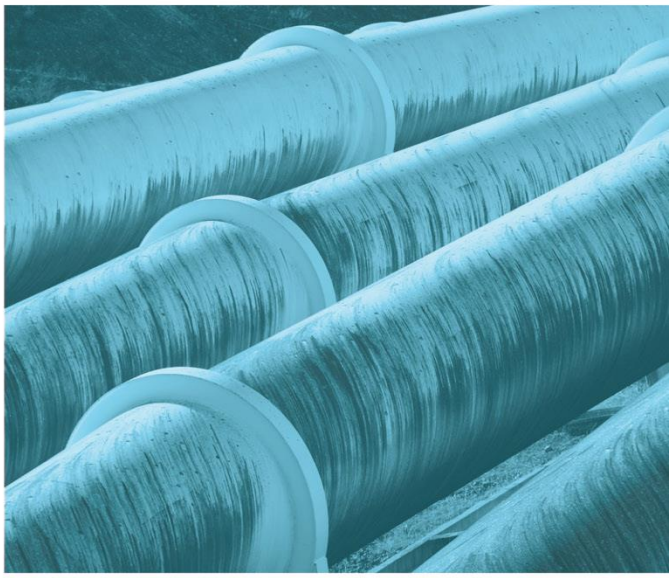



Construction Air Quality Impact Assessment

Sandhills Stormwater Management System Project, Byron Bay

Prepared for Planit Consulting
December 2023

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Executive Summary

Byron Shire Council is seeking to construct a stormwater management system ('the project') that will include reinstating wetlands at Sandhills Reserve in the town of Byron Bay, NSW. The objectives of the project include improving the site's environmental and cultural value, flood mitigation, stormwater treatment and storage, integration with catchment water cycle management, providing education and recreation opportunities, and creating connections between key sites in and around the town centre.

This air quality impact assessment (AQIA) for the construction of the project was prepared to support the corresponding Environmental Impact Statement (EIS). The AQIA followed the *Guidance on the Assessment of Dust from Demolition and Construction* published by the Institute of Air Quality Management (IAQM) in the United Kingdom. In the IAQM assessment procedure, activities at construction sites are divided into four types: demolition (not relevant to this project), earthworks, construction and track-out. A risk-based methodology is then used to consider amenity impacts due to dust soiling, health effects due to an increase in exposure to airborne particulate matter, and harm to ecological receptors.

For dust soiling impacts, the risk was determined to be low for construction, and medium for earthworks and track-out. For human health impacts, the risk was determined to be negligible for construction, and low for earthworks and track-out. For ecological impacts, the risk was also determined to be negligible for construction, and low for earthworks and track-out. Given the nature of the project (i.e. a wetlands area), it is likely that much of the material handled during earthworks and construction will be wet and coarse in nature (e.g. sand), and therefore the risk ratings for these activities are considered to be conservative.

It was considered that the operational impacts of the project on air quality, as well as potential sources of odorous air pollutant emissions, would be negligible.

The Construction Environmental Management Plan (CEMP) for the project will include measures to manage dust. As earthworks and track-out were determined to be medium-risk activities, the CEMP should pay particular attention to the dust generated from these activities.

Recommended mitigation measures include logging dust complaints, carrying out regular inspections and recording results, ensuring that exposed areas are kept moist, and ensuring that vehicles entering and leaving sites are covered to prevent escape of materials during transport.

The proposed mitigation measures are considered sufficient to ensure off-site impacts from the project are effectively managed.

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Appendices

1 Introduction

1.1 Background

Byron Shire Council is seeking to construct a stormwater management system ('the project') that will include reinstating wetlands at Sandhills Reserve in the town of Byron Bay, NSW. The objectives of the project include improving the site's environmental and cultural value, flood mitigation, stormwater treatment and storage, integration with catchment water cycle management, providing education and recreation opportunities, and creating connections between key sites in and around the town centre (AWC 2021).

Planit has been engaged by Bryon Shire Council to prepare an Environmental Impact Statement (EIS) for the project under Part 5 of the EP&A Act, and EMM Consulting Pty Ltd (EMM) has been engaged by Planit to prepare an air quality impact assessment (AQIA) for the construction of the project to support the EIS.

