Construction Air Quality and Odour Management Plan

Glebe Island Concrete Batching Plant

Document Control

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Draft 1	11/08/2021	Damon Roddis	Ashleigh Zarlenga	
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1. Introduction

This Construction Air Quality and Odour Management Plan (the Plan) has been prepared by Hanson Construction Materials (Hanson) and Zephyr Environmental Pty Ltd (Zephyr) for the construction phase of the Glebe Island Concrete Batching Plant (the facility). The Independent Planning Commission conditionally approved the construction and operation of Glebe Island Concrete Batching Plant, NSW, until 31 December 2040 (Project Application SSD 8544).

The following Plan describes the measures that will be undertaken to control air quality and odour impacts during the construction phase of the development. The Plan also details performance objectives for the monitoring of dust, the associated air quality and meteorological monitoring program and the stop work procedures if performance objectives are not met.

1.1. Project Overview

Hanson is developing a new intermodal aggregate storage facility and concrete plant to be located adjacent to Glebe Island Berth One (GLB1) (Lot 10 in DP 1170710) (the Site), as shown in **Figure 1**. The plant will be designed with a capacity to produce up to 1 million cubic metres of concrete per annum and will supply aggregate to other Hanson sites in the vicinity.

The plant will serve two purposes:

- To act as a shipping facility that will support a number of Hanson (and Hymix) concrete batching plants by improving the delivery of aggregates into the city centre; and
- To operate as a concrete batching plant that can supply concrete for infrastructure and buildings in the CBD and inner suburbs.

The concrete batching plant will be supported by new aggregate shipping terminal facilities at GLB1 with the capacity to manage up to 1 million tonnes of concrete aggregates per annum delivered by ship from the Hanson Bass Point Quarry and other facilities if deemed viable. By facilitating delivery by ship, the proposed development will reduce the number of trucks required to haul aggregates into Sydney on the regional road network by up to 65,000 trips per annum.

The new concrete batching plant will consist of the following:

- Six (6) aggregate storage silos;
- Six (6) cement storage silos;
- Truck wash out system;
- An office building, driver's room and amenities building and batch room;
- Three (3) loading bays incorporating high speed roller doors;
- Seven (7) poly water storage tanks; and

- Access and internal driveways.

Delivery vehicles will access the facility from James Craig Road beneath the old Glebe Island Bridge abutment. Cement tankers will enter the facility at the north of the site and drive around the north of the enclosed building to enter from the east. Cement and fly ash delivered to the Facility will be stored in silos.

Aggregate will be delivered by ship to the GLB1 berth at Glebe Island. Ship deliveries are anticipated 120 times per year or approximately three times per week on average. Deliveries are expected to take place between the hours of 6am to 10pm.

The aggregate receiver bin will receive aggregate transferred directly from ships. From the receiving bin aggregate will be transferred via enclosed conveyor belt to the top of the proposed aggregate silos.

