13 Cresta Ave and 96 Beach Haven Road

Proposed Apartments

Beach Haven, Auckland

ACOUSTICS

Date: 15th October 2021

Prepared for: Da-Silva Builders Ltd

Prepared by: Earcon Acoustics Limited

Reference: J004656

Earcon Acoustics Limited, Level 26 - 188 Quay St - Auckland
www.earcon.co.nz 09 443 6410 Info@earcon.co.nz

Document Control

13 Cresta Ave and 96 Beach Haven Rd, Beach Haven, Auckland

Proposed Apartments

J004656

Contact	Issue	Date	Rev
Daniel Martens daniel.martens@earcon.co.nz 027 513 5890	For Internal Review	15/10/2021	C
Fadia Sami fadia.sami@earcon.co.nz 021 437 893	For Consent	15/10/2021	C

Table of Contents

1 Introduction

This report has been prepared to assess the internal and external noise requirements for the proposed apartments, at 13 Cresta Ave and 96 Beach Haven Rd, in Beach Haven, Auckland.

The site for the proposed development is on 2 lots on the north side of Beach Haven Road and to the East of Cresta Ave. The proposed apartments will be divided between 4 separate buildings, with a total of 81 units.

This report is intended as an assessment against the standards of the Auckland Unitary Plan – Operative Version (AUP) and the New Zealand Building Code (NZBC) Clause G6.

- Assesses these activities against noise compliance criteria for the subject zone, and
- Assesses noise insulation to meet recommended internal noise levels based on the AS/NZ 2107:2016.
- Proposes mitigation measures and strategies for compliance with noise standards where necessary.
- Addresses the inter-tenancy elements compliance with the NZBC Clause G6: Acoustics – Airborne and Impact Sound.

This report is based on information provided by:

- Site and Architectural Plans by Brewer Davidson Architecture.

2 Site

2.1 Identification

The proposed development site is located in residential zone in Beach Haven. Acoustic requirements are consistent for all Residential Zones.

Figure 1 - Site Location

The proposed development covers the following land parcels, Lot 1 & 2 DP 157383.

2.2 Zoning

In accordance with the Auckland Unitary Plan – Operative Version, the subject site is zoned *Residential* and the neighbouring properties are zoned *Residential* and *Business – Local Centre Zone.*

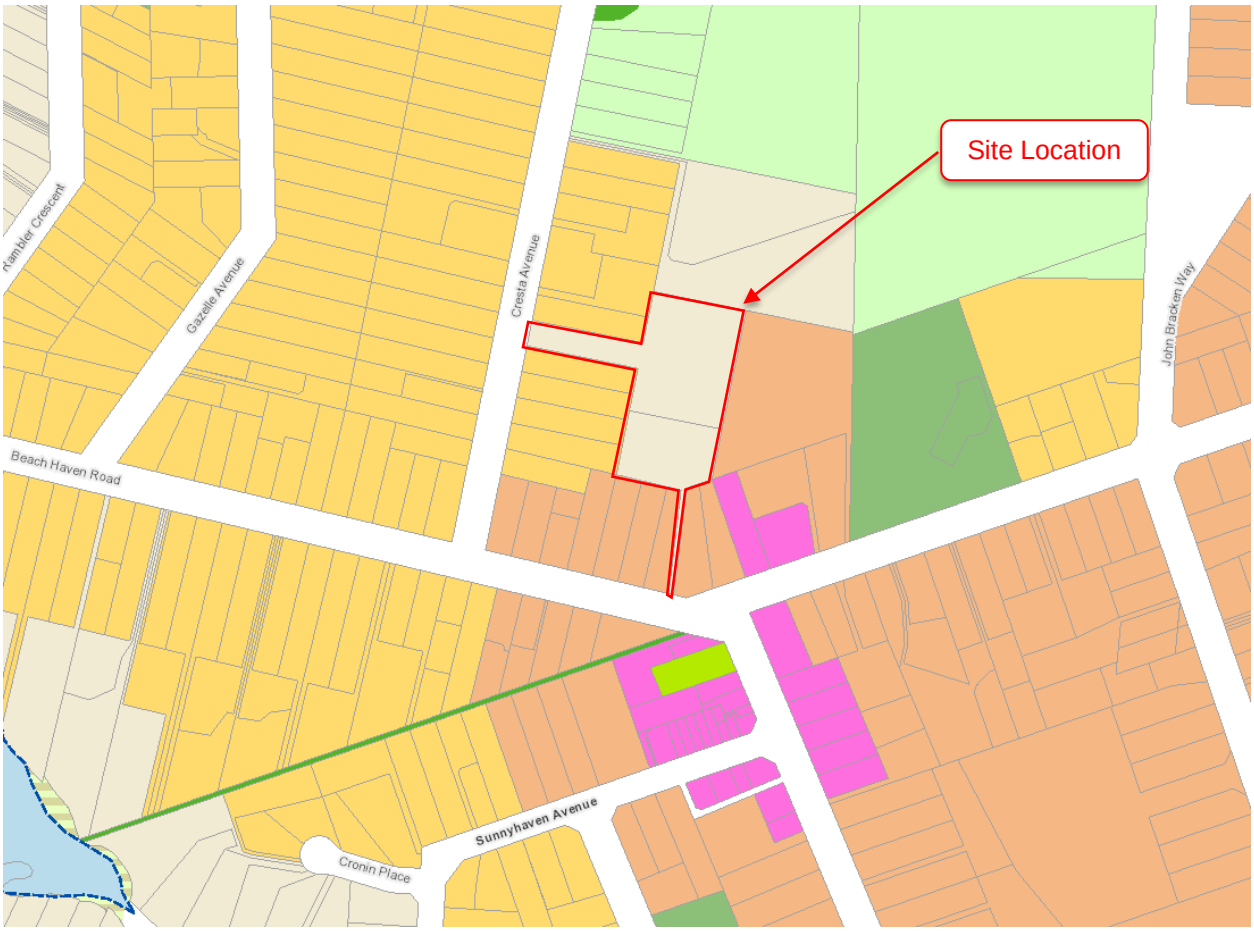


Figure 2 - Site Zoning

3 Proposed Development

The proposed development comprises of 4 buildings, with a total of 81 units. The development also includes a shared driveway along the south-western boundary and parking spaces provided throughout the site. The following figures are representative of the proposed occupancies (shown in more detail in Appendix I.)

Figure 3 - Proposed Development Ground Floor Plans

4 Assessment Standards

4.1 External Noise Levels in Residential Zones

The following standard applies for noise produced within the subject site and received at the neighbouring Residential Zoned properties.

E25.6.2. Maximum noise levels in residential zones

(1) The noise (rating) levels and maximum noise level arising from any activity in the Residential – Large Lot Zone, Residential – Rural and Coastal Settlement Zone, Residential – Single House Zone, Residential – Mixed Housing Suburban Zone, Residential – Mixed Housing Urban Zone and the Residential – Terrace Housing and Apartment Buildings Zone measured within the boundary of an adjacent site in these residential zones must not exceed the levels in Table E25.6.2.1 Noise levels in residential zones below:

Table E25.6.2.1 Noise levels in residential zones

Time	Noise level
Monday to Saturday 7am-10pm	50dB L_{Aeq}
Sunday 9am-6pm	
All other times	40dB L_{Aeq} 75dB L_{AFmax}

(2) The levels for the daytime hours in Table E25.6.2.1 Noise levels in residential zones may be exceeded by intermittent noise for reasonable periods where that noise is associated with normal household activities, such as lawn mowing or home handyman work.

4.2 Internal Noise Levels for habitable spaces

Under the Auckland Unitary Plan no internal noise levels requirements apply to dwellings in residential zones. Nevertheless, the follow internal noise levels are recommended for bedrooms and other habitable spaces in residential buildings near minor roads.

Space	Design Sound Level ($L_{Aeq,t}$) Range	Recommended Level L_{Aeq} dB
Living Areas	30 – 40	40
Sleeping Areas (Night-Time)	30 – 45	35
Work Areas	35 – 45	40

Table 1 – Recommended Internal Noise Levels – AS/NZS 2107:2016

4.3 Criteria Summary

4.3.1 Metrics

In accordance with the Auckland Unitary Plan and NZ standards NZS6801, NZS6802, and NZS6803, AS/NZ 2107:2016, the following metrics are used to quantify noise and **L_{Aeq} [dB] or L_{eq} [dBA]:** A-Frequency Weighted time average sound level. This metric represents the full audio range weighted against the response of the human ear. This is the primary descriptor of noise for receivers. **L_{Amax} [dB] or L_{max} [dBA]:** Maximum sound pressure level.

4.3.2 Noise Levels

Criteria	Location	Occupancy	Time	Limits
Residential Zones	External	Any	Monday to Saturday 7am – 10pm	50dB L_{Aeq}
			Sundays 9am – 6pm	
			All other times	40dB L_{Aeq} 75dB L_{AFmax}
Recommended noise levels from traffic	Internal	Bedroom	Night-Time (10pm – 7am)	35dB L_{Aeq}
		All other habitable spaces	All times	40dB L_{Aeq}

Table 2 – Design Criteria

5 Noise modelling

5.1 Assessment Metrics

NZ standards NZS6801, and NZS6802, the following metrics are used to quantify noise:

- **A-Weighting:** A frequency correction that represents the full audio range weighted against the response of the human ear.
- **L_{AFmax} [dB] or L_{Fmax} [dBA]:** Maximum sound pressure level.
- **L_{Aeq} [dB] or L_{eq} [dBA]:** A-Frequency Weighted time average sound level.

L_{AW} [dB]: A-Frequency Weighted sound power level. This metric is primarily used to describe the power output from a sound source for the purposes of modelling.

5.2 Noise Propagation Modelling Software

To predict noise propagation at the subject site from the movements of traffic, an environmental model was constructed for the extension using the CadnaA version 2021 computer modelling program. The following applies to the modelling software CadnaA:

- CadnaA is an internationally recognised software package designed for the prediction of noise propagation. CadnaA implements numerous national and international standards and guidelines, including the CoRTN standard of the United Kingdom Department of Transport and Welsh Office for the Calculation of Road Traffic Noise.
- The modelling method for noise propagation over distance is based on the international standard ISO 9613: "Acoustics – Attenuation of sound during propagation outdoors" methodology.
- The model allows importing digital ground elevation contours and data to define the topography and data for each of the noise sources, and the locations, geometry and elevations of the noise receivers. The program then calculates the dB levels as the metric for noise at receivers for the purposes of assessment.

5.3 Noise Propagation Modelling Parameters

The following parameters were incorporated into the noise propagation models:

Parameter	Value
	Internal Road
Standards	International ISO9613 – RLS-90
Ground Attenuation	Open Space: G=1 Roads, Pavements, G=0, Other: G=0.5
Atmospherics	Temperature: 20˚C, Rel. Humidity: 70%
Topography	Imported from AUP GIS
Receiver Heights	1.5 above ground level of first occupied floor.
Traffic Speed – Light	50 km/hr
Traffic Speed – Heavy	50 km/hr
Road Gradient	As per topography
Traffic Flow	Steady
Road Type	Local Street
Lanes Used	All traffic assumed half on the lane closest to receiver in each direction, distributed equally for each direction as a conservative measure.

