

**9.1 NO. 46B (LOT: 1; PLAN: 417673) JOEL TERRACE, EAST PERTH - PROPOSED SINGLE HOUSE**

**Ward:** South

- Attachments:**
1. Consultation and Location Plan
  2. Development Plans
  3. Summary of Submissions - Administration Response
  4. Summary of Submissions - Applicant Response
  5. Applicant Context and Character Study
  6. Administration's Streetscape Review
  7. Administration's Height Analysis
  8. Administration's Overshadowing Analysis
  9. Life Cycle Assessment
  10. Advice Notes

**RECOMMENDATION:**

That Council, in accordance with the provisions of the City of Vincent Local Planning Scheme No. 2 and the Metropolitan Region Scheme, APPROVES the application for a Single House at No. 46B (Lot: 1; D/P: 417673) Joel Terrace, East Perth in accordance with the plans shown in Attachment 2, subject to the following conditions, with the associated determination advice notes in Attachment 10:

**1. Development Plans**

This approval is for a Single House as shown on the approved plans dated 29 September 2023. No other development forms part of this approval;

**2. Boundary Walls**

The surface finish of boundary wall facing No. 56 Joel Terrace, East Perth shall be of a good and clean condition, prior to the occupation or use of the development, and thereafter maintained, to the satisfaction of the City. The finish of boundary walls is to be face brick as shown on the approved plans, to the satisfaction of the City;

**3. External Fixtures**

All external fixtures, such as television antennas (of a non-standard type), radio and other antennae, satellite dishes, solar panels, external hot water heaters, air conditioners, and the like, shall not be visible from the street(s), are designed integrally with the building, and be located so as not to be visually obtrusive to the satisfaction of the City;

**4. Colours and Materials**

4.1 Prior to first occupation or use of the development, the colours, materials and finishes of the development shall be in accordance with the details and annotations as indicated on the approved plans which forms part of this approval, and thereafter maintained, to the satisfaction of the City; and

4.2 The meter box is to be painted the same colour as the wall it is attached so as to not be visually obtrusive, to the satisfaction of the City;

**5. Landscaping**

5.1 All landscaping works annotated on the approved plans shall be undertaken in accordance with the approved plans, prior to the occupancy or use of the development and maintained thereafter at the expense of the owners/occupiers, to the satisfaction of the City; and

**5.2 No verge trees shall be removed without the prior written approval of the City. Verge trees shall be retained and protected from damage including unauthorised pruning to the satisfaction of the City. Prior to any pruning of verge trees, an arborist report shall be prepared by the landowner and submitted to the City;**

**6. Visual Privacy**

**Prior to occupancy or use of the development, all privacy screening shown on the approved plans shall be installed and shall be visually impermeable and is to comply in all respects with the visual privacy standards of the Residential Design Codes, to the satisfaction of the City;**

**7. Car Parking and Access**

**The layout and dimensions of all driveways and parking areas shall be in accordance with Australian Standard AS2890.1; and**

**8. Stormwater**

**Stormwater from all roofed and paved areas shall be collected and contained on site. Stormwater must not affect or be allowed to flow onto or into any other property or road reserve.**

**EXECUTIVE SUMMARY:**

The purpose of this report is to consider an application for development approval for a three-storey single house at No. 46B Joel Terrace, East Perth (the subject site).

The subject site and surrounding properties are zoned Residential R60 and are within the Residential Built Form Area under the City's Built Form Policy.

The first two thirds of the subject site is level with Joel Terrace after which it begins to slope down approximately 1.5 metres towards the rear before flattening out again. Vehicle access to the lot is restricted due to an existing power pole and an existing mature Bottlebrush tree within the verge.

The elements of the proposal that require a design principles assessment and the exercise of discretion include the reduced street setback for the upper floors, garage width and setback, building height, setbacks to the north and south lot boundaries, landscaping, visual privacy, site works, the location and size of the outdoor living area and solar access.

The proposal has been designed to minimise the visual dominance of the garage and upper floors when viewed from the street and adjoining properties. The dwelling incorporates varying colours and materials to the street and side facing façades. This assists in providing visual interest to the street and breaking up the presentation of building mass. The proposed design response would be compatible with the surrounding area and in considering the character of the existing streetscape and has received DRP Chair support.

Landscaping and deep soil areas are located within the front setback area and to the rear of the property. This would effectively soften the appearance of the dwellings and partially screen the development from the street and adjoining properties. Further landscaping has also been provided across the site which would assist in making an effective contribution to the occupant amenity and urban canopy on site and within the City more generally.

The overshadowing departure to the deemed-to-comply standard is largely driven by the site's orientation and the three-storey height standard. The proposed development responds to this by minimising the shadow cast to major openings and outdoor living areas on the adjoining property. The proposed development would not adversely impact the amenity of the surrounding properties.

Visual privacy impacts to southern and eastern adjoining properties as views towards the adjoining properties would be oblique rather than direct in nature due to the building's orientation. The adjoining property to the north is not impacted by visual privacy as it is a Western Power owned site containing high voltage power lines, and is not intended to be developed for residential use.

An outdoor living area has been provided that is large enough to provide space of a variety of outdoor leisure pursuits and activities, as well as a separate balcony that can be used in conjunction with the primary living area. The proposed site works would correspond with the finished levels of the adjoining property which is respective of the natural ground levels and existing development levels on site. The retaining wall and proposed fill would not adversely affect the adjoining property because it is located next to a side setback area which is not used as a habitable space.

The proposed development has been the subject of revised plans over the course of its assessment. These changes are detailed in the report below. The modifications to the design have resulted in the proposed development being acceptable as considered against the planning framework and the development is recommended for approval, subject to conditions.

#### PROPOSAL:

The application proposes a three-storey single house to a vacant lot at No. 46B Joel Terrace, East Perth. The proposed development plans are included as **Attachment 2**.

#### BACKGROUND:

<b>Landowner:</b>	Maree and Paul Dalwood
<b>Applicant:</b>	Julian Teles
<b>Client:</b>	Maree and Paul Dalwood
<b>Date of Application:</b>	3 May 2023
<b>Zoning:</b>	MRS: Urban LPS2: Zone: Residential R Code: R60
<b>Built Form Area:</b>	Residential
<b>Existing Land Use:</b>	Vacant
<b>Proposed Use Class:</b>	Single House
<b>Lot Area:</b>	213 square metres
<b>Right of Way (ROW):</b>	No
<b>Heritage List:</b>	No

#### Site Context and Zoning

The subject site is bound by Joel Terrace to the west, a Western Power owned site containing high voltage power lines to the north, a vacant site to the east and a two-storey single house to the south that is currently under construction. A location plan is provided as **Attachment 1**.

The vacant site to the east received approval on 15 August 2022 issued by the Metro Inner-North Joint Development Assessment Panel for a four-storey building containing 10 multiple dwellings. The City has not received a building permit for this site. The approval is valid until 15 August 2026, after which time it would expire if not enacted.

The subject site and surrounding properties are zoned Residential R60 under the City's Local Planning Scheme No. 2 (LPS2) and are located within the Residential Built Form Area under the City's Policy No. 7.1.1 – Built Form (Built Form Policy), with a building height standard of three storeys.

#### Lot Creation and Site Characteristics

The subject site was created through a subdivision approved by the Western Australian Planning Commission (WAPC) in 2018. The subdivision approval resulted in the creation of three lots, one being the subject site and the others being Nos. 46A and 46C Joel Terrace, which adjoin the subject site to the south and east.

The existing site levels and retaining walls along the northern and eastern boundary of the site were established through the subdivision approval. The first two thirds of the subject site sit relatively level with Joel Terrace after which it begins to slope down approximately 1.5 metres towards the rear before flattening out again. The adjoining property to the south experiences a similar slope in the same location.

The subject site is affected by a 2.7 metre by 1.3 metre sewer easement which is located within the south-east corner of the lot. The easement was created following subdivision approval and provides the sewage connections to the site.

Verge and Road Infrastructure

The verge directly adjacent to the subject site contains an existing Western Power consumer pole and an existing mature Bottlebrush tree with an approximate height of 5.0 metres and a canopy spread of approximately 6.0 metres. Within the road reserve, there is an existing marked on-street parking bay.

This existing infrastructure restricts vehicle access to the subject site and requires any driveway to be located adjacent to the northern lot boundary.

Existing Streetscape

Joel Terrace includes a mix of residential and commercial development.

Residential developments are characterised by a mixture of one to three storey contemporary dwellings as well as one to two storey traditional style dwellings.

On site parking areas along Joel Terrace generally consist of covered carports or uncovered paved areas, visible from the street setback. Some properties do not include any parking areas accessed via Joel Terrace due to access being available via a rear laneway. The streetscape also includes single and double garages, particularly along the eastern side of Joel Terrace, including the southern adjoining property at No. 46a Joel Terrace. Where provided, upper floors fronting Joel Terrace are generally in-line or behind the ground floor building line.

Where front fencing is provided, it is generally in the form of low masonry walls with visually permeable fencing above as well as fencing that is solid to approximately 1.8 metres.

Street setback areas within the street are generally landscaped with low level plantings and lawns. Verge areas along the street are lined with established street trees within verges.

The adjoining Western Power property to the north is currently used to provide power to the surrounding area and is not intended to be developed in the foreseeable future. This means that the northern façade of the proposed development will be visible from the public realm.

Commercial development along Joel Terrace is located approximately 75 metres south of the subject site and includes two offices, a Western Power Control Centre and a Western Power substation.

Bushfire Prone Area

The subject site is located within a bushfire prone area under the State-wide Map of Bush Fire Prone Areas prepared by the Office of Bushfire Risk Management. In accordance with Clause 78b of the *Planning and Development (Local Planning Schemes) Regulations 2015*. A Bushfire Attack Level (BAL) assessment is not required as part of this application as it includes the development of a single house on a lot with a total area less than 1,100 square metres.

**DETAILS:****Summary Assessment**

The table below summarises the planning assessment of the proposal against the provisions of the Built Form Policy and the State Government's Residential Design Codes Volume 1 (R Codes). In each instance where the proposal requires the discretion of Council, the relevant planning element is discussed in the Detailed Assessment section following from this table.

Planning Element	Deemed-to-Comply	Requires the Discretion of Council
Site Area	✓	
Street Setback		✓
Lot Boundary Walls	✓	
Lot Boundary Setbacks		✓
Garage Setback		✓
Garage Width		✓
Building Height/ Storeys		✓



Planning Element	Deemed-to-Comply	Requires the Discretion of Council
Open Space	✓	
Outdoor Living Areas		✓
Landscaping (R Codes)		✓
Visual Privacy		✓
Parking & Access	✓	
Solar Access		✓
Site Works/ Retaining Walls		✓
Essential Facilities	✓	
External Fixtures	✓	
Surveillance	✓	

### Detailed Assessment

The R Codes and Built Form Policy have two pathways for assessing and determining a development application, being a deemed-to-comply pathway or a design principles and local housing objectives pathway.

The deemed-to-comply standards are one way of satisfactorily meeting the design principles or local housing objectives and are often quantitative measures.

Design principles and local housing objectives are qualitative measures which describe the outcome that is sought rather than the way that it can be achieved.

If a planning element of an application meets the applicable deemed-to-comply standard/(s) then it is satisfactory and not subject to Council's discretion for the purposes of assessment against the Built Form Policy and R Codes.

If a planning element of an application does not meet the applicable deemed-to-comply standard/(s) then Council's discretion is required to decide whether the element meets the applicable design principles and local housing objectives.

The planning elements of the application that do not meet the applicable deemed-to-comply standards and require the discretion of Council are as follows:

Street Setback	
Deemed-to-Comply Standard	Proposal
<p><b>Built Form Policy Clause 5.1 – Street Setback</b></p> <p>Walls on upper floors to be set back 2 metres behind the predominant ground floor building line.</p>	<p>Bed 1 and walk-in-robe (WIR) wall on the first floor are setback 0.2 metres behind the predominant ground floor building line.</p> <p>Kitchen and Scullery walls on the second floor are setback 0.3 metres behind of the predominant ground floor building line.</p>

<b>Lot Boundary Setbacks</b>	
<b>Deemed-to-Comply Standard</b>	<b>Proposal</b>
<b>R Codes Clause 5.1.3 – Lot Boundary Setbacks</b>	
<u>Southern Boundary</u> Ground Floor <ul style="list-style-type: none"> <li>• Entry/Guest wall: 1.5 metres</li> <li>• Activity/Ensuite: 1.5 metres</li> </ul> First Floor <ul style="list-style-type: none"> <li>• Store/Bathroom: 1.6 metres</li> </ul> Second Floor <ul style="list-style-type: none"> <li>• Kitchen window: 3.8 metres</li> <li>• Living/Dining: 1.9 metres</li> <li>• Balcony: 2.4 metres</li> </ul>	<u>Southern Boundary</u> Ground Floor <ul style="list-style-type: none"> <li>• Entry/Guest wall: 1.0 metres</li> <li>• Activity/Ensuite: 1.1 metres</li> </ul> First Floor <ul style="list-style-type: none"> <li>• Store/Bathroom: 1.5 metres</li> </ul> Second Floor <ul style="list-style-type: none"> <li>• Kitchen window: 2.5 metres</li> <li>• Living/ Dining: 1.5 metres</li> <li>• Balcony: 1.9 metres</li> </ul>
<u>Northern Boundary</u> Ground Floor <ul style="list-style-type: none"> <li>• Laundry/Lift: 1.7 metres</li> </ul> First Floor <ul style="list-style-type: none"> <li>• Stairs/WIR: 1.6 metres</li> <li>• Minor: 2.1 metres</li> </ul> Second Floor <ul style="list-style-type: none"> <li>• Stair windows/Balcony: 4.6 metres</li> <li>• Scullery window: 4.3 metres</li> <li>• Balcony/ Scullery: 2.5 metres</li> </ul>	<u>Northern Boundary</u> Ground Floor <ul style="list-style-type: none"> <li>• Laundry/Lift: 1.0 metre</li> </ul> First Floor <ul style="list-style-type: none"> <li>• Stairs/WIR wall: 1.0 metre</li> <li>• Minor: 1.3 metres</li> </ul> Second Floor <ul style="list-style-type: none"> <li>• Stair windows/Balcony: 1.0 metre</li> <li>• Scullery window: 1.1 metres</li> <li>• Balcony/Scullery: 1.0 metre</li> </ul>
<b>Garage Setback</b>	
<b>Deemed-to-Comply Standard</b>	<b>Proposal</b>
<b>Built Form Policy Clause 5.1 – Garage Setback</b>	
Garages to be setback 0.5 metres behind the dwelling alignment. The dwelling alignment in this instance is the Ground Floor Entry Wall.	The garage sits in line with the Ground Floor Entry Wall.
<b>Garage Width</b>	
<b>Deemed-to-Comply Standard</b>	<b>Proposal</b>
<b>Built Form Policy Clause 5.5 – Garage Width</b>	
Garage width shall be a maximum of 50 percent (5.3 metres) of the lot frontage.	Garage width is 51.4 percent (5.4 metres) of the lot frontage.
<b>Building Height</b>	
<b>Deemed-to-Comply Standard</b>	<b>Proposal</b>
<b>Built Form Policy Clause 5.6 – Building Height</b>	
Top of external wall (roof above): 9.0 metres.	Top of external wall (roof above): 9.3 metres.

Outdoor Living Areas																							
Deemed-to-Comply Standard	Proposal																						
<p><b>R Codes Clause 5.3.1 – Outdoor Living Areas</b></p> <p>Outdoor living areas to be accessed from the primary living space of the dwelling.</p> <p>Outdoor living areas to have a minimum length and width dimension of 4 metres.</p>	<p>The outdoor living area would be accessed from the Ground Floor Activity Room which does not meet the definition of primary living space, as it is not the largest room in the dwelling nor the main area of activity.</p> <p>Outdoor living area has a minimum width of 3.4 metres.</p>																						
Landscaping (R Codes)																							
Deemed-to-Comply Standard	Proposal																						
<p><b>R Codes Clause 5.3.2 – Landscaping</b></p> <p>Landscaping required in the street setback area: 50 percent (12.7 square metres).</p>	<p>Landscaping provided in the street setback area: 48.8 percent (12.4 square metres).</p>																						
Site Works/ Retaining Walls																							
Deemed-to-Comply Standard	Proposal																						
<p><b>R Codes Clause 5.3.7 – Site Works</b></p> <p>Retaining walls and fill located on the boundary shall be not more than 0.5 metres in height.</p>	<p>0.7 metres of fill proposed to the southern boundary.</p> <p>Retaining wall proposed to the southern boundary has a maximum height of 0.9 metres.</p>																						
Visual Privacy																							
Deemed-to-Comply Standard	Proposal																						
<p><b>R Codes Clause 5.4.1 – Visual Privacy</b></p> <p><u>Cone of Vision setbacks required:</u></p> <table> <tr> <td>Bedrooms and Studies:</td> <td>3.0 metres</td> </tr> <tr> <td>Kitchens and Living Rooms:</td> <td>4.5 metres</td> </tr> <tr> <td>Balconies:</td> <td>6.0 metres</td> </tr> </table>	Bedrooms and Studies:	3.0 metres	Kitchens and Living Rooms:	4.5 metres	Balconies:	6.0 metres	<table> <tr> <td colspan="2"><u>Northern Boundary</u></td> </tr> <tr> <td>Second Floor Living Room windows:</td> <td>1.0 metre</td> </tr> <tr> <td>Second Floor Balcony:</td> <td>1.0 metre</td> </tr> <tr> <td colspan="2"><u>Southern Boundary</u></td> </tr> <tr> <td>Second Floor Kitchen window:</td> <td>2.5 metres</td> </tr> <tr> <td>Second Floor Balcony:</td> <td>4.4 metres</td> </tr> <tr> <td colspan="2"><u>Eastern Boundary</u></td> </tr> <tr> <td>Second Floor Balcony:</td> <td>4.7 metres</td> </tr> </table>	<u>Northern Boundary</u>		Second Floor Living Room windows:	1.0 metre	Second Floor Balcony:	1.0 metre	<u>Southern Boundary</u>		Second Floor Kitchen window:	2.5 metres	Second Floor Balcony:	4.4 metres	<u>Eastern Boundary</u>		Second Floor Balcony:	4.7 metres
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Deemed-to-Comply Standard	Proposal																						
<p><b>R Codes Clause 5.4.2 – Solar Access for Adjoining Sites</b></p> <p>A maximum of 50 percent (106.5 square metres) of the adjoining property to be overshadowed when measured at midday on 21 June.</p>	<p>72.6 percent (142.3 square metres) of the adjoining property would be overshadowed when measured at midday on 21 June.</p>																						

The above elements of the proposal do not meet the specified deemed-to-comply standards and are discussed in the Comments section below.

**CONSULTATION/ADVERTISING:***First Consultation*

Community consultation was undertaken by the City in accordance with the *Planning and Development (Local Planning Schemes) Regulations 2015*, for a period of 14 days between 12 July 2023 and 25 July 2023. The method of consultation included a notice on the City's website and eight letters being sent to the adjoining and adjacent landowners and occupiers, as shown in **Attachment 1** and in accordance with the City's Community and Stakeholder Engagement Policy.

Three submissions were received at the conclusion of the advertising period, one in support, one which objected to the proposal and one which neither supported nor objected to the proposal but provided comment.

Comments received in support are summarised as follows:

- Overshadowing primarily falls to the roof of the adjoining property and does not impact solar access; and
- The setbacks, landscaping and tree canopies departures will not result in adverse impacts to the adjoining properties.

Comments of concern are summarised as follows:

- Scale of development results in adverse impacts to the surrounding properties;
- The development proposes several R Code and Built Form Policy departures which would set a negative precedence for future developments in the area; and
- The proponent should further refine the design of the house to adhere to the R Codes and design principles detailed within the submission form.

The application was referred to Western Power as a landowner of property within the consultation radius. Western Power's submission neither supported nor objected to the proposal but stated that the development would not impact the function of the northern adjoining property, which includes high voltage power lines.

*Second Consultation*

Following the community consultation period, amended plans dated 20 September 2023 and additional information was submitted by the applicant.

A summary of the key changes made as part of these amended plans is as follows:

- Bringing the ground floor entry forward to be in line with the garage and bringing the porch forward of the garage;
- A decreased floor area to the entire first and second floors resulting in increased lot boundary setbacks to the eastern (rear) lot boundary;
- Reduction in the building height by 0.2 metres;
- Reduction to the garage width when viewed from the street by 1.0 metre;
- Reduction to the width of the driveway by 1.6 metres; and
- Increased landscaping to the street setback area.

Additional design modifications were also made to the plans in response to comments provided by the Chair of the City's Design Review Panel (DRP). This is further detailed in the Design Review Panel section of this report below.

Following the submission of amended plans on 20 September 2023, the application was readvertised for a period of 14 days from 28 September 2023 to 11 October 2023. Previous submitters were notified and a notice placed on the City's website.

At the conclusion of the second round of community consultation, the City received one submission from a previous submitter. This submitter reiterated their objection to the proposal as summarised above, but did not raise any new comments.

Revised plans were submitted on 29 September 2023 during the second consultation period and included additional modifications to address comments from the DRP Chair. These changes are further detailed in the Design Review Panel section of the report below.

A copy of the final set of development plans dated 29 September 2023 is included as **Attachment 2**.

In accordance with the City's Community and Stakeholder Engagement Policy, these final set of plans were not re-advertised. This is because the amendments result in no new or greater departures to the deemed-to-comply standards.

A summary of submissions received across the two community consultation periods along with Administration's responses to each comment is provided in **Attachment 3**. The applicant's response to the submissions received are provided as **Attachment 4**.

### Design Review Panel (DRP):

Referred to DRP: Yes

The proposal was referred on four occasions to the City's DRP Chair for comment as considered against the 10 principles of good design. These referrals were for the plans originally lodged and each set of amended plans submitted by the applicant.

The table below provides a summary of this application's design review assessment progress.

<b>Design Review Progress</b>				
	<i>Supported</i>			
	<i>Pending further attention</i>			
	<i>Not supported</i>			
	<i>DRP Chair</i>			
	<i>Referral 1 – Plans dated 8 Jun 2023</i>	<i>Referral 2 – Plans dated 11 Jul 2023</i>	<i>Referral 3 – Plans dated 20 Sep 2023</i>	<i>Referral 4 – Plans dated 29 Sep 2023</i>
<b>Principle 1 – Context &amp; Character</b>				
<b>Principle 2 – Landscape Quality</b>				
<b>Principle 3 – Built Form and Scale</b>				
<b>Principle 4 – Functionality &amp; Built Quality</b>				
<b>Principle 5 – Sustainability</b>				
<b>Principle 6 – Amenity</b>				
<b>Principle 7 – Legibility</b>				
<b>Principle 8 – Safety</b>				
<b>Principle 9 – Community</b>				
<b>Principle 10 – Aesthetics</b>				

A summary of all the DRP Chair's comments provided on the proposal are included below.

- Consider undertaking a context and character study of the surrounding area to inform the choice of materials, textures and colours as well as reflect aspects of the broader streetscape area;
- Illustrate through the plans, sections and a shadow study how the southern property will be impacted by overshadowing because of reduced setbacks including impacts on any private outdoor space, and the amenity of the adjoining property;
- Bringing the ground floor entry forward and removing the front fence would assist providing a more prominent entry to the street. Presenting it in a white render version rather than face brick which will increase legibility;
- The width of the garage should be reduced further to decrease its dominance to the street;
- Consider the use of face brick to the garage boundary wall to assist in mitigating its visual impact on the public realm;
- Consider changes to the design to capitalise on north sun and to view and vista across the undeveloped northern site and away from the adjoining property to the south;
- Consider a greater selection of native species including tree selections that have the potential to deliver generous canopy;

- Consider how the north facing elevation can be aesthetically improved as it will be visible for the foreseeable future;
- Consider how AC condensers will be accommodated on site; and
- Both the ground floor and first floor have floor-to-ceiling heights of 2.4 metres. This will have a negative impact on internal amenity and is inconsistent with good design practice which recommends 2.7 metres as a minimum floor to ceiling height for habitable rooms.

In response to comments and recommendations received from the DRP Chair from referrals, the applicant made the following key changes over the course of the application process:

- The inclusion of a context and character study, included as **Attachment 5**. The findings resulted in the following changes:
  - Setting back bedroom 1 and the kitchen behind the ground floor predominant building line;
  - Additional face brick to the front façade to reflect the character of the street;
- The inclusion of 2D and 3D overshadowing diagrams to demonstrate the impact of overshadowing. The following changes were made in response to the findings:
  - The introduction of a pitched roof to the ground floor entry;
  - A decreased floor area to the entire first and second floors resulting in an increased setback of the development from the rear lot boundary and reduction in the building height;
- Bringing the ground floor entry forward to be in line with the garage and bringing the porch forward of the garage;
- The removal of the front fence and replacement with additional landscaping;
- Reduction in the width of the garage, internal area of the garage and the width of the driveway;
- The use of face brick to the garage boundary wall;
- Removal of north facing balcony screening and obscure glazing to the living room windows;
- The introduction of more landscaping in the front setback area and native tree species to the rear of the property to provide additional canopy coverage;
- The introduction of face brick and on-structure landscaping to the north facing façade;
- Recessing the minor bedroom wall along the north facing façade to increase articulation in the wall; and
- Concealing AC condensers.

The DRP Chair provided the following comments in respect to the final set of amended plans:

- The streetscape analysis assists with justifying the proposed discretion in height by identifying precedent for three storey developments in the immediate area;
- The design presents a built form towards the public realm that has visual diversity with contemporary materiality, texture and colour that is contextually sensitive;
- Whilst the ground floor streetscape engagement is limited because of the garage, the upper levels provide for adequate levels of engagement and passive surveillance over the public realm;
- The 3D diagrams demonstrate that the overshadowing impacts to the southern adjoining property are minimal;
- Moving the entry door forward in line with the garage has engaged more successfully with the streetscape;
- Removal of the front fence feature enables a more direct and legible/visible approach to the front door;
- The introduction of additional areas of face brick and landscaping to the north façade has assisted in mitigating its visual impact on the public realm;
- Screening has been removed from the balcony, opening it up to northern sun;
- There are improvements to landscaping through the addition of native landscape species;
- Additional native landscape species including native frangipani have been included as well as additional detail regarding other planting species which positively contributes to the street;
- The AC condenser locations have been illustrated on plan and a roof plan has now been included in the submission; and
- A minimum 2.7 metre floor to ceiling height for habitable rooms is still recommended to increase internal amenity.

The table below provides a summary of the DRP Chair's comments which have not been addressed. This is in respect to their last referral response based on amended plans dated 29 September 2023, along with Administration's response.

Principle 6 – Amenity	
DRP Chair's Comments	Administration Response
<ul style="list-style-type: none"> <li>Both the ground floor and first floor have floor-to-ceiling heights of 2.4 metres. This will have a negative impact on internal amenity and is inconsistent with good design practice which recommends 2.7 metres as a minimum floor to ceiling height for habitable rooms.</li> </ul>	<ul style="list-style-type: none"> <li>There is no minimum floor to ceiling height deemed-to-comply standards under the R Codes or Built Form Policy;</li> <li>The 2.4 metre high ceilings would comply with relevant National Construction Code standards; and</li> <li>Increasing the floor to ceiling height could result in additional building height and associated overshadowing impacts to the southern adjoining property.</li> </ul>

**LEGAL/POLICY:**

- *Planning and Development Act 2005;*
- *Planning and Development (Local Planning Schemes) Regulations 2015;*
- *City of Vincent Local Planning Scheme No. 2;*
- *State Planning Policy 3.7 – Planning in Bushfire Prone Areas;*
- *State Planning Policy 7.3 – Residential Design Codes;*
- *Community and Stakeholder Engagement Policy; and*
- *Policy No. 7.1.1 – Built Form Policy.*

*Planning and Development Act 2005*

In accordance with Schedule 2, Clause 76(2) of the *Planning and Development (Local Planning Scheme) Regulations 2015*, and Part 14 of the *Planning and Development Act 2005*, the applicant would have the right to apply to the State Administrative Tribunal for a review of Council's determination.

*Planning and Development (Local Planning Schemes) Regulations 2015*

In accordance with [Clause 67\(2\)](#) of the Deemed Provisions in the Planning Regulations and in determining a development application, Council is to have due regard to a range of matters to the extent that these are relevant to the development application.

The matters for consideration relevant to this application relate to the compatibility of the development within its setting, amenity and character of the locality, consistency with planning policies, comments received during community consultation and advice from the DRP Chair.

*Local Planning Scheme No. 2*

The objectives of the Residential zone under LPS2 are a relevant consideration for the application. These objectives are:

- *To provide for a range of housing and a choice of residential densities to meet the needs of the community;*
- *To facilitate and encourage high quality design, built form and streetscapes throughout residential areas;*
- *To provide for a range of non-residential uses, which are compatible with and complementary to residential development;*
- *To promote and encourage design that incorporates sustainability principles, including but not limited to solar passive design, energy efficiency, water conservation, waste management and recycling;*
- *To enhance the amenity and character of the residential neighbourhood by encouraging the retention of existing housing stock and ensuring new development is compatible within these established areas;*
- *To manage residential development in a way that recognises the needs of innovative design and contemporary lifestyles; and*
- *To ensure the provision of a wide range of different types of residential accommodation, including affordable, social and special needs, to meet the diverse needs of the community.*

State Planning Policy 7.3 – Residential Design Codes Volume 1 2023

On 23 February 2023, the State Government publicly released amendments to Volume 1 of the R Codes (2023 R Codes). The amendments split the R Codes Volume 1 into Part B – Low Density and Part C – Medium Density (Medium Density Code). The Medium Density Code was due to be gazetted and come into operation on 1 September 2023.

On 9 August 2023, the Minister for Planning announced that they had requested deferred gazettal of the Medium Density Code to rework the policy, including removal of its application to R30 and R40 coded lots. No further information has been provided by the Minister or the Department of Planning, Lands and Heritage at this time regarding these amendments or a future gazettal date.

The 2023 R Codes remains an adopted policy of the WAPC, although the weight it is afforded in determining an application is limited. This is because it is neither certain nor imminent in coming into effect in the form it was adopted and the deferred gazettal date is unknown.

**Delegation to Determine Applications:**

This matter is being referred to Council for determination in accordance with the City's Register of Delegations, Authorisations and Appointments. This is because the delegation does not extend to proposals where the development proposes a height of three storeys or more and does not meet the applicable building height deemed-to-comply standard.

The application proposes a building height of three storeys and would exceed the deemed-to-comply height standard by 0.3 metres.

**RISK MANAGEMENT IMPLICATIONS:**

There are minimal risks to Council and the City's business function when Council exercises its discretionary power to determine a planning application.

**STRATEGIC IMPLICATIONS:**

This is in keeping with the City's Strategic Community Plan 2022-2032:

Innovative and Accountable

*Our decision-making process is consistent and transparent, and decisions are aligned to our strategic direction.*

**SUSTAINABILITY IMPLICATIONS:**

The City has assessed the application against the environmentally sustainable design provisions of the City's Policy No. 7.1.1 – Built Form. These provisions are informed by the key sustainability outcomes of the City's Sustainable Environment Strategy 2019-2024, which requires new developments to demonstrate best practice in respect to reductions in energy, water and waste and improving urban greening.

**PUBLIC HEALTH IMPLICATIONS:**

There are no impacts on the priority health outcomes of the City's *Public Health Plan 2020-2025* from this report.

**FINANCIAL/BUDGET IMPLICATIONS:**

There are no finance or budget implications from this report.



