Lot 878 Aura – Nirimba Social Housing

Lot 878, Nirimba, QLD, 4551

Site Specific Noise Assessment

Coast2Bay

Date
5 October 2022

Report
227401.0170.R01V01

PLANS AND DOCUMENTS
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APPENDICES

1. INTRODUCTION

Trinity Consultants Australia (Trinity) was commissioned by Coast2Bay to provide a site-specific noise assessment for the new low rise social housing development proposed at 0BLot 878, Nirimba, QLD, 4551.

It is understood that a Material Change of Use (MCU) request was lodged with Economic Development Queensland (EDQ) for the site which triggered the request for a Noise Impact Assessment. The assessment is required given the development is a Class 2 building within a transport noise corridor overlay. Coast2Bay have nominated to address this request by referencing a previously endorsed Transport Noise Impact Assessment Report (197401.0141.R01V04 dated 8 July 2021) prepared by Trinity (formerly ASK and ANE) for Precincts 11 – 14 within the Aura development in which the site lies.

It is proposed to assess the development based on the noise contours developed in this prior assessment as recommended within the RFI provided by EDQ for the development and recommend façade upgrades to comply with Queensland Development Code (QDC) Mandatory Part (MP) 4.4.

The purpose of this report is as follows:

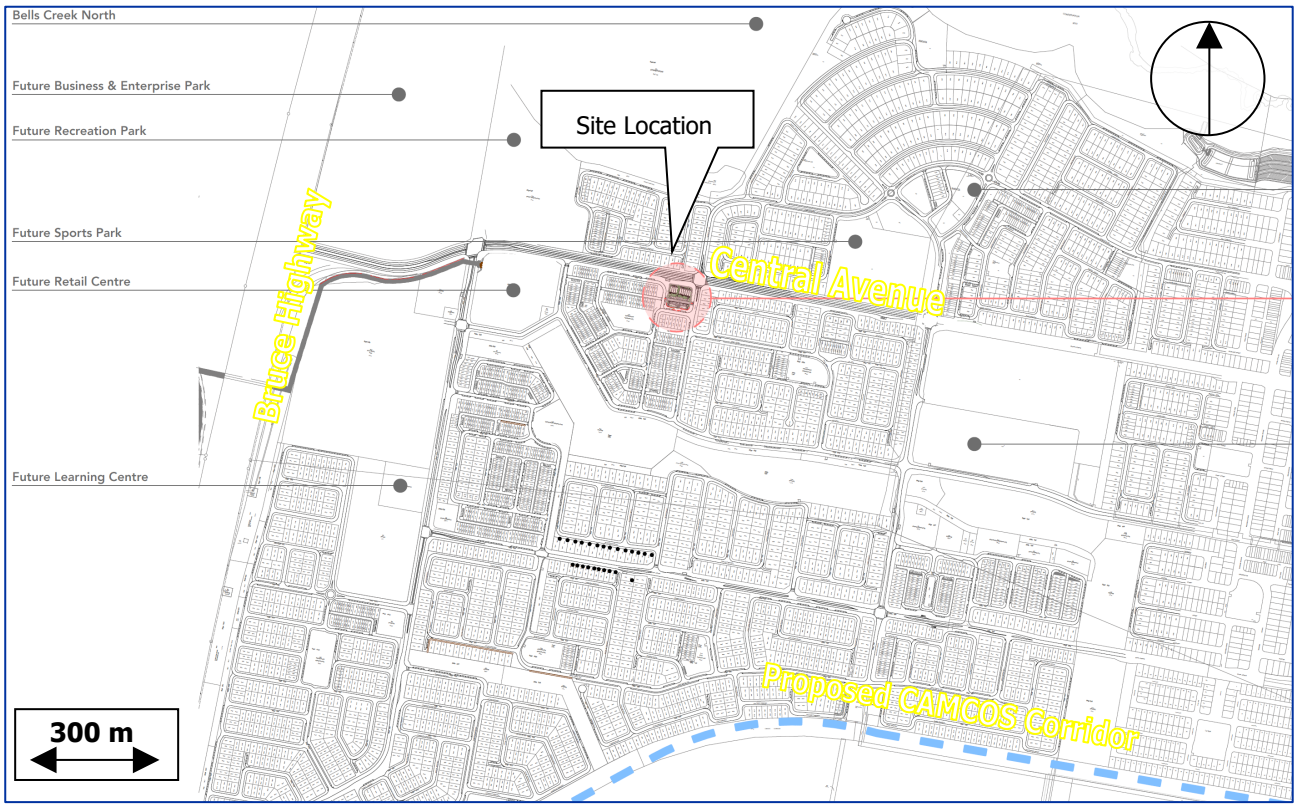
- Outline the relevant project noise criteria.
- Predict and assess the road traffic noise impact onto the development.
- Describe façade requirements and noise mitigation requirements, if any.

To aid in the understanding of the terms in this report a glossary is included in **Appendix A**.

2. STUDY AREA DESCRIPTION

The proposed development is to be located at 0BLot 878, Nirimba in Queensland's Sunshine Coast. The site location is shown in **Figure 2.1** (Source: Hollindale Mainwaring Architecture).

Figure 2.1: Site Location



The subject site is a greenfield development located within Precinct 11 – 14 of the Aura estate in Nirimba.

The site is surrounded by the following uses (refer **Figure 2.1**):

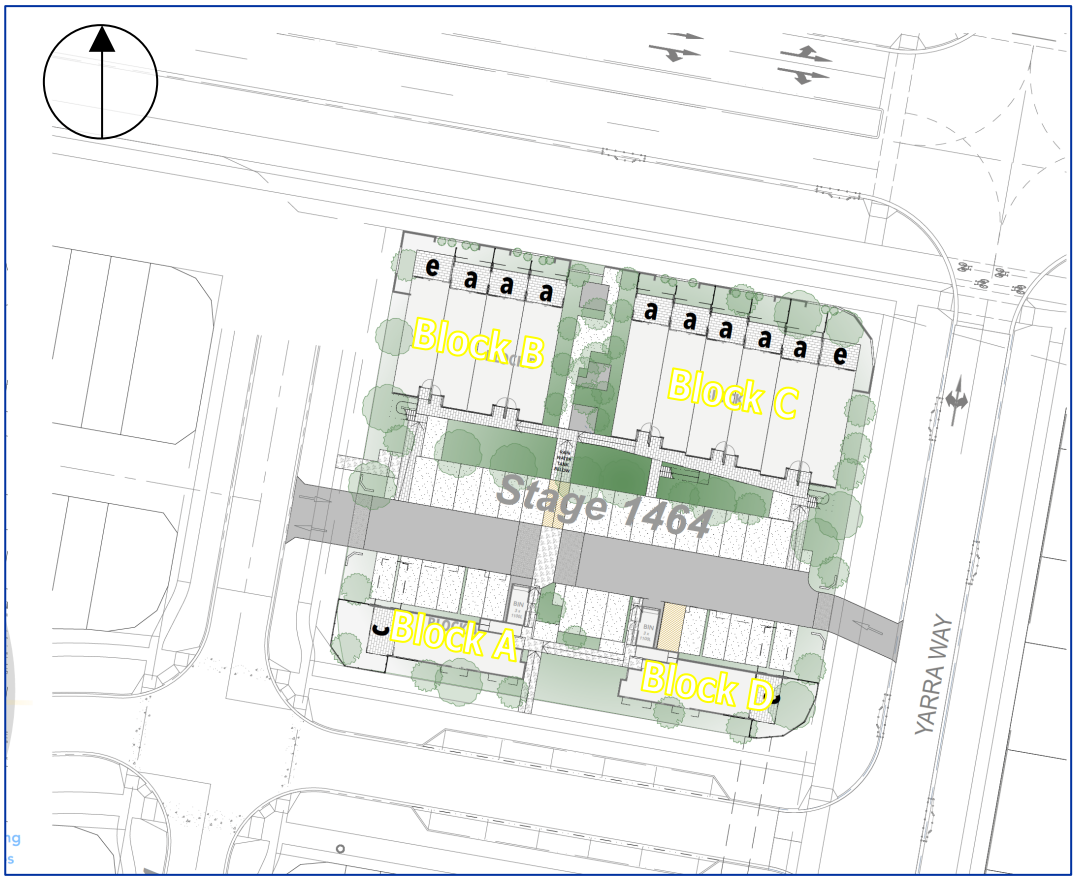
- Residential lots which will surround the development.
- Parkland to the south-west.
- Central Avenue immediately north of the site.
- Bruce Highway to the west.

The proposed development is impacted upon by road traffic noise from Central Avenue (a major sub-arterial road), and this is a consideration required for development approval.

3. PROPOSED DEVELOPMENT

The proposed development is shown in in **Figure 3.1** (Source: Hollindale Mainwaring Architecture).

Figure 3.1: Subject Site Lot Boundaries (Ground floor)



The development consists of four low rise blocks (Blocks A – D) separated by carparking and communal spaces with the following unit layout designs (a – e):

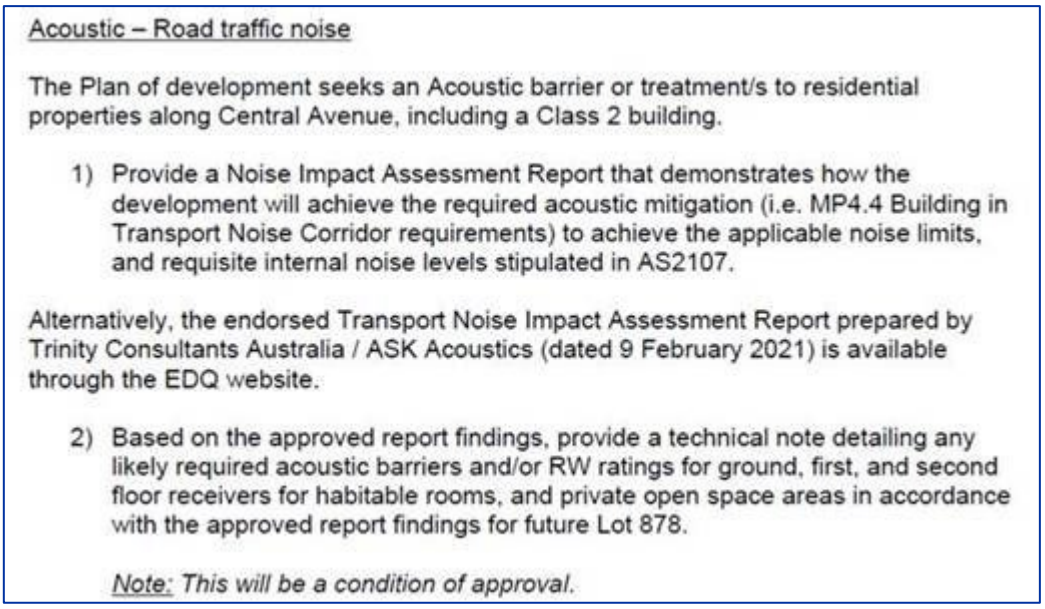
- Unit a
  - Single-storey (Ground floor) – Single bedroom, living area, outdoor area and ensuite bathroom
- Unit b (Located above Unit a)
  - Double-storey (First and Second floor) – One bedroom on each floor, living area, study, outdoor balcony and two bathrooms
- Unit c
  - Single-storey (Ground floor) – Two bedrooms, living area, outdoor area and single bathroom
- Unit d
  - Single-storey (First floor) – Two separate units each with: Two bedrooms, living area, outdoor areas and two bathrooms
- Unit e
  - Double-storey (Ground and First floor) – Three bedrooms: one on ground floor, living area, study, outdoor area, three bathrooms
- Communal spaces
  - Between Block B – C and A – D

The proposed building plan for each unit type is included in **Appendix B.** Example Construction materials for MP4.4 are shown in **Appendix C**.

