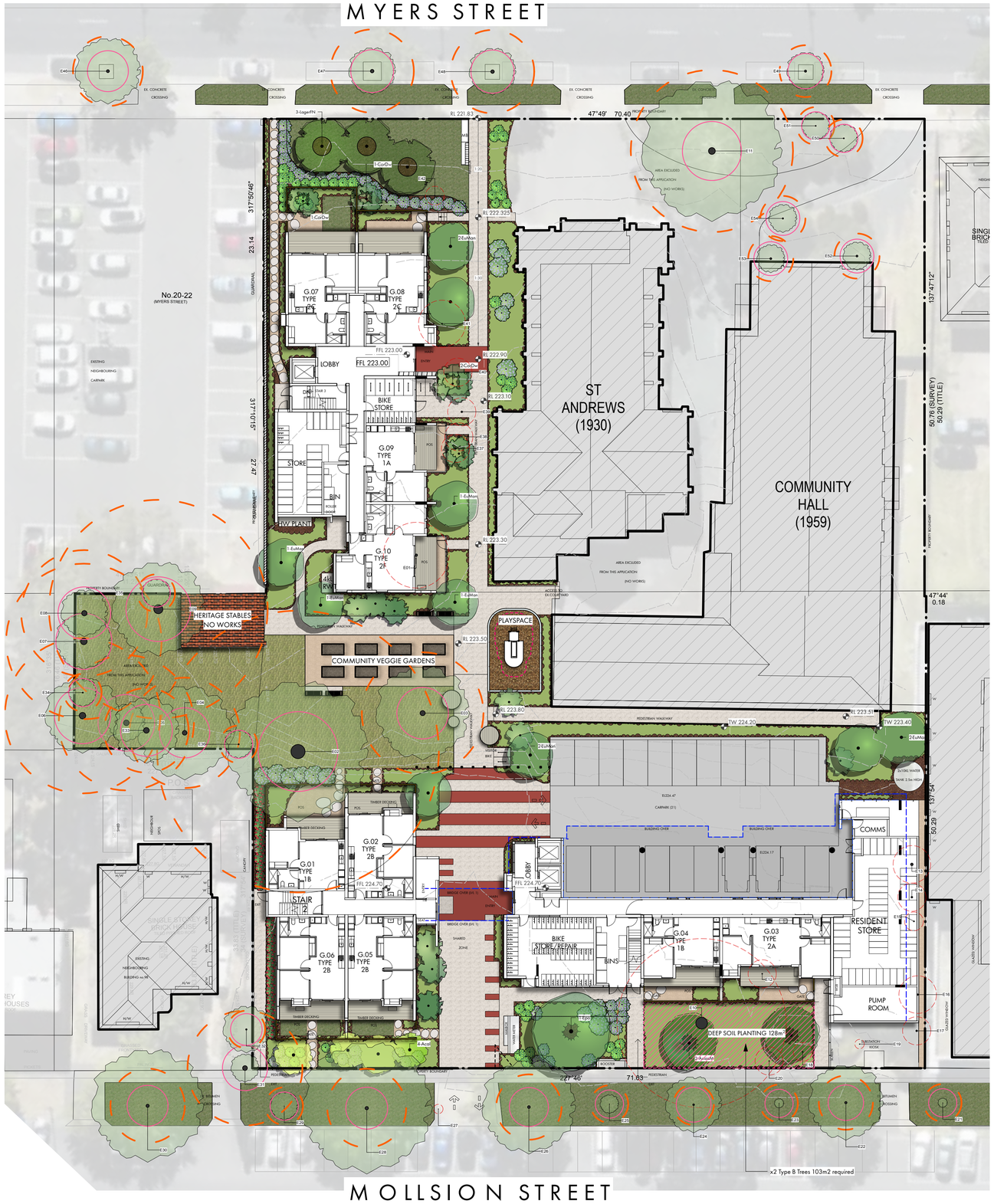

LEGEND

- E01 TPZ SRZ — Existing Tree To Be Retained
- E04 — Proposed Tree To Be Removed
- FFL 223.00 — Proposed Level
- 🟫 Mulched And Irrigated Garden Bed
- 🟫 Softfall Playground Mulch
- 🟩 Lawn
- 🟩 Native Grass Lawn
- 🟩 Low Planting /Garden Bed
- ▥ Deck
- ▨ Compacted Granitic Sand
- ▨ Exposed Aggregate Concrete Paving
- 🟥 Coloured Concrete Paving
- ⬜ Asphalt Paving
- Play Equiptment
- Proposed Seatng Type 1
- Proposed Seatng Type 2
- Floor Above
- Raised Veggie Planter
- Existing Brick Wall
- Proposed Brick Fence
- Proposed Timber Fence
- Proposed Sleeper Retaining Wall
- Removable Bollards
- Garden Steppers

GARDEN BED MULCH

SOFTFALL MULCH

LAWN

GRANITIC SAND

EXPOSED AGGREGATE 01

COLOURED CONCRTE 01

ASPHALT

PROPOSED SEATING TYPE 1

PROPOSED SEATING TYPE 2

VEGETABLE PLANTER BOXES

FOR DEVELOPMENT APPLICATION ONLY - 22/11/2022

1 Landscape Concept Plan
Scale: 1:250

memLa

ISSUE	DATE	REVISION
C	22/11/2022	TOWN PLANNING

PROJECT St Andrew's Bendigo Housing
PROJECT # 2694
CLIENT Uniting Vic Tas
DATE # 16-6-22
SCALE AS NOTED
DRAWN RM
CHKD
DWG Landcape Concept Plan
DWG # LC1
REVISION C

MEMLA pty ltd www.memla.net e: matthew@memla.net
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PLANT SELECTION

Trees


Acacia implexa


Acacia melanoxylon


Eucalyptus mannifera "Little Spotty"


Eucalyptus polyanthemos

Shrubs

Grasses and Groundcovers

Tree List

Image	ID	Qty	Common Name	Botanical Name	Scheduled Size	Mature Height	Mature Spread	Tree Type
	Trees							
	AcaI	4	Lightwood	Acacia implexa	2.0m Ht 45 L	5 - 10m	3.5 - 6m	TYPE A
	AcaiaM	2	Blackwood	Acacia melanoxylon	2.0m Ht 45 L	8 - 10m	6-10m	TYPE B
	Bma	9	Silver Banksia	Banksia marginata	2.0m Ht 45 L	2 - 5m	1.5 - 4m	N/A
	CorDw	4	Dwarf lemon scented Gum 'Sc	Corymbia citriodora 'Scentuous' (dwarf)	2.0m Ht 45L	5-8m	3.5-6m	TYPE A
	EuMan	10	Brittle Gum	Eucalyptus mannifera "Little Spotty'	2.0m Ht 45 L	7m	5m	TYPE A
	Epo	1	Red Box	Eucalyptus polyanthemos	2.0m. ht 45L	15 - 20m	8 - 10m	TYPE B
	LagerFN	3	Crepe Myrtle	Lagerstroemia indica fauriei 'Natchez'	2.0m Ht 45 L	8.0m	6.0m	TYPE A
	Total	**33**						

Plant List

Image	ID	Qty	Common Name	Botanical Name	Scheduled Size	Mature Height	Mature Spread
	Shrubs						
	ACogl	135	River Wattle	Acacia cognata 'Limelight'	150mm Pot	0.5 - 1m	1 - 1.2m
	CalsI	26	Hybrid Bottlebrush	Callistemon Slim	200mm Pot	3m	1.3m
	Calc	135	Lemon beauty heads	Calocephalus citreus	150mm Pot	0.2 - 0.5m	0.3 - 0.6m
	Cal	6	White Correa	Correa alba	200mm Pot	0.9 - 1.5m	0.9 - 1.2m
	Core	43	Native Fuchsia	Correa reflexa	150mm Pot	1.5 - 1.2m	0.5-1m
	Hvm	40	Native lilac	Hardenbergia violacea 'Meema'	150mm Pot	0.5m	1.2m
	Indau	15	Australian Indigo	Indigofera australis	150mm Pot	1.5 - 3m	2.0 - 3.5m
	Ground Covers						
	Chrya	276	Everlasting Daisy	Chrysocephalum apiculatum 'Yellow Buttons'	150mm Pot	0.4 - 0.6m	0.5 - 0.9m
	Grasses						
	Drev	276	Spreading Flax Lily	Dianella revoluta	150mm Pot	.5m	.5m
	DiaTE	412	EMERALD ARCH™ Dianella	Dianella tasmanica	200mm Pot	.5m	.5m
	Llo	276	Spiny-headed Mat-Rush	Lomandra longifolia	150mm Pot	0.75 - 0.9m	0.9 - 1.2m
	Ltani	276	Dwarf mat-rush	Lomandra longifolia 'Tanika'	150mm Pot	0.6m	0.65m
	Poa	550	Tussock Grass	Poa labillardieri	150mm Pot	0.75 - 0.9m	0.6 - 0.9m
	Them	412	Kangaroo Grass	Themeda triandra	150mm Pot	0.75 - 0.9m	0.3 - 0.6m
	Climbers						
	Fern						
	Total	**2878**					

Deep Soil Areas

	CL 52.20 Requirement	Proposed
Canopy Cover	849.8m2	513m2
Deep Soil	637.35m2	1767m2
Trees	2x Type B or 1x Type C	2x Type B
Site Area = 4249m2		

*Landscape response indicates specifically where the 2x Type B tree requirement is met, however note the the landscape plans exceed the number of trees required under the 52.20 requirement

FOR DEVELOPMENT APPLICATION ONLY - 22/11/2022

C 22/11/2022 TOWN PLANNING

ISSUE | DATE | REVISION C

PROJECT St Andrew's Bendigo Housing — PROJECT # 2694

CLIENT Uniting Vic Tas — DATE # 16-6-22 — DWG # LC2

DWG Landscape Pallette — SCALE AS NOTED — DRAWN RM — CHKD — REVISION C

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BLUE BEE
SUSTAINABLE SERVICES

Sustainability Management Plan

For the: 26 Myers St Bendigo

Presented to: Duo Projects

November 29, 2022
Reference: 22084

Contents

Revision History:

Author	Revision	Date	Content/Changes
Jessica Daaboul	0	12.07.2022	Preliminary report
Jessica Daaboul	1	19.09.2022	Amended drawings and glazing
Jessica Daaboul	2	25.10.2022	Updated in response to OVGA and project planner
Jessica Daaboul	3	29.11.2022	Updated as per latest architectural

Executive Summary

This Sustainability Management Plan (SMP) is prepared by Blue Bee Sustainable Services for the proposed mixed-use development located at 26 Myers St Bendigo Central and is based on the drawing set prepared by MGS dated 25 November 2022.
This report addresses the Green Star minimum expectations that must be achieved by the development to seek Green Star certification, in addition to the credits targeted to achieve 4 star Green Star using the Green Star Design and As Built V1.3 tool.

Eligibility criteria:

To be eligible for Green Star certification, the proposed building should:

- Be a new habitable building or major refurbishment (except homes).
- Have a distinct boundary with its own address, title, and entrance.

Key requirements for 4 star (refer to section 3 for details):

Credit	Requirement
2.1 - Services & maintainability	Review of design by maintenance staff at early design stages.
2.2 – Building commissioning	Detailed commissioning of all services performed
4.1 – Building Information	Building logbook and/or users guide to be provided
5.1 - Environmental building perf.	Performance metrics set for building energy, water, waste and IEQ
5.2- End of Life Waste Performance	Commitment to end of life building recycling 80% of the project's GFA
6.0 & 6.1 – Metering and monitoring	Energy and water metering and monitoring systems provided
7.2-High quality staff support	Head contractor provides training on welfare and environmental design
9.1- Ventilation system attributes	Air intake clearance to ASHRAE std.
9.3- Exhaust / elimination of pollutants	Exhaust discharged externally and non recirculating exhaust
10.3- Acoustic separation	Walls between spaces >45 sound reduction index
11.1- General illuminance	Artificial lighting levels >AS1680 and baffled, louvred or opaque diffuser
11.2- Surface illuminance	Min. one wall mounted fitting in each living space, kitchen and bedroom
11.3- Localised lighting control	Local lighting control for each area, additional GPO for task lighting
12- Visual comfort	Blinds with VLT<10%; daylight access and views; report to be provided.
13- Indoor pollutants	Low VOC and formaldehyde (paints, carpets, engineered wood etc..)
14.1-Thermal Comfort	High levels of thermal comfort
15B.2 – Building services and appliances	A- 10% reduction in IPD, automated control and independent switching. B- 3-star HVAC system capacity selected with low tolerance to load. C- No fossil fuels and 15% of required energy generated on site. (heat pump hot water system - billing might be self-managed) D- Passive laundry facilities E- Installation of a solar PV array with storage on-site generation (TBC)
17B.4 - Active transport facilities	Residential: provide approx. AS2890 compliant 1 bicycle space/unit in every building and 5% for visitors. This is a total of 76 spaces of which 5 accessible by visitors.
18B.2 - Rainwater Reuse	Rainwater tank sized through modelling
18.4- Landscape irrigation	Automatic subsoil irrigation system; no potable water used for irrigation
20.1- Responsible building materials	95% steel from responsible steel maker and timber with forest certification 90% of pipework, flooring, blinds and cables contain approved or no PVC
22B – Percentage Benchmark	90% of construction and demolition waste to be recycled
24.1- Reuse of Land	75% of the site was previously developed land at the date of purchase
24.2 – Contamination	Site contamination was remediated to the satisfaction of an auditor
26.1- Reduced peak discharge	Stormwater flows are reduced as part of the development
27.0; 27.1 Light pollution	External lighting to AS4282 with upward light ratio <5%
30 – Innovation - local procurement	A percentage of the services and labour are resourced locally
30 – Innovation –Social housing	Affordable or social housing proposed
30 – Innovation –Surveys	Pre and Post-occupancy surveys performed

1- Introduction

This Sustainability Management Plan sets the requirements for the Environmentally Sustainable Design (ESD) elements to be incorporated into the proposed mixed use development located at 26 Myers St Bendigo Central. It is to be used throughout the design phases to assist developers, architects and design consultants in understanding their role in achieving Green Star rating and certification.

This SMP captures initiatives necessary to ensure that the development meets the sustainability requirements of Green Star as well as lists the optional credits that can be thought to achieve 4 star certification using the Green Star Design and As Built V1.3 tool.

The analysis is based on drawings prepared by MGS dated 25 November 2022. This report starts with a site description, then provides the references, benchmarks and Green Star requirements. This report concludes with a discussion of the next steps.

2- Site Description

The site is located at 26 Myers St Bendigo Central (Figure 1) and has an approximate surface area of approx. 4500 sqm. The current building is on a site that has been previously developed.

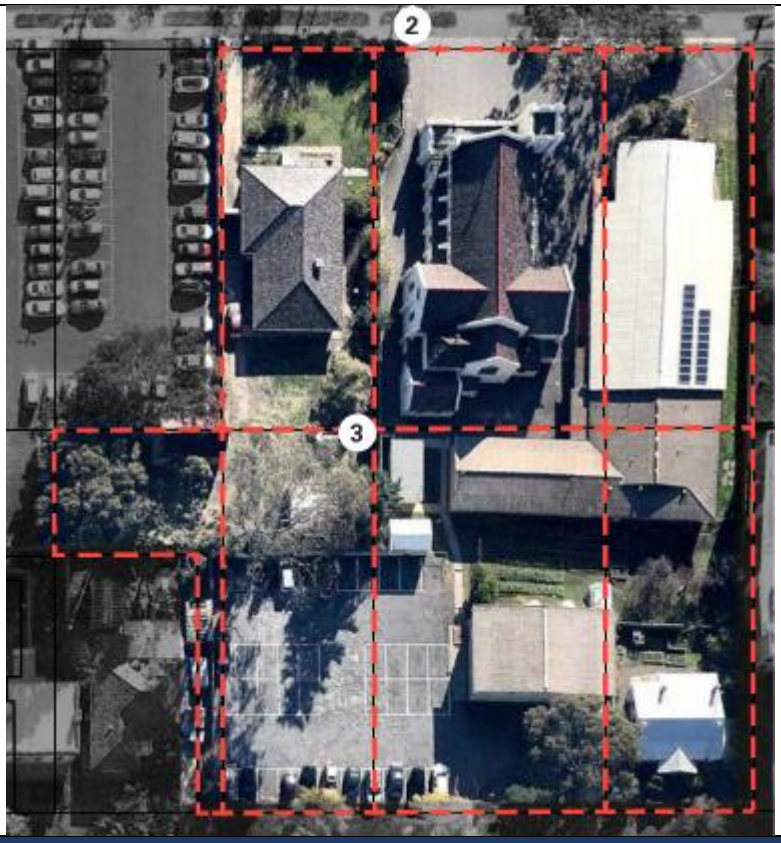


Figure 1: Site Description

3- Client Requirements

3.1- Client Requirements – Uniting Design Guidelines:

Requirement	Addressed in
Achieve a NatHERS average of 7 stars	Credit 14.1
Use low voltage LED lighting	Credit 11.1
Use energy-efficient appliances	-
Use fixtures with the following WERS rating: - Toilets – 4 Stars - Tapware – 5 Stars - Showers – 4 stars => 6-7.5 L/min	Credit 18B.1
Incorporate good passive solar design principles including; - Maximising natural light and ventilation - Window orientation toward solar north, < 20° west of north and < 30° east of north - Provide high levels of thermal insulation and airtightness. - Consider material selections with a low carbon footprint; and - Consider material selections that may be recycled at their end of life.	Credit 14.1 Credit 15B.2 Credit 20.2
Aim to enhance or enrich the existing biodiversity through landscape design strategies. The following should be considered as part of the ESD response; - Integration of Water Sensitive Urban Design principles to manage surface runoff through the introduction of rain gardens and/ or permeable paving to appropriate locations; - Landscaping to respect and enhance existing biodiversity and topography to maximise the benefit to the ecosystem. For example, planting native species and minimising site excavation. - Solar Energy capture for use in landscape and common area lighting; and - Minimise pollution through promotion of low impact travel options such as car share and proximity to public transportation.	Credit 23.1 Credit 26.1 Credit 15B.2 Credit 17B.3 Credit 17B.4

3.2- Client Requirements –Homes Victoria:

Requirement	Addressed in
An average of 7 star NatHERS, with no dwelling below 6 stars;	Credit 14.1
A certified Green Star rating using any available Green Building Council tool is required	-
The minimum settings for all dwellings are the provision of single or multi-split reverse-cycle air conditioners	Credit 15B.2
Projects must be able to able to meet LHD Silver Level – The Liveable Housing Design Guidelines	-

4- Project ESD assessment

Figure 2 illustrates a chart showing the credit criteria that were prioritized in this project, it shows the achieved points vs the maximum available in each credit.

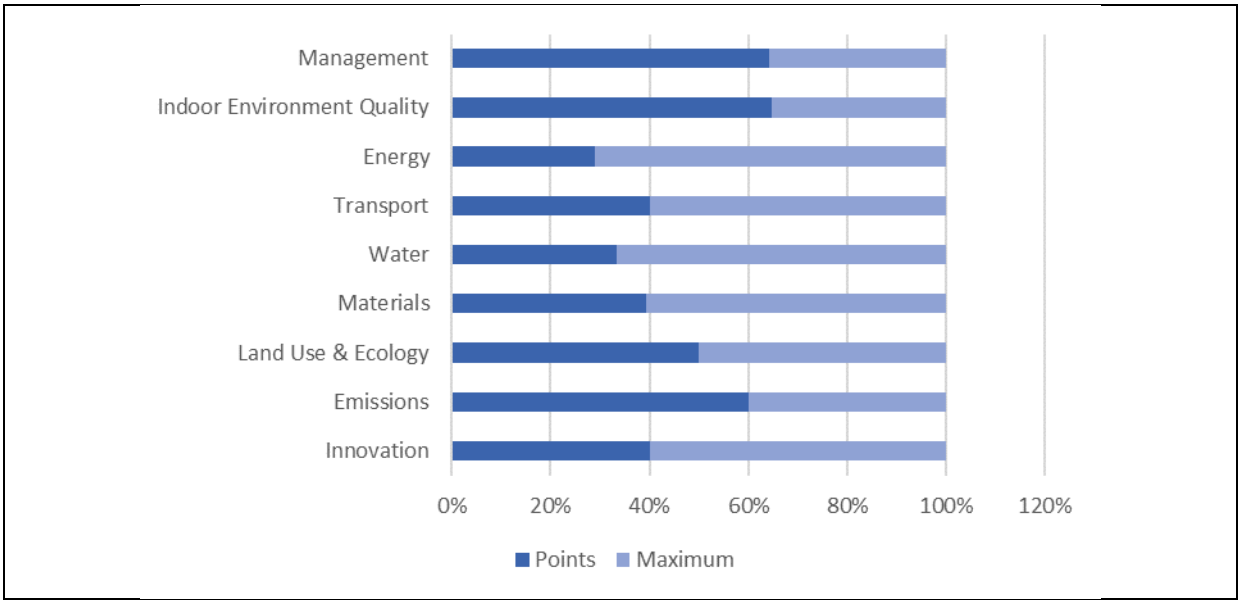


Figure 2: Claimed points % achieved vs total available for every credit

4.1. Preliminary Green Star Pathway Schedule

The below Green Star schedule is to be used as guidance to achieve the 4 star benchmark committed to in this report. If the listed credits were not achieved or became unsuitable throughout the course of the project (design, construction, etc…), the design team and head contractor will be required to achieve equivalence with a 4 star Green Star design standard with different credits

A summary of the project's key ESD commitments is included below:

Uniting Central Bendigo
26 Myers St, Bendigo

Green Star Implementation Schedule

BLUE BEE SUSTAINABLE SERVICES

Category	Code	Credit Criteria	Points available	Points Claimed at 4*	Potential points TBC	Credit Details	Implementation Demonstration
Management			**14**	**9**	**12**		
Green Star Accredited Professional	1.0	Accredited Professional	1	1	1	GSAP engaged throughout design and construction phases	Applicable - Blue Bee
Commissioning and Tuning	2.0	Environmental Performance Targets	C	C	C	Set targets for energy, water and indoor environment quality	Demonstrated in the design assessment
	2.1	Services and Maintainability Review	1	1	1	Review of design by maintenance staff	Demonstrated in the design assessment
	2.2	Building Commissioning	1	1	1	Detailed commissioning of all services performed	Commissioning reports from Mechanical and Electrical services contractor
	2.3	Building Systems Tuning	1	0	1	Quarterly tuning of building services conducted for the first year of operation	Tuning reports from Mechanical and Electrical services contractor
	2.4	Independent Commissioning Agent	1	0	1	ICA engaged to review building services in design and construction	-
Adaptation and Resilience	3.1	Implementation of a Climate Adaptation Plan	2	0	0	Climate Adaptation Plan created and recommendations implemented	-
Building Information	4.1	Building Information	1	1	1	Building users guide and operation and maintenance manuals provided and building log book	Operation and Maintenance Manual and/or building log boo to be prepared in DD
Commitment to Performance	5.1	Environmental Building Performance	1	1	1	Performance metrics set for building energy, water, waste and IEQ	Demonstrated in the design assessment
	5.2	End of Life Waste Performance	1	1	1	Commitment to end of life building recycling 80% of the project's GFA, excluding carparking areas, has a formal commitment in place to reduce demolition waste (make good clause in the lease)	-
Metering and Monitoring	6.0	Metering	C	C	C	Energy and water metering systems provided	Metering schematic to be prepared by RSP consulting
	6.1	Monitoring Systems	1	1	1	Energy and water monitoring systems provided	EMS schedule to be prepared by RSP consulting and relevant specialists
Construction Environmental Management	7.0	Environmental Management Plan	C	C	C	Environmental management plan provided	Environmental Management Plan
	7.1	Environmental Management System	1	0	1	Head contractor ISO14001 certified	-
	7.2	High Quality Staff Support	1	1	1	Head contractor provides training and programs on wellfare and environmental design	-
Operational Waste	8A	Performance Pathway - Specialist Plan	1	1	1	A waste professional prepares and implements an Operational Waste Management Plan (OWMP) for the project	Report provided
	8B	Prescriptive Pathway - Facilities	-	-	-	Performance pathway taken	Nil (demonstrated in the design assessment)
Indoor Environment Quality			**17**	**12**	**14**		
Indoor Air Quality	9.1	Ventilation System Attributes	1	1	1	Air intake clearances to ASHRAE standard. Air handling systems designed for ease of cleaning	Letter from mechanical contractor
	9.2	Provision of Outdoor Air	2	0	1	Mechanical ventilation increase outside air rates by 50%, natural ventilation to AS1668.4 (1pt); or Twice the minimum requirement in AS 1668.2, or max CO2 700ppm at all times (2pts)	TBC by services engineers

Green Star Implementation Schedule

Category	Code	Credit Criteria	Points available	Points Claimed at 4*	Potential points TBC	Credit Details	Implementation Demonstration
	9.3	Exhaust or Elimination of Pollutants	1	1	1	Exhaust systems discharged externally and non recirculating exhaust directly discharging to the outside	-
Acoustic Comfort	10.1	Internal Noise Levels	1	1	1	Commitment to measure noise levels at project completion and action if >5dB above AS2107 recommended levels	-
	10.2	Reverberation	1	0	1	Commitment to measure reverberation times at project completion and action if above AS2107 recommended levels	-
	10.3	Acoustic Separation	1	1	1	Walls between spaces >45 sound reduction index	Letter from head contractor - and/or accoustic consultant
Lighting Comfort	11.0	Minimum Lighting Comfort	C	C	C	Electronic ballasts to be used	Lighting specifications - TBC by services engineers in DD
	11.1	General Illuminance and Glare Reduction	1	1	1	Artificial lighting levels >AS1680 and baffled, louvred or opaque diffuser	Lighting specifications - TBC by services engineers in DD
	11.2	Surface Illuminance	1	1	1	Ceiling lit to 30% of working plane levels	To be confirmed by services team
	11.3	Localised Lighting Control	1	1	1	Local lighting control for each area, additional GPO for task lighting for residential	Letter from electrical contractor
Visual Comfort	12.0	Glare Reduction	C	C	C	External windows are fitted with external louvres or blinds with VLT<10%	Architectural speification and Letter from head contractor
	12.1	Daylight	2	1	1	Daylight factor of >2% for 40% of floor area	Demonstrated in the design assessment
	12.2	Views	1	1	1	60% of floor area within 8m of external window	Demonstrated in the design assessment
Indoor Pollutants	13.1	Paints, Adhesives, Sealants and Carpets	1	1	1	95% of paints, adhesives, sealants and carpets are low VOC	Architectural speification and Letter from head contractor
	13.2	Engineered Wood Products	1	1	1	95% of engineered wood is low emission formaldehyde	Architectural speification and Letter from head contractor
Thermal Comfort	14.1	Thermal Comfort	1	1	1	Predicted Mean Vote (PMV) +/-1,	Demonstrated in the design assessment
	14.2	Advanced Thermal Comfort	1	0	0	Predicted Mean Vote (PMV) +/-0.5,	Demonstrated in the design assessment
Energy			**22**	**7.4**	**5**		
Greenhouse Gas Emissions	15A.0	Conditional Requirement: Prescriptive Pathway	-			Exceed J1 DtS requirements by 5% meets all other applicable DtS requirements	
	15A.1	Building Envelope	-			Performance pathway taken	
	15A.2	Glazing	-			Performance pathway taken	
	15A.3	Lighting	-			Performance pathway taken	
	15A.4	Ventilation and Air-conditioning	-			Performance pathway taken	
	15A.5	Domestic Hot Water Systems	-			Performance pathway taken	
	15A.6	Building Sealing	-			Performance pathway taken	
	15A.7	Accredited GreenPower	-			Performance pathway taken	
	15B.0	Conditional Requirement: NatHERS Pathway	-			minimum 0.5 star improvement over average and over individual minimum	
	15B.1	NatHERS Pathway	-	2.4	2	NatHERS improvement over 6.5 star	
	15B.2.1			0	1	10% reduction in IPD, automated control, independent switching (1pt)	
	15B.2.2			1		Minimum 3star HVAC system and capacity <15% to <20% tolerance to load, effective cross ventilation and ceiling fans (2pts)	Services specifications

Green Star Implementation Schedule

Category	Code	Credit Criteria	Points available	Points Claimed at 4*	Potential points TBC	Credit Details	Implementation Demonstration
	15B.2.3	Building Services and Appliance				Solar thermal with 30% contribution (1.5pts) and electric heat pump with COP>3.5 (or heat recovery) (0.5pts)	
	15B.2.4					Appliances are provided for all units and within 1star below the maximum available (1pt)	
	15B.2.5			-	1	No fossil fuel on site and 15% of required energy generated on site (or 3pts from 15B.1) (1pt)	
	15B.2.6			1		On site RE storage(1pt)	Architectural drawings and services specifications - TBC in DD
	15B.2.7			1		Compliant lifts (1pt)	Services specifications
	15B.2.8				1	Passive laundry facilities for 95% of apartments (clothesline) (1pt)	Architectural drawings - TBC in DD
				1		Unoccuppied areas are compliant with 15B.2.9and naturally ventilated, >5% openability (1pt)	
	15B.2.9					Off site renewables (2pts) for 50% off site renewables and (5pts) with 100% (refer to condition on 15B.2.10)	
	15E.5.3	On Site Storage				On site storage sized on as need; reduces peak demand; stored and used by the building. (1pt)	
Peak Electricity Demand Reduction	16A	Prescriptive Pathway - On-site Energy Generation	-			Performance pathway taken	
	16B	Performance Pathway - Reference Building	2	1	0	Reduction in peak energy by 20% (1pt), 30% (2pt) via building fabric improvements and equipment energy efficiency.	TBC in DD
Transport			**10**	**3**	**6**		
Sustainable Transport	17A.1	Performance Pathway	-	-	6	Prescriptive pathway taken	
	17B.1	Access by Public Transport	3	0	-	Proximity and frequency to public transport	Nil (demonstrated in the design assessment)
	17B.2	Reduced Car Parking Provision	1	1	-	Car parking less than planning requirements	Nil (demonstrated in the design assessment)
	17B.3	Low Emission Vehicle Infrastructure	1	0	-	5% parking for electric vehicles or 15% for fuel efficient vehicles (<5L/100km)	
	17B.4	Active Transport Facilities	1	1	-	Cyclist facilities (parking, shower, change area) for 7.5% of occupants and parking for 5% of visitors	Architectural drawings
	17B.5	Walkable Neighbourhoods	1	1	-	Walkscore >80 or eight amenities within 400m	Wlakscore of 85 - very walkable for the location
Water			**12**	**4**	**5**		
Potable Water	18A.1	Potable Water - Performance Pathway	12	0	0	Prescriptive pathway taken	
	18B.1	Sanitary Fixture Efficiency	1	0	1	WELS star rating to be greater than: Tap: 5*, urinal: 5*, WC: 4*, shower: 3*, washing machine: 4*, dishwasher: 5*	
	18B.2	Rainwater Reuse	1	1	1	Rainwater tank sized through modelling	Minimum 20kL envisaged - TBC in DD
	18B.3	Heat Rejection	2	2	2	No water based heat rejection systems	Letter from mechanical contractor
	18B.4	Landscape Irrigation	1	1	0	No potable water for irrigation and automatic subsoil system used	Letter from landscape irrigation contractor
	18B.5	Fire System Test Water	1	0	1	Fire test water recycling system (>80% reused or floor by floor isolation valves for system by system testing)	

Green Star Implementation Schedule

Category	Code	Credit Criteria	Points available	Points Claimed at 4*	Potential points TBC	Credit Details	Implementation Demonstration
Materials			**14**	**5.5**	**7**		
Life Cycle Impacts	19A.1	Comparative Life Cycle Assessment	-			Prescriptive pathway taken	
	19A.2	Additional Life Cycle Impact Reporting	-			Prescriptive pathway taken	
Concrete	19B.1.1	Portland Cement Reduction	2	0	0	Portland cement reduced by 30% (1pt), 40% (2pt) through the use of sustainable cement	
	19B.1	Water Reduction	0.5	0.5	0.5	50% of water recycled used in concrete recycled	Letter from head contractor
	19B.1	Aggregates Reductions	0.5	0	0.5	40% of coarse aggregate is crushed slag, or 25% of fine aggregate is manufactured sand	
	19B.2	Steel	1	0	0	Reduced steel content compared to standard practice	-
	19B.3	Building Reuse	4	0	0	Reuse of existing façade 50% (1pt), 80% (2pts) by area and structure 30% (1pt), 60% (2pts) by mass	-
	19B.4	Structural Timber	3	0	1	Structural timber is used for 30% (1pt), 70% (2pts) and 90% (3pts) of GFA	-
Responsible Building Materials	20.1	Structural and Reinforcing Steel	1	1	1	95% of steel is from an environmentally responsible steel maker	Letter from head contractor
	20.2	Timber Products	1	1	1	95% of timber is from an approved forest certification scheme, or reused	Letter from head contractor
	20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1	1	1	90% of pipework, flooring, blinds and cables contain approved or no PVC	Letter from mechanical, electrical and hydraulic contractors
Sustainable Products	21.1	Product Transparency and Sustainability	3	1	1	Materials used are either: reused, recycled content, environmental product declarations, third party certified or stewardship programs. 3% (1pt), 6% (2pts), 9% (3pts) based on cost	Letter from head contractor
Construction and Demolition Waste	22	Reporting Accuracy	-			Minimum reporting requirements for construction and demolition waste	
	22B	Percentage Benchmark	1	1	1	90% of construction and demolition waste is recycled	Report from head contractor
Land Use & Ecology			**6**	**3**	**3**		
Ecological Value	23.0	Endangered, Threatened or Vulnerable Species	C	C	C	No endangered or vulnerable species on site	-
	23.1	Ecological Value	3	1	1	Change in ecological value before and after development (2.5% of site area to be native planting)	To be provided by specialist - Demonstrated in DD in the design assessment)
Sustainable Sites	24.0	Conditional Requirement	C	C	C	Site does not contain old growth forest, wetland or high natural importance	-
	24.1	Reuse of Land	1	1	1	75% of the site was previously developed land at the date of site purchase	-
	24.2	Contamination and Hazardous Materials	1	1	1	Site has been contaminated and remediated in accordance with best practice remediation strategy	-
Heat Island Effect	25.0	Heat Island Effect Reduction	1	0	0	75% of site area is vegetation or light coloured roof (SRI >64)	-
Emissions			**5**	**3**	**3**		
Stormwater	26.1	Reduced Peak Discharge	1	1	1	Stormwater flows are reduced as part of the development	Nil (demonstrated in the design assessment)

Green Star Implementation Schedule

Category	Code	Credit Criteria	Points available	Points Claimed at 4*	Potential points TBC	Credit Details	Implementation Demonstration
Stormwater	26.2	Reduced Pollution Targets	1	0	0	Stormwater treated prior to leaving site	
Light Pollution	27.0	Light Pollution to Neighbouring Bodies	C	C	C	External lighting complies with AS4282	-
	27.1	Light Pollution to Night Sky	1	1	1	External lighting upward light ratio <5%	Letter from electrical contractor
Microbial Control	28.0	Legionella Impacts from Cooling Systems	1	1	1	No water based cooling systems provided	Letter from mechanical contractor
Refrigerant Impacts	29.0	Refrigerants Impacts	1	0	0	Refrigerant ODP=0 and GWP<10	-
Innovation			**10**	**4**	**4**		
Innovative Technology or Process	30A	Innovative Technology or Process	10				-
Market Transformation	30B	Market Transformation		-	-	Meters validated to NABERS protocol	
Improving on Green Star Benchmarks	30C	Improving on Green Star Benchmarks		1	1	50% of internally applied paints to be ultra low VOC with maximum TVOC content of 5g/L	Letter from head contractor
Innovation Challenge	30D	Innovation Challenge					
	30D	Innovation Challenge		-	-	Building integrated PV contribute to 15% of the GHG emission reduction (1)	-
	30D	Innovation Challenge		0	1	On site renewable energy produces 5% more than the building requirement (1) or 10% (2)	
	30D	Innovation Challenge		0	0	Hot water systems designed to manage the risk of microbial ontamination	
	30D	Innovation Challenge		1	0	Pre and post occupancy surveys performed (1pt)	
				1	1	Affordable/social housing (1pt)	
				1	0	Local procurment (1pt)	
						Financial transparancy (1pt)	
				1	1	No new car parking (1pt)	
Global Sustainability	30E	Global Sustainability		-	-		
Total			**110**	**51**	**59**		

Summary	Pts
Points Achieved	50.9
Four Star Rating (Best Practice)	45
Five Star Rating (Australian Excellence)	60
Six Star Rating (World Leader	75

	Legend
C	Compulsory Credit, No points awarded
	Credits to be investigated for inclusion
	Credits not applicable, different pathway undertaken
	Credit might be a requirement by client outside Green Star (TBC)

Additional credits have been identified as optional credits that require further review. The design team and head contractor will ultimately be responsible for ensuring this report's commitments are realised, and if any credits become unsuitable throughout the course of the project, the design team and head contractor will be required to adopt additional Green Star credits such that equivalence with a 4 star Green Star design standard is maintained.

4.2- Acceptable Environmentally Responsible Steel

The schemes/processes accepted:

- Australian Steel Institutes (ASI)
- Environmental Sustainability Charter (ESC)
- World Steel Association (WSA)
- Climate Action Programme (CAP)
- Polymer Injection Technology (PIT) study by PE-Australasia
- Protocol for demonstrating equivalency in energy reduction by LCA

4.3- Acceptable Timber Products/Schemes:

- Bamboo and Cork
- Certified Timber by forest certification schemes (FSC and PEFC)
- Formwork from certified timber
- Recycled Timer

4.4- Energy Systems Requirements

Measure	Responsible Party
Installation of a solar Photovoltaic array on the roof. (Envisaged total power approx. 50kW with share of storage - TBC – total solar PV requirement to be determined based on Green Star requirements in DD)	Architect and electrical engineer
Provision of electric heat pump systems for hot water provision	Hydraulics engineer
Provision of sensor controlled external lighting	Electrical engineer
Provision of LED internal lighting with a maximum of 4W/sqm lighting power density	Electrical engineer
Artificial lighting levels >AS1680 and baffled, louvred or opaque diffuser	Electrical engineer
External lighting to AS4282 with upward light ratio <5%	Electrical engineer
10% reduction in IPD, automated control and independent switching.	Electrical engineer

4.5- Water Systems Requirements

Measure	Responsible Party
Installation of a total of minimum 20,000 L rainwater tank to cater for the irrigation and toilets' water consumption. RWT tank and stormwater system design and installation to comply with the Building Code of Australia, Australian standards (including: AS/NZS 2179.1; AS/NZS 3500.3.2; AS/NZS 3500.3 etc…) and rainwater tank design and installation handbook. TBC – total RWT kL requirement and extent of re-use to be determined based on Green Star requirements in design development.	Architect and Hydraulics consultant
Use of the following WELS rating for fixtures: • 4 star showers (>=6L/min, <=7.5 L/min) • 5 star taps • 4 star toilets	Architect
Use of water efficient landscaping with drip irrigation system supplied through the RWT: • Native or • Draught tolerant plants	Architect and landscape architect

4.6- NCC / NatHERS requirements

A NatHERS requirement of 7 star average and 6 star minimum is thought in this development. Preliminary assessment shows that this can be achieved with the following building fabric:

- R2.5 walls insulation with reflective wrap to external walls
- R2 floor insulation for CSOG
- R1.7 to partition walls to common areas
- R3.4 for partition to neighbouring apartments
- R2 insulation for any slab exposed to air from below (elevated) or air from above (exposed slab) like balcony
- R4 with reflective foil for ceiling exposed to roof space. Add R2 to upper roof for attic roofs.

Glazing with frame thermal performance including common area glazing:

Frame	***U value*** <=	***SHGC***	***Example glazing***
Sliding	2.96	0.48	CAP-018-05
Fixed	2.51	0.5	CAP-041-73
Casement	3.16	0.41	CAP-079-07
Awning	3.59	0.41	CAP-022-06

5- Preliminary energy rating results

Address: 26 Myers St Bendigo building 1

29.11.22

Legend
Critical Heating exceeded
Critical Cooling exceeded
Critical star rating exceeded
Pass

Based on Architectural set dated 21.11.22

Apartment	Typical to	Star Rating	Heating load (max 178 MJ/m2)	Cooling load (max 23 MJ/m2)	Glazing Specs	Wall Insulation	Additonal Insulation
Apt G01	1	7.2	120.2	12.8	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to CSOG and exposed ceiling/slab
Apt G02	1	7.7	99.3	9.1	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to CSOG and exposed ceiling/slab
Apt G06	1	7.5	106.8	8.7	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to CSOG and exposed ceiling/slab
Apt G05	1	7.7	91.7	13.6	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to CSOG and exposed ceiling/slab
Apt G04	2	7.4	105.5	14.2	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to CSOG and exposed ceiling/slab
Apt 101	1	7.2	114.9	19.7	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 102	1	7.80	85.8	17.8	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 103	1	6.40	163.8	11.2	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 104	3	6.80	136.9	16.5	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 105	3	6.70	144.4	12.7	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 106	1	7.20	122.3	11.9	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 107	1	7.30	120.0	9.9	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 108	1	7.80	90.2	13.2	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 109	1	6.40	161.1	15.6	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 110	1	7.40	103.7	15.0	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 111	1	7.70	94.2	14.3	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 112	2	7.70	90.8	16.3	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 201	2	7.60	91.6	18.7	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 202	2	7.40	98.7	19.0	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 203	2	7.00	75.4	20.0	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab

Apt 206	1	8.00	76.8	12.4	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 208	1	7.70	94.30	12.7	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 209	2	7.80	83.70	16.3	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 210	2	7.40	108.2	12.6	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 211	2	7.60	98.7	15.6	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 301	1	6.60	124.6	22.8	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R4 insulation to ceiling and R2 soffit to attic roof with single sided reflective wrap
Apt 306	1	7.00	119.6	21.3	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R4 insulation to ceiling and R2 soffit to attic roof with single sided reflective wrap
Apt 307	2	7.30	114.7	14.8	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R4 insulation to ceiling and R2 soffit to attic roof with single sided reflective wrap
Apt 308	1	7.80	88.5	13.7	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R4 insulation to ceiling and R2 soffit to attic roof with single sided reflective wrap
Apt 311	1	6.60	146.3	16.1	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R4 insulation to ceiling and R2 soffit to attic roof with single sided reflective wrap
Apt 401	1	6.80	128.7	22.8	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R4 insulation to ceiling and R2 soffit to attic roof with single sided reflective wrap - extend roof to cover balcony
Apt 404	1	6.70	146.7	14.2	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R4 insulation to ceiling and R2 soffit to attic roof with single sided reflective wrap
Apt 405	1	6.40	153.3	19.9	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R4 insulation to ceiling and R2 soffit to attic roof with single sided reflective wrap
Apt 407	1	6.70	137.5	21.9	Type 1	R2.5 insulation in external walls with wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R4 insulation to ceiling and R2 soffit to attic roof with single sided reflective wrap - provide 1.2m eave above living area windows

		Heating	Cooling	
Gross Average:	**7.24**	**112.10**	**15.60**	Pass
Required Average:	7.00	144	35	

	Type 1 -Clear		
Frame	***U value <=***	***SHGC***	
Sliding	2.96	0.48	CAP-018-05
Fixed	2.51	0.5	CAP-041-73
Awning	3.59	0.41	CAP-022-06
Casement	3.16	0.41	CAP-079-07

Address: 26 Myers St Bendigo, Building 2

28.11.22

Legend
Critical Heating exceeded
Critical Cooling exceeded
Critical star rating exceeded
Pass

Based on Architectural set dated 21.11.22

Apartment	Typical to	Star Rating	Heating load (max 178 MJ/m2)	Cooling load (max 23 MJ/m2)	Glazing Specs	Wall Insulation	Additonal Insulation
Apt G07	1	7.9	80.1	13.7	Type 1	R2.5 insulation in external walls with reflective wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab. R2 for CSOG.
Apt G08	1	7.3	108.9	17.1	Type 1	R2.5 insulation in external walls with reflective wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab. R2 for CSOG.
Apt G09	1	7.3	117.3	10.2	Type 1	R2.5 insulation in external walls with reflective wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighboursv	R2 insulation to exposed ceiling/slab. R2 for CSOG.
Apt G10	1	6.9	125.2	20.9	Type 1	R2.5 insulation in external walls with reflective wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab. R2 for CSOG.
Apt 113	2	8.1	68.0	18.1	Type 1	R2.5 insulation in external walls with reflective wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 114	1	7.8	80.5	21.0	Type 1	R2.5 insulation in external walls with reflective wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab
Apt 312	1	6.90	126.4	18.0	Type 1	R2.5 insulation in external walls with reflective wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab R4 ceiling insulation with SS foil and R2 roof insulation for attic roofs
Apt 313	2	6.70	137.9	22.6	Type 1	R2.5 insulation in external walls with reflective wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab R4 ceiling insulation with SS foil and R2 roof insulation for attic roofs - Provide pergola roof above living area window
Apt 315	5	7.80	79.0	20.5	Type 1	R2.5 insulation in external walls with reflective wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab R4 ceiling insulation with SS foil and R2 roof insulation for attic roofs - Provide approx. 1.2m eave/canopy above living area window
Apt 316	3	7.20	117.4	17.0	Type 1	R2.5 insulation in external walls with reflective wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab R4 ceiling insulation with SS foil and R2 roof insulation for attic roofs
Apt 4.09	1	7.50	100.2	16.1	Type 1	R2.5 insulation in external walls with reflective wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab R4 ceiling insulation with SS foil and R2 roof insulation for attic roofs
Apt 410	1	7.30	104.0	21.0	Type 1	R2.5 insulation in external walls with reflective wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab R4 ceiling insulation with SS foil and R2 roof insulation for attic roofs
Apt 411	4	6.30	155.6	22.2	Type 1	R2.5 insulation in external walls with reflective wrap, R1.7 insulation in walls to common areas, a total of R3.4 insulation in partition walls to neighbours	R2 insulation to exposed ceiling/slab R4 ceiling insulation with SS foil and R2 roof insulation for attic roofs

		Heating	Cooling	
Gross Average:	**7.26**	**109.33**	**19.24**	Pass
Required Average:	7.00	178	23.6	

	Type 1 -Clear		
Frame	***U value <=***	***SHGC***	
Sliding	2.96	0.48	CAP-018-05
Fixed	2.51	0.5	CAP-041-73
Awning	3.59	0.41	CAP-022-06
Casement	3.16	0.41	CAP-079-07

6- Storm Assessment

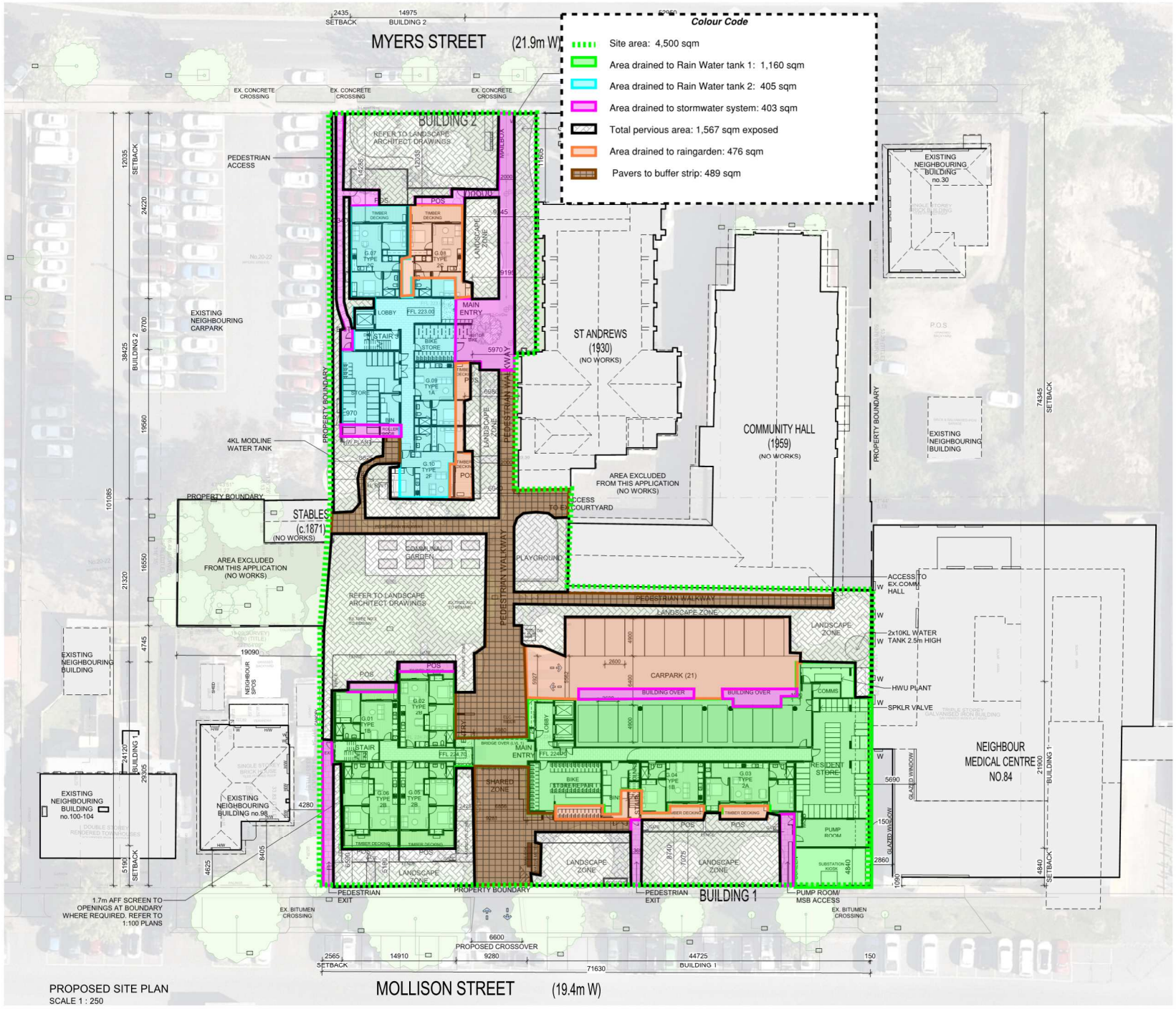
Hard and impervious surfaces, such as buildings, roads and car parks lead to excess stormwater runoff that would otherwise have been retained on site in natural forests. This development is committed to reduce stormwater runoff and improve the quality of our waterways.
This is demonstrated by achieving best practice reduction in total suspended solids (TSS), total phosphorus (TP) and total nitrogen (TN) loads.
These reductions are achieved here through a 100% STORM score using Melbourne Water STORM tool. Below is a mark-up showing assumptions taken to this end:

STORM Rating Report

TransactionID:	1493826	
Municipality:	GREATER BENDIGO	
Rainfall Station:	BENDIGO	
Address:	26 Myers St	
	Bendigo	
	VIC	3550
Assessor:		
Development Type:	Residential - Multiunit	
Allotment Site (m2):	4,500.00	
STORM Rating %:	100	

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roof 1 to rainwater tank	1,160.00	Rainwater Tank	16,000.00	100	132.50	62.00
Roof 2 to RWT	405.00	Rainwater Tank	4,000.00	45	119.00	51.00
Paving to buffer strips	489.00	Buffer Strip	8.00	0	59.45	0.00
Carpark and trafficable to raingarden	476.00	Raingarden 100mm	10.00	0	128.55	0.00
Untreated	403.00	None	0.00	0	0.00	0.00

Date Generated: 28-Nov-2022 Program Version: 1.0.0



REVISIONS		CLIENT	PROJECT	DRAWING TITLE	DRAWN BY	CHECKED BY	PROJECT NUMBER	DATE	SCALE	DRAWING NUMBER	REVISION
P1 25.11.22 PRELIMINARY ISSUE		UNITING (VICTORIA AND TASMANIA) LTD	ST. ANDREW'S BENDIGO HOUSING DEVELOPMENT	SITE PLAN AND GF GA PLAN	Author	Checker	20004	MAY 2022	1 : 250 @ A1	SD0101	P1

SCHEMATIC DESIGN

25/11/2022 3:00:46 PM

MGS ARCHITECTS PTY LTD I ABN 13 006 488 302 I
MGSARCHITECTS.COM.AU
10-22 MARTON LANE MELBOURNE 3000 AUSTRALIA I T +61 3 9291 9900

The design team and head contractor will ultimately be responsible for ensuring that the STORM score of "pass" is achieved (or equivalent tool), and if assumptions taken here become unsuitable throughout the course of the project, the design team and head contractor will be required to adopt alternative assumptions such that equivalence with a passing STORM score is maintained.

Disclaimer: The builder is required to adhere to Melbourne Water's stormwater management guidelines during the construction stage. RWT tank and stormwater system design and installation (by others) to comply with the Building Code of Australia, Australian standards (including: AS/NZS 2179.1; AS/NZS 3500.3.2; AS/NZS 3500.3 etc…) and rainwater tank design and installation handbook.
This report does not constitute a civil engineering design and nor does it replace any civil engineering designs or requirements.
This report does not constitute a flood management design and nor does it replace any flood management designs or requirements.
This report assumes all materials, designs, sizing and construction processes are expected to be compliant with the building code, relevant codes and Australian standards.
The drawings and values provided indicate the performance required and design intent but not material specifications or detailed site implementation. The builder is required to implement the design intent indicated in this report in accordance with the BCA and relevant Australian codes and standards.
Any products indicated in this report are suggestions only and have been suggested in relation to their WSUD performance. The results of any computer simulations within this report do not guarantee future performance.

7- Stormwater Managements and System Maintenance

Below are commitments pertaining to stormwater management beyond harvesting of rainwater:

Stormwater management report:

A STORM score of over 100% has been achieved as detailed in part 6 of this report to demonstrate achieving best practice stormwater pollution reduction targets. It is required that the total storm score claimed in this report be achieved using part 6 of this report or an equivalent storm score.

Stormwater management layout:

Refer to part 6 of this report for treatment areas and architectural drawings for location of rainwater tanks.

Site management plan:

Refer to Construction Management Plan to be prepared by the builder for stormwater control measures during construction.
Plan to contain and be not limited to initiatives similar to the following or to commit to initiatives with similar outcome:

- Silt fences or the like to prevent sediment infiltration into the stormwater system.
- Buffer strips or the like for the prevention of stormwater runoff.
- Gravel filters or similar at stormwater inlets to prevent site contaminant infiltration into the stormwater system.
- Site is to be kept clean.

