



Considerate Constructors Scheme

Construction dust and air quality

Introduction

A significant proportion of traffic in cities is generated by construction and civil engineering, including some of the most polluting diesel vehicles. Apart from the road traffic movements, there are also sources of air pollution that are attributed to the actual onsite construction; up to 15% of air pollutant emissions can be from construction and demolition activity and the machinery used in these processes.

The construction industry can contribute 7% of the nitrogen oxides, 8% of the particulate matter (PM10) and 12.5% of the ultrafine particulate matter (PM2.5) of the total directly emitted directly into the air.

Emissions from construction can be divided into three main categories:

- Dust: Particulate matter mechanically generated from construction activity contributing to PM10 concentrations.
- Construction Plant: Exhaust emissions from diesel non-road mobile machinery (NRMM) contributing to elevated NOx and PM10/PM2.5 concentrations.
- Construction transport: Road transport delivering and collecting construction materials and waste. Often these are HGVs or LGVs using diesel engines. Additionally, fine particles 'tracked out' onto the public highway on the wheels of these vehicles are also re-suspended and can remain in the air for many hours, day or even weeks.

Dust is defined as **all airborne particulate matter (PM) including ultra-fine particles suspended in the air**. PM is a complex assemblage of non-gaseous material of varied chemical composition comprising tiny bits of solids or liquids suspended in the air, varying in size, shape, composition and origin. Properties vary from place to place and time to time and the nature of the dust source.

Two sizes of the particle are commonly monitored:

- PM10: Coarse particles with a diameter of 10 µm or less; and
- PM2.5: Fine particles with a diameter of 2.5 µm or less.

Particles greater than PM10 are those that generally give rise to soiling and environmental damage; they are generally filtered in the nose and throat and do not usually cause health problems. Less than PM10 size particles can settle in the airway and deep in the lungs and are known to cause health problems.

Most particulate emissions from construction are not visible to the naked eye but are solid particles that are suspended in air or have settled out onto a surface after being suspended in the air. It can result in visible dust plumes and dust deposition adjacent to the construction activity. The main air quality impacts that may arise during demolition and construction activities are:

- dust deposition, resulting in the soiling of surfaces;
- visible dust plumes, which are evidence of dust emissions;
- elevated PM10 concentrations, as a result of dust generating activities on site; and
- an increase in concentrations of airborne particles and nitrogen dioxide due to exhaust emissions from diesel powered vehicles and equipment used on site (non-road mobile machinery) and vehicles accessing the site.

Air Quality Assessments – can be required of the developer through the planning process

The risk of dust from a demolition/construction site to have detrimental effects on amenity, health and the natural environment is related to: the activities being undertaken; the duration of these activities; the size of the site; the proximity of receptors to the activity; the existing levels of background pollution and the adequacy of the mitigation measures applied to reduce or eliminate dust; and the sensitivity of the receptors to dust.

Where this is deemed to be risk, an Air Quality Assessment may be required. An assessment will normally be required where 'high level' receptors (for example, housing, a hospital or school) are within 350m of a site or an ecological receptor with 50m of the boundary of the site. The access route up to 500m from the site is included in a site boundary.

The assessment should identify whether each phase of activity on site represents a low, medium or high risk during the four phases of construction: demolition; earthworks; construction; and trackout (travel to/from the site).

The assessment will describe the site and receptors on both health and environmental grounds; consider the potential scale of dust emissions for each development stage; and the level of risk due to the scale of dust emissions on health, soiling and the natural environment.

A recent report by the ICE suggests that a Construction Logistics Plan (CLP) should be produced as part of development planning submissions embedding good air quality as a key part of Health and Safety assessments. The controls and systems outlined above can equally form part of a CLP as well as an air quality assessment. (The CLP also contains information on the CLOCS standard and is good practice generally).

The CLP will consider options for reducing air pollution/dust and this will often include:

- consolidation centres (located away from the site)
- delivery management systems ('just-in-time' delivery)
- off-site holding areas
- delivery requirements information issued in advance to all drivers
- toolbox talks for drivers

Off-site Consolidation Centres can be set up outside a city centre or built up area and smaller, less polluting delivery vehicles used to transport materials to sites from the consolidation centre. It is fair to say that CLPs and Consolidation Centres will only be in place at larger construction projects or in very sensitive locations. Smaller sites should at least be issuing delivery instructions to drivers.

Good Practices to look out for on site

The Scheme's Checklist asks in 3.3:

- *Are all reasonable efforts being made to minimise the impact...of air...pollution?*

This question has prompts including 'Working methods and equipment, programming, monitoring'.

Question 3.9 expands on this by asking:

- *How is...air pollution measured and managed to minimise impact?*

Prompts include 'Dust, fumes, working methods'.

Questions 3.1, 3.5 and 3.6 are also relevant, asking about identifying and managing environmental issues and communicating these to the workforce and public.

Monitors could ask about:

Initial stakeholder engagement by the developer (client)

- Availability of an Air Quality Assessment identifying high, medium and low receptors prepared through the planning process by the developer (client).

Continuing stakeholder engagement by the contractor

- A Construction Logistics Plan prepared by the contractor promoting use of 'Green Travel'
- Site Layout to screen sensitive receptors (retaining vegetation)
- Regular inspections and site maintenance
- Use of mobile crushing plant with the appropriate licence and nuisance controls
- Covering/seeding of stockpiles
- Procedures for dealing with spills and removal of contaminated soils/waste
- Restrictions on burning
- Good waste management procedures, covers for skips, minimising vehicle movements
- Vehicle management (particularly the NRMM guidance if in London), including reducing idling, planning of works remote from boundaries, surfacing of haul routes and accesses/egresses, wheel washing, road sweepers, covering vehicles, use of dust suppression (water, chemicals), run-off management (reduces dust when mud dries out)
- Location of generators/plant away from receptors
- Procedures to reduce/minimise cutting, grinding and sawing, cement mixing/batching
- Use of chutes, conveyors and covered skips

Good practice measures on site may need to be supplemented with dust monitoring, particularly focusing on any sensitive locations. Dust deposition monitoring, visual inspections, dust control systems and recording site conditions in a daily dust log may all be required. A procedure to notify the local authority, so that immediate and appropriate measures can be put in place to rectify any problem, is additionally good practice.

