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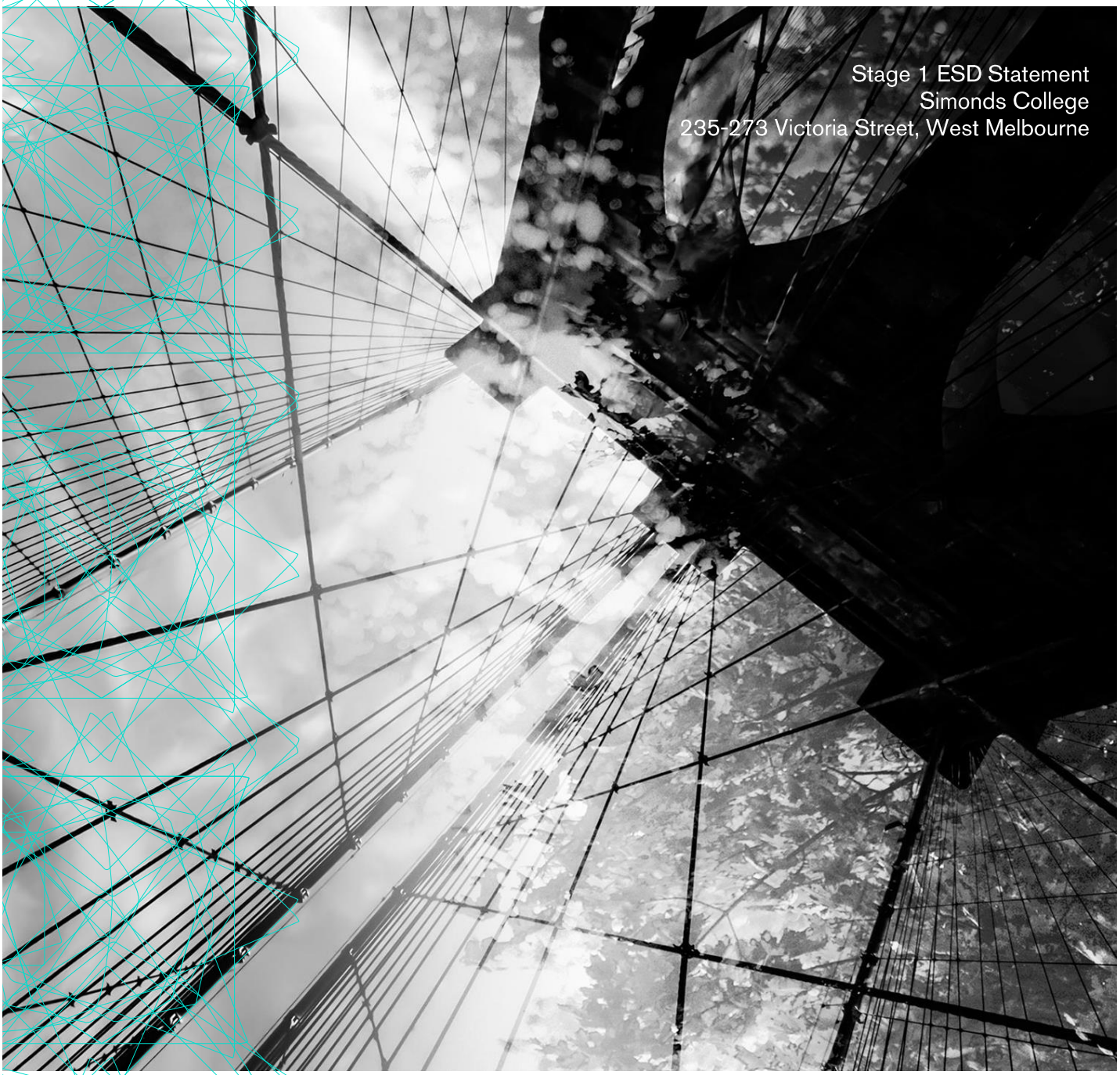

Stage 1 ESD Statement
Simonds College
235-273 Victoria Street, West Melbourne

SUSTAINABLE DEVELOPMENT
_CONSULTANTS

Proposed Simonds College Redevelopment
235-273 Victoria Street, West Melbourne

Stage 1 ESD Statement

December 2020

S4200 Stage 1 ESD Statement.V1

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Table of Contents

Version	Date of Issue	Description	Author	Approved
V1	16-12-2020	For Planning Submission	PC	BdW

1. Introduction

This ESD Statement has been prepared to assist the design, construction and operation of the proposed Stage 1 Simonds College redevelopment at 235-273 Victoria Street, West Melbourne.

Sustainable Development Consultants have assessed the proposed development and provided input to the design team. This SMP captures initiatives necessary to ensure that the development meets the sustainability requirements of Melbourne City Council, as outlined in Section 1.3 of this report.

This document has been prepared by Sustainable Development Consultants with reference to the architectural drawings prepared by Chandler Architecture.

Site Description

The site at 235-273 Victoria Street, West Melbourne is on the north-western fringe of the CBD. It is bounded by Chetwynd, Victoria, William and Howard Streets, and bordered by residential properties to the south. The site is within a predominantly mixed-use locality, with commercial and residential properties opposite on Chetwynd Street.

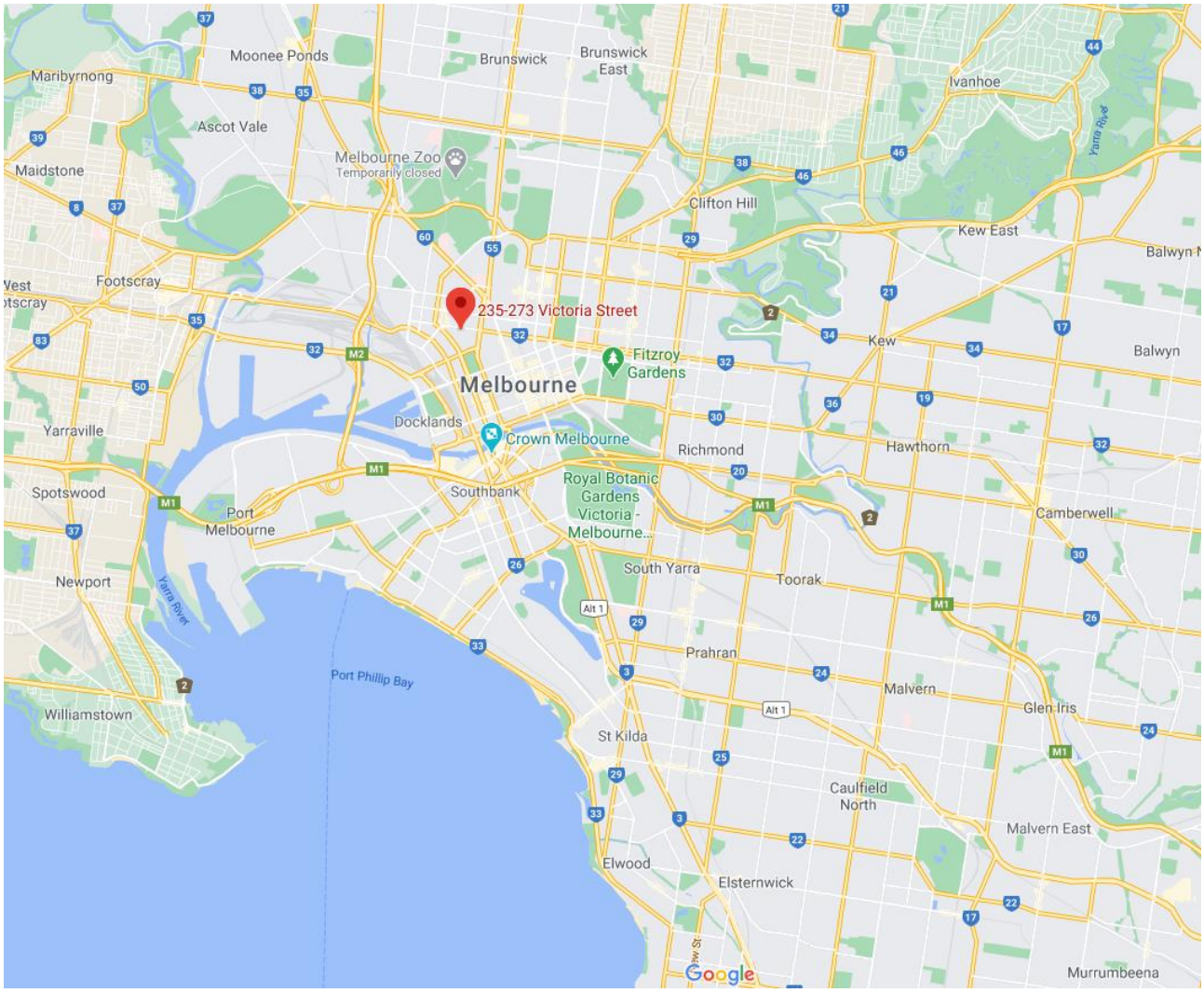


Figure 1: Location of 235-273 Victoria Street, West Melbourne in relation to the Melbourne CBD (Source: Google Maps)

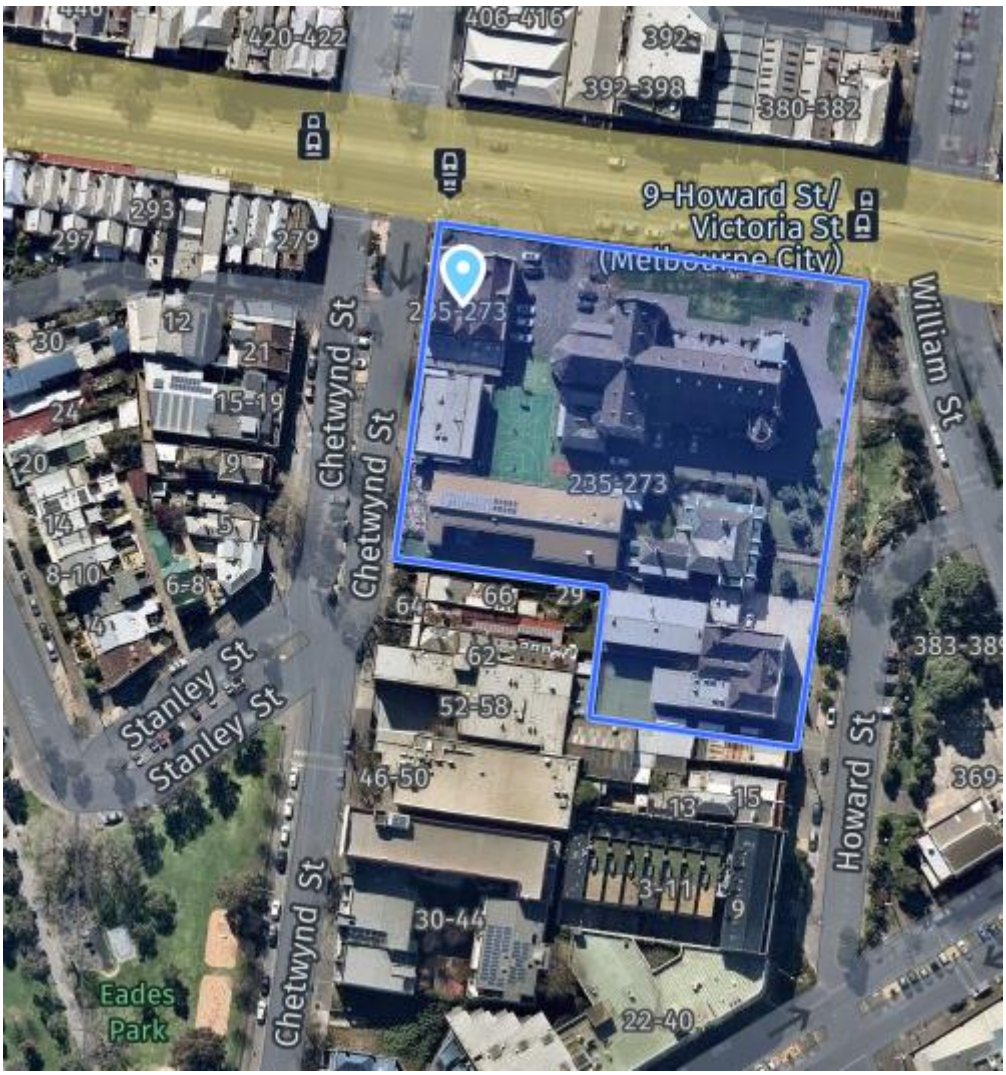


Figure 2: Aerial image of the development site at 235-273 Victoria Street, West Melbourne (Source: Nearmap, mark-up by SDC)

Development Summary

Set out in Table 1 below is a development summary for this project.

Table 1: Development Summary

Development Information	
Total Site Area	Approximately 3,998.6m^2.
Stage 1 Site Area	1,531.7m^2 Building D to be demolished. Construction of Building 3 (five levels, all new) and refurbishment of Building E to become Building 4. Gross Floor Area (GFA) approx. 2,870m^2.

The area of each stage of the redevelopment has been marked up in Figure 3.