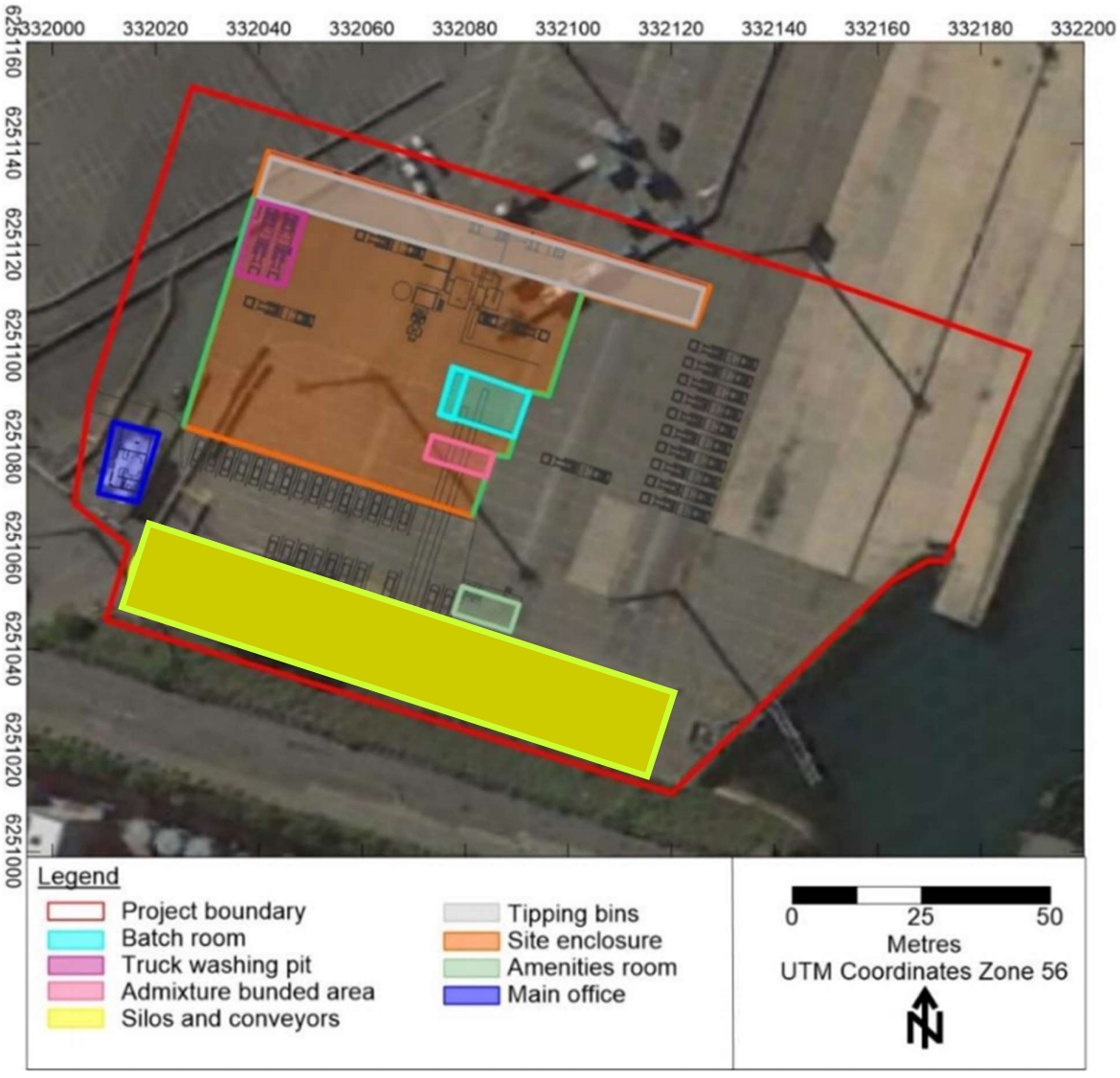

Figure 1: Indicative Site Layout

2. Statutory Requirements

2.1. Approval Requirements

Table 1 provides a summary of the conditions of the Project Approval relevant to the construction phase together with the relevant section(s) of this Plan indicating where the requirements have been addressed.

Table 1: Requirements of Conditions of Approval relevant to Construction

Required Element (Approval SSD 8544)	Relevant Section
Schedule 2, Part C, Condition C26 – Construction Air Quality and Odour Management Plan Prior to commencement of works, a construction air quality management plan (CAQMP) must be prepared by a suitably qualified person and to the satisfaction of the Planning Secretary. The CAQMP must be prepared in consultation with and address the relevant requirements of, Council, City of Sydney Council and the EPA. The CAQMP must address (but not be limited to);	Whole of document
(a) describe the measures that would be implemented on site to ensure: *i) the control of air quality and odour impacts of the development;* *ii) that these controls remain effective over time;* *iii) that all reasonable and feasible air quality management practice measures are employed;* *iv) the air quality impacts are minimized during adverse meteorological conditions and extraordinary events; and* *v) compliance with relevant conditions of consent.*	Section 8
(b) include performance objectives for monitoring dust and ensuring no off-site air quality impacts to nearby residences and businesses;:	Section 4
(c) includes an air quality monitoring program that: i) is capable of evaluating the performance of the construction works; ii) includes a protocol for determining any exceedances of the relevant conditions of consent and responding to complaints; iii) adequately supports the air quality performance objectives; and iv) evaluates and reports on the effectiveness of air quality management for the construction works.	Section 7
(d) details on monitoring weather conditions and communicating changing conditions to the workforce;	Section 6, Section 8.3
(e) stop work procedures if performance objectives are not being met.	Section 8.3
Prior to the commencement of works, details demonstrating compliance with the above requirements must be submitted to the Certifier. A copy of the CAQMP must be submitted to the Certifier and the Planning Secretary.	Section 2.2
Schedule 2, Part D, Condition D21 – Covering of Loads	
All vehicles involved in the excavation and / or demolition process and departing from the property with materials, spoil or loose matter must have their loads fully covered before entering the public roadway.	Section 8
Schedule 2, Condition D22 – Vehicle Cleansing	
Prior to the commencement of work, suitable measures are to be implemented to ensure that sediment and other materials are not tracked onto the roadway by vehicles leaving the site. It is an offence to allow, permit or cause materials to pollute or be placed in a	Section 8

Required Element (Approval SSD 8544)		Relevant Section
position from which they may pollute waters.		
Schedule 2, Part D, Condition D24 – Dust Control Measures		
Adequate measures must be taken to prevent dust from affecting the amenity of the neigbourhood during construction. In particular, the following measures should be adopted:		
(a)	physical barriers should be erected at right angles to the prevailing wind direction or must be placed around or over dust sources to prevent wind or activity from generating dust emissions;	Section 8
(b)	activities must be managed to coincide with the next stage of development to minimise the amount of time the site is left cut or exposed;	Section 8
(c)	all materials must be stored or stockpiled at suitable locations and stockpiles must be maintained at manageable sizes which allow them to be covered, if necessary, to control emissions of dust and/or VOCs/odour;	Section 8
(d)	the surface should be dampened slightly to prevent dust from becoming airborne but should not be wet to the extent that run-off occurs;	Section 8
(e)	all vehicles carrying spoil or rubble to or from the site must at all times be covered to prevent the escape of dust or other material;	Section 8
(f)	all equipment wheels must be washed before exiting the site using manual or automated sprayers and drive-through washing bays to ensure no visible dirt is tracked onto the public road network;	Section 8
(g)	gates must be closed between vehicle movements and must be fitted with shade cloth; and	Section 8
(h)	Cleaning of footpaths and roadways must be carried out regularly.	Section 8

2.2. Consultation

Hanson undertakes ongoing consultation with regulatory and community stakeholders in relation to the facility. The consultation required as part of the approval conditions relevant to construction air quality management is detailed in **Table 2**.

Table 2: Consultation Summary

Date	Company/Agency	Input requested
September 2021	Planning Secretary Inner West Council City of Sydney Council EPA	Request for comment on construction air quality management plan (CAQMP)
Prior to commencement of works	Certifier Planning Secretary	Details demonstrating compliance with the CAQMP requirements submitted.
Prior to commencement	Certifier	Copy of the CAQMP submitted.

3. Sensitive Receptor Locations

The concrete batching plant is proposed to be located on Glebe Island immediately to the north of Glebe Island Bridge. Glebe Island is one of the last remaining industrial port facilities within 2km of Sydney CBD. The port has historically been used for the transportation of bulk construction materials such as cement, gypsum and sand and currently functions as a deep water port for common user berths, dry bulk imports and cruise ships.

In addition to the port related uses, Glebe Island accommodates warehouses, manufacturing plants, and low to mid-rise commercial office buildings. The port's two eastern berths (GLB1 and GLB2) are located along the length of the Island's south-eastern edge. Much of the Glebe Island's remaining eastern part is undeveloped and currently incorporates at-grade parking.

