

# The Green Lung

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1 Maitland Rd, Mayfield

## Abstract

The Green Lung facilitates a new and improved multi-use design concept, inspired by the niche market of DfMA (Design for Manufacture and Assembly) design, consisting of both Volumetric and Kit-Of-Part (KOP) elements. The development accommodates to a broad demographic, by contributing to its surrounding environment, ultimately cleansing the polluted air of Newcastle. After a long history of coal mining, the imperative of the design behind Green Lung has focused on the indoor environmental quality of air, by contributing a green oasis. Nestled into the industrial area of Mayfield; the Green Lung will work away, pumping out clean air amongst its residents and the surrounding environment. Where the central lift itself, will act as the lung; as residents utilise the internal area, the lift will pump polluted air through an array of filtering systems to produce clean air for all. The multi-residential development will provide accommodation to students, individuals, and small families, built above a bustling assortment of commercial and retail spaces, open to the public. The materials and variety of plant will reflect the history of coal within the area, through natives and locally sourced materials. The Green Lung has taken inspiration from both the natural and industrial world to provide a sustainable solution that will be self-sufficient whilst providing its direct environment with healthy air.

## Executive Summary

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The Green Lung proposal reconfigures the existing master plan, through the removal of the existing internal spaces, whilst maintaining the external skin of the building. Construction will consist of re-leveling the ground and providing a durable support system to maintain the weight load of our multi-storey development. The new construction will reconfigure the existing café, yoga and workshops, whilst including green garden pockets and a central courtyard, housing the lift, a new convenience store will be included along with a storage facility which will house garbage bins and the main to all services provided to residents. The new units above will consist of three different categories; x6 Student, x4 1 Bedroom and x4 2 Bedroom Units, which are designed with a volumetric frame, that provides an interlocking system for the KOP walls to be slotted in. Manufacturing of all DfMA components will be done so at the 'Virid Group' warehouse, which is located 206km from site. Units will be fully equipped with access to all services, where each will consist of a balcony area, open to the outdoors. This assurance of combining nature into our design is important as the process of plants photosynthesising is the inspiration behind our design to be able to clean the air. Materials within the concept, consist of tabby – lime render made by oysters; as oysters were originally found in abundance within the Mayfield area. Charred Timber cladding to reflect the charred surfaces of coal fragments staining its environment. Glulam timber is found internally within the units, providing an innovative material that is durable and utilises sustainable processes. Native plants to Mayfield area are found in abundance where mesh corridors intertwine the built and the natural together, blurring what indoors and what's outdoors.

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1 Maitland Rd, Mayfield

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## 1.0 Introduction

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The purpose of this report is to provide an in-depth evaluation for the tendered construction company. The following assessment is provided to the public for a greater understanding of the proposed development. In our proposal we are suggesting to build upon four different divided lots, and to recombine them into a multi-disciplinary development for the purpose of the brief.