5.4 Building Construction Modelling

The following parameters are used for the purposes of assessment of noise levels and attenuation performance:

- Sound Insulation Prediction is done in accordance with EN12354/3 using Insul software Version 8.0.7.

- Assessment is based on attenuation of noise across the 1-Octave frequency range. While a single Standardised Sound Level Difference is provided for each combination, assessment of attenuation performance is based on the frequency based Sound Transmission Loss.
- Frequency distribution is based on entertainment noise in 1 Octaves

It is worth noting here that a reduction of 10-15dBA is the maximum that can be achieved with windows open in a dwelling. To achieve higher attenuation levels, windows need to be closed and mechanical ventilation installed in accordance with the requirements of the AUP and NZBC clause G4.

6 Noise Sources

6.1 Road Traffic

Assessment is based on published traffic count data for Beach Haven Road in proximity to the subject site and measurements carried out on similar roads.

We note that a design year of 2031 is assumed, with a 1% annual growth of traffic volumes. This yields the following design year traffic volumes along Beach Haven Rd:

- Average Daily Traffic (ADT) <2000 Vehicles.
- 4% Heavy Vehicles.

Based on the above ADT and % Heavy Vehicle traffic, daytime noise levels incident on the most exposed facades of the buildings is less than L_{Aeq} 45 dB. We note this is in line with measurements at similar sites.

Frequency distribution of traffic noise in 1 Octaves is in accordance with ISO 717, where the external Sound Pressure level on the facades of the subject dwellings, the most exposed façade of each block, is as follows:

	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	Overall dBA
Exterior Sound Pressure Level	<53	<47	<43	<41	<41	<38	<33	<45

Table 3 – Noise Levels at Building Facades

6.2 Zone Noise Levels

The maximum allowable noise levels are assumed from activities within adjacent sites.

Time	Limits
Monday to Saturday 7am – 10pm	50dB L_{Aeq}
Sundays 9am – 6pm	
All other times	40dB L_{Aeq} 75dB L_{AFmax}

Table 4 - External Noise Levels from Zone Noise

7 Recommendations

Based on the noise modelling from the ambient traffic noise, and to achieve compliance with the required standards, the following is required:

7.1 Building Envelope for Residential Occupancies

7.1.1 Facade

The proposed cladding is currently unknown, however, typical constructions such as concrete, timber weatherboard, metal panels, etc. complete an internal lining of 10mm standard plasterboard and thermal insulation are all acoustically suitable.

7.1.2 Roofing

The roof construction currently unknown, however, typical constructions such as Longrun Metal or membrane roofing will all be acoustically suitable. The ceiling of the top levels will be 1x13mm standard plasterboard with complete with thermal insulation. This construction is acoustically suitable.

7.1.3 Glazing

No minimum glazing requirements apply to any units and all units will meet the internal noise levels with ventilating windows open.

7.2 Mechanical Ventilation

All windows may be open for ventilation. No mechanical ventilation is required.

7.3 Mechanical Plant

All mechanical plant shall be designed, selected, positioned and shielded to control noise at any receiver to with the required compliance standards. Furthermore, mechanical plant shall be mounted on suitable vibration isolation mounts to maintain vibration levels and noise levels within any adjoining habitable spaces.

7.4 Residents Vehicle Noise

For the noise from resident's vehicle traffic, we have assumed that all 63 parking spaces will be vacated or occupied over the peak hour of traffic, e.g., all leaving in the morning and all arriving in the evening over a 1 hour period. During the night-time period where up to 7 vehicle movements may be anticipated over any given hour, the noise levels will exceed the noise limit of 40dB LAeq at the closest neighbouring receivers.

In order to mitigate the noise levels produced during the night-time hours the following management procedures are proposed to be included in the Body Corporate rules:

- A maximum speed limit of 10km/h along the Right-of-Way (ROW)
- No speed pumps near the ROW
- Smooth transitions along the ROW (i.e. no manhole covers or service covers in the wheel tracks)
- Acceptance the NZ vehicle fleet will move to EV and development will facilitate charging on site when needed.
- Rules regarding courteous behaviour between 10pm and 7am, including no engine revving, quiet voices, no door slamming, car stereos off or quiet until on the legal road, etc.

Reference the landscape plans, a combination of 1.2 and 1.8m fencing are proposed (Refer to the Appendix showing for the location and height of the fences as noted on the landscape plans. The fencing is required to be rated at 10kg/sqm (25mm overlapping timber battens or equivalent). Retaining walls are effective acoustically and act as acoustic fences. The resulting noise level from the proposed fencing is as follows:

Receiver	Noise Level L_{Aeq} dB	Exceedance dB
11 Cresta Ave	47	N/A
15 Cresta Ave	52	2
17 Cresta Ave	<40	N/A
29 Cresta Ave	<40	N/A
120 Beach Haven Rd	49	N/A
102 Beach Haven Rd*	<35	N/A
98 & 100 Beach Haven Rd	47	N/A
94A Beach Haven Rd	<40	N/A
94 Beach Haven Rd	<40	N/A
92 Beach Haven Rd	<40	N/A

Table 5 – Predicted Traffic Noise Levels

7.5 Rubbish and Recycling Noise

Rubbish and recycling is be handled using a private collection service and will take place in proximity to the proposed bin storage area in the north-eastern corner of the parking lot. Assuming a single truck and collection occurring in proximity to the bin, the noise levels are predicted (from the vehicle movement) to be no more than 49dB L_{Aeq} at the closest neighbouring receivers.

The noise predicted from the collection of rubbish and recycling may reach as high as LAeq 62dB at 120 Beach Haven Rd over the duration of the collection. With the application of averaging the noise levels will be less than 57dB at the boundary of the 120 Beach Haven Rd.

Therefore, collection of rubbish and recycling on site may produce an exceedance at 120 Beach Haven Rd. The effects are, nevertheless, considered to be less than minor with the noise occurring for a relatively short duration, during the daytime-hours and received at an elevated level only within a small area of the neighbouring receiver.

8 Internal Building Elements

8.1 Requirements of NZBC Clause G6: Airborne and Impact Sound

- STC (Sound Transmission Class) 55 and IIC (Impact Insulation Class) 55 ratings are required between the inter-tenancy floors and walls to prevent undue noise transmission from other occupancies or common spaces to the habitable spaces of the household units.
- The STC and IIC ratings are required for common walls and floors of different tenancies.
- The code allows 5dB for field situation; i.e., FSTC 50 and FIIC 50 in situ.

8.2 Wall STC Rating

The construction detail is currently unknown; however, suitable inter-tenancy constructions include, single timber/steel stud complete with acoustic mounts/rails, double timber/steel stud walls. Examples include:

Central Barrier System

Gib Barrierline GBTLAB 60b wall system, which consists of 1x10mm Gib braceline or noiseline on timber framing complete with thermal insulation either side of the Gib Barrierline panels. This wall system is rated STC 64 and is acoustically suitable.

Concrete

Precast concrete or concrete block options are also available. With 150mm unlined precast concrete wall or 190mm solid filled concrete block wall providing the STC 55 minimum required.

With the addition of timber/steel framing, thermal insulation and plasterboard lining the STC rating can been increased or concrete wall be reduced in thickness.

This inter-tenancy wall construction is above the minimum of STC 55 required by the NZBG clause G6.

General Notes

- The proposed ratings meet G6 requirements. We would like to note that these ratings are based on laboratory tests and the actual rating depends on standard of workmanship; usually walls can degrade between 3-7 dB.
- Electrical sockets and power outlets may be located in the separating wall provided the positions of the sockets are staggered and backed with an acoustically rated well sealed box (e.g. Clipsal supply acoustically and fire-rated boxes. The boxes to be wrapped with Acoustop Flexilagg).
- All penetrations need to be acoustically treated.

8.3 Floor/Ceiling STC Rating

The construction detail is currently unknown; however, options include timber/steel frame joists and concrete constructions. Example constructions include:

Concrete

A 100mm concrete floor slab, complete with 10mm standard plasterboard and thermal insulation. This construction is rated above STC 55 and is acoustically suitable.

Timber

Timber floor system include constructions such as the Gib GBDFA 60b construction, which provides an STC of 57, meeting the NZBC requirements.

8.4 Floor/Ceiling IIC Rating

The apartment units on the upper floors acoustic underlay is required under all non-carpeted spaces. Suitable underlays include: Regupol 4515 or equivalent.

8.5 Risers/Shafts

The risers design and acoustic rating to provide the necessary sound insulation from duct and pipe noise to meet the necessary amenity between units. Refer to the Arch spec for the proposed construction.

- For risers containing ductwork and unlagged PVC pipes adjacent to habitable spaces STC 44 is required. If the pipes are lagged, the risers rating would reduce to STC 30.
- For risers containing ductwork adjacent to non-habitable spaces, STC 40 is required.

8.6 Plumbing

- The systems should not be subjected to high operating pressure or high levels of pulsation, which can be significantly reduced by the use of pulsation dampers and adequate air chambers.
- The Contractor shall use acoustically lagged flexible connectors where required.
- Keeping flow velocity through the pipes as low as feasible assures quiet & less turbulent flow. Cavitation's, sharp and rough edges in fittings should be avoided.
- Heavy, thick walled pipes contain turbulent noise better than thin lightweight pipes.
- Storm water and waste water PVC pipes within the cavity of habitable spaces or within risers next to habitable spaces shall be lagged with a resilient material such as leaded vinyl (4.5 kg/m^2 Soundlag) acoustic pipe lagging or equivalent.

8.7 Penetrations

- PVC pipes: lag the pipes with Acoustop Flexilag AFL 4/24 or equivalent for 1m on both sides of the wall. Seal the gaps with Firepro M707 acoustic sealant or equivalent.
- Armaflex insulated copper pipes (refrigeration, domestic & hot water): Use a steel sheet (1.2mm thickness) over the Armaflex insulation for 1m on both sides of the wall or Acoustop FlexiBarrier AFB/8. Seal the gaps with Firepro M707 acoustic sealant or equivalent.
- Cable trays are required to be cut 150mm clear of the acoustic walls, with the gaps around the cables acoustically sealed to the wall (no gaps). Suitable acoustic sealants include Firepro M707 or Holdfast Fyrecryl or equivalent.
- Ductwork and pipework are not to be supported off the acoustic walls or acoustic ceilings. The support shall be off the soffit / slab.
- No acoustic flexible ducts are allowed to penetrate the acoustic walls.
- Air Transfer ducts through acoustic walls need to be sized based on 3 m/s velocity with airway maximum size of 600mmx300mm.