4. CONDITIONS OF APPROVAL

Economic Development Queensland (EDQ) provided the following conditions for development approval:

Figure 4.1: EDQ Conditions of Approval for the development



Acoustic – Road traffic noise

The Plan of development seeks an Acoustic barrier or treatment/s to residential properties along Central Avenue, including a Class 2 building.

1) Provide a Noise Impact Assessment Report that demonstrates how the development will achieve the required acoustic mitigation (i.e. MP4.4 Building in Transport Noise Corridor requirements) to achieve the applicable noise limits, and requisite internal noise levels stipulated in AS2107.

Alternatively, the endorsed Transport Noise Impact Assessment Report prepared by Trinity Consultants Australia / ASK Acoustics (dated 9 February 2021) is available through the EDQ website.

2) Based on the approved report findings, provide a technical note detailing any likely required acoustic barriers and/or RW ratings for ground, first, and second floor receivers for habitable rooms, and private open space areas in accordance with the approved report findings for future Lot 878.

Note: This will be a condition of approval.

The above assessment calls for an assessment against the Queensland Development Code (QDC) Mandatory Part (MP) 4.4 to achieve amenable internal noise levels or alternatively, as assessment based on the findings from previous Trinity report 197401.0141.R01V04. Coast2Bay have opted for the later to address EDQ's conditions for approval such that model results from the previously endorsed Trinity report by EDQ for Aura Precincts 11 – 14 will be used to assess the development.

5. NOISE CRITERIA

5.1 Overview

The site is located within the Sunshine Coast Council area and therefore is required to comply with the requirements of the Planning Scheme 2014 Development and Overlay Codes, and Noise impact assessment planning scheme policy.

Other criteria to be considered include:

- Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) State Assessment and Referral Agency (SARA) – State Development Assessment Provisions (SDAP).
- Department of Transport and Main Roads (TMR) – Road Traffic Noise Management: Code of Practice.
- Department of Housing and Public Works (HPW) – Queensland Development Code (QDC) Mandatory Part 4.4 (MP4.4) 'Buildings in transport noise corridors'.
- Sunshine Coast Council Planning Scheme 2014.
- Building design in accordance with AS3671-1989: Acoustics-Road traffic noise intrusion-building siting and construction, to achieve the satisfactory noise levels as stated within AS2107-2016: Acoustics-Recommended design sound levels and reverberation times for building interiors, for the internal acoustic amenity.

5.2 Sunshine Coast Council – Sunshine Coast Planning Scheme 2014

On 14 April 2014 Sunshine Coast Council (SCC) adopted the Sunshine Coast Planning Scheme 2014 and the associated planning scheme policies. The planning scheme and the planning scheme policies were gazetted on 2 May 2014 and commenced on 21 May 2014.

With regards to the assessment of noise impacts, the relevant sections of the planning scheme are the Nuisance Code (Section 9.4.3) and the Planning Scheme Policy for the Nuisance Code (Section SC6.15). The Nuisance Code presents Performance Outcomes and Acceptable Outcomes for assessable development for acoustic amenity and noise but does not specifically nominate noise limits or assessment criteria, refer **Table 5.1**.

Table 5.1: Acoustic Amenity and Noise Criteria (partial copy of Table 9.4.3.3.1)

Performance Outcomes	Acceptable Outcomes
PO1 Development, other than development involving live entertainment or amplified sound in a hospitality area or as part of a temporary event, is located, designed, constructed and operated to ensure that noise emissions do not adversely impact on surrounding sensitive land uses. *Note – this performance outcome applies even if noise emissions are generated by sensitive land uses, from sources such as communal areas, service areas, plant and equipment (e.g. air conditioning units) and the like.*	**AO1** Development does not involve activities that would cause noise related environmental harm or nuisance. OR Development ensures noise does not emanate from the site through site layout, design, construction, and operation.
PO2 Development that is a sensitive land use is located, designed, constructed and operated to achieve a satisfactory level of acoustic amenity where there is potential for noise emissions generated from surrounding development to adversely affect the sensitive land use.	**AO2** The sensitive land use is not established in an area that will be adversely impacted by noise generated by existing land uses, activities and possible future development in the area. OR

Performance Outcomes	Acceptable Outcomes
Editor's note—this performance outcome relates to a 'reverse amenity' situation where a proposed sensitive land use may be adversely impacted by noise emissions from surrounding development. In such cases, it is contingent upon the proposed sensitive land use to implement measures to ensure a satisfactory level of acoustic amenity is provided to prospective occupants and users of the development.	Where located in an area where adverse noise impacts are likely, the sensitive land use mitigates all potential impacts through site layout, design, construction, and operation.
PO3 Development involving live entertainment or amplified sound in a hospitality area, or as part of a temporary event, provides a satisfactory level of acoustic amenity for surrounding sensitive land uses, having regard to the location and setting of the development and the frequency of the event.	**AO3** No acceptable outcome is provided.

The Planning Scheme Policy for the Nuisance Code provides guidance for the assessment of road and rail noise, live entertainment, amplified music and voices (patrons). The policy does not specify noise limits but references the following guidelines to achieve the Nuisance Code outcomes:

On 29th September 2014 Council advised that at the present time, road traffic noise intrusion into buildings should still be assessed against the criteria previously applied by Caloundra City Council and Maroochy Shire Council. Caloundra City Council and Maroochy Shire Council specified an external building facade limit of 63 dBA L_{10}(18 hour) (façade corrected) on residential land. For those instances where this external noise limit was predicted to be exceeded, the internal noise levels within habitable rooms were required to be designed to meet the recommended design sound levels stated in Table 1 of AS/NZS 2107-2016 entitled "Acoustics - Recommended design sound levels and reverberation times for building interiors".

On 10th March 2021 Council provided advice on their recommended approach to assessing allotments or residences affected by transport noise from both State and Council roads. The approach is outlined as follows:

- Where the noise from the State controlled road/s is of a sufficient level to trigger QDC MP4.4 (i.e. 58 dBA L_{10}(18 hour) or higher) at a building façade, then determine the MP4.4 categories for the building facades based on the total noise from all (State and Council) roads;
- Where the noise from the State controlled road/s is not of a sufficient level to trigger QDC MP4.4 (i.e. 57 dBA L_{10}(18 hour) or lower), but the noise from all (State and Council) roads is greater than 63 dBA L_{10}(18 hour) (i.e. the Council traffic noise limit) then determine the building requirements using AS3671 and AS2107 based on the noise from all (State & Council) roads; and
- Where the noise from the State controlled road/s is not of a sufficient level to trigger QDC MP4.4 (i.e. 57 dBA L_{10}(18 hour) or lower), and the noise from all (State and Council) roads is not greater than 63 dBA L_{10}(18 hour) (i.e. the Council traffic noise limit) then no building upgrades are required. Note: If a room has multiple facades and requires AS3671/AS2107 assessment, as per dot point above, then the overall room is assessed per that method.

As the subject site falls within MP4.4 category 1 from the state-controlled Bruce Highway to the west, an MP4.4 assessment of the site is necessary as indicated by Council's conditions of approval, see **Section 5.4**. Conversely, as the site is exposed to noise levels which 63 dBA, an AS3671 assessment is required for sections of the development exposed to these noise levels as discussed above, refer to **Section 5.6** and **5.7**.

5.3 State Assessment and Referral Agency (SARA) – State Development Assessment Provisions (SDAP)

5.3.1 Overview

The development is to be referred to SARA given the subject site falls within MP4.4 Category 1 from the State controlled Bruce Highway, see previous Trinity report 197401.0141.R01V04. Acoustic criteria for the project

will need to address noise intrusion into the development in accordance with 'Module 1: Community Amenity' section of SDAP. The current version of the SDAP is v3.0, effective 18 February 2022.

The following glossary of terms is provided in SDAP:

- Accommodation Activity
  - Accommodation activity means any of the following: caretaker's accommodation, community residence, dual occupancy, dwelling house, dwelling unit, multiple dwelling, relocatable home park, residential care facility, resort complex, retirement facility, rooming accommodation, short-term accommodation, tourist park, or a development with a combination of these uses.
  - Private open space means an outdoor space for the exclusive use of occupants of a building.
  - Passive recreation area means an area used for passive recreation such as a park, playground or walking track. This term does not include drainage reserves or channels, landscape buffer strips, environmental areas or corridors, or conservation areas or corridors.
  - Residential building means a Class 1, Class 2, Class 3 or Class 4 building as defined in the Building Code of Australia.

Noise levels are to be measured in accordance with AS1055 Acoustics – Description and measurement of environmental noise.

5.3.2 State Code 1: Development in a State-Controlled Road Environment

The relevant performance outcomes and acceptable outcomes for developments in a state-controlled road or type 1 multi modal corridor environment are presented in Table 5.2. Relevant clauses from the SDAP document reference tables are shown in Table 5.3.

Table 5.2: SDAP State Code 1 Performance and Acceptable Outcomes (Partial Copy Table 1.2.2: Environmental Emissions)

Performance Outcomes	Acceptable Outcomes
Involving the creation of 5 or fewer new residential lots adjacent to a state-controlled road or type 1 multi-modal corridor	
PO37 Development minimises free field noise intrusion from a **state-controlled road**.	**AO37.1** Development provides a noise barrier or earth mound which is designed, sited and constructed: 1. To achieve the maximum free field acoustic levels in reference table 2 (item 2.1); 2. In accordance with: a. Chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads 2013; b. Technical Specification-MRTS15 Noise Fences, Transport and Main Roads, 2019; c. Technical Specification-MRTS04 General Earthworks, Transport and Main Roads, 2020. OR **AO37.2** Development achieves the maximum free field acoustic levels in reference table 2 (item 2.1) by **alternative noise attenuation measures** where it is not practical to provide a noise barrier or earth mound. OR

Performance Outcomes	Acceptable Outcomes
	AO37.3 Development provides a **solid gap-free fence** or other **solid gap-free structure** along the full extent of the boundary closest to the **state-controlled road**.
Ground floor level requirements adjacent to a state-controlled road or type 1 multi-modal corridor	
PO39 Development minimises noise intrusion from a **state-controlled road** in **private open space**.	**AO39.1** Development provides a noise barrier or earth mound which is designed, sited and constructed: 1. To achieve the maximum free field acoustic levels in reference table 2 (item 2.2) for **private open space** at the ground floor level; 2. In accordance with: a. Chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013; b. Technical Specification-MRTS15 Noise Fences, Transportation and Main Roads, 2019; c. Technical Specification-MRTS04 General Earthworks, Transport and Main Roads, 2020. OR **AO39.2** Development achieves the maximum free field acoustic level in reference table 2 (item 2.2) for **private open space** by **alternative noise attenuation measures** where it is not practical to provide a noise barrier or earth mound.
PO40 Development (excluding a **relevant residential building** or **relocated building**) minimises noise intrusion from a **state-controlled road** in **habitable rooms** at the façade.	**AO40.1** Development (excluding a relevant residential building or relocated building) provides a noise barrier or earth mound which designed, sited and constructed: 1. To achieve the maximum building façade acoustic level in reference table 1 (item 1.1) for **habitable rooms**; 2. In accordance with: a. Chapter 7 integrated noise barrier design of the Transport Noise Management Code of Practice: Volume 1 (Road Traffic Noise), Department of Transport and Main Roads, 2013; b. Technical Specification-MRTS15 Noise Fences, Transport and Main Roads, 2019; c. Technical Specification-MRTS15 Noise General Earthworks, Transport and Main Roads, 2020. OR **AO40.2** Development (excluding a **relevant residential building** or **relocated building**) achieves the maximum building façade acoustic level in reference table 1 (item 1.1) for **habitable rooms** by **alternative noise attenuation measures** where it is not practical to provide a noise barrier or earth mound.

