ground pressure

machinery on the same day and in accordance with MAFF Good Practice for Handling Soils. Seeding will take place as soon as possible to bind the surface and prevent wind scouring from the bunds.

Landfill Operations

The main source of the potential dust emissions from these activities will be from inherently dusty dry soils imported to the site, waste placement, compaction and emissions covered waste surfaces and removal of the waste from Phase 1. The delivery of waste to the site will be via a paved fully concreted site access road to the edge of the landfill cells. Lorries are to be limited entering the site. A large proportion of the lorries will delivery waste directly to the recycling and treatment facility and this will significantly reduce the traffic travelling across the daily cover.

Small amounts of inherently dusty waste will be accepted at the site. This will include dry soils, foundry sands and some dry construction and demolition wastes. The majority of wastes are delivered in sheeted vehicles (under Duty of Care) and handled with care to minimise dust escape. The only emissions of dust which should take place therefore, if the waste is disturbed during blading out of the material during landfilling and compaction. Exposed clays and stockpiled restoration and cover materials could dry out during summer months and have potential to become windblown. This will be prevented by damping down periodically over the landfill and quarry using a tractor and water bowser, obtaining water from the surface water sump in the quarry.

All incoming wastes will be tipped for the majority of cases in the treatment area, however unsuitable inert wastes such as wet soils and soils with a high clay and silt content will be sent directly to active disposal area, spread and compacted by a landfill plant. The number of traverses the plant makes, and thus disturbance will be restricted to the minimum requirement (3-5 passes).

If the soil cover cannot be restored immediately then these areas will be watered and left inactive so a crust would form and seal the surface to wind blow-off. This measure will be highly effective for as long as vehicles do not traverse the compacted material and break the surface crust.

Inert Recycling Area

The main source of the potential dust emissions from these activities will be from inherently dusty wastes imported to the site, waste tipping and emissions from the crushing and screening and yard surfaces. Waste will be normally transported to the site in covered tipper lorries and skip type lorries.

It is anticipated that construction and demolition type waste and road plannings will comprise the main bulk of waste deliveries to the inert recycling area. The remainder will be a soils suitable for screening and recovery only. No waste will be putrescible. None of the materials are considered to have bio-aerosols, which would contain airborne endotoxins from bacteria and fungal spores, and thus the material is unlikely to cause breathing problems for on-site staff.

Small amounts of inherently dusty waste will be accepted at the site, primarily tipped directly into designated stockpiles then crushed and screened. This will include dry soils which will be screened only and construction and demolition wastes which will be crushed and screened. The majority of soils are delivered in sheeted vehicles (under Duty of Care) and handled with care to minimise dust escape. The only emissions of dust which should take place therefore, is if the material is disturbed during loading into the crusher or screener or for off-site removal. Stockpiles could dry out during summer months and have potential to become windblown. This will be prevented by damping down periodically.

The crusher is required to have dust suppression available to use at all times.

All incoming materials will be tipped in the active recycling and processing area.

Stockpiles

Long-term stockpiles of restoration material will be created within quarry. The stockpiles will comprise subsoil and topsoil and will not exceed 4 metres in height. These may be a potential source of dust.

Long-term stockpiles of soil making materials will be created within the treatment area footprint. The stockpiles will comprise subsoil, topsoil, 6F2, 6F5, and 20-40mm aggregates and road sub-base and will not exceed 4 metres in height. These may be a potential source of dust.

The operator will use conditioned on site clays for the geological barrier and liner material for the permit area.

A number of best practice measures will be implemented to keep the fugitive emission of dust to a minimum and to clean up any deposits that do occur:

- Stockpiles of different materials will be clearly delineated to avoid mixing and lightly tampered to confine moisture and seal against erosion;

- Stockpiles will be graded to minimise wind blown dust and normally be kept damp by the application of water in sprays, as and when necessary, but particularly during periods of dry weather. The operator will provide and maintain at all times an adequate supply of water for watering equipment on site.
- All long-term screening mounds retained for longer than one growing season will be seeded to grass and have fast growing tree species planted such as alder and silver birch at the earliest opportunity and adequately maintained for their active life.
- Location of stockpiles to take advantage of shelter from the prevailing wind. The operator proposed to retain for as long as possible stockpiles within the void in the inert recycling area set behind a large bund and this will be the last phase of infilling and is as far from residential properties as possible.
- This will reduce ground level wind speed and thus potential for dust emissions towards the Crooked House and the gypsy site.

Movement of Haulage Vehicles

The potential main long-term source of the potential dust emissions will be the movement of haulage vehicles and slave dump trucks across the site on the access road and temporary haul roads to the tipping face and working quarry areas.