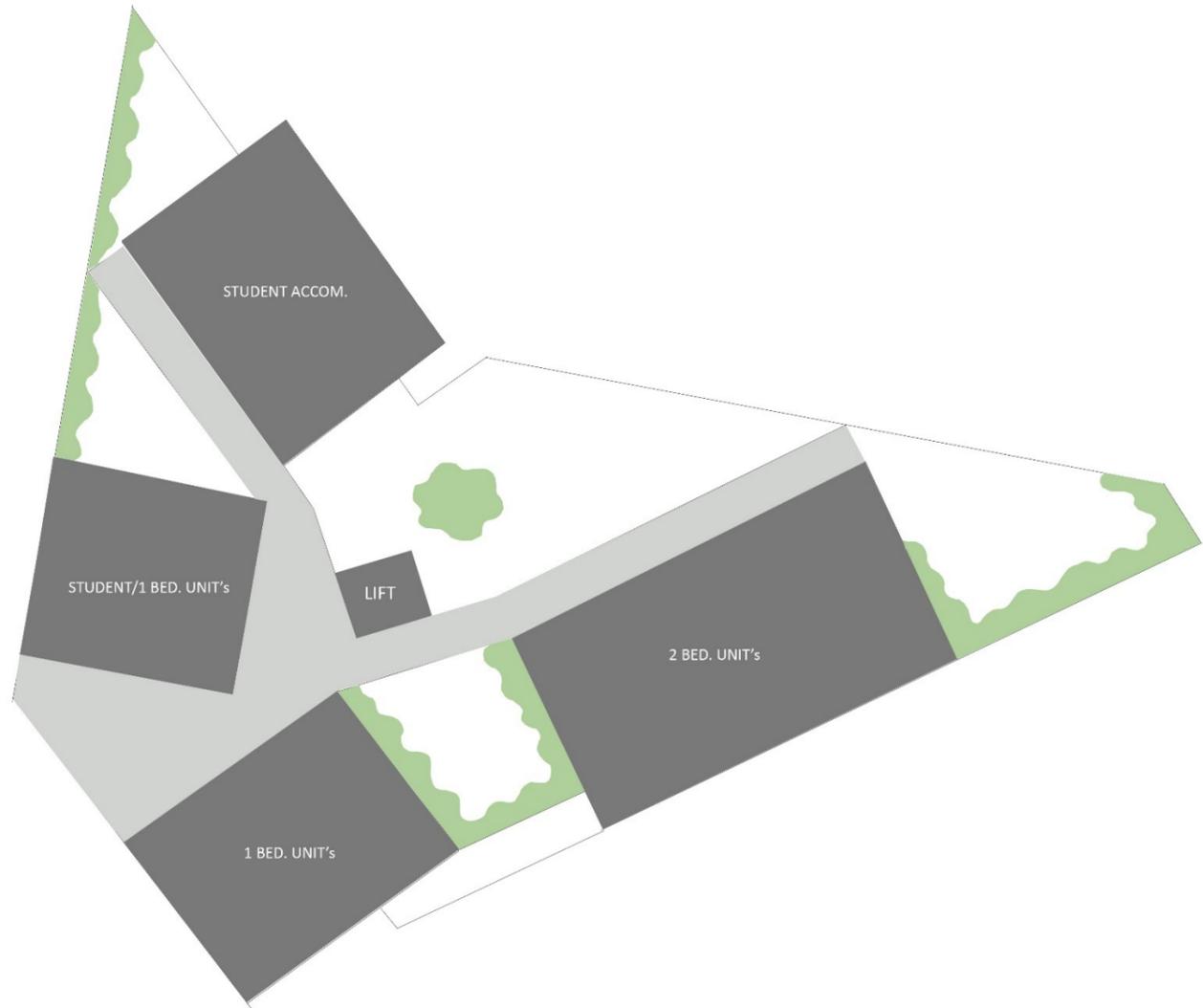
### Site Information:

1. Lot3A, Section C, DP229 (residing occupant)
2. Lot3, DP187624 (Earthie Yoga Studio)
3. Lot2, DP187624 (Equium Social)
4. Lot11, DP1239193 (Workshops)

All four lots are adjacent to each other and will not interfere with the surrounding environment by being developed. The proposal will improve the area by providing a sustainable concept design that will contribute to the suburb of Mayfield.

## 2.0 Design Concept

### 2.1 Architectural Plans





### 3.0 Material Specifications & Plant Schedule

Glulam Unit Framing:

Can Assume the long 9m beam to be a 'simply supported beam'

\* Subjected to an 'ultimate' uniformly distributed load (UDL) of  $1.2 \times G + 1.5 \times Q$ .

- G = 'Permanent Load' i.e. dead load. Approx = the weight of the floor of the unit. (think you said it would be concrete?)  
 therefore can assume 100mm thick slab @  $2.6 \text{ tonne/m}^3$   
 $\rightarrow 3\text{m}/2 \times 2600 \text{ kg} \times 10 \text{ m}^2/\text{s}^2 \times 0.1 \text{ m} = 3.9 \text{ kN/m}$   
 width density of concrete gravity thickness

