Project Bayview Mentone Grammar

SUSTAINABILITY MANAGEMENT PLAN

November 2021

INTEGRAL

Project Bayview Mentone Grammar Sustainability Management Plan

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1 Executive Summary

This Sustainability Management Plan (SMP) provides an overview of the Sustainability Strategy for the proposed Project Bayview development at Mentone Grammar School, Mentone.

In particular this SMP addresses the specific requirements of the Kingston Planning Scheme **Clause 22.13 – Environmentally Sustainable Development**.

'Best practice' in environmentally sustainable development is demonstrated through:

- Building Environment Sustainability Scorecard (BESS) score of 53% – 'Best Practice'
- Compliance with Urban Stormwater – Best Practice Environmental Management Guidelines (Victorian Stormwater Committee, 1999)

The proposed design includes numerous sustainable design strategies including:

Category	Initiatives
Management	• Preliminary JV3 modelling of the building has been completed • A Building User Guide will be provided at project handover
Water	• Water efficient fixtures (high WELS rating) • Zero water heat rejection • Capture 80% of fire system test water • Rainwater harvested from the roof terrace for landscape irrigation
Energy	• 10% improvement on NCC 2019 insulation levels • High performance glazing (low SHGC and U-value) • Natural ventilation in all classrooms • All-electric building services ("Net Zero Ready") • VRV heating and cooling system efficiency >85% of best available • Carbon Monoxide (CO) ventilation control in underground carpark • LED lighting 90% of allowable NCC 2019 power density • Lighting occupancy sensor in intermittently used spaces • Water heater efficiency >85% of best available • Solar PV being considered at site level as the Year 7 & 8 building roof is a terrace
Stormwater	• Bioswale treatment of sports field run off • Raingarden for treatment of roof terrace run off • Compliance with Planning Scheme Clause 22.12 – Stormwater Management demonstrated through MUSIC modelling (by Civil Engineer)
Indoor Environment Quality (IEQ)	• 35% of regularly use floor area achieves Daylight Factor of 2.0 (excluding basement) • Natural ventilation in all classrooms • Solar shading / self-shading on 50%+ of north, west, and east windows • Mechanically ventilated spaces include CO2 control to maintain 800 ppm CO2 • VOC limits for paints, adhesives, carpets, and low formaldehyde engineered timber
Transport	• Ten electric vehicle charging points
Waste	• General waste and recycling bins for occupants
Urban Ecology	• Previously developed site – low ecological impact • Outdoor learning space including a landscaped roof terrace with food garden • 10% of the project site is vegetation, including areas on the roof terrace

2 Introduction

2.1 Project Description

Mentone Grammar School (MGS) are developing Project Bayview, a new Year 7 & 8 Building and adjacent underground carpark with a sports field above.

The new building features new classrooms, a multi-purpose hall, science and project spaces, staff areas, and amenities.

The new learning environment will not be confined to internal spaces but also feature a landscaped roof terrace.

2.2 Existing Site Conditions

The MGS campus is located in Mentone and is within the jurisdiction of Kingston Council.

The proposed project site is shown outlined red below.

The proposed project replaces the existing buildings and synthetic sports field, and as such has minimal impact on site ecological value and permeability.

2.3 Town Planning ESD Requirements

Kingston Planning Scheme Clause 22.13 – Environmentally Sustainable Development includes specific objectives under the following sustainability categories:

- Energy performance
- Water resources
- Indoor environment quality
- Stormwater management
- Transport
- Waste management
- Urban ecology

The Sustainability Strategy within this SMP directly responds to each of these categories in the context of the proposed development.

The SMP must utilise a third-party sustainability tool to benchmark the project from the following options:

- Built Environment Sustainability Scorecard (BESS)
- Green Star
- MUSIC
- STORM

In addition to providing response to the Planning Scheme sustainability objectives, a development of this type and size is required to provide the following:

- Green travel plan (GTP)

This document has been provided by the specialist transport consultant.

2.4 Town Planning ESD Approach

The project has elected to use BESS as the sustainability framework to demonstrate "best practice in environmentally sustainable development". This SMP is structured around the BESS reporting framework for ease for review.

We note that although Clause 22.13 – Environmentally Sustainable Development states that the Melbourne Water 'STORM' calculator may be used to demonstrate compliance with stormwater requirements, Clause 22.12 – Stormwater Management states that non-residential developments with a new building gross floor area greater than 1,000 m² must use undertake stormwater modelling using 'MUSIC'. As such, the Civil Engineer has provided a MUSIC Modelling Report that is summarised in this SMP.

2.5 Refence Information

The assessment herein is based on the reference information as listed in Appendix A.

3 Sustainability Strategy

The following Section outlines the sustainability features and initiatives that are proposed for Project Bayview.

3.1 Management

Best practice for building management means that sustainability is integrated from concept design through to construction.

Best practice building management also means empowering future occupants to operate the building efficiently.

3.1.1 Preliminary Energy Modelling

Preliminary JV3 modelling has been undertaken during the early design phase.

Refer Appendix B for Energy Modelling Report.

3.1.2 Building User Guide

A Building User Guide (BUG) will be provided at building handover. The BUG will be written in non-technical language and be targeted to building occupants and building managers. The purpose of the BUG is to help facilitate more sustainable behaviour by building users.

3.2 Water

Best practice water efficiency means using fixtures and appliances with a high WELS rating and substituting potable water with alternative water sources where viable.

3.2.1 Water Efficient Fixtures

The following fixture water efficiencies are proposed.

Table 1 Water Fixture Efficiency

Fixture Type	WELS Rating
Taps	5 Star
WC's	4 Star (dual flush)
Showers (end of trip)	3 Star ≤ 7.5 L/min.
Showers accessible	3 Star ≤ 6.0 L/min.

3.2.2 Rainwater Harvesting

As the roof terrace of the proposed building is trafficable, harvested rainwater would require significant treatment to be reused within the building (e.g. for toilet flushing).

Water from the roof will be treated through a rain garden and then directed to a storage tank in the basement. This water will be used to irrigate the educational landscaped areas on the roof terrace.

Refer Appendix D for drawing showing rainwater tank locations.

3.2.3 Waterless Heat Rejection

Air-conditioning heat rejection will be air-cooled, and therefore will consume no water.

3.2.4 Fire Test Water

Fire test water consumption will be reduced by 80% or more compared to 'standard practice' by using recirculated tank water for fire pump testing (if tanks are required by the fire brigade), or through capture in the rainwater tank if fire tanks are not required. This will be determined during the subsequent design stages following further engagement with the fire brigade.

3.3 Energy

Best practice design for energy efficiency means designing buildings that need minimal heating and cooling because they are well insulated, have appropriate summer shading, have good orientation to take advantage of the sun for heating, and have high efficiency fittings and appliances. On-site renewable energy generation reduces carbon emission by reducing grid power consumption and peak electricity demand.

An all-electric building services approach is proposed that aligns with the design principles of a 'net zero ready' building. The only gas used in the project will be for a gas fireplace and laboratory gas taps – however this is estimated to be less than 1.0% of annual building energy use.

3.3.1 Building Envelope

Insulation levels will exceed NCC 2019 Section J deemed to satisfy requirements by 10%.

Table 2 Building Fabric

Element	Thermal Performance
Envelope Walls	R1.1 >20% glazing R1.6 <20% glazing
Roof	R3.5
Ground slab	n/a

Glazing performance will comply with NCC 2019 Section J deemed to satisfy requirements.

Table 3 Building Fabric

Façade Glazing Type	System U-value	System Solar Heat Gain Coefficient (SHGC)
All other	≤3.6	≤0.30
Skylight	≤3.8	≤0.34

3.3.2 Passive Design

The building is oriented with the main facades facing northwest and southeast.

The southeast façade glazing only receives direct sun at the start of the day (until around 10:15 am during school term times).

The northwest facade is susceptible to direct sun in the afternoon, which can result in excessive solar loads and high air-conditioning energy consumption as the building is already 'warmed up'. Large windows on this façade have been treated with a shading canopy and local window shading.

Glazing has been specified for low solar heat gain coefficient, therefore even when expose to direct sun, only around 30% of solar heat will enter the building, compared to 65%+ for standard double glazing.

3.3.3 Heating and Cooling

The building will be heated and cooled by an all-electric variable refrigerant volume (VRV) system.

The system will be selected from the 'high COP' product range, which features larger outdoor unts for more efficient heat rejection. System efficiency will be not less than 85% efficiency of the best available of this system type.

Refrigerant heat recovery will be included that permits highly efficient simultaneous heating and cooling which often occurs in schools due to variable space occupancy rates.

3.3.4 Ventilation

All classrooms are naturally ventilated with manually openable windows. The classroom air-conditioning systems will provide 'background' ventilation. Although 'background' ventilation is not required by code in naturally ventilated buildings, it provides the space with a low level of outdoor air to keep the space 'fresh' even if the windows be left closed – e.g. during high winds.

The lower ground floor multi-purpose room and breakout areas on ground floor and level 1 will be mechanically ventilated and will include carbon dioxide (CO2) demand control ventilation to minimise energy use whist providing high levels of indoor air quality.

The carpark will include carbon monoxide (CO) control to vary fan speed in response to CO ppm in accordance with the requirements of AS1668.2. This results in significant energy savings as the exhaust system will only operate at design air flow during busy periods – i.e. in the morning and at the end of the day when the car park is busy.

Amenities will include mechanical exhaust as required by code.

3.3.5 Lighting

High efficiency LED lighting will be provided throughout.

Occupancy sensors will be provided in intermittently occupied spaces.

Lighting power will be 90% or less of NCC 2019 Section J requirement – i.e. 10% better than code.

3.3.6 Domestic Hot Water

Domestic hot water will be provided by high efficiency electric heat pumps as part of the all-electric building services strategy.

3.3.7 Renewable Energy

The Year 7 & 8 building roof is proposed to be an outdoor learning area. In the original planning submission a 12 kW solar PV was proposed on a canopy on the new building roof. This system has been deleted due to the height restrictions on the development.

A sitewide solar study is underway at the time of this planning submission. Refer Appendix D for analysis showing the full solar study scope, which is investigating the feasibility of installing up to 99 kW of roof top solar at the campus.

3.4 Stormwater

Best practice stormwater management means incorporating water sensitive urban design (WSUD) strategies such as rainwater tanks, raingardens, porous paving, and landscaping to reduce the volume of run-off and the pollutant load on local waterways.