Performance Outcomes	Acceptable Outcomes
PO41 **Habitable rooms** (excluding a **relevant residential building** or **relocated building**) are designed and constructed using materials to achieve the maximum internal acoustic level in reference table 3 (item 3.1).	No acceptable outcome is provided.
Above ground floor level requirements (accommodation activity) adjacent to a state-controlled road or type 1 multi-modal corridor	
PO42 Balconies, podiums and roof decks include: 1. A continuous **solid gap-free structure** or balustrade (excluding gaps required for drainage purposes to comply with the Building Code of Australia); 2. Highly acoustically absorbent material treatment for the total area of the soffit above balconies, podiums and roof decks.	No acceptable outcome is provided.
PO43 **Habitable rooms** (excluding a **relevant residential building** or **relocated building**) are designed and constructed using materials to achieve the maximum internal acoustic level in reference table 3 (item 3.1).	No acceptable outcome is provided.

Table 5.3: Relevant reference table clauses

Applicable use	Acoustic levels
Table 1 – Maximum building acoustic levels	
1.1 Accommodation activity	■ ≤60 dBA L_{10} (18 hour) façade corrected (measured L_{90} (8 hour) free field between 10pm and 6am ≤40 dBA). OR ■ ≤63 dBA L_{10} (18 hour) façade corrected (measured L_{90} (8 hour) free field between 10pm and 6am > 40 dBA).
Table 2 - Maximum free field acoustic levels	
2.1: Private open space for residential lots **2.2: Private open space for an accommodation activity (including lots created for a future accommodation activity**	■ ≤57 dBA L_{10} (18 hour) free field (measured L_{90} (18 hour) free field between 6am and 12 midnight ≤45 dBA) OR ■ ≤60 dBA L_{10} (18 hour) free field (measured L_{90} (18 hour) free field between 6am and 12 midnight > 45 dBA)
Table 3 – Maximum internal acoustic levels	
3.1: Habitable rooms in an accommodation activity (excluding uses addressed in QDC MP4.4)	≤35 dBA L_{eq} (1 hour) (maximum hour over 24 hours)

5.4 Department of Housing and Public Works – MP4.4 (Road Traffic Noise)

The Department of Housing and Public Works (HPW) has a number of mandatory Codes that must be complied with at the building application stage. These are referred to as the Queensland Development Codes (QDC). These codes previously only related to items such as energy efficiency and water efficient fixtures in new residences.

QDC Mandatory Part (MP) 4.4 applies to new Class 1 – 4 buildings (as defined under the Building Code of Australia) within transport noise corridors. Specifically, MP4.4 applies to habitable spaces used for domestic purposes and sets mandatory construction standards for new residential developments, or additions to existing residential developments, within a Transport Noise Corridor.

The noise level categories extend out to 57 dBA L_{10}(18 hour) for road traffic noise. The road noise categories and corresponding noise levels from Schedule 3, Table 1 of MP4.4 are as follows:

- Road Noise:
  - Category 0: ≤ 57 dBA L10(18 hour)
  - Category 1: 58 – 62 dBA L10(18 hour)
  - Category 2: 63 – 67 dBA L10(18 hour)
  - Category 3: 68 – 72 dBA L10(18 hour)
  - Category 4: ≥ 73 dBA L10(18 hour)

These categories only apply to habitable spaces, i.e. those spaces within the Social Housing development which are expected to be occupied for extended periods of time, i.e. excluding the bathroom and laundry spaces, see Architectural drawings for the development in **Appendix B**.

5.5 Queensland Department of Transport and Main Roads (TMR)

The Department of Transport and Main Roads (TMR) issued a Policy Position Statement for Development on Land Affected by Environmental Emissions from Transport and Transport Infrastructure Version 4.0 dated October 2017. This document nominates internal and external criteria limits for the assessment of road and rail noise onto new developments adjacent to road and rail corridors. The criteria with respect to proposed residential developments are as per SDAP criteria nominated previously. A separate document titled: Transport Noise Management – Code of Practice (2013) published by TMR includes outdoor noise criteria which is referred to for the purposes of assessment.

5.6 Australian Standard AS3671-1989

AS3671 is used to determine the required façade treatment of individual building elements comprising a façade, roof and floor to address road traffic noise intrusion into buildings near roads carrying more than 2000 vehicles per day; it may also be used to assess the acoustic adequacy of existing buildings in similar areas. It provides guidelines for determining the type of building construction necessary to achieve recommended noise levels indoors outlined in in AS 2107 as defined for different uses, e.g. bedrooms and study areas.

5.7 Australian Standard AS2107:2016

For road traffic noise, Council recommends the most applicable assessment methodology would be the application of indoor noise levels specified in AS 2107:2016 "Acoustics -Recommended design sound levels and reverberation times for building interiors" (AS 2107). AS 2107 lists recommended internal noise levels for various building and room types, including residential bedrooms and other areas. For developments near minor and major roads, the recommended design levels are as listed in Table 5.4.

Table 5.4: Recommended Internal Noise Levels from AS2107:2016

Road Type	Type of Occupancy / Activity	Design Sound Level Range L_{eq} (dBA)	Target Sound Level Range L_{eq} (dBA)
Minor Road	Living areas	30 to 40	35
	Sleeping areas	30 to 35	32
	Study / Work areas	35 to 40	37

- These internal design noise levels from AS/NZS 2107:2016 specifically relate to;
  - 32 dBA L_{eq} (1 hour) (target of between 30 and 35) for bedrooms within suburban areas, for night-time peak-hour traffic.
  - 35 L_{eq} (1 hour) (target of between 30 and 40) for living rooms within suburban areas, for day-time peak-hour traffic.
  - 37 L_{eq} (1 hour) (target of between 35 and 40) for work areas (study) within suburban areas, for day-time peak-hour traffic.

5.8 Summary of Criteria

Based on the advice and noise criteria prescribed by Sunshine Coast Council, the noise criteria nominated for the project are as follows:

- If external traffic noise at a façade of the Social Housing Development is less than 63 dBA L_{A10} (18 hour) (façade corrected) then an MP4.4 Assessment is required.
- If external traffic noise from a Council Road is greater than or equal to 63 L_{A10} (18 hour) (façade corrected) then an AS 3671 Noise Assessment is required. The internal noise limits shown in **Table 5.4** are targeted for this assessment and are only applicable if the external limit of 63 dBA is exceeded.

This assessment methodology addresses EDQ's Conditions for Approval for the development within their RFI and is adopted for the purposes of assessment.

6. ROAD TRAFFIC NOISE ASSESSMENT

6.1 Overview

Road traffic noise has been assessed from Central Avenue onto the proposed development by referring to the modelled results on which the Transport Noise Impact Assessment findings (previously endorsed by EDQ) are based on. The relevant assessment criteria for this assessment are outlined in **Section 4**.

The model results determined over this development (previously lots 7030 – 7058 in Trinity report 197401.0141.R01V04) indicate that certain units within the development are exposed to noise levels which exceed 63 dBA L_{10} (18 hour). For all affected facades of these units, an AS 3671 assessment is required to determine the required R_w rating of all building elements comprising the unit's building envelope, e.g. walls, glazing and roof. For units with noise level less than 63 dBA L_{10} (18 hour), a standard MP4.4 façade designation applies to the entire façade as shown in **Table 6.1**.

6.2 Data

The model on which the previously endorsed Transport Noise Impact Assessment was based on has been reused for this assessment. It considered 2037 traffic volumes along Central Avenue, ground contours for the Precinct and other parameters specified by Stocklands at the time of assessment.

For the purposes of this assessment Blocks B and C (Two/Three-storey) and Blocks A and D (Two-storey) have been modelled to determine the façade corrected noise levels outside each habitable space within the low-rise development and communal outdoor spaces. The model predictions were made at 1.5m above the finished floor level based on a floor-to-ceiling height of 3m while outdoor noise levels were made at a height of 1.5m.

The following corrections and considerations have been applied to reported results:

- A -1.7 dB* correction has been applied for calculations at a façade and -0.7 dB for calculations in the free-field as per the TMR Transport Noise Management Code of Practice.
- Acoustic barriers previously recommended in Trinity report 197401.0141.R01V04 for the Aura Precinct north of Central Avenue were modelled to account for potential reflections of noise back towards the development.

*A +2.5 dBA facade reflection allowance is included in the road traffic noise level predictions.

6.3 Calculations and Assessment

Façade corrected road 2037 traffic noise levels have been predicted at each unit façade and roof for the Nirimba Social Housing Development. Predicted L_{10}(18 hour) noise levels outside habitable areas are presented in **Table 6.1**, rounded to the nearest whole number alongside the corresponding MP4.4 Noise Category.

For facades and rooms affected by noise levels higher than 63 dBA L_{10}(18 hour), the results of the AS 3671 assessment and required acoustic ratings (R_w) for each of the structural components within the affected façades are displayed in **Table 6.2**.

6.3.1 QDC MP4.4 Façade Recommendations

The predicted L_{10}(18 hour) noise levels for habitable areas are presented below in **Table 6.1**, rounded to the nearest whole number and shown alongside the corresponding MP4.4 Noise Category.

Table 6.1: Predicted Future (2037) Traffic Noise Levels and MP4.4 categories at Building Facade

Room		$L_{10,18hr}$ dBA 'Façade Corrected' Future Noise Levels (2033)					MP4.4 Category (For reference only)
		North Façade	East Façade	South Façade	West Façade	Ceiling	
BLOCK A – Ground Floor							
1	Bedroom – East	52	55	57	-	-	North façade - Category 0 East façade - Category 0 South façade - Category 0
1	Bedroom – West	-	-	57	-	-	South façade - Category 0
1	Living area	60	-	58	61	-	North façade - Category 1 South façade - Category 1 West façade - Category 1
BLOCK A – First Floor							
1	Bedroom – East	61	56	-	61	-	North façade - Category 1 East façade - Category 0 West façade - Category 1
1	Bedroom – West	62	60	-	61	-	North façade - Category 1 East façade - Category 1 West façade - Category 1
1	Living area	-	-	-	62	-	West façade - Category 1
2	Bedroom – East	-	-	58	57	-	South façade - Category 1 West façade - Category 0
2	Bedroom – West	-	57	58	58	-	East façade - Category 0 South façade - Category 1 West façade - Category 1
2	Living area	-	-	60	62	-	South façade - Category 1 West façade - Category 1
2	Bedroom – East	-	-	-	-	62	Roof - Category 1
2	Bedroom – West	-	-	-	-	62	Roof - Category 1
BLOCK B – Ground Floor							
1	Bedroom – South	-	52	61	-	-	East façade - Category 0 South façade - Category 1
2	Bedroom – South	-	-	58	56	-	South façade - Category 1 West façade - Category 0
3	Bedroom – South	-	53	57	-	-	East façade - Category 0 South façade - Category 0
4	Bedroom – South	-	59	56	54	-	East façade - Category 1 South façade - Category 0 West façade - Category 0
BLOCK B – First Floor							
1	Bedroom – South	-	55	62	-	-	East façade - Category 0 South façade - Category 1
2	Bedroom – South	-	-	59	57	-	South façade - Category 1 West façade - Category 0
3	Bedroom – South	-	54	58	-	-	East façade - Category 0 South façade - Category 1