**COMMENTS:**Summary Assessment

In assessing the application against the planning framework, it is recommended for approval. The following key comments are of relevance:

- The residential streetscape along Joel Terrace between Summers Street and Gardiner Street is varied in terms of development scale, style and form;
- Portions of the proposed development that are above the maximum building height standard is limited to the north facing living room wall, located approximately 13.3 metres away from the front property boundary. The development incorporates different colours and materials across each level to assist in creating a delineation between the ground and upper floors of the façade and reducing the visual dominance as viewed from the street;
- The position of the porch forward of the garage assists in providing articulation to the street. This reduces the overall impression of building bulk and dominance of the garage door. The projection forward of the garage was supported by the DRP Chair as it emphasises the main entry over the garage on the ground floor and engages more successfully with the streetscape. The provision of landscaping within the front setback area would also partially screen the garage door from the street;
- The overshadowing departure to the deemed-to-comply standard is largely driven by the site's orientation and the three-storey height standard proposed development responds to this by minimising the shadow cast to major openings and outdoor living areas on the adjoining property. The proposed development would not adversely impact the amenity of the surrounding properties;
- The impact of overlooking has been reduced through the use of screening devices or does not overlook major openings and outdoor living areas;
- The dwelling would be provided with functional outdoor living areas capable of use with the primary living space of the dwellings, and with uncovered area on-site that would allow for the occupants to pursue a variety of outdoor living and leisure activities; and
- The development site would be provided with deep soil and planting areas that would exceed the deemed-to-comply standards of the Built Form Policy. This includes a combined 45 square metres of deep soil area within the front setback area and rear garden. The proposed deep soil and planting areas within the front setback area would provide for trees and plantings that would soften the appearance of the dwellings to the street.

Street Setback

The proposed primary street setback would satisfy the design principles of the R Codes for [Street Setback](#), and the local housing objectives of the Built Form Policy for [Street Setback](#) for the following reasons:

- Consistency with the Street: The upper floor design is consistent with the established character of the Joel Terrace streetscape where there are varied setbacks to the upper floors of existing dwellings. As demonstrated in Administration's streetscape review included as **Attachment 6**, the dwellings to Nos. 45, 46A, 53, 58, 65 and 71 include upper floors that are setback less than two metres from the ground floor dwelling alignment. In addition, Nos. 45, 58, 53 and 71 include balconies that project forward of the dwelling alignment. The upper floor setbacks are also specifically consistent with the closest adjoining developments at Nos. 46A and 53 Joel Terrace, which provide upper floor setbacks that are in line with the ground floor, allowing the proposed street presentation to align with the established character in the immediate area;
- Ground Floor Street Setback: The proposed dwelling is setback a minimum of 2.5 metres from the street boundary and meets the street setback deemed-to-comply standard under the Built Form Policy to all levels. This ensures the predominant building is adequately set back from the street consistent with the average setbacks of existing nearby dwellings and to reduce the impacts of building bulk;
- Reduction of Building Bulk: The 0.2 metre stepping back of the first floor and 0.3 metre stepping back of the second floor would not result in visual bulk that is commonly associated with unarticulated two storey walls. This is because the Joel Terrace facade includes large openings and a variety of materials and colours. Materials include light rendered brickwork and red face brick to the ground floor and second floor, and dark vertical cladding on the first floor. This assists in breaking up the presentation of mass to the street and creates a delineation between the ground and upper floors of the façade, reducing the visual dominance as viewed from the street. These design elements provide a façade that contributes to the established streetscape. The City's DRP Chair advised that the colours and materials reduce the appearance of built form and scale;

- **Landscaping:** The street setback area would include 45.7 percent (11.6 square metres) of deep soil area. An additional 3.1 percent (0.8 square metres) of soft landscaping would be provided within the street setback that does not meet the minimum 1 metre dimension to constitute deep soil area. This would soften the appearance of the upper floors to the street and create a sense of open space between the street and dwelling;
- **Definable Entry Point:** The upper floor setbacks would not affect legibility of the entry to the dwelling due to the position of the porch forward of the upper floor and contrasting render on the entry wall;
- **Surveillance and Interaction:** The major openings from the master bedroom on the first floor and kitchen on the second floor provide visual connectivity and surveillance with the street; and
- **Design Review Panel:** The combination of the design responses to the site resulted in DRP Chair support for the street presentation of the proposed dwelling. These design responses include the articulation in the façade, landscaping in the front setback area and the use of different colours and materials to break up the appearance of building bulk.

#### Garage Setback and Width

The proposed garage would satisfy the design principles of the R Codes for [Setback of Garages and Carports](#) and [Garage Width](#), and the local housing objectives of the Built Form Policy for [Garages and Carports](#) and [Garage Width](#) for the following reasons detailed below.

- **Streetscape Context:** The established Joel Terrace streetscape primarily includes uncovered parking areas and open carports. As demonstrated in Administration's streetscape review included as **Attachment 6**, the streetscape does include some double garages along the eastern side of Joel Terrace at Nos. 46A, 38 and 30 Joel Terrace. These garage alignments vary from being 6.5 metres forward of the dwelling alignment to 1.0 metre behind the dwelling alignment. The garage widths also vary between 27 to 56 percent of the respective lot frontages. In particular, the direct southern neighbour at No. 46A Joel Terrace provides a garage that is 1.0 metre behind the dwelling alignment and has a garage width of 56 percent. Whilst this development on the southern adjoining property is consistent with what is proposed, the broader streetscape consists of garages with a width below 50 percent as well as varied garage alignments;
- **Porch Position:** The position of the porch forward of the garage assists in providing articulation to the street which reduces the overall impression of building bulk and the dominance of the garage door. The projection forward of the garage was supported by the DRP Chair who advised that it emphasises the main entry over the garage on the ground floor and engages more successfully with the streetscape;
- **Garage Design:** The Joel Terrace façade incorporates contrasting colours and materials to the ground floor and to the garage, including light rendered brickwork and face brick. These colours and materials are reflective of those that exist within the street, which would ensure the development contributes to and is complementary with the existing streetscape. These design elements would also help to break up the horizontal bulk of the dwelling and assists in reducing visual dominance. A steel beam is also included over the front of the garage which assists to break up the presentation of mass when viewed from the street;
- **Driveway Design and Garage Location:** The extent of hardstand areas within the front setback area has been reduced through the driveway design which tapers from 3.5 metres at the lot boundary to 4.9 metres at the garage door. This tapered design allows for additional landscaping including the planting of two trees within front setback areas as well as the retention of the existing verge tree. This new and existing landscaping would sit partially in front of the garage, softening the appearance of the buildings as viewed from the street and obscuring views to the garage door; and
- **Design Review Panel:** As discussed in the Street Setback section of this report, the DRP Chair supported the street presentation of the proposed dwelling as the design responses, including the position of the porch forward of the garage assist to break up the appearance of bulk.

#### Building Height and Solar Access for Adjoining Sites

The proposed building height and overshadowing would satisfy the design principles of the R Codes for and [Building Height](#) and [Solar Access](#) and the local housing objectives of the Built Form Policy for [Lot Boundary Setback](#) for the following reasons:

The proposed building height and solar access would satisfy the design principles of the local housing objectives of the Built Form Policy for the following reasons:

- Acceptability of Building Height: The portion of the upper level that exceeds the permitted building height is limited to portions of the north and east facing living room wall, as shown in **Attachment 7**. The proposed building height is acceptable because:
  - Site Topography: The over height portions of the dwelling results from a level change between the front and rear of the site. The first two thirds of the subject site is level with Joel Terrace after which it begins to slope down approximately 1.5 metres towards the rear before flattening out again. The portion of the upper level above this exceeds the permitted building height by 0.3 metres is located approximately 13.3 metres away from the street boundary. As the adjoining property to the north is not intended to be used for residential development, the additional height to the north facing living room wall would be visible from Joel Terrace on an angle. Given the over height portion of the dwelling is well setback from the street and as the land slopes approximately 1.5 metres down from the street boundary, impacts over the additional height would not provide adverse visual impacts to the street;
  - Consistency with Neighbourhood Character: The Built Form Policy sets a height standard of three storeys for development in the locality within the residential built form area. The proposed height of the dwelling would be consistent with the established and future visual character of the neighbourhood. This is because the immediate streetscape and locality are characterised mixture of contemporary and Californian Bungalow housing styles that range between one and three storeys in height. The use of a pitched roof is also consistent with the existing streetscape;
  - Treating Building Bulk: To reduce the impacts of building bulk, the side and rear elevations include a mix of face brick, rendered brickwork and large openings that would assist in breaking up the overall perception of mass as viewed from the street and adjoining properties. The southern and eastern elevations include articulated walls and varied roof forms to further break down the building bulk and add a level of depth to the facade. On-structure landscaping in the form a Virginia Creeper has also been included to the northern elevation which spans from the ground floor to second floor. This would provide softening of the overall presentation of mass when viewed from the street and would assist in the reduction of a solid blank wall. The design of the north façade was supported by the DRP Chair due to it mitigating its visual impact on the public realm;
  - Views of Significance: The building height would not adversely impact views of significance, being the Swan River and Optus Stadium. This because the additional height results from the change in topography towards the rear two-thirds of the lot. As viewed from the street, the height is within the permitted maximum which would allow existing views to be maintained. No concerns relating to impact on views were raised by properties on the western side of Joel Terrace;
- Deemed-to-Comply Overshadowing Comparison: Administration undertook an analysis of the extent of overshadowing from the proposed development compared to a three-storey development that meets deemed-to-comply standards in relation to building height and lot boundary setbacks. Overshadowing is measured under the R Codes at midday on 21 June, winter solstice, with the shadow extending to the south, which is when the sun is lowest in the sky and overshadowing is at its worst. A development that satisfies these deemed-to-comply standards would result in 72 percent overshadowing to the adjoining property. This would be 0.6 percent less than the proposed development and would also not satisfy the 50 percent overshadowing deemed-to-comply standard of the R Codes. The greatest reduction in overshadowing would be to the roof of the southern dwelling, being an area that is not sensitive to the impacts of overshadowing. The other area of reduction would not fall within the southern adjoining property as the current shadow extends into the driveway of No. 44 Joel Terrace. This is demonstrated in Administration's analysis included as **Attachment 8**. This plan also indicates that a compliant shadow cast would fall to the same areas as the proposed overshadowing, including the portion of the outdoor living areas and major openings, causing no further impact;
- Acceptability of Overshadowing: Due to the orientation of the lot and the three-storey height standard, the southern adjoining property at No. 46A Joel Terrace is vulnerable to being overshadowed. The proposal would overshadow an existing a two-storey single house to the south that is currently under construction, and of the overshadowing created, 51.7 percent (105.04 square metres) would fall to the roof of the adjoining dwelling. The remaining overshadowing to the south is acceptable for the following reasons:
  - Outdoor Living Area: The adjoining properties outdoor living area includes a rear covered alfresco and an uncovered landscape area. The uncovered outdoor living area of the adjoining dwelling would be overshadowed by the adjoining development itself or would be overshadowed by any three-storey development that satisfied the deemed-to-comply building height standards at the subject site. Even with the proposed development, the adjoining outdoor living area would maintain solar access from the northern and eastern aspects of the site. As demonstrated in **Attachment 8**, solar access would increase into the morning as the sun moves west;

- Eastern Major Opening: Due to its location and orientation, the eastern facing major opening would not be impacted by the overshadowing from the proposed development. As demonstrated in **Attachment 8**, this major opening would experience overshadowing from the adjoining dwelling; and
- Northern Major Opening: The northern facing major opening of the adjoining property is located within 1.2 metres of the boundary. Due to its location and orientation, this major opening would be susceptible overshadowing from a development that met deemed to comply standards on the subject site. As demonstrated in **Attachment 8**, the major opening would still benefit from solar access during the summer months as the angle of the summer sun is much higher.

#### Lot Boundary Setbacks and Visual Privacy

The proposed lot boundary setbacks would satisfy the design principles of the R Codes for [Lot Boundary Setback](#) and [Visual Privacy](#), and the local housing objectives of the Built Form Policy for [Building Height](#) for the following reasons:

- Building Bulk: Building bulk from the proposed development is acceptable because:
  - North Elevation: As the adjoining northern property is to remain a long-term vacant site due to existing high voltage power lines, the northern façade has been designed in a way that is more reflective of a street façade as it will be visible from the public realm. As discussed in the Building Height section of this report, the northern elevation includes a mix of colours, materials and landscaping to break up the overall perception of mass of the northern boundary, and would assist in the reduction of a solid blank wall;
  - Southern Elevation: While there are some views to walls from the southern adjoining properties outdoor living area and major openings, the building bulk impacts of the walls would be reduced through the articulation of walls and the incorporation of differing materials and colours. This has been provided through rendered brickwork, openings and screening which provides visual articulation and would assist in breaking up the presentation of mass. Views of the proposed development from the adjoining properties primary outdoor living area would also be restricted by the roof of the existing building;
- Adjoining Property Amenity: The proposed setbacks would result in a separation of 2.6 metres to 3.5 metres to the adjoining property to the south which would be sufficient to preserve access to ventilation. The outdoor living area and major openings within the southern property would be partially impacted by overshadow, but they would still benefit from solar access throughout the day, particularly during the summer months;
- Visual Privacy:
  - Impact to Southern Site: The proposal has sought to minimise the extent of overlooking from the balcony to the southern property through incorporating privacy screens along the southern and eastern facades. The balcony is also setback 1.8 metres from the adjoining property to provide a level of separation between the properties. A portion of the cone of vision would fall within the outdoor living area of the adjoining property, however views towards the outdoor living area would be oblique rather than direct in nature due to the balcony being orientated towards the east. This would assist in reducing the impacts of visual privacy to the adjoining property. The proposed kitchen window would overlook the roof of the adjoining southern dwelling and would not result in an amenity impact given no windows or active habitable spaces are impacted. The City did not receive any submissions that raised concerns with overlooking from the balcony;
  - Impact to Eastern Site: The eastern adjoining property is currently vacant, but approval has been granted for the development of 10 multiple dwellings. The cone of vision would not impact the existing vacant land and would fall within a proposed deep soil area on the approved plans, which sits adjacent to an entry to the building. The cone of vision would therefore have no impact to any future major openings or active habitable spaces; and
  - Impact to Northern Site: The adjoining property to the north is a Western Power owned site containing high voltage power lines and is not intended to be developed for residential use. No overlooking would fall to any current or future residential development.

### Landscaping

In addition to the deemed-to-comply standards of the R Codes, the application has also been assessed against the landscaping provisions of the Built Form Policy. The deemed-to-comply landscaping standards set out in the Built Form Policy have not been approved by the WAPC. As such, these provisions are given regard only in the assessment of the application and do not have the same weight as other policy provisions.

The proposed landscaping would satisfy the [Design Principles](#) of the R Codes and the [Local Housing Objectives](#) of the Built Form Policy for the following reasons:

- **Streetscape Planting:** Landscaping within the street setback includes a native Frangipani and Magnolia tree which would soften the appearance of the proposed development and assist with reducing the overall impact of the buildings bulk and scale when viewed from the street. The applicant has tapered driveway to provide for a greater area for landscaping within the street setback and incorporates low lying shrubs and permeable paving. This would provide added landscaping amenity in addition to deep soil areas and would assist in water infiltration to support the health the adjoining verge tree;
- **Canopy Coverage:** In addition to the trees within the street setback, one Magnolia tree is provided to the rear of the site. This would contribute to the overall site achieving 16.5 percent canopy coverage at maturity. These plantings would assist in making an effective contribution to the occupant amenity and urban canopy on site and within the City more generally;
- **On-Structure Landscaping:** On-structure landscaping is provided to the northern façade and spans from the ground floor to second floor. This would assist in softening the appearance of the building façade and provide a visually pleasing outcome to this elevation when viewed from the public realm;
- **Environmental Benefits:** The proposed plantings and deep soil areas would contribute towards increased urban air quality and a sense of open space between the subject site and adjoining properties. This would make an effective contribution to the City's urban green canopy to assist in reducing the impact of the urban heat island effect; and
- **Verge Tree:** The existing mature Bottlebrush tree in the verge would remain. It is located centrally to the Joel Terrace boundary of the subject site. No further trees could be provided due to the location of the driveway and Western Power consumer pole within the verge.

### Outdoor Living Area

The proposal provides a rear garden on the ground floor and a balcony on the second floor which both could be considered the outdoor living area.

Neither of these spaces would satisfy the deemed-to-comply standards of the R Codes relating to outdoor living areas. This is because rear garden is not directly accessible from the primary living space of the dwelling and the balcony does not meet the minimum area standards. Both the rear garden and the balcony have minimum dimension less than 4 metres.

Administration's assessment has been undertaken on the basis that the rear garden would be the outdoor living area as this is the larger of the two areas.

The proposed outdoor living areas would satisfy the [Design Principles](#) of the R Codes for the following reasons:

- **Rear Garden Outdoor Living Area:** The dwelling would be provided with 31.2 square metres open garden to the rear of the site that would provide space of a variety of outdoor leisure pursuits and activities. This garden area would be accessible via an activity room on the ground floor which would allow it to be used in conjunction with the dwelling. This rear garden exceeds the minimum 16 square metre minimum outdoor living area standard under the R Codes;
- **Additional Balcony:** The development provides a 14.5 square metre balcony directly adjoining the primary living space of the dwelling. The balcony would be of sufficient size and dimension to be functional and usable for outdoor entertaining in conjunction with the primary living space of the dwelling;
- **Orientation:** The outdoor living area is oriented with an eastern and northern aspect and is uncovered, enabling adequate access to sunlight and ventilation into living spaces of the dwelling; and
- **Landscaping:** The outdoor living area would be co-located with deep soil areas and landscaping on the site.



### Site Works

The subject site contains existing retaining walls to the northern and eastern boundaries that were established following subdivision approval. The application proposes two new retaining walls to the northern and southern boundary below 0.5 metres in height and one 0.9-metre-high retaining wall along the southern boundary which accommodates a staircase down towards the rear of the site. The application also proposes 0.7 metres of fill along the southern boundary side setback area that accommodates a pathway towards the staircase.

The proposed site works would satisfy the [Design Principles](#) of the R Codes for the following reasons:

- **Response to Site:** The site fill and retaining wall are located adjacent to the southern external wall of the ground floor guest bedroom and ensuite, which is contained to a small portion of the overall site. The proposed site fill would correspond with the finished levels of the southern dwelling which is respective of the natural ground levels and existing development levels on site. The retaining wall sits slightly higher than the finished levels of the southern dwelling and is required as a form of structural retaining for the proposed stairs. The finished floor levels provided across the remainder of site respond to the topography, and result in minimal excavation or fill across the site. This allows the development to appropriately respond to existing natural ground levels of adjoining properties;
- **Visibility from the Street:** The proposed retaining wall is below the street level and is not visible from the street; and
- **Amenity Impact:** The retaining wall and proposed fill would not adversely affect the adjoining property because it is located next to a side setback area which is not used as a habitable space. A portion of retaining wall that measures 0.9 metres in height would be visible from the alfresco area of the adjoining property, though it would primarily be obscured by the existing kitchen wall which would assist in reducing its visual impact.

### Environmentally Sustainable Design

Clause 5.11 of the Built Form Policy relating to environmentally sustainable design (ESD) sets out local housing objectives to be achieved and does not prescribe deemed-to-comply standards. The Built Form Policy ESD standards have not been approved by the WAPC and in the assessment of the application is given regard only. This means that it does not have the same weight as other policy provisions.

The applicant has submitted a Life Cycle Assessment in support of the application. This is provided as **Attachment 9**. The acceptable outcomes state that life cycle assessments are to demonstrate 50 percent global warming potential and net fresh water use savings against Perth statistical average residences. The applicant's Sustainable Design Strategy demonstrates that the proposal would result in more than a 50 percent reduction in both global warming potential and net freshwater use.

In addition, the below built form, construction and site planning measures have been incorporated into the proposed development to improve energy and water efficiency on site in accordance with the Local Housing Objectives of the Built Form Policy:

- Provision of a 'Shale Grey' Colorbond roof with a solar absorptance rating of 0.44;
- Most tap fittings and toilets with minimum 4-star WELS rated;
- Solar panels to the roof; and
- EV charging facilities are provided on the ground floor level.

**CITY OF VINCENT  
LOCAL PLANNING SCHEME NO. 2  
SCHEME MAP 1 - LEEDERVILLE**

**LEGEND**

**METROPOLITAN REGION SCHEME RESERVES**

*Note: The Western Australian Planning Commission acts on behalf of the Department of Planning and should be consulted for full information on the actual land requirements for all Metropolitan Region Scheme Reserves.*

- PARKS AND RECREATION**
- R Restricted Public Access
- PRIMARY REGIONAL ROADS RESERVATION**
- OTHER REGIONAL ROADS RESERVATION**
- RAILWAYS**
- PUBLIC PURPOSES**  
Particular use denoted as follows:
- H Hospital
- HS High School
- TS Technical School
- CP Car Park
- U University
- CG Commonwealth Government
- SU Special Use
- WSD Water Authority of Western Australia
- P Prison

**CITY OF VINCENT LOCAL SCHEME RESERVES**

- PUBLIC OPEN SPACE**
- R Restricted
- PUBLIC PURPOSES**  
Particular use denoted as follows:
- PS Primary School
- CP Car Park
- CU Civic Uses
- HS High School
- I Institute for the Deaf
- W Water Supply Sewerage and Drainage
- TS Technical School

**CITY OF VINCENT SCHEME ZONES**

- RESIDENTIAL**
- MIXED USE**
- COMMERCIAL**
- LOCAL CENTRE**
- DISTRICT CENTRE**
- REGIONAL CENTRE**
- SPECIAL USE**  
Particular use denoted as follows:
- CP Car Park
- CU Community Use
- FC Function Centre
- HC Hall and Non Residential Club
- H Hotel
- PW Place of Worship
- S Service Station

**ADDITIONAL USE**

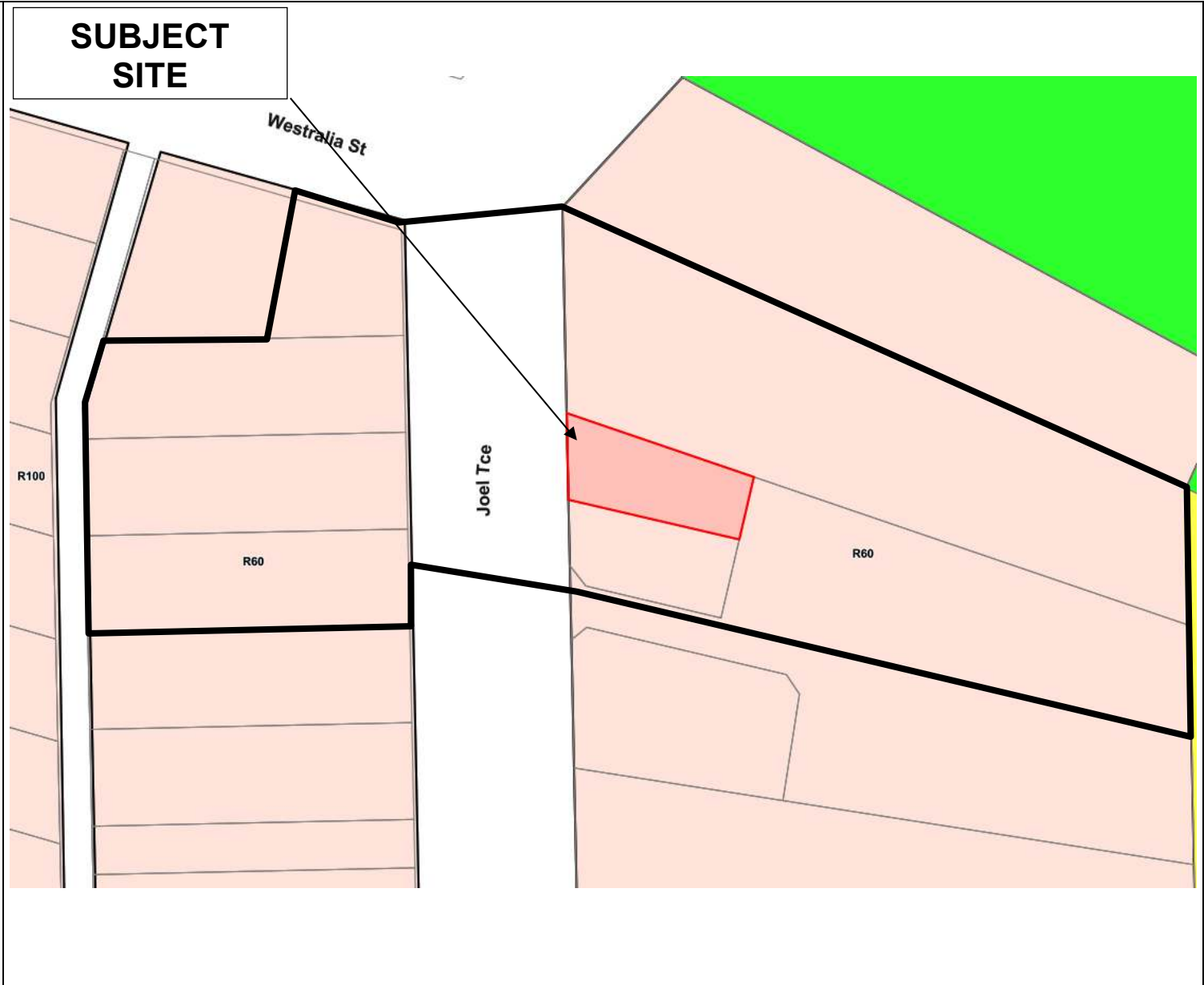
- ADDITIONAL USE**

**ADDITIONAL INFORMATION & RESIDENTIAL PLANNING CODES**

- CODE AREA BOUNDARY**
- SCHEME AREA BOUNDARY**
- DENSITY CODE**



CITY OF VINCENT



The City of Vincent does not warrant the accuracy of information in this publication and any person using or relying upon such information does so on the basis that the City of Vincent shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information. Includes layers based on information provided by and with the permission of the Western Australian Land Information Authority (Landgate) (2013).

Consultation and Location Map  
No. 46B Joel Terrace, East Perth

Extent of Consultation







**SUBJECT SITE**



CITY OF VINCENT

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No. 46B Joel Terrace, East Perth






CITY OF VINCENT  
RECEIVED  
29 September 2023



**PERSPECTIVE**  
(FOR ILLUSTRATIVE PURPOSES ONLY)

	LOCALITY: City of Vincent		REV:	BY:	DATE:	AMENDMENTS:	<b>PERSPECTIVE</b>		
	CLIENT NAME: <b>Mr P. &amp; Mrs M. Dalwood</b>		1	J.T.	29/03/23	PLANNING DRAWINGS	JOB No:	DATE:	DRAWN:
	ADDRESS: <b>LOT 1 (No.46b) Joel Terrace, East Perth</b>		2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
			3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:		REV:
			4	J.T.	21/08/23	PLANNING AMMENDMANTS	<b>A.01 OF 15</b>		<b>PL06</b>
			5	J.T.	20/09/23	PLANNING AMMENDMANTS			
		6	J.T.	28/09/23	PLANNING AMMENDMANTS				




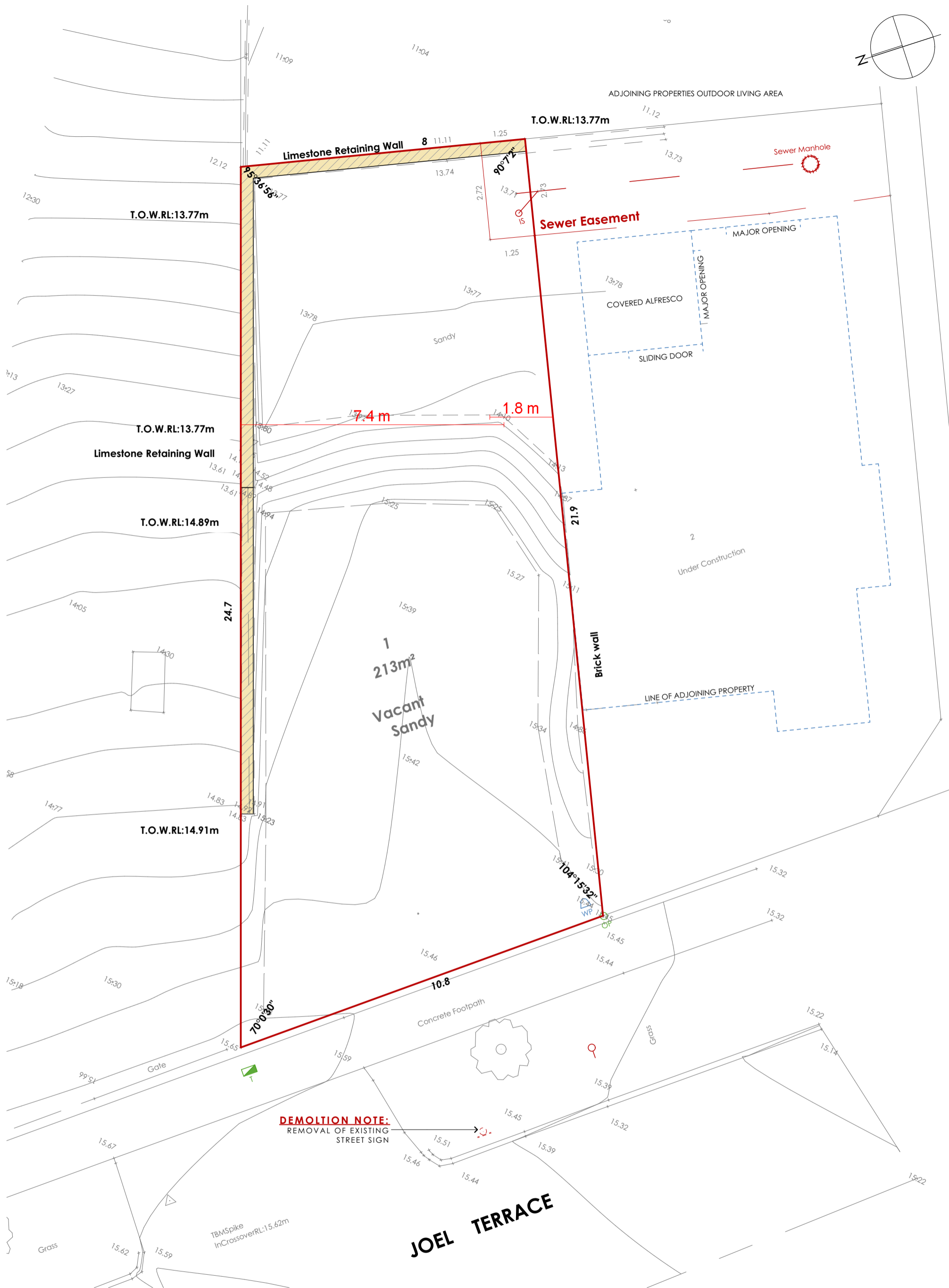


**STREETSCAPE PERSPECTIVE**  
(FOR ILLUSTRATIVE PURPOSES ONLY)




**STREETSCAPE PERSPECTIVE**  
(FOR ILLUSTRATIVE PURPOSES ONLY)

	LOCALITY: City of Vincent		REV:	BY:	DATE:	AMENDMENTS:	<b>STREETSCAPE PERSPECTIVES</b>		
	CLIENT NAME: <b>Mr P. &amp; Mrs M. Dalwood</b>		1	J.T.	29/03/23	PLANNING DRAWINGS			
	ADDRESS: <b>LOT 1 (No.46b) Joel Terrace, East Perth</b>		2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
			3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:		REV:
			4	J.T.	21/08/23	PLANNING AMMENDMANTS	<b>A.02 OF 15 PL06</b>		
			5	J.T.	20/09/23	PLANNING AMMENDMANTS			
		6	J.T.	28/09/23	PLANNING AMMENDMANTS				



**SITE - EXISTING PLAN**  
1:100

	LOCALITY: City of Vincent		REV:	BY:	DATE:	AMENDMENTS:	<b>EXISTING SITE PLAN</b>		
	CLIENT NAME: <b>Mr P. &amp; Mrs M. Dalwood</b>		1	J.T.	29/03/23	PLANNING DRAWINGS	JOB No:	DATE:	DRAWN:
	ADDRESS: <b>LOT 1 (No.46b) Joel Terrace, East Perth</b>		2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
			3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:	REV:	
			4	J.T.	21/08/23	PLANNING AMMENDMANTS	<b>A.03 OF 15</b>		
			5	J.T.	20/09/23	PLANNING AMMENDMANTS	<b>PL06</b>		
			6	J.T.	28/09/23	PLANNING AMMENDMANTS			