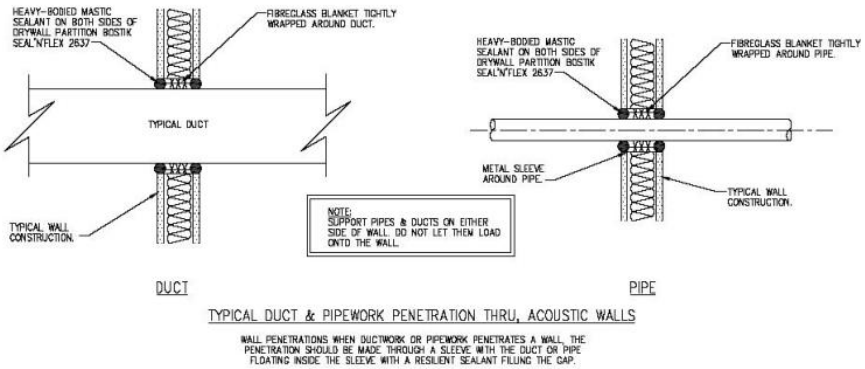


Figure 4 – Acoustic Treatment of Pipework & Ductwork Penetrations

Appendix I – Proposed Development

Figure 5 – Block A – Proposed ground floor plan

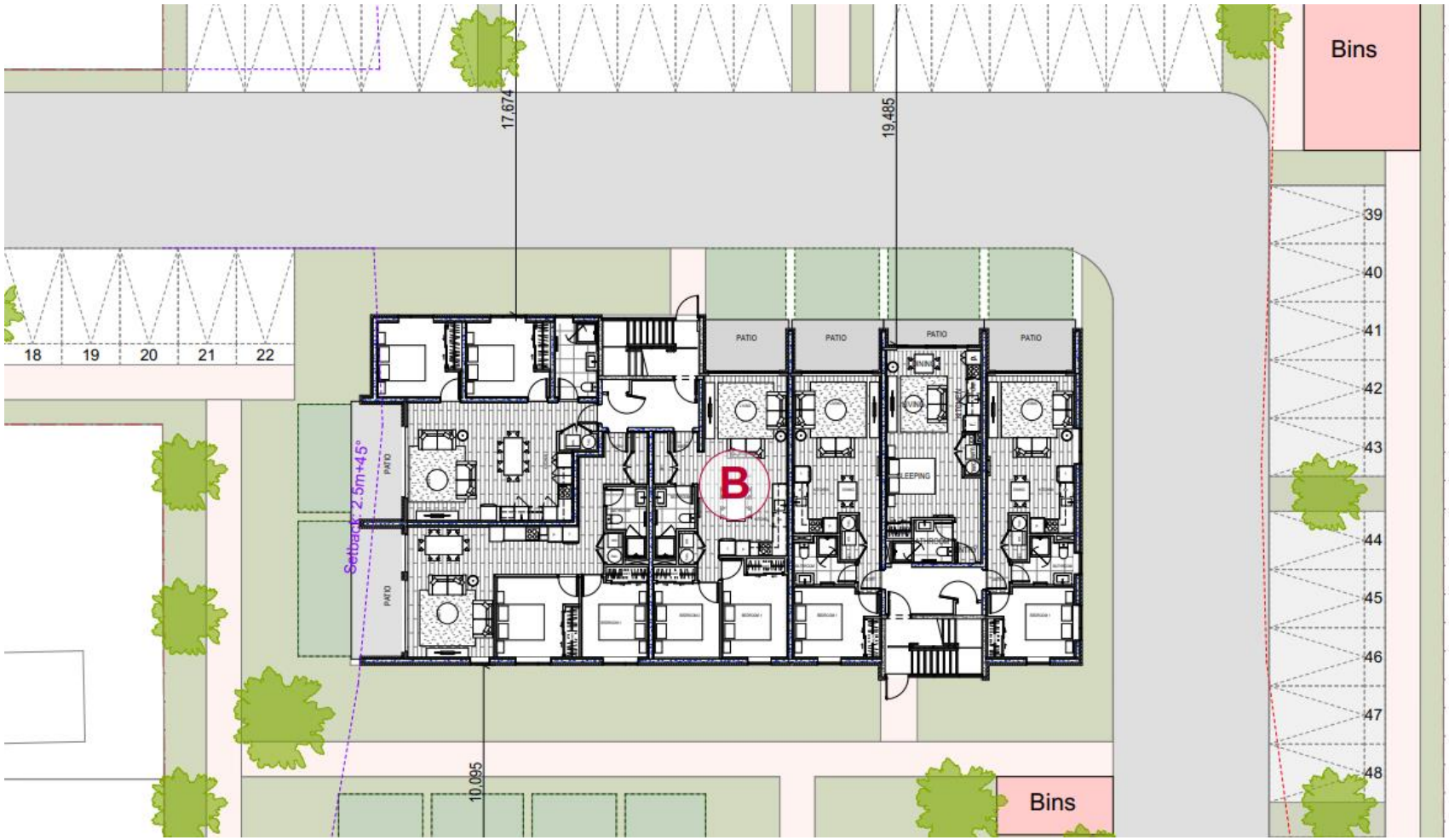


Figure 6 – Block B – Proposed ground floor plan

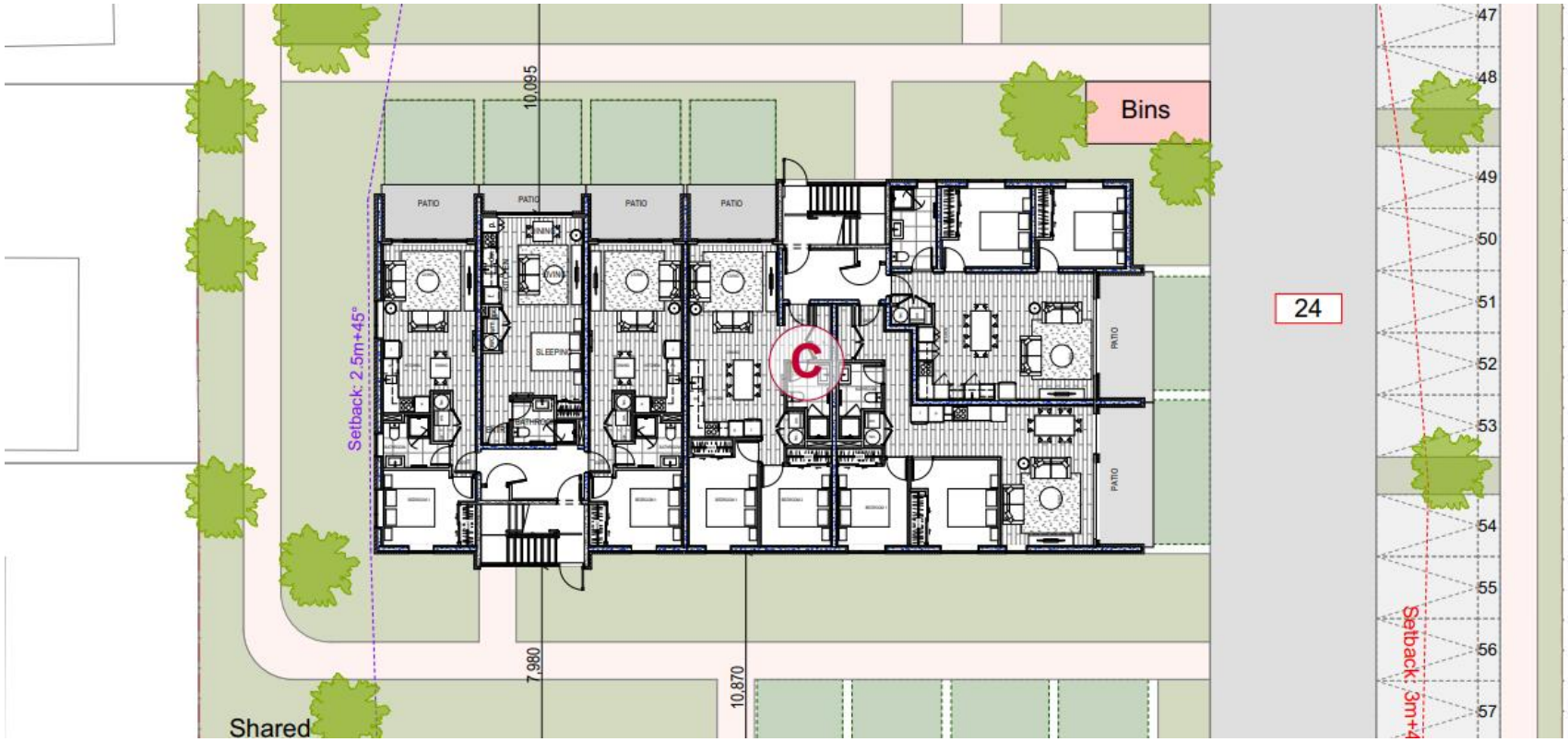