A sensitive receptor is defined as a location where people are likely to work or reside; and may include a dwelling, school, hospital, office or public recreational area in addition to known or likely future locations (NSW EPA, 2016).

Air quality impacts were assessed at the closest sensitive receptors as part of the air quality assessment for the facility (PE, 2018), as illustrated in **Figure 2**. These Include potential future receptors that may be located within the adjacent industrial estate.

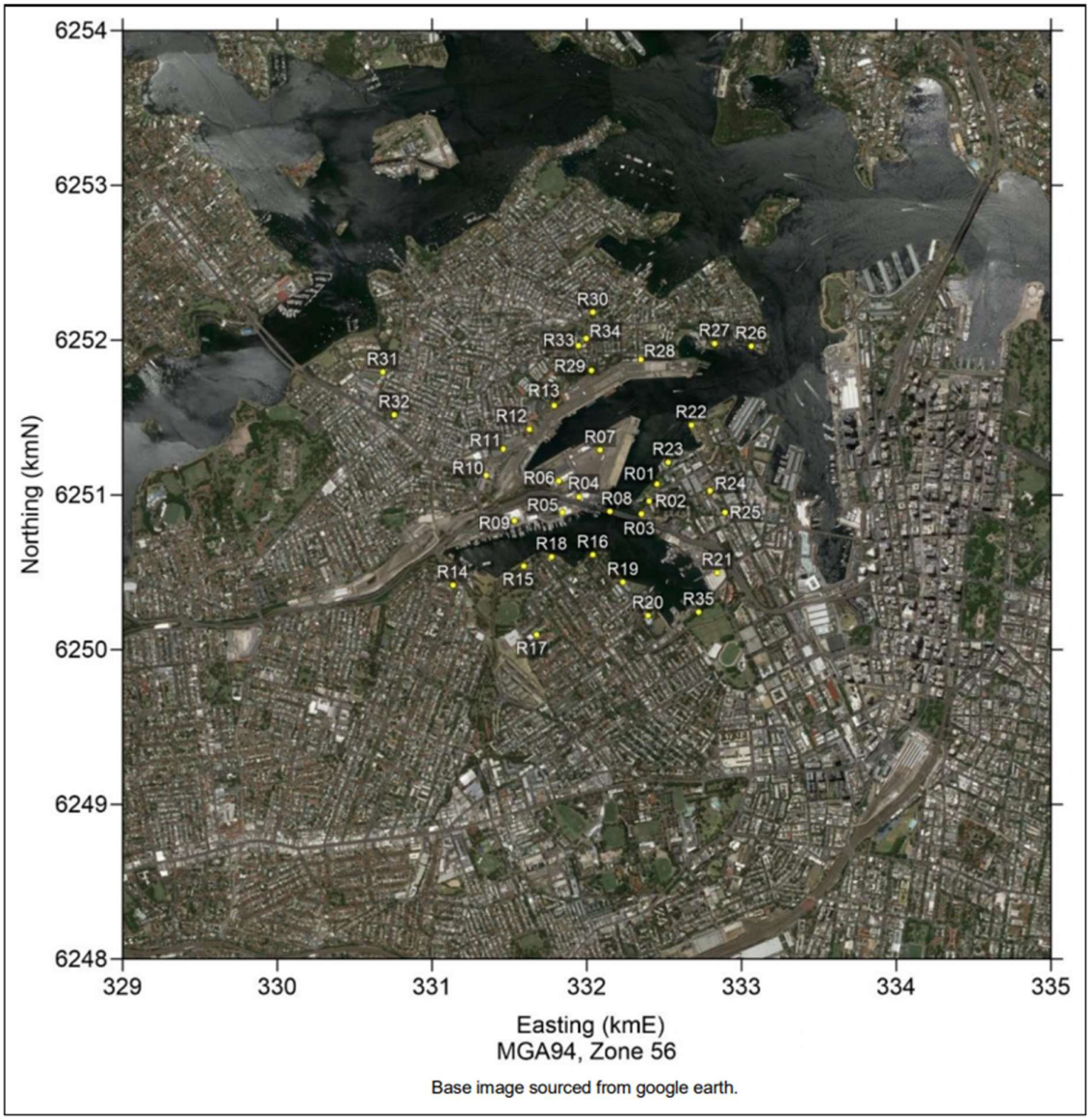

Figure 2: Representative Sensitive Receptor Locations

4. Air Quality Criteria

Air quality impact assessment criteria relevant to the facility construction operations are prescribed by the NSW EPA in their document, *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (2016).

It is acknowledged that an air quality criterion for Total Suspended Particulate (TSP) is provided within EPA, 2016. However, as a result of typical percentages of the PM_{10} size fraction within TSP, it is anticipated that the TSP criterion will be met when the annual average PM_{10} criterion is satisfied. For this reason, a TSP criterion is not considered further.

Similarly, it is considered that PM_{10} criteria are most relevant as a performance indicator for construction and operational air quality management, compared with $PM_{2.5}$. However, $PM_{2.5}$ criteria are referenced within this CAQMP due to the proximity of existing $PM_{2.5}$ monitoring data (refer **Section 7.2**).

Facility-specific criteria apply at any residence on privately-owned land. Construction activities must not cause any exceedances of the air quality impact assessment criteria outlined in **Table 3**.

Table 3: Relevant Criteria for Particulate Matter

Pollutant	Averaging Period	Criterion	Source
Particulate matter < 10 µm (PM_{10})	Annual	30 µg/m^3 (a)	EPA, 2016
	24 hours	50 µg/m^3 (a)	EPA, 2016
Particulate matter < 2.5 µm ($PM_{2.5}$)	Annual	8 µg/m^3 (a)	EPA, 2016
	24 hours	25 µg/m^3 (a)	EPA, 2016
Deposited dust (c)	Annual	**Maximum Increase in Deposited Dust Level**	EPA, 2016
		2 g/m^2/month (b)	
		Maximum Total Deposited Dust Level	
		4 g/m^2/month (a)	

Notes:

(a) Total cumulative concentrations and deposition rates due to the project plus background levels due to all other sources.