Maintenance program:

A maintenance program which sets out future operation and maintenance arrangements.
The WSUD objectives are achieved through a rainwater capture and reuse system. The maintenance requirements for this system are:

- Rainwater tank:
    - Maintenance in accordance with Handbook HB-230:2008 produced by Standards Australia
    - Access will be via the watertight maintenance panel, noting that it is a confined space and appropriate precautions must be taken.
    - Pumps and filtration systems maintenance to be in accordance with manufacturer requirements

8- Preliminary daylight modelling assessment

BLUE BEE
SUSTAINABLE SERVICES

Daylight Modelling Report

For the: 25 Myers St Bendigo

Presented to: Duo Projects

NOVEMBER 29, 2022

Reference:22084-BBDM[Rev-2]

Contents

Revision History:

Author	Revision	Date	Content/Changes
Jessica Daaboul	Rev-00	08.08.2022	Preliminary Daylight Report – Issue for internal coordination only
Jessica Daaboul	Rev-01	19.09.2022	Daylight Modelling Report – For planning permit purposes
Jessica Daaboul	Rev-02	29.11.2022	Daylight Modelling Report – updated in accordance with the latest architectural

1- Executive Summary

Blue Bee Sustainable Services performed a preliminary daylight analysis on a selection of typical apartments in the planned development by Uniting located at 25 Myers St Bendigo. This development is seeking Green Star certification, and thus Green Star requirements for daylight access are used to demonstrate daylight performance.

To assess the development against the Green Star V1.3 credit 12.1 we summarise the daylight requirements below:

> *Up to 2 points are available where a percentage of the nominated area receives high levels of daylight:*
>
> - *For 40% of the nominated area – 1 point;*
> - *For 60% of the nominated area – 2 points.*
>
> *Daylight access is determined through modelling the Daylight Factor across the Nominated Area. High Levels of daylight are deemed to have daylight factors above 2.0% for all spaces, except living rooms and dining rooms in residential primary spaces, where the threshold is a 1.5% daylight factor.*

For credit 12.1, the nominated area is defined as all primary spaces and the primary spaces in residential developments consist of residential lounge rooms.

Based on the above requirements, the below benchmark is used:

- Nominated area: Exceed minimum daylight factor in 40% of nominated areas
- Living rooms: DF=1.5% minimum requirement
- Other nominated areas: DF=2% minimum requirement

This daylight modelling was performed using the Integrated Environmental Solutions, Virtual Environment. A three-dimensional model of the project was created to this end. The daylight assessment was undertaken on a representative selection of apartments.

The results of the assessment indicates that the apartments would be granted 1 point if assessed with credit 12.1 requirements.

Summary of results			
VLT 55%			
Space Type	**Total Nominated Area**	**Compliant Nominated Area**	**% Compliant**
Living areas with DF>1.5%	942.7	472	50.1%

Legend

Benchmark Achieved - Pass	

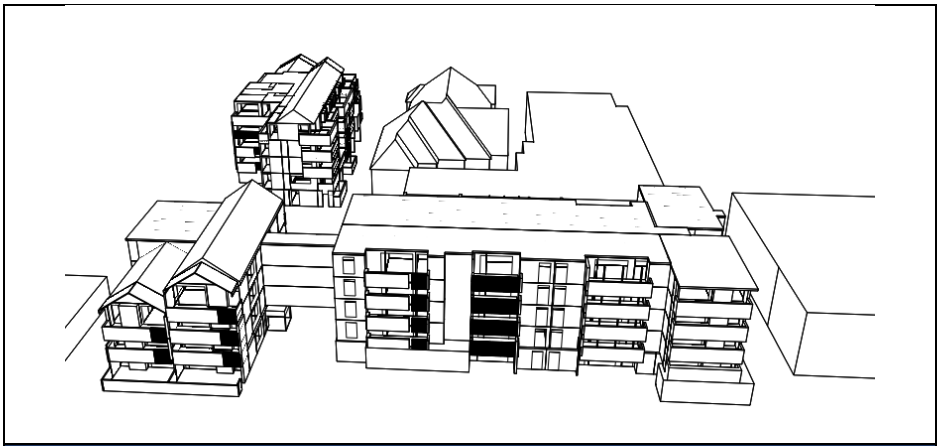


Figure 1: 3D modelled representation

2- Introduction

Blue Bee Sustainable Services performed a daylight analysis on a selection of typical apartments in the planned development by the Uniting Church located at 25 Myers St Bendigo. This report outlines the assumptions made, benchmarks, and tools used to perform this assessment. Then recommendations are given for an improved daylight outcome. This report concludes with a discussion of the results.

3- References and Benchmarks

This assessment is based on drawings reference 20004 dated 21.11.22. It compares the performance of the modelled representation of the building against the following benchmarks. Those benchmarks were developed based on the requirements of credit 12.1 in the Green Star Design and As-Built V1.3 outlined below:

> *Up to 2 points are available where a percentage of the nominated area receives high levels of daylight:*
>
> - *For 40% of the nominated area – 1 point;*
> - *For 60% of the nominated area – 2 points.*
>
> *Daylight access is determined through modelling the Daylight Factor across the Nominated Area. High Levels of daylight are deemed to have daylight factors above 2.0% for all spaces, except living rooms and dining rooms in residential primary spaces, where the threshold is a 1.5% daylight factor.*

For credit 12.1, the nominated area is defined as all primary spaces and the primary spaces in residential developments consist of Residential lounge rooms.

Based on the above requirements, the below benchmark is used:

- Nominated area: Exceed minimum daylight factor in 40% of nominated areas
- Living rooms: DF=1.5% minimum requirement

4- General Modelling Parameters and Assumptions

The software used for the analysis is Integrated Environmental Solutions (IES) Virtual Environment version 2022. Daylight access is determined through modelling the Daylight Factor across the Nominated Area.

The main modelling parameters and assumptions are provided below:

Daylight Factor:

- When calculating Daylight Factor, a CIE uniform sky was used.
- The daylight Factor is determined at the finished floor level
- The equivalent horizontal illuminance used for base daylight is 7,943Lux based on the average diffuse sky luminance calculations given by Tregenza[1] calculated at a latitude of -37.8

Daylight Autonomy:

- Calculations were completed using hourly weather data for every hour during the Nominated Hours.

Calculation method:

- Point-by-point method

[1] Tregenza, P.R., Measured and Calculated Frequency Distributions of Daylight Illuminance, Lighting Research and Technology 18 (2) 71-74 (1986)

Modelling resolution:

- 0.5m by 0.5m, giving a maximum grid area of 0.25sqm

Reflectance:

- Reflectance from all external surfaces and all room internal surfaces

5- Project specific assumptions:

Glazing assumptions:

- As per drawings.

Shading:

- A site assessment was conducted based on the current condition of the site.
- Project modelling includes shading from external shadings, balconies or overhangs.
- Project modelling includes shading from significant nearby buildings and feature (ex: neighbouring building height is at least a third of the height of the proposed building design).
- The development located at 26 Myers St, Bendigo adjacent to this site is a church and community hall that are expected to impact the daylight performance and hence have been included in the model.

Internal Joinery:

- Cupboards and closets inside the rooms are excluded from the area calculation.

Assessment area:

- Corridors are excluded from the area calculation as they are not nominated areas.

Project materials:

The characteristics shown in table 2 were used for the building elements. The values for the glass properties were assumed based on the likely VLT corresponding to the assumed glazing thermal performance averaged across the different types of glazing. The values used for the building materials were chosen based on AS/NZS1680.1 Table E1 referenced in Green Star and are as follows.

Table 02: Visible light transmittance and reflectance values assumed

Surface	Light Transmittance (%)	Light Reflectance (intermal)	Light Reflectance (external)
Floor	0	30	30
Internal Partitions	0	80	80
External Wall	0	50	50
Ceiling/Roof	0	80	20
Windows	55	15	18

6- Results

Based on the above materials, the model results are summarised as follows, in table 2 and table 3. Modelling output is provided in Appendix A.

Summary of results			
VLT 55%			
Space Type	Total Nominated Area	Compliant Nominated Area	% Compliant
Living areas with DF>1.5%	942.7	472	50.1%

Legend

Benchmark Achieved - Pass	
Benchmark Not Achieved	

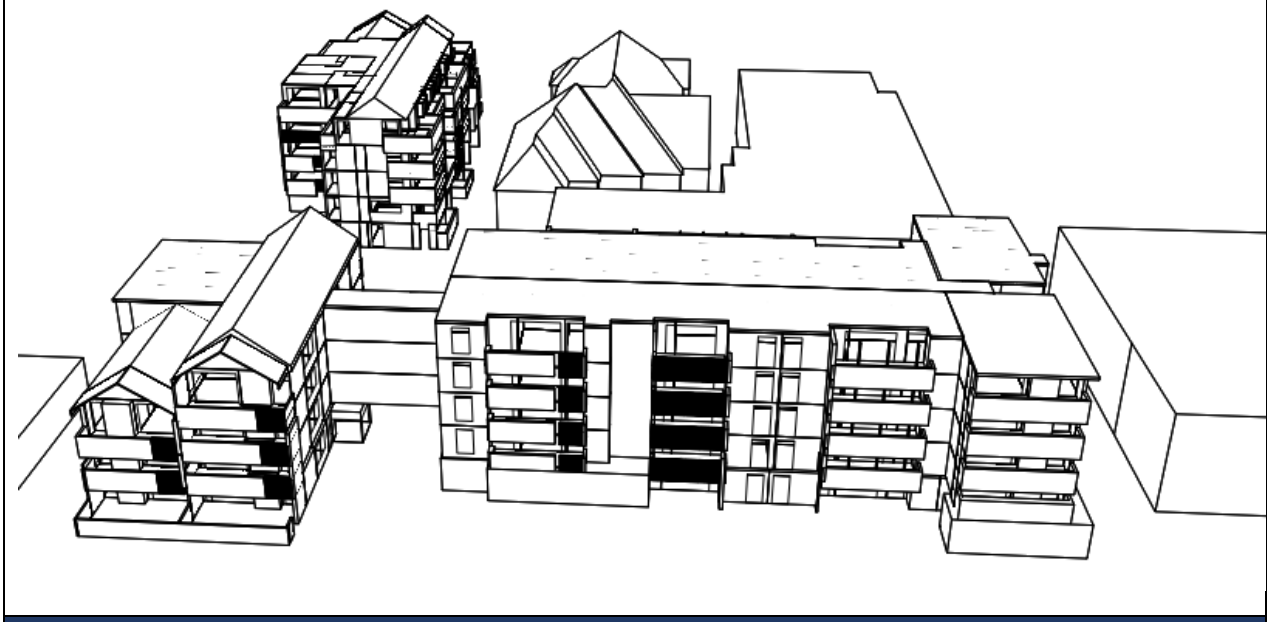


Figure 1: 3D modelled representation

7- Recommendations

Based on the apartment selection, the project is expected to exceed the 40% benchmark for living rooms. Bedrooms daylight access performance is not required for Green Star V1.3 assessment and hence has been excluded from this assessment.

Note the following:

- Cupboards and corridors are not regularly occupied and thus do not need high levels of daylight.
- Kitchens require artificial task lighting to a level that might not be provided by daylight. They therefore do not necessarily require to be located near the windows.
- Bedrooms are accessed in the evening and early morning with likelihood of blinds activation for privacy making task lighting requirement higher than daylight access requirement.

8- Appendix A – Daylight Levels in Modelled Apartments

BUILDING 1

BLD1 - GROUND LEVEL
SCALE 1 : 100

REVISIONS	CLIENT	PROJECT	DRAWING TITLE	DRAWN BY	CHECKED BY	PROJECT NUMBER	DATE	SCALE	DRAWING NUMBER	REVISION
P1 25.11.22 PRELIMINARY ISSUE	UNITING (VICTORIA AND TASMANIA) LTD	ST. ANDREW'S BENDIGO HOUSING DEVELOPMENT	BLD 1 - GF PLAN	SS/JH	JW/CR	20004	MAY 2022	1 : 100 @ A1	SD0201	P1

SCHEMATIC DESIGN

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MGS ARCHITECTS PTY LTD I ABN 13 006 488 302 I
MGSARCHITECTS.COM.AU
10-22 MARION LANE MELBOURNE 3000 AUSTRALIA I T +61 3 9291 9900

BLD1 - LEVEL 1
SCALE 1 : 100

REVISIONS	CLIENT	PROJECT	DRAWING TITLE	DRAWN BY	CHECKED BY	PROJECT NUMBER	DATE	SCALE	DRAWING NUMBER	REVISION
P1 25.11.22 PRELIMINARY ISSUE	UNITING (VICTORIA AND TASMANIA) LTD	ST. ANDREW'S BENDIGO HOUSING DEVELOPMENT	BLD 1 - LEVEL 1 PLAN	SS/JH	JW/CR	20004	MAY 2022	1 : 100 @ A1	SD0202	P1

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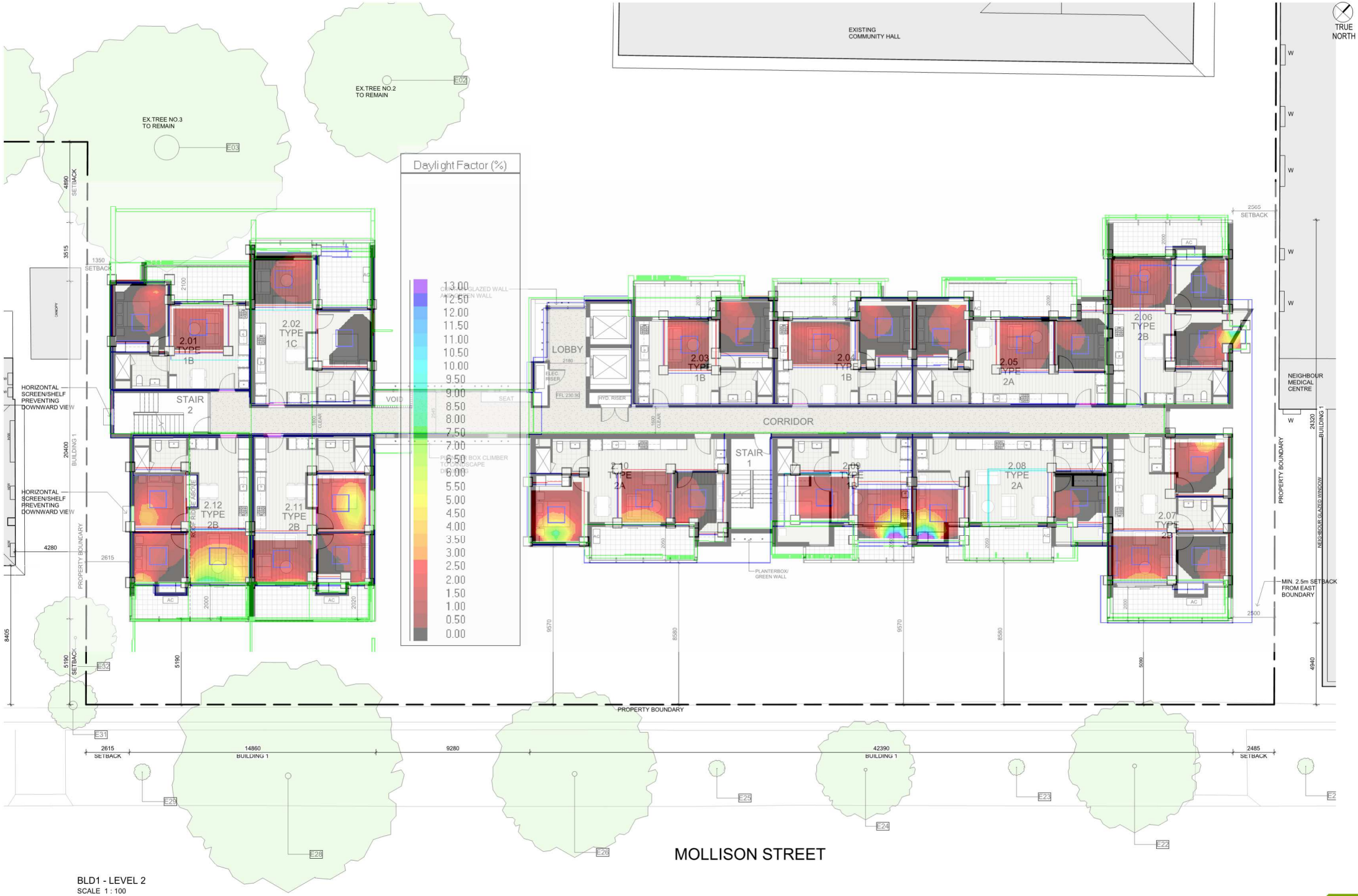

BLD1 - LEVEL 2
SCALE 1 : 100

REVISIONS	CLIENT	PROJECT:	DRAWING TITLE	DRAWN BY	CHECKED BY	PROJECT NUMBER	DATE	SCALE	DRAWING NUMBER	REVISION
P1 25.11.22 PRELIMINARY ISSUE	UNITING (VICTORIA AND TASMANIA) LTD	ST. ANDREW'S BENDIGO HOUSING DEVELOPMENT	BLD 1 - LEVEL 2 PLAN	SS/JH	JW/CR	20004	MAY 2022	1 : 100 @ A1	SD0203	P1

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BLD1 - LEVEL 3
SCALE 1 : 100

REVISIONS	CLIENT	PROJECT	DRAWING TITLE	DRAWN BY	CHECKED BY	PROJECT NUMBER	DATE	SCALE	DRAWING NUMBER	REVISION
P1 25.11.22 PRELIMINARY ISSUE	UNITING (VICTORIA AND TASMANIA) LTD	ST. ANDREW'S BENDIGO HOUSING DEVELOPMENT	BLD 1 - LEVEL 3 PLAN	SS/JH	JW/CR	20004	MAY 2022	1 : 100 @ A1	SD0204	P1

SCHEMATIC DESIGN

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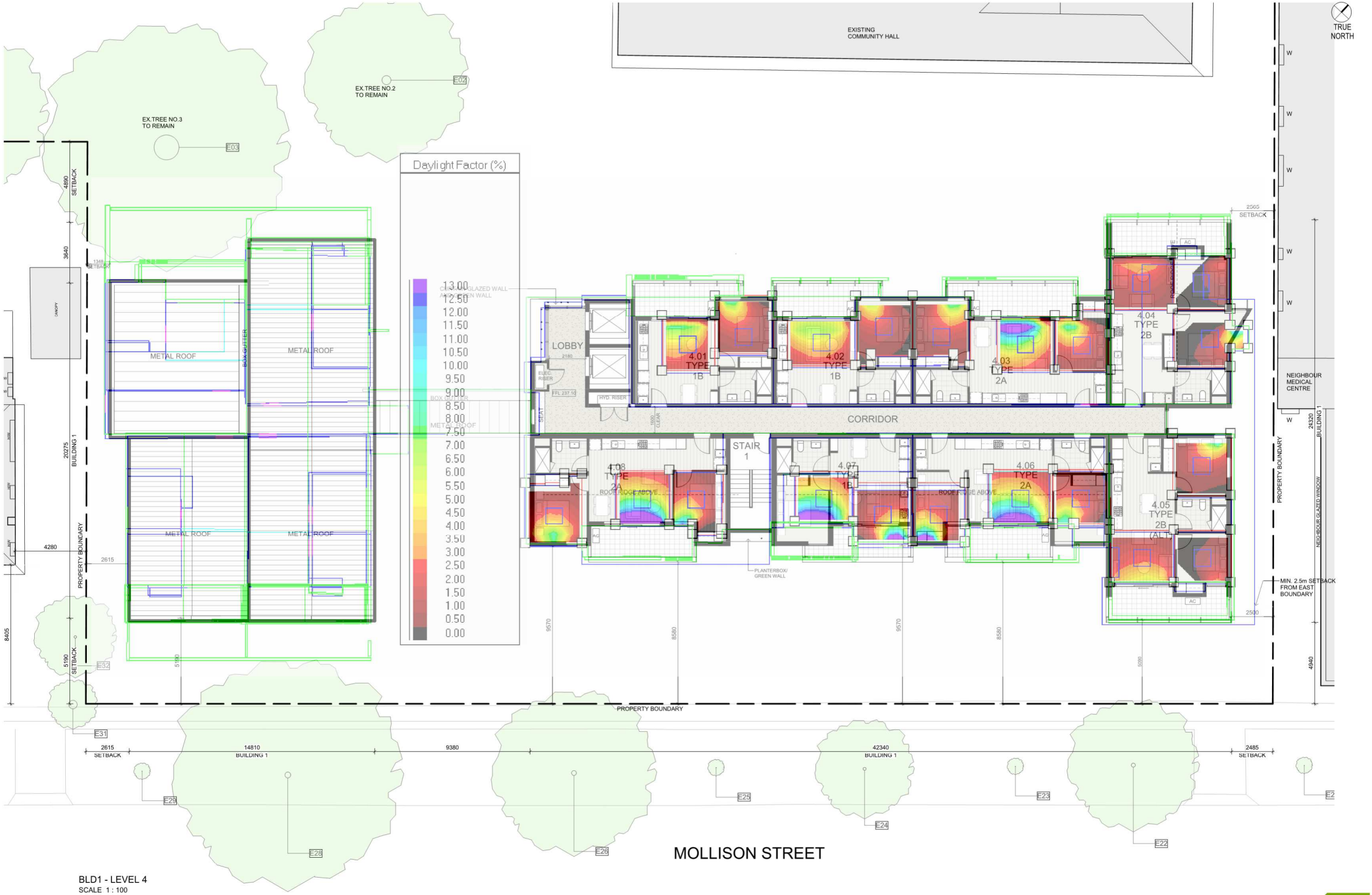

BLD1 - LEVEL 4
SCALE 1 : 100

REVISIONS	CLIENT	PROJECT	DRAWING TITLE	DRAWN BY	CHECKED BY	PROJECT NUMBER	DATE	SCALE	DRAWING NUMBER	REVISION
P1 25.11.22 PRELIMINARY ISSUE	UNITING (VICTORIA AND TASMANIA) LTD	ST. ANDREW'S BENDIGO HOUSING DEVELOPMENT	BLD 1 - LEVEL 4 PLAN	SS/JH	JW/CR	20004	MAY 2022	1 : 100 @ A1	SD0205	P1

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BLD2 - GROUND LEVEL
SCALE 1 : 100

REVISIONS		CLIENT	PROJECT	DRAWING TITLE	DRAWN BY	CHECKED BY	PROJECT NUMBER	DATE	SCALE	DRAWING NUMBER	REVISION
P1 25.11.22 PRELIMINARY ISSUE		UNITING (VICTORIA AND TASMANIA) LTD	ST. ANDREW'S BENDIGO HOUSING DEVELOPMENT	BLD 2 - GF PLAN	SS/JH	JW/CR	20004	MAY 2022	1 : 100 @ A1	SD0211	P1

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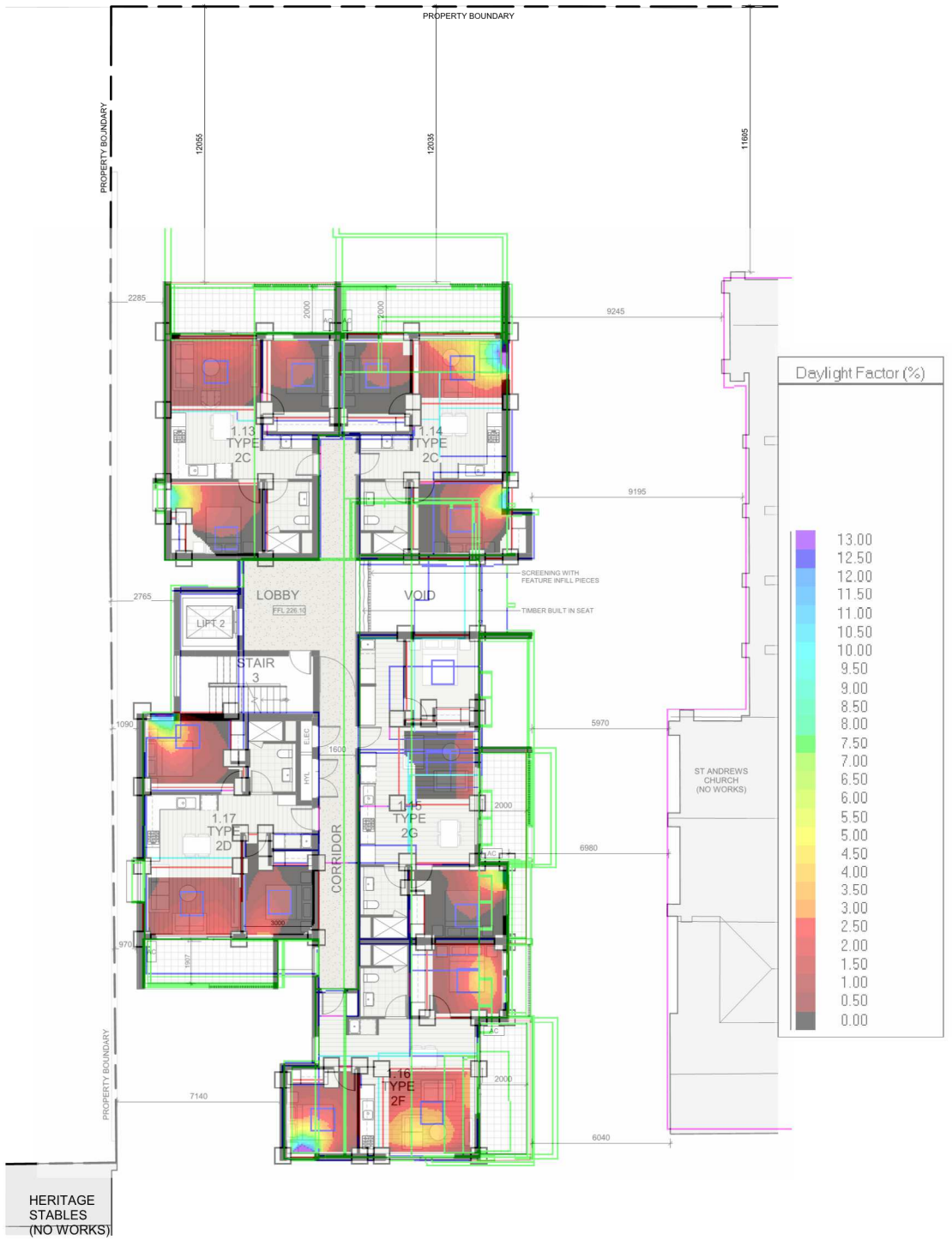

TRUE
NORTH

BLD2 - LEVEL 1
SCALE 1 : 100

REVISIONS	CLIENT	PROJECT :	DRAWING TITLE	DRAWN BY	CHECKED BY	PROJECT NUMBER	DATE	SCALE	DRAWING NUMBER	REVISION
P1 25.11.22 PRELIMINARY ISSUE	UNITING (VICTORIA AND TASMANIA) LTD	ST. ANDREW'S BENDIGO HOUSING DEVELOPMENT	BLD 2 - LEVEL 1 PLAN	SS/JH	JW/CR	20004	MAY 2022	1 : 100 @ A1	SD0212	P1

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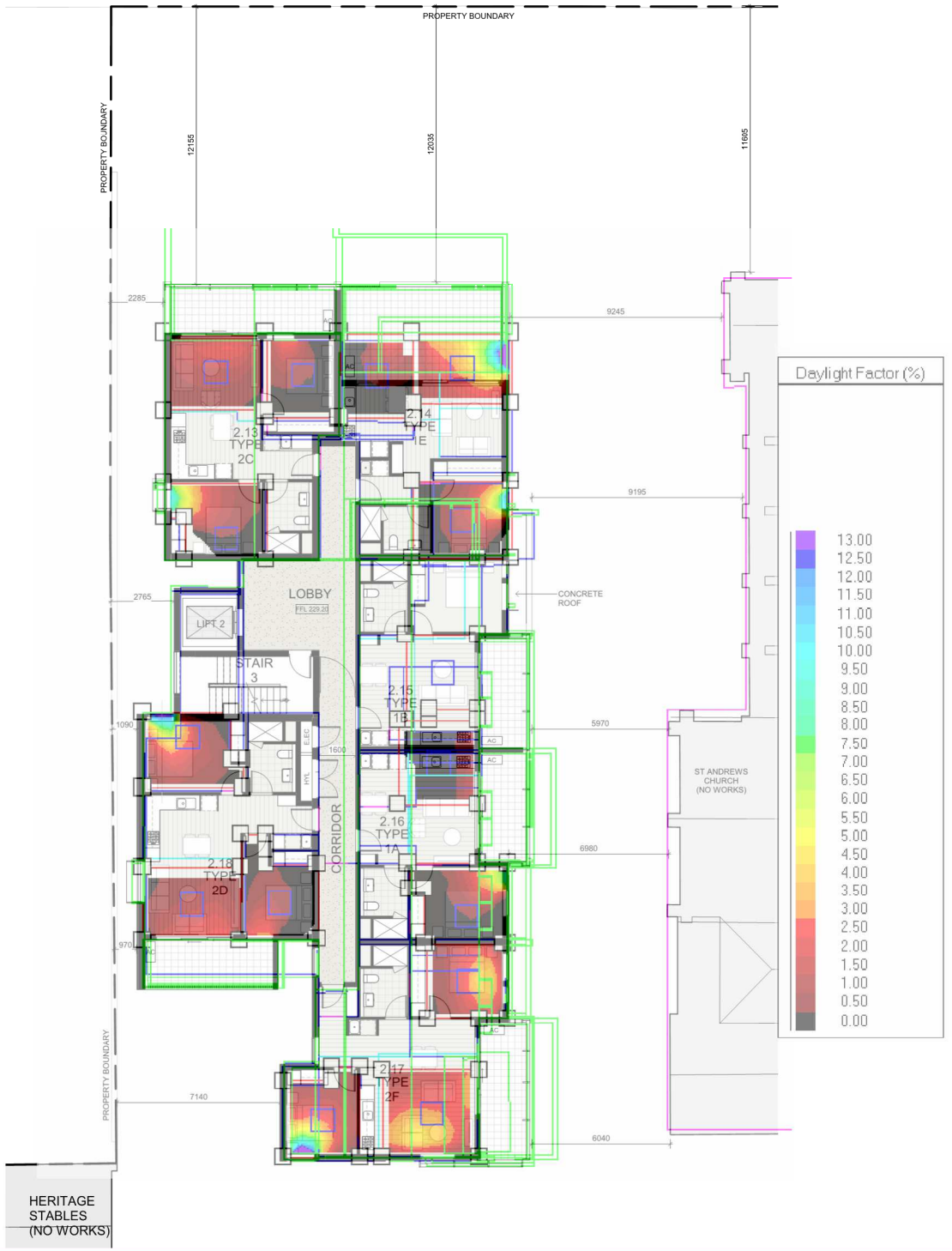

TRUE NORTH

BLD2 - LEVEL 2
SCALE 1 : 100

REVISIONS	CLIENT	PROJECT :	DRAWING TITLE	DRAWN BY	CHECKED BY	PROJECT NUMBER	DATE	SCALE	DRAWING NUMBER	REVISION
P1 25.11.22 PRELIMINARY ISSUE	UNITING (VICTORIA AND TASMANIA) LTD	ST. ANDREW'S BENDIGO HOUSING DEVELOPMENT	BLD 2 - LEVEL 2 PLAN	SS/JH	JW/CR	20004	MAY 2022	1 : 100 @ A1	SD0213	P1

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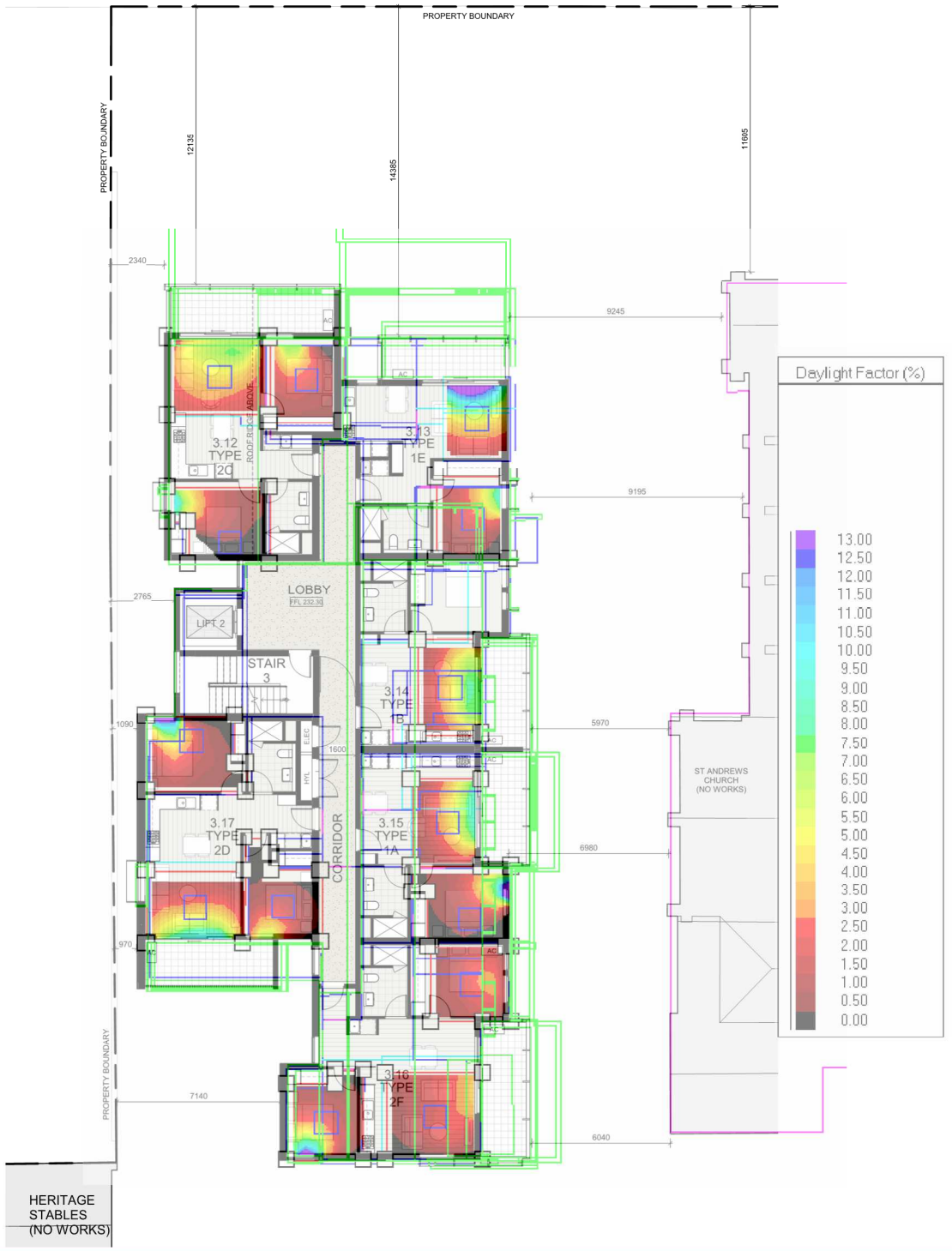

TRUE NORTH

BLD2 - LEVEL 3
SCALE 1 : 100

REVISIONS		CLIENT	PROJECT:	DRAWING TITLE	DRAWN BY	CHECKED BY	PROJECT NUMBER	DATE	SCALE	DRAWING NUMBER	REVISION
P1 25.11.22 PRELIMINARY ISSUE		UNITING (VICTORIA AND TASMANIA) LTD	ST. ANDREW'S BENDIGO HOUSING DEVELOPMENT	BLD 2 - LEVEL 3 PLAN	SS/JH	JW/CR	20004	MAY 2022	1 : 100 @ A1	SD0214	P1

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BLD2 - LEVEL 4
SCALE 1 : 100

REVISIONS	CLIENT	PROJECT:	DRAWING TITLE	DRAWN BY	CHECKED BY	PROJECT NUMBER	DATE	SCALE	DRAWING NUMBER	REVISION
P1 25.11.22 PRELIMINARY ISSUE	UNITING (VICTORIA AND TASMANIA) LTD	ST. ANDREW'S BENDIGO HOUSING DEVELOPMENT	BLD 2 - LEVEL 4 PLAN	SS/JHH	JW/CR	20004	MAY 2022	1 : 100 @ A1	SD0215	P1

SCHEMATIC DESIGN

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9- Appendix B – Software Tabular Results

Daylight Analysis

IES
Integrated
Environmental
Solutions Limited

Analysis Overview

Analysis Comparison (against previous assessment)

	Total	Comparison (with previous)
Daylight levels (lux)	185.054	**Increased**
Percentage area above threshold (%)	50.1	**Reduced**

Analysis History

Date / Time	Area-weighted average daylight factor (%)	Area-weighted average illumination (lux)
01 Aug 2022 at 2:49 PM	1.4	114.874
01 Aug 2022 at 2:57 PM	1.1	88.107
01 Aug 2022 at 3:04 PM	2.1	164.793
01 Aug 2022 at 4:12 PM	1.4	114.254
01 Aug 2022 at 4:16 PM	1.2	93.690
01 Aug 2022 at 4:22 PM	2.1	164.793
26 Aug 2022 at 8:23 AM	1.8	139.903
26 Aug 2022 at 8:24 AM	1.8	139.903
26 Aug 2022 at 8:24 AM	1.8	139.903
26 Aug 2022 at 8:32 AM	2.2	171.920
26 Aug 2022 at 8:42 AM	1.5	120.365
26 Aug 2022 at 3:38 PM	1.5	120.822
26 Aug 2022 at 3:40 PM	2.3	180.027

Threshold Calculation

Building Results

Total floor area (m^2)	Total floor area above threshold (m^2)	Percentage floor area above threshold (%)	Area-weighted average daylight factor (%)	Area-weighted average illumination (lux)
942.661	472.046	50.1	2.3	185.054

Rooms included in the analysis

Room ID	Room name	Working plane	Floor area (m^2)	Floor area > threshold (m^2)	Percentage floor area > threshold (%)	Average illumination (%)
BL000025	BLD1-GF-G.01-LR	0	17.060	2.925	**17.1**	0.83
BL00002F	BLD1-GF-G.02-LR	0	11.992	10.493	**87.5**	4.43
BL000040	BLD2-GF-G.09-LR	0	14.625	-0.000	**-0.0**	0.05
BL000042	BLD2-GF-G.08-LR	0	12.785	9.972	**78.0**	3.74
BL000045	BLD2-GF-G.07-LR	0	13.687	5.523	**40.4**	1.55
BL00017A	BLD1-L1-1.03-LR	0	10.549	2.261	**21.4**	0.90
BL00017D	BLD1-L1-1.04-LR	0	12.331	3.083	**25.0**	0.90
BL000181	BLD1-L1-1.05-LR	0	11.514	2.350	**20.4**	0.82
BL000185	BLD1-L1-	0	12.484	0.892	**7.1**	0.43

Things to consider:

Increase amount of **glazing** (assess **trade-off** with energy consumption)

Evaluate size and shape of glass (glass **above** 2.3m (7'6") has **greater impact**)

Select a **glass type** with a different **visible transmittance** (Tvis)

Evaluate other daylighting metrics such as **glare**

	1.06-LR					
BL00020A	BLD2-L1-1.13-LR	0	15.035	3.341	**22.2**	1.08
BL00018C	BLD1-L1-1.107-LR	0	12.219	1.527	**12.5**	0.85
BL000188	BLD1-L1-1.10-LR	0	10.638	4.993	**46.9**	1.78
BL000208	BLD2-L1-1.15-LR	0	13.131	0.536	**4.1**	0.33
BL0001FC	BLD2-L1-1.14-LR	0	13.187	10.501	**79.6**	4.32
BL00011F	BLD2-L1-1.17-LR	0	13.777	3.827	**27.8**	1.17
BL000032	BLD1-GF-G.06-LR	0	13.582	6.063	**44.6**	1.75
BL000028	BLD1-GF-G.05-LR	0	12.926	4.847	**37.5**	1.60
BL000007	BLD1-GF-G.04-LR	0	13.102	9.007	**68.7**	2.79
BL00000A	BLD1-GF-G.03-LR	0	11.869	6.540	**55.1**	2.27
BL000039	BLD1-L1-1.09-LR	0	10.724	4.085	**38.1**	1.29
BL000117	BLD1-L1-1.08-LR	0	12.618	2.253	**17.9**	0.80
BL0002F0	BLD1-L2-2.03-LR	0	10.549	3.014	**28.6**	1.08
BL0002F2	BLD1-L2-2.04-LR	0	12.331	3.083	**25.0**	1.05
BL0002F4	BLD1-L2-2.05-LR	0	11.514	3.055	**26.5**	1.01
BL0002F7	BLD1-L2-2.06-LR	0	12.484	2.006	**16.1**	0.84
BL0002F8	BLD1-L2-2.10-LR	0	10.638	4.993	**46.9**	1.78
BL0002FD	BLD1-L2-2.07-LR	0	12.219	4.582	**37.5**	1.55
BL000315	BLD1-L2-2.09-LR	0	10.724	4.085	**38.1**	1.32
BL000320	BLD1-L2-2.08-LR	0	12.618	2.253	**17.9**	0.80
BL0000A3	BLD1-L3-3.03-LR	0	10.549	3.014	**28.6**	1.09
BL0000A5	BLD1-L3-3.04-LR	0	12.331	3.083	**25.0**	1.05
BL0000A7	BLD1-L3-3.05-LR	0	11.514	3.055	**26.5**	1.01
BL0000AA	BLD1-L3-3.06-LR	0	12.484	2.006	**16.1**	0.84
BL0000AB	BLD1-L3-3.10-LR	0	10.638	4.993	**46.9**	1.78
BL0000B0	BLD1-L3-3.07-LR	0	12.219	4.582	**37.5**	1.55
BL000369	BLD1-L3-3.09-LR	0	10.724	5.362	**50.0**	1.44
BL000374	BLD1-L3-3.08-LR	0	12.618	2.253	**17.9**	0.80
BL000507	BLD1-L4-4.01-LR	0	10.549	8.791	**83.3**	3.32
BL000509	BLD1-L4-4.02-LR	0	12.331	12.074	**97.9**	3.95
BL00050B	BLD1-L4-	0	11.514	11.044	**95.9**	5.97

	4.03-LR					
BL00050E	BLD1-L4-4.04-LR	0	12.484	4.904	**39.3**	1.43
BL00050F	BLD1-L4-4.08-LR	0	10.638	10.638	**100.0**	7.49
BL000514	BLD1-L4-4.05-LR	0	12.219	8.910	**72.9**	2.52
BL000527	BLD1-L4-4.07-LR	0	10.724	10.724	**100.0**	7.21
BL000532	BLD1-L4-4.06-LR	0	12.618	12.392	**98.2**	6.21
BL000573	BLD1-L3-3.11-LR	0	12.138	11.885	**97.9**	4.23
BL000575	BLD1-L3-3.02-LR	0	13.508	4.101	**30.4**	1.45
BL000579	BLD1-L3-3.01-LR	0	11.169	8.510	**76.2**	2.22
BL00057B	BLD1-L2-2.12-LR	0	13.318	13.080	**98.2**	3.90
BL000583	BLD1-L2-2.11-LR	0	12.138	4.552	**37.5**	1.40
BL000587	BLD1-L2-2.02-LR	0	13.508	1.206	**8.9**	0.64
BL00058B	BLD1-L2-2.01-LR	0	11.169	3.191	**28.6**	1.19
BL00058D	BLD1-L1-1.12-LR	0	13.318	4.281	**32.1**	1.29
BL000595	BLD1-L1-1.11-LR	0	12.138	4.552	**37.5**	1.39
BL000603	BLD1-L1-1.02-LR	0	13.508	10.372	**76.8**	4.72
BL00060E	BLD1-L1-1.01-LR	0	11.169	2.925	**26.2**	1.08
BL00026D	BLD2-L4-4.09-LR	0	16.007	14.229	**88.9**	3.14
BL0002C5	BLD2-L4-4.10-LR	0	27.998	23.691	**84.6**	5.73
BL0002DC	BLD2-L4-4.11-LR	0	16.225	16.225	**100.0**	6.99
BL00003E	BLD2-GF-G.10-LR	0	20.717	14.834	**71.6**	2.65
BL0000DD	BLD2-L1-1.16-LR	0	16.261	13.466	**82.8**	2.52
BL000262	BLD2-L1-1.13-LR	0	15.035	3.341	**22.2**	1.08
BL0002A3	BLD2-L2-2.18-LR	0	13.777	7.654	**55.6**	1.86
BL0002AE	BLD2-L2-2.17-LR	0	16.261	8.130	**50.0**	1.54
BL000261	BLD2-L2-2.17-LR	0	11.913	2.730	**22.9**	0.86
BL000268	BLD2-L2-2.15-LR	0	11.812	1.476	**12.5**	0.77
BL0002CC	BLD2-L2-2.14-LR	0	10.857	4.395	**40.5**	1.66
BL00066F	BLD2-L3-3.12-LR	0	15.035	14.319	**95.2**	3.83
BL000676	BLD2-L3-3.17-LR	0	13.777	10.715	**77.8**	3.73
BL00067D	BLD2-L3-3.16-LR	0	16.261	8.893	**54.7**	1.69
BL000680	BLD2-L3-	0	11.913	8.935	**75.0**	3.65

	3.15-LR					
BL000684	BLD2-L3-3.14-LR	0	11.812	9.843	**83.3**	4.17
BL000688	BLD2-L3-3.13-LR	0	10.857	10.599	**97.6**	5.88

Rooms not included in the analysis

Room ID	Room name	Reason
BL00002B	BLD1-GF-G.01-BD	Not selected for inclusion in report
BL00002C	BLD1-GF-G.01-Kitchen/WC	Not selected for inclusion in report
BL000001	BLD1-GF-G.02-BD1	Not selected for inclusion in report
BL00002D	BLD1-GF-G.02-BD2	Not selected for inclusion in report
BL00002E	BLD1-GF-G.02-Kitchen/WC	Not selected for inclusion in report
BL00003F	BLD2-GF-G.09-Kitchen/WC	Not selected for inclusion in report
BL000041	BLD2-GF-G.08-BD1	Not selected for inclusion in report
BL000002	BLD2-GF-G.08-BD2	Not selected for inclusion in report
BL000044	BLD2-GF-G.07-BD1	Not selected for inclusion in report
BL000047	BLD1-L1-1.02-BD1	Not selected for inclusion in report
BL00017C	BLD1-L1-1.04-Kitchen/WC	Not selected for inclusion in report
BL00017F	BLD1-L1-1.05-Kitchen/WC	Not selected for inclusion in report
BL00017E	BLD1-L1-1.06-BD1	Not selected for inclusion in report
BL000183	BLD1-L1-1.06-BD2	Not selected for inclusion in report
BL000184	BLD1-L1-1.06-Kitchen/WC	Not selected for inclusion in report
BL000192	BLD1-L1-1.07-BD1	Not selected for inclusion in report
BL0001FB	BLD2-L1-1.15-BD2	Not selected for inclusion in report
BL00020D	BLD2-L1-1.14-BD2	Not selected for inclusion in report
BL000043	BLD2-GF-G.08-Kitchen/WC	Not selected for inclusion in report
BL000046	BLD2-GF-G.07-Kitchen/WC	Not selected for inclusion in report
BL000189	BLD1-L1-1.10-Kitchen/WC	Not selected for inclusion in report
BL000206	BLD2-L1-1.15-Kitchen/WC	Not selected for inclusion in report
BL000195	BLD2-L1-1.13-Kitchen/WC	Not selected for inclusion in report
BL00020E	BLD2-L1-1.14-Kitchen/WC	Not selected for inclusion in report
BL000204	BLD1-GF-G.03-BD2-closet	Not selected for inclusion in report
BL000033	BLD1-GF-G.04-BD1-closet	Not selected for inclusion in report
BL000274	BLD1-GF-G.01-BD-closet	Not selected for inclusion in report
BL000275	BLD1-GF-G.02-BD1-closet	Not selected for inclusion in report
BL000280	BLD2-GF-G.07-BD1-closet	Not selected for inclusion in report
BL000020	BLD2-GF-G.07-BD2-closet	Not selected for inclusion in report
BL000281	BLD2-GF-G.07-BD2	Not selected for inclusion in report
BL000284	BLD2-GF-G.08-BD2-closet	Not selected for inclusion in report
BL000283	BLD2-GF-G.09-Kitchen cabinet	Not selected for inclusion in report
BL000021	BLD2-GF-G.09-BD-closet	Not selected for inclusion in report
BL000285	BLD2-GF-G.09-BD	Not selected for inclusion in report
BL0000C0	BLD1-L1-1.02-BD1-closet	Not selected for inclusion in report
BL0000C4	BLD1-L1-1.10-BD1	Not selected for inclusion in report
BL0000C5	BLD1-L1-1.10-BD1-closet	Not selected for inclusion in report
BL0000C6	BLD1-L1-1.10-BD2-closet	Not selected for inclusion in report
BL0000C7	BLD1-L1-1.10-BD2	Not selected for inclusion in report
BL0000D7	BLD1-L1-1.04-BD-closet	Not selected for inclusion in report

BL000679	BLD2-L3-3.17-BD2	Not selected for inclusion in report
BL00067A	BLD2-L3-3.15-BD2	Not selected for inclusion in report
BL00067B	BLD2-L1-1.15-BD2-closet	Not selected for inclusion in report
BL00067C	BLD2-L3-3.16-BD1	Not selected for inclusion in report
BL00067E	BLD2-L3-3.16-Kitchen / WC	Not selected for inclusion in report
BL00067F	BLD2-L3-3.16-BD2	Not selected for inclusion in report
BL000681	BLD2-L3-3.15-Kitchen / WC	Not selected for inclusion in report
BL000682	BLD2-L2-2.15-BD	Not selected for inclusion in report
BL000683	BLD2-L3-3.14-Kitchen / WC	Not selected for inclusion in report
BL000685	BLD2-L1-1.17-BD1-closet	Not selected for inclusion in report
BL000686	BLD2-L3-3.13-BD	Not selected for inclusion in report
BL000687	BLD2-L3-3.13-kitchen / WC	Not selected for inclusion in report
BL000689	BLD2-L2-2.16 balcony	Not selected for inclusion in report
BL00068A	BLD2-L3-common area	Not selected for inclusion in report
BL0006B1	BLD2-L3-3.17-BD1	Not selected for inclusion in report
BL0006B2	BLD2-L3-3.17-BD1-closet	Not selected for inclusion in report

Calculation Data

Location: Bendigo Airport (Aws), Australia(-36.73 N, 215.68 W)
Calculated: 26 Nov 2022 at 12:00 PM
Sky Model: CIE Uniform Overcast Sky
Working plane height: 0.000m
Grid Size: 0.500m
Illuminance Threshold (%): 1.50
Light Penetration: With light penetration through internal windows

9- Preliminary GHG emissions calculator

Green Star Design & As Built

Greenhouse Gas Emissions Calculator

greenstar Developed by the Green Building Council of Australia

User Input Cells

Rows may be inserted if requried

This calculator addresses criterion '15B GHG Emissions Reduction - NaTHERS Pathway' and '16A Prescriptive Pathway - Onsite Energy Generation'.

15B NatHERS Pathway

Project input		
Legislated Minimum Development Average Rating	6	star
Legislated Minimum Worst-Case Apartment Rating	5	star
Project Average Energy Intensity	140	MJ/m²
Project Worst-Case Energy Intensity	197	MJ/m²
NatHERS Climate Zone	66	
Ventilation and Comfort strategy	Mixed	
Which is provided? Heating, cooling or both?	Both	
If Mixed, proportion of apartments with nat vent	100%	
Building total nominal occupancy	3	
Benchmark Building Information		
Minimum Average Benchmark	**6.5**	**star**
Minimum Worst-Case Benchmark	**5.5**	**star**
Benchmark Energy Intensity	**169.0**	**MJ/m²**
Worst Case Energy Intensity Benchmark	**225.0**	**MJ/m²**
Energy Intensity at NatHERS 10-star	**2.0**	**MJ/m²**
Energy Intensity Conditional Requirement met?	**PASS**	
Worst Case Unit Conditional Requirement met?	**PASS**	
Performance Improvement	**17%**	

BUILDING SERVICES SPECIFICATION		
Lighting		
Lighting power density is reduced by at least 10% below the requirement of BCA Part J6 for sole-occupancy units of Class 2 buildings, and in all communal areas accessible by residents	Yes	
Independent light switching to each room of each sole-occupancy unit (including separation of kitchen and living area in open-plan living/dining areas).	Yes	
All common area lighting with automatic lighting control	Yes	
Ventilation and Air-Conditioning		
Mechanical cooling	**Yes**	
Minimum cooling system Energy Star rating	6	star
Installed equipment capacity no more than 10% greater than design cooling capacity	Yes	
Mechanical heating provided? (only assessed if cooling is not provided)	**Yes**	
Minimum heating system Energy Star rating	6	star
Installed equipment capacity no more than 20% greater than design heating capacity	No	
Natural Ventilation	**Yes**	
Compliance is achieved with IEQ Indoor Air Quality credit	Yes	
Cross ventilation pathway in all naturally ventilated apartments	No	
Ceiling fan installed in all naturally ventilated apartments	No	
Domestic Hot Water		
DHW non-renewable fuel source	Electric heat pump (COP>3.5)	
Installed solar thermal heating system capacity (total RECs)		
Building Sealing		

For mechanically air-conditioned buildings, an air pressurisation test is carried out in accordance with ASTM E779-10, ATTMA TSL2, or an equivalent standard.	No
Appliances and Equipment	
Refrigerators achieve a minimum Energy Rating of 1 star below the maximum available rating	No
Washing machines achieve a minimum Energy Rating of 1 star below the maximum available rating	No
Clothes dryers achieve a minimum Energy Rating of 1 star below the maximum available rating	No
Dishwashers achieve a minimum Energy Rating of 1 star below the maximum available rating	No
Accredited GreenPower®	
Percentage GreenPower®	

CREDIT SCORE	
Energy Intensity Reduction	1.0
HVAC	0.0
Lighting	1.0
Domestic Hot Water	0.4
Building Sealing	0.0
Appliances and Equipment	0.0
Accredited GreenPower®	0.0
TOTAL POINTS ACHIEVED	**2.4**
TOTAL POINTS AVAILABLE	**12.0**

16A PEAK ELECTRICITY DEMAND REDUCTION

Building calculated maximum electricity demand as per AS3000	237	kVA
Always on, on-site power generation supply	50	kVA
Peak demand reduction	**21%**	

CREDIT SCORE	
TOTAL POINTS ACHIEVED	**1**
TOTAL POINTS AVAILABLE	**1**

10- Preliminary transport calculator (TBC)

Green Star
Design & As Built
Sustainable Transport, Performance Pathway Calculator

Sustainable Transport 19A Performance Pathway Calculator

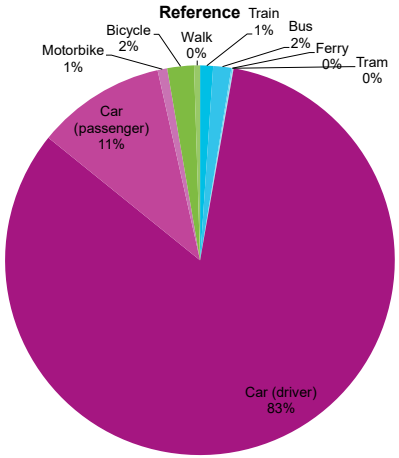
Project details	
Street address	26, Myers, St
Suburb	Bendigo
Postcode	3550
State	Victoria
SA2	Bendigo

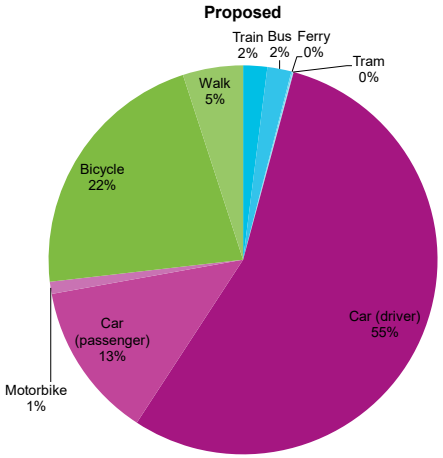
Building type	Multi-unit Residential

Transport modes

Mode	Reference	Adjusted	Proposed
Train	1.1%	2.0%	2.0%
Bus	1.5%	2.0%	2.0%
Ferry	0.1%	0.1%	0.1%
Tram	0.1%	0.1%	0.1%
Car (driver)	83.0%	55.0%	55.0%
Car (passenger)	10.7%	13.0%	13.0%
Motorbike	0.8%	1.0%	1.0%
Bicycle	2.2%	21.8%	21.8%
Walk	0.5%	5.0%	5.0%
Total (%)	**100.0%**	**100.0%**	**100.0%**
Avoided trips (%)	2.0%	2.0%	2.0%
Average trip length (km)	10.5	12.0	12.0
Work weeks (weeks/annum)	40	40	40
Total (trips/annum)	392	-	392
Emissions per trip (g CO2-e / trip)	2,303	-	1,790
Total emissions (tonnes/person/annum)	**0.90**	**-**	**0.70**
Active modes (%)	**2.7%**	**-**	**26.8%**
Total vkt (km/person/annum)	**3,425**	**-**	**2,587**

At least one mode must remain the same as reference. Review figures provided





Emissions intensity

Mode	Reference	Proposed	Unit
Train	177	177	g CO_{2-e}/person km
Bus	131	131	g CO_{2-e}/person km
Ferry	131	131	g CO_{2-e}/person km
Tram	191	191	g CO_{2-e}/person km
Car (driver)	258	258	g CO_{2-e}/vehicle km
Car (passenger)	0	0	g CO_{2-e}/person km
Motorbike	104	104	g CO_{2-e}/person km
Bicycle	0	0	g CO_{2-e}/person km
Walk	0	0	g CO_{2-e}/person km

Walkable location

Points can be achieved based on the project's WalkScore ® or amenities available (FAQ 179)

Select the method used	WalkScore ®

WalkScore ®

Score (0 - 100)	85

Amenities availabile	
Amenities within 400m walking distance	
Categories of amenities included	

Impacts from transport

Indicator	Value	Points available	Points achieved
Emissions reduction	22.3%	5	**2**
Active mode encouragement	892.3%	1	**1**
Vehicle kilometres travelled reduction	24.5%	1	**1**
Walkable location	-	3	**2**
Total		**10**	**6**

11- Walkscore

(/)

26 Myers Street

Bendigo, (/AU-VIC/Bendigo/Bendigo) Bendigo (/AU-VIC/Bendigo), 3550

Commute to **Downtown Bendigo (/compare#edit-commutes)**

1 min 6 min 2 min 9 min

Favorite **Map** **Nearby Apartments (/apartments/search/26-myers-st-bendigo-vic-australia)**

Walk Score 85

Very Walkable

Most errands can be accomplished on foot.