Key to Figure 3:

Stage 1 = Red, 1,531.7m²

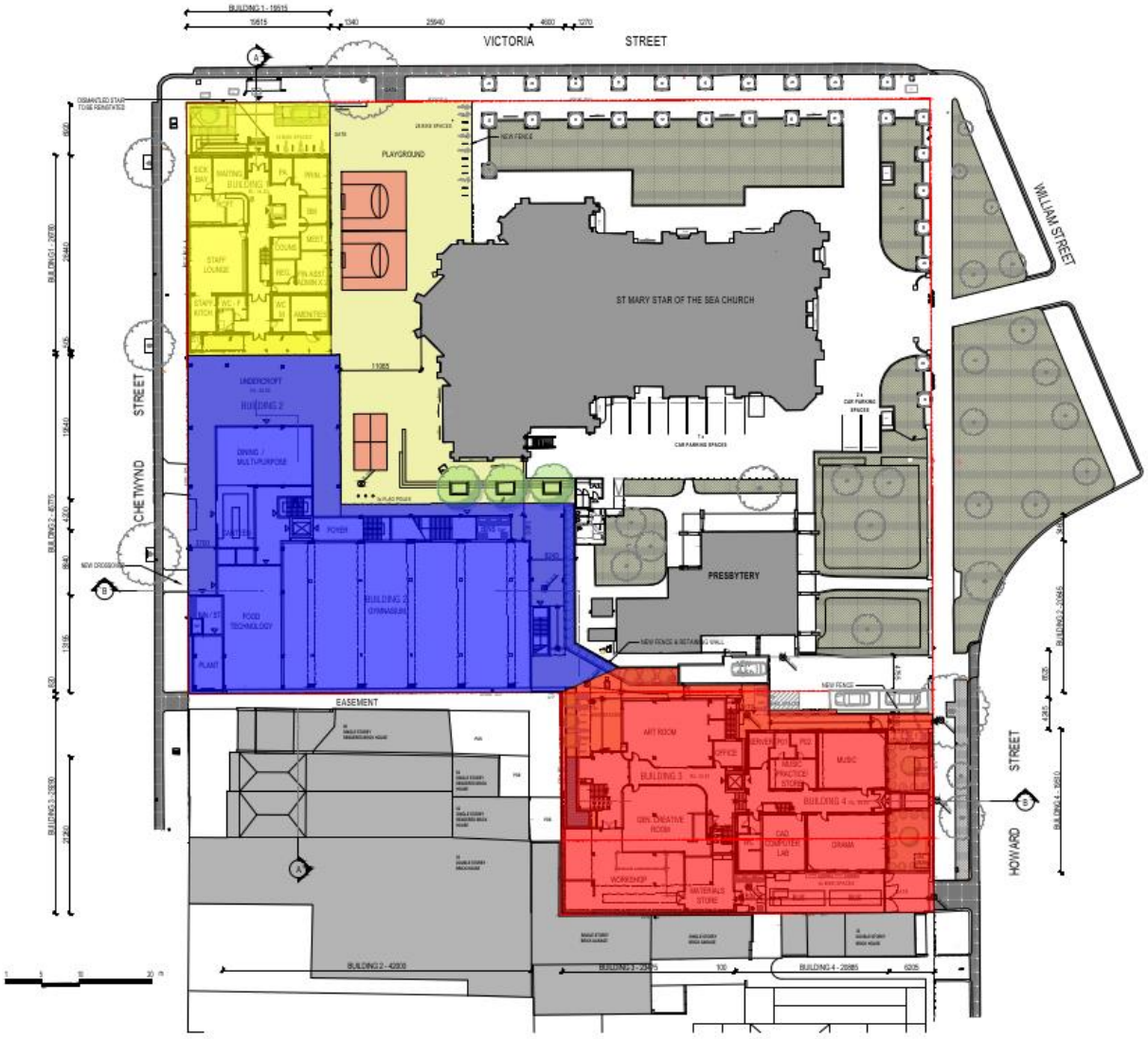


Figure 3: Redevelopment Site Delineation

City of Melbourne Requirements

City of Melbourne is committed to becoming an environmentally sustainable city. Critical to achieving this commitment is for development to meet appropriate environmental design standards, including the eco-city goals and standards as detailed in *Future Melbourne Community Plan 2008*.

The City of Melbourne expects that this project should achieve best practice in environmentally sustainable development from the design stage through to construction and operation. To comply with the Local Planning Scheme including Clause 22.19 *Energy, Water and Waste Efficiency,* this project is required to satisfy the objectives as set out within the following categories, where applicable:

- Energy Efficiency
- Water Resources
- Indoor Environment Quality
- Stormwater Management
- Transport
- Waste Management
- Urban Ecology

This requires an Environmentally Sustainable Design Statement which demonstrates how for this project, the relevant policy objectives will be achieved.

Based on Stage 1 GFA of between 2,000 and 5,000m², this portion of the development is required to achieve:

- 5 points for the Ene-1 credit under a current version of the Green Building Council of Australia's Green Star – Education rating tool or equivalent; and
- 3 points for the Wat-1 credit under a current version of the Green Building Council of Australia's Green Star – Education rating tool or equivalent, and
- A Waste Management Plan prepared in accordance with the current version of the City of Melbourne's Guidelines for Waste Management Plans.

The City of Melbourne also requires that this project addresses the following relevant planning scheme provisions:

- Clause 19.03-3S *Integrated Water Management*
- Clause 21.05 *Environment and Landscape Values*
- Clause 22.23 *Stormwater Management (WSUD)*
- Clause 52.17 *Native Vegetation*
- Clause 52.34 *Bicycle Facilities*
- Clause 53.18 *Stormwater Management in Urban Development*
- Clause 54.03 *Site Layout and Building Massing*
- Clause 56.07 *Integrated Water Management*

In July 2019, the City of Melbourne declared a climate emergency and as part of this, are committed to enhanced Environmentally Sustainable Design.

ESD Assessment Tools

There are several calculators and modelling programs available in Victoria to assess proposed developments against benchmarks for ESD, as set by the Victorian government, local councils and the Building Code of Australia.

For this project, the assessment tools that have been adopted for this project are set out below.

1.4.1 GREEN STAR DESIGN & AS BUILT V1.3

The Green Star Design & As-built tool was created by the Green Building Council of Australia (GBCA) to help assess and benchmark new developments against a thorough set of criteria, specifically designed to reward best practice and innovative sustainable design approaches. The tool includes nine (9) different categories which cover all areas of building design and some ongoing operation. These are:

- Management;
- Energy;
- Indoor Environment Quality;
- Water;
- Materials;
- Transport;
- Land Use and Ecology;
- Emissions; and
- Innovation.

Stage 1 of this project is only targeting minimum points thresholds in two categories, those of energy and water. As such, a full Green Star assessment is not applicable.

1.4.4 MODEL FOR URBAN STORMWATER IMPROVEMENT CONCEPTUALISATION V6 (MUSIC)

MUSIC is an urban stormwater modelling software that was developed to provide an easy-to-use universal treatment model for all urban stormwater systems. The tool is capable of simulating stormwater runoff, its treatment and quality during a rainfall event for catchment areas up to 100km^2 and can be used to assess and inform on stormwater treatment measures necessary to ensure the design of urban development meet required Water Sensitive Urban Design Standards.

Details and results for the MUSIC assessment completed for the proposed development can be found in Appendix 2 - MUSIC Assessment and WSUD Report. Note that the MUSIC assessment was completed with a site-wide approach, encompassing Stages 1-3 within the one assessment.

Overview of Assessments

The following ESD assessments are being undertaken by SDC in response to the planning requirements:

Overall: Project-wide stormwater assessment, using eWater's MUSIC tool, to gauge requirements to achieve Urban Stormwater Best Practice Environmental Guidelines as stipulated by CSIRO (1999).

Stage 1: Buildings 3 & 4

- ESD Statement detailing the suite of environmentally sustainable design measures proposed for implementation (refer Section 2).
- Green Star Design & As Built v1.3 Potable Water Calculator to gauge requirements to achieve a minimum of 3 points (refer Appendix 1).
- Energy Modelling to enable the Green Star Design & As Built v1.3 Greenhouse Gas Emissions Calculator to be completed, to achieve a minimum of 5 points.

2. Sustainability Initiatives

The following sections outline the initiatives that will be incorporated into the development throughout its design, construction and operation.

The following sections, as well as nominating the sustainability initiatives, also identify the party/parties responsible for implementation of the initiative.

The following are the broad project stages:

1	Design Development	• Consultants develop conceptual design drawing to a detailed stage suitable as a basis for preparing working drawings - Integration of architectural, services, structure and site attributes • Checking compliance with all statutory requirements, codes and standards • Arranging special surveys or reports as required
2	Construction Documentation	• Architectural and services drawing sets completed • All specialist reports completed • All necessary planning and building consents obtained as required by authorities
3	Construction	• All work carried out onsite – site preparation, construction, alteration, extension, demolition • Purchase of all materials / certification • Evidence gathering from subcontractors • Commissioning
4	Post Occupancy	• Operation and Maintenance • Education – Building Users Guides

Building Management

The development will aim to promote the adoption of environmental management initiatives at different stages of the project – not just in the project design stage.

Design Requirements	Responsibility & Implementation	Project Stage
Environmental Performance Targets		
Documented targets will be set for the environmental performance of the building: • Greenhouse gas emissions – commitment in kg/CO_2/$m^{2;}$ and • Potable water usage – kL/person Energy and water consumption will be monitored and reported against set performance targets for the building. These will be updated periodically to ensure the building performance has continuous improvement. These targets will be used as an educational tool for students by providing a real-time display in a main foyer/corridor.	ESD Consultant/ Building Operator	Design Development
Building Commissioning		
All building systems should be fully commissioned in accordance with CIBSE or ASHRAE codes before handover. All services proposed for the development will be reviewed prior to install for the servicing and maintainability requirements, they will be fully commissioned in accordance with best practice commissioning guidelines.	Builder/ Services Consultant	Commissioning
Building Systems Tuning		
Initial tuning and ongoing maintenance and monitoring will be undertaken for all building systems included in the development. This commitment must include monthly adjustments and measurement for the first 12 months following occupation with quarterly reporting provided.	Builder/ Services Consultant	Commissioning
Implementation of a Climate Adaptation Plan		
A Climate Adaptation Plan is a means of future-proofing the development to be prepared to handle a changing climate over two timescales (i.e. 2030, 2070), and specific design responses which have been put in place to adapt for the future. A requirement of Stage 2 only, but a CAP prepared for Stage 2 would be applicable to the whole site, and any building-specific recommendations would be worth considering at Stages 1 (and 3) considering that City of Melbourne have declared a climate emergency.	Builder/ ESD Consultant	Commissioning
Building Information		
A comprehensive operations and maintenance manual will be developed and made available to the facilities management team. A Building Logbook to be prepared for the entire facility, information to be in line with Green Star Requirements. A Building Users Guide to be prepared, outlining relevant and current building user information. It should take into account the passive design features of the facility. The information should include descriptions of systems installed in the building, sustainable transport in the area as well as sustainable building operation suggestions relevant to building users.	ESD Consultant/ Services Consultant	Post Occupancy

Design Requirements	Responsibility & Implementation	Project Stage
Metering and Monitoring		
The design will include electronic metering systems that will be integrated into the building to monitor and report on energy and water consumption and control the building central services. This should address the following end uses: Energy: • HVAC • Domestic Hot Water • Interior Lighting • Exterior Lighting • Lifts Water: • Amenities • Irrigation • Rainwater Tank usage	Services Consultant	Design Development
Construction Environmental Management		
As part of the construction process, the contractor will implement a project-specific Best Practice Environmental Management Plan—this must be in line with *NSW EMS Guidelines*. This will be in place before starting works and throughout the construction process.	Builder	Construction Documentation

Energy Efficiency

Energy usage of the campus redevelopment will be minimised by the installation of an efficient hot water system, heating and cooling systems, lighting, and best practice building envelopes.

Design Requirements	Responsibility & Implementation	Project Stage
Building Envelope		
All new building envelope facades (walls and glazing) are to be designed to meet the requirements of the NCC 2019 Façade Calculator (or better than the allowance). Floor and ceiling insulation are to meet the requirements of Section J of the NCC 2019 at a minimum. Preliminary JV3 energy modelling will be undertaken for Stage 1 following further design development, to identify the building fabric requirements necessary to achieve a minimum of 5 points in the Green Star Design & As Built v1.3 Greenhouse Gas Emissions Calculator.	ESD Consultant/ Architect	Construction Documentation
Heating and Cooling Systems		
Heating and cooling will be provided by energy efficient air conditioners (within one energy rating star of the best available, or if no star rating applies, achieve an EER/COP at least 10% more efficient than minimum allowed under MEPS for an equivalent sized unit).	Mechanical Engineer	Design Development
Hot Water Systems		
Hot water in the development will be provided via electric instantaneous systems (within one-star of best available). This will be installed at points of use, minimising distribution heat losses. All pipework will be insulated to minimise distribution heat losses.	Hydraulic Engineer	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
Indoor Lighting		
Energy consumption from artificial lighting throughout the development will be reduced by using LED lighting and by optimising daylight diffusion through light-coloured internal surfaces (particularly walls, furniture and ceilings). Lighting levels must not exceed the maximum wattages listed in Table J6.2a of the 2019 BCA without the use of any adjustment factor. Lighting energy consumption will be reduced both by energy efficient fittings, and the use of daylight sensors. For glazing greater than 2.1m above floor height in classrooms, consider incorporating light shelves to reflect sunlight toward the ceiling and promote daylight access deeper within the space whilst also reducing the need for internal lighting.	Electrical Engineer	Design Development
External Lighting		
External lighting will be LED and will have controls (e.g., motion detectors and timers) to minimise consumption during off-peak times (i.e. when the school is closed).	Electrical Engineer	Design Development
Electrical Appliances		
Electrical appliances (other than air-conditioning) should have an energy rating no less than 1.5 star below the highest available energy rating under the E3 Program. Refer to http://www.energyrating.gov.au/ for current ratings. The number of fridges and fridge locations will be limited.	Services Consultant	Design Development
Peak Electricity Demand Reduction & Solar PV		
Peak electricity demand will be reduced with the addition of roof-mounted solar photovoltaic arrays. This will generate green energy and offset the HVAC and internal lighting loads of the development. With usage patterns over the peak daytime period of solar energy production (10am-2pm), and high expected usage rates, the more solar PV that can be installed on both Buildings 2 and 3, the better. It is recommended that the PV array be increased in size as much as possible given the space limitations. Installation must follow CEC guidelines and AS/NZS5033 and consider the use of non-penetrative fixings for rooftop PV. Solar PV systems to have remote monitoring and be integrated to the BMS. These measures will help to reduce the peak demand of the building.	Architect/ Services Consultant	Design Development
Lifts		

The design places the lifts adjacent to the stairs, making it easier for users to have the choice of using the stairs.
 	