(b) Incremental increase in deposition rate due to the project on its own.

(c) Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, *AS/NZS 3580.10.1:2003 Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter - Deposited Matter - Gravimetric Method.*

5. Baseline Air Quality

5.1. Baseline Dust Deposition Rates

The air quality assessment for the facility (PE, 2018) completed a review of existing air quality monitoring within the locality.

Background PM concentration data have been sourced from the nearby DPIE Rozelle Monitoring Station, located approximately 1,800 m to the west of the facility.

The background air quality relevant to the facility is outlined in **Table 3**.

Table 4: Relevant Criteria for Particulate Matter

Pollutant	Averaging Period	Adopted background concentration	EPA criterion
Particulate matter < 10 µm (PM_{10})	Annual	17 µg/m^3	30 µg/m^3 (a)
	24 hours	44 µg/m^3 (b)	50 µg/m^3 (a)
Particulate matter < 2.5 µm ($PM_{2.5}$)	Annual	7.2 µg/m^3	8 µg/m^3 (a)
	24 hours	16.7 µg/m^3 (b)	25 µg/m^3 (a)
Deposited dust	Annual	2 g/m^2/month (c)	4 g/m^2/month (a)

Notes:

(a) Total cumulative concentrations and deposition rates due to the project plus background levels due to all other sources.

(b) Adopted background is based on the highest measurement below the criterion to evaluate the potential for additional exceedances in accordance with the Approved Methods.

(c) Conservatively high background deposition rate adopted in the absence of site-representative monitoring data.

6. Meteorological Conditions

Work completed in support of the development application for the facility (ERM, 2020) identified that there are several Bureau of Meteorology (BoM) Automatic Weather Stations (AWS) in the region of the facility:

- BoM Fort Denison Automatic Weather Station (AWS).
- BoM Sydney Olympic Park AWS.
- BoM Sydney Airport AWS
- BoM Canterbury AWS.

ERM, 2020 acknowledges that no single AWS location is specifically representative of the facility, and for this reason a synthetically generated meteorological input file was ultimately used within the facility's air quality assessment.

Notwithstanding the above, ERM, 2020 concluded that the locality reproduces the key wind patterns of the region.

To enable interrogation of meteorological conditions for operational air quality management, the Fort Denison AWS (4km east-northeast of the facility) has been selected as the principal meteorological data reference. Given the exposed location of this AWS in the centre of Sydney Harbour, it is considered that this location will be conservative if used as a reference for high wind speed triggers.

Annual and seasonal wind roses (i.e. plots of wind speed and direction) have been generated for the calendar year 2019 for Fort Denison AWS, and are presented in **Figure 3**.

The plots show that winds from the west are dominant annually, as well as during spring, autumn and winter. In summer, easterly and northeasterly winds dominate. The prevalence of westerly winds means that physical barriers for dust management should focus on ensuring that particulate does not migrate across the facility's eastern boundary.