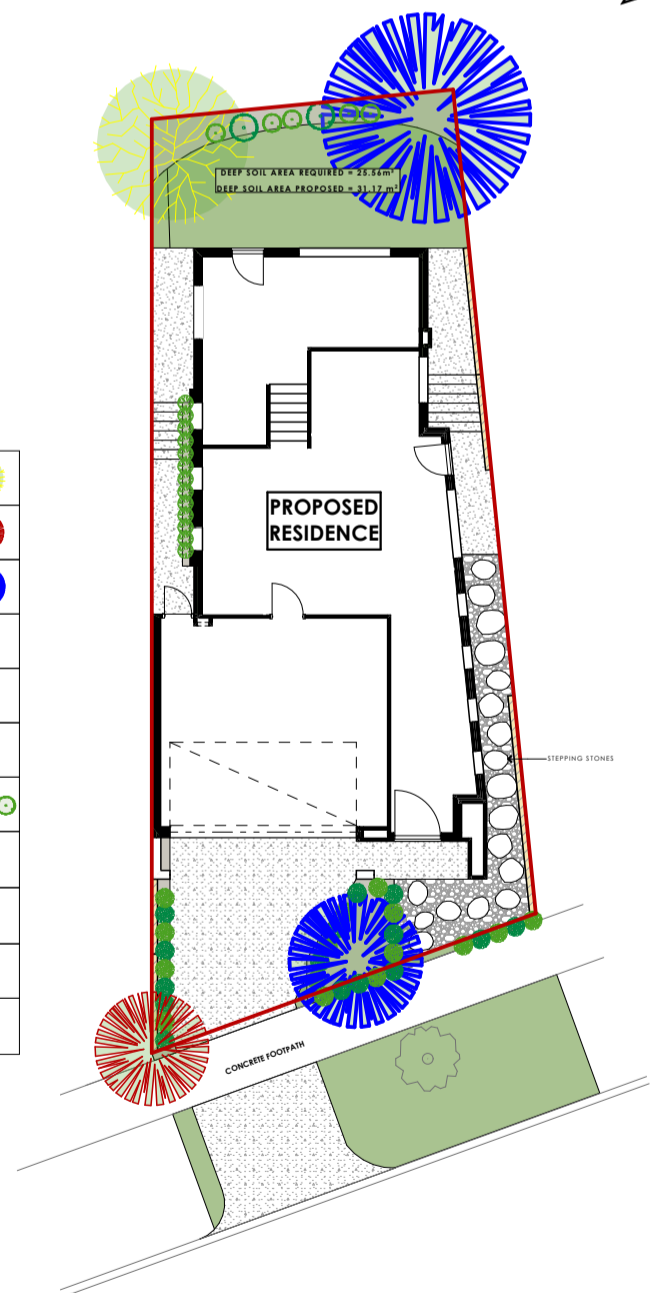




**SITE - PROPOSED PLAN**  
1:200

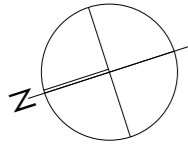
**LANDSCAPING LEGEND**

LEMON TREE (Citrus limon)	
NATIVE FRANGIPANI (Hymenosporum flavum)	
MAGNOLIA (Magnolia grandiflora)	
BACOPA (Sutera cordifolium)	
HERRLEAF ICEPLANT (Mesembryanthemum cordifolium)	
VIRGINIA CREEPER (Parthenocissus quinquefolia)	
HERB GARDEN (Cucumber, Parsley, Basil, Rosemary & Thyme)	
IRRIGATED GRASS AREA	
IRRIGATED MULCH AREA	
DECORATIVE STONES (PERMEABLE)	
EXPOSED AGGREGATE AREA	

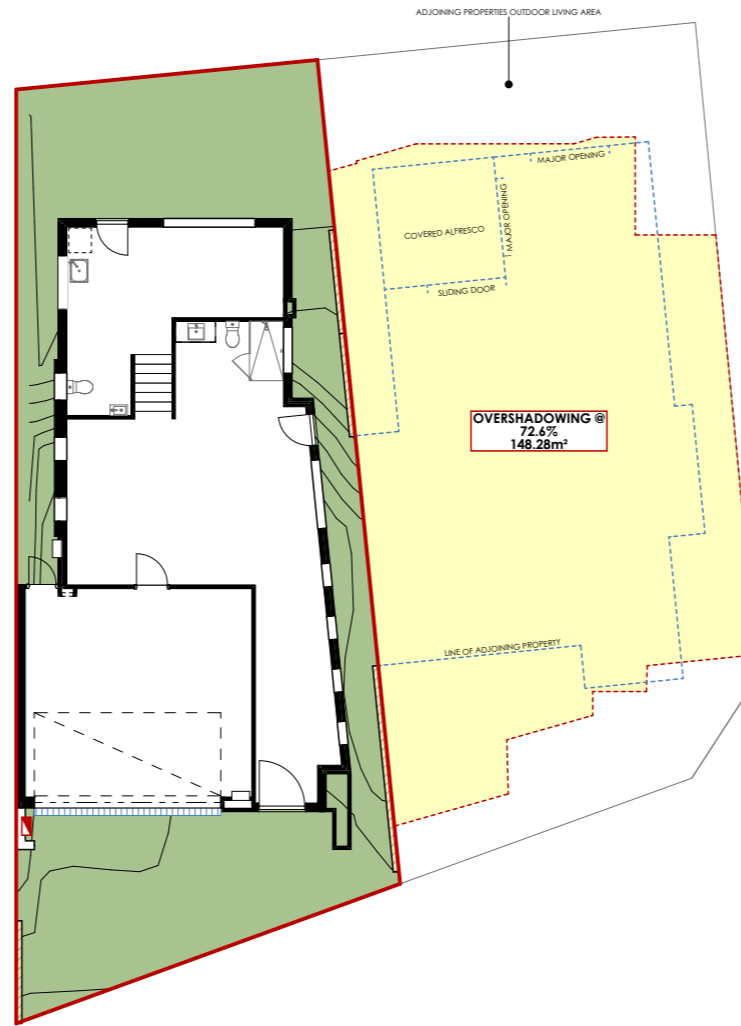


**SITE - LANDSCAPING PLAN**  
1:200

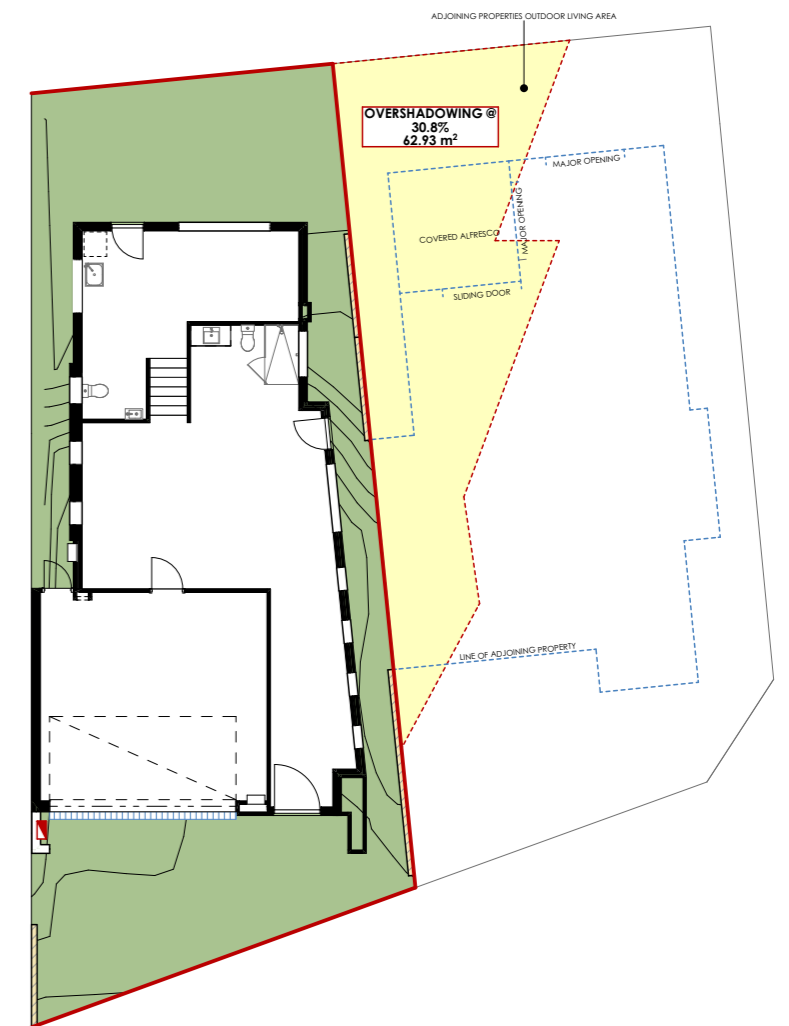
	LOCALITY: City of Vincent	REV:	BY:	DATE:	AMENDMENTS:	<b>SITE PLANS</b>		
	CLIENT NAME: <b>Mr P. &amp; Mrs M. Dalwood</b>	1	J.T.	29/03/23	PLANNING DRAWINGS			
	ADDRESS: <b>LOT 1 (No.46b) Joel Terrace, East Perth</b>	2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
		3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:		REV:
		4	J.T.	21/08/23	PLANNING AMMENDMANTS	<b>A.04 OF 15 PL06</b>		
		5	J.T.	20/09/23	PLANNING AMMENDMANTS			
	6	J.T.	28/09/23	PLANNING AMMENDMANTS				



WINTER SOLSTICE OVERSHADOWING - 9AM



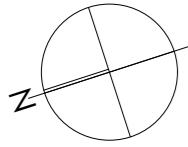
WINTER SOLSTICE OVERSHADOWING - 12PM



WINTER SOLSTICE OVERSHADOWING - 3PM

**SITE - OVERSHADOWING**  
1:200

	LOCALITY: City of Vincent			REV:	BY:	DATE:	AMENDMENTS:	<b>OVER SHADOWING DIAGRAMS (WINTER)</b>						
	CLIENT NAME:							1	J.T.	29/03/23	PLANNING DRAWINGS	JOB No:	DATE:	DRAWN:
	Mr P. & Mrs M. Dalwood							2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
	ADDRESS:							3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:		REV:
	LOT 1 (No.46b) Joel Terrace, East Perth							4	J.T.	21/08/23	PLANNING AMMENDMANTS	<b>A.05 OF 15 PL06</b>		
								5	J.T.	20/09/23	PLANNING AMMENDMANTS			
							6	J.T.	28/09/23	PLANNING AMMENDMANTS				



**SUMMER SOLSTICE OVERSHADOWING - 9AM**



**SUMMER SOLSTICE OVERSHADOWING - 12PM**

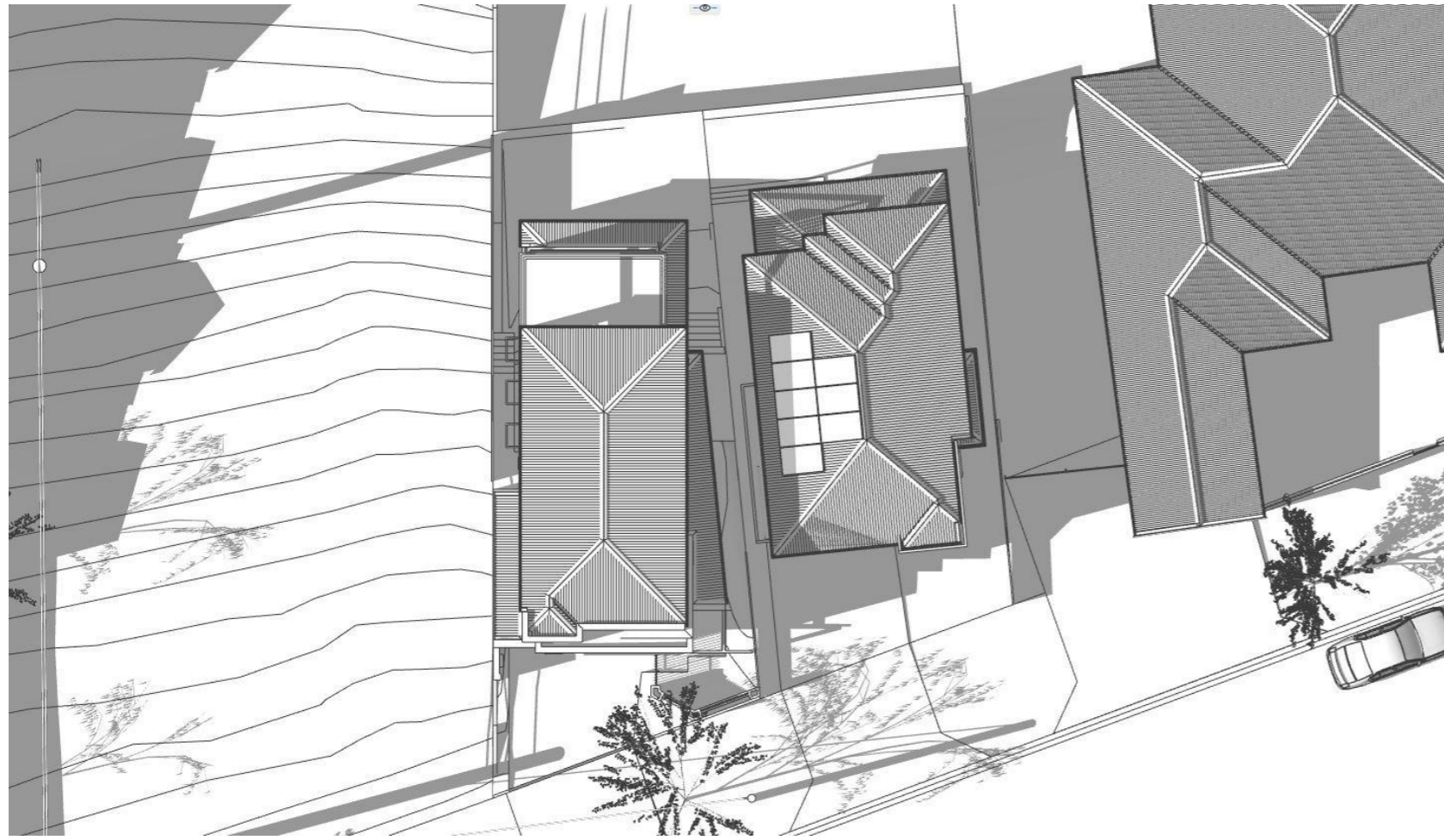
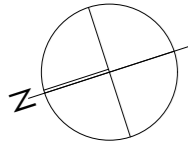


**SUMMER SOLSTICE OVERSHADOWING - 3PM**

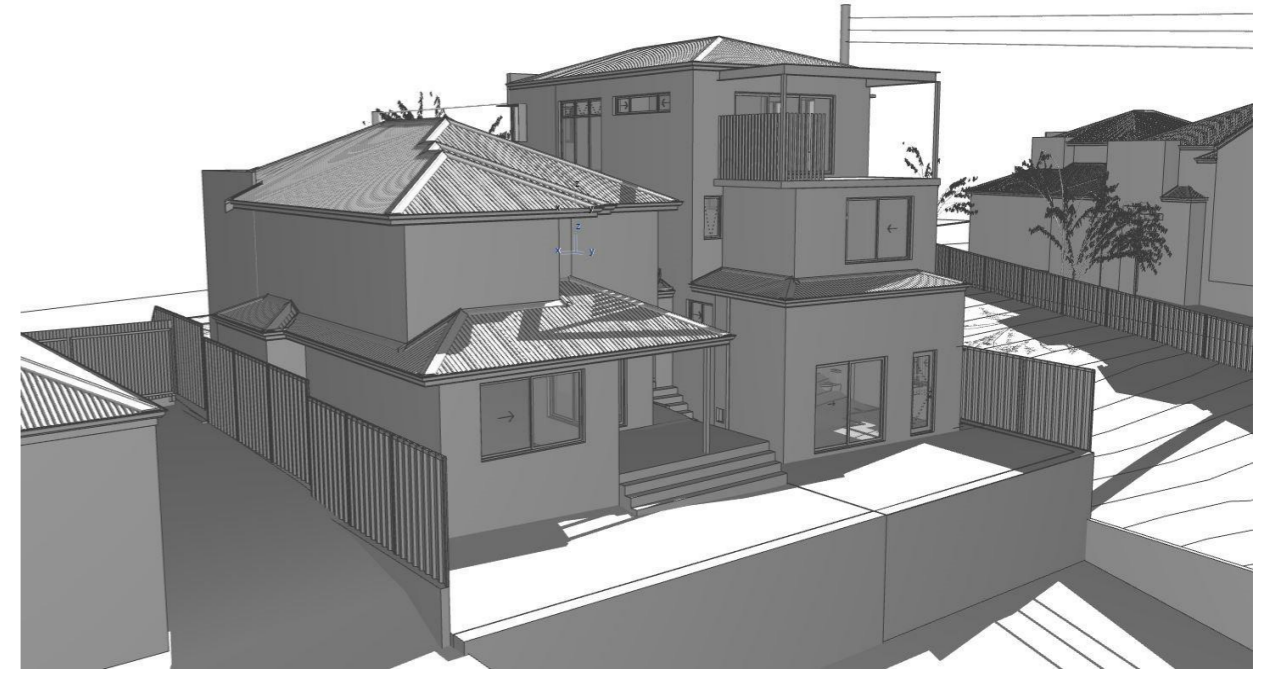
**SITE - OVERSHADOWING**  
1:200

	LOCALITY: City of Vincent			REV:	BY:	DATE:	AMENDMENTS:	<b>OVER SHADOWING DIAGRAMS (SUMMER)</b>						
	CLIENT NAME:							1	J.T.	29/03/23	PLANNING DRAWINGS	JOB No:	DATE:	DRAWN:
	Mr P. & Mrs M. Dalwood							2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
	ADDRESS:							3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:		REV:
	LOT 1 (No.46b) Joel Terrace, East Perth							4	J.T.	21/08/23	PLANNING AMMENDMANTS	<b>A.06 OF 15 PL06</b>		
								5	J.T.	20/09/23	PLANNING AMMENDMANTS			
							6	J.T.	28/09/23	PLANNING AMMENDMANTS				

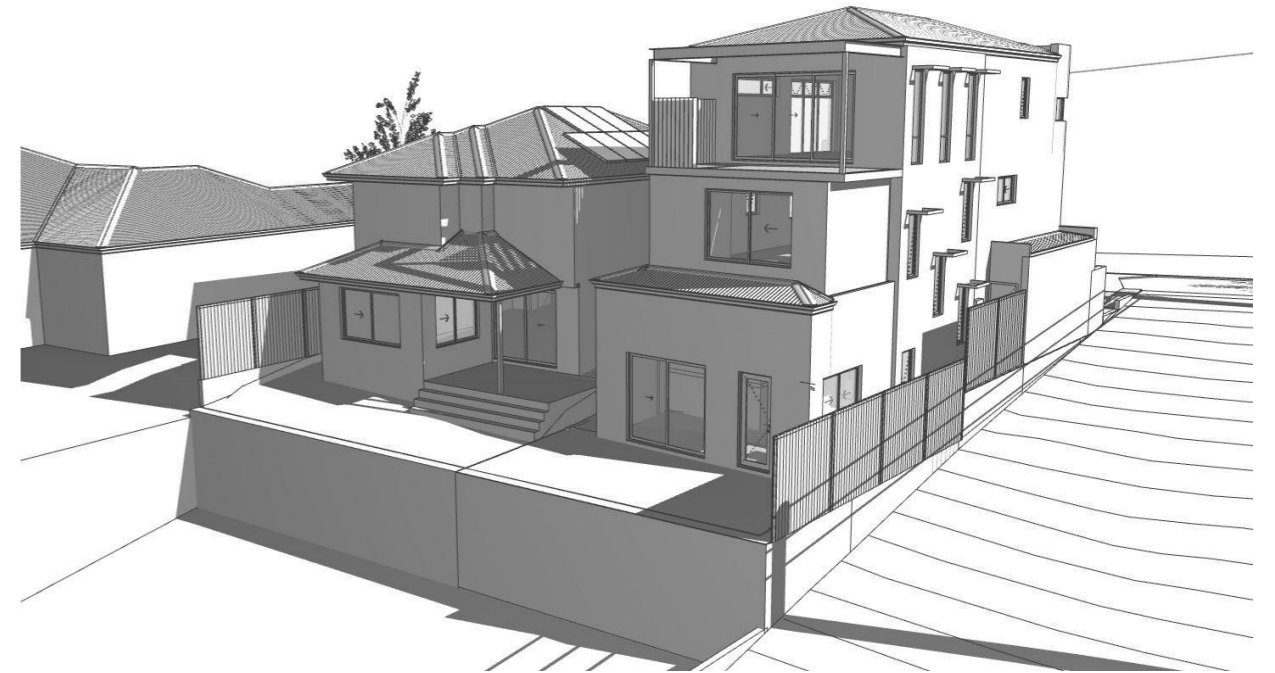





**OVERSHADOWING PERSPECTIVE 1  
WINTER SOLSTICE - 12PM**



**OVERSHADOWING PERSPECTIVE 2  
WINTER SOLSTICE - 12PM**

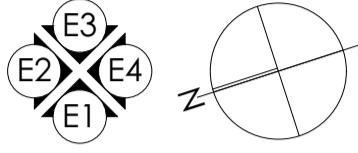


**OVERSHADOWING PERSPECTIVE 3  
WINTER SOLSTICE - 12PM**

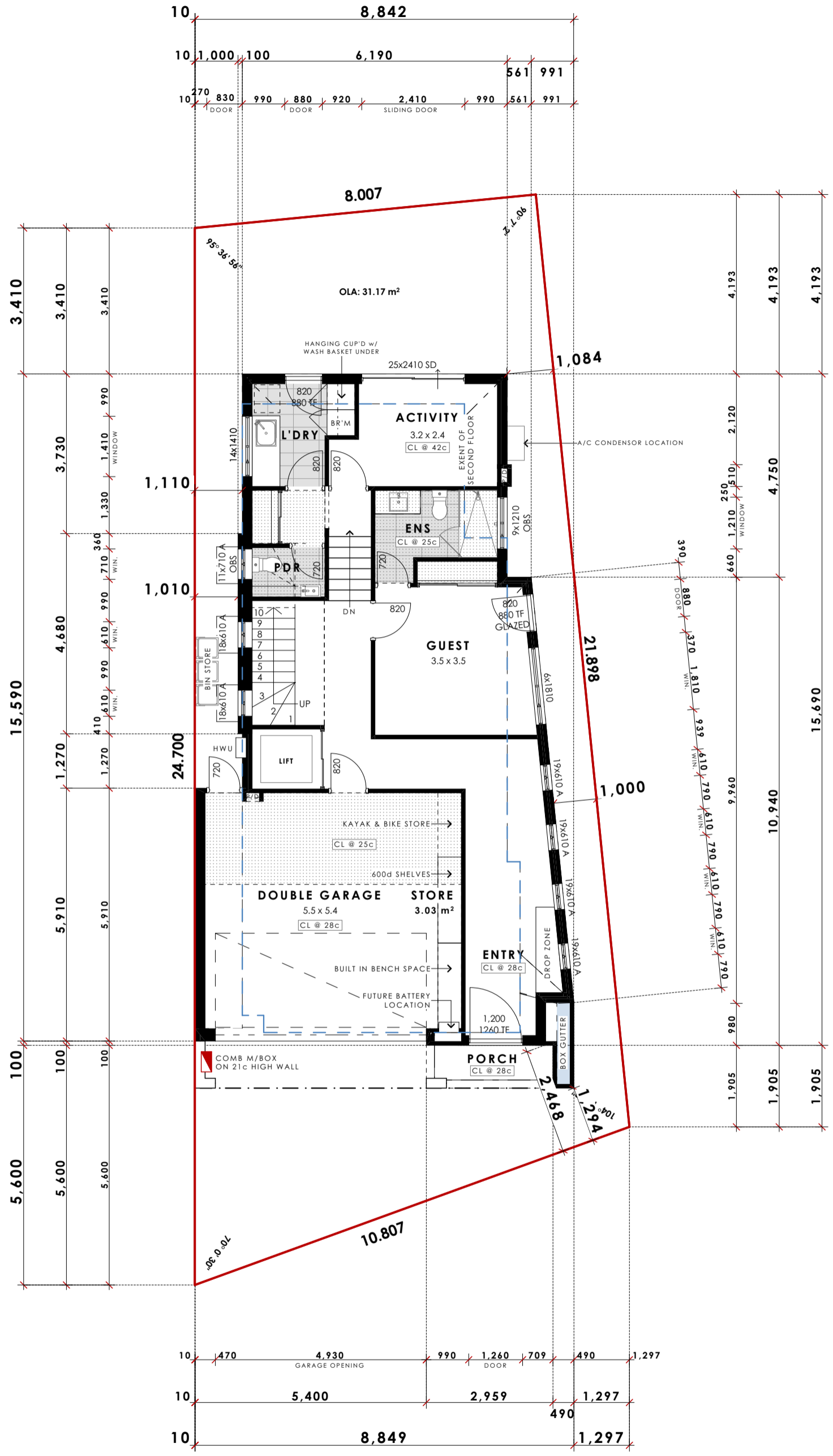
	LOCALITY: City of Vincent			REV:	BY:	DATE:	AMENDMENTS:	<b>OVER SHADOWING PERSPECTIVE</b>			
	CLIENT NAME: <b>Mr P. &amp; Mrs M. Dalwood</b>				1	J.T.	29/03/23				PLANNING DRAWINGS
	ADDRESS: <b>LOT 1 (No.46b) Joel Terrace, East Perth</b>				2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
					3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:		
					4	J.T.	21/08/23	PLANNING AMMENDMANTS	<b>A.07 OF 15</b> PL06		
					5	J.T.	20/09/23	PLANNING AMMENDMANTS			
				6	J.T.	28/09/23	PLANNING AMMENDMANTS	REV:			

**AREAS**

FIRST FLOOR	76.21m <sup>2</sup>
GARAGE	35.98m <sup>2</sup>
PORCH	2.79m <sup>2</sup>
<b>GROUND FLOOR TOTAL</b>	<b>114.97m<sup>2</sup></b>
<b>SECOND FLOOR TOTAL</b>	<b>88.91m<sup>2</sup></b>
THIRD FLOOR	70.66m <sup>2</sup>
BALCONY	14.76m <sup>2</sup>
<b>THIRD FLOOR TOTAL</b>	<b>85.42m<sup>2</sup></b>
<b>GRAND TOTAL</b>	<b>289.3m<sup>2</sup></b>
FIRST FLOOR PERIM.	47.61m
SECOND FLOOR PERIM.	42.56m
THIRD FLOOR PERIM.	35.70m



<b>LOCALITY</b>	City of Vincent
<b>Planning Required</b>	Yes
<b>OPEN SPACE (PART 5.1.4)</b>	
Zoning	R60
Site area	213m <sup>2</sup>
Site cover permitted	60% / 127.8m <sup>2</sup>
Site cover area	113.27m <sup>2</sup>
Site coverage	53.1%



**FIRST FLOOR PLAN**  
1:100

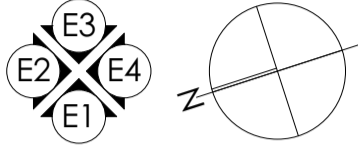
	LOCALITY: City of Vincent		REV:	BY:	DATE:	AMENDMENTS:	<b>FIRST FLOOR PLAN</b>		
	CLIENT NAME: <b>Mr P. &amp; Mrs M. Dalwood</b>		1	J.T.	29/03/23	PLANNING DRAWINGS			
	ADDRESS: <b>LOT 1 (No.46b) Joel Terrace, East Perth</b>		2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
			3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:	REV:	
			4	J.T.	21/08/23	PLANNING AMMENDMANTS	<b>A.08 OF 15</b> PL06		
			5	J.T.	20/09/23	PLANNING AMMENDMANTS			
			6	J.T.	28/09/23	PLANNING AMMENDMANTS			



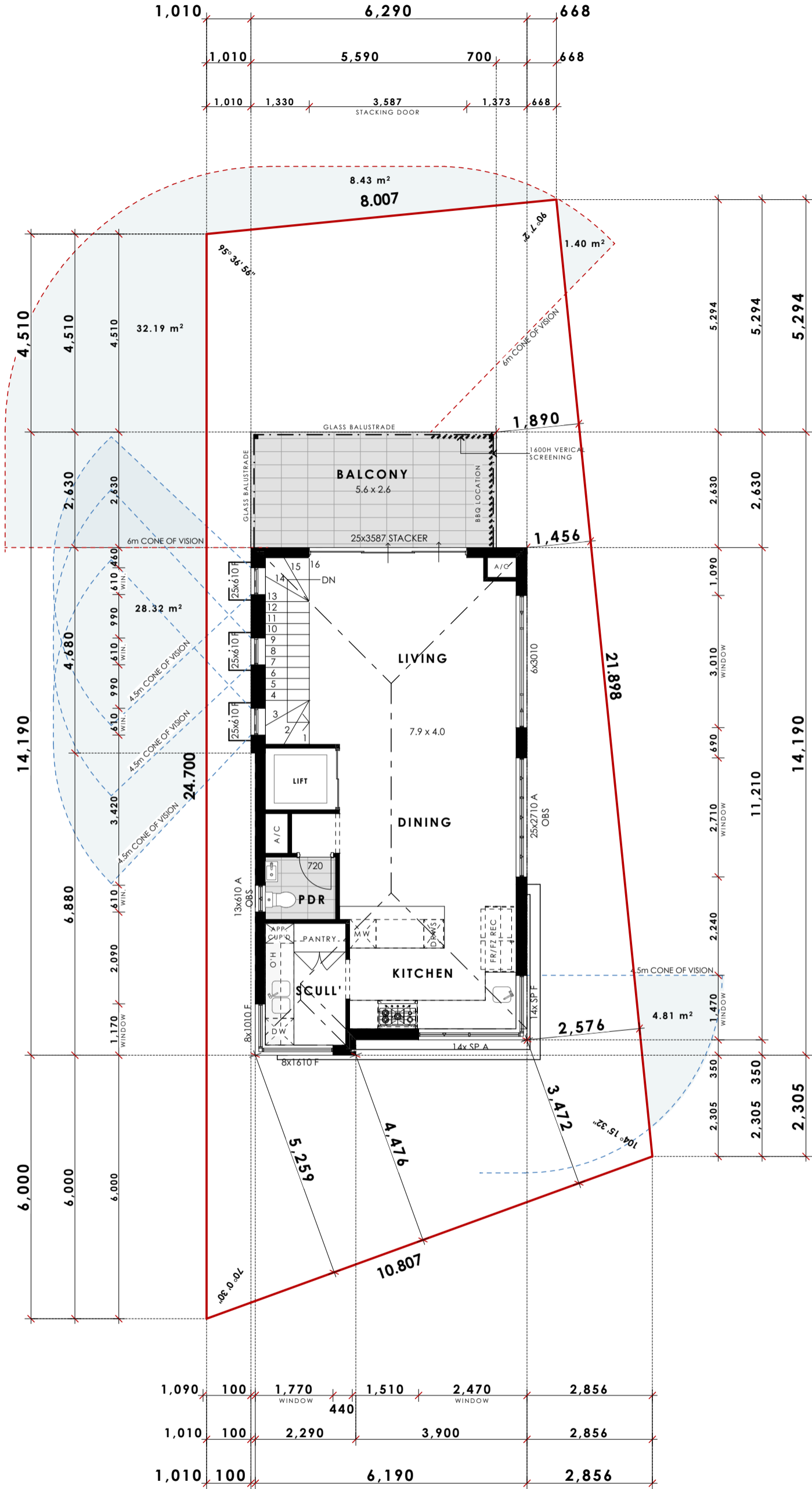


**AREAS**

FIRST FLOOR	76.21m <sup>2</sup>
GARAGE	35.98m <sup>2</sup>
PORCH	2.79m <sup>2</sup>
<b>GROUND FLOOR TOTAL</b>	<b>114.97m<sup>2</sup></b>
<b>SECOND FLOOR TOTAL</b>	<b>88.91m<sup>2</sup></b>
THIRD FLOOR	70.66m <sup>2</sup>
BALCONY	14.76m <sup>2</sup>
<b>THIRD FLOOR TOTAL</b>	<b>85.42m<sup>2</sup></b>
<b>GRAND TOTAL</b>	<b>289.3m<sup>2</sup></b>
FIRST FLOOR PERIM.	47.61m
SECOND FLOOR PERIM.	42.56m
THIRD FLOOR PERIM.	35.70m