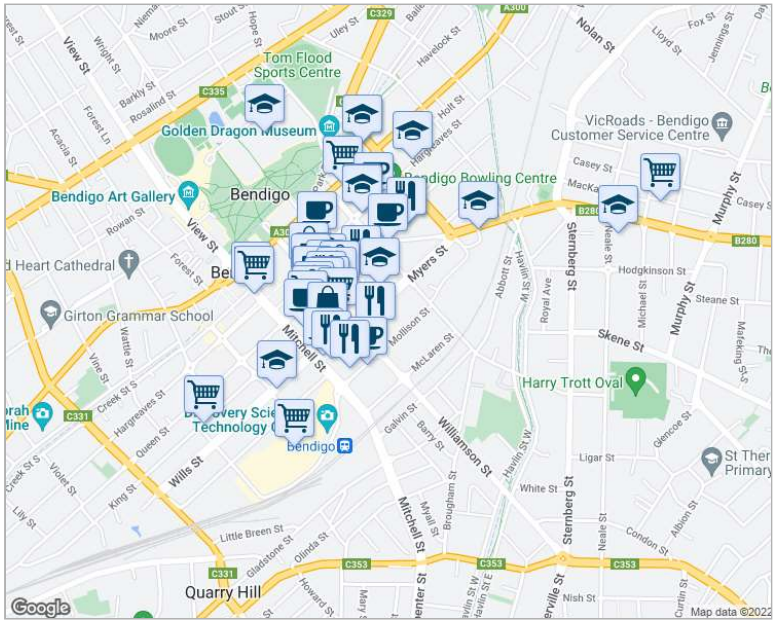
Transit Score 51

Good Transit

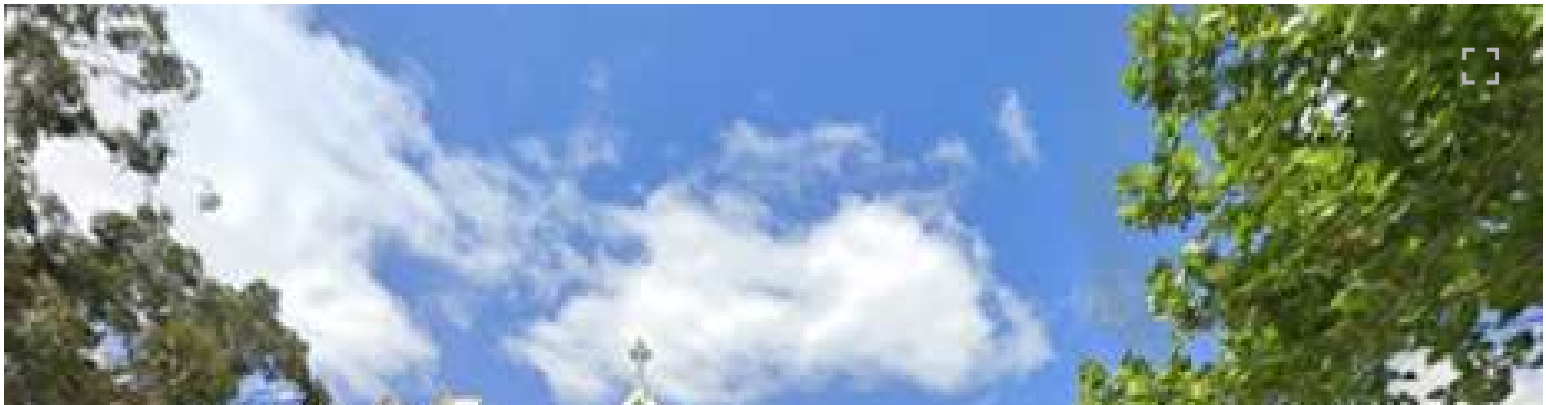
Many nearby public transportation options.

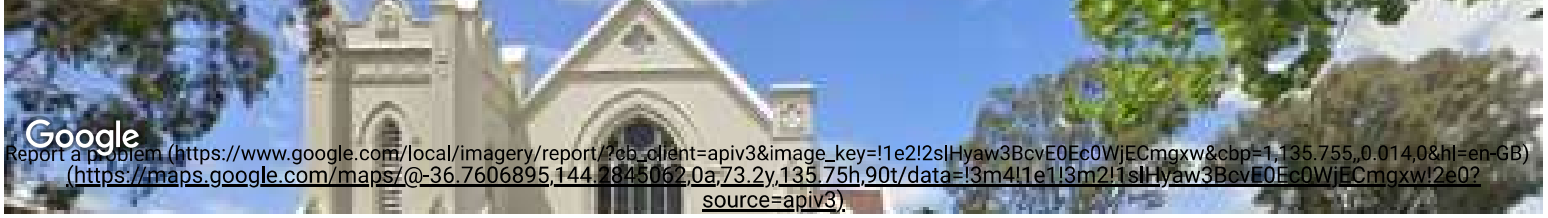
About your score

Add scores to your site (/professional/badges.php?address=26 Myers Street Bendigo, AU-VIC 3550)



About this Location





26 Myers Street has a Walk Score of 85 out of 100. This location is Very Walkable so most errands can be accomplished on foot.

26 Myers Street is an eight minute walk from the Bendigo - Melbourne Via Sunbury, the Echuca/Moama - Melbourne Via Bendigo or Heathcote and the Melbourne - Swan Hill Via Bendigo at the Bendigo Railway Station (Bendigo) stop.

This location is in the Bendigo neighborhood in Bendigo. Nearby parks include Rosalind Park, Ewing Park and Lake Weeroona Park.

Transit Score 51

Good Transit

26 Myers Street has good transit which means many nearby public transportation options.

Rail lines:

Melbourne - Swan Hill Via Bendigo	0.6 km
Bendigo - Melbourne Via Sunbury	0.6 km
Melbourne - Echuca/Moama Via Bendigo or Heathcote	0.6 km

More ▼

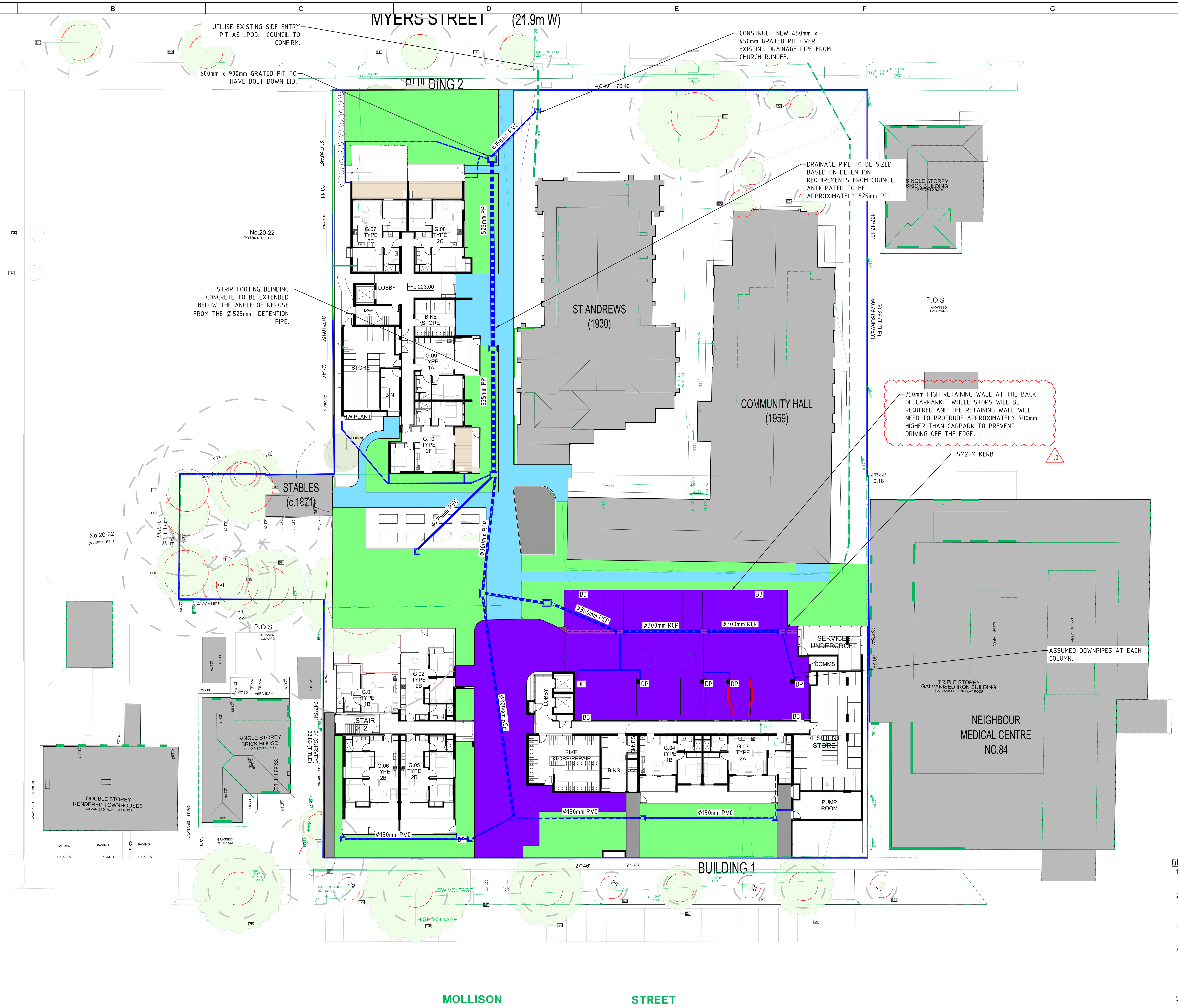
Bendigo Neighborhood

26 Myers Street is in the Bendigo neighborhood. Bendigo is the most walkable neighborhood in **Bendigo** (/AU-VIC/Bendigo) with a neighborhood Walk Score of 66.

Learn More About Bendigo (/AU-VIC/Bendigo/Bendigo)

Learn More About Bendigo (/AU-VIC/Bendigo)

Australia (/cities-and-neighborhoods/australia/) Victoria (/AU-VIC) Bendigo (/AU-VIC/Bendigo) **Bendigo (/AU-VIC/Bendigo/Bendigo)**



MYERS STREET (21.9m W)
UTILISE EXISTING SIDE ENTRY PIT AS LPOD. COUNCIL TO CONFIRM.
600mm x 900mm GRATED PIT TO HAVE BOLT DOWN LID.
CONSTRUCT NEW 450mm x 450mm GRATED PIT OVER EXISTING DRAINAGE PIPE FROM CHURCH RUNOFF.
BUILDING 2
DRAINAGE PIPE TO BE SIZED BASED ON DETENTION REQUIREMENTS FROM COUNCIL. ANTICIPATED TO BE APPROXIMATELY 525mm PP.
SINGLE STOREY BRICK BUILDING
STRIP FOOTING BLINDING CONCRETE TO BE EXTENDED BELOW THE ANGLE OF REPOSE FROM THE Ø525mm DETENTION PIPE.
ST ANDREWS (1930)
COMMUNITY HALL (1959)
P.O.S
750mm HIGH RETAINING WALL AT THE BACK OF CARPARK. WHEEL STOPS WILL BE REQUIRED AND THE RETAINING WALL WILL NEED TO PROTRUDE APPROXIMATELY 700mm HIGHER THAN CARPARK TO PREVENT DRIVING OFF THE EDGE.
SM2-M KERB
STABLES (c.1871)
No.20-22
Ø150mm PVC
525mm PP
Ø225mm PVC
Ø300mm RCP
ASSUMED DOWNPIPES AT EACH COLUMN.
SERVICES UNDERCROFT
TRIPLE STOREY GALVANISED IRON BUILDING
NEIGHBOUR MEDICAL CENTRE NO.84
SINGLE STOREY BRICK HOUSE
DOUBLE STOREY RENDERED TOWNHOUSES
RESIDENT STORE
PUMP ROOM
BIKE STORE/REPAIR
BUILDING 1
LOW VOLTAGE
HIGH VOLTAGE
MOLLISON STREET

GENERAL NOTES

1. STORMWATER PIPEWORK TO BE DESIGN TO MEET A 1:10 YEAR STORM EVENT.
2. THE STORMWATER NETWORK WILL BE DESIGNED TO MEET PRE-DEVELOPMENT FLOWS FOR A 1:10 YEAR STORM EVENT.
3. ALL MAJOR STORMWATER PIPES BENEATH VEHICLE TRAFFICABLE AREAS WILL BE RCP PIPE.
4. ALL DOWNPIPE LOCATIONS HAVE BEEN ASSUMED FOR THE SCHEMATIC PHASE. HYDAULIC ENGINEERING CONSULTANT TO PROVIDE THE DOWNPIPE LOCATIONS DURING THE DESIGN DEVELOPMENT PHASE.
5. LOCATION OF AGI DRAINAGE PIPES TO BE INCLUDED AFTER LANDSCAPE ARCHITECTURAL DRAWINGS HAVE BEEN PROVIDED.

REV	DESCRIPTION	DATE	APPROVED
-	-	-	-
-	-	-	-
3.0	REVISED SCHEMATIC DESIGN	22/11/22	J. BISH
2.0	REVISED SCHEMATIC DESIGN	28/07/22	J. BISH
1.0	SCHEMATIC DESIGN	1/07/22	J. BISH

DESIGNED: J. BISH DATE: 22/11/22
DRAWN: J. BISH DATE: 22/11/22

CHECKED:	NAME	DATE	APPROVED:	NAME	DATE
☒ RMG	P. CHATTERLEY	22/11/22	☒ RMG	P. CHATTERLEY	28/06/22
☐ PSC	-	-	☐ PSC	-	-
☐ -	-	-	☐ CHW	-	-

RMG
REGIONAL MANAGEMENT GROUP PTY. LTD
All Correspondence to PO Box 2422, Bendigo DC, Victoria, 3550.
P: 03 5441 6521 E: info@rmg.com.au

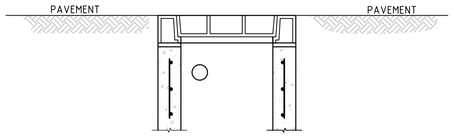
MGS ARCHITECTURE
ST ANDREWS BENDIGO DEVELOPMENT
CIVIL DESIGN
SCHEMATIC LAYOUT

SCALE 1:250 — ORIGINAL SHEET SIZE A1

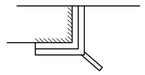
220159-SK-01

ISSUED 2022 VERSION 1.0

22/11/2022 1:59 PM

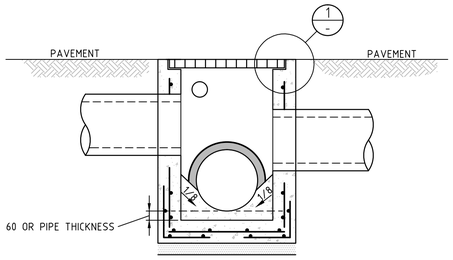


JUNCTION PIT
SCALE 1:20



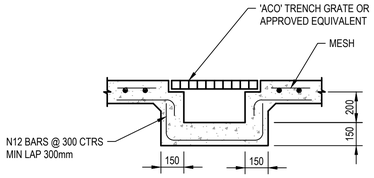
GRATED FRAME DETAIL
NTS

REINFORCEMENT DETAILS	
PIT LENGTH "D"	REINFORCEMENT
UP TO 1200	SL 92
1201 TO 1800	RL 918
1801 TO 2400	RL 1218
> 2400	AS DETAILED

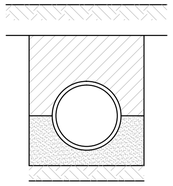


GRATED PIT
SCALE 1:20

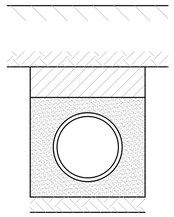
PIT NOTE: STORMWATER PITS ARE TO BE 600mm (W) x 900mm (L) UNLESS OTHERWISE SPECIFIED ON THE PLANS



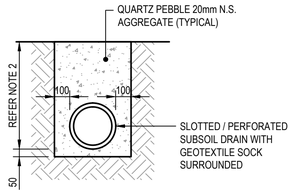
GRATED TRENCH DETAIL
SCALE 1:20



PIPE BEDDING DETAIL LANDSCAPE AREAS
SCALE 1:20



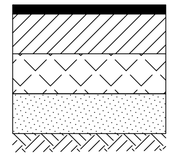
PIPE BEDDING DETAIL UNDER DRIVEWAY PAVEMENTS
SCALE 1:20



NOTES:

1. THE INVERT LEVEL OF THE PIPES SHALL NOT BE LESS THAN:
   - 500mm BELOW SURFACE or
   - 200mm BELOW PAVEMENT SUBGRADE.
2. UNDER PAVEMENT BACKFILL TO BE NO FINE CONCRETE - CLASS 1000.
3. SCORIA AGGREGATE IS NOT PERMITTED FOR USE.

TYPICAL SUBSOIL DRAIN DETAILS
SCALE 1:20



ASPHALT WEARING COURSE - 30mm Type N C170 size 10mm WITH 7mm CRS Primerseal

130mm BASE - CLASS 2 SIZE 20mm FCR

130mm SUBBASE - CLASS 3 SIZE 20mm FCR

(VARIES) IMPORTED FILL - TYPE 'A' FILL OR CLASS 4 SIZE 40mm FCR COMPACTED IN 150mm LAYERS (MAX).

SUBGRADE - CBR > 3

CARPARK ASHPALT PAVEMENT DETAILS
SCALE 1:10

PAVEMENT NOTES

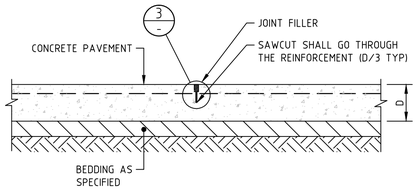
1. ALL PAVEMENT WORKS SHALL BE IN ACCORDANCE WITH THE SPECIFICATION UNLESS SPECIFIED OTHERWISE.

2. AFTER COMPLETION OF EARTHWORKS TO NEAR SUBGRADE LEVEL THE CONTRACTOR SHALL CONFIRM THE SUBGRADE CBR IS AT OR ABOVE THE DESIGN CBR. THE CONTRACTOR SHALL NOTIFY THE SUPERINTENDENT IF IT IDENTIFIED THAT THE SUBGRADE CBR IS LESS THAN THE DESIGN CBR.

3. PRIOR TO PLACING THE PAVEMENT MATERIAL, THE EXPOSED SUBGRADE SHOULD BE PROOF ROLLED WITH A FULLY LADEN DUMP TRUCK OR WATER TRUCK. A SATISFACTORY PROOF ROLL IS WHERE THERE IS NO VISIBLE DEFORMATION OR SPRINGING/ HEAVING OF THE SURFACE. ANY AREAS THAT FAIL THE PROOF ROLL SHALL BE EITHER RECOMPACTED UNTIL SATISFACTORY OR EXCAVATED AND REPLACED WITH SUITABLY COMPACTED MATERIAL.

4. PAVEMENT TESTING TO BE COMPLETED IN ACCORDANCE WITH THE BELOW TABLES.

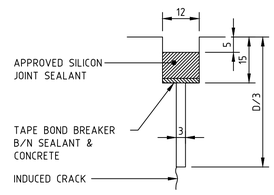
5. PRELIMINARY DESIGN RLs OF THE CARPARK SUGGEST THAT APPROXIMATELY 200mm OF APPROVED FILL WILL BE REQUIRED TO BUILD THE SITE UP TO SUBBASE LEVEL FROM THE APPROVED SUBGRADE.



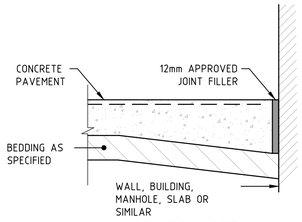
SAWCUT JOINT DETAIL (SC)
LIGHT DUTY PAVEMENT (NO DOWEL)
N.T.S

NOTE:
SAWCUT WITHIN 24 HOUR PERIOD AFTER CONCRETE HAS BEEN PLACED.

SPACING MAXIMUM OF 3.5x3.5m, MAXIMUM LENGTH TO WIDTH RATIO OF 2:1.

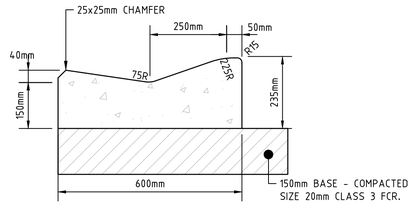


JOINT FILLER DETAIL
SCALE 1:1 (3)

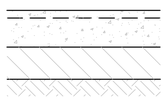


ISOLATION JOINT
N.T.S

PAVEMENT COMPACTION REQUIREMENTS
- BASE COURSE - 98% (MMDD)
- SUBBASE - 96% (MMDD)
- SUBGRADE - 96% (SMDD)



SM2-M (MODIFIED)
NOT TO SCALE



LIGHT/ DARK CONCRETE PAVEMENT
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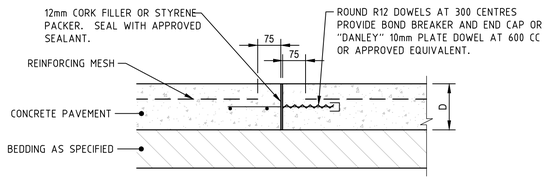
PAVEMENT NOTE: REFER LANDSCAPE ARCHITECT DRAWINGS FOR EXTENT OF PAVEMENT WORKS



DOWELED EXPANSION JOINT (CJ)
REINFORCED CONCRETE
SCALE 1:10

REV	DESCRIPTION	DATE	APPROVED
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-	-	-	-
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2.0	REVISED SCHEMATIC DESIGN	28/07/22	J. BISH
1.0	SCHEMATIC DESIGN	1/07/22	J. BISH

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DRAWN: J. BISH DATE: 22/11/22

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☐ PSC	-	-	☐ PSC	-	-
☐ -	-	-	☐ CHW	-	-

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MGS ARCHITECTURE
ST ANDREWS BENDIGO DEVELOPMENT
CIVIL DESIGN
TYPICAL DETAILS

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26 Myers Street, Bendigo

Transport Impact Assessment

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21 November 2022

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FIGURES

APPENDICES

1 INTRODUCTION

onemile**grid** has been requested by Uniting (Victoria and Tasmania) Ltd to undertake a Transport Impact Assessment of the proposed social housing development at 26 Myers Street, Bendigo.

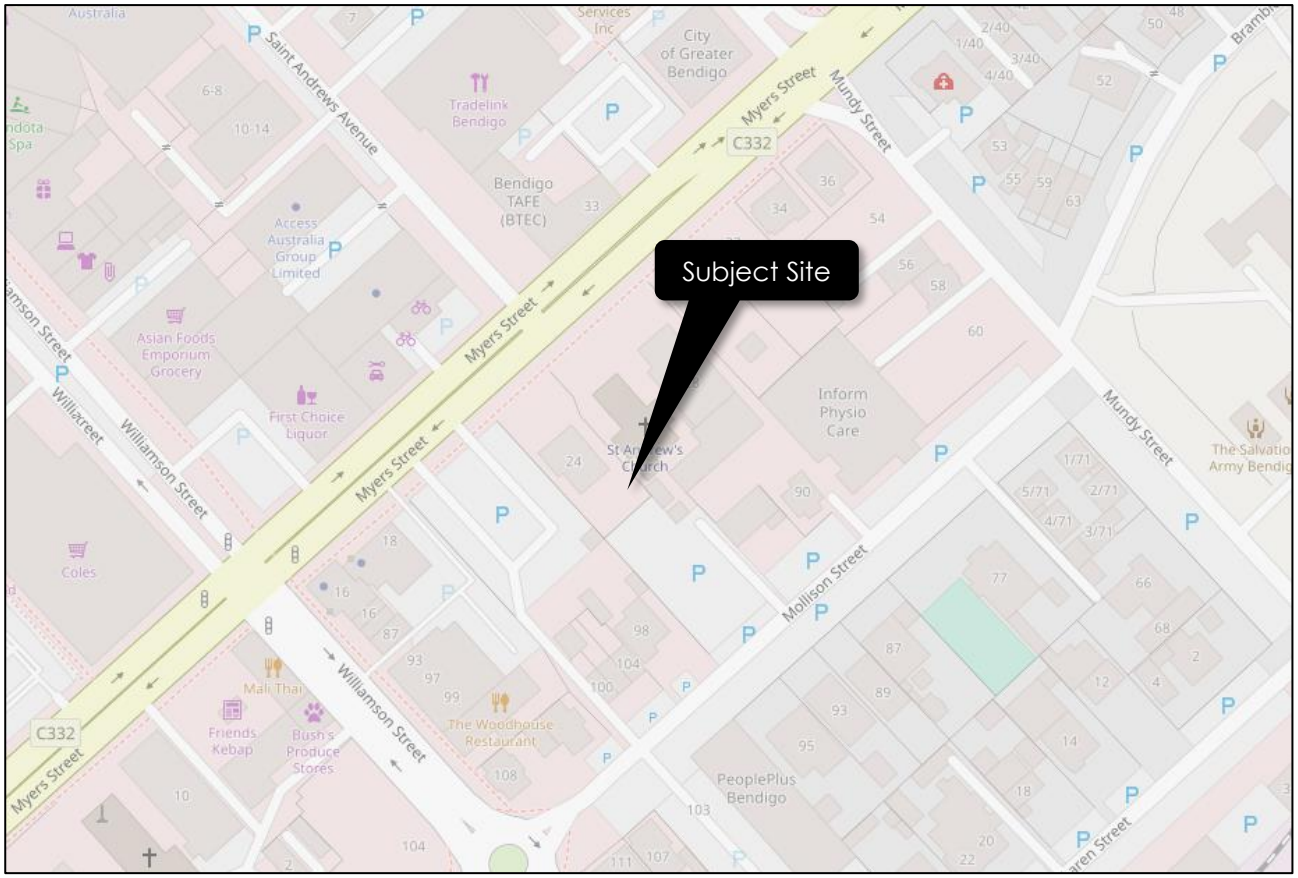
As part of this assessment the subject site has been inspected with due consideration of the development proposal, and relevant background reports have been reviewed.

2 EXISTING CONDITIONS

2.1 Site Location

The subject site is addressed as 26 Myers Street, Bendigo and has a frontage to Mollison Street and Myers Street. Specifically, the site is located on the northwest side of Mollison Street and on the southeast side of Myers Street, approximately midway between Mundy Street and Williamson Street as shown in Figure 1.

Figure 1 Site Location



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The subject site includes a frontage to Mollison Street and Myers Street of approximately 71 metres, and a depth of approximately 101 metres.

The site is currently occupied by the St Andrew's Uniting Church, which includes the main church building, a community hall, a games hall, 2 single storey brick dwellings, and an at-grade carpark.

The St Andrew's Uniting Church includes worship services every second Sunday beginning at 9:30am, while the community hall includes the following schedules:

- Creative Living: 10:15am on Mondays
- Adult Fellowship: 10:00am on the 3rd Friday of the month
- Meditation Groups: 9:00am Fridays
- Uniting Threads: 9:30am Wednesdays
- Messy Church: 4:30pm on the 4th Friday of the month

The site includes a total of 5 vehicle access points, including 3 connections to Myers Street and 2 connections to Mollison Street.

The at-grade carpark includes a total of 40 spaces, and is accessed from the western crossover to Mollison Street. Access to the carpark is unrestricted and is understood to be unmonitored, which may therefore result in the carpark being used by those not affiliated with the church or community hall due to the sites proximity to the Bendigo city centre.

An aerial view of the subject site is provided in Figure 2.

Figure 2 Site Context (20 May 2022)

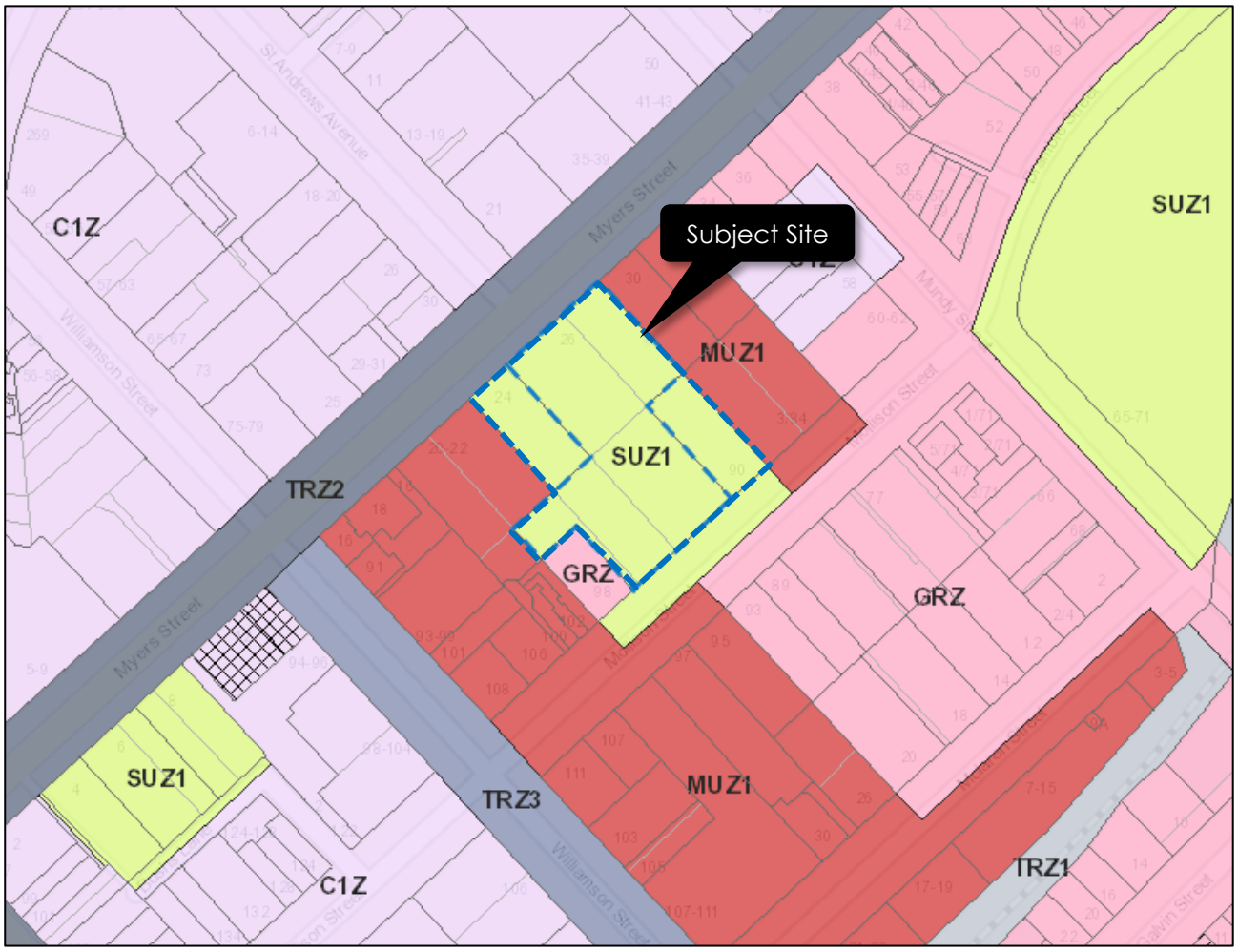
Copyright Nearmap

Land use in the vicinity of the site is mixed in mature, generally comprising of various retail, commercial and medical uses on the northern side of Myers Street, and residential dwellings to the south.

2.2 Planning Zones and Overlays

It is shown in Figure 3 that the site is located within a Special Use Zone (SUZ).

Figure 3 Planning Scheme Zones



Additionally, the site abuts Myers Street, which is within a Transport Zone (TZ2); Principal Road Network.

Furthermore, a Parking Overlay (PO1) applies to the subject site.

2.3 Road Network

2.3.1 Myers Street

Myers Street is an arterial road generally aligned east-west, running between the roundabout connecting Myers Street/McIvor Highway, Chapel Street, Littleton Terrace and Bramble Street in the east and Mitchell Street in the west. Myers Street provides two single traffic lanes in each direction adjacent to the site, with the eastbound carriageway and westbound carriageway separated by a central median. Kerbside parking is provided on both sides of the road within separate indented kerbside lanes, generally restricted to metered parking between the hours of 8:30am and 5:30pm from Monday to Friday on the northern side of the road, and 3-hour metered parking between the hours of 8:30am and 5:30pm from Monday to Friday on the southern side of the road.

A 60km/h speed limit applies to Myers Street in the vicinity of the site.

The cross-section of Myers Street at the frontage of the site is shown in Figure 4.

Figure 4 Myers Street, looking east adjacent to the subject site

Figure 5 Myers Street, looking west adjacent to the subject site

2.3.2 Mollison Street

Mollison Street is a local road generally aligned east-west, running between Mundy Street to the east and Mitchell Street in the west. Mollison Street provides a pavement width of approximately 19.3 metres, which includes 90-degree parking on both sides of the road, and a single traffic lane in each direction adjacent to the site. On-street parking is provided on both sides of the road, generally restricted to 2-hour parking between 9:00am and 5:30pm, Monday to Friday.

The default 50km/h speed limit applies to Mollison Street in the vicinity of the site.

The cross-section of Mollison Street at the frontage of the site is shown in Figure 6.

Figure 6 Mollison Street, looking west adjacent to the subject site

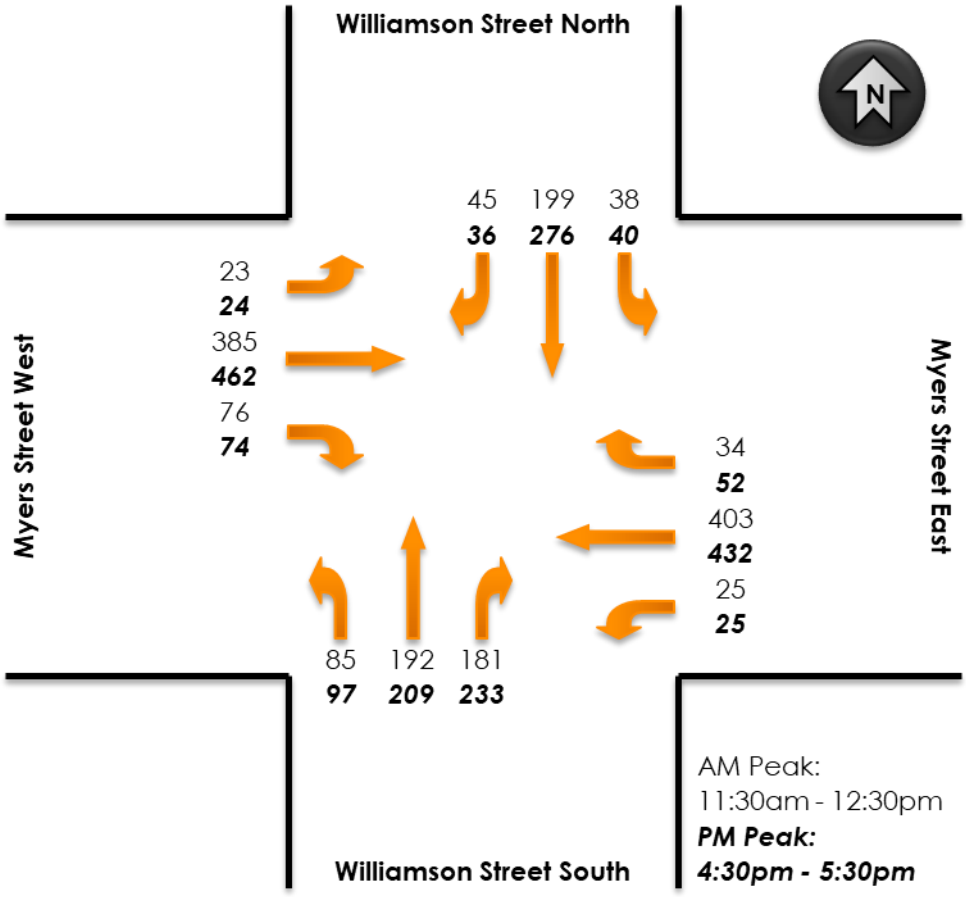
Figure 7 Mollison Street, looking east adjacent to the subject site

2.4 Traffic Volumes

Traffic volumes were obtained from the Department of Transport (VicRoads)' SCATS data at the signalised intersection of Williamson Street and Myers Street on Thursday 5th May 2022.

The peak hour results of the surveys are shown in Figure 8.

Figure 8 Existing Traffic Volumes – Thursday 5th May 2022



To assess the operation of the intersection the traffic volumes have been input into SIDRA Intersection, a traffic modelling software package.

The SIDRA Intersection software package has been developed to provide information on the capacity of an intersection with regard to a number of parameters. Those parameters considered relevant are, Degree of Saturation (DoS), 95th Percentile Queue, and Average Delay as described below.

Table 1 SIDRA Intersection Parameters

Parameter	Description
Degree of Saturation (DoS)	The DoS represents the ratio of the traffic volume making a particular movement compared to the maximum capacity for that particular movement. The value of the DoS has a corresponding rating depending on the ratio as shown below.

Degree of Saturation	Rating
Up to 0.60	Excellent
0.61 – 0.70	Very Good
0.71 – 0.80	Good
0.81 – 0.90	Fair
0.91 – 1.00	Poor
Above 1.00	Very Poor

It is noted that whilst the range of 0.91 – 1.00 is rated as 'poor', it is acceptable for critical movements at an intersection to be operating within this range during high peak periods, reflecting actual conditions in a significant number of suburban signalised intersections.

Average Delay (seconds)	Average delay is the time delay that can be expected for all vehicles undertaking a particular movement in seconds. This includes time taken to accelerate or decelerate, time taken to undertake the manoeuvre, and delay at a hold line or stop line.
95th Percentile (95%ile) Queue	95%ile queue represents the maximum queue length in metres that can be expected in 95% of observed queue lengths in the peak hour.

The results of the analysis are provided in Table 2

Table 2 Myers Street / Williamson Street – Existing Conditions

Approach	DoS	Avg. Delay (sec)	Queue (m)
AM Peak			
Williamson Street South	0.432	30.3	62.8
Myers Street East	0.425	37.7	80.4
Williamson Street North	0.430	42.6	71.9
Myers Street West	0.422	39.1	79.6
PM Peak			
Williamson Street South	0.581	39.8	80.5
Myers Street East	0.529	42.8	94.7
Williamson Street North	0.586	39.6	103.7
Myers Street West	0.579	43.5	105.4

As detailed above, the Myers Street / Williamson Street signalised intersection is currently operating under excellent conditions during the morning and evening peak periods.

2.5 Sustainable Transport

2.5.1 Public Transport

The full public transport provision in the vicinity of the site is shown in Figure 9 and detailed in Table 3. Public transport in Bendigo, similar to other rural town centres, is typically limited to bus services, as is the case for the subject site. Nevertheless, Bendigo Station is located approximately 500m from the site, providing train services to and from Melbourne.

Figure 9 Public Transport Provision

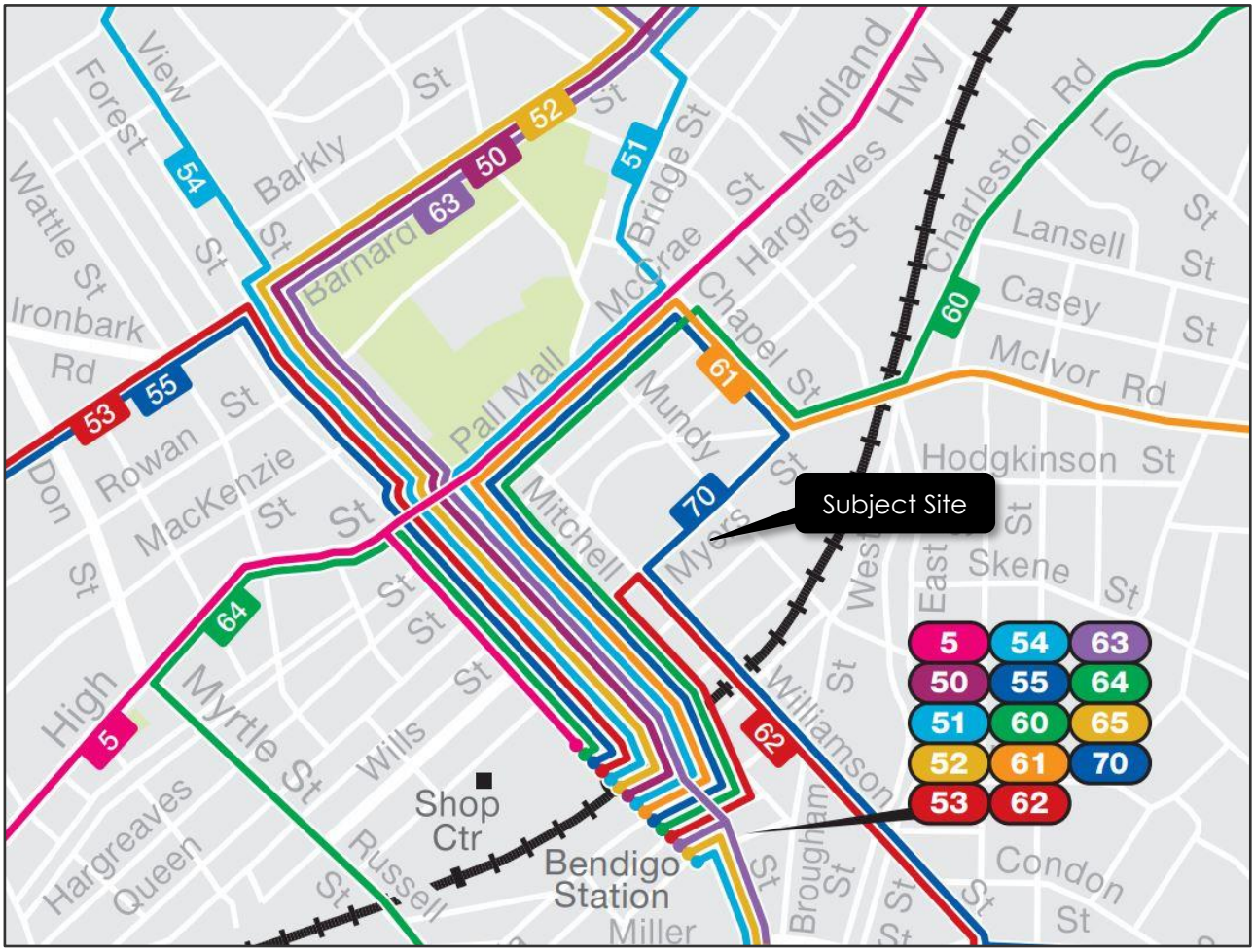


Table 3 Public Transport Provision

Mode	Route No	Route Description	Nearest Stop/Station
Bus	62	Bendigo Station - Spring Gully via La Trobe University	Williamson street
	70	Bendigo Station - Strathfieldsaye via Kennington	Myers Street

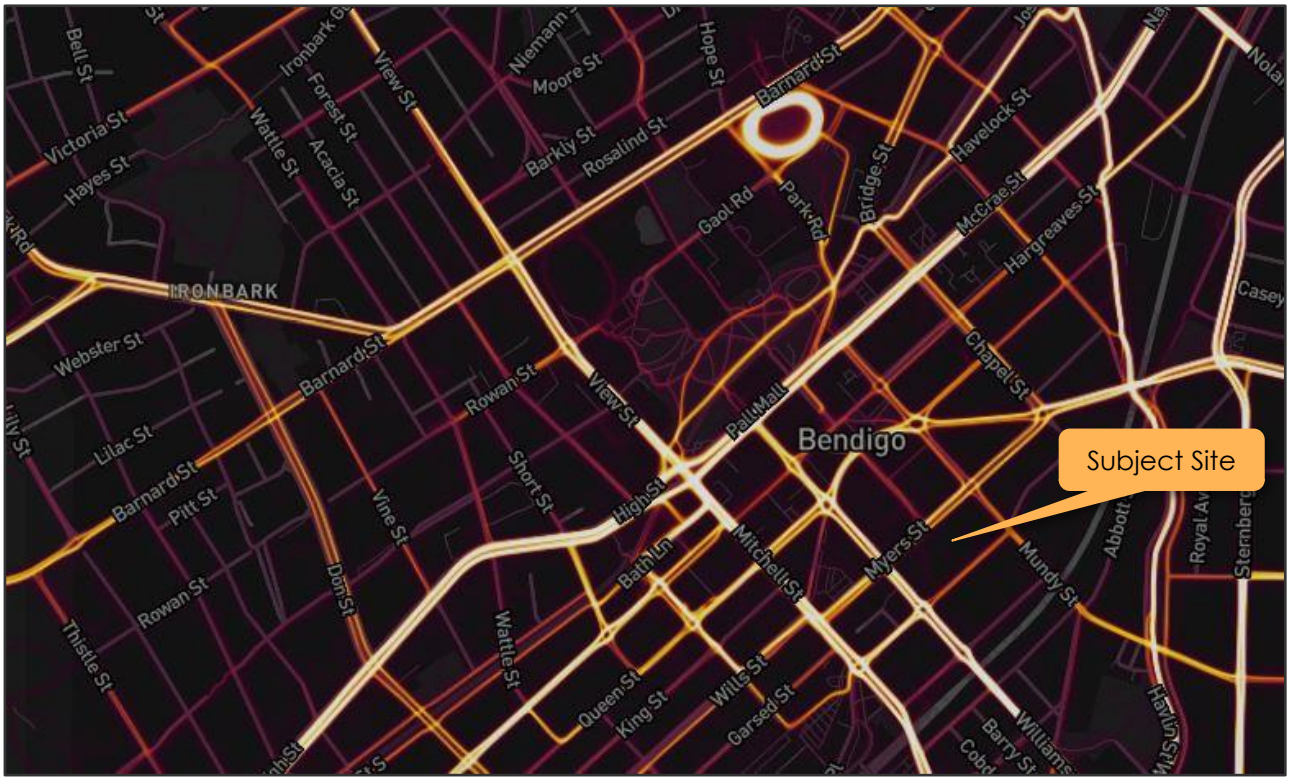
2.5.2 Bicycle Facilities

Strava is a social network and training tool for cyclists, runners and swimmers. Users record their physical activity using a dedicated GPS device or utilise the mobile app, and upload the file to their profile.

Strava anonymised this information and makes it available through their "Global Heatmap" tool, showing aggregated all public activities over the last two years across the world.

A view of the cycling heatmap in proximity to the study area is provided below in Figure 10. Routes of higher usage are brighter in colour.

Figure 10 Strava Cycling Heatmap



As shown above, primary routes around the subject site comprise:

- Myers Street; and
- Williamson Street.

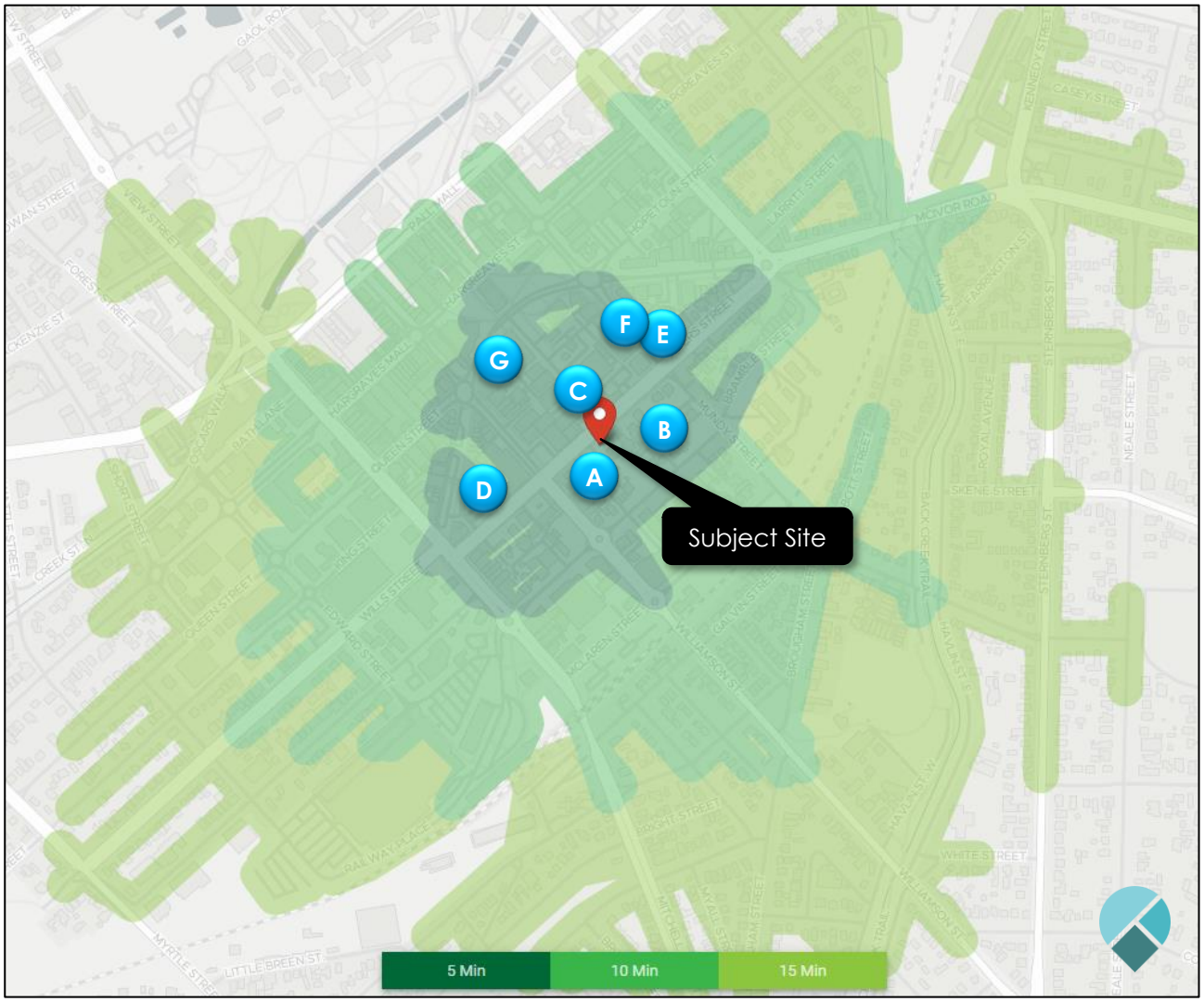
It is noted that this information includes all cycling activities recorded on the platform, inclusive of weekend trips, and all trips throughout the day. Additionally, the data is skewed towards sports cyclists, given that the bulk of commuter and recreational cyclists will not be tracking their rides.

2.5.3 Pedestrian Accessibility

In addition to having good access to public transport modes, the site is well-located for pedestrian accessibility, with a number of recreation, education, shopping and employment uses located within 10 - 15 minutes' walk of the site.

Figure 11 shows a pedestrian walk time map for the site, with the major facilities in the vicinity of the site identified in Table 4.

Figure 11 Pedestrian Walk-Time Map



Courtesy of Targomo

Table 4 Site Facilities

Ref	Facility	Approx. Distance
A	Myers Street Municipal Carpark	Adjacent
B	Sandhurst Medical Practice	Adjacent
C	Myers Street Municipal Carpark 2	40m
D	Coles Supermarket	150m
E	YMCA Bendigo Youth Services	180m
F	Palmer's Gym Bendigo	200m
G	Centrelink	240m

2.6 Walkability

Walkability is a measure of how friendly an area is to walking. Walkability has many health, environmental, and economic benefits. Factors influencing walkability include the presence or absence and quality of footpaths or other pedestrian rights-of-way, traffic and road conditions, land use patterns, building accessibility, and safety.

The site has a Walk Score rating of 85/100 and is very walkable, with most errands able to be accomplished on foot.