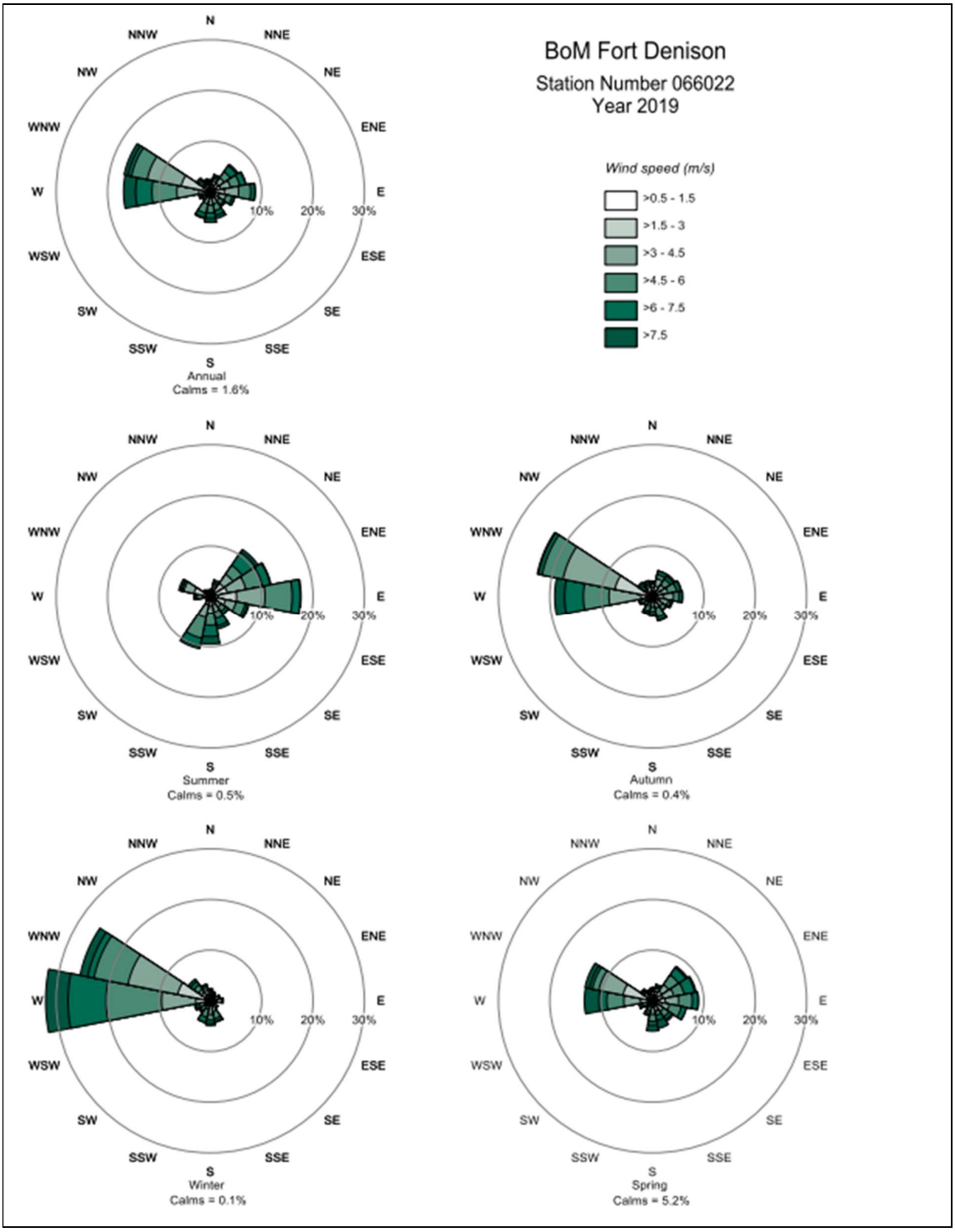

Figure 3: Annual and Seasonal Wind Roses, 2019, Fort Denison AWS

7. Air Quality Monitoring Program

The Air Quality Monitoring Program for the construction phase is designed to ensure that air quality is measured at representative locations in the vicinity of the facility.

The monitoring program will be used to:

- determine if there are any exceedances of the relevant conditions of consent and responding to complaints;
- support the air quality performance objectives; and
- evaluate and report on the effectiveness of air quality management for the construction works.

7.1. Dust Deposition Monitoring

Dust Deposition Gauges (DDGs) record dust fallout and are a useful measure of longer-term changes in air quality.

They are particularly relevant to construction phase monitoring since the air quality risks of this component of the works are higher in relation to nuisance dust / amenity issues.

One DDG will be installed, representative of the closest sensitive receptor location to the facility (location R05).

In the event of a complaint / community request, up to three additional DDGs may be installed, located in the vicinity of the complainant. If complaints arise from the sensitive receptors on the eastern side of the Anzac Bridge, locations R01, R01 and R03 are suggested as representative of this area (refer **Figure 2**).

The locations and descriptions of these DDGs are provided in **Table 5**.

Table 5: Locations of dust deposition gauges used to evaluate air quality performance

Sensitive receptor ID	Description	Easting (kmE)	Northing (kmN)
R01	Waterfront Park	332.453	6251.070
R02	Residential Area	332.403	6250.960
R03	Residential Building	332.354	6250.879
R05	State Government Office	331.842	6250.888

The monitoring locations will conform to the requirements of AS 3580.1.1:2007 *Methods for sampling and analysis of ambient air – Guide to siting air monitoring equipment*, subject to local site constraints with any deviations from the standard noted in the siting documentation.

DDGs are exposed for 30 days (± 2 days) and analysed for Total Insoluble Solids and Ash Residue. Equipment and monitoring methods complies with *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (2005) and Australian

Standard, *AS/NZS 3580.10.1:2016 Determination of particulate matter – Deposited matter – Gravimetric method*. Monitoring is conducted by suitably trained personnel.

Where rain events occur, dust deposition flasks are changed over to prevent over-filling and therefore loss of sample, with the results of the analyses summed to provide a total dust deposition rate for the monitoring period.

All air quality monitoring samples are analysed at a NATA accredited laboratory and results interpreted and reported by a suitably qualified personnel.

Hanson will investigate any recorded dust deposition rates of greater than 4 g/m^2/month. In the event that it is determined that site activities have materially contributed to elevated dust deposition, Hanson will detail corrective actions that will be implemented to reduce dust deposition in the future.

7.2. Continuous PM Monitoring

the NSW Ports Authority installed and air quality station in September 2015 to measure local ambient air quality in the vicinity of the White Bay Cruise Terminal (WBCT). This station is located approximately 0.8 km north-west of the facility, at location R28 in **Figure 2**.

Due to its proximity, the data recorded by this station may also be considered representative of the air quality in the study area. The purpose of this monitoring is to detect adverse combustion emissions from vessels servicing the WBCT. As such, the monitoring is of the combustion-related PM2.5 size fraction.

While this is less relevant to construction, these data are indicative of the particulate load in the local airshed, and are freely available in real-time at:

https://www.portauthoritynsw.com.au/environment/air-emissions/air-quality-monitoring-data/

The $PM_{2.5}$ monitor is a beta-attenuation monitor, which records hourly concentrations of $PM_{2.5}$. The instrument operates in compliance with *AS/NZS 3580.9.11:2016 Methods for sampling and analysis of ambient air Determination of suspended particulate matter – $PM_{2.5}$ beta attenuation monitors*. The monitor is fitted with a wind sensor to record wind speed and wind direction in the vicinity of the sample inlet.

In the event of a complaint, Hanson will in the first instance interrogate these data (refer **Section 9**).

7.1. Complaints-driven PM Monitoring

As noted above, in the event of a complaint / community request up to three additional DDGs may be installed, located in the vicinity of the sensitive receptors R02, R03 and R05 (refer **Figure 2**).

Additionally, if a particulate matter complaint or suspected non-compliance with air quality criteria occurs, Hanson will investigate the complaint to determine the likely cause. If required, additional monitoring of the PM_{10} size fraction will be completed.

Ideally, a real-time, optical-based PM_{10} with reliable power supply (battery-solar or mains power) should be deployed at the complainant's property (with owner approval) to enable a detailed investigation of PM_{10} concentrations. Suitable instrumentation includes the TSI

DustTrak / DRX, Aeroqual Dust Sentry, Teledyne API T640, SiteHive Hexanode or similar.