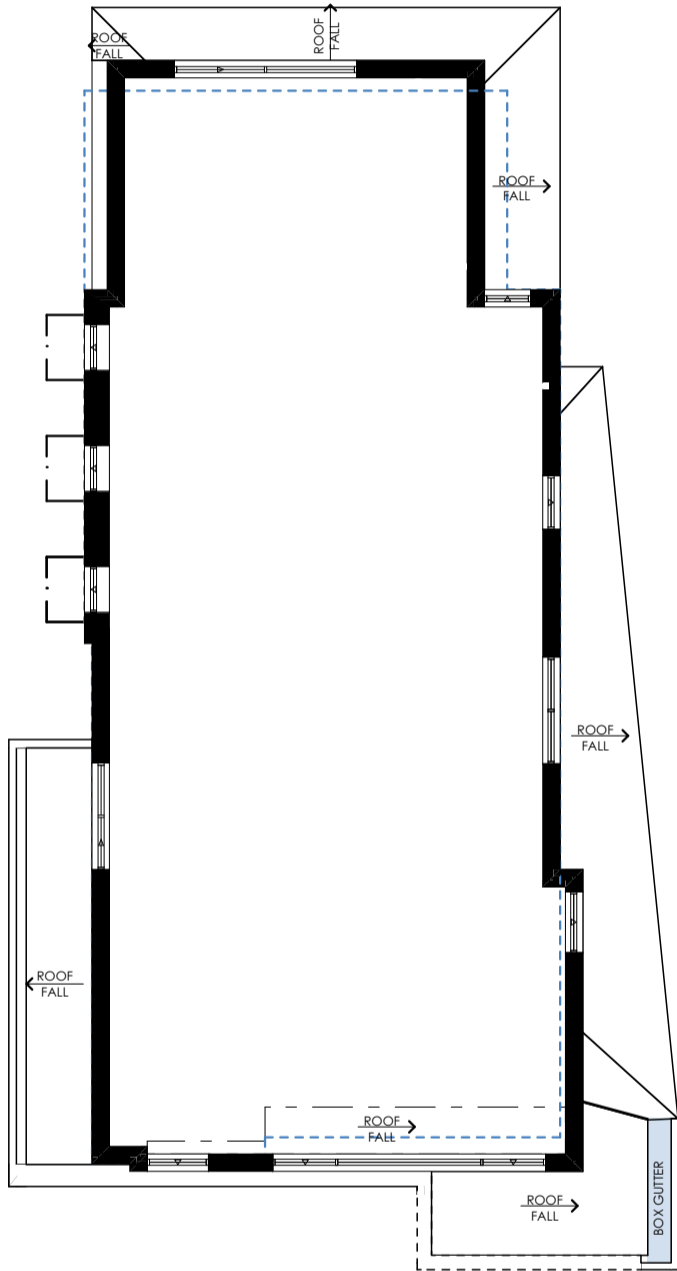


<b>LOCALITY</b>	City of Vincent
<b>Planning Required</b>	Yes
<b>OPEN SPACE (PART 5.1.4)</b>	
Zoning	R60
Site area	213m <sup>2</sup>
Site cover permitted	60% / 127.8m <sup>2</sup>
Site cover area	113.27m <sup>2</sup>
Site coverage	53.1%

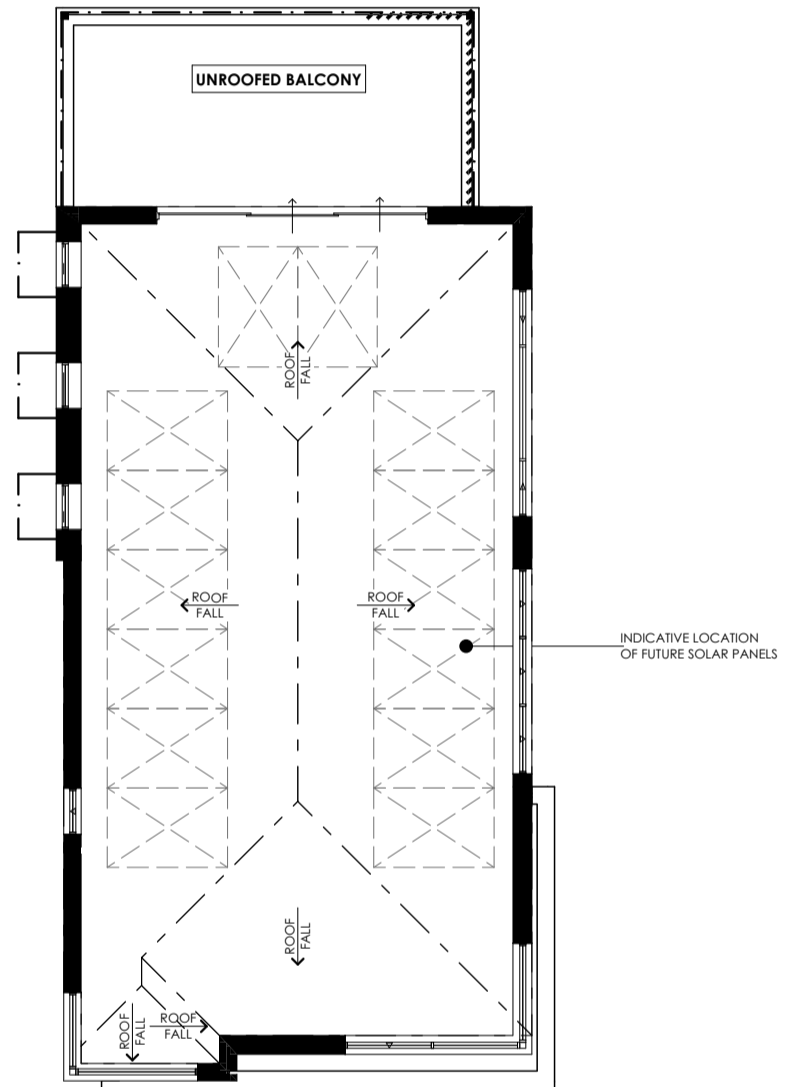


**THIRD FLOOR PLAN**  
1:100


	LOCALITY: City of Vincent		REV:	BY:	DATE:	AMENDMENTS:	<b>THIRD FLOOR PLAN</b>		
	CLIENT NAME: <b>Mr P. &amp; Mrs M. Dalwood</b>		1	J.T.	29/03/23	PLANNING DRAWINGS	JOB No:	DATE:	DRAWN:
	ADDRESS: <b>LOT 1 (No.46b) Joel Terrace, East Perth</b>		2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
			3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:	REV:	
			4	J.T.	21/08/23	PLANNING AMMENDMANTS	<b>A.10 OF 15</b>		
			5	J.T.	20/09/23	PLANNING AMMENDMANTS	<b>PL06</b>		
			6	J.T.	28/09/23	PLANNING AMMENDMANTS			







**SECOND FLOOR ROOF PLAN**  
1:100

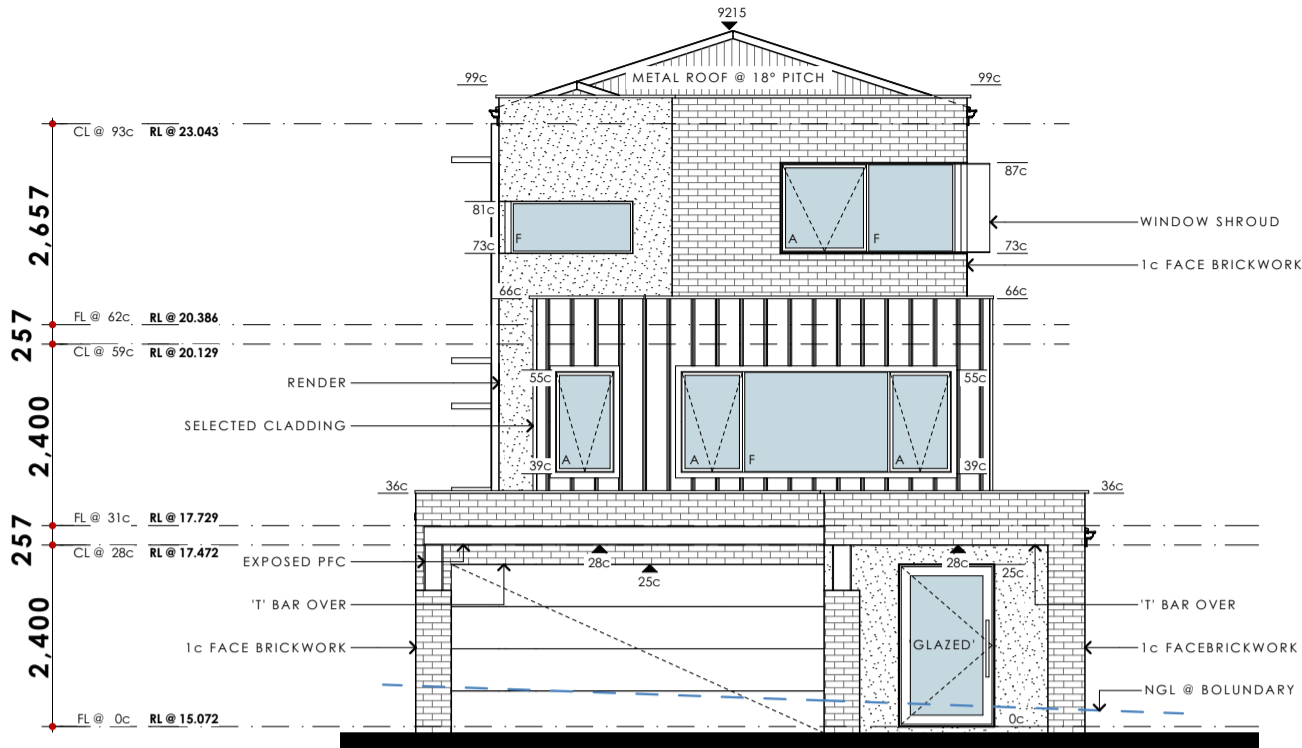


**THIRD FLOOR ROOF PLAN**  
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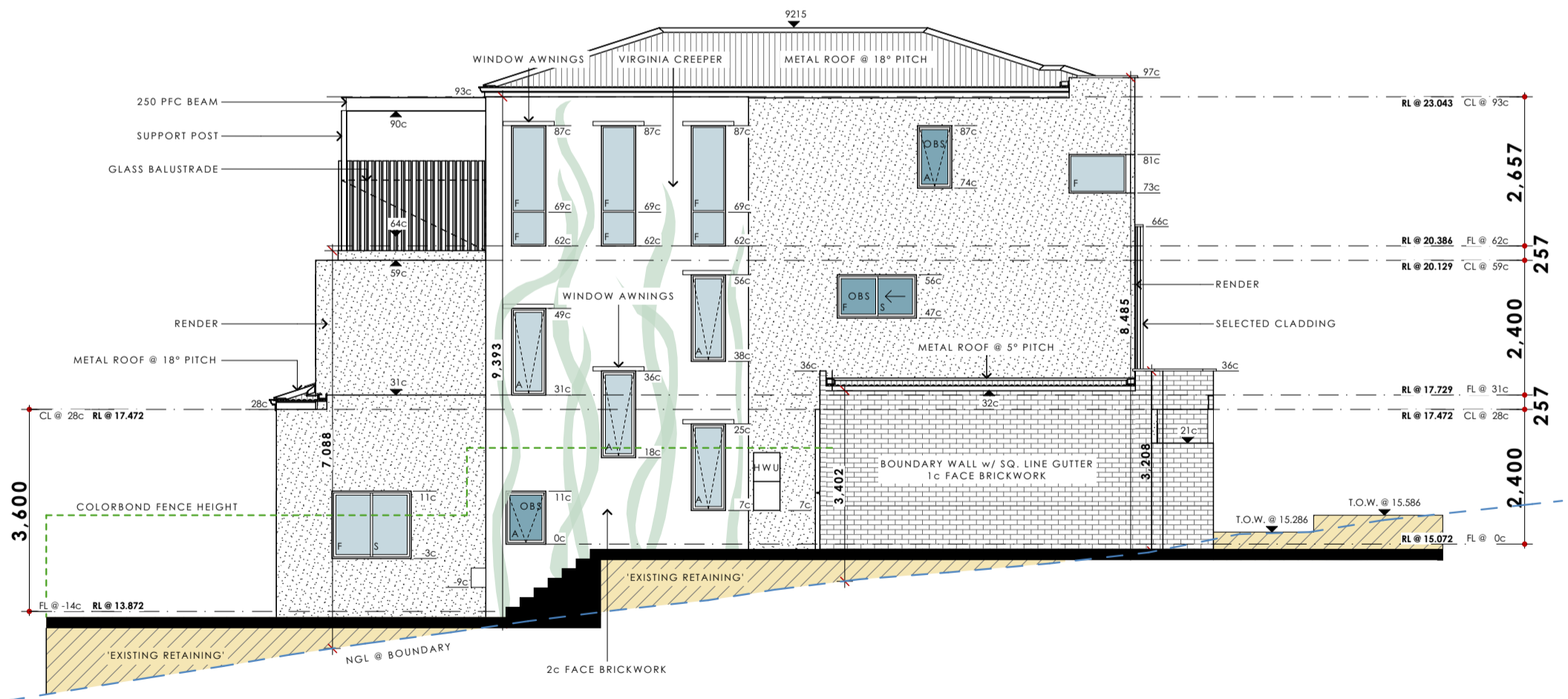
	LOCALITY: City of Vincent				REV:	BY:	DATE:	AMENDMENTS:	<b>ROOF PLANS</b>		
	CLIENT NAME: <b>Mr P. &amp; Mrs M. Dalwood</b>				1	J.T.	29/03/23	PLANNING DRAWINGS			
	ADDRESS: <b>LOT 1 (No.46b) Joel Terrace, East Perth</b>				2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
					3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:		REV:
					4	J.T.	21/08/23	PLANNING AMMENDMANTS	<b>A.11 OF 15</b>		<b>PL06</b>
					5	J.T.	20/09/23	PLANNING AMMENDMANTS			
				6	J.T.	28/09/23	PLANNING AMMENDMANTS				

COLOURS & MATERIALS LEGEND


TRIMDECK CLADDING	
RENDER (LEXICON HALF)	
RECYCLED 1c FACE BRICKWORK	
RED 2c FACE BRICKWORK	







**ELEVATION 1**  
1:100

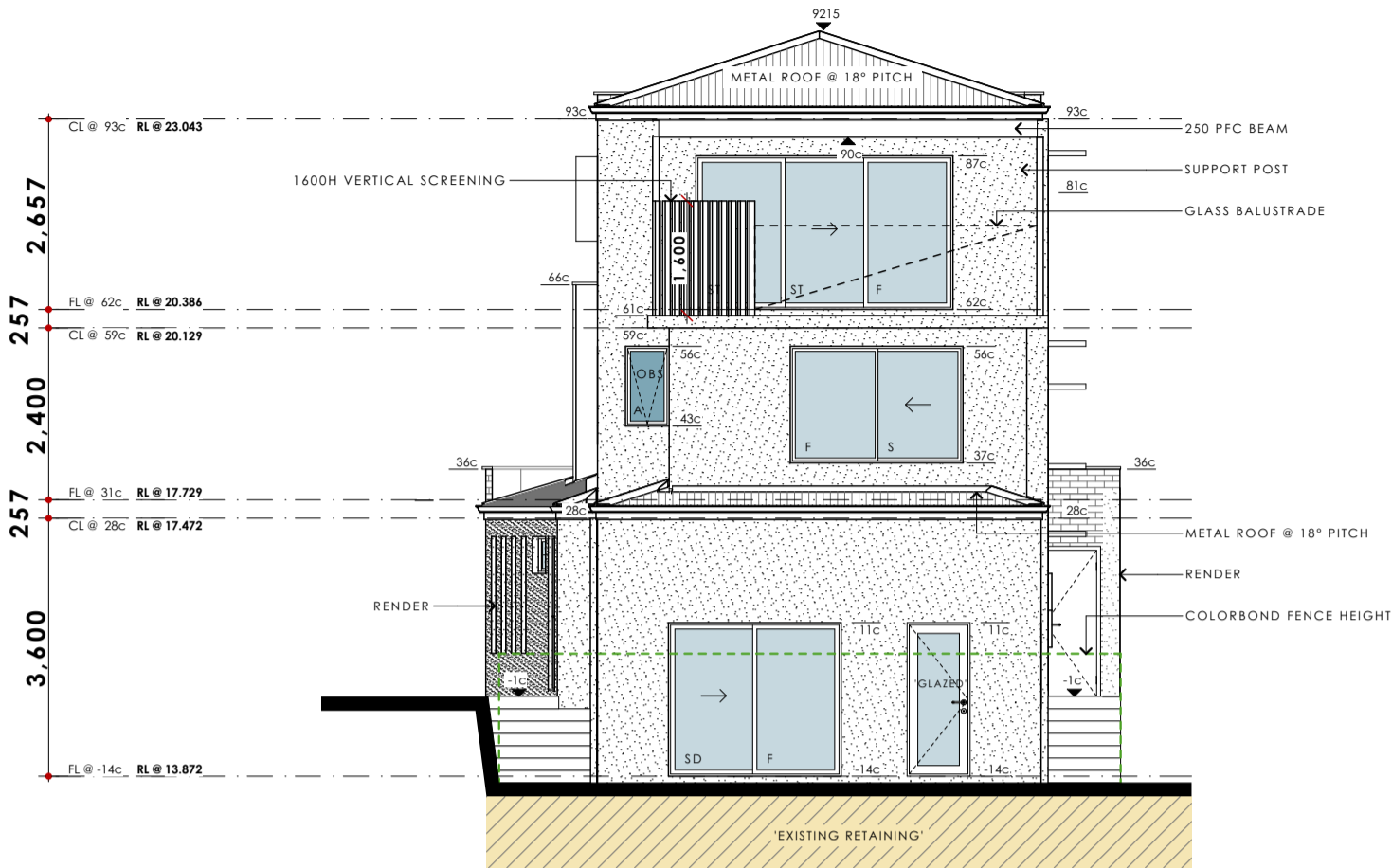


**ELEVATION 2**  
1:100

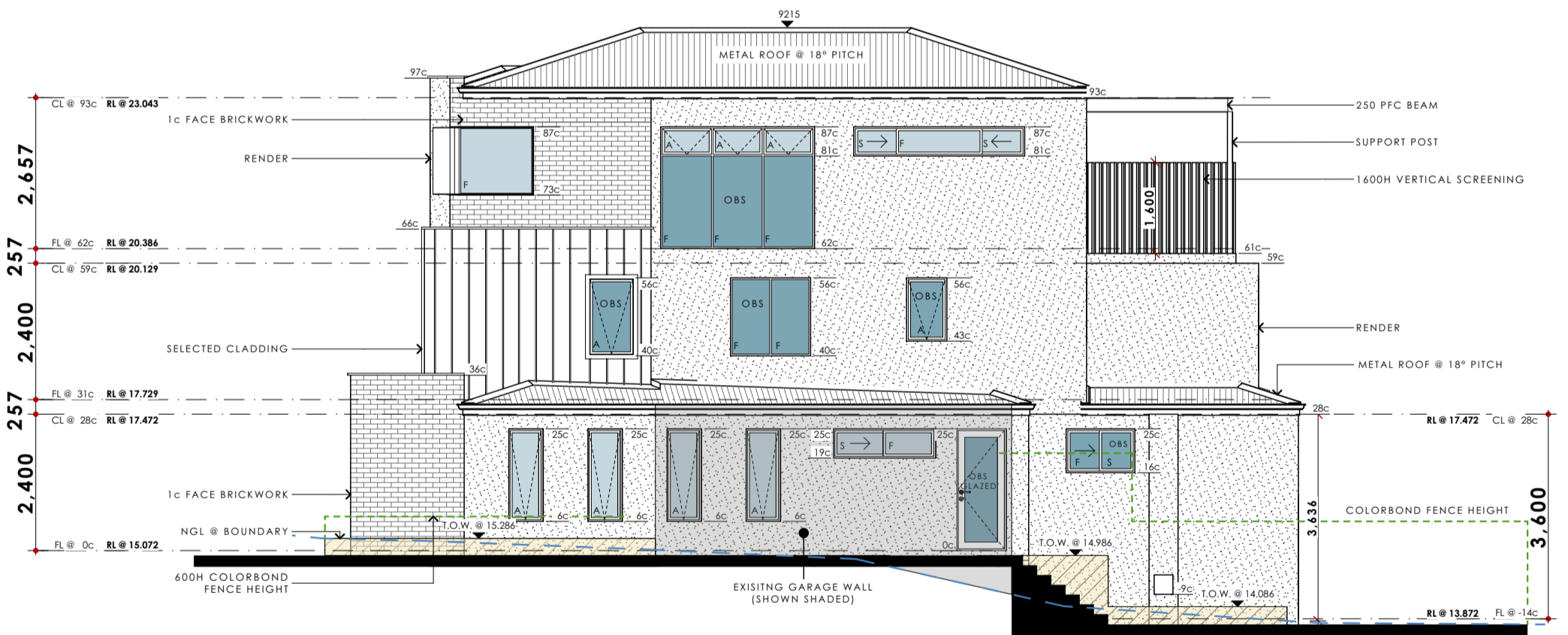
	LOCALITY: City of Vincent		REV:	BY:	DATE:	AMENDMENTS:	<b>ELEVATIONS 1</b>		
	CLIENT NAME: <b>Mr P. &amp; Mrs M. Dalwood</b>		1	J.T.	29/03/23	PLANNING DRAWINGS			
	ADDRESS: <b>LOT 1 (No.46b) Joel Terrace, East Perth</b>		2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
			3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:		REV:
			4	J.T.	21/08/23	PLANNING AMMENDMANTS	<b>A.12 OF 15</b>		
			5	J.T.	20/09/23	PLANNING AMMENDMANTS			
		6	J.T.	28/09/23	PLANNING AMMENDMANTS				

COLOURS & MATERIALS LEGEND


TRIMDECK CLADDING	
RENDER (LEXICON HALF)	
RECYCLED 1c FACE BRICKWORK	
RED 2c FACE BRICKWORK	







**ELEVATION 3**  
1:100

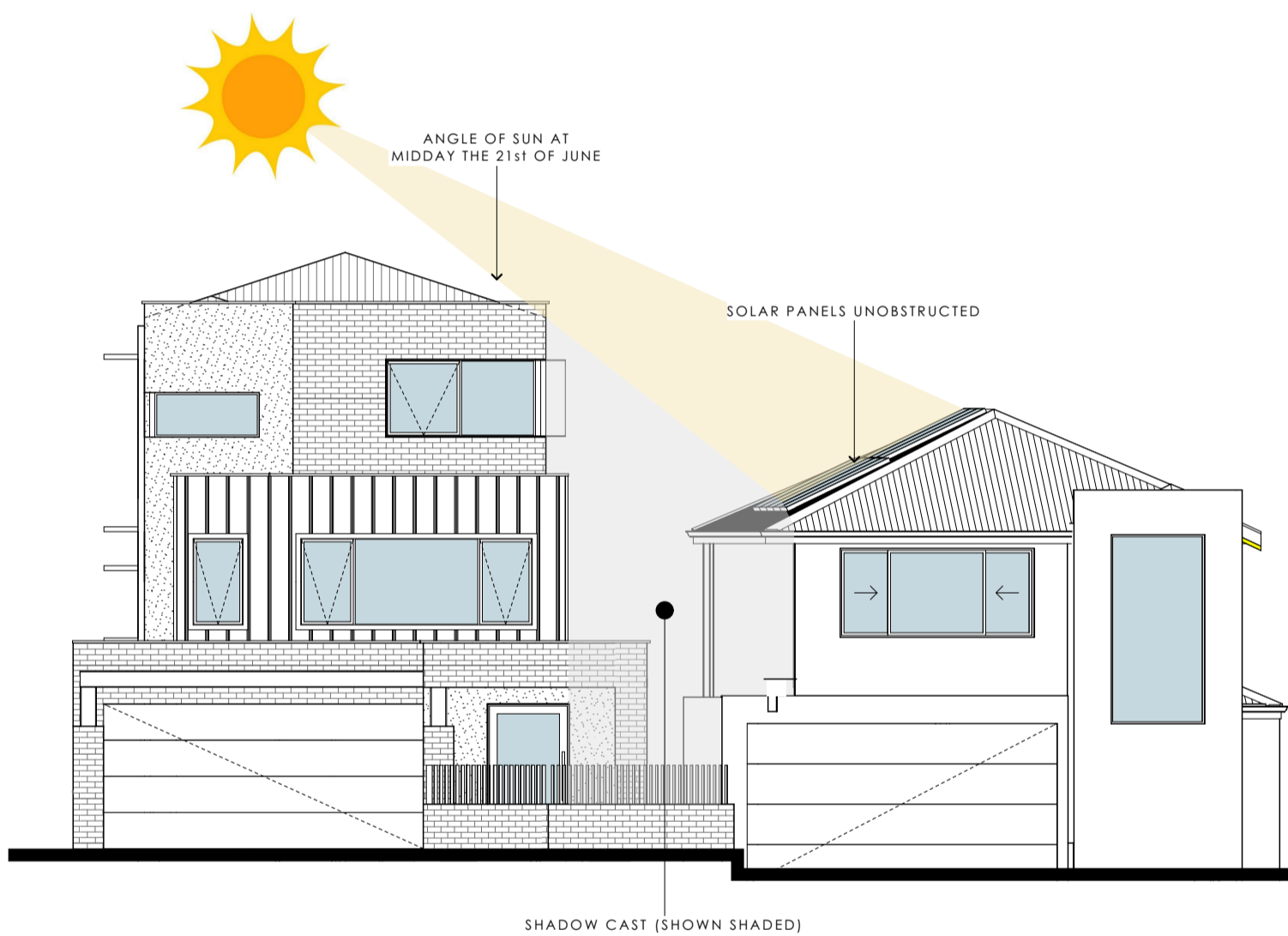


**ELEVATION 4**  
1:100


	LOCALITY: City of Vincent	REV:	BY:	DATE:	AMENDMENTS:	<b>ELEVATIONS 2</b>		
	CLIENT NAME: <b>Mr P. &amp; Mrs M. Dalwood</b>	1	J.T.	29/03/23	PLANNING DRAWINGS			
	ADDRESS: <b>LOT 1 (No.46b) Joel Terrace, East Perth</b>	2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
		3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:		REV:
		4	J.T.	21/08/23	PLANNING AMMENDMANTS	<b>A.13 OF 15</b>		
		5	J.T.	20/09/23	PLANNING AMMENDMANTS			
		6	J.T.	28/09/23	PLANNING AMMENDMANTS			

**COLOURS & MATERIALS LEGEND**

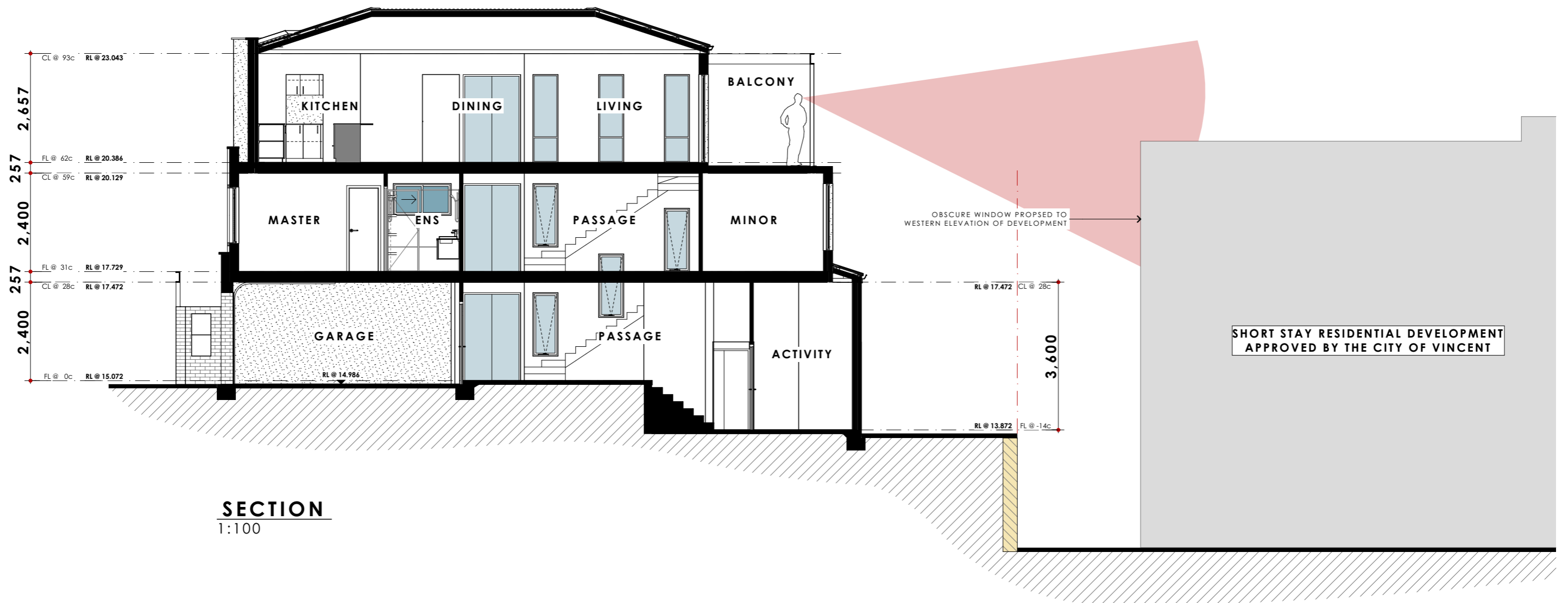
TRIMDECK CLADDING	
RENDER (LEXICON HALF)	
RECYCLED 1c FACE BRICKWORK	
RED 2c FACE BRICKWORK	



**OVERSHADOWING ELEVATION**  
1:100

	LOCALITY: City of Vincent	REV:	BY:	DATE:	AMENDMENTS:	<b>ELEVATIONS 3</b>		
	CLIENT NAME: <b>Mr P. &amp; Mrs M. Dalwood</b>	1	J.T.	29/03/23	PLANNING DRAWINGS	JOB No:	DATE:	DRAWN:
	ADDRESS: <b>LOT 1 (No.46b) Joel Terrace, East Perth</b>	2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
		3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:		REV:
		4	J.T.	21/08/23	PLANNING AMMENDMANTS			
		5	J.T.	20/09/23	PLANNING AMMENDMANTS			
	6	J.T.	28/09/23	PLANNING AMMENDMANTS				
						<b>A.14 OF 15</b>		<b>PL06</b>





**SECTION**  
1:100

	LOCALITY: City of Vincent		REV:	BY:	DATE:	AMENDMENTS:	<b>SECTION</b>		
	CLIENT NAME: <b>Mr P. &amp; Mrs M. Dalwood</b>		1	J.T.	29/03/23	PLANNING DRAWINGS	JOB No:	DATE:	DRAWN:
	ADDRESS: <b>LOT 1 (No.46b) Joel Terrace, East Perth</b>		2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
			3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:		REV:
			4	J.T.	21/08/23	PLANNING AMMENDMANTS	<b>A.15 OF 15</b>		<b>PL06</b>
			5	J.T.	20/09/23	PLANNING AMMENDMANTS			
			6	J.T.	28/09/23	PLANNING AMMENDMANTS			

## Summary of Submissions:

The tables below summarise the comments received during the advertising period of the proposal, together with the Administration's response to each comment.

