Construction Air Quality Management Plan

[type project name]

[type date of issue]

[type document reference]

[This is a template that may be used to help prepare a project specific construction air management plan.

All notes in square brackets should be deleted or edited and should not form part of the plan without modification.

In many cases, this completed plan is intended for inclusion in the overall environmental and social management plan for the project. In those instances the construction air management plan should include a reference to where specific information is located].

Template version v0.0 DRAFT, June 2015

Record of amendment

|  |  |  |  |
| --- | --- | --- | --- |
| Amendment number | Description of change | Effective date | Updated by |
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# Glossary of Abbreviations

Table 1: Glossary of Abbreviations

|  |  |
| --- | --- |
| Acronym | Definition |
| CAQMP | Construction Air Quality Management Plan |
| ESMP | Environmental and Social Management Plan |
| HAPs | Hazardous air pollutants |
| MfE | Ministry for the Environment |
| NES | National environmental standard |
| PM10 | Particulate matter smaller than 10µm |
| TSP | Total suspended particulates |
| µg/m3 | micrograms per cubic metre, a unit of pollutant concentration |
| µm | Micrometre, a millionth of a metre |
| [Others as required] |  |
|  |  |
|  |  |
|  |  |

# 1. Background

## 1.1 Introduction

This Construction Air Quality Management Plan (CAQMP or the Plan) forms part of the suite of environmental controls within the Construction Environmental Management Plan (CEMP, [document location]) for:

* Project: [type project name]
* Construction location: [type location]
* Construction start date: [type start date]
* Construction finish date: [type completion date]

The CAQMP addresses the potential construction air quality impacts associated with earthworks and construction activities of the Project.

## 1.2 Purpose and scope

The purpose of this CAQMP is to facilitate the avoidance, remediation and mitigation of any adverse effects of discharges of [dust, odour, and hazardous air pollutants (select those that apply)] generated from construction activities, and to promote proactive solutions to the control of those discharges from the site.

The CAQMP identifies the following:

* Sources of dust that may be created during the construction project
* Dust mitigation and prevention methods
* Monitoring methods
* Methods for managing complaints regarding discharges into air and keeping records related to compliance
* [type additional sources of pollutants, mitigation or prevention methods where applicable].

The CAQMP will be updated, with the necessary approvals, throughout the course of the Project to reflect changes associated with construction techniques or to the natural environment. Any relevant revisions to the CAQMP will be submitted to the [type organisation responsible] for review. A formal review process is described in section 5 of the CAQMP. If the construction methodology changes for any reason, the dust impacts and appropriate mitigation measures will need to be reassessed and documented.

[add any references that should be made to additional sections of the CEMP (eg the Erosion and Settlement Control plan)]

## 1.3 Project description

[include in this section all of the following: the project name (including State highway number); Territorial/regional/unitary council(s) who have jurisdiction; construction period; state highway classification; nature of the works being undertaken]

Project name and State highway number: [insert project name and SH number]

Council(s) who have jurisdiction: [insert territorial/regional/unitary council(s) who have jurisdiction]

Construction period: [insert construction period]

State highway classification: [insert state highway classification]

Nature of works being undertaken: [insert nature of works being undertaken]

## 1.4 Location plan

[insert aerial photograph showing general plans of the construction area and locations of the key construction activities, including lay down areas]

## 1.5 Environmental policy

[can include individual contractors or project policies alongside the following Transport Agency policy]



## 1.6 Environmental objectives/Key performance indicators

The objective of the CAQMP is to ensure that all work is undertaken in a manner that complies with regulatory requirements. The regulations all have a common aim, which is to avoid, remedy, or mitigate adverse effects on the environment, including effects on the health of people and ecosystems and amenity effects.

In order for the construction of the Project to comply with all statutory requirements, the discharge of dust, odour, or hazardous air pollutants from this site must comply with the following: [type the relevant regional rules for discharges, eg for dust nuisance].

