Mitigation Measures Table

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SSD-86797708

Residential Flat Building at 64-66 Lavender St & 3-7 Middlemiss St, Lavender Bay

Environmental Impact	Mitigation Measure	Residual Impact
Noise and Vibration General vibration – Operation	Façade noise control: • The building shell will need to be designed to control external noise intrusion in order to comply with the internal noise criteria in Section5.1. The following sections provide the performance requirements for different facade elements. • The glazing recommendations for the North and South Towers are provided solely from an acoustic performance perspective (Rw rating)to satisfy the acoustic requirements only, and the Clientmay select alternative glazing systems with an equivalent or higher Rw rating, provided that the applicable internal noise level criteria are satisfied. Building design: • All operable glass windows and doors shall incorporate full perimeter acoustic seals equivalent to Q-Lon, which enable the Rw rating performance of the glazing to not be reduced. • The glazing thicknesses outlined inSection5.3should be considered the minimum thicknesses to achieve acoustical ratings. Greater glazing thicknesses may be required for structural loading, wind loading etc. • The glazing supplier shall ensure that installation techniques will not diminish the Rw performance of the glazing when installed on site. Sliding door meeting stiles should form an airtight seal when closed and locked. • The perimeter of all window and door frames are to be sealed airtight in the external facade using the following methods: - For gaps less than 10mm-Fill all gaps around the window perimeter with an acoustic masticsealer (minimum specific gravity 1.6sg) equivalent to Promat Promaseal. The depth of sealershall be at least equal to the width of the gap - If the gap is greater than 10mm, fill the cavity with polyester insulation and a backing rod. Seal the gap airtight an acoustic mastic sealer (min specific gravity 1.6sg) equivalent to Promat Promaseal. The depth of sealer shall be at least equal to the width of the gap. The gaps between frames shall also be sealed using aluminium angle brackets (approximately 25x 25 x 3mm). Non-glazed elements: • In the event that façade elements are not masonry, detailed acoustic review of external wall build up is required to ensure noise transmission to internal areas is adequately controlled to ensure compliance with internal noise level requirements of Section 5.1. Supplementary ventilation:	**Low**

	• All habitable rooms except west facing living are to be provided with supplementary fresh air in accordance with the ISEPP Guideline. In addition, it is recommended that the level 2 and 3western living rooms are provided alternative ventilation due to noise from the use of the loading dock. Any ventilation system must meet the requirements of AS1668.1. Predicted ground-borne rail noise • For facades with line-of-sight to the rail corridor, Section 3.6.2 of the Rail & Road Guideline provides discussion regarding the masking effect provided by airborne noise over for ground-borne noise. • The Rail & Road Guideline identifies a risk scenario for rooms facing away from the rail line (with no line-of-sight) where they may experience ground-borne noise but without significant airborne noise impacts due to building shielding • For the facades that are shielded from airborne rail noise: - Additional rail vibration measurements are recommended to be undertaken inside the an existing building on site that is shielded from the rail. The vibration measurements carried out on V01 and V02 were taken on-grade with a spike on the ground. Additional measurements taken on the slab would provide insight to vibration levels with building decoupling from the ground on site. These additional measurements could be used to refine predicted ground-borne noise levels. - Building vibration isolation may be required to satisfy the ground-borne noise criteria (subject to further review in the detailed design phase). Mechanical plant and equipment • It is likely that primary ventilation plant and equipment items will either be located in the basement or at roof level. • If located within the basement, noise emission control will be achievable using in duct lining or silencers or similar standard treatment for noise emissions to the environment. • Acoustic treatments must be sufficient such plant noise emissions are compliant with the project noise trigger levels. • Detailed acoustic review is recommended to be conducted at detailed designed stage, once plant and equipment items are designed and selections finalised. • In particular, detailed review is needed for any mechanical equipment located on roofs or podiums that will be overlooked by future apartments. This includes residential apartments in the South tower overlooking the North tower roof deck. • Plantrooms with louvre openings are recommended to be not adjacent to a residential balcony.	
Noise and Vibration **General vibration – Construction**	• It is recommended that vibration monitoring is conducted if excavation using hammer, vibrated piling or vibrator compaction is proposed within 20m of the residences on the eastern and western boundary of the site until safe working distance can be established. • Any monitor is to have SMS notification facility to enable the contractor to have immediate notification in the event that vibration levels reach the threshold in Section8.2.2.	**Low**

	• Dilapidation surveys should be conducted for any residential dwellings that fall within the relevant minimum buffer distances of the equipment used during the works that are being carried out. This will inform if any of the adjacent development should be subject to vibration criteria different to those identified in Section 8.2.2. This will also document any existing defects with those dwellings/items. • Where vibration is found to be excessive, management measures should be implemented to ensure vibration compliance is achieved. Management measures may include modification of construction methods such as: - Using smaller equipment, or use of rock rippers as opposed to hammers (if possible). - Use of rock saws to make perimeter cuts to excavation area prior to use of percussive equipment. - Establishment of safe buffer zones as mentioned above. • Notification by letterbox drop would be carried out for all occupied buildings surrounding the site.	
Sediment and erosion control	The following construction methodology will be followed to minimise the impact of sedimentation due to construction works: • Diversion of "clean" water away from the disturbed areas and discharge via suitable scour protection. • Diversion of sediment-laden water into temporary sediment control tanks/basins to capture the design storm volume and undertake flocculation (if required). This will generally be the basement excavation in urban development. • Provision of construction traffic shaker grids and wash-down facilities to prevent vehicles carrying soil beyond the site. • Provision of catch drains to carry sediment-laden water to sediment tanks/basins. • Provision of silt fences to filter and retain sediments at source. • Provision of geofabric filters to new stormwater pits to retain sediments at source; and • Where future construction and building works are not proposed, the rapid stabilisation of disturbed and exposed ground surfaces with turf or hydro-seeding.	**Low**
Earthworks	**General** Earthworks should be undertaken in general accordance with AS3798:2007 'Guidelines on Earthworks for Commercial or Residential Developments". The designers detailed specification for earthworks should take precedence over these recommendations where appropriate. The following commentaries are applicable: • Remove any loose surface soils, topsoil, uncontrolled fill and vegetation and unsuitable materials prior to filling. • Treatment of uncontrolled fill for areas to be overlain by pavement or concourse. • Proof roll the exposed surface using a minimum 8-tonne roller, fully laden water cart or other approved method. The surface should be rolled, and the passes observed by a geotechnical engineer, or a suitably qualified engineer, or an experienced Geotechnical Inspection and Testing Authority (GITA).	**Low**