Comments Received in Support:	Administration Comment:
<p><u>General Comments</u></p> <ul style="list-style-type: none"> <li>The majority of overshadowing falls to the roof of the adjoining property and shouldn't impact solar access.</li> <li>The setbacks, landscaping and tree canopies will not result in adverse impacts to the adjoining properties.</li> </ul>	<p>Noted.</p>
Comments Received in Objection:	Administration Comment:
<p><u>General Comments</u></p> <ul style="list-style-type: none"> <li>The development is too large for the site resulting in adverse impacts to the surrounding properties.</li> <li>The development proposes a number of R-Code and Built Form Policy departures which will set a negative precedence for future applications.</li> <li>The proponent should further refine the house design to adhere to the R-Codes and design principles detailed within the submission form.</li> </ul>	<ul style="list-style-type: none"> <li>Applications for development approval need to demonstrate that the proposal achieves the requirements of each design element of the R-Codes through either of the following pathways:             <ol style="list-style-type: none"> <li>Deemed-to-comply – Deemed-to-comply provisions provide a straightforward means for the development proposal to demonstrate compliance with the objectives and design principles of the R-Codes. They outline the expected minimum development standards that should be met.</li> <li>Design principle – The design principles pathway offers an alternative performance-based approach. This allows for innovative design responses that may be more context and site-responsive. The onus is on the proponent to demonstrate how they have met or exceeded the requirements of the relevant design principle when this pathway is pursued.                 <p style="margin-left: 40px;">This application includes a number of deemed-to-comply and design principle based elements which is consistent with the intent of the R-Codes.</p> </li> </ol> </li> <li>Throughout the course of the application process, the plans have been amended to reduce the building footprint. The application now proposes elements to reduce the impact of the double garage to the streetscape and has been reduced in size to reduce the overshadowing impacts to habitable spaces on the adjoining property.</li> </ul>



**Summary of Submissions:**

<b>Comments Received in Objection:</b>	<b>Administration Comment:</b>
	<ul style="list-style-type: none"><li>• The application includes rendered brickwork, face brick, large openings and varied roof forms across each façade, as well as on-structure landscaping along the northern wall which will be visible from the public realm. This provides visual articulation and would assist in breaking up the presentation of mass when viewed from the street and surrounding properties. These design elements would assist in mitigating adverse impacts to adjoining properties.</li><li>• The building form, scale and colours and materials of the development would ensure the proposal has been designed to tie into the established and emerging streetscape character, and consistent with objectives of the Residential zone under LPS2.</li><li>• It is open to the applicant to seek approval the proposed departures. The City is required to consider and determine the application as proposed by the applicant based on the planning framework that applies.</li></ul>

<b>General Comments Received:</b>	<b>Administration Comment:</b>
<p><u>General Comments</u></p> <p>The development will not pose an impact to the adjoining western power land.</p>	<p>Noted.</p>

Note: Submissions are considered and assessed by issue rather than by individual submitter.

## **Summary of Submissions:**

The tables below summarise the comments received during the advertising period of the proposal, together with the Applicant's response to each comment.

<b>Comments Received in Support:</b>	<b>Applicant Comment:</b>
<u>General Comments</u> <ul style="list-style-type: none"><li>• The majority of overshadowing falls to the roof of the adjoining property and shouldn't impact solar access</li><li>• The setbacks, landscaping and tree canopies will not result in adverse impacts to the adjoining properties.</li></ul>	<ul style="list-style-type: none"><li>• Noted</li></ul>

<b>Comments Received in Objection:</b>	<b>Applicant Comment:</b>
<u>General Comments</u> <ul style="list-style-type: none"><li>• The development is too large for the site resulting in adverse impacts to the surrounding properties</li><li>• The development proposes a number of RCode and Build Form Policy departures which will set a negative precedence for future applications.</li><li>• The proponent should further refine the house's design to adhere to the RCodes and design principles detailed within the submission form.</li></ul>	<ul style="list-style-type: none"><li>• We have carefully considered the comments received from submitters, the City and the DRP and have made significant changes accordingly. We have taken great care to strike a balance that does not compromise the integrity of the dwellings design. Our approach ensures that the proposed heights, setback, overshadow, etc respect the regulations while maintaining the architectural vision we seek to achieve.</li></ul>

<b>General Comments Received:</b>	<b>Applicant Comment</b>
<u>General Comments</u> <ul style="list-style-type: none"><li>• The development will not pose an impact to the adjoining western power land</li></ul>	<ul style="list-style-type: none"><li>• Noted</li></ul>

Note: Submissions are considered and assessed by issue rather than by individual submitter.



31/03/2023

City of Vincent

244 Vincent Street,

Leederville, 6007

ATTENTION: Aaron Hawkins & Nick Bertone in the Planning Department

**RE: Proposed Residence Development Application at LOT 1 #46B Joel Terrace, East Perth**

**Streetscape Analysis:**

Joel Terrace is a unique street within East Perth as it not only has residential buildings, but also commercial. To the northern end of Joel Terrace, it is solely residential buildings and to the south there is a combination of residential and commercial. Being closer to the southern end of Joel Terrace we have utilised materials that are present in commercial and residential developments. The use of render and face brickwork was used to keep the relationship with the existing residential houses as they are generally of federation style and these are the predominant materials used, also with the combined use of metal cladding, this is an ode to the surrounding commercial infrastructure.

The streetscape surrounding 46B Joel Terrace has undulating roads comprised of single, double, and triple story houses that tie into one another using similar materials and design principals. The style of homes that are built along the street scape vary, however, federation style seems to be the most common. With this being the case, federation style features follow through to majority of houses by using feature brickwork, render, fretwork to porch and verandas, ornamental posts, and gables. Majority of the homes along Joel Terrace are of single storey nature, however, with river views present to there is development that takes advantage of this by building to a height of up to three storeys. These 3 storey developments take advantage of the views to the Swan River by using front courtyard living, large windows to the front façade and balconies.

While commuting through Joel Terrace there are many different types of flora ranging from small, flowered plants such as agapanthus to tall gum trees that surround Banks Reserve and the Swan River. The utilisation of the verge has been done using grass or mulch; this allows people to manoeuvre off the footpaths/roads safely. Front fences are used to create a sense of privacy and are generally constructed of the same materials as the home. Coupled with the plantation of low ground cover or hedges this softens the appearance of the front fences and does not dominate the streetscape.

Joel Terrace has different forms of development ranging from untouched, renovated, and new homes. Throughout the street we can see very similar roof construction and materials, a variance in setbacks of homes and architectural features that transcend generations. The roof construction that is use is very similar throughout Joel Terrace and rarely strays away from the traditional hip and valley roof. We have kept to this and increased the height of the walls to the front façade which conceals the and provides for an attractive elevation. The older homes generally have a greater setback from the front boundary which promotes front yard living and large landscaping areas to the front, moreover, with newer homes developing much closer to the front boundary. With constraints in having quite a small lot we have found a happy medium which allows for a usable backyard while still maintain a setback the is coherent to the existing streetscape and allows for landscaping. Different design features have been used and this constitutes for a diverse streetscape. This has allowed us to take inspiration from the surrounding developments and implement them into our design. We have done so by utilising the materials present within the streetscape while also using a colour palette that stands out.

Kind Regards,

Julian Teles

Designer | Draftsperson

P | 0451 482 259

E | [julianteles@imperialdrafting.com](mailto:julianteles@imperialdrafting.com)





**KEY**

- Setback from street
- Setback forward of dwelling alignment
- Setback behind dwelling alignment

Access via laneway

Access via laneway

Access via laneway

Single carport

Uncovered parking bay

Single Garage & uncovered parking bay

Double carport

Uncovered parking bay

Access via common property

Vacant site

Subject site

Double Garage

Single Garage

Double Garage

Double Garage

7.5m

9.5m

7.5m

4.2m

1.0m

Nil

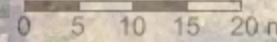
2.5m

1.5m

3.0m

6.5m

1.5m







**KEY**

- Orange circle: Upper Floor setback departure
- Blue circle: Balcony setback departure

Westralia St

Gardiner St

Joel Tce

Banks Reserve

0 5 10 15 20 m

Lot 152

Lot 151

174  
Lot 150

172  
Lot 149

160-162  
Lot 20

59  
Lot 175

67  
Lot 173

65  
Lot 174

Lot 170

74  
Lot 171

69  
Lot 172

Lot 176

55  
Lot 177

150  
Lot 97

148  
Lot 92

146  
Lot 93

144  
Lot 94

140  
Lot 95

144A  
Lot 94

4  
Strata Lot 3

53  
Strata Lot 1

51  
Lot 89

49  
Lot 88

47  
Lot 87

45A  
Strata Lot 2

45  
Strata Lot 1

41  
Lot 85

31  
Lot 84

31,33  
Strata Lots 1,2

29  
Lot 82

27

Strata Lot 1

2/58  
Strata Lot 2

3/58  
Strata Lot 3

4/58  
Strata Lot 4

5/58  
Strata Lot 5

56  
Lot 375

46B  
Lot 1

Lot 2

46C  
Lot 9000

42  
Lot 11

44  
Lot 12

38  
Lot 578

36  
Strata Lot 1

34  
Strata Lot 2

30  
Lot 1000

32  
Strata Lot 3



## Joel Terrace Streetscape Review

### 46A Joel Terrace

**Garage setback:** 4.2m

**Garage position:** 1.0m  
behind dwelling  
alignment

**Upper floor position:** In  
line with ground floor



**38 Joel Terrace**

**Garage setback:** 1.5m

**Garage position:** 3.0m  
forward of dwelling  
alignment





**30 Joel Terrace**

**Garage setback:** 1.5m  
(parallel to street)

**Garage position:** 6.5m  
forward of dwelling  
alignment





**42 Joel Terrace**

**Garage setback:** Nil

**Garage position:** 2.5  
forward of dwelling  
alignment



**41 Joel Terrace**

**Garage setback: 9.5**

**Garage position: 3.5  
behind dwelling  
alignment**





**45 Joel Terrace**

**Upper floor position:**

In line with ground floor

**Balcony position:** 1m

forward of ground floor



**53 Joel Terrace**

**Upper floor position:**  
Second floor in line with  
ground floor

**Balcony position:** 1m  
forward of ground floor





**58 Joel Terrace**

**Upper floor position:** 1.5m  
behind the ground floor

**Balcony position:** 0.5m  
forward of ground floor



**65 Joel Terrace**

**Upper floor position:** In line with the ground floor

**Balcony position:** In line with the ground floor





**71 Joel Terrace**

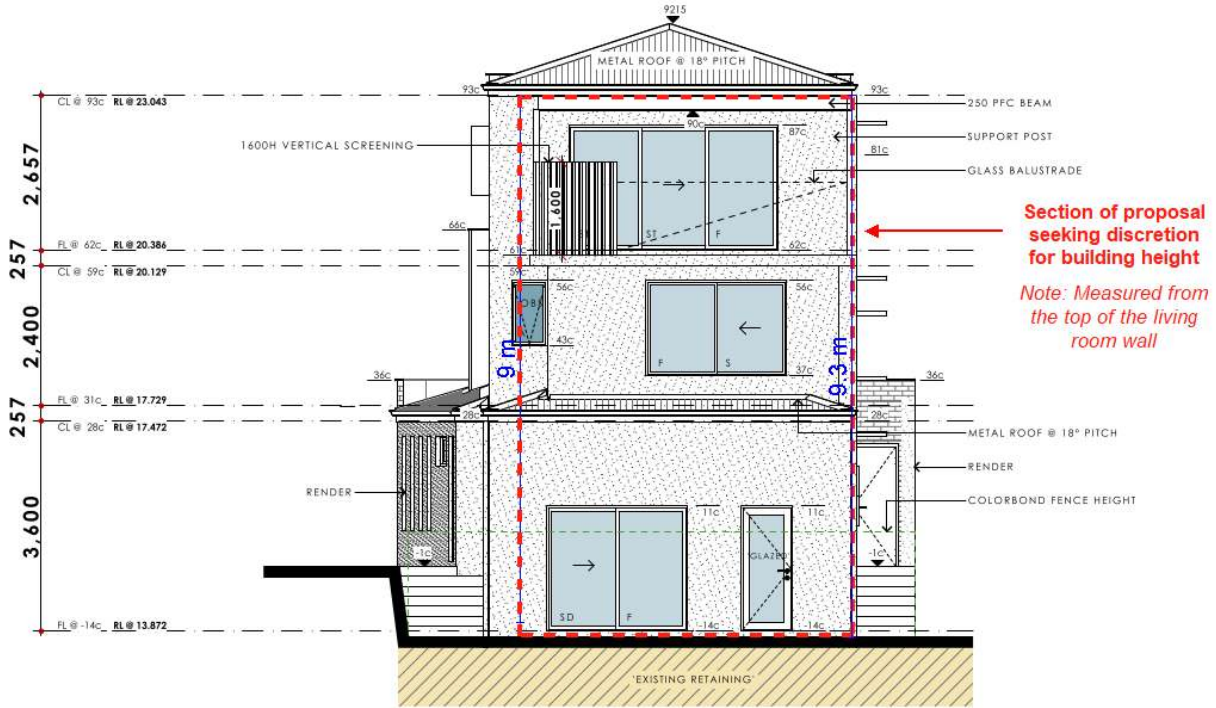
**Upper floor position:** In line with the ground floor

**Balcony position:** 1.1m forward of the ground floor

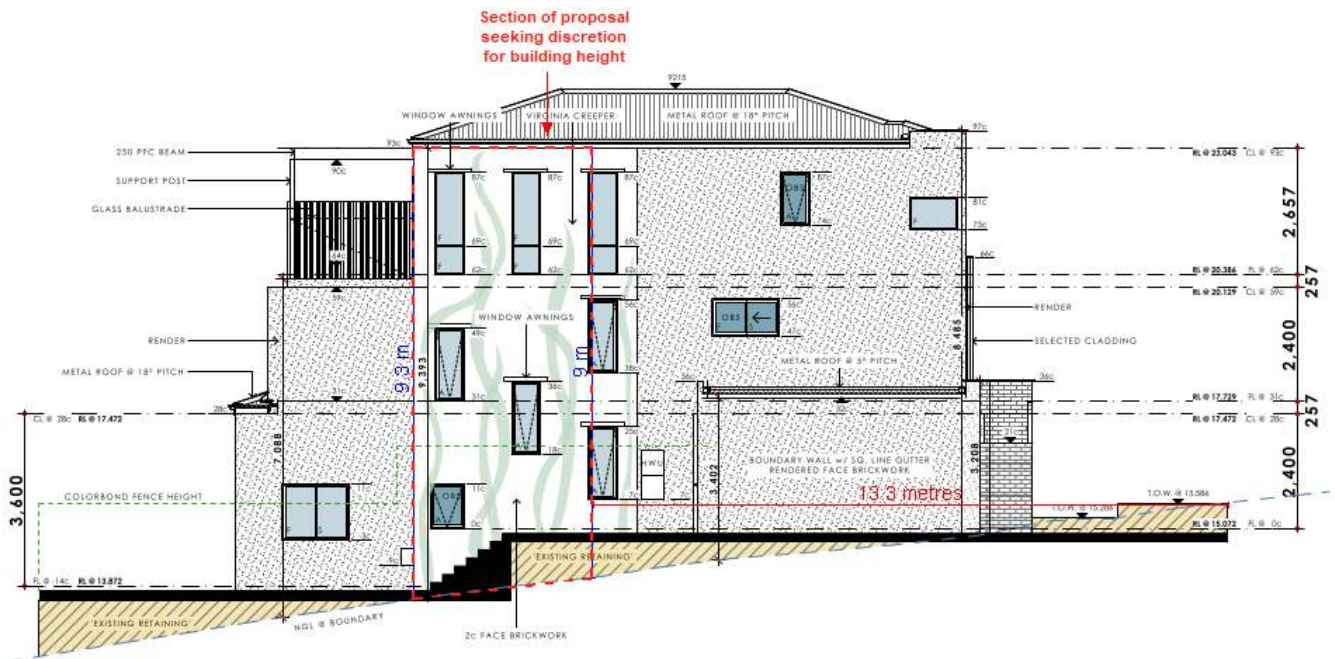




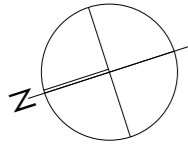
# EXTENT OF HEIGHT DEPARTURE



**ELEVATION 3**



**ELEVATION 2**

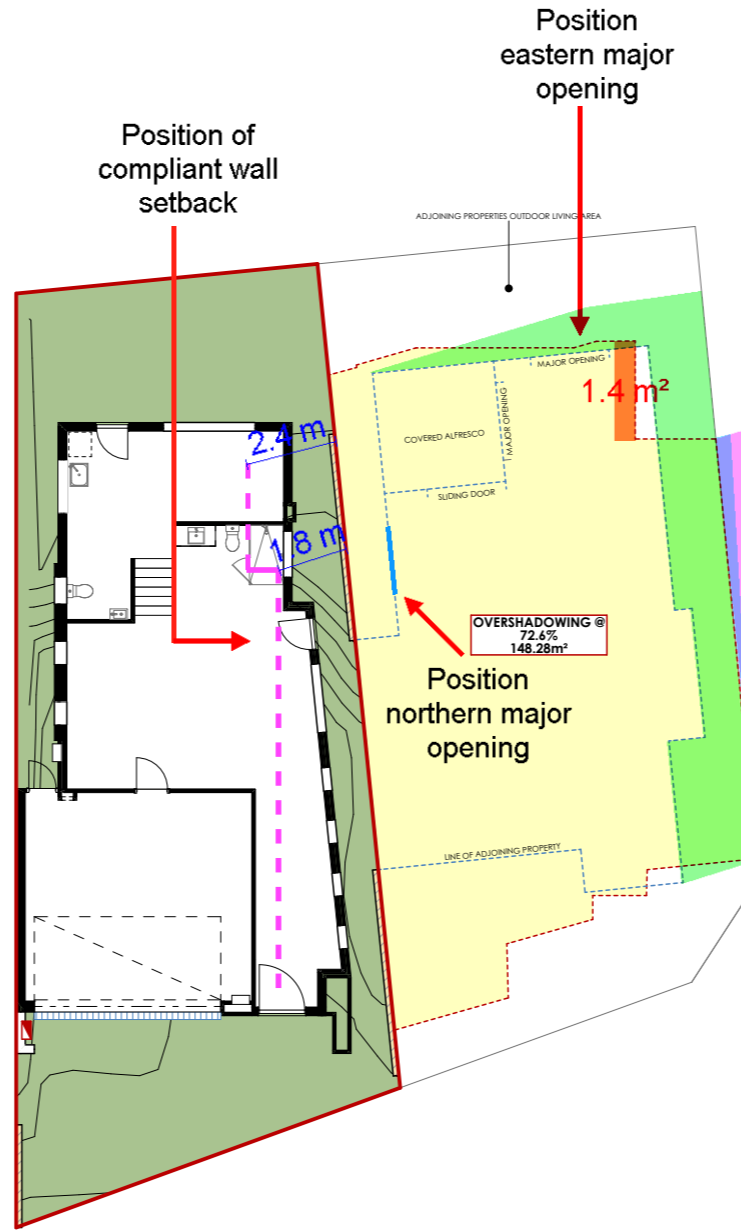


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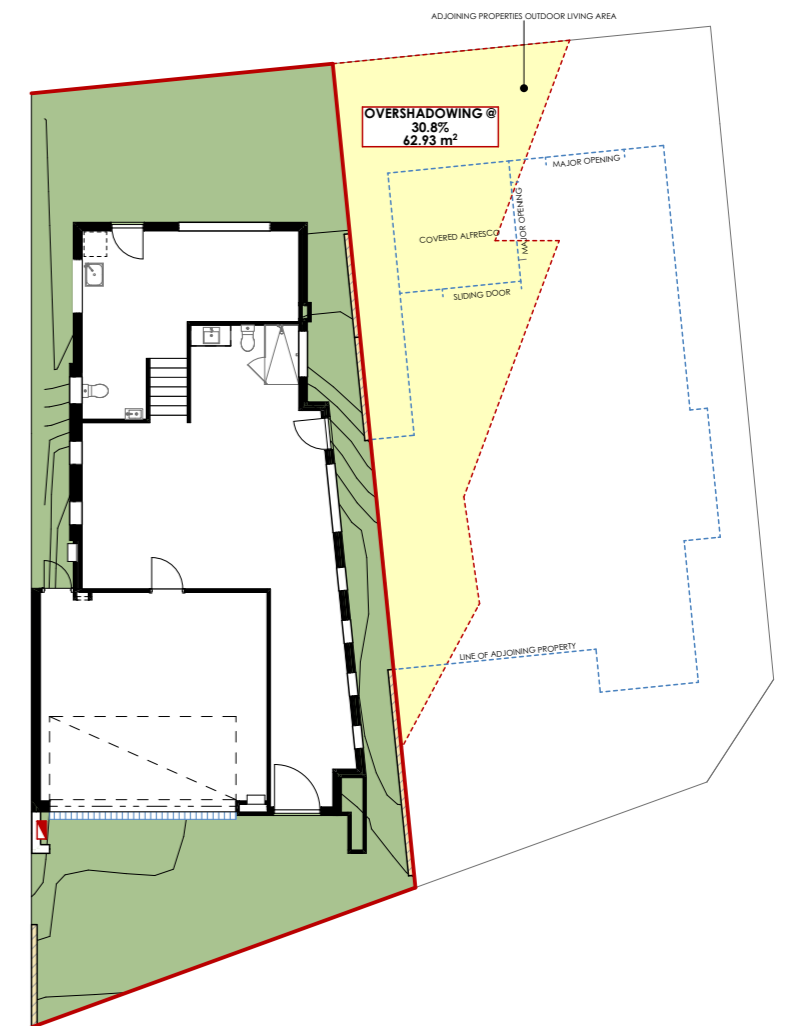
- Extent of overshadowing created from the adjoining single house
- Extent of overshadow into 44 Joel Terrace
- Extent of overshadow into 44 Joel Terrace (compliant height/ setbacks)
- Reduced overshadow area if compliant height/ setbacks



**WINTER SOLSTICE OVERSHADOWING - 9AM**



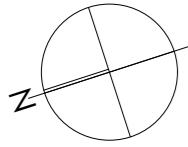
**WINTER SOLSTICE OVERSHADOWING - 12PM**



**WINTER SOLSTICE OVERSHADOWING - 3PM**

**SITE - OVERSHADOWING**  
1:200

	LOCALITY: City of Vincent			REV:	BY:	DATE:	AMENDMENTS:	<b>OVER SHADOWING DIAGRAMS (WINTER)</b>						
	CLIENT NAME: <b>Mr P. &amp; Mrs M. Dalwood</b>							1	J.T.	29/03/23	PLANNING DRAWINGS	JOB No:	DATE:	DRAWN:
	ADDRESS: <b>LOT 1 (No.46b) Joel Terrace, East Perth</b>							2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
								3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:	REV:	
								4	J.T.	21/08/23	PLANNING AMMENDMANTS	<b>A.05 OF 15</b>		
								5	J.T.	20/09/23	PLANNING AMMENDMANTS	<b>PL06</b>		
							6	J.T.	28/09/23	PLANNING AMMENDMANTS				



**SUMMER SOLSTICE OVERSHADOWING - 9AM**



**SUMMER SOLSTICE OVERSHADOWING - 12PM**

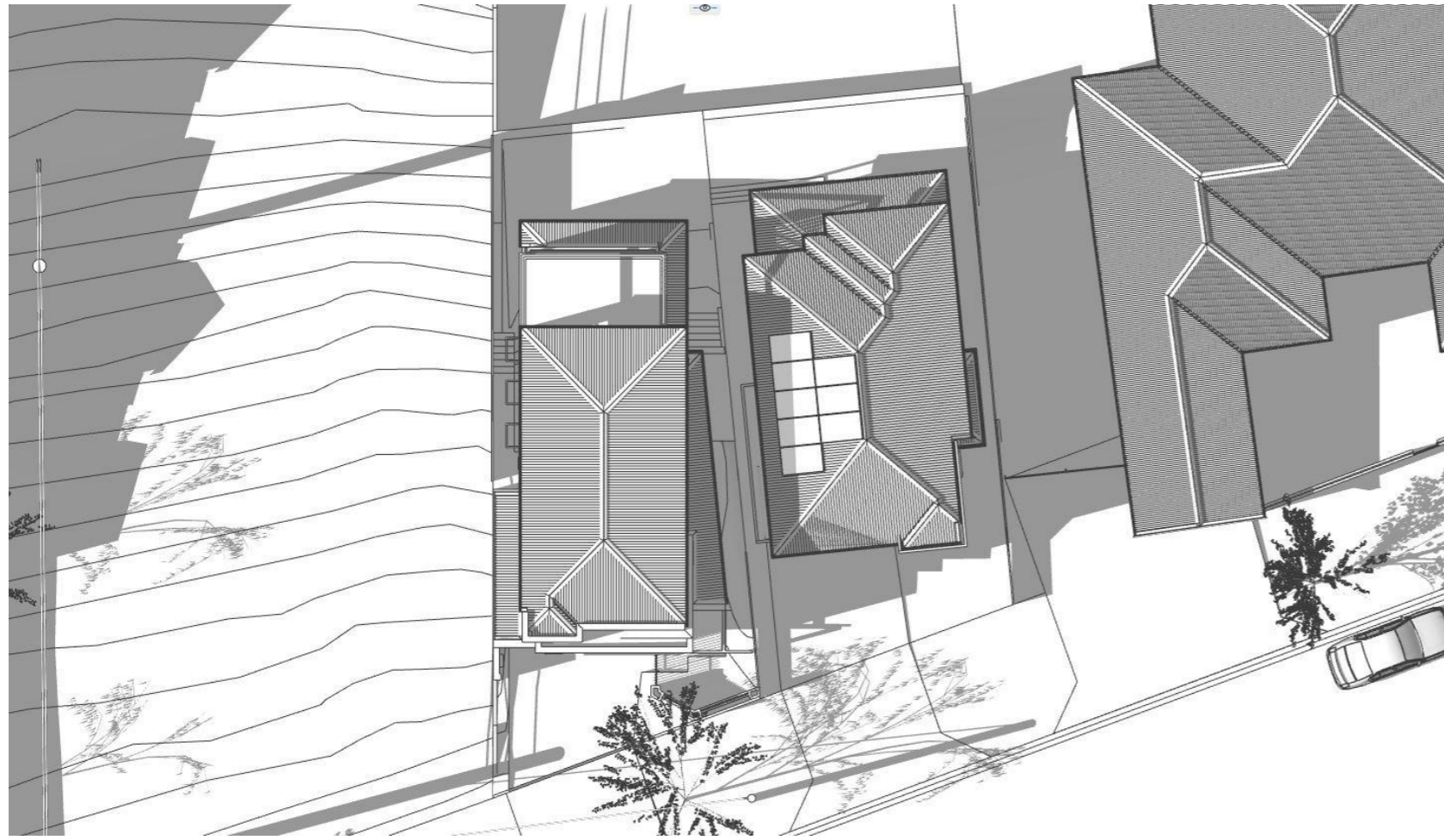
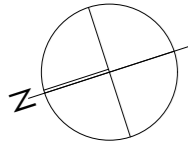


**SUMMER SOLSTICE OVERSHADOWING - 3PM**

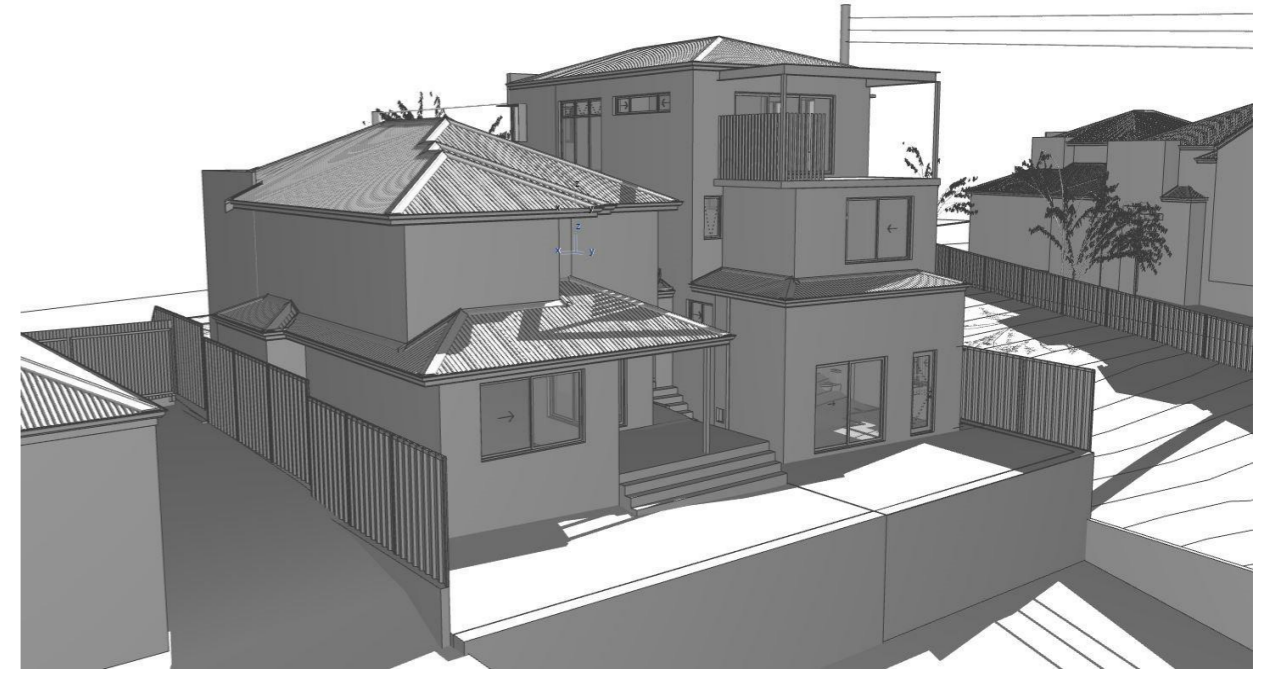
**SITE - OVERSHADOWING**  
1:200

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	CLIENT NAME:							1	J.T.	29/03/23	PLANNING DRAWINGS	JOB No:	DATE:	DRAWN:
	Mr P. & Mrs M. Dalwood							2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
	ADDRESS:							3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:		REV:
	LOT 1 (No.46b) Joel Terrace, East Perth							4	J.T.	21/08/23	PLANNING AMMENDMANTS	<b>A.06 OF 15 PL06</b>		
								5	J.T.	20/09/23	PLANNING AMMENDMANTS			
							6	J.T.	28/09/23	PLANNING AMMENDMANTS				

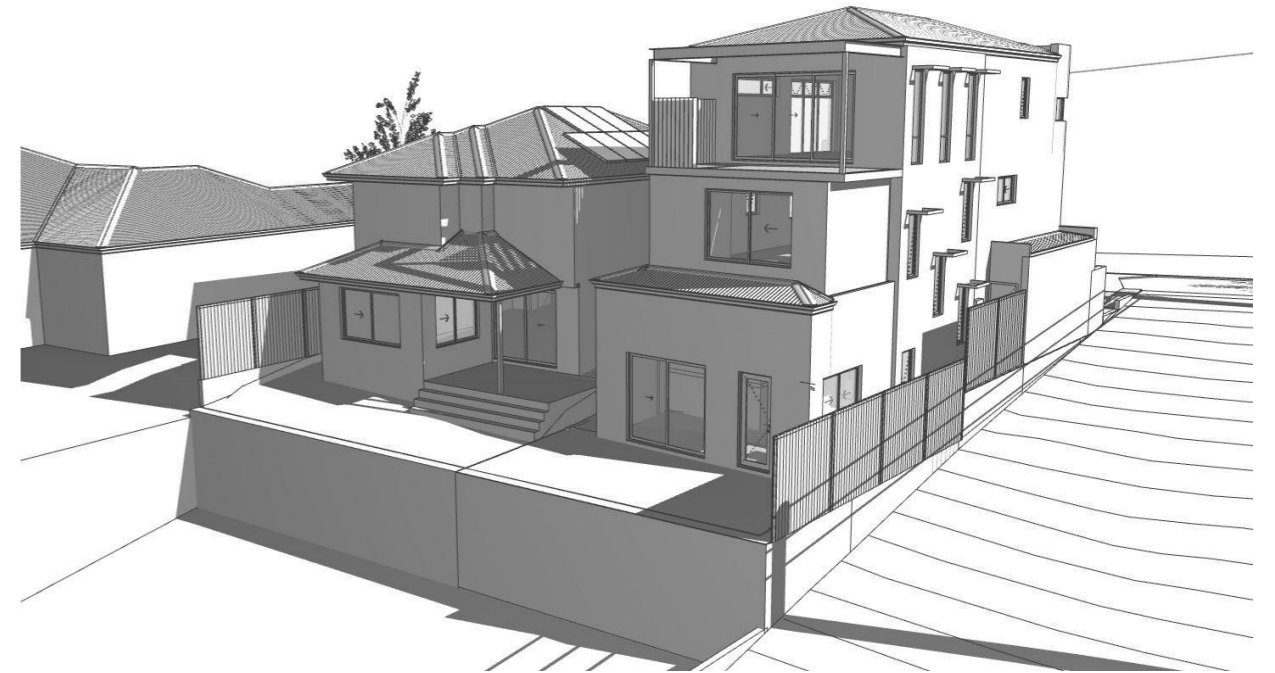




**OVERSHADOWING PERSPECTIVE 1  
WINTER SOLSTICE - 12PM**



**OVERSHADOWING PERSPECTIVE 2  
WINTER SOLSTICE - 12PM**



**OVERSHADOWING PERSPECTIVE 3  
WINTER SOLSTICE - 12PM**

	LOCALITY: City of Vincent			REV:	BY:	DATE:	AMENDMENTS:	<b>OVER SHADOWING PERSPECTIVE</b>			
	CLIENT NAME: <b>Mr P. &amp; Mrs M. Dalwood</b>				1	J.T.	29/03/23				PLANNING DRAWINGS
	ADDRESS: <b>LOT 1 (No.46b) Joel Terrace, East Perth</b>				2	J.T.	27/06/23	PLANNING AMMENDMANTS	2204JOE	29/02/2023	Julian
	3	J.T.	08/08/23	PLANNING AMMENDMANTS	SHEET No:			REV:			
	4	J.T.	21/08/23	PLANNING AMMENDMANTS	<b>A.07 OF 15</b>			<b>PL06</b>			
	5	J.T.	20/09/23	PLANNING AMMENDMANTS							
6	J.T.	28/09/23	PLANNING AMMENDMANTS								



CITY OF VINCENT  
RECEIVED  
19 April 2023



## Life Cycle Assessment Report

Residence

46b Joel Terrace, East Perth

City of Vincent

Date : 1 April 2023  
Author : julian teles  
Peer Reviewer : Not Reviewed  
Report Id : 33806



This LCA Study was conducted as part of the City of Vincent. The LCA modeling within eToolLCD is being managed by City of Vincent. For more information see contact details below.