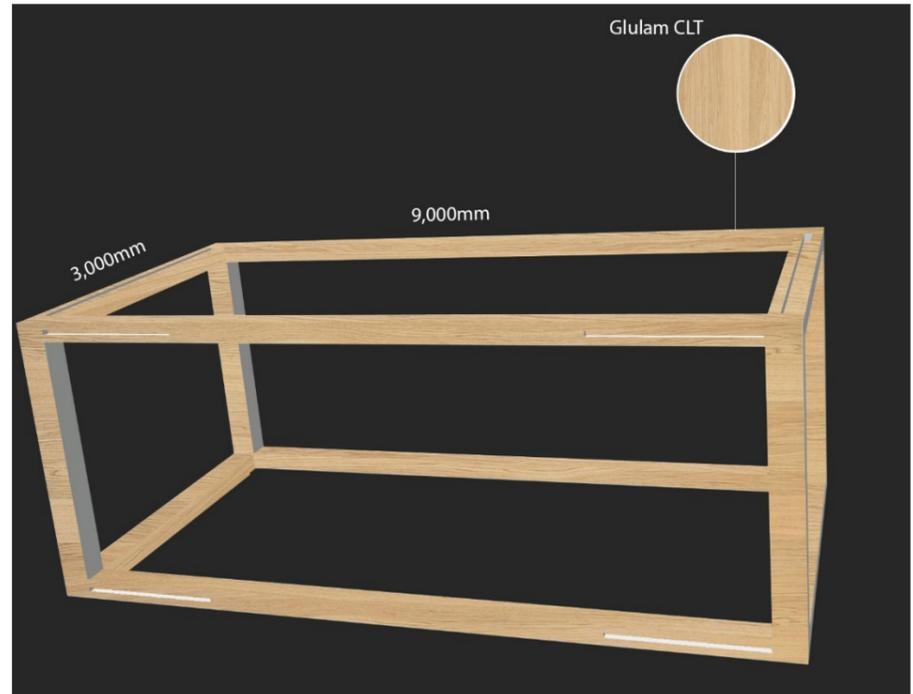
- Q = 'Imposed Load' i.e. furniture and people etc  
 From AS 1170.1 Table 3.1 = 1.5 kPa  
 $\rightarrow 1.5 \times 3\text{m}/2 = 2.25 \text{ kN/m}$

$\therefore$  Therefore UDL =  $1.2 \times 3.9 + 1.5 \times 2.25 = 8.1 \text{ kN/m}$

Using  $\frac{wL^2}{8}$  length, will give maximum (bending moment) force in the beam.

$\rightarrow \frac{8.1 \times 9^2}{8} = 82 \text{ kNm}$

So your beam needs to be strong enough to be strong enough. (This might be on a product page/data sheet if your using an actual product)



Material Schedule: Locally Sourced

External		Internal	
	Charred Timber Cladding		Glulam Timber
	Tabby Concrete		Lime Render

Plant Schedule: Natives of Mayfield

**Ground Cover**

Senecio Leucostachys    Senecio Serpens    Euphorbia Myrsinites    Viola Hederacea    Kalanchoe Quicksilver    Stachys Byzantina

**Grass**

Panicum Virgatum 'Heavy Metal'    Ammophila Arenaria

**Shrub**

Yucca recurvifolia    Agave Americana    Correa Alba    Westringia Fruticosa    Crassula Ovata 'Blue Bird'    Banksia Integrifolia Sentinel    Thaumaphyllum Xanadu    Kalanchoe beharensis 'Oak Leaf'

**Tree**

Leptospermum Laevigatum

**Vine**

Sedum morganianum    Dichondra Monrovia    Casuarina Glauca    Epiphyllum Chrysocardium    Platycerium Superbum    Rhipsalis

## 4.0 Statement of Environmental Effects

This Statement of Environmental Effects has been prepared for the demolition of the existing internal spaces at 1 Maitland Rd, Mayfield, whilst maintaining the existing external facade and constructing a mixed-use development, comprising of a multi-residential typology for a broad demographic and ground floor retail tenancy, open to the public. This Statement of Environmental Effects has been prepared to address the proposed development in accordance with councils LEP and DCP. The statement describes the subject site and surrounding area, together with the relevant planning controls and policies relating to the site and type of development. The subject site is located in Newcastle and is within the Newcastle City Council. The site itself is naturally oriented North-East and the existing topography of the site falls towards South-West. The site currently accommodates the Social Equium café, Earthie Yoga Studio, a single living occupant and multiple workshop spaces. Essential services are available to the site such as water, sewer and electricity. The proposal consists of a new multi-level plan, consisting of 1-bedroom units, 2-bedroom units and student accommodation and a reconfigured ground floor commercial space.