Energy efficient lifts will be specified that include:
• Measures to specifically reduce stand-by consumption such as:
  ○ Switching off control devices when the lift is not in motion & using a more efficient power supply unit;
  ○ LED lights and display; and
  ○ Suspension specifically designed to reduce friction.
	Service Consultant	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
Building Sealing		
All windows, doors, exhaust fans and pipe penetrations will be constructed to minimise air leakage as required by the provisions outlined in Section J3 of the 2019 BCA. This will include the use of seals around operable windows and doors as well as caulking to pipe penetrations, and the addition of self-closing louvers or dampers to exhaust fans.	Architect	Design Development
Building Management System (BMS)		
A BMS will be installed capable of both gathering and reporting usage data from all meters and alerting the facilities management team in case of atypical or high usage. It is proposed that the BMS will form part of the central monitoring and control systems. The BMS will be commissioned at its installation. Alerts and automatic report generation must be set up and provided to the building manager.	Services Consultant	Design Development
Provision of Outdoor Air		
Outdoor air rates provided at 50% greater than the minimum required by AS 1668.2:2012, or CO_2 concentrations maintained below 800ppm. A requirement of Stage 2 only but recommended across all stages.	Services Consultant	Design Development
Exhaust or Elimination of Pollutants		
Science exhaust ducts will be directly discharged from the building with no recirculation component. Printer/photocopy equipment located in an enclosed space with dedicated exhaust riser directly to outside.	Services Consultants	Design Development
Refrigerant Pollution		
Refrigerants to be selected to have zero ozone depletion potential (ODP) and a global warming potential (GWP) of less than 10 in all systems.	Services Consultant	Design Development
BMS HVAC Tuning and Sensors		
Rooms used intermittently (e.g. meeting rooms) will have their own HVAC systems and will include controls and thermostats for those rooms. Wider heating and cooling setpoint design criteria to be implemented with at least a 2°C - 3°C dead band. All HVAC systems to have time schedules, linked to the BMS. The BMS will allow cooling and heating lockouts based on outside air temperatures or calendar.	Services Consultant	Design Development
Ventilation System		
ASHRAE Standard 62.1:2013 is followed for minimum separation distances between pollution sources and outdoor air intakes. Ducts will be cleaned before occupation or sealed off during construction. Easy and safe access to all mechanical plant and equipment will be provided.	Services Consultant	Design Development

Water Resources & Stormwater Treatment

Water will be used efficiently across the development through efficient fixtures and fittings, and collection and use of rainwater which helps to reduce mains water requirements and diverts stormwater.

Design Requirements	Responsibility & Implementation	Project Stage
Potable Water Reduction – Efficient Fixtures (18A)		
Efficient water fittings and fixtures will be installed to reduce the volume of mains water used. The following Water Efficiency Labelling Scheme (WELS) star ratings will be specified: • Wash hand basin taps: flowrate ≤ 6L/min (≥ 5 Star); • Toilets: dual flush, 3/4.5 L/flush (≥ 4 Star); • Urinals: ≥ 5 Star or waterless; and • Dishwashers: ≥ 4 Star WELS.	Architect / Services Consultant	Design Development
Rainwater Collection and Reuse		
Rainwater runoff from suitable roof areas from Buildings 2 and 3 will be collected and stored in two rainwater tanks, each with a minimum effective storage capacity of 10kL. The collected water will be used for toilet and urinal flushing throughout the redevelopment site, as well as irrigation of landscaped areas. Note that the tanks have been sized appropriately to reduce peak stormwater flows and prepare for the effects of climate change and associated potential for the increased frequency of heavy rainfall events. Refer Appendix 2 - MUSIC Assessment and WSUD Report.	Civil / Hydraulic Engineer	Design Development
Water Efficient Landscaping		
A sub-surface drip irrigation system, with moisture sensor override if required, will be installed along with the use of mulch (min. depth of 75mm).	Landscape Designer	Construction Documentation
Stormwater – Pollution Reduction Target		
The proposed redevelopment site achieves a compliant site-wide MUSIC result. This result can be attributed to the rainwater collection and re-use system, and to raingardens which filter stormwater from the trafficable terraces of Buildings 2 and 3 prior to discharge. Refer Appendix 2 - MUSIC Assessment and WSUD Report. This result demonstrates stormwater discharged from the site meets the minimum pollution reduction targets in accordance with Clause 22.23.	Architect / Services Engineer / ESD Consultant	Design Development
Waterless HVAC Systems		
Air-conditioning units will use air-cooled condenser components which will help to reduce the development's overall water usage while also preventing the growth and spread of legionella bacterium, which thrive in warm stagnant water.	Services Consultant	Construction Documentation

Indoor Environment Quality

Indoor Environment Quality (IEQ) within the buildings will be improved through various initiatives which help to create a healthy indoor environment free from toxins with ample supply of daylight and outside air.

Design Requirements	Responsibility & Implementation	Project Stage
Volatile Organic Compounds		
All paints, adhesives and sealants, flooring, and wall and ceiling coverings will not exceed the limits outlined in Appendix 2. Alternatively, products with no VOCs will be selected. Paints such as eColour, or equivalent, should be considered.	Architect	Construction Documentation
Formaldehyde Minimisation		
All engineered wood products will have 'low' formaldehyde emissions, certified as E0 or better. Alternatively, products with no formaldehyde will be specified. Emissions limits are listed in Appendix 4 – Green Star VOC and Formaldehyde Limits. Products such as Ecological Panel – 100% post-consumer recycled wood (or similar) will be considered for use within the development.	Architect	Construction Documentation
Reverberation		
The design of the development will have the potential to reduce reverberation to a level suitable for the activity type in the relevant spaces.	Acoustic Consultant	Design Development
Acoustic Separation		
The development design will address noise transmission in enclosed spaces. Partitions between classrooms, office and meeting rooms will be constructed to achieve a weighted sound reduction index (R_w) of at least 45 (for all partitions without a door).	Acoustic Consultant	Design Development
Minimum Lighting Comfort		
All luminaires will be installed with high-frequency ballasts. All lights selected will be flicker-free and will accurately address the perception of colour in the space, by having a minimum Colour Rendering Index (CRI) of 80.	Electrical Engineer	Construction Documentation
General Illuminance and Glare Reduction		
For learning spaces, Best Practice lighting levels will be met and will be in accordance with AS 1680.1:2006 for different space types. Internal lights are fitted with baffles, louvres or diffusers to obscure any direct light source so as to cut out glare.	Electrical Engineer	Design Development
Surface Illuminance		
Sufficient illuminance will be provided for task areas such as the classrooms and over bathroom basins within the development to ensure that there is adequate light to carry out tasks in these areas.	Electrical Engineer	Design Development
Glare Reduction		
Glare into the building will be controlled via the provision of shading from the roof as well as blinds provided to all unshaded windows. External mechanical roller blinds would also provide a significant reduction in heat gain during these periods.	Architect	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
Daylight		
The development is provided with plenty of natural light via the provision of windows to all learning spaces. Internal amenity is enhanced through light-coloured internal finishes to maximise natural light levels.	Architect	Design Development
External Views		
Access to a 'high quality' external view is provided to at least 60% of the occupied areas.	Architect	Design Development
Thermal Comfort		
Thermal comfort PMV targets of the NCC 2019 apply to all conditioned spaces.	ESD Consultant Mechanical Engineer	Design Development

Building Materials

The development will aim to promote the use of recycled materials and materials with lower embodied energy and environmental impacts.

Design Requirements	Responsibility & Implementation	Project Stage
Insulation		
All insulants used on site must have a zero Ozone Depletion Potential in processing and manufacturing.	Builder	Construction
Concrete		
The Portland Cement content of the concrete should be reduced by a minimum of 30% through a replacement with supplementary cementitious materials such as fly-ash, slag or metakaolin. The mix water will also be recycled water or rainwater for at least 50% of the mix and 25% of all fine aggregate is to be manufactured sand (not virgin sand from a quarry). A further recommendation is that Holcim concrete be investigated for use as they have a full EPD on concrete in Australia now.	Builder	Construction
Structural Steel		
Reduction in mass of steel framing by 5% used when compared to standard practice or by specifying high strength steel.	Builder	Construction
Structural Steel		
At least 95% of all structural steel used in the building will be sourced from a Responsible Steel Maker[1].	Builder	Construction
Timber		
All timber used in the development will be Forest Stewardship Council (FSC) or Program for the Endorsement of Forest Certification (PEFC) certified or recycled/reused.	Architect	Construction Documentation
Cables, pipes, floors and blinds		
All standard uses of cables, pipes, flooring and blinds within the development will either not contain any PVC or will be sourced from a	Services Consultant	Construction Documentation

[1] A Responsible Steel Maker must have facilities with a currently valid and certified ISO 14001 Environmental Management System (EMS) in place and be a member of the World Steel Association's (WSA) Climate Action Program (CAP).

Design Requirements	Responsibility & Implementation	Project Stage
manufacturer/supplier that adheres to the Green Building Council of Australia's *Best Practice Guidelines for PVC in the Built Environment*.		
Flooring		
All flooring will be manufactured from materials/products certified under any of the following: • Carpet Institute of Australia Limited, Environmental Certification Scheme (ECS) v1.2; • Ecospecifier GreenTag GreenRate V3.1; • Good Environmental Choice (GECA); and/or • The Institute for Market Transformation to Sustainability (MTS) Sustainable Materials Rating Technology Standard Version 4.0 – SmaRT 4.0. Alternatively, floor coverings and joinery must be durable, include some eco-preferred content, be modular and/or come from a manufacturer with a product stewardship program and ISO 14001certification.	Builder/ Architect	Construction Documentation

Figure 4: Examples of approved environmental labels for products which may be incorporated into the development

Urban Heat Island Effect Reduction		
Selection of light-coloured roofing materials with a three-year Solar Reflectance Index (SRI) greater than 64 (roof pitch <15°) and light-coloured terrace/balcony paving with a three-year SRI greater than 34. This can be achieved through the selection of a light colour such as Colorbond 'Surfmist'. Solar Panels are also considered to meet this requirement.	Architect	Design Development

Transport

The 235-273 Victoria Street, West Melbourne proposed redevelopment site has been assessed using the "Walk Score" locational performance tool. The tool was developed in 2007 by Front Seat using the Google Maps tools. This tool takes into account the number of facilities within close proximity, and public transit based on distance and type of nearby transit lines. Numerical scores of between 0 and 100 for the following two aspects are provided:

- Walk Score: 0 being heavily car dependent with access to community facilities that are located some distance away, and 100 reflecting a location that is easily accessible to abundant facilities by foot.
- Transit Score: 0 being the location only provides minimal transit while 100 reflecting a location that is well served by public transport.

The proposed development in West Melbourne achieves a Walk score of 97 out of 100 – "Walker's Paradise" and a Transit Score of 100 out of 100 – "Rider's Paradise", which indicate that the building users can complete most daily errands without requiring a car and that transit is convenient for most trips.