Room		$L_{10,18hr}$ dBA 'Façade Corrected' Future Noise Levels (2033)					MP4.4 Category (For reference only)
		North Façade	East Façade	South Façade	West Façade	Ceiling	
4	Bedroom – South	-	60	57	56	-	East façade - Category 1 South façade - Category 0 West façade - Category 0
BLOCK B – Second Floor							
3	Study	-	-	59	-	-	South façade - Category 1
4	Study	-	-	59	-	-	South façade - Category 1
BLOCK C – Ground Floor							
1	Bedroom – South	-	52	56	60	-	East façade - Category 0 South façade - Category 0 West façade - Category 1
2	Bedroom – South	-	-	56	55	-	South façade - Category 0 West façade - Category 0
3	Bedroom – South	-	52	56	-	-	East façade - Category 0 South façade - Category 0
4	Bedroom – South	-	-	56	55	-	South façade - Category 0 West façade - Category 0
5	Bedroom – South	-	52	56	-	-	East façade - Category 0 South façade - Category 0
6	Bedroom – South	-	61	57	54	-	East façade - Category 1 South façade - Category 0 West façade - Category 0
BLOCK C – First Floor							
1	Bedroom – South	-	54	57	61	-	East façade - Category 0 South façade - Category 0 West façade - Category 1
2	Bedroom – South	-	-	57	56	-	South façade - Category 0 West façade - Category 0
3	Bedroom – South	-	54	57	-	-	East façade - Category 0 South façade - Category 0
4	Bedroom – South	-	-	57	56	-	South façade - Category 0 West façade - Category 0
5	Bedroom – South	-	54	58	-	-	East façade - Category 0 South façade - Category 1
6	Bedroom – South	-	-	59	55	-	South façade - Category 1 West façade - Category 0
BLOCK C – Second Floor							
1	Study	-	-	58	-	-	South façade - Category 1
2	Study	-	-	58	-	-	South façade - Category 1
3	Study	-	-	58	-	-	South façade - Category 1
4	Study	-	-	58	-	-	South façade - Category 1
5	Study	-	-	62	-	-	South façade - Category 1
BLOCK D – Ground Floor							
1	Bedroom – East	-	-	56	-	62	South façade - Category 0 Roof - Category 1

Room		$L_{10,18hr}$ dBA 'Façade Corrected' Future Noise Levels (2033)					MP4.4 Category (For reference only)
		North Façade	East Façade	South Façade	West Façade	Ceiling	
1	Bedroom – West	56	-	57	57	62	North façade - Category 0 South façade - Category 0 West façade - Category 0 Roof - Category 1
1	Living area	57	56	56	-	62	North façade - Category 0 East façade - Category 0 South façade - Category 0 Roof - Category 1
2	Bedroom – East	-	-	-	-	61	Roof - Category 1
2	Bedroom – West	-	-	-	-	61	Roof - Category 1
2	Living area	-	-	-	-	61	Roof - Category 1
BLOCK D – Ground Floor							
1	Bedroom – East	-	-	56	-	62	South façade - Category 0 Roof - Category 1
1	Bedroom – West	56	-	57	57	62	North façade - Category 0 South façade - Category 0 West façade - Category 0 Roof - Category 1
1	Living area	57	56	56	-	62	North façade - Category 0 East façade - Category 0 South façade - Category 0 Roof - Category 1
2	Bedroom – East	-	-	-	-	61	Roof - Category 1
2	Bedroom – West	-	-	-	-	61	Roof - Category 1
2	Living area	-	-	-	-	61	Roof - Category 1
BLOCK D – First Floor							
1	Bedroom – East	60	58	-	59	-	North façade - Category 1 East façade - Category 1 West façade - Category 1
1	Bedroom – West	60	57	-	-	-	North façade - Category 1 East façade - Category 0
1	Living area	60	58	-	-	-	North façade - Category 1 East façade - Category 1
2	Bedroom – East	-	57	57	57	-	East façade - Category 0 South façade - Category 0 West façade - Category 0
2	Bedroom – West	-	56	58	-	-	East façade - Category 0 South façade - Category 1
2	Living area	-	58	60	-	-	East façade - Category 1 South façade - Category 1

"-" Indicates that either the façade is not present or that the predicted value exceeds 63 dBA in which an AS 3671 assessment applies

From **Table 6.1** it can be seen that numerous spaces across all four blocks experience levels below 63 dBA L_{10} (18 hour) but require MP4.4 Category 1 treatment, see **Appendix C**. For spaces exposed to levels at or above 63 dBA, further assessment in line with AS3671-1989 is called for with the required R_w for each façade element displayed in **Table 6.2** below.

6.4 AS 3671 Façade Recommendations

Rooms exposed to external noise levels that exceed 63 dBA outside the building envelope require upgrades to the façade construction to maintain the habitability of these spaces. The required acoustic ratings (R_w) for each of the structural components within each affected façade are displayed in **Table 6.2**. Refer to **Appendix B** to identify the affected unit based on the numbering format below.

An internal noise limit of 32 dBA, 35 dBA and 37 dBA is targeted for the bedroom, living area and study respectively based on the recommendations outlined in AS 2107:2016. It is conservatively assumed that 18-hour traffic volumes are unabated at night when the bedroom is expected to be used.

Table 6.2: Calculated Minimum Required Acoustic Ratings (Rw)

Room		Required Acoustic Ratings (R_w)								
		North Façade		East Façade		South Façade		West Façade		N.A
		Walls	Glazing	Walls	Glazing	Walls	Glazing	Walls	Glazing	Ceiling
BLOCK B – Ground Floor										
1	Living area	50	35					50	35	
1	Bedroom*							50	35	
2	Living area	40	35							
3	Living area	40	35							
4	Living area	50	35	45	35					
BLOCK B – First Floor										
1	Bedroom	50	42					50	42	50
1	Bedroom							50	35	50
2	Living area	50	35							
3	Living area	50	35							
4	Living area	40	38	45	38					
BLOCK B – Second Floor										
2	Bedroom	50	42					50	42	50
2	Study					40	30	40		50
3	Bedroom	50	42							50
4	Bedroom	50	42	50	40					50
BLOCK C – Ground Floor										

Room		Required Acoustic Ratings (R_w)								
		North Façade		East Façade		South Façade		West Façade		N.A
		Walls	Glazing	Walls	Glazing	Walls	Glazing	Walls	Glazing	Ceiling
1	Living area	50	35					50	35	
2	Living area	40	35							
3	Living area	40	35							
4	Living area	40	35							
5	Living area	40	35							
6	Living area	50	35	50	35					
BLOCK C – First Floor										
1	Living area	45	38					45	35	
2	Living area	45	35							
3	Living area	45	35							
4	Living area	45	35							
5	Living area	45	35							
6	Bedroom	50	42	50	40					50
BLOCK C – Second Floor										
1	Bedroom	50	42					50	42	50
2	Bedroom	50	40							50
3	Bedroom	50	40							50
4	Bedroom	50	40							50
5	Bedroom	50	42	50	40					50

*Bedroom refers to the closest room to Central Avenue in multi-bedroom units

The acoustic ratings above for walls, windows, doors and roof/ceiling can be achieved with a construction similar to those nominated in **Appendix C**: Example QDC MP4.4 construction materials.

To achieve the target internal noise levels, construction details are to be at least as per **Table 6.2**. This will result in a compliance scenario providing all openings are closed, e.g. doors and operable windows. Allowing other façade penetrations for the purposes of natural ventilation will drastically reduce the R_W performance otherwise expected from the façade and should be carefully considered at the design stage to ensure that the in-situ performance of the façade is equivalent or greater than the R_W values specified in **Table 6.2** above.

7. OUTDOOR SPACES

Guidance is taken from both SARA's SDAP and TMR's Transport Noise Management – Code of Practice (2013) to assess the noise amenity for outdoor spaces within the development. Under the SDAP, communal access to noise compliant spaces is considered adequate for compliance irrespective of whether a unit's private outdoor space is non-compliant. Given this, a noise contour map is provided in **Appendix D** which shows predicted noise levels at an assessment height of 1.5m above ground levels. A +2 dB correction was used to convert $L_{A10,18hr}$ road traffic noise levels into an equivalent $L_{A10,12hr}$ statistic for assessment against the Code of Practice criteria of 63 dBA L_{10} (12 hour), refer to **Section 5.5.** This correction factor is in line with data Trinity has previously received for traffic along the Bruce Highway. This criteria is found to be identical to the SARA criteria of 60 dBA $L_{A10,18hr}$ which was previously used to assess residential units in Trinty report 197401.0141.R01V04.

Figure A in **Appendix D** shows that most of the designated outdoor communal spaces are compliant against the criteria such that no further ameliorative measures are required.

8. RECOMMENDATIONS AND CONCLUSION

A site-specific road noise impact assessment has been conducted for the proposed low-rise Social Housing development at Lot 3, 0BLot 878, Nirimba, QLD, 4562. The results and recommendations of the assessment are as follows:

- The acoustic criteria are outlined in **Section 5**.
- A road traffic noise assessment has been undertaken based on the results previously modelled in Trinity report 197401.0141.R01V04 for the lot over which the development is proposed. The results of the MP4.4 and AS3671 assessments are summarized in **Section 6**.
- An assessment of outdoor area amenity has been undertaken with acceptable regions for communal use of outdoor spaces discussed and shown in **Section 7** and **Appendix D** respectively.

Implementation of the above is predicted to result in compliance with the relevant noise criteria.

APPENDIX A GLOSSARY

Parameter or Term	Description
dB	The decibel (dB) is the unit measure of sound. Most noises occur in a range of 20 dB (quiet rural area at night) to 120 dB (nightclub dance floor or concert).
dBA	Noise levels are most commonly expressed in terms of the 'A' weighted decibel scale, dBA. This scale closely approximates the response of the human ear, thus providing a measure of the subjective loudness of noise and enabling the intensity of noises with different frequency characteristics (e.g. pitch and tone) to be compared.
Day	The period between 7am and 6pm.
Evening	The period between 6pm and 10pm.
Night	The period between 10pm and 7am.
Free-field	The description of a noise receiver or source location which is away from any significantly reflective objects (e.g. buildings, walls).
L_1	The noise level exceeded for 1% of the measurement period.
L_{10}	The noise level exceeded for 10% of the measurement period. It is sometimes referred to as the average maximum noise level.
L_{90}	The noise level exceeded for 90% of the measurement period. This is commonly referred to as the background noise level.
L_{eq}	The equivalent continuous sound level, which is the constant sound level over a given time period, which is equivalent in total sound energy to the time-varying sound level, measured over the same time period.
$L_{eq,1hour}$	As for Leq except the measurement intervals are defined as 1 hour duration.
L_{max}	Maximum A-weighted sound pressure level. Brisbane City Council 2014 City Plan and Moreton Bay Regional Council Noise Policy additional definition: Lmax assessment only applies to 'specified noise sources' which are defined as - (a) impact noises; (b) hammering; (c) loading/unloading; (d) dropping items; (e) beepers, alarms, bells, phones, sirens; (f) power tools; (g) valve releases; (h) air brakes; and (i) door slamming. People noise and vehicle pass-by noise (engine, exhaust, induction, tyres) are specifically excluded.
L_{eq}(24 hour)	The average Leq noise level over the 24-hour period from midnight to midnight.
L_{10}(18 hour)	The arithmetic average of the one-hour L10 values between 6am and midnight. This parameter is used in the assessment of road traffic noise.
R_w	Weighted Sound Reduction Index – is a single number evaluation of the property of a partition to attenuate sounds. For the majority of partitions, the value of Rw will be similar to the value for STC. Partitions with particularly poor performance at 100 Hz may have lower values for Rw than for STC. Conversely, partitions with poor performance at 4000 Hz may have higher Rw than for STC. (As per AS1276.1-1999).
Habitable Rooms	According to the "Building Code of Australia" a Habitable Room is: " a room used for normal domestic activities and Includes a bedroom, living room, lounge room, music room, television room, kitchen, dining room, sewing room, study, playroom, family room, home theatre, and sunroom, but Excludes a bathroom, laundry, water closet, pantry, walk-in wardrobe, corridor, hallway, lobby, photographic darkroom, clothes drying room, and other spaces of a specialised nature occupied neither frequently nor for extended periods."
Acoustically screened	Brisbane City Council 2014 City Plan definition: The source of noise is completely screened from view of habitable rooms (including balconies, patios, decks and verandas) of an adjoining sensitive use by solid, gap free material and construction e.g. acoustic fence, building, or enclosure.