1.2 Site description

The project site (Figure 1.1) is located on Lot 383 DP 728202 and the adjoining Cowper Street road reserve. The site is largely undeveloped and well vegetated. It was subject to intensive sand mining activities during the early 1960s, although since restoration it has been left largely untouched, allowing regrowth of native vegetation.

Figure 1.1 Project site

The site is generally bound by Lawson Street to the north, Massinger Street to the east, Cowper Street to the west and residential and community uses to the south. The site is located directly across the road (Lawson Street) from Byron Bay's main beach. Land to the east is residential in nature with a mix of single dwellings, medium density development and tourist accommodation. To the south, the site joins residential and aged care accommodation. To the west, the site adjoins a Crown Reserve, and further west is the Byron Central Business District.

1.3 Proposed development

The scope of works for the project includes the establishment of a stormwater management system, including the following:

- a series of three artificial wetlands, including two permanent open water zones, for stormwater management and water quality improvement;
- formal entry and circulation paths;
- secondary informal gravel access paths.

The maximum extent of the project works, which covers an area of 2.7 ha, is shown in Figure 1.2. The work includes establishment of about 1.2 ha of wetlands and about 1 kilometre of paths will include vegetation removal, and will require the off-site disposal of around 15,000 m^3 of excess spoil (Planit 2023).

Figure 1.2 Extent of works

Once established, the wetlands will lead to positive impacts on water quality at Clarkes Beach, Belongil Creek and Cumbebin Swamp, while contributing to stormwater and flood management within the town centre and delivering positive cultural, social, economic and environmental outcomes.

A detailed description of the proposed project can be found in the report by AWC (2021).

1.4 Secretary's Environmental Assessment Requirements (SEARs)

The EIS is being prepared in accordance with the requirements of the Planning Secretary's Environmental Assessment Requirements (SEARs), issued by the NSW Department of Planning and Environment on 1 September 2023.

With respect to air quality, the requirements of the SEARs are presented in Table 1.1. The table also shows where the relevant SEARs requirements have been addressed in this report.

Table 1.1 Secretary's Environmental Assessment Requirements

Key issue	Requirement	Relevant report section
Air Quality	The EIS must include an assessment of all potential impacts of the proposed development on the existing environment (including cumulative impacts if necessary) and develop appropriate measures to avoid, minimise, mitigate and/or manage these potential impacts. As part of the EIS assessment, the following matters must also be addressed: • air quality – including: – a description of all potential sources of air and odour emissions during construction and operation – an air quality impact assessment in accordance with relevant Environment Protection Authority guidelines – a description and appraisal of air quality impact mitigation and monitoring measures.	This report addresses construction impacts. Operational impacts on air quality, and impacts from odorous emission sources, once the wetlands are constructed, are likely to be negligible, and have not been assessed.

2 Construction dust risk assessment

2.1 Overview

This section of the report provides an assessment of the dust impacts associated with the construction of the project. The assessment follows the *Guidance on the Assessment of Dust from Demolition and Construction* published by the Institute of Air Quality Management in the United Kingdom (IAQM 2014).

The main air pollution and amenity issues[1] at construction sites are:

- annoyance due to dust deposition (soiling of surfaces) and visible dust plumes;
- elevated concentrations of airborne particulate matter less than 10 micrometres (µm) in aerodynamic diameter (PM_{10}) due to dust-generating activities; and
- exhaust emissions from diesel-powered construction equipment[2].

Very high levels of soiling can also damage plants and affect the diversity of ecosystems.

Dust emissions can occur during the preparation of the land (e.g. demolition and earthmoving) and during construction itself. They can vary substantially from day to day depending on the level of activity, the specific operations being undertaken, and the weather conditions.

The risk of dust impacts from a construction site is related to the following:

- the nature of the activities being undertaken;
- the duration of the activities;
- the size of the site;
- the meteorological conditions (wind speed, direction and rainfall), as adverse impacts are more likely to occur downwind of the site and during drier periods;
- the proximity of receptors to the activities;
- the sensitivity of the receptors to dust;
- the adequacy of the mitigation measures applied to reduce or eliminate dust.

Any effects of construction on air pollution and amenity would generally be temporary and relatively short-lived. Moreover, mitigation should be straightforward, as most of the necessary measures are routinely employed as 'good practice' on construction sites. The IAQM approach therefore aims to identify risks and to recommend appropriate mitigation measures.