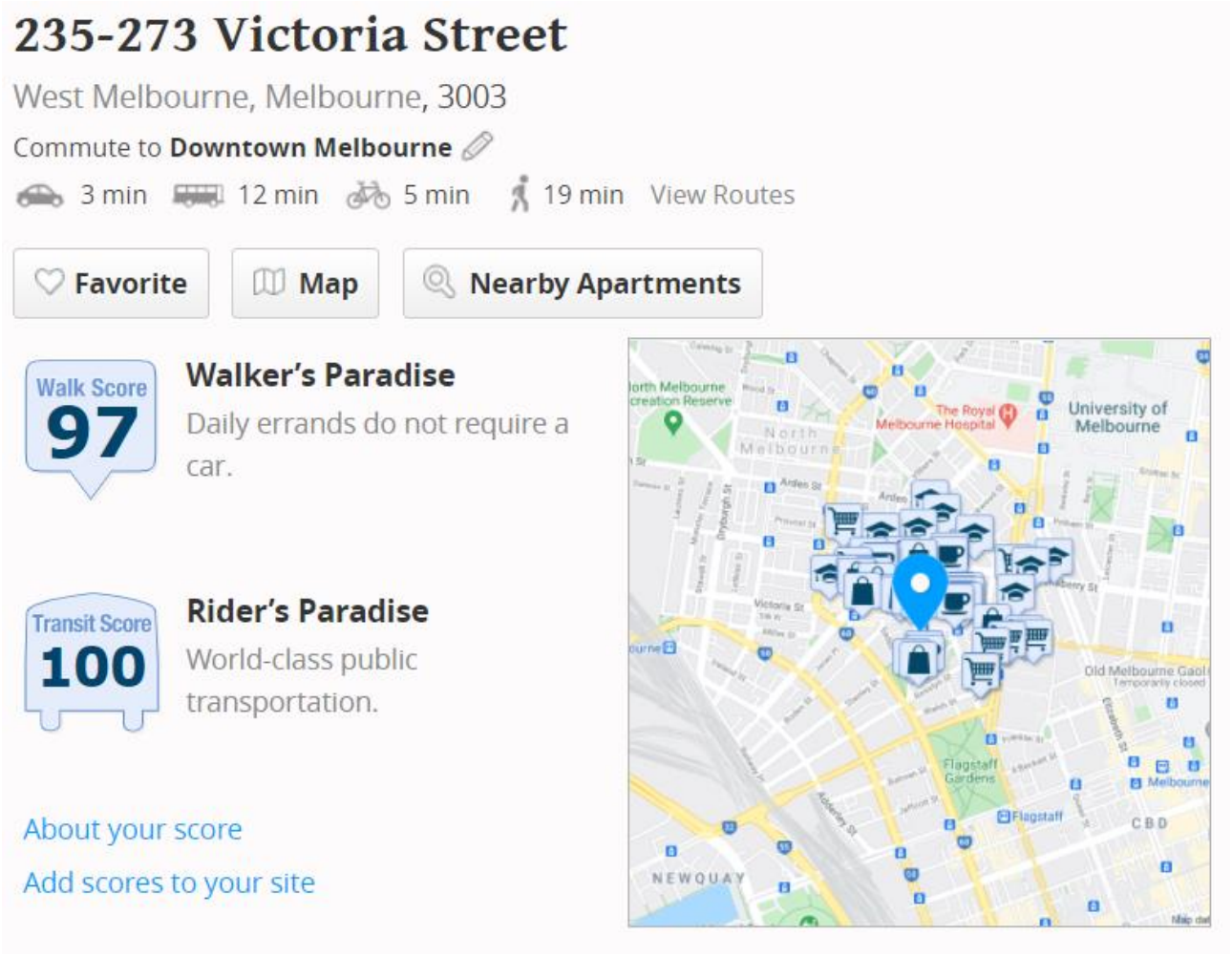


Figure 5: Walk Score results and map showing amenities surrounding 235-273 Victoria Street, West Melbourne. (Source: walkscore.com)

Design Requirements	Responsibility & Implementation	Project Stage
Active Transport Facilities		
Stage 1 will include 38 new spaces (in addition to the 5 existing spaces) for the storage of bicycles for use by students and staff:	Architect	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
Additionally, end of trip facilities with showers, changing areas and lockers are provided within Building 2 for staff.		
Access to Public Transport (17B.1)		
The development site has direct access within 1km walking distance to the following public transport options: V-Line Train Line: • Southern Cross station • Southern Cross coach terminal Metro Train Line: • Melbourne Central and Flagstaff City Loop stations • Parkville and Arden stations (under construction) Tram Routes: • 57: West Maribyrnong – Flinders Street Station • 58: Toorak – West Coburg Bus Routes: • 951: City - Glenroy • 219/220: Gardenvale – Sunshine • 216: Brighton Beach - Sunshine	Inherent in Location	

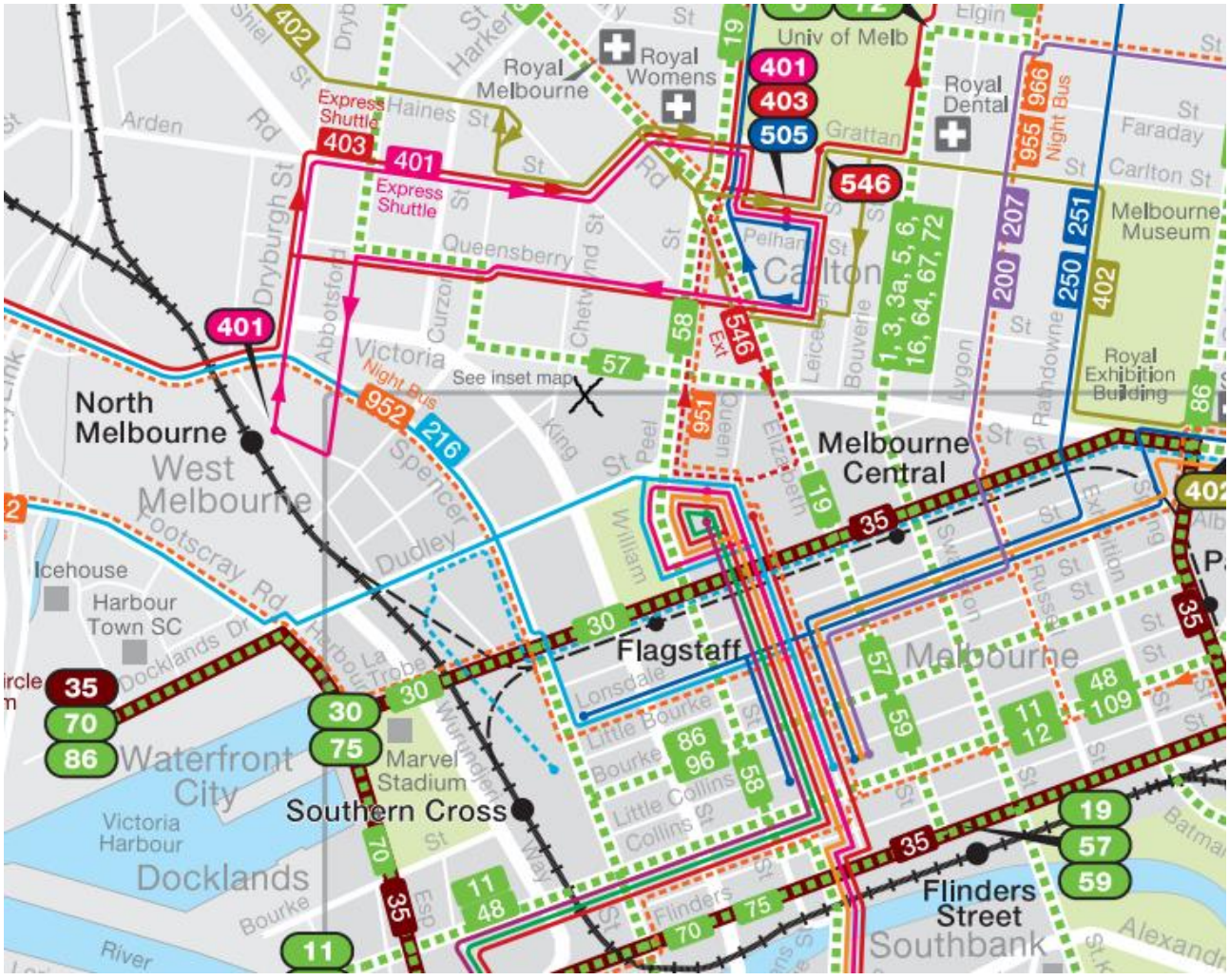


Figure 6: PTV Local Area Map indicating the public transport options surrounding 235-273 Victoria Street (black X)

Urban Ecology

Design Requirements	Responsibility & Implementation	Project Stage
Vegetation		
5% of the overall site is covered with vegetation through the inclusion of planters and raingardens across the development. It is recommended that a variety of indigenous species be included in the landscaping of the site. This will help to enhance local biodiversity and encourage native birds to visit the space, whilst also facilitating on-site stormwater infiltration.	Architect / Landscape Architect	Design Development
Raingardens		
Raingarden bioretention systems have been included at Stage 1 (and 2), to filter rainwater draining from the trafficable terraces of Buildings 2 and 3. Such systems, designed with appropriate indigenous vegetation, contribute to local habitat improvement and the provision of attractive spaces.	Architect / Landscape Architect	Design Development
Sustainable Sites		
At the time of purchase, the site did not include old-growth forest, or a wetland of "High National Importance", or did not impact on a Matter of National Significance or have to be referred to the Federal Environment Minister as a "controlled action".	N/A – Inherent in location	
Light Pollution		
No external luminaire on the project will have an Upward light Output Ratio (ULOR) exceeding 5%, relative to its mounted orientation. External lighting will be designed to avoid light spill off the site or into the night sky.	Architect/ Electrical Engineer	Schematic Design

Waste Management

The development will aim to manage waste emissions from the building in an efficient manner, seeking to reduce and reuse waste where possible.

Design Requirements	Responsibility & Implementation	Project Stage
Construction Waste Management		
The builder will develop a construction waste management plan (CWMP) for the construction phase. This will include the following: • Waste generation; • Any waste systems; • Minimisation Strategy; • Performance / Reduction targets; • Bin quantity and size; • Collection frequency; • Signage; and • Monitoring and reporting including frequency and method. The CWMP will require that all hazardous substances, pollutants and contaminants must be managed and disposed of in accordance with all state regulatory requirements. Where these materials are treated, or used	Builder	Construction Documentation

Design Requirements	Responsibility & Implementation	Project Stage
on site, they must be in accordance with a sanctioned remediation process. The CWMP may form part of a broader Construction Environmental Management Plan (CEMP).		
Operational Waste		
A waste management plan will be prepared by Leigh Design, and include the following: • Waste generation; • Any waste systems; • Minimisation Strategy; • Performance / Reduction targets; • Bin quantity and size; • Collection frequency; • Waste contractors; • Signage; and • Monitoring and reporting including frequency and method. In addition, the following prescriptive Green Star requirements must be met: • 90% of waste generated onsite diverted from landfill (via reuse or recycling); • Separation of Waste Streams; • Dedicated Waste Storage Area; and • Access to Waste Storage Area	Services Consultant	Construction Documentation
Construction and Demolition Waste		
A maximum 5kg per sqm of GFA of the waste generated during construction and demolition by weight will be diverted from landfill.	Builder	Construction

3. Conclusion

As set out in this ESD Statement, Stage 1 of the proposed Simonds College redevelopment at 235-273 Victoria Street, West Melbourne will meet best practice Environmentally Sustainable Design requirements through the initiatives outlined in this report including the use of energy efficient systems to reduce greenhouse gas emissions, rainwater reuse tanks and efficient fittings to reduce potable water consumption, and measures to reduce waste not only during building operation, but also during demolition and construction.

The initiatives that have been included within this ESD Statement all have a proven track record of serving their individual purpose and can be easily maintained with any failures obvious to school staff and the facilities management team. This helps to ensure the ongoing sustainability of the buildings, as the systems installed in the beginning are maintained for purpose throughout the life of the building.

Appendix 1 – Green Star Design & As Built Potable Water Calculator

Stage 1 (Buildings 3 & 4)

Potable Water, Performance Pathway (18A) - All projects, except Hotels & Residentials

			Weighted Points Achieved		3.6
Links to - Building and climate data:	Building input, areas and operation	10-year rainfall data			
Links to - Water demand:	Fittings	Whitegoods	Heat Rejection	Washdown	Landscape Irrigation
	Swimming pools	Fire Protection System	Process Cooling		
Links to - Reclaimed water supply:	Reclaimed water use	Rainwater collection	Greywater collection	Blackwater collection	Stormwater and off-site reclaimed water
Links to - Results:	Checklist	Demand summary	Results for Performance Pathway (18A) only	Results for Domestic hot water	Results for Sewerage

Instructions: Enter information into light blue cells

For details on what information is required and how this information is used to calculate the reduction in potable water consumption against the Standard Practice Benchmark, please refer to the Green Star - Potable Water Calculator Guide, available from the GBCA website.

0. GENERAL

BUILDING OCCUPANCY, AREAS AND OPERATION

Space type description	Area (m²)	Peak days of operation (remaining days assumed off-peak)	Occupancy profile	Maximum design occupancy used in water use		Percentage of building users who occupy the space continually for periods greater than one hour.
				Proposed Building design occupancy (m2/person)	Default design occupancy (Not applicable for residential areas)	
Staff Room/meeting room/office	124.37	5 days a week	NCC table 2j (Class 9b School)	10	Office (10m2/person)	100%
General Classroom	1044.87	5 days a week	NCC table 2j (Class 9b School)	2	Please select	100%
Practical (Workshop)	556.75	5 days a week	NCC table 2j (Class 9b School)	5	Please select	100%
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
		Please Select	Please Select		Please select	
Non occupied areas	1143.91	n/a	n/a			
TOTAL AREA	2869.9					

1. SANITATION FIXTURE EFFICENCY

WATER DEMAND FROM FIXTURES AND FITTINGS: (Annual water demand from fixtures and fittings is calculated using assumed usage rates based on the space types and occupancies entered above. Please see pages 10-13 of the Green Star - Potable Water Calculator Guide for further details.)