Figure 7 – Block C – Proposed ground floor plan

Figure 8 – Block C – Proposed ground floor plan

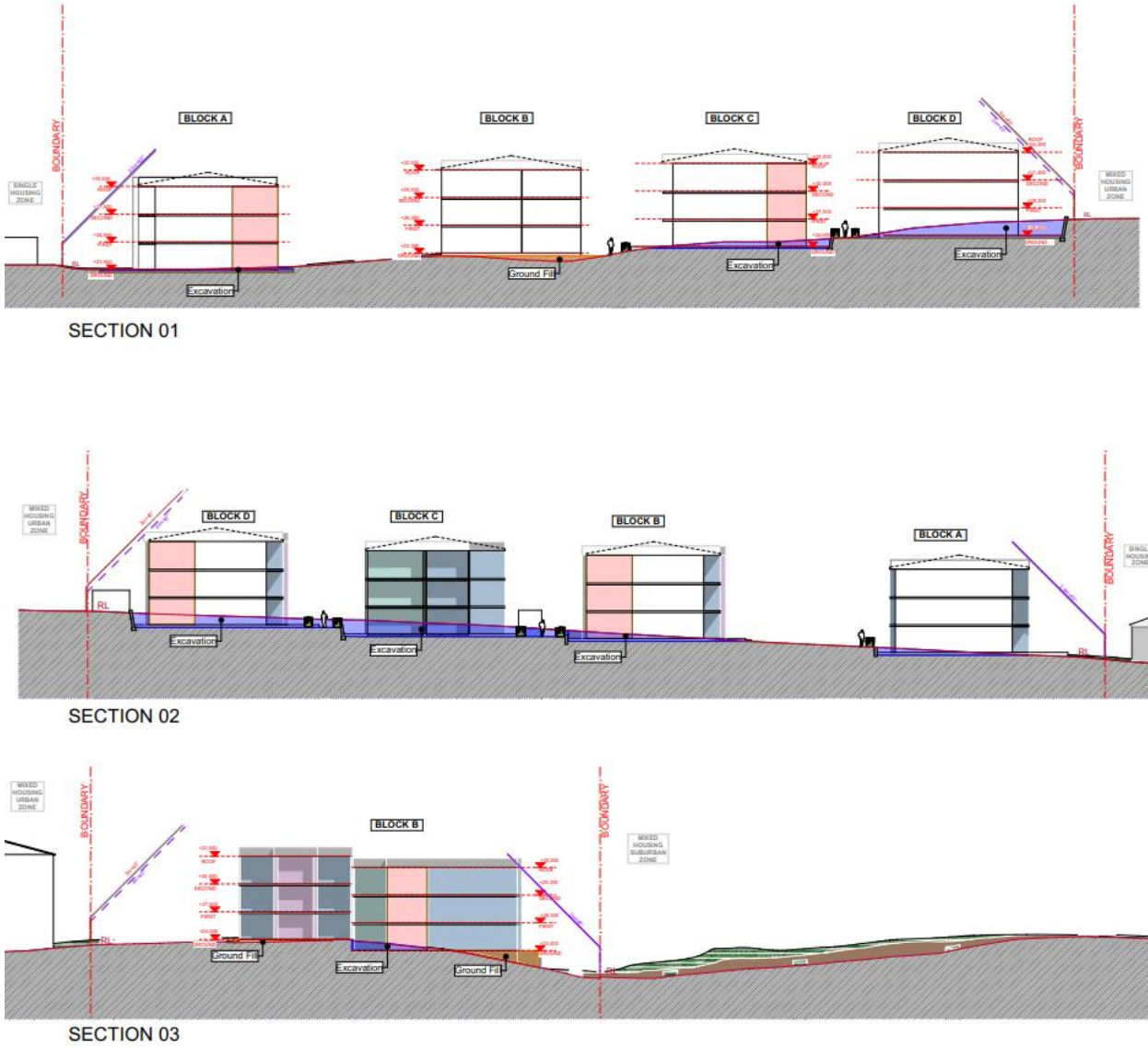
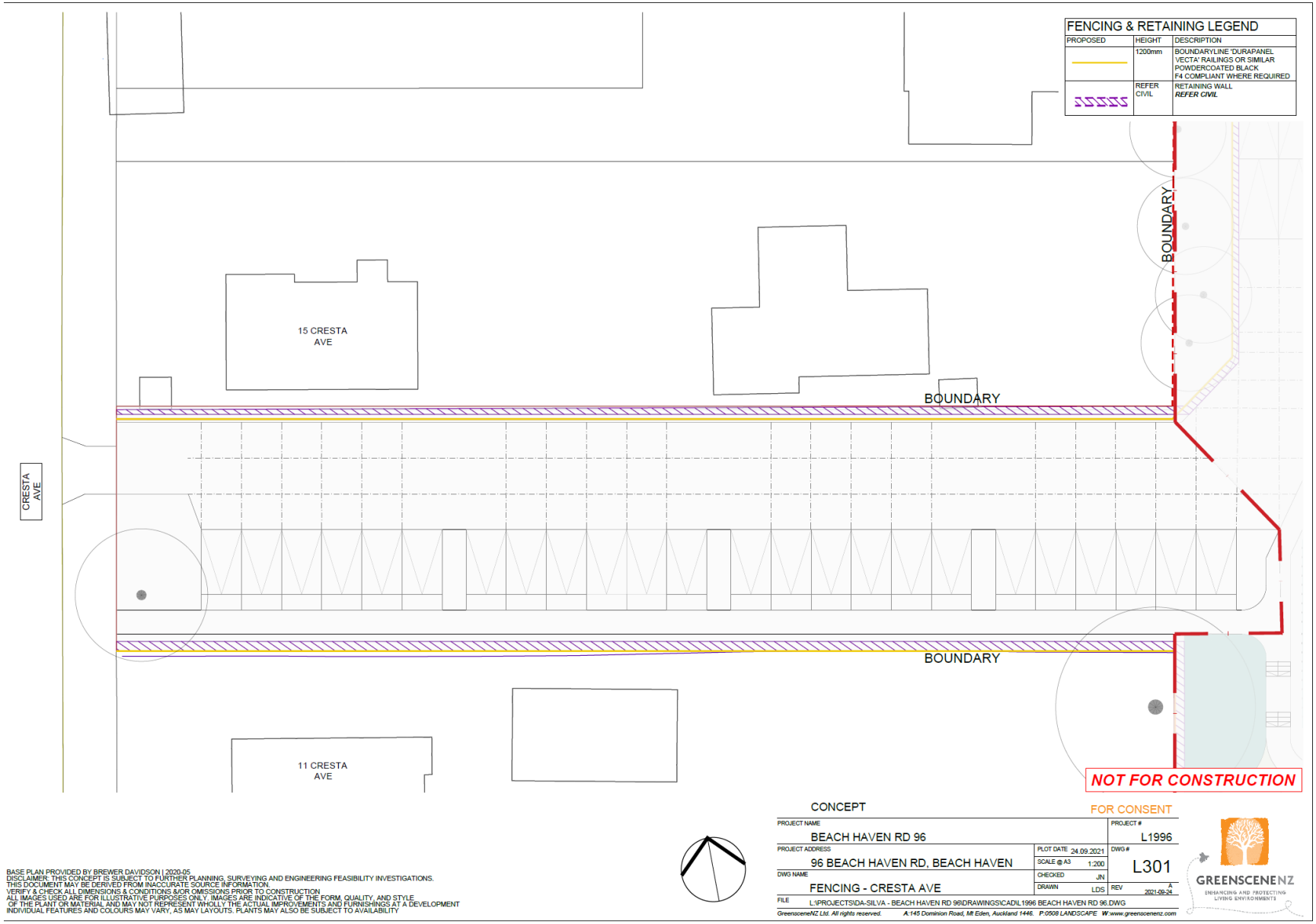
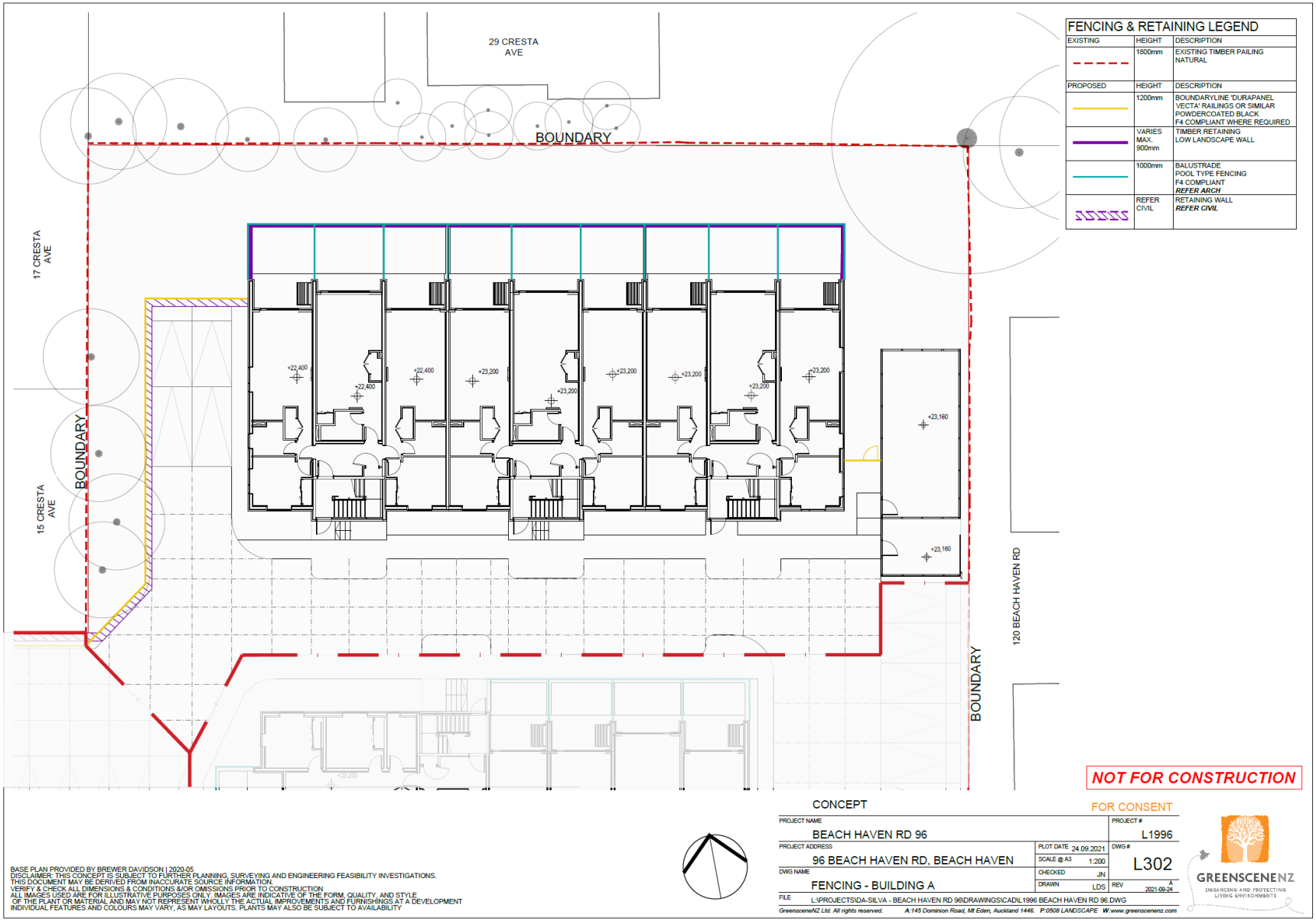
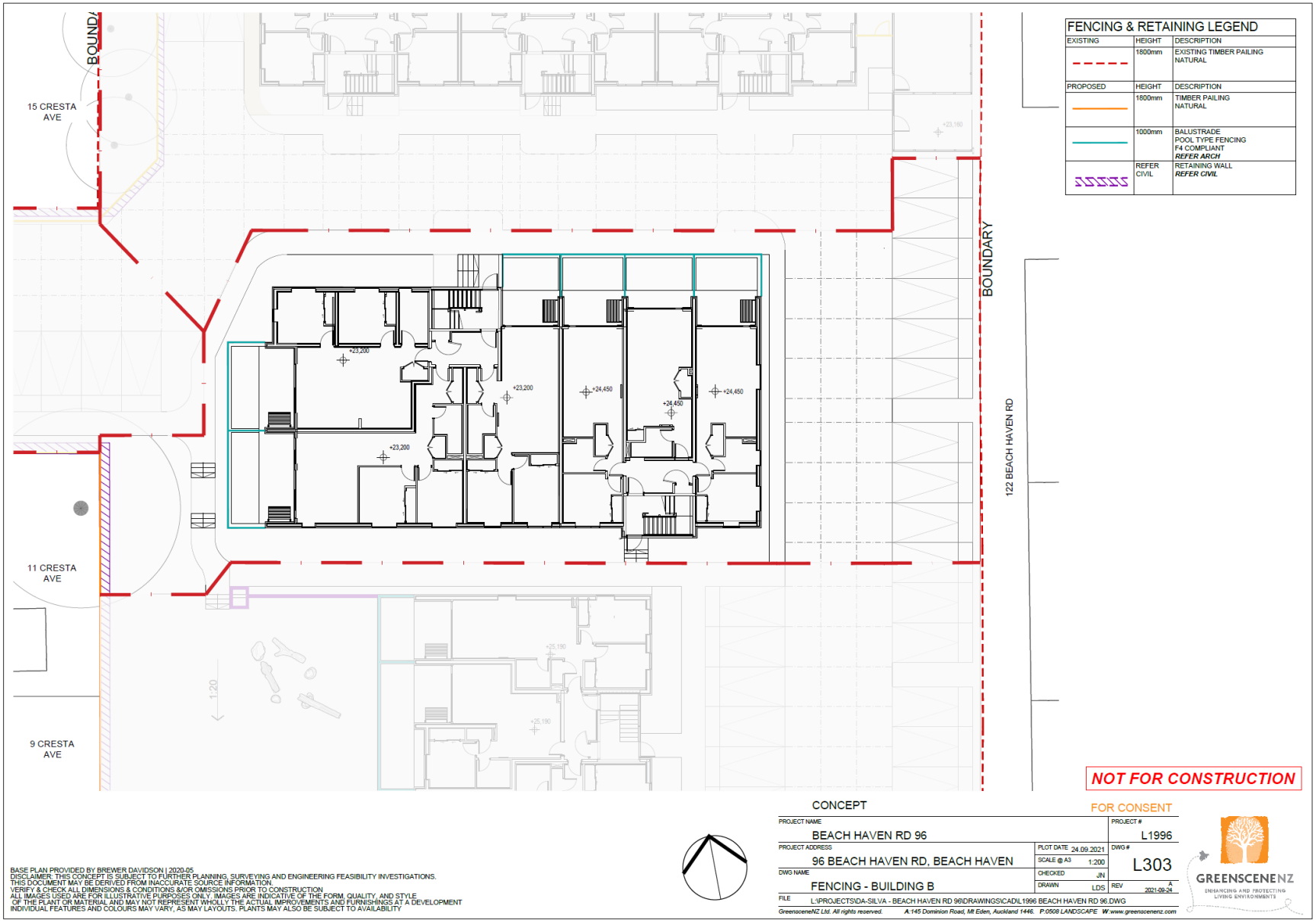
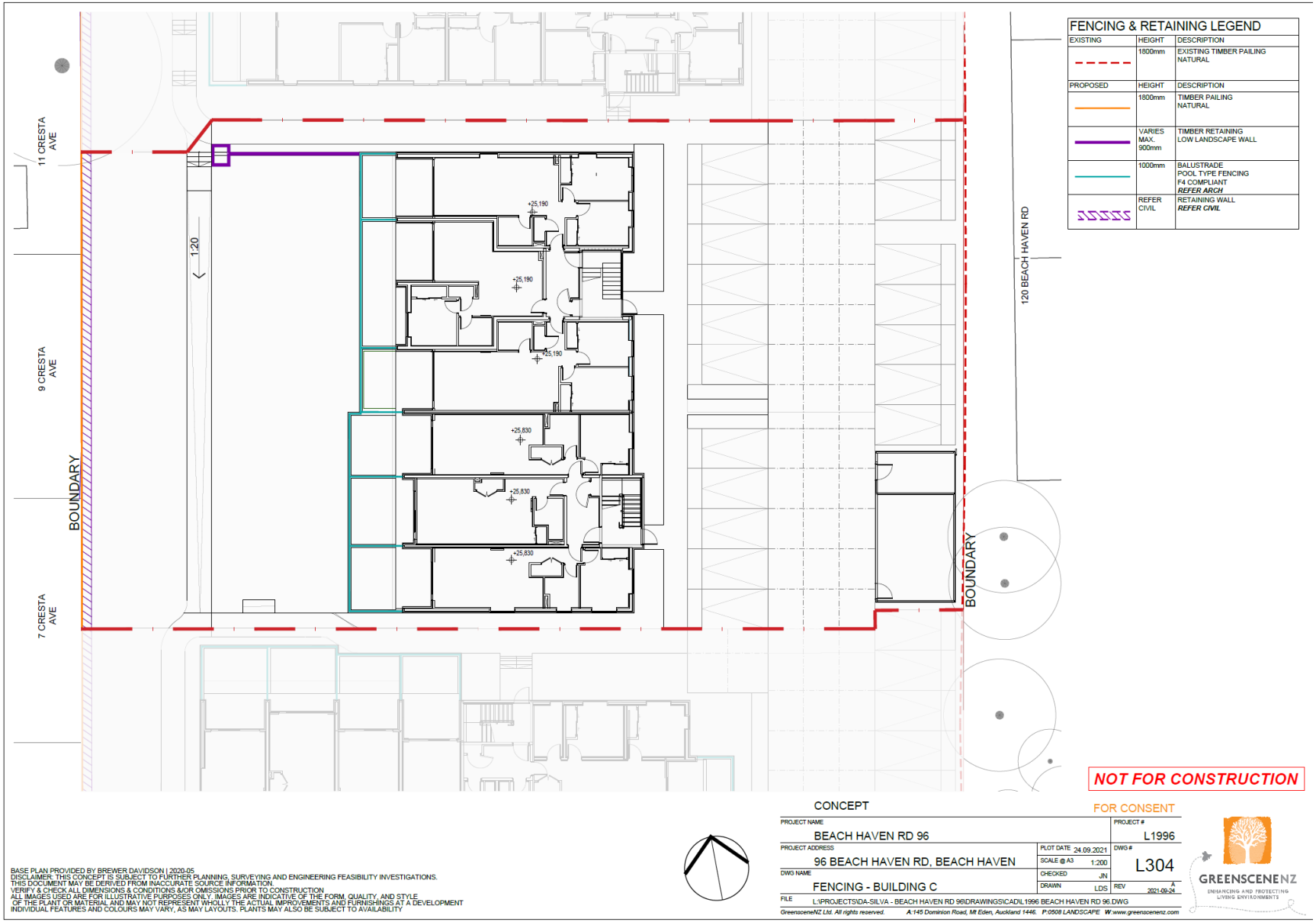