[describe the designation or resource consent conditions ( where applicable) for air discharges and cross reference with relevant sections of the CAQMP]

Consent conditions for air quality are addressed in the CAQMP in the following sections:

**Table x:** Air quality conditions

|  |  |  |
| --- | --- | --- |
| Consent or Designation Number | Condition | Relevant Section of the CAQMP |
|  |  |  |
|  |  |  |
|  |  |  |

# 2. **Social and Environmental Management**

## 2.1 Environmental impacts summary

The potential environmental inputs of the construction activities include: [select all those that apply]

* Dust
* Odour
* Hazardous air pollutants (HAPs)

## 2.2 Activity description

[fill in the construction activities involved which have the potential to generate dust, odour or hazardous air pollutants]

**Table x:** Construction activities with the potential to generate discharges into the air

|  |  |  |
| --- | --- | --- |
| Timescale/Duration | Discharge | Activity |
|  |  |  |
|  |  |  |
|  |  |  |

## 2.3 Receiving environment

The [type name of responsible party] will ensure that all personnel are aware of nearby sensitive receptors when carrying out activities that have the potential to generate dust, odour and hazardous air pollutants.

This is important where sensitive receptors are close to construction activities that have a high potential to generate dust. Key sensitive receptors that shall be taken into account when minimising dust are shown in the following table:

**Table x:** Sensitive receptors

|  |  |  |
| --- | --- | --- |
| Indicative Timescale/Duration | Proposed Activity | Sensitive Receptors |
|  |  |  |
|  |  |  |
|  |  |  |

## 2.4 Meteorology

[add a brief description of prevailing winds, and attach wind roses. Note any particular seasonal considerations, e.g. (The Spring Equinox in some coastal parts of New Zealand)]

# 3. Implementation and Operation

## 3.1 Structure and responsibility

All personnel working on the Project have responsibility for following the requirements of the air discharge consent conditions and the CAQMP. Specific responsibilities are as follows:

[describe the responsibilities of each role, eg all site staff, environmental manager, site manager:]

## 3.2 Training

Environmental training for all staff will be undertaken as part of the site induction programme. Details of training are included in [type relevant document reference in the CEMP]. The environmental induction will include the following information specific to this Plan:

* Information about the activities and stages of construction that may cause dust and odour impacts within the construction area
* Consent requirements
* Complaints management procedures
* Dust /odour management procedures
* Description of dust odour/air pollutant monitoring for the Project

## 3.3 Operating and management procedures

### 3.3.1 Factors influencing dust generation [repeat for odour, other air pollutants if required]

There are five primary factors which influence the potential for dust to be generated from the site.

These are:

* **Wind speed across the surface.** Dust emissions from exposed surfaces generally increase with increasing wind speed. However dust pick up by winds is only significant at wind speeds above 5m/s (11 knots or a Beaufort scale number of 3 – see Appendix G.A of this Plan). Above wind speeds of 10m/s (20 knots) dust pick up increases rapidly.
* **Moisture content of the material.** Moisture binds particles together, preventing them from being disturbed by winds or vehicle movements. Similarly, vegetated surfaces are less prone to wind erosion than bare surfaces.
* **The area of exposed surface.** The larger the area of exposed surfaces the more potential there will be for dust emission.
* **The percentage of fine particles in the material on the surface.** The smaller the particle size of material on an exposed surface the more easily the particles are able to be picked up and entrained in the wind.
* **Disturbances such as traffic and loading and unloading of materials.** Vehicles travelling over exposed surfaces tend to pulverise any surface particles. Particles are displaced from rolling wheels and the surface. Dust is also sucked into the turbulent wake created behind moving vehicles.

### 3.3.2 Dust sources and controls [repeat for odour, other air pollutants if required]

The dust prevention methods summarised in Table x below will be employed: [select the relevant sources and controls from the list]