Any continuous PM_{10} monitoring should be co-located with a meteorological sensor to record concurrent wind speed and wind direction data at the sampling head. These data will be used to analyse the measured PM_{10} data to determine (if relevant/possible) the potential sources of any elevated cocentrations recorded.

The monitoring location must conform with the requirements of *AS 3580.1.1:2016 Methods for sampling and analysis of ambient air – Guide to siting air monitoring equipment*, subject to local site constraints with any deviations from the standard noted in the siting documentation.

A minimum of five days of sampling should be completed to enable a robust monitoring data set to be collected.

In the event of adverse findings from such investigations (i.e. exceedances of project air quality objectives), a compliance-grade instrument such as a High Volume Sampler (HVAS) may be installed and operated at the sensitive receptor location (subject to landowner approval) to measure ambient PM_{10} concentrations in accordance with the NSW EPA *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (2005).

7.1. Reporting of monitoring data

A summary of all air quality (DDG, PM_{10}) monitoring data will be included in the site's Annual Review. Any measured 24-hour average PM_{10} concentrations will be compared to data recorded over the same period by the DPIE-operated Rozelle air quality monitoring station to provide an assessment of on-site PM_{10} concentrations compared to regional background levels. Any dust deposition rates or 24-hour or annual average PM_{10} concentrations recorded above the PM_{10} criteria presented in *Section 4* will be identified, and an assessment of whether they relate to on-site operations or regional background levels will be provided.

The following records must be kept for each sampling event using the PM_{10} LVAS:

a. Sampling location;

b. The name of the person who collected the sample

c. Start and end date and time of the sampling period;

d. Pre- and post-sampling filter paper weights;

e. Sampling air flowrate;

f. Total volume of air sampled;

g. Calculated PM_{10} concentration;

h. Wind speed and wind direction data recorded by the sensor attached to the LVAS;

i. Written records of investigations and remedial actions taken (where applicable) for each event when exceedances of the PM_{10} criteria presented in *Section 4* have been recorded; and

j. Records of all maintenance and calibration activities performed on the monitor.

The above records must also be maintained and kept for a period of at least 4 years.

7.2. Meteorological Monitoring

Meteorological data should be used to identify wind speeds above which there is significant risk of wind-blown dust from the site. This information may then be used as a management tool to trigger the need for additional dust control.

As discussed in **Section 6**, the nearby and representative BOM weather station at Fort Denison is referred to for all meteorological monitoring. This AWS provides representative real-time weather data including wind speed and direction, rainfall, temperature (including sigma theta), temperature lapse rate and humidity, and complies with the requirement in the EPA's *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (2005).

Real-time data from the station is made available to environmental personnel and the CBP Project Manager to assist in operational monitoring and real-time response.

Additionally, the daily forecast for Sydney CBD / Fort Denison will be consulted prior to the morning pre-start meeting and/or toolbox talks and any forecast adverse wind speed conditions (wind speeds in excess of 20km/h) should be communicated and additional dust controls evaluated and implemented as required.

Figure 4: Dust Deposition and $PM_{2.5}$ Monitoring Locations

8. Mitigation Measures

8.1. Construction Risk Assessment

A formal construction air quality risk assessment process was completed as part of the air quality assessment for the facility (PE, 2018) using the guidance provided by the UK Institute of Air Quality Management (IAQM, 2014).

The main air quality and amenity issues at any construction site are:

- Annoyance due to dust deposition (soiling of surfaces)
- Visible dust plumes / visual amenity
- Elevated PM10 concentrations due to dust-generating activities
- Exhaust emissions from diesel-powered construction equipment

Exhaust emissions from on-site construction plant and site traffic are unlikely to have a significant impact on local air quality and in the majority of cases they will not need to be quantitatively assessed (IAQM, 2014).

Particulate emissions can occur during the preparation of the land (e.g. demolition and earth moving) and during construction itself, and can vary substantially from day to day depending on the level of activity, the specific operations being undertaken, and the weather conditions. A significant portion of the emissions results from site plant and road vehicles moving over temporary roads and open ground. If mud is allowed to get onto local public roads, dust emissions can occur at some distance from the construction site (IAQM, 2014).

A full technical description of the assessment methodology and outcomes is provided in Appendix E of PE, 2018. The activities considered are:

- Earthworks
- Construction
- Track out

The potential for dust emissions were then defined by allocating each construction stage a level of risk, as ‘small’, ‘medium’ or ‘large’ based on the detailed information about the construction activities, such as the number of heavy duty vehicles that would enter the site per day and the quantity of material to be handled during earthworks. The next step was to identify the sensitivity of the area based on the nature of sensitive receptors, such as ‘human’ or ‘ecological’ and then by the number and distance of these sensitive receptors to the proposed Proposal’s construction activities.

The results for the construction risk assessment are provided in **Table 6**. Overall the assessment is classified as “low risk”.

Table 6: Summary of the risk assessment for the construction phase

Type of activity	Step 2a: Potential for dust emissions	Step 2b: Sensitivity of area			Step 2c: Risk of dust impacts		
		Dust soiling	Human health	Ecological	Dust soiling	Human health	Ecological
Earthworks	Small	Low	Low	Medium	Negligible	Negligible	Low
Construction	Medium	Low	Low	Medium	Low	Low	Medium
Track-out	Medium	Low	Low	Medium	Low	Low	Low

For those cases where the risk category is 'negligible', no mitigation measures beyond those required by legislation will be required.

Site-specific construction mitigation activities are provided in Section 8.2. Most of the recommended measures are routinely employed as 'good practice' on construction sites. In the event that mitigation measures prove impracticable, they should be read as guidelines as opposed to requirements.

The mitigation measures derived from the construction air quality risk assessment has been adapted / augmented to include the development approval requirements detailed in Section 2.1.

8.2. Site Specific Mitigation Measures

The site-specific air emissions mitigation measures implemented at the CBP Construction are listed in **Table 7**.