1 There are other potential impacts, such as the release of heavy metals, asbestos fibres or other pollutants during the demolition of certain buildings. These issues need to be considered on a site by site basis (IAQM 2014).

2 Exhaust emissions from on-site 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).

2.2 Details of construction

2.2.1 Construction footprint

The construction footprint (or maximum extent of works) for the project, as shown in Figure 1.2, covers an area of 2.7 ha.

2.2.2 Activities

The works for the project includes the establishment of the following:

- a series of three artificial wetlands, including two permanent open water zones, for stormwater;
- management and water quality improvement;
- formal entry and circulation paths;
- secondary informal gravel access paths

2.3 Risk assessment

In the IAQM assessment procedure, activities at construction sites are divided into four types:

1. Demolition, which is any activity that involves the removal of existing structures.
2. Earthworks, which covers the processes of soil stripping, ground levelling, excavation and landscaping. Earthworks will primarily involve excavating material, haulage, tipping and stockpiling.
3. Construction, which is any activity that involves the provision of new structures, modification or refurbishment.
4. Track-out, which involves the transport of dust and dirt by vehicles from the construction site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network.

The assessment method considers three separate dust impacts:

- annoyance due to dust soiling;
- the risk of health effects due to an increase in exposure to PM_{10}; and
- harm to ecological receptors.

The procedure for assessing risk is shown in Figure 2.1. Professional judgement is required in some cases, and where justification cannot be given, a precautionary approach is adopted. The assessment is used to define appropriate mitigation measures to ensure that there will be no significant residual effects.

