REPORT

Tonkin+Taylor

Downtown West - Downtown Carpark Redevelopment - Demolition to Construction

Air Quality Assessment

Prepared for
Precinct Properties Holdings Limited
Prepared by
Tonkin & Taylor Ltd
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1 Introduction

1.1 Background

Precinct Properties New Zealand Limited (PPL) has lodged resource consent applications with Auckland Council for the Downtown West redevelopment of the Downtown Carpark property at 2 Lower Hobson Street, Auckland, including associated elements at 188 and 204 Quay Street and 29 Customs Street West (herein referred to as "the Site"). The Site location is shown in Figure 1.1.

In response to a request from Auckland Council for further information in relation to compliance with permitted activity standards of discharges to air from demolition and construction activities for the development PPL has engaged Tonkin & Taylor Limited (T+T) to prepare this air quality impact assessment (AQIA).

This AQIA report has been prepared in accordance with our proposal[1] dated 14 February 2023 and variation order dated 8 October 2024.

Figure 1.1: Application lots.

1.2 Context

The information request from Auckland Council included the following request relating to discharges to air from the demolition and construction phases of the development:

> *The Air Quality Specialist has reviewed the relevant information to Air Quality and has noted: "The effectiveness of the DMP is contingent on strict adherence to the outlined measures.*

[1] T+T LOE, 14 February 2023. *"Downtown Carpark Redevelopment – Geotechnical and Environmental Engineering/Civil and Infrastructure Services"*, Job number 1016043.

Given the scale of the project and the urban context, there is a significant risk that dust control measures may not be fully effective at all times, leading to potential air quality impacts beyond the site boundaries."

In light of this, the Air Quality Specialist is of the view that the project must not be classified as a permitted activity under AUP E14. Instead, it is requested that either:

a. The dust management and monitoring strategy is enhanced to ensure compliance with the permitted activity standards; or

b. An air discharge consent is added to the reasons for consent, which would allow specific conditions to adequately protect air quality during the demolition and construction phases.

The discharges to air from the proposed demolition and construction activities are permitted under the rules of the Auckland Unitary Plan (Operative in Part)[2], provided the following permitted activity standards under section E14.6.1.1 are met:

1 *The discharge must not cause, or be likely to cause, adverse effects on human health, property or ecosystems beyond the boundary of the premises where the activity takes place.*
2 *The discharge must not cause noxious, dangerous, offensive or objectionable odour, dust, particulate, smoke or ash beyond the boundary of the premises where the activity takes place.*
3 *There must be no dangerous, offensive or objectionable visible emissions.*
4 *There must be no spray drift or overspray beyond the boundary of the premises where the activity takes place.*

1.3 Purpose

The purpose of this report is to assess the environmental effects of discharges to air from the construction and demolition phases of the development to assess compliance of the discharges with the permitted activity standards described in Section 1.2.

[2] At Activity A1 of Table E14.4.1

2 Activity description

2.1 Overview of site and development

The Site, illustrated in in Figure 1.1, includes the following elements:

- The seven storey Downtown Carpark Building at 2 Lower Hobson Street. The majority of demolition and construction works will occur within this property.
- The AON Centre at 29 Customs Street West and HSBC Tower at 188 Quay Street, which share the same two level podium. The works within these properties relate only to the shared podium of the two buildings to facilitate the new laneway network.
- The second floor footbridge over Lower Hobson Street connecting the Downtown Carpark Building to the building at 204 Quay Street.
- The second floor (vehicle) bridge over Customs Street West connecting the Downtown Carpark Building to Fanshawe Street.

Within the Site, the proposed development works include:

- Demolition of existing carpark building and adjoining foot and vehicle bridge structures;
- Construction enabling works, including removal of remaining ground floor slabs and foundations;
- Excavation of six levels within the Downtown Carpark Building property; and
- Construction of three podium buildings, two towers and six basement levels.

The stages of development works, as they relate to potential emissions to air are summarised in sections 2.2 to 2.5.

2.2 Demolition

Demolition of the existing Downtown Carpark building, the vehicle ramp connecting to Fanshawe Street and the pedestrian bridge over Lower Hobson Street is proposed in five stages over approximately 10 to 12 months. The five stages are summarised below:

- Stage 1: Removal of Lower Hobson Street pedestrian overbridge (48 hours).
- Stage 2: Demolition of the west section of the Downtown Carpark building (3 months).
- Stage 3: Demolition of the west section of the Downtown Carpark building (3 months).
- Stage 4: Demolition of the east section of the Downtown Carpark building (6 months).
- Stage 5: Removal of the Downtown Carpark ramp over Customs Street West onto Fanshawe Street (1 week).

The demolition will be subject to the demolition contractor's final methodology. It is currently proposed that the demolition of the carpark will entail an internal strip out followed by hard demolition. The hard demolition will involve cut and crane top down demolition down to Level 2 and high reach demolition excavators on lower levels down to the ground floor slab. Water sprays will be operated prior to and during demolition activity and all concrete shall be wet cut.

Demolition materials will be loaded onto trucks for recycling (where appropriate) and offsite removal. All asbestos will be removed by licensed asbestos contractors in accordance with the Asbestos Management Plan for the works and disposed of at an appropriate facility that can accept asbestos.

Ground floor slabs and foundations will subsequently be removed to enable excavation and construction.

2.3 Basement excavation

Earthworks to excavate the six below-ground basement levels are proposed to occur over 6 months. The volume of earthworks is approximately 130,000 m³ to an RL of -16.3 m over an area of 6,442 m².

The modelled groundwater level is approximately RL 1.4 m at design static groundwater level and RL 2.5 m at elevated groundwater level. Therefore, some groundwater infiltration is anticipated during earthworks. To minimise groundwater inflows, prior to earthworks an impermeable perimeter wall will be installed. Due to residual moisture and a reduced degree of groundwater inflow, excavated material is expected to be in damp condition and water is likely to pond at the low points of the excavation area. areas a result the excavated material will have a low dust generation potential on removal.

All excavated material will be carted offsite and disposed of at an appropriate waste disposal facility which can accept the level of contamination present. A surge pile of excavated material may be formed where the trucks are loaded. This will be isolated by a perimeter bund to prevent surface water runoff. There will be no large-scale bunds or stockpiles formed on the site due to its constrained nature.

Note that the existing belled reinforced concrete pile foundations from the Downtown Carpark building will need to be removed as the excavation proceeds if they conflict with the construction of the foundations for the proposed development.

2.4 Construction

2.4.1 Construction elements and phases

The proposed construction works involve the following:

- A 6 level basement
- Two main towers
- Three podium buildings

Construction can be separated into three major phases; basement, foundations and main works which are described in the following section.

2.4.2 Basement construction

As excavation of the 6-level basement occurs, stabilisation measures will be constructed to support the exposed cut faces. The method of stabilisation varies for each side of the basement.

Along the northern portion of the basement site, a perimeter wall and internal plunge piles will be installed with top down construction and partial construction of floor slabs to stabilise the excavation face. Excavation will be accessed from the south of the site.

On the western side of the site, the basement excavation will be retained by a diaphragm wall with ground anchors.

Similarly, a sheet pile wall with ground anchors will be installed along the southern and south-eastern perimeter. Once excavation reaches Auckland's East Coast Bay Formation (ECBF) rock, excavation can occur vertically. Temporary support may be required with rock bolts with mesh facing or shotcrete to stabilise the rock cut. Horizontal drains may be required to temporarily relieve groundwater pressures near the cut face. An alternative to this is a diaphragm wall with ground anchors. Limited dust is expected to be generated from the exposed rock face.

The construction of these stabilisation measures will cover the exposed soil faces thereby reducing dust sources.

2.4.3 Foundations

Foundation works will commence after the completion of excavation works. The foundation will be comprised of a shallow strip, pad or raft foundation on ECBF rock and piled foundations comprised of sheet piles or bored cast in-situ concrete piles.

2.4.4 Main construction works

Above ground core raft foundations will be constructed to support two crane towers that will be used during construction. The crane towers and jump forms will be installed. A 'Jump Form' is a prefabricated, 'self-climbing' formwork system for concrete structures that lets the construction of the lift core progress in advance of the concrete floor slab construction.

Forming, reinforcement tying and of the cores will progress in a controlled cycle to construct the podium levels of the development. Once above the podium levels, the two high-rise towers will transition into typical arrangements. From here the high rises will be efficiently constructed in a structure, passive fire, façade and fit-out works sequence.

2.5 Vehicle movements

Vehicle movements will occur throughout demolition, earthworks and construction. Vehicle access to the construction site will be from the slip lane off Lower Hobson Street adjacent to the site. Using the Lower Hobson Street slip lane, the site entry will be from Quay Street and the exit will be via Customs Street West.

The projected frequencies of truck movements associated with the demolition, earthworks and construction phases are described in the Integrated Transport Assessment for the project. The highest number of truck movements is likely to occur during the excavation stage as excavation material is transported off site.. A lower frequency of truck movements will be required during the demolition phase stage as demolition material is transported off site.

2.6 Operating hours

As noted in the AEE, it is anticipated that construction hours will generally be between 7am – 6pm, Monday to Friday (excluding public holidays) and 8am – 5pm, Saturdays and public holidays.

Construction hours may be extended to 6.30am – 10.30pm Monday to Friday (excluding public holidays) and 7am – 11pm on Saturdays and public holidays to enable high noise works to occur outside of normal office hours.

3 Nature of the discharges to air

The main discharge to air from the proposed demolition and construction activities is dust/particulate matter. Dust/particulate matter emissions are generally categorised by particle size (denoted by aerodynamic diameter of particles) as follows:

- Deposited dust – particulate of generally greater than 30 microns (μm) in diameter. This coarse size fraction falls out of the air relatively rapidly and deposits on exposed surfaces. The deposition on surfaces can cause nuisance effects on amenity and soiling effects on property;
- Total suspended particulates (TSP) - particulate of generally less than 30 μm in diameter. Particulate of this size fraction remains suspended in air at the time for longer than larger fractions. TSP (particularly the coarse fractions of greater than 10 μm) can potentially affect visibility; and
- Fine inhalable or respirable fractions of TSP such as PM_{10} (particles with an aerodynamic diameter less than 10 μm) can penetrate the nose or mouth under normal breathing conditions, and is the most commonly used indicator of the potential for health effects of particulate matter in New Zealand.

The particulate emitted from demolition and construction activities will be predominantly comprised of the coarse deposited fraction, from which nuisance and amenity effects are most prevalent. However, a minority fraction of the particulate emissions may also be comprised of fine particulate that can cause respiratory health effects.

Crystalline silica (comprising crystalline forms of silicon dioxide, SiO_2), may also be present in concrete and other construction material to be removed during demolition. Exposure to high concentrations of the respirable fraction (respirable crystalline silica or RCS) of this material can cause the respiratory disease silicosis.

4 Environmental setting

4.1 Adjoining land use and sensitive receptors

The Site is located in a mixed-use (City Centre) zone, in Auckland City Centre. As a result of this, the area surrounding the site is highly modified, high density and developed for a range of uses typical of a central business district. Figure 4.1 shows the density of the area surrounding the site and neighbouring major buildings.

Within the application lots and partially included in the activities are the HSBC Tower and the AON Centre, which share the same podium. The AON Centre features 21 level office tower, and the HSBC Tower features a 29 level office tower. Each of these tower buildings are fully enclosed with air conditioned ventilation. Exposure to outdoor air for activities occupying the tower floors is likely to be via ventilation intakes only.

Activities located at first floor level of the shared podium of the two buildings (where there is outdoor access) include:

- A childcare centre operated by Kindercare. The outdoor play area for the centre is located at first floor on the western side of the AON Centre (facing the carpark building);
- Separate lobby areas for each building; and
- Food retail outlets.

Outside of the application lots, directly to the north of the existing carparking building is the M Social Hotel. This also contains a restaurant and bar on the ground floor which is accessed off Quay Street to the north.

To the west of the site across Lower Hobson Street lies the Sebel Auckland Viaduct Harbour Hotel at the corner of Customs Street West and Lower Hobson Street, which includes both hotel rooms and private apartments. To the north of the Sebel Hotel on Lower Hobson Street lie the rear of various hospitality operations on the Viaduct Harbour. These buildings screen the existing carpark building from the Viaduct Harbour, which features a sailboat marina and public promenade areas, as well as hospitality operations.

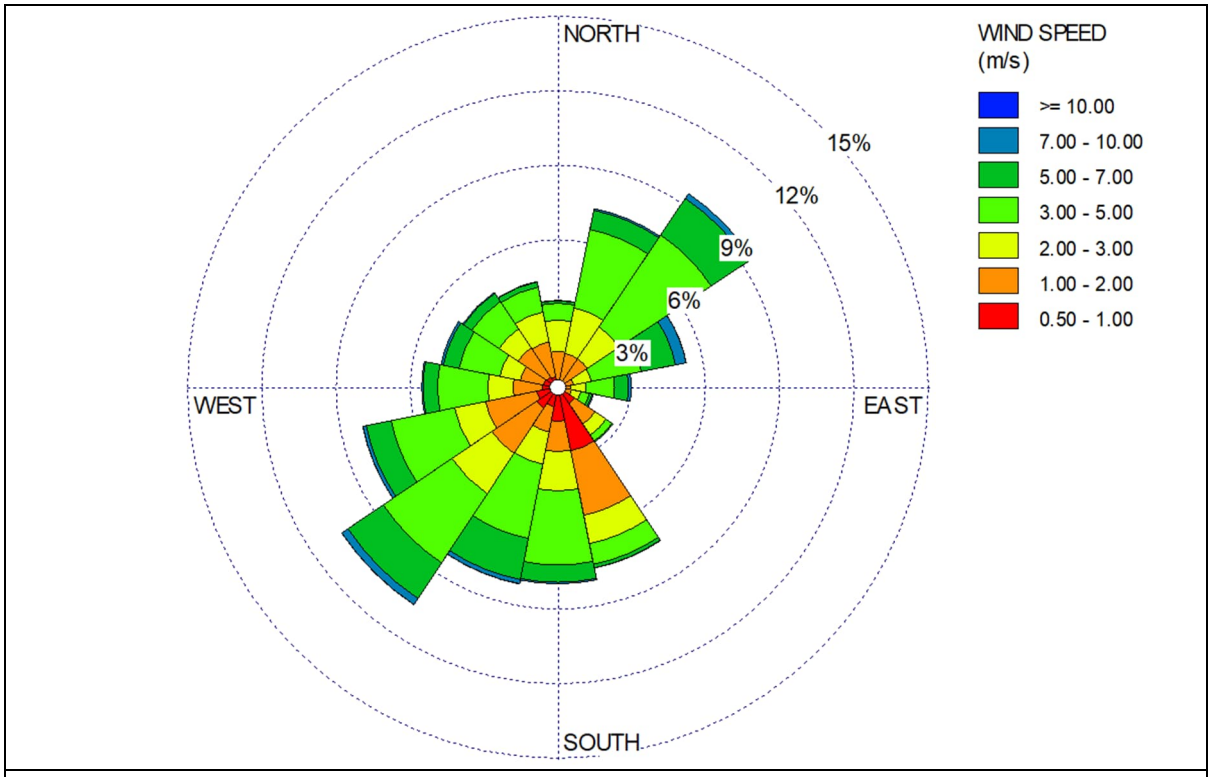
To the south of the site, across Fanshawe Street lie the multi-storey Kyndryl and Group M buildings. Commercial Bay Shopping Mall and the PwC Tower are located Street to the east of the AON Centre across Lower Albert Street. An office building at 139 Quay Street lies to the north of the M Social Hotel, across Quay Street. All of these buildings are used by a range of occupants, generally including commercial and office uses above ground level and food service and retail at ground and lower levels.