As required by clause 22.12 of the Kingston Planning Scheme the project is required to:

- To improve the water quality of stormwater run-off.
- To reduce the impact of stormwater run-off.
- To incorporate the use of WSUD in development including stormwater reuse.
- To ensure that developments designed to meet the best practice performance objectives for suspended solids, total phosphorus, and total nitrogen, as set out in the Urban Stormwater–Best Practice Environmental Management Guidelines, (Victoria Stormwater Committee 1999) as amended.

As mentioned previously, stormwater harvested from the building roof terrace will be treated through a raingarden and then stored for irrigation of the roof terrace landscape features.

An onsite stormwater detention tank located beneath the carpark will limit discharge flow to the municipal stormwater drainage system.

Stormwater runoff from the large sports field surface will be treated by a 600 mm wide bio-swale that will run down the south west edge of the sports field on the boundary of the development area. A cross section of this system is shown below (provided by the Civil Engineer, TTW).

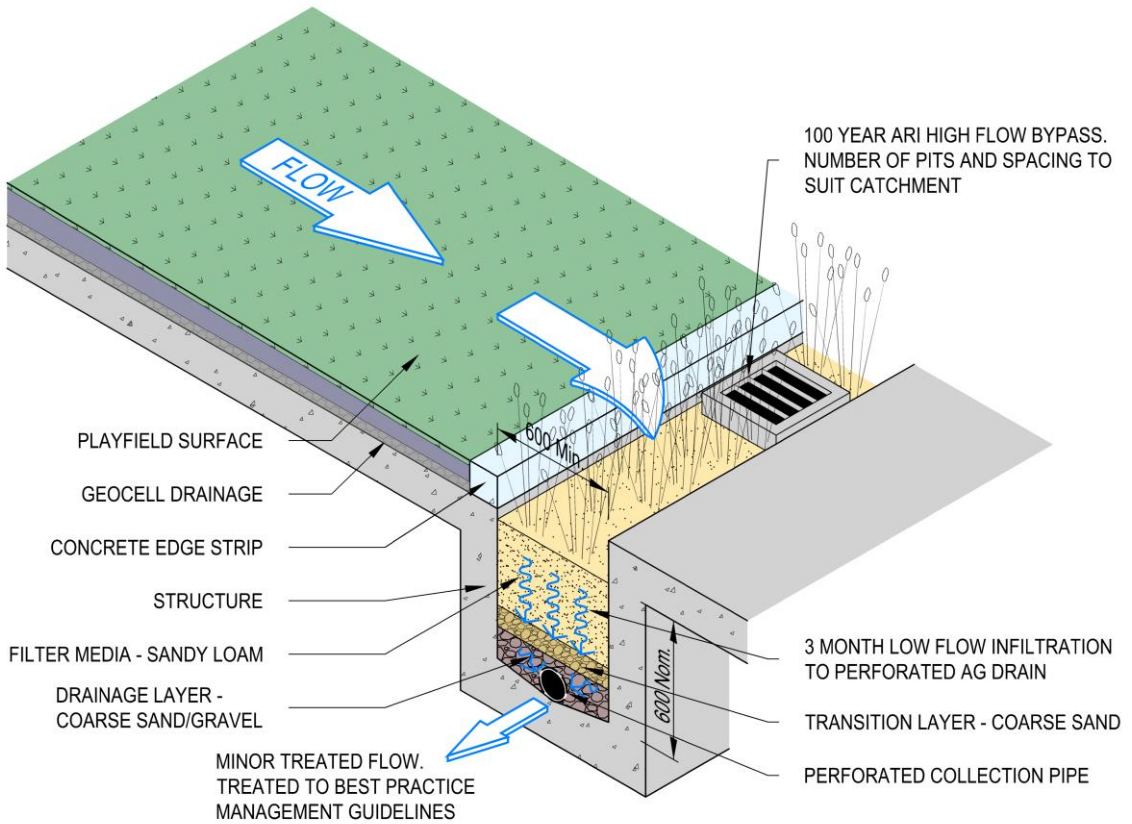


Figure 1 Sports field Bioswale Design

MUSIC modelling has been undertaken by the Civil Engineer for the proposed sitewide stormwater management approach. Results of this modelling are shown in the table below demonstrating compliance with best practice pollutant reduction requirements.

Table 4 MUSIC Modelling Results Summary

Pollutant	Best Practice Pollutant Reduction	Modelled Reduction
Flows	Below pre-development levels	17.1%
Gross Pollutants (Litter)	70%	100.0%
Total Suspended Solids	80%	85.7%
Total Phosphorus (TP)	45%	61.5%
Total Nitrogen (TN)	45%	48.6%

Refer Appendix D for drawings showing the WSUD strategy and the MUSIC modelling report.

3.5 Indoor Environmental Quality

Best practice design for Indoor Environment Quality means that building occupants can enjoy a comfortable space with good air quality, adequate daylight, and ventilation. Indoor environment quality is affected by building orientation and layout, window sizes and specification, shading devices, products used for construction and fit-out, and neighbouring structures.

3.5.1 Daylight

32% of the Ground Floor and 39% of the Level 01 regularly occupied floor area achieves a daylight factor of 2% or higher.

The lower ground floor multifunction room has been excluded from the daylight assessment as it is not used regularly throughout the day or occupied for extended periods by the same group.

Refer Appendix C for Daylight Modelling Report.

3.5.2 Natural Ventilation

All classrooms are naturally ventilated in accordance with NCC 2019 Section F requirements.

The lower ground floor multi-purpose room and breakout areas on ground floor and level 1 are mechanically ventilated. These spaces will include carbon dioxide (CO2) demand control ventilation to maintain an indoor CO2 concentration below 800 ppm.

3.5.3 Low VOC Building Materials

All paints, sealants, adhesives, and carpets will meet the maximum VOC limits as specified in Green Star Design and As Built v1.3 credit 13.1.

All engineered wood products will meet the formaldehyde limits as specified in Green Star Design and As Built v1.3 credit 13.2.

3.6 Transport

Best practice design for transport means creating buildings that encourage walking, cycling, public transport, car sharing, and the use of lower emissions vehicles.

3.6.1 Cyclist Facilities

Secure bicycle parking is provided on the site which is not currently being utilised to full capacity.

32 new secure bicycle parks will be provided within the proposed development site.

In the proposed building showers are provided for staff who wish to cycle to work.

Refer Appendix D for drawing showing secure bicycle parks and showers.

3.6.2 Electric Vehicle Parking

Ten electric vehicle charging station will be provided in the proposed car park.

Refer Appendix D for drawing showing the electric vehicle charging point.

3.7 Waste

Best practice design for resource recovery and waste means re-using materials during construction where possible and making sure future building occupants have opportunities to easily re-use and recycle their waste.

3.7.1 Recycling

All waste points will include a general waste and recycling bin.

Refer Appendix D for drawing showing bin locations.

3.7.2 Urban Ecology

The project is being built on existing developed land and will therefore not significantly impact site ecological value.

The roof terrace provides a landscaped outdoor space for learning.

10% of the development site is vegetation, including the roof terrace and an area to the southeast of the building.

15 m² of food production area is provided on the roof terrace.

Refer Appendix D for drawing showing the roof terrace and landscape design.

Appendix A Reference Information

This SMP assessment is based on the following information.

Table 5 Reference Information

Document	Description	Revision	Custodian
TP010	Existing Site Plan	6	McIldowie Partners
TP050	Site Plan	7	McIldowie Partners
TP055	Oval Plan	7	McIldowie Partners
TP101	Car Park	11	McIldowie Partners
TP102	Basement	10	McIldowie Partners
TP103	Ground Floor	9	McIldowie Partners
TP104	Level 01	8	McIldowie Partners
TP105	Level 02	8	McIldowie Partners
TP106	Roof Plan	8	McIldowie Partners
TP201	Elevations	9	McIldowie Partners
TP202	Elevations	10	McIldowie Partners
TP203	Elevations	8	McIldowie Partners
TP301	Section	10	McIldowie Partners
TP302	Section	10	McIldowie Partners
C201	Site Plan Ground	P5	TTW
Memo 002	MGS MUSIC model	-	TTW
TPL01A	Car Park Landscape	DRAFT	Craig Eldridge Design
TPL02A	LG Landscape Plan	DRAFT	Craig Eldridge Design
TPL08A	Roof Gardens	DRAFT	Craig Eldridge Design
Solar Study Report	Solar Study Report	-	Integral Group

Appendix B Energy Modelling Report

Preliminary JV3 modelling has been undertaken for the building.

Methodology

The occupancy, scheduling of services and other modelling parameters have been entered as per design where known, otherwise in accordance with the NCC 2019 modelling methodology described in Specification JV of the NCC.