Figure 9 – Section


FENCING & RETAINING LEGEND
PROPOSED
HEIGHT
DESCRIPTION
1200mm
BOUNDARYLINE 'DURAPANEL VECTA' RAILINGS OR SIMILAR POWDERCOATED BLACK F4 COMPLIANT WHERE REQUIRED
REFER CIVIL
RETAINING WALL REFER CIVIL
15 CRESTA AVE
11 CRESTA AVE
CRESTA AVE
BOUNDARY
BOUNDARY
BOUNDARY
NOT FOR CONSTRUCTION
CONCEPT
FOR CONSENT
PROJECT NAME
BEACH HAVEN RD 96
PROJECT #
L1996
PROJECT ADDRESS
96 BEACH HAVEN RD, BEACH HAVEN
PLOT DATE 24.09.2021
SCALE @ A3 1:200
DWG #
L301
DWG NAME
FENCING - CRESTA AVE
CHECKED JN
DRAWN LDS
REV A 2021-09-24
FILE L:\PROJECTS\DA-SILVA - BEACH HAVEN RD 96\DRAWINGS\CAD\L1996 BEACH HAVEN RD 96.DWG
GreensceneNZ Ltd. All rights reserved. A:145 Dominion Road, Mt Eden, Auckland 1446. P:0508 LANDSCAPE W:www.greenscenenz.com
GREENSCENENZ
ENHANCING AND PROTECTING LIVING ENVIRONMENTS
BASE PLAN PROVIDED BY BREWER DAVIDSON | 2020-05.
DISCLAIMER: THIS CONCEPT IS SUBJECT TO FURTHER PLANNING, SURVEYING AND ENGINEERING FEASIBILITY INVESTIGATIONS.
THIS DOCUMENT MAY BE DERIVED FROM INACCURATE SOURCE INFORMATION.
VERIFY & CHECK ALL DIMENSIONS & CONDITIONS &/OR OMISSIONS PRIOR TO CONSTRUCTION
ALL IMAGES USED ARE FOR ILLUSTRATIVE PURPOSES ONLY. IMAGES ARE INDICATIVE OF THE FORM, QUALITY, AND STYLE OF THE PLANT OR MATERIAL AND MAY NOT REPRESENT WHOLLY THE ACTUAL IMPROVEMENTS AND FURNISHINGS AT A DEVELOPMENT
INDIVIDUAL FEATURES AND COLOURS MAY VARY, AS MAY LAYOUTS. PLANTS MAY ALSO BE SUBJECT TO AVAILABILITY


29 CRESTA AVE
BOUNDARY
17 CRESTA AVE
15 CRESTA AVE
BOUNDARY
BOUNDARY
120 BEACH HAVEN RD
+22,400
+22,400
+22,400
+23,200
+23,200
+23,200
+23,200
+23,200
+23,200
+23,160
+23,160
FENCING & RETAINING LEGEND
EXISTING | HEIGHT | DESCRIPTION
1800mm | EXISTING TIMBER PAILING NATURAL
PROPOSED | HEIGHT | DESCRIPTION
1200mm | BOUNDARYLINE 'DURAPANEL VECTA' RAILINGS OR SIMILAR POWDERCOATED BLACK F4 COMPLIANT WHERE REQUIRED
VARIES MAX. 900mm | TIMBER RETAINING LOW LANDSCAPE WALL
1000mm | BALUSTRADE POOL TYPE FENCING F4 COMPLIANT REFER ARCH
REFER CIVIL | RETAINING WALL REFER CIVIL
NOT FOR CONSTRUCTION
CONCEPT
FOR CONSENT
PROJECT NAME
BEACH HAVEN RD 96
PROJECT #
L1996
PROJECT ADDRESS
96 BEACH HAVEN RD, BEACH HAVEN
PLOT DATE 24.09.2021
SCALE @ A3 1:200
DWG #
L302
DWG NAME
FENCING - BUILDING A
CHECKED JN
DRAWN LDS
REV A 2021-09-24
FILE L:\PROJECTS\DA-SILVA - BEACH HAVEN RD 96\DRAWINGS\CAD\L1996 BEACH HAVEN RD 96.DWG
GreensceneNZ Ltd. All rights reserved. A:145 Dominion Road, Mt Eden, Auckland 1446. P:0508 LANDSCAPE W:www.greenscenenz.com
GREENSCENENZ
ENHANCING AND PROTECTING LIVING ENVIRONMENTS
BASE PLAN PROVIDED BY BREWER DAVIDSON | 2020-05.
DISCLAIMER: THIS CONCEPT IS SUBJECT TO FURTHER PLANNING, SURVEYING AND ENGINEERING FEASIBILITY INVESTIGATIONS.
THIS DOCUMENT MAY BE DERIVED FROM INACCURATE SOURCE INFORMATION.
VERIFY & CHECK ALL DIMENSIONS & CONDITIONS &/OR OMISSIONS PRIOR TO CONSTRUCTION
ALL IMAGES USED ARE FOR ILLUSTRATIVE PURPOSES ONLY. IMAGES ARE INDICATIVE OF THE FORM, QUALITY, AND STYLE OF THE PLANT OR MATERIAL AND MAY NOT REPRESENT WHOLLY THE ACTUAL IMPROVEMENTS AND FURNISHINGS AT A DEVELOPMENT
INDIVIDUAL FEATURES AND COLOURS MAY VARY, AS MAY LAYOUTS. PLANTS MAY ALSO BE SUBJECT TO AVAILABILITY