	Water efficiency		Resulting water efficiency used in calculator (l/min, except for toilets, L/flush)	Percentage of each type	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)	
	Manual entry from manufacturer's data sheet (l/min, or L/flush for toilets)	WELS Star Rating selection					
Toilets							
Toilets		4 Star	3.5	100%			
<enter description here>		Select star rating					
<enter description here>		Select star rating					
<enter description here>		Select star rating					
			Total	100%	601.2	687.0	(The Standard Practice Benchmark is based on 3 StarWELS rated toilets)

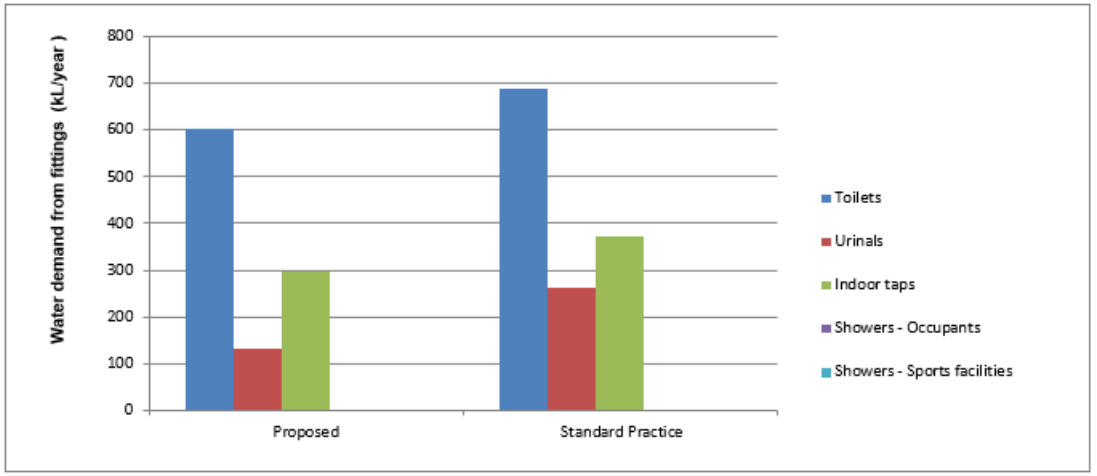
	Are urinals installed?	Yes	**Would urinals normally be installed in the building type?**	Yes	(Note: if "No" is selected, the project team should provide justification within the short report as to why the standard practice building does not have urinals.)		
Urinals							
Urinals		5 Star	1	100%			
<enter description here>		Select star rating					
<enter description here>		Select star rating					
<enter description here>		Select star rating					

Urinals on auto timer	**Enter average L/flush**					
	Enter number of urinals on autotimer	0				
	Percentage of total number of Urinals		0%			(The Standard Practice Benchmark is based on 3 Star WELS rated urinals)
		Total	100%	132.1	264.2	

Indoor taps							
Taps		5 Star	6	100%			
<enter description>		Select star rating					
<enter description>		Select star rating					
<enter description>		Select star rating					
			Total	100%	297.3	371.6	(The Standard Practice Benchmark is based on 4 Star WELS rated taps)

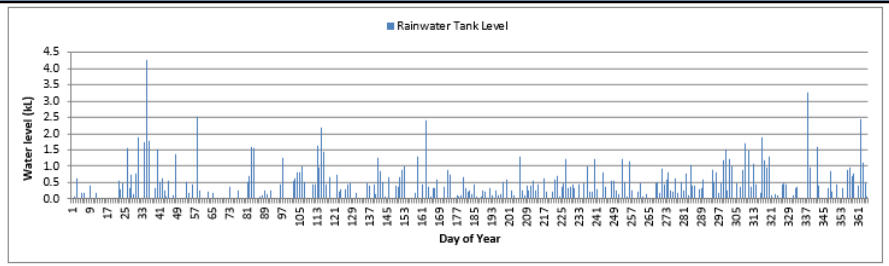
RESULTS: WATER DEMAND FROM FITTINGS

	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
Toilets	601.2	687.0
Urinals	132.1	264.2
Indoor taps	297.3	371.6
Showers - Occupants	0.0	0.0
Showers - Sports facilities	0.0	0.0
TOTAL	1030.6	1322.9



Rainwater Collection

Rainfall collection area (m2)		490.4
Run-off co-efficient	Flat roof without gravel	0.8
Storage capacity (kL)		10
Rainwater tank reliability %		17%

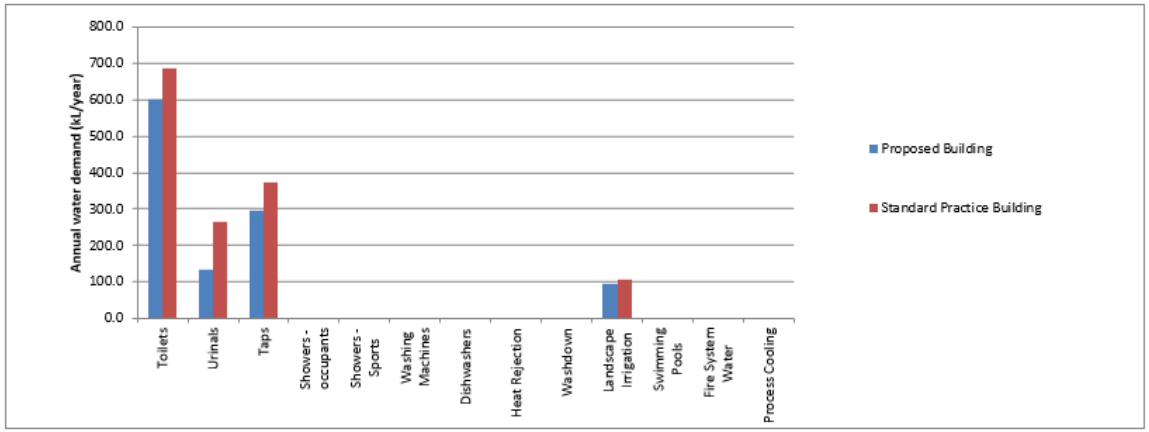


9. SUMMARY OF WATER DEMAND

Summary of demand from each Potable water use

Annual water demand from each Potable water use (kL/year)

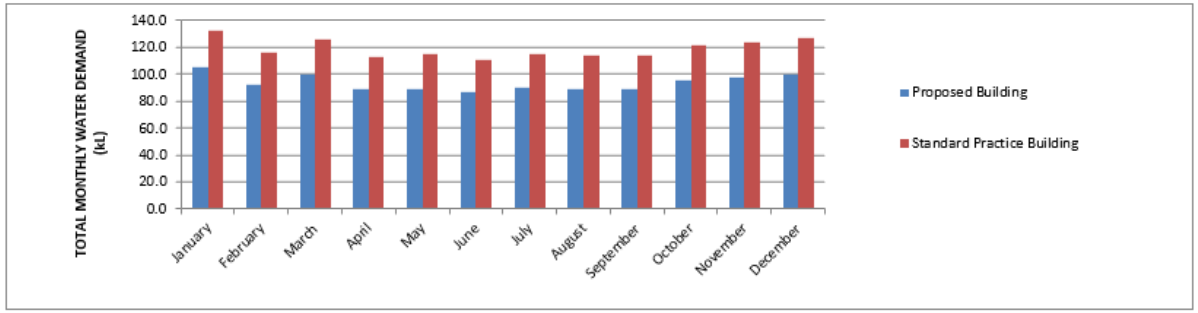
	Proposed Building	Standard Practice Building
Toilets	601.2	687.0
Urinals	132.1	264.2
Taps	297.3	371.6
Showers - occupants	0.0	0.0
Showers - Sports	0.0	0.0
Washing Machines	0.0	0.0
Dishwashers	0.0	0.0
Heat Rejection	0.0	0.0
Washdown	0.0	0.0
Landscape Irrigation	94.1	106.6
Swimming Pools	0.0	0.0
Fire System Water	0.0	0.0
Process Cooling	0.0	0.0
TOTAL	1,124.6	1,429.5



Summary of demand from all Potable water uses per month

Summary of demand from all Potable water uses per month

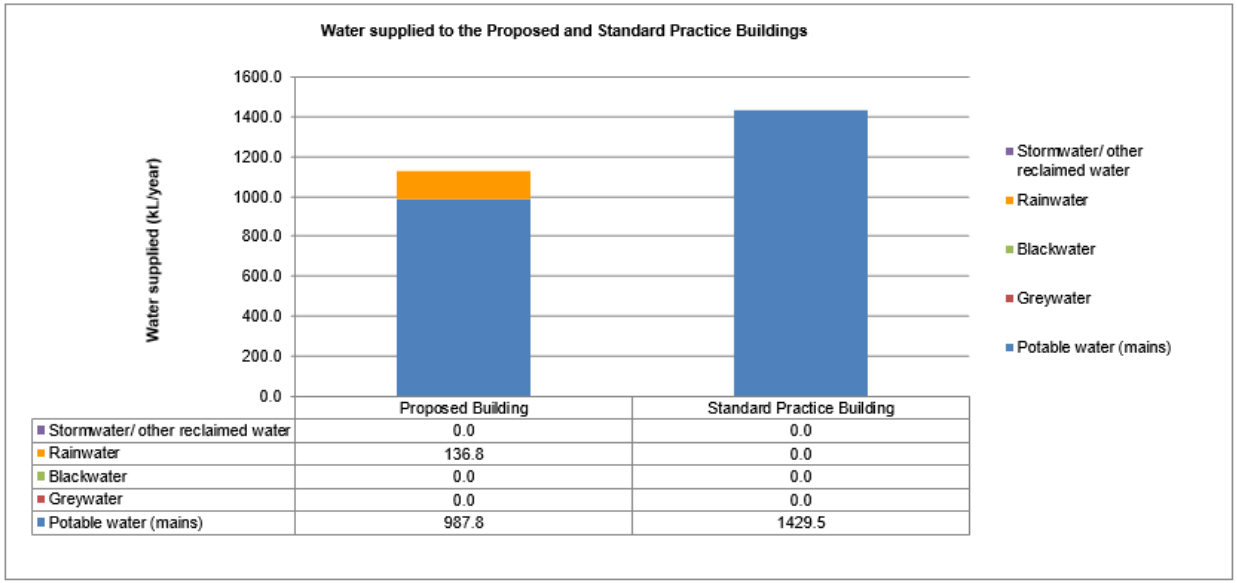
	Monthly water demand from all Potable water uses (kL/month)	
	Proposed Building	Standard Practice Building
January	105.2	132.4
February	92.1	116.2
March	99.9	126.4
April	88.7	113.3
May	89.6	114.7
June	86.6	110.9
July	89.9	115.0
August	89.0	114.1
September	89.6	114.2
October	96.0	122.0
November	97.7	123.5
December	100.3	126.8
TOTAL	1,124.6	1,429.5



Percentage reduction in Potable Water Consumption compared to the Standard Practice Building	31%

Points Achieved - General	**3.6**
Points Achieved - Fire system test water	**0**
Points Achieved - Process cooling	**0**

Points Allocation		
Percentage reduction compared to standard practice benchmark	kL/year	Points awarded
0%	1429	0.0
5%	1358	1.0
15%	1215	2.0
25%	1072	3.0
35%	929	4.0
45%	786	5.0
55%	643	6.0
65%	500	7.0
75%	357	8.0
85%	214	9.0
95%	71	10.0



	Proposed Building	Standard Practice Building
Stormwater/ other reclaimed water	0.0	0.0
Rainwater	136.8	0.0
Blackwater	0.0	0.0
Greywater	0.0	0.0
Potable water (mains)	987.8	1429.5

Appendix 2 - MUSIC Assessment and WSUD Report

Objectives

The quality and quantity of stormwater leaving a site can have a significant impact on the surrounding infrastructure and waterways. Impervious surfaces move water quickly and efficiently out of built-up areas straight into stormwater infrastructure, which in turn quickly moves the untreated water into natural watercourses. This process does not treat the stormwater and as the water flows into natural water courses, it causes erosion and pollution of those waterways with the rubbish, sediments, pathogens, and other pollutants off the impervious surfaces into the stormwater drains.

The City of Melbourne recognises the importance of stormwater management and the effects on the surrounding environment. Part of this ESD Masterplan addresses how the proposed development responds to the principles and requirements of Water Sensitive Urban Design (WSUD). The main objectives for WSUD are:

- To achieve the best practice water quality performance objectives as set out in the Urban Stormwater Best Practice Environmental Management Guidelines, Victoria Stormwater Committee 1999 (as amended). Currently, these water quality performance objectives are:
    - Suspended Solids - 80% retention of typical urban annual load;
    - Total Nitrogen - 45% retention of typical urban annual load;
    - Total Phosphorus - 45% retention of typical urban annual load; and
    - Litter - 70% reduction of typical urban annual load.

- To promote the use of water sensitive urban design, including stormwater use.

- To mitigate the detrimental effect of development on downstream waterways, by the application of best practice stormwater management through water sensitive urban design for new developments.

- To minimise peak stormwater flows and stormwater pollutants to improve the health of water bodies, including creeks, rivers and bays.

- To reintegrate urban water into the landscape to facilitate a range of benefits including microclimate cooling, local habitat and provision of attractive spaces for community use and wellbeing.

Developments must also incorporate treatment measures that improve the quality of water and reduce flow of water discharged into waterways (such as collection and use of rainwater/stormwater on site) and encourage the use of measures to prevent litter being carried off-site in stormwater flows.

The proposed development has addressed these requirements by identifying the impervious surfaces within the site and implementing treatments to mitigate the impacts of stormwater leaving the site. To assess these initiatives, the MUSIC model – which is an industry accepted tool – was used to determine the treatment effectiveness of these initiatives.