To the south-west of the site are the Auckland Council Tepid Baths which are used recreationally for swimming. To the north of the HSBC Tower is the Downtown Ferry Terminal Pier 13 and the recently redeveloped Waterfront Park, Te Wananga.

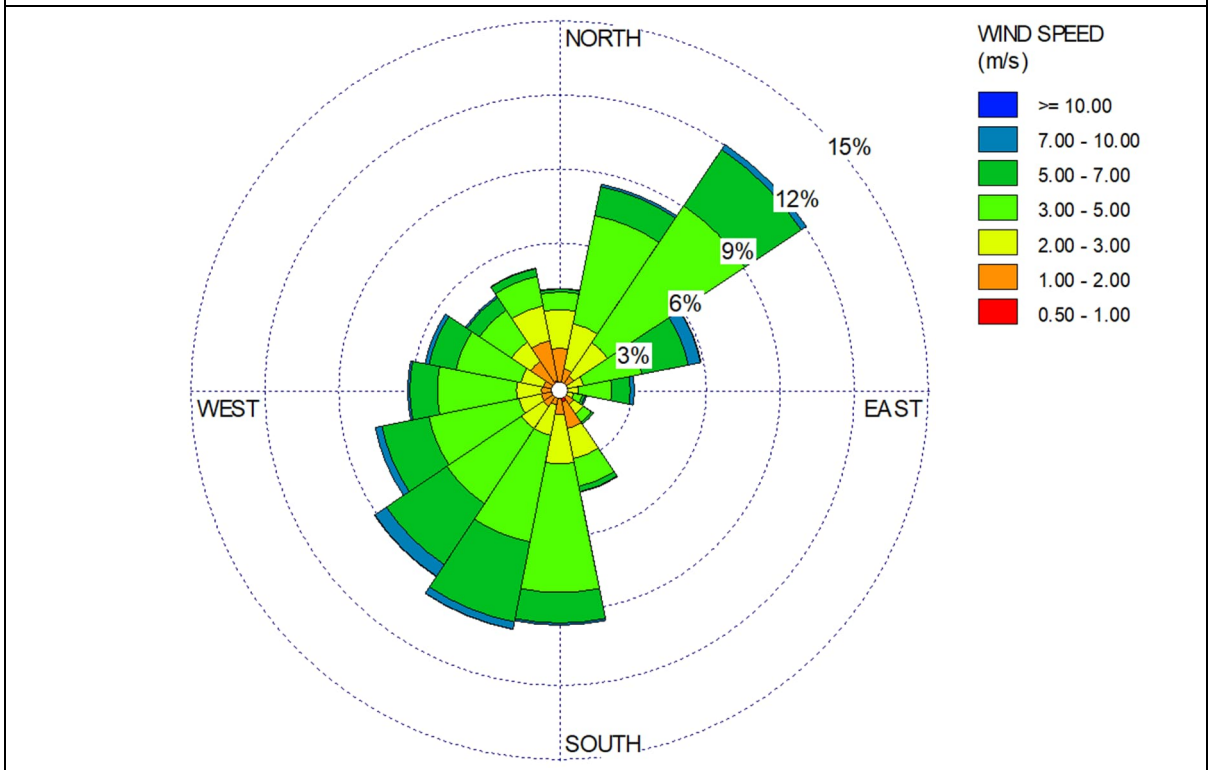
Figure 4.1: Area surrounding site.

4.2 Local meteorology

Local meteorological conditions provide an important influence on dust emissions generation and propagation. In general, the amount of dust generated largely depends on if conditions are dry, and the wind speeds, with faster wind speeds increasing effect of wind erosion and the distance that the dust travels.



All hours, 2018-2022. Calms = 5.4%, Average wind speed = 3,7 m/s



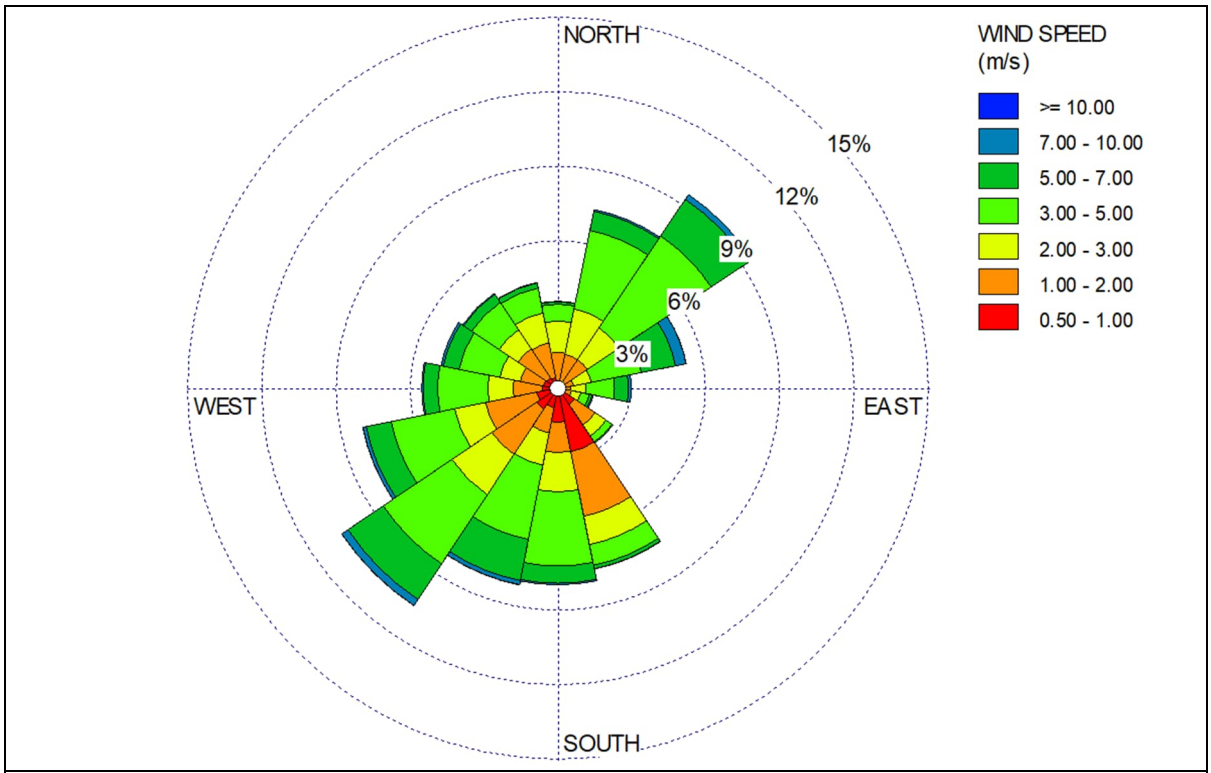
7am – 6pm, 2018-2022. Calms = 1.6%, Average wind speed = 5.5 m/s

Figure 4.2 shows wind roses of wind speeds and directions measured at the NIWA weather station at the Auckland Museum of Transport and Technology (MOTAT), Western Springs from 2018 to 2023. Wind roses are presented in Figure 4.2 for all hours and for the hours of 7am to 6pm (broadly representing the proposed operating hours.

The weather station is located approximately 4.2 km southwest of the Site. Wind measurements at this station are likely to be generally representative of overlying wind conditions in central Auckland as it is relatively free from nearby obstructions or eddies created by adjacent buildings.

Although tall buildings and topographical features in the area will alter localised wind conditions, the wind direction frequency trends illustrated below are likely to be broadly similar to those experienced at the site.

Based on the wind roses in winds are predominantly from the southwest and northeast, and therefore sensitive locations to the northeast and southwest of the site, respectively, are likely to be most frequently exposed to any off-site dust emissions from site activities. Winds during the proposed construction hours follow a similar directional pattern with generally higher wind speeds and a lower frequency of calm and light wind conditions.



All hours, 2018-2022. Calms = 5.4%, Average wind speed = 3,7 m/s

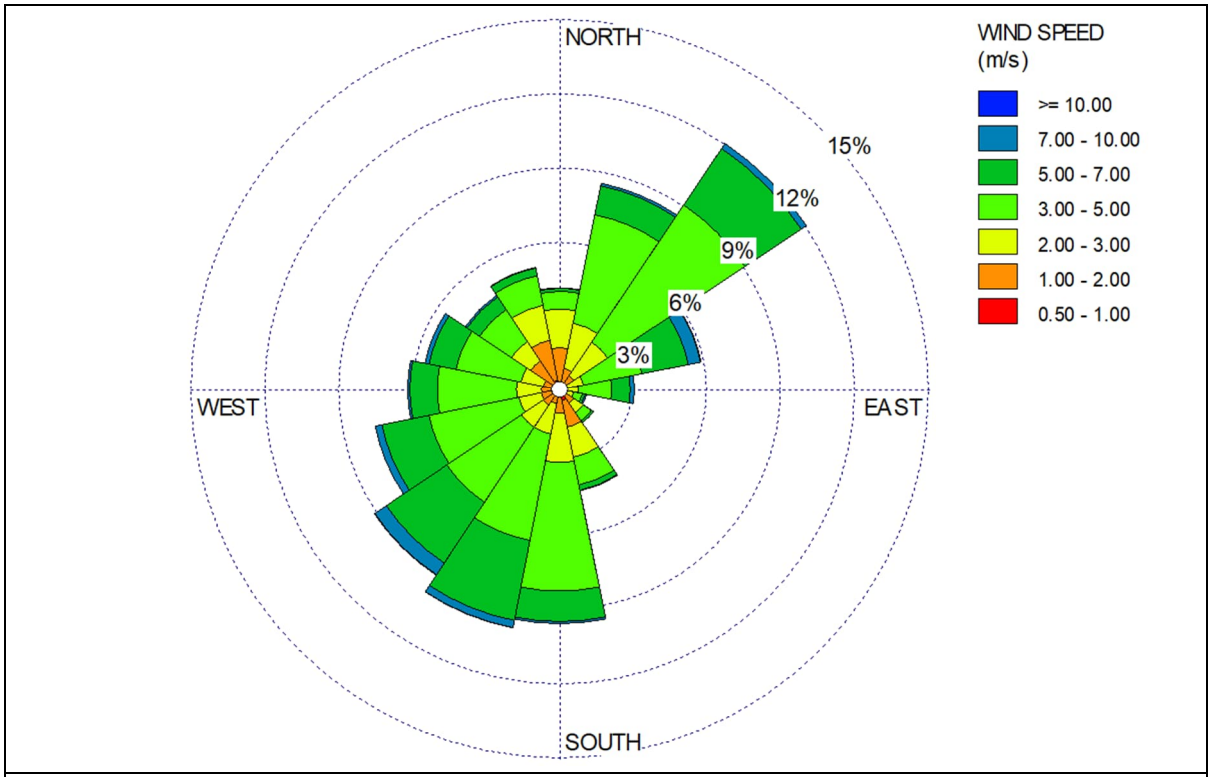


Figure 4.2: Wind rose frequency analyses of wind speeds and directions at the Auckland MOTAT weather station for 2018 to 2023 (inclusive), all hours and operating hours. Source: NIWA Cliflo database.

Figure 4.3 shows that the expected drier months are during summer, when wind speeds also tend to be higher. Over the year winds from the southwest, which will transport any emitted dust towards sensitive receptors to the northeast of works activities, are relatively frequent over the Auckland Isthmus. Northeast winds become more frequent over summer months.

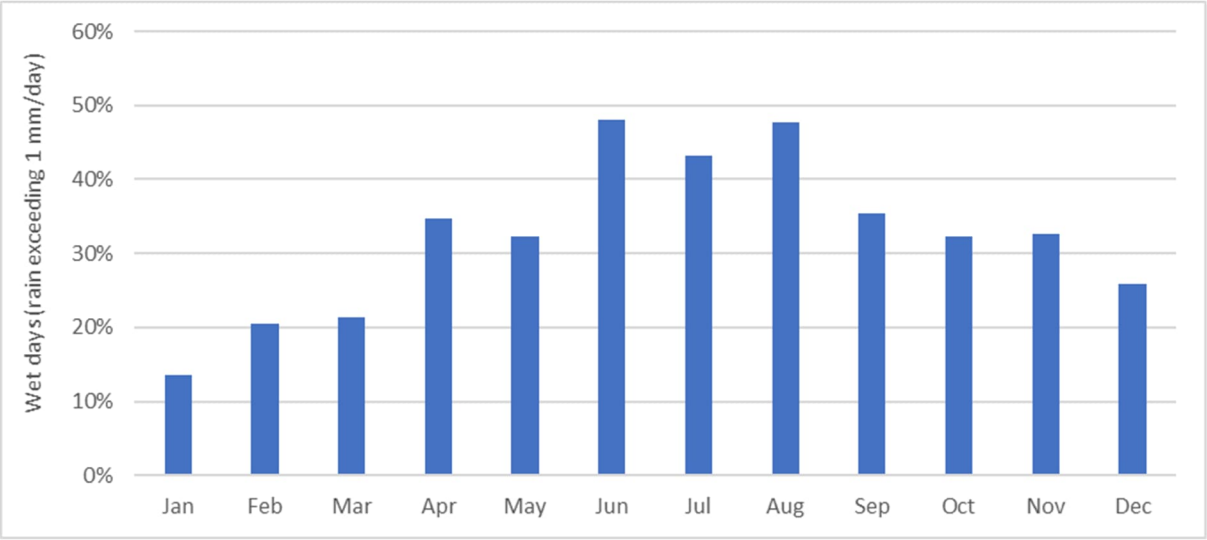


Figure 4.3: Percentage of wet days (rain exceeding 1 mm) over each month of the year at MOTAT (2018-2022). Source: NIWA CliFlo database.