BOUNDA
15 CRESTA AVE
11 CRESTA AVE
9 CRESTA AVE
BOUNDARY
122 BEACH HAVEN RD
+23,200
+23,200
+23,200
+24,450
+24,450
+24,450
+25,190
+25,190
1:20
FENCING & RETAINING LEGEND
EXISTING
HEIGHT
DESCRIPTION
1800mm
EXISTING TIMBER PAILING
NATURAL
PROPOSED
HEIGHT
DESCRIPTION
1800mm
TIMBER PAILING
NATURAL
1000mm
BALUSTRADE
POOL TYPE FENCING
F4 COMPLIANT
REFER ARCH
REFER CIVIL
RETAINING WALL
REFER CIVIL
NOT FOR CONSTRUCTION
CONCEPT
FOR CONSENT
PROJECT NAME
BEACH HAVEN RD 96
PROJECT #
L1996
PROJECT ADDRESS
96 BEACH HAVEN RD, BEACH HAVEN
PLOT DATE 24.09.2021
SCALE @ A3 1:200
DWG #
L303
DWG NAME
FENCING - BUILDING B
CHECKED JN
DRAWN LDS
REV A 2021-09-24
FILE L:\PROJECTS\DA-SILVA - BEACH HAVEN RD 96\DRAWINGS\CAD\L1996 BEACH HAVEN RD 96.DWG
GREENSCENENZ
ENHANCING AND PROTECTING LIVING ENVIRONMENTS
GreensceneNZ Ltd. All rights reserved.
A:145 Dominion Road, Mt Eden, Auckland 1446. P:0508 LANDSCAPE W:www.greenscenenz.com
BASE PLAN PROVIDED BY BREWER DAVIDSON | 2020-05
DISCLAIMER: THIS CONCEPT IS SUBJECT TO FURTHER PLANNING, SURVEYING AND ENGINEERING FEASIBILITY INVESTIGATIONS.
THIS DOCUMENT MAY BE DERIVED FROM INACCURATE SOURCE INFORMATION.
VERIFY & CHECK ALL DIMENSIONS &/OR OMISSIONS PRIOR TO CONSTRUCTION
ALL IMAGES USED ARE FOR ILLUSTRATIVE PURPOSES ONLY. IMAGES ARE INDICATIVE OF THE FORM, QUALITY, AND STYLE OF THE PLANT OR MATERIAL AND MAY NOT REPRESENT WHOLLY THE ACTUAL IMPROVEMENTS AND FURNISHINGS AT A DEVELOPMENT
INDIVIDUAL FEATURES AND COLOURS MAY VARY, AS MAY LAYOUTS. PLANTS MAY ALSO BE SUBJECT TO AVAILABILITY



FENCING & RETAINING LEGEND

EXISTING	HEIGHT	DESCRIPTION
	1800mm	EXISTING TIMBER PAILING NATURAL
PROPOSED	**HEIGHT**	**DESCRIPTION**
	1800mm	TIMBER PAILING NATURAL
	VARIES MAX. 900mm	TIMBER RETAINING LOW LANDSCAPE WALL
	1000mm	BALUSTRADE POOL TYPE FENCING F4 COMPLIANT ***REFER ARCH***
	REFER CIVIL	RETAINING WALL ***REFER CIVIL***

NOT FOR CONSTRUCTION

BASE PLAN PROVIDED BY BREWER DAVIDSON | 2020-05
DISCLAIMER: THIS CONCEPT IS SUBJECT TO FURTHER PLANNING, SURVEYING AND ENGINEERING FEASIBILITY INVESTIGATIONS.
THIS DOCUMENT MAY BE DERIVED FROM INACCURATE SOURCE INFORMATION.
VERIFY & CHECK ALL DIMENSIONS & CONDITIONS &/OR OMISSIONS PRIOR TO CONSTRUCTION
ALL IMAGES USED ARE FOR ILLUSTRATIVE PURPOSES ONLY. IMAGES ARE INDICATIVE OF THE FORM, QUALITY, AND STYLE OF THE PLANT OR MATERIAL AND MAY NOT REPRESENT WHOLLY THE ACTUAL IMPROVEMENTS AND FURNISHINGS AT A DEVELOPMENT
INDIVIDUAL FEATURES AND COLOURS MAY VARY, AS MAY LAYOUTS. PLANTS MAY ALSO BE SUBJECT TO AVAILABILITY

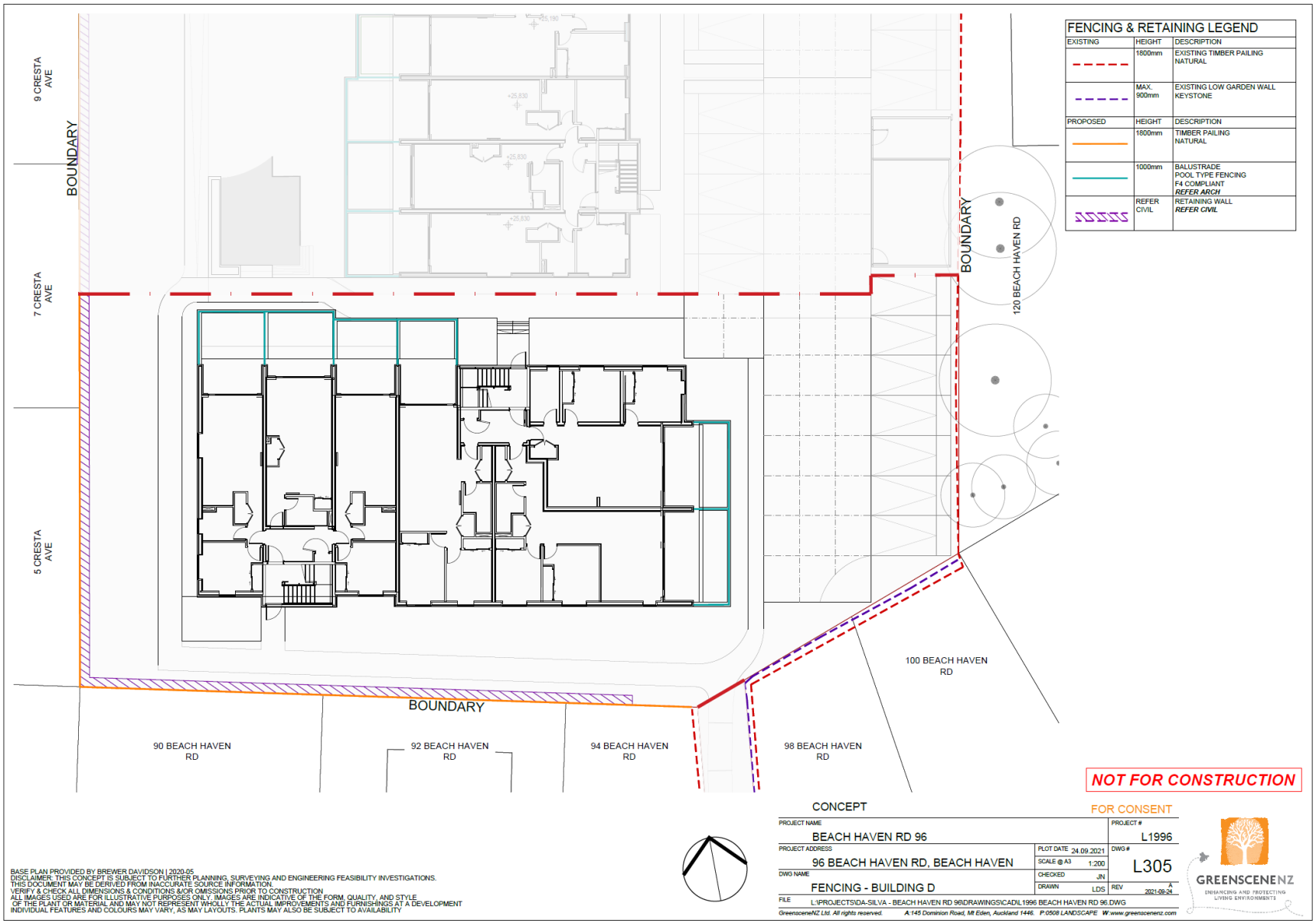
CONCEPT

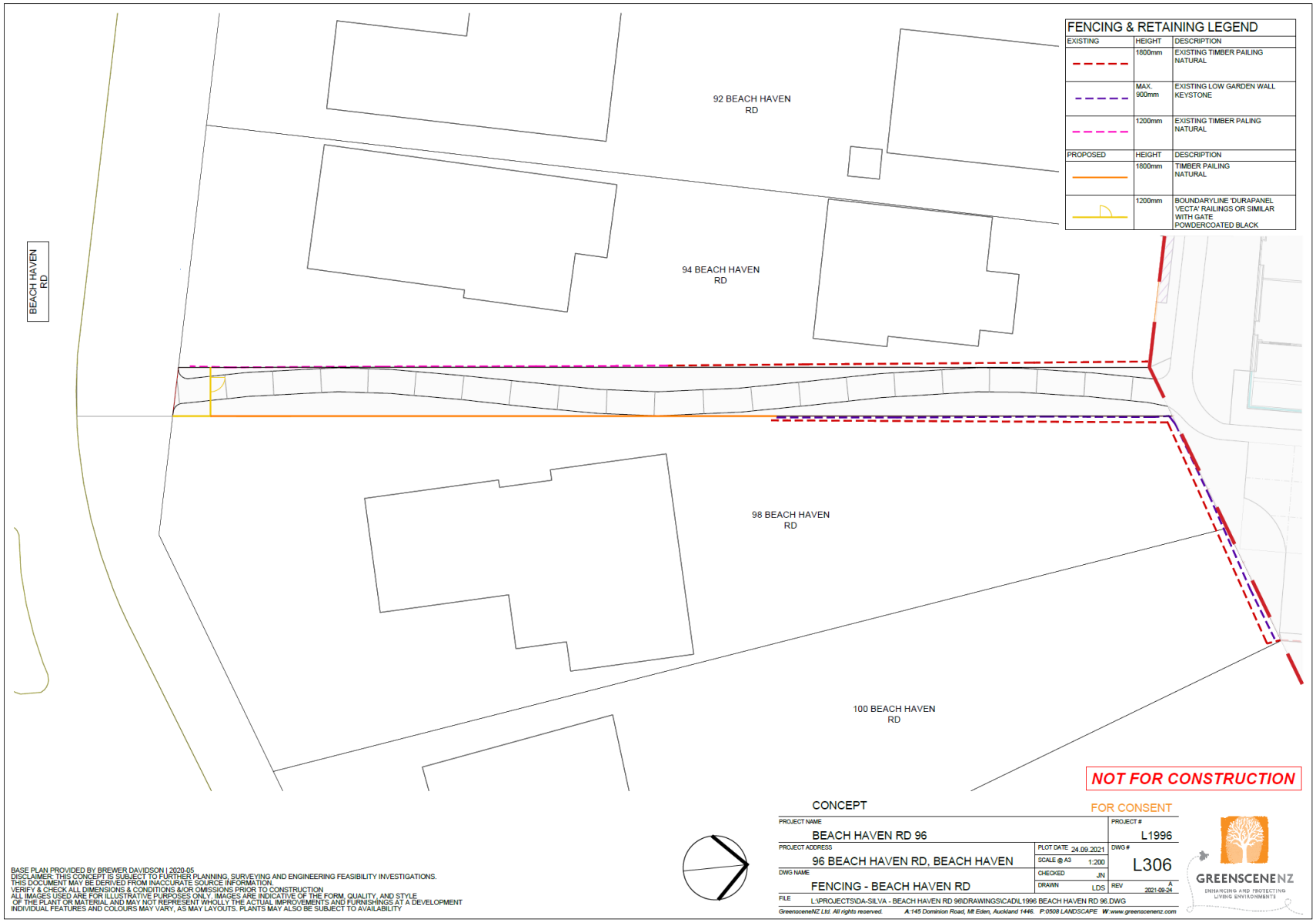
FOR CONSENT

PROJECT NAME: BEACH HAVEN RD 96		PROJECT #	L1996
PROJECT ADDRESS: 96 BEACH HAVEN RD, BEACH HAVEN	PLOT DATE: 24.09.2021	DWG #	L304
	SCALE @ A3: 1:200		
DWG NAME: FENCING - BUILDING C	CHECKED: JN		
	DRAWN: LDS	REV: A	2021-09-24
FILE: L:\PROJECTS\DA-SILVA - BEACH HAVEN RD 96\DRAWINGS\CAD\L1996 BEACH HAVEN RD 96.DWG			