Parameter or Term	Description
Acoustic fence	Brisbane City Council 2014 City Plan definition: Solid, gap free fence with minimum panel surface density of 12.5kg/m^2.
Sensitive Uses	Brisbane City Council 2014 City Plan definition: A use that is child care centre, community care centre, community residence, dual occupancy, dwelling house, dwelling unit, educational establishment, health care services, hospital, multiple dwelling, relocatable home park, residential care facility, retirement facility, rooming accommodation, short term accommodation or tourist park.

APPENDIX B PROJECT DRAWINGS

COAST2BAY HOUSING GROUP

Friday, 2 September 2022

LOCALITY PLAN
1:10000

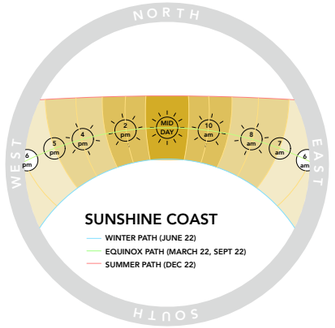
Nirimba Social Housing, CENTRAL AVE NIRIMBA QLD 4551

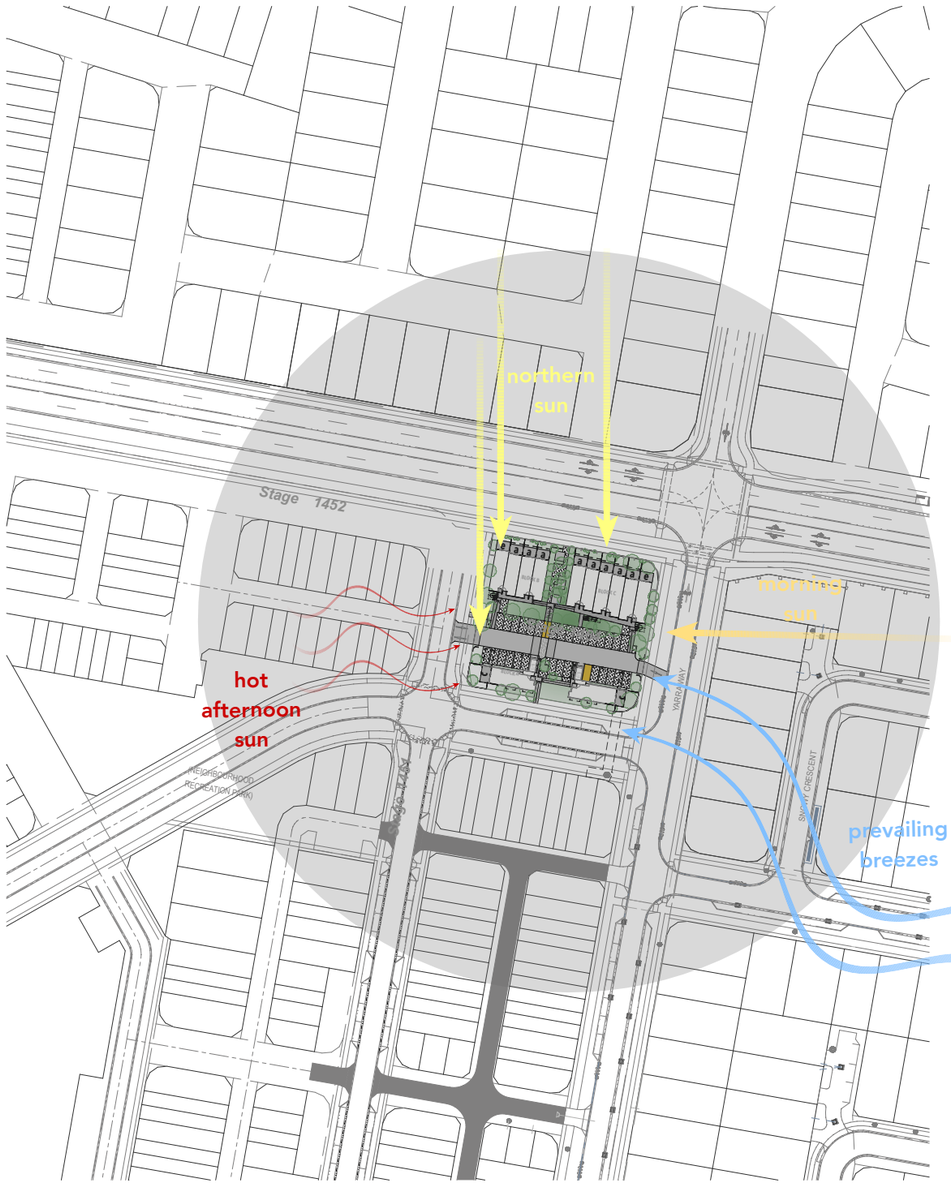
MASTER PLANS

1262 : SK-2-00 LOCALITY PLAN

FOR APPROVAL

Hollindale Mainwaring ARCHITECTURE





SITE ANALYSIS
1:2000

LOCALITY PLAN
1:500

COAST2BAY HOUSING GROUP

Friday, 2 September 2022

MASTER PLANS | 1262 : SK-2-01 SITE ANALYSIS

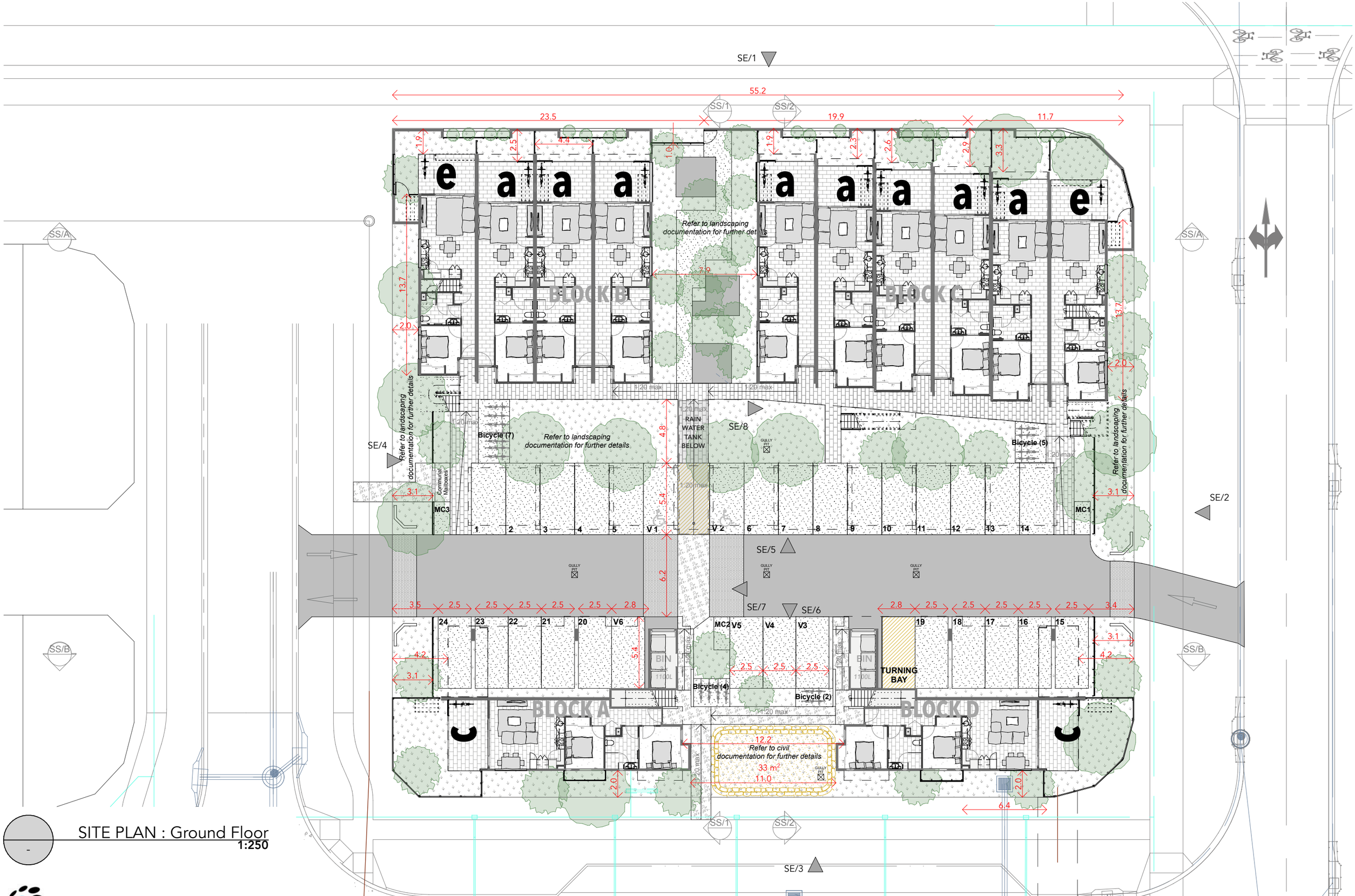
Nirimba Social Housing, CENTRAL AVE NIRIMBA QLD 4551 | FOR APPROVAL