General Principles	
<b>Zoning</b>	The Site is located within a R4 (High Density Residential) zoning and the proposed development is permissible.
<b>Mine Subsidence</b>	The Site is not located within a Mines Subsidence area, this is not relevant.
<b>Bushfire</b>	The site is not located within a Bushfire Prone Area; this is not relevant.
<b>Flood Management</b>	The site is not located within a Flood Area; this is not relevant.
<b>Acid Sulphate Soils</b>	The site is not located within an Acid Sulphate Area; this is not relevant.
<b>Heritage Provisions</b>	The site is not located within a Heritage Conservation Area; this is not relevant.
<b>Tree Preservation &amp; Management</b>	The Proposed development does not include the removal of vegetation on site.
<b>Contamination</b>	The site is not located within contaminated land; this is not relevant.
<b>Noise &amp; Vibration</b>	All noise, vibration and air emission levels of occupants will comply with Australian Standards, and EPA requirements. It is therefore deemed that an Acoustic Report will not be required.
<b>Erosion &amp; Sediment Control</b>	Erosion and sediment control measures are adequate to ensure the stability of the site and that there is no impact on roads, waterways, adjacent property, or construction sequence over the duration of the works. Please refer to Erosion and Sediment Control Plan submitted with this application.
<b>Waste Management</b>	Any excavated material during construction will be incorporated into the landscaping and stormwater levels of the site. All construction waste is to be removed by the contractor on completion of works and disposed of offsite. The proposed development will not create toxic waste. Please refer to Waste Management Plan submitted with this application.
Design Principles	
<b>Height of Buildings</b>	The maximum height of the proposed development can be 11m, being compliant with the height requirement.
<b>Street Setback and Streetscape</b>	The front setback of the proposed development is remaining the same which is in accordance with the DCP requirements. The proposed development is compatible with the existing context and considered not to adversely impact the immediate vicinity.
<b>Side &amp; Rear Setbacks</b>	The proposed development complies with the DCP requirements regarding side and rear setbacks.
<b>Site Coverage</b>	The site has an area of 1085m <sup>2</sup> . The proposed development will have a site coverage of approximately 713m <sup>2</sup> , being 66% of the total site.
<b>Landscaping</b>	The proposed development will provide 372m <sup>2</sup> of calculated landscaping across the site, equating to 33% of the site area, being compliant with the DCP requirements.
<b>Private Open Space</b>	The proposed development provides adequate private open space areas accessible from living areas receiving compliant levels of solar access.
<b>Solar Access and Overshadowing</b>	The proposed development has been designed to best accommodate development controls in consideration of the orientation of the site. The living areas and private open space are receiving an adequate level of solar access. The proposed development will not significantly increase impacts of overshadowing to the surrounding properties and therefore remains compliant with the requirements of the DCP.
<b>Privacy</b>	The proposed development will not interfere with adjacent dwellings, with no windows from habitable areas or outdoor areas looking into the adjacent dwellings and their common areas. Screening vegetation and fencing will be incorporated into the proposal to increase privacy.
<b>Vehicular Access and Car Parking</b>	The proposed development will have little impact to increase traffic to the area. The proposal provides adequate parking and manoeuvring areas.
<b>View Sharing</b>	The proposed development will not have any significant impact on views of the adjoining properties.
<b>Cut/Fill and Retaining Walls</b>	The proposed development will have little cut and fill over the site and any excavated material will be used on site.
<b>Energy Efficiency and Environmental Performance</b>	The proposed development has followed closely to guidelines provided by the Living Building Challenge.
<b>Stormwater</b>	Rainwater will be directed into a rainwater tank for re-use on site. Overflow from the water tank will be directed into councils existing stormwater system. Refer to architectural documentation for further details.