- Any remaining wet, soft, or heaving materials identified during the proof roll should be removed and/or treated as directed by the Geotechnical Engineer.
- Fill, where required, should generally be placed in layers not exceeding 300mm loose thickness (or in accordance with Council specifications, or in accordance with other specific recommendations within this report, whichever is lesser) and compacted to the target compaction prior to placement of the next layer. Thinner layers may be required for a smaller plant. The recommended compaction levels are indicated below, unless superseded by the designer's specifications:
    - General Fill / Pavement Subgrades - 98% standard minimum dry density at ±2% optimum moisture content.
    - Pavement materials - 98% modified minimum dry density ratio at ±2% optimum moisture content.
    - Beneath Structures – 98% standard minimum dry density ratio at ±2% optimum moisture content.
- Filling below structures and pavements should be undertaken under Level 1 AS3798:2007,including a halo zone laterally to encompass the zone of influence of proposed loads.

Reuse of site won materials other than Topsoil

- All earthworks, including site preparation, placement, and compaction, must be carried out in accordance with AS 3798:2007–Guidelines on Earthworks for Commercial and Residential Developments. To minimise the risk of differential settlement, fill placement should ensure that horizontal layers remain homogenous. Mixing of distinct material types (e.g., clay and rock) within the same lift should be avoided. Prior to reuse, it is anticipated that all site-won materials will be assessed for contamination by a qualified environmental consultant to confirm their chemical suitability for the proposed land use.
- Where site-won crushed rock is intended for use in pavement subgrades, The material should be crushed and screened to produce a well-graded product with a maximum particle size appropriate for the layer thickness (typically <75 mm). Laboratory California Bearing Ratio (CBR) testing should be conducted on representative samples of the processed material to verify that the achieved CBR meets the minimum design assumptions adopted for the pavement design.

Geotechnical Advice for Foundations

- Bored piles may require the use of permanent or temporary steel liners as pile excavations may likely encounter groundwater, and concrete pouring should utilise a tremie system.
- High-level footings on newly placed controlled fill, placed as per recommendations on this report under Level 1 control in accordance with AS3798-2007 to satisfy a minimum 98% Maximum Dry Density by Standard Compaction, may adopt an allowable bearing capacity of 150kPa. For any footing founded on controlled fill, controlled fill or suitable natural material shall underlie the lateral spread of the zone of influence of loads from the footing.
- All footings must be designed with consideration to the zone of influence of loads, pertaining nearby structures, excavations, buried services, previously backfilled excavations and footings.
- Notwithstanding the ranges of allowable bearing capacities detailed inTable6for all encountered strata, it is recommended structures be founded on strata of similar stiffness to limit potential differential settlement.

- Footing/pile excavations should be inspected by a Geotechnical Engineer or Principal Certifying Authority (PCA) during excavation and prior to pouring concrete and constructed with minimal delay following excavation. The Geotechnical Engineer is to confirm that encountered conditions satisfy design assumptions.

Temporary and Permanent Batter Slopes

- Given the significant depth of the proposed basement (approx. 15.0 m to 17.0 m) and the site constraints at the boundaries, it is anticipated that the bulk excavation will be carried out vertically using the shoring systems detailed insection7.1.However, where lateral space permits (such as for internal localized excavations, service trenches, or temporary internal ramps), a battered slope approach may be adopted. Excavating vertically in uncontrolled fill, residual soil, or extremely weathered sandstone without support presents significant stability risks and is generally not recommended for depths exceeding 1.5 metres unless approved by a geotechnical engineer.

- Table 7provides recommended maximum batter slopes for temporary and permanent excavations up to 3.0 metres in depth. These guidelines assume that the ground is fully drained (above the groundwater table) and is not subject to surcharge loading.

Table 7: Recommended Maximum Batter Slopes for Excavations up to 3m Deep

Material	Maximum Batter Slope Ratio (H:V)	
	Temporary	Permanent
Unit 1 (Fill and Soil)	2:1	2.5:1*
Units 2 & 3 (VL & L Strength Sandstone)	0.5:1*	1:1*
Units 4 & 5 (M & H Strength Sandstone)	Vertical*	Vertical*

***Note:** Vertical cuts in sandstone are subject to inspection by a geotechnical engineer to identify adverse defects. Systematic rock bolting or shotcreting may still be required.

- No heavy loads (including stockpiles, excavators, or construction traffic) should be placed within a horizontal distance from the crest of the batter equal to the depth of the excavation (1H), unless specifically accounted for in the stability assessment.

- Permanent batter angles should be considered as preliminary; detailed design should include additional assessment (with potential for support design) by a geotechnical engineer or detailed designer, with provision for drainage and erosion control.

- Competent medium-strength to strong sandstone will generally be stable when excavated vertically, provided no adversely oriented joints or other defects are present. Vertical rock faces for internal excavations (e.g. lift pits) should be inspected by an experienced geotechnical engineer or engineering geologist as excavation progresses, at depth intervals not exceeding 1.5 m. These inspections serve to identify the extent of shotcrete face protection required and to check for adverse defects daylighting into the excavation face that may require additional stabilisation measures (such as rock bolts and/or shotcrete).