3 DEVELOPMENT PROPOSAL

3.1 General

It is proposed to demolish the existing single story dwellings towards the southwest and northeast corners of the site, the games hall and the Mollison Street at-grade car park and develop the subject site for the purposes of a social housing development.

The proposed social housing development will include two separate buildings, with Building 1 fronting Mollison Street and Building 2 fronting Myers Street. Th existing church and community hall buildings will remain on-site.

A summary of the proposed development is shown in Table 5, and the overall site plan is presented in Figure 12.

Figure 12 Proposed Site Plan

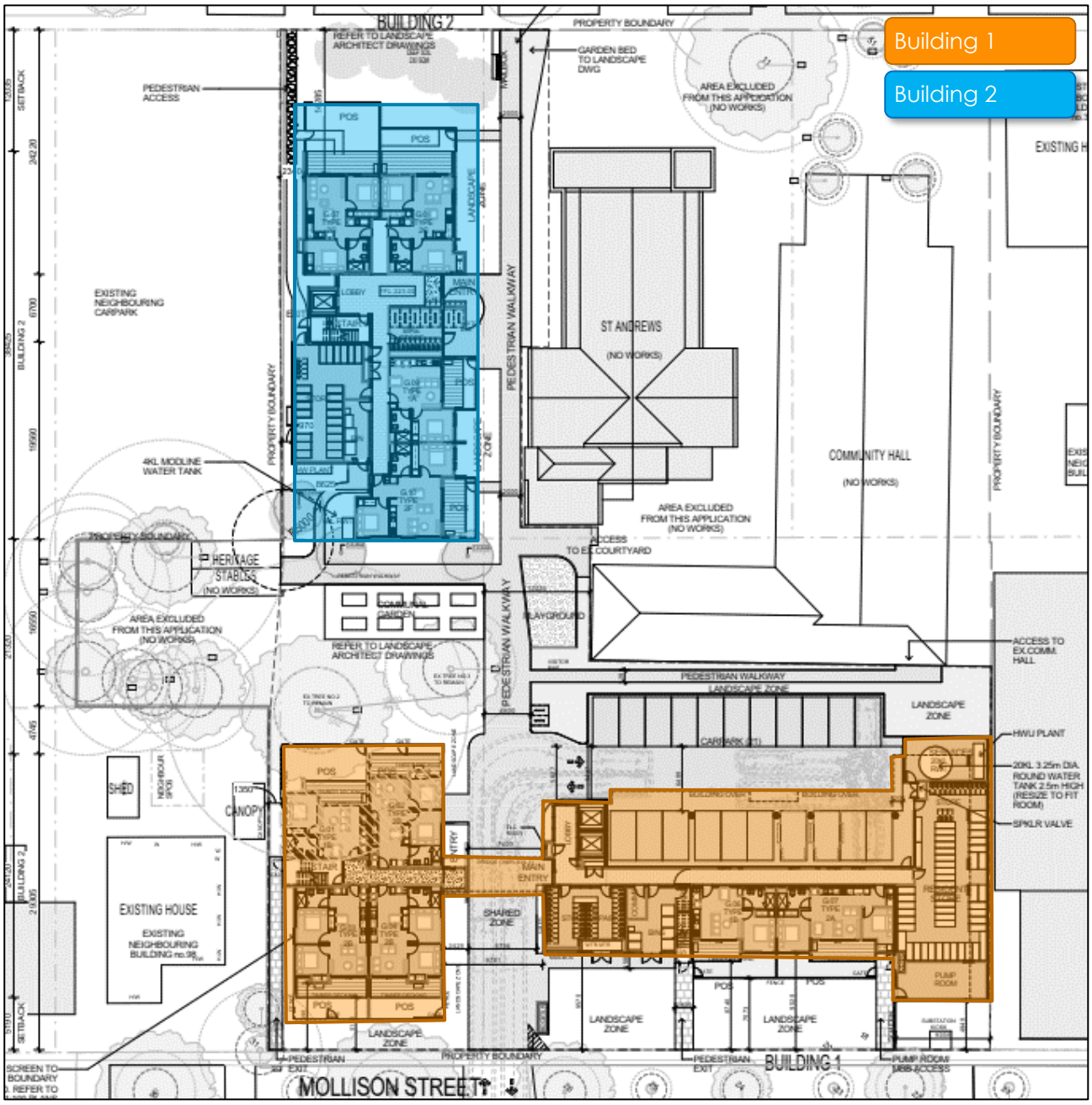


Table 5 Proposed Development

Use	*Component*	*No.*
Building 1	1-Bedroom Dwelling	17
	2-Bedroom Dwelling	32
	Sub-Total	**49**
Building 2	1-Bedroom Dwelling	7
	2-Bedroom Dwelling	17
	Sub-Total	**24**
Total		**73**

3.2 Pedestrian Facilities

Pedestrian access to Building 1 includes a main entrance fronting the internal accessway leading directly into the building lobby, while Building 2 includes a pedestrian connection to Myers Street with the main entrance located approximately midway along the building.

It is proposed to provide a pedestrian link through the site, creating a direct connection from Mollison Street to Myers Street. This is not only intended to improve pedestrian access to the site, but to improve the pedestrian connectivity as a whole for the surrounding precinct.

The pedestrian link will include a footpath connection to Myers Street between Building 2 and the existing St Andrew's Church, which will extend south towards the on-site carpark. From there, pedestrians may use the vehicle accessway to proceed towards Mollison Street. It is noted that the vehicle accessway will function as an informal shared zone, which is considered appropriate given the expected low vehicle movements and the low speed nature of the carpark.

3.3 Bicycle Parking and End-of-Trip Facilities

A total of 81 bicycle spaces are proposed on-site, including 49 bicycle spaces in Building 1, and 24 bicycle spaces in a secure compound on the ground floor of Building 2.

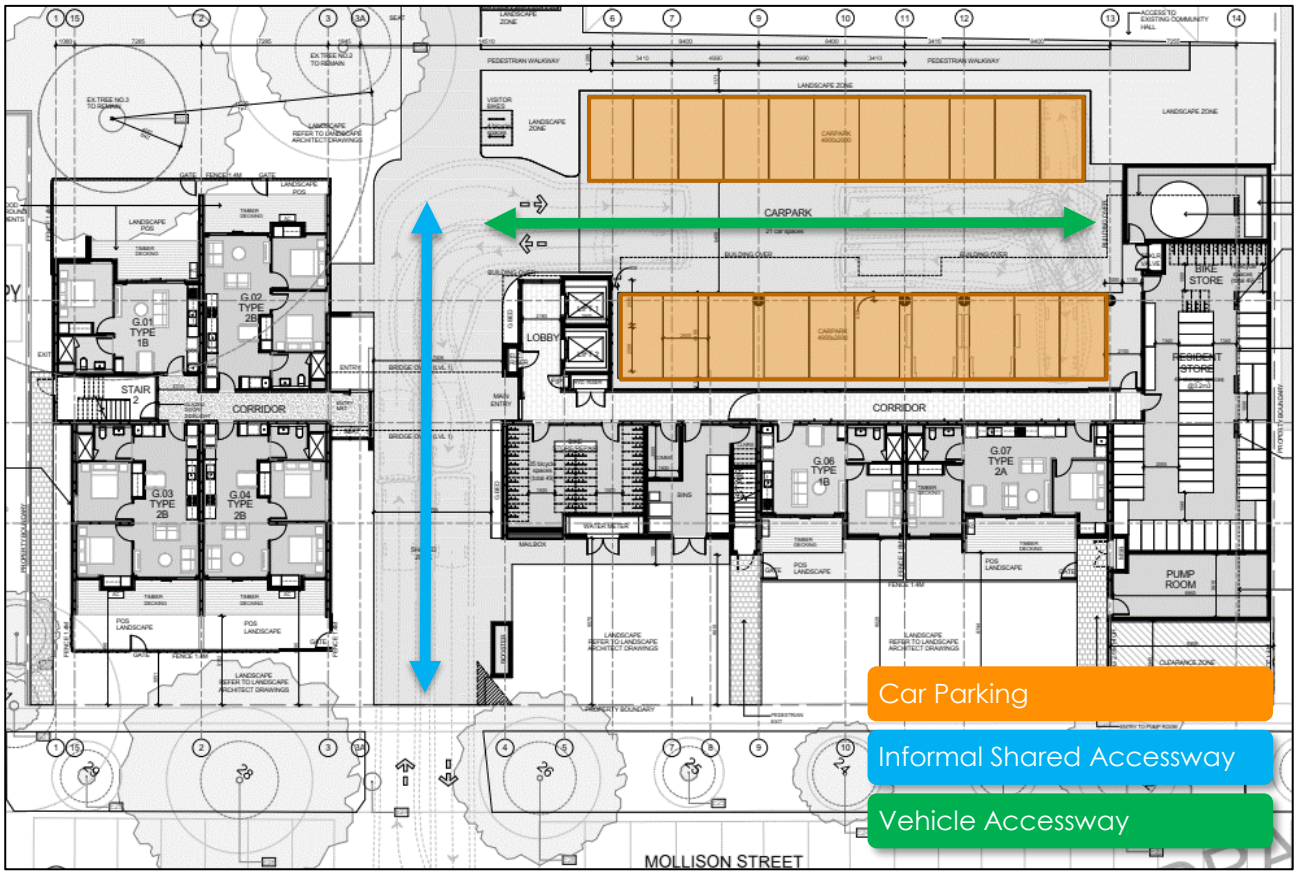
An additional 4 spaces are provided at the frontage to each building for visitors.

3.4 Car Parking and Vehicular Access

Vehicle access to the site is proposed to be provided via a new crossover to Mollison Street towards the western end of the site. The new crossover will lead directly through to the internal accessway, continuing north past Building 1 and connecting through to the on-site carpark which includes 21 spaces.

The proposed site access point and at-grade carpark are shown below in Figure 13.

Figure 13 Proposed Vehicle Access and Carpark Layout



The new crossover to Mollison Street is expected to result in the removal of 4 on-street parking spaces. It is noted that that the existing 2 access points to Mollison Street will be removed as part of this application, with kerb, channel, nature strip and footpath fully reinstated, resulting in an additional 5 spaces to the road network. Furthermore, the existing vehicle crossover on Myers Street to the western end of the site will be removed, with amenities fully reinstated, resulting in 1 additional on-street parking space on Myers Street. The vehicle access connections proposed as part of this application are therefore expected to see an additional 1 on-street space introduced into Mollison Street and 1 additional on-street space on Myers Street.

The existing at-grade carpark located on the subject site comprising 40 spaces will be removed as part of this application. Of these 40 spaces, it is noted that 11 spaces are currently leased out to separate uses and are identified as 'Permit Zones' within the carpark, while the remaining 29 spaces are available for staff and visitors of the church.

The existing two access points to the church from Myers Street will remain as per existing conditions. Additionally, the informal reserved parking space to the eastern end of the site, directly opposite to the eastern crossover to Myers Street will remain. The internal accessway extending off the porte-cochere and between the church and the community hall is understood to be used for general loading purposes and will also remain as per existing conditions.

4 DESIGN ASSESSMENT

4.1 Greater Bendigo Planning Scheme – Clause 52.06

onemile**grid** has undertaken an assessment of the car parking layout and access for the proposed development with due consideration of the Design Standards detailed within Clause 52.06-9 of the Planning Scheme. A review of those relevant Design Standards is provided in the following section.

4.1.1 Design Standard 1: Accessways

A summary of the assessment for Design Standard 1 is provided in Table 6.

Table 6 Clause 52.06-9 Design Assessment – Design Standard 1

Requirement	*Comments*
Be at least 3 metres wide.	Satisfied
Have an internal radius of at least 4 metres at changes of direction or intersection or be at least 4.2 metres wide.	Satisfied
Allow vehicles parked in the last space of a dead-end accessway in public car parks to exit in a forward direction with one manoeuvre.	N/a – private car park
Provide at least 2.1 metres headroom beneath overhead obstructions, calculated for a vehicle with a wheel base of 2.8 metres.	Satisfied – a minimum height clearance of 2.2 metres is achieved
If the accessway serves four or more car spaces or connects to a road in a Transport Zone 2 or Transport Zone 3, the accessway must be designed so that cars can exit the site in a forward direction.	Satisfied
Provide a passing area at the entrance at least 6.1 metres wide and 7 metres long if the accessway serves ten or more car parking spaces and is either more than 50 metres long or connects to a road in a Transport Zone 2 or Transport Zone 3.	N/a – accessway is less than 50 metres and does not connect to a Transport Zone. Nonetheless, the accessway provides a carriageway width of 6.4m at the connection to Mollison Street.
Have a corner splay or area at least 50 per cent clear of visual obstructions extending at least 2 metres along the frontage road from the edge of an exit lane and 2.5 metres along the exit lane from the frontage, to provide a clear view of pedestrians on the footpath of the frontage road. The area clear of visual obstructions may include an adjacent entry or exit lane where more than one lane is provided, or adjacent landscaped areas, provided the landscaping in those areas is less than 900mm in height.	Partially Satisfied – a small section of the corner splay area is obstructed by the booster. In this regard, it is noted that vehicles exiting the site are likely to prop closer towards the centre of the accessway, given the wide 6.4m connection at the southern site boundary, effectively increasing the visual splay area. The proposed corner splay area is therefore considered to be appropriate.
If an accessway to four or more car parking spaces is from land in a Transport Zone 2 or Transport Zone 3, the access to the car spaces must be at least 6 metres from the road carriageway.	N/a – does not connect to a Transport Zone

4.1.2 Design Standard 2: Car Parking Spaces

All car spaces on-site are proposed with a minimum width of 2.6 metres, length of 4.9 metres and are accessed from aisles of no less than 6.4 metres.

4.2 Waste Collection

A bin storage area is located within each building. Bins will be transferred by the private contractor to the waiting collection vehicle on Mollison Street.

Refer to the Waste Management Plan for further information.

4.3 Bicycle Parking

Bicycle parking is proposed to be provided in a mixture of vertically mounted and staggered bicycle racks and on-ground bicycle hoops.

The vertical mounted racks have been designed in accordance with the Australian Standards; specifically, they are located at 500 mm centres, with an envelope of 1.2 metres provided for bicycles and a 1.5 metre access aisle.

The bicycle hoops have been designed in accordance with the Australian Standards; specifically, they are provided at one metre centres, with an envelope of 1.8 metres provided for bicycles and a 1.5 metre access aisle.

In addition, 18 of the 81 bicycle parking spaces proposed have been provided as on-ground hoops exceeding the Australian Standard requirement for 20% of spaces being provided on-ground.

4.4 Clause 52.29 – Land Adjacent to the Principal Road Network

The development proposal is subject to the requirements of Clause 52.29 of the Greater Bendigo Planning Scheme which applies to land adjacent to the Principal Road Network (Myers Street) and aims to ensure appropriate access is provided to identified roads.

Relevant to the proposed development, the Clause states that a permit is required to create or alter access to a road in a Transport Zone 2, and that the proposal is to be referred to the relevant referral authority (in this case the Department of Transport (VicRoads)).

The proposed development does not propose any additional vehicle access points to Myers Street and is anticipated to have no impact on the operation of Myers Street along the site frontage. It is therefore considered that the proposed development will satisfy the requirements of Clause 52.29.

5 LOADING

Clause 65 (Decision Guidelines) of the Greater Bendigo Planning Scheme identifies that "*Before deciding on an application or approval of a plan, the responsible authority must consider, as appropriate: The adequacy of loading and unloading facilities and any associated amenity, traffic flow and road safety impacts.*"

In relation to the proposed residential development, loading facilities will only be required for occasional removalist vehicles, which may utilise the existing on-street parking along the Mollison Street site frontage.

The provision for loading is therefore considered appropriate for the proposed use.

6 BICYCLE PARKING

The bicycle parking requirements for the subject site are identified in Clause 52.34 of the Greater Bendigo Planning Scheme, which specifies the following requirements for the proposed development.

Table 7 Clause 52.34 – Bicycle Parking Requirements

Component	*No/Area*	*Requirement*	*Total*
Dwelling (four or more storeys)	73 dwellings	1 space per 5 dwellings for residents 1 space per 10 dwellings for visitors	15 7

It is proposed to provide a total of 81 bicycle parking spaces on-site, including 73 spaces available for residents and 8 spaces available for visitors.

Considering the above, the proposed provision of bicycle parking far exceeds the requirements of the Planning Scheme, and is considered appropriate.

7 CAR PARKING

7.1 Statutory Car Parking Requirements

7.1.1 Car Parking Planning Controls

It is understood that the proposed development will be funded by Victoria's Big Housing Build program, therefore the requirements detailed within Clause 52.20 – Victoria's Big House Build apply.

VC187 and VC190, gazetted on 1 December 2020, introduced changes to the Victoria Planning Provisions and all planning schemes to streamline the planning process and support economic recovery through the creation of thousands of jobs, and the rapid delivery of much needed social and affordable housing.

The amendment makes changes to the Victoria Planning Provisions and all planning schemes by introducing a new particular provision, Victoria's Big Housing Build at Clause 52.20. The Minister for Energy, Environment and Climate Change is the responsible authority for assessing all proposals made under this new provision (Clause 72.01). Clause 52.20 removes the need for a planning permit or scheme amendment with a streamlined development approval process where the Minister approves the project and plans.

The proposed development will pursue the requirements of Clause 52.20, which are summarised below.

7.1.2 Car Parking Requirements – Clause 52.20

As noted above, the site will be funded under Victoria's Big Housing Build and will pursue car parking provisions under Clause 52.20.

The car parking requirements for the subject site are summarised below in Table 8.

Table 8 Clause 52.20 – Car Parking Requirements

Use	*Car Parking Measure*
Dwelling	A minimum 0.6 spaces to each dwelling

Based on Clause 73.03 Land Use Terms, the development will be assessed as 'dwellings', therefore the rate of 0.6 spaces to each dwelling will be used to determine car parking requirements.

The car parking requirements for each building have been assessed in Table 9.

Table 9 Clause 52.20 – Car Parking Requirements

Use	*No.*	*Car Parking Measure*	*Total*
Private and affordable housing	73 dwellings	A minimum 0.6 spaces to each dwelling	43 spaces
Total Spaces Required			**43 spaces**

Based on the above calculations, Clause 52.20 requires to provide a total of 43 spaces for the development.

7.1.3 Proposed Car Parking Provision

It is proposed to provide a total of 21 car parking spaces on-site, which equates to a shortfall of 22 spaces when compared to the Planning Scheme requirements.

In addition to the above, the proposed development will see the removal of the at-grade carpark fronting Mollison Street, which includes parking for up to 40 vehicles, noting that only 29 spaces are used by the church.

In this regard, Clause 52.06-7 of the Greater Bendigo Planning Scheme indicates that an application to reduce (including reduce to zero) the requirement for car spaces must be accompanied by a Car Parking Demand Assessment. The Assessment must assess the car parking demand likely to be generated by the proposed development, having consideration to:

- The likelihood of multi-purpose trips within the locality which are likely to be combined with a trip to the land in connection with the proposed use.
- The variation of car parking demand likely to be generated by the proposed use over time.
- The short-stay and long-stay car parking demand likely to be generated by the proposed use.
- The availability of public transport in the locality of the land.
- The convenience of pedestrian and cyclist access to the land.
- The provision of bicycle parking and end of trip facilities for cyclists in the locality of the land.
- The anticipated car ownership rates of likely or proposed visitors to or occupants of the land.
- Any empirical assessment or case study.

An assessment of the likely parking demands and the appropriateness of reducing the car parking provision below them is set out below.

7.2 Car Parking Demand Assessment

7.2.1 2016 Census Data – Australian Bureau of Statistics

Car ownership data from the 2016 Census for the City of Greater Bendigo was sourced from the Australian Bureau of Statistics (ABS).

The ABS data was further assessed to determine the proportion of dwellings where residents do not own or otherwise have the need to park a vehicle at their place of residence. The data identifies that residents of 35% of one-bedroom dwellings and residents of 17% of two-bedroom dwellings do not own or otherwise park a vehicle at their place of residence. It should be recognised, however, that this data covers the entire municipality and importantly dwelling types, including traditional apartment style dwellings rather than social housing that is proposed on-site.

The ABS data clearly indicates that there is a market for dwellings that do not provide, and therefore do not attract the price premium associated with a car parking space. Given the site's location with respect to public transport services and other services resulting in enhanced walkability, it is expected that dwellings within the subject site would be particularly appealing to potential tenants who do not have the need to park a vehicle at their place of residence.

Furthermore, it should be recognised that the proposed dwellings are for social housing purposes which is expected to increase the likelihood of tenants not owning their own private vehicle – therefore not generating a demand for an on-site parking space.

With the site's proximity to public transport and other amenities, as well as the social housing arrangement of the proposed dwellings, it is considered reasonable to assume that resident parking demands generated by the proposed dwellings will amount to the parking provision of 21 spaces.

7.3 Review of Car Parking Provision

7.3.1 Council Policy

7.3.1.1 Bendigo City Centre Parking Futures Action Plan 2020

The Bendigo City Centre Parking Futures Action Plan has been prepared to *"help assist the City to better understand the complexities of city centre parking and to ensure informed parking related decisions can be made in the future"*.

Furthermore, the guide states, *"The problems with conventional approaches to parking policy include that providing ample supply incentivises car ownership and use, working against transport policies aiming for less traffic congestion and more walking, cycling and public transport use"* and *"often it is not desirable, feasible nor even possible to include the amount of parking required by the Planning Scheme"*.

This further emphasizes Council's desire to reduce car use, through a reduction in car parking compared to the statutory requirements.

7.3.1.2 Bendigo Integrated Transport and Land Use Strategy 2015

The City of Bendigo adopted the Integrated Transport and Land use Strategy in 2015. The strategy was prepared to examine among other objectives, how strategic land use planning could "*reduce the many short local trips that are unnecessarily made by car in Urban Bendigo*".

The document outlines a desire to design '10-minute neighbourhoods' in which residents can access all their daily amenities within a 10-minute walk or cycle as a strategy for reducing road trips. In this regard, the subject site, located within the Bendigo city centre, meets the objectives of a 10-minute neighbourhood. As such, the proposal provides an opportunity for infill housing, while decreasing vehicle ownership levels.

7.3.1.3 Bendigo CBD Parking Precinct Plan 2009 (Incorporated Plan)

The purpose of the City of Bendigo CBD Parking Precinct Plan is to "*encourage a modal shift away from the private motor vehicle toward more sustainable transport modes such as public transport, walking and cycling*".

Furthermore, the document outlines a number of circumstances which may justify a reduction or waiver from the statutory car parking rates which includes:

- When the proposal is for the development and reuse of an existing building;
- If a range of sustainable transport initiatives can be incorporated into the use and development;
- If participation in a car sharing scheme can be implemented;
- If a better urban design outcome would be achieved through the provision of parking in an off street public parking facility no more than 400 metres from the site through a cash-in-lieu contribution; and
- The effects of car parking provision on any adjoining residential area are considered.

7.3.2 Viability for Future Residents

As noted, the proposed development proposes reduced car parking. Occupants of the development are well located with regard to access amenities, education and employment. Of note, the site is located just outside the border of the town centre, which includes a wide variety of shopping, commercial and amenity based options (food, groceries, banks, post office etc).

Based on the above, the day to day requirements of a resident can be comfortably met without the need for a private vehicle on-site.

7.3.3 On-Street Parking Restrictions

For developments with reduced parking supply, and where on-street parking in the area is unrestricted, it is often observed that long term resident parking may occur on-street. Conversely, where on-street parking surrounding a development with a reduced parking supply is restricted, residents with lower car ownership levels are encouraged to occupy the development, knowing that long-term parking is generally unavailable in the area if they are not provided with an on-site parking space (or only one on-site parking space).

A review of parking restrictions in the area surrounding the proposed development indicates that on-street parking is restricted, which will assist in ensuring residents retain the low car ownership levels sought for the social housing development.

7.3.4 Alternative Modes of Transport

As indicated in Section 2.5.1, the site has good access to public transport, with bus services operating along Myers Street and Williamson Street in the immediate vicinity, and the Bendigo Railway Station located approximately 500m southwest. The provision of public transport ensures that residents of the dwellings with no parking will have good access to alternate transportation modes including for trips outside of Bendigo.

7.3.5 Aerial Photo Review

onemile**grid** has undertaken a review of aerial photography of parking availability within the public car parking areas in the immediate vicinity of the site, using the latest available Nearmap imagery. The area assessed is shown in Figure 14 and includes a total parking supply of 292 spaces, including 132 off-street spaces within the Myers Street Municipal Carparks and 160 on-street spaces surrounding the site.

A review of the 5 most recent dates between 22nd May 2022 and 11th September 2021, provided the parking occupancy shown in Table 10 below.

Figure 14 Public Parking Areas Assessed

Table 10 On-Street Parking Availability

Date	Day	Time	Vehicles Present	Utilisation (%)
22nd May 2022	Sunday	1:14pm	21	13%
12th March 2022	Saturday	11:44am	36	23%
20th January 2022	Thursday	10:26am	132	83%
3rd December 2021	Friday	11:59am	144	90%
11th September 2021	Saturday	10:09am	59	37%
Average			**78**	**49%**

Table 11 Off-Street Parking Availability

Date	Day	Time	Vehicles Present	Utilisation (%)
22nd May 2022	Sunday	1:14pm	1	1%
12th March 2022	Saturday	11:44am	37	28%
20th January 2022	Thursday	10:26am	64	48%
3rd December 2021	Friday	11:59am	124	94%
11th September 2021	Saturday	10:09am	29	22%
Average			**51**	**39%**

As shown above, the on-street and off-street car parking occupancy varies greatly between the dates, ranging from 13% to 90% for on-street parking and 1% to 94% for off-street parking.

It is observed that parking occupancy throughout the area is typically at its peak during weekdays, where parking spaces are assumed to be occupied staff of the surrounding uses (noting that the site is located on the border of the Bendigo city centre) and visitors to the nearby commercial and retail developments. During the weekends, a maximum occupancy of only 37% of on-street parking and 28% of off-street parking was observed.

It is noted that the lower car parking occupancy observed on weekends occurs during the St Andrew's Church worship services, which take place on Sundays at 9:30am. While the at-grade carpark fronting Mollison Street will no longer be in operation following construction of the proposed development, there is considered to be sufficient parking availability within the surrounding on-street road network and off-street municipal carparks to accommodate the demand from the remaining church and community hall uses on site.

7.3.6 Adequacy of Proposed Car Parking Provision

It is expected that the proposed supply of car parking is appropriate for the proposed development, considering the following:

- The 2016 Census data identifies that a market exists for dwellings with reduced car parking;
- The proposed dwellings are for social housing purposes, which is expected to increase the likelihood of tenants not owning their own private vehicle;
- The proposed development provides bicycle parking well in excess of the Planning Scheme requirements, therefore providing an alternate means of transportation;
- The development is within walking distance of amenities, including shops, education, entertainment and recreational facilities;
- The reduced provision of car parking is entirely in line with the initiatives within the Bendigo City Centre Parking Futures Action Plan;
- On-street parking is largely restricted in the vicinity, which will assist in ensuring residents retain the low car ownership levels sought for the social housing development;
- The provision of public transport ensures that residents of the dwellings with no parking will have good access to alternate transportation modes;
- There is considered to be sufficient parking availability within the surrounding on-street road network and off-street municipal carparks to accommodate the additional parking demands offset by the removal of the St Andrew's Church carpark; and
- Reduced car parking provision assists with the desired reduction in private vehicle usage, therefore minimising traffic impacts in the vicinity.

8 TRAFFIC

Surveys undertaken by other traffic engineering firms at residential dwellings have shown that the daily traffic generation rates vary depending on the size, location and type of the dwelling, the parking provision and proximity to local facilities and public transport.

It is generally accepted that single dwellings on a lot in outer suburban areas may generate traffic at up to 10 vehicle trips per day, whilst in areas with good public transport, and for higher density dwellings, lower traffic generation rates are often recorded.

Considering the size of the dwellings proposed, the proximity of the site to public transport, and the provision of parking proposed, it is anticipated that the social housing development may generate up to 7 vehicle trips per apartment per day, or 0.7 trips per apartment during the peak periods.

Application of the above rates indicates that the 21 dwellings with a car parking space will generate 147 movements per day, inclusive of 15 vehicle movements during the morning and afternoon peak hours.

It is noted that this assessment is conservatively high given the specific social housing use, which may see a reduction in vehicle trips during peak periods compared to standard residential dwellings.

Reviewing the volumes above, it is noted that up to 15 vehicle movements are expected during the morning and evening peak hours, equivalent to an average of 1 vehicle trips every 4 minutes. Even when focussed into one access point, the traffic volumes generated by the proposed development are very low, and are expected to be easily absorbed into the surrounding road network.

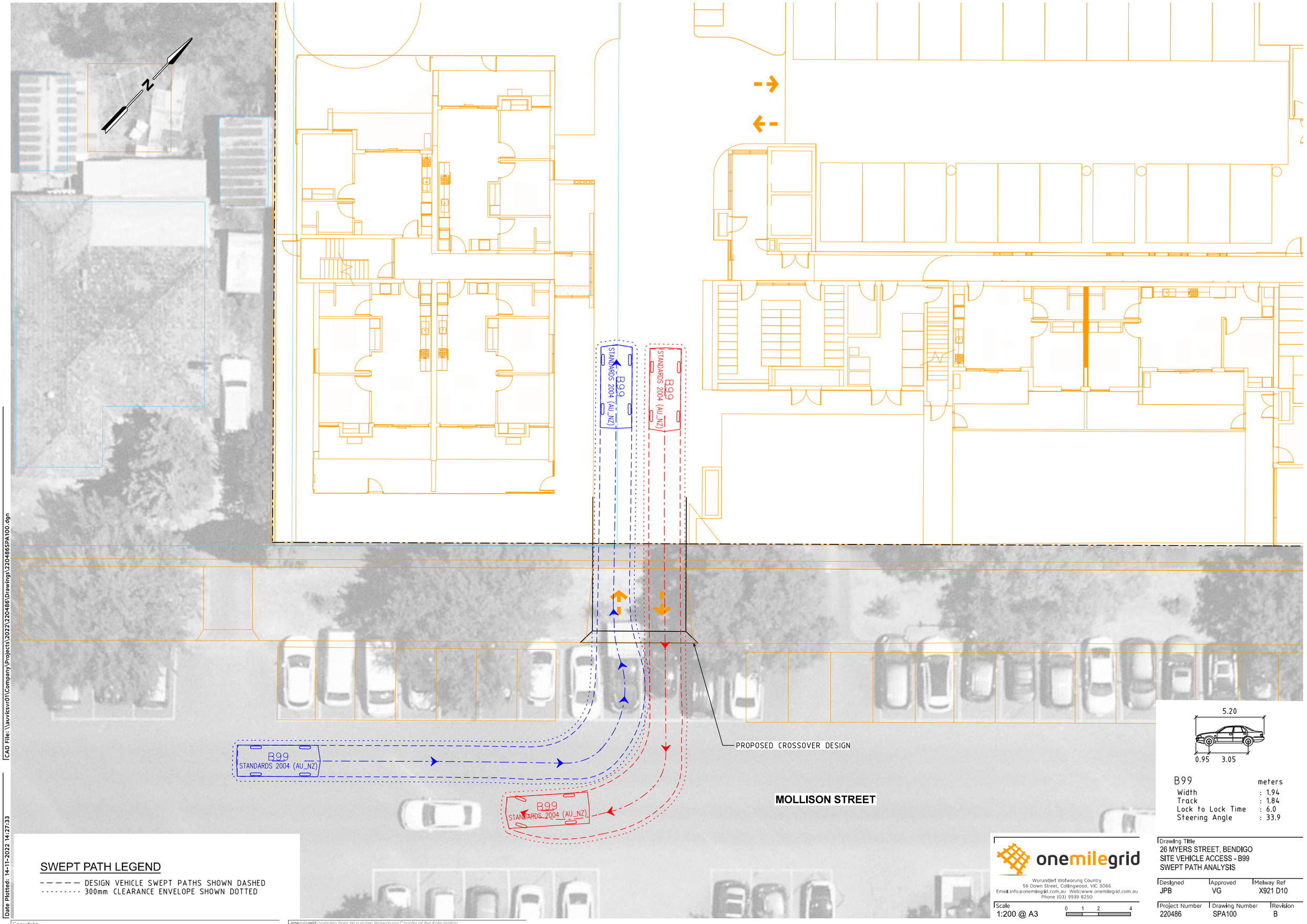
9 CONCLUSIONS

It is proposed to develop the site for the purposes of a social housing development, including 72 rooms and an at-grade carpark providing 21 spaces.

Considering the analysis presented above, it is concluded that:

- The car parking layouts and accesses have been designed generally in accordance with the requirements of the Planning Scheme and are considered appropriate;
- The provision for loading is considered appropriate for the proposed use;
- The proposed provision of bicycle parking far exceeds the requirements of the Planning Scheme;
- The proposed provision of car parking to service the proposed development is considered appropriate based on the following:
  - The 2016 Census data identifies that a market exists for dwellings with reduced car parking;
  - The proposed dwellings are for social housing purposes, which is expected to increase the likelihood of tenants not owning their own private vehicle;
  - The development is within walking distance of amenities, including shops, education, entertainment and recreational facilities;
  - The reduced provision of car parking is entirely in line with the initiatives within the Bendigo City Centre Parking Futures Action Plan;
  - On-street parking is largely restricted in the vicinity, which will assist in ensuring residents retain the low car ownership levels sought for the social housing development;
  - The provision of public transport ensures that residents of the dwellings with no parking will have good access to alternate transportation modes;
  - Reduced car parking provision assists with the desired reduction in private vehicle usage, therefore minimising traffic impacts in the vicinity;
- The existing on-site carpark is understood to be unmonitored and used by external parties, with limited use by the church and community hall;
- The surrounding on-street road network and off-street municipal carparks have sufficient availability to accommodate the parking demands generated by the removal of the on-site carpark; and
- The traffic volumes generated by the proposed development are very low, and are expected to be easily absorbed into the surrounding road network.

Appendix A Vehicle Swept Paths



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SWEPT PATH LEGEND

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5.20

0.95 3.05

B99	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.9

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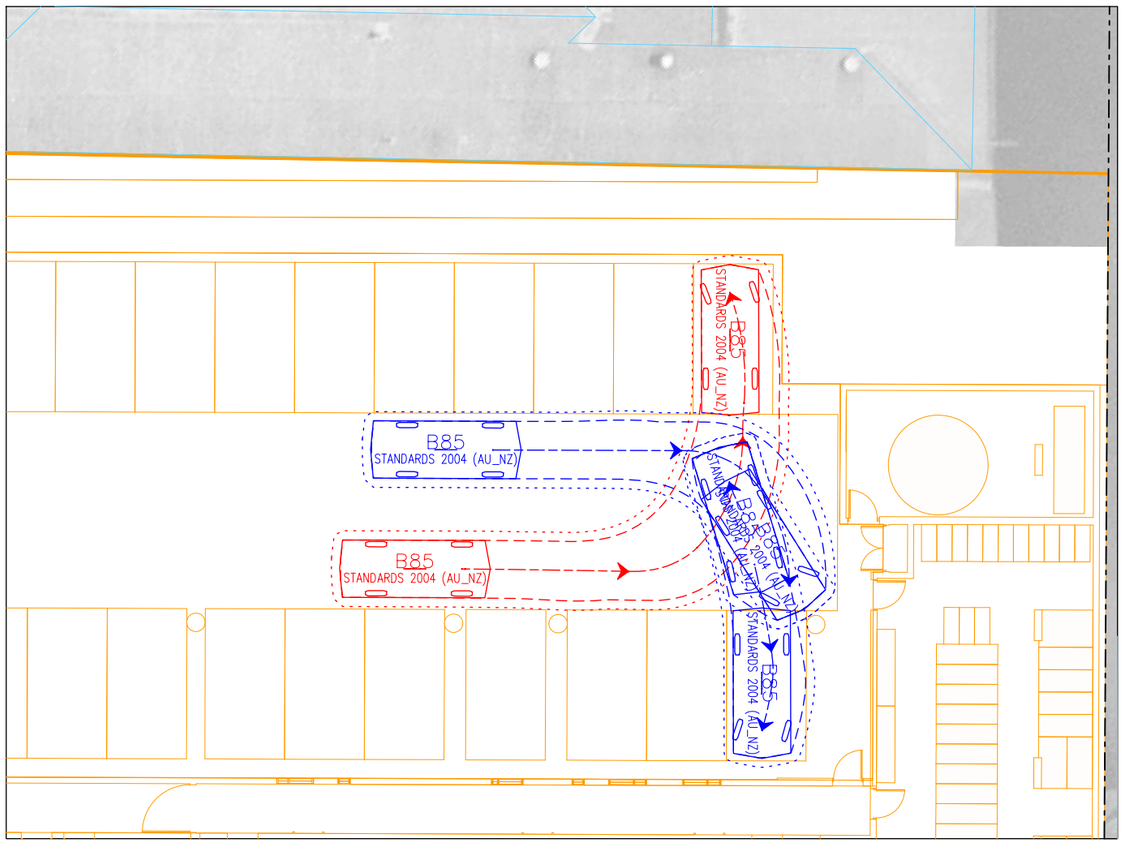
Phone (03) 9939 8250

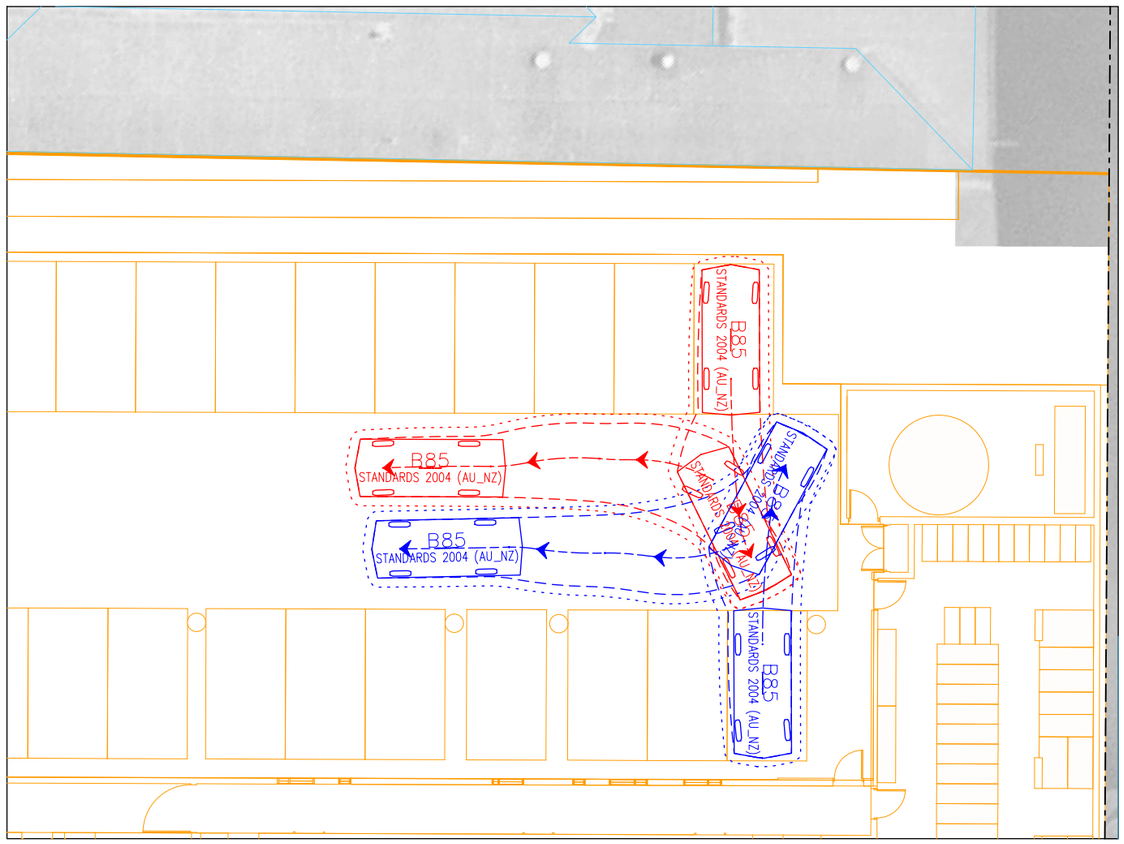
Scale 1:200 @ A3 (0 1 2 4)

Drawing Title
26 MYERS STREET, BENDIGO
SITE VEHICLE ACCESS - B99
SWEPT PATH ANALYSIS

Designed	Approved	Melway Ref
JPB	VG	X921 D10

Project Number	Drawing Number	Revision
220486	SPA100	B





ENTRY MANOEUVRES

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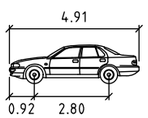
--------- 300mm CLEARANCE ENVELOPE SHOWN DOTTED

EXIT MANOEUVRES

– – – – – DESIGN VEHICLE SWEPT PATHS SHOWN DASHED
--------- 300mm CLEARANCE ENVELOPE SHOWN DOTTED



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Steering Angle	: 34.1

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Phone (03) 9939 8250

Scale
1:200 @ A3
0 1 2 4

Drawing Title
26 MYERS STREET, BENDIGO
SITE VEHICLE ACCESS
SWEPT PATH ANALYSIS

Designed	Approved	Melway Ref
JPB	VG	X921 D10

Project Number	Drawing Number	Revision
220486	SPA101	B

CAD File: \\auvlcsvr01\Company\Projects\2022\220486\Drawings\220486SPA101.dgn

Date Plotted: 14-11-2022 14:28:07

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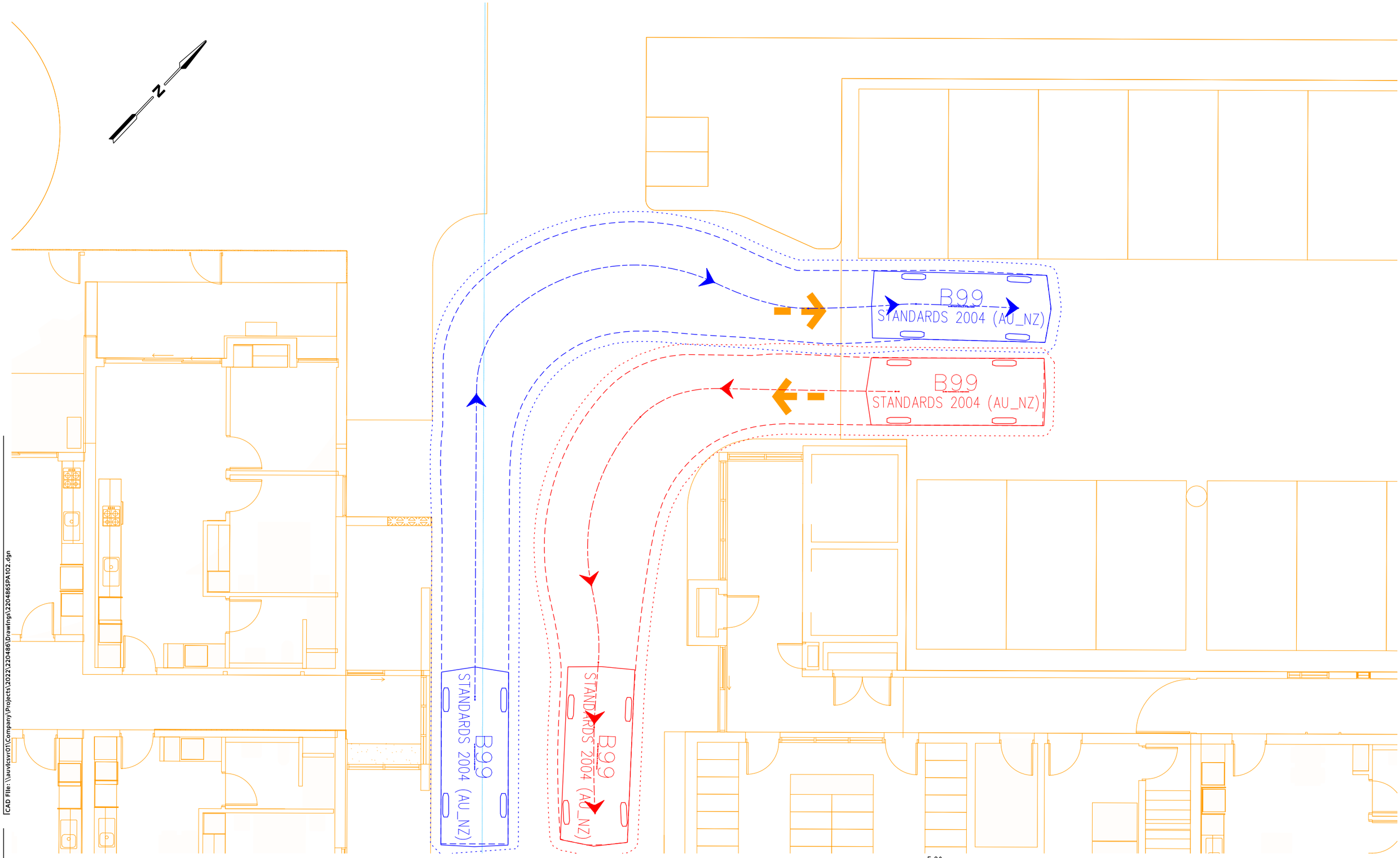

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SWEPT PATH LEGEND

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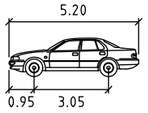
- ---------- 300mm CLEARANCE ENVELOPE SHOWN DOTTED

MOLLISON STREET



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Steering Angle	: 33.9

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Drawing Title
26 MYERS STREET, BENDIGO
SITE VEHICLE ACCESS
SWEPT PATH ANALYSIS

Designed	Approved	Melway Ref
JPB	VG	X921 D10

Scale
1:100 @ A3
0 0.5 1 2

Project Number	Drawing Number	Revision
220486	SPA102	B

Appendix B DoT Referral Response

Department of Transport

GPO Box 2392
Melbourne, VIC 3001 Australia
Telephone: +61 3 9651 9999
www.transport.vic.gov.au
DX 201292

Greater Bendigo City Council
195-229 Lyttleton Terrace
Bendigo VIC 3552

Dear Sir/Madam

PLANNING APPLICATION NO.:	**N/A**
DEPARTMENT REFERENCE NO:	**PPR 40368/22**
PROPERTY ADDRESS:	**MOLLISON STREET BENDIGO VIC 3550**

Section 55 – No Objection

Thank you for your referral dated 8 July 2022 of the above application to the Head, Transport for Victoria under Section 55 of the *Planning and Environment Act 1987.*

The Head, Transport for Victoria has considered this application and does not object to the grant of a permit.

Please forward a copy of any decision to this office as required under the *Planning and Environment Act 1987*.

Should you have any enquiries regarding this matter, please contact Daniel Mustata on or Statutory.planning@roads.vic.gov.au.

Yours sincerely

JASMINE BARTLETT
TEAM LEADER STATUTORY PLANNING – Department of Transport – Loddon Mallee Region
Under delegation from the Head, Transport for Victoria
01/08/2022
Cc: Permit applicant

VICTORIA State Government

26 Myers Street, Bendigo

Waste Management Plan

220486WMP001B-F.docx

29 November 2022

onemile**grid**

ABN: 79 168 115 679

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DOCUMENT INFORMATION

Prepared for	Uniting (Victoria and Tasmania) Ltd		
File Name	220486WMP001B-F.docx	**Report Date**	29 November 2022
Prepared by	JM	**Reviewed by**	VPG

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CONTENTS

TABLES

FIGURES

1 INTRODUCTION

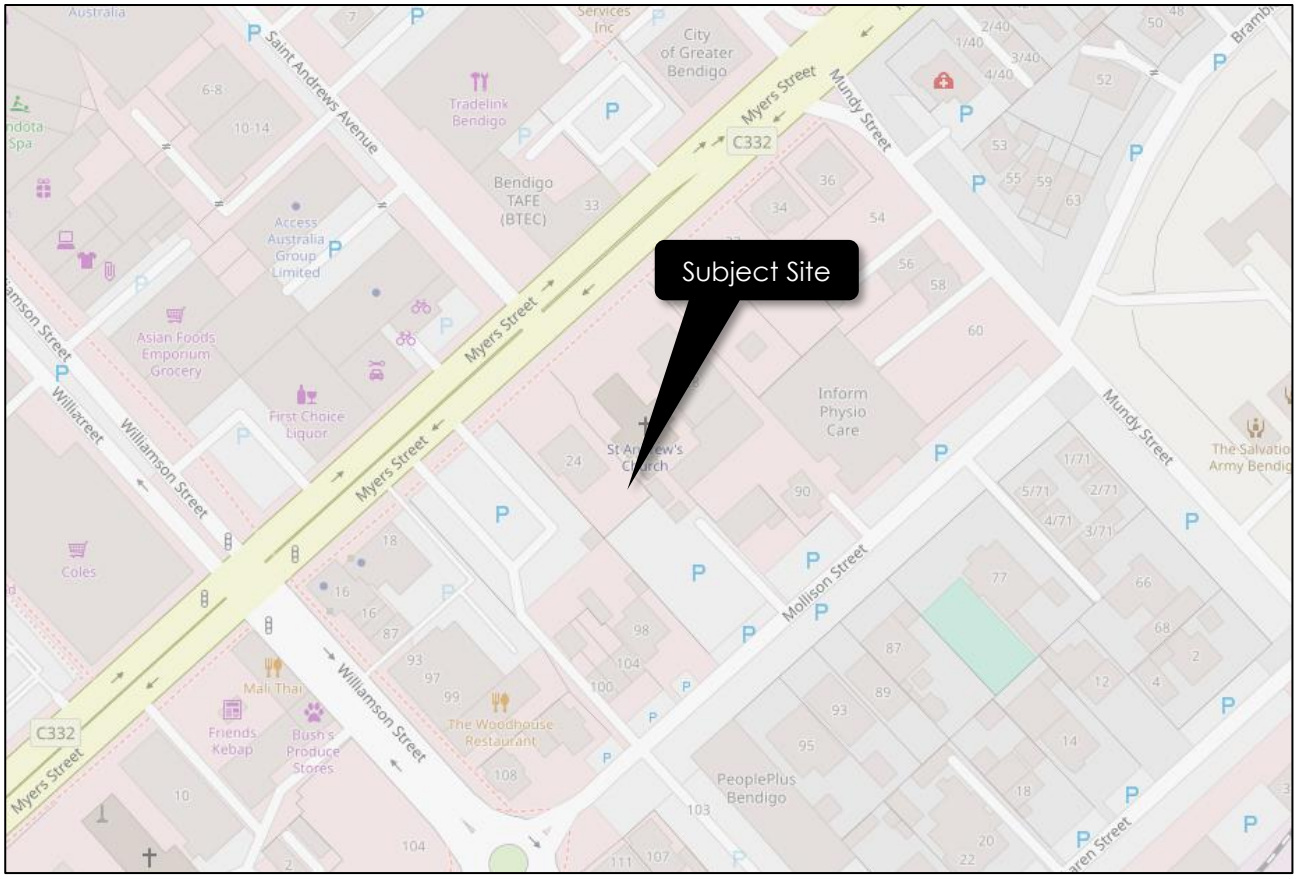
onemile**grid** has been requested by Uniting (Victoria and Tasmania) Ltd to prepare a Waste Management Plan for the proposed social housing development at 26 Myers Street, Bendigo.

The preparation of this management plan has been undertaken with due consideration of the Sustainability Victoria Better Practice Guide for Waste Management and Recycling in Multi-unit Developments and relevant Council documentation.

2 EXISTING SITE CONDITIONS

The subject site is addressed as 26 Myers Street, Bendigo and has a frontage to Mollison Street and Myers Street. Specifically, the site is located on the northwest side of Mollison Street and on the southeast side of Myers Street, approximately midway between Mundy Street and Williamson Street as shown in Figure 1.

Figure 1 Site Location



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The subject site includes a frontage to Mollison Street and Myers Street of approximately 71 metres, and a depth of approximately 101 metres.

The site is currently occupied by the St Andrew's Uniting Church, which includes the main church building, a community hall, a games hall, 2 single storey brick dwellings, and an at-grade carpark.

3 DEVELOPMENT PROPOSAL

3.1 General

It is proposed to demolish the existing single story dwellings towards the southwest and northeast corners of the site, the games hall and the Mollison Street at-grade car park and develop the subject site for the purposes of a social housing development.

The proposed social housing development will include two separate buildings, with Building 1 fronting Mollison Street and Building 2 fronting Myers Street. Th existing church and community hall buildings will remain on-site.

A summary of the proposed development is shown below in Table 1.

Table 1 Proposed Development

Use	*Component*	*No.*
Building 1	1-Bedroom Dwelling	17
	2-Bedroom Dwelling	32
	Sub-Total	**49**
Building 2	1-Bedroom Dwelling	7
	2-Bedroom Dwelling	17
	Sub-Total	**24**
Total		**73**

Vehicle access to the site is proposed to be provided via a new crossover to Mollison Street towards the western end of the site. The new crossover will lead directly through to the internal accessway and on-site carpark.

3.2 Waste Management

It is proposed to utilise a private contractor to manage the collection and disposal of all waste streams associated with the development.

