

OPERATOR NAME

SITE NAME

SITE ADDRESS

**DUST & EMISSION
MANAGEMENT PLAN
(DEMP)**

VERSION NUMBER: X

DATE: DD MMM YYYY

Issue and Revision Record

Revision	Date	Originator	Checker	Company Approver	Description of Changes

DRAFTING NOTES:

1. Please note this is a draft document produced to support operators in producing a dust and emission management plan (DEMP) for a site with an Environmental Permit.
2. This template DEMP has been written with the activities of waste management sites in mind. However, the structure, content, practices and philosophy behind the document can be adapted to cover a much wider range of regulated activities with the potential for dust and particulate emissions.
3. It does not form a definitive dust and emission management plan and additional controls over and above what is included in this draft may be required depending on site specific issues.
4. You should not assume that using this format will automatically result in a dust and emission management plan being acceptable to your regulator and we wish to point out that the information provided is on a best endeavours only basis.
5. Red text is a prompt to help complete the DEMP and should be deleted once completed.
6. It was produced by the Environment Agency's Waste and Air Quality Working Group
7. This is **version 10** of the template DEMP which was released in October 2018.
8. To request the latest version of this DEMP template email; air.quality@environment-agency.gov.uk.

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1. Introduction

Introduce the site – assume the audience isn't aware of the site or the history.
What processes are waste materials subjected to?

Explain in layman's terms what the site does - be specific about the site activities but do not go into detail; does the site treat or sort waste, or is it just storage etc.

Include what local authority the site is in.

Is the site located in an Air Quality Management Area? You can check here: <http://uk-air.defra.gov.uk/aqma/>

If so what is the Air Quality Management Area declared for? PM₁₀/NO₂/SO₂

Be up front – without any abatement controls does the site have the potential for dust and/or other emissions to be generated?

Has the site infrastructure been designed to reduce emissions or has it evolved over a number of years as the business develops?

Does the site's planning permission require any infrastructure or special controls to prevent dust and other emissions?

Explain why you are creating this document – have you been asked to do this in response to complaints or is it an annual review or has your Environment Agency site officer requested it?

What is the purpose of this document?

How does this DEMP fit into other documents/management systems?

Remember that this document should be written so that operational staff at the site can use it and must have access to refer to it. State here who the audience is for this document and where it can be found.

1.1 Sensitive Receptors

List the receptors close to the site which may be impacted by dust and other emissions such as Nitrogen Dioxide from combustion sources (generators, mobile plant and road vehicles).

Normally this is up to a 1000m range of the site.

Consider using a map to show the locations you are referring to.

Out of the receptors which of these are sensitive?

(Sensitive receptors include, but are not limited to, environmental habitat site, hospitals, schools, protected species sites, childcare facilities, elderly housing and convalescent facilities. These are areas where the occupants are more susceptible to the adverse effects of exposure to high levels of dust and particulates.)

You must also consider the amenity impact of dust and other emissions within the 1000m radius of your site. Do not forget to consider clean industry and manufacturing processes such as, but not limited to, powder coaters and paint shops, offices, diesel generators, busy roads, power stations, food manufacturing and food outlets, agricultural land, the location of solar panels or air conditioning systems in the near vicinity, and areas of car parking.

Why do you consider them a sensitive receptor?

What are the distances of the sensitive receptors from the site boundary?

Tabulate the closest dust and other emissions sensitive properties to the site boundaries in Table 1.1.

Are there any factors that might mean a receptor further away needs to be considered in greater detail?

Are there any factors that might mean a receptor close to the site should not be considered a receptor? (Factors to consider can include the local geography, other local sources of dust and particulates (which can be added to Table 1.2))

Use a wind rose from a local weather station to bear consideration to these sensitive receptors. Is this a suitable weather station to use, does the local geography and topography have similar resemblance to the waste site - will conditions at the site be an honest reflection of the data received at that weather station? Insert wind rose diagram into figure 1.2 below.

Insert map showing the location of local sensitive receptors here.

Make it clear where there are.

Include a north arrow.

Centre the map on the site.

Include a scale.