**Table x:** Sources of dust and recommended controls to be employed

|  |  |
| --- | --- |
| Source of Dust | Control |
| **Stockpiles (including material placement and removal)** | * Limit the height and slope of stockpiles to reduce wind entrainment. Stockpiles exceeding 3m in height have a higher risk of discharging dust. * Orientate stockpiles to maximise wind sheltering as much as possible. * Maximise shelter from winds as far as practicable. * Keep active stockpiles damp at all times or cover stockpiles of fine materials. * Dampen inactive stockpiles if they are producing visible dust emissions. * Use polymer additives to assist in forming a surface crust or cover with mulch and straw. * Vegetate stockpiles if inactive for more than three months. Supply adequate water to support optimum vegetation growth. |
| **Unpaved surfaces such as roads and yards** | * Limit the amount of exposed surfaces as much as possible. * Retain as much vegetation as possible. * Keep unpaved roads and exposed surfaces damp. Typical water requirements for most parts of New Zealand are up to 1 litre per square meter per hour. * Cover surfaces with coarse materials where practicable. * Compact all unconsolidated surfaces where practicable. * Regularly maintain roads by grading and the laying of fresh gravel. * In very high risk areas, haul roads should be sealed. * Stabilise cleared areas not required for construction, access or for parking, if liable to cause excessive dust during windy conditions. Methods may include wetting with polymer additives to facilitate crusting, metalling, grassing, mulching or the establishment of vegetative cover. |
| **Sealed surfaces** | * Regular removal of dust through washing or vacuum sweeping. |
| **Vehicles** | * Limit vehicle speeds on unsealed surfaces to 10km/hr. * Limit load sizes to avoid spillages. * Cover loads of fine materials. * Minimise travel distances through appropriate site layout and design. * Minimise mud and dust track out from unsealed areas by establishing stabilised entranceways at all ingress and egress points to sealed roads. * If necessary, provide wheel wash facilities. |
| **Earthmoving and construction** | * Adequate irrigation systems must be available on each site to dampen areas that are to be earthworked prior to any earthwork commencing and shall be used permanently on sites until the final site shape has been established and further earthworks are not required. * Limit drop heights. * Prior to a cut and fill activity in sand, pre-water the area with sprinklers to allow time for penetration of the soil. |
| **Miscellaneous** | * Ensure sufficient water is available on site. * Take account of daily forecast wind speed, wind direction and soil conditions before commencing an operation that has a high dust potential. * Install windbreak fences where practicable and appropriate. Effectiveness is greatest where fencing is perpendicular to the prevailing wind direction with a porosity of about 50%. * Minimise the area of surfaces covered with fine materials. |

### 3.3.3 Complaints

Complaints procedures are detailed in [cross-reference with the CEMP]. The procedure for managing complaints associated with [type dust/odour/air pollutants as applicable] is detailed as follows.

The [nominate the person/role responsible] has the responsibility to respond to and follow up all complaints regarding [dust/odour/air pollutants], and furthermore to ensure that suitable trained personnel are available to respond to complaints at all times.

**Actions to be taken as soon as possible by** [nominate the person/role responsible]**:**

* Fill out the appropriate complaint form, [type name of document and document reference].
* Note the time and date of the complaint/s and (unless the complainant refuses to provide them) the identity and contact details of the complainant. Ask the complainant to describe the discharge: is it constant or intermittent, how long has it been going on for, is it worse at any time of day, does it come from an identifiable source. Wind direction and strength and weather conditions are to be recorded. Note if the complaint has been referred to the Regulatory Authority.
* As soon as possible after receipt of a complaint, undertake a site inspection. Note all [dust/odour/air pollutant] producing activities taking place and the mitigation methods being used. If the complaint was related to an event in the recent past, if possible note any [dust/odour/air pollutant] producing activities that were underway at that time. Initiate any remedial action necessary.
* As soon as possible (within 2 hours, where practicable), visit the area from where the complaint originated to ascertain if [dust/odour/air pollutants] is still a problem.
* If it becomes apparent that there may be a source of [dust/odour/air pollutants] other than the construction project causing the complaint, it is important to verify this. Photograph the source and emissions.
* As soon as possible after initial investigations have been completed, contact the complainant to explain any problems found and remedial actions taken. Initiate a damage assessment if required.
* If necessary update any relevant procedures to prevent any recurrence of problems and record any remedial action taken.

**Follow-up actions:**

* Advise the Environmental Manager and the Regulatory Authority within 24 hours that a complaint has been received, what the findings of the investigation were and any remedial action taken.
* Advise site personnel as soon as is practicable that a complaint has been received, what the findings of the investigation were and any remedial action taken.

## 3.4 Emergency contacts and response

[use the following tables to identify internal and external emergency contact details]

**Table x:** Internal environmental emergency contact details

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Role | Name | Organisation | Phone | Email |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Table x:** External environmental emergency contact details

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Role | Name | Organisation | Phone | Email |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

# 4. Monitoring and Review

## 4.1 Compliance monitoring

### 4.1.1 Trigger levels

There are no national air quality standards or guidelines for nuisance dust. However, the Ministry for the Environment (MfE) has recommended trigger levels which can be applied to total suspended particulate (TSP) and other parameters (as shown in Table x)[[1]](#footnote-1). These trigger levels have been successfully used to control dust on Transport Agency projects, such as the Waterview Connection and Mackays to Peka Peka.