Generally, the proposal is a permissible use and it is considered that this proposal represents an appropriate development for the building and the area. It is believed the standards are satisfied as the proposal outlined will not exert any detrimental effects on the environment and shall be compatible with the character and scale of the area. The selection of a sympathetic colour scheme and materials shall enhance the residential amenity of the area. The proposed development has been identified as local development under the terms of the Environmental Planning and Assessment Act 1979 and has been assessed against the requirements of the Act, Council's Local Environmental Plan and Development Control Plan. In this regard it is considered that the proposal satisfies the aims and objectives of the Above Plans and Acts, respectively.

In summary, it is therefore considered that the development is an appropriate and visually suitable proposal for the site and will have a positive effect on the local amenity of the area.

## 5.0 Waste Management Plan

Demolition/Excavation Phase				
Materials on Site		Destination		
Type of Material	Estimated Volume	Reuse & Recycling		Disposal
		ON SITE	OFF-SITE	Contractor
Excavation Material	2m <sup>3</sup>	Keep and reuse topsoil for cut, fill and landscaping	N/A	
Green waste	2m <sup>3</sup>	To be separated and collected on site	To be removed by contractor on completion of works and disposed of or recycled off site	Concrush or Awaba Waste Facility
Bricks	3m <sup>3</sup>	To be separated and collected on site	To be removed by contractor on completion of works and disposed of or recycled off site	Concrush
Concrete	3m <sup>3</sup>	To be separated and collected on site	To be removed by contractor on completion of works and disposed of or recycled off site	Concrush
Timber	6m <sup>3</sup>	To be separated and collected on site	To be removed by contractor on completion of works and disposed of or recycled off site	Awaba Waste Facility
Plasterboard	6m <sup>3</sup>	To be separated and collected on site	To be removed by contractor on completion of works and disposed of off site	Awaba Waste Facility
Metals	2m <sup>3</sup>	To be separated and collected on site	To be removed by contractor on completion of works and disposed of or recycled off site	Awaba Waste Facility or Lucky's Scrap Metals
Construction Phase				
Materials on Site		Destination		
Type of Material	Estimated Volume	Reuse & Recycling		Disposal
		ON SITE	OFF-SITE	Contractor/Site
Excavation Material	Nil	N/A	N/A	N/A
Green waste	Nil	N/A	N/A	N/A
Bricks	2m <sup>3</sup>	To be separated and collected on site	To be removed by contractor on completion of works and disposed of or recycled off site	Concrush or Awaba Waste Facility
Concrete	2m <sup>3</sup>	N/A	To be removed by contractor on completion of works and disposed of or recycled off site	Concrush
Timber	0.5m <sup>3</sup>	To be separated and collected on site	To be removed by contractor on completion of works and disposed of or recycled off site	Awaba Waste Facility
Plasterboard	0.5m <sup>3</sup>	To be separated and collected on site	To be removed by contractor on completion of works and disposed of off site	Awaba Waste Facility
Metals	1m <sup>3</sup>	N/A	To be removed by contractor on completion of works and disposed of or recycled off site	Awaba Waste Facility or Lucky's Scrap Metals
Other	Plastic bottles, cardboard boxes, lunch wrapping etc	To be placed in bins on-site	To be removed by contractor on completion of works and disposed of off site	Awaba Waste Facility
Use of Premises Phase				
Type of Waste To Be Generated	Estimated Volume Per Week Per Unit	Proposed On-Site Storage And Treatment Facilities	Destination	
Paper	50L	Recycle bin located on-site	To Recycling site by Council Waste Contractor	
Food and General Waste	220L	Temporary storage bin in kitchen, council bin located on-site	To landfill site by Council Waste Contractor	
Glass & Plastic Bottles	50L	Recycle bin located on-site	To Recycling site by Council Waste Contractor	
Organic/Green Waste	80L	Green Recycle bin located on-site	To Recycling site by Council Waste Contractor	

## 6.0 Cost Estimate

As seen below, we are estimating that this development will cost approximately \$21,090,883.25.