Consider using <http://magic.defra.gov.uk> to create your map

Figure 1.1: Nearby Sensitive Receptors

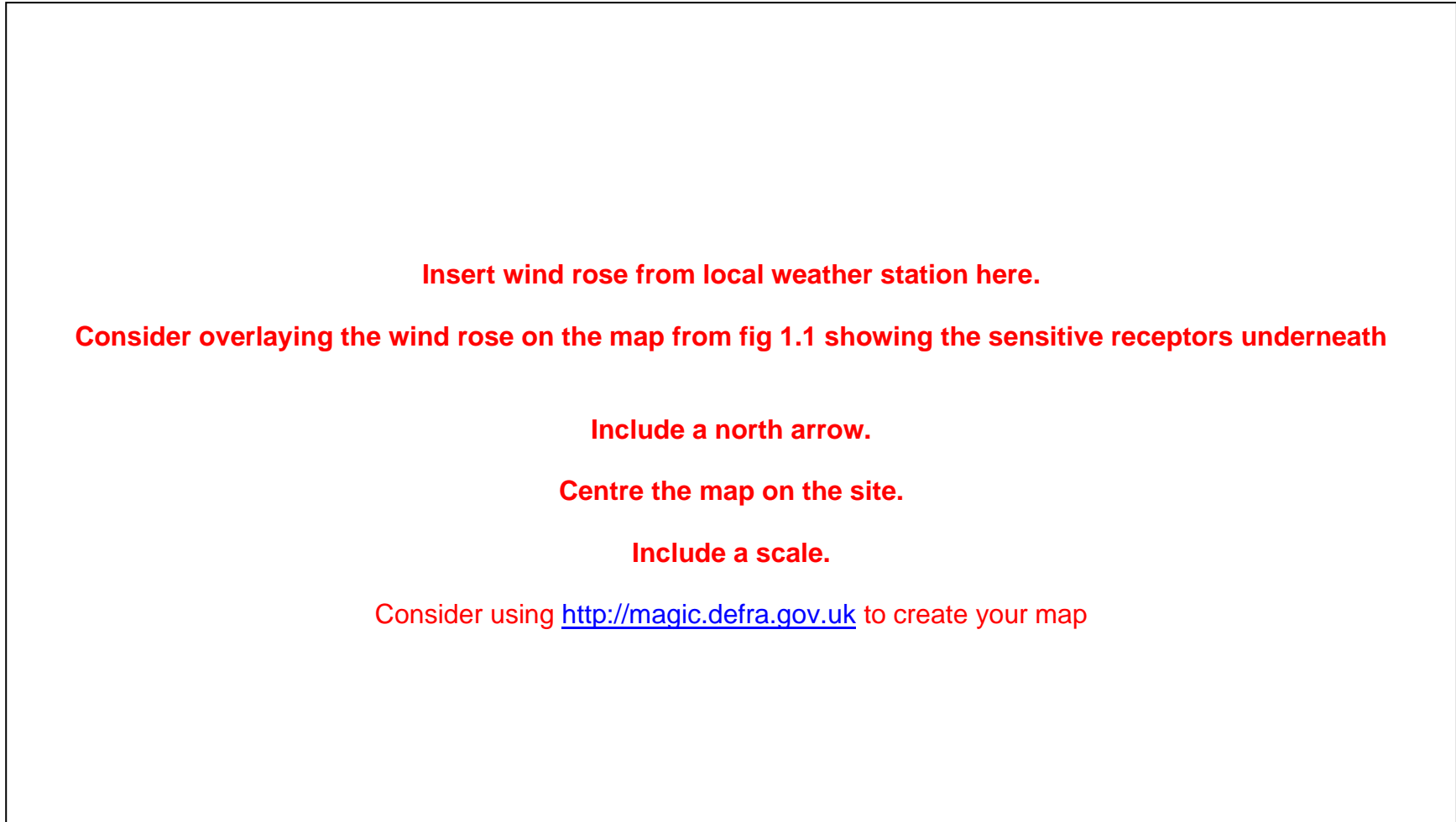


Figure 1.2: Wind rose showing the AVERAGE WIND DIRECTION AND STRENGTH at SITE NAME (edit to complete)

Table 1.1 Distances to Selected, Representative Sensitive Locations

Boundary	Closest property	Approximate distance to SITE NAME site boundary (m)
East	Houses on London Lane	50
West	Residential care home on Sheffield Street	53
West	School on Aberdeen Avenue	83
West	Nursery on Coventry Close	69
West	Local wildlife site on Sheffield Street	55
West	Sheltered accommodation on Romford Row	160
South	Site of Special Scientific Interest on Midland Mews	350
South	Public Park and playground on London Lawns	182
North	Clear View Primary School	480
North	Clear View Nursing Home	290
South	An NHS Trust Hospital	133
South	A Train Station	172

Table 1.2 Sources of Dust and/or other Emissions

Company	Address	Type of Business	Distance from SITE NAME site boundary (m)
Dusty Dave's Skips	London Lane	Waste Transfer Station	215
Smokey Joe's Bus Company	Barron Street	Bus Company	112
	North of London Lane	Busy Railway Line	114
John's Builders Merchants	Junction of Old Lane and Good Street	Builders Merchant and Timber Centre	90
Pour it concrete	Good Street	Concrete Batching Plant	500
Crushing Dreams	Barron Street	Aggregate Recycling	314
Metal R Us	Scrap Street	Scrap Metal Site	157
	Barron Street	Major Trunk Road	256
Smokey Power	Power Station Road	Power Station	700

2. Operations at **SITE NAME**

2.1 Waste Deliveries to **SITE NAME**

How is waste delivered to the site? (Road/rail/canal)

What kind of vehicles?

What are the emission rating of the vehicles (Euro 5/Euro 6)?

What kind of containers? Are they sealed or covered?

Do certain types of waste get delivered in certain type of vehicles?

What records are kept?

Are customers / vehicle drivers provided with any special instructions about dusty loads?

Set out in table 2.1 below the handling/processing of different waste streams at your site

2.2 Overview of Waste Processing, Dust, and Other Emission Controls

Provide some detail of the site layout. Using figure 2.1 below show the site infrastructure, location of buildings, loading and unloading areas, storage bays, fixed plant (such as trommels, shakers, conveyors, crushers etc), locations of mobile plant, locations of suppression systems and nozzle heads (including their arc coverage area), wheel washes, different types of site surface (if applicable), etc. Consider using more than 1 site plan if one plan becomes too complex or busy.

Use drawings, flow charts or photos to illustrate what areas of the site you are talking about.

Don't forget to give detail about the heights of walls as they can be very effective at disrupting wind flow over the site. Waste should be kept at-least 0.5m below the top of the wall height and consider using a painted line on walls to give a visual indicator to operational staff to meet this requirement. Waste storage bays should face away from the prevailing wind directions so that it reduces wind-whipping of stockpiled material.

What is the site surface? Concrete is easy to clean and prevent dust and particulate generation where as hard standing/tarmac is a source of dust and particulates itself.

Don't for get to include generators, biomass combustion and mobile plant.

Insert site layout plan showing the various areas used by the site to process the different types of waste.

Figure 2.1: Site Layout Plan

Explain which parts of the site do what. Go into detail here about the site activities and where they happen on the site.

Have consideration to the site layout. Is it design to limit double handling as much as possible and minimise disturbance of the wastes?

This section should aid the operator to think about the source- pathway- receptor model, and designing the site or the site abatement to minimise the contact between source and wind/ dispersion as much as possible.

Give detail of how the infrastructure is designed to prevent dust and particulate emissions. Don't forget;

- Doors on buildings/bays
- Water based dust suppression systems and where they target. (Plot the arc coverage of the dust suppression system so you identify what areas need further dust suppression.)
- Give details about the type of suppression system used and the nozzle head type. Bear in mind that mist sprays are useful for point source suppression but not very effective for site boundary suppression. The agricultural spray type nozzle head deploys large droplets of water and are good at covering a large area and keeping areas damp.
- Wind screening around stockpiles
- Covered conveyors and picking stations

2.3 Mobile Plant and Equipment.

Nitrogen Dioxide gas is a by-product of internal combustion engines and the site uses several items of plant with internal combustion engines. The following table lists the type, mobile and emission ratings for the mobile plant and equipment used on site:

Description	Make	Model	Emission Rating
Loading Shovel	Caterpillar	996G	Tier 3a
Generator for trommel	Cummins	C90D5	Tier 3b

Are they leased, hired or owned?

Explain the maintenance schedule used to keep the plant running. If it is different from the manufacturers specification explain why.

What is the replacement strategy? Are replacements the lowest emission standard possible at the time of purchase?

Is ultra-low/low sulphur fuel used?

What controls are in place to reduce emissions? Eg; Anti-Idling campaigns.
To learn more about emission ratings for non-road going mobile machinery visit this website – www.nrmm.london

3. Dust and Particulate (PM₁₀) Management

3.1 Responsibility for Implementation of the DEMP

Who is responsible for the DEMP and making sure it works?

Who is this person's deputy?

How often is it reviewed?

How are the staff competent to implement the DMP and review it?

Have they been given any special training for this job?

Who delivered the training?

Is there any refresher training given? If so how often?

3.2 Sources and Control of Fugitive Dust/Particulate Emissions

Sources

Detail all the operations at **your site** that have the potential to produce dust and particulates.

Examples include:

- Vehicles entering and/or leaving the site with mud on wheels, and tracking dust on to or off the site.
- Debris falling off lorries which arrive uncovered.
- Vehicles and plant moving around the site kicking up dust
- Road vehicles tipping waste
- Excavators/360s sorting waste
- Plant sorting waste – trommel screeners
- Plant treating waste – shredders, crushers etc
- Waste dropping from conveyors into bays
- Waste stored in bays – consider wind-whipping on the surface of the waste
- Site surfaces (not just the ground include around plant and equipment)
- Loading waste materials back on to vehicles.
- Particulate emissions from the exhaust of vehicles/plant/machinery on site.
- Generators, plant and other non-road going mobile machinery.