City of Vincent  
99 Loftus St, Leederville  
info@email.com  
0411 141 246

## eTool Disclaimer

The predictions of embodied and operational impacts (including costs) conducted in eToolLCD software, by their very nature, cannot be exact. It is not possible to accurately track all the impacts associated with a product or service over the life of a building or structure. eToolLCD software and the modelling workflow has been built and tested to enable informed decisions when comparing design options. Environmental impact coefficients and generic costs do not necessarily correspond to those of individual brands of the same product or service due to differences within industries in the way these products and services are delivered.

This LCA study has not been reviewed and as such does not meet the relevant section of the ISO14044 requirements. Caution should be taken when interpreting the LCA study report.

eTool PTY LTD cannot make assurances regarding the accuracy of these reports for the above reasons.  
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## Executive Summary

This Life Cycle Assessment has been completed for the Residence, located at 46b Joel Terrace, East Perth. The has been conducted for City of Vincent, the lead author is julian teles The goal of this study is to profile and improve the environmental performance of the construction works. The study has been conducted in accordance with ISO 14044 and EN15978 .






## About the Design

The following designs were modelled in these reports:

- **Proposed Design:** The proposed design at the time the modelling occurred.
- **Benchmark:** An equivalent benchmark design (or weighted statistical mix of designs) with conventional products, construction methods and use patterns.

## Results

The results of the study are shown in the table below with savings highlighted in green text and increased impacts highlighted in red.

Characterised Impacts per Occupant per Year		Benchmark	Proposed Design	Proposed Design Savings
<b>Environmental Impacts</b>				
 Global Warming Potential, GWP	kg CO <sub>2</sub> eq	3.3E+3	1.4E+3	<b>59%</b>
 Ozone Depletion Potential, ODP	kg CFC-11 eq	1.2E-4	1.8E-4	<b>-42%</b>
 Acidification Potential for Soil and Water, AP	kg SO <sub>2</sub> eq.	8.9E0	5.0E0	<b>44%</b>
 Eutrophication potential, EP	kg PO <sub>4</sub> eq	3.0E0	2.3E0	<b>24%</b>
 Photochemical Ozone Creation Potential, POCP	kg ethylene	5.9E-1	5.0E-1	<b>16%</b>
 Abiotic Depletion Potential – Elements, ADPE	kg antimony	1.1E-1	6.7E-2	<b>37%</b>
 Abiotic Depletion Potential – Fossil Fuels, ADPF	MJ	4.5E+4	1.8E+4	<b>59%</b>

## Analysis

The report shows that the Proposed Design has lower Global Warming Potential, GWP impact than the Benchmark Design. The **Non-integrated Energy (B6+)** GWP Impacts are the most dominant life cycle module in the Proposed Design Design followed by the **Replacement (B4)** and then **Product Stage (A1A3)**.

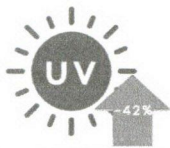
Further analysis reveals:

- The **Superstructure** is the highest impact construction category,
- **HVAC** is the highest operational impact by demand category,
- The **Electricity** is this highest impact operational impact by supply source,
- **Cementitious Binders | Mortars and Renders | 1 cement : 4 sand** is the highest impact material category,
- **Electrical Equipment, Small with transport and tradestaff, Electricity** is the highest people and equipment impact

## Proposed Design Performance against Benchmark



Global Warming Potential, GWP



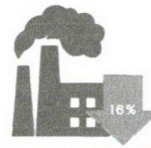
Ozone Depletion Potential, ODP



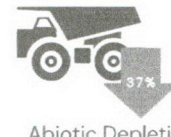
Acidification Potential for Soil and Water, AP



Eutrophication potential, EP



Photochemical Ozone Creation Potential, POCP



Abiotic Depletion Potential - Elements, ADPE



Abiotic Depletion Potential - Fossil Fuels, ADPF



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11.1	Environmental Impacts
12	Detailed Analysis
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# 1 Introduction

Managing the environmental impacts that arise from the construction and operation of buildings and infrastructure is of key importance in mitigating the damage caused directly and indirectly on the biosphere. Life Cycle Assessment (LCA) is the leading industry standard in clearly identifying optimum strategies for reducing environmental impacts. This report presents the results of the LCA completed for the Residence, 46b Joel Terrace, East Perth.

The study has been conducted using RapidLCA in accordance with the following standards:

- International Standards 14040 and 14044.
- European Standard EN 15978: Sustainability of Construction Works – Assessment of Environmental Performance of Buildings – Calculation Method

The Author of the study is julian teles of City of Vincent, and no independent review has yet been completed.

## 2 Goal of the Study

The goal of this study is to profile and improve the environmental performance of the construction works at 46b Joel Terrace, East Perth. The life cycle performance of the project is compared to other designs and as such this is a comparative study. The study has been conducted on assumption the results may be made public.

## 3 Scope of the Study

The LCA study has been conducted in accordance with the EN 15978 standard to assess the direct and indirect potential environmental impacts associated with the construction works at 46b Joel Terrace, East Perth as part of the City of Vincent project.

### 3.1 Functional Unit

The function of the Building must reflect the core purpose of the asset such that it can be compared accurately to different designs. In this case, the functional focus is the Residence and the chosen functional unit is the provision of this function for one Occupant over one year.

The estimated design life of the design is 55 years which has been adopted for the LCA study period. This takes into consideration the structural service life limit (150 years), as well as redevelopment pressure on the asset such as surrounding density, asset ownership structures, and the architectural design quality.

Note that products with expected service lives of less than the life span of the project are assumed to be replaced at increments reflecting their service life.

### 3.2 System Boundary

The system boundary, shown in Figure 1, follows guidance given in EN15978.



### System Boundary

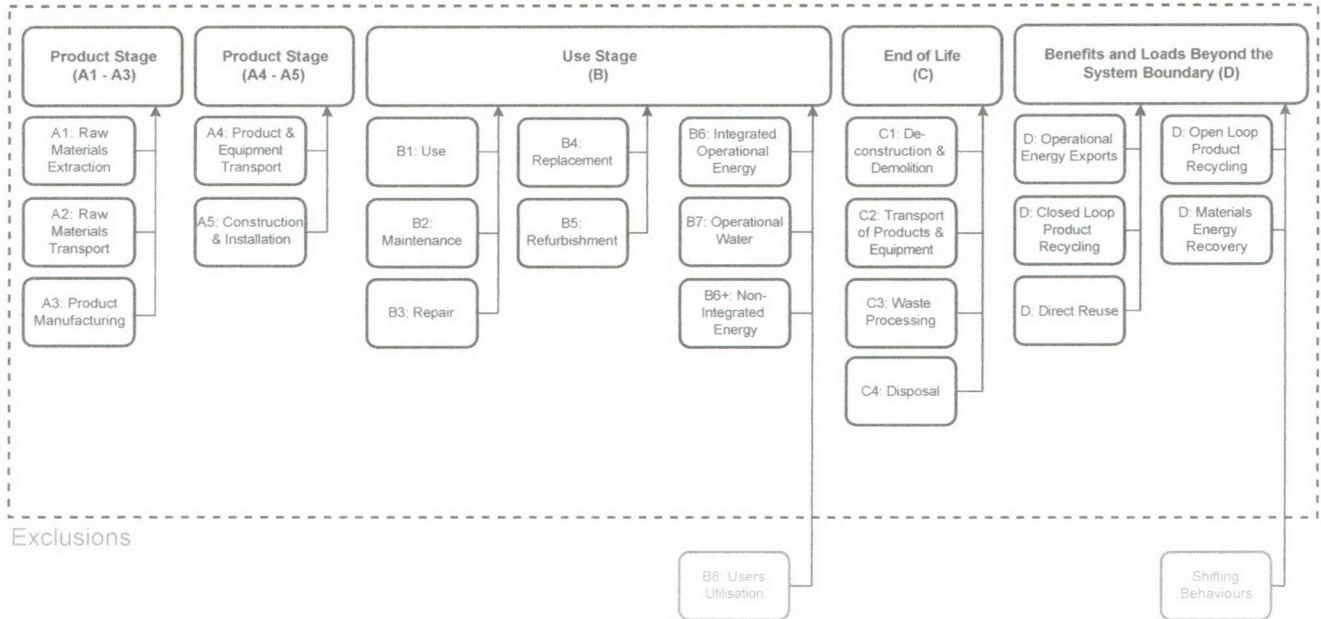


Figure 1: System Boundary Diagram

### 3.3 Environmental Indicators

The environmental indicators have been included in the study are detailed in Table 1. For further information regarding the environmental indicators please refer to Appendix A.








Environmental Indicator	Unit	Abbreviation	Characterisation Method
<b>Environmental Impacts</b>			
 Global Warming Potential, GWP	kg CO <sub>2</sub> eq	GWP	CML-IA baseline V4.5
 Ozone Depletion Potential, ODP	kg CFC-11 eq	ODP	CML-IA baseline V4.5
 Acidification Potential for Soil and Water, AP	kg SO <sub>2</sub> eq.	AP	CML-IA baseline V4.5
 Eutrophication potential, EP	kg PO <sub>4</sub> eq	EP	CML-IA baseline V4.5
 Photochemical Ozone Creation Potential, POCP	kg ethylene	POCP	Institute of Environmental Sciences (CML)
 Abiotic Depletion Potential - Elements, ADPE	kg antimony	ADPE	CML-IA baseline V4.5
 Abiotic Depletion Potential - Fossil Fuels, ADPF	MJ	ADPF	CML-IA baseline V4.5

Table 1: Environmental Indicators Included in LCA study.

## 4 Cutoff Criteria

The EN15978 cut-off criteria were used to ensure that all relevant potential environmental impacts were appropriately represented:

- Mass – if a flow is less than 1% of the mass at either a product-level or individual-process level, then it has been excluded, provided its environmental relevance is not of concern.
- Energy – if a flow is less than 1% of the energy at either a product-level or individual-process level, then it has been excluded, provided its environmental relevance is not a concern.
- The total of neglected input flows per module, e.g. per module A1-A3, A4-A5, B1-B5, B6-B7, C1-C4 and module D shall be a maximum of 5% of energy usage and mass.
- Environmental relevance – if a flow meets the above criteria for exclusion, but is considered to potentially have a significant environmental impact, it has been included. All material flows which leave the system (emissions) and whose environmental impact is higher than 1% of an impact category, have been included.

The Operational Guidance for Life Cycle Assessment Studies (Wittstock et al. 2012) states:

*The apparent paradox is that one must know the final result of the LCA (so one can show that the omission of a certain process is insignificant for the overall results) to be able to know which processes, elementary flows etc. can be left out.*

The approach taken in this study is to continue modelling smaller inputs until confidence is gained that the criteria is safely met.

## 5 Allocation

Allocation rules follow those of EN15804 as given below:

- Allocation will respect the main purpose of the studied processes. If the main purpose of combined processes cannot be defined (e.g. combined mining and extraction of nickel and precious metals), economic allocation may be used to divide resources and emissions between the products.
- The principle of modularity is maintained. Where processes influence the product's environmental performance during its life cycle, they will be assigned to the module where they occur.
- The sum of the allocated inputs and outputs of a unit process are equal to the inputs and outputs of the unit process before allocation. This means no double counting of inputs or outputs is permissible.



## 6 Independent Review

No independent review has been conducted of this study.

## 7 System Description Introduction

The object of the assessment is the Residence, located at 46b Joel Terrace, East Perth. The assessment includes all the upstream and downstream processes needed to provide the primary function of the structure from construction, maintenance, operation, and finally demolition and disposal. The inventory includes the extraction of raw materials or energy and the release of substances back to the environment or to the point where inventory items exit the system boundary either during or at the end of the project life cycle.

The area of the project is the City of Vincent local government in Western Australia. This local government authority covers an area of approximately 10.4 square kilometres in metropolitan Perth, the capital of Western Australia, and lies about 3 km from the Perth CBD. It includes the suburbs of Highgate, Leederville, Mount Hawthorn, North Perth, as well as parts of Coolbinia, East Perth, Mount Lawley, Osborne Park, Perth and West Perth. The City of Vincent maintains 139 km of roads and 104 ha of parks and gardens.

New developments in the area must comply with the city's [built form policy released in 2020](#).

The project location is shown in figures 2 and 3.

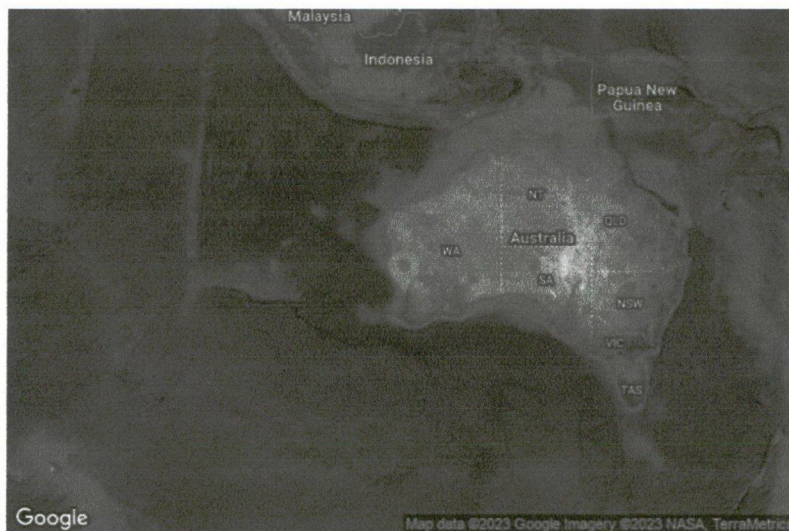


Figure 2: Location of the project – Global View.



Figure 3: Location of the project – Locality View.

3 Storey Development

## 8 Building Characteristics Table

Table 5 below shows the key characteristics of the design.

	Benchmark	Proposed Design
<b>Design Details</b>		
Design Name	AU WA Res Ave Code Compl CZ 5 (10 dwellings)	46b Joel Terrace, East Perth
Stories (#)	2	3
Functional Focus	Single Family Residence	Residence
Structural Service Life Limit	100	150
Predicted Design Life	54	55
<b>Functional Characteristics</b>		
Dwellings	10	1
Bedrooms	30	3
Occupants	24	2
<b>Total Floor Areas</b>		
Usable Floor Area	2,140	82
Net Lettable Area	0	0
Fully Enclosed Covered Area	3,010	118
Unenclosed Covered Area	0	0
Gross Floor Area	3,010	118
Usable and Lettable Yield	71 %	69 %

Table 5 : Design Characteristics Compared

## 9 Structure Scope Table

Table 7 shows the structural scope of the inventory collection for the LCA. For further details on structure scope please refer to Appendix B.

### Summary Structure Scope Diagram

Key: ✓ In Scope ✓ Partial ✗ Out of Scope

Category Name	Benchmark Design	Proposed Design
Substructure	✓	✗
Superstructure	✓	✗
Internal finishes	✓	✗
Fittings, furnishings and equipment	✓	✗
Services equipment	✓	✗
Prefabricated buildings and building units	✗	✗
Work to existing building	✗	✗
External works	✗	✗
Facilitating works	✓	✗
Project/design team	✓	✗
Undefined	✗	✗









Characterised Impacts Per Occupant Per Per Year	Construction Phases			Use Phases									End of Life Phases				Loads Beyond the System Boundary	Total
	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B6+	B7	C1	C2	C3	C4	D		
<b>Benchmark</b>																		
GWP	kg CO <sub>2</sub> eq	6.2E+2	1.2E+2	9.6E+1	0.0E0	0.0E0	0.0E0	5.1E+2	0.0E0	9.4E+2	8.2E+2	1.7E+2	0.0E0	5.0E+1	0.0E0	6.9E+1	-7.6E+1	3.3E+3
ODP	kg CFC-11 eq	3.0E-5	1.9E-5	1.5E-5	0.0E0	0.0E0	0.0E0	3.4E-5	0.0E0	4.9E-6	6.6E-6	3.6E-6	0.0E0	8.0E-6	0.0E0	4.6E-6	-2.3E-6	1.2E-4
AP	kg SO <sub>2</sub> eq.	3.5E0	3.9E-1	2.7E-1	0.0E0	0.0E0	0.0E0	2.5E0	0.0E0	1.2E0	1.5E0	3.7E-1	0.0E0	1.6E-1	0.0E0	9.1E-2	-1.0E0	8.9E0
EP	kg PO <sub>4</sub> eq	1.3E0	9.6E-2	4.7E-2	0.0E0	0.0E0	0.0E0	8.3E-1	0.0E0	3.8E-1	5.1E-1	2.4E-1	0.0E0	3.5E-2	0.0E0	1.9E-2	-4.9E-1	3.0E0
POCP	kg ethylene	2.2E-1	2.5E-2	3.6E-2	0.0E0	0.0E0	0.0E0	1.7E-1	0.0E0	8.3E-2	4.2E-2	2.4E-2	0.0E0	1.0E-2	0.0E0	1.4E-2	-3.4E-2	5.9E-1
ADPE	kg antimony	5.9E-2	3.6E-3	2.6E-4	0.0E0	0.0E0	0.0E0	4.8E-2	0.0E0	4.2E-3	6.1E-3	2.9E-3	0.0E0	2.0E-3	0.0E0	1.1E-4	-1.9E-2	1.1E-1
ADPF	MJ	7.7E+3	1.9E+3	1.3E+3	0.0E0	0.0E0	0.0E0	7.2E+3	0.0E0	1.4E+4	1.1E+4	2.0E+3	0.0E0	7.8E+2	0.0E0	4.6E+2	-8.3E+2	4.5E+4
<b>Proposed Design</b>																		
GWP	kg CO <sub>2</sub> eq	2.2E+2	7.7E+1	2.8E+1	0.0E0	7.5E0	0.0E0	2.3E+2	0.0E0	1.5E+2	7.0E+2	8.6E+1	1.1E+1	2.0E+1	7.3E-1	4.1E+1	-2.2E+2	1.4E+3
ODP	kg CFC-11 eq	3.1E-5	1.2E-5	3.4E-6	0.0E0	9.0E-7	0.0E0	1.1E-4	0.0E0	2.5E-6	5.6E-6	1.9E-6	1.9E-6	3.2E-6	1.5E-7	1.6E-6	-1.7E-6	1.8E-4
AP	kg SO <sub>2</sub> eq.	2.2E0	2.5E-1	7.6E-2	0.0E0	2.6E-2	0.0E0	1.5E0	0.0E0	2.8E-1	1.3E0	1.9E-1	3.3E-2	6.2E-2	1.8E-3	3.2E-2	-9.2E-1	5.0E0
EP	kg PO <sub>4</sub> eq	1.2E0	6.5E-2	1.1E-2	0.0E0	8.2E-3	0.0E0	6.9E-1	0.0E0	9.7E-2	4.3E-1	1.4E-1	6.8E-3	1.4E-2	3.9E-4	6.9E-3	-4.5E-1	2.3E0
POCP	kg ethylene	1.7E-1	1.6E-2	1.7E-2	0.0E0	1.5E-3	0.0E0	1.2E-1	0.0E0	1.4E-1	3.6E-2	1.3E-2	2.5E-3	4.1E-3	6.7E-5	7.5E-3	-3.4E-2	5.0E-1
ADPE	kg antimony	3.7E-2	2.2E-3	7.4E-5	0.0E0	2.8E-4	0.0E0	2.9E-2	0.0E0	8.2E-4	5.2E-3	1.6E-3	1.3E-4	7.5E-4	6.3E-6	3.9E-5	-1.0E-2	6.7E-2
ADPF	MJ	3.2E+3	1.2E+3	3.2E+2	0.0E0	1.1E+2	0.0E0	3.4E+3	0.0E0	1.9E+3	9.1E+3	1.0E+3	1.7E+2	3.1E+2	9.3E0	1.6E+2	-2.7E+3	1.8E+4
<b>Savings (Benchmark Compared to Proposed Design)</b>																		
GWP	kg CO <sub>2</sub> eq	3.9E+2	4.7E+1	6.8E+1	0.0E0	-7.5E0	0.0E0	2.8E+2	0.0E0	7.9E+2	1.2E+2	8.0E+1	-1.1E+1	3.0E+1	-7.3E-1	2.8E+1	1.4E+2	59%
ODP	kg CFC-11 eq	-1.4E-6	7.4E-6	1.1E-5	0.0E0	-9.0E-7	0.0E0	-7.9E-5	0.0E0	2.3E-6	9.6E-7	1.7E-6	-1.9E-6	4.8E-6	-1.5E-7	3.0E-6	-5.2E-7	-42%
AP	kg SO <sub>2</sub> eq.	1.3E0	1.5E-1	1.9E-1	0.0E0	-2.6E-2	0.0E0	9.5E-1	0.0E0	8.8E-1	2.2E-1	1.7E-1	-3.3E-2	9.4E-2	-1.8E-3	5.9E-2	-9.5E-2	44%
EP	kg PO <sub>4</sub> eq	5.2E-2	3.2E-2	3.6E-2	0.0E0	-8.2E-3	0.0E0	1.4E-1	0.0E0	2.8E-1	7.4E-2	1.1E-1	-6.8E-3	2.1E-2	-3.9E-4	1.3E-2	-3.9E-2	24%
POCP	kg ethylene	5.2E-2	9.4E-3	1.9E-2	0.0E0	-1.5E-3	0.0E0	4.7E-2	0.0E0	-6.0E-2	6.2E-3	1.1E-2	-2.5E-3	6.2E-3	-6.7E-5	6.4E-3	-5.6E-4	16%
ADPE	kg antimony	2.1E-2	1.4E-3	1.9E-4	0.0E0	-2.8E-4	0.0E0	1.9E-2	0.0E0	3.4E-3	8.9E-4	1.3E-3	-1.3E-4	1.3E-3	-6.3E-6	7.2E-5	-8.5E-3	37%
ADPF	MJ	4.5E+3	7.3E+2	9.8E+2	0.0E0	-1.1E+2	0.0E0	3.8E+3	0.0E0	1.2E+4	1.5E+3	9.8E+2	-1.7E+2	4.7E+2	-9.3E0	3.0E+2	1.8E+3	59%

## 12 Detailed Analysis

This section provides a more detailed results of the life cycle impacts with the aim of identifying the hotspots by analysing temporal, spatial, functional, end-use demand and supply chain dimensions.

For each indicator being assessed the following charts are provided

The Time Series Charts articulate when impacts occur during the life of the design. This exposes insights such as the temporal hotspots signified by jumps in the plot during the life of the project (for example, relating to a large replacement item) and the payback period of design options

The Top Five Life Cycle Charts express impacts by different modules, categories and classes enabling a detailed understanding of what is responsible for the greatest impacts and also compares these impacts between designs. The pie chart within each bar chart shows the proportion of the life cycle impacts represented in the bar chart. A brief description of the categories is provided below:

- **LC Module Impacts:** The EN15978 Life Cycle Modules. Generally 100% building impacts will be included in the bar chart.
- **Construction Category:** The breakdown of the impacts by construction category. The bar chart will generally only part of the total building impacts.
- **Operational Demand:** The building end use demands that are driving environmental impacts.
- **Energy Supply:** The supply of fuels to the building, in effect the upstream fuel sources supplying energy for on site use during construction, operational and demolition.
- **Materials:** The materials (grouped into common categories) that are driving the environmental impacts.
- **Equipment and People:** The equipment and people required during construction, maintenance and demolition and all associated transport trips that are driving the environmental impacts

All impact figures are quoted per the functional unit selected for the study.

## 12.1 Global Warming Potential, GWP

Figure 4: Time series Global Warming Potential, GWP chart

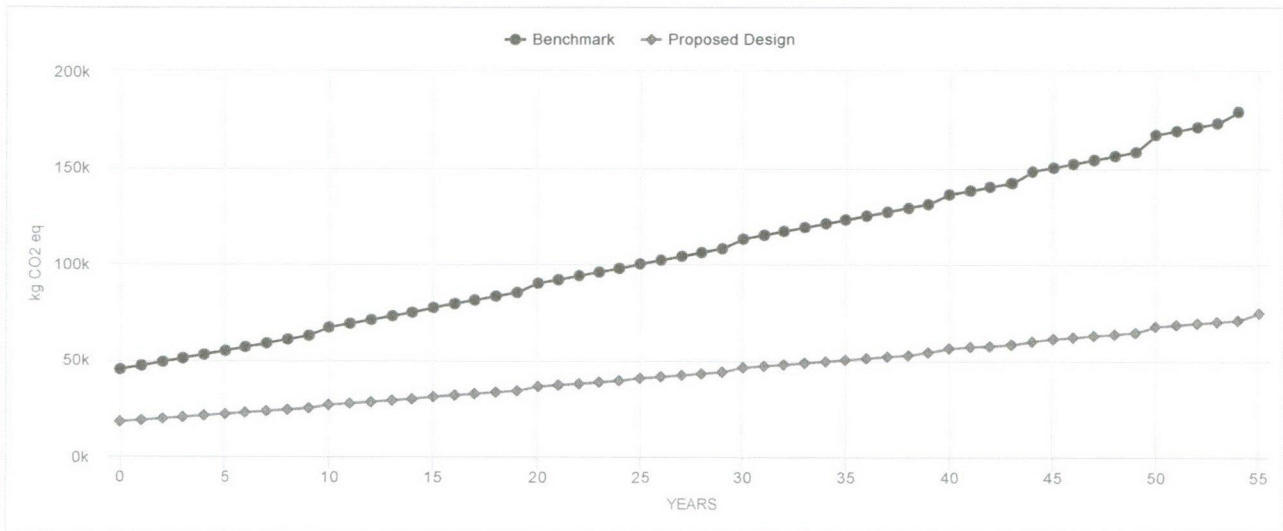
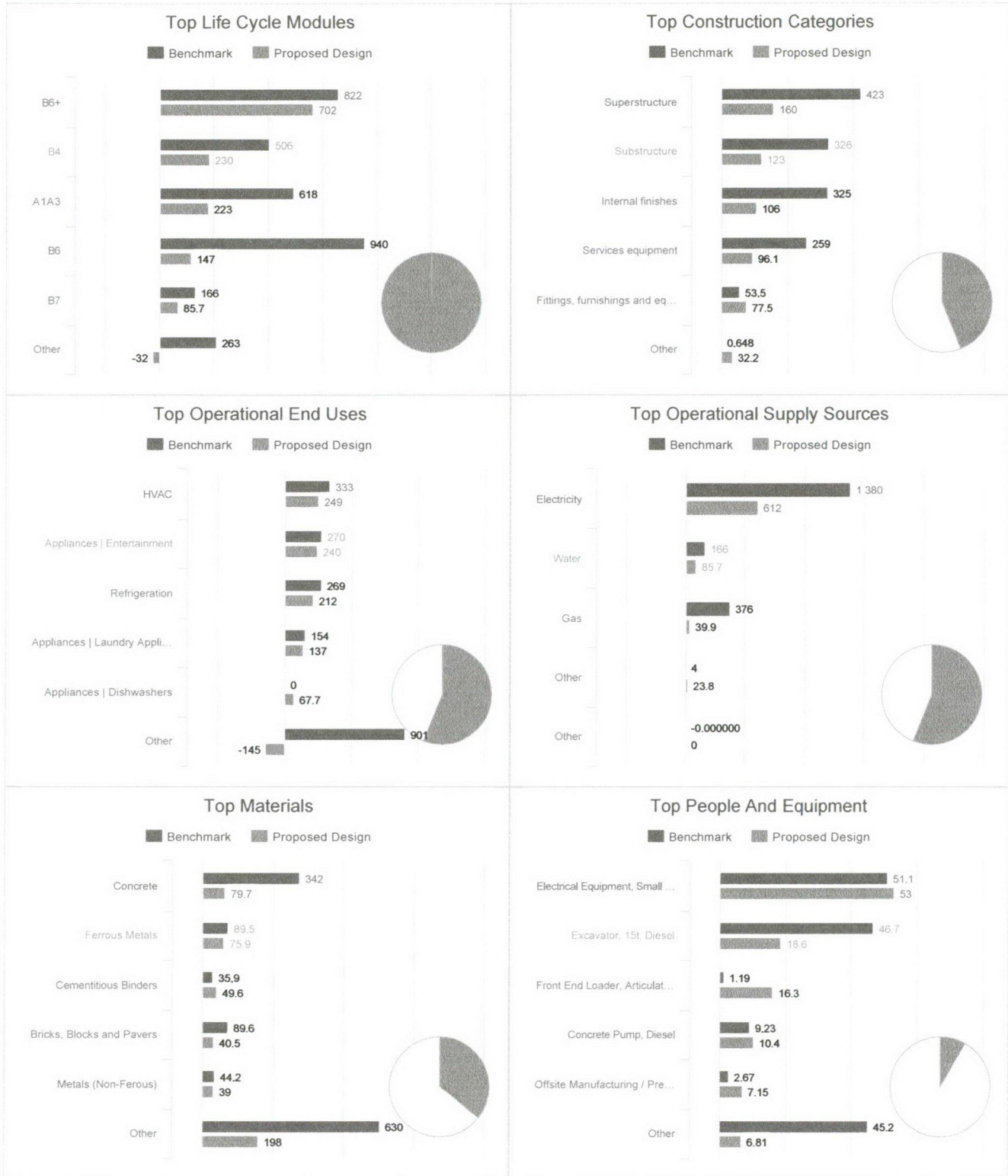