- Where temporary or permanent batters aren’t possible or impractical due to space constraints or the presence of existing buildings on neighbouring properties, retaining, or shoring walls may be designed in accordance with the retaining wall parameters identified inTable8 below:

Table 8: Recommended Design parameters for Retaining Walls

Material Unit	Unit Weight (kN/m³)	Poisson's Ratio (v)	Modulus of Elasticity (E, MPa)	Cohesion (c, kPa)	Friction Angle (φ, degrees)	K_a	K_p	K_0
Fill/Topsoil (Unit 1)	18	0.3	10	0	25	0.406	2.464	0.577
Class V Rock (Unit 2, Very Low to Low Strength)	22	0.3	100	50	32	0.307	3.255	0.470
Class IV Rock (Unit 3, Low to Medium Strength)	23	0.25	500	200	35	0.271	3.690	0.426
Class III or Better Rock (Unit 4, Medium+ Strength)	24	0.2	2000	500	40	0.217	4.599	0.357

The apparent lateral pressure (σ_h) can be calculated as:

$\sigma_h = 0.65 \times Ka \times \gamma \times H$

Where:

γ Bulk unit weight of the soil

H Total height of the excavation

- The above values do not account for any surcharge loads from adjacent structures, construction equipment, or stockpiled materials. These must be included in the final design. The shoring design must account for hydrostatic pressures below the depth of water table. The effective unit weight of the soil should be used for calculations below the watertable. Passive pressures must be factored appropriately (e.g., Factor of Safety 2.0)

Vibration and Noise Control

- The proposed development necessitates a bulk excavation extending approximately 15.0 m to 17.0m below existing ground levels. This will require the removal of high-strength Hawkesbury Sandstone, including Class III, II, and I units. Excavation of such competent rock typically demands heavy rock-breaking equipment, such as hydraulic impact hammers and rock saws, which are significant sources of ground-borne vibration and transmitted noise. This geotechnical risk is amplified by the site’s location within ahigh-density residential precinct. Particular sensitivity is

	required regarding the local heritage item located on the site, as older masonry structures are often more susceptible to vibration-induced damage than modern reinforced concrete buildings. • To manage these risks and ensure the protection of adjacent assets, strict control measures must be incorporated into the Construction Management Plan (CMP). Prior to the commencement of any site works, including demolition, comprehensive video-recorded dilapidation surveys must be carried out on all neighbouring properties and public infrastructure. A specialized structural assessment of the heritage item on the northern boundary should be conducted by a qualified heritage structural engineer to establish a baseline of existing defects and structural integrity. • A continuous, real-time vibration monitoring plan must be implemented for the duration of the excavation works. Geophones with automated alarm systems should be installed at critical locations along the site boundaries and specifically attached to the footing or base of the adjacent heritage structure. If vibration limits are exceeded, all works must cease immediately, and the excavation methodology must be reviewed and modified before work recommences. For residential structures, Vibration Peak Particle Velocity (PPV) should generally be limited in accordance with AS 2187.2 and BS 7385-2. Significantly lower, heritage-appropriate limits must be adopted for the northern boundary, typically in accordance with the German Standard DIN 4150-3 (Structural Vibration in Buildings), which recommends limiting PPV to 3 mm/s to 5 mm/s for sensitive heritage structures at low frequencies. • To minimize the transmission of vibration, the excavation sequence should prioritize isolation of the site perimeter from the central rock mass using a rock saw or line-drilling techniques prior to bulk excavation. This creates a physical air gap that significantly reduces vibration transmission to neighbouring footings. Furthermore, large hydraulic hammers should be restricted to the centre of the site. As excavation approaches the boundaries non-percussive methods such as rock sawing, grinding, or smaller hammers must be employed to maintain compliance with the established vibration limits. **Spoil Management** • The bulk of the material generated from the proposed basement excavation will consist of fill material and Sandstone, ranging from Class V through to Class I. Prior to removal from the site, all excavated spoil must be classified in accordance with the NSW EPA Waste Classification Guidelines: Part 1–Classifying Waste (2014) to determine the appropriate disposal or reuse pathway. • It is anticipated that the underlying natural sandstone bedrock will be classified as Virgin Excavated Natural Material (VENM), provided it is not cross-contaminated with fill or other waste streams during excavation. VENM is typically suitable for reuse on other sites or disposal at facilities licensed to accept this category of waste. Conversely, the upper profile, comprising fill material, requires careful assessment. Reference should be made to the separate Preliminary Site Investigation (PSI) report (Ref: RG1358-PSI-1-1) prepared for this project, which details the chemical characterisation of the site soils. All material intended for off-site disposal must be transported by a licensed contractor to a waste facility legally authorised to accept the specific waste classification, with waste dockets retained for validation purposes.	
Contamination and Remediation	• A hazardous building materials survey should be undertaken prior to demolition to identify asbestos-containing materials, lead-based paint and any other materials requiring specific management prior to bulk demolition.	**Low-Moderate**

	• Clearance inspections should be undertaken by a suitably qualified occupational hygienist following removal of identified hazardous building materials and prior to demolition. • Clearance inspections of the ground surface by a qualified occupational hygienist once all buildings and hardstand are removed. Following demolition and removal of hardstand (where required), complete a post-demolition intrusive investigation to: - delineate the localised PCB impact identified in the north-east portion of the Site (and confirm whether additional PCB hotspots are present); and - support waste classification of fill/materials for off-site disposal and confirm management requirements for excavated natural soils/bedrock. • Intrusive investigation following removal of fill soils should be undertaken to confirm the classification of underlying natural soils and bedrock to be excavated during basement construction. • An unexpected finds procedure should be implemented during excavation works to manage any previously unidentified contamination encountered. • Should previously unidentified contamination be encountered during demolition or bulk excavation, appropriate management or remediation measures should be implemented in accordance with relevant NSW EPA guidelines. This staged approach is consistent with the intent of the State Environmental Planning Policy (Resilience and Hazards) 2021 and the NSW EPA Contaminated Land Guidelines-Consultants Reporting on Contaminated Land (2020), which recognise that full site characterisation may not be feasible prior to demolition where access is constrained.	
Construction Traffic	• Trucks to minimise the use of local streets for access to the construction site. • Trucks to enter and exit the site in a forward direction. • Pedestrians near the ingress/egress points will not be held unnecessarily. • At construction vehicle access/egress points, priority is to be given to trucks accessing the site over trucks egressing the site so as to have no impact to traffic flow on surrounding roads (unless exceptional circumstances do not permit). • Trucks to not circulate on the road network to wait to enter the site (unless exceptional circumstances do not permit). • Restrict construction vehicle activity to designated routes which do not utilise any local roads; • Truck drivers will be advised of the designated truck routes to/ from the site; • Construction access from the external road network to mainly occur at signalised intersection; • Pedestrian movements adjacent the construction site will be managed and controlled by site personnel where required; • Pedestrian warning signs and construction safety signs/devices to be utilised in the vicinity of the site and to be provided in accordance with WorkCover requirements; • Construction activity to be carried out in accordance with approved hours of work;	**Low**