PROCUREMENT				BUDGET
<b>Supply and Fabricate</b>				
Floors	3766.00	m3	\$ 1,250.00	\$ 4,707,500.00
Walls	1042.00	m3	\$ 1,250.00	\$ 1,302,500.00
Columns	716.00	m3	\$ 2,000.00	\$ 1,432,000.00
Beams	2502.00	m3	\$ 2,000.00	\$ 5,004,000.00
Stairs	139.00	m3	\$ 2,000.00	\$ 278,000.00
Bracing (steel)	94.00	t	\$ 6,000.00	\$ 564,000.00
<b>Other</b>				
Shop Drawings (engineering input)	1.00	item	\$ 250,000.00	\$ 250,000.00
Certification (Fire)	10.00	no	\$ 10,000.00	\$ 100,000.00
Certification (Acoustic)	10.00	no	\$ 2,500.00	\$ 25,000.00
SUB-TOTAL				\$ 13,663,000.00
<b>LOGISTICS `</b>				
<b>Fees, Taxes and Charges</b>				
Logistics Agent / Customs Broker	1.00	item	\$ 50,000.00	\$ 50,000.00
Import Duty	5.00	%	\$ 136,630.00	\$ 683,150.00
Insurance (transit protection)	2.50	%	\$ 136,630.00	\$ 341,575.00
<b>Transport+Storage</b>				
Campbelltown - Newcastle	8165.00	m3	\$ 151.52	\$ 1,237,121.21
Storage (sorting/scheduling)	20.00	weeks	\$ 10,000.00	\$ 200,000.00
Campbelltown - Newcastle - Mayfield	8165.00	m3	\$ 37.88	\$ 309,280.30
SUB-TOTAL				\$ 2,821,126.52
<b>ERECTION</b>				
<b>Installation</b>				
Floors	24593.00	m2	\$ 40.00	\$ 983,720.00
Walls	4877.00	m2	\$ 40.00	\$ 195,080.00
Columns	3050.00	m	\$ 80.00	\$ 244,000.00
Beams	11069.00	m	\$ 80.00	\$ 885,520.00
Stairs	481.00	m2	\$ 100.00	\$ 48,100.00
Bracing (steel)	124.00	no	\$ 1,000.00	\$ 124,000.00
<b>Material Handling</b>				
Mobile Crane	480.00	hrs	\$ 250.00	\$ 120,000.00
Crawler Crane	1200.00	hrs	\$ 50.00	\$ 60,000.00
Forklift	20.00	weeks	\$ 1,000.00	\$ 20,000.00
<b>Protection (damage and weather)</b>				
Floors	24593.00	m2	\$ 5.00	\$ 122,965.00
Walls	4877.00	m2	\$ 5.00	\$ 24,385.00
Columns	3050.00	m	\$ 5.00	\$ 15,250.00
Beams	11069.00	m	\$ 5.00	\$ 55,345.00
Stairs	481.00	m2	\$ 50.00	\$ 24,050.00
<b>Rectification (sanding and finishing)</b>				
Walls (External Brick wall)	4877.00	m2	\$ 20.00	\$ 97,540.00
Columns	3050.00	m	\$ 5.00	\$ 15,250.00
Beams	11069.00	m	\$ 5.00	\$ 55,345.00
Stairs	481.00	m2	\$ 20.00	\$ 9,620.00
<b>Sundries</b>				
Sundries and connection allowance (5-8% of the timber supply price)	8.00	%	\$ 136,630.00	\$ 1,093,040.00
SUB-TOTAL				\$ 4,193,210.00
<b>CONTINGENCY</b>				
Procurement	2.00	%	\$ 136,630.00	\$ 273,260.00
Logistics	2.00	%	\$ 28,211.27	\$ 56,422.53
Erection	2.00	%	\$ 41,932.10	\$ 83,864.20
SUB-TOTAL				\$ 413,546.73
<b>TOTAL</b>				<b>\$ 21,090,883.25</b>

## 7.0 Construction Programme

As seen below, we are estimating that this development will take a time of approximately 6 months.