Table 7: Site-specific mitigation measures

Mitigation/Control Measure	Implementation Timing	Responsibility
Site Management		
Regular communication with sites in close proximity to ensure that measures are in place to manage cumulative dust impacts.	Ongoing.	Project Manager
Monitoring		
Regular site inspections will be conducted to monitor for potential dust issues. The site inspection, and issues arising, will be recorded.	Daily	Environmental Coordinator
Preparing and maintaining the site		
Construction activities with the potential to generate dust will be modified or ceased during unfavourable weather conditions to reduce the potential for dust generation.	Winds forecast / observed > 20km/h	Foreman

Mitigation/Control Measure	Implementation Timing	Responsibility
Planning Controls		
Measures to reduce potential dust generation, such as the use of water carts, sprinklers, dust screens and surface treatments, will be implemented within project sites.	As required	Foreman, Project Manager
Unsealed access roads within project sites will be maintained and managed to reduce dust generation.	Ongoing	Foreman, Project Manager
Storage of materials that have the potential to result in dust generation will be minimised within project sites.	Ongoing	Foreman, Project Manager
Physical barriers should be erected at right angles to the prevailing wind direction (i.e. barriers running north-south) or must be placed around or over dust sources to prevent wind or activity from generating dust emissions.	Ongoing	Project Manager
All materials must be stored or stockpiled at suitable locations and stockpiles must be maintained at manageable sizes which allow them to be covered, if necessary, to control emissions of dust and/or VOCs/odour;	Ongoing	Foreman, Project Manager
Stockpile surfaces should be dampened slightly to prevent dust from becoming airborne but should not be wet to the extent that run-off occurs;	As required.	Foreman, or as directed by Project Manager
In the event of an extended period of inactivity, all stockpiles should be covered at all times, regardless of prevailing weather conditions/	As required	Foreman, or as directed by Project Manager
Operating vehicles / machinery		
All construction vehicles and plant will be inspected regularly and maintained to ensure that they comply with relevant emission standards.	Consistent with manufacturer's specifications.	Foreman, Project Manager
Engine idling will be minimised when plant are stationary, and plant will be switched off when not in use to reduce emissions..	Ongoing.	Foreman, Project Manager
The use of mains electricity will be favoured over diesel or petrol powered generators where practicable to reduce site emissions.	Where practicable.	Foreman, Project Manager
Haul roads will be treated with water carts and monitored during earthworks operations, ceasing works if necessary during high winds where dust controls are not effective.	Winds forecast / observed > 20km/h.	Foreman, or as directed by Project Manager
Earthworks		
Areas of soil exposed during construction will be minimised times to reduce the potential for dust generation.	All times.	Foreman, or as directed by Project Manager
Exposed soils will be temporarily stabilised to prevent dust generation.	During weather conditions conducive to dust generation and prior to extended periods of inactivity.	Foreman, or as directed by Project Manager
Exposed soils will be permanently stabilised following disturbance to minimise the potential for ongoing dust generation.	As soon as practicable.	Foreman, or as directed by Project Manager
Activities must be managed to coincide with the next stage of development to minimise the amount of time the site is left cut or exposed	Periods between stages of development.	Project Manager
Construction		

Mitigation/Control Measure	Implementation Timing	Responsibility
Suitable dust suppression and/or collection techniques will be used during cutting, grinding or sawing activities likely to generate dust in close proximity to sensitive receivers.	During cutting, grinding and sawing activities.	Foreman
The potential for dust generation will be considered. Equipment will be selected and handling protocols developed to minimise the potential for dust generation..	During the handling of loose material.	Foreman, Project Personnel
All vehicles involved in the excavation and / or demolition process and departing from the property with materials, spoil or loose matter must have their loads fully covered before entering the public roadway.	Ongoing	Foreman, Project Personnel
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	Ongoing	Foreman, or as directed by Project Manager
Ensure fine materials are stored and handled to minimise dust.	Ongoing	Foreman, or as directed by Project Manager
Track out		
All equipment wheels must be washed before exiting the site using manual or automated sprayers and drive-through washing bays to ensure no visible dirt is tracked onto the public road network.	Ongoing.	Foreman, Project Manager
Deposits of loose materials will be regularly removed from sealed surfaces within and adjacent to project sites to reduce dust generation.	As required.	Foreman, or as directed by Project Manager
Gates must be closed between vehicle movements and must be fitted with shade cloth.	Ongoing.	Foreman, Project Personnel
Cleaning of footpaths and roadways must be carried out regularly.	As required.	Foreman, or as directed by Project Manager
Cleaning of footpaths and roadways must be carried out in such a way as to prevent sediment, dust or any other matter from entering the stormwater system or from polluting waters in ay other manner;	As required	Foreman, or as directed by Project Manager
Suitable measures are to be implemented to ensure that sediment and other materials are not tracked onto the roadway by vehicles leaving the site. It is an offence to allow, permit or cause materials to pollute or be placed in a position from which they may pollute waters.	Prior to commencement of work	Project Manager

8.3. Trigger Action Response Plan

A simply Reactive Dust Management Strategy, based on the following Trigger Action Response Plan (TARP), is to be implemented as part of this Plan.

A 1-hour average time period has been selected as a practical time-step for identifying adverse meteorological conditions that could potentially result in an exceedance of the facility's air quality objectives, while providing sufficient time for additional mitigation measures to be implemented to reduce dust emissions before such an exceedance occurs.

The short-term (1-hour average) trigger levels for the TARP have been set based on experience at construction sites throughout Australia and are also based on the empirical testing of dust generation with wind speed. The 1-hour average trigger levels and responses are shown in **Table 8**.