	• Truck loads would be covered during transportation off-site; • Establishment and enforcement of appropriate on-site vehicle speed limits which would be reviewed depending on weather conditions or safety requirements; • Activities related to the construction works would not impede traffic flow along adjacent roads; • Materials would be delivered and spoil removed during standard construction hours; • Construction vehicles not to queue on adjacent streets; • During site induction, workers will be informed of the existing bus, train and metro network servicing the site; • To support construction workers in utilising public transport, appropriate arrangements will be made for any equipment/ tool storage and drop-off requirements; and • Development and enforcement of driver charter. The appointed contractor will include the following in all subcontract procurement packages as part of a driver code of conduct: • a copy of the approved truck routes as previously detailed in this document. • the approved maximum truck size • any other entry restrictions, or site access restrictions as agreed to by the authorities	
Operational Waste Management	• Specifications and recommendations on bin access and travel paths have been provided within the OWMP, however it is the architect's responsibility to ensure the architectural drawings meet these provisions. • Based on the estimated volumes of general waste, recycling and FOGO generated by the residential component of this development, the recommended bin quantities and collection frequencies are as follows: General Waste: 10 x 660L bins collected 1 x weekly (Compacted 2:1) Recycling: 20 x 660L bins collected 1 x weekly FOGO: 18 x 240L bins collected 1 x weekly. During operation, it is the responsibility of the building manager to monitor the number of bins required for the residential component of the development. • It is strongly recommended that the bins and equipment at the base of each chute allows for at least 2 days' worth of general waste and recycling generation. Based on the estimated general waste and recycling volumes generated by each building/core, the following equipment is recommended:	**Low**

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Table 3: Chute Discharge Equipment Summary
<table>
<tr><th colspan="8">Volume Handling Equipment</th></tr>
<tr><th colspan="4">General Waste</th><th colspan="4">Recycling</th></tr>
<tr><th>Tower</th><th>Generated General Waste (L/week)</th><th>#660L Bins Required for 2 days' Capacity</th><th>Recommended Chute Discharge Equipment</th><th>Tower</th><th>Generated Recycling (L/week)</th><th>#660L Bins Required for 2 days' Capacity</th><th>Recommended Chute Discharge Equipment</th></tr>
<tr><td>NT</td><td>3240</td><td>1.40</td><td>2-Bin Linear System</td><td>NT</td><td>6480</td><td>2.81</td><td>3-Bin Linear System</td></tr>
<tr><td>ST</td><td>3280</td><td>1.42</td><td>2-Bin Linear System</td><td>ST</td><td>6560</td><td>2.84</td><td>3-Bin Linear System</td></tr>
</table>
The above is a recommendation only and equivalent volume handling equipment may be used subject to equipment supplier's recommendation/review.

Bin Collection procedures:
Prior to collections, the Building Manager will be responsible for transporting the bins from Chute Discharge Rooms and South Tower Communal FOGO Bin Room to the allocated Bin Holding Room and Temporary Loading Zone respectively, located on the ground level adjacent to the loading dock. The Building Manager is also responsible for ensuring that the bins are adequately arranged for an efficient collection. It is recommended that additional 660L service bins be placed under the chute to collect discharge while the other bins are being serviced.
It is recommended that the building caretaker provide information in multiple languages to support correct behaviours, and to minimise the possibility of chute blockages and contamination in communal bins.
It is also recommended that the owners' corporation website contain information for residents' referral regarding use of the chute.
As the distance of the bin moving paths exceeds 10m, a bin moving device will be required to aid the movement of full bins. The developer is responsible for supplying all equipment required for moving bins this includes any bin lifters, bin moving devices and waste transfer bins.

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<td>Construction Waste Management</td>
<td>A comprehensive waste management plan will be devised and implemented. This plan will encompass strategies for minimizing waste generation, maximizing material reuse, recycling, and reprocessing, and reducing the volume of materials destined for landfill. Cut and excavation materials will also be reused for backfilling or for grading purposes to level the site where possible. As part of the project's waste minimisation efforts, the aim is to divert up to 80% of construction and demolition waste from ending up in landfills.</td>
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<td>Aboriginal Cultural Heritage</td>
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No mitigation measures are necessary due to the absence of Aboriginal objects, sites and cultural heritage values for the study area, and the lack of potential for Aboriginal objects to be present.
An Unexpected Finds Procedure outlining the protocols to be followed in the event that unexpected Aboriginal objects are encountered during the works must be prepared and presented to project personnel during site inductions.

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	• Where there are changes to the project area or development proposal, additional archaeological assessment may be required.	
European Heritage	• Prepare a Photographic Archival Recording (PAR) of existing buildings in the study area prior to demolition, in accordance with NSW Heritage Division guidelines. • Develop an Unexpected Finds Procedure (UFP) to manage any archaeological material uncovered during works. • Incorporate heritage-awareness protocols into the Construction Environmental Management Plan (CEMP), including: • Heritage induction for site personnel. • Vibration mitigation advice from qualified professionals.	**Low**
Air Quality *Construction Dust*	**Communications** • Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. • Display the name and contact details of the Responsible Person accountable for air quality and dust issues on the site boundary. • Display the head or regional office contact information. • Develop and implement a Dust Management Plan (DMP) that considers, as a minimum, the measures identified herein. **Site Management** • 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. • Make the complaints log available to relevant authorities (Council, EPA, etc). • Record exceptional incidents that cause dust and/or air emissions, on or off site, and the actions taken to resolve the situation in the logbook. • 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. **Monitoring** • Undertake daily on-site and off-site inspections at nearby receptors to monitor dust. Record inspection results and make available to relevant authorities. This should include regular dust soiling checks of surfaces such as street furniture, cars, and windows. Continuous real-time dust monitoring is not necessary for the Proposal. • 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.	**Moderate**