4.3 Background air quality

Auckland Council operated an air quality monitoring station at Queen Street between December 1998 and August 2023. This is the only air quality monitoring station operated in the Auckland City Centre. The concentrations recorded at this station are likely to be broadly representative of the current air quality at the site and other locations throughout Auckland CBD.

Figure 4.4 shows the average annual PM_{10} concentration at Queen Street between 2018 and 2022. In 2022, the annual average PM_{10} concentration was measured at 19 ug/m³. This is below the National Ambient Air Quality Guideline (AAQG) of 20 ug/m³. However, the 2022 annual average PM_{10} concentration is above the 15 ug/m³ WHO guideline value shown by the red line in Figure 4.4.

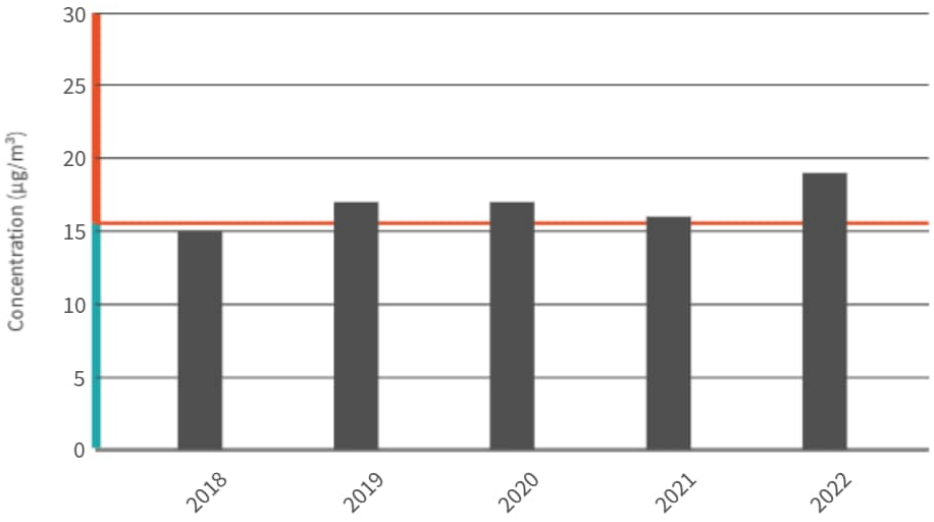


Figure 4.4: Annual PM_{10} averages at Queen Street monitoring station. Source: LAWA.

5 Assessment methodology

5.1 Selection of assessment method

The assessment of dust impacts has been conducted using qualitive assessment methods set out in Ministry for the Environment (MfE) guidance on dust assessment and management (Dust GPG)[3]. The MfE Dust GPG notes the difficulties associated with the use of quantitative assessment approaches based on atmospheric dispersion modelling as an alternative to the qualitative methods employed as follows:

> *Dispersion modelling is typically only employed for new, large industrial sources of particulate. This is because it can be very difficult to estimate and model particulate emissions accurately, particularly from fugitive sources.*

The dust emission sources associated with the proposed demolition and construction activities are diffuse (fugitive) in nature and emissions from those sources vary significantly both spatially, in terms of location and elevation within the site, and temporally, varying over each working day and over the different phases of the development. As a result, dust emissions from the development are not able to be accurately quantified and represented in a dispersion modelling investigation.

The assessment of air quality impacts of emissions from the proposed demolition and construction activities has therefore utilised the following techniques, in accordance with the MfE Dust GPG:

- Comparison of the risk of dust impacts associated with the proposed demolition and construction activities calculated using a method developed by the UK Institute of Air Quality Management (IAQM), referred to in the MfE Dust GPG;
- Evaluation of the measures employed and proposed to manage dust emissions and mitigate potential environmental effects; and
- An evaluation of potential dust exposure at key receptor locations using the 'FIDOL' factor framework.

5.2 IAQM dust risk assessment approach

Guidance on the assessment of demolition and construction dust published by the IAQM[4] details a method for determining the risk of dust impacts factoring in the following aspects of the activity:

- the magnitude of potential dust emissions from proposed demolition, earthworks, construction and vehicle track-out activities; and
- the sensitivity of the surrounding area to dust soiling, human health or ecological effects.

The identified dust risk is then used to inform dust management and mitigation requirements for the activity.

The potential magnitude of emissions is categorised as "small", "medium" or "large" based on the nature and scale of the activities proposed.

The sensitivity of the surrounding area is determined in relation to three aspects as follows:

[3] MfE. 2016. "Good Practice Guide for Assessing and Managing Dust".
[4] IAQM. 2024 "Guidance on the assessment of dust from demolition and construction". Version 2.2.

- The sensitivity of the surrounding area to dust soiling is categorised as “low”, “medium” or “high” based on the number of high, medium and low sensitivity receptors located within distances of 20 m, 50 m and 100 m of the dust proposed sources[5].
- The sensitivity of the surrounding area to human health effects is calculated in a similar fashion with additional consideration of annual average PM_{10} concentrations in the area.
- The sensitivity of the area to ecological impacts is based on the number of ecologically sensitive receptors within distances of 20 m and 50 m.

5.3 FIDOL Assessment

Potential dust nuisance effects associated with discharges from the site have been assessed in accordance with the Dust GPG. This involves a qualitative assessment of potential dust impacts on sensitive locations surrounding the site.

Following the identification of affected sensitive receptors within the screening criteria, those locations are then assessed in more detail using the FIDOL[6] factors, which are described as follows:

Frequency:	The frequency of exposure to dust impacts experienced at a given location. This depends on both the frequency of discharges and the frequency of weather conditions that could transport a discharge the receptor location.
Intensity:	The intensity of dust impacts depends on the scale or intensity of the discharge and the degree of dispersion or dilution of the discharge, which in relation to dust is dependent on the degree of separation between the source and the receptor and weather conditions.
Duration	The duration of dust impacts depends on both the duration of the discharge and how long a sensitive location is continuously downwind of the dust source.
Offensiveness:	The offensiveness of the dust relates to both the character of the dust and the degree of how pleasant or unpleasant that character is.
Location:	The location factor relates to sensitivity to dust at the receptor location and relates to the nature of land use at the location.

[6] Frequency, Intensity, Duration, Offensiveness, Location

6 Assessment of air quality impacts

6.1 Assessment of dust risk

6.1.1 Potential dust emission magnitude

The potential magnitude of dust emissions from each activity phase of the project taking into consideration the example definitions outlined in section 7.2 of the IAQM guidance is described below:

- Demolition: The building volume to be demolished (approximately 165,000 m³) exceeds 75,000 m³ and demolition will occur at heights of over 12 m above ground level. However, no on-site crushing or screening of demolition material is proposed. Overall, the magnitude of dust emissions from demolition is assessed as being 'large'.
- Earthworks: The total site area of 6,500 m² is less than 18,000 m². As the excavation is below ground level, the excavated material is expected to be damp and thereby less prone to emitting dust. Other than the surge pile of material awaiting removal, excavated material is unlikely to be stockpiled or formed into bunds on site, further reducing the potential for dust generation. Overall, the magnitude of dust emissions from earthworks is assessed as being 'small'.
- Construction: The building volume to be constructed is greater than 75,000 m³. However, on site concrete batching and sandblasting are not proposed and construction methods do not involve significant. Overall, the magnitude of dust emissions from construction is assessed as being 'small'.
- Vehicle track-out: Heavy vehicle movements out of the site during the earthworks phase are estimated in the Integrated Transport Assessment to be greater than 50 per day. Due to the confined nature of the site area, the length of unpaved road length has been assumed to be less than 50 m. Overall, the magnitude of dust emissions from track-out is assessed as being 'medium'; however, track-out of material should be able to be controlled appropriately through application of wheel wash facilities for vehicles exiting the site.

6.1.2 Sensitivity of area

6.1.2.1 Sensitivity of area to dust soiling effects

Figure 6.1 illustrates the area located within distances of 20 m, 50 m and 100 m of the approximate demolition area for the purposes of determining sensitivity. Figure 6.2 illustrates the same buffer distances but for the construction area.

As detailed in Section 4.1, the site is located within the central business district of Auckland. The area surrounding the site is occupied primarily by a high density of commercial office, retail and hospitality activities, which under the IAQM guidance would be classed as medium sensitivity receptors.

However, the area is also interspersed with activities that would be classified as high sensitivity activities, including:

- Kindercare Pre-school Centre (roll of 49 children) located within 20 m of demolition and constructions works.
- M Social hotel located within 20 m (exposure to outdoor air in hotel rooms appears to be via air conditioned ventilation rather than openable windows and balconies).
- The Sebel hotel and private apartments located within 50 m (the nearest rooms/apartments along Albert Street do not feature openable windows and balconies whereas

rooms/apartments along Customs Street West and the Viaduct Harbour feature outdoor access via balconies).

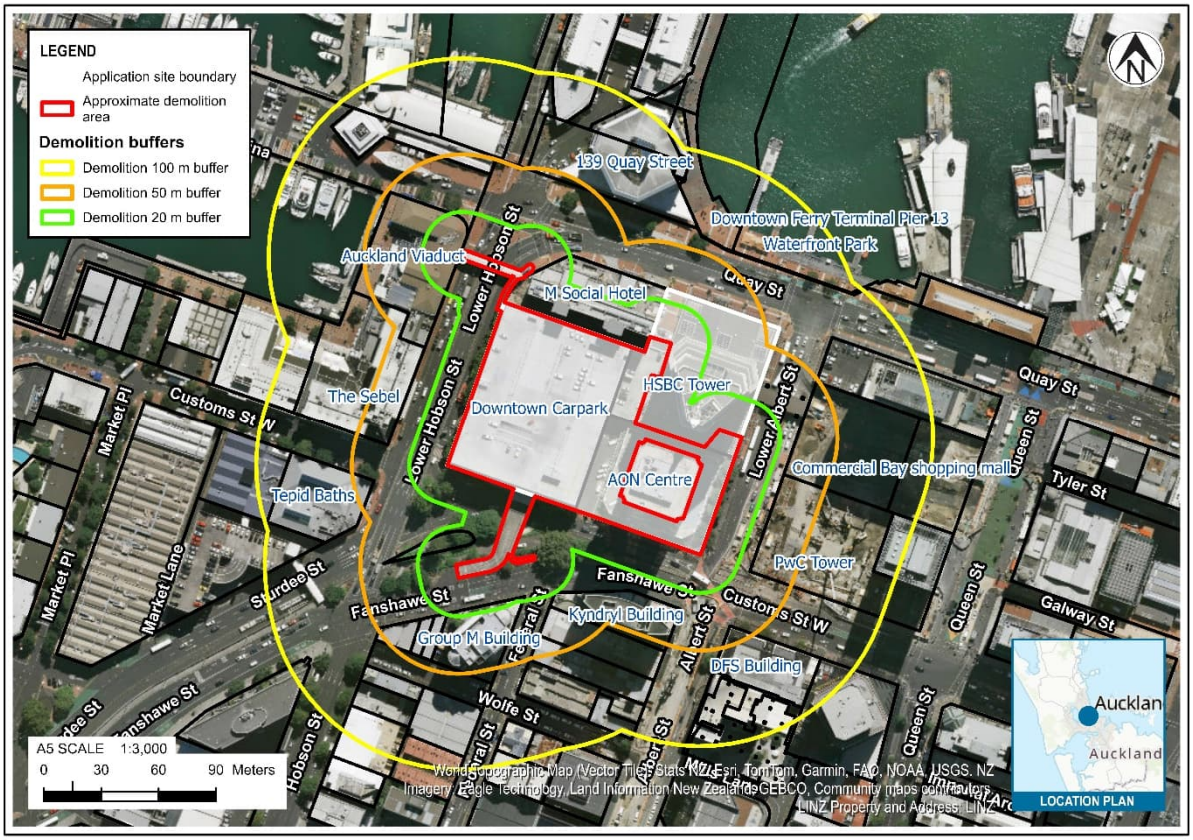


Figure 6.1: Area within 20 m, 50 m and 100 m of demolition area.