Hollindale Mainwaring ARCHITECTURE

SITE PLAN : Ground Floor

1:250

-



COAST2BAY HOUSING GROUP

Friday, 2 September 2022

MASTER PLANS | 1262 : SK-2-02 SITE PLAN : Ground Floor

Nirimba Social Housing, CENTRAL AVE NIRIMBA QLD 4551 | **FOR APPROVAL**

Hollindale Mainwaring ARCHITECTURE

SITE PLAN : First Floor
1:250

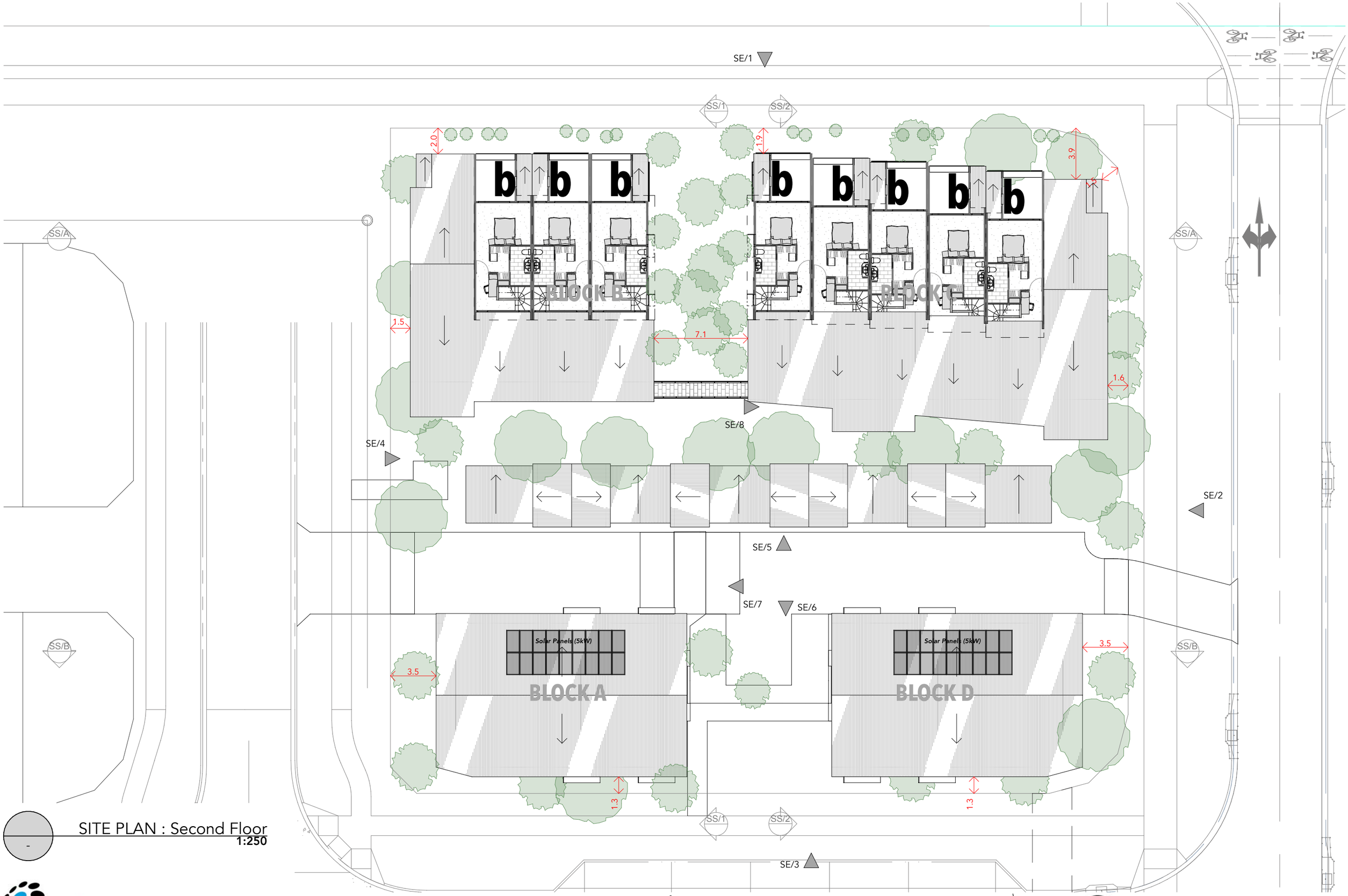
COAST2BAY HOUSING GROUP

Friday, 2 September 2022

MASTER PLANS | 1262 : SK-2-03 SITE PLAN : First Floor

Nirimba Social Housing, CENTRAL AVE NIRIMBA QLD 4551 | **FOR APPROVAL**

Hollindale Mainwaring ARCHITECTURE



SITE PLAN : Second Floor
1:250

COAST2BAY HOUSING GROUP

Friday, 2 September 2022

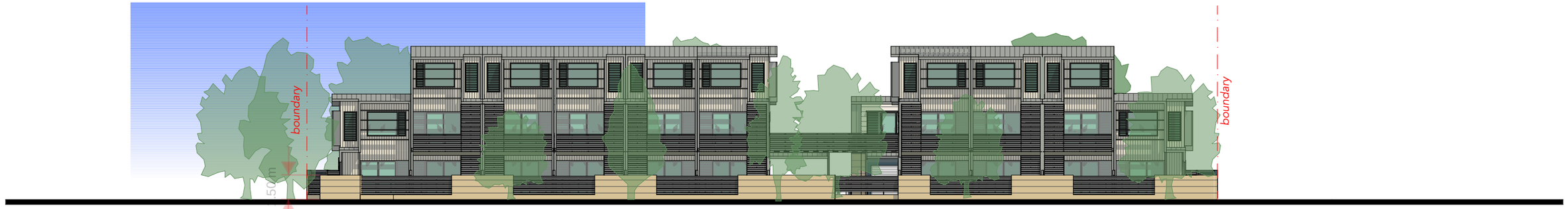
MASTER PLANS

Nirimba Social Housing, CENTRAL AVE NIRIMBA QLD 4551

1262 : SK-2-04 SITE PLAN : Second Floor

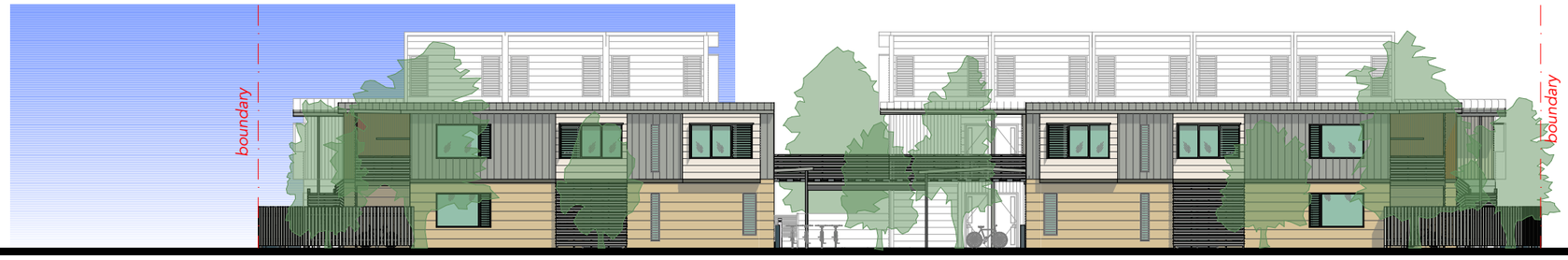
FOR APPROVAL

Hollindale Mainwaring ARCHITECTURE

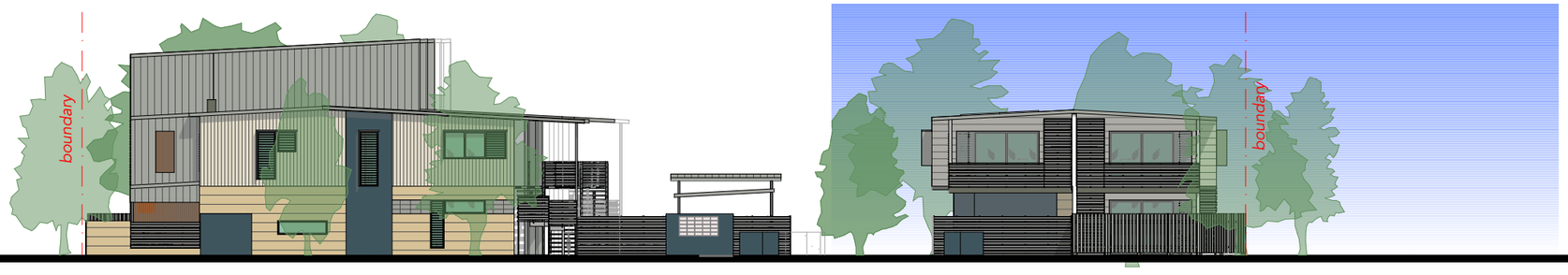


SE/1 - Street : Northern Elevation
1:250

SE/2 - Street : Eastern Elevation (Yarra Way)
1:250



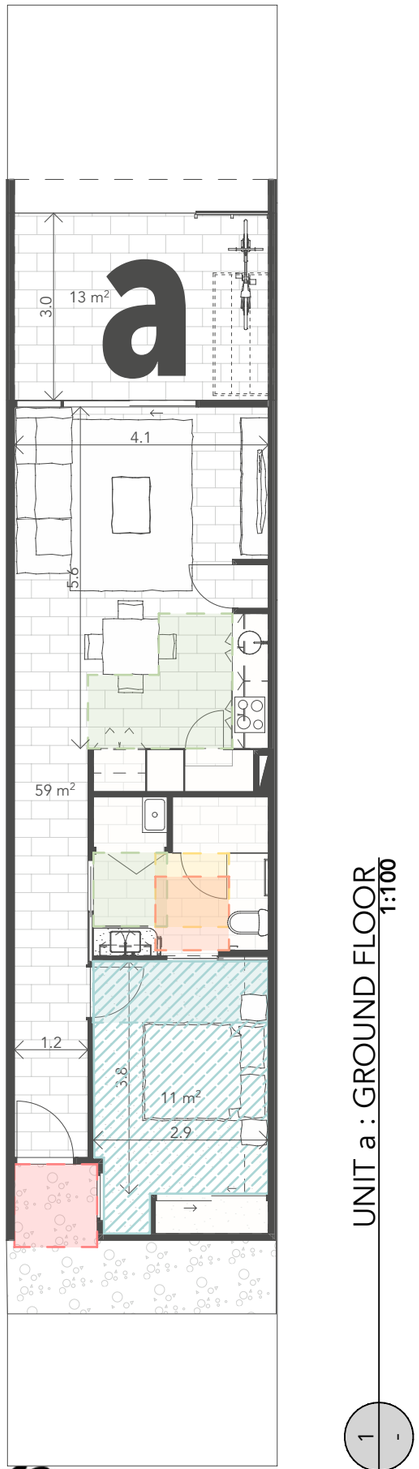
SE/3 - Street : Southern Elevation
1:250



SE/4 - Street : Western Elevation
1:250

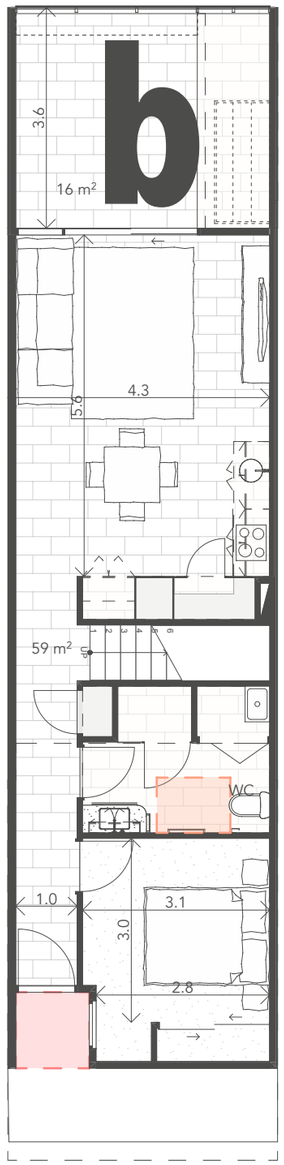
Finishes Schedule

FC#1	Horizontal Weatherboard Cladding *Dulux™ White Dune or similar*	PW	Vertical Standing Seam Metal Cladding/Boards *Colorbond™ Shale Grey*	BW-b+c	Blockwork - Bagged + Chased Finish *Dulux™ Stonebread or similar*
FC#2	Vertical Weatherboard Cladding 1 *Dulux™ White Dune or similar*	MRS	Metal Roof Sheeting *Colorbond™ Shale Grey*	BW-Ft	Blockwork - Coloured
FC#3	Vertical Weatherboard Cladding 2 *Dulux™ Golden Mandarin or similar*	BW-R	Blockwork - Rendered Finish *Dulux™ Sultry Sea or similar*	x-Sc	Horizontal Batten Screen *Powdercoated to match Shale Grey*



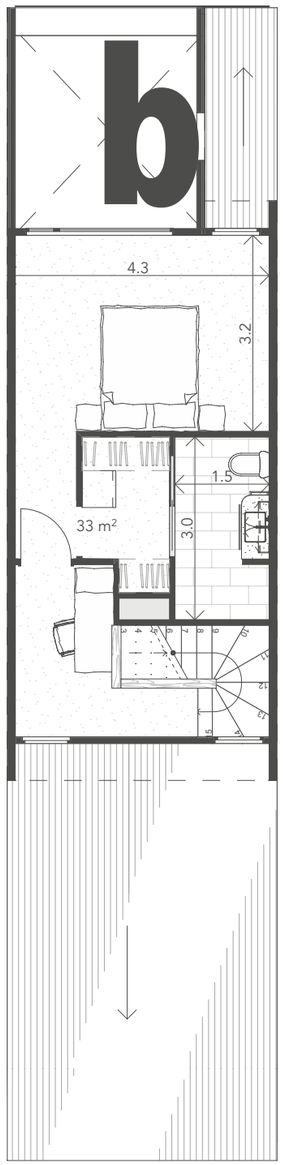
UNIT a : GROUND FLOOR 1:100

1 - 1



UNIT b : FIRST FLOOR 1:100

2 - 1



UNIT b : SECOND FLOOR 1:100

3 - 1

	UNIT a		UNIT b	
	1Br, 1B (GOLD)		2Br, 2B (SILVER)	
	Internal	External	Internal	External
GROUND FLOOR HABITABLE	59 sqm	13 sqm		
FIRST FLOOR HABITABLE			59 sqm	16 sqm
SECOND FLOOR HABITABLE			33 sqm	
	59 sqm	13 sqm	92 sqm	16 sqm
	72 sqm		**108 sqm**	