	• 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. **Preparing and Maintaining the Site** • Plan site layout so that dust generating activities are located as far away as possible from receptors. • Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. • Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period. • Avoid site runoff of water or mud. o Keep site fencing, barriers and scaffolding clean using wet methods. • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If being re-used, keep materials covered or contained in a way which prevents dust, for example dust suppression. • Cover, seed, or fence stockpiles to prevent wind erosion. **Construction Vehicles and Sustainable Travel** • Ensure all vehicles switch off engines when stationary – no idling vehicles. • Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable. • Impose and signpost a maximum-speed-limit of 25 km/h on surfaced and 15 km/h on unsurfaced haul roads and work areas (if long haul routes are required, these speeds may be increased with suitable additional control measures provided). • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials. • Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing). **Measures for General Construction Activities** • 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 • Ensure an adequate water supply on the site for effective dust/PM suppression/mitigation, using non-potable water where possible and appropriate. • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate • 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. **Measures Specific to Demolition**	

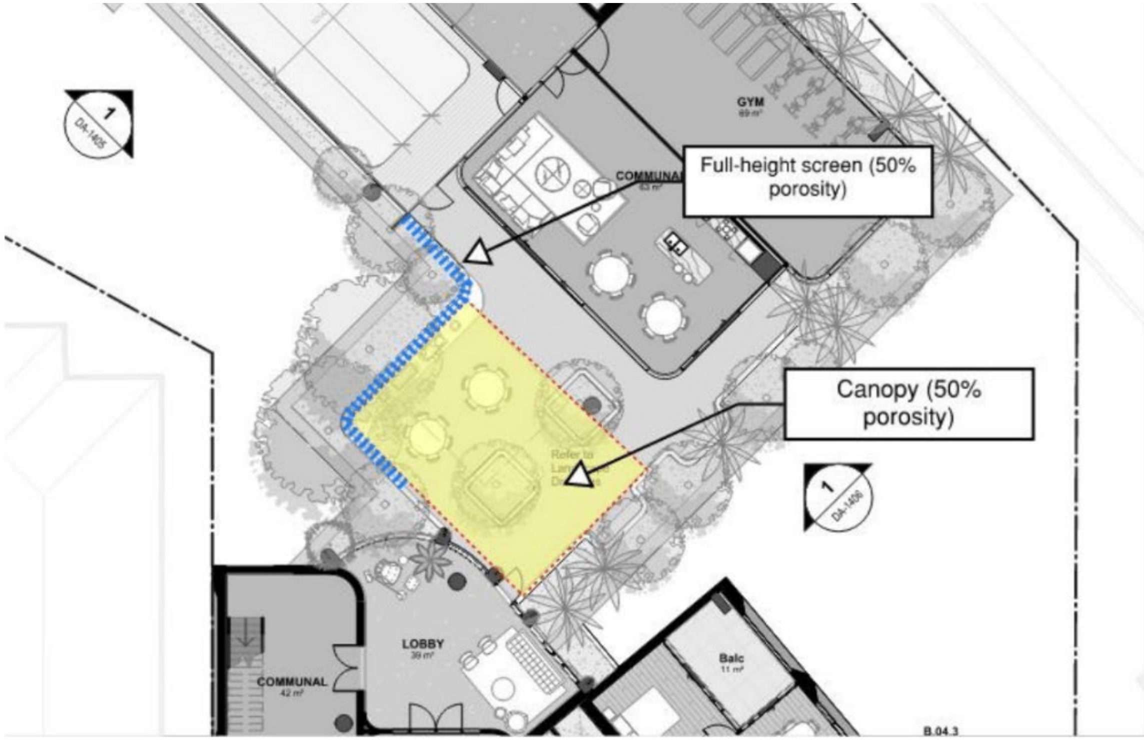
	• Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). • Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as 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. • Avoid explosive blasting, using appropriate manual or mechanical alternatives. • Bag and remove any biological debris or damp down such material before demolition. **Measures Specific to Earthworks** • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. • Only remove the cover in small areas during work and not all at once. **Measures Specific to Construction** • Avoid scabbling (roughening of concrete surfaces) if possible. • 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. • 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. • For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust. **Measures Specific to Haulage** • Use water-assisted dust sweeper(s) on the access and local roads, as necessary. • Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. • Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. o Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). • Access gates to be located at least 10 m from receptors where possible.	
Pedestrian Wind Impact	Based on the findings of the wind tunnel study, the following in-principle wind mitigation strategies can be incorporated in the design of the development to improve the overall wind environment: **Ground Level:**	**Low**

- It is recommended to retain the dense landscaping within the site. It is recommended to include densely foliating hedges around any proposed outdoor seating areas to the north of Tower A (total height of vegetation and planter to be a minimum of 1.5 m).
- Vertical porous screening is recommended within the proposed planting areas to reduce the wind impacts at the corner of Lavender Street and Middlemiss Street and between the towers. Indicative location of screening is shown in Image 6a. Screens should be at least 2 to 3 m tall with a maximum porosity of 50%.

Image 6a: Recommended Wind Mitigation Measures – Ground Level

Level 4:

- It is recommended to retain the densely foliating vegetation within the proposed perimeter planting areas. Vegetation to comprise of densely foliating evergreen species.

	• It is recommended to include an overhead trellis or canopy with a maximum porosity of 50%to reduce the risk of westerly winds reattaching within the space. It is also recommended to include a porous vertical screen connecting to the canopy and level above along the northern perimeter. Refer to Image 6b:  **Image 6b: Recommended Wind Mitigation Measures – Level 4** **Corner Balconies:** • It is recommended to include full-height vertical screening (maximum porosity of50%) along one of the open aspects for all corner balconies within Towers A and B.	
Reflectivity	The detailed analysis, which accounted for more realistic view directions and operated at one-minute increments, predicted that, • Drivers travelling east on Lavender Street, at Walker Street Intersection (D2), • Drivers travelling north on Warringah Freeway, off ramp to Alfred Street South (D9), and; • Drivers travelling west on High Street, off ramping to Cahill Expressway (D13)	**Low**

have a risk of glare during early mornings(D13) or evenings (D2 and D9) at specific times of the year as they approach the Project. That said, the frequency at which glare was predicted to be possible was very small (ranging from less than 0.01% to 0.03% of daytime) and of short duration (on average lasted 1 to 5 minutes).