GREENSCENENZ
ENHANCING AND PROTECTING LIVING ENVIRONMENTS

A:145 Dominion Road, Mt Eden, Auckland 1446. P:0508 LANDSCAPE W:www.greenscenenz.com


9 CRESTA AVE
7 CRESTA AVE
5 CRESTA AVE
BOUNDARY
BOUNDARY
BOUNDARY
120 BEACH HAVEN RD
100 BEACH HAVEN RD
90 BEACH HAVEN RD
92 BEACH HAVEN RD
94 BEACH HAVEN RD
98 BEACH HAVEN RD
FENCING & RETAINING LEGEND
EXISTING
HEIGHT
DESCRIPTION
1800mm
EXISTING TIMBER PAILING NATURAL
MAX. 900mm
EXISTING LOW GARDEN WALL KEYSTONE
PROPOSED
HEIGHT
DESCRIPTION
1800mm
TIMBER PAILING NATURAL
1000mm
BALUSTRADE POOL TYPE FENCING F4 COMPLIANT REFER ARCH
REFER CIVIL
RETAINING WALL REFER CIVIL
NOT FOR CONSTRUCTION
CONCEPT
FOR CONSENT
PROJECT NAME
BEACH HAVEN RD 96
PROJECT #
L1996
PROJECT ADDRESS
96 BEACH HAVEN RD, BEACH HAVEN
PLOT DATE 24.09.2021
SCALE @ A3 1:200
DWG #
L305
DWG NAME
FENCING - BUILDING D
CHECKED JN
DRAWN LDS
REV A 2021-09-24
FILE L:\PROJECTS\DA-SILVA - BEACH HAVEN RD 96\DRAWINGS\CAD\L1996 BEACH HAVEN RD 96.DWG
GreensceneNZ Ltd. All rights reserved.
A:145 Dominion Road, Mt Eden, Auckland 1446. P:0508 LANDSCAPE W:www.greenscenenz.com
GREENSCENENZ
ENHANCING AND PROTECTING LIVING ENVIRONMENTS
BASE PLAN PROVIDED BY BREWER DAVIDSON | 2020-05
DISCLAIMER: THIS CONCEPT IS SUBJECT TO FURTHER PLANNING, SURVEYING AND ENGINEERING FEASIBILITY INVESTIGATIONS.
THIS DOCUMENT MAY BE DERIVED FROM INACCURATE SOURCE INFORMATION.
VERIFY & CHECK ALL DIMENSIONS & CONDITIONS &/OR OMISSIONS PRIOR TO CONSTRUCTION
ALL IMAGES USED ARE FOR ILLUSTRATIVE PURPOSES ONLY. IMAGES ARE INDICATIVE OF THE FORM, QUALITY, AND STYLE OF THE PLANT OR MATERIAL AND MAY NOT REPRESENT WHOLLY THE ACTUAL IMPROVEMENTS AND FURNISHINGS AT A DEVELOPMENT
INDIVIDUAL FEATURES AND COLOURS MAY VARY, AS MAY LAYOUTS. PLANTS MAY ALSO BE SUBJECT TO AVAILABILITY


FENCING & RETAINING LEGEND
EXISTING
HEIGHT
DESCRIPTION
1800mm
EXISTING TIMBER PAILING NATURAL
MAX. 900mm
EXISTING LOW GARDEN WALL KEYSTONE
1200mm
EXISTING TIMBER PALING NATURAL
PROPOSED
HEIGHT
DESCRIPTION
1800mm
TIMBER PAILING NATURAL
1200mm
BOUNDARYLINE 'DURAPANEL VECTA' RAILINGS OR SIMILAR WITH GATE POWDERCOATED BLACK
BEACH HAVEN RD
92 BEACH HAVEN RD
94 BEACH HAVEN RD
98 BEACH HAVEN RD
100 BEACH HAVEN RD
NOT FOR CONSTRUCTION
CONCEPT
FOR CONSENT
PROJECT NAME
BEACH HAVEN RD 96
PROJECT #
L1996
PROJECT ADDRESS
96 BEACH HAVEN RD, BEACH HAVEN
PLOT DATE 24.09.2021
SCALE @ A3 1:200
DWG #
L306
DWG NAME
FENCING - BEACH HAVEN RD
CHECKED JN
DRAWN LDS
REV A 2021-09-24
FILE L:\PROJECTS\DA-SILVA - BEACH HAVEN RD 96\DRAWINGS\CAD\L1996 BEACH HAVEN RD 96.DWG
GreensceneNZ Ltd. All rights reserved.
A:145 Dominion Road, Mt Eden, Auckland 1446. P:0508 LANDSCAPE W:www.greenscenenz.com
GREENSCENENZ
ENHANCING AND PROTECTING LIVING ENVIRONMENTS
BASE PLAN PROVIDED BY BREWER DAVIDSON | 2020-05
DISCLAIMER: THIS CONCEPT IS SUBJECT TO FURTHER PLANNING, SURVEYING AND ENGINEERING FEASIBILITY INVESTIGATIONS.
THIS DOCUMENT MAY BE DERIVED FROM INACCURATE SOURCE INFORMATION.
VERIFY & CHECK ALL DIMENSIONS & CONDITIONS &/OR OMISSIONS PRIOR TO CONSTRUCTION
ALL IMAGES USED ARE FOR ILLUSTRATIVE PURPOSES ONLY. IMAGES ARE INDICATIVE OF THE FORM, QUALITY, AND STYLE OF THE PLANT OR MATERIAL AND MAY NOT REPRESENT WHOLLY THE ACTUAL IMPROVEMENTS AND FURNISHINGS AT A DEVELOPMENT
INDIVIDUAL FEATURES AND COLOURS MAY VARY, AS MAY LAYOUTS. PLANTS MAY ALSO BE SUBJECT TO AVAILABILITY

Glossary of Terms- Acoustics

Ambient Noise: the total noise, at a given place, a composite of sounds from many sources near and far.

Asymmetric: a waveform not identical on both sides of the mean or zero line, lacks symmetry.

Average: in acoustics where dB levels are extensively used, average may not mean adding up the values and then dividing by the number of samples.

Octave: a range of frequencies whose upper frequency limit is twice that of its lower frequency limit. For example, the 1000 Hertz octave band contains noise energy at all frequencies from 707 to 1414 Hertz.

In acoustical measurements, Sound Pressure Level is often measured in octave bands, and the centre frequencies of these bands are defined by ISO - 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, 16 kHz to divide the audio spectrum into 10 equal parts.

The sound pressure level of sound that has been passed through an octave band pass filter is termed the octave band sound pressure level.

One-third Octave Bands, there are three similar bands in each octave band.

1/1, 1/3, 1/6, 1/12, and 1/24 octaves are all used in acoustics.

Background Noise: the noise at a given location and time, measured in the absence of any alleged noise nuisance sources, also known as Residual Noise.

Broadband Noise: also called wideband noise - noise whose energy is distributed over a wide section of the audible range as opposed to Narrowband Noise.

Class 1: precision grade sound level meters for laboratory and field use - also known as Type 1.

Continuous Spectrum: sound spectrum whose components are continuously distributed over a given frequency range.

Frequency Weighted Sound Levels: Frequency weightings correlate objective sound measurements with the subjective human response. The human ear is frequency selective; between 500 Hz and 6 kHz our ears are very sensitive compared with lower and higher frequencies.

A-weighting: the A-weighting filter covers the full audio range - 20 Hz to 20 kHz and the shape is similar to the response of the human ear at the lower levels

C-weighting: a standard frequency weighting for sound level meters, commonly used for higher level measurements and Peak - Sound Pressure Levels.

Z-weighting: Z for 'Zero' frequency weighting, which implies no frequency weighting. In reality the range is 10 Hz to 20 kHz ±1.5 dB.

dB Level: is the Logarithm of the ratio of a given acoustic quantity to a reference quantity of the same kind. The base of the logarithm, the reference quantity, and the kind of level must be indicated.

decibel: dB : a relative unit of measurement widely used in acoustics, electronics and communications. The dB is a Logarithmic unit used to describe a ratio between the measured level and a reference or threshold level of 0dB. The ratio may be Sound Power, Sound Pressure, voltage or Sound Intensity, etc.

Deltatron ®: trade name for IEPE - Integrated Electronics Piezoelectric.

FFT: Fast Fourier Transform : a digital signal processing technique that converts a time record into a narrow band constant bandwidth filtered spectrum. Measurements are defined by specifying the frequency span and a number of lines (or filters).

Frequency: f : the number of times that a Periodic function or vibration occurs or repeats itself in a specified time, often 1 second - cycles per second. It is usually measured in Hertz (Hz).

Frequency Analysis: analysing an overall broadband noise to identify the different contributions in different parts of the audio spectrum. Typically the analysis in made using 1/1-Octave, 1/3-Octave or narrow band (FFT) Analysis.

Frequency Band: a continuous range of frequencies between two limiting frequencies.

Hertz: Hz : the unit of Frequency or Pitch of a sound. One hertz equals one cycle per second.

Impact Sound: the sound produced by the collision of two solid objects. Typical sources are footsteps, dropped objects, etc., on an interior surface (wall, floor, or ceiling) of a building.

Infrasound: sound whose frequency is below the low-frequency limit of audible sound (about 16 Hz).

Integrating (of an instrument): indicating the mean value or total sum of a measured quantity.

kHz: kilohertz : 1 kHz = 1000 Hz = 1000 Hertz.

LA: A-weighted, Sound Level.

LA10: is the noise level just exceeded for 10% of the measurement period, A-weighted and calculated by Statistical Analysis.

LA90: is the noise level exceeded for 90% of the measurement period, A-weighted and calculated by Statistical Analysis.

LAn: noise level exceeded for n% of the measurement period with A-weighted , calculated by Statistical Analysis - where n is between 0.01% and 99.99%.

LAeq: A-weighted, equivalent sound level. A widely used noise parameter describing a sound level with the same Energy content as the varying acoustic signal measured - also written as dBA Leq

LAF: A-weighted, Fast, Sound Level.

LAFmax: A-weighted, Fast, Maximum, Sound Level.

LAFmin: A-weighted, Fast, Minimum, Sound Level.

LAIeq: A-weighted, Impulse, Leq, Sound Level.

LAmax: A-weighted, Maximum, Sound Level

LAS: A-weighted, Slow, Sound Level.

LASmax: A-weighted, Slow, Maximum, Sound Level.

LASmin: A-weighted, Slow, Minimum, Sound Level.