Make sure you detail how you intend to break the source-pathway-receptor model for each of these sources.

The pathway for the majority of the releases is atmospheric dispersion; either primary from the dust/particulate source (e.g. wind whipping of stockpiles) or after tracking onto the public highway on the wheels of vehicles. Detail the source-pathway-receptor routes in a table. Bear in mind the topography of the site and surrounding area, as the site may experience local 'fetch' and wind tunnelling that differs from weather station data. It is up to the operator to determine the local wind and ensure that the abatement takes consideration of this.

Also consider local sources of wind generation/ dispersion, from the likes of downward facing exhausts or blow off valves, vehicle movements (low speed limits), and fans from blowers on plant.

Controls:

Make sure you clearly explain what you will do if the controls fail. (Normally this is to cease operations and inform your regulator.)

Use table 3.1 below to demonstrate the source pathway receptor model for your site.

Use table 3.2 below to list what control methods you will use at your site

Table 3.1: Source-Pathway-Receptor Routes

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	Choose from table 1.1 above	Visual soiling, also consequent resuspension as airborne particulates	Remove mud before vehicles leave site. Long haul road ensures residual mud drops off before vehicle reaches public highway but there then is a need for a road sweeper to be on site every day
Debris	falling off lorries	Choose from table 1.1 above	Visual soiling, also consequent resuspension as airborne particulates	Cover lorries before leaving site. Long haul road ensures residual mud drops off before vehicle reaches public highway but there then is a need for a road sweeper to be on site every day
Tipping, storage and sorting of wastes in the open	Atmospheric dispersion	Choose from table 1.1 above	Visual soiling and airborne particulates	Minimise source strength by means of low drop heights, profiling and shielding of piles from wind whipping, positioning sources away from receptors. Also wetting of certain materials (not plasterboard)
Tipping, storage and sorting of waste inside buildings	Escape from buildings and subsequent atmospheric dispersion	Choose from table 1.1 above	Visual soiling and airborne particulates	Maximise containment, open doors only for entry of vehicles. Direct doors away from most sensitive receptors. Minimise source strength by misting/water/barrier techniques.
Vehicle exhaust emissions	Atmospheric dispersion	Choose from table 1.1 above	Airborne particulates	Regulatory controls and best-practice measures to minimise source strength
Non road going machinery exhaust emissions	Atmospheric dispersion	Choose from table 1.1 above	Airborne particulates	Regulatory controls and best-practice measures to minimise source strength

Table 3.2: Measures that will be used on site to control dust/particulates (PM₁₀) and other emissions

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
Preventative Measures			
Enclosure within a building	Creating a solid barrier between the source of dust and particulates and receptors is likely to be the most effective method of control, provided that the building entrances and exits are well managed.	<p>Very effective despite costs and the high potential for disruption to already operational sites.</p> <p>New sites are strongly recommended to fully enclose from the outset.</p> <p>This is a required 'standard design feature' by Office of the Deputy Prime Minister (ODPM) guidance.</p> <p>If your site is in a London Borough you are likely to be required to fully enclose your activities in a building.</p> <p>If your site is in a sensitive location then you are likely to be required to fully enclose your activities in a building.</p> <p>Ensure that procedures are in place to manage the building and its integrity.</p>	<p>Will this be used all the time the site is operational?</p> <p>If not explain what will trigger the use of this abatement measure.</p> <p>Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on?</p> <p>Are there any limitation to this abatement measure?</p>
Negative pressure extraction	Within enclosed buildings, controlled extraction can be undertaken to ensure a constant negative pressure relative to the outside air. This system should prevent the emission of particulates from any openings in the building. Extracted air should be treated through a suitable filtration system prior to discharge to	<p>Very effective.</p> <p>Reduces H+S risks for staff working on site</p> <p>Operational costs need to be considered.</p>	<p>Will this be used all the time the site is operational?</p> <p>If not explain what will trigger the use of this abatement measure.</p> <p>Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on?</p> <p>Are there any limitations to this abatement measure?</p>

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
	atmosphere. This method is more frequently applied for odour control.		
Dust Extraction Systems	A large variety of abatement technologies exist for the removal of dust and particulates from a flowing gas and have typically been applied to combustion plants and other sites where controlled emissions of particulates occur. These include Electrostatic Precipitators (ESPs), wet scrubbers, baghouses (bag filters), viscous media (e.g. oil) filters and gravitational settling. Although not all of these may be appropriate for dust and particulate suppression at waste management sites, and they cannot be applied to controlling external fugitive emissions, they may be effective when coupled with local exhaust extraction, ventilation or negative pressure extraction systems from enclosed buildings to remove dust and particulates from the airstream.	Very effective despite costs and potential disruption to already operational sites. Operational costs may be prohibitive. Should be identified clearly in the site management system and implemented as appropriate measures. Note: sites in Air Quality Management Areas are finding this the only effective way to control dust and particulate emissions so point sources at waste transfer stations are becoming more common now. The proliferation of enclosed “super” waste transfer stations makes this even more pertinent	Will this be used all the time the site is operational? If not explain what will trigger the use of this abatement measure. Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on? Are there any limitations to this abatement measure?

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
Site / process layout in relation to receptors	Locating particulate emitting activities at a greater distance and downwind from receptors may reduce receptor exposure, provided that emissions from the source are not dispersed over significant distances.	<p>May be worthwhile in combination with other measures to reduce dust and particulate generation.</p> <p>If at all possible discuss at pre-application and prior to site design if the activity is known to be cause lots of dust and particulates.</p> <p>For existing sites this will require the operator to think about moving the site around or proposing temporary areas in inclement weather.</p>	<p>Will this be used all the time the site is operational?</p> <p>If not explain what will trigger the use of this abatement measure.</p> <p>Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on?</p> <p>Are there any limitations to this abatement measure?</p>
Site speed limit, 'no idling' policy and minimisation of vehicle movements on site	Reducing vehicle movements and idling should reduce emissions from vehicles. Procurement policy to only purchase clean burn road vehicles and non-road going mobile machinery. Enforcement of a speed limit may reduce re-suspension of particulates by vehicle wheels.	<p>Easy to implement as part of good practice.</p> <p>Should be identified clearly in the site management system and implemented as appropriate measures.</p>	<p>Will this be used all the time that the site is operational?</p> <p>If not explain what will trigger the use of this abatement measure.</p> <p>Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on?</p> <p>Are there any limitations to this abatement measure?</p>
Minimising drop heights for waste. Use of enclosed chutes for waste drops/end of	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.	<p>Relatively easy to implement at many sites.</p> <p>These steps should be identified clearly in the site management system and implemented as appropriate measures.</p>	<p>Will this be used all the time that the site is operational?</p> <p>If not explain what will trigger the use of this abatement measure.</p> <p>Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on?</p>