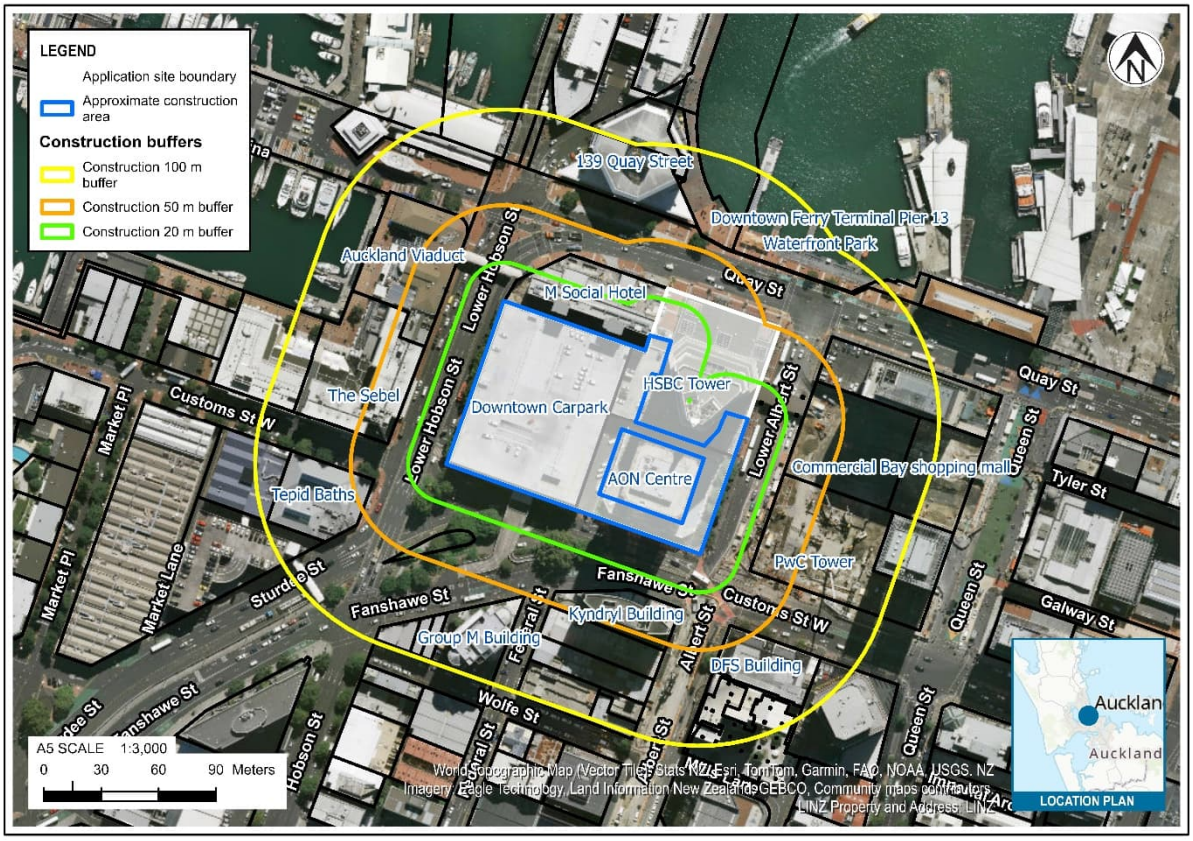


Figure 6.2: Area within 20 m, 50 m and 100 m of construction area.

Although the area is primarily occupied by medium sensitivity receptors, given the number of people likely to occupy the above high sensitivity receptor locations the area is assessed as having a 'high' sensitivity to dust soiling effects.

6.1.2.2 Sensitivity of area to the health effects of PM_{10}

As discussed in Section 4.3, the average annual PM_{10} concentration at the Queen Street air quality monitoring station in 2022 (the most recent complete calendar year of monitoring) was 19 ug/m³. Although PM_{10} concentration measured in preceding years were lower, this 2022 value measured at Queen Street has been conservatively assumed to be representative of potential annual average PM_{10} concentrations surrounding the site.

Given that the assumed annual mean PM_{10} concentration is greater than 18 ug/m and the presence of high sensitivity receptors within 20 m of the site, as described in section 6.1.2.1, the area is assessed as having a 'high' sensitivity to the health effects of PM_{10}.

6.1.2.3 Sensitivity of area to ecological effects

The site is located in the highly modified CBD environment and is not located within 50 m of any significant ecological area set out in the AUP. The sensitivity of the area to ecological effects is therefore assessed as being 'low'.

6.1.3 Overall risk of dust impacts

Table 6.1 summarises the sensitivity of the area to dust soiling, human health effects and ecological effects discussed in Section 6.1.2.

Table 6.1: Summary of dust risk for proposed demolition, earthworks, construction and vehicle tracking activities under the UK IAQM framework

Activity	Potential magnitude of dust emissions	Sensitivity of surrounding area		
		To dust soiling	To human health effects	To ecological effects
Demolition	Large	High	High	Low
Earthworks	Small			
Construction	Small			
Track-out	Medium:			

Based on the potential dust emission magnitude and the sensitivity of the area the overall risk of dust impacts for each activity can be determined. The risk calculated under the IAQM framework for each activity is summarised in Table 6.2. The relative level of dust impact risk of the various proposal activities has been used to inform the consideration of dust management measures in Section 6.2.

Table 6.2: Summary of dust risk to define specific mitigation

Potential impact	Risk			
	Demolition	Earthworks	Construction	Track-out
Dust soiling	High	Low	Low	Medium
Human health	High	Low	Low	Medium
Ecological	Medium	Negligible	Negligible	Low

6.2 Evaluation of dust management and monitoring measures

The proposed dust management measures specified in the existing application documents are evaluated against the recommendations of the UK IAQM guidance (taking account of the dust risk identified in Section 6.1.3) in Appendix B.

The proposed measures and recommendations for further measures, taking account of the following, are described in Table 6.3:

- Outcomes of evaluation against IAQM guidance presented in Appendix B;
- Relevant guidance on dust management published by the Ministry for the Environment (MfE)[7]; and
- Our experience of effective management of dust from the types of activities proposed.

Overall, with incorporation of the additional recommendations described in Table 6.3, the proposed dust management and monitoring regime will be consistent with published dust management guidance recommendations and in our experience is likely to provide effective management of dust emissions in this environment. The recommendations of Table 6.3 have been incorporated into the update to the Dust Management Plan (DMP) provided in Appendix A..

[7] MfE. 2016. "Good Practice Guide for Assessing and Managing Dust".

Table 6.3: Recommendations from evaluation of proposed dust mitigation and monitoring measures

Source of dust	Control measure proposed in existing application documents	Recommendations
Demolition	• Internal fittings are to be stripped out prior to demolition of structural and exterior elements. • Use of water sprays to dampen material prior to and during demolition. • Only wet cutting of concrete is to be undertaken. • Any breaking of concrete should be done under wet conditions (such as a water spray or fog cannons directed at where the breaking is occurring). • Containment of the immediate area of demolition works though placement of construction wrap in a series of zones as the demolition progresses.	The following additional measures are recommended: • Installation of containment or screening along the entire eastern façade of the carpark building is recommended to protect the Kindercare childcare centre from dust during demolition of the adjacent carpark building (demolition stages 3 and 4). This could include: – Screening by the "*scaffold lined with an acoustic barrier is proposed to the full eastern façade*" described in the Construction Management Plan, provided that this wall of barriers is impermeable to wind flow. – If wind flow is able to pass through the acoustic barrier wall, construction wrap should be placed along entire eastern façade. This could be progressively reduced in elevation as demolition progresses.
Stockpiles (including material placement and removal)	• Store stockpiled material containing a high content of fine material indoors or undercover where practicable. • Locate and orientate outdoor stockpiles to maximise wind sheltering and separation from sensitive off-site activities as far as practicable. • Dampen, cover or stabilise inactive stockpiles if they are producing visible dust emissions. • Limit the height of stockpiles to reduce wind entrainment as far as practicable. • Minimise handling of stockpiled material and drop heights to stockpiles during unloading to decrease potential for dust generation.	No further recommendations.
Earthworks	• Limit the extent of excavation and material handling activities in exposed areas carried out during dry and/or windy conditions, as far as practicable. • Limit drop heights of material during handling, including from any conveyor transfer points.	Measures added to existing DMP to control dust from the earthworks phase.

Source of dust	Control measure proposed in existing application documents	Recommendations
	• Stabilise exposed areas not required for construction, access or parking, along with completed fill and spoil areas as soon as practicable. • Remove excavated spoil from site on a regular basis. • Maintain surfaces of active earthworks areas in damp condition during dry weather. Where material to be excavated is dry, this should include pre-watering of surfaces, prior to excavation allowing enough time for moisture to penetrate.	
Construction	• Only wet cutting of concrete is to be undertaken. • Concrete grinding or scabbling is only to be undertaken with either wet suppression or on-tool air extraction systems in operation. • Bagged fine power materials ensure bags are to be sealed after use and stored appropriately to prevent dust emissions.	Measures added to existing DMP to control dust from the construction phase.
Handling of dry material	• Avoid handling (including loading or unloading) of material during windy conditions in locations where dust may be emitted beyond the site boundary, where practicable. • Cover loads of fine materials. • Minimise drop heights when loading and unloading dry material.	The following additional measures are recommended: • Use enclosed drop chutes is recommended for material to be dropped to lower levels.
Vehicle movements	• Limit vehicle speeds on site to no more than 20 km/h. • Limit load sizes to avoid spillages. • Cover loads of fine materials leaving or entering the site. • Minimise on-site travel distances through appropriate site layout and design. • Minimise mud and dust track out the site to sealed areas by using wheel cleaning facilities at site exits to sealed roads. • Wheels of all trucks exiting the site to public roads are to be inspected and washed as required to prevent tracking of material off-site. • Any material identified to be tracked onto public roadways during regular inspections (or via notification from the public) is to be cleaned with a vacuum sweeper truck. • Sealed access routes are to be cleaned with a vacuum sweeper truck whenever inspections (regular or in response to complaints) identify surface accumulation of dust material.	The following additional measures are recommended: • All vehicle engines are to be switched off when stationary (no idling) on-site.

Source of dust	Control measure proposed in existing application documents	Recommendations
	• In dry conditions (e.g. less than 1 mm of rain in the preceding 48 hours), maintain vehicle accessways in regular use in damp condition through surface watering (e.g. with water carts or fixed irrigation). • If water suppression is ineffective, synthetic dust suppressants (excluding used oil-based suppressants) may be used as an alternative.	
Miscellaneous	• Planning of site layout so that dust generating activities are located away from sensitive receptors where practicable. • Site personnel trained in dust management controls. • Monitoring of site conditions (weather/soil conditions) to anticipate and prevent dust effects. • Limiting operations which have the potential to cause high dust during high wind events. • Use of water cart and sprays to keep surfaces damp as required near sensitive receptors. A critical part of this control measure is identification of a sufficient water supply at the site for this purpose with adequate volume. • Use of wind break fences. • Cleaning paved surfaces if affected by tracking of transported dust.	No further recommendations
Monitoring	• Inspection of dust emitting activities and land adjacent to site on at least daily basis. • Inspect watering systems on weekly basis.	The following additional measures are recommended: • Continuous instrumental dust monitoring at or near the Kindercare outdoor play area is recommended to provide feedback on the efficacy of dust management measures during the demolition of the carpark (where access is able to be obtained). Further details of the recommended monitoring are provided in the updated DMP.

6.3 FIDOL assessment

The potential air quality effects of dust and other emissions from the redevelopment works and compliance with the relevant permitted activity standards have been assessed through a consideration of the FIDOL factors (frequency, intensity, duration, offensiveness/character and locational sensitivity) as described in section 5.3.

Table 6.4 summarises an evaluation of dust impacts that may be experienced at key receptors locations in the surrounding area as a result of dust from the proposed demolition and construction activities against the FIDOL factor framework. Based on the IAQM dust risk assessment described in 6.1, the key receptors on which the FIDOL assessment has focussed on are as follows:

- The Kindercare childcare centre to the east of the site at the AON Centre (29 Customs Street West);
- The M Social Hotel to the north of site at 196-200 Quay Street; and
- The Sebel Hotel and apartments to the east of the site at the corner of Lower Hobson Street and Customs Street West.

These receptor locations represent to peak potential air quality impact locations and potential air quality effects at other locations are likely to be lesser in scale.

In summary of the FIDOL evaluation at these receptor locations:

- Overall, the sensitivity at each of these locations is high. Potential exposure to dust at both hotel locations is reduced by the lack of openable windows facing the site and ventilation of each building via mechanical means. By contrast, the outdoor play area of the Kindercare centre lies adjacent to the carpark and occupants are likely to be regularly exposed to outdoor while the centre is in operation.
- The Kindercare centre is located in close proximity to the site and is likely to be exposed to wind from the site on a relatively frequent basis. Both hotel locations are likely to be exposed infrequently by comparison.
- Dust comprised primarily of coarse particles of concrete, aggregate and soil/crustal material will be emitted from the demolition and construction activities. These emissions are likely to occur intermittently during daytime working hours and are likely to be associated primarily with demolition works that are projected to occur over a period of 10 to 12 months.
- The potential for dust emissions is greatest during the demolition phase and the uncontrolled risk of dust soiling and health risk from PM_{10} exposure assessed during this phase under the IAQM framework described in section 6.1 is high. A range of dust management measures are proposed to mitigate the risk of dust impacts in section 6.2, including use of wet suppression and construction wrap containment measures.
- Given the high sensitivity, close proximity and potential outdoor exposure of occupants at the Kindercare centre, further measures are recommended to mitigate potential exposure to dust at this location. In particular the screening of entire eastern façade of the carpark building during demolition of the building is recommended. Continuous instrumental monitoring of ambient particulate levels at this location would then provide feedback on the efficacy of these measures.

Overall, the FIDOL analysis indicates that offensive or objectionable dust impacts on the identified key receptors should be avoided through effective implementation of the recommended dust management measures. With the implementation of those measures, the potential for adverse property soiling, health and ecological effects of dust from the demolition and construction activities should be minimal.

Table 6.4: FIDOL evaluation of potential dust impacts

Factor	General considerations for all receptors	Kindercare Learning Centre	M Social Hotel	Sebel Hotel
Frequency / duration	The frequency and duration of dust experienced at receptor locations will depend on the frequency/duration of emissions from the dust source and the frequency with which the receptor is downwind of the source. Demolition, earthworks, construction and tracking activities will occur over a finite period The approximate duration of each activity is anticipated to be: • Demolition: 10-12 months • Earthworks: 9 months • Construction: 54 months • Tracking: 75 months. Operating hours are proposed to be from 7:00 am to 6:00 pm on weekdays, and 8:00 am to 5:00 pm on Saturdays and public holidays. Within these operating hours, dust generating activities will occur intermittently. In terms wind exposure, the MOTAT EWS wind measurements discussed in Section 4.2 provide an indication of wind conditions around the site. These measurements indicate there is likely to be a strong prevalence for winds (and stronger winds in which dust entrainment and transport is most likely to occur) from the southwest and northeast. As a result, receptors located to the northeast and southwest of the site, respectively, are likely to be most frequently exposed to wind from the site.	Kindercare Centre is located on the western and southwestern sides of the first floor podium of the AON Centre. The outdoor play area of the childcare facility occupies a terrace area running the length of the eastern side of the building, across the access way from the carpark building. Given the proximity of the Kindercare Centre and length of its outdoor play area, it will potentially be exposed to wind from the demolition and construction areas in a wide range of wind direction conditions (when wind is from the southwest through to from the north). Based on the MOTAT EWS wind measurements discussed in Section 4.2, wind from this range of directions occurs for approximately 42% of the time. The Kindercare Centre is therefore exposed to wind from the carparking building relatively frequently. Dust management measures described in section 6.2, including the screening of the eastern façade of the carparking building will minimise potential emissions and should reduce the frequency and duration of exposure at this location to a minimal level.	The M Social Hotel adjoins the Site to the north. This location is exposed to wind from the site in winds from the southerly quadrant (south-east to south-west). Therefore, the hotel is likely to be downwind of the site during prevailing north-easterly winds. Based on MOTAT EWS wind measurements, the hotel is likely to be exposed to wind from the carpark for 4.9% of the time. Exposure to wind from the site is therefore relatively low. The rear of the hotel faces the site and does not contain openable windows. The hotel is fully enclosed with air conditioned ventilation and exposure to outdoor air is likely to be via ventilation intakes only. The frequency and duration of dust exposure for occupants of the hotel of the hotel Is therefore likely be low.	The Sebel Hotel is located to the east of the site, across Lower Hobson Street. This location is exposed to wind from the site in winds from the easterly quadrant (south-east to north-east). Based on MOTAT EWS wind measurements, the hotel is like lot be exposed to wind from the carpark for 4.8% of the time. Exposure to wind from the site is therefore relatively low. The rooms and apartments facing the site on Lower Hobson Street do not feature openable windows or balconies. These rooms are fully enclosed with air conditioned ventilation and exposure to outdoor air is likely to be via ventilation intakes only. Rooms on Customs Street West and the Viaduct Harbour feature balconies but do not face the site and are located further distant. The frequency and duration of dust exposure at this location Is therefore likely be low.