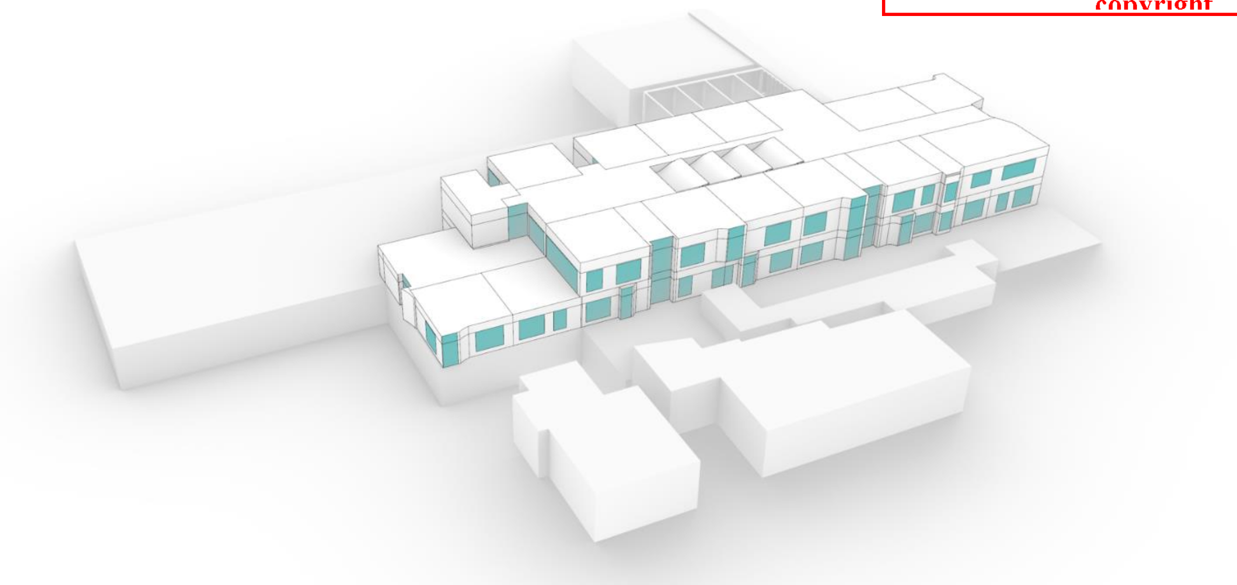
Input Parameters

Table 6 Input Parameters

Glazing	Reference	Proposed
Solar Shading	None	As per architectural drawings
Building Fabric and Glazing	Roof: R3.2 Walls: • R1.0 >20% glazing • R1.4 <20% glazing Ground slab: uninsulated Windows: U3.6, SHGC 0.30 Skylight: U3.8, SHGC 0.34	Roof R3.5 Walls: • R1.1 >20% glazing • R1.6 <20% glazing Ground slab: uninsulated Windows: U3.6, SHGC 0.30 Skylight: U3.8, SHGC 0.34
Occupancy	Classrooms 1 person per 2 m^3 Multipurpose room 1 person per 2 m^3 Administration areas 1 person per 10 m^3	Classrooms 1 person per 2 m^3 Multipurpose room 1 person per 2 m^3 Administration areas 1 person per 10 m^3
HVAC System	Variable volume refrigerant system COP 2.7	Variable volume refrigerant system COP 2.9
Ventilation	Classrooms natural ventilation Other spaces 12 L/s/person Toiler exhaust 10 L/m^2	Classrooms natural ventilation Other spaces 12 L/s/person Toiler exhaust 10 L/m^2
Lighting	NCC Section J5	As nominated in Section 3.3.5
Operating Profile	NCC 2019 Class 9b	NCC 2019 Class 9b

Energy Model Image

The energy model is shown below with adjacent buildings hidden for clarity.



Whole Building Energy Model

Results

Whole building annual energy simulation results are shown in the table below.

Table 7 Annual Energy Results

Energy End Use	Reference Building (kWh/yr.)	Intermediate Building (kWh/yr.)	Proposed Building (kWh/yr.)
Heating	60,581	56,174	54,237
Cooling	69,215	70,251	67,829
Air-Conditioning Fans	47,251	47,251	47,251
Ventilation Fans	2,941	2,941	2,941
Interior Lighting	60,495	60,495	54,446
TOTAL	**240,483**	**237,112**	**226,703**

The proposed building uses 6% less energy than the reference building.

Limitations

The final equipment selections, systems commissioning, actual climate conditions, actual occupancy patterns and hours of operation will affect the real-world annual energy consumption. Therefore, the energy prediction of the in this report should not be taken as an indication of the of the likely annual energy consumption of the building in operation, or potential energy targets.

Building simulations provide an estimate of building performance. This estimate is based on necessarily simplified and idealised version of the building that does not and cannot fully represent all of the intricacies of the building once built. As a result, simulation results only represent an interpretation of the potential performance of the building. No guarantee or warrantee of building performance in practice can be based on simulation results alone. This modelling cannot be used to demonstrate compliance with any aspect of the NCC for the purposes of obtaining a building permit.

Appendix C Daylight Modelling Report

Daylight modelling has been undertaken for all spaces that are occupied for extended period of time such as classrooms and administration spaces.

The basement multifunction room is excluded from the daylight assessment as it is not used regularly throughout the day or occupied for extended periods by the same group.

Glazing Performance

Glazing has been modelled based on high performance double glazing as nominated in the SMP.

Table 8 Glazing Performance

Glazing	Visual Light Transmittance
External windows	49%

Uniform Sky

Daylighting factors were determined for the model building under a uniform design sky. This condition provides a uniform distribution of light at a nominal 10,000 lx of external horizontal illuminance across the entire hemispheric model. The daylighting factor is then determined as a direct percentage of the 10,000 lx external design sky condition.

Surface Reflectance

The reflectance's of all surfaces including floor finishes, ceiling and walls were modelled as per the following table.

Table 9 Surface Reflectance Values

Surface	Points
Floor	0.3
Walls	0.7
Ceilings	0.8

Working Plane

The working plan has been modelled as 720 mm above floor level.

Modelling Grid

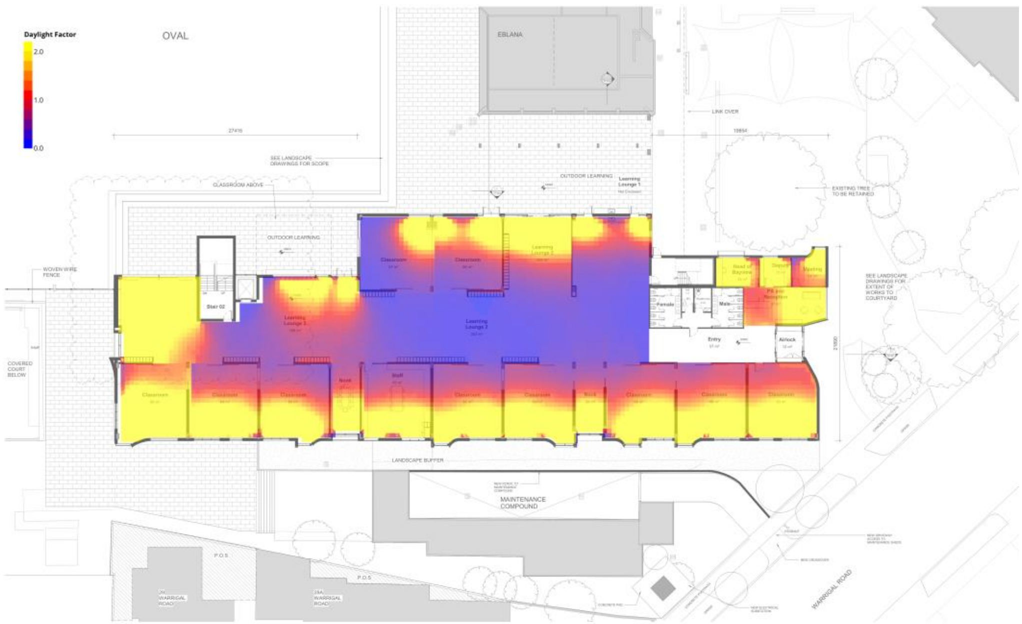
The analysis grid was sized at 0.5 m x 0.5 m.

Results

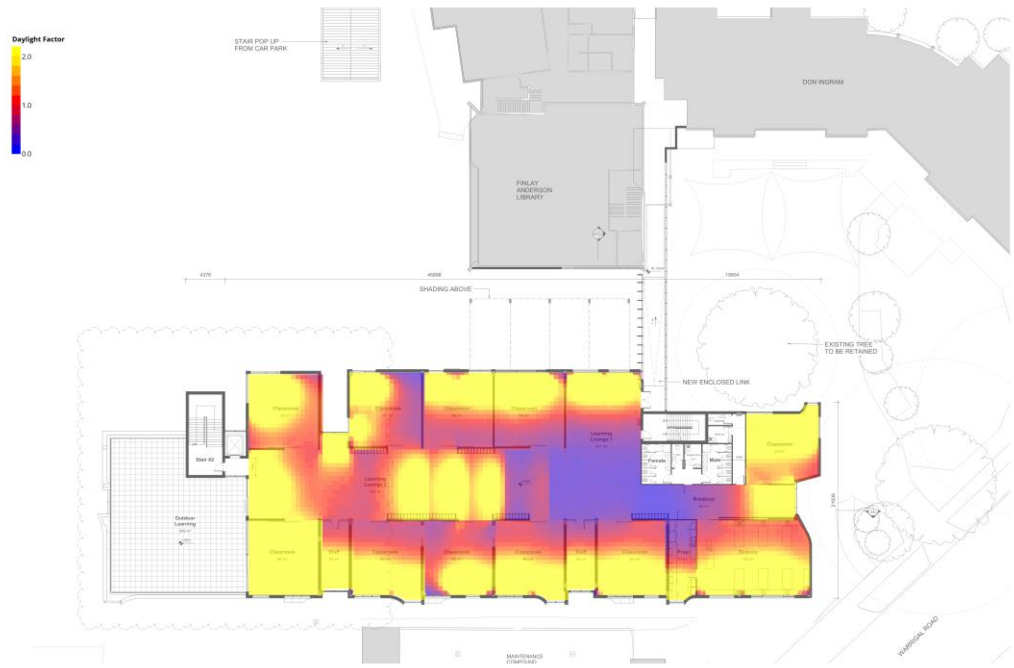
Daylight factor images at the nominated working place height are shown in the images below.

Table 10 Daylight Modelling Results

Area	Area	Area Above Daylight Factor 2%	Percentage Above Daylight Factor 2%
Ground Floor	1,579	498	32%
Level 01	1,417	557	39%
TOTAL	**2,996**	**1,055**	**35%**



Ground Floor Daylight at Working Plane



Level 01 Daylight at Working Plane

Appendix D Drawings

The following drawings are provided to support the SMP with relevant features highlighted.