	BLOCK A	BLOCK B	BLOCK C	BLOCK D	TOTAL
Type a (LHA GOLD)		3	5		8
Type **b** (LHA Silver)		3	5		8
Type **c** (LHA GOLD)	1			1	2
Type d (LHA Silver)	2			2	4
Type e (LHA Silver)	1			1	2
	4	6	10	4	24
	24				

LHA Requirements

MIN. ENTRY LANDING
Silver: 1200 x 1200
Gold: 1350 x 1350

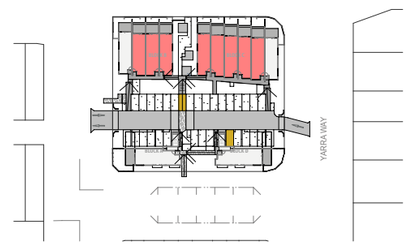
MIN. TOILET CIRCULATION
Silver: 900 x 1200
Gold: 1200 x 1200

MIN. SHOWER CLEARNACE
Silver: N/A
Gold: 1200 x 1200

MIN. BENCH CIRCULATION CLEARANCE
Silver: N/A
Gold: 1200 clearance to front of fixed benches

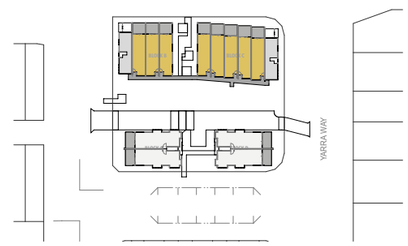
MIN. BEDROOM PATH OF TRAVEL
Silver: N/A
Gold: 1000 to min. one side of the bed

MIN. BEDROOM FLOOR AREA
0 m²
Silver: N/A
Gold: 10m2 min.



Key Plan : GROUND

- 1



Key Plan : FIRST

- 1

COAST2BAY HOUSING GROUP

Friday, 2 September 2022

UNITS a + b

Nirimba Social Housing, CENTRAL AVE NIRIMBA QLD 4551

1262 : SK-3-a-01 UNITS a + b : Plans

FOR APPROVAL

Hollindale Mainwaring ARCHITECTURE

	UNIT c		UNIT d	
	2Br, 1B (GOLD)		2Br, 2B (SILVER)	
	Internal	External	Internal	External
GROUND FLOOR HABITABLE	76 sqm	16 sqm		
FIRST FLOOR HABITABLE			83 sqm	16 sqm
SECOND FLOOR HABITABLE				
	76 sqm	16 sqm	83 sqm	16 sqm
	92 sqm		**99 sqm**	

	BLOCK A	BLOCK B	BLOCK C	BLOCK D	TOTAL
Type a (LHA GOLD)		3	5		8
Type **b** (LHA Silver)		3	5		8
Type **c** (LHA GOLD)	1			1	2
Type d (LHA Silver)	2			2	4
Type e (LHA Silver)	1			1	2
	4	6	10	4	24
	24				

LHA Requirements

MIN. ENTRY LANDING
Silver: 1200 x 1200
Gold: 1350 x 1350

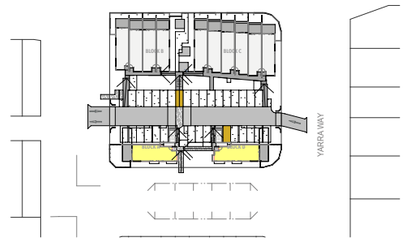
MIN. TOILET CIRCULATION
Silver: 900 x 1200
Gold: 1200 x 1200

MIN. SHOWER CLEARNACE
Silver: N/A
Gold: 1200 x 1200

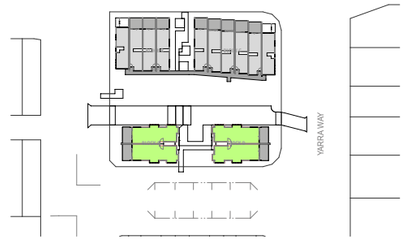
MIN. BENCH CIRCULATION CLEARANCE
Silver: N/A
Gold: 1200 clearance to front of fixed benches

MIN. BEDROOM PATH OF TRAVEL
Silver: N/A
Gold: 1000 to min. one side of the bed

MIN. BEDROOM FLOOR AREA
Silver: N/A
Gold: 10m2 min.



Key Plan : GROUND



Key Plan : FIRST

COAST2BAY HOUSING GROUP

Friday, 2 September 2022

Nirimba Social Housing, CENTRAL AVE NIRIMBA QLD 4551

UNITS c + d

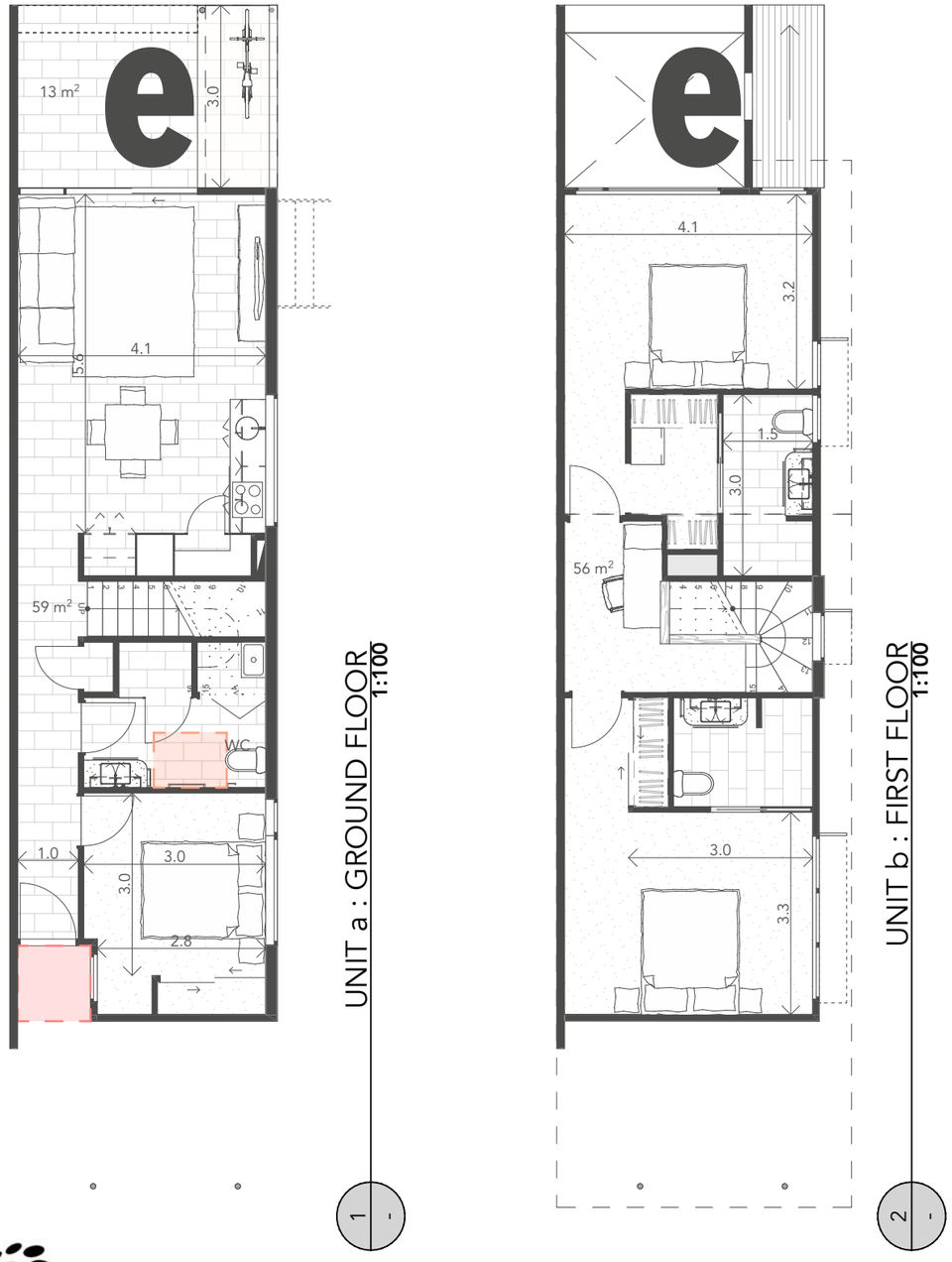
1262 : SK-3-c-01 UNIT c + d : Plans

FOR APPROVAL

Hollindale Mainwaring ARCHITECTURE

	TYPE e
	3Br, 3B (SILVER)
	Internal External
GROUND FLOOR	
HABITABLE	59 sqm 13 sqm
FIRST FLOOR	
HABITABLE	56 sqm
SECOND FLOOR	
HABITABLE	
	115 sqm 13 sqm
	128 sqm

	BLOCK A	BLOCK B	BLOCK C	BLOCK D	TOTAL
Type a (LHA GOLD)		3	5		8
Type **b** (LHA Silver)		3	5		8
Type **c** (LHA GOLD)	1			1	2
Type d (LHA Silver)	2			2	4
Type e (LHA Silver)	1			1	2
	4	**6**	**10**	**4**	**24**
	24				



UNIT a : GROUND FLOOR 1:100

1 -

UNIT b : FIRST FLOOR 1:100

2 -

LHA Requirements

MIN. ENTRY LANDING
Silver: 1200 x 1200
Gold: 1350 x 1350

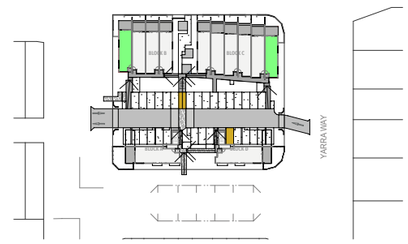
MIN. TOILET CIRCULATION
Silver: 900 x 1200
Gold: 1200 x 1200

MIN. SHOWER CLEARNACE
Silver: N/A
Gold: 1200 x 1200

MIN. BENCH CIRCULATION CLEARANCE
Silver: N/A
Gold: 1200 clearance to front of fixed benches

MIN. BEDROOM PATH OF TRAVEL
Silver: N/A
Gold: 1000 to min. one side of the bed

0 m² MIN. BEDROOM FLOOR AREA
Silver: N/A
Gold: 10m2 min.



Key Plan : GROUND

-

COAST2BAY HOUSING GROUP

Friday, 2 September 2022

UNIT e

Nirimba Social Housing, CENTRAL AVE NIRIMBA QLD 4551

1262 : SK-3-e-01 UNIT e : Plans

FOR APPROVAL

Hollindale Mainwaring ARCHITECTURE

APPENDIX C MP4.4 CONSTRUCTION REQUIREMENTS

Component of Buildings External Envelope	Minimum Acoustic Rating (R_w)	Acceptable Forms of Construction
Noise Category 4		
Glazing	43	Double glazing consisting of two panes of minimum 5mm thick glass with at least 100mm air gap and full perimeter acoustically rated seals.
External walls	52	Two leaves of clay brick masonry, at least 270mm in total, with subfloor vents fitted with noise attenuators.
Roof	45	Concrete or terracotta tile or sheet metal roof with sarking, acoustically rated plasterboard ceiling at least 13mm thick fixed to ceiling joists, cellulose fibre insulation at least 100mm thick with a density of at least 45kg/m^3 in the cavity. OR Concrete or terracotta tile or sheet metal roof with sarking, 2 layers of acoustically rated plasterboard at least 16mm thick fixed to ceiling joists, glass wool insulation at least 50mm thick with a density of at least 11kg/m^3 or polyester insulation at least 50mm thick with a density of at least 20kg/m^3 in the cavity.
Floors	51	Concrete slab at least 150mm thick.
Entry doors	35	Solid core timber not less than 45mm thick, fixed so as to overlap the frame or rebate of the frame by not less than 10mm, with full perimeter acoustically rated seals.
Noise Category 3		
Glazing	38 (where total area of glazing for a habitable room is greater than 1.8m^2)	Minimum 14.38mm thick laminated glass, with full perimeter acoustically rated seals; OR Double glazing consisting of one pane of minimum 5mm thick glass and one pane of minimum 6mm thick glass with at least 44mm air gap, and full perimeter acoustically rated seals
	35 (where total area of glazing for a habitable room is less than or equal to 1.8m^2)	Minimum 10.38mm thick laminated glass, with full perimeter acoustically rated seals.