Factor	General considerations for all receptors	Kindercare Learning Centre	M Social Hotel	Sebel Hotel
Intensity	The intensity of dust experienced at receptor locations will depend on the intensity of emissions at source and the degree of deposition or dispersion of the emissions that occurs en-route to the receptor (which itself will be dependent on wind strength and the degree of separation between source and receptor). As noted in Section 6.1.1, the IAQM framework identifies that the various activities associated with the project have the following sizes of emission sources without effective controls: • Demolition: Large • Earthworks: Small • Construction: Small • Tracking: Medium As noted in Section 6.2, the emissions from demolition and construction activities are likely to be well controlled through the implementation of dust measures including wet suppression and containment during demolition.	The Kindercare Centre is located within 10 m of the eastern extent of carpark building and there is relatively little opportunity for dust emissions to disperse or deposit before reaching the childcare facility. Therefore, without application of dust management measures to reduce the intensity of emissions, the intensity of dust exposure at Kindercare during the demolition phase would likely be high. The use of containment and screening measures along the eastern façade of the carpark building as described in section 6.2, should provide effective protection at this location from dust during demolition, in combination with wet suppression. With those measures in place, the intensity of dust exposure should be minimal at this location, provided the measures are rigorously implemented. Further dust management contingency measures are discussed in Section 6.2, if further reduction in intensity of dust deposition is required.	The M Social Hotel is located within 10 m of the northern extent of the carpark building and there is relatively little opportunity for dust emissions to disperse or deposit before reaching the hotel building. However, as noted above, exposure to outdoor air is likely to be via ventilation intakes only. Taking account of the measures described in section 6.2, the intensity of dust exposure for occupants of the hotel of the hotel Is therefore likely be low.	The Sebel Hotel is located approximately 30 m from the western extent of the carpark building. The intensity of dust exposure will be reduced through deposition and dispersion over this distance. Rooms and apartments on the eastern side of the hotel facing the site do not have openable windows or balconies. Taking account of the measures described in section 6.2, the intensity of dust exposure for occupants of the hotel of the hotel Is therefore likely be low.
Offensive-ness	The offensiveness of dust relates to its characteristics in relation to visibly soiled surfaces. These characteristics might include colour or texture. The dust generated during demolition is likely to be from concrete and from earthworks and construction dust emissions are likely to be comprised of soil and crustal matter. Both soil and concrete will be light grey or brown in colour, similar to the soils in the area and typical of construction dust. As noted in Section 3, dust from demolition is likely to contain a component of RCS and is likely to be alkaline when exposed to water.			
Location	As noted in Section 4.1, the Site is located in a mixed-use (City Centre) zone. The area surrounding the site is highly modified and features a high density of development. The	The early childcare facility is occupied primarily by pre-school aged children, which as a sector of the community are of particularly high sensitivity to	People staying at the hotel will have high expectations for air quality amenity. The to dust soiling and human	People resident in the apartments or staying at the hotel will have high expectations for air quality

Factor	General considerations for all receptors	Kindercare Learning Centre	M Social Hotel	Sebel Hotel
	zone provides for a range of uses and is predominantly occupied by commercial office and retail activities typical of a central business district. As identified in Section 6.1.2.1, under the UK IAQM framework the local environment is classified as having high sensitivity in relation to dust soiling and human health effects and a low sensitivity to ecological effects.	respiratory effects associated with fine particulate exposure. The facility is required to provide outdoor play area facilities and outdoor area for the facility lies adjacent to the carpark building on the eastern side of the AON Centre. Overall, the sensitivity to dust soiling and human health effects at this location is high.	health effects at this location is therefore high.	amenity. The sensitivity to dust soiling and human health effects at this location is therefore high.

6.4 Summary compliance evaluation

Compliance of the discharge of contaminants to air from the proposed demolition and construction activities with the permitted activity standards set out in section E14.6.1.1 of AUP Chapter E14 is evaluated in Table 6.5.

Table 6.5: Evaluation of compliance with AUP section E14.6.1.1 permitted activity standards

Number reference	Standard	Compliance evaluation
1	The discharge must not cause, or be likely to cause, adverse effects on human health, property or ecosystems beyond the boundary of the premises where the activity takes place.	Compliant: The assessment described in section 6 indicates that with the adoption of the measures outlined in the updated DMP, there is minimal potential for adverse effects on human health, property or ecosystems due to the discharges.
2	The discharge must not cause noxious, dangerous, offensive or objectionable odour, dust, particulate, smoke or ash beyond the boundary of the premises where the activity takes place.	Compliant: The assessment described in section 6 indicates that with the adoption of the measures outlined in the updated DMP, dust and particulate matter emitted from the development is unlikely to be noxious, dangerous, offensive or objectionable beyond the site,
3	There must be no dangerous, offensive or objectionable visible emissions.	Compliant: Dangerous, offensive or objectionable visible emissions are unlikely to occur from the proposed development activities.
4	There must be no spray drift or overspray beyond the boundary of the premises where the activity takes place.	Compliant: Spray drift is not associated with the activities.

7 Conclusions

The following conclusions are drawn from this assessment of the environmental effects of dust emissions from the proposed demolition and construction activities:

- Proposed activities have the potential to generate dust/particulate matter emissions. The effects of the predominant coarse fraction of particulate emissions are primarily related to nuisance and soiling effects though components of the emissions also have the potential to cause adverse effects on ecology or human health.
- The site is located in a high-density central business district. Due to the proximity of sensitive activities, including the adjacent Kindercare childcare centre, M Social Hotel and Sebel Hotel, the environment overall is assessed as having a high sensitivity to dust soiling and health effects.
- The risk of dust impacts of the proposed activities (without implementation of dust control measures) has been assessed using a method developed by the UK IAQM. Without control measures in place, the demolition works are assessed as having a “high risk” of causing dust soiling and health effects. The corresponding uncontrolled risk during the earthworks and construction phases is assessed as being “low”.
- The identified uncontrolled dust impact risk levels have been factored into our review of the proposed dust mitigation and monitoring measures. Our mitigation review has recommended further measures be implemented including specific measures to manage potential impacts at the Kindercare childcare centre. With those additional measures in place, the dust management regime is assessed as being consistent with relevant published dust management guidance recommendations and are likely to provide effective management of dust emissions.
- Overall, with the proposed dust management regime (including additional measures recommended in Section 6.2) in place the discharges to air from the proposed demolition and construction activities are assessed as being compliant with permitted standards (1) to (5) set out in section E14.6.1.1 of the AUP. The discharges to air are therefore evaluated as being a permitted activity under Activity A1 of Chapter E14 of the AUP.

8 Applicability

This report has been prepared for the exclusive use of our client Precinct Properties Holdings Limited, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report in relation to an application for resource consent and that Auckland Council as the consenting authority will use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
.....	.....
Cailtin Dalziel	Peter Millar
Environmental Consultant	Project Director

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Appendix A Updated Dust Management Plan

REPORT

Tonkin+Taylor

Downtown West - Downtown Carpark Redevelopment – Demolition and Construction

Dust Management Plan

Prepared for
Precinct Properties Holdings Limited
Prepared by
Tonkin & Taylor Ltd
Date
December 2024
Job Number
1016043.1000 v3

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Document control

Title: Downtown West - Downtown Carpark Redevelopment – Demolition and Construction					
Date	Version	Description	Prepared by:	Reviewed by:	Authorised by:
08 Sep 2023	1	Demolition dust management plan to support resource consent submission	M. Dyer	J. Pene	P. Millar
22 Oct 2024	2	Update to dust management plan to incorporate earthworks/construction and recommendations from air quality assessment	C. Dalziel	J. Pene	P. Millar
6 Dec 2024	3	Final for submission with response to resource consent application information request	C. Dalziel	J. Pene	P. Millar

Distribution:

Precinct Properties Holdings Limited	1 PDF copy
Tonkin & Taylor Ltd (FILE)	1 PDF copy

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1 Introduction

1.1 Background - the project

Precinct Properties New Zealand Limited (PPL) has lodged resource consent applications with Auckland Council for the Downtown West redevelopment of the Downtown Carpark property at 2 Lower Hobson Street, Auckland, including associated elements at 188 and 204 Quay Street and 29 Customs Street West(herein referred to as "the Site"). The Site location is shown in Figure 1.1. The application included a Dust Management Plan (DMP) prepared by Tonkin & Taylor Limited (T+T) for the demolition activities associated with the project.

In response to a request from Auckland Council for further information on the resource consent application, PPL has engaged Tonkin & Taylor Limited (T+T) to prepare this update to the Dust Management Plan (DMP) to:

- encompass both the demolition and construction phases of the project; and
- and incorporate the recommendations of the air quality assessment (AQA) of the demolition activity that has also been prepared by T+T in response to the request for information.

This DMP document has been prepared in accordance with our proposal[1] dated 14 February 2023 and variation order dated 8 October 2024.

Figure 1.1: Site location shown in red outline (Basemap Source: LINZ Creative Commons Atribution 3.0 New Zealand)

[1] T+T LOE, 14 February 2023. *"Downtown Carpark Redevelopment – Geotechnical and Environmental Engineering/Civil and Infrastructure Services"*, Job number 1016043.

1.2 Purpose of the Dust Management Plan

The DMP has been prepared to identify measures that are to be implemented to mitigate and manage the potential adverse effects on air quality of dust and other air emissions from the demolition and construction phases of the Downtown Carpark Redevelopment (the "Project").

The purpose of this DMP is as follows:

- Manage and control dust emissions from demolition and construction activities;
- Minimise air quality impacts on surrounding receptors;
- Keep the local community and regulators informed of activities where required and respond quickly and effectively to issues or complaints;
- Monitoring emissions and off-site air quality effects to ensure dust generating activities are managed in accordance with the DMP and air quality impacts are effectively minimised.

This DMP has been prepared in accordance with the Ministry for the Environment (MfE) '*Good Practice Guide for Assessing and Managing Dust*'[2].

This plan shall be implemented for the demolition and construction activities at the site and is the primary document for management of dust during these activities with exception of asbestos management. This DMP is appended to the Construction Demolition Plan for the Downtown Carpark Redevelopment for ease of reference. The Site Clearance and Demolition Management Plan has been prepared by RCP for resource consenting purposes[3].

1.3 Statutory environmental performance requirements

The discharges to air from the demolition and construction activities will be permitted under the rules of the Auckland Unitary Plant (Operative in Part)[4], provided the following permitted activity standards are met:

1 *The discharge must not cause, or be likely to cause, adverse effects on human health, property or ecosystems beyond the boundary of the premises where the activity takes place.*

2 *The discharge must not cause noxious, dangerous, offensive or objectionable odour, dust, particulate, smoke or ash beyond the boundary of the premises where the activity takes place.*

3 *There must be no dangerous, offensive or objectionable visible emissions.*

4 *There must be no spray drift or overspray beyond the boundary of the premises where the activity takes place.*

The demolition and construction works and associated discharges to air are required to comply with the above conditions at all times.

A range of air quality management and monitoring measures are specified in Section 6 and Section 7 of this DMP, to minimise the potential for adverse air quality effects and avoid the occurrence of offensive or objectionable dust or contaminants in the surrounding environment.

[2] Ministry for the Environment (2016) '*Good Practice Guide for Assessing and Managing Dust*'. Available online at: https://environment.govt.nz/publications/good-practice-guide-for-assessing-and-managing-dust/

[3] RCP, Downtown Carpark Redevelopment – Site Clearance and Demolition Management Plan, prepared for resource consent application.

[4] At Activity A1 of Table E14.4.1

2 DMP administration and control

2.1 Overview

This DMP provides a framework for managing dust nuisance from the demolition and construction works by identifying potential dusty activities and identifying mitigation measures. It provides information and recommendations to augment this process but is not intended to relieve the person conducting business or undertaking (PCBU) of either their responsibility for the health and safety of their workers, contractors and the public or its responsibility for the protection of the environment.

2.2 Roles and responsibilities

The roles and responsibilities of companies/organisations under this DMP are set out in Table 2.1.

Table 2.1: Organisational involvement

Company/organisation	Roles and responsibilities
Precinct Properties Limited	Developer: responsible for compliance with consent conditions, including the requirements of the DMP.
RCP Limited	RCP is the client appointed Project Manager and the client representative on site. RCP is responsible for compliance with the consent conditions, including the requirements of this DMP.
Main Contractor (Contractor).	Responsible for implementation of DMP during demolition works, including monitoring compliance of all Sub-contractors with the requirements for the DMP.
Any subcontractor(s) undertaking work.	Responsible for undertaking works applicable in accordance with the requirements of this DMP
Auckland Council (Regulatory)	Monitoring and compliance of consent conditions.

2.3 Distribution

A copy of the final approved DMP shall be kept onsite at all times during demolition and construction activities. It is the responsibility of PPL and/or their nominated project management company (RCP) to distribute the plan to the Contractor appointed to carry out the work. It is the responsibility of PPL's nominated Contractor to distribute the DMP to any other sub-contractors or parties carrying out demolition and construction works and ancillary activities.