Energy

- Solar PV study

Water

- Rainwater harvesting tanks and pumps

Stormwater

- Civil drawing showing bio-swale
- MUSIC modelling report

Transport

- Electric vehicle charging

Waste

- Bin locations

Urban Ecology

- Landscape drawings

New Building + 2 Existing Buildings Mentone Grammar School, 63 Venice St, Mentone VIC 3194

Report

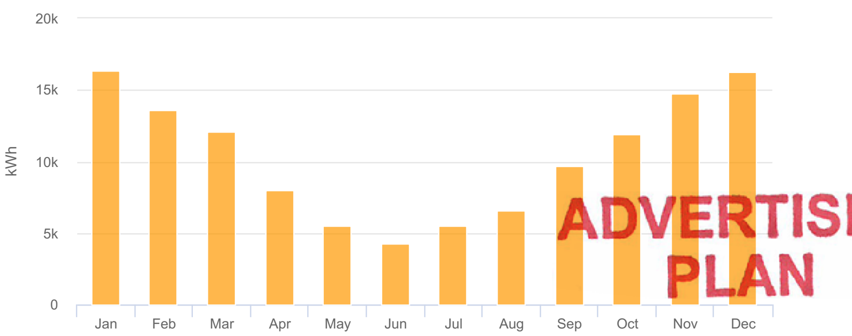
Project Name	Mentone Grammar School
Project Address	63 Venice St, Mentone VIC 3194
Prepared By	Andrew Coulston andrew.coulston@umowlai.com.au

System Metrics

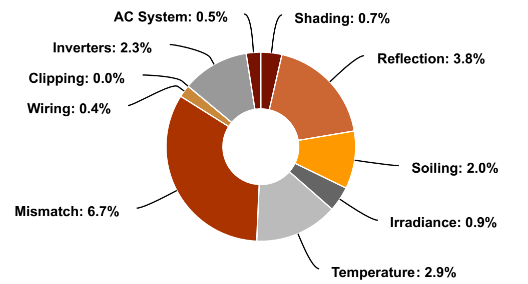
Design	New Building + 2 Existing Buildings
Module DC Nameplate	99.9 kW
Inverter AC Nameplate	96.2 kW Load Ratio: 1.04
Annual Production	124.7 MWh
Performance Ratio	81.4%
kWh/kWp	1,247.9
Weather Dataset	TMY, Moorabbin Airport, RMY (epw)
Simulator Version	8e8a737557-8c574f6450-f3f5464605-b7b0b7f0e1

Project Location

Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,507.5	
	POA Irradiance	1,533.8	1.7%
	Shaded Irradiance	1,522.6	-0.7%
	Irradiance after Reflection	1,464.8	-3.8%
	Irradiance after Soiling	1,435.5	-2.0%
	Total Collector Irradiance	**1,435.7**	**0.0%**
Energy (kWh)	Nameplate	143,470.7	
	Output at Irradiance Levels	142,228.5	-0.9%
	Output at Cell Temperature Derate	138,131.2	-2.9%
	Output After Mismatch	128,818.8	-6.7%
	Optimal DC Output	128,270.5	-0.4%
	Constrained DC Output	128,269.5	0.0%
	Inverter Output	125,291.9	-2.3%
	Energy to Grid	**124,665.4**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		16.0 °C
	Avg. Operating Cell Temp		24.6 °C
Simulation Metrics			
	Operating Hours		4618
	Solved Hours		4618

Condition Set

Description	Condition Set 1
Weather Dataset	TMY, Moorabbin Airport, RMY (epw)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Sandia Model

Temperature Model Parameters

Rack Type	a	b	Temperature Delta
Fixed Tilt	-3.56	-0.075	3°C
Flush Mount	-2.81	-0.0455	0°C

Soiling (%)

J	F	M	A	M	J	J	A	S	O	N	D
2	2	2	2	2	2	2	2	2	2	2	2

Irradiation Variance	5%
Cell Temperature Spread	4° C
Module Binning Range	-2.5% to 2.5%
AC System Derate	0.50%

Module Characterizations

Module	Uploaded By	Characterization
LR4-60HPH-370M (Longi Solar)	Folsom Labs	Spec Sheet Characterization, PAN

Component Characterizations

Device	Uploaded By	Characterization
Sunny Tripower 24000TL-US (SMA)	Folsom Labs	Modified CEC

Components

Component	Name	Count
Inverters	Sunny Tripower 24000TL-US (SMA)	4 (96.2 kW)
Strings	10 AWG (Copper)	16 (755.8 m)
Module	Longi Solar, LR4-60HPH-370M (370W)	270 (99.9 kW)

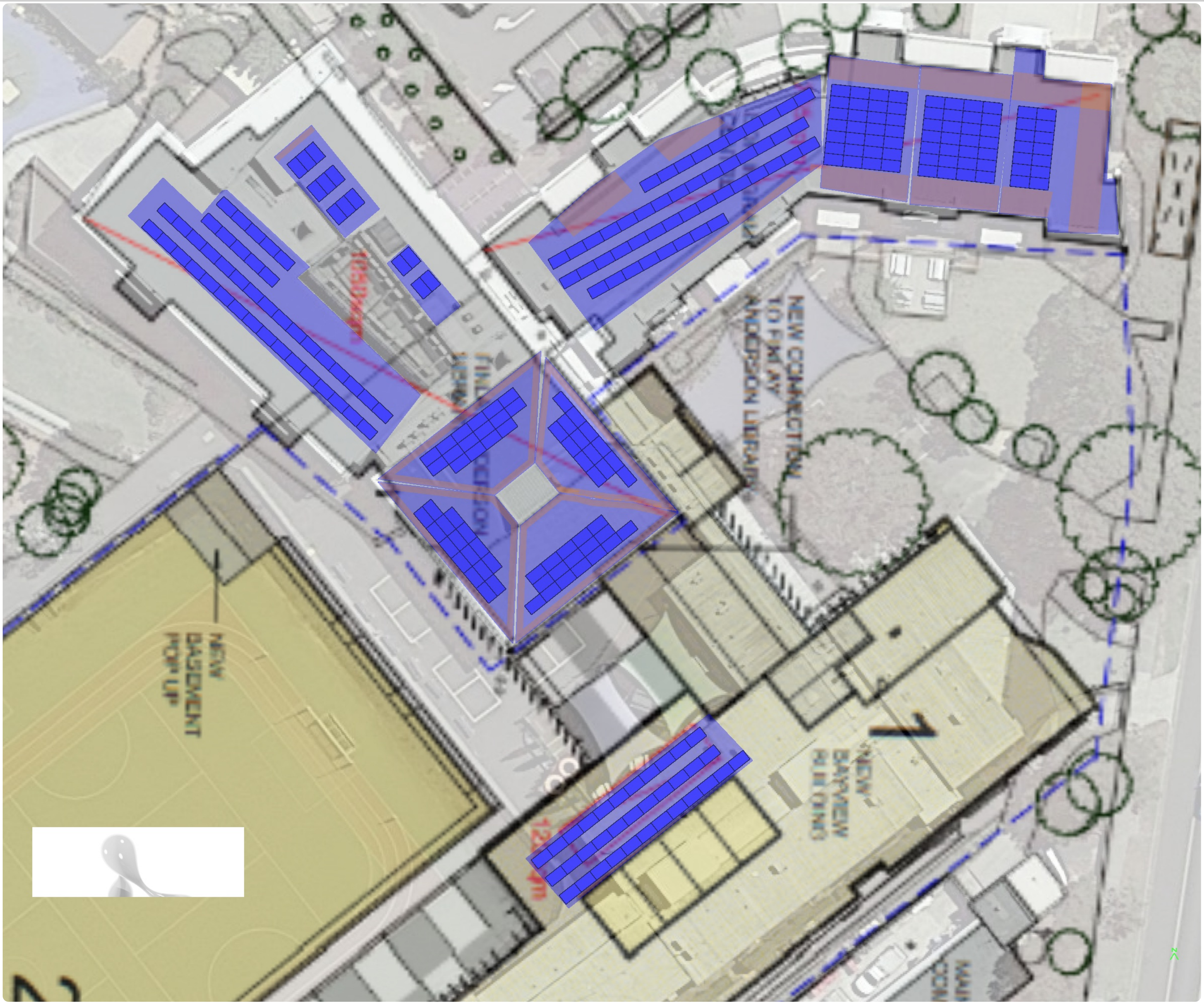
Wiring Zones

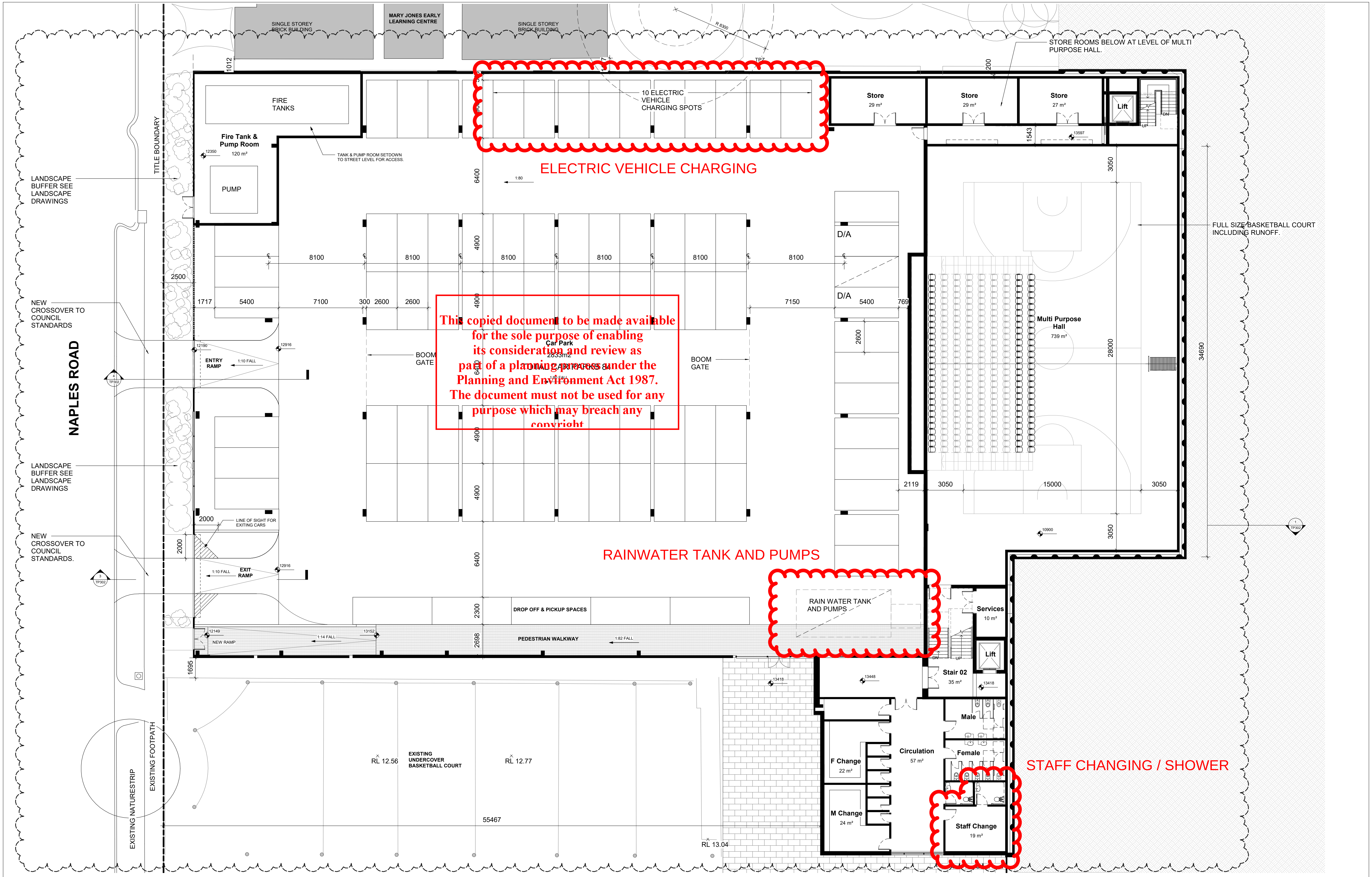
Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	-	5-22	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 4	East-West	Portrait (Vertical)	10°	6.033253°	0.0 m	1x1	7	14	5.18 kW
Field Segment 5	East-West	Portrait (Vertical)	10°	6.033253°	0.0 m	1x1	14	28	10.4 kW
Field Segment 6	East-West	Portrait (Vertical)	10°	6.033253°	0.0 m	1x1	14	28	10.4 kW
Field Segment 8	Flush Mount	Landscape (Horizontal)	10°	141.18088°	0.0 m	1x1	17	17	6.29 kW
Field Segment 11	Flush Mount	Landscape (Horizontal)	10°	49.47147°	0.0 m	1x1	14	14	5.18 kW
Field Segment 12	Flush Mount	Landscape (Horizontal)	10°	322.79657°	0.0 m	1x1	16	16	5.92 kW
Field Segment 13	Flush Mount	Landscape (Horizontal)	10°	230.11707°	0.0 m	1x1	16	16	5.92 kW
Field Segment 18	Fixed Tilt	Landscape (Horizontal)	10°	330.82367°	1.0 m	1x1	48	48	17.8 kW
Field Segment 18	Fixed Tilt	Landscape (Horizontal)	10°	321.7109°	1.0 m	1x1	34	34	12.6 kW
Field Segment 12	Fixed Tilt	Landscape (Horizontal)	10°	42.951283°	1.0 m	1x1	42	42	15.5 kW
Field Segment 11	Fixed Tilt	Portrait (Vertical)	10°	319.4524°	1.0 m	1x1	9	9	3.33 kW
Field Segment 12	Fixed Tilt	Portrait (Vertical)	10°	319.4524°	1.0 m	1x1	4	4	1.48 kW