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
conveyor transfers and covered skips / storage vessels.			Are there any limitations to this abatement measure?
Good house-keeping	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.	Easy to implement and requires minimal equipment. Encourages a sense of pride and satisfaction amongst the staff which promotes vigilance and a positive culture. Staff should target the areas not caught by the road sweeper and other cleaning apparatus. Details on the frequency, job roles and areas covered should be documented here.	Will this be used all the time the site is operational? If not explain what will trigger the use of this abatement measure. Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on? Are there any limitations to this abatement measure?
Sheeting of vehicles	Prevents the escape of debris, dust and particulates from vehicles as they travel.	Relatively easy to implement at many sites. Should be identified clearly in the site management system and implemented as appropriate measures.	Will this be used all the time the site is operational? If not explain what will trigger the use of this abatement measure. Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on? Are there any limitations to this abatement measure?
Hosing of vehicles on exit	May remove some dirt, dust and particulates from the lower parts of vehicles although likely to be less	May be worthwhile where wheel wash installation is not feasible, or where the wheel wash does not achieve the desired outcome.	Will this be used all the time the site is operational?

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
	effective than a more powerful wheel wash.	This should be in the site procedures and training. If the action works as a control measure, then consideration must be given to installing a wheel wash as the appropriate measure.	If not explain what will trigger the use of this abatement measure. Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on? Are there any limitations to this abatement measure?
Ceasing operation during high winds 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.	Likely to reduce dust and particulate emissions, however, not a long-term solution. Procedures should be in place to identify when operations will cease. May require a weather station to be installed.	Will this be used all the time the site is operational? If not explain what will trigger the use of this abatement measure. Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on? Are there any limitations to this abatement measure?
Installed wheel wash	Provides a high pressure wash of vehicle wheels and lower parts (including under body) using a series of jet sprays. More effective if vehicles drive through the wheel wash slowly in order that there is sufficient time for dirt to be removed.	Proven results where wheel wash is well designed and vehicles drive through slowly on entry and exit. Should be identified clearly in the site management system and implemented as appropriate measures. The range of wheel wash technology is rather large and to avoid any knowledge gaps, this section should detail specifics about the wheel wash. Consider using photos to assist. You should consider the placement and	Will this be used all the time the site is operational? If not explain what will trigger the use of this abatement measure. Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on? Are there any limitations to this abatement measure?

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
		positioning of the wheel wash in this document too along with contingency plans for downtime or breakdown.	
Easy to clean concrete impermeable surfaces	Creating an easy to clean impermeable surface, using materials such as concrete as opposed to unmade (rocky or muddy) ground within the site and on site haul roads. This should reduce the amount of dust and particulate generated at ground level by vehicles and site activities.	Considered good overall based on dust and particulate reduction but potentially costly and disruptive to retrofit. For sites that have concrete surfaces ensure there are maintenance and cleaning procedures in the management system and they are implemented.	Will this be used all the time the site is operational? If not explain what will trigger the use of this abatement measure. Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on? Are there any limitations to this abatement measure?
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.	Likely minimal return on potentially costly layout changes. The amount of waste that can be managed on site without causing dust and particulate pollution should be identified in the management system and may have to be reduced if it is considered an appropriate measure.	Will this be used all the time the site is operational? If not explain what will trigger the use of this abatement measure. Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on? Are there any limitations to this abatement measure?
Reduction in operations (waste throughput, vehicle size,	Reducing the amount of activity on site, including no tipping, shredding, chipping or screening of high risk loads during windy weather as well as associated traffic movements should result in reduced emissions and re-	Effective in terms of dust and particulate reduction but unlikely to be popular/implemented by operators. It may be the only option when other steps fail. Ensure the site has procedures to reduce activity on site if required through complaints or known	Will this be used all the time the site is operational? If not explain what will trigger the use of this abatement measure.

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
operational hours)	suspension of dust and particulates from a site.	issues, or adverse weather conditions. This may include installing a weather station to alert the site to windy weather and when they need to reduce agreed activities.	Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on? Are there any limitations to this abatement measure?
Remedial Measures			
Netting / micro netting around equipment	Erecting netting around equipment that could give rise to large amounts of dust and particulates may be effective within the site boundary and prevent their dispersion off-site / their re-suspension within the site.	Reduces wind speed across the site which indirectly controls the potential for dust and particulate emissions. Maintenance should be covered in the management system and procedures. Effective for use as litter netting, but not for stopping dust from leaving the site boundary.	Will this be used all the time the site is operational? If not explain what will trigger the use of this abatement measure. Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on? Are there any limitations to this abatement measure?
On-site sweeping	Sweeping could be effective in managing larger debris, dust and particulates but may also cause the mobilisation of smaller particles. Road sweeping vehicles damp down dust and particulates whilst brushing and collecting dust and particulates from the road surface, particularly at the kerbside.	Easy to apply but less effective than other measures. Should be covered in the management system and procedures and implemented thoroughly. Be specific and consider including photos of the apparatus. The range of roadsweeping equipment is very broad and you should detail what is being used.	Will this be used all the time the site is operational? If not explain what will trigger the use of this abatement measure. Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on? Are there any limitations to this abatement measure?

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
	This may generate dust and particulate movement that may become a Health and Safety issue if the filters and spray bars on the sweepers are not maintained.	<p>We would expect to see training procedures to ensure that staff are clear on what needs to happen and when.</p> <p>We would expect to see maintenance schedules detailing when consumable items on road sweepers are replaced (Filters, brushes etc).</p>	
Site perimeter netting / micro netting	Erecting netting around the site perimeter may capture released debris and dust and particulates prior to it being dispersed off-site.	<p>Reduces wind speed across the site which indirectly controls the potential for dust and particulate emissions.</p> <p>Maintenance should be covered in the management system and procedures. Can look untidy and dirty creating negative impression of the facility. Not very effective at reducing dust and emissions from leaving the site boundary.</p>	<p>Will this be used all the time the site is operational?</p> <p>If not explain what will trigger the use of this abatement measure.</p> <p>Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on?</p> <p>Are there any limitations to this abatement measure?</p>
Water suppression with hoses & water jets	Damping down of site areas using hoses can reduce dust and particulate re-suspension and may assist in the cleaning of the site if combined with sweeping.	<p>Quite water intensive. Can reduce the calorific value of the material which should be considered if sent for energy recovery/biomass type operations.</p> <p>Maintenance should be covered in the management system and procedures.</p>	<p>Will this be used all the time the site is operational?</p> <p>If not explain what will trigger the use of this abatement measure.</p> <p>Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on?</p> <p>Are there any limitations to this abatement measure?</p>