	wk1	wk2	wk3	wk4	wk5	wk6	wk7	wk8	wk9	wk10	wk11	wk12	wk13	wk14	wk15	wk16	wk17	wk18	wk19	wk20	wk21	wk22	wk23	wk24
<b>Earthworks</b>																								
Bulk Excavation																								
Detailed Excavation																								
Footings																								
<b>Structure</b>																								
Groundfloor																								
Glulam beams fixed																								
Internal walls																								
Student Unit																								
Volumetric frames fixed																								
Walls panels fixed																								
1 Bed. Unit																								
Volumetric frames fixed																								
Walls panels fixed																								
2 Bed. Unit																								
Volumetric frames fixed																								
Walls panels fixed																								
<b>Services</b>																								
MEP cupboards installed																								
Solar installed																								
Fixed to main																								
<b>External Finishes</b>																								
Charred clad. Installed																								
Tabby render applied																								
<b>Landscaping</b>																								
Walkways/ corridors installed																								
Plants put in																								

## 8.0 Statutory Compliance

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The intent of the proposed development is to provide 3 x 240 litre bins for general waste, green waste and recyclables per unit, these bins are to be stored within the developments designated storage area. The development will be reliant upon servicing of the premise by a waste contractor. That process will involve the Strata Body entering an agreement with a waste contractor to service the site. That service will incorporate a waste vehicle being stood at the front of the premise within the road corridor, whilst a runner enters the site, collects the bins and takes them to the vehicle for servicing. Once empty, the bins will be returned, each tenancy will be afforded their own bins for putrescible waste and recyclable materials.

Any excavated material during construction of the residence will be incorporated into the landscaping and stormwater levels of the site.

The proposed development will NOT create any toxic waste. During construction, any substance identified as hazardous or material of questionable nature, must be reported directly to the contractor. If identification of the material is inconclusive, the material must be treated as hazardous for purpose of removal and disposal. Removal of asbestos or hazardous waste from site and subsequent disposal is the responsibility of the owner and the removal contractor. Transport and disposal shall be undertaken in accordance with all relevant State legislation and guidelines for the transport and disposal of asbestos waste. If

Glulam CLT Australian Standards.

### ADJOINING ELEMENTS

General: Obtain the requirements for adjoining building elements to be fixed to or supported on the CLT and provide for the required fixings. Where applicable provide for temporary support of the adjoining elements during erection of the CLT.

### GENERAL REQUIREMENTS

General: The contractor is to allow for any CLT required as may be necessary to complete the works as documented but not necessarily shown on the architectural and structural drawings.

Method: Fabricate and erect the CLT in a safe manner, without interfering with or damaging adjacent structures, using methods complying with the requirements of all relevant Australian Standards, manufacturers specifications, authorities and statutory requirements for materials, construction, fabrication and erection.

Cost: All items and associated costs referred to in this Specification and the drawings shall form part of the contract price, unless noted otherwise. All materials are to be supplied including wastage and over-supply construction.

Variations: Should the Contractor consider that a variation to the contract exists, and then they should refer immediately to the superintendent and obtain written approval prior to proceeding with variation work. Refer Contract Conditions.

Notice: Should any ambiguity, error, omissions, discrepancy or other faults exist or seem to exist in the contract documents then promptly notify in writing to the Superintendent.

### APPROVED SUBCONTRACTORS

Requirement: The proposed fabricator, shop detailer and other specialist subcontractors shall be specified by the contractor and reviewed by the Superintendent during the tender submission. CLT connection shop drawings and fabricators shall be specified by the contractor and reviewed by the Superintendent during the tender submission

IDENTIFICATION CLT characteristic values to be submitted by the proposed fabricator and reviewed by the Superintendent.

### HANDLING AND STORAGE

General: To relevant Australian Standards, Eurocode 5 and manufacturers specifications. Handle and store CLT so as to protect it from damage, including overstress, distortion, damage to surfaces and applied finishes, contamination by foreign matter, and the like. CLT panels not to be left exposed to the weather for extended periods of time.

Correction of Faults: Method of correction to be submitted to the Superintendent for instruction.