LC: C-weighted, Sound Level.

LCE: C-weighted, Sound Exposure Level

LCeq: C-weighted, Leq, Sound Level

LCF: C-weighted, Fast, Sound Level.

LCFmax: C-weighted, Fast, Maximum, Sound Level.

LCpeak: C-weighted, Peak, Sound Level.

Leq: Equivalent Sound Level

Lpeak: Peak Sound Level

LZ: Z weighted, Sound Level.

LZE: Z-weighted, Sound Exposure Level

LZeq: Z-weighted, Leq, Sound Level.

LZF: Z-weighted, Fast, Sound Level.

LZFmax: Z-weighted, Fast, Maximum, Sound Level.

LZFmin: Z-weighted, Fast, Minimum, Sound Level.

Multi-spectrum: a one or two-dimensional array of spectra, consisting of two or more spectra that were recorded during the same measurement

Narrowband Noise: noise which has its energy distributed over a relatively small section of the audible range.

Natural Frequency: the frequency at which a resiliently mounted mass will vibrate when set into free vibration. The frequency of oscillation of the free vibration of a system if no Damping were present.

Noise: any sound that is undesired by the recipient. Any sound not occurring in the natural environment, such as sounds emanating from aircraft, highways, industrial, commercial and residential sources. Interference of an electrical or acoustical nature.

Octave: a range of frequencies whose upper frequency limit is twice that of its lower frequency limit. For example, the 1000 Hertz octave band contains noise energy at all frequencies from 707 to 1414 Hertz.

Octave Band analyser: an instrument that measures Sound Levels in octave bands.

Peak-to-Peak: the amplitude difference between the most positive and most negative value in a time waveform, that is, the total Amplitude.

Piezoelectric: PE : any material which provides a conversion between mechanical and electrical energy. Piezo is a Greek term which means 'to squeeze'. If mechanical stresses are applied to a piezoelectric crystal, then an electrical charge results. Conversely, when an electrical voltage is applied across a piezoelectric material, the material deforms.

Pitch: is a subjective auditory sensation and depends on the frequency, the harmonic content, and to a lesser extent on the loudness of a sound.

Spectrum: the description of a sound wave's resolution into its components of frequency and amplitude.

Third Octave Band: Octave bands sub-divided into three parts, equal to 23% of the centre frequency. Used when octave analysis is not discrete enough. Divides the audio spectrum into 33 or more equal parts with Constant Percentage Bandwidth filter.

Tone: sound or noise recognisable by its regularity. A simple or Pure Tone has one frequency. Complex tones have two or more simple tones, the lowest tone frequency is called the Fundamental, the others are Overtones.

Vibration: mechanical oscillations occur about an equilibrium point. The oscillations may be periodic such as the motion of a pendulum or random.

13 CRESTA AVENUE & 96 BEACH HAVEN ROAD – PROPOSED DWELLINGS CARPARK ACOUSTIC FENCING

---

1. INTRODUCTION

The following memo has been prepared to assess the acoustic fencing and associated noise reduction of traffic noise at the proposed dwellings at 13 Cresta Ave & 96 Beach Haven Rd, Beach Haven, Auckland.

This assessment is limited to assessing the noise level produced by onsite vehicle traffic and the effect of either a 1.2m high or 1.8m high acoustic fence.

2. DESIGN CRITERIA

The following standard applies for noise produced within the subject site and received at the neighbouring Residential Zoned properties.

E25.6.2. Maximum noise levels in residential zones

(1) The noise (rating) levels and maximum noise level arising from any activity in the Residential – Large Lot Zone, Residential – Rural and Coastal Settlement Zone, Residential – Single House Zone, Residential – Mixed Housing Suburban Zone, Residential – Mixed Housing Urban Zone and the Residential – Terrace Housing and Apartment Buildings Zone measured within the boundary of an adjacent site in these residential zones must not exceed the levels in Table E25.6.2.1 Noise levels in residential zones below:

Table E25.6.2.1 Noise levels in residential zones

Time	Noise level
Monday to Saturday 7am-10pm	50dB L_{Aeq}
Sunday 9am-6pm	
All other times	40dB L_{Aeq} 75dB L_{AFmax}

(2) The levels for the daytime hours in Table E25.6.2.1 Noise levels in residential zones may be exceeded by intermittent noise for reasonable periods where that noise is associated with normal household activities, such as lawn mowing or home handyman work.

3. PREDICTED NOISE LEVELS

For the noise from resident's vehicle traffic, we have assumed that all 63 parking spaces will be vacated or occupied over the peak hour of traffic, e.g. all leaving in the morning and all arriving in the evening over a 1 hour period. The noise level rating generated from general traffic is therefore predicted to be no more than 50dB at the most effected neighbouring boundary with 2m high acoustic fencing along the boundaries adjoining the right-of-way / parking spaces.

However, during the night-time period where up to 7 vehicle movements may be anticipated over any given hour, the noise levels will exceed the noise limit of 40dB LAeq at the closest neighbouring receivers. In order to mitigate the noise levels produced during the night-time hours the following management procedures are proposed to be included in the Body Corporate rules:

- A maximum speed limit of 10km/h along the Right-of-Way (ROW)
- No speed pumps near the ROW.
- Smooth transitions along the ROW (i.e. no manhole covers or service covers in the wheel tracks).
- Rules regarding courteous behaviour between 10pm and 7am, including no engine revving, quiet voices, no door slamming, car stereos off or quiet until on the legal road, etc.

The following daytime noise levels are predicted at the neighboring receivers, either at ground level, 1.5m above the ground, or at the most affected building façade. The predicted noise levels include averaging over the daytime period to account for periods less or no traffic.

Receiver	**With 1.2m high acoustic fencing**		**With 1.8m high acoustic fencing**	
	Noise Level L_{Aeq} dB	Exceedance dB	Noise Level L_{Aeq} dB	Exceedance dB
11 Cresta Ave	47	N/A	41	N/A
15 Cresta Ave	52	2	50	N/A
17 Cresta Ave	<40	N/A	<40	N/A
29 Cresta Ave	<40	N/A	<40	N/A
120 Beach Haven Rd	49	N/A	49	N/A
102 Beach Haven Rd*	<35	N/A	<35	N/A
98 & 100 Beach Haven Rd	50	N/A	48	N/A
94A Beach Haven Rd	52	2	50	N/A
94 Beach Haven Rd	49	N/A	43	N/A
92 Beach Haven Rd	44	N/A	42	N/A

Table 1 – Predicted Traffic Noise Levels

*102 Beach Haven Rd is zoned Business and is subject to higher noise limits assessed at the building façade not at the site boundary, see rule E25.6.8.

**98 & 100 Beach Haven Rd appear to be a combined lot with 3 dwellings spanning both sites. The noise levels are predicted at the highest point / receiving location generally being at the building facade.

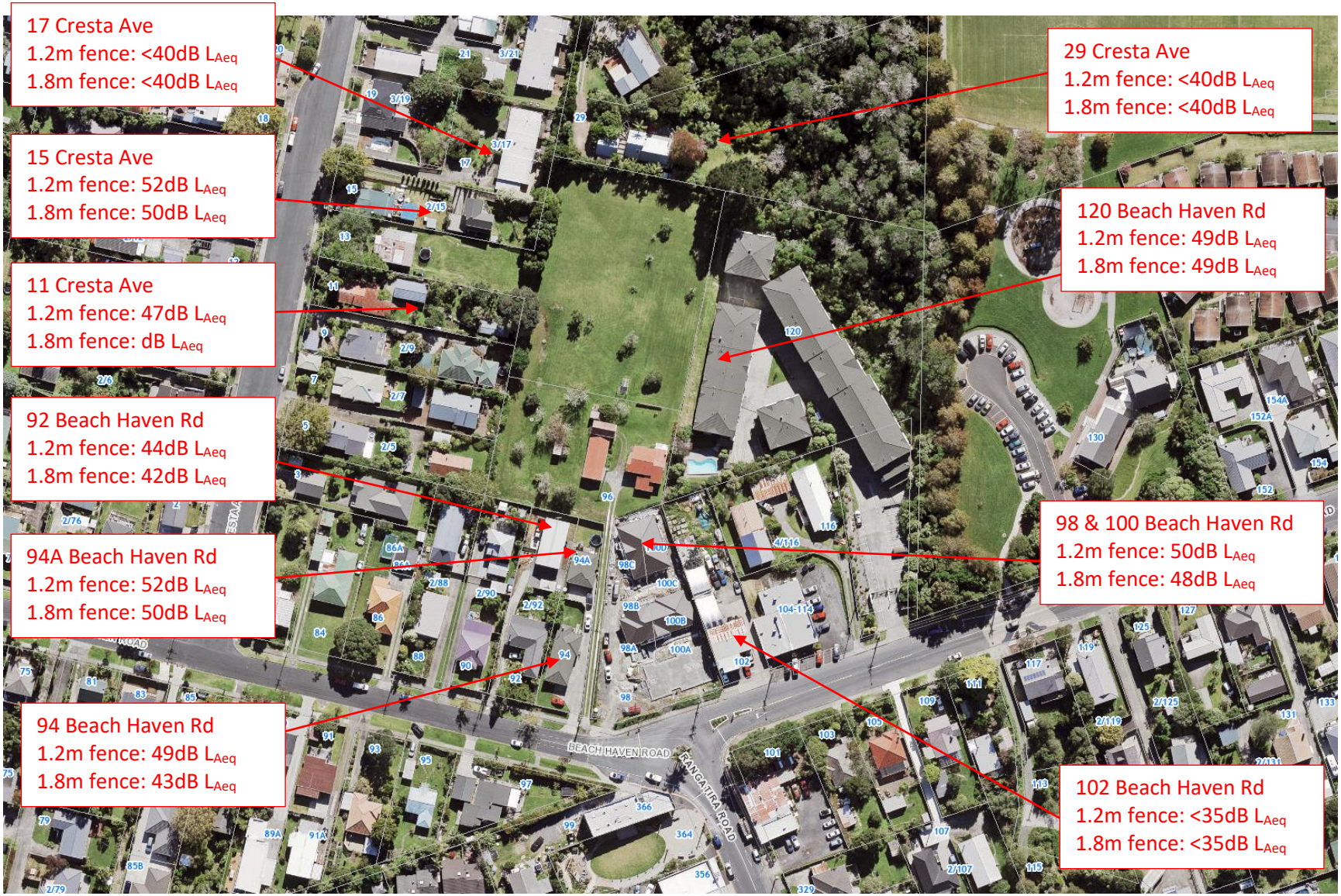


Figure 1 – Predicted Traffic Noise Levels

4. CONCLUSION

With 1.8m high acoustic fencing the noise levels are predicted to comply at all neighbouring receivers, and with a 1.2m high acoustic fence may exceed the noise limit by up to 2dB at 15 Cresta Ave and 94A Beach Haven Rd.

We note that a 2dB exceedance is considered to be negligible being an imperceptible difference in the noise level.

We also note that the high of the acoustic fencing has a varying level off effectiveness due to the relative distances and heights of the neighbouring builds relative to driveway.

Yours faithfully
Earcon Acoustics Limited

Daniel Martens
Acoustician
PG DipSci. ME(EngSci),