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
Water suppression with mist sprays	Installation of mist sprays around sites, at building entrances/exits and within buildings at point source emissions like conveyors, trommels etc. It can also assist in the damping down of dust and particulates, therefore, reducing emissions from site.	Very effective at controlling point source emissions of dust and particulates. Can be installed to conveyors and areas where waste is dropped. 'Halo' rings can be fitted to conveyor drops on concrete crushers and screeners to minimise dispersion. Not effective for use at site boundaries. Uses less water than water bowser Maintenance should be covered in the management system and procedures.	Will this be used all the time the site is operational? If not explain what will trigger the use of this abatement measure. Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on? Are there any limitations to this abatement measure?
Water suppression with bowser	Using bowzers is a quick method of damping down large areas of the site with large water jets. This method could also be used on easy-to-clean, impermeable concrete surfaces.	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. Can reduce the calorific value of the material which should be considered if sent for energy recovery/biomass type operations. Maintenance should be covered in the management system and procedures.	Will this be used all the time the site is operational? If not explain what will trigger the use of this abatement measure. Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on? Are there any limitations to this abatement measure?
Dust and particulate monitor with trigger alarm	Installation of a dust and particulate monitor with specified alarm trigger level can alert site staff when short-term particulate concentrations are	Worthwhile installing as a real-time tracker of dust and particulate concentrations. Helpful to monitor environmental performance and	Will this be used all the time the site is operational? If not explain what will trigger the use of this abatement measure.

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
	<p>elevated in order that site practices can be reviewed or application of mitigation measures increased.</p>	<p>also to track the effectiveness of improvements made at the site.</p> <p>It is important that the equipment is backed up by a suitable maintenance contract and initial capital costs, with maintenance is sub £10k for a suitable system.</p> <p>At multi-operator sites this kind of system can be used to demonstrate a specific site is not a source of dust and particulate pollution.</p> <p><i>Note - The alarm trigger isn't set in permit conditions as a "compliance limit" but by the operator in the Dust Management Plan as an "action level" to alert the operator that they may be generating dust. The operator should stop once the alarm sounds and if they believe they are the source then they should modify their operations and report to the EA. If the dust isn't coming from their operations then they should note it down and continue with their operations. Experience has shown us that a limit of less than 75 ug/m3 (over a 5 min average) for PM10 should be considered by operators initially and reviewed down after the system has been in place for some time. NOTE - Regulatory emphasis should NOT be placed on the exceedance but instead on the</i></p>	<p>Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on?</p> <p>Are there any limitations to this abatement measure?</p>

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
		<i>action the operator takes, if they are the source, to prevent a re-occurrence.</i>	
Shaker grids	Similar to cattle grids, these are installed at a site entrance and exit. The movement of vehicles over the grids shakes dust and particulates from the wheels, thus removing them before vehicles enter the site.	<p>Unlikely to be as effective and as thorough wheel washing. Work better for sites without impermeable surfaces where large amounts of mud need to be shaken off tyres and undercarriages. Must then be used in accordance with a wheel wash before exiting site onto the public highway.</p> <p>Maintenance should be covered in the management system and procedures.</p>	<p>Will this be used all the time the site is operational?</p> <p>If not explain what will trigger the use of this abatement measure.</p> <p>Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on?</p> <p>Are there any limitations to this abatement measure?</p>
Water Cannons	Water cannons provide a means for delivery of powerful water streams from a water truck. With variable nozzles, the spray pattern can be controlled and varied between jet and fog. Typical water flows are up to 5000 litres per minute. Water cannons are most often used for fire protection, mining operations, heavy machinery wash down, cleaning and dust and particulate abatement.	<p>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. Covers a large area in a short amount of time.</p> <p>Can reduce the calorific value of the material which should be considered if sent for energy recovery/biomass type operations.</p> <p>Should be identified clearly in the site management system and implemented as appropriate measures.</p> <p>Produces large amounts of run-off that need to be managed to prevent pollution.</p>	<p>Will this be used all the time the site is operational?</p> <p>If not explain what will trigger the use of this abatement measure.</p> <p>Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on?</p> <p>Are there any limitations to this abatement measure? Eg is there a limited power or water supply which might limit its use?</p>

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
Screening of buildings / reducing large apertures using plastic strips	Installing plastic strips to cover entrances/exits to buildings may reduce emissions of dust and particulates dispersing through doorways.	This is a well-established approach and works well in association with other measures e.g. hosing of waste and downward facing misters at building entrance. Reduces the encroachment of wind into the building and traps emissions on the inside. Vehicles can damage them and they do wear out over time. Sites could consider holding small supplies of spares. Maintenance should be covered in the management system and procedures.	Will this be used all the time the site is operational? If not explain what will trigger the use of this abatement measure. Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on? Are there any limitations to this abatement measure?
Application of CMA / chemical suppressant	Diluted Calcium Magnesium Acetate (CMA) or other chemical based dust suppressant is regularly applied by spraying using a back-pack applicator for small areas or by road sweeper to cover larger areas. CMA acts as a suppressant with the aim of reducing dust and particulate re-suspension and hence ambient concentrations.	Trials indicate this can be an effective process. It shouldn't be applied during rain and once applied it needs to be re-applied regularly. Works best when applied to clean surfaces, and can also be applied to stockpiles to form a 'crust' and reduce wind-whipping. Price and efficacy vary depending on the brand selected. Maintenance should be covered in the management system and procedures.	Will this be used all the time the site is operational? If not explain what will trigger the use of this abatement measure. Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on? Are there any limitations to this abatement measure?
Heavy Water	Heavy water is used to improve the compaction and stability and reduce dust and particulates on unsealed roads or areas of land. Ideally it is	Potentially useful but only for sites with large areas of unmade ground.	Will this be used all the time the site is operational? If not explain what will trigger the use of this abatement measure.

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
	<p>blended into the road construction material as the road is constructed, but where this is not possible it can be sprayed onto the top of the road. Heavy water combines fast acting wetting agents with polymer binders, to allow penetration deep into the material and to 'agglomerate' the dust and particles together.</p>	<p>Should be identified clearly in the site management system and implemented as appropriate measures.</p>	<p>Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on?</p> <p>Are there any limitations to this abatement measure?</p>
Foam Suppression	<p>The aggregate and mining industries frequently use foam suppression for the control of dust and particulate emissions, mixing the foam with broken material to increase efficiency. Foaming agents can be added to increase the efficiency of dust and particulate reduction. Foam suppression has seen increased attention in recent years and has previously been applied to waste transfer facilities where crushing of waste occurs. If using foam suppression to control dust and particulates from waste drops, the foam must be entrained within the waste material and as such must be</p>	<p>Potential to be useful at waste transfer sites. There is some evidence that this method is highly effective for controlling dusts and particulates on conveyor drops. Should be identified clearly in the site management system and implemented as appropriate measures.</p>	<p>Will this be used all the time the site is operational?</p> <p>If not explain what will trigger the use of this abatement measure.</p> <p>Are there any situations that this abatement measure will not be used or areas of the site that this won't be used on?</p> <p>Are there any limitations to this abatement measure?</p>

Abatement Measure	Description / Effect	Overall consideration and implementation	Trigger for implementation
	injected prior to dropping the waste rather than at the bottom of the drop.		