If mitigations are desired for receptors above, the highlighted areas in Figures6 to8on the next pages illustrate the sources of the reflections and suggest the means of mitigating the impact.

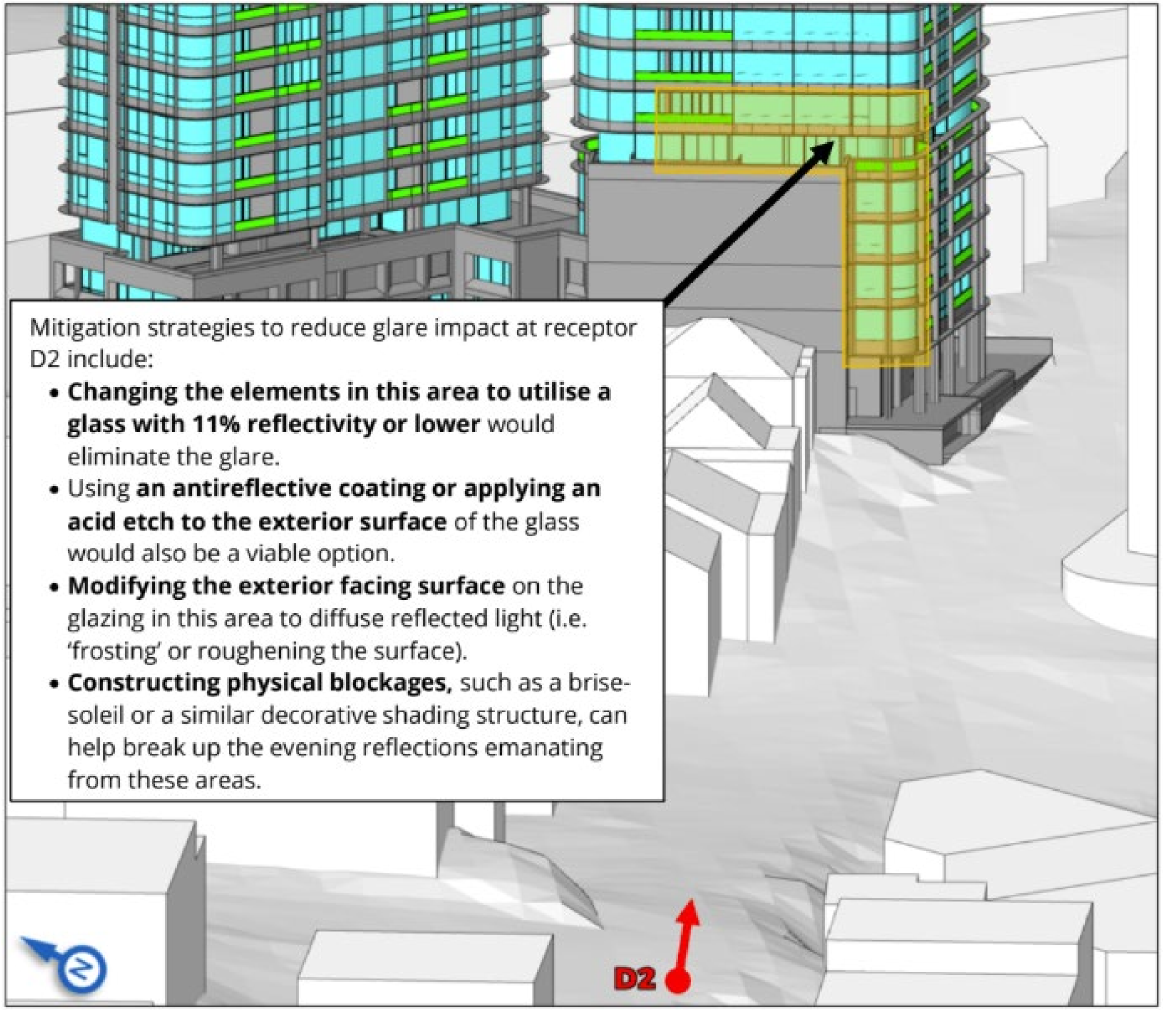


Figure 6: Markup of Facade Locations for Glare Source at Receptor D2

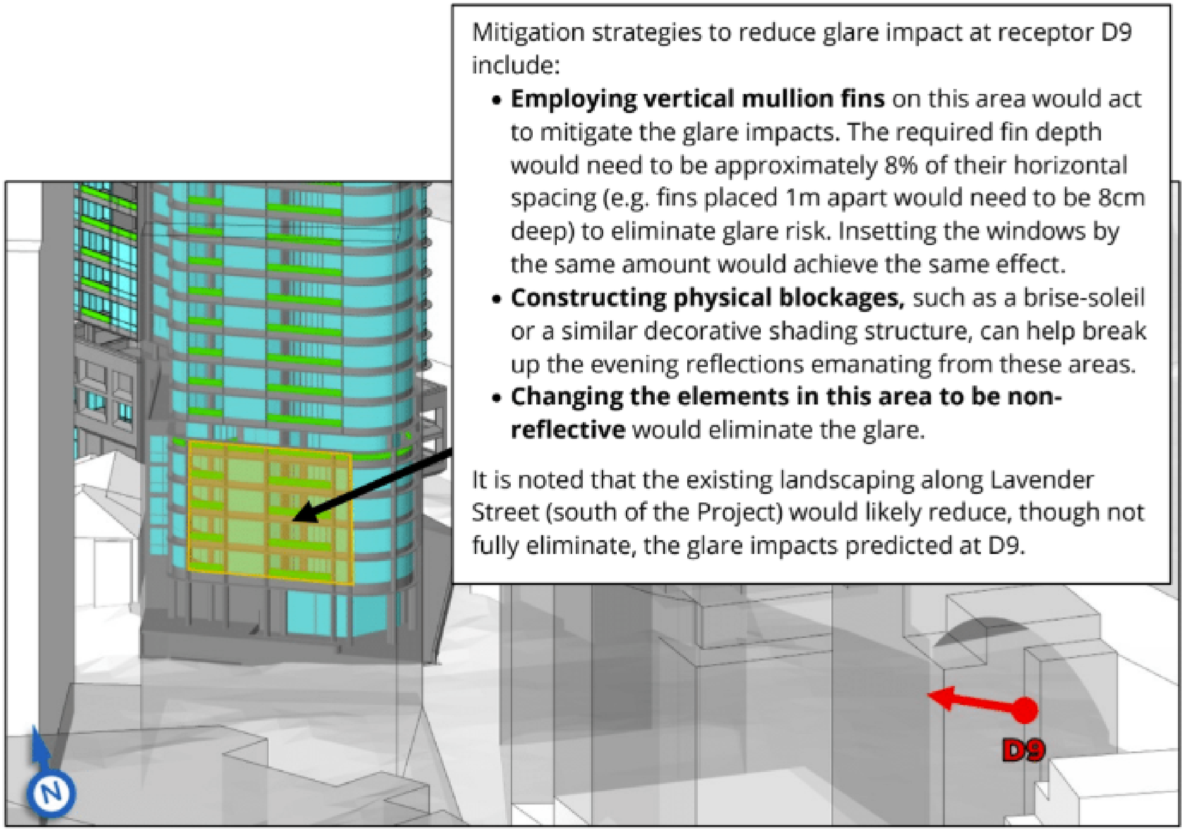


Figure 7: Markup of Facade Locations for Glare Source at Receptor D9

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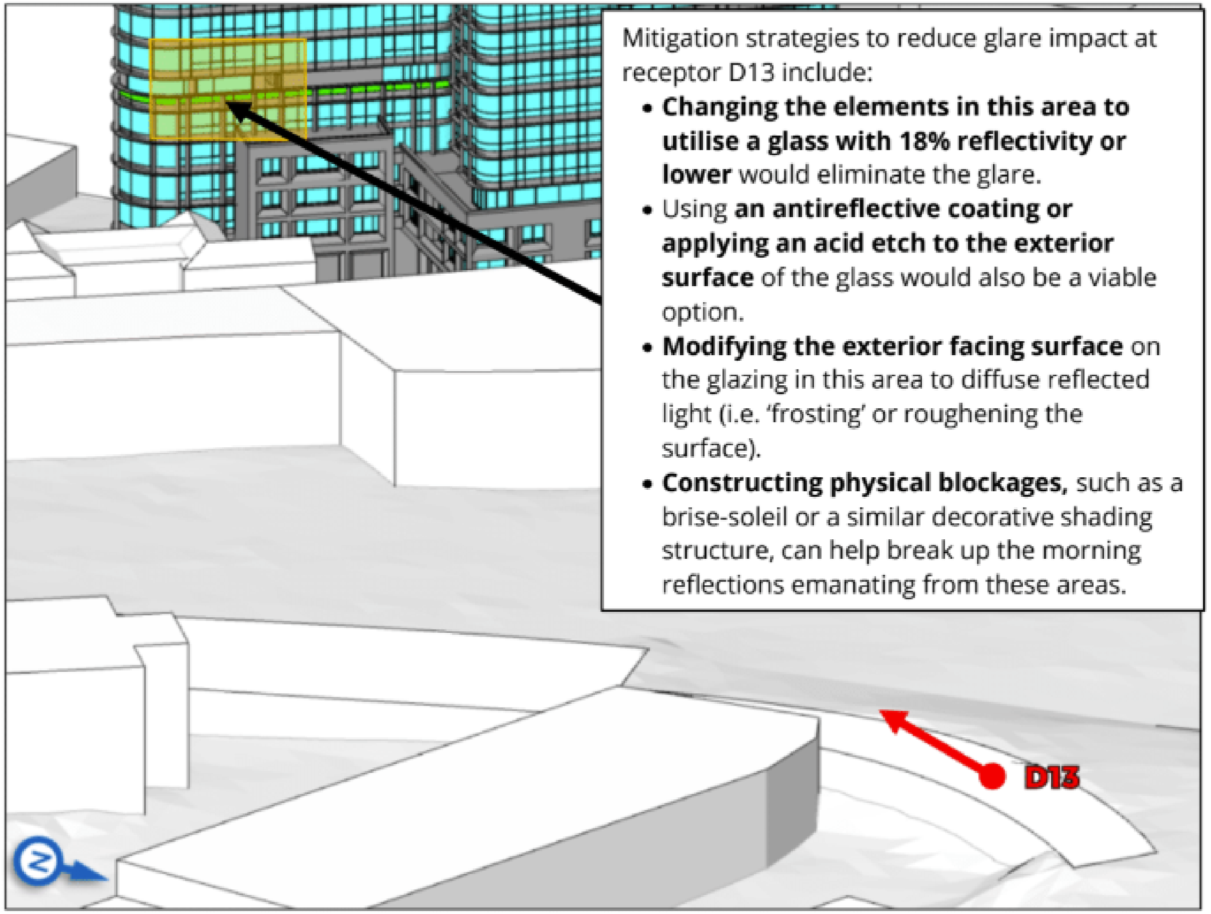

Figure 8: Markup of Facade Locations for Glare Source at Receptor D13
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<td>Environmentally Sustainable Development Initiatives</td>
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Peak electricity demand reduction
Heating, cooling and ventilation systems:

The air-conditioning and ventilation systems will be designed to surpass the minimum requirements of the NCC 2022Section J Energy Efficiency Part J6.
A high-efficiency air-cooled heat rejection system is proposed to minimise energy consumption by ensuring the schedule and setpoints are appropriate to the intended operation of the buildings.