Component of Buildings External Envelope	Minimum Acoustic Rating (R_w)	Acceptable Forms of Construction
External walls	47	Two leaves of clay brick masonry at least 110mm thick with: (i) cavity not less than 50mm between leaves; and (ii) 50mm thick mineral insulation or 50mm thick glass wool insulation with a density of 11kg/m^3 or 50mm thick polyester insulation with a density of 20kg/m^3 in the cavity. OR Two leaves of clay brick masonry at last 110mm thick with: (i) cavity not less than 50mm between leaves; and (ii) at least 13mm thick cement render on each face OR Single leaf of clay brick masonry at least 110mm thick with: (i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and (ii) Mineral insulation or glass wool insulation at least 50mm thick with a density of at least 11 kg/m^3 positioned between studs; and (iii) One layer of plasterboard at least 13mm thick fixed to outside face of studs. OR Single leaf of minimum 150mm thick masonry of hollow, dense concrete blocks, with mortar joints laid to prevent moisture bridging.
Roof	41	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling joists, glass wool insulation at least 50mm thick with a density of at least 11kg/m^3 or polyester insulation at least 50mm thick with a density of at least 20kg/m^3 in the cavity. OR Concrete suspended slab at least 100mm thick.
Floors	45	Concrete slab at least 100mm thick OR Tongued and grooved boards at least 19mm thick with: (i) timber joists not less than 175mm x 50mm; and (ii) mineral insulation or glass wool insulation at least 75mm thick with a density of at least 11kg/m^3 positioned between joists and laid on plasterboard at least 10mm thick fixed to underside of joists; and (iii) mineral insulation or glass wool insulation at least 25mm thick with a density of at least 11kg/m^3 laid over entire floor, including tops of joists before flooring is laid; and (iv) secured to battens at least 75mm x 50mm; and (v) the assembled flooring laid over the joists, but not fixed to them, with battens lying between the joists.
Entry doors	33	Fixed so as to overlap the frame or rebate of the frame by not less than 10mm, fitted with full perimeter acoustically rated seals and constructed of - (i) solid core, wood, particleboard or blockboard not less than 45mm thick; and/or (ii) acoustically laminated glass not less than 10.38mm thick.

Component of Buildings External Envelope	Minimum Acoustic Rating (R_w)	Acceptable Forms of Construction
Noise Category 2		
Glazing	35 (where total area of glazing for a habitable room is greater than 1.8m^2)	Minimum 10.38mm thick laminated glass, with full perimeter acoustically rated seals.
	32 (where total area of glazing for a habitable room is less than or equal to 1.8m^2)	Minimum 6.38mm thick laminated glass with full perimeter acoustically rated seals.
External walls	41	Two leaves of clay brick masonry at least 110mm thick with cavity not less than 50mm between leaves OR Single leaf of clay brick masonry at last 110mm thick with: (i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and (ii) mineral insulation or glass wool insulation at least 50mm thick with a density of at least 11 kg/m3 positioned between studs; and (iii) One layer of plasterboard at least 10mm thick fixed to outside face of studs OR Single leaf of brick masonry at least 110mm thick with at least 13mm thick render on each face OR Concrete brickwork at least 110mm thick OR In-situ concrete at least 100mm thick OR Precast concrete at least 100mm thick and without joints.
Roof	38	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling cavity, mineral insulation or glass wool insulation at least 50mm thick with a density of at least 11 kg/m^3.
Floors	45	Concrete slab at least 100mm thick OR Tongued and grooved boards at least 19mm thick with: (i) timber joists not less than 175mm x 50mm; and (ii) mineral insulation or glass wool insulation at least 75mm thick with a density of at least 11kg/m^3 positioned between joists and laid on plasterboard at least 10mm thick fixed to underside of joists; and (iii) mineral insulation or glass wool insulation at least 25mm thick with a density of at least 11kg/m^3 laid over entire floor, including tops of joists before flooring is laid; and (iv) secured to battens at least 75mm x 50mm; and (v) the assembled flooring laid over the joists, but not fixed to them, with battens lying between the joists.

Component of Buildings External Envelope	Minimum Acoustic Rating (R_w)	Acceptable Forms of Construction
Entry doors	33	Fixed so as to overlap the frame or rebate of the frame by not less than 10mm, fitted with full perimeter acoustically rated seals and constructed of - (i) solid core, wood, particleboard or blockboard not less than 45mm thick; and/or (ii) acoustically laminated glass not less than 10.38mm thick.
Noise Category 1		
Glazing	27 (where total area of glazing for a habitable room is greater than 1.8m^2)	Minimum 4mm thick glass with full perimeter acoustically rated seals
	24 (where total area of glazing for a habitable room is less than or equal to 1.8m^2)	Minimum 4mm thick glass with standard weather seals
External walls	35	Single leaf of clay brick masonry at least 110mm thick with: (i) a row of at least 70mm x 35mm timber studs or 64mm steel studs at 600mm centres, spaced at least 20mm from the masonry wall; and (ii) One layer of plasterboard at least 10mm thick fixed to outside face of studs OR Minimum 6mm thick fibre cement sheeting or weatherboards or plank cladding externally, minimum 90mm deep timber stud or 92mm metal stud, standard plasterboard at least 13mm thick internally.
Roof	35	Concrete or terracotta tile or metal sheet roof with sarking, plasterboard ceiling at least 10mm thick fixed to ceiling cavity.
Entry doors	28	Fixed so as to overlap the frame or rebate of the frame, constructed of - (i) Wood, particleboard or blockboard not less than 33mm thick; or (ii) Compressed fibre reinforced sheeting not less than 9mm thick; or (iii) Other suitable material with a mass per unit area not less than 24.4kg/m^2; or (iv) Solid core timber door not less than 35mm thick fitted with full perimeter acoustically rated seals.
Noise Category 0		
No additional acoustic treatment required – standard building assessment provisions apply.		

APPENDIX D OUTDOOR NOISE CONTOUR

BLOCK B

BLOCK C

BLOCK A

BLOCK D

Refer to landscaping documentation for further details

RAIN WATER TANK BELOW

Bicycle (7)

Bicycle (5)

Bicycle (4)

Bicycle (2)

BIN 1100L

TURNING BAY

Refer to civil documentation for further details

33 m²

MC1

MC2

MC3

V1

V2

V3

V4

V5

V6

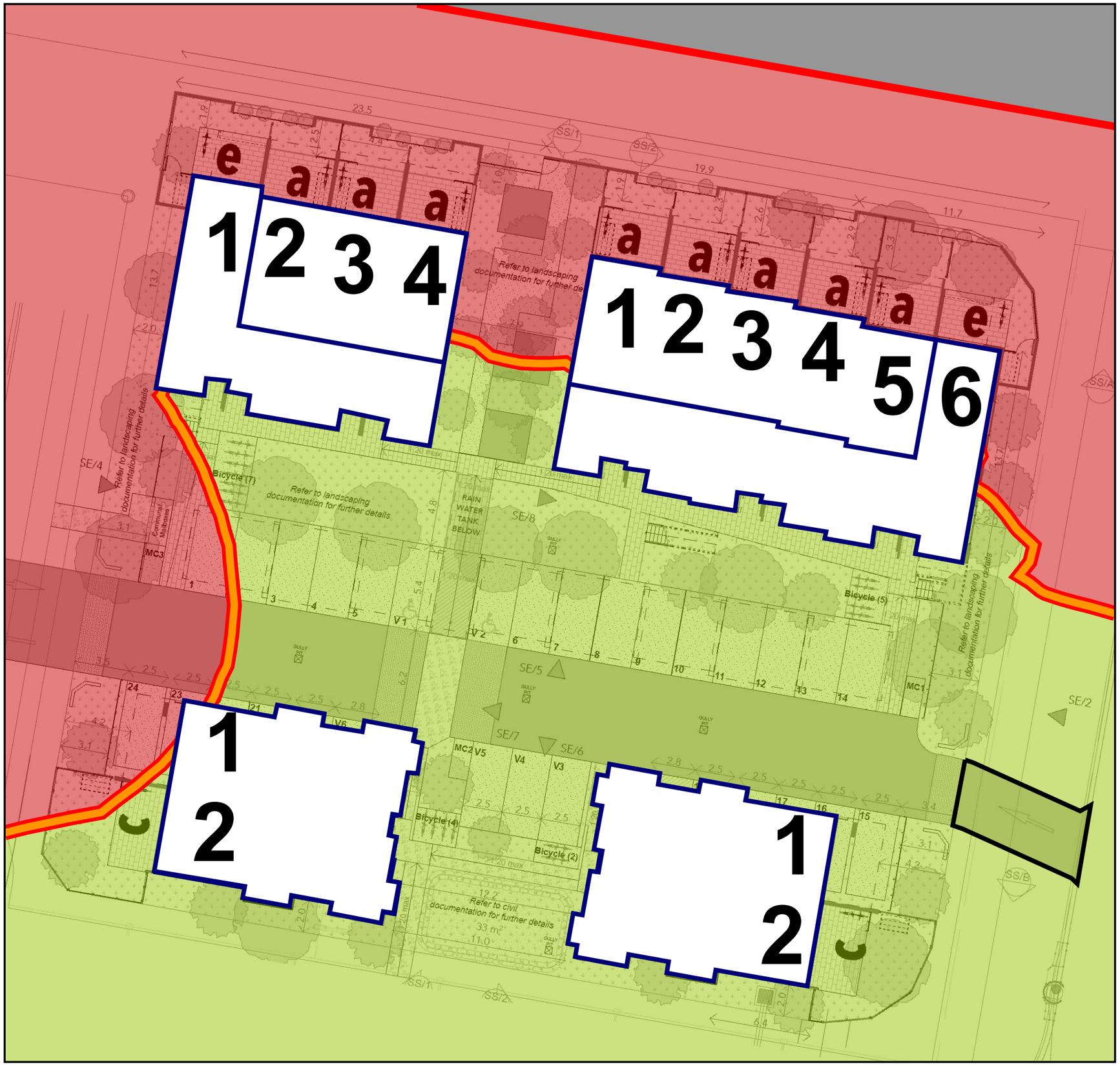
SE/1

SE/5

SE/6

SE/7

SE/8



Aura P11 to P14 - Nirimba Social Housing
Project Number: 22.0170

N

Outdoor noise - 1.5m height

Figure

A

Ground Floor Calculation Height 1.5m - No Barriers
Year 2037

Date: 4/10/2022
Drawn By: AL
Prepared For: Coast2Bay

Road Traffic Noise Levels L10(18 hour)

(Facade Corrected) dB(A)

- ≤ 60
- > 60

Signs and Symbols

- Code of Practice External Noise Limit (<63 dBA L10 (12 Hour))
- Building Block
- SARA External Noise Limit (≤60 dBA L10 (18 Hour))

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