2.4 Review and update

This DMP is a live document. Statutory requirements, operating procedures or site conditions may vary and may require that this plan be amended or updated. Any variations to the DMP proposed by the Contractor must be approved by PPL prior to works commencing or the variation being implemented if works have already commenced. If the changes are substantive, they may need to be approved by Council prior to implementation.

It is the responsibility of the appointed Contractor to distribute any changes to the plan to the relevant parties involved in the demolition and construction works and update the site copy.

3 Site and works description

3.1 Overview of site and development

The Site, illustrated in in Figure 1.1, includes the following elements:

- The seven storey Downtown Carpark Building at 2 Lower Hobson Street. The majority of demolition and construction works will occur within this property.
- The AON Centre at 29 Customs Street West and HSBC Tower at 188 Quay Street, which share the same two level podium. The works within these properties relate only to the shared podium of the two buildings to facilitate the new laneway network.
- The second floor footbridge over Lower Hobson Street connecting the Downtown Carpark Building to the building at 204 Quay Street.
- The second floor (vehicle) bridge over Customs Street West connecting the Downtown Carpark Building to Fanshawe Street.

Within the Site, the proposed development works include:

- Demolition of existing carpark building and adjoining foot and vehicle bridge structures;
- Construction enabling works, including removal of remaining ground floor slabs and foundations;
- Excavation of six levels within the Downtown Carpark Building property; and
- Construction of three podium buildings, two towers and six basement levels.

3.2 Works description

3.2.1 Demolition enabling works

Initial activities on site will focus on undertaking the enabling works and site establishment work which shall include the works to 188 Quay Street, Aon House and other adjacent sites for continuity of function and creating safe evacuation and establishment of a project site office and site amenities. Laydown areas will be determined and traffic management systems implemented.

Following this stormwater runoff catchpits will be protected and existing kerb and channels along Customs Street West and Lower Hobson Street will serve as a clean water cut off, diverting stormwater and road runoff around the site location. A bund will be installed at sections along the portions of the perimeter not confined by kerb and channel (locations to be confirmed). The bund will be constructed from hotmix asphalt or sandbags (subject to location). The purpose of this bund is to both isolate the site from clean runoff and to ensure runoff from within the site is retained within the site boundaries. Stabilised entrance ways will be established at all entry and exit points of the site.

Asbestos has been identified in some locations on site and is further assumed to be present based on the Aecom Asbestos Management Plan[5]. A pre-demolition survey is required prior to the demolition activities and the removal of asbestos will be managed and undertaken under an Asbestos Removal Control Plan (ARCP) with appropriate permits. Asbestos will be removed by licensed asbestos contractors and disposed off-site to appropriate facilities which can accept the waste type. Controls and asbestos removal will be managed under the ARCP and is outside the scope of this DMP.

[5] Aecom, 7 February 2020, Asbestos Management Plan – Downtown Carpark, prepared for Auckland Transport

3.2.2 Demolition works

The demolition of the multi-storey car park will be subject to the demolition contractors final methodology. It is currently proposed that the methodology will entail:

- Internal strip out.
- Hard demolition in two stages:
  - Cut and crane top down demolition on the upper floors.
  - High reach demolition excavators on lower levels down to ground floor slab.

Demolition materials will be loaded onto trucks for recycling (where appropriate) and offsite removal. All asbestos will be removed by licensed asbestos contractors and disposed of at an appropriate facility that can accept asbestos.

Ground floor slabs and foundations will subsequently be removed to enable excavation and construction.

3.2.3 Basement excavation

Earthworks to excavate the six below-ground basement levels are proposed to occur over 6 months. The volume of earthworks is approximately 130,000 m^3 to an RL of -16.3 m over an area of 6,442 m^2.

The modelled groundwater level is approximately RL 1.4 m at design static groundwater level and RL 2.5 m at elevated groundwater level. Therefore, some groundwater infiltration is anticipated during earthworks. To minimise groundwater inflows, prior to earthworks an impermeable perimeter wall will be installed. Due to residual moisture and a reduced degree of groundwater inflow, excavated material is expected to be in damp condition and water is likely to pond at the low points of the excavation area. areas a result the excavated material will have a low dust generation potential on removal.

All excavated material will be carted offsite and disposed of at an appropriate waste disposal facility which can accept the level of contamination present. A surge pile of excavated material may be formed where the trucks are loaded. This will be isolated by a perimeter bund to prevent surface water runoff. There will be no large-scale bunds or stockpiles formed on the site due to its constrained nature.

Note that the existing belled reinforced concrete pile foundations from the Downtown Carpark building will need to be removed as the excavation proceeds if they conflict with the construction of the foundations for the proposed development.

3.2.4 Construction

3.2.4.1 Construction elements and phases

The proposed construction works involve the following:

- A 6 level basement
- Two main towers
- Three podium buildings

Construction can be separated into three major phases; basement, foundations and main works which are described in the following section.

3.2.4.2 Basement construction

As excavation of the 6-level basement occurs, stabilisation measures will be constructed to support the exposed cut faces. The method of stabilisation varies for each side of the basement.

Along the northern portion of the basement site, a perimeter wall and internal plunge piles will be installed to stabilise the excavation face. Temporary diagonal props or corner props will be connected to the internal plunge props at various stages of construction and excavation which will be accessed from the south of the site.

On the western side of the site, the basement excavation will be retained by a diaphragm wall with ground anchors. Similarly, a sheet pile wall with ground anchors will be installed along the southern and south-eastern perimeter.

The construction of these stabilisation measures will cover the exposed soil faces thereby reducing dust sources.

Once excavation reaches Auckland's East Coast Bay Formation (ECBF) rock, excavation can occur vertically. Temporary support may be required with rock bolts with mesh facing or shotcrete to stabilise the rock cut. Horizontal drains may be required to temporarily relieve groundwater pressures near the cut face. An alternative to this is a diaphragm wall with ground anchors. Limited dust is expected to be generated from the exposed rock face.

3.2.4.3 Foundations

Foundation works will commence after the completion of excavation works. The foundation will be comprised of a shallow strip, pad or raft foundation on ECBF rock and piled foundations comprised of sheet piles or bored cast in-situ concrete piles.

3.2.4.4 Main construction works

Above ground core raft foundations will be constructed to support two crane towers that will be used during construction. The crane towers and jump forms will be installed. A 'Jump Form' is a prefabricated, 'self-climbing' formwork system for concrete structures that lets the construction of the lift core progress in advance of the concrete floor slab construction.

Forming, reinforcement tying and of the cores will progress in a controlled cycle to construct the podium levels of the development. Once above the podium levels, the two high-rise towers will transition into typical arrangements. From here the high rises will be efficiently constructed in a structure, passive fire, façade and fit-out works sequence.

4 Environmental Setting

4.1 Overview

This section of the DMP describes the environment surrounding the Site in terms of meteorological influences on the transport of air contaminants and sensitivity of adjacent activities to those discharges.

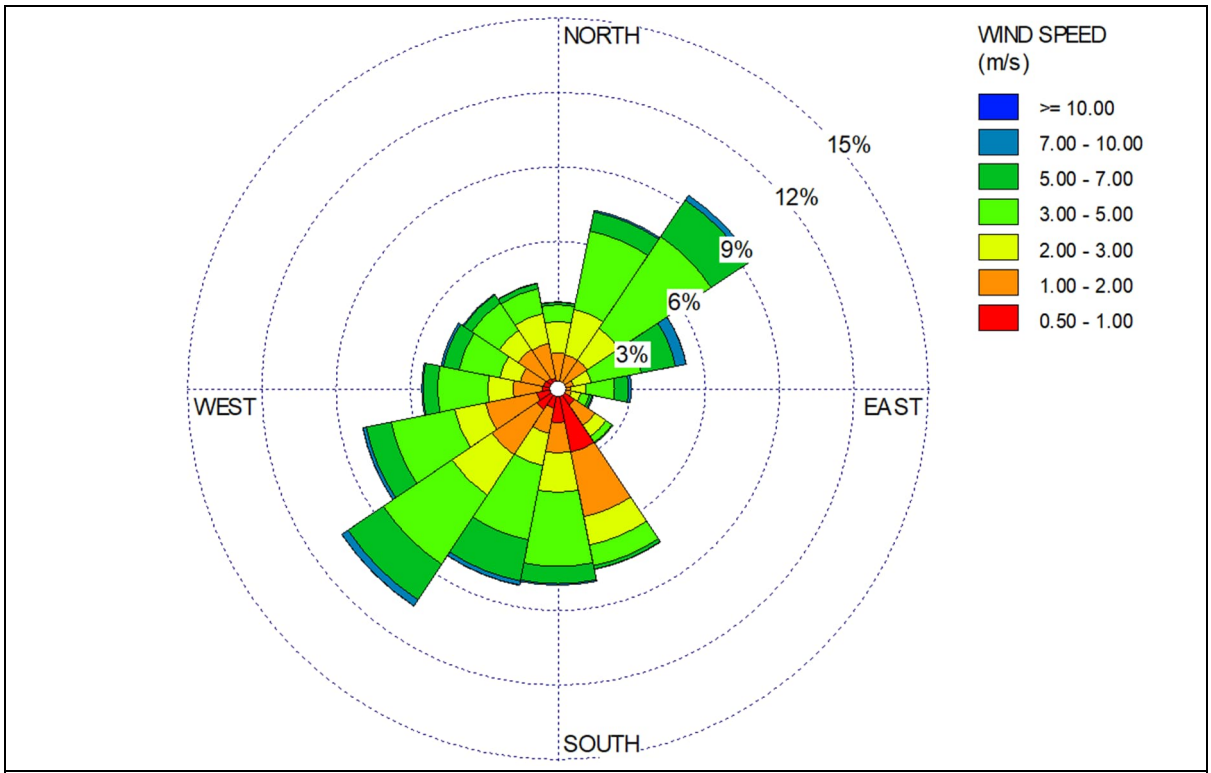
4.2 Local meteorology

Figure 4.1 shows wind roses of wind speeds and directions measured at the NIWA weather station at the Auckland Museum of Transport and Technology (MOTAT), Western Springs.

The weather station is located approximately 4.2 km southwest of the Site. Wind measurements at this station are likely to be generally representative of overlying wind conditions in central Auckland as it is relatively free from nearby obstructions or eddies created by adjacent buildings.

Although tall buildings and topographical features in the area will alter localised wind conditions, the wind direction frequency trends illustrated below are likely to be broadly similar to those experienced at the site.

Based on the wind roses in Figure 4.1, winds are predominantly from the southwest and northeast, and therefore sensitive locations to the northeast and southwest of the site, respectively, are likely to be most frequently exposed to any off-site dust emissions from site activities. The amount of dust generated also largely depends on if conditions are dry, and the wind speeds, with faster wind speeds increasing effect of wind erosion and the distance that the dust travels.



All hours, 2018-2022. Calms = 5.4%, Average wind speed = 3,7 m/s

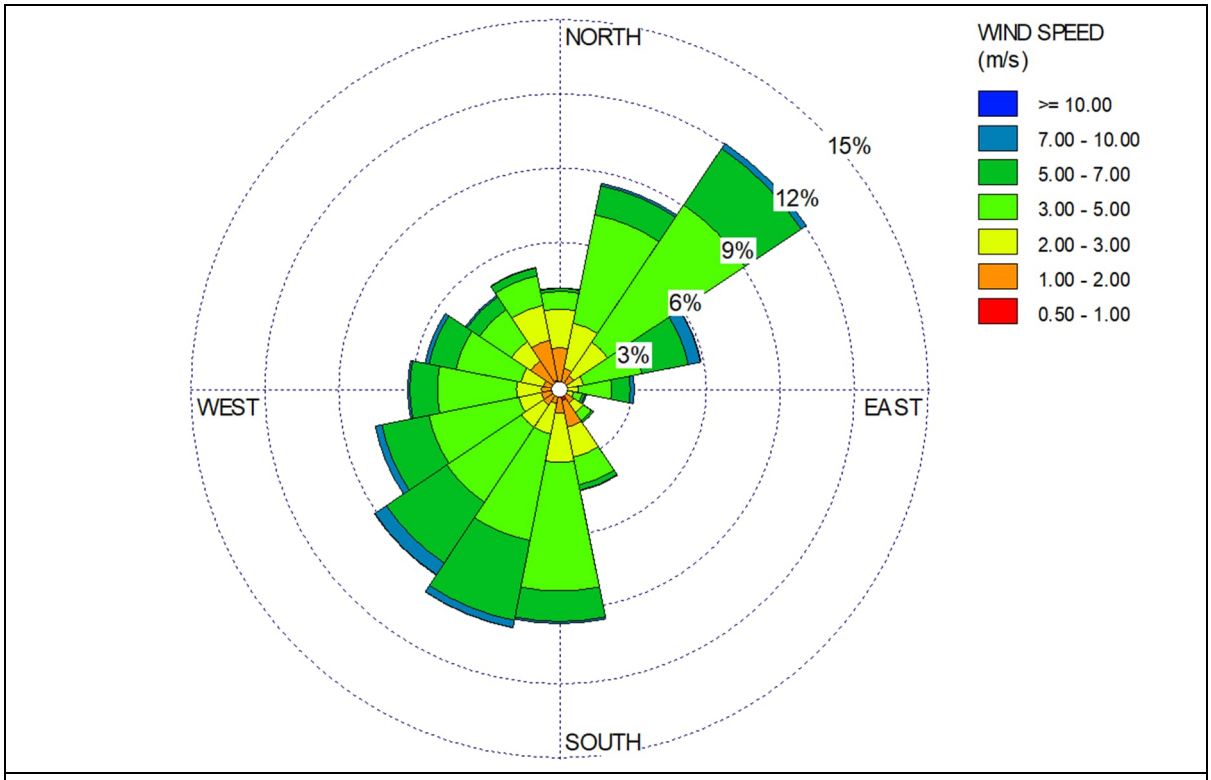


Figure 4.1: Wind rose frequency analyses of wind speeds and directions at the Auckland MOTAT weather station for 2018 to 2023 (inclusive), all hours and operating hours. Source: NIWA Cliflo database.