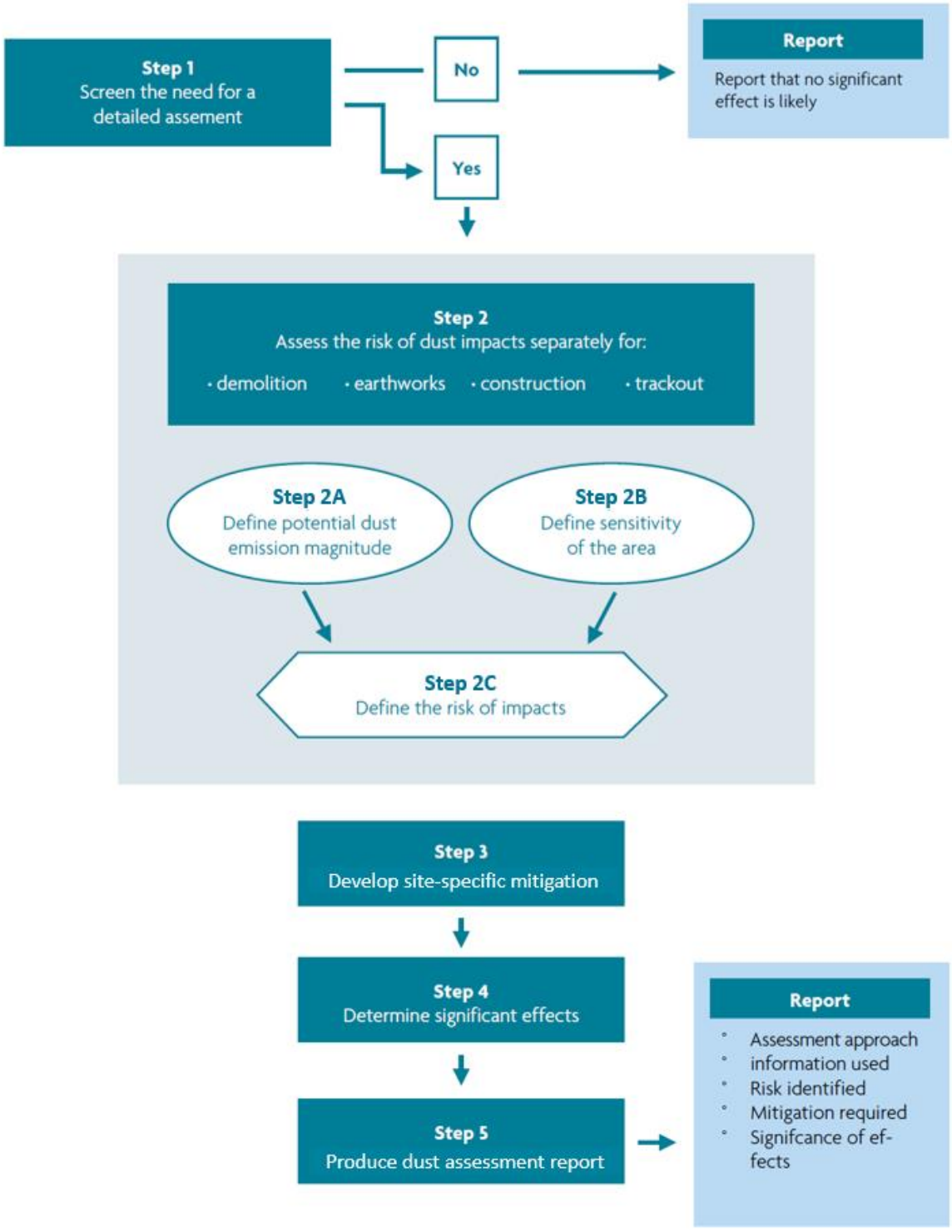

Figure 2.1 Procedure for the assessment of construction dust

The key steps in the procedure are as follows:

- Step 1 – a screening requirement for a detailed assessment based on the proximity of surrounding receptors;
- Step 2 – an assessment of the risk of dust impacts and the sensitivity of surrounding receptors;
- Step 3 – a determination of site-specific mitigation;
- Step 4 – consideration of residual effects and significance; and
- Step 5 – an assessment report (this document).

The following sections document the construction dust assessment for the project, and recommended mitigation measures are provided in Section 3.

2.4 Step 1 – Screening

The IAQM guidance specifies that a detailed construction dust assessment should be undertaken if:

- a human receptor[3] is located within 350 m of the works boundary;
- an ecological receptor[4] is located within 50 m of the works boundary; or
- a human/ecological receptor is within 50 m of a route used by construction vehicles up to 500 m from a site entrance.

It should be noted that, for the purpose of the assessment, the boundary was taken to be the outer envelope of the extent of works shown in Figure 1.2, as there were no receptors inside this envelope.

The results of Step 1 are summarised in Table 2.1. As there were human and ecological receptors within the distances from the works boundary specified above, the proposed construction activities triggered the requirement for a detailed assessment of construction impacts.

Table 2.1 Results of Step 1

Human receptors		Ecological receptors		Detailed assessment required
Within 350 m of site boundary	**Within 50 m of route used by construction vehicles**	**Within 50 m of site boundary**	**Within 50 m of route used by construction vehicles**	
Yes	Yes	Yes	Yes	Yes

[3] A 'human receptor' refers to any location where a person or property may experience the adverse effects of airborne dust or dust soiling, or exposure to PM_{10} over a time period relevant to air quality standards and goals. In terms of annoyance effects, this will most commonly relate to dwellings, but may also refer to other premises such as museums, galleries, vehicle showrooms, food manufacturers, electronics manufacturers, amenity areas and horticultural operations.

[4] An 'ecological receptor' refers to any sensitive habitat affected by dust soiling. This includes the direct impacts on vegetation or aquatic ecosystems of dust deposition, and the indirect impacts on fauna (e.g. on foraging habitats).

2.5 Step 2 – Assessment of risk of dust impacts

The IAQM guidance dictates that the risk category for dust impacts from construction activities should be allocated based on the following:

- the scale and nature of works (Step 2A); and
- the sensitivity of the area to dust impacts (Step 2B).

These factors are then combined to determine the risk of impacts from the construction activities (Step 2C). The risk rating process is addressed in the following sections.

2.5.1 Step 2A – Scale and nature of works

The scale and nature of demolition, earthworks, construction and track-out activities were determined. The IAQM guidance prescribes a range of criteria that classify the magnitude of each activity as either large, medium or small (see Table A.1 of Appendix A). The proposed activities were reviewed and allocated a potential dust emission magnitude, in accordance with the guidance as far as possible, and the findings are summarised in Table 2.2.