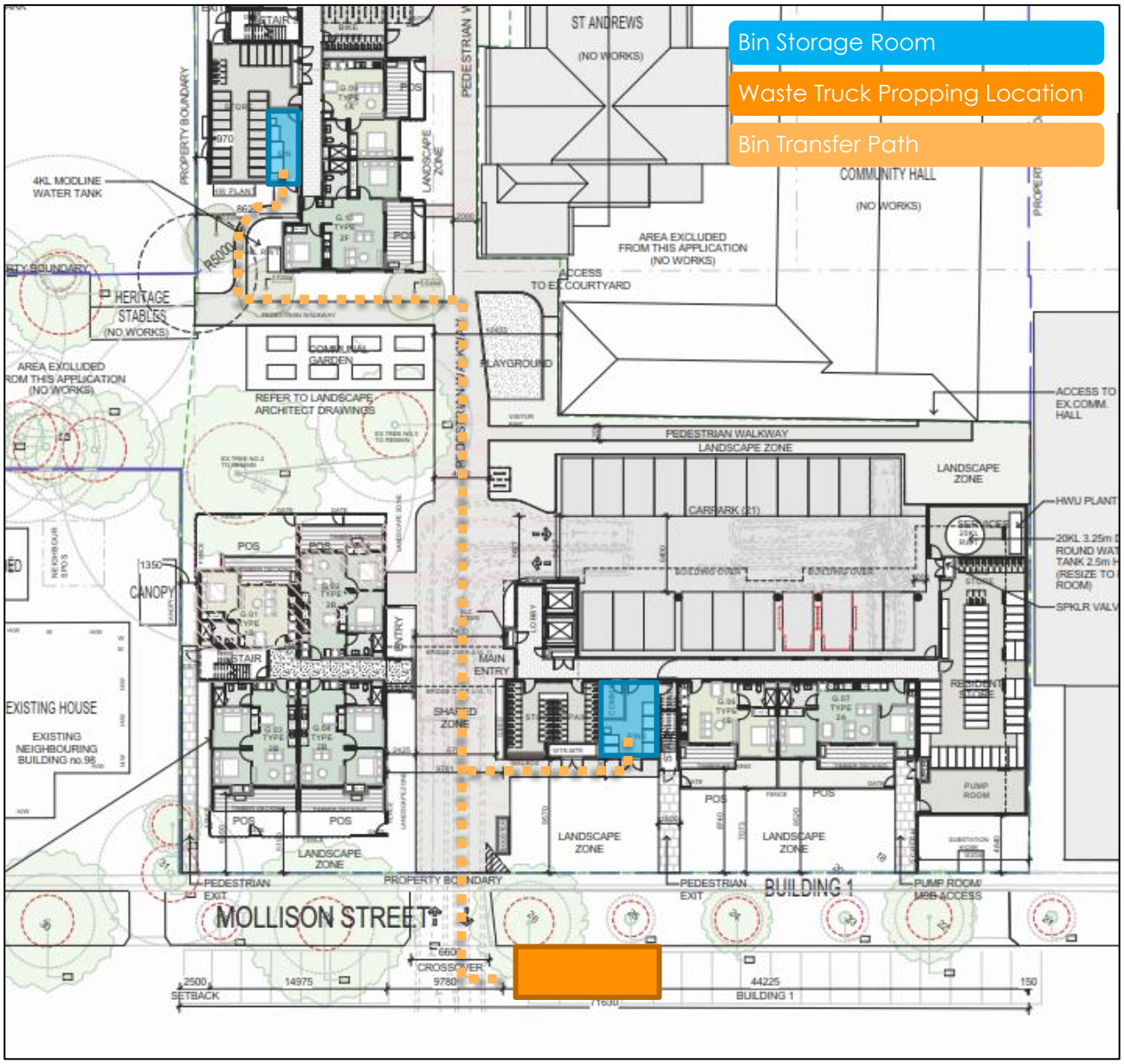
Bins will be stored within a dedicated bin storage room on the ground floor of each building. The waste collection vehicle will prop on Mollison Street adjacent to the vehicle access point, from where the bins will be transferred directly from each storage room to the waiting truck for emptying. The bins will be returned to the appropriate bin storage room immediately following collection.

Residents will be responsible for disposing of recyclables, bagged garbage, organics and glass recycling into the appropriate bins located within each bin storage room via the lift (for those on upper levels).

Collections are to occur on alternate days to Council's waste collection services in the area to ensure no conflict with the municipal service.

The collection location and expected transfer route is shown in Figure 2.

Figure 2 **Bin Storage Room and Collection Details**



4 WASTE GENERATION

4.1 Sustainability Victoria Recommended Rates

Waste generation rates published within Sustainability Victoria's "Better Practice Guide for Waste Management and Recycling in Multi-unit Developments" suggest the following rates for multi-unit developments:

Table 2 Sustainability Victoria Recommended Rates – Residential

Dwelling Size	*Garbage*	*Recycling and Paper*
2-bedroom apartment	100L	100L
1 bedroom or studio apartment	80L	80L

In relation to residential dwellings, Sustainability Victoria indicates that approximately 35% of garbage is made of food waste, therefore, the provision of organics waste collection can result in a reduction in garbage generation by 35%. The resultant

Table 3 Residential Waste Generation Rates

Dwelling Size	*Garbage*	*Recycling and Paper*	*Organics*
2-bedroom apartment	65L	100L	35L
1 bedroom or studio apartment	52L	80L	28L

4.2 Expected Waste Generation

4.2.1 Garbage and Recycling

Based on the Sustainability Victoria waste generation rates, the following weekly waste generation is expected.

Table 4 Expected Garbage Generation

	Component	*No.*	*Rate/week*	*Total Waste / Week*
Building 1	2-bedroom apartment	32	65 litres / apartment	2,080 litres
	1 bedroom apartment	17	52 litres / apartment	884 litres
	Building 1 Total			**2,964 litres**
Building 2	2-bedroom apartment	17	65 litres / apartment	1,105 litres
	1 bedroom apartment	7	52 litres / apartment	364 litres
	Building 2 Total			**1,469 litres**
Total				**4,433 litres**

Table 5 Expected Recycling Generation

	Component	No.	Rate/week	Total Waste / Week
Building 1	2-bedroom apartment	32	100 litres / apartment	3,200 litres
	1 bedroom apartment	17	80 litres / apartment	1,360 litres
	Building 1 Total			**4,560 litres**
Building 2	2-bedroom apartment	17	100 litres / apartment	1,700 litres
	1 bedroom apartment	7	80 litres / apartment	560 litres
	Building 2 Total			**2,260 litres**
Total				**6,820 litres**

4.2.2 Organic (Food) Waste

In relation to organic waste, Sustainability Victoria identifies that approximately 35% of the garbage generation for residential properties comprises organic waste. Application of this ratio to the Sustainability Victoria garbage generation rates results in an organic waste generation rate of 35 litres to each 2-bedroom apartment per week and 28 litres to each 1-bedroom apartment per week. The residential apartments can therefore be expected to generate 1,596 litres of organic waste per week for Building 1 and 791 litres of organic waste per week for Building 2.

4.2.3 Glass Recycling

Noting that private collection is proposed for the development, a glass recycling stream will be provided on-site to service the residential component of the proposed development.

It is generally considered reasonable that 10% of comingled recycling is comprised of glass. Consequently, a 10% reduction in comingled recycling will be applied.

The proposed development can therefore be expected to generate 456 litres of glass per week for Building 1 and 226 litres of glass per week for Building 2.

4.2.4 Green Waste

Given the nature of the proposed development and dwellings (being multi-unit/multi-level), it is expected that green waste generation will be minimal or negligible, and therefore a green waste collection service is not expected to be required.

It is expected that any maintenance and gardening undertaken on common property will be managed by a contractor appointed by the building manager. The appointed contractor will be responsible for the disposal of any green waste accumulated during the course of their duties.

4.2.5 Hard Waste

Hard waste services will also be provided by the private contractor, under the management of the operator. Hard waste will be stored within individual dwellings between collections, and placed within the bin room prior to scheduled collections.

4.2.6 Electronic Waste (E-Waste)

E-waste includes all manner of electronic waste, such as televisions, computers, cameras, phones, household electronic equipment, batteries and light bulbs. On 1st July 2019, the disposal of E-waste to landfill was banned by the Victorian Government.

E-waste contains valuable materials that can be recovered and reused such as tin, nickel, zinc, aluminium, copper, silver and gold.

E-waste must be taken by residents to the appropriate collection centre, as described below:

- Planet Ark operate a number of e-waste recycling drop-off locations throughout Victoria (https://recyclingnearyou.com.au/electrical);
- Officeworks stores accept small amounts of personal E-waste;
- Aldi stores accept batteries; and
- Some Bunnings stores accept batteries.

Additional recycling locations are provided at https://recyclingnearyou.com.au/

5 BIN REQUIREMENTS

5.1 Bin Provision and Specifications

It is proposed to utilise a private waste contractor, providing weekly waste and recycling collection.

Consequently, the following bins will be required for the proposed development.

Table 6 Bin Provision – Building 1

Component – Stream	Total Waste/Week	Bin Size	Collection Frequency	Bins Required
Garbage	2,964 litres	1,100 litres 660 litres	2 per Week	1 bin 1 bin
Recycling	4,104 litres	1,100 litres	2 per Week	2 bins
Organics	1,596 litres	660 litres 240 litres	2 per Week	1 bin 1 bin
Glass	456 litres	240 litres	2 per Week	1 bin
Total				**7 bins**

Table 7 Bin Provision – Building 2

Component – Stream	Total Waste/Week	Bin Size	Collection Frequency	Bins Required
Garbage	1,469 litres	1,100 litres	2 per Week	1 bin
Recycling	2,034 litres	1,100 litres	2 per Week	1 bin
Organics	791 litres	660 litres	2 per Week	1 bin
Glass	226 litres	120 litres	2 per Week	1 bin
Total				**4 bins**

Table 8 Bin Specifications

Capacity	Width	Depth	Height	Area
120 litres	0.50m	0.55m	0.95m	0.28m²
240 litres	0.60m	0.75m	1.10m	0.45m²
660 litres	1.25m	0.80m	1.30m	1.00 m²
1,100 litres	1.25m	1.10m	1.35m	1.38 m²

To differentiate between Council collection, it is recommended that the bins are colour coded to the Australian Standard (AS4123) or to the standard colour specifications of the private contractor.

5.2 Bin Storage

It is proposed to provide a bin storage area on the ground floor of each building. The layout of the bin storage areas are shown in Figure 3 and Figure 4, which demonstrates that the area is capable of accommodating the required bins, as calculated in Table 6 and Table 7.

Some additional area is also provided within the bin storage room to allow for the temporary storage of bulk items and packaging, under the control of the operator.

Furthermore, the bin storage room is located appropriately for access by residents, and is secured from the common areas.

The bin storage room should be vermin proof, and have appropriate ventilation, lighting and drainage.

Figure 3 Bin Storage Room Layout – Building 1

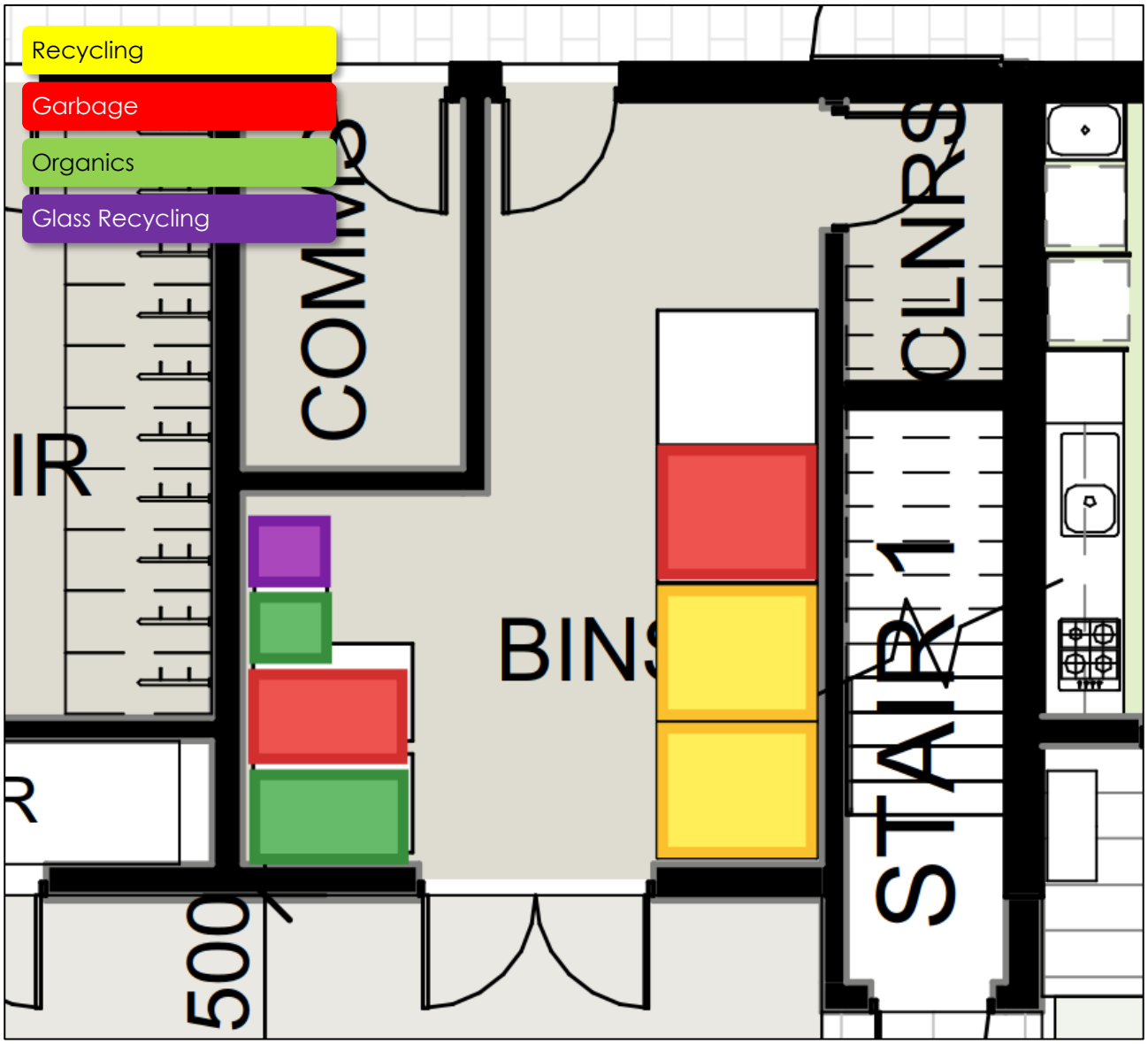
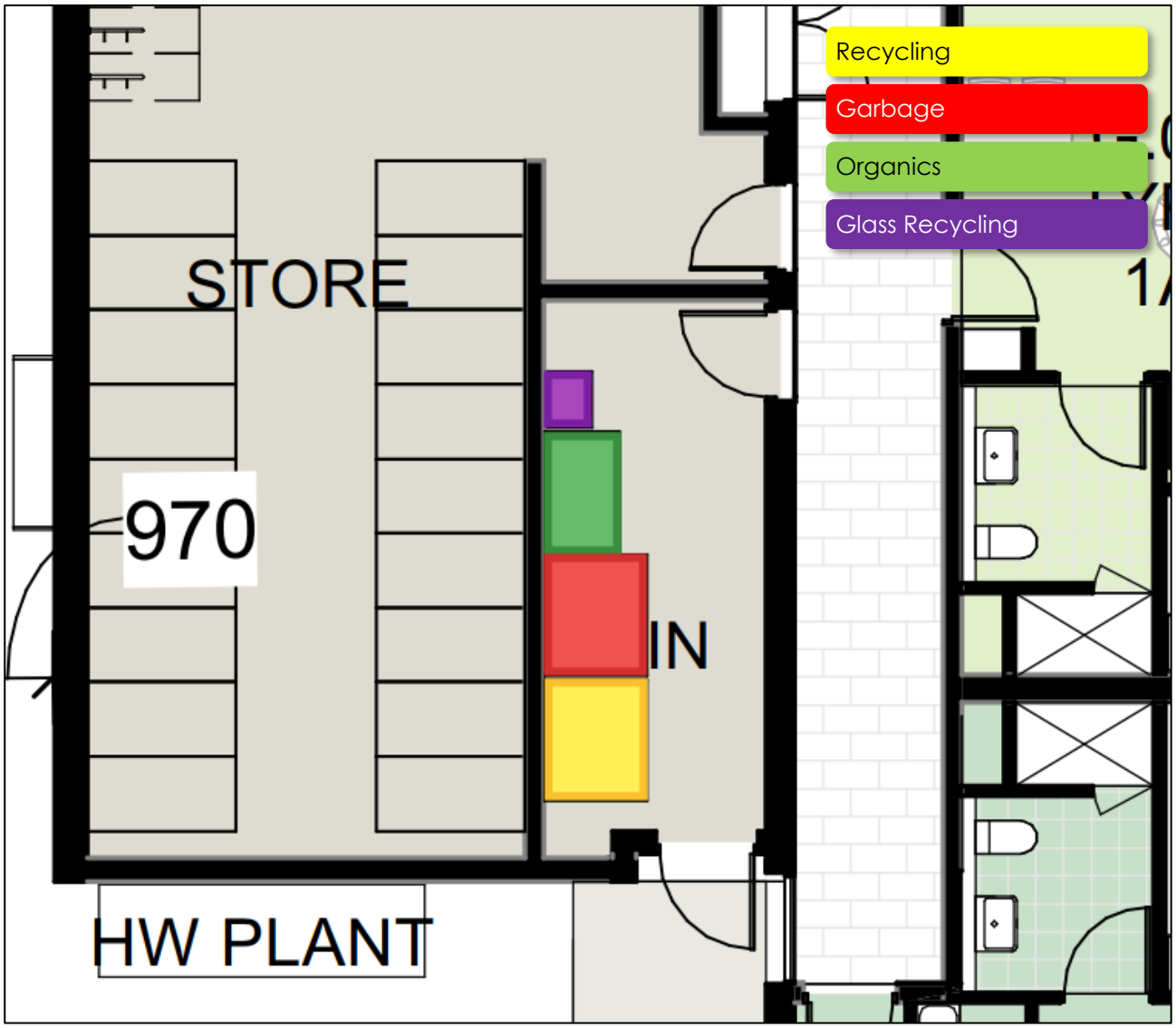


Figure 4 Bin Storage Room Layout – Building 2



5.3 Bin Collection

Bins will be stored within a dedicated bin storage room on the ground floor of each building. The waste collection vehicle will prop on Mollison Street adjacent to the vehicle access point, from where the bins will be transferred directly from each storage room to the waiting truck for emptying. The bins will be returned to the appropriate bin storage room immediately following collection.

5.4 Bin Cleaning

The operator shall ensure that the shared residential bins are kept in a clean state, to minimise odours and to discourage vermin. This may include regular cleaning by a third party, cleaning by the waste contractor or bin swapping by the waste contractor.

6 WASTE MANAGEMENT

6.1 Best Practice Waste Management

Best Practice Waste Management is an initiative designed to reduce the amount of waste generated through encouraging a change of behaviour and action on waste management and moreover recycling.

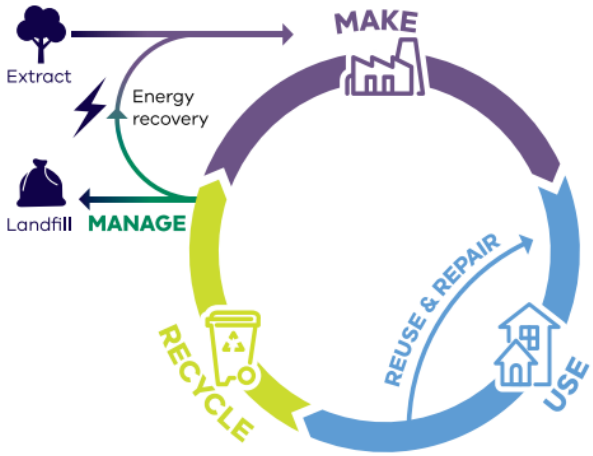
The benefits of reducing waste generation are far reaching and have been identified as significantly important by Council and the Victorian Government.

Recycling Victoria: A New Economy is a policy and 10-year action plan, prepared by the Victoria Government, to "deliver a cleaner, greener Victoria, with less waste and pollution, better recycling, more jobs and a stronger economy".

Four overarching goals have been identified in order to achieve a circular economy in relation to waste, as below:

1. MAKE – Design to last, repair and recycle;
2. USE – Use products to create more value;
3. RECYCLE – Recycle more resources;
4. MANAGE – Reduce harm from waste and pollution.

Figure 5 Resource Flows in a Circular Economy



In relation to the proposed development, recycling is of key importance, and in this regard, the operator shall encourage residents to participate in minimising and reducing solid waste production by:

- Promoting the waste hierarchy, which in order of preference seeks to:
  - Avoid waste generation in the first place;
  - Increase the reuse and recycling of waste when it is generated; and
  - Recover, treat or contain waste preferentially to;
  - Its disposal in Land Fill (which is least desirable).
- Providing information detailing recyclable materials to ensure that non-recyclable materials do not contaminate recycling collections;
- Providing information regarding safe chemical waste disposal methods and solutions, including correct battery and electronics disposal methods;
- Encouraging composting for residents; and
- Providing tips for recycling and reusing waste, including encouraging the disposal of reusable items in good condition via donations to Opportunity Shops and Charities.

6.2 Bin Usage

Residents will bag and dispose of garbage in the provided bins, located in the bin storage room.

Residents will transport and dispose of recyclables (non-bagged) in the provided bins, located in the bin storage room. Cardboard boxes should be flattened, and containers rinsed and cleaned prior to disposal in the provided bins.

6.3 Common Property Litter and Waste Removal

The proposed development includes a number of common property areas, including foyers, hallways, parking areas and the bin storage area.

The operator shall ensure that all common areas are kept clear of litter, and that all waste is removed from common areas on a regular basis. This includes the bin storage area in particular, to discourage vermin.

6.4 Signage

To avoid contamination between garbage streams, bin lids will be colour coded generally in accordance with contractor standards, to ensure the bin type is easily distinguishable. Furthermore, bins should include typical signage (preferably on the bin lid) to reinforce the appropriate materials to be deposited in each bin. Example signage available from Sustainability Victoria is shown below.

Figure 6 Example Waste Signage

6.5 Noise Control

It is noted that with the bin storage and collection area being situated within the basement car park, disturbance to residents during waste collection will be minimal. Regardless, to minimise the disturbance to residents during waste collection, the collection should follow the criteria specified by the EPA, as below:

- Collections occurring more than once a week should be restricted to the hours 7:00am to 6:00pm, Monday to Saturday;
- Compaction should only be carried out while on the move;
- Bottles should not be broken up at the point of collection;
- Routes that service entirely residential areas should be altered regularly to reduce early morning disturbance; and
- Noisy verbal communication between operators should be avoided where possible.

6.6 Resident Information

To ensure all residents are aware of their responsibilities with regard to waste and bin management, an information package will be provided by the operator to all residents, including the following information:

- A copy of this Waste Management Plan;
- Methods and techniques for waste reduction and minimisation;
- Information regarding bin collection days and requirements;
- Resident responsibilities with regard to bin usage, storage, and collection; and
- Resident responsibilities with regard to litter and waste removal from the common property.

6.7 Waste Management Plan Implementation

The implementation, coordination and funding of the Waste Management Plan is the responsibility of the operator, and should be a dynamic document, reflecting changes in on-site and off-site conditions e.g., varying bin requirements, or changing waste collection methodology. As such, the plan should be regularly revisited and amended to provide the most accurate and relevant information to achieve the desired objectives of effectively managing the storage and disposal of waste generated on-site.

Should any significant operational changes occur on-site, a new or amended Waste Management Plan prepared by a suitable qualified and experienced person or firm may be required, detailing changes to the storage and disposal of the general, recyclable and e-wastes, responsibility in management and maintenance of the bins, location and area of bin rooms, etc.

7 PLANNING SCHEME REQUIREMENTS – CLAUSE 58.06-3

Clause 58.06-3 of the Greater Bendigo Planning Scheme identifies the waste and recycling objectives for Apartment Developments, including:

- To ensure dwellings are designed to encourage waste recycling.
- To ensure that waste and recycling facilities are accessible, adequate and attractive.
- To ensure that waste and recycling facilities are designed and managed to minimise impacts on residential amenity, health and the public realm.

In particular, Standard D24 indicates that developments should include dedicated areas for:

- Waste and recycling enclosures which are:
  - Adequate in size, durable, waterproof and blend in with the development.
  - Adequately ventilated.
  - Located and designed for convenient access by residents and made easily accessible to people with limited mobility.
- Adequate facilities for bin washing. These areas should be adequately ventilated.
- Collection, separation and storage of waste and recyclables, including where appropriate opportunities for on-site management of food waste through composting or other waste recovery as appropriate.
- Collection, storage and reuse of garden waste, including opportunities for on-site treatment, where appropriate, or off-site removal for reprocessing.
- Adequate circulation to allow waste and recycling collection vehicles to enter and leave the site without reversing.
- Adequate internal storage space within each dwelling to enable the separation of waste, recyclables and food waste where appropriate.

Waste and recycling management facilities should be designed and managed in accordance with a Waste Management Plan approved by the responsible authority and:

- Be designed to meet the better practice design options specified in Waste Management and Recycling in Multi-Unit Development (Sustainability Victoria, 2019).
- Protect public health and amenity of residents and adjoining premises from the impacts of odour, noise and hazards associated with waste collection vehicle movements.

In relation to the above, the proposed development provides a centrally located and accessible bin storage areas for each building, which can accommodate the required waste bins.

8 OCCUPATIONAL HEALTH & SAFETY RESPONSIBILITIES

The Owners Corporation/site operator shall ensure compliance to all relevant OH&S regulations and legislation, including the following:

- Worksafe Victoria Guidelines for Non-Hazardous Waste and Recyclable Materials

9 CONTACT INFORMATION

9.1 Council

Greater Bendigo City Council

Phone: 1300 002 642 (Customer Service)

Web: https://www.bendigo.vic.gov.au/

Email: requests@bendigo.vic.gov.au

9.2 Contractors

ASI JD MacDonald

Services: Waste collection and management equipment

Phone: 1800 023 441

Web: www.jdmacdonald.com.au

Email: enquiry@asijdmacdonald.com.au

Urban Waste

Services: Private contractor

Phone: 0429 309 269

Web: www.urbanwaste.com.au

Email: info@urbanwaste.com.au

iDump

Services: Private contractor

Phone: 1300 443 867

Web: www.iDump.com.au

Email: info@idump.com.au

Cleanaway

Services: Private contractor

Phone: 131 339

Web: www.cleanaway.com.au/

JJ Richards & Sons

Services: Private contractor including bin tugs

Phone: (03) 9703 5222

Web: www.jjrichards.com.au

Email: operations.melbourne@jjrichards.com.au

WasteWise

Services: Private contractor

Phone: 1300 550 408

Web: www.wastewise.com.au

9.3 Others

Sustainability Victoria

Services: Sustainable Waste Management initiatives and information

Phone: 1300 363 744 (Energy, Waste and Recycling)

Web: www.sustainability.vic.gov.au

Email: info@sustainability.vic.gov.au

ST ANDREW'S BENDIGO HOUSING DEVELOPMENT, BENDIGO

DESKTOP ENVIRONMENTAL WIND ASSESSMENT

By

A. Loie

Report 156-22-DE-EWA-01

CONTENTS

1. INTRODUCTION

The proposed St Andrew's Bendigo Housing Development, Bendigo, will consist of two 5 level residential buildings on an "L" shaped site with frontages on both Myers Street and Mollison Street, between Mundy Street and Williamson Street, in Bendigo. The location is highlighted in Figure 1.

Figure 1: Location of the proposed St Andrew's Bendigo Housing Development (highlighted by red outline) [Googlemaps].

This assessment was commissioned by Duo Projects and is based on a review of drawings prepared by MGS Architects (dated 21 November 2022) that are listed in Appendix A and only considers current existing surrounds and under construction buildings (i.e. no proposed future buildings). This desktop environmental wind assessment is based on MEL Consultants knowledge of wind flow around buildings and structures from undertaking numerous wind tunnel model studies, no wind tunnel study has been undertaken for this study.

2. THE DEVELOPMENT

The development at St Andrew's Bendigo Housing Development will be two 5 level residential buildings (hereon referred to as Building 1 for the southern building and Building 2 for the northern building). The main entrance to Building 1 will be located on the east side of the pedestrian throughfare under the overpass section (refer to Figure 2), with a secondary entrance on west side of the pedestrian thoroughfare, opposite the main entrance. The main entrance to Building 2 will be located centrally on the east facade facing the St Andrew's church.

Building 1

The overall footprint for levels ground to Level 3 (Figures 2 – 5) are relatively consistent with only a few changes to the building outline (Level 3). A pedestrian throughfare is present through the building on ground level. The Level 4 floorplan (Figure 6) steps back further from the west. There are balconies on the northwest and southeast faces for all levels above ground.

Building 2

Ground level and Level 1 share the same general floorplan (Figures 7 and 8) while the floorplan for Levels 2 and 3 is set back from the northern corner (Figures 9 and 10). Level 4 steps back further from the northwest (Figure 11). There are balconies on the northeast and southeast faces for all levels above ground and balconies on the northwest face for Level 1 – 3.

The extent of the setbacks for both buildings are shown in the elevations and isometric views in Figures 12 – 16.

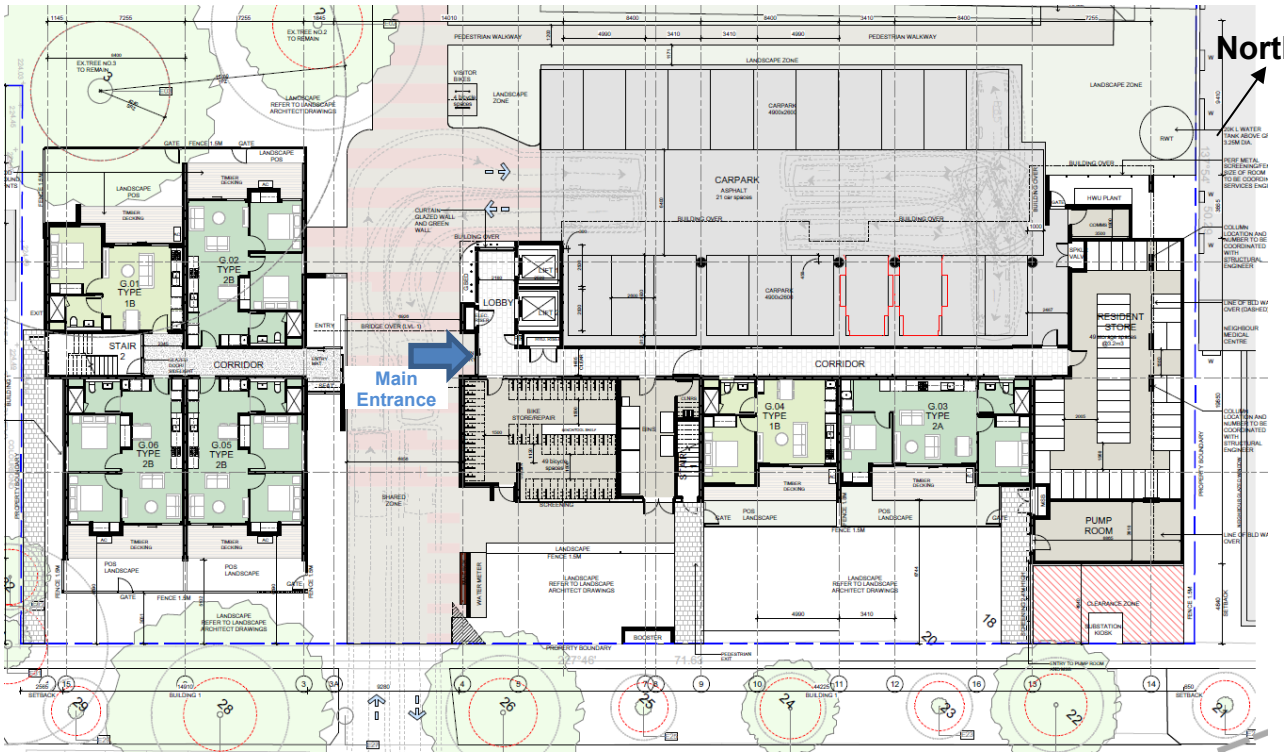


Figure 2: Ground level plan of the proposed Building 1 of the St Andrew's Bendigo Housing Development.

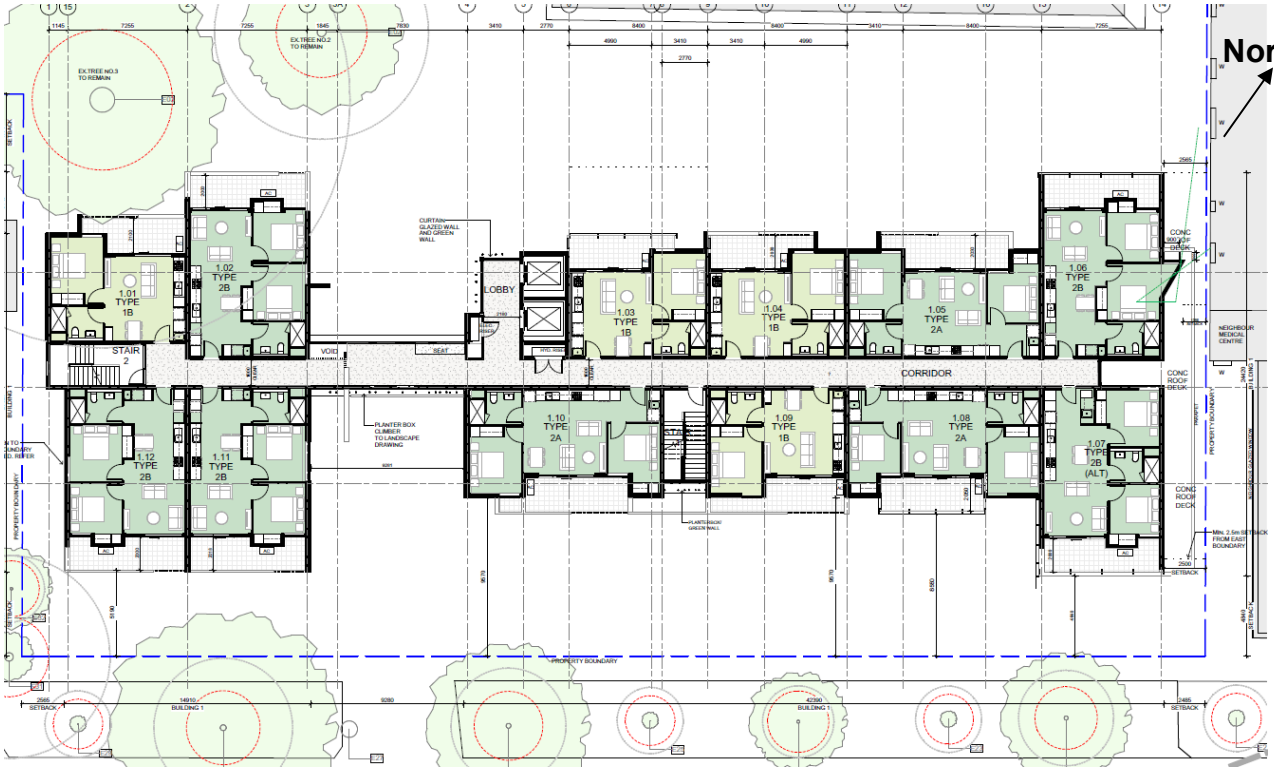


Figure 3: Level 1 floor plan of the proposed Building 1 of the St Andrew's Bendigo Housing Development.

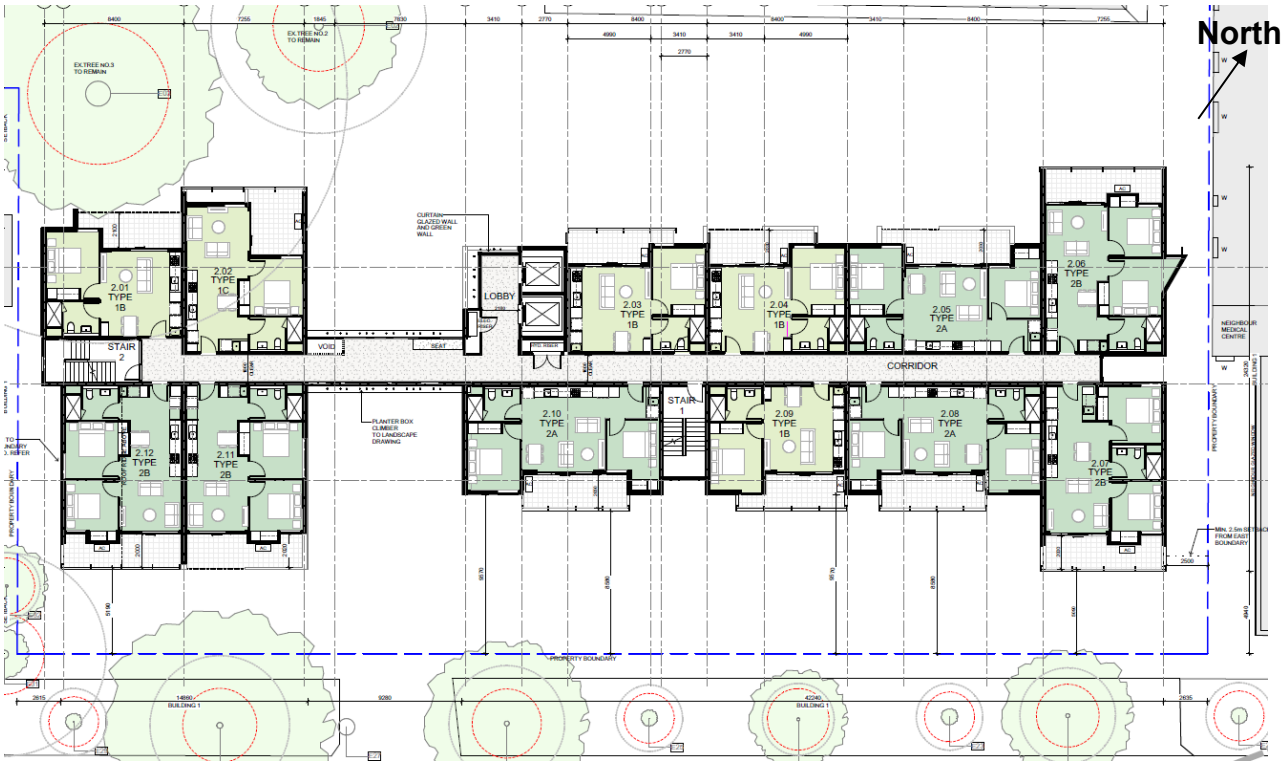


Figure 4: Level 2 floor plan of the proposed Building 1 of the St Andrew's Bendigo Housing Development.

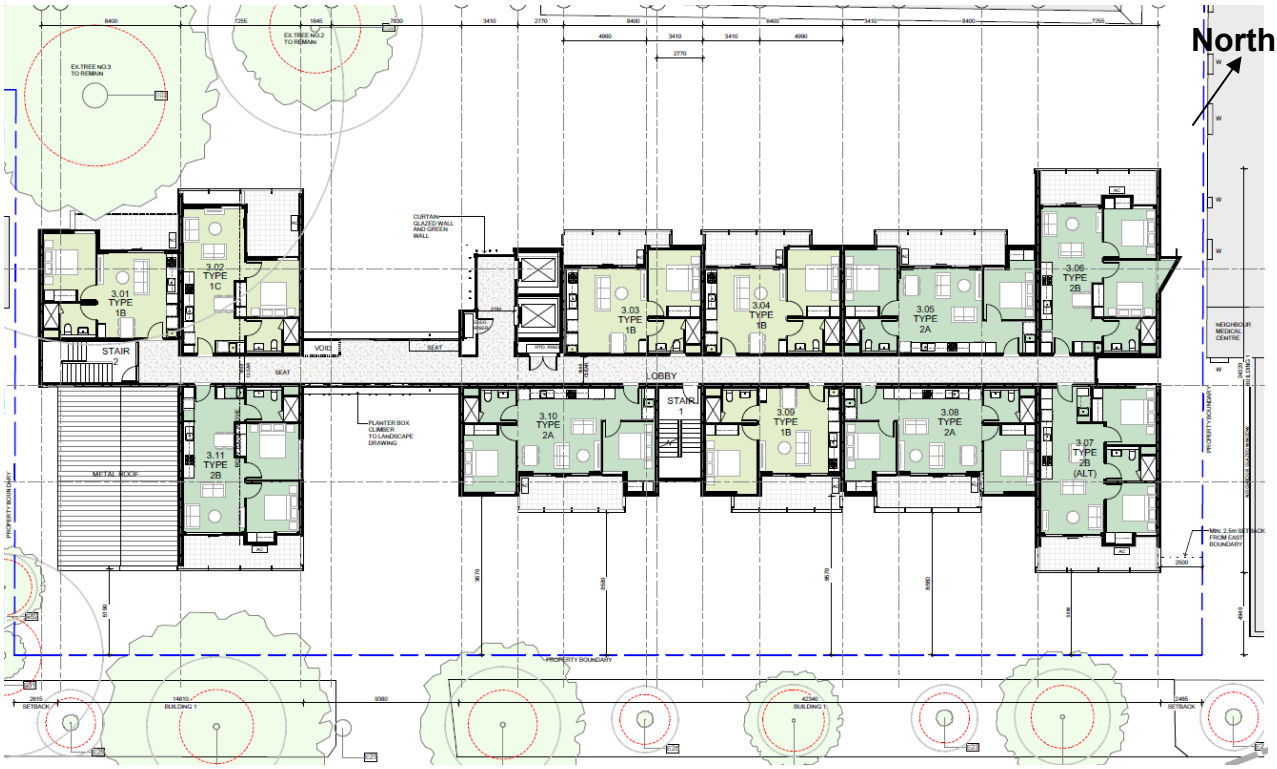


Figure 5: Level 3 floor plan of the proposed Building 1 of the St Andrew's Bendigo Housing Development.

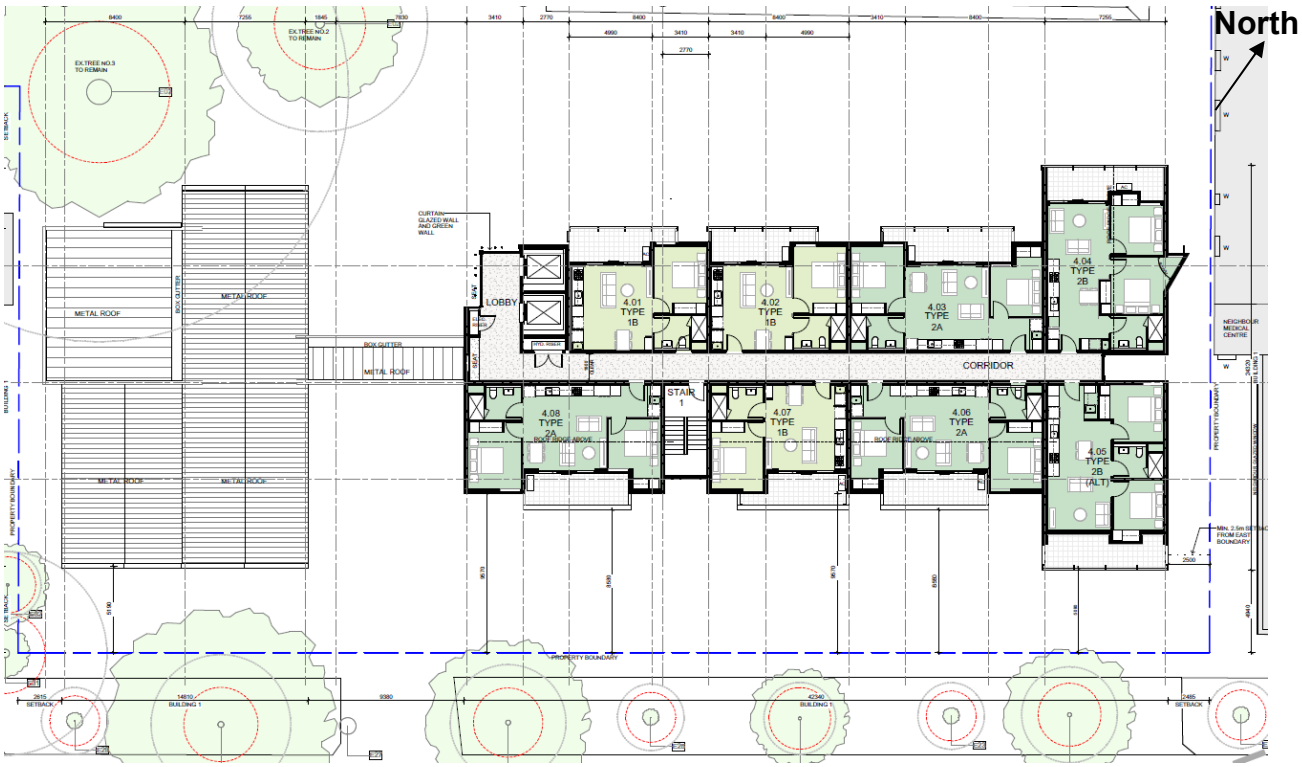


Figure 6: Level 4 floor plan of the proposed Building 1 of the St Andrew's Bendigo Housing Development.

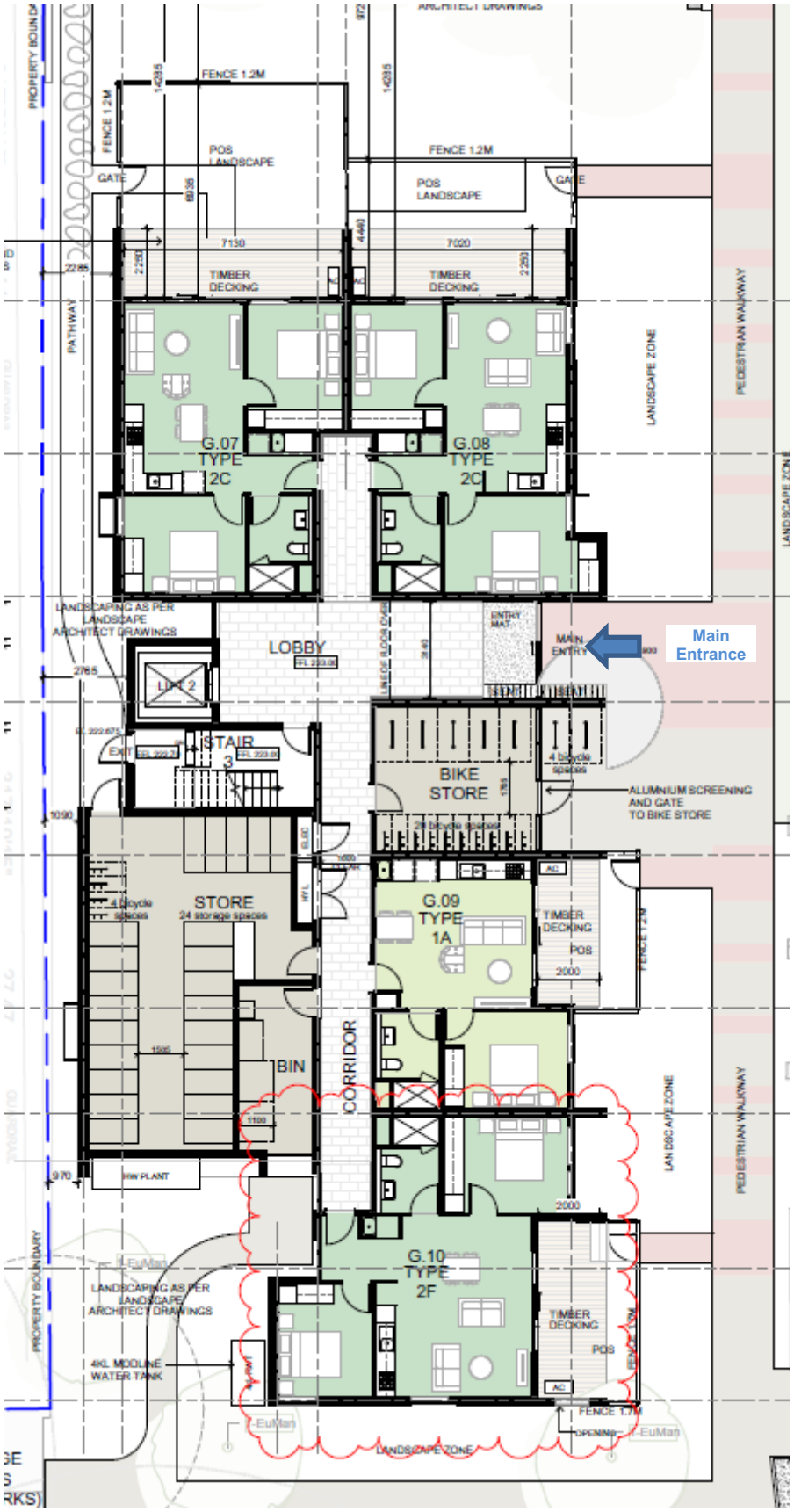


Figure 7: Ground Level plan of the proposed Building 2 of the St Andrew's Bendigo Housing Development.

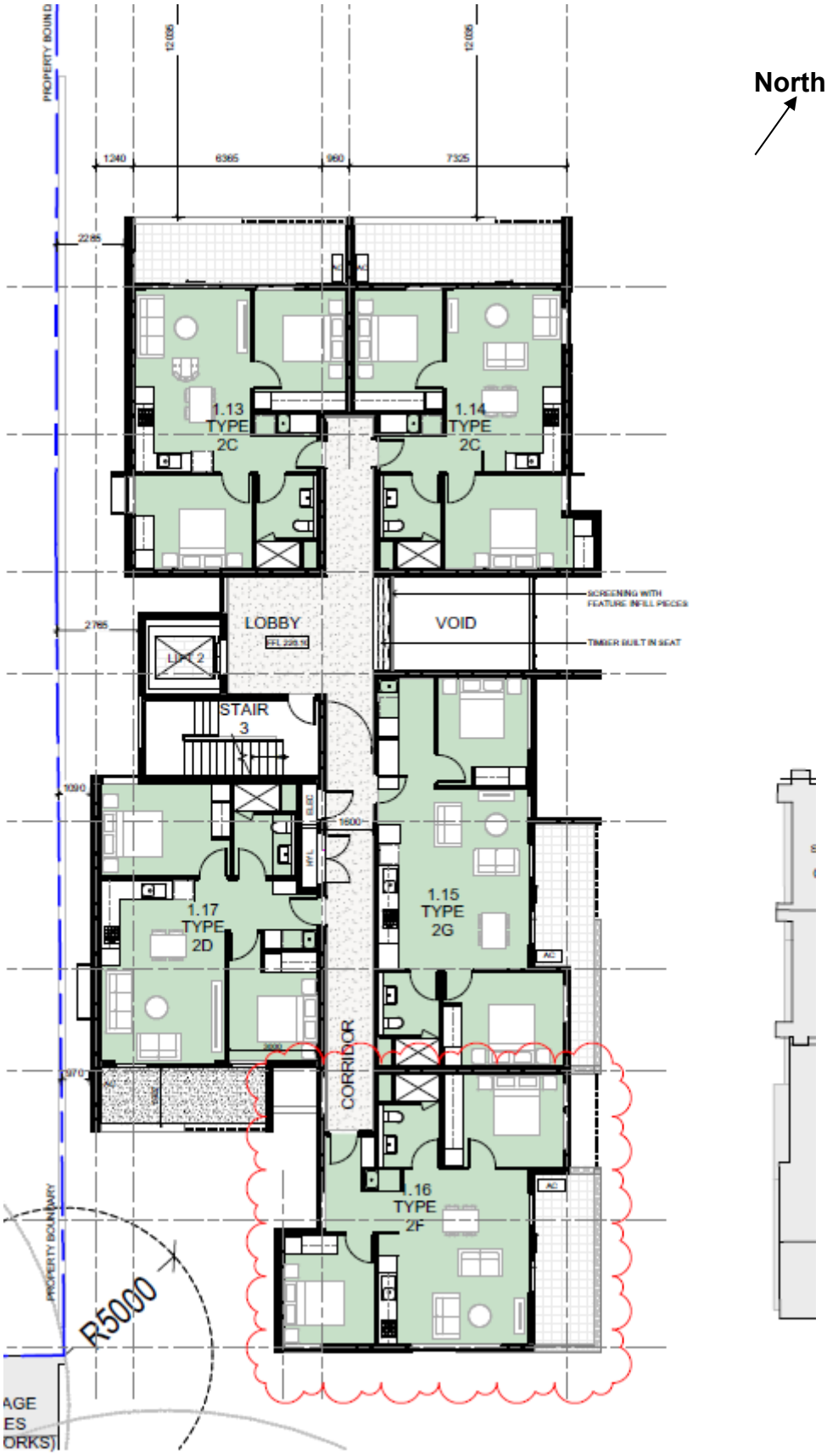


Figure 8: Level 1 floor plan of the proposed Building 2 of the St Andrew's Bendigo Housing Development.

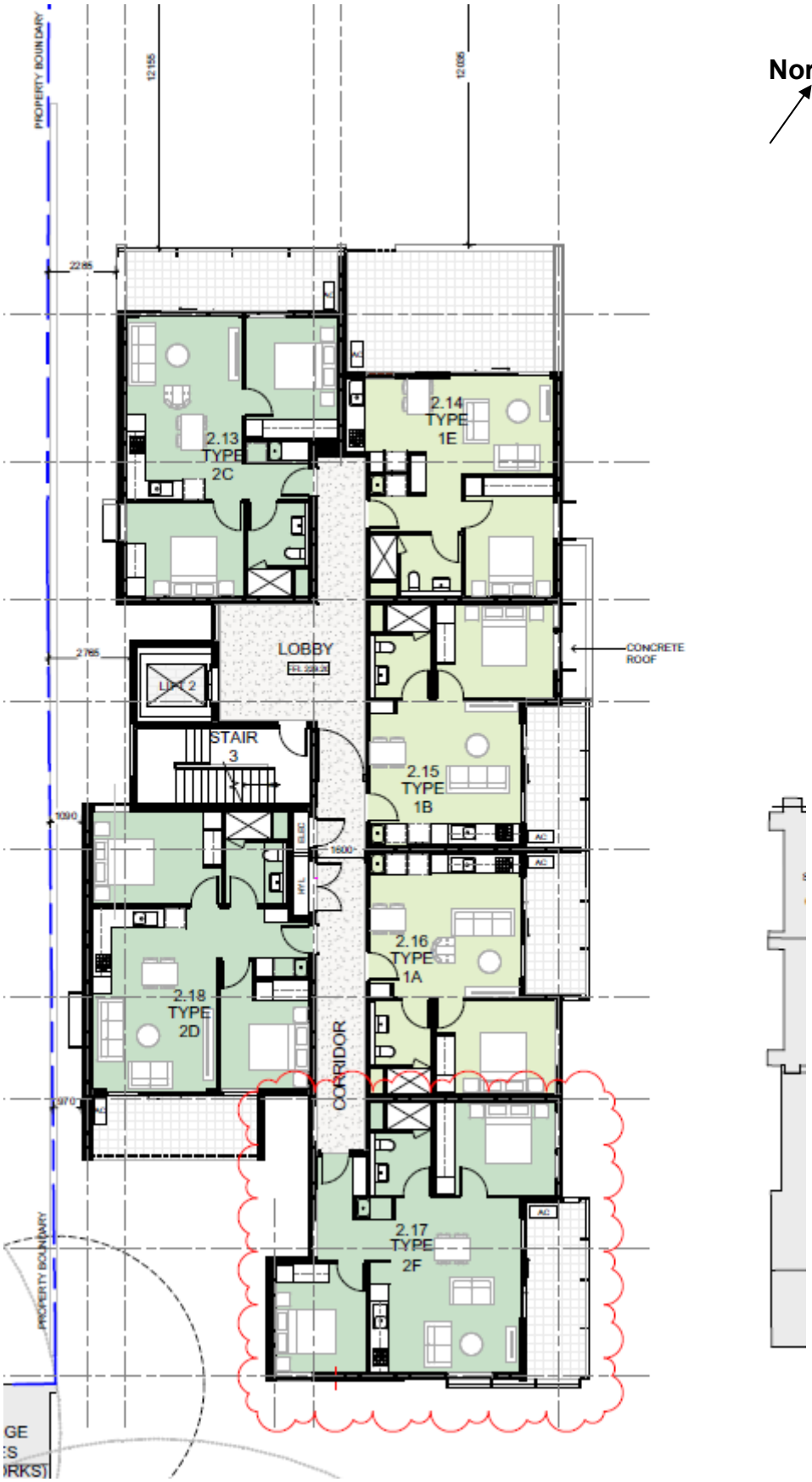


Figure 9: Level 2 floor plan of the proposed Building 2 of the St Andrew's Bendigo Housing Development.