Figure 4.2 shows that the expected drier months are during summer, when wind speeds also tend to be higher. Over the year winds from the southwest, which will transport any emitted dust towards sensitive receptors to the northeast of works activities, are relatively frequent over the Auckland Isthmus. Northeast winds become more frequent over summer months.

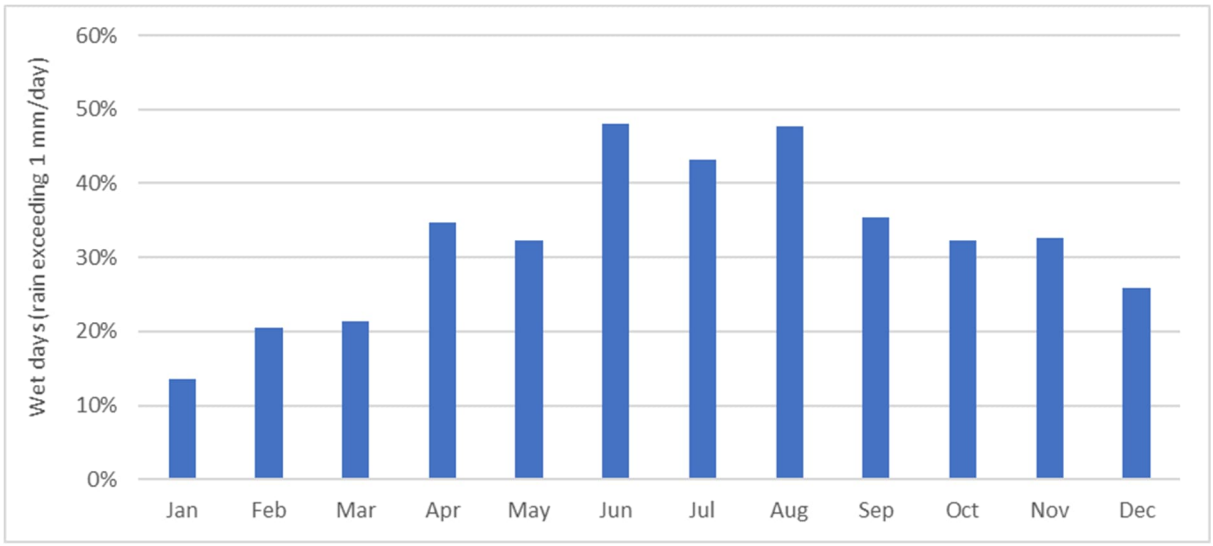


Figure 4.2: Percentage of wet days (rain exceeding 1 mm) over each month of the year at MOTAT (2018-2022). Source: NIWA Cliflo database.

4.3 Sensitive receptors

The Site is located in a mixed use (City Centre) zone, in Auckland City Centre, so features a range of adjacent activities.

Nearby activities that may be sensitive to dust nuisance include:

- Early childhood education on the ground floor of AON House to the east of the Site (Kindercare).
- M Social Hotel on the northern boundary of the site.
- The Sebel Hotel to the west of the site across Lower Hobson Street.
- Commercial, office and hospitality in the AON House building and the HSBC tower building on the eastern boundary of the Site, both sites are owned by PPL.
- Hospitality at the Viaduct Harbour to the west of the Site.
- Recreational facility (the Auckland Tepid Baths) to the southwest of the site.
- Pedestrian access and parked vehicles along neighbouring roads.

5 Discharges to air

5.1 Dust emissions

The main discharge to air from the demolition activities will be dust. Dust has the potential to cause nuisance or soil property if deposited in sufficient quantities in the environment.

Fine particles present in dust emissions have the potential to affect respiratory heath while suspended in air. Fly ash and cement used in grout and concrete may contain respirable crystalline silica (RCS), which can also have respiratory health effects with sufficiently high exposure.

The main sources of nuisance dust emission along the project are:

- Demolition activities, such as
  - Knocking down and breaking up of building material including plasterboard and blockwork, and
  - Cutting, breaking and crushing of concrete;
- Handling of spoil, aggregate and other solid materials;
- Wind erosion of spoil and other stockpiled material; and
- Vehicle movements over unsealed surfaces and spilled material.

The major factors that influence dust emissions are:

- Wind speeds across the Project - pickup of dust from exposed surfaces occurs at windspeeds above 5 m/s and increase as windspeeds rise;
- The percentage of fine particulate in the material;
- Moisture content of material;
- The area of exposed surfaces;
- Disturbances such as vehicle movements and material handling activities; and
- The height of the dust source above the surrounding ground level.

5.2 Other minor discharges to air could include:

- Combustion emissions from vehicles, equipment or stationary engines on site, which can affect respiratory health in the environment with sufficient exposure.

6 Management procedures

6.1 Approach to dust management

A range of routine measures will be used to manage and mitigate the effects of discharges of dust emissions during the demolition activities. An adaptive approach to management of dust, including additional mitigation may be required if:

- Monitoring indicates that abnormal discharges of dust are occurring;
- Weather conditions are changing such that dust or odour discharges are more likely; and / or
- Complaints are received regarding discharges of dust or odour.

If the available mitigation methods are unsuccessful in controlling discharges (i.e. dust) that cause significant adverse effects on receptors beyond the site boundary, the activities causing the discharge shall be suspended until adequate mitigation can be put in place.

6.2 Dust mitigation measures

Dust management measures are specified Table 6.1 and will be used as required across the Project, depending on the demolition and construction activities undertaken, weather conditions, and proximity to sensitive receptors. The list is not necessarily exhaustive, and additional methods may be implemented during demolition to provide further control. The

Alternative methods may be employed after the effectiveness of those methods is demonstrated and this DMP should be updated accordingly. Sections of Table 6.1 update from the previous version submitted with resource consent application are highlighted in green.

Table 6.1: Dust mitigation procedures

Source of dust	Control
Demolition	• Internal fittings are to be stripped out prior to demolition of structural and exterior elements. • Use of water sprays to dampen material prior to and during demolition. • Only wet cutting of concrete is to be undertaken. • Any breaking of concrete should be done under wet conditions (such as a water spray or fog cannons directed at where the breaking is occurring). • Containment of the immediate area of demolition works though placement of construction wrap in a series of zones as the demolition progresses. • Containment or screening is to be installed along the entire eastern façade of the carpark building during demolition of the adjacent carpark building (demolition stages 3 and 4), This is to be achieve through either: – Installation of scaffold lined with an acoustic barrier is proposed to the full eastern façade, provided that this wall of barriers is impermeable to wind flow. – If wind flow is able to pass through the acoustic barrier wall, construction wrap should be placed along entire eastern façade. This could be progressively reduced in elevation as demolition progresses.
Stockpiles (including material placement and removal)	• Store stockpiled material containing a high content of fine material indoors or undercover where practicable. • Locate and orientate outdoor stockpiles to maximise wind sheltering and separation from sensitive off-site activities as far as practicable. • Dampen, cover or stabilise inactive stockpiles if they are producing visible dust emissions.

Source of dust	Control
	• Limit the height of stockpiles to reduce wind entrainment as far as practicable. • Minimise handling of stockpiled material and drop heights to stockpiles during unloading to decrease potential for dust generation.
Handling of dry material	• Avoid handling (including loading or unloading) of material during windy conditions in locations where dust may be emitted beyond the site boundary, where practicable. • Cover loads of dry fine materials. • Minimise drop heights when loading and unloading dry material. • Use enclosed chutes and conveyors for material to be dropped to lower levels as well as covered skips.
Earthworks	• Limit the extent of excavation and material handling activities in exposed areas where material is dry, as far as practicable. • Limit drop heights of material during handling, including from any conveyor transfer points. • Stabilise exposed areas not required for construction, access or parking, along with completed fill and spoil areas as soon as practicable. • Remove excavated spoil from site on a regular basis. • Maintain surfaces of active earthworks areas in damp condition during dry weather. Where material to be excavated is dry, this should include pre-watering of surfaces, prior to excavation allowing enough time for moisture to penetrate.
Construction	• Only wet cutting of concrete is to be undertaken. • Concrete grinding or scabbling is only to be undertaken with either wet suppression or on-tool air extraction systems in operation. • Bagged fine power materials ensure bags are to be sealed after use and stored appropriately to prevent dust emissions.
Vehicle movements	• Limit vehicle speeds on site to no more than 20 km/h. • All vehicle engines are to be switched off when stationary (no idling on-site). • Limit load sizes to avoid spillages. • Cover loads of fine materials leaving or entering the site. • Minimise on-site travel distances through appropriate site layout and design. • Minimise mud and dust track out the site to sealed areas by using wheel cleaning facilities at site exits to sealed roads. • Wheels of all trucks exiting the site to public roads are to be inspected and washed as required to prevent tracking of material off-site. • Any material identified to be tracked onto public roadways during regular inspections (or via notification from the public) is to be cleaned with a vacuum sweeper truck. • Sealed access routes are to be cleaned with a vacuum sweeper truck whenever inspections (regular or in response to complaints) identify surface accumulation of dust material. • In dry conditions (e.g. less than 1 mm of rain in the preceding 48 hours), maintain vehicle accessways in regular use in damp condition through surface watering (e.g. with water carts or fixed irrigation). • If water suppression is ineffective, synthetic dust suppressants (excluding used oil-based suppressants) may be used as an alternative.
Miscellaneous	• Planning of site layout so that dust generating activities are located away from sensitive receptors where practicable. • Site personnel trained in dust management controls.

Source of dust	Control
	• Monitoring of site conditions (weather/soil conditions) to anticipate and prevent dust effects. • Limiting operations which have the potential to cause high dust during high wind events. • Use of water cart and sprays to keep surfaces damp as required near sensitive receptors. A critical part of this control measure is identification of a sufficient water supply at the site for this purpose with adequate volume. • Use of wind break fences. • Cleaning paved surfaces if affected by tracking of transported dust.

6.3 Review of dust mitigation

When site operators are alerted to a potential off-site dust nuisance through the monitoring techniques described in Section 7 of this DMP, or as a result of a complaint from a third party, the Environmental Manager will undertake a review of site activities to determine the source of the dust and implement further mitigation measures as required in order to reduce the dust generation to acceptable levels.

In general, the additional mitigation will be those measures set out in Table 6.1. Once the additional mitigation has been implemented the Environmental Manager will review the monitoring data to ensure that it has been effective.

6.4 Control of engine exhaust emissions

The following key actions shall be carried out to manage potential off-site impacts of exhaust emissions from vehicle and stationary engines:

- All engines used on the site will be maintained at least in accordance with manufacturers' requirements;
- Where excessive exhaust smoke is identified from any engine, it is to be serviced as soon as is practicable and the vehicle or piece of equipment is to remain out of service until such maintenance has been completed; and
- Unless warm-up or turbo maintenance procedures require it, vehicles should not be left idling while parked or unattended.

6.5 Dust contingency measures

As discussed in Section 6.2, a range of standard dust controls will be used to manage and mitigate dust effects during demolition activities of the Project. Additional mitigation may also be required in the event that:

- Monitoring indicates that significant dust emissions are occurring;
- Weather conditions are changing such that dust emissions are more likely; and / or
- Complaints are received regarding dust.

In the event of significant on-going dust emissions that are unable to be mitigated through the measures described in Section 6.2, the Environmental Manager shall investigate the implementation of dust contingency measures. The suggested dust contingency measures are presented in Table 6.2.

Table 6.2: Dust contingency measures

Source	Contingency measure
Dust generating activities at any location within 100 m of sensitive receptors.	• Install windbreak fences around dust generating activities where practicable. • Additional visual inspections of dust generating activities for visible dust emissions beyond the site boundary. • Ensure availability of water as dust suppressant should visible emissions arise.
Dust discharges cause excessive deposition / soiling at sensitive receptors	• Stop activities that are generating dust until mitigation is reviewed and additional mitigation is in place. .
Forecast high winds (greater than 5 m/s) in dry conditions	• Limit the activities that generate dust within 200 m of downwind sensitive activities. • Additional visual inspection of exposed areas and activities. • Assess the need for additional controls such as increased water application rates.
Forecast high winds (greater than 10 m/s) in dry conditions	• Stop activities that generate dust within 200 m of downwind sensitive activities until wind eases.
Visible dust discharges from stockpiles / areas of uncovered soil near sensitive receptors	• Dampen stockpile or exposed area of soil. • Cover or stabilise area to reduce dust generation.

7 Monitoring requirements

7.1 Monitoring approach

The overall approach to dust control is largely based on visual monitoring; good management of the demolition areas; or complaints received.

Good practice focusing on proactive measures will aid in avoiding significant dust emissions, however if dust emissions do occur, the monitoring will help to identify such occurrences and enable a prompt response.

Additionally use of continuous instrumental monitoring is recommended at or near the outdoor play are of the Kindercare Chilcdcare Centre at 29 Customs Street West, during the demolition of the Downtown Carpark building, where access is able to be obtained.

7.2 Visual inspection and monitoring methods

Visual monitoring of dust across all areas of the site where dust generating activities are in progress will be undertaken on a daily basis, or more frequently if conditions change.

Weather forecasts should also be checked daily (wind speed, wind direction and rainfall) to assist in managing site activities and implementing the appropriate dust controls.

Table 7.1 describes the nature and frequency visual dust monitoring activities to be undertaken during demolition. In the event that dust deposits or visible dust plumes are observed at or beyond the site boundary, the findings of the visual inspections are to be recorded in the daily dust inspection log as set out in Appendix A.