**Table x:** MfE recommended trigger levels for total suspended particulate (TSP) and other parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Trigger | Averaging Period | Sensitivity of Receiving Environment1 | | |
| High | Moderate | Low |
| Short term | 1-hour | 200 µg/m3 | 250 µg/m3 | n/a |
| Daily | Rolling 24-hour | 60 µg/m3 | 80 µg/m3 | n/a |
| Wind warning | 1-minute | 10 m/s (during two consecutive 10 minute periods) | | |
| Rain warning | 12-hour | There has been no rain in the previous 12 hours | | |
| Visible dust | Instantaneous | Visible dust crossing the boundary | | |

1 In general, all residential areas will be high sensitivity.

Nuisance dust often also comprises smaller size fractions known to cause health effects – most notably particulate matter less than 10µm (PM10). Unlike nuisance dust, PM10 is regulated by a national environmental standard (NES) and this must not be exceeded where a person can be reasonably exposed. MfE has also recommended short term trigger levels for on-site management of PM10 (shown in Table x)1. Swift implementation of dust control measures when PM10 levels approach or exceed these triggers has been shown to be successful in preventing exceedances of the PM10 NES.

**Table x:** MfE recommended trigger levels for fine particulate less than 10 µm (PM10)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Trigger | Averaging Period | Sensitivity of Receiving Environment1 | | |
| High2 | Moderate | Low |
| Short term | 1-hour | 150 µg/m3 | n/a | n/a |

1 In general, all residential areas will be high sensitivity.

2 As PM10 is relatively expensive to measure, it is only likely to be measured where people may reasonably be exposed (primarily residential areas, which are rated as high sensitivity).

The following table shows the trigger levels to be adopted for the Project.

**Table x:** Project trigger levels

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Trigger | Averaging Period | Sensitivity of Receiving Environment | | |
| High | Moderate | Low |
| Short term PM10 | 1-hour | [fill in] µg/m3 | [fill in] µg/m3 | [fill in] µg/m3 |
| Short term TSP | 1-hour | [fill in] µg/m3 | [fill in] µg/m3 | [fill in] µg/m3 |
| Daily TSP | Rolling 24-hour | [fill in] µg/m3 | [fill in] µg/m3 | [fill in] µg/m3 |
| Wind warning | 1-minute | [fill in] m/s | | |
| Visible dust | Instantaneous | [fill in criterion] | | |

### 4.1.2 Visual dust monitoring

Table x outlines the dust monitoring programme that is to be implemented. The implementation of this programme will be the responsibility of the [type the role of the person responsible], in conjunction with site personnel.

[insert activities and nominate frequency as appropriate]

**Table x:** Dust monitoring programme

|  |  |
| --- | --- |
| Monitoring activities | Frequency |
| eg check weather forecasts for strong winds and rainfall to plan appropriate dust management response (7 day forecasts also available on [www.metvuw.com](http://www.metvuw.com) and [www.metservice.com](http://www.metservice.com)). | Daily |
| Etc. |  |

### 4.1.3 Instrumental dust monitoring [include section if applicable]

Continuous monitoring of TSP (or dust) and of meteorological conditions will be undertaken during the construction of the Project. The Environmental Manager, [name party responsible], will be responsible for the provision and maintenance of the instrumental monitoring.

[type specific details relating to instrumental dust monitoring equipment and location for this project]

### 4.1.4 Odour monitoring [include section if applicable]

Should odorous material be encountered, odour scouting around the site boundary adjacent to sensitive receptors should be instigated during the following periods:

* When potentially contaminated land is excavated
* When odour complaints have been received

### 4.1.5 Monitoring of hazardous air pollutants [include section if applicable]

[type specific details relating to monitoring for hazardous pollutants]

### 4.1.6 Contingency plan for ambient air instrument downtime

Instruments need to be shut down periodically for regular maintenance and from time to time the instruments fail. During these times, the following contingency plans should be implemented:

[type specific details relating to planned and unplanned shut-downs]

[eg if a power failure is the cause of the fault and there are no wind speed readings available, use the Beaufort Wind Scale to estimate wind speed (see Appendix A). If winds exceeding a force 2 wind (light breeze), the sprinklers should be activated.]

### 4.1.7 Response to TSP and meteorological triggers [include PM10 if applicable]

In the event that the trigger levels in Table x are exceeded, actions to be undertaken by [type name of the person responsible] are summarised in this section.