Table 8 TARP PM_{10} Trigger Levels and Responses

Alert	Wind speeds predicted / observed in excess of 10km/h	▪ Review operations via a visual inspection of dust emissions from current activities to ensure all standard dust mitigation measures are being appropriately implemented. ▪ Continue to closely monitor wind speed and direction being recorded at BoM Fort Denison AWS.
Action I	Wind speeds predicted / observed in excess of 15km/h; wind gusts at or above 20km/h	▪ Increase watering rates on haul roads and exposed areas where appropriate. ▪ Reduce speed of equipment / vehicles. ▪ Consider holding off on potentially dust generating activities. ▪ Note changed state and continue to closely monitor for visible dust generation
Action II	Wind speeds predicted / observed in excess of 20km/h; wind gusts at or above 25km/h	▪ Review planned operations considering exposed areas ▪ Cease any dust-producing activities or relocate relevant activities away from sensitive receptors, or to less exposed locations. ▪ Note changed state and monitor for further change

An alert level has been nominated at which point management will review the environmental conditions to determine if the dust is likely to be generated from the construction activities (or another local source or regional event). Further, confirm that all standard mitigation practices are being followed and remain alert as to any further changes to meteorological conditions that may require further action.

An exceedance of the interim trigger level ("Action I") will alert management to increasing wind speeds which will prompt a review of the need to increase/relocate watering where required based on visible dust or informal risk assessment. Even if any visible dust is concluded to be due to another local source / elevated background concentrations rather than emissions from construction, steps will be taken to minimise the additional incremental impacts from construction where possible.

An exceedance of the Action II trigger level requires more direct action to reduce dust levels, e.g., assessing whether dust-generating activities need to be temporarily stopped or relocated until conditions improve.

Alerts may be as simple as setting up custom alerts within a smart phone app on the Project Manager's phone, corresponding to the wind speeds in Table 8.

The nominated 1-hour average trigger levels listed in **Table 7** are to be reviewed as construction activities progress to ensure they are appropriate for the ongoing monitoring and management of dust emissions from construction. Any amendments to the trigger levels will be undertaken in consultation with the project manager and will be documented in an updated version of this Plan.

8.4. Daily Site Inspections

Daily informal site inspections will be carried out by the Compliance Officer (or equivalent role) during the construction period. Daily environmental inspections will include, but not be limited to:

- Visual inspection of airborne dust.
- Sniff tests for fumes / odour at the eastern site boundary (in the direction of sensitive receptors).
- Evaluate whether roads leaving the site are free of soil, and whether soil tracking onto the road network is being adequately prevented.
- Inspection of the erosion and sediment controls.
- Inspection of the waste storage areas.
- Determine whether all hazardous goods, including fuel and oil, are adequately stored or bunded.
- Evaluate whether spill kits are appropriately located and stocked.
- Any environmental inspection reports should include the above observations, with remedial or corrective actions noted (as appropriate). Any remedial or corrective actions should be reported to the Project Manager as soon as is practicable.

9. Complaints Handling Procedure

Hanson will provide a contact telephone number which the public may seek information or make a complaint. A log of complaints should be maintained and actioned by the site superintendent in a responsive manner;

All complaints received regarding operational air quality will be responded to within 24 hours by the appropriate construction personnel, so far as is reasonably practical.

Records of any complaints will include:

- Date and time of complaint.
- Method by which the complaint was made.
- Personal details of the complainant (if provided).
- Nature of the complaint.
- Action taken by Hanson and any follow up actions.
- If no action was taken, the reason why no action was taken.
- The complaints register must be made publicly available on the company website, updated on a quarterly basis, and records must be produced to any authorised officer of the EPA if requested.

10. Reporting and Review

Air quality management reporting is designed to comply with Approval conditions and provide stakeholder access to relevant air quality information and data.

10.1. Monitoring Reports

Air quality monitoring results will be reviewed by the Compliance Officer on a monthly basis. Investigations into any exceedances of the relevant air quality criteria will be undertaken and include analysis of corresponding meteorological conditions and activities undertaken at during the period. .

10.2. Incident Reporting

Incidents and Emergencies shall be managed in accordance with Hanson's Integrated Risk Management System (IRMS) guidelines document.

These detail how to:

- prevent and/or prepare for emergency situations;
- respond in the event of different emergency scenarios;
- notify required persons;

- report; and
- undertake incident investigation.

Where required, the Emergency and Crisis Management Plan may be enacted for major or extreme incidents.

A record of all incidents is recorded in Hanson's IRMS database.

10.3. Periodic Review

Review of the Plan will take place if monitoring records indicate that it is warranted or in the event of any significant change to air quality management procedures at the Project Site.

Any substantial modifications to the construction methods will be undertaken in consultation with the appropriate government agencies.

11. Community Consultation

Community management which includes, amongst other things, protocols for the distribution of letters informing the community of construction events, and contact details for further information, or the registration of complaints.

The Hanson Project Manager shall notify the Development Manager of all site environmental issues, concerns and complaints.

Complaints from other parties shall be directed to the Project Manager for investigation.
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12. Performance Monitoring

Compliance of this Plan with the Approval and any other relevant agency requirements will be measured according to the following performance indicators:

- Compliance with relevant air quality criteria at monitoring locations;
- Compliance with relevant Australian Standards;
- The frequency and nature of complaints reported to Hanson in relation to air quality;
- Contractor and employee awareness of the company's Environmental Policy and this Plan; and,
- Compliance with this Plan, as indicated by statutory reporting.

13. Continual Improvement

Through the effective application of best practice principles to construction activities including, where cost-effective and practicable, the adoption of best practice technologies and air quality control measures, Hanson will continue to improve on the environmental

performance of construction with progress to be monitored against performance indicators noted in Section 12.

14. References

ERM 2020, Hanson Glebe Island Concrete Batching Plant AQIA - Technical Addendum: Dispersion Modelling Sensitivity Analysis, ERM Australia Pacific, 21 October 2020

IAQM (2014). Guidance on the assessment of dust from demolition and construction. Institute of Air Quality Management, London. http://iaqm.co.uk/guidance/

PE 2018, Hanson Glebe Island Concrete Batching Plant Air Quality Assessment, Pacific Environment, 15 March 2018.