The stormwater assessment has been completed as a site-wide approach, encompassing Stages 1, 2 and 3 in one MUSIC assessment to achieve compliance for the overall site. Additionally, separate Green Star Potable Water Calculators have been completed for each of the three stages of development to ensure that individual compliance can be achieved for each stage with Clause 22.19.

Site Characteristics

For the purposes of the stormwater assessment, the site has been delineated into the basic surface types listed below:

- Site area of 3998.6m^2;
- Roof catchment area of 1,824m^2;
- Remaining roof area of 774.3m^2;
- Trafficable terrace area of 594.5m^2;
- Untreated pavement area and uncollectable decorative roofing elements of 606.6m^2; and

- Permeable landscaping area of 199.2m^2.

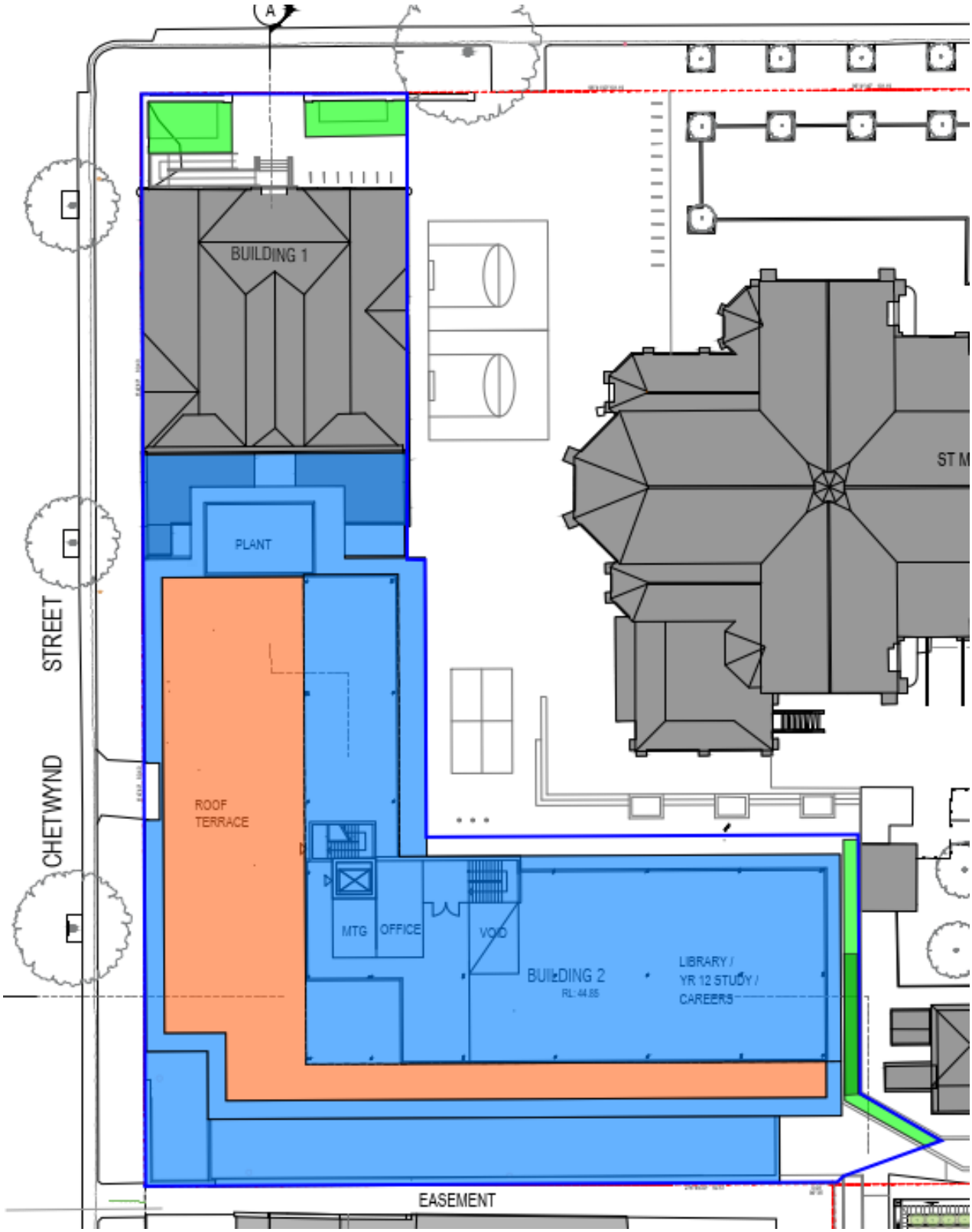


Figure 7: Site delineation (Stages 2 & 3)

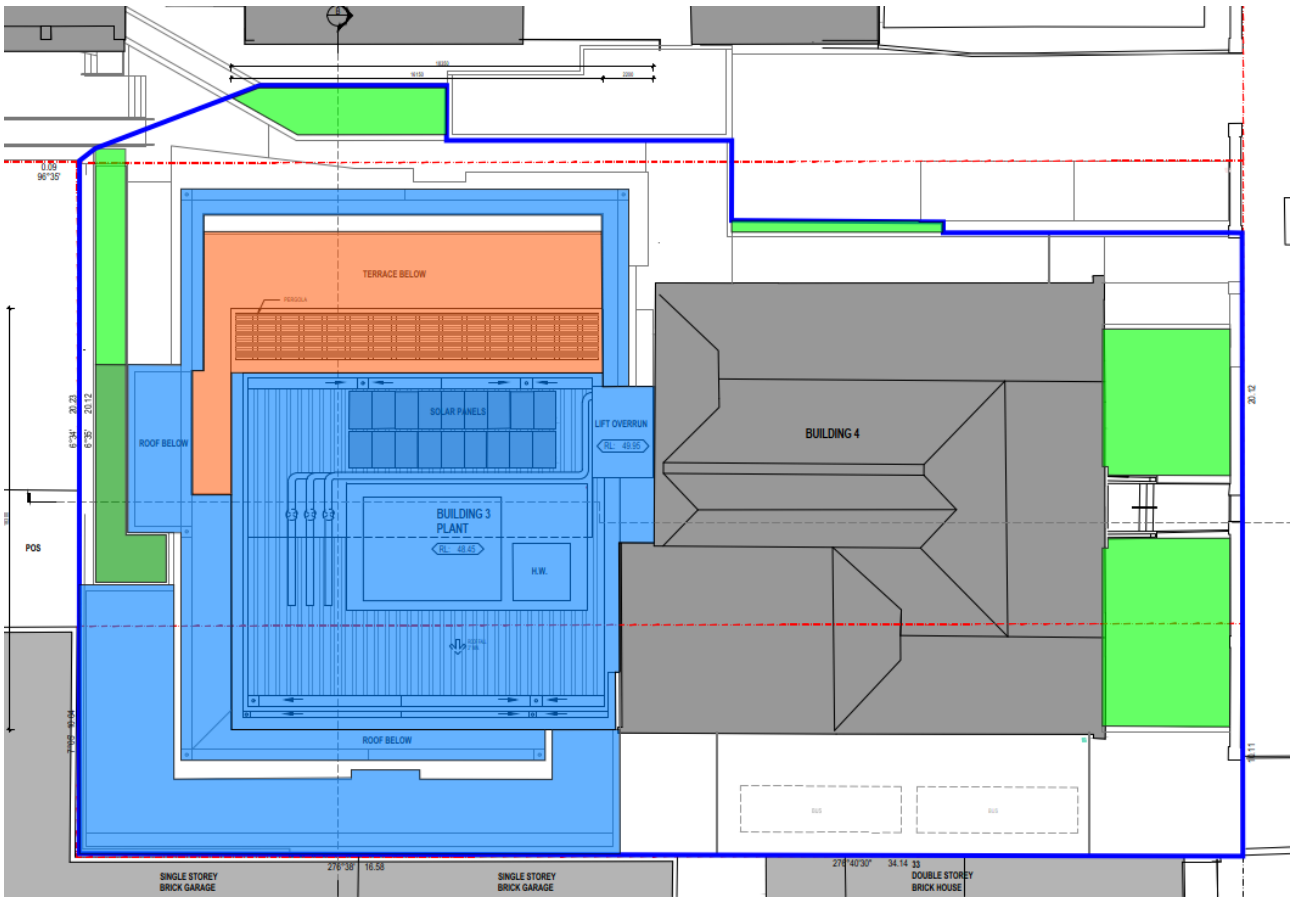


Figure 8: Site delineation (Stage 1)

Stormwater Management Initiatives

Stormwater treatment initiatives will need to be implemented. The following section presents the different surfaces that have been identified for treatment, and the required treatment[2]. The initiatives to manage stormwater flows for the building area will underpin the overall performance of the site and its ability to meet stormwater management objectives.

Table 2: List of areas and their stormwater treatment measures

Surfaces	Area	Required Treatment
Site Area (blue line)	3,998.6m^2	Detailed below (covers all three stages).
Roof Catchment Area (blue)	Building 2: 1,333.6m^2 Building 3: 490.4m^2	Rainwater will be collected from suitable areas of Buildings 2 & 3, a total roof area of 1,824m^2, and stored in rainwater tanks. One rainwater tank will collect from Building 2, and the second tank will collect from Building 3, each with a minimum effective storage capacity of 10kL. The stored water will be used for irrigation and the flushing of all toilets and urinals throughout the development. Any overflow from the rainwater tanks will be directed to the SPEL Hydrosystem (or equivalent) prior to being discharged to the Legal Point of Discharge (LPD) onsite.
Remaining Roof Area	Building 1: 378.5m^2	Due to the heritage status of these two buildings and the preference not to add potentially unsightly collection infrastructure to these roof areas, out of respect for neighborhood character, rainwater runoff is not to be

[2] Please note that alternative stormwater treatment devices may be selected, provided that they result in an equivalent or better level of stormwater treatment.

Surfaces	Area	Required Treatment
	Building 4: 395.8m^2	collected. Rather, it is to be filtered by SPEL Stormsacks and a SPEL Hydrosystem prior to diversion to the legal point of discharge.
Trafficable Terrace Areas (orange)	Building 2: 479m^2 Building 3: 115.5m^2	Terrace areas are to drain to raingardens for filtration prior to further treatment by the SPEL Hydrosystem, and subsequently discharge as stormwater.
Raingardens (dark green)	Building 2: 10m^2 Building 3: 15.9m^2	Raingardens located near to the terraces of Buildings 2 and 3, from where water will be drained for filtration/bioretention.
Untreated pavement area and uncollectable decorative roofing elements (unmarked)	606.6m^2	Areas to be filtered by SPEL Stormsacks and a SPEL Hydrosystem prior to diversion to the legal point of discharge.
Permeable Landscaping (light green)	443m^2	Permeable surfaces: no treatment required.

Reuse Demand

Water reuse demand for toilet flushing has been determined using the Green Star Potable Water Calculator as follows:

Table 3: Reuse demand (as per Green Star Potable Water Calculator)

Stage	Toilets (kL/year)	Urinals (kL/year)	Total (kL/year)
1 (Buildings 3 & 4)	601.2	132.1	733.2
2 (Building 2)	1,139.6	250.5	1,390.1
3 (Building 1)	42.4	9.3	51.7
Total	1783.2	391.9	2,175.0

The Potable Water Calculator assumes toilet and urinal flushing water demand based on the projected occupancy of each building.

Runoff from the roof catchment areas will need to be supplemented with mains water to provide sufficient potable water to the development site.

Refer Appendix 1 – Green Star Design & As Built Potable Water Calculator.

Stormwater Quality Modelling Results

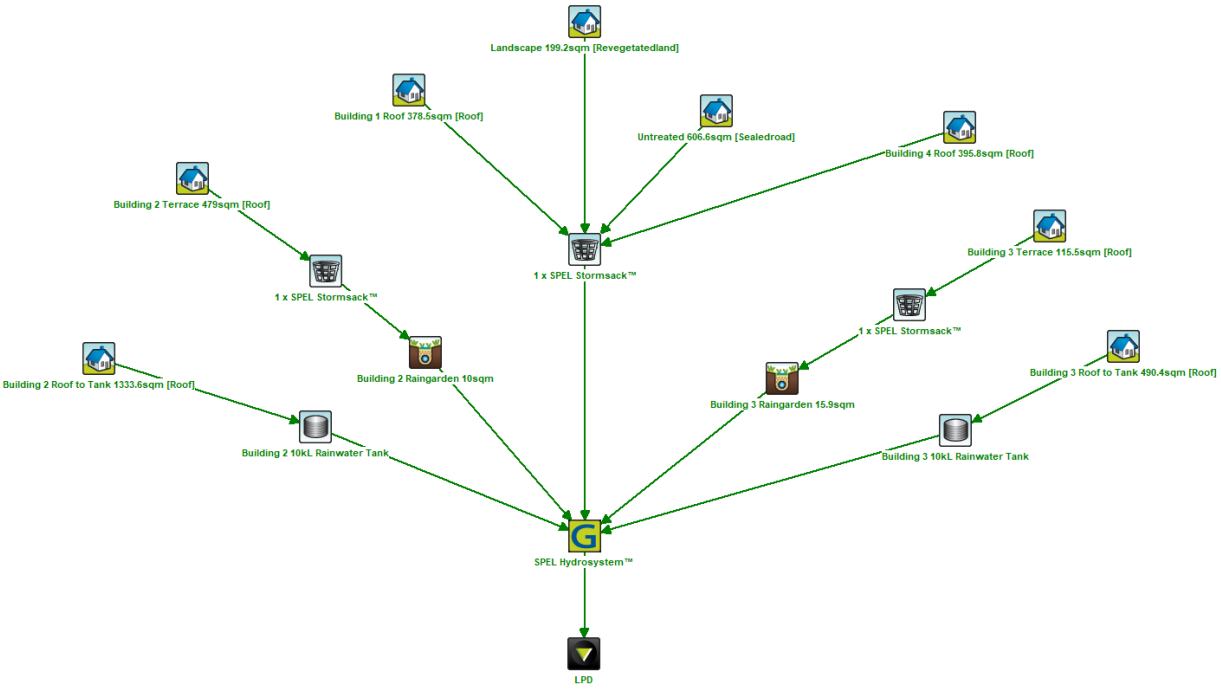
The impervious surfaces and recommended treatments have been assessed using the MUSIC tool.