No demolition work will be required for the project. For earthworks and track-out the potential dust emission magnitude was 'medium', and for construction it was 'low'. For earthworks there was not a direct match with the IAQM criteria. The size of the project works area would suggest a large potential for dust generation, but on the other hand the type of material (mainly coarse sand), and the likelihood that the surrounding vegetation would provide some shielding for receptors, would suggest a small potential for dust generation. The selection of 'medium' therefore reflects these conflicts. For track-out, the selection of 'medium' dust emission potential was based primarily on the number of loads taken off-site per day.

Table 2.2 Dust emission potential

Activity	Project details (proposed activities)	Potential dust emission magnitude
Demolition	No demolition required.	Not applicable
Earthworks	• Extent of works, as defined in the assessment = 2.7 ha. • Material moved = 15,000 m^3 of soil and spoil (equating to around ~25,000 t). • Soil type = sand, with some silt/clay. • 4-5 earth-moving vehicles operating at one time.	Medium
Construction	• No buildings. • Pre-cast pipes and trafficable spillways between ponds. • Shared bike/pedestrian pathways.	Small
Track-out	• Around 4 trucks on rotation (truck & dog). • Around 20 loads a day taken off-site[(a)]. • Damp material with low potential for dust release. • Unpaved road length on-site >100 m.	Medium

(a) Based on 980 loads of excess spoil over 50 days, from Table 4-1 of Planit (2023).

2.5.2 Step 2B – Sensitivity of area

In determining the sensitivity of the area to dust impacts, soiling, human health and ecological receptors are treated separately.

i Dust soiling effects on people and property

For dust soiling impacts, the sensitivity of the local area is defined based on the sensitivity of receptors and their number (see Table A.2 of Appendix A). For earthworks, construction and track-out, the receptors within 350 m of the construction footprint were allocated a 'high' sensitivity rating for dust soiling on the basis that they were mostly residential.

Figure 2.2 shows the extent of works used in the assessment (i.e. the outer envelope of the actual works), the IAQM distance bands and the locations of receptors. It is worth noting here that there is no 200 m distance for dust soiling impacts (this is only used for human health impacts – see Section 2.5.2ii).

The numbers of buildings in each distance band were counted, with receptor types being identified from Google Earth.

Figure 2.2 Extent of works, buffers zones and receptors for construction impacts

The exact counting of the number of human receptors is not required by the IAQM guidance. Instead it is recommended that judgement is used to determine the approximate number of buildings within each distance band. For buildings which are not dwellings professional judgement should be used to determine the number of human receptors. For this assessment, the following numbers of human receptors per building were assumed:

- residential (home) = 1 (by convention in the IAQM guidance)
- residential (complex) = 20
- hotel = 20
- commercial (small) = 2
- church = 10
- recreation = 5

The resulting numbers of human receptors for each IAQM distance band are shown in Table 2.3.

Table 2.3 Numbers of human receptors for dust soiling impacts

	Number of human receptors by distance from construction footprint boundary or haul routes			
Activity	**<20 m**	**20-50 m**	**50-100 m**	**100-350 m**
Demolition	Not applicable			
Earthworks, construction	40	206	170	390
Track-out	12	88	-	-

Based on the receptor sensitivity and the numbers of receptors within the stated distances from the footprint, the sensitivity to dust soiling effects for earthworks, construction and track-out was determined to be 'high' (Table 2.4).

Table 2.4 Summary of sensitivity of area to dust soiling impacts

Activity	**Sensitivity of local area to dust soiling impacts**
Demolition	Not applicable
Earthworks	High
Construction	High
Track-out	High

ii Human health impacts

The IAQM guidance defines the approach for categorising the sensitivity of the local area to human health impacts, taking into account the sensitivity of receptors in the area, the proximity and number of receptors, and annual mean concentrations of particulate matter less than 10 µm in aerodynamic diameter (PM_{10}) (see Table A.3 of Appendix A).

As with dust soiling, the receptors in the area of the project were allocated a 'high' sensitivity rating for human health.

Figure 2.2 shows the IAQM distance bands for construction and the receptors for human health impacts. For human health impacts the 200 m distance is included. The resulting numbers of human receptors for each IAQM distance band are shown in Table 2.5.