This is not an exhaustive list of all abatement options, and there may be other technology and abatement options that exist to achieve the same or a greater outcome in reducing the risk of pollution.

The table above is an exercise to make the connection between the pathway and receptor and source. It is to encourage the operator into thinking about how the abatement works, what options could be alternatively more suitable (and possibly cheaper and less intensive to operate regularly) and to go into specific detail about how the abatement works. This will encourage the operator and staff that use this document to not make any assumptions and to ensure that there are no gaps in abating the sources of dust emissions on site.

3.3 Other considerations

Water usage/ availability:

For sites that use water for suppression/ hosing/ wheel washes/ road sweeping, we require you to make an assessment of your water supply and drainage capacity. In order to provide water for all of the systems that rely on water for effect, you must calculate the usage for the worst possible scenario (dry and windy conditions for an entire operational day) to assess if you have the supply for your demand. If you do not, this is not an effective and appropriate abatement measure (water based systems).

In the event of a drought:

You are still required to abate fugitive emissions and not cause pollution, and those sites that rely heavily on water will be required to stop operating in those circumstances unless other means can be used, so as to not cause pollution. It may be worthwhile to plan for this in site and abatement design so that the business remains as flexible as possible and able to operate at all times, without causing pollution.

3.4 Enclosure of Waste Processing & Storage Areas

In England the Environment Agency has conducted considerable work to review the effectiveness of dust and particulate control measures that are currently available. It is expensive to fully enclose a waste management facility inside a building but there are significant long term savings to factor in when considering enclosing an operation. Some of the benefits of fully enclosure are detailed below:

Waste Weight	Enclosure keeps waste dry and therefore can reduce disposals costs significantly.
Water Saving 1	Enclosure can reduce water usage and therefore ensure waste operations continue during drought conditions when water based systems are not available.
Water Saving 2	Less water use will reduce your water bill significantly.
Water Saving 3	It can maintain a high calorific value for residual waste being sent to energy from waste.
Water Saving 4	If a roof water collection system is used you can reduce water usage even further.
Management Savings	It is much easier to control dust inside a building without wind affecting the emissions. It is a passive control measure and will work with limited staff and management oversight.
Odour & Noise Control	Buildings can also help control odour and noise.
Limited effectiveness of other abatement measures	There are numerous case studies available that show even with considerable investment in other abatement measures they are not as effective as a fully enclosed building.

As a result in England the Environment Agency will consider the enclosure of activities inside a building to be best available techniques especially if you are located inside an Air Quality Management Area or a London Borough.

The European BREF note on waste treatment strongly suggests the enclosure of activities that have the potential to give rise to fugitive emissions so if your site is an installation you may have to enclosure your activities at a later date.

You should use this section to explain what areas on your site are covered and which areas are not.

For areas not covered you should provide a justification why not or details on when you will enclose them. You may wish to include another site layout drawing to help with this.

3.5 Visual Dust Monitoring

Detail how you will carry out routine dust monitoring. This isn't something you should do after a complaint. This is your company being pro-active to ensure it isn't affecting local neighbours.

Are there set locations agreed around the perimeter of the sites that you visit as part of your routine dust monitoring?

Don't forget to include what happens out of hours. Is there an out of hours provision?

Don't forget small particles like PM10 and PM2.5 affect human health but they are not visible by the naked eye so if you see dust this will include an element of PM2.5 and PM10. It also means that if you don't see dust, there still might be high levels of PM10.

Do you recognise that certain activities are particularly dusty? (Crushing/screening/chipping/sorting) If you do, why not carry out additional routine monitoring at the times that these activities are operational?

How will you record the results of the monitoring?

If dust is detected how will you respond? Additional visual dust monitoring is a good starting point and if you get several complaints you could arrange some monitoring to be carried out.

If the additional measure you propose fail and dust continues to escape the site will you stop activities?

4. Particulate Matter Monitoring

The reliability of optical based particulate monitoring systems has increased dramatically and the cost has reduced as a result of competition. Systems should operate to a known standard to ensure they are reliable such as the Environment Agency's MCERTS standards.

It is important to understand that there are two forms of MCert standard.

There is the full MCert Standard that required instruments to perform to a relatively high level, it must have demonstrated considerable reliability, precision and accuracy.

There is also an "Indicative" form of MCerts where a reduced requirement of precision and accuracy are needed. Instruments that are given this form of certificate have demonstrated that they have an acceptable level of reliability and the data can usefully be used to gain an indicative understanding of dust concentrations.

In many situations where relative levels are more important than absolute levels indicative analysers are adequate.

Analysers

There are a wide variety of analysers on the market now, which range in price. There are a number of different techniques that the instruments use to measure the concentration of the particulate. The most common (and affordable) method uses a light scattering technique. These instruments include the highly regarded Defra MCerted analysers (cost ~ £25K) that are particularly accurate and reliable through to the more affordable indicative analysers (cost ~ £10K) with less accuracy. They all provide real-time data with a high temporal resolution (1-minute averages or smaller).

It is important to note with light scattering analysers that the instruments are actually directly measuring particle volume and the mass of the particle is calculated by making assumptions of the density of the particle material. In situations where the instruments are used to measure very light particles (i.e. wood dust) or very heavy particles (i.e. iron rich dust) the inaccuracy of the readings can increase.

Normally sites monitor for PM₁₀ particulates but if wood is stored and chipped on site it might be worth also monitoring for total suspended particulate (TSP) matter.

Such systems can allow operators to minimise their fugitive emissions but also, in urban areas, demonstrate that they are not the sole source of emissions. The

reduction in cost means it is possible to install a continuous monitoring system rather than relying on contractors to take samples over a short period of time which means the impact a site is having on local air quality is better understood.

If your site is in an Air Quality Management Area it is likely you will be required to install such a system.

REMEMBER – We recommend that data is collected on a 5 minute averaging period and that levels should be below **75µg/m³** for this period at the site boundary. In some cases this level may need to be lower depending upon how close the site is to sensitive receptors. All the time the emphasis is on making sure you update your way of operating the site to prevent a re-occurrence.

You should include details as to how often the equipment will be calibrated and who will do this.

We recommend that such monitors also record wind direction and wind speed to get the most value out of the PM data.