Figure 5: Top Five Global Warming Potential, GWP chart







## Highest and Lowest Impact Materials

	Initial Materials & Construction (A1-A5)	Use Stage Materials & Construction (B1-B5)	End of Life (C1-C4)	Recycling & Energy Export (D)	Total
<b>Top 10 Impact Materials</b>					
Concrete	9686	3.975	1264	0	10955
Ferrous Metals	9966	3246	413.1	-3194	10431
Cementitious Binders	5542	1024	258.9	0	6825
Bricks, Blocks and Pavers	4354	134.6	1075	0	5565
Metals (Non-Ferous)	2867	4382	85.39	-1972	5363
Glazing	2012	2268	52.39	0	4332
Plastics	1298	2958	17.36	-2.75	4271
Plaster and Mineral Derived Products	1764	1885	121.5	0	3771
Finished Products	1263	3111	102.4	-862.5	3614
Carpets and Floor Coverings	529.2	2655	1.712	0	3186

### Bottom 5 Impact Materials

Asphalt and Bitumen	1.54	10.94	0.2846	0	12.77
Fibre Reinforced Plastics and Resins	1.084	5.448	0.004899	0	6.538
Plant Based Products (non Timber)	1.072	4.291	0	0	5.364



### Highest and Lowest Impact Templates

	Initial Materials & Construction (A1-A5)	Use Stage Materials & Construction (B1-B5)	Integrated Energy Use (B6)	Plug Load Energy Use (B6+)	Water Supply & Treatment (B7)	End of Life (C1-C4)	Recycling & Energy Export (D)	Total
<b>Top 10 Impact Templates</b>								
Appliances Residential Average (AUS)	452.3	2435	0	67443	0	9.611	-568.3	69772
Refrigeration, Residential Well Ventilated Fridge Recess Less than 800mm Width	561.6	4777	0	29125	0	401.7	-441.7	34424
Ducted System Air Source Heat Pump for Heating, higher efficiency (COP/EER 3.8), R32 Refrigerant	128.7	731.3	17126	0	0	1.875	-35.18	17953
Ducted System Air Source Heat Pump for Cooling, higher efficiency (COP/EER 3.8), R32 Refrigerant	128.7	731.3	17126	0	0	1.875	-35.18	17953
Wall, External, Masonry, double recycled brick 90-50-90 insulated with foundations and finishes	9656	1210	0	0	0	1433	-0.6544	12299
Water Use and Treatment (eTool Turbo)	0	0	8.135E-05	0	11778	0	0	11778
Solar Gas Instantaneous Boost (HWS_App)	852.2	4146	5486	0	0	19.08	-780.4	9724
Wall Internal Type 1, Masonry, Single Brick Wall	5932	1224	0	0	0	479.2	-0.3272	7636



(90mm)  
uninsulated with  
foundations and  
finishes

Wall Internal Type 2, Masonry, Single Brick Wall (90mm) uninsulated with foundations and finishes	5932	1224	0	0	0	479.2	-0.3272	7636
Lowest Floor – Concrete Slab, 100mm, 25MPa, 3.8% reo (m2)	5239	0	0	0	0	885.3	558.8	6683

**Bottom 5 Impact Templates**

Pool Structure – Concrete	309.3	0.01387	0	0	0	0.02929	0.00462	309.3
Swimming Pool Seasonal Temperature Control – No Pool Cover – Gas	18.55	120.5	1.025	0	0.194	0.0002012	-0.003736	140.3
Swimming Pool – Pumps and Filters Ultra Efficient	9.286	46.41	0	0	0	0.0001509	-0.002748	55.69
Floor Covering – 19mm timber, nail down (superstructure)	-786.8	-786.7	0	0	0	0.1113	-2.109	-1575
Solar PV System Residential – Zone 3 (Perth Sydney etc)	1812	3435	-25958	0	0	115.3	-25069	-45664

## 12.2 Ozone Depletion Potential, ODP

Figure 6: Time series Ozone Depletion Potential, ODP chart

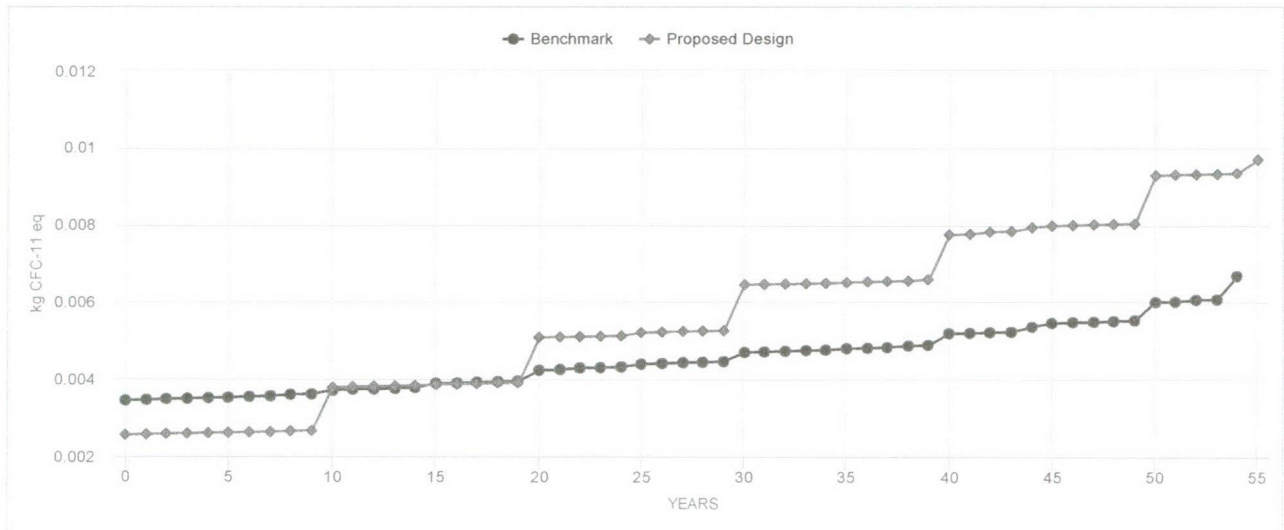
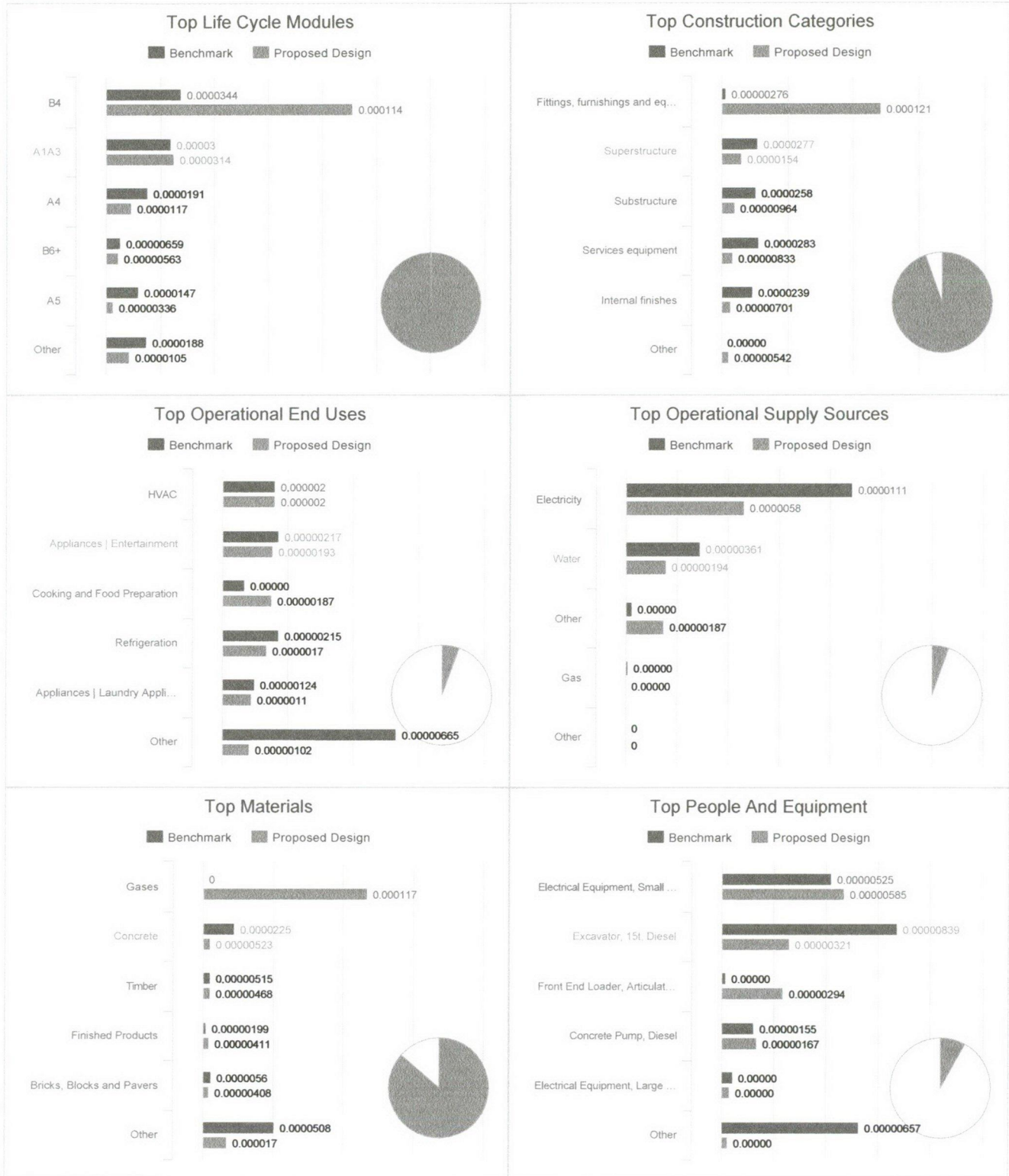




Figure 7: Top Five Ozone Depletion Potential, ODP chart





### Highest and Lowest Impact Materials

	Initial Materials & Construction (A1-A5)	Use Stage Materials & Construction (B1-B5)	End of Life (C1-C4)	Recycling & Energy Export (D)	Total
<b>Top 10 Impact Materials</b>					
Gases	0.002687	0.01342	0	0	0.01611
Concrete	0.0004728	2.529E-07	0.0002456	0	0.0007187
Timber	0.0004329	0.0001781	3.054E-05	1.46E-06	0.000643
Finished Products	0.0001609	0.0004028	2.053E-05	-1.867E-05	0.0005656
Bricks, Blocks and Pavers	0.0003429	1.044E-05	0.0002075	0	0.0005609
Ferrous Metals	0.0004145	0.0001275	6.6E-05	-0.0001071	0.0005008
Glazing	0.0002207	0.0002441	1.01E-05	0	0.0004749
Paints and Finishes	6.837E-05	0.0002057	4.855E-07	0	0.0002746
Cementitious Binders	0.0001402	3.359E-05	5.028E-05	0	0.0002241
Metals (Non-Ferous)	0.000103	0.0001425	1.434E-05	-4.586E-05	0.000214

### Bottom 5 Impact Materials

Plant Based Products (non Timber)	6.436E-07	2.574E-06	0	0	3.218E-06
Asphalt and Bitumen	3.088E-07	2.186E-06	5.551E-08	0	2.55E-06
Fibre Reinforced Plastics and Resins	1.741E-08	9.183E-08	9.516E-10	0	1.102E-07
Generic	0	0	0	0	0



## Highest and Lowest Impact Templates

	Initial Materials & Construction (A1-A5)	Use Stage Integrated Energy Materials & Construction (B1-B5)	Integrated Energy Use (B6)	Plug Load Energy Use (B6+)	Water Supply & Treatment (B7)	End of Life (C1-C4)	Recycling & Energy Export (D)	Total
Refrigeration, Residential Well Ventilated Fridge Recess Less than 800mm Width	0.002699	0.0135	0	0.0002334	0	1.962E-06	-1.174E-05	0.01642
Wall, External, Masonry, double recycled brick 90-50-90 insulated with foundations and finishes	0.0005913	0.0001433	0	0	0	0.00026	-1.166E-08	0.0009947
Appliances Residential Average (AUS)	2.054E-05	0.0001166	0	0.0005405	0	1.591E-06	-1.419E-05	0.0006651
Wall Internal Type 1, Masonry, Single Brick Wall (90mm) uninsulated with foundations and finishes	0.0003983	9.566E-05	0	0	0	8.418E-05	-5.831E-09	0.0005782
Wall Internal Type 2, Masonry, Single Brick Wall (90mm) uninsulated with foundations and finishes	0.0003983	9.566E-05	0	0	0	8.418E-05	-5.831E-09	0.0005782
Windows, Residential Timber Alu Hybrid frame, Single Glaze, fly screen	0.0002325	0.0002606	0	0	0	1.015E-05	-4.461E-06	0.0004988
Utilities Connection to Site Residential	0.0004453	3.939E-05	0	0	0	1.759E-06	-3.921E-06	0.0004825



Lowest Floor - Concrete Slab, 100mm, 25MPa, 3.8% reo (m2)	0.000308	0	0	0	0	0.000114	1.756E-05	0.0004396
Roof - Timber Truss/Steel Sheeting/15° Pitch	0.0002913	8.897E-05	0	0	0	2.764E-05	-3.989E-05	0.000368
Cooking, Res Wood Stove and Oven	1.207E-05	4.916E-05	0.0002575	0	0	5.008E-07	-9.124E-06	0.0003101

**Bottom 5 Impact Templates**

Pool Structure - Concrete	4.596E-05	2.896E-09	0	0	0	5.654E-09	1.451E-10	4.597E-05
LED Residential Lighting (Ultra High Efficiency - 150lm/watt)	3.943E-06	2.091E-05	1.58E-05	0	0	5.308E-08	-8.784E-07	3.984E-05
LED Outdoor Lighting (Residential - Ultra High Efficiency 150lm/watt), m2	2.658E-06	1.296E-05	8.983E-06	0	0	2.913E-08	-4.82E-07	2.415E-05
Swimming Pool Seasonal Temperature Control - No Pool Cover - Gas	2.191E-06	1.424E-05	2.758E-09	0	3.287E-09	3.364E-11	-1.786E-10	1.644E-05
Swimming Pool - Pumps and Filters Ultra Efficient	1.096E-06	5.48E-06	0	0	0	2.651E-11	-5.435E-11	6.577E-06



### 12.3 Acidification Potential for Soil and Water, AP

Figure 8: Time series Acidification Potential for Soil and Water, AP chart

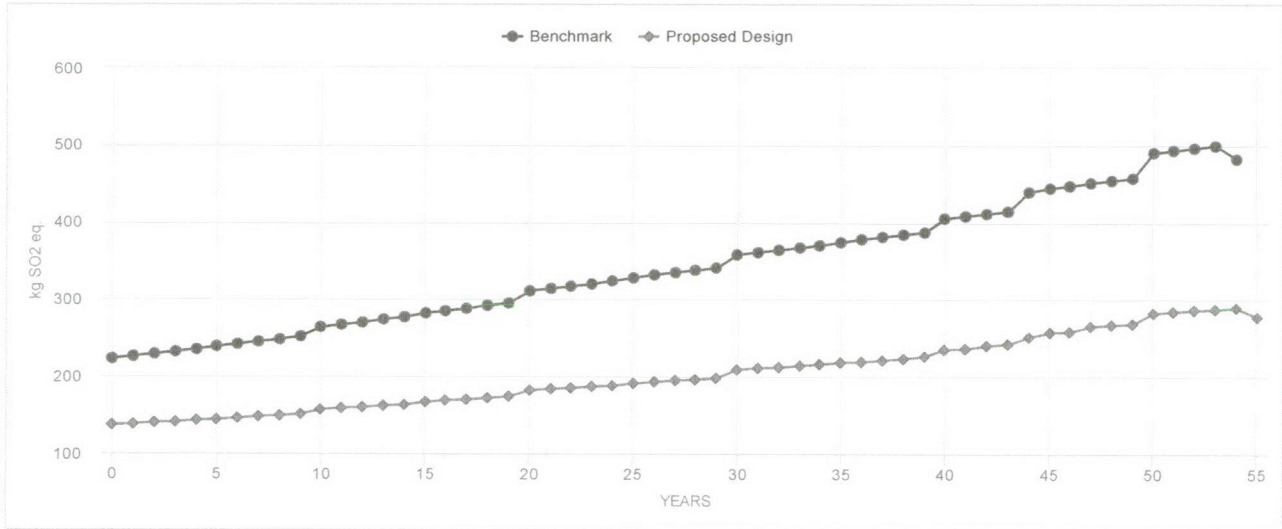
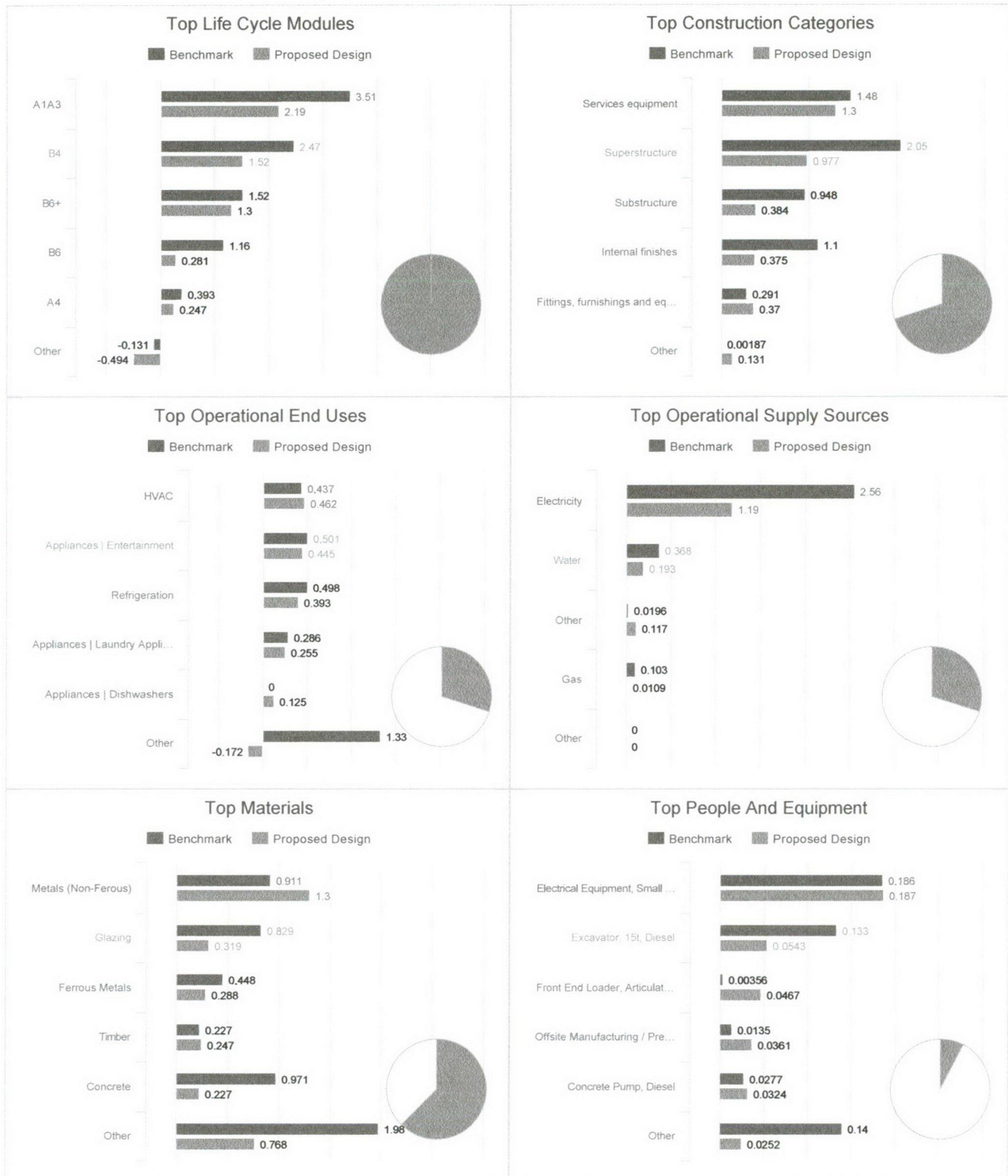


Figure 9: Top Five Acidification Potential for Soil and Water, AP chart





### Highest and Lowest Impact Materials

	Initial Materials & Construction (A1-A5)	Use Stage Materials & Construction (B1-B5)	End of Life (C1-C4)	Recycling & Energy Export (D)	Total
<b>Top 10 Impact Materials</b>					
Metals (Non-Ferrous)	144.9	95.59	0.24	-61.55	179.2
Glazing	20.94	22.67	0.1968	0	43.81
Ferrous Metals	45.75	12.57	1.283	-20.03	39.57
Timber	26.96	9.975	0.7041	-3.667	33.98
Concrete	26.35	0.01124	4.785	0	31.14
Cementitious Binders	19.18	3.555	0.9797	0	23.71
Bricks, Blocks and Pavers	11.14	0.3874	4.044	0	15.57
Finished Products	3.808	10.82	0.2486	-4.007	10.87
Plaster and Mineral Derived Products	4.954	5.414	0.4597	0	10.82
Plastics	2.776	7.198	0.05766	-0.008943	10.02

### Bottom 5 Impact Materials

Gases	0.1357	0.3984	0	0	0.5341
Plant Based Products (non Timber)	0.02939	0.1175	0	0	0.1469
Asphalt and Bitumen	0.00516	0.03745	0.001081	0	0.04369
Fibre Reinforced Plastics	0.005942	0.0298	1.854E-05	0	0.03576



### Highest and Lowest Impact Templates

	Initial Materials & Construction (A1-A5)	Use Stage Materials & Construction (B1-B5)	Integrated Energy Use (B6)	Plug Load Energy Use (B6+)	Water Supply & Treatment (B7)	End of Life (C1-C4)	Recycling & Energy Export (D)	Total
Appliances Residential Average (AUS)	2.889	15.35	0	125	0	0.02992	-4.277	139
Refrigeration, Residential Well Ventilated Fridge Recess Less than 800mm Width	4.14	20.74	0	53.99	0	0.03602	-5.056	73.85
Electrical Fittings - sockets power points wiring embodied only (m2)	63.7	2.216	0	0	0	0.09338	-15.52	50.49
Solar Gas Instantaneous Boost (HWS_App)	16.96	45.49	1.501	0	0	0.06004	-14.12	49.9
Windows, Residential Timber Alu Hybrid frame, Single Glaze, fly screen	22.01	24.16	0	0	0	0.1958	-1.502	44.87
Wall, External, Masonry, double recycled brick 90-50-90 insulated with foundations and finishes	30.9	4.445	0	0	0	5.067	-0.111	40.31
Utilities Connection to Site Residential	28.25	21.84	0	0	0	0.02986	-10.37	39.75
Ducted System Air Source Heat Pump for Heating, higher efficiency (COP/EER 3.8),	2.046	5.178	31.74	0	0	0.005749	-1.183	37.79





R32 Refrigerant

Ducted System Air Source Heat Pump for Cooling, higher efficiency (COP/EER 3.8), R32 Refrigerant	2.046	5.178	31.74	0	0	0.005749	-1183	37.79
Roof – TimberTruss/SteelSheeting/15°Pitch	34.88	9.985	0	0	0	0.5871	-13.82	31.63

Bottom 5 Impact Templates

Floor Covering – Tiles (ceramic/5mm)	0.9472	1.165	0	0	0	0.02115	0	2.133
Pool Structure – Concrete	0.988	5.926E-05	0	0	0	0.0001101	1.291E-05	0.9882
Swimming Pool Seasonal Temperature Control – No Pool Cover – Gas	0.06391	0.4128	0.000797	0	0.0003957	5.786E-07	-0.00014	0.4778
Swimming Pool – Pumps and Filters Ultra Efficient	0.03182	0.159	0	0	0	4.764E-07	-2.811E-05	0.1908
Solar PV System Residential – Zone 3 (Perth Sydney etc)	7.678	12.9	-48.11	0	0	0.2843	-43.34	-70.6

## 12.4 Eutrophication potential, EP

Figure 10: Time series Eutrophication potential, EP chart

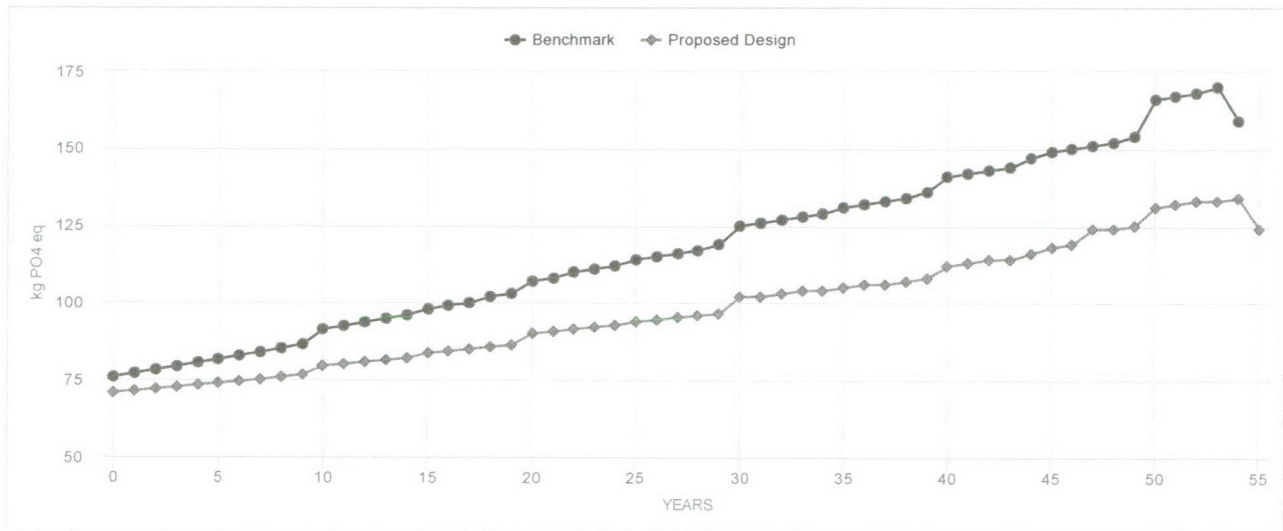
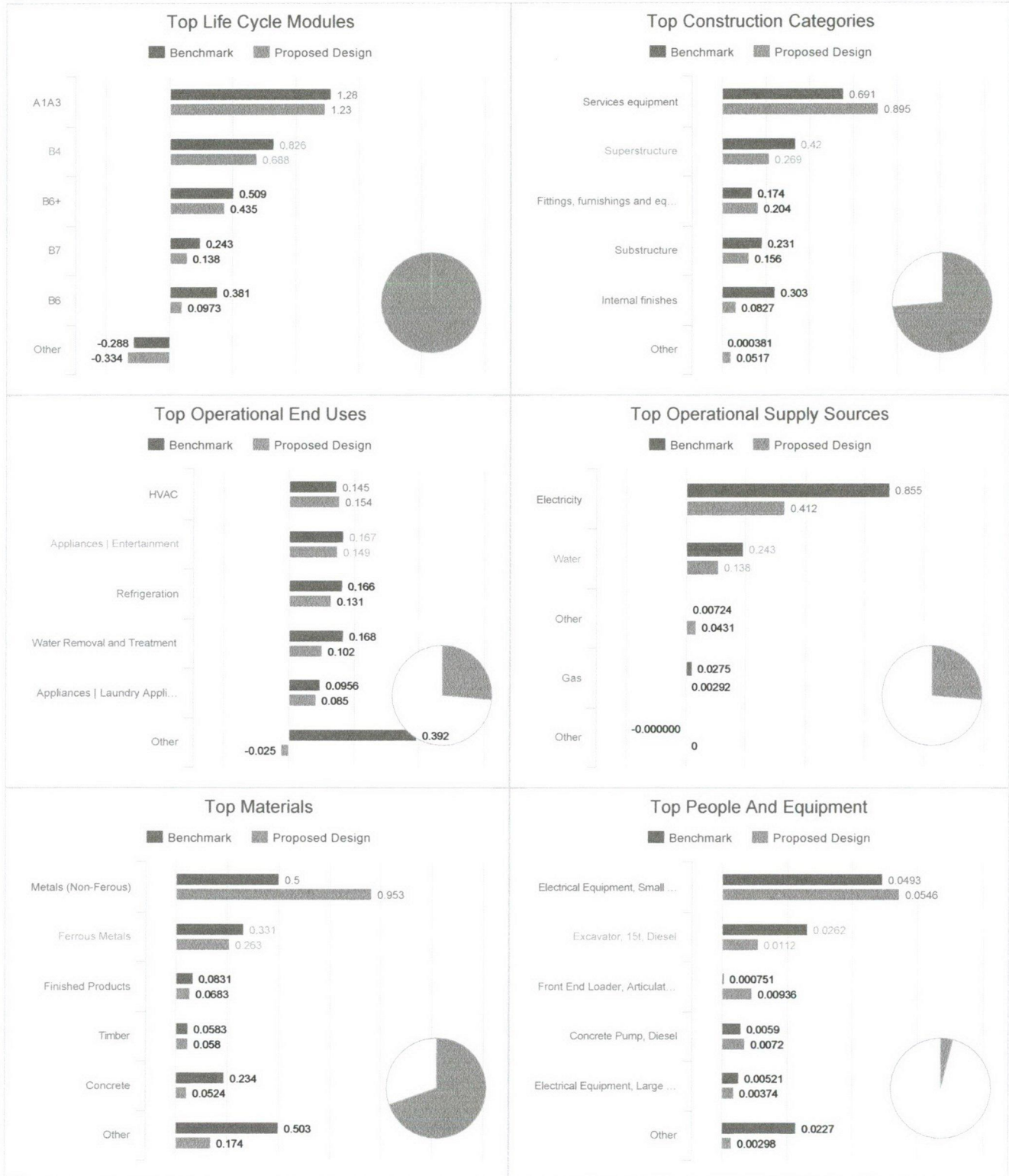


Figure 11: Top Five Eutrophication potential, EP chart





### Highest and Lowest Impact Materials

	Initial Materials & Construction (A1-A5)	Use Stage Materials & Construction (B1-B5)	End of Life (C1-C4)	Recycling & Energy Export (D)	Total
<b>Top 10 Impact Materials</b>					
Metals (Non-Ferrous)	112.9	61.84	0.05002	-43.75	131.1
Ferrous Metals	34.27	7.592	0.2842	-6.032	36.11
Finished Products	1.994	7.699	0.05416	-0.3548	9.393
Timber	6.474	2.286	0.1574	-0.94	7.978
Concrete	6.149	0.002307	1.051	0	7.203
Glazing	2.303	2.502	0.04329	0	4.849
Bricks, Blocks and Pavers	2.485	0.08006	0.8894	0	3.454
Cementitious Binders	2.585	0.4945	0.2153	0	3.294
Plaster and Mineral Derived Products	1.028	1.129	0.101	0	2.258
Carpets and Floor Coverings	0.3502	1.758	0.001416	0	2.11

### Bottom 5 Impact Materials

Gases	0.02271	0.06387	0	0	0.08659
Plant Based Products (non Timber)	0.009981	0.03992	0	0	0.0499
Asphalt and Bitumen	0.001066	0.007827	0.0002376	0	0.009131





## Highest and Lowest Impact Templates

	Initial Materials & Construction (A1-A5)	Materials & Construction (B1-B5)	Use Stage Integrated Energy Use (B6)	Plug Load Energy Use (B6+)	Water Supply & Treatment (B7)	End of Life (C1-C4)	Recycling & Energy Export (D)	Total
<b>Top 10 Impact Templates</b>								
Appliances Residential Average (AUS)	1.74	9.178	0	41.75	0	0.006529	-2.244	50.43
Electrical Fittings - sockets power points wiring embodied only (m2)	51.63	0.5318	0	0	0	0.01971	-12.79	39.39
Refrigeration, Residential Well Ventilated Fridge Recess Less than 800mm Width	2.517	12.57	0	18.03	0	0.00778	-3.329	29.8
Solar Gas Instantaneous Boost (HWS_App)	11.73	25.67	0.4019	0	0	0.01285	-8.789	29.03
Utilities Connection to Site Residential	18.77	17.53	0	0	0	0.006277	-8.538	27.76
Water Use and Treatment (eTool Turbo)	0	0	5.036E-08	0	18.99	0	0	18.99
Standard 1st Bathroom - WC/Shower-bath/Basin/WallTiles	17.26	0.9912	0	0	0	0.0219	-4.121	14.15
Ducted System Air Source Heat Pump for Heating, higher efficiency (COP/EER 3.8), R32 Refrigerant	1.437	2.957	10.6	0	0	0.001236	-0.9037	14.09
Ducted System	1.437	2.957	10.6	0	0	0.001236	-0.9037	14.09