Table 2.5 Numbers of human receptors for human health impacts

	Number of human receptors by distance from construction footprint boundary or haul routes				
Activity	**<20 m**	**20-50 m**	**50-100 m**	**100-200 m**	**200-350 m**
Demolition	Not applicable				
Earthworks, construction	40	206	170	168	222
Track-out	12	88	-	-	-

In the absence of long-term PM_{10} monitoring within the Byron Shire, annual mean PM_{10} concentrations between 2012 and 2020 were obtained from the air quality monitoring stations at Port Macquarie and Coffs Harbour, operated by the NSW Department of Planning and Environment (DPE), and Southport, operated by Queensland Department of Environment and Science (DES).

The annual mean concentrations are summarised in Table 2.6. PM_{10} concentrations were relatively high in 2019 due to extensive bushfires in Eastern Australia, and not representative of historical levels. On balance, it was determined that the concentrations at the project site would correspond to the lowest concentration band (<15 µg/m^3)[5] in the IAQM guidance.

Table 2.6 Annual mean PM_{10} concentrations

Year	**Annual mean PM_{10} concentration (µg/m^3)**		
	NSW: Port Macquarie	**NSW: Coffs Harbour**	**QLD: Southport**
2018	-	-	15.8
2019	-	-	19.7
2020	14.4	11.9	13.4
2021	10.8	10.0	10.5

Based on these assumptions, the sensitivity of the local area to human health impacts was determined to be 'low' for earthworks, construction and track-out (Table 2.7). This is the lowest available rating in the guidance.

[5] In the IAQM guidance this value is 24 µg/m^3. For the purpose of this assessment it has been scaled down according to the ratio Australian and UK annual mean standards for PM_{10} (25 µg/m^3 and 40 µg/m^3 respectively).

Table 2.7 Summary of sensitivity of area to human health impacts

Activity	Sensitivity of local area to human health impacts
Demolition	Not applicable
Earthworks	Low
Construction	Low
Track-out	Low

iii Ecological impacts

For ecological impacts, the sensitivity of the local area is defined based on the sensitivity of locations and their distance from the construction activity (see Table A.4 of Appendix A).

AWC (2021) identified vulnerable ecological receptors outside the works boundary and within the distances in the IAQM guidance. Elevated levels of dust may be deposited onto the foliage of vegetation adjacent to the works area. This has the potential to reduce photosynthesis and transpiration and cause abrasion and heating of leaves. Dust deposition is likely to be greatest during periods of earthworks and vegetation clearing activities and during adverse weather conditions. However, deposition of dust on foliage is likely to be highly localised, temporary and relatively short-lived. The site's location, in a subtropical environment, and proximity to coastal breezes, will assist the shedding of any short-term dust deposition from foliage. In addition, the species present are not known to be particularly sensitive to dust. Based on this information, and the short timeframe of exposure to dust, ecological receptors were allocated a 'low' sensitivity rating.

The resulting sensitivity of the local area to ecological impacts was determined to be 'low' for earthworks, construction and track-out (Table 2.8). This is the lowest available rating in the guidance.

Table 2.8 Summary of sensitivity of area to ecological impacts

Activity	Sensitivity of local area to ecological impacts
Demolition	Not applicable
Earthworks	Low
Construction	Low
Track-out	Low

2.5.3 Step 2C – Definition of risk of impacts

To determine the risk of impacts **with no mitigation applied**, the IAQM guidance requires that the dust magnitude rating is combined with the sensitivity of the local area for each of the activity categories (ie demolition, earthworks, construction and track-out). Using the lookup tables in the guidance (see Table A.5 of Appendix A), risk ratings for each type of activity were allocated and are presented in Table 2.9.

To summarise:

- For dust soiling impacts, the risk was determined to be low for construction and medium for earthworks and track-out.

- For human health impacts, the risk was determined to be negligible for construction, and low for earthworks and track-out.
- For ecological impacts, the risk was determined to be negligible for construction, and low for earthworks and track-out.

None of the activities were found to be high-risk.

NB: Given the nature of the project (i.e. a wetlands area), it is likely that much of the material handled during earthworks and construction will be wet and coarse in nature (e.g. sand), and therefore the risk ratings for these activities are considered to be conservative.

The risk ratings in Table 2.9 are useful to help focus and target mitigation measures (Step 3 below), such that all risks are not significant.