4.1 Monitoring Location

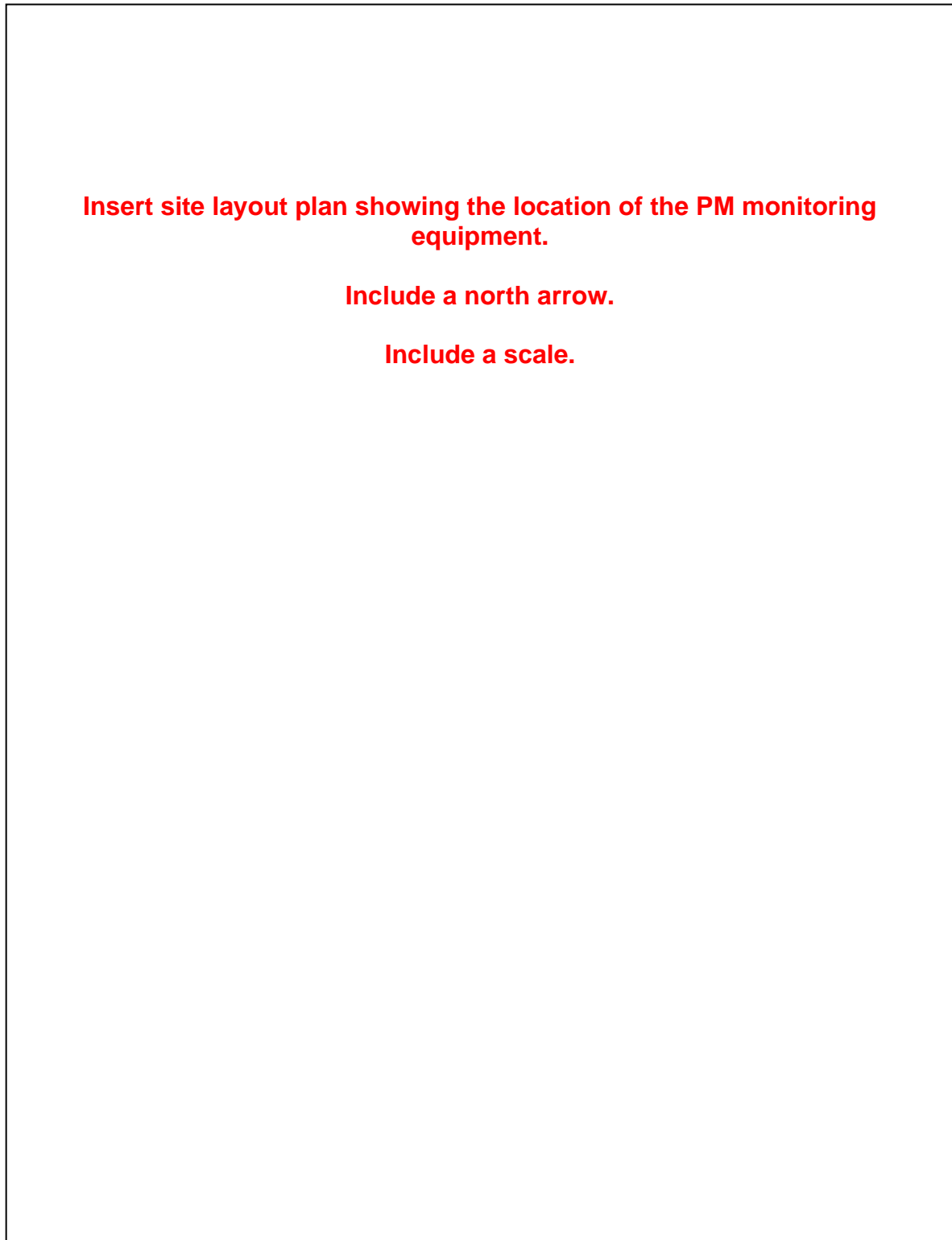
Describe the location of your monitor - In the UK the wind direction is most commonly from the south west to the north east so a monitoring location to the north east of a site is most likely going to collect the most useful and relevant data (depending on local topography and infrastructure).

Your site officer should be able to help you chose the best monitoring location for your site so you can collect the best data. They may ask for the national monitoring team to provide advice if the decision is not straight forward.

The inlet of the instrument should be at a height of 2m above ground and the wind speed and wind direction instruments should be located so they are not shielded by buildings and other obstructions (they do not necessarily need to be together).

The location of the monitor is shown in Figure 4.1 below.

Figure 4.1 Location of PM monitoring equipment at **Insert Site Name**



4.2 Operation of the PM Monitoring Equipment

Detail who is responsible for management *and* operation of the system

How the data is is looked at and presented?

Does your Environmental Permit require the data to be sent at certain times?

What “action level” will be used?

How are site supervisors made aware of high levels of particulates? Flashing light on the wall of the site office/Alarm (Consider noise nuisance before doing this!)

Are the data sets looked at to try and understand when and why higher levels occur?

Provide details on how you will review and improve your dust management measures using the results of the monitoring.

4.3 Quality Assurance/Quality Control and Record Keeping

Detail what records you will keep to ensure the system works correctly.

Consider recording;

- i) The make and model of the monitoring equipment
- ii) The serial number of the monitoring equipment;
- iii) When, how and by whom the data is checked
- iv) When the equipment is calibrated;
- v) How the equipment is calibrated;
- vi) Copies of the qualifications and training records of who carries out the calibration
- vii) When and by whom the equipment is routinely inspected;
- viii) If the equipment is damaged and/or no longer able to collect reliable data.

4.4 Equipment and Data Management

Who is responsible for the PM monitoring equipment?

Are they trained? If so provide details of their training.

Collection of data, filter and flow checks, and basic standard maintenance to keep the instrument running in good order are very important.

If the responsible person can't solve a problem who do they get support from?

4.5 Reporting of Data

Provide information on how you will report the data to the Environment Agency and how often.

Don't forget your Environmental Permit may require you to do this by a certain date so check your permit to ensure they don't conflict.

4.6 Additional Detailed Monthly Reporting

What happens when the level (We recommend $75 \mu\text{g}/\text{m}^3$ (as a 5-minute average)) is exceeded repeatedly? (A 5 minute average is probably the most appropriate resolution to use as activities on site won't get picked up if they are averaged over a longer period)

Consider carrying out a more detailed investigation in order to work out the source of the pollution, whether it be from dust/particulate sources on site (as listed in Table 3.1), sources of dust/particulates beyond the site boundary, background sources affecting the whole region, or more local sources.

5. Actions when alarm is triggered.

Provide a summary of what happens when the “action level” alarm sounds.

EXAMPLE –

The following actions are taken:

1. The Site Foreman assesses yard activities and the nature of the waste handling and deliveries immediately prior to the alarm being activated, to work out what has caused the alarm to be activated.
2. If the source cannot be ascertained with 100% confidence, the Site Foreman on duty suspends the **likely** dust/particulate generating activities, i.e. waste wood-shredding and tromelling.
3. If the source is within the site’s control, the Site Foreman on duty takes appropriate action in terms of dust/particulate abatement, to ensure that the alarm is not re-activated. This may take the form of the following;
 - (a) Investigating the source of the dust/particulates to prevent a re-occurrence.
 - (b) Suspending operations which are not being conducted using best-practice controls as set out in Table 3.1.
 - (c) Additional use of the dust abatement measures.
 - (d) Logging findings of a – c in the site diary, and also in the reporting template within the relevant appendix of the Environmental Permit.