Detailed Layout





ADVERTISED PLAN

REVISION SCHEDULE

Rev	Date	By	Description
1	19.05.21	LB	Preliminary TP Set
2	08.06.21	LB	For coordination
3	10.06.21	LB	Draft Town Planning
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5	21.06.21	LB	Town Planning
6	24.06.21	LB	TOWN PLANNING SET
7	11.08.21	LB	ADDITIONAL INFO
8	21.10.21	JM	Updated Planning Concept for Review
9	21.10.21	LB	Updated Planning
10	28.10.21	OCM	Revised Napes Road Location
11	28.10.21	LB	Revised Car Pak layout

NORTH POINT

CONTRACTORS

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DRAWINGS TO BE PRINTED IN COLOUR.

TOWN PLANNING

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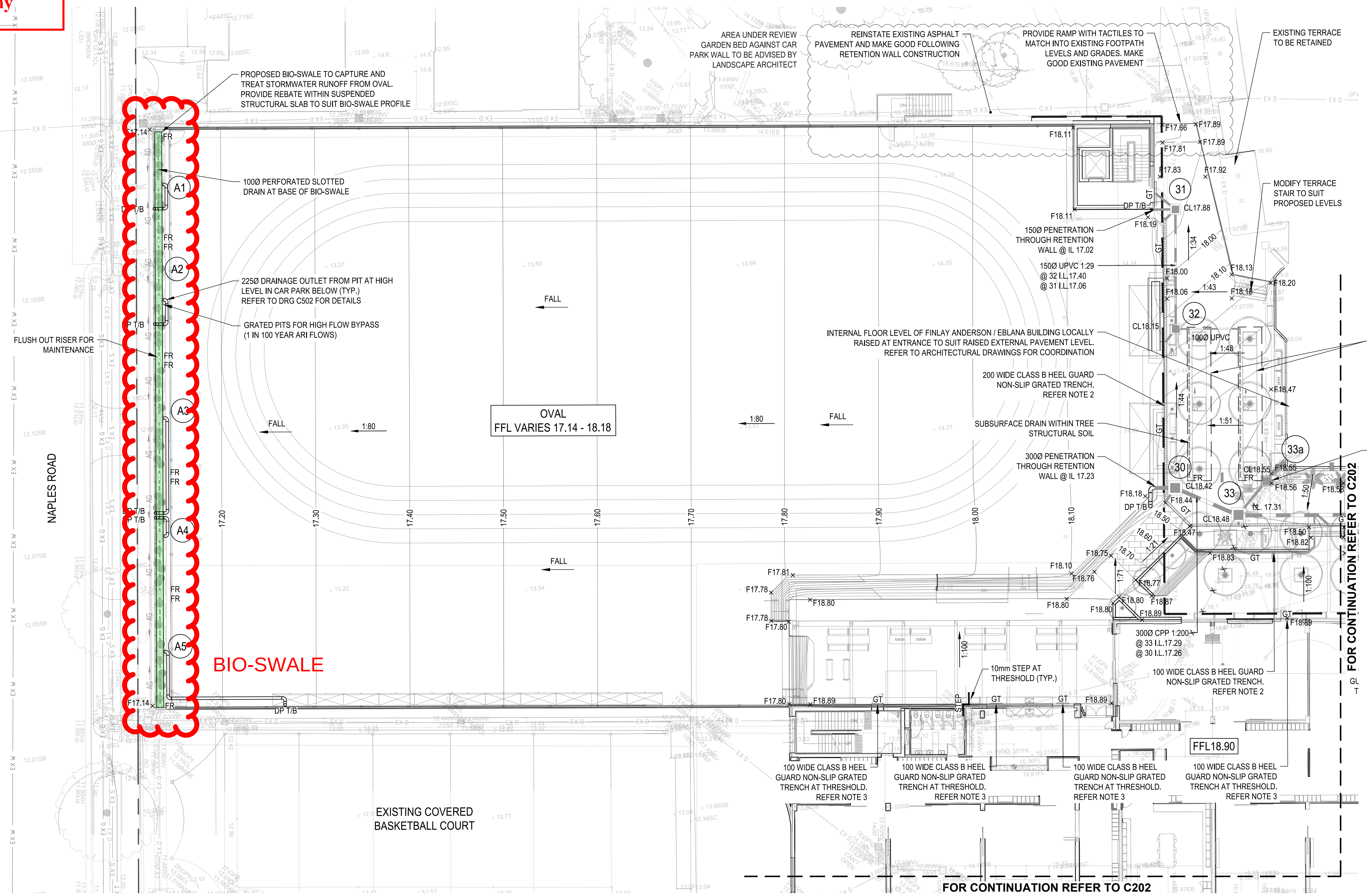
Melbourne, Vic 3000

CLIENT: Mentone Grammar
PROJECT NAME: Bayview and Car Park
PROJECT ADDRESS: 75-77 Naples Rd, 33-35,37 Warrigal Rd - Mentone

DRAWING TITLE: Car Park
SCALE: 1 : 100 @ A0
DRAWN: LB
DATE: 28.10.21
CHECKED: JM
JOB No.: 3114
DATE PRINTED: 3/11/2021 9:35:29 AM
FILE: BIM 360://3114 Mentone Grammar Bayview & car park/211014 Mentone Grammar_Bayview Carpark & Building STEPPED TOWN PLANNING.rvt
DRAWING NUMBER: TP101
REV.: 11

NOTES

1. REFER TO DRAWING C002 FOR GENERAL NOTES AND LEGEND.
2. GRATED TRENCH CHANNEL TO BE PROVIDED WITH 0.5% IN-BUILT FALL.
3. REFER TO HYDRAULICS DRAWINGS FOR GRATED TRENCH OUTLETS WHERE ON SUSPENDED SLAB (TYP.).



SCALE 1:200 AT ORIGINAL SIZE 0 2 4 6 8 10 m

NOT TO BE USED FOR CONSTRUCTION

Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date
P5	75% TENDER	RP	AE	12.10.21					
P4	50% TENDER	RP	AE	14.09.21					
P3	100% DD	RP	AE	30.07.21					
P2	75% DD	RP	AE	20.07.21					
P1	50% DD	RP	AE	06.07.21					

Client
McILDOWIE PARTNERS
LEVEL 2, 325 FLINDERS LANE, MELBOURNE

Taylor Thomson Whitting
613 9602 1433 | L13 379 Collins Street Melbourne VIC 3000

Project
MENTONE GRAMMAR
BAYVIEW AND CAR PARK
75-77 NAPLES RD, 33-35, 37 WARRIGAL RD - MENTONE

Sheet Subject
SITE PLAN GROUND, SHEET 1 OF 2

Scale : A1 Drawn: RP
Job No 214067 Drawing No C201 Revision P5
Plot File Created: Oct 13, 2021 - 10:30am

TTW Structural Civil Traffic Façade

214067

Memo 002 – MGS MUSIC model

1.1 MUSIC model inputs

This memo details the input parameters and results from the MUSIC model prepared by TTW to support the Sustainability Management Plan for the proposed Project Bayview development at Mentone Grammar School, Mentone.

To inform the effectiveness of the proposed stormwater treatment measures and to demonstrate compliance to the Best Practice Environmental Management Guidelines (BPEMG), a MUSIC model has been developed in accordance with Section 6 of the City of Kingston 'Civil Design Requirements for Developers – Part A: Integrated Stormwater Management' dated May 2016. Refer to Table 1 below describing the input parameters.

Table 1 – MUSIC model input parameters

Parameter	Input used in model
MUSIC model software	Version 6.3.0
Model type	Stormwater treatment
Rainfall reference station	Melbourne City (MAR 650-750mm)
Timestep	6 minute

Design assumptions used in the development of the model include:

- 20kL irrigation tank with 2kL/day daily reuse demand

1.2 MUSIC model results

Refer to attached MUSIC model output detailing catchment areas and proposed stormwater treatment measures used in the model. Table 2 below provides a summary of the MUSIC model results.