Table 2.9 Summary of risk assessment[(a)]

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
Demolition	-	-	-	-	-	-	-
Earthworks	Medium	High	Low	Low	Medium Risk	Low Risk	Low risk
Construction	Small	High	Low	Low	Low Risk	Negligible risk	Negligible risk
Track-out	Medium	High	Low	Low	Medium Risk	Low Risk	Low risk

(a) '-' = not applicable.

2.5.4 Step 3: Recommended mitigation measures

The dust impact risk allocations in Step 2C relate to unmitigated construction dust emissions. Based on the risk of dust impacts identified in Table 2.9, Step 3 involved identifying mitigation measures for each of the three relevant activities to further reduce the residual risk for impacts on the surrounding area. The project would be constructed according to conventional methods and would be guided by a Construction Environmental Management Plan (CEMP) to effectively manage site environmental impacts. The measures recommended for inclusion in the CEMP are summarised in Section 3.

2.5.5 Step 4: Significance of risks

Once the appropriate dust mitigation measures have been identified in Step 3, the next step in the IAQM procedure is to determine whether there are residual significant effects arising from the construction phase of a proposed development. For almost all construction activities the aim should be to prevent significant effects on receptors through effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant' (IAQM 2014).

Construction dust is unlikely to represent a serious problem at the project site, assuming the recommended mitigation measures in Section 3 are implemented. Therefore, the residual risk for impacts on the surrounding area following mitigation will be 'not significant'.

2.6 Operational impacts and odour

It is considered that following the completion of proposed construction activities, there would be negligible potential for the generation of air pollutant emissions or associated impacts from the operation of the project. For example, all disturbed areas will be stabilised, and exposed areas revegetated, removing any significant sources of dust.

There will not be any significant sources of odorous air pollutants associated with the construction or operation of the project.

Consequently, operational phase air quality and odour-related impacts from the project have not been included in this assessment.

3 Mitigation and monitoring

The project would be constructed according to conventional methods and would be guided by a CEMP to effectively manage off-site environmental impacts. The CEMP may include (but will not be limited to) the recommended mitigation measures listed below. These measures are routinely employed as 'good practice' on construction sites.

None of the construction activities were found to be high-risk. Earthworks was determined to be medium-risk for dust soiling impacts and human health impacts, and track-out was determined to be medium-risk for dust soiling impacts. The CEMP should therefore pay particular attention to these activities.

The following general mitigation measures are recommended:

- prior to commencement of construction activities, develop appropriate communications to notify the potentially impacted residences of the project (duration, types of works, etc), relevant contact details for environmental complaints reporting;
- a complaints logbook will be maintained throughout the construction phase which should include any complaints related to dust; where a dust complaint is received, the response actions should be detailed in the logbook;
- record any exceptional incidents that cause dust and/or air emissions, either on or off site, and the action taken to resolve the situation in the logbook;
- carry out daily site inspections, including local meteorological forecast, Record inspection results in a logbook;
- erect shade cloth barriers to site fences around potentially dusty activities such as excavation and material stockpiles where practicable;
- keep site fencing and barriers clean using wet methods;
- ensure proper maintenance of all equipment engines;
- avoid leaving engines running at idle where possible;
- deploy a water cart to ensure that exposed areas and topsoils/subsoil are kept moist, where necessary;
- modify working practices by limiting activity during periods of adverse weather (hot, dry and windy conditions) and when dust is seen leaving the site;
- limit the extent of clearing of vegetation and topsoil to the designated footprint required for construction and appropriate staging of any clearing; and
- minimise drop heights from loading or handling equipment.

With respect to managing **earthworks**, the following measures are recommended:

- re-vegetate earthworks and exposed areas to stabilise surfaces as soon as practicable.

With respect to managing **track-out**, the following measures are recommended:

- use water-assisted dust sweeper(s), to remove, as necessary, any material tracked out of the site onto public roads;
- ensure vehicle loads entering and leaving sites are covered to prevent escape of materials during transport.

4 Summary and conclusions

The construction dust assessment followed the *Guidance on the Assessment of Dust from Demolition and Construction* published by the IAQM. A risk-based methodology was used to consider amenity impacts due to dust soiling, health effects due to an increase in exposure to PM_{10}, and harm to ecological receptors.