Please note that whilst the MUSIC Model has been undertaken by SDC, SPEL treatment nodes and their performance specifications used in the model were provided by SPEL Stormwater.

The MUSIC model of the treatment measures demonstrates that minimum pollutant load reductions are met.

Table 4: Comparison of pollutant load reduction from the stormwater treatment systems against the best practice targets

Pollutant Load	Required Load Reduction	Calculated Load Reduction
Total Suspended Solids	80%	92.2%
Total Phosphorus	45%	86.1%
Total Nitrogen	45%	77.3%
Gross Pollutants/Litter	70%	99.9%



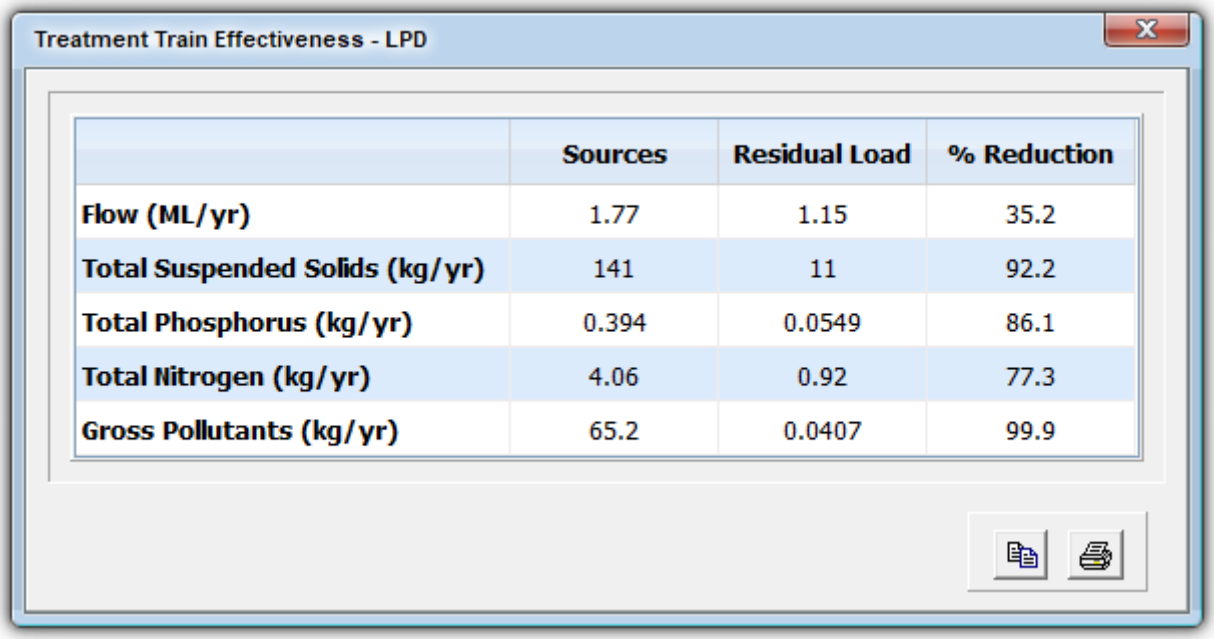


Figure 9: MUSIC interface layout of the stormwater treatment network and rainwater collection and reuse system. All flows will subsequently discharge to the legal point of discharge.

MUSIC Inputs

Listed in the tables below are the basic inputs used for the MUSIC model. All low and high-flow bypass volumes were left at either MUSIC default (0m^3/s and 100m^3/s respectively), or treatment nodes provided by SPEL Stormwater. *MUSIC Guidelines: Recommended input parameters and modelling approaches for MUSIC users (Melbourne Water 2018)* was used as a guideline in the creation of the model.

Weather

Rainfall Reference Station	Reference Year	Time Step
Melbourne Airport	1971-1980	6 Min

Source Nodes: Urban

Parameter	Input
Node Name	Building 1 Roof (378.5m^2)
Total Area	0.038ha
Zoning/Surface Type	Roof
Fraction Impervious	1.00
Rainfall-Runoff Parameters	Melbourne Water MUSIC Guidelines 2018
Pollutant Flow Concentration Parameters	Melbourne Water MUSIC Guidelines 2018

Parameter	Input
Node Name	Building 2 Roof to Tank (1,373.6m^2)
Total Area	0.133ha
Zoning/Surface Type	Roof
Fraction Impervious	1.00
Rainfall-Runoff Parameters	Melbourne Water MUSIC Guidelines 2018
Pollutant Flow Concentration Parameters	Melbourne Water MUSIC Guidelines 2018

Parameter	Input
Node Name	Building 2 Terrace (479m^2)
Total Area	0.048ha
Zoning/Surface Type	Roof
Fraction Impervious	1.00
Rainfall-Runoff Parameters	Melbourne Water MUSIC Guidelines 2018
Pollutant Flow Concentration Parameters	Melbourne Water MUSIC Guidelines 2018

Parameter	Input
Node Name	Building 3 Roof to Tank (490.4m^2)
Total Area	0.049ha
Zoning/Surface Type	Roof
Fraction Impervious	1.00
Rainfall-Runoff Parameters	Melbourne Water MUSIC Guidelines 2018
Pollutant Flow Concentration Parameters	Melbourne Water MUSIC Guidelines 2018

Parameter	Input
Node Name	Building 3 Terrace (115.5m^2)
Total Area	0.012ha
Zoning/Surface Type	Roof
Fraction Impervious	1.00
Rainfall-Runoff Parameters	Melbourne Water MUSIC Guidelines 2018
Pollutant Flow Concentration Parameters	Melbourne Water MUSIC Guidelines 2018

Parameter	Input
Node Name	Building 4 Roof (395.8m^2)
Total Area	0.040ha
Zoning/Surface Type	Roof
Fraction Impervious	1.00
Rainfall-Runoff Parameters	Melbourne Water MUSIC Guidelines 2018
Pollutant Flow Concentration Parameters	Melbourne Water MUSIC Guidelines 2018

Parameter	Input
Node Name	Landscape (199.2m^2)
Total Area	0.020ha
Zoning/Surface Type	Revegetated Land
Fraction Impervious	0.00
Rainfall-Runoff Parameters	Melbourne Water MUSIC Guidelines 2018
Pollutant Flow Concentration Parameters	Melbourne Water MUSIC Guidelines 2018

Parameter	Input
Node Name	Untreated (606.6m^2)
Total Area	0.061ha
Zoning/Surface Type	Sealedroad
Fraction Impervious	1.00
Rainfall-Runoff Parameters	Melbourne Water MUSIC Guidelines 2018
Pollutant Flow Concentration Parameters	Melbourne Water MUSIC Guidelines 2018

Treatment Node: Rainwater Tank

Parameter	Input
Node Name	Building 2, 10kL Rainwater Tank
Number of Tanks	1
Total Tank System Properties	
Volume below overflow pipe	10kL
Depth above overflow	0.2m
Surface Area	5m^2
Initial Volume	5kL
Outlet Properties	
Overflow Pipe Diameter	50.00 mm
Advanced Properties	
Orifice Discharge Coefficient	0.60 (Melbourne Water MUSIC Guidelines 2018)
Number of CSTR Cells	2
Pollutant k & C* Values	Melbourne Water MUSIC Guidelines 2018
Re-use	
Max Drawdown Height	1.9m
Daily Demand	7.21kL/d (toilet and urinal flushing, based on Green Star Potable Water Calculator and 200 school days/year, for Buildings 1 and 2).

Parameter	Input
Node Name	Building 3, 10kL Rainwater Tank
Number of Tanks	1
Total Tank System Properties	
Volume below overflow pipe	10kL
Depth above overflow	0.2m
Surface Area	5m^2
Initial Volume	5kL
Outlet Properties	
Overflow Pipe Diameter	50.00 mm
Advanced Properties	
Orifice Discharge Coefficient	0.60 (Melbourne Water MUSIC Guidelines 2018)
Number of CSTR Cells	2
Pollutant k & C* Values	Melbourne Water MUSIC Guidelines 2018
Re-use	
Max Drawdown Height	1.9m
Daily Demand	3.666kL/d (toilet and urinal flushing, based on Green Star Potable Water Calculator and 200 school days/year, for Buildings 3 and 4).

Treatment Node: Bioretention

Parameter	Input
Node Name	Building 2 Raingarden 10m^2 (filtering water from the Building 2 trafficable terrace)
Inlet Properties	
Low Flow By-pass	0m^3/s (MUSIC Default)
High Flow By-pass	100m^3/s (MUSIC Default)
Storage Properties	
Surface Area	10 m^2
Extended detention depth	0.30 m
Filtration media depth	0.5m
Advanced Properties	
Vegetation	Vegetated with effective nutrient removal plants
Lined Base	Yes
Weir Coefficient	1.70 (MUSIC Default)
Number of CSTR Cells	3 (MUSIC Default)

Treatment Node: Bioretention

Parameter	Input
Node Name	Building 3 Raingarden 15.9m^2 (filtering water from the Building 3 trafficable terrace)
Inlet Properties	
Low Flow By-pass	0m^3/s (MUSIC Default)
High Flow By-pass	100m^3/s (MUSIC Default)
Storage Properties	
Surface Area	10 m^2
Extended detention depth	0.30 m
Filtration media depth	0.5m
Advanced Properties	
Vegetation	Vegetated with effective nutrient removal plants
Lined Base	Yes
Weir Coefficient	1.70 (MUSIC Default)
Number of CSTR Cells	3 (MUSIC Default)

Treatment Node: Gross Pollutant Trap

Parameter	Input
Node Name	1 x SPEL Stormsack (pit size 600x600) (three nodes, one filtering stormwater water from each terrace and a third filtering stormwater from untreated roof/landscape/impervious ground area)
Inlet Properties	
Low Flow By-pass	0.000m^3/s (Specified by SPEL)
High Flow By-pass	0.011m^3/s (Specified by SPEL)
Treatment Properties	
Target Element	**Capture Efficiency** (SPEL Performance Specifications)
Total Suspended Solids	61% (Specified by SPEL)
Total Phosphorus	28% (Specified by SPEL)
Total Nitrogen	45% (Specified by SPEL)
Gross Pollutants	100% (Specified by SPEL)

Treatment Node: Filter

Parameter	Input
Node Name	SPEL Hydrosystem (HS.1000)
Inlet Properties	
Low Flow By-pass	0.000m^3/s (Specified by SPEL)
High Flow By-pass	0.012m^3/s (Specified by SPEL)
Treatment Properties	
Target Element	**Capture Efficiency** (SPEL Performance Specifications)
Total Suspended Solids	84% (Specified by SPEL)
Total Phosphorus	81% (Specified by SPEL)
Total Nitrogen	47% (Specified by SPEL)
Gross Pollutants	100% (Specified by SPEL)

4. Stormwater Runoff from Roof Catchment Areas

Treatment – Rainwater Tanks

Rainwater tanks are considered one of the most practical and effective mechanisms to reduce the quantity and velocity of stormwater leaving a site. Rainwater tanks will capture the stormwater that runs off the roof surfaces as per Figures 7 & 8 and store it for toilet/urinal flushing re-use throughout the redevelopment site, and for irrigation, effectively reducing the actual volume of water leaving the site. Instead of rainwater being considered as waste and a burden on the infrastructure, it is seen as a resource which has the double benefit of reducing demand on potable water supplies and as a stormwater mitigation initiative.

Treatment – Raingardens

Raingardens are low-maintenance stormwater filtration measures employed to reduce the concentration of pollutants within stormwater leaving a property. Stormwater is captured when running off hard surfaces, in this case the marked trafficable terrace areas of Buildings 2 & 3, and subsequently flows through adjacent raingardens encountering various filtration media and appropriate plants[2].