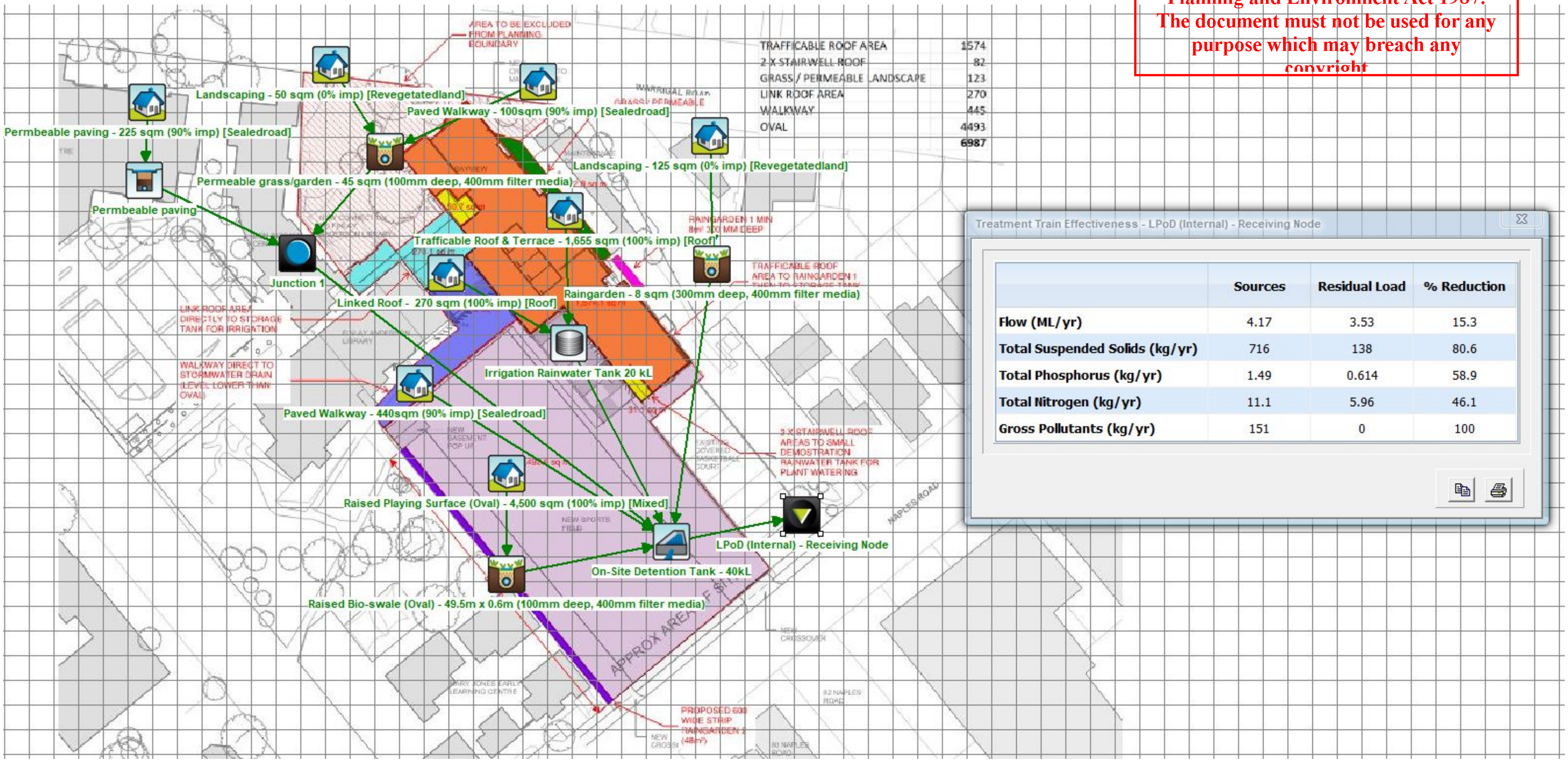
Table 2 – MUSIC model output summary

Parameter	Sources	Residual Load	% Reduction	BPEMG Target % Reduction
Total Suspended Solids (kg/yr)	716	138	80.6	80
Total Phosphorus (kg/yr)	1.49	0.614	58.9	45
Total Nitrogen (kg/yr)	11.1	5.96	46.1	45
Gross Pollutants (kg/yr)	151	0	100	70

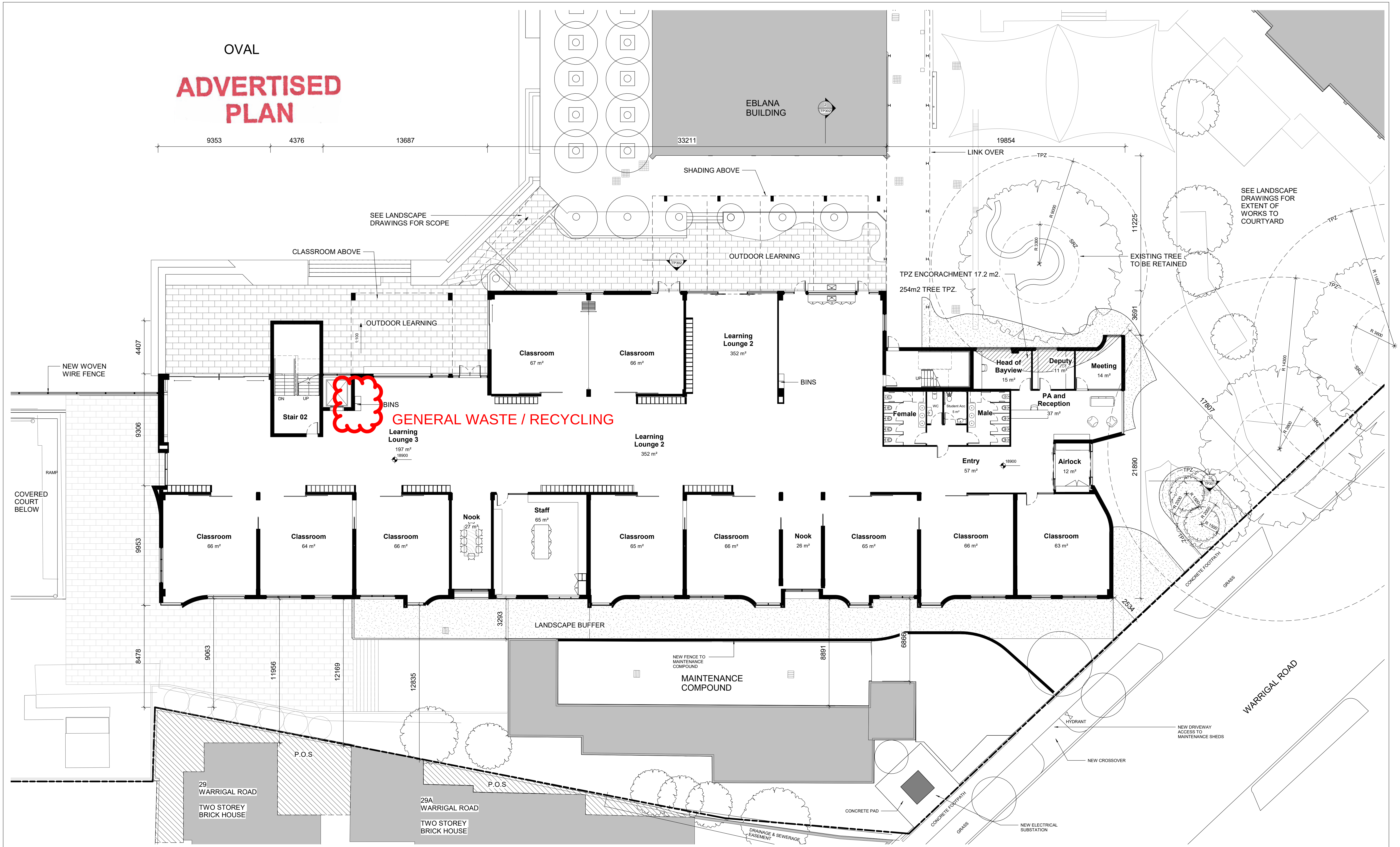
Structural
Civil
Traffic
Façade

Yours faithfully,
TAYLOR THOMSON WHITTING (VIC) PTY LTD
in its capacity as trustee for the
TAYLOR THOMSON WHITTING VIC TRUST

Richard PENWELL
Senior Civil Engineer



	Sources	Residual Load	% Reduction
Flow (ML/yr)	4.17	3.53	15.3
Total Suspended Solids (kg/yr)	716	138	80.6
Total Phosphorus (kg/yr)	1.49	0.614	58.9
Total Nitrogen (kg/yr)	11.1	5.96	46.1
Gross Pollutants (kg/yr)	151	0	100



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NORTH POINT

CONTRACTORS

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DRAWINGS TO BE PRINTED IN COLOUR.

TOWN PLANNING

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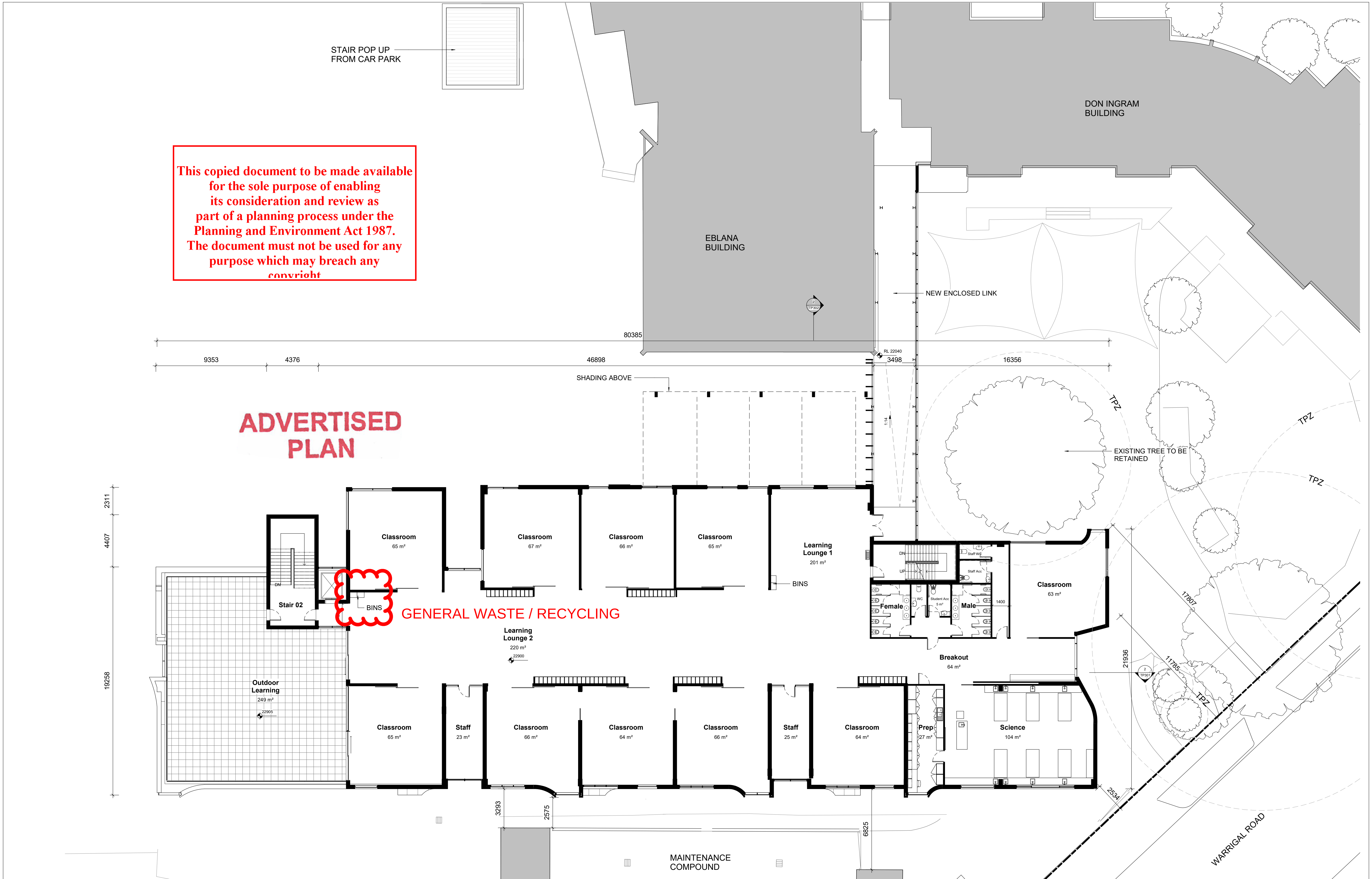
CLIENT: Mentone Grammar
PROJECT NAME: Bayview and Car Park
PROJECT ADDRESS: 75-77 Naples Rd, 33-35,37 Warrigal Rd - Mentone