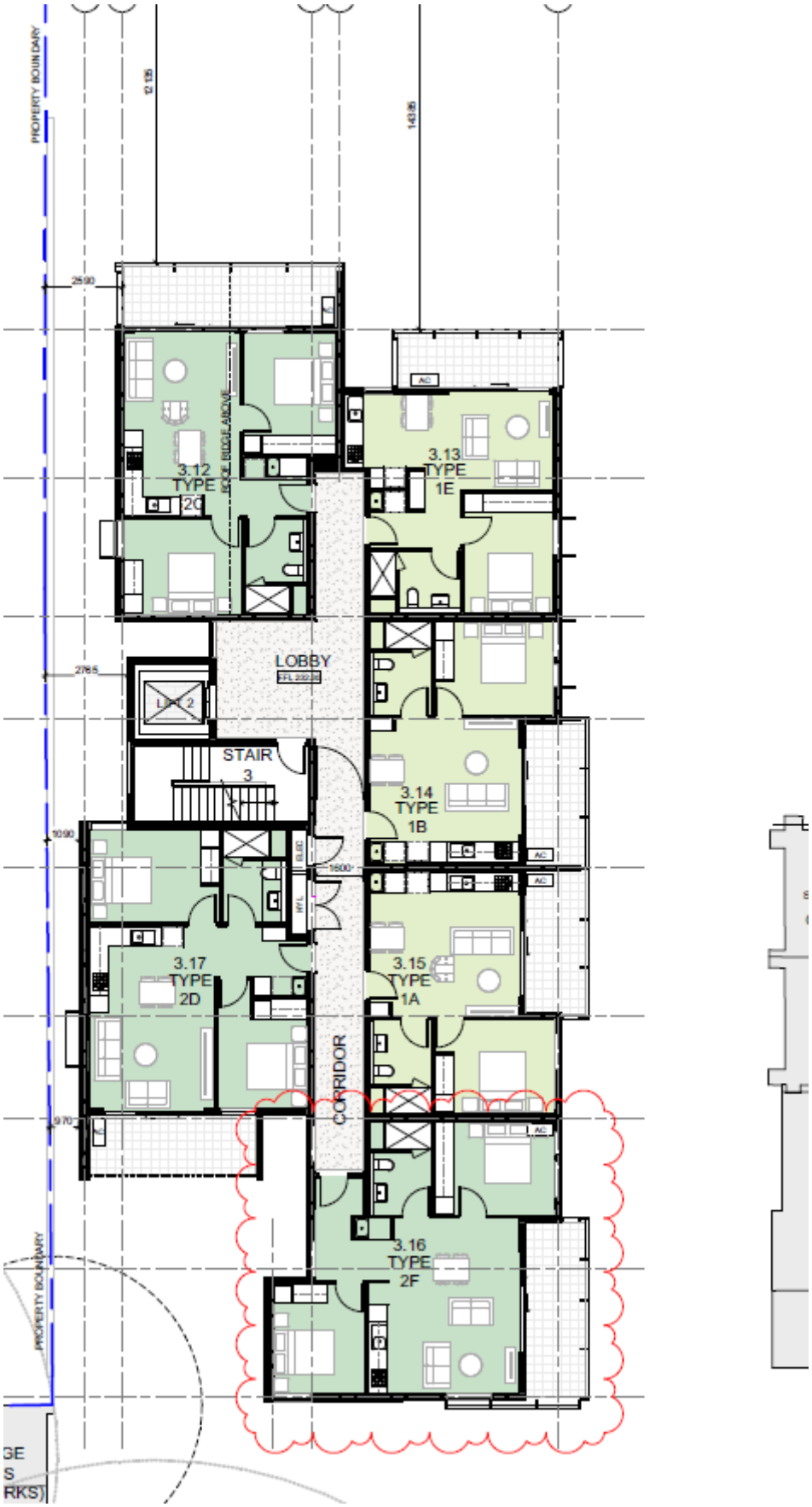


Figure 10: Level 3 floor plan of the proposed Building 2 of the St Andrew's Bendigo Housing Development.

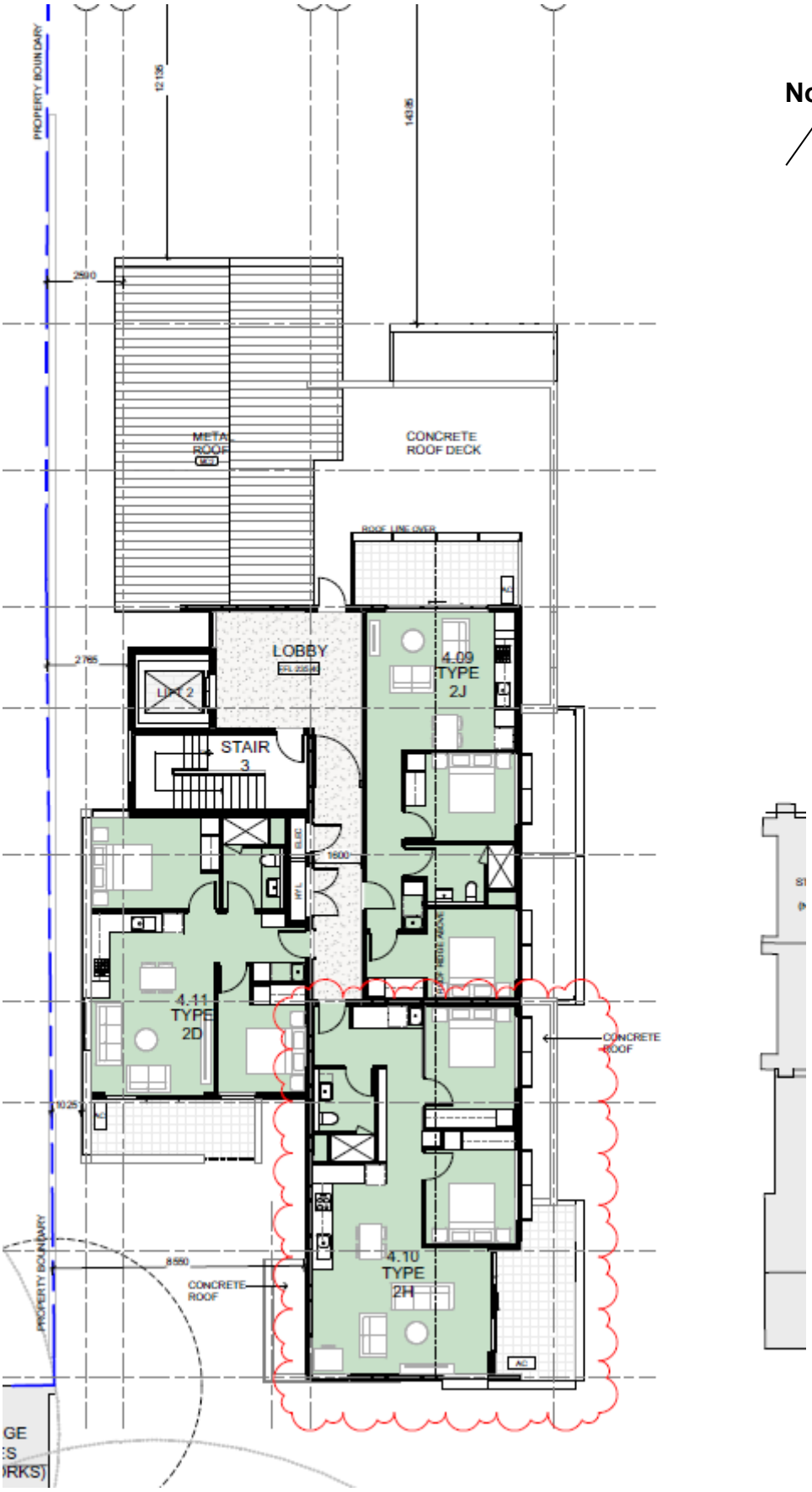


Figure 11: Level 4 floor plan of the proposed Building 2 of the St Andrew's Bendigo Housing Development.

Figure 12: North, west and east elevations of Building 1 of the proposed St Andrew's Bendigo Housing Development.

Figure 13: Isometric view from the southwest of Building 1 of the proposed St Andrew's Bendigo Housing Development.

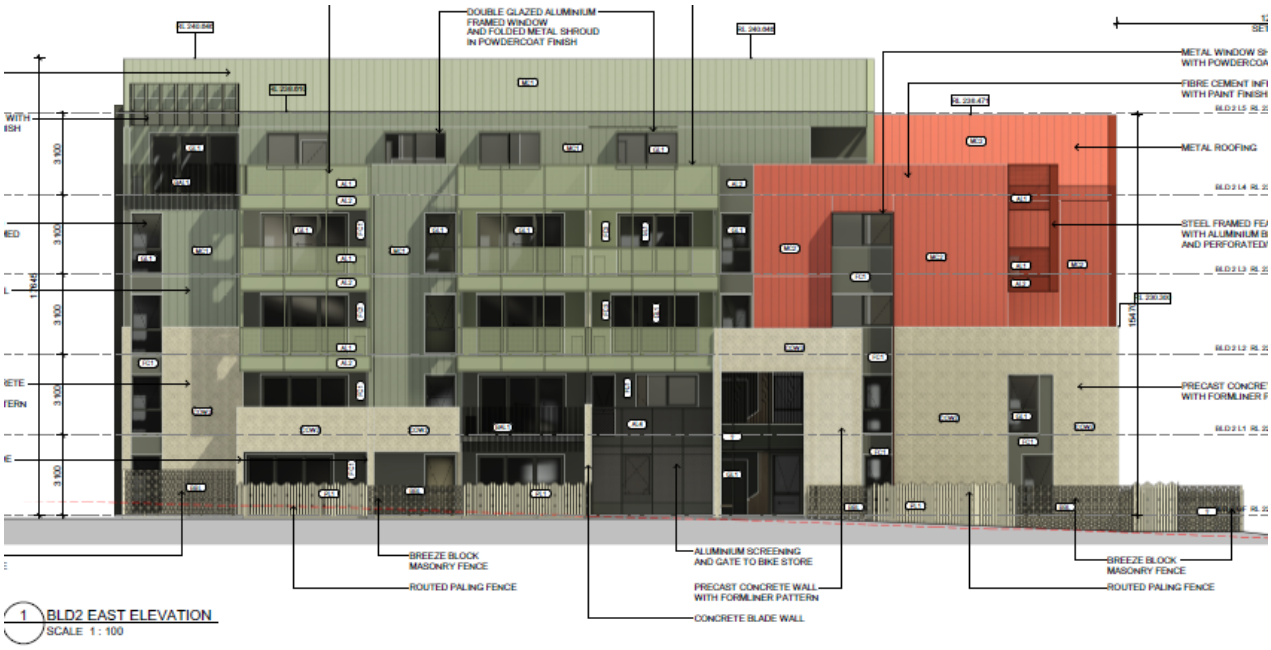


Figure 14: East elevation of Building 2 of the proposed St Andrew's Bendigo Housing Development.

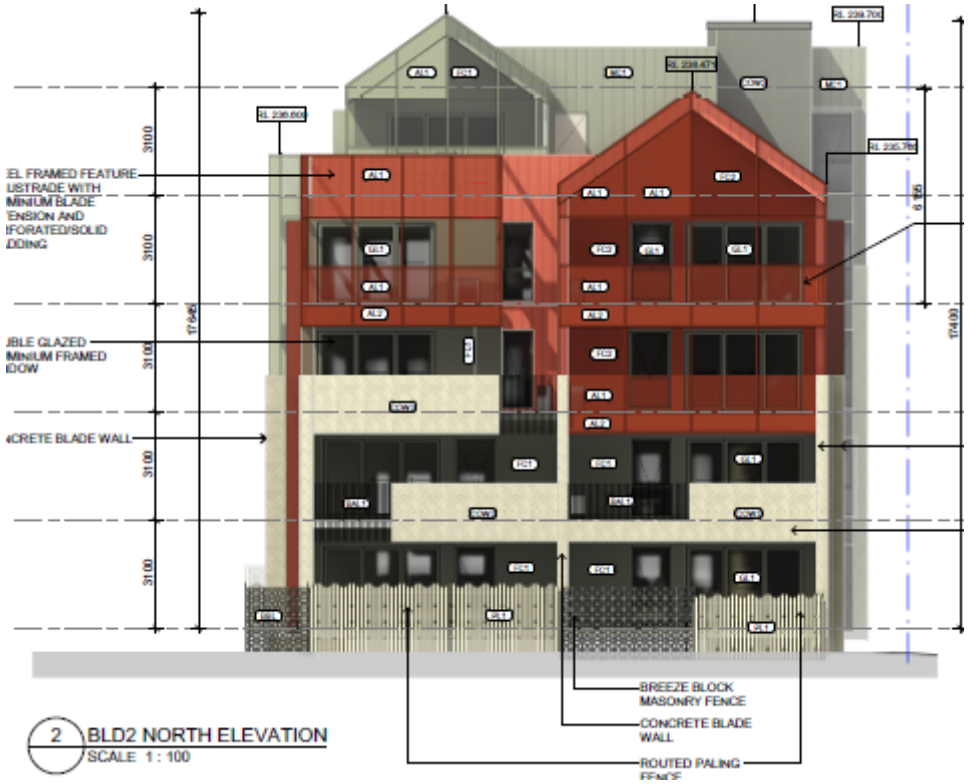


Figure 15: North elevation of Building 2 of the proposed St Andrew's Bendigo Housing Development.

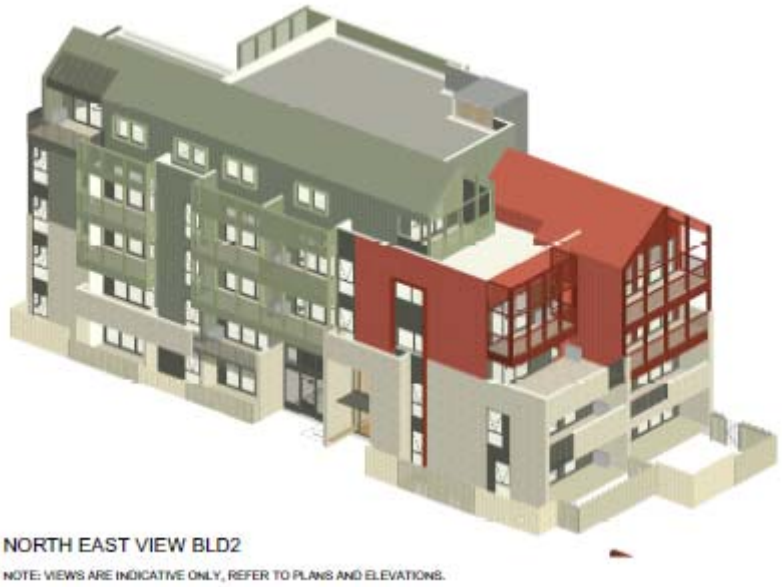


Figure 16: Isometric view from the northeast of Building 2 of the proposed St Andrew's Bendigo Housing Development.

3. WIND ENVIRONMENT AND EXPOSURE

The strongest and most frequent winds in the Bendigo Region come from the north, west and south sectors with secondary strong winds coming from the southwest sector; east sector winds are relatively light and infrequent.

The proposed development will be nestled amongst generally 1-2 storey buildings from all directions.

There is a neighbouring 3-storey medical centre to the east of the proposed development along Mollison Street and a 3-storey building at the corner of Myers Street and St Andrews Avenue to the north of the proposed. These buildings will provide shielding to the full height of the building for wind directions in which they are directly upstream to the proposed development.

The topography of the land has been considered for this assessment but the gradient of these changes has been assessed to not be significant to affect approach wind flow.

Based on the above, the upper levels of the proposed development (Levels 3 and 4) would have exposure to direct wind flow from winds from the southeast, through south, to northwest. The proposed development would have limited exposure from the remaining wind directions due to the proximity of the aforementioned nearby 3-storey buildings.

4. ASSESSMENT CRITERIA

To assess whether the predicted wind conditions are likely to be acceptable or not, some forms of criteria are required. For the purposes of the wind assessment of the development the wind criteria, safety and comfort, from the City of Greater Bendigo Planning Scheme Clause 58.04-4 (Standard D17) will be used. The definition of the criteria is summarised as follows:

58.04-4 Wind Impacts Objective

To ensure the built form, design and layout of development does not generate unacceptable wind impacts within the site or on surrounding land.

Standard D17

Development of five or more storeys should:

- *not cause unsafe wind conditions specified in Table D6 in public land, publicly accessible areas on private land, private open space and communal open space; and*
- *achieve comfortable wind conditions specified in Table D6 in public land and publicly accessible areas on private land*

within a distance of half the greatest length of the building, or half the total height of the building measured outwards on the horizontal plane from the ground floor building façade, whichever is greater.

Trees and landscaping should not be used to mitigate wind impacts. This does not apply to sitting areas, where trees and landscaping may be used to supplement fixed wind mitigation elements.

Wind mitigation elements, such as awnings and screens should be located within the site boundary, unless consistent with the existing urban context or preferred future development of the area.

Table D6 Wind Conditions

Unsafe	***Comfortable***
Annual maximum 3 second gust wind speed exceeding 20 metres/second with a probability of exceedance of 0.1% considering at least 16 wind directions.	*Hourly mean wind speed or gust equivalent mean speed (3 second gust wind speed divided by 1.85), from all wind directions combined with probability of exceedance less than 20% of the time, equal to or less than:* • *3 metres/second for sitting areas* • *4 metres/second for standing areas* • *5 metres/second for walking areas*

The above criteria are pass/fail criteria as they only assess the summation of probabilities of exceedance across all wind directions to determine whether a location passes or fails the threshold criterion i.e. the criteria assess the average wind conditions.

5. RECOMMENDED WIND COMFORT CRITERIA

The following wind comfort criteria are recommended:

Streetscapes	Walking
Building Entrances	Standing
Outdoor Balconies/Terraces	Walking

The wind conditions on private outdoor balconies/terraces have been recommended to satisfy the walking comfort criterion as these spaces could be considered elective when external conditions would be perceived as acceptable for the desired activity. Users of these balconies will need to be educated on the wind effects and loose objects should not be left on an unattended balcony/terrace.

6. WIND ASSESSMENT

As described in Section 3, only the top one or two levels of the proposed development would be exposed to direct winds from any given wind direction. In addition to this, due to the pressure field created by the building itself, wind flow incident to the top 25% of the building would be induced up and over the rooftop. Therefore, it would be expected that only a small amount of additional wind flow induced down towards pedestrian levels for winds incident to the faces of the proposed development for any given wind direction.

6.1 Around Building 1

It would be expected that the pedestrian thoroughfare through Building 1 would funnel flow from winds incident to the northwest and southeast faces, leading to increased wind speeds under the overpass. Despite this, however, wind conditions around Building 1, including along the thoroughfare, would be expected to satisfy the walking comfort criterion and safety criterion. Wind conditions at the main entrance and secondary entrance to Building 1, which are recessed away from the pedestrian thoroughfare, would be expected to satisfy the standing criterion and safety criterion.

6.2 Around Building 2

It would be expected that the proximity of Building 2 to the St Andrew's church would funnel flow through the gap between them, leading to increased wind speeds compared to existing conditions. Despite this, however, wind conditions around Building 2 would be expected to satisfy the walking comfort criterion and safety criterion while wind conditions at the main entrance to Building 2 would be expected to satisfy the standing criterion and safety criterion.

6.3 Private Balconies/Terraces

With the limited exposure to direct wind flow, the wind conditions in the balconies across both Building 1 and 2 would be expected to satisfy the walking comfort criterion and the safety criterion.

It would be recommended that users be educated on the wind impacts on elevated balcony and that any objects to be left permanently on the balconies would be tethered/ fixed securely to the balcony and the fixing/tethers inspected regularly for damage/ corrosion. Any loose items should not be left on the balcony when unattended.

7. CONCLUSIONS

We have assessed the likely environmental wind conditions in the streetscapes surrounding the proposed development at St Andrew's Bendigo Housing Development, Bendigo, detailed in drawings by MGS Architects dated 21 November 2022.

The wind conditions have been assessed with consideration of the proposed St Andrew's Bendigo Housing Development. The wind conditions around the proposed development have been assessed to satisfy the walking comfort criterion and the safety criterion.

The wind flow over the private balconies/terraces across both buildings have been assessed with wind conditions to satisfy the walking comfort criterion and the safety criterion.

Prepared by

A. Loie
MEL Consultants Pty Ltd
23 November 2022

Released by

J. Kostas
MEL Consultants Pty Ltd
23 November 2022

Appendix A – Drawing Register

Sheet Number	Sheet Name	Current Revision
SK0101	SITE PLAN AND GF GA PLAN	P4
SK0201	BLD 1 – GF PLAN	P3
SK0202	BLD 1 – LEVEL 1 PLAN	P3
SK0203	BLD 1 – LEVEL 2 PLAN	P3
SK0204	BLD 1 – LEVEL 3 PLAN	P2
SK0205	BLD 1 – LEVEL 4 PLAN	P3
SK0206	BLD 1 – ROOF PLAN	P2
SK0211	BLD 2 – GF PLAN	P1
SK0212	BLD 2 – LEVEL 1 PLAN	P1
SK0213	BLD 2 – LEVEL 2 PLAN	P1
SK0214	BLD 2 – LEVEL 3 PLAN	P1
SK0215	BLD 2 – LEVEL 4 PLAN	P1
SK0216	BLD 2 – ROOF PLAN	P1
SK0301	ELEVATIONS BLD 1	P1
SK0302	ELEVATIONS BLD 1	P1
SK0303	ELEVATIONS BLD 2	P1
SK0304	ELEVATIONS BLD 2	P1

Development Impact Report

Assessment of Trees at Bendigo Uniting Church

Report Details

Client:	Duo Projects 312 St Kilda Rd, Melbourne 3004
Intended Audience:	City of Greater Bendigo Builder/developer
Subject site details:	St Andrews Uniting Church, Mollison St Bendigo
Date of assessment	Thursday, 18 November 2021
Date of report:	Tuesday, 22 November 2022
Planning permit details:	
Council details:	City of Greater Bendigo
Zone and relevant overlays:	Special Use Zone (SUZ1) Design and Development Overlay (DDO5) Heritage Overlay (HO212) Parking Overlay (PO1)
Relevant Standards:	AS 4970:2009- Protection of Trees on Development Sites AS 4373:2007 - Pruning of Amenity Trees AS 4687:2007 - Temporary Fencing and Hoardings
Plans, maps or other construction information:	Feature Survey-JCA Consultants-2873311F1D Residential Study: MGS Architects November 2021 Draft Schematic Design: MGS Architects (Dwg Title: SITE PLAN AND GF GA PLAN, Dwg No: SK0101, Rev: P4).
Other relevant Arborist, Ecology or Development Impact Reports:	Arborist Report-Axiom Tree Management Pty Ltd-Dated 8/10/2019
Axiom Tree Management Job Number:	10812
Prepared By:	*Tim Cameron - Consulting Arborist/Director* Email: timcameron@axiomtrees.com Qualifications: -Graduate Certificate Arboriculture -Diploma Horticulture (Arboriculture) – AQF Level 5
Reviewed By:	*Robyn Cameron – Axiom Tree Management Administration Co-ordinator*
Axiom Tree Management Business Information	Axiom Tree Management Pty Ltd (Office Address) Office 2/8 Sauer Rd, New Gisborne VIC 3438 (Postal Address) 48 Montgomerys Lane, Woodend 3442 Ph: 0428 896 951 ABN: 11 612 205 099

Summary

Axiom Tree Management Pty Ltd has been engaged by Duo Projects to provide a report on trees at St Andrews Uniting Church, Myers St, Bendigo. A report has been requested as part of the proposed development to assist with planning.

The site is the St Andrews Uniting Church and adjacent residential properties and hall in Bendigo. The site covers approximately 7550 square metres and has frontages to Myers Street and Mollison Street. The site contains a large stone church, several brick buildings, and an asphalt carpark. The site slopes to the northwest. Most large trees are located within the residential property and overhang neighbouring properties.

- Fifty-four (54) trees were assessed on and directly adjoining the subject site:
  - Trees within the subject site consist of a mixture large native trees and small commonly planted/self-sown garden specimens.
  - Trees within the road reserve consist of common street trees including *Ulmus parvifolia* and *Platanus Xacerifolia.*
- The health of most of the trees is 'Good'.
  - The good health of the trees can be attributed to the selection of self-sown indigenous and common planted specimens and the above average rainfall over the last 12 months.
- The structure of most of the trees is 'Fair'.
  - The trees are typical of the species age and situation with Arboricultural maintenance that has been carried out over many years
- ULE is an estimation of how long a tree can provide amenity in the landscape at an acceptable level of risk.
  - Most of the trees are long lived species in good condition commonly living for many decades.
- Three retention values have been considered, consisting of ‘High’, ‘Medium’ and ‘Low’.
  - Five trees (5) have been assigned High retention value.
  - Sixteen trees (16) have been assigned ‘Medium’ retention value.
  - Thirty-three trees (33) have been assigned ‘Low’ retention value.

The design proposal includes removal of specified structures and vegetation, construction of multi-level residential development, associated car parking and internal roads and footpaths, open space areas with landscaping and installation of associated infrastructure and services.

Trees to be Removed

- It is proposed to remove Trees 1, 10, 12-20, and 37-42 within the subject property as part of the proposed design.
  - Trees 1, 12-20, and 37-42 have been assessed as having a ‘Low’ retention value.
  - Tree 10 has been assessed as having a ‘High’ retention value.
- It is proposed to remove Tree 27 within the Mollison Street Road reserve.
  - Tree 27 has been assigned low retention value.

Trees to be Retained

- It is proposed to retain Trees 2-9, 11, 33-36 and 50-54 within the subject site.
  - The trees are mainly small to large specimens that have been assigned ‘Low’ to ‘High’ retention values.
- It is proposed to retain Trees 21-26, 28-30 and 45-49 within the Mollison and Myers Street Road reserves.
  - The trees are young to semi-mature specimens that have been assigned ‘Low’ to ‘Medium’ retention values.
- Trees 31, 32, 43 and 44 are located within adjoining residential properties and carpark.
  - The trees should be protected and retained throughout development unless permission for their removal is granted.

Contents

Disclaimer: This document may only be used for the purpose for which it was commissioned and in accordance with the contract between Axiom Tree Management and the client. This includes the information contained in the report, maps, photos, and any other documentation. The scope of services was defined in consultation with the client, by time and budgetary constraints, and the availability of reports and other data on the subject area. Changes to available information, legislation and schedules are made on an ongoing basis and readers should obtain up to date information,

1 Introduction

Axiom Tree Management Pty Ltd has been engaged by Duo Projects to provide a report on trees at St Andrews Uniting Church, Myers St, Bendigo. A report has been requested as part of the proposed development to assist with planning. A feature survey has been provided by JCA Consultants-(Drawing No: 2873311F1D).

Site plans have been provided by MGS Architects (MGS Architects (Dwg Title: SITE PLAN AND GF GA PLAN, Dwg No: SK0101, Rev: P4) and have been used to assess construction impact and removal and retention of trees.

The site is in a Special Use Zone (SUZ1), located within the City of Greater Bendigo Council. Relevant Overlays that may impact development include Design and Development Overlay (DDO5), Heritage Overlay (HO212) and Parking Overlay (PO1). In Victoria, a permit is usually required to remove, destroy, or lop native vegetation. These regulations are known as the native vegetation removal regulations (Clause 52.17) and are primarily implemented through local council planning schemes.

2 Key Objectives

As part of the report the key objectives include:

- Identify and record the dimensions of all trees that have the potential to be impacted by future development.
- Provide an assessment of the health, structure, and retention value of the tree specimens; and
- Provide tree protection measures in accordance with AS 4970 2009 for retained trees to ensure that their health and structure is maintained or improved throughout development and in the long term.

2.1 Site Methodology

On Monday, 18 November 2019, Tim Cameron conducted a site inspection. Data collected for the trees included but was not limited to:

- Botanical Name;
- Diameter at Breast Height (DBH);
- Retention Value;
- Canopy Dimensions (estimated);
- Health and Structure;
- Useful Life Expectancy (ULE).

Additional methodology includes:

- Assessments were conducted from ground level, with no instruments other than a diameter tape to measure DBH.
- A detailed visual inspection of the tree/s and the surrounding site was conducted, including a complete walk around the tree, looking at the buttress roots, trunk, branches, and leaves.
- Trees were assessed and located using differentially corrected GPS (generally +/- 1.0m accuracy) and aligned to a surveyor feature survey where available.

AXIOM
Tree Management Pty Ltd

Drawn and Plotted by:
Geographic Projection: GDA 1994 MGA Zone 55
Scale: 1:3,974
Date: 6/12/2021

Assessment of Trees at 26 Myers Street, Bendigo

Legend

- trees
- Cadastre
- Roads

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3 Observations/Discussions

3.1 Subject Site

The site is the St Andrews Uniting Church and adjacent residential properties and hall in Bendigo. The site covers approximately 7550 square metres and has frontages to Myers Street and Mollison Street. The site contains a large stone church, several brick buildings, and an asphalt carpark. The site slopes to the northwest. Most large trees are located within the residential property and overhang neighbouring properties.

Figure 1. Subject site from Mollison Street looing northwest showing carpark buildings and trees.

Figure 2. Rear of residential property showing rear yard, building and trees.

3.2 Trees Details

3.2.1 Species Composition

Fifty-four (54) trees were assessed on and directly adjoining the subject site that may be impacted by future development. Of the trees:

- Trees 1-20, 33-42 and 50-54 are in the subject site;
- Trees 31 and 32 are in an adjoining property to the southwest;
- Trees 43 and 44 are in the adjoining council managed carpark;
- Trees 21-30 are in the Mollison Street Road reserve; and
- Trees 45-49 are in the Myers Street Road reserve.

Trees within the subject site consist of a mixture large native trees and small commonly planted/self-sown garden specimens. Trees within the road reserve consist of common street trees including *Ulmus parvifolia* and *Platanus Xacerifolia.*

3.2.2 Permit Requirements and Vegetation Controls

No overlays or local laws are present that require a permit for pruning or removal of trees. Heritage overlays are present at the site that cover the church building and associated stables. No tree controls apply as part of the heritage overlays.

Trees indigenous to the local area, that are likely to be self-sown and not planted include Trees 3, 5, 9, 10, 34 and a permit is required to remove, destroy, or lop. The remaining trees are not subject to the requirements of native vegetation regulations at they are exotic, non-Victorian or planted and exempt.

The trees located on neighbouring properties have been assessed on the assumption that their owner requires their retention. Consideration must be given for their protection throughout any future proposed development on the site unless the property owner and/or responsible authority gives consent.

Table 1. Species composition

Botanical Name	Common Name	Origin	Count
Ulmus parvifolia	Chinese Elm	Exotic	**11**
Prunus cerasifera	Cherry Plum	Exotic	**6**
Eucalyptus camaldulensis	River Red Gum	Indigenous	**5**
Platanus Xacerifolia	London Plane	Exotic	**5**
Prunus cerasifera 'Nigra'	Purple Cherry Plum	Exotic	**4**
Cotoneaster glaucophyllus	Cotoneaster	Exotic	**3**
Corymbia maculata	Spotted Gum	Native	**2**
Cupressus sempervirens	Italian Cypress	Exotic	**2**
Species with single specimen			**16**
Total			**54**

3.2.3 Health

The health of most of the trees is 'Good'. The assessment of health has been assigned based on several factors including canopy growth and density, presence of pest or disease, presence of dead branches considering the time of year and typical form of the species. The good health of the trees can be attributed to the selection of self-sown indigenous and common planted specimens that are tolerant of many biotic and abiotic conditions. The relatively good health also reflects the above average rainfall over the last 12 months.

Table 2. Health, structure, and ULE ratings

Health/Structure Range	Health Count	Structure Count	ULE ratings	ULE
Good	39	15	**20+ years**	27
Fair	15	34	**10-20 years**	15
Poor	0	5	**5-10 years**	12
Very poor/Dead	0	0	**0-5 years**	0
Total	**54**	**54**	**Total**	**54**

3.2.4 Structure

The structure of most of the trees is 'Fair'. The trees are typical of the species age and situation. Arboricultural maintenance that has been carried out over many years which has resulted in Arboricultural works being recommended and a relatively low risk of harm at the site.

3.2.5 Useful Life Expectancy (ULE)

The ULE of a tree is assigned by the assessor based on many factors including species longevity, suitability to the site and current age and condition both regarding health and structure. It is an estimation of how long a tree can provide amenity in the landscape at an acceptable level of risk. Most of the trees are long lived species in good condition commonly living for many decades.

3.3 Tree Retention

Three retention values have been considered, consisting of 'High', 'Medium' and 'Low'. Retention value considers tree size and condition, ULE, contribution to landscape and individual tree significance and they provide useful information to planners, regarding which trees are considered worthy of protection in the design phase. Table 3 gives a breakdown of retention values across the site.

Table 3. Retention Values.

Retention Value	Count
High	5
Medium	16
Low	33
Total	**54**

3.3.1 High Retention

Five trees (5) have been assigned High retention value. High retention trees are well suited to the site and offer amenity. They are normally in 'Good' to 'Fair' health and have 'Good' to 'Fair' structure. The ULE should be at least the same as the design life of any new buildings. High retention value trees are the largest trees at the site and consist of *Eucalyptus camaldulensis, Corymbia maculata* and *Corymbia citriodora.* The trees prominent in the landscape and visible from surrounding streets.

3.3.2 Medium Retention

Sixteen trees (16) have been assigned 'Medium' retention value. The trees are moderate or large sized specimens with a general condition rating of fair. If designing around these trees is not feasible or practical, removal and replacement would be an acceptable compromise.

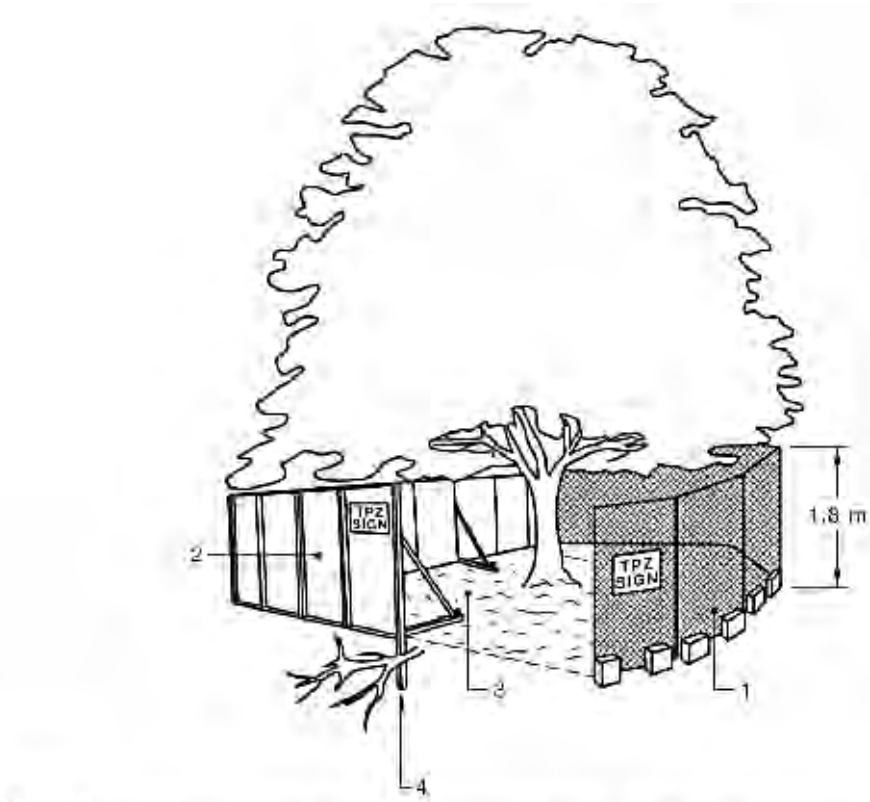
3.3.3 Low Retention

Thirty-three trees (33) have been assigned 'Low' retention value. Low retention value trees are either young or semi mature common varieties that are easily replaceable or are dead and require removal. Trees in poor health or with significant defects in structure are not suitable for preservation in areas where people or structures will be located (Matheny & Clark, 1998).

3.4 TPZ Specifications

Regardless of tree condition or retention value, any tree selected to be retained requires protection during construction. The best way to protect retained trees as part of any development is by establishing a tree protection zone (TPZ). TPZs have been calculated according to *Protection of Trees on Development Sites* (AS 4970-2009) for all trees to be retained calculating the TPZ as 12 times the trunk diameter at 1.4m above ground level (DBH).

The TPZ fence is designed to act as a physical barrier of protective fencing that is a minimum of 1.8m high. It is erected around retained specimens (at the edge of the TPZ or where specified by the Arborist) before site works commence (Figure 5).



LEGEND:
1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

Figure 3 Tree Protection Fencing

Activities excluded from the TPZ include but are not limited to-

- machine excavation including trenching (unless on approved plans);
- cultivation;
- preparation of chemicals, including cement products;
- refuelling;
- wash down and cleaning of equipment;
- lighting of fires;
- temporary or permanent installation of utilities and signs;
- excavation for silt fencing;
- storage;
- parking of vehicles and plant;
- dumping of waste;
- placement of fill;
- soil level changes;
- physical damage to the tree/s.

3.4.1 Encroachment

Encroachment into the TPZ of trees is allowed under certain circumstances depending on a number of factors including site and tree conditions.

3.4.1.1 Encroachment Less Than 10%

Encroachment of less than 10% of the TPZ and outside the SRZ is deemed to be minor encroachment according to AS 4970-2009. Detailed root investigations should not be required but must be compensated with an extension to the TPZ elsewhere (Figure 6 & Figure 7). Variations must be made by the project arborist considering other relevant factors including tree health, vigour, stability, species sensitivity and soil characteristics.

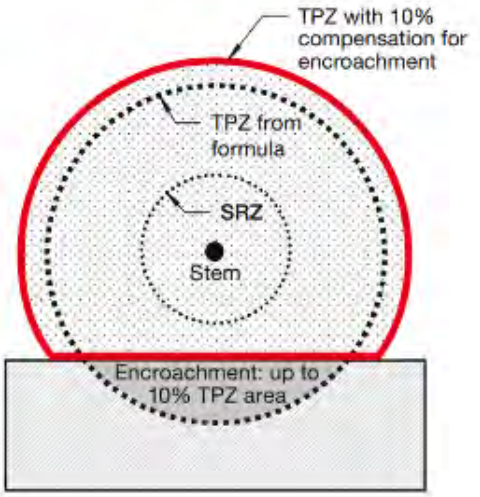


Figure 4. Example of TPZ encroachment and compensatory offset (image from AS 4970-2009).

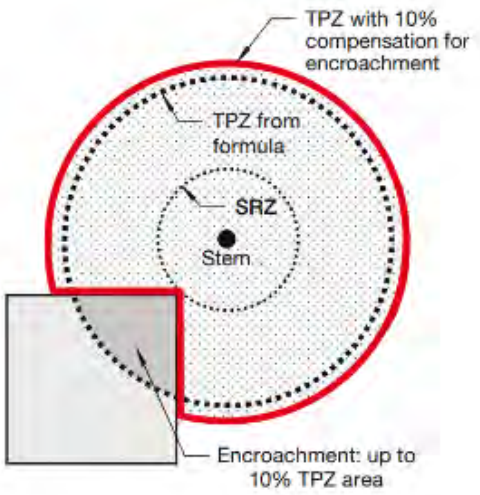


Figure 5. Example of TPZ encroachment and compensatory offset (image from AS 4970-2009).

3.4.1.2 Encroachment Greater Than 10%

Encroachment of more than 10% of the TPZ or into the SRZ will require the project arborist to demonstrate that the tree(s) will remain viable. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by non-destructive methods and consideration of relevant factors tree health, vigour, stability, species sensitivity and soil characteristics.

3.4.2 SRZ

The SRZ is the minimum volume of roots required by the tree to remain stable in the ground. If the SRZ is breached the chances of windthrow are significantly increased, especially if roots are cut on the same side as prevailing winds. Windthrow is an event where the entire tree fails/falls over. Often, the tree is completely uprooted with devastating results. It is important to note that the SRZ is not related to tree health. It refers to the physical volume of roots required for the tree to remain stable in the ground. It is in no way related to the physiological requirements of the tree but is the minimum volume of roots required for the tree to remain standing.

3.5 Design Proposal

The design proposal includes:

- Removal of specified structures and vegetation.
- Construction of multi-level residential development.
- Associated car parking and internal roads and footpaths.
- Open space areas with landscaping; and
- Installation of associated infrastructure and services.

The location of services has not been provided. Where services are required to encroach into the TPZ of retained trees by greater than 10%, boring to a depth greater than 750mm below existing ground level should be explored. Excavation and machinery travel associated with boring activities must be located outside TPZ areas unless permitted by the project Arborist.

3.6 Construction Impact

Construction into the TPZs of trees is allowed (AS 4970 2009). The level of encroachment is based upon the percentage of TPZ area intruded upon with less than 10% encroachment considered minor and greater than 10% encroachment considered major. Minor encroachment is considered acceptable with some modification of the TPZ, whereas mitigation measures/alternative designs are required for trees with major encroachment. Based upon the current design:

Trees to be Removed

- It is proposed to remove Trees 1, 10, 12-20, and 37-42 within the subject property as part of the proposed design.
  - Trees 1, 12-20, and 37-42 have been assessed as having a 'Low' retention value.
    - The trees consist of planted and self-sown ornamental fruit trees.
    - The trees are small, have reached their mature size and are easily replaceable with advanced nursery stock.
    - The trees require removal to facilitate construction of the residential development, carparking and thoroughfares.
  - Tree 10 has been assessed as having a 'High' retention value.
    - The tree is a large mature self-sown native specimen subject to the requirements of 52.17 of the planning schemes.
    - There will be up to 21% encroachment from construction of the residential dwelling and potential impacts from service installation other associated works.
    - A planning permit is required for the removal of Tree 10 including obtaining native vegetation offsets from a third party.
- It is proposed to remove Tree 27 within the Mollison Street Road reserve.
  - Tree 27 has been assigned low retention value.
    - The tree is a recently planted exotic specimen that can be easily replaced with advanced nursery stock.
    - Permission from the City of Greater Bendigo will be required for the trees removal including payment of an offset in accordance with their Urban Tree Management Policy.

Trees to be Retained

- It is proposed to retain Trees 2-9, 11, 33-36 and 50-54 within the subject site.
  - The trees are mainly small to large specimens that have been assigned 'Low' to 'High' retention values. The trees are located at the rear of 20-24 Myers Street surrounding the stables or at the front of the church
  - There will be 14% encroachment into the TPZ of Tree number 3 from construction of the residential dwelling which is classed as major encroachment. Minor pruning will also be required to ensure clearance from future buildings.
    - All works are proposed to take place within an existing sealed, raised, carpark which has been present for many decades.
    - Non-destructive root exploration must by undertaken to determine the presence of roots and to guide footing design to ensure the long term health and viability of the tree is not impacted.
    - A specific Tree Protection Management Plan must be prepared to ensure the tree is not lost as part of the requirements of Clause 52.17 of the planning scheme.
- It is proposed to retain Trees 21-26, 28-30 and 45-49 within the Mollison and Myers Street Road reserves.
  - The trees are young to semi-mature specimens that have been assigned 'Low' to 'Medium' retention values.
- Trees 31, 32, 43 and 44 are located within adjoining residential properties and carpark.
  - The trees should be protected and retained throughout development unless permission for their removal is granted.

Table **4** Tree removal and retention

ID	Botanical Name	Status	H x W	DBH (cm)	Retention Value	TPZ (m radius)	SRZ (m radius)	Location	Retention/ removal
1	*Prunus cerasifera*	Self-sown exotic	6m x 7m	25	Low	3	2.25	Subject site	Remove
2	*Cedrus deodara*	Planted Exotic	18m x 10m	54	Medium	6.48	2.74	Subject site	Retain
3	*Eucalyptus camaldulensis*	Indigenous	28m x 15m	150	High	15	4.24	Subject site	Retain (14%)
4	*Angophora costata*	Non-VIC native	15m x 10m	49	Medium	5.88	2.67	Subject site	Retain
5	*Eucalyptus camaldulensis*	Indigenous	18m x 4m	60	Medium	7.2	3.01	Subject site	Retain
6	*Corymbia maculata*	Planted Native-	25m x 8m	69	High	8.28	2.98	Subject site	Retain
7	*Corymbia maculata*	Planted Native-	22m x 6m	43	Medium	5.16	2.53	Subject site	Retain
8	*Eucalyptus saligna*	Non-VIC native	26m x 5m	56	Medium	6.72	2.80	Subject site	Retain
9	*Eucalyptus camaldulensis*	Indigenous	26m x 10m	97	High	11.64	3.44	Subject site	Retain
10	*Eucalyptus camaldulensis*	Indigenous	22m x 18m	124	High	14.88	3.57	Subject site	Remove
11	*Corymbia citriodora*	Non-VIC native	18m x 15m	72	High	8.64	3.14	Subject site	Retain
12	*Cotoneaster glaucophyllus*	Self-sown exotic	3m x 3m	9	Low	2	1.50	Subject site	Remove
13	*Prunus cerasifera*	Planted Exotic	6m x 4m	27	Low	3.24	2.00	Subject site	Remove
14	*Prunus cerasifera*	Planted Exotic	7m x 3m	17	Low	2.04	1.68	Subject site	Remove
15	*Citrus limon*	Planted Exotic	5m x 2m	11	Low	2	1.68	Subject site	Remove
16	*Punica granatum*	Planted Exotic	5m x 4m	16	Low	2	1.85	Subject site	Remove
17	*Prunus cerasifera 'Nigra'*	Self-sown exotic	6m x 3m	17	Low	2.04	1.65	Subject site	Remove
18	*Thuja occidentalis*	Planted Exotic	3m x 2m	10	Low	2	1.50	Subject site	Remove
19	*Prunus cerasifera*	Self-sown exotic	3m x 1m	5	Low	2	1.50	Subject site	Remove
20	*Cotoneaster glaucophyllus*	Self-sown exotic	3m x 3m	7	Low	2	1.50	Subject site	Remove
21	*Ulmus parvifolia*	Planted Exotic	2m x 1m	1	Low	2	1.50	Mollison Street	Retain
22	*Ulmus parvifolia*	Planted Exotic	10m x 8m	24	Medium	2.88	1.88	Mollison Street	Retain
23	*Ulmus parvifolia*	Planted Exotic	2m x 1m	1	Low	2	1.50	Mollison Street	Retain
24	*Ulmus parvifolia*	Planted Exotic	9m x 6m	18	Medium	2.16	1.85	Mollison Street	Retain
25	*Ulmus parvifolia*	Planted Exotic	3m x 1m	2	Low	2	1.50	Mollison Street	Retain
26	*Ulmus parvifolia*	Planted Exotic	12m x 10m	29	Medium	3.48	2.08	Mollison Street	Retain
27	*Ulmus parvifolia*	Planted Exotic	2m x 1m	2	Low	2	1.50	Mollison Street	Remove
28	*Ulmus parvifolia*	Planted Exotic	12m x 14m	35	Medium	4.2	2.23	Mollison Street	Retain
29	*Ulmus parvifolia*	Planted Exotic	3m x 1m	2	Low	2	1.50	Mollison Street	Retain
30	*Ulmus parvifolia*	Planted Exotic	10m x 12m	33	Medium	3.96	2.18	Mollison Street	Retain
31	*Cupressus sempervirens*	Planted Exotic	18m x 3m	51	Medium	6.12	2.39	Adjoining private	Retain
32	*Prunus cerasifera 'Nigra'*	Planted Exotic	5m x 5m	15	Low	2	1.68	Adjoining private	Retain
33	*Phoenix canariensis*	Planted Exotic	9m x 7m	60	Low	4.5	2.76	Subject site	Retain
34	*Eucalyptus leucoxylon*	Indigenous	5m x 3m	11	Low	2	1.50	Subject site	Retain

ID	Botanical Name	Status	H x W	DBH (cm)	Retention Value	TPZ (m radius)	SRZ (m radius)	Location	Retention/ removal
35	*Prunus cerasifera 'Nigra'*	Planted Exotic	4m x 3m	7	Low	2	1.50	Subject site	Retain
36	*Prunus cerasifera*	Planted Exotic	5m x 3m	12	Low	2	1.50	Subject site	Retain
37	*Pyracantha crenulata*	Planted Exotic	6m x 3m	15	Low	2	4.93	Subject site	Remove
38	*Crataegus monogyna*	Planted Exotic	5m x 3m	20	Low	2.4	1.79	Subject site	Remove
39	*Prunus cerasifera*	Planted Exotic	5m x 3m	17	Low	2.04	1.61	Subject site	Remove
40	*Prunus cerasifera 'Nigra'*	Planted Exotic	6m x 3m	10	Low	2	1.50	Subject site	Remove
41	*Cotoneaster glaucophyllus*	Planted Exotic	6m x 5m	10	Low	2	1.50	Subject site	Remove
42	*Pyrus calleryana*	Planted Exotic	4m x 2m	8	Low	2	1.50	Subject site	Remove
43	*Eucalyptus camaldulensis*	High	9m x 2m	20	Low	2.4	1.85	Carpark	Retain
44	*Ulmus parvifolia*	Planted Exotic	2m x 2m	4	Low	2	1.50	Carpark	Retain
45	*Platanus Xacerifolia*	Planted Exotic	12m x 6m	37	Medium	4.44	2.34	Myers Street	Retain
46	*Platanus Xacerifolia*	Planted Exotic	10m x 7m	31	Medium	3.72	2.18	Myers Street	Retain
47	*Platanus Xacerifolia*	Planted Exotic	10m x 5m	37	Medium	4.44	2.28	Myers Street	Retain
48	*Platanus Xacerifolia*	Planted Exotic	10m x 5m	37	Medium	4.44	2.32	Myers Street	Retain
49	*Platanus Xacerifolia*	Planted Exotic	7m x 4m	23	Medium	2.76	1.88	Myers Street	Retain
50	*Callistemon viminalis*	Non-VIC native	3m x 3m	10	Low	2	1.50	Subject site	Retain
51	*Acacia sp.*	Planted native	4m x 3m	10	Low	2	1.50	Subject site	Retain
52	*Cupressus sempervirens*	High	7m x 3m	20	Low	2.4	1.85	Subject site	Retain
53	*Cupressus sempervirens*	High	7m x 3m	20	Low	2.4	1.85	Subject site	Retain
54	*Melaleuca styphelioides*	High	6m x 3m	14	Low	2	1.50	Subject site	Retain

3.7 Future Pruning Works

Clearance pruning works have been recommended for Tree number 3 to ensure clearance from future building construction including scaffolding. Figure 3 and Figure 4 give examples of the maximum pruning likely to be required. Qualified arborists should carry out all pruning and removal works. The minimum qualification should be Certificate Arboriculture AQF Level 3. All pruning should conform to the Australian Standard Pruning of Amenity Trees (AS 4373-2007).

Figure 3. Low branch requiring removal from Tree number 3 to allow for building scaffolding etc.

Figure 4. Low branch requiring removal from Tree number 3 to allow for building scaffolding etc.

3.8 General Construction Specifications

TPZ and SRZ dimensions and locations have been provided as part of this report. Where possible, construction works, and associated activities should be avoided within TPZ areas. Where low impact construction works are required within TPZ areas the following specifications should be adhered to.

Fence Construction within TPZ Areas

Construction of Timber or colourbond fencing generally has a minor impact on trees due to their lightweight construction and relatively small footings. Provided the following specifications are adhered to construction impact will be low:

- Augers or excavation equipment are prohibited from within SRZ areas.
- Post holes are to be hand dug within TPZ areas, with roots no greater than 50mm to be removed or damaged.
- The location of fence posts is to be flexible to avoid damaging roots greater than 50mm in diameter.
- Apart from excavation for post holes, no excavation is permitted within TPZ areas greater than 150mm.
- Existing post holes for support post are to be utilised where possible for fence replacement.

Footpath Construction within TPZ's

Construction of the footpaths has the potential to impact trees due to excavation, compaction, and mechanical damage. Where construction of path is required within large areas of TPZ and SRZ areas, the following construction techniques should be adopted in consultation with the project Arborist:

- Footpath construction within the TPZ area is to be constructed at or near grade using porous/permeable material with no greater than 150mm cut/scrape permitted for preparation.
- Cut/scrape for preparation is to be dug by hand within TPZ areas to reduce the likelihood of root damage.
- Where surface roots are identified, the finished soil level is to be raised (no greater than 150mm) to reduce the probability of root damage.
- Excavation equipment are not permitted within TPZ areas.
- Where large amounts of battering/fill are required greater than 150mm, alternative design methods/materials will be required to reduce the impact on trees.

Trenching for Drainage, Irrigation and Services

The location of services and drainage should be planned to avoid TPZ areas. To reduce the potential impact on trees the following specifications should be adhered to:

- Boring is to be explored where services occur within the TPZ of trees.
- Drainage is to be located outside TPZ areas. Where drainage is required within TPZ areas, the project Arborist is to be consulted regarding potential impacts and design.
- Installation of irrigation should not exceed 100mm below ground level within TPZ areas.

Landscaping within TPZ Areas

Unspecified landscaping may be required for within TPZ and SRZ areas. The following specifications are to be adhered to during landscaping operations:

- No machine excavation or placement of soil fill within SRZ areas.
- No machine excavation or placement of soil fill greater than 150mm within TPZ areas; and
- Holes for tree planting are to be dug by hand within the TPZ of adjoining trees with no augers or excavation machinery used.

TPZ and Site Map

AXIOM Tree Management Pty Ltd

Base Map supplied by: MGS
Geographic Projection: GDA 1994 MGA Zone 55
Scale: 1:728
Date: 22/11/2022

Assessment of Trees at St Andrews Uniting Church 26 Myers Street, Bendigo

Legend

Trees-Retain/remove

- Remove
- Retain

TPZ-Retention value

- High
- Medium
- Low
- Encroachment
- SRZ
- Cadastre

N W E S

4 Conclusion and Recommendations

Axiom Tree Management Pty Ltd has been engaged by Duo Projects to provide a report on trees at St Andrews Uniting Church, Myers St, Bendigo. A report has been requested as part of the proposed development to assist with planning.

The site is the St Andrews Uniting Church and adjacent residential properties and hall in Bendigo. The site covers approximately 7550 square metres and has frontages to Myers Street and Mollison Street. The site contains a large stone church, several brick buildings, and an asphalt carpark. The site slopes to the northwest. Most large trees are located within the residential property and overhang neighbouring properties.