The internal unpaved haul roads within the site extension and from the material excavation area could potentially be a significant source of dust, which may become entrained and distributed by passage of vehicles. Further general factors include (1) a continuous breakdown of the surface layer and potential dust emission via a passage of vehicles, (2) liberation of loose material during excavation works and on any haul roads by wind blow off and (3) loading and off-loading operations.

The most effective abatement measures for the control of fugitive dust on roads are good road design, layout, repair and maintenance, and cleaning. The following measures are proposed by the operator.

- The most regularly adopted, simple and effective method of reducing fugitive dust emission is by watering of haul roads during dry weather. Total suspended particular dust emissions could be reduced by up to 97% by the application of water to haul roads. The operator will provide sufficient bowser capacity on site at all times.
- A road sweeper will be available to regularly sweep the access road of excess dirt and debris. The wheel wash unit will be located adjacent to the site offices complex to remove dirt from the vehicles leaving the site.
- All operators vehicles will be fitted with upward facing exhausts and radiator cowl. The use of vehicles with upward

pointing exhausts and radiator cowls is moderately effective in reducing potential dust emissions.

- The design of haul roads will be undertaken to avoid sharp corners or steep gradients, which would encourage sharp braking. The layout of haul roads will be such to distance them from the sensitive receptors. Access to the active cells will be along a central core road, which will mean that haul roads are oriented as far as possible from residential housing.
- The regular grading of site haul roads removes loose material from the surface, it also increases fuel efficiency and minimises "wear and tear" on the vehicles and mobile plant. It is also a highly effective method of dust control as it removes loose debris and mud, one of the main potential sources of dust.

There are procedures for controlling fugitive emissions of dust from landfill operations and the relevant guidance will be adhered to. In determining their proposed abatement procedures the applicant consulted the procedures and practices recommended by the CIRIA, Site Planning Conditions, and their own operational procedures. The following Table 1 summarises the proposed dust mitigation measures.

Table 1: Summary of the proposed dust/bioaerosol control measures and estimate of effectiveness

Site Operation	Dust/bioaerosol control measures	Estimate of effectiveness
Cell construction	Water bowsers to be used as required and rain gun	High
and restoration	Avoid material handling during adverse weather conditions	High
	Reduction of drop height by matching sizes of excavator and dump tracks	High
Landfill operations	Water bowsers and rain gun to be used as required	High
	Progressive restoration minimises the area exposed to wind erosion	Moderate
	Drop heights to be minimised at all times	Moderate
	Avoid double handling of material	Moderate
	Restrict access to restored areas	High
Stockpiles	Stockpiles graded to minimise wind blown dust	Moderate
	Water sprays to be available for stockpiles	High
	Discharged heights to be minimised where practicable	Moderate
	Location of stockpiles to take advantage of shelter from wind	Moderate/High
	Long-term screening mounds graded and seeded to minimise wind blown dust	High
Haul & access roads	Optimise separation distances to sensitive receptors	High
	Water bowsers to be used as required	High
	Concreted site access road	High
	Installation of sprays within site infrastructure area and at entrance	High
	Use of road sweeper on concreted road	Moderate/High

	when required	
Site general	Continuous dust monitoring across the site	Moderate
	Weather information assessment	High
	Dust complaints response system	High
Inert Treatment operations	Water bowsers and or hoses to be used as required	High
	Drop heights to be minimised at all times	Moderate
	Avoid double handling of material	Moderate

2. LOCAL WEATHER AND POLLUTION POTENTIAL

Wind data was assessed from Shawbury in terms of wind pattern, and the wind roses which have been generated. It shows that overall south-westerly winds have high frequency and higher wind speed. These winds are associated with Atlantic cyclones and thus lead to both high winds and precipitation. Easterly and southerly winds are equally dominant during the cold part of the year (October – March), whereas south-westerly and north-easterly winds are more common during the warm season. Strong winds are common throughout the year, as well as variable and light winds (2m/s), which account for 25% of time, and 2.5% calm weather conditions. The annual average wind speed is 16 knots.

In terms of dust pollution the local wind pattern would expose some potential local receptors. The most sensitive to the prevailing winds are situated to the north and north east of the site development and permit footprint, principally DR2, DR3 and DR4.

Potential dust emissions will be reduced during low wind periods and rainy/west days. Based on data from Birmingham Airport on average there are 150 wet or rainy days per year. Therefore, dust emissions are suppressed for over 40% of days and the ground may remain wet for subsequent days. Generally light local winds (average 2m/s- 4 m/s) are below the critical wind speed at which dust becomes airborne, for most mineral dusts this is 5.6m/s. On average during 10% of time wind speed (average hourly, all directions) exceeds 5.6m/s marker, which promotes generation of dust. Overall, there will be few days a year when the ambient conditions (adverse wind speed and direction, coupled with dry weather) will favour the transport of significant dust from the landfill site towards the nearest receptors.