Air Source Heat Pump for Cooling, higher efficiency (COP/EER 3.8), R32 Refrigerant

Concrete Floor - 150mm elevated slab, 40MPa, 3.8% reo (Geopolymer Concrete, 90% Fly Ash)	16.01	0	0	0	0	0.1418	-2.673	13.48
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**Bottom 5 Impact Templates**

Floor Covering - Tiles (ceramic/5mm)	0.2512	0.2995	0	0	0	0.00465	0	0.5554
Pool Structure - Concrete	0.247	2.042E-05	0	0	0	2.422E-05	1.137E-05	0.247
Swimming Pool Seasonal Temperature Control - No Pool Cover - Gas	0.02066	0.1322	0.0002535	0	0.0001266	1.223E-07	-8.91E-05	0.1532
Swimming Pool - Pumps and Filters Ultra Efficient	0.0102	0.051	0	0	0	1.018E-07	-1.026E-05	0.0612
Solar PV System Residential - Zone 3 (Perth Sydney etc)	2.021	4.271	-16.07	0	0	0.06148	-10.81	-20.53

## 12.5 Photochemical Ozone Creation Potential, POCP

Figure 12: Time series Photochemical Ozone Creation Potential, POCP chart

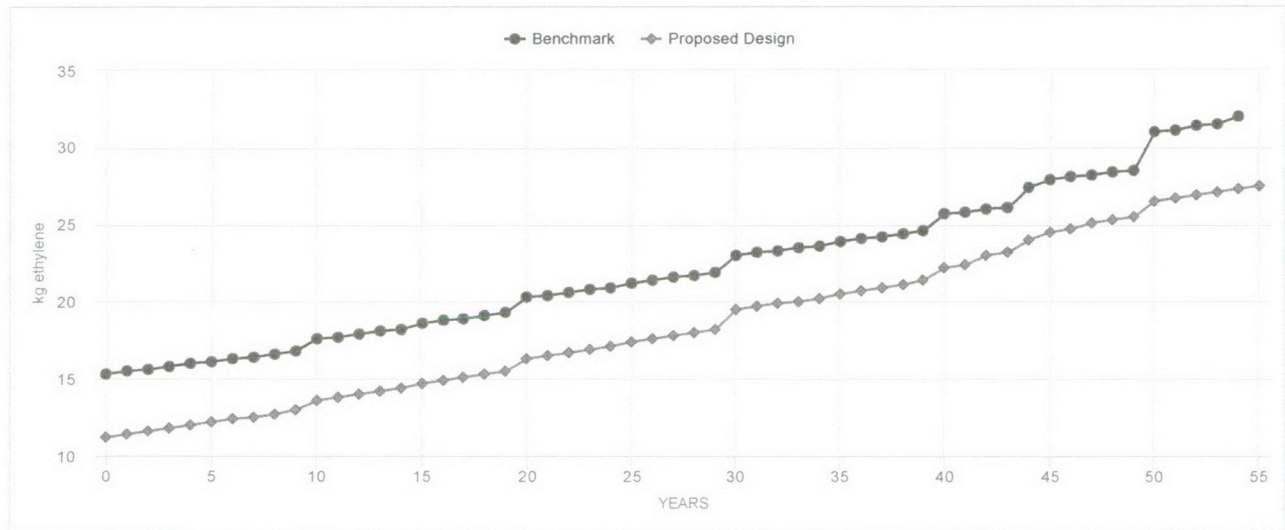
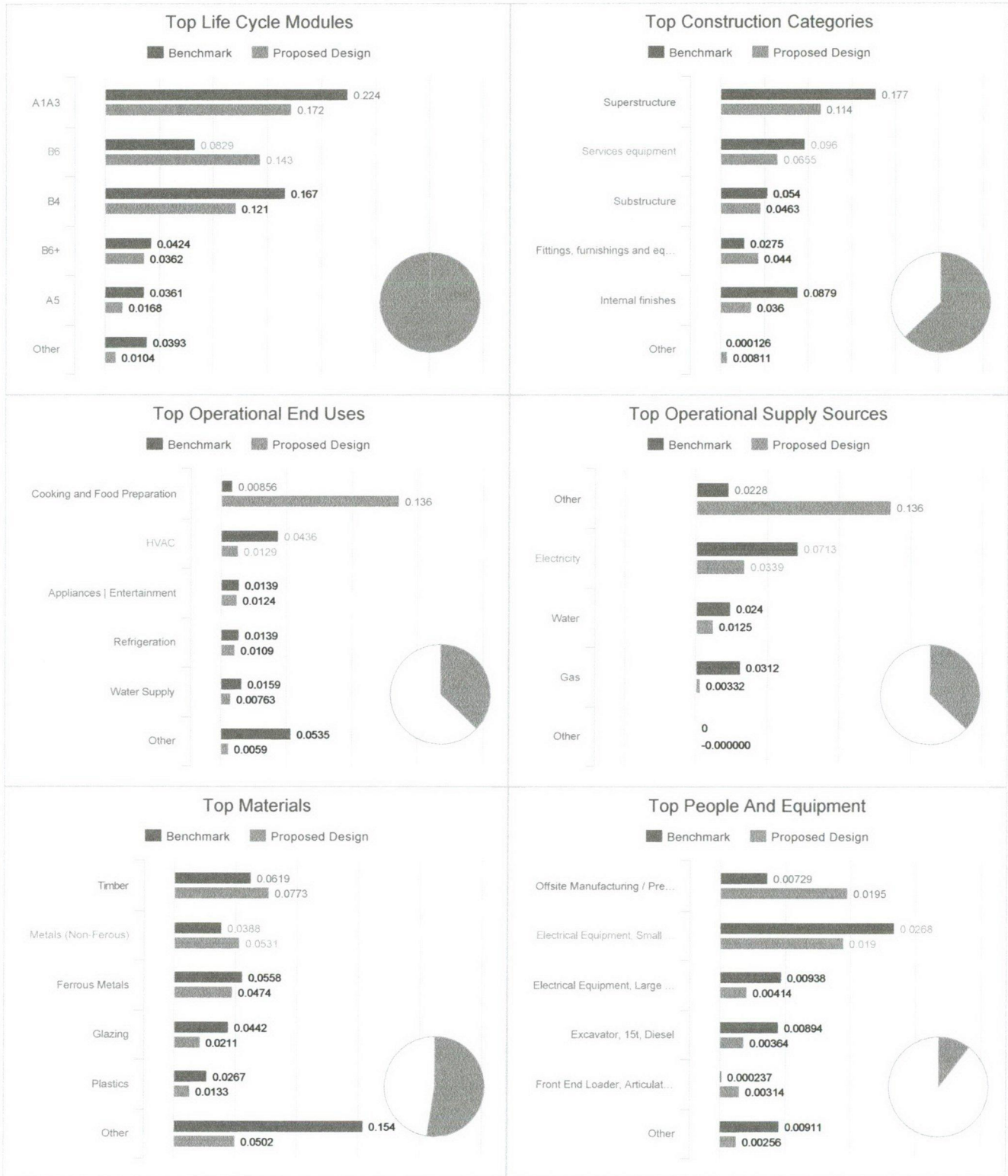


Figure 13: Top Five Photochemical Ozone Creation Potential, POCP chart







### Highest and Lowest Impact Materials

	Initial Materials & Construction (A1-A5)	Use Stage Materials & Construction (B1-B5)	End of Life (C1-C4)	Recycling & Energy Export (D)	Total
<b>Top 10 Impact Materials</b>					
Timber	7.668	2.17	0.8927	-0.09988	10.63
Metals (Non-Ferrous)	5.728	4.087	0.01565	-2.532	7.299
Ferrous Metals	5.783	1.495	0.08505	-0.8429	6.521
Glazing	1.415	1.478	0.01124	0	2.905
Plastics	0.4551	1.37	0.003472	-0.0004217	1.828
Concrete	1.172	0.0004638	0.2718	0	1.445
Bricks, Blocks and Pavers	0.8169	0.01717	0.2308	0	1.064
Cementitious Binders	0.8383	0.1575	0.05565	0	1.051
Finished Products	0.1958	0.5956	0.009515	-0.2207	0.5803
Paints and Finishes	0.1402	0.4208	0.0005373	0	0.5616

### Bottom 5 Impact Materials

Gases	0.005385	0.01572	0	0	0.02111
Plant Based Products (non Timber)	0.001653	0.006613	0	0	0.008266
Asphalt and Bitumen	0.0003763	0.002625	6.125E-05	0	0.003063
Fibre Reinforced Plastics and Resins	0.0001829	0.0009199	1.053E-06	0	0.001103



## Highest and Lowest Impact Templates

	Initial Materials & Construction (A1-A5)	Use Stage Materials & Construction (B1-B5)	Integrated Energy Use (B6)	Plug Load Energy Use (B6+)	Water Supply & Treatment (B7)	End of Life (C1-C4)	Recycling & Energy Export (D)	Total
<b>Top 10 Impact Templates</b>								
Cooking, Res Wood Stove and Oven	0.1298	0.4612	18.65	0	0	0.0006269	-0.1125	19.13
Appliances Residential Average (AUS)	0.2665	1.422	0	3.48	0	0.001937	-0.2243	4.947
Concrete Floor - 150mm elevated slab, 40MPa, 3.8% reo (Geopolymer Concrete, 90% Fly Ash)	4.938	0	0	0	0	0.1223	-0.474	4.586
Refrigeration, Residential Well Ventilated Fridge Recess Less than 800mm Width	0.39	1.953	0	1.503	0	0.002322	-0.2482	3.6
Roof - TimberTruss/SteelSheeting/15°Pitch	2.746	0.5944	0	0	0	0.4134	-0.2227	3.531
Lowest Floor - Concrete Slab, 100mm, 25MPa, 3.8% reo (m2)	3.04	0	0	0	0	0.1823	0.2409	3.463
Solar Gas Instantaneous Boost (HWS_App)	0.8763	2.721	0.4558	0	0	0.00374	-0.6201	3.437
Windows, Residential Timber Alu Hybrid frame, Single Glaze, fly screen	1.523	1.663	0	0	0	0.01128	-0.08539	3.112
Wall, External, Masonry, double	1.813	0.4558	0	0	0	0.3055	-0.003274	2.571



recycled brick  
90-50-90  
insulated with  
foundations and  
finishes

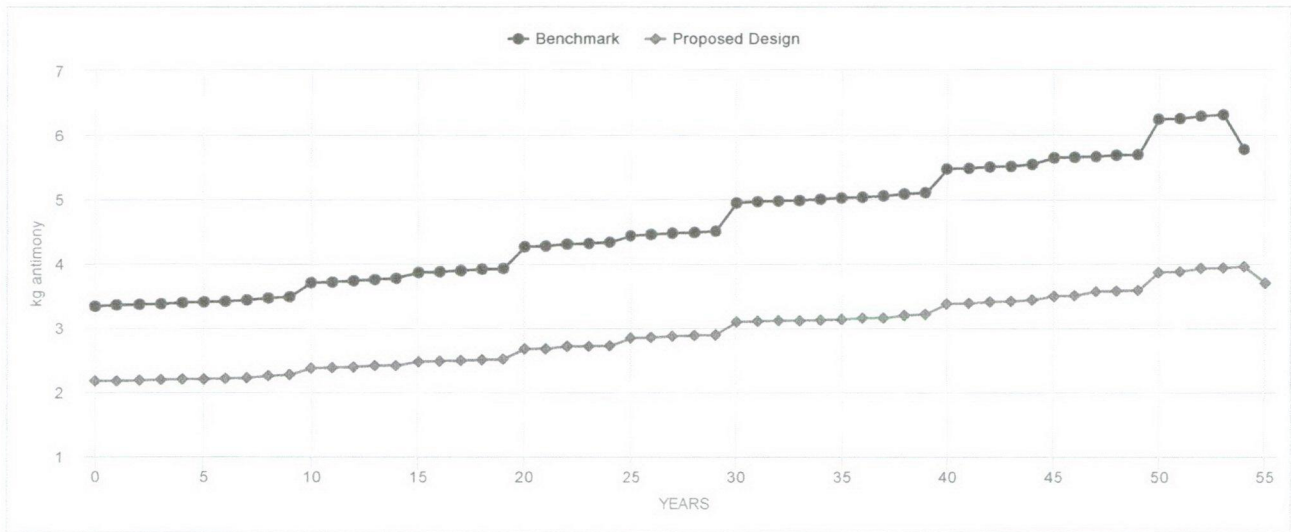
Electrical Fittings - sockets power points wiring embodied only (m2)	2.598	0.3327	0	0	0	0.005964	-0.5968	2.34
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**Bottom 5 Impact Templates**

LED Outdoor Lighting (Residential - Ultra High Efficiency 150lm/watt), m2	0.01252	0.06216	0.05784	0	0	3.652E-05	-0.002232	0.1303
Pool Structure - Concrete	0.06227	5.85E-06	0	0	0	6.287E-06	2.037E-06	0.06229
Swimming Pool Seasonal Temperature Control - No Pool Cover - Gas	0.003502	0.02266	7.493E-05	0	2.656E-05	3.773E-08	-4.309E-06	0.02626
Swimming Pool - Pumps and Filters Ultra Efficient	0.001747	0.008736	0	0	0	2.96E-08	-1.392E-06	0.01048
Solar PV System Residential - Zone 3 (Perth Sydney etc)	0.4048	0.7063	-1.339	0	0	0.01185	-1.269	-1.486

## 12.6 Abiotic Depletion Potential - Elements, ADPE

Figure 14: Time series Abiotic Depletion Potential - Elements, ADPE chart







### Highest and Lowest Impact Materials

	Initial Materials & Construction (A1-A5)	Use Stage Materials & Construction (B1-B5)	End of Life (C1-C4) Recycling & Energy Export (D)	Total	
<b>Top 10 Impact Materials</b>					
Ferrous Metals	2.798	0.9099	0.007275	-0.8196	2.896
Finished Products	0.4477	1.52	0.0009411	-0.002801	1.966
Metals (Non-Ferrous)	1.4	0.7725	0.0004541	-0.5396	1.633
Ceramics	0.1369	0.2119	0.0007953	0	0.3496
Paints and Finishes	0.05778	0.1729	8.408E-05	0	0.2307
Concrete	0.1497	4.49E-05	0.04254	0	0.1923
Timber	0.08832	0.04035	0.005641	0.0009232	0.1352
Carpets and Floor Coverings	0.01738	0.08722	5.813E-05	0	0.1046
Bricks, Blocks and Pavers	0.06128	0.001544	0.0365	0	0.09932
Insulation	0.02868	0.03057	0.0003389	0	0.05959

### Bottom 5 Impact Materials

Rubber	0.00252	0.00603	8.243E-06	0	0.008559
Plant Based Products (non Timber)	0.0001255	0.000502	0	0	0.0006275
Asphalt and Bitumen	2.734E-05	0.0002211	9.521E-06	0	0.000258
Fibre Reinforced Plastics	9.769E-06	4.967E-05	1.648E-07	0	5.96E-05



## Highest and Lowest Impact Templates

	Initial Materials & Construction (A1-A5)	Materials & Construction (B1-B5)	Integrated Energy Use (B6)	Plug Load Energy Use (B6+)	Water Supply & Treatment (B7)	End of Life (C1-C4)	Recycling & Energy Export (D)	Total
Solar PV System Residential – Zone 3 (Perth Sydney etc)	0.3501	0.9835	-0.1922	0	0	0.000984	-0.06269	1.079
Concrete Floor – 150mm elevated slab, 40MPa, 3.8% reo (Geopolymer Concrete, 90% Fly Ash)	1.111	0	0	0	0	0.003821	-0.1872	0.9277
Appliances Residential Average (AUS)	0.05899	0.3163	0	0.4996	0	0.0001587	-0.08547	0.7896
Lowest Floor – Concrete Slab, 100mm, 25MPa, 3.8% reo (m2)	0.536	0	0	0	0	0.0186	0.09849	0.6531
Roof – TimberTruss/SteelSheeting/15°Pitch	0.7682	0.1389	0	0	0	0.004663	-0.3283	0.5835
Refrigeration, Residential Well Ventilated Fridge Recess Less than 800mm Width	0.05669	0.2827	0	0.2157	0	0.000173	-0.04756	0.5077
Electrical Fittings – sockets power points wiring embodied only (m2)	0.6431	0.01389	0	0	0	0.0002912	-0.1587	0.4986
Utilities Connection to Site Residential	0.2743	0.3297	0	0	0	7.26E-05	-0.1069	0.4971
Solar Gas Instantaneous	0.1553	0.3779	0.0004199	0	0	0.0003034	-0.1106	0.4235



Boost  
(HWS\_App)

Standard Ist Bathroom - WC/Shower- bath/Basin/WallTiles	0.2895	0.1612	0	0	0	0.0007226	-0.07557	0.3759
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**Bottom 5 Impact Templates**

Floor Covering - 19mm timber, nail down (superstructure)	0.009404	0.009405	0	0	0	1.777E-06	-7.331E-05	0.01873
Demolition - Residential (End- of-Life)	0	0	0	0	0	0.01809	0	0.01809
Pool Structure - Concrete	0.0125	2.401E-06	0	0	0	9.696E-07	8.17E-07	0.01251
Swimming Pool Seasonal Temperature Control - No Pool Cover - Gas	0.0006494	0.004194	2.474E-06	0	1.926E-06	1.576E-09	-2.153E-06	0.004845
Swimming Pool - Pumps and Filters Ultra Efficient	0.0003274	0.001638	0	0	0	2.753E-09	-1.223E-07	0.001966

## 12.7 Abiotic Depletion Potential – Fossil Fuels, ADPF

Figure 16: Time series Abiotic Depletion Potential – Fossil Fuels, ADPF chart

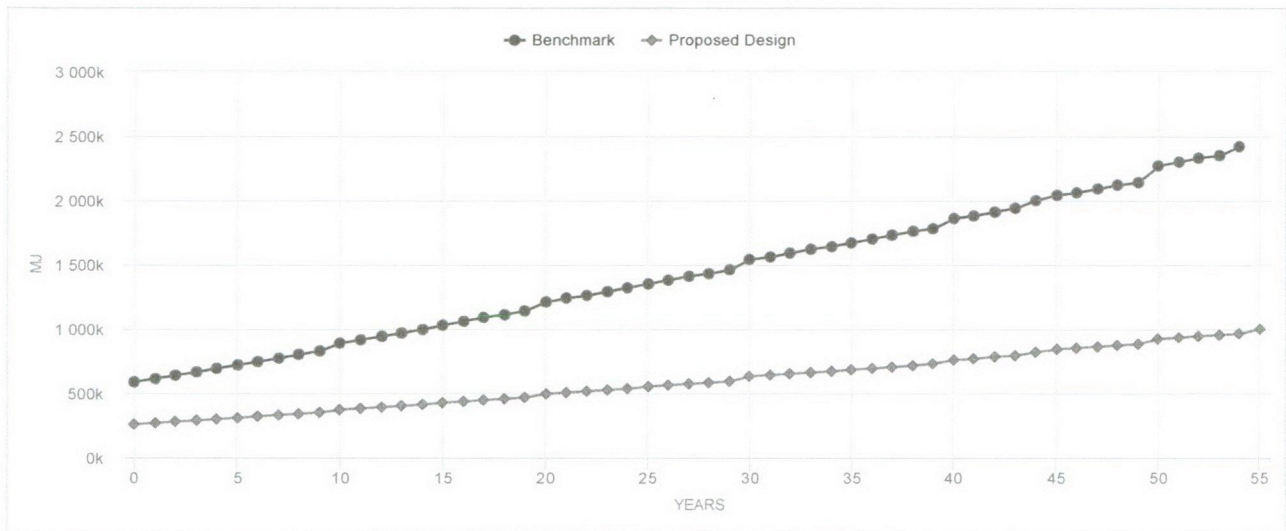
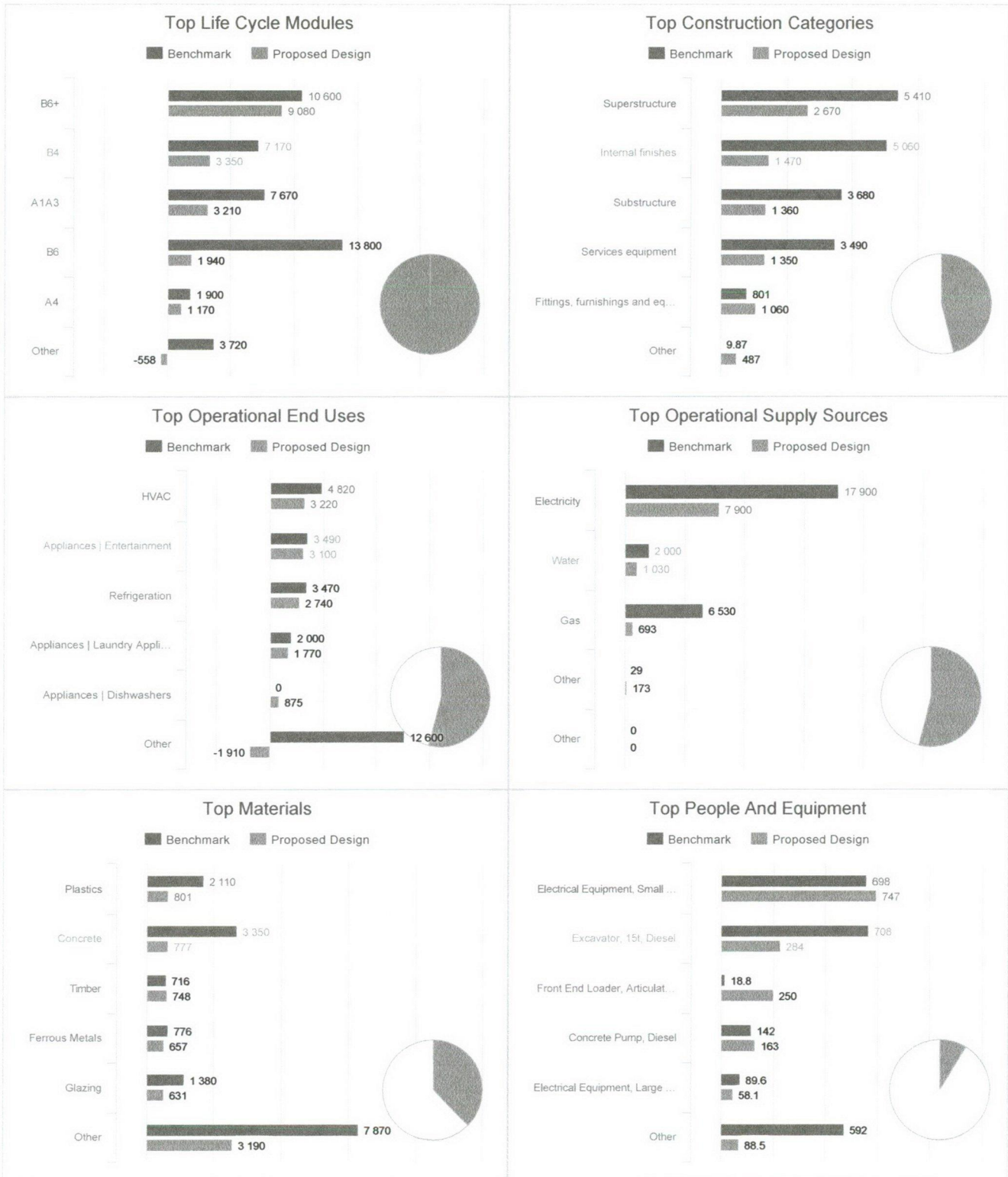




Figure 17: Top Five Abiotic Depletion Potential – Fossil Fuels, ADPF chart





### Highest and Lowest Impact Materials

	Initial Materials & Construction (A1-A5)	Use Stage Materials & Construction (B1-B5)	End of Life (C1-C4)	Recycling & Energy Export (D)	Total
<b>Top 10 Impact Materials</b>					
Plastics	35134	74671	300.2	-33.11	110073
Concrete	82491	37.81	24354	0	106884
Timber	65388	26964	2902	7554	102810
Ferrous Metals	89289	32259	6326	-37498	90377
Glazing	41178	44560	1001	0	86739
Bricks, Blocks and Pavers	52719	1396	20575	0	74690
Cementitious Binders	43368	8530	4986	0	56884
Metals (Non-Ferous)	29696	43148	1292	-19051	55086
Carpets and Floor Coverings	7737	38853	32.76	0	46623
Finished Products	15077	37408	1311	-8591	45205

### Bottom 5 Impact Materials

Gases	321.4	911.9	0	0	1233
Plant Based Products (non Timber)	102	408.3	0	0	510.3
Asphalt and Bitumen	39.57	270.4	5.505	0	315.5
Fibre Reinforced Plastics	17.52	88.12	0.09435	0	105.7



### Highest and Lowest Impact Templates

	Initial Materials & Construction (A1-A5)	Use Stage Materials & Construction (B1-B5)	Integrated Energy Use (B6)	Plug Load Energy Use (B6+)	Water Supply & Treatment (B7)	End of Life (C1-C4)	Recycling & Energy Export (D)	Total
<b>Top 10 Impact Templates</b>								
Appliances Residential Average (AUS)	7283	39474	0	871534	0	151	-6455	91988
Refrigeration, Residential Well Ventilated Fridge Recess Less than 800mm Width	8006	40387	0	376378	0	184.5	-5111	419845
Ducted System Air Source Heat Pump for Heating, higher efficiency (COP/EER 3.8), R32 Refrigerant	1936	10838	221316	0	0	29.73	-399.6	233721
Ducted System Air Source Heat Pump for Cooling, higher efficiency (COP/EER 3.8), R32 Refrigerant	1936	10838	221316	0	0	29.73	-399.6	233721
Solar Gas Instantaneous Boost (HWS_App)	11098	54296	95270	0	0	313.2	-7772	153205
Wall, External, Masonry, double recycled brick 90-50-90 insulated with foundations and finishes	104962	18917	0	0	0	25773	194.4	149847
Water Use and Treatment (eTool Turbo)	0	0	0.001051	0	141076	0	0	141076
Windows, Residential Timber Alu Hybrid	45084	51187	0	0	0	1000	-2144	95128



frame, Single  
Glaze, fly screen

Wall Internal Type 1, Masonry, Single Brick Wall (90mm) uninsulated with foundations and finishes	65241	14843	0	0	0	8341	97.22	88524
Wall Internal Type 2, Masonry, Single Brick Wall (90mm) uninsulated with foundations and finishes	65241	14843	0	0	0	8341	97.22	88524

**Bottom 5 Impact Templates**

Floor Covering - Tiles (ceramic/5mm)	3855	4942	0	0	0	107.6	0	8905
Pool Structure - Concrete	4742	0.309	0	0	0	0.5601	0.04571	4743
Swimming Pool Seasonal Temperature Control - No Pool Cover - Gas	269.6	1752	16.36	0	2.472	0.003067	-0.04514	2040
Swimming Pool - Pumps and Filters Ultra Efficient	134.9	674.3	0	0	0	0.002493	-0.02548	809.3
Solar PV System Residential - Zone 3 (Perth Sydney etc)	20127	39920	-335443	0	0	1504	-320240	-594131



## 15 Conclusion

The report shows that the Proposed Design has lower Global Warming Potential, GWP impact than the Benchmark Design. The **Non-integrated Energy (B6+)** GWP Impacts are the most dominant life cycle module in the Proposed Design Design followed by the **Replacement (B4)** and then **Product Stage (A1A3)**.

Further analysis reveals:

- The **Superstructure** is the highest impact construction category,
- **HVAC** is the highest operational impact by demand category,
- The **Electricity** is this highest impact operational impact by supply source,
- **Cementitious Binders | Mortars and Renders | 1 cement : 4 sand** is the highest impact material category,
- **Electrical Equipment, Small with transport and tradestaff, Electricity** is the highest people and equipment impact

In addition to GWP, other indicators were included in the study, the results of which are summarised below.

The Proposed Design shows an expected performance improvement against the Benchmark Design for 6 indicators:

- 59% **saving** in GWP impacts
- 43% **increase** in ODP impacts
- 43% **saving** in AP impacts
- 24% **saving** in EP impacts
- 16% **saving** in POCP impacts
- 37% **saving** in ADPE impacts
- 59% **saving** in ADPF impacts

### Determination Advice Notes:

1. This is a development approval issued under the City of Vincent Local Planning Scheme No. 2 and the Metropolitan Region Scheme only. It is not a building permit or an approval to commence or carry out development under any other law. It is the responsibility of the applicant/owner to obtain any other necessary approvals and to commence and carry out development in accordance with all other laws.
2. If the development the subject of this approval is not substantially commenced within a period of two years, or another period specified in the approval after the date of determination, the approval will lapse and be of no further effect.
3. Where an approval has so lapsed, no development must be carried out without the further approval of the local government having first been sought and obtained.
4. If an applicant or owner is aggrieved by this determination there is a right of review by the State Administrative Tribunal in accordance with the *Planning and Development Act 2005* Part 14. An application must be made within 28 days of the determination.
5. This approval is not an authority to ignore any constraint to development on the land, which may exist through statute, regulation, contract or on title, such as an easement or restrictive covenant. It is the responsibility of the applicant and not the City to investigate any such constraints before commencing development. This approval will not necessarily have regard to any such constraint to development, regardless of whether or not it has been drawn to the City's attention.
6. The applicant is responsible for ensuring that all lot boundaries as shown on the approved plans are correct.
7. NO verge trees shall be removed. The verge trees shall be RETAINED and PROTECTED from any damage including unauthorised pruning.
8. An Infrastructure Protection Bond together with a non-refundable inspection fee shall be lodged with the City by the applicant, prior to the commencement of works, and will be held until all building/development works have been completed and any disturbance of, or damage to the City's infrastructure, including verge trees, has been repaired/reinstated to the satisfaction of the City. An application for the refund of the bond shall be made in writing. The bond is non-transferable.
9. The movement of all path users, with or without disabilities, within the road reserve, shall not be impeded in any way during the course of the building works. This area shall be maintained in a safe and trafficable condition and a continuous path of travel (minimum width 1.5 metres) shall be maintained for all users at all times during construction works. Permits are required for placement of any material within the road reserve.
10. The owners of the subject land shall obtain the consent of the owners of relevant adjoining properties before entering those properties in order to make good the boundary walls.
11. The visual privacy requirements of Clause 5.4.1 C1.2 of the R Codes Volume 1 states that *"screening devices such as obscure glazing, timber screens, external blinds, window hoods and shutters are to be at least 1.6m in height, at least 75 percent obscure, permanently fixed, made of durable material and restrict view in the direction of the overlooking into any adjoining property."*
12. All new crossovers to lots are subject to a separate application to be approved by the City. All new crossovers shall be constructed in accordance with the City's Standard Crossover Specifications, which specify that the portion of the existing footpath traversing the proposed crossover (subject to the footpath being in good condition as determined by the Infrastructure and Environment Services Directorate), must be retained. The proposed crossover levels shall match into the existing footpath levels. Should the footpath not to be in satisfactory condition, it must be replaced with in-situ concrete panels in accordance with the City's specification for reinstatement of concrete paths.
13. All stormwater produced on the subject land shall be retained on site, by suitable means to the full satisfaction of the City. No further consideration shall be given to the disposal of stormwater 'offsite' without the submission of a geotechnical report from a qualified consultant. Should approval to dispose of stormwater 'offsite' be subsequently provided, detailed design drainage plans and associated calculations for the proposed stormwater disposal shall be lodged together with the building permit application working drawings.