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	• Ductwork systems will be designed to minimise system pressure losses, thereby reducing the power required by fan motors. • In spaces such as bathrooms/toilets, laundries, and equipment plant areas, natural ventilation will be prioritised wherever feasible. • Mechanical ventilation will be incorporated only where necessary to ensure air quality and temperature levels. Lighting • To minimize energy consumption and optimize lighting efficiency, the proposed development will be using LED fittings. The energy efficient light fittings will be complemented by an automatic control system featuring timer controls, PIR occupancy sensors and/or microwave occupancy sensors as appropriate to enhance operational efficiency. • A daylight sensor to adjust artificial light output or turn lights off when sufficient natural daylight is available to the space. • External luminaires will adhere to AS 4282:1997 to prevent light pollution and maintain compliance with specified benchmarks for night sky illumination. Domestic hot water • The project will use heat pump-based technology for domestic hot water to generate hot water energy efficiently.	
	Materials Building envelope performance • The building fabric will be designed to meet and/or improve upon the minimum BASIX requirements for the building envelope. Thermal breaks will be incorporated into walls, floors, and roofs where appropriate to ensure a continuous thermal barrier on the building envelope, reducing the flow of thermal energy between conductive materials. Building fabric • Insulation will b e required for the building's walls and roof/ceilings. • Employing light-coloured roofing material with low solar absorptance (SA) is recommended. This will help deflect more sunlight, thereby minimising summer heat buildup in the roof space and contributes to mitigating elevated local temperatures, known as the heat island effect. External glazing • A high thermal performance glazing system is recommended. Performance glazing substantially reduces heat transmission. This reduces conduction heat loss in winter and reduces the amount of direct solar heat gains in summer. This will correspond to a reduction of both heating and cooling loads. Shading and daylighting • Appropriate external shading devices in the form of eaves will be strategically utilised to block the intense summer sun while allowing the lower winter sun to penetrate for passive heating. These passive design features not only enhance	**Low**

	daylighting and external views for occupants but also reduce the need for artificial lighting, leading to improved alertness, mood, and productivity. Additionally, connecting occupants to nature through external views fosters a positive and constructive experience within the built environment.	
	Indoor environmental quality Maximise natural ventilation and daylight • DUs, common areas, and corridors have been designed to support cross-ventilation, reducing reliance on mechanical cooling and promoting fresh air movement throughout the building. Openable windows and vents further enhance natural airflow. • The design also maximises access to natural daylight through generous windows, lowering the need for artificial lighting. High VLT (Visible Light Transmittance) glazing allows generous daylight penetration, improving comfort and supporting occupant wellbeing. Air filtration systems • The buildings will incorporate high-efficiency air filtration systems such as MERV-13 or HEPA filters to remove airborne pollutants, allergens, and particulate matter. This will improve air quality and ensure a healthier indoor environment for occupants. Low-VOC Materials • The facility will ensure low-VOC (volatile organic compounds) paints, adhesives, finishes, and materials are being used in the buildings to reduce the release of harmful chemicals. Thermal comfort • The buildings will incorporate strategies such as individual thermostats, external and internal shading devices to maintain ambient indoor temperatures. Acoustic design • Acoustic ceilings, double-glazed windows, and insulated internal walls will reduce noise transfer between spaces. These interventions help maintain low noise levels in the DUs, enhancing comfort and speech intelligibility.	**Low**
	Renewable energy Photovoltaics • A roof-mounted photovoltaic system (PV) is proposed for the project. It is recommended that the PV system should be sized to cover at least 20% of the roof area of a building. • The batteries storage of renewable electricity generated by the solar PV system is not recommended nor is it necessary as this is a daytime building and it will consume the solar electricity as it is generated.	**Low**
	Energy metering and monitoring Electricity and metering and monitoring	**Low**

	• Electricity metering and sub-metering will be provided in accordance with Section J requirements to monitor and manage electricity consumption in the building. The sub-meters required will be interlinked by a communication system that collates the time-of-use energy data to a single interface monitoring system where it can be stored, analysed and reviewed.	
	Water conservation Fittings and fixtures • Water-efficient fixtures and fittings will be installed in accordance with the Australian Government's Water Efficiency Labelling Scheme (WELS) to reduce potable water consumption. All fixtures and fittings will meet the minimum WELS Rating. Heat rejective system • The project will use of air-cooled heat rejection systems as opposed to water-based heat rejection to reduce water demand.	**Low**
Services Infrastructure	The following mitigation measures to be implemented in the future, post SSDA lodgement include: • Lodgement of a Jemena gas application for connection to the Jemena gas infrastructure. • Lodgement of the Section 73 Application to confirm any requirements for upgrade of Sydney Water assets to service the development and any subsequent design associated with such. • Design of the Sydney Water sewer diversion currently running through the eastern portion of the site. • Lodgement / coordination of an Ausgrid ASP3 substation design package to achieve Ausgrid certification approvals for construction. • Engage a Level 3 Accredited Service Provider (ASP3) designer to undertake the ASP3 Ausgrid Contestable Designs to achieve certification approval from Ausgrid to allow construction of services. • Lodgement of an NBN/Telstra Connection Application to establish new telecommunication lead-in for the development or proper communication with the authority for any changes in their networks are required.	**Low**
Social Impact	**Changes to the sense of place and local character** • The project response is through a design that is responsive to the surrounding character of Lavender Bay through podium heights/datums and through a permeable fine grain ground plane, including detailed overshadowing and visual impact analysis. At the same time, the proposal also responds to the context of a site that is optimally located and able to mediate built form and height between the higher density character of Milsons Point and North Sydney. **Increased pressure on local infrastructure** • The proposal is proximate to existing and new infrastructure and will contribute to both local developer contributions as well as State Housing and Productivity Contributions (HPC), thereby further contributing to local and regional infrastructure upgrades.	**Low**

	Temporary amenity impacts during construction including, noise, dust and vibration and traffic disruptions. • A comprehensive Construction Environmental Management Plan will be prepared prior to construction certificate that will include clear noise and vibration monitoring and reporting protocols, procedures to communicate staging, work hours, and mitigation measures proactively, and offer of dilapidation surveys for nearby heritage properties.	