Table 7.1: Visual dust monitoring programme

Monitoring activity	Frequency*
Inspect land adjacent to the site, exits and adjoining roads for the presence of dust deposition and/or accumulation of dust material.	Daily
Observe weather conditions including wind and rain.	Daily and as conditions change
Inspect all exposed un-stabilised surfaces for dampness and that the extent of those areas is being minimised.	Daily and as conditions change
Inspect stockpiles for dampness and height of no more than 3°m (or appropriately stabilised).	Daily and as conditions change
Inspect dust generating activities for effectiveness of dust management measures and avoidance of visible dust emissions beyond the boundary of the site.	Daily and as new activities commence
Inspect watering systems (sprays and water carts) to ensure equipment is maintained and functioning to effectively dampen exposed areas.	Weekly
Inspect dust generating activities and check surfaces are being maintained in a visibly damp condition, and dust and particulate matter emissions are minimised.	Where weather conditions are dry and wind speeds exceed 5 m/s
Inspect wheels of all trucks exiting the Site to public roads for evidence of tracked material (to be washed and removed as required)	All truck departures
Check for dust on local roads being used to access the site.	Daily

Monitoring activity	Frequency*
Inspect vehicle exits to ensure that wheel inspection and washing is effective and dust or sediment laden water is not being tracked off site by vehicles.	Daily
Inspect sealed vehicle access routes within the Site for deposition of material (to be removed via vacuum sweeper truck)	Daily
Inspect watering systems (sprays and water carts) to ensure equipment is maintained and functioning to effectively dampen exposed areas.	Weekly

* The frequency of site inspections may need to be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

7.3 Instrumental dust monitoring

7.3.1 Monitoring location and methods

Where access is able to be obtained, continuous instrumental monitoring of dust concentrations at or near the outdoor play area of the Kindercare Childcare Centre at the AON Centre, 29 Customs Street West would provide useful information on dust levels at this nearby sensitive location and continuous feedback in relation to the efficacy of dust management measures.

It is recommended that the continuous instrumental monitoring involves the following:

- Continuous instrumental monitoring of PM_{10} concentrations (as an indicator of dust levels[6]) at or near the Kindercare outdoor play area. As the purpose of the monitoring is to provide feedback on dust management rather than compliance with the Resource Management (National Environmental Standards for Air Quality) Regulations 2004, monitoring methods do not need to accord with the reference methods specified in Schedule 2. Methods can therefore include optical monitoring methods.
- Calculation of 1-hour average concentrations from real-time monitoring data.
- Online display of real-time particulate data.
- Provision for alarms on 1-hour average concentrations measured above dust trigger levels (visual and/or via internet, email and mobile phone).
- Recording/logging of monitoring data.

7.3.2 Dust Trigger Levels and Alerts

Dust monitoring results are to be compared with trigger levels to indicate where dust levels may have the potential to cause adverse air quality effects and where modification to dust management measures may be required to avoid this outcome.

In the first instance, trigger levels published by the Ministry for the Environment (MfE)[7] are adopted as operational dust trigger levels. In the event of monitoring results exceeding the trigger level, response actions are to be taken as outlined below. The trigger level values are described in Table 7.2.

[6] Experience of construction dust monitoring at other sites in Auckland has indicated that monitoring of the PM_{10} component of particulate provides a more effective indicator of dust levels that monitoring of the total of suspended particulate (TSP).
[7] Ministry for the Environment. 2016. *Good Practice Guide for Assessing and Managing Dust*: Ministry for the Environment.

Table 7.2: Dust Trigger Levels

Discharge	Trigger Level
Dust monitoring*	• MfE recommended trigger values for PM_{10} concentrations: – 150 µg/m^3 (rolling 1-hour average)*
Dust deposition	• Evidence of dust on windows, balconies or cars (a finger run down the glass leaves a clear line)

* The MfE recommended trigger values do not relate specifically to rolling averages, which are specified in this case to provide instantaneous feedback on dust levels.

The dust monitoring trigger levels should be reviewed through regular (at least monthly) review of monitoring results as described in the air quality log. The regular review should include comparison with:

- The trigger alerts specified in Table 7.2;
- A review criterion for 24-hour average particulate TSP concentrations of 60 µg/m^3 for TSP or of 50 µg/m^3 for PM_{10} (if TSP is not measured)[8];
- Visual monitoring records;
- Dust complaints.

If review of monitoring results indicates the triggers specified in Table 7.2 have not provided suitable advance indication of potential adverse air quality effects, the triggers may require modification.

[8] The MfE Good Practice Guide (2016) does not recommend a 24-hour average trigger for PM_{10} and the threshold concentration for 24-hour average PM_{10} concentrations specified in the National Environmental Standards for Air Quality has been specified as the PM_{10} review criterion (where TSP concentrations are not measured).

8 Complaints

8.1 Overview

Although the mitigation measures described in this DMP are aimed at avoiding discharges to air, complaints may be received by members of the public. It is important to ensure that any complaints are recorded and promptly investigated to identify and resolve the cause of the complaint. The requirements and procedures relating to complaints are detailed below.

8.2 Receiving and recording complaints

A complaint may be received from a member of the public via the following:

- Direct call to the main works Hotline.
- Complaint received by Auckland Council which notifies the Site of the complaint.
- Written or email correspondence.

In all circumstances, correct and accurate information needs to be recorded by the person receiving the complaint in order to help investigate the cause of the complaint, and ensure appropriate mitigation has or will be undertaken.

Any complaints received should be recorded in a complaints file, and an investigation undertaken as outlined in the Section 8.3. The following guide should be followed when a complaint is received:

- Record the details provided about the incident by the complainant.
- The name and contact details of the person(s) who raised the complaint (unless they elect not to provide this).
- Acknowledge receipt of the concern or complaint and assure that an initial response shall be undertaken within 24 hours of receiving a complaint and resolved as soon practicable.
- Known demolition activities at the time and in the vicinity of the complainant during the concern or complaint period.
- Remedial actions undertaken (if any) and the outcome of these, including monitoring of the activity, to ensure that dust mitigation measures are effective in controlling dust emissions, and that there are no significant impacts on the surrounding environment, to the satisfaction of Auckland Council and the complainant.
- Weather conditions at the time of the concern or complaint, including wind direction.
- Reporting of the investigation in the complaints file.

8.3 Investigating complaints

The investigation of all complaints relating to air discharges will involve the following:

- Information about the incident as described by the complainant.
- Weather conditions at the time of the complaint, including wind direction and speed, and rainfall (if any).
- Reporting the findings and recommendations.
- Actions and time taken to close-out complaint.
- Communication with the complainant.
- Ensure reporting of the investigation is recorded in the complaints file.

An investigation of the complaint will require the Environmental Manager to visit the location where the complainant observed the impact and make visual observations in relation to the reported impacts and adjacent and upwind activities occurring on site. This may also include going to the location where the complainant observed the impact.

The site health and safety procedures must always be followed during the complaint investigation procedure.

9 Applicability

This report has been prepared for the exclusive use of our client Precinct Properties Holdings Limited, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for resource consent and that Auckland Council as the consenting authority will use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
	
Caitlin Dalzell	Peter Millar
Environmental Engineer	Project Director

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Appendix A Dust inspection log

DUST INSPECTION LOG FORM

Date:___/___/_____ ☐ Mon ☐ Tue ☐ Wed ☐ Thu ☐ Fri ☐ Sat ☐ Sun

VISIBLE DUST EMISSIONS

Source	Level*	Colour/Opacity	Time	Weather Cond. *(i.e. rain, windy, calm)*	Wind Speed / Wind Direction *(e.g. "5 m/s / NE")*
________________	____	___________	___:____	_____________	__________/__________
________________	____	___________	___:____	_____________	__________/__________
________________	____	___________	___:____	_____________	__________/__________
________________	____	___________	___:____	_____________	__________/__________
________________	____	___________	___:____	_____________	__________/__________
________________	____	___________	___:____	_____________	__________/__________
________________	____	___________	___:____	_____________	__________/__________
________________	____	___________	___:____	_____________	__________/__________
________________	____	___________	___:____	_____________	__________/__________
________________	____	___________	___:____	_____________	__________/__________

Levels (extent) of visible dust emissions:

(1) Minor visible emissions (<5m source);

(2) Moderate visible emissions (<30m from source);

(3) Major visible emissions (>30m from source

INVESTIGATION AND RESPONSE

Date event was investigated:___/___/_____ Person responsible for investigation and response:_________________________________

Possible cause(s):

☐ Exposure of activities to excessive wind

☐ Water application insufficient

☐ Excessive vehicle speeds

☐ Materials not handled or stored properly

☐ Loading/Unloading not carried out properly

☐ Other____

____

____

____

Corrective actions:

Date: Description:

___/___/_____ ____

___/___/_____ ____

___/___/_____ ____

Preventive actions:

Date: Description:

___/___/_____ ____

___/___/_____ ____

___/___/_____ ____

VEHICLES AND MACHINERY – PRESTART CHECK		
Equipment identification	Excessive or prolonged visible emissions observed?	If yes, describe action taken (e.g., equipment repaired or removed from site within 24 hours):
_____	_____	_____
_____	_____	_____
_____	_____	_____

Person responsible for the above information:

Name:_____ Job Title:_____ Signature:_____ Date:___/___/_____

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Appendix B Evaluation of dust mitigation and monitoring against IAQM recommendations

Table B1: Evaluation of dust mitigation and monitoring measures against IAQM mitigation recommendations[1]

Activity	IAQM Recommended Mitigation Measure	Implementation Recommendation by Activity Dust Risk*			Evaluation of proposed measures
		Low	Medium	High	
Communications	*1. Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.*	H	H	H	Community and stakeholder engagement in relation to wider project addressed in SCDMP and CMP
	2. Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	H	H	H	To be confirmed in future
	3. Display the head or regional office contact information.	H	H	H	To be confirmed in future
	4. Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, realtime PM10 continuous monitoring and/or visual inspections	D	H	H	The existing DMP has been updated to encompass the construction phase and to incorporate recommendations of the air quality assessment
Site Management	*5. Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.*	H	H	H	Required under existing DMP
	6. Make the complaints log available to the local authority when asked.	H	H	H	Required under existing DMP

[1] IAQM. 2024 "Guidance on the assessment of dust from demolition and construction". Version 2.2. Section 8.2.

Activity	IAQM Recommended Mitigation Measure	Implementation Recommendation by Activity Dust Risk*			Evaluation of proposed measures
		Low	Medium	High	
	7. 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 log book.	H	H	H	Required under existing DMP
	8. Hold regular liaison meetings with other high risk construction sites within 250 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.	N	N	H	Community and stakeholder liaison in relation to wider project addressed in SCDMP and CMP
Monitoring	*9. Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary.*	D	D	H	Required under existing DMP
	10. Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.	H	H	H	Required under existing DMP
	11. Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	H	H	H	Visual monitoring requirements of DMP updated

Activity	IAQM Recommended Mitigation Measure	Implementation Recommendation by Activity Dust Risk*			Evaluation of proposed measures
		Low	Medium	High	
	12. Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	H	H	H	Conit nous PM_{10} monitoring in or around Kindercare outdoor play area is recommended to provide ongoing feedback on dust level s at this sensitive location and efficacy of dust management measures.
Preparing and maintaining the site	*13. Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.*	H	H	H	Required under existing DMP
	14. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	H	H	H	Use of construction wrap and acoustic barriers incorporated into DMP update
	15. Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.	D	H	H	
	16. Avoid site runoff of water or mud.	H	H	H	N/A to dust emissions
	17. Keep site fencing, barriers and scaffolding clean using wet methods.	D	H	H	Measure unlikely to have discernible impact on dust emissions (value of measure is largely aesthetic)
	18. Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below	D	H	H	Covered in DMP
	19. Cover, seed or fence stockpiles to prevent wind whipping.	D	H	H	Stockpiling limited to surge pile prior to removal from site
Operating vehicle/machinery	*20. Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.*	H	H	H	N/A – specified requirements are not applicable in NZ

Activity	IAQM Recommended Mitigation Measure	Implementation Recommendation by Activity Dust Risk*			Evaluation of proposed measures
		Low	Medium	High	
and sustainable travel	*21. Ensure all vehicles switch off engines when stationary - no idling vehicles.*	H	H	H	Required under existing DMP
	22. Avoid the use of diesel or petrol powered generators and use mains electricity or battery	H	H	H	Use of diesel fired generators (if required other than for emergency supply) is likely to require resource consent (depending on rating and exhaust configuration)
	23. Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).	D	D	H	Speed limits specified in DMP
	24. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	N	N	H	N/A
	25. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	N	D	H	N/A
Operations	*26. Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.*	H	H	H	Required under existing DMP
	27. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate	H	H	H	Mains or tanker supply available
	28. Use enclosed chutes and conveyors and covered skips.	H	H	H	Incorporated into DMP update

Activity	IAQM Recommended Mitigation Measure	Implementation Recommendation by Activity Dust Risk*			Evaluation of proposed measures
		Low	Medium	High	
	29. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H	H	H	Required under existing DMP
	30. Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	D	H	H	Required under existing DMP
Waste management	*31. Avoid bonfires and burning of waste materials.*	H	H	H	Not proposed
Demolition	*32. Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).*	D	D	H	Incorporated into DMP update
	33. Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	H	H	H	Required under existing DMP
	34. Avoid explosive blasting, using appropriate manual or mechanical alternatives.	H	H	H	Not proposed
	35. Bag and remove any biological debris or damp down such material before demolition.	H	H	H	Contaminated material is to be handled in accordance with the Contamination Site Management Plan
Earthworks	*36. Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.*	N	D	H	N/A - Basement walls to be stabilised prior to excavation.
	37. Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	N	D	H	

Activity	IAQM Recommended Mitigation Measure	Implementation Recommendation by Activity Dust Risk*			Evaluation of proposed measures
		Low	Medium	High	
	38. Only remove the cover in small areas during work and not all at once.	N	D	H	Required under existing DMP
Construction	*39. Avoid scabbling (roughening of concrete surfaces) if possible.*	D	D	H	Incorporated into DMP update
	40. 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.	D	H	H	Required under existing DMP
	41. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	N	D	H	On-site concrete batching not proposed
	42. For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	N	D	D	Incorporated into DMP update
Vehicle track-out	*43. Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.*	D	H	H	Required under existing DMP. Continuous use unlikely to be required if wheel wash facilities are effective.
	44. Avoid dry sweeping of large areas.	D	H	H	Suction sweeping required under DMP
	45. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	D	H	H	Required under existing DMP (fine materials only)
	46. Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	N	H	H	Required under existing DMP
	47. Record all inspections of haul routes and any subsequent action in a site log book.	D	H	H	Required under existing DMP

Activity	IAQM Recommended Mitigation Measure	Implementation Recommendation by Activity Dust Risk*			Evaluation of proposed measures
		Low	Medium	High	
	48. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	N	H	H	Access will be via hard surfaces during demolition. Hard surfacing of access routes then unlikely to be practicable until construction commences.
	49. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	D	H	H	Required under existing DMP
	50. Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	N	H	H	Likely to be restricted by constrained site area
	51. Access gates to be located at least 10 m from receptors where possible.	N	H	H	To be confirmed in future

*Key to recommendation:

H: Highly recommended

D: Desirable

N: Not required

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