3. RECEPTORS TO DUST

Local Settlements

Dorrington Quarry is located 150 metres from the Dorrington and close to DR1, DR2 and DR3 on ESSD3. The ground surrounding the quarry is generally flat but rises to the south towards DR3 and DR6. The site

north, east and south east has sparse residential surroundings with the majority of properties located on the southern fringe. The site has a tree screen belt all around and soil bunds currently in place or proposed additional screening as part of the landfill development programme.

The closest properties to the application site are: north with the DR1 owned by the Evasons, DR2 and DR3 again well screened This is shown on Drawing ESID 2.

As potential receptors to the emissions from the landfill, and quarry site development these properties will be influenced by the local wind rose and the topography. The prevailing winds from south-westerly sector would blow any arising emission towards the IR1.

With respect to fugitive emissions of dust, properties are considered vulnerable within c.500m (the Department of Environment (DoE) publication 'Environmental Effects of Surface Mineral Workings (1991)') but the distance varies with local topography and prevailing wind. Severe impacts from dust are most likely, without mitigation, within 100m, but receptors can be affected at up to 250m. The nearest properties to the site are physically within 25 metres of the boundary.

DR1 is just to the north west of the inert recycling area.

Wildlife

The site is surrounded by trees. The results of the Habitat Survey concluded that flora and fauna associated with the land and its margins are typical of modern quarries and previously used for agriculture and has little nature conservation interest. The flora and fauna associated within the site exhibit greater diversity but do not contain any protected species or habitats.

The site is therefore not likely to have any impact on wildlife locally and

Fluvial Environment

The quarry, inert recycling area and landfill site within the tributary of the Cound Brook which flows between the inert recycling area and the landfill.

The fluvial environment has little potential for any major deposition and the brook is fast flowing and therefore any deposition would be quickly diluted and dispersed.

Highways and public rights of way

Traffic on the adjacent carriageway (A49) and users of a number of the site adjoining public paths may potentially be affected by fugitive emissions of dust, though these are to the north and south of the site. Vehicles use the A49 to gain access to the site.

4. AIR QUALITY AT LOCAL RECEPTORS

Shropshire County Council have completed the statutory Statutory Air Quality Assessments (an inventory of emissions to air in the Metropolitan Borough), based on the current and the DEFRA objectives for 8 main pollutants (SO_2, CO, NO_2, O_3, PM_{10}, lead, benzene,1,3-butadiene). The current ambient air quality for Oak Farm Quarry with regard to PM_{10} therefore accords with the NAQS objectives.

The national archive for the regulated pollutants has been obtained from the www.airquality.co.uk website for the purpose of this assessment.

Both current and the projected background concentrations of pollutants in the area are well below the National Air Quality Standards

The Council does not undertake any ambient air quality monitoring in the vicinity of the site. With the exception of dust nuisance caused by operations of site, ambient air quality at all local receptors is understood to be representative of that in urban areas.

5. RECEPTOR SENSITIVITY TO DUST

Dust management procedures have been designed for Dorrington Quarry treatment and inert landfill site to reduce the potential dust generation and the cause for nuisance. When properly implemented there will be residual fugitive emissions of dust from the site. The following receptors were identified as having medium to high sensitivity to emissions of particulates from the site development:

- DR1 Forest Hall Cottage - high risk on the grounds of its close proximity to the site boundary but is upwind of the site. The area has a dense thick tree line which will be retained and a large screen bund. Both help to significantly reduce potential impact. The potential dust issues are dealt with in the dust management plan.
- DR2 is between the landfill and inert recycling facility to the west and is upwind of the site..