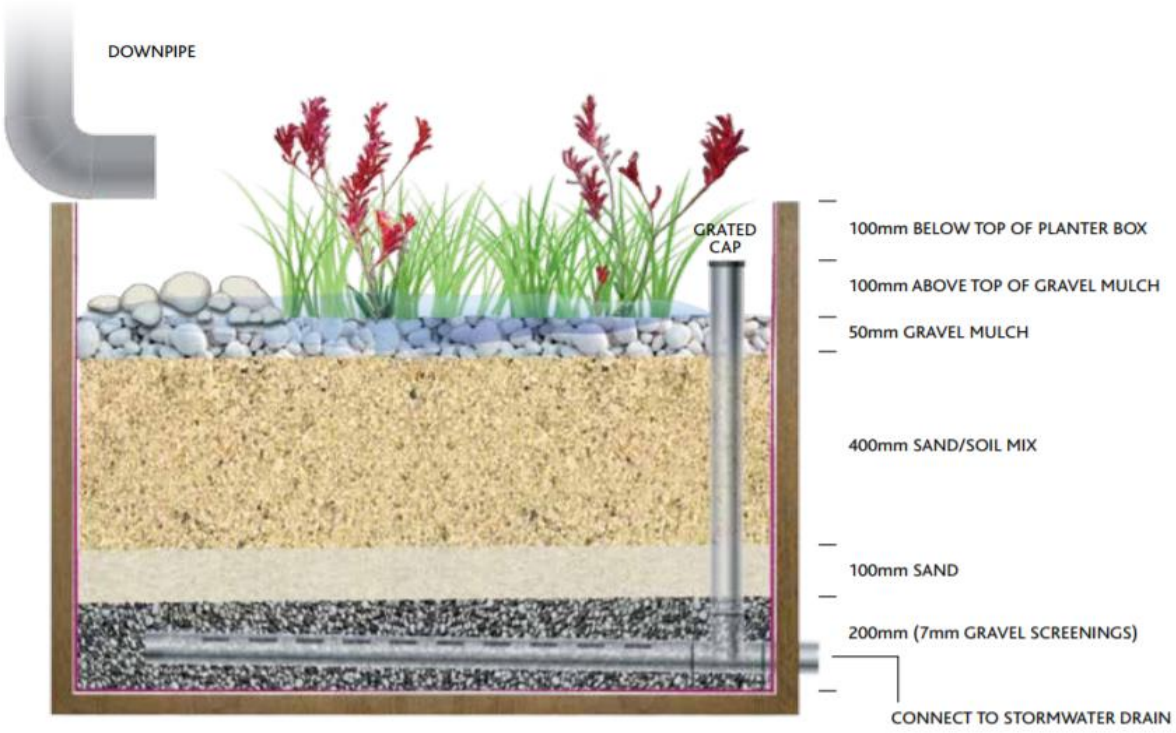


Figure 10: Example cross-sectional view of proposed raingarden (Source: Melbourne Water[3])

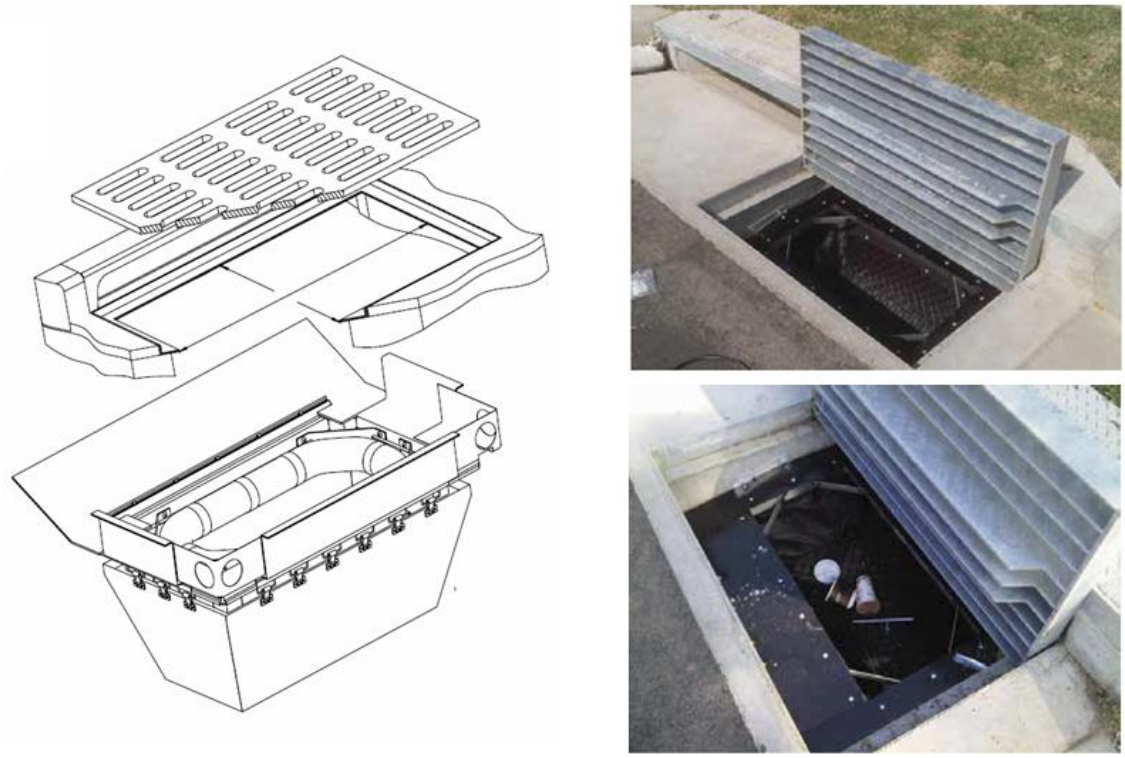


Figure 11: SPEL Stormsacks schematic and examples (Source: SPEL Environmental)

[3] Please refer to "Planter box raingarden instruction sheet" from "How do I build a raingarden" section of Melbourne Water website https://www.melbournewater.com.au/water-data-and-education/environment-and-sustainability/why-we-need-save-water/tips-saving-water-0 accessed 18 August 2020. It is noted that the cross-sectional composition of the proposed raingarden will resemble Figure 8.

Figure 12: SPEL Hydrosystem schematic and examples (Source: SPEL Environmental)

Stormwater System Maintenance

The proposed stormwater management devices will require regular maintenance and monitoring to ensure they function as designed. An operation maintenance manual will be prepared for the site. The following section outlines key maintenance tasks and recommended frequency. The property owner will be responsible for continuous implementation of stormwater management device maintenance.

Rainwater Tank Systems

The standard maintenance activities that typically take place as part of an ongoing maintenance schedule for the rainwater tank system are as follows:

Rainwater tank system element	Frequency	Maintenance Task
Rainwater tanks – Minor service	Quarterly	• Check for any damage/compression • Check that supporting base is free of cracks and movement • Empty and clean first flush diverters • Remove and clean inlet and outlet/overflow strainers • Check correct operation of potable mains back up switch • Check that mesh covers have not deteriorated and intact • Check for mosquito infestation
Rainwater tanks – Major service	Every 2 years	• Clean tank to remove accumulated sludge
Pumps	Every 6 months	• Service water pump to prolong life
Roof and gutters	Every 6 months	• Clean out of leaves/debris

Raingardens

The standard maintenance activities that typically take place as part of an ongoing maintenance schedule for the raingardens are as follows:

Raingarden system element	Frequency	Maintenance Task
Plants	As required	• Replace plants when necessary • Remove weeds as required
Gravel mulch	As required	• Repair erosion by rearranging gravel/rocks after initial heavy rain events if required
Downpipe	As required	• Remove any sediment/build-up from the downpipe if blocked
Roof and gutters	Every 6 months	• Clean out of leaves/debris

SPEL Systems

Regular maintenance of the SPEL Stormsacks and Hydrosystem system is required to ensure proper ongoing performance. Basic maintenance activities depend on regular visual inspections, which may trigger silt removal or filter replacement, depending on TSS accumulation.

The standard maintenance activities that typically take place as part of an ongoing maintenance schedule for the SPEL Stormsack system are detailed below. For additional information relating to the maintenance of the SPEL devices refer to the product maintenance brochures.

Activity	Frequency	Maintenance Detail
Visual Inspection	Years 1& 2: Every six months Years 3-10: Once per year	• Visual inspection of each sack, if minimal pollutant it will be emptied into the onsite waste bins
Silt Removal	Dictated by silt condition on the site, detected through the site inspections	• When required, the Stormsack will need the silt to be vacuumed out

The standard maintenance activities that typically take place as part of an ongoing maintenance schedule for the SPEL Hydrosystem are as follows:

Activity	Frequency	Maintenance Detail
Visual Inspection	Years 1& 2: Every six months Years 3-10: Twice per year	• Visual inspection for sediment accumulation
Silt Removal	Dictated by silt condition on the site, detected through the site inspections	• When required, the tank will need the silt to be vacuumed out
System replacement	Life of the filters is expected to be between 5 – 7 years, subject to the silt conditions of the site	• One filter change throughout a 10yr period may be required

Disposal of Waste Materials

The accumulated pollutants found in the stormwater treatment systems must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes.

Stormwater Runoff Treatment during the Construction Stage

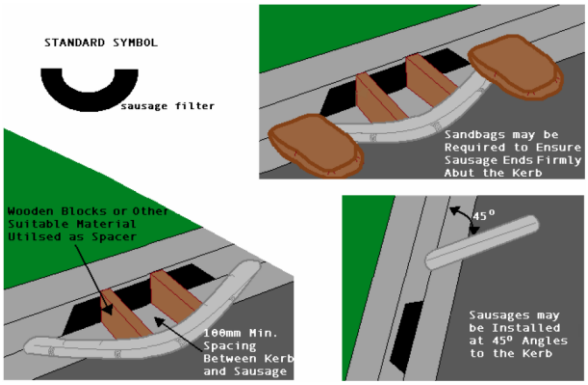
Treatment – Various

Stormwater management in the construction stage will include measures which will be put in place to minimise the likelihood of contaminating stormwater discharge from the site as well as reduce the velocity of the flows generated from the building as it is being constructed. This will mean ensuring buffer strips are in place, and the site will be kept clean from any loose rubbish. More information is available from "*Keeping Our Stormwater Clean – A Builder's Guide*" by Melbourne Water[4]. The diagram below is an illustration of the various objectives which assist in minimising the impacts of stormwater runoff typical during the construction phase. Typical pollutants that are generated from a construction site during a rainfall event include:

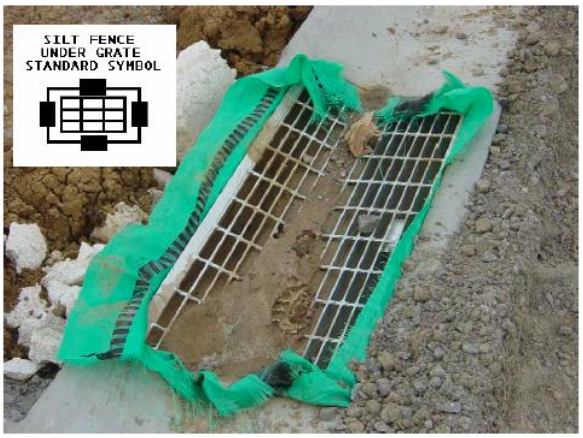
- Dust
- Silt
- Mud
- Gravel
- Stockpiled materials
- Spills/oils
- Debris/litter

To reduce the impacts and minimise the generation of these pollutants the following measures are proposed. The symbols embedded within each image are typically used for Construction Environmental Management Plans.

Gravel Sausage filters – to be placed at the entrance of pits/side stormwater inlets. These permeable sacks will filter the suspended soils and sediments and any other litter carried by the stormwater to prevent the pollutants entering the system



Silt Fences Under Grates - Silt fence material may be placed under the grate of surface-entry inlets to prevent sediment from entering the stormwater system.



[4] For copies please contact Melbourne Water on 131 722.

Temporary Rumble Grids – these are designed to open the tread on tires and vibrate mud and dirt off the vehicle (in particular the chassis). This will heavily minimise the amount of soil/dirt deposited on local streets where it can be washed (by rainfall or other means) into the stormwater drains.

Appendix 4 – Green Star VOC and Formaldehyde Limits

Table 5: Maximum Volatile Organic Compound Levels for construction materials (Source: Green Building Council Australia – Green Star Design and As Built v1.3 2019 Manual)

Product Type/Subcategory	Max TVOC Content (g/L of ready-to-use-product)
Paints, Adhesives and Sealants	
General purpose adhesives and sealants	50
Interior wall and ceiling paint, all sheen levels	16
Trim, varnishes and wood stains	75
Primers, sealers and prep coats	65
One and two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membranes and sealant, fire retardant sealants and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesives and sealants	100
Carpets	
Total VOC limit	0.5 mg/m^2 per hour
4-PC (4-Phenylcyclohexene)	0.05mg/m^2 per hour
ISO 16000 / EN 13419 - TVOC at three days	0.5 mg/m^2 per hour
ISO 10580 / ISO/TC 219 (Document N238) - TVOC at 24 hours	0.5 mg/m^2 per hour

Table 2: Maximum Formaldehyde levels for processed wood products. (Source: Green Building Council Australia – Green Star Design and As Built v1.3 2019 Manual)

Formaldehyde emission limit values for different testing methods	
Test Method	Emission Limit/ Unit of Measurement
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood	≤1mg/ L
AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.5 mg/L
AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1mg/ L
AS/NZS 4357.4 - Laminated Veneer Lumber (LVL)	≤1mg/ L
Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11) - LVL	≤1mg/ L
JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460	≤1mg/ L
JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460	≤1mg/ L
JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤0.1 mg/m^{2}hr
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤0.1 mg/m^{2}hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1 mg/m^{2}hr (at 3 days)
ASTM D6007	≤0.12mg/m^3
ASTM E1333	≤0.12mg/m^3
EN 717-1 (also known as DIN EN 717-1)	≤0.12mg/m^3
EN 717-2 (also known as DIN EN 717-2)	≤3.5mg/m^{2}hr