Smaller projects that have not addressed some of the basic items (such as location of plant/generators away from receptors, dust suppression, use of chutes, covering skips and turning off plant when not in use) could be deemed to be non-compliant with Question 3.3. Conversely, larger projects that are not addressing the majority of the measures outlined above should not be scored exceptional.

Non-road Mobile Machinery (NRMM)

For a number of years, many diesel road vehicles have had to meet emissions standards to avoid being charged for travelling within the London Low Emission Zone (LEZ). The London Atmospheric Emissions Inventory estimates that in 2013, NRMM used on construction sites was responsible for 7% of NO_x emissions, 8% of PM₁₀ emissions, and 14.5% of PM_{2.5} emissions in London. PMs and NO_x contribute to poor respiratory health.

In July 2014 the Greater London Authority (GLA) released a Supplementary Planning Guidance 'The Control of Dust and Emissions from Construction and Demolition'. This document contains information outlining the new engine emission standards for NRMM in London under chapter 7, Cleaner Construction Machinery for London: A Low Emission Zone (LEZ) for Non-Road Mobile Machinery.

From 1 September 2015 NRMM of net power between 37 kW and 560 kW used in London has been required to meet emissions standards set by the GLA. The power range and emissions standards are regularly reviewed. In order to comply with the GLA's NRMM LEZ policy there is a requirement for developments to keep an inventory of all NRMM used at a site in Greater London:

An inventory of all NRMM should be kept on-site stating the emission limits for all equipment. All machinery should be regularly serviced and service logs kept on-site for inspection. This documentation should be available to local authority officers as required.

Currently the NRMM emissions standards only apply to all Major Development Sites in Greater London, and all sites within the Central Activity Zone or Canary wharf (CAZ/CW).

Major Development Sites are defined in the London Plan as a residential development of 10 or more dwellings, or having an area of 0.5 hectares or more where number of dwellings is not known; or any development carried out on a site having an area of 1 hectare or more, or floor space of 1,000 square metres or more.

NRMM is defined as any mobile machine, an item of transportable industrial equipment, or vehicle that is:

- not intended for carrying passengers or goods on the road;
- installed with a combustion engine, either an internal spark ignition petrol engine, or a compression ignition diesel engine

Hybrid plant and equipment is included. Examples of NRMM include, but are not limited to:

- access platforms
- dumpers
- piling rigs
- excavators
- bulldozers
- forklifts
- compressors
- generators
- mobile cranes
- concrete pumps
- mobile crushers
- telehandlers
- rollers
- compactors

To comply with the NRMM, the following should be in place on all Major Development Sites in the Greater London area:

- Definition of Roles and Responsibilities
- Checks on Subcontractors to ensure compliance
- Maintenance of an NRMM inventory spreadsheet
- Primary contractor checks and monitoring
- A process for managing non-compliant NRMM

A flowchart for the assessment of NRMM to determine whether it is required to comply with the standard is shown at the end of this Guidance Note. This is taken from the Greater London Authority's NRMM Practical Guide, issued November 2017.

It could only be a matter of time before the NRMM standards that are now a legal requirement in Greater London are adopted by other cities in the UK. Away from London, although the standards are not mandatory, they do represent best practice and so any sites monitoring site plant and/or meeting emission standards could be commended in Monitors' reports.

Examples of Best Practice NRMM Measures that Monitors can look for on site include:

- NRMM Inventory kept on site in addition to registering on the NRMM website to ensure full compliance including photographic reference of plant;
- individual plant stickers to record information and registration details to facilitate compliance audits;
- site no idling policies;
- NRMM and associated air quality requirements included in site induction;
- toolbox talks given to plant operators about air quality requirements and benefits of efficient driver operation and to reinforce no idling policy;
- all machinery to be regularly serviced and service logs kept on site for inspection;
- use of generators limited by early engagement with power supplier to ensure temporary power available for the construction phase (if generators are the only option then generators should be appropriately sized and/or hybrid technology considered);
- all exempt plant should be registered for monitoring purposes;
- use of hybrid fuel source plant;
- use of offsite manufacturing where appropriate.

In the Greater London area, the Scheme expects sites to meet legal obligations and so any site in the Greater London Area not complying with the NRMM standards could be given a non-compliant score as it may be considered not to be complying with Question 3.3 'Are all reasonable efforts being made to minimise the impact of....air pollution? Sites in the Greater London Area not complying with the NRMM should not be deemed to be excellent or exceptional.

The Considerate Constructors Scheme is a non-profit-making, independent organisation founded in 1997 by the construction industry to improve its image. Construction sites, companies and suppliers voluntarily register with the Scheme and agree to abide by the Code of Considerate Practice, designed to encourage best practice beyond statutory requirements. For more information on the Code, please visit www.ccscheme.org.uk.

This note was developed by the Scheme's Review Group in January 2018 and was originally intended for internal use only. It simply aimed to help raise awareness amongst Monitors who may not be experts in this particular subject and therefore the note should not be considered as an authoritative document on the matter of air pollution.

Compliance Flow Chart from GLA NRMM Practical Guide