For dust soiling impacts, the risk was determined to be low for construction and medium for earthworks and track-out. For human health impacts, the risk was determined to be negligible for construction, and low for earthworks and track-out. For ecological impacts, the risk was also determined to be negligible for construction, and low for earthworks and track-out.

Given the nature of the project (i.e. a wetlands area), it is likely that much of the material handled during earthworks and construction will be wet and coarse in nature (e.g. sand), and therefore the risk ratings for these activities are considered to be conservative.

It was assumed that odour impacts and operational impacts on air quality will be negligible. There will not be any significant sources of odorous air pollutants associated with project construction. Following construction there would be negligible potential for the generation of air pollutant emissions or odour. For example, all disturbed areas will be stabilised, and exposed areas revegetated, removing any significant sources of dust.

The CEMP will include measures to manage dust. As earthworks and track-out was determined to be medium-risk activities, the CEMP should pay particular attention to the dust generated from these activities. Recommended mitigation measures include logging dust complaints, carrying out regular inspections and recording results, ensuring that exposed areas are kept moist, and ensuring that vehicles entering and leaving sites are covered to prevent escape of materials during transport. The proposed mitigation measures are considered sufficient to ensure off-site impacts from the project are effectively managed.

5 References

AWC 2021, Sandhills Wetland - Basis of Design Report, Australian Wetlands Consulting Pty Ltd, December 2021.

IAQM 2014, Guidance on the assessment of dust from demolition and construction, Version 1.1, Institute of Air Quality Management, London, www.iaqm.co.uk/ text/guidance/construction-dust-2014.pdf.

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Appendix A

IAQM criteria

The assessment criteria in the IAQM guidance are summarised in the following tables.

Table A.1 Site categories (scale of works)

Type of activity	Site category definitions		
	Large	**Medium**	**Small**
Demolition	Building volume >50,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level.	Building volume 20,000–50,000m^3, potentially dusty construction material, demolition activities 10-20 m above ground level.	Building volume <20,000 m^3, construction material with low potential for dust release (e.g. metal cladding, timber), demolition activities <10 m above ground and during wetter months.
Earthworks	Site area >10,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth-moving vehicles active at any one time, formation of bunds>8 m in height, total material moved >100,000 tonnes.	Site area 2,500-10,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4-8 m in height, total material moved 20,000-100,000 tonnes.	Site area <2,500 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes, earthworks during wetter months.
Construction	Total building volume >100,000 m^3, piling, on site concrete batching; sandblasting	Building volume 25,000-100,000 m^3, potentially dusty construction material (e.g. concrete), piling, on site concrete batching.	Total building volume <25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).
Track-out	>50 HDV (>3.5t) OUTWARD movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length on-site >100 m.	10-50 HDV (>3.5t) OUTWARD movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length on-site 50–100 m.	<10 HDV (>3.5t) OUTWARD movements in any one day, surface material with low potential for dust release, unpaved road length on-site <50 m.

Table A.2 Sensitivity of area to dust soiling impacts

Receptor sensitivity	Number of receptors	Distance from source (m)			
		<20	**<50**	**<100**	**<350**
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table A.3 Sensitivity of area to human health impacts

Receptor sensitivity	Annual mean PM_{10} concentration	Number of receptors	Distance from the source (m)				
			<20	<50	<100	<200	<350
High	>20 µg/m³	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	17.5 - 20 µg/m³	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	15 – 17.5 µg/m³	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<15 µg/m³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>20 µg/m³	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	17.5 - 20 µg/m³	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	15 – 17.5 µg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<15 µg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table A.4 Sensitivity of area to ecological impacts

Receptor sensitivity	Distance from source (m)	
	<20	20-50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Table A.5 Risk of dust impacts

Type of activity	Sensitivity of area	Dust emission potential		
		Large	**Medium**	**Small**
Demolition	High	High Risk	Medium Risk	Medium Risk
	Medium	High Risk	Medium Risk	Low Risk
	Low	Medium Risk	Low Risk	Negligible
Earthworks	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible
Construction	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible
Track-out	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Low Risk	Negligible
	Low	Low Risk	Low Risk	Negligible