DRAWING TITLE: Ground Floor

SCALE	DRAWN	DRAWING NUMBER
1 : 100 @ A0	LB	TP103
DATE: 21.10.21	CHECKED: JM	
JOB No.: 3114	DATE PRINTED: 3/11/2021 9:35:40 AM	REV.: 9

FILE: BIM 360://3114 Mentone Grammar Bayview & car park/211014 Mentone Grammar_Bayview Carpark & Building STEPPED TOWN PLANNING.rvt



REVISION SCHEDULE

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NORTH POINT

CONTRACTORS

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DRAWINGS TO BE PRINTED IN COLOUR.

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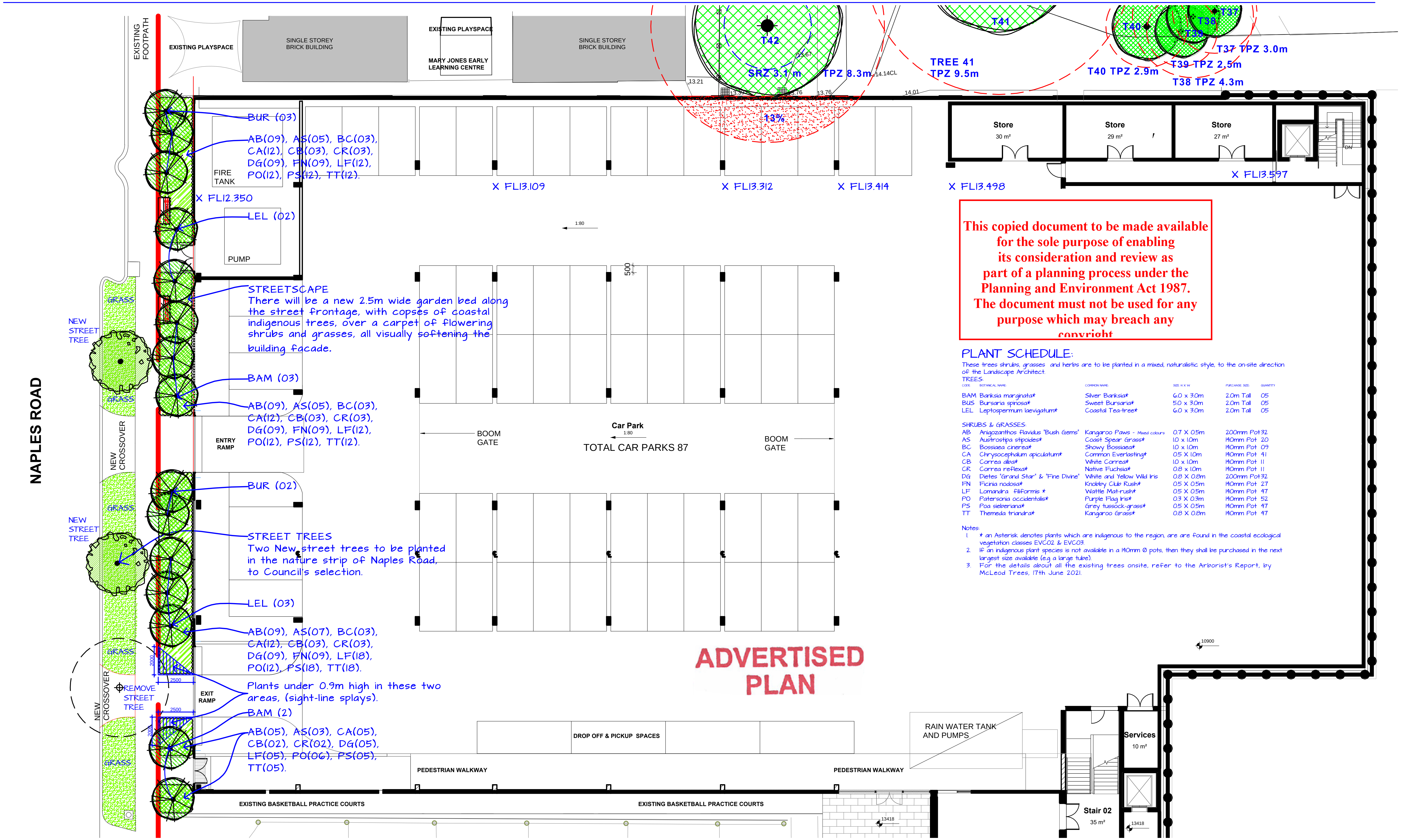
CLIENT: Mentone Grammar
PROJECT NAME: Bayview and Car Park
PROJECT ADDRESS: 75-77 Naples Rd, 33-35,37 Warrigal Rd - Mentone

DRAWING TITLE: Level 01

SCALE	1 : 100 @ A0	DRAWN	LB
DATE	21.10.21	CHECKED	JM
JOB No.	3114	DATE PRINTED	3/11/2021 9:35:43 AM

FILE: BIM 360://3114 Mentone Grammar Bayview & car park/211014 Mentone Grammar_Bayview Carpark & Building STEPPED TOWN PLANNING.rvt

DRAWING NUMBER: TP104
REV. 8



PLANT SCHEDULE:

These trees shrubs, grasses and herbs are to be planted in a mixed, naturalistic style, to the on-site direction of the Landscape Architect.

TREES:

CODE	BOTANICAL NAME:	COMMON NAME:	SIZE H X W	PURCHASE SIZE:	QUANTITY
BAM	Banksia marginata*	Silver Banksia*	6.0 x 3.0m	2.0m Tall	05
BUS	Bursaria spinosa*	Sweet Bursaria*	5.0 x 3.0m	2.0m Tall	05
LEL	Leptospermum laevigatum*	Coastal Tea-tree*	6.0 x 3.0m	2.0m Tall	05

SHRUBS & GRASSES:

CODE	BOTANICAL NAME:	COMMON NAME:	SIZE H X W	PURCHASE SIZE:	QUANTITY
AB	Anigozanthos flavidus "Bush Gems"	Kangaroo Paws - Mixed colours	0.7 X 0.5m	200mm Pot	32
AS	Austrostipa stipoides*	Coast Spear Grass*	1.0 x 1.0m	140mm Pot	20
BC	Bossiaea cinerea*	Showy Bossiaea*	1.0 x 1.0m	140mm Pot	09
CA	Chrysocephalum apiculatum*	Common Everlasting*	0.5 X 1.0m	140mm Pot	41
CB	Correa alba*	White Correa*	1.0 x 1.0m	140mm Pot	11
CR	Correa reflexa*	Native Fuchsia*	0.8 x 1.0m	140mm Pot	11
DG	Dietes "Grand Star" & "Fine Divine"	White and Yellow Wild Iris	0.8 X 0.8m	200mm Pot	32
FN	Ficinia nodosa*	Knobby Club Rush*	0.5 X 0.5m	140mm Pot	27
LF	Lomandra filiformis *	Wattle Mat-rush*	0.5 X 0.5m	140mm Pot	47
PO	Patersonia occidentalis*	Purple Flag Iris*	0.3 X 0.3m	140mm Pot	52
PS	Poa sieberiana*	Grey tussock-grass*	0.5 X 0.5m	140mm Pot	47
TT	Themeda triandra*	Kangaroo Grass*	0.8 X 0.8m	140mm Pot	47

Notes:

1. * an Asterisk denotes plants which are indigenous to the region, are are found in the coastal ecological vegetation classes EVC02 & EVC03.
2. If an indigenous plant species is not available in a 140mm Ø pots, then they shall be purchased in the next largest size available (e.g a large tube).
3. For the details about all the existing trees onsite, refer to the Arborist's Report, by McLeod Trees, 17th June 2021.

CRAIG ELDRIDGE DESIGN
Landscape Architecture
22 Walsh Avenue, Moorabbin, Victoria, 3189, Australia.
Tel+61 3 0419 508 047 craig@cedesign.net.au

LANDSCAPE PLAN
CARPARK BUILDING

Mentone Grammar College, Mentone, Victoria.