* **Exceedance of 1-hour TSP trigger**

[add discussion of appropriate procedure in the case of this event]

* **Exceedance of 24-hour TSP trigger**

[add discussion of appropriate procedure in the case of this event]

* **Wind speeds in excess of warning level**

[add discussion of appropriate procedure in the case of this event]

### 4.1.8 Reporting

As required by designation or consent condition [type condition reference], the following information will be provided to [type relevant person/regulatory authority]. The specific reporting requirements associated with managing dust, odour and hazardous air pollutants include the following:

[eg records, logs, monitoring data and test results]

The Environmental Manager, [type the name of the person responsible], will provide the Regulatory Authority with a copy of the updated CAQMP if any significant revisions of the CAQMP are made.

## 4.2 Audits

The CAQMP will be reviewed and updated, with the necessary approval, throughout the course of the Project to reflect changes in construction techniques, staging or the natural environment. Approval from the [type the name of the client/regulatory authority] will be required for any relevant revisions of a material nature for the CAQMP. The review will take into consideration:

* Any significant changes to construction activities or methods
* Key changes to roles and responsibilities within the Project
* Changes in industry best practise standards or recommended dust controls
* Changes in legal or other requirements (social and environmental legal requirements, consent conditions, Transport Agency objectives and relevant policies, plans, standards, specifications and guidelines)
* Results of inspection and maintenance programmes, logs of incidents, corrective actions, internal or external assessments
* The outcome of investigations into discharges of dust/odour/air pollutants

Reasons for making changes to the CAQMP will be documented. A copy of the original CAQMP document and subsequent versions will be kept for the Project records, and marked as obsolete. Each new/updated version of the CAQMP documentation will be issued with a version number and date to eliminate obsolete CAQMP documentation being used.

## 4.3 Corrective management

[state the responsibility for corrective action, including actions resulting from compliance monitoring, audits and external regulatory compliance monitoring]

## 4.4 Management review

[detail the review procedure, the frequency, who will be involved in the review, and who is responsible for ensuring the review takes place]

# 5. References

Ministry for the Environment (2015). *Draft Good Practice Guide for Assessing and Managing Dust*, July 2015, available at [www.mfe.govt.nz](http://www.mfe.govt.nz)

[type any other references used in the writing of this document]

# Appendix A: Beaufort Wind Scale

**Table x:** Beaufort Wind Scale

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Beaufort Scale | Wind Speed | | | Label | Observations on Land |
| m/s | Knots | Km/h |
| **0** | 0-0.2 | <1 | <1 | Calm | Calm. Smoke rises vertically. |
| **1** | 0.3-1.5 | 1-3 | 1 -5 | Light Air | Wind motion visible in smoke. |
| **2** | 1.6-3.3 | 4-6 | 6-11 | Light Breeze | Wind felt on exposed skin. Leaves rustle. |
| **3** | 3.4-5.4 | 7-10 | 12-19 | Gentle Breeze | Leaves and smaller twigs in constant motion. |
| **4** | 5.5-7.9 | 11-15 | 20-28 | Moderate Breeze | Dust and loose paper raised. Small branches begin to move. |
| **5** | 8-10.7 | 16-21 | 29-38 | Fresh Breeze | Branches of a moderate size move. Small trees begin to sway. |
| **6** | 10.8-13.8 | 22-27 | 39-49 | Strong Breeze | Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. Empty plastic garbage cans tip over. |
| **7** | 13.9-17.1 | 28-33 | 50-61 | Near Gale | Whole trees in motion. Effort needed to walk against the wind. Swaying of skyscrapers may be felt, especially on upper floors. |
| **8** | 17.2-20.7 | 34-40 | 62-74 | Gale | Twigs broken from trees. Cars veer on road. |
| **9** | 20.8-24.4 | 41-47 | 75-88 | Severe Gale | Larger branches break off trees, some small trees blow over. Construction/ temporary signs and barricades blow over. Damage to circus tents and canopies. |
| **10** | 24.5-28.4 | 48-55 | 89-102 | Storm | Trees broken off or uprooted, saplings bent and deformed, poorly attached asphalt shingles or shingles in poor condition peel off roofs. |
| **11** | 28.5-32.6 | 56-63 | 103-117 | Violent Storm | Widespread vegetation damage. More damages to most roofing surfaces, asphalt tiles that have curled up and/or fractured due to age may break away completely. |
| **12** | 32.7-36.9 | 64-71 | 118-133 | Hurricane | Considerable and widespread damage to vegetation, a few windows broken, structural damage to mobile homes and poorly constructed sheds and barns. Debris may be hurled about. |

1. Ministry for the Environment (2015). *Draft Good Practice Guide for Assessing and Managing Dust*, July 2015 [↑](#footnote-ref-1)