- Fifty-four (54) trees were assessed on and directly adjoining the subject site:
  - Trees 1-20, 33-42 and 50-54 are located within the subject site.
  - Trees 31 and 32 are in an adjoining property to the southwest.
  - Trees 43 and 44 are in the adjoining council managed carpark.
  - Trees 21-30 are located within the Mollison Street Road reserve and
  - Trees 45-49 are located within the Myers Street Road reserve.
  - Trees within the subject site consist of a mixture large native trees and small commonly planted/self-sown garden specimens.
  - Trees within the road reserve consist of common street trees including *Ulmus parvifolia* and *Platanus Xacerifolia.*
- No overlays or local laws are present that require a permit for pruning or removal of trees.
  - Heritage overlays are present at the site that cover the church building and associated stables. No tree controls apply as part of the heritage overlays.
  - Trees indigenous to the local area, that are likely to be self-sown and not planted include Trees 3, 5, 9, 10, 34 and a permit is required to remove, destroy, or lop. The remaining trees are not subject to the requirements of native vegetation regulations at they are exotic, non-Victorian or planted and exempt.
  - The trees located on neighbouring properties have been assessed on the assumption that their owner requires their retention. Consideration must be given for their protection throughout any future proposed development on the site unless the property owner and/or responsible authority gives consent.
- The health of most of the trees is 'Good'.
  - The good health of the trees can be attributed to the selection of self-sown indigenous and common planted specimens and the above average rainfall over the last 12 months.
- The structure of most of the trees is 'Fair'.
  - The trees are typical of the species age and situation with Arboricultural maintenance that has been carried out over many years
- ULE is an estimation of how long a tree can provide amenity in the landscape at an acceptable level of risk.
  - Most of the trees are long lived species in good condition commonly living for many decades.
- Three retention values have been considered, consisting of ‘High’, ‘Medium’ and ‘Low’.
  - Five trees (5) have been assigned High retention value.
  - Sixteen trees (16) have been assigned ‘Medium’ retention value.
  - Thirty-three trees (33) have been assigned ‘Low’ retention value.

The design proposal includes removal of specified structures and vegetation, construction of multi-level residential development, associated car parking and internal roads and footpaths, open space areas with landscaping and installation of associated infrastructure and services.

Trees to be Removed

- It is proposed to remove Trees 1, 10, 12-20, and 37-42 within the subject property as part of the proposed design.
  - Trees 1, 12-20, and 37-42 have been assessed as having a 'Low' retention value.
  - Tree 10 has been assessed as having a 'High' retention value.
- It is proposed to remove Tree 27 within the Mollison Street Road reserve.
  - Tree 27 has been assigned low retention value.

Trees to be Retained

- It is proposed to retain Trees 2-9, 11, 33-36 and 50-54 within the subject site.
  - The trees are mainly small to large specimens that have been assigned 'Low' to 'High' retention values.
- It is proposed to retain Trees 21-26, 28-30 and 45-49 within the Mollison and Myers Street Road reserves.
  - The trees are young to semi-mature specimens that have been assigned 'Low' to 'Medium' retention values.
- Trees 31, 32, 43 and 44 are located within adjoining residential properties and carpark.
  - The trees should be protected and retained throughout development unless permission for their removal is granted.

5 References

AS 4373, 2007, *Australian Standard, Pruning Amenity Trees*, 2nd Edition Standards Australia

AS 4970, 2009, *Australian Standard, Protection of Trees on Development Sites*, Standards Australia.

Matheny, N. & Clark, J. 1998 *Trees and development – a technical guide to preservation of trees during land development*. International Society of Arboriculture, Champaign, IL USA

6 Appendices

6.1 Definitions

Botanical name:

The genus, species and common name.

Canopy dimensions

Height (approximate) and width (measured) of the canopy in metres.

DBH

Diameter at breast height (measured at 1.4m above ground level).

Tree Origin

Term	Definition
Exotic	The species originates in a country other than Australia.
Native	The species originates within Australia.
Indigenous	The species originates within the local environs.

Health

Term	Definition
Excellent	The tree is demonstrating excellent or exceptional growth. The tree should exhibit a full canopy of foliage and be free of pest and disease problems.
Good	The tree is demonstrating good or exceptional growth. The tree should exhibit a full canopy of foliage, and have only minor pest or diseases problems.
Fair	The tree is in reasonable condition and growing well. The tree should exhibit an adequate canopy of foliage. There may be some deadwood present in the crown. Some grazing by insects or possums may be evident.
Poor	The tree is not growing to its full capacity; extension growth of the laterals is minimal. The canopy may be thinning or sparse. Large amounts of deadwood may be evident throughout the crown. Significant pest and disease problems may be evident or symptoms of stress indicating tree decline.
Very Poor	The tree appears to be in a state of decline. The tree is not growing to its full capacity. The canopy may be very thin and sparse. A significant volume of deadwood may be present in the canopy or pest and disease problems may be causing a severe decline in tree health.
Dead	The tree is dead.

Structure

Term	Definition
Good	The tree has a well-defined and balanced crown. Branch unions appear to be strong, with no defects evident in the trunk or the branches. Major limbs are well defined. The tree is considered a good example of the species.
Fair	The tree has some minor problems in the structure of the crown. The crown may be slightly out of balance, and some branch unions may be exhibiting minor structural faults. If the tree has a single trunk, it may be on a slight lean or exhibiting minor defects.
Poor	The tree may have a poorly structured crown. The crown may be unbalanced or exhibit large gaps. Major limbs may not be well defined. Branches may be rubbing or crossing over. Branch unions may be poor or faulty at the point of attachment. The tree may have suffered root damage.
Very Poor	The tree has a poorly structured crown. The crown is unbalanced or exhibit large gaps with possibly large sections of deadwood. Major limbs may not be well defined. Branches may be rubbing or crossing over. Branch unions may be poor or faulty at the point of attachment. Branches may exhibit large cracks that are likely to fail in the future. The tree may have suffered major root damage.
Failed	The tree has a very poorly structured crown. A section of the tree has failed or is in imminent danger of failure.

Useful Life Expectancy (ULE) Rating

Useful Life Expectancy is approximately how long a tree can be retained safely and usefully in the landscape.

Term	Definition
0 years	The tree is considered dangerous in the location and has no significant amenity value.
Less than 5 years	The tree, under normal circumstances and without extra stresses being imposed on it, should be safe and have value for up to five years, but will need to be replaced. During this period, normal inspections and maintenance will be required. If possible, replacement trees should be planted.
5 – 10 years	The tree, under normal circumstances and without extra stresses being imposed on it, should be safe and of value for up to ten years. During this period, normal inspections and maintenance will be required.
10– 20 years	The tree, under normal circumstances and without extra stresses being imposed on it, should be safe and of value for up to twenty years. During this period, normal inspections and maintenance will be required.
Greater than 20 years	The tree, under normal circumstances and without extra stresses being imposed on it, should be safe and of value for greater than 20 years. During this period, normal inspections and maintenance will be required.

TPZ and Site Map

AXIOM
Tree Management Pty Ltd

Base Map supplied by: MGS
Geographic Projection:
GDA 1994 MGA Zone 55
Scale: 1:728
Date: 22/11/2022

Assessment of Trees at St Andrews Uniting Church 26 Myers Street, Bendigo

Legend

Trees-Retain/remove

- Remove
- Retain

TPZ-Retention value

- High
- Medium
- Low
- Encroachment
- SRZ
- Cadastre

N W E S

6.3 Individual Tree Details Spreadsheet

ID	Botanical Name	Common Name	Age	Status	H x W	DBH (cm)	Health	Structure	ULE	Retention Value	TPZ (m radius)	SRZ (m radius)	Comments	Location	Retention/ removal
1	*Prunus cerasifera*	Cherry Plum	Mature	Self-sown exotic	6m x 7m	25	Good	Fair	10-20 years	Low	3	2.25		Subject site	Remove
2	*Cedrus deodara*	Deodar Cedar	S-mature	Planted Exotic	18m x 10m	54	Good	Good	20+ years	Medium	6.48	2.74		Subject site	Retain
3	*Eucalyptus camaldulensis*	River Red Gum	Mature	Indigenous	28m x 15m	150	Good	Fair	20+ years	High	15	4.24	Tree on edge of carpark. Significant age. No major failures.	Subject site	Retain (14%)
4	*Angophora costata*	Smooth-barked Apple Myrtle	S-mature	Non-VIC native	15m x 10m	49	Good	Good	20+ years	Medium	5.88	2.67		Subject site	Retain
5	*Eucalyptus camaldulensis*	River Red Gum	S-mature	Indigenous	18m x 4m	60	Fair	Fair	10-20 years	Medium	7.2	3.01		Subject site	Retain
6	*Corymbia maculata*	Spotted Gum	Mature	Planted Native-	25m x 8m	69	Good	Fair	20+ years	High	8.28	2.98		Subject site	Retain
7	*Corymbia maculata*	Spotted Gum	S-mature	Planted Native-	22m x 6m	43	Good	Good	20+ years	Medium	5.16	2.53		Subject site	Retain
8	*Eucalyptus saligna*	Sydney Blue Gum	Mature	Non-VIC native	26m x 5m	56	Good	Fair	20+ years	Medium	6.72	2.80		Subject site	Retain
9	*Eucalyptus camaldulensis*	River Red Gum	Mature	Indigenous	26m x 10m	97	Fair	Fair	20+ years	High	11.64	3.44	Cable installed	Subject site	Retain
10	*Eucalyptus camaldulensis*	River Red Gum	Mature	Indigenous	22m x 18m	124	Good	Fair	20+ years	High	14.88	3.57	Codominant and wide spreading	Subject site	Remove
11	*Corymbia citriodora*	Lemon-scented Gum	Mature	Non-VIC native	18m x 15m	72	Fair	Fair	20+ years	High	8.64	3.14		Subject site	Retain
12	*Cotoneaster glaucophyllus*	Cotoneaster	S-mature	Self-sown exotic	3m x 3m	9	Good	Fair	10-20 years	Low	2	1.50		Subject site	Remove
13	*Prunus cerasifera*	Cherry Plum	Mature	Planted Exotic	6m x 4m	27	Fair	Fair	5-10 years	Low	3.24	2.00		Subject site	Remove
14	*Prunus cerasifera*	Cherry Plum	S-mature	Planted Exotic	7m x 3m	17	Good	Fair	5-10 years	Low	2.04	1.68		Subject site	Remove
15	*Citrus limon*	Lemon	Mature	Planted Exotic	5m x 2m	11	Fair	Fair	5-10 years	Low	2	1.68		Subject site	Remove
16	*Punica granatum*	Pomegranate	Mature	Planted Exotic	5m x 4m	16	Fair	Fair	10-20 years	Low	2	1.85		Subject site	Remove
17	*Prunus cerasifera 'Nigra'*	Purple Cherry Plum	Mature	Self-sown exotic	6m x 3m	17	Fair	Poor	5-10 years	Low	2.04	1.65	mixed up with Feijoa	Subject site	Remove
18	*Thuja occidentalis*	White Cedar	S-mature	Planted Exotic	3m x 2m	10	Good	Fair	5-10 years	Low	2	1.50	Dbh estimated	Subject site	Remove
19	*Prunus cerasifera*	Cherry Plum	S-mature	Self-sown exotic	3m x 1m	5	Good	Fair	10-20 years	Low	2	1.50	Self-sown	Subject site	Remove
20	*Cotoneaster glaucophyllus*	Cotoneaster	S-mature	Self-sown exotic	3m x 3m	7	Fair	Fair	5-10 years	Low	2	1.50		Subject site	Remove
21	*Ulmus parvifolia*	Chinese Elm	Young	Planted Exotic	2m x 1m	1	Good	Good	20+ years	Low	2	1.50		Mollison Street	Retain
22	*Ulmus parvifolia*	Chinese Elm	S-mature	Planted Exotic	10m x 8m	24	Good	Good	20+ years	Medium	2.88	1.88		Mollison Street	Retain
23	*Ulmus parvifolia*	Chinese Elm	Young	Planted Exotic	2m x 1m	1	Good	Good	20+ years	Low	2	1.50		Mollison Street	Retain
24	*Ulmus parvifolia*	Chinese Elm	S-mature	Planted Exotic	9m x 6m	18	Good	Good	20+ years	Medium	2.16	1.85		Mollison Street	Retain
25	*Ulmus parvifolia*	Chinese Elm	Young	Planted Exotic	3m x 1m	2	Good	Good	20+ years	Low	2	1.50		Mollison Street	Retain
26	*Ulmus parvifolia*	Chinese Elm	S-mature	Planted Exotic	12m x 10m	29	Good	Good	20+ years	Medium	3.48	2.08		Mollison Street	Retain
27	*Ulmus parvifolia*	Chinese Elm	Young	Planted Exotic	2m x 1m	2	Good	Good	20+ years	Low	2	1.50		Mollison Street	Remove
28	*Ulmus parvifolia*	Chinese Elm	S-mature	Planted Exotic	12m x 14m	35	Good	Fair	20+ years	Medium	4.2	2.23		Mollison Street	Retain
29	*Ulmus parvifolia*	Chinese Elm	S-mature	Planted Exotic	3m x 1m	2	Good	Good	20+ years	Low	2	1.50		Mollison Street	Retain
30	*Ulmus parvifolia*	Chinese Elm	S-mature	Planted Exotic	10m x 12m	33	Good	Good	20+ years	Medium	3.96	2.18		Mollison Street	Retain

ID	Botanical Name	Common Name	Age	Status	H x W	DBH (cm)	Health	Structure	ULE	Retention Value	TPZ (m radius)	SRZ (m radius)	Comments	Location	Retention/ removal
31	*Cupressus sempervirens*	Italian Cypress	Mature	Planted Exotic	18m x 3m	51	Good	Fair	20+ years	Medium	6.12	2.39		Adjoining private	Retain
32	*Prunus cerasifera 'Nigra'*	Purple Cherry Plum	S-mature	Planted Exotic	5m x 5m	15	Good	Fair	10-20 years	Low	2	1.68	Dimensions estimated. leaning over subject site	Adjoining private	Retain
33	*Phoenix canariensis*	Canary Island Date Palm	S-mature	Planted Exotic	9m x 7m	60	Good	Good	20+ years	Low	4.5	2.76		Subject site	Retain
34	*Eucalyptus leucoxylon*	Yellow Gum	Young	Indigenous	5m x 3m	11	Good	Poor	10-20 years	Low	2	1.50		Subject site	Retain
35	*Prunus cerasifera 'Nigra'*	Purple Cherry Plum	Mature	Planted Exotic	4m x 3m	7	Good	Fair	5-10 years	Low	2	1.50		Subject site	Retain
36	*Prunus cerasifera*	Cherry Plum	Mature	Planted Exotic	5m x 3m	12	Good	Fair	5-10 years	Low	2	1.50		Subject site	Retain
37	*Pyracantha crenulata*	Firethorn	Mature	Planted Exotic	6m x 3m	15	Good	Poor	5-10 years	Low	2	4.93		Subject site	Remove
38	*Crataegus monogyna*	Hawthorn	Mature	Planted Exotic	5m x 3m	20	Fair	Poor	5-10 years	Low	2.4	1.79		Subject site	Remove
39	*Prunus cerasifera*	Cherry Plum	S-mature	Planted Exotic	5m x 3m	17	Fair	Fair	10-20 years	Low	2.04	1.61		Subject site	Remove
40	*Prunus cerasifera 'Nigra'*	Purple Cherry Plum	S-mature	Planted Exotic	6m x 3m	10	Good	Fair	10-20 years	Low	2	1.50		Subject site	Remove
41	*Cotoneaster glaucophyllus*	Cotoneaster	S-mature	Planted Exotic	6m x 5m	10	Good	Fair	10-20 years	Low	2	1.50		Subject site	Remove
42	*Pyrus calleryana*	Callery Pear	S-mature	Planted Exotic	4m x 2m	8	Good	Fair	10-20 years	Low	2	1.50		Subject site	Remove
43	*Eucalyptus camaldulensis*	River Red Gum	Young	High	9m x 2m	20	Good	Good	20+ years	Low	2.4	1.85	Self-sown in carpark	Carpark	Retain
44	*Ulmus parvifolia*	Chinese Elm	Young	Planted Exotic	2m x 2m	4	Good	Good	20+ years	Low	2	1.50	Self-sown in carpark	Carpark	Retain
45	*Platanus Xacerifolia*	London Plane	S-mature	Planted Exotic	12m x 6m	37	Fair	Fair	10-20 years	Medium	4.44	2.34	Street tree in carpark	Myers Street	Retain
46	*Platanus Xacerifolia*	London Plane	S-mature	Planted Exotic	10m x 7m	31	Good	Fair	20+ years	Medium	3.72	2.18	Street tree in carpark lifting asphalt	Myers Street	Retain
47	*Platanus Xacerifolia*	London Plane	S-mature	Planted Exotic	10m x 5m	37	Fair	Fair	20+ years	Medium	4.44	2.28	Street tree in carpark	Myers Street	Retain
48	*Platanus Xacerifolia*	London Plane	S-mature	Planted Exotic	10m x 5m	37	Fair	Fair	20+ years	Medium	4.44	2.32		Myers Street	Retain
49	*Platanus Xacerifolia*	London Plane	S-mature	Planted Exotic	7m x 4m	23	Fair	Fair	20+ years	Medium	2.76	1.88		Myers Street	Retain
50	*Callistemon viminalis*	Weeping Bottle Brush	S-mature	Non-VIC native	3m x 3m	10	Good	Fair	10-20 years	Low	2	1.50		Subject site	Retain
51	*Acacia sp.*	Wattle	Mature	Planted native	4m x 3m	10	Fair	Fair	10-20 years	Low	2	1.50	Various planted acacia species	Subject site	Retain
52	*Cupressus sempervirens*	Italian Cypress	Mature	High	7m x 3m	20	Good	Fair	5-10 years	Low	2.4	1.85		Subject site	Retain
53	*Cupressus sempervirens*	Italian Cypress	S-mature	High	7m x 3m	20	Good	Fair	10-20 years	Low	2.4	1.85		Subject site	Retain
54	*Melaleuca styphelioides*	Prickly Paperbark	S-mature	High	6m x 3m	14	Good	Poor	5-10 years	Low	2	1.50		Subject site	Retain

6.4 Individual Tree Details

Tree Number: 1

Botanical Name:	*Prunus cerasifera*
Common Name:	Cherry Plum
Origin:	Exotic
Tree Age:	Mature
H x W:	6m x 7m
Health:	Good
Structure:	Fair
ULE:	10-20 years
Retention Value:	Low
Retain/remove:	Remove
Defects:	Codominant main stems and deadwood throughout the canopy
Comments:	

DBH (cm): 25
TPZ (m): 3
SRZ (m): 2.25

Tree Number: 2

Botanical Name:	*Cedrus deodara*
Common Name:	Deodar Cedar
Origin:	Exotic
Tree Age:	Semi mature
H x W:	18m x 10m
Health:	Good
Structure:	Good
ULE:	20+ years
Retention Value:	Medium
Retain/remove:	Retain
Defects:	None
Comments:	

DBH (cm): 54
TPZ (m): 6.48
SRZ (m): 2.74

Tree Number: 3

Botanical Name:	*Eucalyptus camaldulensis*
Common Name:	River Red Gum
Origin:	Indigenous
Tree Age:	Mature
H x W:	28m x 15m
Health:	Good
Structure:	Fair
ULE:	20+ years
Retention Value:	High
Retain/remove:	Retain
Defects:	Codominant stems
Comments:	Tree on edge of carpark. Significant age. No major failures.

DBH (cm): 150
TPZ (m): 15
SRZ (m): 4.24

Tree Number: 4

Botanical Name: *Angophora costata*
Common Name: Smooth-barked Apple Myrtle
Origin: Native
Tree Age: Semi mature
H x W: 15m x 10m
Health: Good
Structure: Good
ULE: 20+ years
Retention Value: Medium
Retain/remove: Retain
Defects: None

Comments:

DBH (cm): 49
TPZ (m): 5.88
SRZ (m): 2.67

Tree Number: 5

Botanical Name: *Eucalyptus camaldulensis*
Common Name: River Red Gum
Origin: Indigenous
Tree Age: Semi mature
H x W: 18m x 4m
Health: Fair
Structure: Fair
ULE: 10-20 years
Retention Value: Medium
Retain/remove: Retain
Defects: None

Comments:

DBH (cm): 60
TPZ (m): 7.2
SRZ (m): 3.01

Tree Number: 6

Botanical Name: *Corymbia maculata*
Common Name: Spotted Gum
Origin: Native
Tree Age: Mature
H x W: 25m x 8m
Health: Good
Structure: Fair
ULE: 20+ years
Retention Value: High
Retain/remove: Retain
Defects: None

Comments:

DBH (cm): 69
TPZ (m): 8.28
SRZ (m): 2.98

Tree Number: 7

Botanical Name: *Corymbia maculata*
Common Name: Spotted Gum
Origin: Native
Tree Age: Semi mature
H x W: 22m x 6m
Health: Good
Structure: Good
ULE: 20+ years
Retention Value: Medium
Retain/remove: Retain
Defects: None

Comments:

DBH (cm): 43
TPZ (m): 5.16
SRZ (m): 2.53

Tree Number: 8

Botanical Name: *Eucalyptus saligna*
Common Name: Sydney Blue Gum
Origin: Native
Tree Age: Mature
H x W: 26m x 5m
Health: Good
Structure: Fair
ULE: 20+ years
Retention Value: Medium
Retain/remove: Retain
Defects: None

Comments:

DBH (cm): 56
TPZ (m): 6.72
SRZ (m): 2.80

Tree Number: 9

Botanical Name: *Eucalyptus camaldulensis*
Common Name: River Red Gum
Origin: Indigenous
Tree Age: Mature
H x W: 26m x 10m
Health: Fair
Structure: Fair
ULE: 20+ years
Retention Value: High
Retain/remove: Retain
Defects: Codominant main stems and deadwood throughout the canopy

Comments: Cable installed

DBH (cm): 97
TPZ (m): 11.64
SRZ (m): 3.44

Tree Number: 10

Botanical Name:	*Eucalyptus camaldulensis*
Common Name:	River Red Gum
Origin:	Indigenous
Tree Age:	Mature
H x W:	22m x 18m
Health:	Good
Structure:	Fair
ULE:	20+ years
Retention Value:	High
Retain/remove:	Remove
Defects:	Codominant stems
Comments:	Codominant and wide spreading

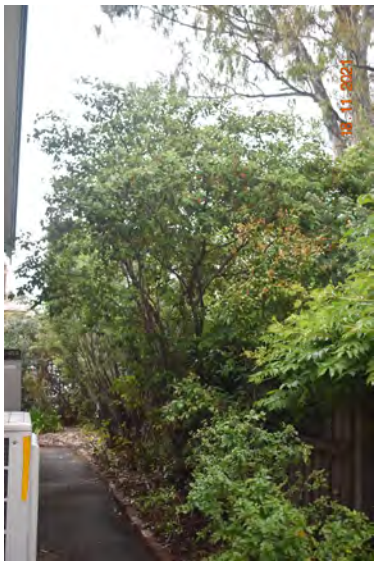
DBH (cm): 124
TPZ (m): 14.88
SRZ (m): 3.57

Tree Number: 11

Botanical Name:	*Corymbia citriodora*
Common Name:	Lemon-scented Gum
Origin:	Native
Tree Age:	Mature
H x W:	18m x 15m
Health:	Fair
Structure:	Fair
ULE:	20+ years
Retention Value:	High
Retain/remove:	Retain
Defects:	None
Comments:	

DBH (cm): 72
TPZ (m): 8.64
SRZ (m): 3.14

Tree Number: 12



Botanical Name:	*Cotoneaster glaucophyllus*
Common Name:	Cotoneaster
Origin:	Exotic
Tree Age:	Semi mature
H x W:	3m x 3m
Health:	Good
Structure:	Fair
ULE:	10-20 years
Retention Value:	Low
Retain/remove:	Remove
Defects:	Codominant stems
Comments:	

DBH (cm): 9
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 13

Botanical Name: *Prunus cerasifera*
Common Name: Cherry Plum
Origin: Exotic
Tree Age: Mature
H x W: 6m x 4m
Health: Fair
Structure: Fair
ULE: 5-10 years
Retention Value: Low
Retain/remove: Remove
Defects: Leaning codominant stems with deadwood throughout canopy
Comments:

DBH (cm): 27
TPZ (m): 3.24
SRZ (m): 2.00

Tree Number: 14

Botanical Name: *Prunus cerasifera*
Common Name: Cherry Plum
Origin: Exotic
Tree Age: Semi mature
H x W: 7m x 3m
Health: Good
Structure: Fair
ULE: 5-10 years
Retention Value: Low
Retain/remove: Remove
Defects: Leaning codominant stems with deadwood throughout canopy
Comments:

DBH (cm): 17
TPZ (m): 2.04
SRZ (m): 1.68

Tree Number: 15

Botanical Name: *Citrus limon*
Common Name: Lemon
Origin: Exotic
Tree Age: Mature
H x W: 5m x 2m
Health: Fair
Structure: Fair
ULE: 5-10 years
Retention Value: Low
Retain/remove: Remove
Defects: Deadwood throughout the canopy
Comments:

DBH (cm): 11
TPZ (m): 2
SRZ (m): 1.68

Tree Number: 16

Botanical Name:	*Punica granatum*
Common Name:	Pomegranate
Origin:	Exotic
Tree Age:	Mature
H x W:	5m x 4m
Health:	Fair
Structure:	Fair
ULE:	10-20 years
Retention Value:	Low
Retain/remove:	Remove
Defects:	Codominant main stems and deadwood throughout the canopy
Comments:	

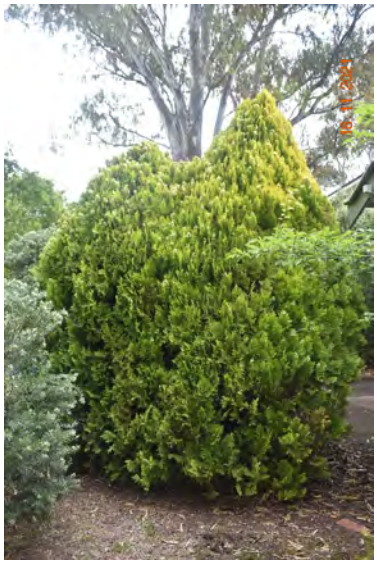
DBH (cm): 16
TPZ (m): 2
SRZ (m): 1.85

Tree Number: 17

Botanical Name:	*Prunus cerasifera 'Nigra'*
Common Name:	Purple Cherry Plum
Origin:	Exotic
Tree Age:	Mature
H x W:	6m x 3m
Health:	Fair
Structure:	Poor
ULE:	5-10 years
Retention Value:	Low
Retain/remove:	Remove
Defects:	Codominant stems
Comments:	Mixed up with Feijoa

DBH (cm): 17
TPZ (m): 2.04
SRZ (m): 1.65

Tree Number: 18



Botanical Name:	*Thuja occidentalis*
Common Name:	White Cedar
Origin:	Exotic
Tree Age:	Semi mature
H x W:	3m x 2m
Health:	Good
Structure:	Fair
ULE:	5-10 years
Retention Value:	Low
Retain/remove:	Remove
Defects:	None
Comments:	Dbh estimated

DBH (cm): 10
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 19

Botanical Name:	*Prunus cerasifera*
Common Name:	Cherry Plum
Origin:	Exotic
Tree Age:	Semi mature
H x W:	3m x 1m
Health:	Good
Structure:	Fair
ULE:	10-20 years
Retention Value:	Low
Retain/remove:	Remove
Defects:	Codominant stems
Comments:	Self-sown

DBH (cm): 5
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 20

Botanical Name:	*Cotoneaster glaucophyllus*
Common Name:	Cotoneaster
Origin:	Exotic
Tree Age:	Semi mature
H x W:	3m x 3m
Health:	Fair
Structure:	Fair
ULE:	5-10 years
Retention Value:	Low
Retain/remove:	Remove
Defects:	Codominant stems
Comments:	

DBH (cm): 7
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 21

Botanical Name:	*Ulmus parvifolia*
Common Name:	Chinese Elm
Origin:	Exotic
Tree Age:	Young
H x W:	2m x 1m
Health:	Good
Structure:	Good
ULE:	20+ years
Retention Value:	Low
Retain/remove:	Retain
Defects:	None
Comments:	

DBH (cm): 1
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 22

Botanical Name:	*Ulmus parvifolia*
Common Name:	Chinese Elm
Origin:	Exotic
Tree Age:	Semi mature
H x W:	10m x 8m
Health:	Good
Structure:	Good
ULE:	20+ years
Retention Value:	Medium
Retain/remove:	Retain
Defects:	None
Comments:	

DBH (cm): 24
TPZ (m): 2.88
SRZ (m): 1.88

Tree Number: 23

Botanical Name:	*Ulmus parvifolia*
Common Name:	Chinese Elm
Origin:	Exotic
Tree Age:	Young
H x W:	2m x 1m
Health:	Good
Structure:	Good
ULE:	20+ years
Retention Value:	Low
Retain/remove:	Retain
Defects:	None
Comments:	

DBH (cm): 1
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 24

Botanical Name:	*Ulmus parvifolia*
Common Name:	Chinese Elm
Origin:	Exotic
Tree Age:	Semi mature
H x W:	9m x 6m
Health:	Good
Structure:	Good
ULE:	20+ years
Retention Value:	Medium
Retain/remove:	Retain
Defects:	None
Comments:	

DBH (cm): 18
TPZ (m): 2.16
SRZ (m): 1.85

Tree Number: 25

Botanical Name: *Ulmus parvifolia*
Common Name: Chinese Elm
Origin: Exotic
Tree Age: Young
H x W: 3m x 1m
Health: Good
Structure: Good
ULE: 20+ years
Retention Value: Low
Retain/remove: Retain
Defects: None

Comments:

DBH (cm): 2
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 26

Botanical Name: *Ulmus parvifolia*
Common Name: Chinese Elm
Origin: Exotic
Tree Age: Semi mature
H x W: 12m x 10m
Health: Good
Structure: Good
ULE: 20+ years
Retention Value: Medium
Retain/remove: Retain
Defects: None

Comments:

DBH (cm): 29
TPZ (m): 3.48
SRZ (m): 2.08

Tree Number: 27

Botanical Name: *Ulmus parvifolia*
Common Name: Chinese Elm
Origin: Exotic
Tree Age: Young
H x W: 2m x 1m
Health: Good
Structure: Good
ULE: 20+ years
Retention Value: Low
Retain/remove: Remove
Defects: None

Comments:

DBH (cm): 2
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 28

Botanical Name: *Ulmus parvifolia*
Common Name: Chinese Elm
Origin: Exotic
Tree Age: Semi mature
H x W: 12m x 14m
Health: Good
Structure: Fair
ULE: 20+ years
Retention Value: Medium
Retain/remove: Retain
Defects: Codominant stems

Comments:

DBH (cm): 35
TPZ (m): 4.2
SRZ (m): 2.23

Tree Number: 29

Botanical Name: *Ulmus parvifolia*
Common Name: Chinese Elm
Origin: Exotic
Tree Age: Semi mature
H x W: 3m x 1m
Health: Good
Structure: Good
ULE: 20+ years
Retention Value: Low
Retain/remove: Retain
Defects: None

Comments:

DBH (cm): 2
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 30

Botanical Name: *Ulmus parvifolia*
Common Name: Chinese Elm
Origin: Exotic
Tree Age: Semi mature
H x W: 10m x 12m
Health: Good
Structure: Good
ULE: 20+ years
Retention Value: Medium
Retain/remove: Retain
Defects: None

Comments:

DBH (cm): 33
TPZ (m): 3.96
SRZ (m): 2.18

Tree Number: 31

Botanical Name: *Cupressus sempervirens*
Common Name: Italian Cypress
Origin: Exotic
Tree Age: Mature
H x W: 18m x 3m
Health: Good
Structure: Fair
ULE: 20+ years
Retention Value: Medium
Retain/remove: Retain
Defects: None

Comments:

DBH (cm): 51
TPZ (m): 6.12
SRZ (m): 2.39

Tree Number: 32

Botanical Name: *Prunus cerasifera 'Nigra'*
Common Name: Purple Cherry Plum
Origin: Exotic
Tree Age: Semi mature
H x W: 5m x 5m
Health: Good
Structure: Fair
ULE: 10-20 years
Retention Value: Low
Retain/remove: Retain
Defects: Codominant stems

Comments: Dimensions estimated. leaning over subject site

DBH (cm): 15
TPZ (m): 2
SRZ (m): 1.68

Tree Number: 33

Botanical Name: *Phoenix canariensis*
Common Name: Canary Island Date Palm
Origin: Exotic
Tree Age: Semi mature
H x W: 9m x 7m
Health: Good
Structure: Good
ULE: 20+ years
Retention Value: Low
Retain/remove: Retain
Defects: None

Comments:

DBH (cm): 60
TPZ (m): 4.5
SRZ (m): 2.76

Tree Number: 34

Botanical Name: *Eucalyptus leucoxylon*
Common Name: Yellow Gum
Origin: Indigenous
Tree Age: Young
H x W: 5m x 3m
Health: Good
Structure: Poor
ULE: 10-20 years
Retention Value: Low
Retain/remove: Retain
Defects: Codominant stems

Comments:

DBH (cm): 11
TPZ (m): 2
SRZ (m): 1.50

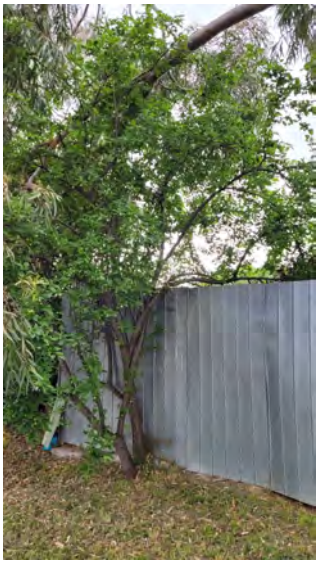
Tree Number: 35

Botanical Name: *Prunus cerasifera 'Nigra'*
Common Name: Purple Cherry Plum
Origin: Exotic
Tree Age: Mature
H x W: 4m x 3m
Health: Good
Structure: Fair
ULE: 5-10 years
Retention Value: Low
Retain/remove: Retain
Defects: None

Comments:

DBH (cm): 7
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 36



Botanical Name: *Prunus cerasifera*
Common Name: Cherry Plum
Origin: Exotic
Tree Age: Mature
H x W: 5m x 3m
Health: Good
Structure: Fair
ULE: 5-10 years
Retention Value: Low
Retain/remove: Retain
Defects: None

Comments:

DBH (cm): 12
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 37

Botanical Name: *Pyracantha crenulata*
Common Name: Firethorn
Origin: Exotic
Tree Age: Mature
H x W: 6m x 3m
Health: Good
Structure: Poor
ULE: 5-10 years
Retention Value: Low
Retain/remove: Remove
Defects: None

Comments:

DBH (cm): 15
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 38

Botanical Name: *Crataegus monogyna*
Common Name: Hawthorn
Origin: Exotic
Tree Age: Mature
H x W: 5m x 3m
Health: Fair
Structure: Poor
ULE: 5-10 years
Retention Value: Low
Retain/remove: Remove
Defects: Lopped main stem

Comments:

DBH (cm): 20
TPZ (m): 2.4
SRZ (m): 1.79

Tree Number: 39

Botanical Name: *Prunus cerasifera*
Common Name: Cherry Plum
Origin: Exotic
Tree Age: Semi mature
H x W: 5m x 3m
Health: Fair
Structure: Fair
ULE: 10-20 years
Retention Value: Low
Retain/remove: Remove
Defects: Codominant main stems and deadwood throughout the canopy

Comments:

DBH (cm): 17
TPZ (m): 2.04
SRZ (m): 1.61

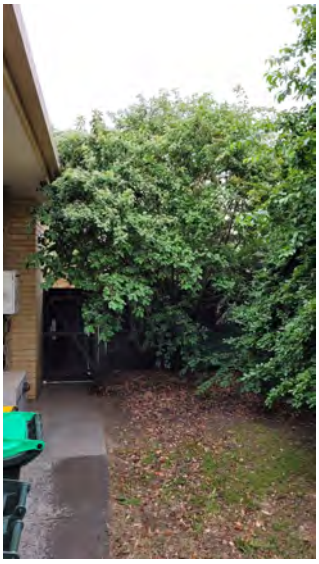
Tree Number: 40

Botanical Name: *Prunus cerasifera 'Nigra'*
Common Name: Purple Cherry Plum
Origin: Exotic
Tree Age: Semi mature
H x W: 6m x 3m
Health: Good
Structure: Fair
ULE: 10-20 years
Retention Value: Low
Retain/remove: Remove
Defects: None

Comments:

DBH (cm): 10
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 41



Botanical Name: *Cotoneaster glaucophyllus*
Common Name: Cotoneaster
Origin: Exotic
Tree Age: Semi mature
H x W: 6m x 5m
Health: Good
Structure: Fair
ULE: 10-20 years
Retention Value: Low
Retain/remove: Remove
Defects: Codominant stems

Comments:

DBH (cm): 10
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 42

Botanical Name: *Pyrus calleryana*
Common Name: Callery Pear
Origin: Exotic
Tree Age: Semi mature
H x W: 4m x 2m
Health: Good
Structure: Fair
ULE: 10-20 years
Retention Value: Low
Retain/remove: Remove
Defects: Codominant stems

Comments:

DBH (cm): 8
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 43

Botanical Name:	*Eucalyptus camaldulensis*
Common Name:	River Red Gum
Origin:	Indigenous
Tree Age:	Young
H x W:	9m x 2m
Health:	Good
Structure:	Good
ULE:	20+ years
Retention Value:	Low
Retain/remove:	Retain
Defects:	None
Comments:	Selfsown in carpark

DBH (cm): 20
TPZ (m): 2.4
SRZ (m): 1.85

Tree Number: 44

Botanical Name:	*Ulmus parvifolia*
Common Name:	Chinese Elm
Origin:	Exotic
Tree Age:	Young
H x W:	2m x 2m
Health:	Good
Structure:	Good
ULE:	20+ years
Retention Value:	Low
Retain/remove:	Retain
Defects:	None
Comments:	Selfsown in carpark

DBH (cm): 4
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 45

Botanical Name:	*Platanus Xacerifolia*
Common Name:	London Plane
Origin:	Exotic
Tree Age:	Semi mature
H x W:	12m x 6m
Health:	Fair
Structure:	Fair
ULE:	10-20 years
Retention Value:	Medium
Retain/remove:	Retain
Defects:	None
Comments:	Street tree in carpark

DBH (cm): 37
TPZ (m): 4.44
SRZ (m): 2.34

Tree Number: 46

Botanical Name:	*Platanus Xacerifolia*
Common Name:	London Plane
Origin:	Exotic
Tree Age:	Semi mature
H x W:	10m x 7m
Health:	Good
Structure:	Fair
ULE:	20+ years
Retention Value:	Medium
Retain/remove:	Retain
Defects:	None

DBH (cm): 31
TPZ (m): 3.72
SRZ (m): 2.18

Comments: Street tree in carpark lifting asphalt

Tree Number: 47

Botanical Name:	*Platanus Xacerifolia*
Common Name:	London Plane
Origin:	Exotic
Tree Age:	Semi mature
H x W:	10m x 5m
Health:	Fair
Structure:	Fair
ULE:	20+ years
Retention Value:	Medium
Retain/remove:	Retain
Defects:	None

DBH (cm): 37
TPZ (m): 4.44
SRZ (m): 2.28

Comments: Street tree in carpark

Tree Number: 48

Botanical Name:	*Platanus Xacerifolia*
Common Name:	London Plane
Origin:	Exotic
Tree Age:	Semi mature
H x W:	10m x 5m
Health:	Fair
Structure:	Fair
ULE:	20+ years
Retention Value:	Medium
Retain/remove:	Retain
Defects:	None

DBH (cm): 37
TPZ (m): 4.44
SRZ (m): 2.32

Comments:

Tree Number: 49

Botanical Name: *Platanus Xacerifolia*
Common Name: London Plane
Origin: Exotic
Tree Age: Semi mature
H x W: 7m x 4m
Health: Fair
Structure: Fair
ULE: 20+ years
Retention Value: Medium
Retain/remove: Retain
Defects: None

Comments:

DBH (cm): 23
TPZ (m): 2.76
SRZ (m): 1.88

Tree Number: 50

Botanical Name: *Callistemon viminalis*
Common Name: Weeping Bottle Brush
Origin: Native
Tree Age: Semi mature
H x W: 3m x 3m
Health: Good
Structure: Fair
ULE: 10-20 years
Retention Value: Low
Retain/remove: Retain
Defects: None

Comments:

DBH (cm): 10
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 51

Botanical Name: *Acacia sp.*
Common Name: Wattle
Origin: Native
Tree Age: Mature
H x W: 4m x 3m
Health: Fair
Structure: Fair
ULE: 10-20 years
Retention Value: Low
Retain/remove: Retain
Defects: None

Comments: Various planted acacia species

DBH (cm): 10
TPZ (m): 2
SRZ (m): 1.50

Tree Number: 52

Botanical Name: *Cupressus sempervirens*
Common Name: Italian Cypress
Origin: Exotic
Tree Age: Mature
H x W: 7m x 3m
Health: Good
Structure: Fair
ULE: 5-10 years
Retention Value: Low
Retain/remove: Retain
Defects: Lopped main stem

Comments:

DBH (cm): 20
TPZ (m): 2.4
SRZ (m): 1.85

Tree Number: 53

Botanical Name: *Cupressus sempervirens*
Common Name: Italian Cypress
Origin: Exotic
Tree Age: Semi mature
H x W: 7m x 3m
Health: Good
Structure: Fair
ULE: 10-20 years
Retention Value: Low
Retain/remove: Retain
Defects: Lopped main stem

Comments:

DBH (cm): 20
TPZ (m): 2.4
SRZ (m): 1.85

Tree Number: 54

Botanical Name: *Melaleuca styphelioides*
Common Name: Prickly Paperbark
Origin: Native
Tree Age: Semi mature
H x W: 6m x 3m
Health: Good
Structure: Poor
ULE: 5-10 years
Retention Value: Low
Retain/remove: Retain
Defects: Codominant stems

Comments:

DBH (cm): 14
TPZ (m): 2
SRZ (m): 1.50

90 Mollison Street & 26 Myers Street Bendigo 3550

(Council): Greater Bendigo

Council Property Number: 177416 & 183 529

Directory Reference: 607 T6

ECOLOGICAL ASSESSMENT

23 November 2022

Heather Beever,

Principal

Cumbre Consulting P/L

cumbre.com.au

Table of Contents

1 INTRODUCTION

1.1 Project Background

Cumbre Consulting was commissioned by Duo Projects for the St Andrew Church to assess the environmental value of vegetation at 90 Mollison Street & 26 Myers Street Bendigo, Greater Bendigo Shire Council, in relation to Clause 52.20-8 of the planning scheme for St Andrews site which is part of the Victorian Governments Big Housing Build program/development. See Figure 1 for location of study area & Figure 2A Existing Site & Demolition Plan, Figure 2B Site Plan and Figure 3 Arborist assessment in relation to the proposed design.

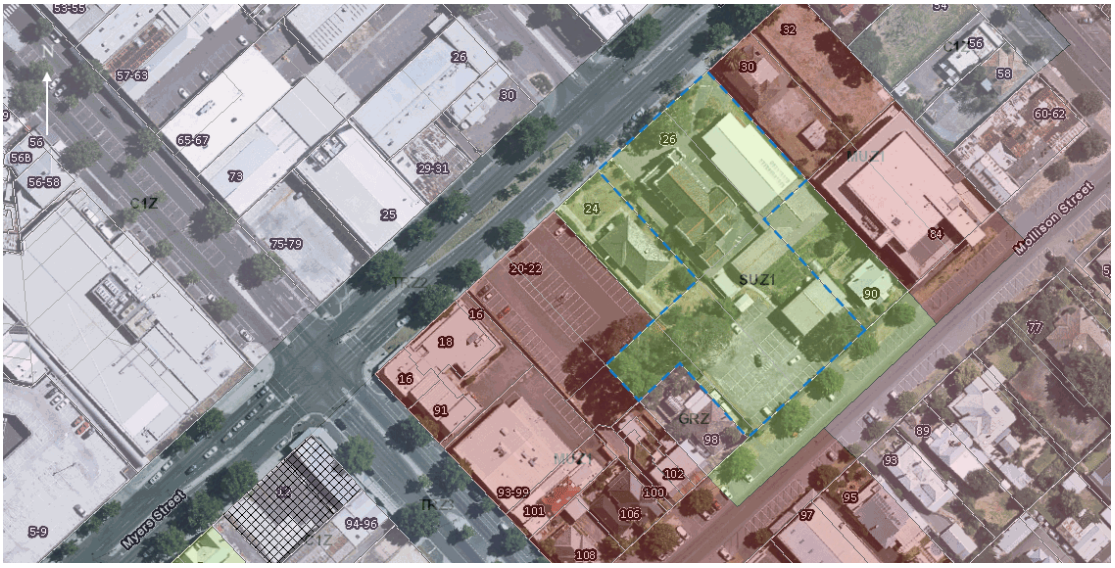


Figure 1: Location of study area

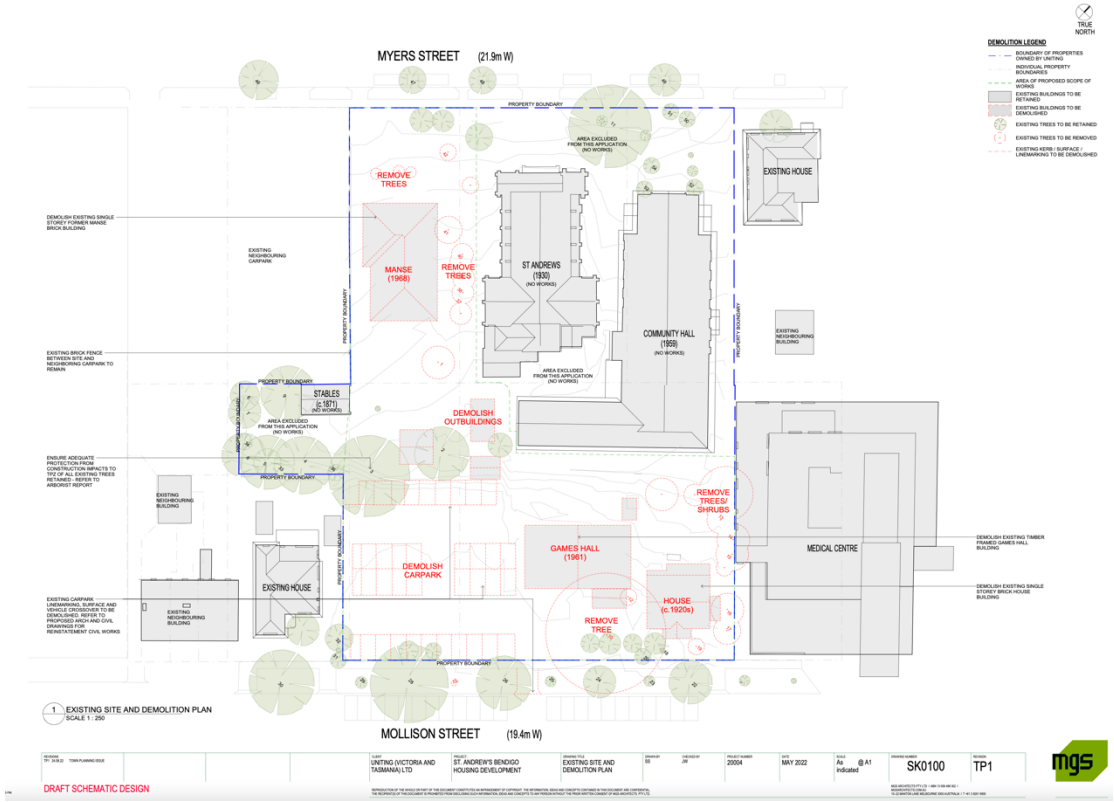


Figure 2A: Existing site condition and demolition plan

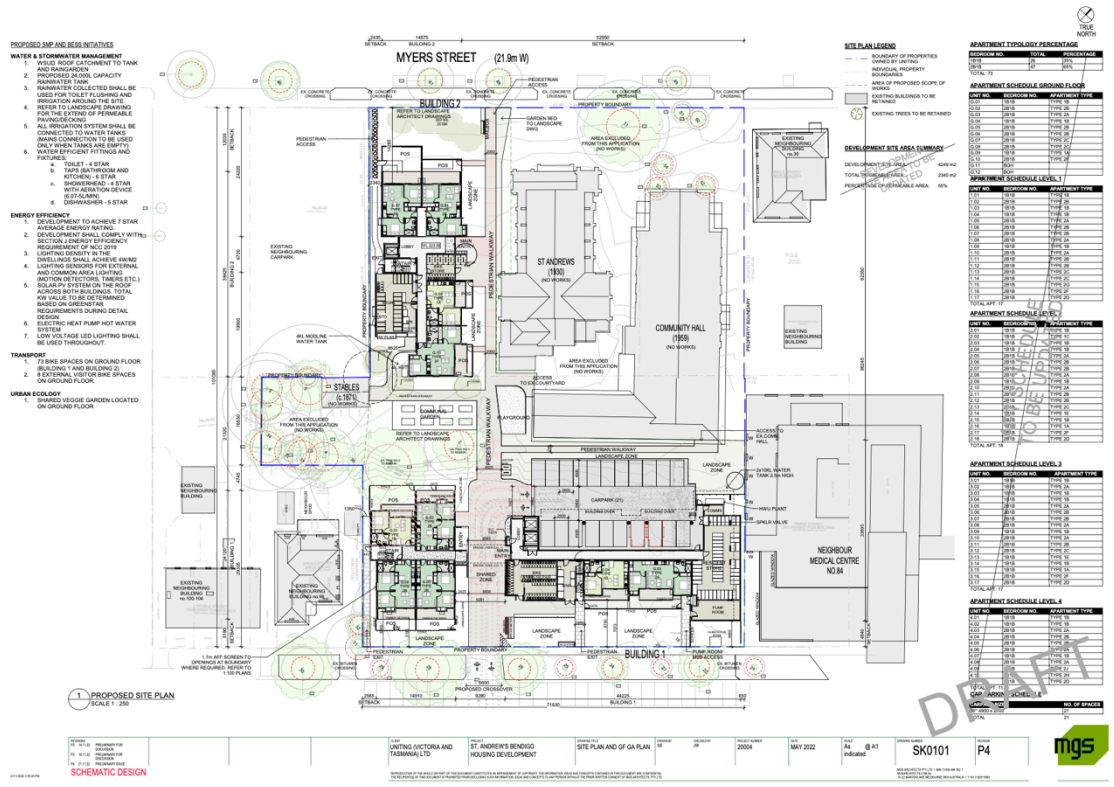


Figure 2B: Site Plan

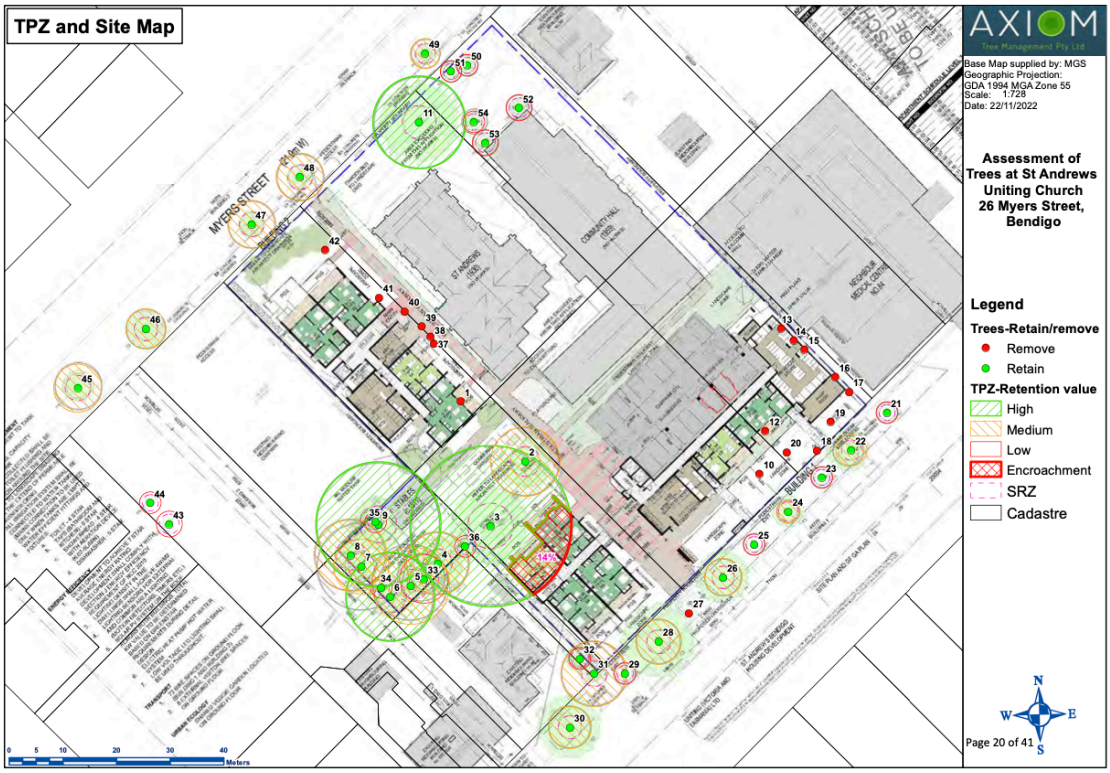


Figure 3: Arborist assessment in relation to the proposed design

1.2 Objectives

The objectives of this assessment are:

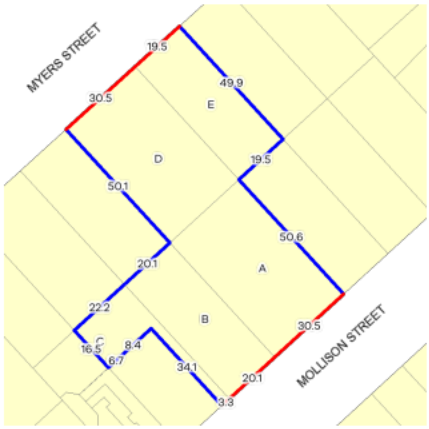
- Assess the conservation significance of the habitat
- Map the extent, type and condition of the native vegetation
- Assess potential impacts of the proposed development on ecological values
- Consider measures that could avoid or reduce any impacts
- Assess and quantify measures to offset impacts and achieve a Net Gain
- Meet the requirements of Clause 52.20-8 of the planning scheme.

1.3 Study Area

The study area covers 90n Mollison Street & 26 Myers Street Bendigo, within the City of Greater Bendigo Council, and is zoned Special Use Zone (SUZ). The property has 6 parcels see below for Site Dimensions and Parcel Details of multiple parcels of 26 Myers Street Bendigo:

SITE DIMENSIONS

All dimensions and areas are approximate. They may not agree with those shown on a title or plan.



Area: 5533 sq. m
Perimeter: 386 m
For this property:
Site boundaries
Road frontages

Dimensions for individual parcels require a separate search, but dimensions for individual units are generally not available.