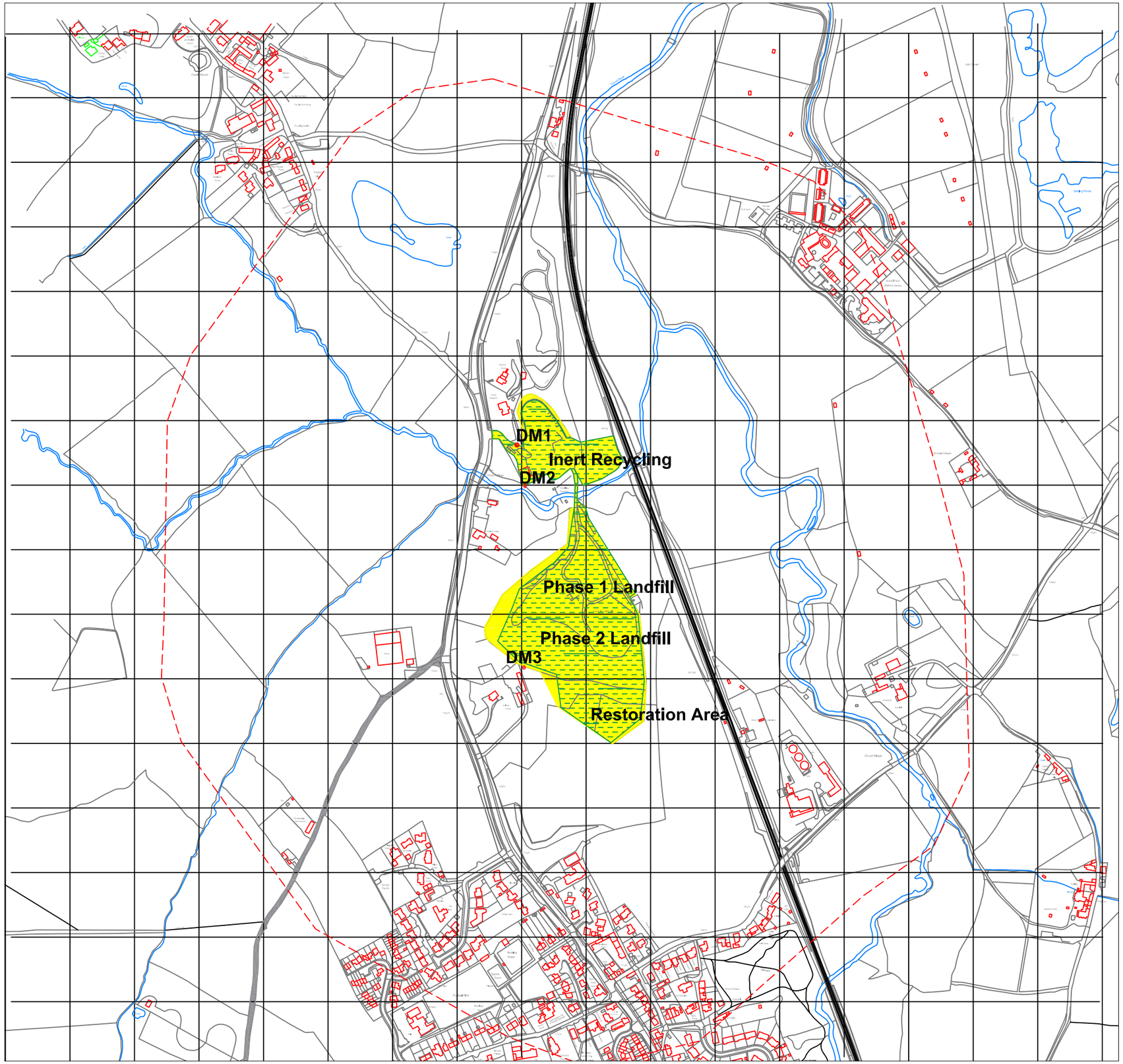
- DR3 is upwind of the landfill and has a large tree belt. The potential dust issues are dealt with in the dust management plan.
- DR6 Dorrington is also upwind of the site and has 100 to 200 metres of trees and grass .
- The remaining local receptors will be unlikely to be affected by dust soiling form the site due to such factors as their significant separation distance, upwind location in relation to the site and/or presence of dust screening features and have significant dust generation themselves from the local scrap yards, transfer stations and other operational landfill site.

6. PARTICULAR MATTER MANAGEMENT AND MONITORING

3 monitoring points have been proposed to cover DR1, DR2, and DR3 and DR6 and are shown on the attached drawing.

The proposal is for use of dust gauges of drop out type to be used twice per annum on a monthly basis. The benefits of the gauges are;

•Higher collection efficiency and considerably lower cost than the BS1747Pt1 deposit gauge
• Bird guard reduces risk of polluted samples from bird strikes
•Foam dust trap reduces sample contamination from falling leaves, etc. and prevents splash-out
•Large capacity collecting bottle will accommodate 120mm rain (240mm with the 10-litre bottle) and has wide neck permitting easy access for cleaning and removal of deposits.
•Tripod base, which can be spiked down, ensures stability on uneven surfaces
•Powder-coating and anodizing gives durability in hostile environments
• Bottle seal available for improved sample security



Legend

Permit Boundary

H Evason Landfill and Inert Treatment Facility

Client: **H Evason & Co**

Project: **Dorrington Quarry**
Dorrington,Shropshire

Title: Dust

CAD Ref:	Version:	Drawn by:	Scale:	Date:
EL/DQP/1	1	ARM	Plan 1:1500@A3	March 2021

ENVIROARM LIMITED

Drawing: **DP1**