If an effective abatement technique cannot be identified and implemented, and observed PM₁₀ levels remain above the action level for 6 consecutive, 5-minute mean readings (i.e. 25 minutes) concurrent with recorded wind directions suggesting that the source of particulate could be from the site activities, then operations should be suspended until measured PM concentrations drop below the action level of 75 µg/m³ for 6 consecutive, 5-minute mean readings.

In all cases, any new “lessons learnt” from the Site Foreman’s investigations are considered by the company directors and implemented into dust & particulate emission management plan (if not already included), to prevent a re-occurrence of the alarm.

The alarm is not the sole indicator of a dust event at the site; the continuous visual monitoring of potential dust sources and activities safeguard all play a very important part in managing dust and particulates.

6. Reporting and Complaints Response

Provide details on how the site will respond to complaints of dust and particulates.

Include a deadline of when you will complete an investigation into a complaint. Most sites normally allow themselves 2 working days to respond to complaint.

NOTE - Don't forget your Environmental Permit may require you to do specific things if you receive a complaint so check you don't contradict the permit.

6.1 Engagement with the Community

Provide details on how you will interact with neighbouring businesses/local residents.

NOTE - Being a good neighbour is important and can be very beneficial to a business. If your site is causing an impact on local residents/businesses make sure you keep them up to date on what you are doing to tackle the problems. If they think you aren't doing anything to respond to their complaints your relationship will quickly deteriorate.

6.2 Reporting of Complaints

Provide details on how you will report complaints.

Give details of what forms you will use, how you will provide feedback, how you will review them.

NOTE - Don't forget your Environmental Permit may require you to do specific things if you receive a complaint so check you don't contradict the permit.

6.3 Management Responsibilities

Provide details on how complaints are handled and by whom.

NOTE - Don't rely on the Environment Agency Incident Hotline as the only way for people to complain about your site. Consider circulating the site's telephone number to local residents/businesses so you can respond quickly to a complaint, or making the site email address and contact numbers visible from the site I.D. board near the site entrance, and on your website. In extreme cases you can also set up your own 24hr complaint line.

6.4 Summary

Quickly summarise this dust management plan and its objectives.

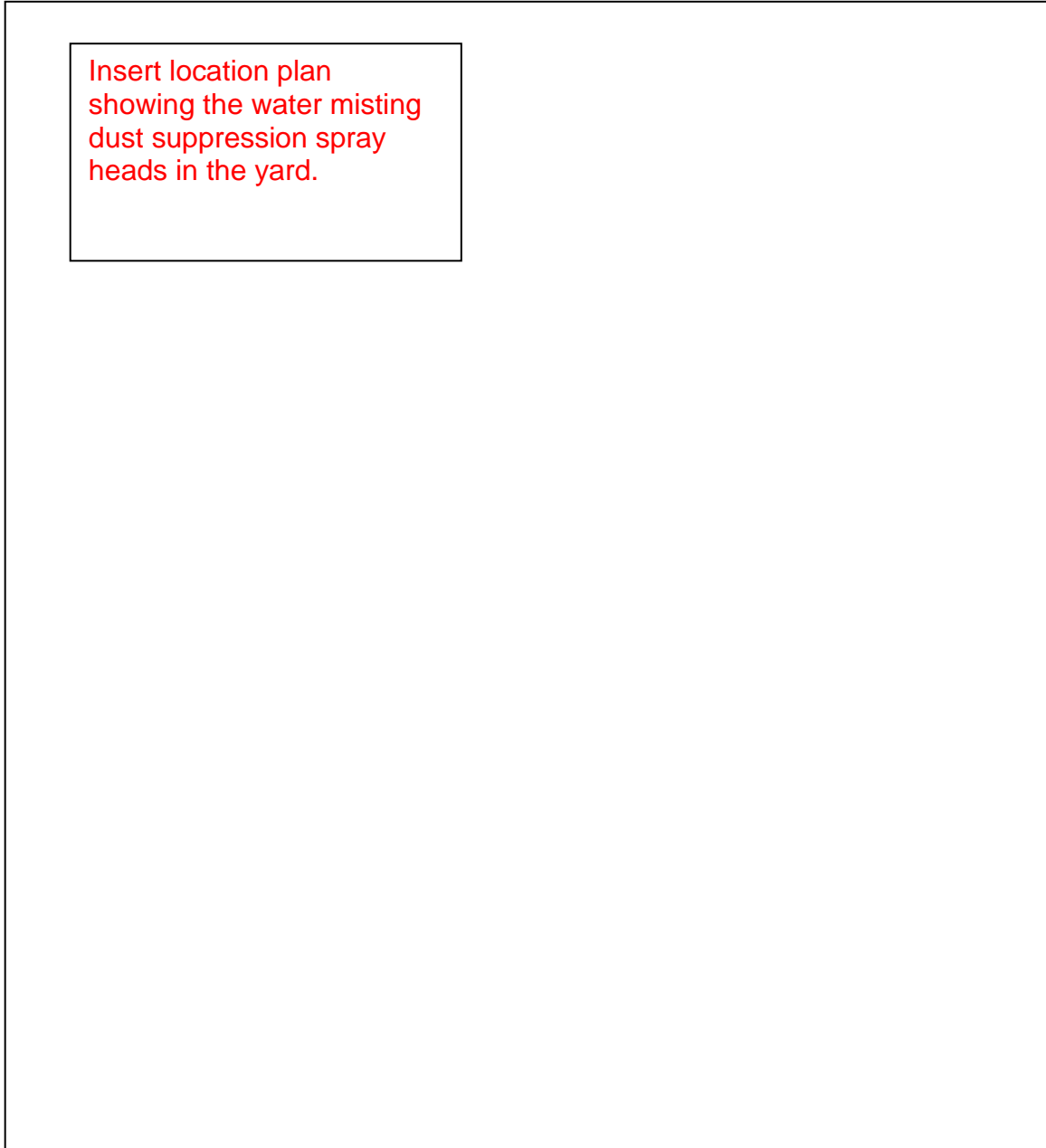
Provide details of how it will be reviewed to ensure it stays up to date.

APPENDICES

Appendix A - Location plans of dust and particulate suppression systems

Provide a site layout drawing showing the location and coverage of all the dust suppression systems on the site

Figure A1
Location plan showing the location and coverage of dust suppression systems



Appendix B - Dust Complaint Form

Customer Details	
Customer Name -	
Address -	
Postcode -	
Customer Contact Details -	
Tel -	
Email -	
Date -	
Complaint Ref Number -	
Complaint Details -	
Investigation Details	
Investigation carried out by -	
Position -	
Date & time investigation carried out -	
Weather conditions -	
Wind direction and speed -	
Investigation findings -	
Feedback given to Environment Agency and/or local authority -	
Date feedback given -	
Feedback given to public -	
Date feedback given -	
Review and Improve	
Improvements needed to prevent a reoccurrence -	
Proposed date for completion of the improvements -	
Actual date for completion -	
If different insert reason for delay -	
Does the dust management plan need to be updated -	
Date that the dust management plan was updated -	
Closure	
Site manager review date	
Site manager signature to confirm no further action required	