1 overlapping dimension label is not being displayed

Calculating the area from the dimensions shown may give a different value to the area shown above

For more accurate dimensions get copy of plan at Title and Property Certificates

PARCEL DETAILS

The letter in the first column identifies the parcel in the diagram above

	Lot/Plan or Crown Description	SPI
A	Lot 2 TP683060	2\TP683060
B	Lot 3 TP683060	3\TP683060
C	Lot 4 TP683060	4\TP683060
	PARISH OF SANDHURST	
D	Allot. 5 Sec. 8C AT BENDIGO,	5-8C\PP3473A
E	Allot. 6 Sec. 8C AT BENDIGO,	6-8C\PP3473A

The following Planning scheme overlays pertain to this project:

Table 1 Planning scheme overlays

Clause Number	Name	Associated Schedules
37.01	Special Use Zone (SUZ)	Schedule 1 (SUZ1)
43.02	Design and Development Overlay (DDO)	Schedule 5 (DDO5)
43.01	Heritage Overlay	Schedule (HO212) Schedule (HO926)
45.09	Parking Overlay (PO)	Precinct 1 Schedule (PO1)

The property falls into the Goldfields and the North Central Catchment Management Authority (CMA). The Department of Environment, Land, Water and Planning (DELWP) Native Vegetation Information Management (NVIM) tool[1] list the 1750 Ecological Vegetation Class (EVC) as: 61 Box Ironbark Forest. See Figure 4 Ecological Vegetation Class (EVC) Map.

2 DESCRIPTION OF METHODS

2.1 Field Survey

The EVC was identified using state-wide EVC mapping and then ground trothed on 17/8/2022. The study area was traversed by foot. The Axiom Arborist report was used to assist determine what vegetation was impacted and the name and origin of the species. The remnant native vegetation considered impacted was recorded and mapped.

[1] DELWP 2019. https://www.environment.vic.gov.au/native-vegetation/native-vegetation-information-management

2.2 Defining and Assessing Vegetation

Native vegetation in Victoria has been defined by DELWP as belonging to two categories. These are:

REMNANT PATCH

A remnant patch of native vegetation is either:

- any area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native
- any area with three or more native canopy trees where the dripline of at least one other tree, forming a continuous canopy, or
- any mapped wetland included in the Current wetlands map, available in DELWP systems and tools.

SCATTERED TREE

A scattered tree is:

- a native canopy tree that does not form part of a remnant patch.[2]

HABITAT HECTARE

Habitat hectare (Vegetation Quality Assessment) is a site-based measure that combines extent and condition of native vegetation. The current condition of native vegetation is assessed against a benchmark for its Ecological Vegetation Class (EVC). EVCs are classifications of native vegetation types. The benchmark for an EVC describes the attributes of the vegetation type in its mature natural state, which reflects the pre- settlement circumstances. The condition score of native vegetation at a site can be determined through undertaking a habitat hectare assessment.

The habitat hectare assessment takes the following features into account: large trees; tree canopy cover; under-storey; cover of weeds; regeneration; organic litter; logs (condition score); patch size; neighbourhood; distance to core area (viability scores

The habitat hectares score of native vegetation is calculated by multiplying the current condition of the vegetation (condition score) by the extent of native vegetation.

Due to the small nature of this assessment the Native Vegetation Information Management (NVIM) tool modelled scores were used to inform the vegetation condition.

2.3 Special Considerations

The survey was done in Winter, there are indigenous native species, planted natives and some exotics on site. Due to the modified nature of the site, there is not considered to be any significant limitations to this assessment. Due to the small nature of this assessment the Native vegetation information management (NVIM) tool was used and modelled vegetation quality.

3 FLORA

The following Ecological Vegetation Class (EVC) from the Goldfields Bioregion was identified in this study using the DELWP Native Vegetation Information Management tool and field assessment:

[2] DELWP 2017. Guidelines for the removal, destruction or lopping of native vegetation https://www.environment.vic.gov.au/native-vegetation/native-vegetation

3.1 Pre-European Settlement - 1750 Map of Victorian Goldfields EVCs Present in Study Area

3.1.1 Ecological Vegetation Class: 61 - Box Ironbark Forest.

Occurs in low rainfall areas on gently undulating rises, low hills and peneplains on infertile, often stony soils derived from a range of geologies. The open overstorey to 20 m tall consists of a variety of eucalypts, often including one of the Ironbark species. The mid storey often forms a dense to open small tree or shrub layer over an open ground layer ranging from a sparse to well-developed suite of herbs and grasses. (See Figure 4)

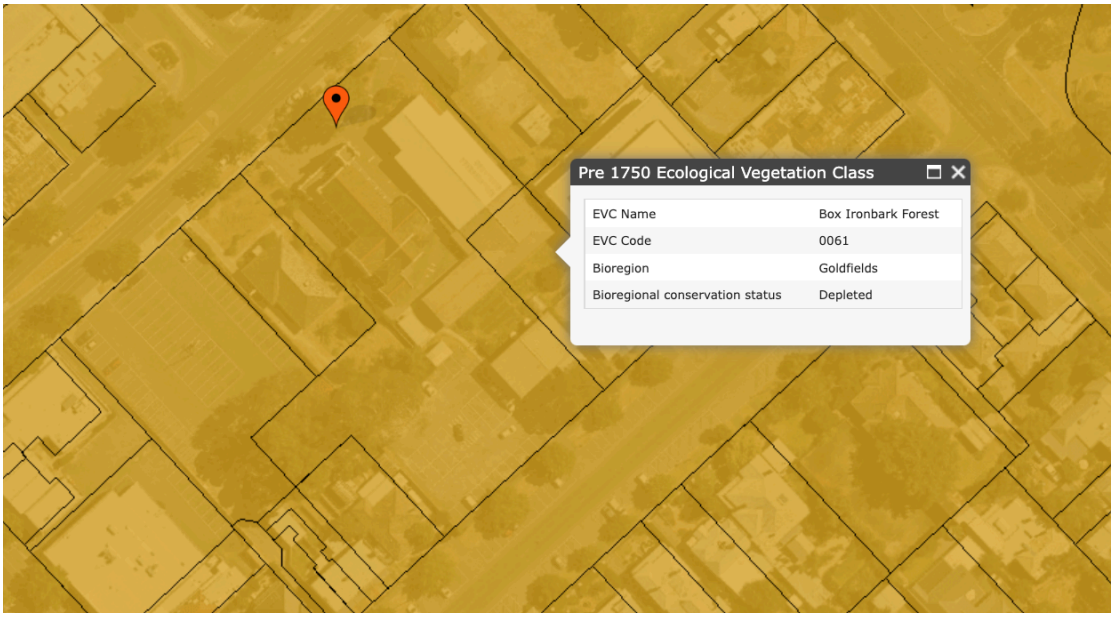


Figure 4: Pre-1750 Ecological Vegetation Class(es) modelled for the study area

4 FAUNA

4.1 Species found by survey

No threatened fauna species surveys were conducted or recorded through field work on site as part of this study.

5 RESULTS

5.1 Description of the native vegetation assessed and to be removed

There was one scattered tree considered impacted within this study area. See Figure 5 and results Appendix 1, Native vegetation removal (NVR) report. The very small nature of this assessment meant that the NVIMtool was used to complete this assessment.

The remnant native overstorey species on the property is Red Gum *Eucalyptus camaldulensis.* The large tree benchmark for EVC 61 Box Ironbark Forest is ≥70cm Diameter at Breast Height (DBH). The one remnant tree from the region is a large 80.5cm DBH Red gum (ST A). The Axiom report identifies this tree as Tree 10 measuring 124cm DBH. The arborist methodology for measuring diameter at breast height (DBH) varies to the vegetation quality assessment (VQA) method. On multiple trunked trees that branch at breast height the arborist uses a method to cumulative add these trunks. The VQA method uses the largest trunk if there is junction of trunks at breast height (1.3m). Arborists measure DBH at 1.4m.

Regardless of the method used the tree impacted by the proposed development is STA which is categorised as large.

See Appendix 2, for photos of all vegetation impacted and included in offset calculation.

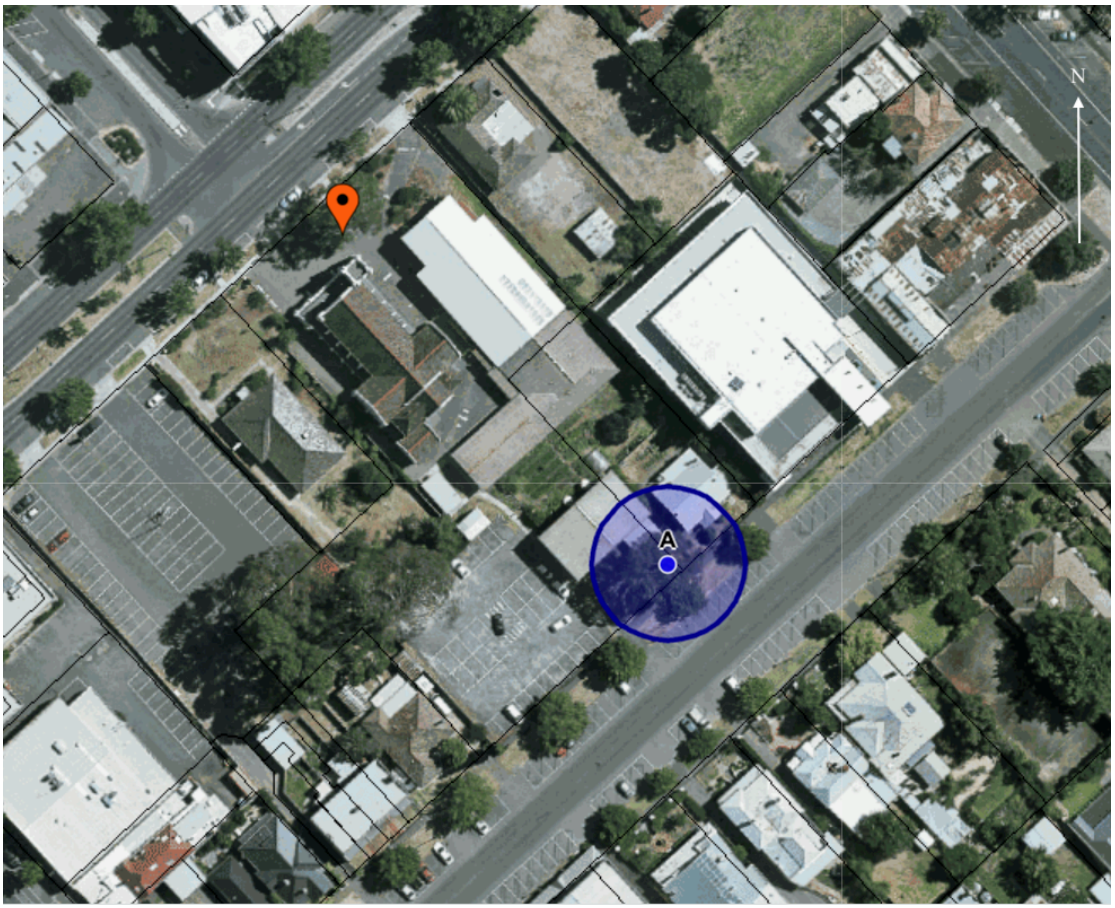


Figure 5: Assessed area (Sites/zones).

5.2 Vegetation not included in the assessment

- *Planted natives and exotic trees were not included in this assessment.* This property has some planted understorey and overstorey natives and some exotics trees and shrubs. See Axiom Arborist report for a full list.
- *Areas with < 25 % native vegetation.* The site is very modified with many hard surfaces. There were no remnant native understorey species in this study area.
- *Regrowth: Native vegetation that is to be removed, destroyed, or lopped that has naturally established or regenerated on land lawfully cleared of native vegetation and is less than 10 years old*. There is no regrowth in this assessment considered exempt.

6 IMPLICATION FOR DEVELOPMENT

6.1 Avoiding Impacts on Native Vegetation and Defendable Space

The development footprint enables the retention of most of the trees on site. A small number of trees require removal in the southeast aspect of the study area near the House (c.1920s)/ southeast

boundary and between the church and the building 'Manse' 1968. See Figure 2A. Of the five trees considered native to the area, four will be retained and one is impacted.

Defendable space is not part of this proposal.

6.2 Minimising Impacts on Native Vegetation

As per Section 6.1.

The site is already very modified with many hard surfaces. The Red gum species is not typical of EVC 61 Box Ironbark however this study area is located between to creek systems (Bendigo Creek approximately 625m to the northwest and Back Creek 470m to the southeast) of which it would typically be found. See Appendix 5. The tree has been included in the assessment.

No feasible opportunities exist to further avoid removal or minimise impacts without compromising the proposed development

6.3 Offset Statement

The client will purchase a third party offset from the credit register. Indications of the availability of the type and amount of offset have been sought from the Native Vegetation Credit Register. Vegetation Link and Enviro Offset Trading have also been asked to supply quotations. The report of available native vegetation credits is shown in Appendix 3.

6.4 Offsets required as per DELWP Native Vegetation Removal (NVR) report

- Offset required is 0.012 general habitat units.
- Offset vicinity is within North Central, where the clearing takes place.
- Minimum strategic biodiversity score 0.080
- 1 Large tree(s)

See Appendix 1- DELWP Native vegetation removal report.

7 SUMMARY OF APPLICANT REQUIREMENTS/DECISION GUIDELINES

Table 3 Requirements

Number	***Decision guidelines to be considered***	***Response***
1	Information about the native vegetation to be removed, including: • The assessment pathway and reason for the assessment pathway^. This includes the location category of the native vegetation to be removed. • A description of the native vegetation to be removed.	See Section 5 This project is mapped as Location 1. The total area of removal is 0.070ha. See Section 5

	• Maps showing the native vegetation and property in context. • The offset requirement that will apply if the native vegetation is approved to be removed^.	See Figure 1 Location of study area, Figure 2A Existing Site and Demolition Plan, Figure 3 Axiom Arborist impact assessment, Figure 4 Ecological Vegetation Class (EVC) map, Figure 5 Assessed zone, & Appendix 1- Native vegetation removal report. See Appendix 1-Native vegetation removal report. 6.3 Offset statement Appendix 3 evidence of offset availability.
2	Topographic and land information relating to the native vegetation to be removed, showing ridges, crests and hilltops, wetlands and waterways, slopes of more than 20 percent, drainage lines, low lying areas, saline discharge areas, and areas of existing erosion, as appropriate.	The land slopes gently downward from Mollison Street towards Myers Street. There are no distinguishing geographical features on site. See Contour Map in Appendix 4. There is no erosion or evidence of salinisation on site.
3	Recent, dated photographs of the native vegetation to be removed	See Appendix 2, Photos 1&2.
4	Details of any other native vegetation approved to be removed, or that was removed without the required approvals, on the same property or on contiguous land in the same ownership as the applicant, in the five-year period before the application for a permit is lodged	N/A
5	An avoid and minimise statement. The statement describes any efforts to avoid the removal of and minimise the impacts on the biodiversity and other values of native vegetation, and how these efforts focussed on areas of native vegetation that have the most value.	See 6.1 & 6.2
6	Property Vegetation Plan applies.	No
7	Where the removal of native vegetation is to create defendable space, a written statement	N/A

	explaining why the removal of native vegetation is necessary.	
8	Clause 52.16 applications- Native Vegetation Precinct Plan (NVPP)	N/A
9	An offset statement providing evidence that an offset that meets the offset requirements for the native vegetation to be removed has been identified and can be secured.	See Section 6.3
10	A site assessment report of the native vegetation to be removed, completed by an accredited native vegetation assessor.	This ecological report compiled by Heather Beever accredited native vegetation assessor.
11	Information about impacts on rare or threatened species habitat.	See Appendix 1 Native vegetation removal report where it states that removal of less than 0.5ha will not have a significant impact on the habitat for any rare or threatened species. This is an Intermediate Assessment Pathway.

8 RECOMMENDATIONS/ CONCLUSIONS

The proposal is designated Location 1, it does not cover an endangered Ecological Vegetation Class. This assessment is to cover off on Clause 52.20-8 in regard to this study area being developed as part of the Victoria's Big Housing Build. Provided the offset is met and other council planning requirements are met, the proposal seems sound.

9 REFERENCES

Axiom2021. Axiom Tree Management P/L Development Impact Report St Andrews Uniting Church Mollison Street Bendigo.

DELWP 2022. Biodiversity EVC Benchmarks Goldfields Bioregion. Sourced at https://www.environment.vic.gov.au/biodiversity/bioregions-and-evc-benchmarks

DELWP 2022. Native Vegetation Information Management tool. Sourced at https://nvim.delwp.vic.gov.au/Biodiversity

DELWP 2022 Planning Schemes Online. Sourced at http://planning-schemes.delwp.vic.gov.au

DELWP 2017. Applicant's guide – Applications to remove, destroy or lop native vegetation sourced, https://www.environment.vic.gov.au/__data/assets/pdf_file/0024/90762/Applicants-guide-applications-to-remove,-destroy-or-lop-native-vegetation.pdf

DEWLP 2017. Guidelines for the removal, destruction or lopping of native vegetation sourced, https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/91146/Guidelines-for-the-removal,-destruction-or-lopping-of-native-vegetation,-2017.pdf

DEWLP 2017. Assessor's handbook – Applications to remove, destroy or lop native vegetation, sourced, https://www.environment.vic.gov.au/__data/assets/pdf_file/0022/91255/Assessors-handbook-Applications-to-remove,-lop-or-destroy-native-vegetation-V1.0.pdf

DSE 2004. Native Vegetation: sustaining a living landscape. Vegetation Quality Assessment Manual-Guidelines for applying habitat hectares scoring method Version

APPENDIX 1 - DELWP Native vegetation removal (NVR) report

Native vegetation removal report

This report provides information to support an application to remove, destroy or lop native vegetation in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation*. The report **is not an assessment by DELWP** of the proposed native vegetation removal. Native vegetation information and offset requirements have been determined using spatial data provided by the applicant or their consultant.

Date of issue: 09/09/2022
Time of issue: 10:19 am

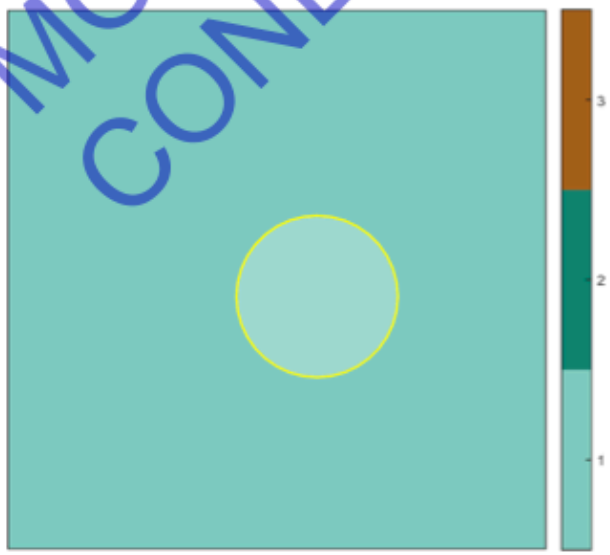
Report ID: CUM_2022_056

Project ID	Export_102251

Assessment pathway

Assessment pathway	**Intermediate Assessment Pathway**
Extent including past and proposed	0.070 ha
Extent of past removal	0.000 ha
Extent of proposed removal	0.070 ha
No. Large trees proposed to be removed	1
Location category of proposed removal	Location 1 The native vegetation is not in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map), sensitive wetland or coastal area. Removal of less than 0.5 hectares in this location will not have a significant impact on any habitat for a rare or threatened species

1. Location map



VICTORIA State Government | Environment, Land, Water and Planning

Page 1

OFFICIAL

Native vegetation removal report

Offset requirements if a permit is granted

Any approval granted will include a condition to obtain an offset that meets the following requirements:

General offset amount[1]	0.012 general habitat units
Vicinity	North Central Catchment Management Authority (CMA) or Greater Bendigo City Council
Minimum strategic biodiversity value score[2]	0.080
Large trees	1 large tree

NB: values within tables in this document may not add to the totals shown above due to rounding

Appendix 1 includes information about the native vegetation to be removed

Appendix 2 includes information about the rare or threatened species mapped at the site.

Appendix 3 includes maps showing native vegetation to be removed and extracts of relevant species habitat importance maps

1 The general offset amount required is the sum of all general habitat units in Appendix 1.

2 Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required

Native vegetation removal report

Next steps

Any proposal to remove native vegetation must meet the application requirements of the Intermediate Assessment Pathway and it will be assessed under the Intermediate Assessment Pathway.

If you wish to remove the mapped native vegetation you are required to apply for a permit from your local council. Council will refer your application to DELWP for assessment, as required. **This report is not a referral assessment by DELWP.**

This *Native vegetation removal report* must be submitted with your application for a permit to remove, destroy or lop native vegetation.

Refer to the *Guidelines for the removal, destruction or lopping of native* vegetation (the Guidelines) for a full list of application requirements This report provides information that meets the following application requirements:

- The assessment pathway and reason for the assessment pathway
- A description of the native vegetation to be removed (met unless you wish to include a site assessment)
- Maps showing the native vegetation and property
- The offset requirements determined in accordance with section 5 of the Guidelines that apply if approval is granted to remove native vegetation.

Additional application requirements must be met including:

- Topographical and land information
- Recent dated photographs
- Details of past native vegetation removal
- An avoid and minimise statement
- A copy of any Property Vegetation Plan that applies
- A defendable space statement as applicable
- A statement about the Native Vegetation Precinct Plan as applicable
- An offset statement that explains that an offset has been identified and how it will be secured.

Authorised by the Victorian Government, 8 Nicholson Street, East Melbourne.

For more information contact the DELWP Customer Service Centre 136 186

www.delwp.vic.gov.au

Appendix 1: Description of native vegetation to be removed

All zones require a general offset, the general habitat units each zone is calculated by the following equation in accordance with the Guidelines:

General habitat units = extent x condition x general landscape factor x 1.5, where the general landscape factor = 0.5 + (strategic biodiversity value score/2)

The general offset amount required is the sum of all general habitat units per zone.

Native vegetation to be removed

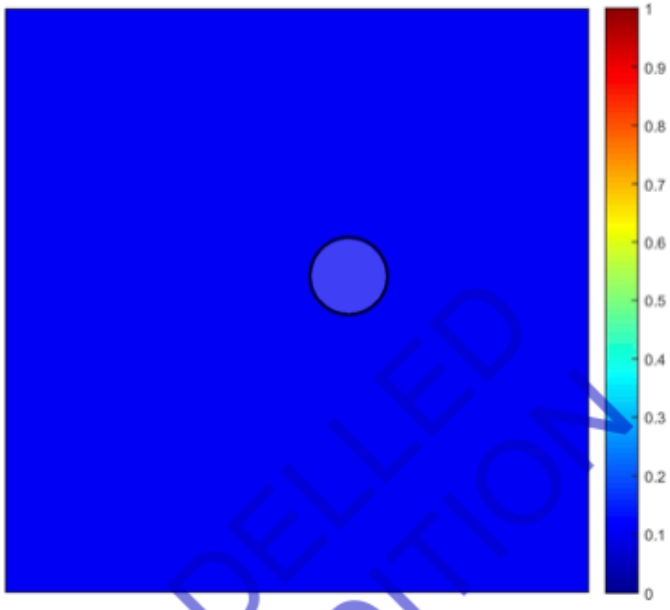
Information provided by or on behalf of the applicant in a GIS file						Information calculated by EnSym						
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Modelled Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
1-A	Scattered Tree			1	no	0.200	0.070	0.070	0.100		0.012	General

Appendix 2: Information about impacts to rare or threatened species' habitats on site

This is not applicable in the Intermediate Assessment Pathway.

Appendix 3 – Images of mapped native vegetation

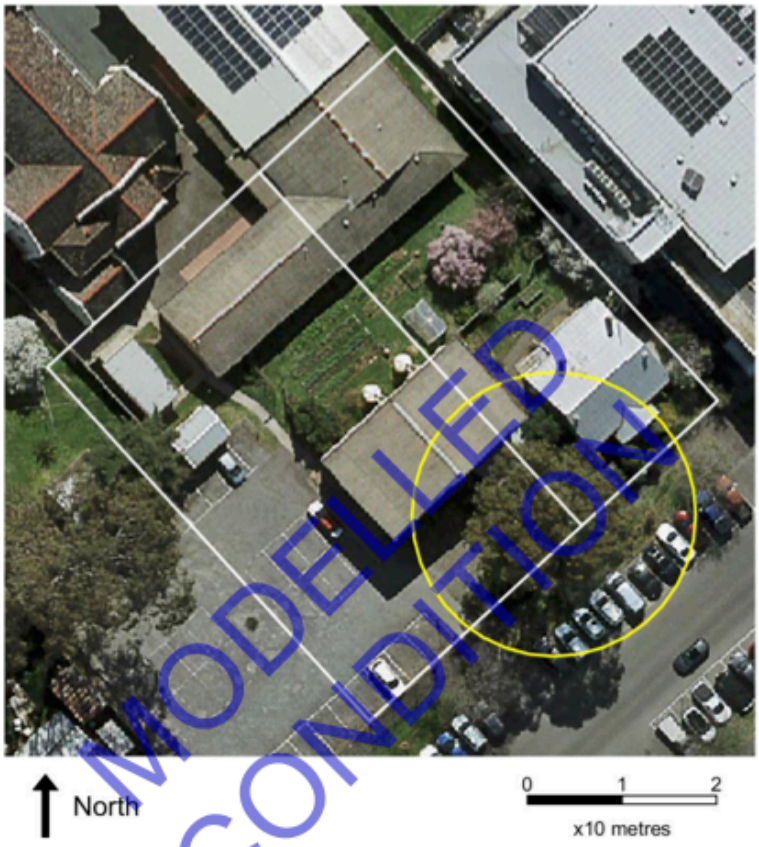
2. Strategic biodiversity values map



3. Aerial photograph showing mapped native vegetation

Page 6

4. Map of the property in context



Yellow boundaries denote areas of proposed native vegetation removal.

APPENDIX 2 – Photos of Study Area

Photo 1: taken 17/8/2022

Looking northeast at Arborist Tree 10, STA 80.5cm DBH recommended for removal with proposed development.

Photo 2: taken 17/8/2022

Looking northeast at Arborist Tree 10, ST A, 80.5cm DBH.

APPENDIX 3 – Evidence of Offset availability

Report of available native vegetation credits

This report lists native vegetation credits available to purchase through the Native Vegetation Credit Register.

This report is **not evidence** that an offset has been secured. An offset is only secured when the units have been purchased and allocated to a permit or other approval and an allocated credit extract is provided by the Native Vegetation Credit Register.

Date and time: 07/09/2022 03:09 **Report ID: 15785**

What was searched for?

General offset

General habitat units	Strategic biodiversity value	Large trees	Vicinity (Catchment Management Authority or Municipal district)	
0.012	0.08	1	CMA	North Central

Details of available native vegetation credits on 07 September 2022 03:09

These sites meet your requirements for general offsets.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
BBA-0737	0.143	14	North Central	Northern Grampians Shire	Yes	Yes	No	Bio Offsets
BBA-0771	0.025	1	North Central	Loddon Shire	Yes	Yes	No	VegLink
BBA-3006	17.363	3	North Central	Greater Bendigo City	No	Yes	No	Ethos
BBA-3006	17.363	3	North Central	Greater Bendigo City	No	Yes	No	Contact NVOR
BBA-3031	9.298	169	North Central	Pyrenees Shire	Yes	Yes	No	VegLink
BBA-3052_01	12.544	251	North Central	Northern Grampians Shire	Yes	Yes	No	VegLink
TFN-C1640	0.854	3	North Central	Hepburn Shire	Yes	Yes	No	VegLink
TFN-C1702	16.952	16	North Central	Gannawarra Shire	Yes	Yes	No	TFN
VC_CFL-3071_01	3.299	148	North Central	Loddon Shire	Yes	Yes	No	VegLink
VC_CFL-3076_01	9.124	49	North Central	Pyrenees Shire	Yes	Yes	No	Bio Offsets
VC_CLO-2451_01	12.684	107	North Central	Greater Bendigo City	No	Yes	No	Contact NVOR
VC_CLO-3046_01	0.144	34	North Central	Greater Bendigo City	No	Yes	No	Contact NVOR

These sites meet your requirements using alternative arrangements for general offsets.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)

There are no sites listed in the Native Vegetation Credit Register that meet your offset requirements when applying the alternative arrangements as listed in section 11.2 of the Guidelines for the removal, destruction or lopping of native vegetation.

These potential sites are not yet available, land owners may finalise them once a buyer is confirmed.

Credit Site ID	GHU	LT	CMA	LGA	Land owner	Trader	Fixed price	Broker(s)
VC_CFL-3701_01	10.574	18	Goulburn Broken, North Central	Greater Bendigo City	Yes	Yes	No	Bio Offsets
VC_CFL-3742_01	12.301	410	North Central	Loddon Shire	Yes	Yes	No	VegLink

LT - Large Trees *CMA - Catchment Management Authority* *LGA - Municipal District or Local Government Authority*

Next steps

If applying for approval to remove native vegetation
Attach this report to an application to remove native vegetation as evidence that your offset requirement is currently available.

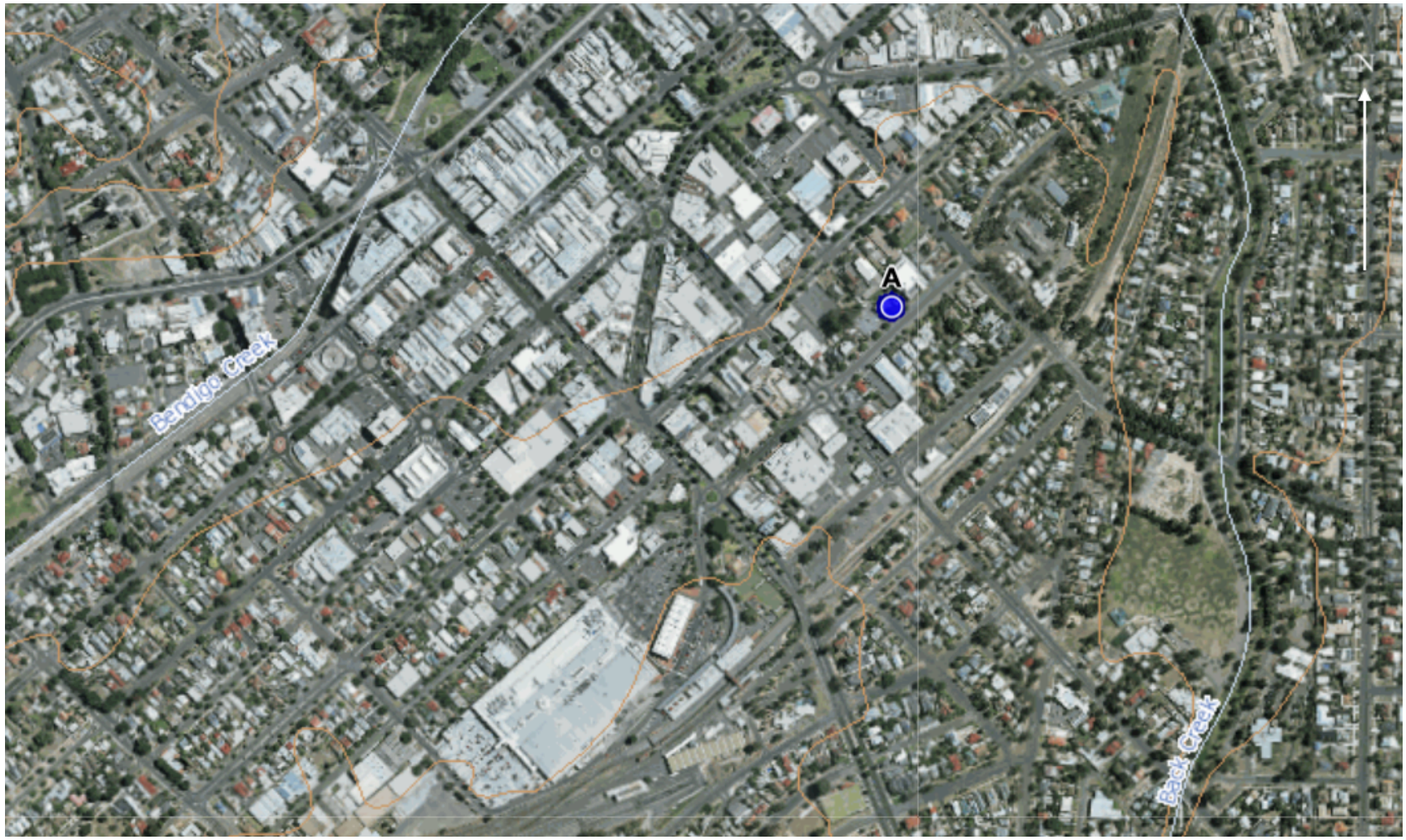
If you have approval to remove native vegetation
Below are the contact details for all brokers. Contact the broker(s) listed for the credit site(s) that meet your offset requirements. These are shown in the above tables. If more than one broker or site is listed, you should get more than one quote before deciding which offset to secure.

Broker contact details

Broker Abbreviation	Broker Name	Phone	Email	Website
Abezco	Abzeco Pty. Ltd.	(03) 9431 5444	offsets@abzeco.com.au	www.abzeco.com.au
Baw Baw SC	Baw Baw Shire Council	(03) 5624 2411	bawbaw@bawbawshire.vic.gov.au	www.bawbawshire.vic.gov.au
Bio Offsets	Biodiversity Offsets Victoria	0452 161 013	info@offsetsvictoria.com.au	www.offsetsvictoria.com.au
Contact NVOR	Native Vegetation Offset Register	136 186	nativevegetation.offsetregister@delwp.vic.gov.au	www.environment.vic.gov.au/native-vegetation
Ecocentric	Ecocentric Environmental Consulting	0410 564 139	ecocentric@me.com	Not avaliable
Ethos	Ethos NRM Pty Ltd	(03) 5153 0037	offsets@ethosnrm.com.au	www.ethosnrm.com.au
Nillumbik SC	Nillumbik Shire Council	(03) 9433 3316	offsets@nillumbik.vic.gov.au	www.nillumbik.vic.gov.au
TFN	Trust for Nature	8631 5888	offsets@tfn.org.au	www.trustfornature.org.au
VegLink	Vegetation Link Pty Ltd	(03) 8578 4250 or 1300 834 546	offsets@vegetationlink.com.au	www.vegetationlink.com.au
Yarra Ranges SC	Yarra Ranges Shire Council	1300 368 333	biodiversityoffsets@yarraranges.vic.gov.au	www.yarraranges.vic.gov.au

APPENDIX 4 – Contour map of study area

APPENDIX 5 – Location of assessment in respect to Bendigo Creek and Back Creek



CONSULTANTS ADVICE NOTICE

PROJECT TITLE	**St Andrews Church, Bendigo**
PROJECT No	**D0002.0001**
CAN No	**CAN - 0001**
DATE	**23 August 2022**
RECIPIENT	**James Creech / Ashley Thomas**
COMPANY	**DUO Projects / Uniting VIC/TAS**
EMAIL	jcreech@duoprojects.com.au; ashley.thomas@vt.uniting.org;

SUBJECT
INGROUND SERVICES REVIEW AND BUILDING SERVICES

INTRODUCTION:

DUO Projects on behalf of Uniting VIC/TAS have requested RSP to conduct a review of the authority assets (existing in-ground services) at St Andrew Church Bendigo located on 24 Myers Street in Bendigo.

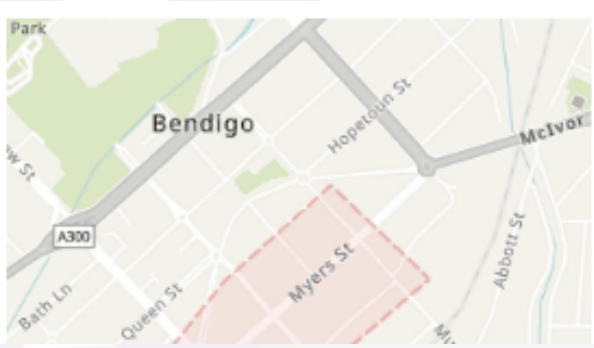
Uniting VIC/TAS is proposing a community housing development between Mollison and Myers Streets in Bendigo.

The proposed development includes the construction of three (3) new multi-level residential buildings adjacent to St Andrew's Church. Each building shall contain one- and two-bedroom apartments, storage and general amenities designated for community use.

DESCRIPTION:

RSP to provide a review report of the DBYD site Enquiry associated with the location, size, capacity, and suitability of existing services authority infrastructure to service the needs of the proposed development.

Site location:



Relevant Authorities:

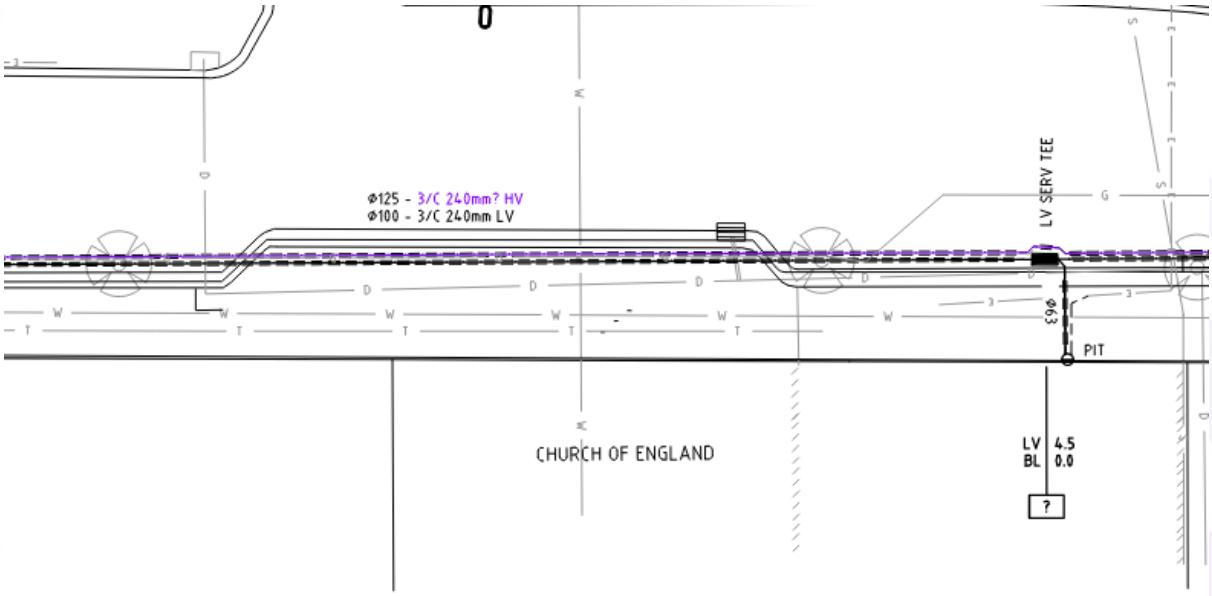
- AusNet Gas Services Pty Ltd
- Greater Bendigo City Council
- Coliban Water
- NBN Co VicTas
- Nextgen (VIC)
- Optus and or Uecomm Vic
- Powercor Australia Ltd
- Telstra VICTAS
- TPG Telecom (VIC)
- VicTrack Access

Electrical services:

Power - PowerCor

- Existing connection:

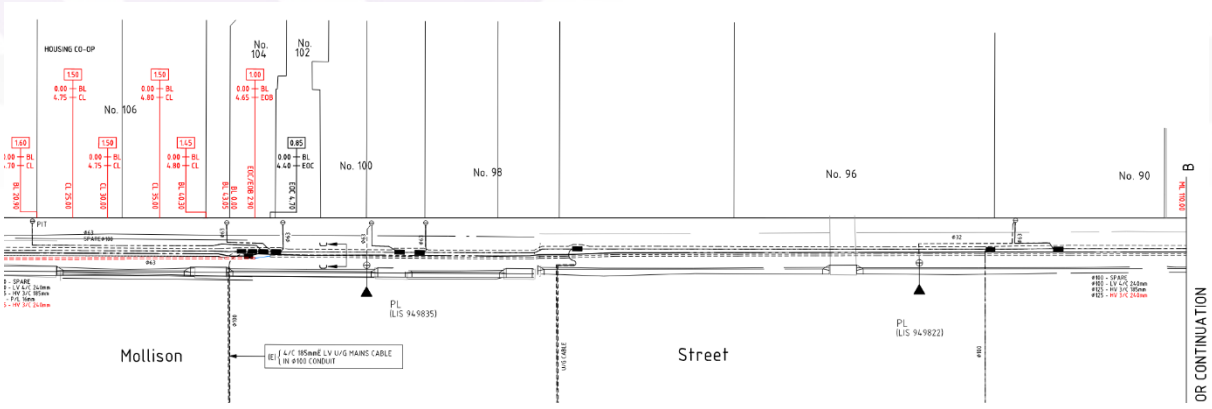
It appears the existing building is supplied via a Low Voltage (LV) connection from Myers St. As per image below, the site is supplied via an in-ground LV supply terminated to a local pit – maximum power supply from Authority via a pit will be 160A 3P.



Extract From PowerCor information document showing existing underground power cabling on Myers St

- Proposed Power supply for the new development:

As per our electrical maximum demand calculation and client advice on not having Gas supply for the site, our maximum demand required is 344A 3P. the most cost-effective way to supply the proposed site is allow for an on-site 500kVA indoor sub-station located within our site on Mollison St. As per below image, the proposed sub-station can be supply via Mollison St.



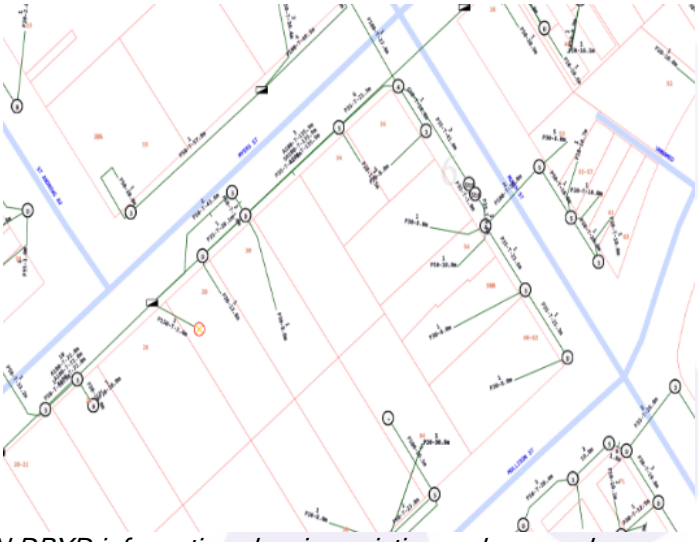
Extract From PowerCor information document showing existing underground power cabling on Mollison St

Telecommunication services:

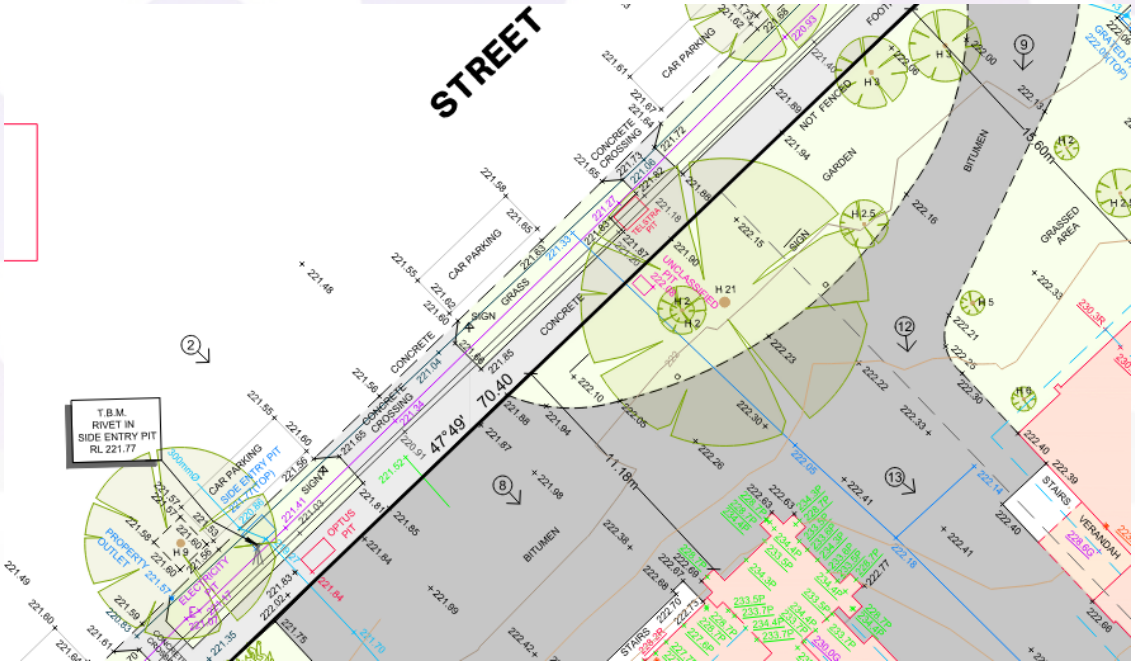
NBN Co, Telstra, Nextgen Comms & Optus

- Existing communications connections:

The existing buildings appears to be provided with a copper communications lead-in from Myers St. as per NBN DBYD information and site survey drawing. NBN services rollout seems to be *in-services/constructed* around our proposed site.



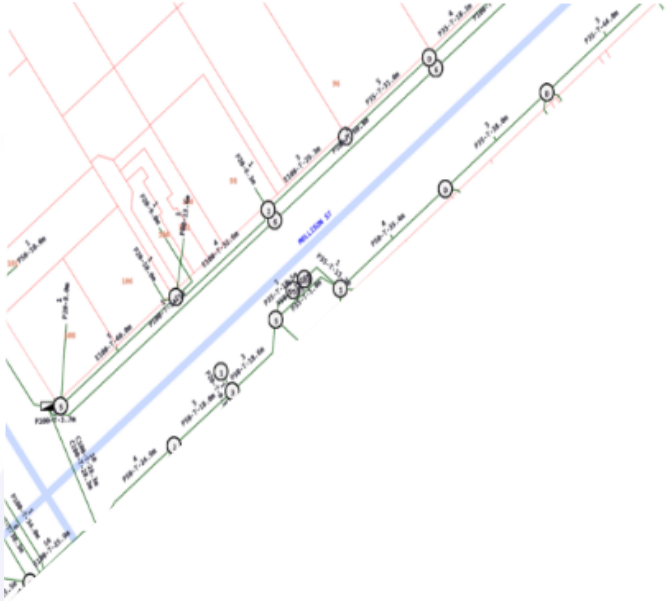
Extract From NBN DBYD information showing existing underground comms cabling on Myers St



Extract From site survey drawing provided showing existing Telstra pit on Myers St in-front of our property

- Proposed telecommunications connection for the new development:

We are proposing to apply to NBN Co for a fibre connection (FttP). As per the new proposing building design, we will be connecting the building from Mollison St as there is an existing NBN Pit at the fron of the property on Mollison site.



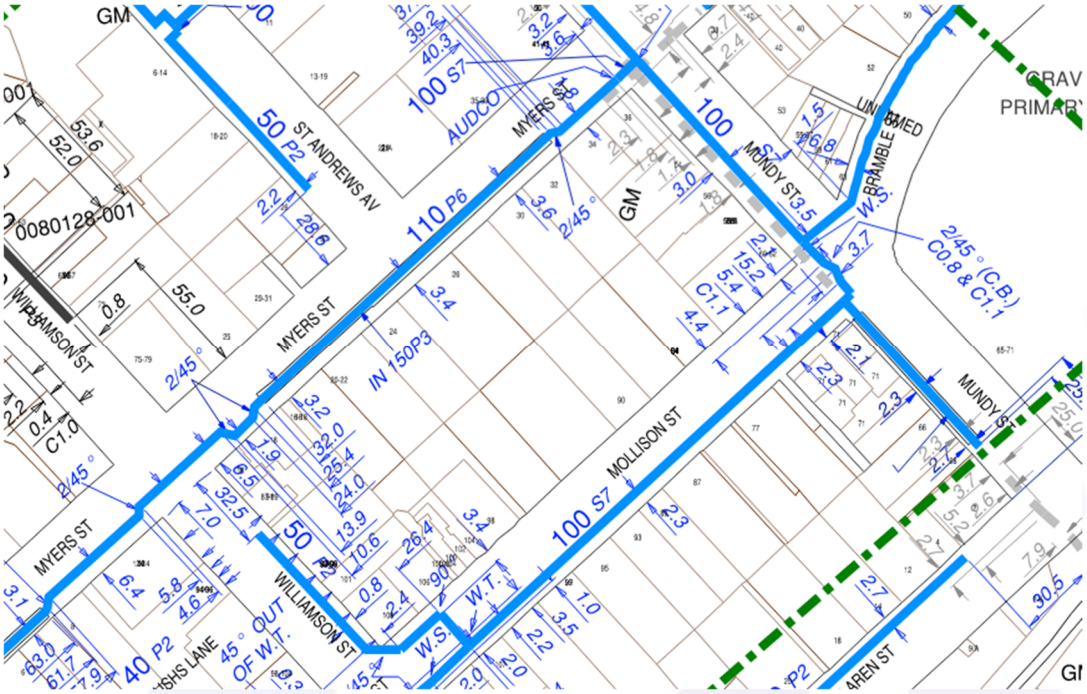
Extract From NBN DBYD information showing existing underground comms cabling on Myers St and Mollison St

Hydraulic Services:

Gas Mains – for information only as we are not planning to supply Gas to the proposed building

Ausnet Services Assets Plans for the gas main distribution indicated:

1. Ø110 P6 located along the southern side of Myers Street (appears to be high pressure however this will need to be confirmed), and
2. Ø100 S7 located along the southern side of Mollison Street; gas main pressures unknown



Extract From AusNet Asset Plan

Further investigation required to establish gas distribution pressure.

Sewer Mains

Coliban Water Assets Maps indicates the sewer assets to be located on the western side of the site entailing an existing Sewer Maintenance Hole (SMH013292 - dated 1923). The sewer drain from the shaft is said to be Ø150 (relined) uPVC dated 2015 with IL 221.32 at the SMH noting the drain extends west bound

Further investigation recommended:

1. Undertake Preliminary Services Advise application to establish the authority sewer mains sufficiency to service the proposed sewer loads discharge into the existing system.
2. Establish SMH location to ensure authority clearances (inclusive of "Buildover" Requirements) are adhered to.

Note: Unable to comment on sewer mains depths in respect to proposed works until site "levels", concepts authority sewer invert levels as confirmed.

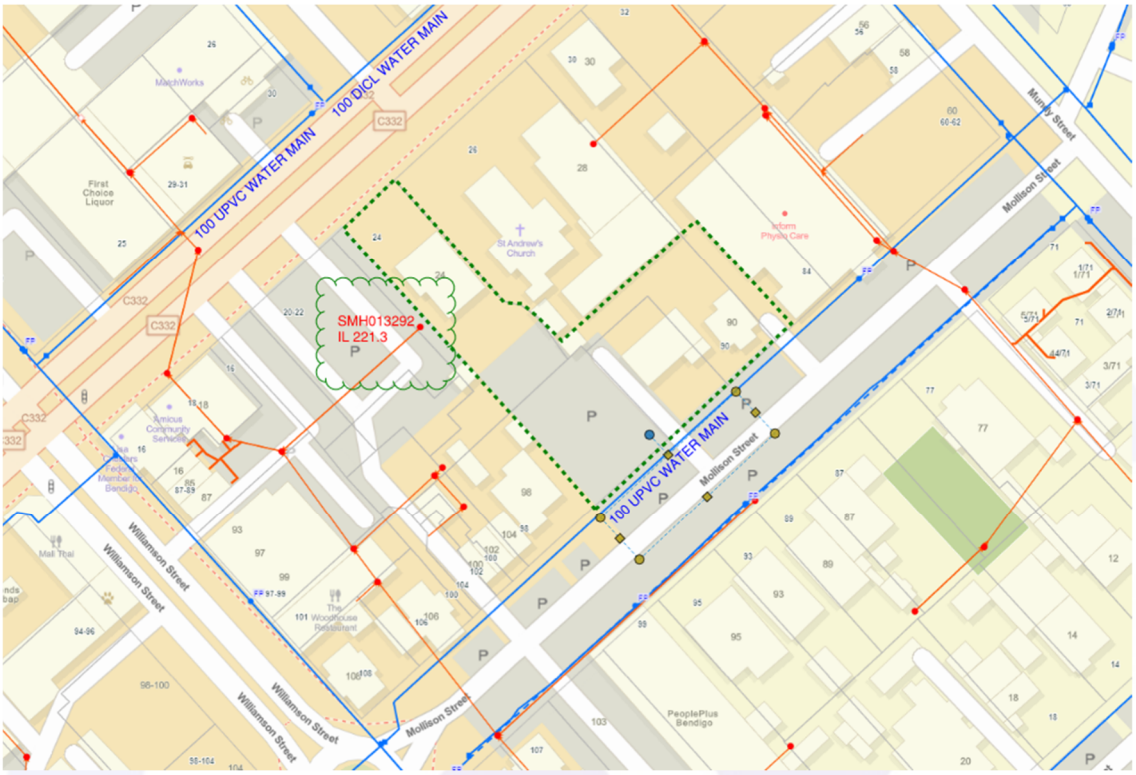
Water Mains

Coliban Water Assets Maps for the water main indicates:

1. Ø225 uPVC water main dated 2001 located on the northern side of Mollison Street
2. Ø100 uPCV water main dated 1979 located on the northern side of Myers Street west of the Fire Plug, and Ø100 DICL water main dated 1979 on the east side of the Fire Plug.
3. A fire hydrant pump is required based on pressure and flow information.

Further investigation recommended:

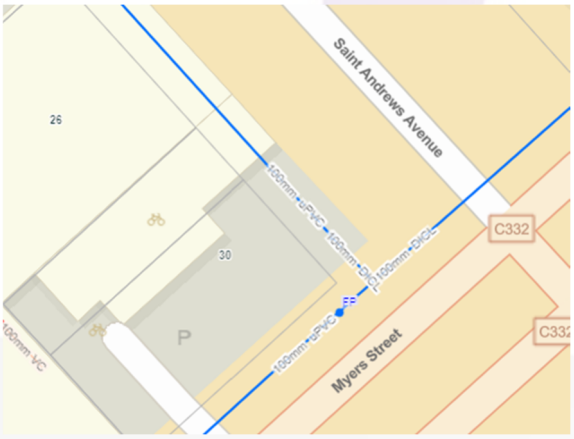
1. Undertake Preliminary Services Advise application to establish the authority water mains sufficiency to service the proposed water loads supplied from the existing system



Red line denotes Sewer Infrastructure Blue line denotes Water Infrastructure

Extract From Coliban Water Assets Map

Enlargement to Relined Sewer Main



Enlargement to Fire Plug at Myers Street

PREPARED BY Carmelo Ribaudo
EMAIL c.ribaudo@rspcosulting.com.au