SCALE: 1 : 250 @ A3 DATE: 01.04.2021

DRAFT

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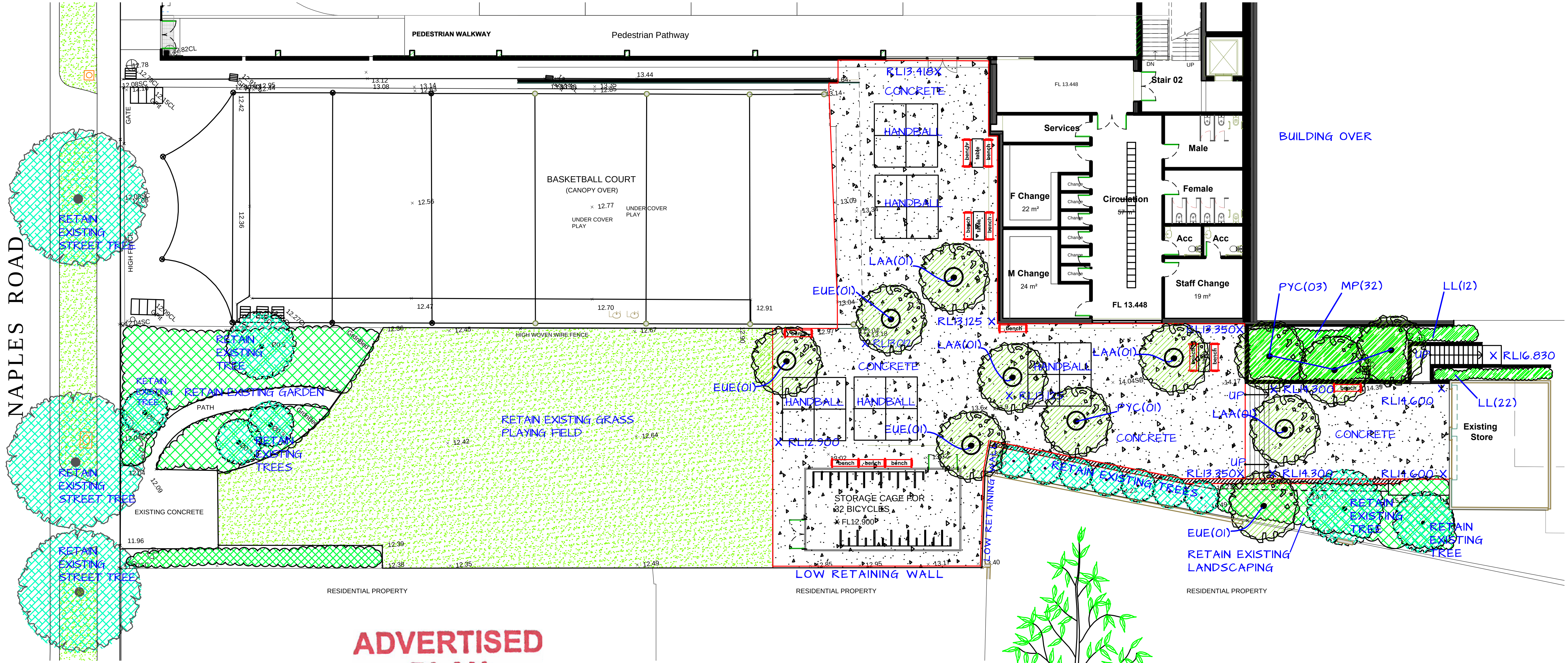
TPL01A



LANDSCAPE PLAN 1:250

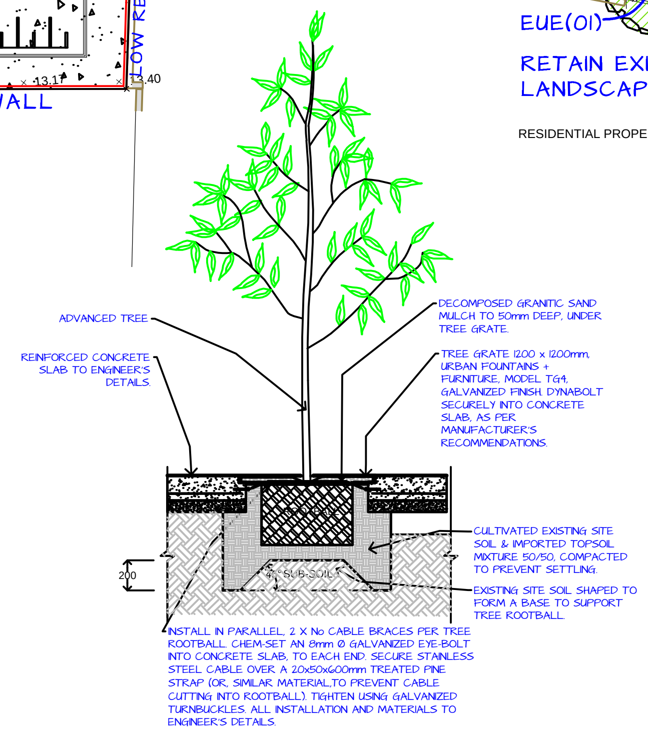
ADVERTISED PLAN

PLANT SCHEDULE:

SYMBOL:	CODE:	BOTANICAL NAME:	COMMON NAME:	MATURE SIZE	PURCHASE SIZE:	QUANTITY
TREES:						
	EUE	EUCALYPTUS "EUKY DWARF"	YELLOW GUM CULTIVAR	6.0 x 4.0m	2.4m	04
	LAA	LAGERSTROEMIA "ALBURY WHITE"	WHITE CREPE MYRTLE	5.0 x 4.0m	2.4m	04
	PYC	PYRUS CALLERYANA 'CAPITAL"	UPRIGHT PEAR	8.0 x 3.0m	2.4m	04
SHRUBS:				H x W		
	LL	LOMANDRA LONGIFOLIA	LOMANDRA	1.0 x 1.0m	200mm Pot	33
	MY	MYOPORUM PARVIFOLIUM	CREEPING BOOBIALLA	0.2 x 1.0m	200mm Pot	32

PLANTING NOTES:

1. All garden beds to have 450mm deep of premium-grade garden-mix soil suitable for native and exotic plants.
2. All garden beds to have 75mm deep of fine-grade, composted, woodchip mulch, sourced from recycled green-waste. Surfaces shall grade evenly, with no localized high, or low areas
3. All plants to have 12 month slow-release fertilizer added at time of planting, suitable for natives & exotic plants.
4. All shrubs to be purchased in 200mm Ø pots minimum. If this size is unavailable, then substitute for 170mm, or 140mmØ pots.
5. All finished surface levels of garden beds to be 20mm below top of adjacent hard surfaces
6. All garden beds to be watered by an automatic, sub-surface irrigation system.
7. All plants to be watered-in at time of planting.
8. For the details about all the existing trees onsite, refer to the Arborist's Report, by McLeod Trees, 17th June 2021.



TREE PLANTING DETAIL 1:50

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LANDSCAPE PLAN
BAYVIEW BUILDING - LOWER GROUND LEVEL

Mentone Grammar College, Mentone, Victoria.

SCALE: 1 : 250 @ A3 DATE: 01.11.2021

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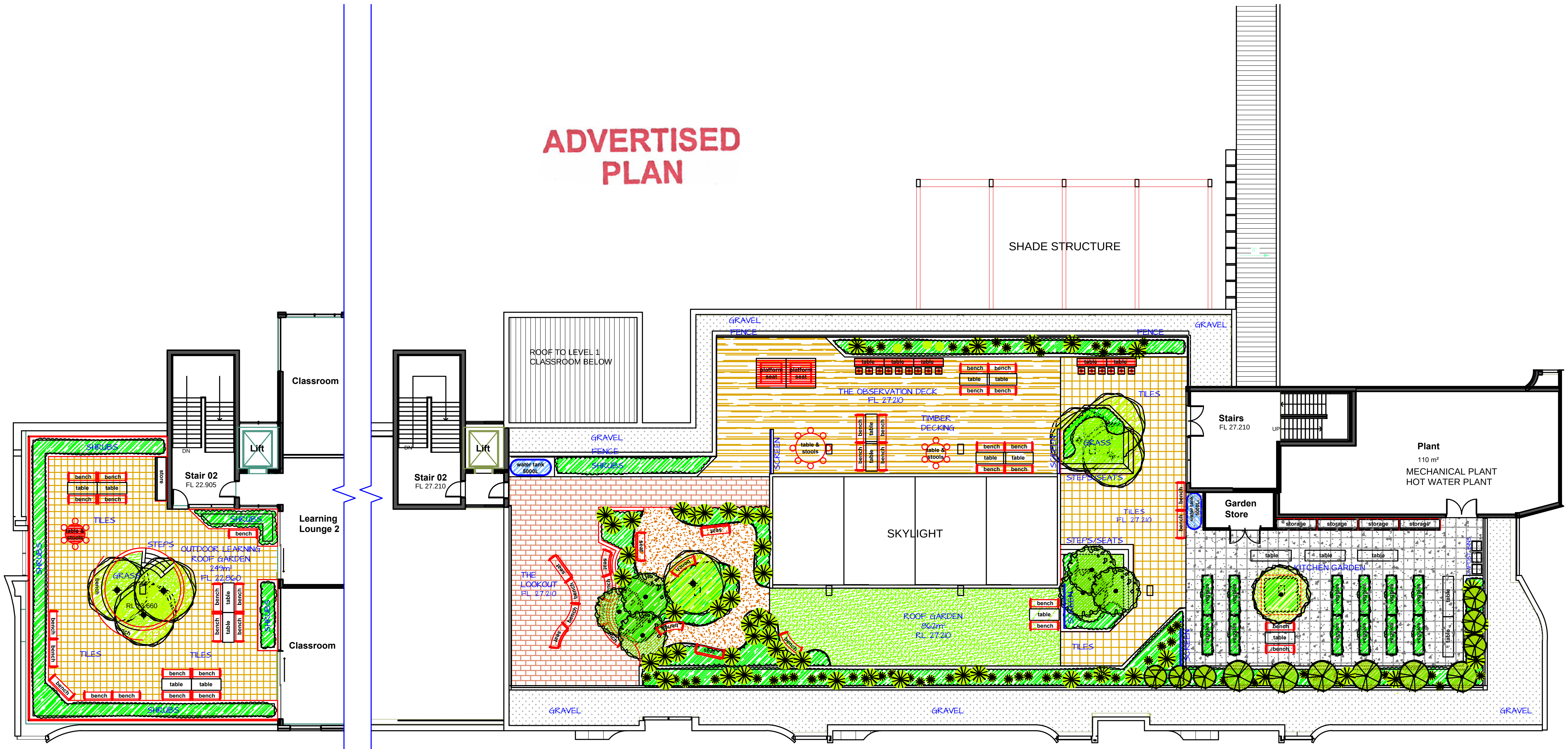
TPL02A

ADVERTISED PLAN



LEVEL 01 PLAN

LEVEL 02 PLAN

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ROOF GARDEN LANDSCAPE PLANS
BAYVIEW BUILDING - LEVELS 1 & 2

Mentone Grammar College, Mentone, Victoria.

SCALE: 1 : 250 @ A3 DATE: 01. 11 .2021

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TPL08A

INTEGRAL